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AS/400 Performance Explorer Tips and Techniques

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IBM
International Technical Support Organization
Rochester Center

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Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix F, "Special Notices" on page 501.

First Edition (March 1997)

This edition applies to Version 3 Release 6 and Version 3 Release 7 of OS/400 Operating System (5716-SS1) and Version 3 Release 6 and Version 3 Release 7 of the Licensed Program Product Performance Tools/400 (5716-PT1) for use with the RISC AS/400 Advanced Systems.

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Contents

Preface

This redbook provides descriptions and detailed examples of the Performance Explorer (PEX) capabilities available under AS/400 V3R6 and V3R7 OS/400 and the Performance Tools/400 licensed program 5716-PT1. Specific application examples and reports are used to augment the Performance Explorer documentation contained in *Performance Tools/400*, SC41-4340.

This redbook is primarily addressed to ″AS/400 performance experts″ who are already familiar with other AS/400 performance tools and need to use the Performance Explorer capabilities to identify and resolve performance-related problems.

Example problems and reports are provided for PEX statistics (*STATS), program source statement profile (*PROFILE), and trace (*TRACE) functions. In addition to standard PEX *TRACE functions, this redbook also provides examples of ″enhanced PEX *TRACE″ capabilities available only through the special PTFs documented in this redbook.

The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization Rochester Center.

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Chapter 1. Performance Management and the Performance Explorer

The Performance Explorer (PEX) functions are a part of the entire set of AS/400 *performance tools* used in a total AS/400 *performance management* methodology. This chapter provides an overview of performance management considerations and identifies where the specific PEX functions can be used as part of this management.

1.1 Introduction to Performance Explorer

The AS/400 Performance Explorer (PEX) is a set of performance collection and reporting functions and commands that became available on RISC versions of OS/400, 5716-SS1, and the AS/400 Performance Tools/400, licensed program product (LPP) 5716-PT1.

The PEX functions, which are part of a total AS/400 performance management methodology, should not be the first set of performance tools used when analyzing a performance problem.

The PEX collection functions and related commands are included as part of the base OS/400 support.

The PEX reporting function and its associated command are part of the Performance Tools/400 LPP, manager feature 5101.

This separation of PEX definition and collection capabilities (under OS/400) and reporting capabilities (under the Performance Tools/400 licensed program) is similar to the usage of OS/400 Performance Monitor support to collect performance data, and the Performance Tools/400 licensed program to generate reports from the Performance Monitor collected data. Both the Performance Monitor collected data and PEX collected data are placed in multiple OS/400 database files.

If you do not use the Performance Tools/400 LPP Print Performance Explorer Report (PRTPEXRPT) command to produce summary and detail reports from the PEX collected data, you must write your own programs or queries to process the collected data. We recommend using the PRTPEXRPT command rather than writing your own programs and queries.

The Performance Explorer and Performance Monitor (STRPFRMON) data collection are separate from one another, producing two completely different sets of database files that contain grouped sets of collected data. Both collections of data can be running at the same time, although this should be kept to a minimum of time because system impact is significant with both collections active. Field definitions for both the Performance Monitor database files (starting with a QAPMxxxx prefix) and the Performance Explorer database files (starting with a QAYPExxxx prefix) are documented in *AS/400 Work Management*, SC41-4306.

All of the Performance Explorer commands are documented in online help text and in *Performance Tools/400*, SC41-4340.

This redbook is a supplement to the information contained in SC21-4340; review that manual for a basic description of the PEX support. Use this redbook for additional examples of the various PEX functions and documentation,and examples of Enhanced PEX TRACE support. Enhanced PEX TRACE support is available only with the PTFs listed in this redbook. This redbook contains the only description on how to use this Enhanced PEX TRACE support.

PEX provides three types of performance data analysis capabilities:

1. PEX STATS is focused on identifying application and IBM programs or modules consuming excessive CPU utilization or performing a high number of disk I/O operations. STATS is *program oriented*.

   STATS is a superset of and replaces the CISC systems Timing and Paging Statistics (TPST) PRPQ.

   TPST remains available on CISC (IMPI) AS/400 systems.

2. PEX PROFILE support is focused on identifying High Level Language (HLL) program hot spots (high CPU consumption) based upon source program statement numbers.

   Typically, you use PEX STATS to identify programs that should investigated further as potential performance bottlenecks. You also use PEX PROFILE on the programs identified for further analysis.

   PEX PROFILE is a superset of and replaces the CISC system Sampled Address Monitor (SAM) support available under the CISC system Performance Tools/400 Licensed Program Product (LPP), 5763-PT1, Manager feature 5101.

   SAM support remains available on CISC (IMPI) AS/400 systems.

3. PEX TRACE is a new function that collects detailed program, Licensed Internal Code (LIC) task, OS/400 job, and object reference information.

   PEX TRACE functions can be used to do additional job and program performance analysis. In cases where other performance tools usage cannot identify an application, set of jobs, or programs, the TRACE functions can be used system-wide to assist in identifying applications or programs that need further analysis.

   PEX TRACE function is similar to SMTRACE (Storage Management Trace) support that remains available on AS/400 CISC (IMPI) systems. On CISC systems, SMTRACE functions are available under special PTFs available only from IBM Software Defect (Level 2) Support.

   Enhanced PEX TRACE Consideration

   As shipped with standard OS/400 and Performance Tools/400, the PEX TRACE capabilities are usable only by a small group of AS/400 development lab level personnel.

   The special ″Enhanced PEX TRACE″ support, available through RISC system PTFs, and documented in this redbook, makes the PEX TRACE data usable to AS/400 performance experts in addition to development lab personnel.

Before going into more detail on PEX support, it is important to understand the total performance picture and the entire performance management methodology. The next topics outline the various steps involved in performance analysis in general, and where PEX capabilities could be used within this analysis.

1.2 Performance Management Methodology

Performance evaluation involves two distinct phases, pre-installation and post-installation, as shown in Figure 1 on page 5.

Pre-installation includes all the steps necessary to find which Application System/400 (AS/400) system is capable of performing all user requirements at an expected response time and throughput. The pre-installation phase is comprised mostly of *system sizing*. The applicable question is, "Who does what, and where, and how many times do they do it?"

Post-installation is concerned with *real*, and not perceived, performance problems. This phase requires a structured approach. It is important that you follow the post-installation tasks in Figure 1 on page 5 in the order presented.

Note: You find a mixture of all kinds of problems related to performance. Do your best to separate the valid performance concerns from the emotional issues and plain misunderstandings about what the system can deliver.

The primary tools used in the post-installation phase include:

- OS/400 system status performance commands:
  - Work with System Status (WRKSYSSTS)

    The Work with System Status (WRKSYSSTS) command can show real-time page fault rates that can be compared to page faults per second guideline values documented in *AS/400 Work Management*, SC41-4306, and *Performance Tools/400*, SC41-4340.
  - Work with Disk Status (WRKDSKSTS)

    The Work Disk Status (WRKDSKSTS) command can show the *percent busy* average for specific disks installed on the system. When performance is poor, an average of over 40% busy for all disks can indicate faster disk drives are required. A high disk-busy percentage, such as 80% or higher for one or a few disk devices, can indicate the application data is concentrated on too few disks; spreading of the data across more disks may be required to improve performance.
  - Work with Active Jobs (WRKACTJOB)

    The Work with Active Jobs (WRKACTJOB) command can be used to identify jobs that are doing abnormally high disk I/Os per second or consuming unexpectedly high CPU utilization.

  Use these commands repetitively over a time period of up to 20 minutes to ensure consistent status.
- OS/400 performance data collection commands:
  - Start and End the Performance Monitor (STRPFRMON, ENDPFRMON)
  - Define, Start, and End the Performance Explorer (ADDPEXDFN, STRPEX, ENDPEX) performance data

  As previously stated, these commands collect their unique sets of performance data.
- For SQL and general query performance evaluation, you should place the affected job in **debug mode** (OS/400 Start Debug (STRDBG) command) and analyze the job log messages issued by the query components of the system.

- The Performance Tools/400 LPP 5716-PT1 Agent (feature 5102) and Manager (feature 5101) capabilities:

  – System, job, and resource usage reports

  – Capacity planning (BEST/1)

  – The Work with System Activity (WRKSYSACT) command

    This command shows CPU utilization and disk I/O activity on a real-time basis for OS/400 jobs and system Licensed Internal Code (LIC) tasks.

    Use this command repetitively over a time period of up to 15 minutes to ensure consistent status.

  The Performance Tools/400 functions are used in system, application, and program tuning, based on the data collected by the performance monitor. See *Performance Tools/400*, SC41-4340, for a complete list of the reports produced by the Performance Tools.

Figure 1 on page 5 provides a picture of an overall performance management methodology by summarizing tasks to perform and performance problem considerations, and listing performance tools that can be used.

Pre-installation	Post-installation
T A S K S T O P E R F O R M	
	o Define performance objectives
o Find the correct system for the customer's requirements ″ Determine application characteristics ″ Determine throughput and response requirements	o Define the problem o Tune the system o Upgrade the system o Tune an application o Tune a program
P R O B L E M S	
o Unknown load – Who? – What? – When?	o Feelings instead of facts o Lack of experience o Poor application design o Poorly configured system o No one assumes responsibility
T O O L S	
o System selection guidelines – AS/400 capacity planner (BEST1) – Your IBM* or IBM partner marketing representative	o Tune the system – OS/400 commands such as WRKACTJOB and WRKSYSSTS – Performance monitor (OS/400) – Performance Tools (LPP) o Upgrade a system – Performance Tools (LPP) – capacity planner (BEST/1) – Tools from IBM or authorized IBM approved remarketer o Tune an application – Performance monitor (OS/400) – Performance Tools (LPP) – PEX STATS, PROFILE, & TRACE o Tune a program – Performance tool (LPP) – PEX STATS, PROFILE, TRACE – STRDBG for SQL, Queries

Figure 1. Overview of Performance Management

1.3 Processing of Work

The work a system does follows a simple process. A system processes requests from users; the requests are transformed by high-level language (HLL) programs to *use* the system's resource. Therefore, requests from users are the source of work on the system.

When designing an application to service these requests, use these objectives:

- Fulfill user requirements with as few system resources as possible.
- Know the effect, both inside and outside your application, of a user requirement that needs a lot of system resources.

The main goal is to have a *balanced* system where none of the system resources are a bottleneck.

As seen in Figure 2 on page 7, primary resources include CPU, main storage, and auxiliary storage (disk devices).

Using primary resources affects everyone on a system. If your resource requirements exceed what is possible on your system, you can either redesign your applications or add hardware resources. The choice often depends on expense and availability.

High usage of one of the secondary resources, such as communication lines or controllers, usually affects only some users. Unlike primary resources, adding hardware is often the most cost-effective means to relieve secondary resource bottlenecks.

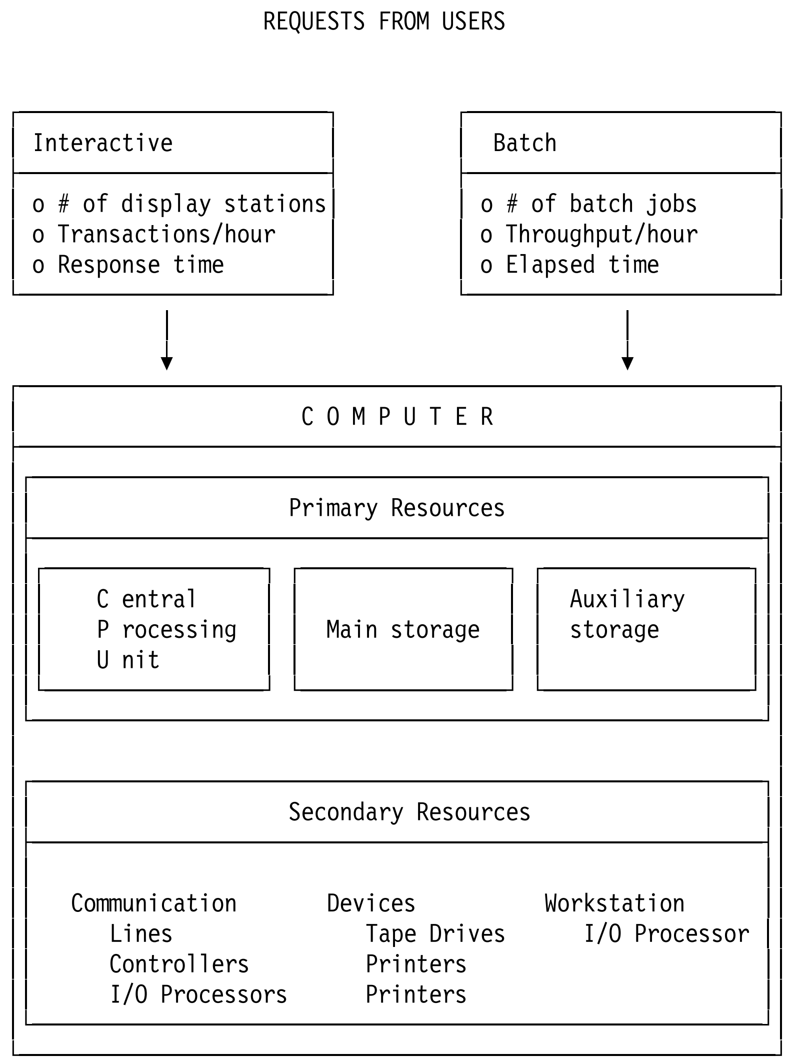

Figure 2. Processing of Work

1.4 Performance Evaluation Components

To discuss performance problems, rely on accepted definitions of *items that can be measured.* In particular, use the following definitions in reaching your performance objective:

- Interactive response time:

  Never discuss one specific response time. (How often have you heard, “We want sub-second response time”?) Response time must always be discussed with an upper limit, and is defined as:

  – The average elapsed time per interactive transaction, as viewed by the end user, in a defined time interval. An interactive transaction is from the time the user presses the Enter key until the Input Inhibit indication on the workstation is turned off.
  – The percentage of response times that do not exceed a specific length of time.

You may also want to break down the response time objectives by business functions, such as orders processed per hour.

- Batch throughput:
  - The time required to process a batch job.

    Often this is expressed in total run time. However, it is best to understand how many *non-interactive transactions* have been completed during a specific run time.

    Throughput can be expressed in business function units, such as invoices printed per hour, paychecks printed per hour, or inventory picking slips per hour.

Keep in mind that interactive response time and batch throughput affect each other. If you define one, you *must* define the other. For example, if you define a response time of less than 1.5 seconds 90% of the time, you must also state whether any other jobs, such as batch jobs, APPN communications, or PC Support file transfers are active at the same time.

It is important to know what is happening to the environment whenever a measurement is taken. A big difference exists between measuring a lightly used system and one at its peak load. Any environment you are measuring must have:

- A defined batch load
- A defined number of interactive transactions

It is also important to know which functions are most frequently used. A general rule of thumb is that 80% of all work done by the system is created by only 20% of the total various functions. Improving a small number of the more frequently used functions results in immediate and significant performance enhancements.

In summary, any agreement on performance should consist of:

- A definite response time range in a given environment.
- The elapsed time for specific batch runs in a given environment.
- An agreed upon definition of a ″transaction″ and transaction throughput per unit of time.
- The average usage of the primary and secondary resources.

1.5 General Performance Analysis Sequence

General tasks to be performed for any performance analysis include the following tasks:

1. Ensure you have a basic knowledge of the system, the application, and the performance issue.
2. Perform organizational tasks.
3. Perform system tuning tasks.
4. Propose a system upgrade, if applicable.
5. Perform application tuning tasks.
6. Perform program tuning tasks.

Step 5 and Step 6 can involve PEX STATS and PEX PROFILE data analysis. In some cases, you may also need to use the Enhanced PEX TRACE support. You must complete Step 1 through Step 4 before the use of PEX STATS or PROFILE or Enhanced TRACE can be of benefit. You may also want to evaluate the cost of doing each of the preceding steps, particularly Step 4 versus Step 5 and Step 6, where application implementation expertise is required.

1.5.1 Organizational Tasks

Consider the following points *before* you begin any performance analysis:

1. Find the person who determines the performance objectives.
2. Find the person who **acts on** decisions; you should find an individual from both the user and system vendor organizations. Furthermore, the key is to find someone who knows how the application is written. Without this knowledge, it is difficult to relate the data PEX STATS or PEX PROFILE produces to the appropriate changes required for an application.
3. Define and characterize the problem. Describe the environment, including the hardware, software, and people involved. Create a list of all user requirements. Discuss what the user wants to achieve. What is the acceptable average response time in 90% of all cases? What is the acceptable elapsed time of a certain batch job? It is important to define the performance goal; otherwise, no defined end exists.
4. Measure and record the status of your system's performance on a regular basis. Keep a historical record of changes made. *It is a good idea to continue this record even after you have reached a performance goal*. You may have to start all over again in a year, and you want to have a record of what changes have occurred.
5. Use electronic customer support to check if any performance enhancement program temporary fixes (PTFs) are available for you to apply to your system. If you do not have electronic customer support installed on your AS/400 system, ask your AS/400 supplier.

   The IBM HONE Question and Answer support contains an important performance PTF item - RTA00003952. This is an index of performance-related PTFs for all supported AS/400 releases. You can have an IBM representative or other authorized user find and print this HONE item. RTA000089352 is updated approximately once per month.

   With electronic customer support enabled on your system, you can also reference the Preventative Service Planning (PSP) ″bucket,″ which contains AS/400 PTF information. You can download this information to your AS/400 system by using the Send PTF Order (SNPTFORD) command and specifying PTFID(SF98vrm), where v is version, r is release, and m is modification level of the operating system you want to receive information about.
6. When doing application or program tuning:
   a. Search for one or more solutions to improve the performance. These may include organizational operations (scheduling batch jobs at a different time) and application/system design issues (rewriting parts of programs).
   b. Evaluate alternatives to determine the most cost effective solution. Where do you get the most return for your investment? A small performance enhancement on a frequently called program may do much more for you than a major rewrite on a program that is infrequently called.
   c. It is important to implement one change at a time and measure the effects of that change.

d. Once you have applied a solution, continue to measure and record your system’s performance.

1.5.2 System Tuning Tasks

Doing system tuning means you try to fairly share out the available system resources to users. Some actions to consider include:

- Decrease the number of activity levels, while maintaining the same size of the main storage pools, to minimize the number of database (DB) and non-database (NDB) faults.
- Increase the size of the main storage pools, while maintaining the same activity levels, to minimize the number of DB and NDB faults.
- Use the Dynamic Priority Scheduler or manually alter the run time priority for different jobs.

System tuning also involves making every attempt to minimize or eliminate unnecessary system work, such as:

- Monitoring the number and arrival rate of messages in the job and history logs.
- Monitoring all error logs in the system service tools.
- Avoiding multiple sign ons and sign offs.
- Regularly clearing all output queues, old history files, and all old journal entries.

  This helps to reduce the seek time per disk access and reduce the size of the Work Control Block Table. Further discussion about the Work Control Block Table can be found in 9.5.3.7, “Reads (*RS, *RSF) Against QWCBTxx Objects” on page 240.

For information about system tuning, see *AS/400 Work Management*, SC41-4306, and *Performance Tools/400*, SC41-4340.

When making changes be sure to make one at a time and measure the effect of that change.

Another way to affect system tuning is to redistribute the system’s workload. Examples of this include moving all batch work to run at night, performing all system saves during a lower system usage time, assigning programmers their own storage pool or even a totally separate subsystem (to avoid interactive program compilations), and generally keeping the workload as constant as possible. If you have attempted all of these and still have not reached your target level of performance, you may need to consider the alternative of a hardware upgrade.

Upgrading your system’s hardware may seem like an expensive undertaking. However, when you consider the cost of hiring and maintaining a staff with the skills necessary to further streamline your applications, the cost of upgrading your system hardware may be comparatively inexpensive.

1.5.3 System Upgrade Tasks

When upgrading a system, you are in either one of two situations:

- Adding a greater workload to an existing adequately sized system.
- Adding more resource to an existing overloaded system.

1.5.3.1 Adding Greater Workload

If you are adding workload to an adequately sized system, you must make sure the system is well-tuned **before adding a significant workload.** Measure the system using the Performance Monitor and the AS/400 Performance Tools. Create a BEST/1 model based on the measured data. (BEST/1 is part of the AS/400 Performance Tools and is the most typically used capacity planning tool on the AS/400 system.)

Validate the BEST/1 model against the measured performance data. You can do this comparison for response time, transactions per hour, and resource utilization by selecting the BEST/1 function *Measured and Predicted Comparison*, or you can manually compare the BEST/1 model values to the AS/400 Performance Tools System and Component Report values.

Before doing capacity planning involving additional transaction rates or additional applications, you must calibrate the model by comparing BEST/1 values to the measured performance data. For additional information on this calibration function, refer to the *BEST/1 Capcity Planning Tool* manual, SC41-3341.

Try to model the existing system as accurately as possible, with both an average and peak load measurement.

1.5.3.2 Adding More Resource

If you are adding hardware to an overloaded system, run the performance monitor and review the listings produced by the AS/400 Performance Tools, particularly the System, Component, and Transaction reports. From these, try to find the bottleneck.

Is the problem with:

- Primary resources?
  - Main storage (too high a faulting rate?)
  - CPU (utilization too high?)
  - Auxiliary storage (service times too high?)
- Secondary resources?
  - Communication lines or controllers (throughput constrained?)

You need to understand issues raised with the analysis of the primary and secondary resources. You can either accept them in the calibrated BEST/1 model or resolve them. If you resolve the problem with application changes, you need to collect Performance Monitor data again and create and calibrate another BEST/1 model before doing any growth analysis with BEST/1.

Once you are satisfied that the BEST/1 has been calibrated to your actual operating environment, you define as carefully as you can the additional workload and add this to the BEST/1 model. BEST/1 determines the required additional hardware based on the same factors you use to determine your performance goal - transaction throughput and response time.

Add all defined future requirements to the existing loads before coming to any conclusion on hardware configurations. You do not want to have to do this over again in six months!

1.5.4 Application Tuning Tasks

First, use the following steps in your investigation of whether your application could have its design improved:

1. Measure the system using the performance monitor, collecting trace data.
2. Review the System report and Component report to identify any extreme values. (For guidelines on resource utilizations, refer to *Performance Tools/400*, SC41-4340.)
3. For most Performance Tools/400 reports, you can select the categories or subsections printed within the report, such as time interval, job, user ID, subsystem, and so on. This helps you focus on those areas that experience extreme values and minimizes unnecessary paper in the report.
4. Because of the detail of the data collected with the trace option, it is even more important for you to select only the categories you want to review on the Print Transaction Report (PRTTNSRPT) command.

   For example, use the Component report to identify jobs with long response times, using unexpectedly high CPU utilization, or performing unexpectedly high synchronous disk I/Os. Print the transaction reports for only those jobs.
5. After reviewing the Transaction reports, you should have a good idea of which applications require further attention. Running PEX STATS at this time helps you focus on those applications. See either *Performance Tools/400*, SC41-4340, or subsequent chapters in this redbook for assistance on how to do this.
6. The reports produced by PEX STATS identify specific high resource usage tasks, processes, programs, and OS/400 modules. *Now you can weigh the cost against potential performance gains of any proposed changes you want to make*. Always record your changes and continue to monitor your system's performance.

Database design and application design are separate components involved when tuning your application.

Database design requires that you investigate your application to reduce or eliminate things such as:

- Too many logical files over physical files, which may lead to potential seize/lock conflicts.
- Inappropriate use of the dynamic select/omit function, which is resource intensive.
- Unnecessarily long keys.
- For SQL and other queries, ensure the proper indexes are built for the SQL or query statements being used. A thorough discussion of improving SQL and other query performance is beyond the scope of this redbook. A good source for performance tips on AS/400 SQL is the *DB2 for OS/400 SQL Programming* manual, SC41-4611.

Application design involves a broader perspective. To start a process, or job, the AS/400 system has to do work such as the following:

- Create open data paths (ODPs) for files.

- Initialize program variables.
- Activate programs.
- Perform housekeeping within the Process Access Group (PAG).

All of this work is done on behalf of the user requesting services and is necessary. However, it is possible to make changes in your application to use system functions more efficiently (for example, using shared file opens instead of full file opens, and reducing program calls within an application).

1.5.5 Program Tuning Tasks

If you have completed all application tuning tasks and you still are not satisfied with your system's performance, you need to look at the programs themselves. In particular, examine those that use an extensive amount of CPU time, do a lot of synchronous disk I/Os, have a wide variation in response times, show or demonstrate several long *exceptional waits*. An exceptional wait is a delay in performance that cannot be accounted for by CPU usage or the number of physical disk I/O operations. These waits are sometimes difficult to identify, but can be due to multiple jobs waiting for a database record (update operation), a message queue, or a data queue in use to be unlocked. Another potential cause of exceptional wait is the interruption of the currently running job by a job of higher run priority.

For program tuning, you may want to use the Performance Explorer′s PROFILE (PEX PROFILE option) to determine the relative amount of processing time spent in different parts of a program or set of programs. This is particularly necessary when a program's CPU time is equal to its cumulative CPU in the PEX STATS Statistics Information report. (For more information on the CPU and cumulative CPU times in the Statistics Information report, refer to the *Performance Tools/400*, SC41-4340, and subsequent chapters in this redbook. The PEX PROFILE commands are used to start, end, and print program execution information. PEX PROFILE does not provide data about total processing time used by a program, but it identifies high-leverage portions of a program for improvement.

Program tuning can require changing program source code. Different programming approaches apply to batch and interactive programs. Batch programs are likely to involve high volumes of data and, therefore, *must* have efficient DB access, calculations, and array processing. Interactive programs should, however, attempt to limit the number of disk accesses and the number of calls to other programs.

Finally, keep in mind that some person or persons within the customer organization must have responsibility (″ownership″) for management of the system′s resources. This is required even if they do not have detail knowledge of an application′s implementation. These are the people that need to understand what is running on the system and who to contact for each application for any performance management methodology or performance problem analysis to be successful.

1.5.6 Enhanced Performance Explorer Trace

The Enhanced PEX TRACE support documented in this redbook can be used to analyze application and program tuning possibilities. Consider using this Enhanced PEX TRACE when other performance tools have not been able to identify specific causes to poor performance.

Enhanced PEX TRACE is particularly helpful in identifying the following potential causes for poor performance:

- Excessive number of full file opens and closes on specific files.
- Excessive number of physical disk I/Os on specific objects.
- Excessive CPU utilization.
- Excessive number of Integrated Language Environment (ILE) program activations and deactivations.

  With a high level of program modularization, there exists the possibility that thousands of ILE program activations and deactivations are causing poor performance if the ILE programs are called thousands of time.

1.6 Requirements for Collecting PEX Data

PEX STATS and PEX TRACE (basic and Enhanced) data can be collected only for programs and procedures that have been *collection enabled*. This enablement actually places compiler generated hooks into the programs, ensuring that PEX STATS and PEX TRACE can collect information about them when they are run. The *enable performance collection* or ENBPFRCOL attribute on OPM (Original Program Model) and ILE (Integrated Language Environment) programs and modules determines the level of detail that is collected. Use the DSPPGM command to see the setting for programs on your system.

Figure 3 is an example of the *enable performance collection* value shown as part of the module information for ILE RPG program CSTBLDRE.

```
                           Display Program Information

 Program . . . . . . . :   CSTBLDRE      Library . . . . . . . :   PFREXP

   Debug data . . . . . . . . . . . . . . . . . :   *YES
   Enable performance collection . . . . . . . . :   *PEP <<--
   Module created on  . . . . . . . . . . . . . :   V3R6M0
   Module created for . . . . . . . . . . . . . :   V3R6M0
   Object control level . . . . . . . . . . . . :
   User modified  . . . . . . . . . . . . . . . :   *YES
   Licensed program . . . . . . . . . . . . . . :
   PTF number . . . . . . . . . . . . . . . . . :
   APAR ID  . . . . . . . . . . . . . . . . . . :

                                                                  Bottom

 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 3. DSPPGM Example Showing Enable Performance Collection Parameter

Please refer to Table 1 on page 16 to see what the defaults are for each of the ILE compilers. Also, note that for OPM programs restored to RISC systems, the performance collection capability is implicitly enabled when the program is retranslated. The OPM ENBPFRCOL setting is equivalent to Program Entry Procedure or PEP level in ILE.

*PEP-level performance statistics are gathered on the entry and exit of the program entry procedure only. Typically, this value is sufficient to gather overall performance information for an application. This support is equivalent to the support formally provided with the TPST tool. Early in V3R6 it was discovered that some High Level ILE Languages were defaulting to not enabling PEX performance data collection on their CRTxxxMOD and CRTBNDxxx commands. PTF MF11968 was issued in April 1996 and included in V3R6 Cumulative PTF packages beginning May 1996. After application of PTF MF11968, execution of any ILE compilation command specifying ENBPFRCOL(*NONE) results in ENBPFRCOL(*PEP) being used by the translator. This ensures that all ILE programs created after application of PTF 11968 are visible to PEX STATS and PEX TRACE.

PTF MF11968 is a V3R6 PTF. V3R7 contains the equivalent of MF11968 support. However, for V3R7, ILE RPG, ILE COBOL, ILE CL all support ENBPFRCOL(*PEP) as the default. (V3R6 ILE C already supported full ENBPFRCOL support and defaulted to *PEP.) On V3R7, ENBPFRCOL(*NONE) is not valid for any of the CRTxxxx commands for ILE C, ILE CL, ILE COBOL, and ILE RPG. See Table 1 for additional ENBPFRCOL considerations. *It is important to understand the ENBPFRCOL value when using PEX to collect performance statistics.*

Table 1. ENBPFRCOL Considerations

Program Type	ENBPFRCOL Default	Can We See ENBPFRCOL Setting?	Can We Change ENBPFRCOL Setting?
OPM RPG	ON[1]	No	No
OPM COBOL	ON[1]	No	No
OPM C	ON[1]	No	No
OPM CL	ON[1]	No	No
ILE RPG	*NONE/*PEP[2]	Yes[4]	Yes[5]
ILE COBOL	*NONE/*PEP[2]	Yes[4]	Yes[5]
ILE C	*PEP	Yes[4]	Yes[5]
ILE CL	*NONE/*PEP[3]	Yes[4]	Yes[5]

Notes:

1. OPM programs going through the translator on RISC have ENBPFRCOL turned on. This is equivalent to *PEP level in ILE. There is no ″display command″ to show you that *PEP is enabled.

2. Where you see two ENBPFRCOL values separated by the forward slash character (/), they represent first, V3R6, and second, V3R7 values.

   On V3R6, the ILE CRTRPGMOD, CRTBNDRPG, CRTCBLMOD, and CRTBNDCBL commands do not have the ENBPFRCOL keyword. ENBPFRCOL for these commands defaults to *PEP if the program/module is created after PTF MF11968 has been applied on V3R6. MF11968 has been on all cumulative V3R6 PTF packages since May 1996. If you created your program or module before MF11968 was applied, the default is ENBPFRCOL(*NONE). On V3R6, DSPPGM shows *NONE even if the program/module was created after MF11968 was installed. On V3R6, the only way to ensure *PEP is enabled is to do a CHGPGM ENBPFRCOL(*PEP) or re-create the program/module.

   In V3R7, things works differently. MF11968 is part of the base system and ILE RPG, ILE COBOL (and ILE CL and ILE C) all support the ENBPFRCOL parameter and all default to *PEP if created on V3R7. You can always do a CHGPGM ... ENBPFRCOL(*PEP) to ensure data collection is enabled.

3. In V3R6, CRTCLMOD and CRTBNDCL ENBPFRCOL default to *NONE. If MF1168 has been applied, a CRTCLMOD or CRTBNDCL defaults to *PEP even if ENDPFRCOL(*NONE) is specified.

   In V3R7, ENBPFRCOL(*PEP) is the default.

4. DSPPGM or DSPMOD shows the ENBPFRCOL setting of ILE programs or modules.

   If you create the program or module after MF11968 has been installed and take the language dependent defaults for ENBPFRCOL, the program or module has ENBPFRCOL(*PEP). For V3R6, ENBPFRCOL(*NONE) may show on the DSPPGM program module information, but *NONE is equal to *PEP.

5. The CHGPGM command, which only works on ILE programs, can be used to change the ENBPFRCOL setting if the program template is available.

   You can specify *PEP, *FULL, or *ENTRYEXIT, or for ILE C, additional levels of detail for PEX performance collection.

   Once the program/module has been created with at least *PEP, you may specify CHGPGM ENBPFRCOL(*NONE), but in reality, *NONE is never in effect. *PEP is the ″simplest″ level of PEX collection data in effect. This is true even if DSPPGM module level information shows ENBPFRCOL(*NONE).

ENBPFRCOL Parameter: CPU Impact and Call Level Caution

If the application environment is such that a large number of ILE program/module/procedures are being called per second, running a PEX collection may cause a serious performance degradation if ENBPFRCOL(*ENTRYEXIT) or ENBPFRCOL(*FULL) or more detailed ILE C ENBPFRCOL values have been specified. Note that CHGPGM can set ILE RPG and ILE COBOL ENBPFRCOL values to *FULL and *ALLPRC (trace all internal procedures and external procedure calls).

*FULL or more detailed ENBPFRCOL values may produce a confusing *number of times called* counts and call level numbers for simple ILE RPG or ILE COBOL programs because both the call to the program and the compiler-generated call to the program entry procedure are counted. This may be ″normal″ for an ILE C programmer, but a traditional RPG or COBOL programmer may be puzzled over call counts or call level numbers compared to actual source program calls.

We strongly recommend *PEP be used and output understood before requesting a more detailed level of program and procedure data collection.

1.7 PEX Implementation - Diagrammatic Overview

The remainder of this redbook assumes it has been determined that the Performance Explorer capabilities must be used to analyze one or more performance problems, and that the focus is on application and application program analysis.

Figure 4 on page 19 is an internal look at how the collection of PEX performance data works. Above the Machine Interface boundary (MI Boundary), you can see the following two jobs:

1. A job issuing the PEX commands to define and collect PEX performance data (ADDPEXDFN, STRPEX session, then ENDPEX session).
   - ADDPEXDFN defines the type of PEX data to collect (STATS, PROFILE, or TRACE), and assigns a name to this definition that is used by the Start PEX session (STRPEX) command.
   - STRPEX starts the PEX data collection process.
   - ENDPEX ends the PEX data collection process; this causes the PEX collected data to be placed into the QAYPExxx database files.
2. A second job that is having PEX data collected for it.

Note that PEX, which runs above the MI, provides the capability to specify what data to collect, what jobs should have data collected, and the type of collection to be made. However, it is the Performance Data Collector (PDC) implemented in SLIC that actually performs the collection that PEX requested.

In this snapshot of time, the job being tracked by PEX is running an application program that has issued a READ operation to a database file already opened. This program READ operation calls the OS/400 database data management program/module QDBGETSQ (DataBase Get Sequential).

QDBGETSQ uses the MI Complex (MICMPLX) instruction Retrieve Data Space Entry (RETDSEN) to request the record that was read by the application program.

Hypothetical Licensed Internal Code (LIC) module names starting with the character '#' are used throughout this example.

- RETDSEN calls the LIC module #dbread.

  LIC is hardware level microcode and is sometimes also referred to as System Licensed Internal Code (SLIC).

In Figure 4 you see the following tasks occur **below the MI Boundary**:

- The LIC #dbread module issues a request to LIC Storage Management to retrieve the record through a Segment Address Range (SAR) read operation ?SAR(READ).

  Remember, OS/400 thinks the data is in virtual storage and is not aware of whether the data is in main storage or on auxiliary (disk) storage. A segment is a "chunk" of virtual storage that contains all or part of an object, such as a program or data. The data in this example is the actual customer data portion (data space) of a database file. In this example, the data is actually on auxiliary storage.

- The LIC ?SAR(READ) operation calls the LIC storage management function to perform the SAR READ request (#sm_do_SAR). #sm_do_SAR determines the data is not already in main storage and requests a physical read of a disk through dasd_read(); and calls LIC task #sm_dasd_rd to read the data from disk.

- LIC #sm_dasd_rd performs the actual physical disk I/O read operation to read the originally requested data.

- The LIC Performance Data Collector (PDC) Manager tasks collect PEX data as requested, based upon the specified ADDPEXDFN definition to collect and record PEX data.

  You can see the PEX data collection trace points where information is collected at **1**, **2**, **3**, and **4** at the darkened circles.

  The PDC data collection is first placed into PDC collection areas on DASD segments. The PEX collection data ends up in the PEX AS/400 database files (prefix QAYPExxxx) as part of the ENDPEX DTAOPT(*LIB) command processing as shown at **6**.

The SMTBCH command is available only with the Enhanced PEX TRACE support. It provides PEX TRACE options not available with the standard PEX TRACE support. With SMTBCH, the PEX collection process can be run either interactively or in a submitted job. SMTBCH also provides an optional Enhanced PEX TRACE menu for producing PEX TRACE reports that are not available with the standard PEX TRACE support.

Enhanced PEX TRACE support is introduced in this redbook in Chapter 6, "Performance Explorer *TRACE Option" on page 125.

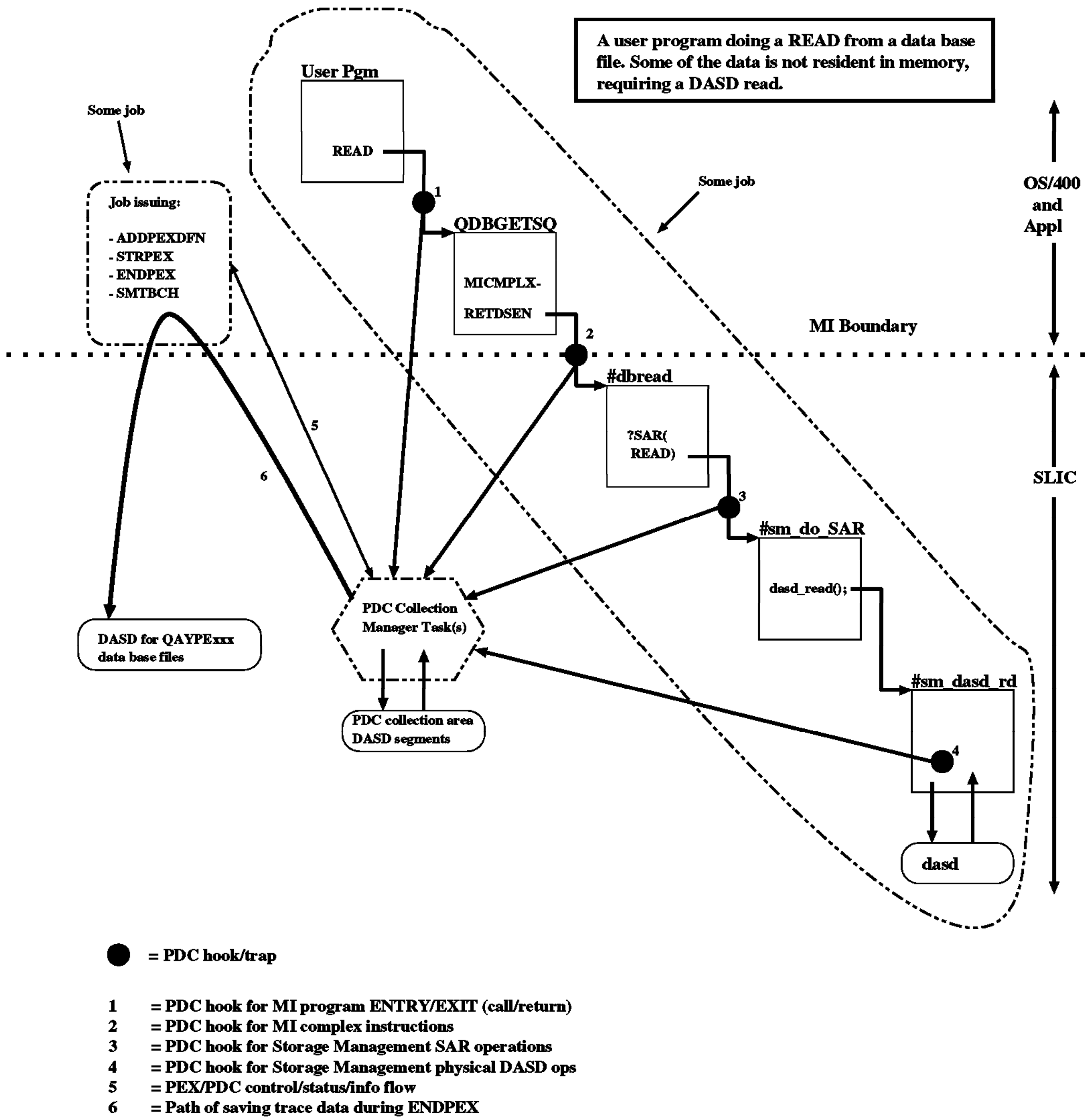

Figure 4. Overview of PEX Implementation

The remainder of this redbook provides more information and examples on using the three PEX functions (STATS, PROFILE, and Enhanced TRACE). We assume that the reader has gone through the performance management methodology and determined that PEX functions should be used.

Notes:

1. Rochester development lab has chosen not to document the functions performed within the LIC routine names shown in this example (for example, those programs beginning with the # character).

2. There is always a possibility of a system software or hardware problem being the root cause of a performance problem. In some cases the system

software detects that this is occurring, and places messages in the system History Log or in hexadecimal format within the VLOG. You may also be getting recoverable hardware errors, which are logged in the System Error log. If you have difficulty identifying a cause for poor performance, ensure that you review these logs.

- To view the system History Log, use the OS/400 Display Log (DSPLOG) command and specify LOG(QHST).
- To view the VLOG, use the OS/400 Start Service Tool (STRSST) command and select the options to *Start a service tool*, followed by selecting the *Licensed Internal Code log* option.
- To view the System Error log, use STRSST, start a service tool, and select the *Product Activity log* option.
- To print the System Error log, use the OS/400 Print Error Log (PRTERRLOG) command.

The *Licensed Internal Code Diagnostics Aid* manual, LY44-4900, provides assistance in using the Start Service Tool (SST) and Dedicated Server Tool (DST) functions for VLOG, LIC log, and Product Activity log review.

Chapter 2. Running the Performance Explorer

This chapter summarizes the three types of data collected by the Performance Explorer. It also provides an overview of how to define the type of data collection, collect the data, and produce reports from the collected data.

2.1 Overview of PEX Collection Types

PEX provides the following three types of performance data collection:

- PEX STATS

  PEX STATS collects CPU utilization and physical disk (DASD) I/O counts of **programs** or **modules** that run during the collection period. These programs or modules may be IBM operating system modules and tasks, or application programs or modules.

  You use STATS to find the *high resource-consuming* programs and modules that run during the performance collection. The objective is to determine if there are specific programs or modules doing most of the resource consumption. If you suspect that an application implementation problem is the reason for poor performance, STATS collection enables you to determine which programs should be examined, based upon the CPU and disk statistics and the number of times the program has been called.

  For example, you may find that the highest CPU utilization program or module is called only once during the collection period. You may have another program or module that uses a moderately high level of CPU utilization, but is called hundreds of times. You need to decide if the program or module that is called only once should be further analyzed, or you may choose to do further analysis on the program or module that consumes a moderately high level of CPU utilization but is called hundreds of times.

- PEX PROFILE

  Once you have identified a high resource-consuming program or module and want to do further performance analysis, you can use PROFILE to find the *hot spots* (high CPU usage sections of instructions) within the program according to the High Level Language (HLL) **source statement numbers**. If the program or module is IBM-provided, you can report this to IBM software service. If the program or module is provided as part of a purchased application, you can report this to the application provider.

  If you have access to the application program or module source, you might find that analysis of these HLL source statements lead you to make changes, such as redefining data types, writing a more efficient algorithm to process required data, or even choosing to implement the function in a more efficient programming language to process the required data. For example, an RPG program could call an ILE C/400 program rather than another RPG program to process financial data more efficiently.

  PROFILE output analysis may also identify a program that is constantly branching between the start of the program and subroutines at the end of the program. If the program is large enough, this constant jumping back and forth could cause excessive page fault rates on a system with limited main storage.

- PEX TRACE

  You might find that all other performance tools analysis still does not identify places where an application implementation appears to be the cause of a performance problem.

  In these cases, where Enhanced PEX is not installed on your system, IBM software support may direct you to collect PEX TRACE data and send that data back to IBM for additional detailed analysis.

  As shipped with OS/400 and Performance Tools/400, PEX TRACE support is meant for use only through IBM Software Support.

- Enhanced PEX TRACE

  If you have the Enhanced PEX TRACE PTFs installed, as described in Table 3 on page 127 and Table 4 on page 130,
  you can analyze the following possible causes for poor performance:

  – Excessive file opens and closes by file, by job, by program.

  – Excessive ILE program activations and deactivations by job and by program.

  – Excessive CPU utilization or disk I/Os by job, by program, by object.

  – Jobs or programs causing excessive page faulting.

The remainder of this chapter presents an overview of how to define a PEX definition type, start and end the PEX collection session, and print a PEX report on the collected data. The following chapters in this redbook discusses specific usage of the STATS, PROFILE, and TRACE capabilities.

For an explanation of all the statistics and column headings that appear on the Performance Explorer reports for each collection type, refer to *Performance Tools/400*, SC41-4340.

The PEX collection cycle is made up of the following activities:

1. Determine the type of collection needed, and create a PEX definition with the Add Performance Explorer Definition (ADDPEXDFN) command.

   On ADDPEXDFN, specify the collection type and a name for the definition. This definition is stored as a database member by that name in the QAPEXDFN file in library QUSRSYS. The PEX definition name is used on the Start PEX Collection command.

2. Determine the application environment for which you want to collect data and start the collection during that environment.

   Use the Start Performance Explorer (STRPEX) command to start the collection. On STRPEX, specify the PEX definition to be used and a PEX collection session id that is assigned to the active PEX collection activity. You use this session id on the End PEX Collection command.

   Note: There can be only one PEX collection session active at a time. This is because a PEX collection always involves all system tasks, and an individual task or job cannot be present in more than one collection at the same time.

3. End the PEX collection session when you have completed the application processing.

   Use the End Performance Explorer (ENDPEX) command to stop the collection. Specify the PEX collection session name (SSNID parameter) that was specified on the STRPEX command. ENDPEX takes the following actions on the collected data:

a. Places the collected PEX data in files QAYPExxx in a library of your choice.

   Use OPTION(*END) and DTAOPT(*LIB) to do this. The database member name for all the QAYPExxx files defaults to session name, but can be any name you choose on the DTAMBR parameter.

   This is the option typically taken.

   You may specify RPLDTA(*YES) to erase already collected data under this session name or RPLDTA(*NO) to add this collected data to data already collected.

   Unless you are a very sophisticated user of PEX collection data we recommend using RPLDTA(*YES).

b. Places the collected data into a single IBM-defined file.

   Use OPTION(*END) and DTAOPT(*FILE) to do this. Typically, you would use *FILE only under the direction of an IBM service representative. By default, the 9 member file that this creates has the same name as the collection session id and is created in library QPEXDATA.

c. Discards the collected data.

   Use OPTION(*END) and DTAOPT(*DLT) to delete any collected data. You do this when you determine the collected data cannot be used. For example, one of the suspected jobs encountered an unanticipated error or did not start as expected.

d. Suspends the collection session, but does not end it.

   Use OPTION(*SUSPEND) to do this. You may later restart data collection by issuing the STRPEX command with OPTION(*RESUME) for the named session id.

   If you forget the active PEX collection session name, you cannot end the PEX collection without powering off the system. There are two ways to determine the active PEX session name.

   - On either V3R6 or V3R7, you can use the Display Object Description (DSPOBJD) command for a *user space* type object in library QUSRSYS. Look for a Text field that contains ″PE persistent object″ as shown in the following example:

```
                       Display Object Description - Basic
                                                       Library  1 of 1
 Library:   QUSRSYS

 Type options, press Enter.
   5=Display full attributes   8=Display service attributes

 Opt  Object      Type      Attribute              Size  Text
 __   DUMMY01     *USRSPC   PF                    69632  PE persistent object
 __   QCQMSSA     *USRSPC                          4096

    :                   :                   :                   :


F3=Exit   F12=Cancel   F17=Top   F18=Bottom
```

   - On V3R7, you can use ENDPEX SSNID(*SELECT), which finds the active PEX session and displays it as shown in the following example:

```
                    Select Performance Explorer Session

 Type option, press Enter.
   1=Select


 Option    Session      User         Type         State       Event
   _       TEST         COOL         *STATS       ACTIVE      count
                                                               2627


F3=Exit    F5=Refresh    F12=Cancel
```

Select the session and ENDPEX is run.

4. Prints a PEX report on the collected data and review the output.

   Use the Performance Tools/400, 5716-PT1, licensed program Print Performance Explorer Report (PRTPEXRPT) command to do this. On PRTPEXRPT, specify the PEX collected data *member name* (ENDPEX DTAMBR parameter) and library name. PRTPEXRPT also requires you to specify PEX collection type (*STATS, *PROFILE, *TRACE) and the order (descending or ascending) in which the data is to be printed.

See Figure 5 on page 25 for a graphic representation of the PEX collection cycle support.

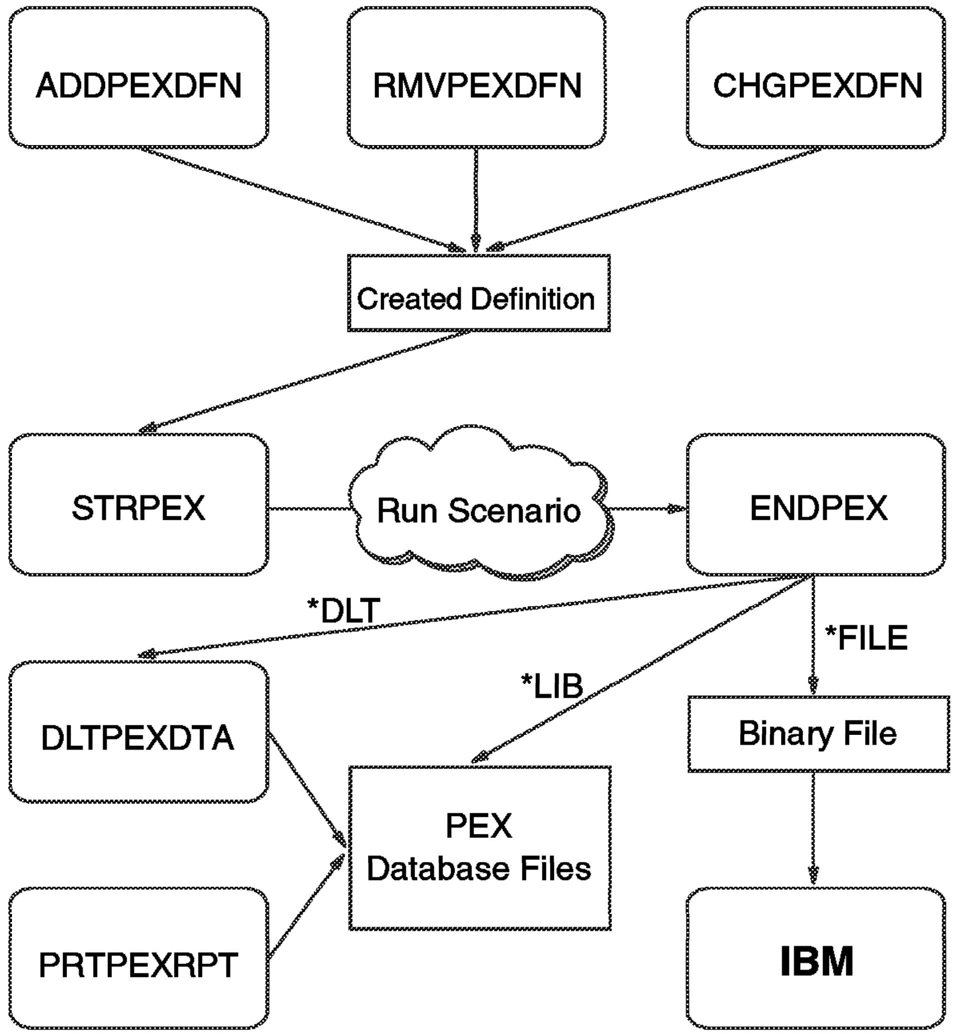

Figure 5. PEX Command and Processing Overview

RMVPEXDFN can be used to *remove* (delete) the PEX definition (the member in file QAPEXDFN in library QUSRSYS is removed).

CHGPEXDFN can be used to changed the PEX definition. Typically you would not change the TYPE (*STATS, *PROFILE, *TRACE), but you might change job names and, for PROFILE, programs.

DLTPEXDTA deletes the PEX data collected for the named database member name (DTAMBR keyword). The DLTPEXDTA DTAMBR name must match one previously specified on the ENDPEX DTAMBR parameter.

DLTPEXDTA removes the members in the various QAYPExxxx database files used to contain the collected PEX data.

If you cannot remember your PEX data collection name, you can do the following to see all the PEX collections (PEX member names) within a library:

```
DSPFD library-name/QAYPEBASE *MBRLIST
```

PRTPEXRPT must specify the DTAMBR name and library name containing the QAYPExxx database files, and it must specify the same PEX TYPE (*STATS, *PROFILE, or *TRACE) specified in the ADDPEXDFN or CHGPEXDFN command for the definition used on the STRPEX command.

Depending on the TYPE value, the report can be sorted on different values, such as CPU or disk I/Os for *STATS, or program or module name or statement number for *PROFILE.

2.2 PEX Collection Example

The following is a simple example of collecting PEX *STATS data for all jobs. It was run for 2 minutes and 48 seconds during a time when the system had a light workload.

```
ADDPEXDFN  DFN(TEST) TYPE(*STATS)
1          JOB(*ALL) DTAORG(*FLAT) MRGJOB(*YES)
           TEXT('PEX EXAMPLE all active jobs')

STRPEX SSNID(RBEXAM) DFN(TEST)
2


The same user-defined command
is run twice.  This command - CMDCSTPEX was run from
another job at the same time.

CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)
CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)
3

ENDPEX SSNID(RBEXAM) OPTION(*END)
4       DTAOPT(*LIB) DTALIB(PEXAMPLE) DTAMBR(*SSNID) RPLDTA(*NO)
        TEXT('TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)')


 PRTPEXRPT MBR(RBEXAM) LIB(PEXAMPLE) TYPE(*STATS)
           STATSOPT(*CPU *PROGRAM) ORDER(*DESCENDING)
```

Figure 6. Running a PEX Collection Example

ADDPEXDFN (1) defines an *STATS performance definition for all jobs running on the system. The collected data does not include the parent-child (call/return sequence) because DTAORG(*FLAT) was specified. All jobs active on the system has data collected.

The PEX collection is started (2), using PEX definition TEST and PEX collection session name of RBEXAM.

CMDCSTPEX (3) is a user-defined command that calls program CSTPEX, which reads sequentially from one file and randomly from another file, and writes the results to the requesting display device.

ENDPEX (4) ends the PEX data collection session RBEXAM and stores the collection data in several QAYPExxx files in library PEXAMPLE. Each member of the QAYPExxx files has a name of RBEXAM.

PRTPEXRPT (**5**) produces a PEX *STATS report from the QAYPExxx file member names of RBEXAM in library PEXAMPLE. The PEX STATS output is summarized by CPU consumption for each program called and sorted in descending sequence (highest CPU consumption first). Each printed PEX report contains the following sections:

- **PEX Definition Description**
- **PEX Run (data collection session) Information**
- **PEX Library Section**
- **Collection Task Information**
- **Collection Type (Statistics, Profile, Trace) Specific Information**

The following figures are examples of the PRTPEXRPT sections that appear for both *STATS and *PROFILE data collection types.

The information under the sections that are included on all collection type reports contains slightly different information. The Collection Type Specific Information is significantly different for each type (*STATS, *PROFILE, *TRACE).

The following topic uses an *STATS collection type as an example. More specific *STATS information is contained in Chapter 3, "Performance Explorer *STATS Option" on page 35.

2.2.1 PEX Report Standard Sections Example

This topic shows the report for the PEX *STATS collection shown in Figure 6 on page 26.

```
                                           Performance Explorer Report                              1/13/97 11:02:58
                                             Definition Information                                          Page
                                                                                                               1
Library . . : PEXAMPLE
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : TEST
Defined By . . . . . . . . . : COOL
Definition Description . . . : PEX EXAMPLE all active jobs
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : YES
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
```

*Figure 7. PRTPEXRPT, *STATS Definition Information Example*

Figure 7 shows the *Definition Information* section that summarizes the actual PEX definition used to collect the data. In this example you can see that TEST is a Type STATISTICS, defined by user id COOL.

Figure 8 on page 28 shows the *Run Information* section, which summarizes the actual PEX collection run-time information.

```
                                   Performance Explorer Report                                1/13/97 11:02:58
                                         Run Information                                          Page
                                                                                                          2
Library . . : PEXAMPLE
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
Sessions since IPL. . . . . . . . . . . . . :                          2
Session name. . . . . . . . . . . . . . . . : RBEXAM
Start time. . . . . . . . . . . . . . . . . : 1997-01-13-10.58.32.238232
Stop time . . . . . . . . . . . . . . . . . : 1997-01-13-11.01.20.538712
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.02.48.300480
Suspend time (us) . . . . . . . . . . . . . :                    330,272
Number of events. . . . . . . . . . . . . . :                     99,612
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : QPADEV0021COOL      068209
Started by user . . . . . . . . . . . . . . : COOL
Target system . . . . . . . . . . . . . . . : ITSM05   1
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304  2
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . . :                        267
Jobs in session . . . . . . . . . . . . . . :                         97
```

Figure 8. PRTPEXRPT, STATS Run Information Example

The Run Information sections shows the start, stop, and total run times of the PEX collection. In this example, the PEX collection *session* ran for approximately 2 minutes and 48 seconds (02.48.300480). You also see that job 068209/COOL/QPADEV0021 ran the PEX collection on system ITSM05. Starting at **1** you can see some hardware and software information about the system on which PEX data was collected.

Sessions since IPL is the number of times the Performance Explorer has collected data since the last IPL. In this case we have run PEX twice.

At **2** you see *Total pages memory*, which is in units of 4K bytes. 98,304 means 384MB of main storage.

```
1. 98,304 / 1024(1K) = 96
2. 96 * 4 = 384
```

Logical DASDs means the physical number of disk drives attached to the system if mirroring is not used. In our example system - ITSM05, we know from other reports we actually have 8 physical disks attached to the system. The two on the MFIOP (9162) are mirrored and the other 6 are RAID-protected, yielding a logical DASD count of 7.

Data areas has a value of 1 because on our ADDPEXDFN for TEST, we specified MRGJOB(*YES). MRGJOB(*YES) specifies to store the collected data for all jobs in a combined data area.

Figure 9 on page 29 shows the *Library Section*, which summarizes the CPU and Disk I/O activity at the library level.

Library Section

Library . . : PEXAMPLE
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
PFREXP	24	20256	11	18,496,006	61.4	0	0	7	2	43,080,237	****	152	1334	62	5	0
**Unknown	0	0	0	7,065,679	23.4	0	0	0	0	7,065,679	23.4	0	0	0	0	0
MI CPLX	26304	0	0	2,539,090	8.4	76	667	43	4	2,539,090	8.4	76	667	43	4	0
QSYS	22338	1507	25854	1,436,621	4.8	0	0	56	0	4,862,988	16.1	95	667	338	13	0
**LIC Task	0	0	0	564,975	1.9	0	0	0	0	564,975	1.9	0	0	0	0	0
QTCP	263	192	262	23,593	0.1	0	0	0	0	93,615	0.3	0	0	0	0	0
QIJS	12	189	6	15,409	0.1	0	0	0	0	275,413	0.9	0	0	2	0	0
QBRM	3	9	0	756	0.0	0	0	0	0	15,819	0.1	0	0	0	0	0

*Figure 9. PRTPEXRPT, *STATS Library Section Example*

The *Library Section* identifies the libraries that contained the programs or modules that were active during the collection period.

All CPU usage and disk I/O operation statistics for all the programs or modules in a specific library are totaled for that library. Note that it is common to have a cumulative CPU percent total be higher than 99.9%. In those cases, you see a CPU percent value of ********. This is considered normal in most cases.

We discuss more about the values in the headings *Inline Stats* and *Cumulative Stats* in Chapter 3, “Performance Explorer *STATS Option” on page 35.

If you notice a single library with a high level of CPU utilization or DASD I/Os, you might want to focus on programs in that library.

In this example, you see library PFREXP, where the programs and data accessed by the user-defined command CMDCSTPEX reside. We also captured the following libraries:

- **QSYS**, where most of the OS/400 modules are stored.
- **QTCP**, which provides TCP/IP support. In particular, our two interactive workstation jobs used TCP/IP Telnet 5250 support.
- **QIJS**, which provides Job Scheduler for OS/400, Licensed Product Program 5716-JS1, support.
- **QBRM**, which provides Backup Recovery and Media Services, Licensed Product Program 5716-BR1, support.

PEX was unable to identify a library for approximately 7.066 seconds (7 065 679 seconds) of CPU seconds.

MI CPLX represents all the high level machine interface (complex) instructions used by OS/400 support.

MI complex instructions are machine instructions to the AS/400 Machine Interface issued by the Operating System to do its normal work. MI complex instructions include functions like finding the pointer to an object (*MATPTR - materialize pointer), writing records sequentially to a file (*INSSDSE - insert sequential data space entries), converting a character value to numeric (*CVTCN,LB - convert character to numeric), creating a duplicate object (*CRTDOBJ - create duplicate object), and so on.

Refer to Figure 4 on page 19 for a Retrieve Data Space Entry (RETDSEN) MI Complex Instruction example. Section 3.3.2, “MI Complex Instructions” on page 54 discusses some relationships between OS/400 functions and MI Complex Instructions.

Figure 10 on page 31 shows the *Task Information* section, which lists all the LIC tasks and OS/400 jobs that were started during the PEX collection. If the task or job did meaningful work during the collection time period, values under the headings *Run Time (us)* (microseconds) and *Run Time Percent* contain non-zero values.

```
                                             Performance Explorer Report                                    1/13/97 11:02:58
                                                  Task Information                                               Page
                                                                                                                          5
Library . . : COOK
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
Task ID    Job/Task Name               Pool Priority Existence    Elapsed Time (us)       Run Time (us) Run Time
                                                     Start/End                                            Percent
-----------------------------------------------------------------------------------------------------------------------------
       688 QPADEV0006 COOK       068210    4      160   Y    Y             166671048            16179896    47.72
       687 QPADEV0021 COOK       068209    4      160   Y    Y             166671056            16416096    48.41
       685 PA-T-P23ARVYBC                  1       40   Y    Y             166671056                   0        0
       684 P23ARVYB   AS0219R    068207    2      160   Y    Y             166671056                   0        0
       683 T2-P23ARVYB                     1       75   Y    Y             166671056                   0        0
       486 T2-TPMAATTA                     1       75   Y    Y             166671056                   0        0
       394 QTFTP00158 QTCP       068163    2      165   Y    Y             166671056                   0        0
       383 VTMTS1                          1       75   Y    Y             166671056               19456     0.06
       382 QESTP      QSRVBAS    068154    2      180   Y    Y             166671056                   0        0
       381 QNFTP      QSNADS     068153    2      180   Y    Y             166671056                   0        0
       380 QDIAHSTPRT QSNADS     068152    2      190   Y    Y             166671056                   0        0
       379 QDIAINDUSR QSNADS     068151    2      190   Y    Y             166671056                   0        0
       378 QDIALOCAL  QSNADS     068150    2      160   Y    Y             166671056                   0        0
       377 QDIA       QSNADS     068149    2      180   Y    Y             166671056                   0        0
       376 QSNMPSA    QTCP       068148    2      175   Y    Y             166671048                   0        0
       375 QPWFSERVSD QUSER      068147    6      160   Y    Y             166671056                   0        0
       374 PRTASM01   QSPLJOB    068146    3      190   Y    Y             166671056                   0        0
       373 JUNK       QSPLJOB    068145    3      190   Y    Y             166671056                   0        0
       372 LANPRINT   QSPLJOB    068144    3      155   Y    Y             166658088                   0        0
       371 QTLPD01553 QTCP       068143    2      165   Y    Y             166658096                   0        0
       370 QTSMTPBRSR QTCP       068142    2      190   Y    Y             166658088                   0        0
       369 QTSMTPBRCL QTCP       068141    2      190   Y    Y             166658096                   0        0
       368 QTSMTPCLNT QTCP       068140    2      190   Y    Y             166658088                   0        0
       367 QTLPD01521 QTCP       068139    2      165   Y    Y             166658096                   0        0
       365 QTFTP00215 QTCP       068137    2      165   Y    Y             166658088                   0        0
       364 QTFTP00192 QTCP       068136    2      165   Y    Y             166658096                   0        0
       363 QTMSNMPRCV QTCP       068135    2      190   Y    Y             166658096                   0        0
       362 QTSMTPSRVR QTCP       068133    2      190   Y    Y             166658088                   0        0
       361 X2507      QSNADS     068134    2      180   Y    Y             166658096                   0        0
       360 X2506      QSNADS     068132    2      180   Y    Y             166658096                   0        0
       359 TARGET2    QGATE      068130    2      180   Y    Y             166658096                   0        0
       358 QTFTP00851 QTCP       068131    2      165   Y    Y             166658096                   0        0
       357 TARGET1    QGATE      068129    2      180   Y    Y             166658096                   0        0
       356 QBRMNET    QPGMR      068128    2      170   Y    Y             166658096               20992     0.06

    :                  :                   :                   :                   :

    :                  :                   :                   :                   :

       292 IPR0060103--2619                1       10   Y    Y             166647640                   0        0
       291 SK-ASC008P                      1       70   Y    Y             166647640                   0        0
       290 SK-ASC007P                      1       70   Y    Y             166647632                   0        0
       289 SK-ASC006P                      1       70   Y    Y             166647632                   0        0
       288 IPR3050103--2619                1       10   Y    Y             166647632                   0        0
       287 IPR2050103--2619                1       10   Y    Y             166647632               43296     0.13
       286 IPR1050103--2619                1       10   Y    Y             166647632                   0        0

    :                  :                   :                   :                   :

       221 DBI003                          1      160   Y    Y             166640400                   0        0
       220 DBI002                          1      160   Y    Y             166640400                   0        0
       219 DBI001                          1      160   Y    Y             166640400                   0        0
       218 DBI000                          1      160   Y    Y             166640400                   0        0
       217 DBL307                          1      160   Y    Y             166640400                   0        0
       216 DBL306                          1      160   Y    Y             166640400                   0        0
       215 DBL305                          1      160   Y    Y             166640400                   0        0
       214 DBL304                          1      160   Y    Y             166640400                   0        0

    :                  :                   :                   :                   :

        68 SMASPTASK                       1       10   Y    Y             166625920                   0        0
        67 LIDMGR-TASK--AHT                1       15   Y    Y             166625920                   0        0
        66 RMSRVCTKLO                      1       40   Y    Y             166625920                   0        0
         1 CFINT1                          0        0   Y    Y             166681656              187792     0.55
-----------------------------------------------------------------------------------------------------------------------------
```

*Figure 10. PRTPEXRPT, *STATS Task Information Example*

In this example, you see that task IDs **688** and **687** (jobs 068210 and 068209) had the highest run time and run-time percents. These are the jobs that ran the user-defined command CMDCSTPEX.

In most cases, you do not need to understand the LIC tasks that are active when doing performance problem analysis for an application or application program.

Explaining all the task or job names included in this Task Information example is beyond the scope of this manual. However, the following task, job, and run priority explanation is included to help you understand what is going on during the PEX collection run time.

Priority values shown do not correspond to the OS/400 Class Description object run priority (RUNPTY) parameter value. However, for OS/400 jobs with priority values of 1-99, you can subtract 140 to correspond to the RUNPTY value. For example, the interactive workstations jobs 068210 and 068209 show priority of 160. If you subtract 140 from 160, you get the value of 20. RUNPTY(20) is the normal default for interactive jobs.

For job 068144 (a spooled writer job), you can subtract 140 from priority 155 and get RUNPTY 15, which is a typical priority for OS/400 spooled writer jobs (class QSPL).

For LIC (Licensed Internal Code) tasks, the priorities are assigned by IBM development and the user has no ability to change them. In most cases LIC task priorities are higher than OS/400 jobs (tasks), though some LIC tasks run at the same priority as the user job for which they are performing a function. LIC priorities are relative to each other, just as OS/400 RUNPTY values are for OS/400 jobs.

For example, a LIC task such as the APPC station IOM task, indicated in the *Task Information* section of the report by a ″T2-″ prefix, followed by the APPC control unit name, runs at priority 75. However, the LIC line IOM (I/O Manager) **I**nter-**P**rocess multiple **R**outer tasks, indicated by the prefix IPR and ending with the IOP feature number (such as 2619), run at priority 10!

The disk drive tasks that start with prefix DBI or DBL typically run under the RUNPTY value of the OS/400 job they are performing the function for.

LIC task **CFINT1** is a centralized interrupt handler that is the highest priority task on the system. There is one CFINTn task for each processor on a system. For example, the 530-2162 is a 4-way system and would list tasks CFINT1 through CFINT4.

In Figure 10 on page 31, the following task IDs are examples of the jobs and tasks we have just described.

668
687
372
683
486
288
287
286
219
218
217
216
1

You can identify a SLIC task by observing that it runs in pool 1, the machine pool, except CFINT, which runs in pool ″0″ (its own pool).

Most of the SLIC tasks are defined in *AS/400 Licensed Internal Code Diagnostics Aids - Volume 1*, LY44-4900. Refer also to Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485 for a list of many of the LIC tasks.

V3R6 and V3R7 PEX Database File Compatibility

Note, the V3R6 and V3R7 PEX *STATS, *PROFILE, and *TRACE collected data are not directly compatible between V3R6 and V3R7. PEX data collected on V3R6 can be restored to V3R7; however, the V3R7 PRTPEXRPT command issues an error message when processing V3R6 data.

The V3R6 PRTPEXRPT command fails if run over V3R7-collected PEX data.

You may ″convert″ PEX *STATS or PEX *PROFILE from V3R6 format to V3R7 format using the following steps.

Assumptions

- The following command sequence is performed on a V3R7 system.
- The library containing the V3R6 PEX data (QAYPExxxxx files) on the V3R7 system is PEXV3R6.
- The library to contain the converted V3R6 PEX files is called PEXV3R7.

1. Run a PEX collection of any type (we suggest using *STATS FLAT over just one job).

2. Issue the PRTPEXRPT command to build the V3R7 QAYPExxxxx files in library PEXV3R7.

   File QAYPERLS is created in library PEXV3R7; this file did not exist for V3R6 PEX and determines the release level for the PEX data collection library.

3. Use the Work with Files command (WRKF) to obtain a list of all the QAYPExxxxx files in library PEXV3R6.

4. Use Copy File (CPYF) command to copy all the members from the PEX files in library PEXV3R6 into library PEXV3R6. Run the CPYF command for **all** of the QAYPExxxxx physical files in library PEXV3R6. An example of copying file QAYPESTATS is now shown below:

   ```
   CPYF FROMFILE(PEXV3R6/QAYPESTATS) TOFILE(PEXV3R7/QAYPESTATS)
   FROMMBR(*ALL) TOMBR(*FROMMBR) MBROPT(*ADD) CRTFILE(*NO) FMTOPT(*MAP)
   ```

You can run PRTPEXRPT against the required collection member in library PEXV3R7.

PEX *TRACE data (including Enhanced PEX TRACE support) cannot be made compatible between V3R6 and V3R7.

Chapter 3. Performance Explorer *STATS Option

This chapter provides more detailed analysis of PEX Statistics (*STATS) capabilities. It compares PEX STATS support to other performance tools and provides assistance in interpreting the PRTPEXRPT reports for *STATS definitions.

The activity sequence for collecting PEX STATS data and reviewing a report on the collected PEX STATS data is as follows:

1. Define a PEX statistics definition via the ADDPEXDFN command, specifying TYPE(*STATS).
2. Start a PEX collection session with the STRPEX command, specifying your STATS PEX definition.
3. Run the appropriate application programs.
4. When sufficient processing has completed, end the PEX collection session with the ENDPEX command. Assuming you want to use the collected data for later reporting, specify OPTION(*END) DTAOPT(*LIB) DLTLIB(your library name or QPEXDATA) DTAMBR(your member name or default to the session name with *SSNID). You can replace or add to data already collected under the same DTAMBR name with the RPLDTA parameter and you can supply a meaningful description of the collected data.

   For example:

   ```
   ENDPEX SSNID(active session name) OPTION(*END) DTAOPT(*LIB)
          DTALIB(your library name) DTAMBR(*SSNID) RPLDTA(*YES)
          TEXT('PAYROLL: End of month processing')
   ```

5. Print the PEX report for STATS collected data using the Performance Tools/400 PRTPEXRPT command.

   For example:

   ```
   PRTPEXRPT MBR(collected session name or your name)
             TYPE(*STATS) LIB(your library)
             STATSOPT(*CPU *PROGRAM)
             ORDER(*DESCENDING)
   ```

Figure 11 on page 36 is an example of a PEX STATS definition, collection, and report printing sequence.

```
ADDPEXDFN  DFN(TEST) TYPE(*STATS)
           JOB(*ALL) DTAORG(*FLAT) MRGJOB(*YES)
           TEXT('PEX EXAMPLE all active jobs')

STRPEX SSNID(RBEXAM) DFN(TEST)



The same user-defined command
is run twice.  This command - CMDCSTPEX was run from
another job at the same time.

CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)
CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)


ENDPEX SSNID(RBEXAM) OPTION(*END)
       DTAOPT(*LIB) DTALIB(PEXAMPLE) DTAMBR(*SSNID) RPLDTA(*NO)
       TEXT('TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)')


 PRTPEXRPT MBR(RBEXAM) LIB(COOL) TYPE(*STATS)
           STATSOPT(*CPU *PROGRAM) ORDER(*DESCENDING)
```

Figure 11. Running a PEX STATS Collection Example

Chapter 4, "PEX STATS Examples" on page 57 provides examples of PRTPEXRPT *STATS reports. Chapter 2, "Running the Performance Explorer" on page 21 provides a general overview discussion of collecting and using PEX data.

3.1 Performance Explorer Statistics (PEX STATS)

PEX STATS is a performance data collection facility in OS/400. You can view performance data at the system, library, job, and program level using the PEX collection and reporting commands. The data can be collected using OS/400 PEX Collection commands and printed with the AS/400 Performance Tools LPP Print PEX data command. If you are familiar with the AS/400 TPST PRPQ, you find that part of PEX STATS is quite similar to that package. However, there are also some dramatic functional differences between PEX STATS and TSPT.

3.1.1 What PEX STATS Does

Figure 12 on page 37 shows a sample prompt display for the Add Performance Explorer Definition (ADDPEXDFN) command. You can collect PEX data for all jobs in the system, a specific job in the system, jobs based on job name, or jobs based on user ID.

```
                        Add PEX Definition (ADDPEXDFN)

Type choices, press Enter.

Definition . . . . . . . . . . . > PEXSTJUL26    Name
Type . . . . . . . . . . . . . .   *STATS        *STATS, *TRACE, *PROFILE
Job name . . . . . . . . . . . .   *ALL          Name, generic*, *ALL, *
  User . . . . . . . . . . . . .                 Name, generic*, *ALL
  Number . . . . . . . . . . . .                 000001-999999, *ALL
               + for more values


                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

*Figure 12. ADDPEXDFN *STATS Example*

There are a number of PEX STATS collection variations (options) available to you:

Job/System Level Collection (JOB keyword) Option

PEX STATS collects program level CPU and Disk I/O usage either system-wide or by individual job. When you create the PEX definition to be used for the collection, you define whether to collect data at the individual job level or the total system level.

Although you can collect PEX data for all jobs on the system with less CPU impact than the CISC version TPTS PRPQ, it is recommended to minimize the number of active jobs during a PEX *STATS collection, if possible.

Merge Job (MRGJOB keyword) Option

This option is available only with STATS DTAORG(*FLAT) collections.

Use this option to keep all the program data summarized for each active job (MRGJOB(*NO)), or to gather all the job and program data into a single consolidated report (MRGJOB(*YES)) that shows the CPU and disk I/O by program. It can be sorted a number of ways. If you specify MRGJOB(*NO), the resulting report is large because there are entries for every job on the system that used resources during the collection period. On the other hand, if you collect data for individual jobs, you probably want to see the report by individual job so you use MRGJOB(*NO).

If, for example, your collection is over several jobs and each of those jobs involves multiple programs performing random reads, then:

- MRGJOB(*YES) shows one total for the database random read program QDBGETKY for all jobs involved in the collection.
- MRGJOB(*NO) shows one total for program QDBGETKY for each of the jobs involved in the collection.

Flat/Hierarchical (DTAORG keyword) Collection Option

There are two ways to collect and view the program data. One is to consolidate (or roll up) all the individual job′s program data into a single set of counters (for CPU and disk I/O data) per program. This is the DTAORG(*FLAT) option that, when printed, shows a single set of data values per program within the job. If you use the

MRGJOB(*YES) option, all the values for all jobs are rolled into one counter per program for all jobs.

The DTAORG(*HIER) option collects and reports the individual program statistics at the Call Level at which the program is invoked. For example, if A is the initial program in the job, it is running at Call Level 1. If A calls B, B is at Call Level 2. If B calls C and C calls A, the following call levels exist in the job:

```
PROGRAM     Call Level

   A            1
   B            2
   C            3
   A            4
```

Clearly, the previous example can occur only for programming languages that support recursion.

If you collect STATS data with the *HIER option at the individual job level, you get CPU and disk usage information for each program in the job by call level.

If, for example, your collection is over several jobs and each of those jobs involves multiple programs performing random database reads, then you see an entry for QDBGETKY for every program that performed random database reads (each entry appears at a call level number numerically higher than the program that called it).

The ability to collect at the individual job, program, and call level is extremely useful in application performance analysis, and represents a major step forward in the capability of the AS/400 Performance Tools. The user sees what programs are using the most resources (similar to the old TPST PRPQ), and with the STATS HIER option the logic paths are reconstructed in the reports so you know who called what and what programs used the most resources. This latter function is quite similar to the TPST PRPQ′s PRTTRCSUM option in that it shows you the logic flow of the job, with the added benefit of showing you what the resource consumption was.

Note: We strongly recommend selecting only 1 to 3 jobs when collecting *HIER data. If you select many jobs, your PRTPEXRPT report is large and the same program name may appear in many places throughout the report. This makes it hard to analyze. In addition, if you select too many jobs the PEX collection function seriously degrades total system performance.

The PEX STATS report′s Task Information section has a *run time* column that tells you the amount of CPU time the job used.

The Task Information section does not provide the total number of disk I/O operations for the job or task.

3.1.2 Using PEX STATS

If you know what jobs on the system you're interested in, you can collect data only on those jobs. If you do not know what to look for, start collection over all jobs and review the Task Information Section of the STATS report to find the jobs that are using the most resources.

In most cases, you use MRGJOB(*YES) and DTAORG(*FLAT).

3.1.2.1 PEX STATS or Performance Monitor?

Why not just use the Performance Monitor? STATS data shows you how long each job was active in addition to the CPU usage and disk I/O counts. You can run PEX over individual jobs, a group of jobs, or all jobs in the system for a short time or a much longer time. The monitor does not have that flexibility; it collects much more data (communications and device information), and does it every five minutes (unless you are using trace). PEX STATS is collecting information at the individual program level and rolling the data up into job and library level reports.

STATS data is quite accurate because the timing mechanism in the RISC systems provides microsecond (six decimal positions) resolution at the program level. At the job level, the reports tell you how long the job was active.

3.1.2.2 *Unknown Category

You can start and stop PEX STATS collection at any time. You receive resource usage data but, depending on what the programs in a job are doing, you may not see it accounted for accurately. The results may end up in the *Unknown category rather than in the program that you thought was using all the resources.

The shorter the time period you run a PEX collection, the greater the percentage allocated to *Unknown may be. This is because STATS collection is done at entry to and exit from a program. If the program is already entered when you start the STATS collection, there's no way to account for it to the program. Because the collection functions know that something is using the CPU, it gets counted and put into a counter called **Unknown*.

If you want to collect accurate information for an individual workstation job and functions, tell the operator to go back to the main menu. Then you start your collection and tell the operator to perform whatever it is you want to collect for. When the functions complete, have the operator go back to the main menu. At this time you can end the collection, save the data, and print it.

3.1.2.3 Looking at the Total System

When you first walk into a performance problem at an account, you may want to get some idea as to what jobs and programs are using the most CPU and doing the most disk I/O on the total system. We recommend running the OS/400 Performance Monitor first for approximately 30 minutes and printing and reviewing the System and the Component reports. Presuming the Performance Tools/400 licensed program is on the system, you should also run the WRKSYSACT command with display refreshes every 30 seconds for up to 15 minutes. You should be able to tell which jobs are consuming the higher percentages of CPU utilization and disk I/Os.

If performance problems appear to be primarily with interactive jobs, running the Performance Monitor with the TRACE(*ALL) option, and printing and reviewing the transaction reports may highlight specific jobs and some programs. These

Transaction reports are useful for interactive jobs, but not of much value for non-interactive jobs.

In this chapter we presume you have determined to use PEX STATS. In this case, run STATS DTAORG(*FLAT) option over all jobs with MRGJOB(*NO) for a reasonably short duration, such as 10 minutes. This is similar to the old TPST *ALL/*ALL for programs and libraries, except you do not have to wait forever for the system to set up (and later on take down) the collection environment. The RISC systems PEX support does things differently and much more efficiently.

Use some of the analysis tips and techniques discussed in the following sections to see what is happening on your system and to help formulate a performance analysis strategy. PEX STATS does a lot of the work for you, you just have to point it in the right direction.

3.1.3 PEX and Performance Tools/400

As we discussed in 1.1, "Introduction to Performance Explorer" on page 1, OS/400 provides the PEX collection and maintenance functions and command support, similar to OS/400 providing Performance Monitor collection and maintenance functions and commands. If you do not have the Performance Tools/400 Manager Feature on the system on which you collected PEX data, you may send it (usually as a single library) to a system with Performance Tools/400 for analysis.

In most cases, you analyze the Performance Tools/400 (Performance Monitor data collection) System and Component Reports first. This can lead to running the Performance Monitor again to collect TRACE(*ALL) data and then analyzing the various Transaction Reports.

In general, the transaction reports are good at identifying jobs and applications that need further investigation. The Transaction Summary Report contains a section that has the "top 20" highest CPU and disk I/O for *interactive transactions and jobs*. Object lock holder and waiter jobs are also included in the Transaction Summary Report. This may be sufficient to identify application program changes. However, as your environment contains more and more non-interactive applications (such as client/server applications) the need to use the Performance Explorer capabilities increases.

The AS/400 Performance Tools allow you to perform these functions:

- Performance measurement
- Performance analysis
- Capacity planning

These are achieved by collecting the following data from your AS/400 system:

- Throughput
- Response time
- Resource utilization

PEX data collection and reports provide a more detailed analysis of an application and object access, by program and job, than is available through the reports on the Performance Monitor collected data.

Why do I need PEX STATS?

PEX STATS gives you an extremely accurate account of which programs, processes, and tasks are using system CPU and disk I/O resources. Although the Performance Tools Print Transaction Report (PRTTNSRPT) gives you similar information in the Transaction and Transition Reports, the PEX STATS reports are more complete and accurate.

When can I use PEX STATS?

You use PEX STATS to determine which programs are being called the most, are using more CPU time, or doing more disk accesses than you think they should. PEX STATS does not show any inter-process dependencies, such as exceptional waits or object seize/lock waits.

The Transaction Summary Report *Longest Seize/Lock Conflict* section shows job holder and job waiter for a named object.

Use PEX STATS when problem analysis has identified inexplicable CPU or disk activity within a job or system task. PEX STATS FLAT MERGE(*NO) produces program statistics against individual jobs and tasks. However, because this option causes the system to keep extra internal counters, use of MERGE(*NO) results in considerably higher overhead than use of MERGE(*YES). Recall that both job trace and the Performance Tools Transaction report output can identify programs used within a job.

Where can I use PEX STATS?

PEX STATS is of considerable benefit in analyzing either a familiar or an unfamiliar environment. In a familiar environment you know what the application is doing but may not be aware of how the functions being done effect the system. PEX STATS allows you to analyze these effects. In an unfamiliar environment, use PEX STATS to identify those application or IBM supplied programs in an application that are called the most or are using the most CPU and disk resources. This allows you to decide where to spend time on improving the applications performance.

What exactly is PEX STATS?

PEX STATS is a performance analysis tool that provides a breakdown of central processing unit (CPU) usage and paging for:

- Programs (both user application and system programs) built in either the OPM or ILE structure.
- High-level MI instructions (referred to as Complex MI instructions). These are the machine instructions OS/400 is programmed to.
- MI processes (user and IBM-supplied jobs)

  Note: The term **MI process** is sometimes used instead of the word *job*, but the two terms mean the same. Consider the phrase *Process Access Group (PAG)*. This is the collection of variables (such as file open information) for a job (process) that is unique by job and separate from the program code that is shared by multiple jobs (processes).

- Licensed Internal Code (LIC) tasks that are used by the system.

  Note: A LIC task does work below the MI interface. However, the *Task Information* section of a PRTPEXRPT includes both LIC tasks and OS/400 jobs because they represent all work being managed by the system. From a LIC task dispatching viewpoint, both LIC tasks and OS/400 jobs (MI processes) are considered tasks.

PEX STATS does not produce detail for LIC programs, or low-level MI instructions.

The PEX data collection and reporting can be for all system activity or individual job activity occurring during the data collection interval. PEX STATS is useful in determining CPU time for a specific application function and the proportion of the CPU time and disk accesses attributable to each program in the function.

PEX STATS collection is controlled by the OS/400 STRPEX and ENDPEX commands. PEX data collection can run concurrently with the OS/400 Performance Monitor and the Performance Investigator/400 PRPQ, 5799-FRD for V3R6 and V3R7. (The Performance Investigator/400 is a real-time performance monitor that can be used to detect if user-defined thresholds have been reached, then call a program or graphically display the resource utilization on a client workstation.)

While all of the performance monitors run independently of each other, performance impact must be monitored closely. For more on PEX STATUS performance impact considerations, refer to index entry *CPU impact caution.*

3.1.3.1 Performance Analysis Tools and Reports

Figure 13 shows the AS/400 Performance Tool reports, PEX STATS reports, and OS/400 commands that can be used in the performance analysis process.

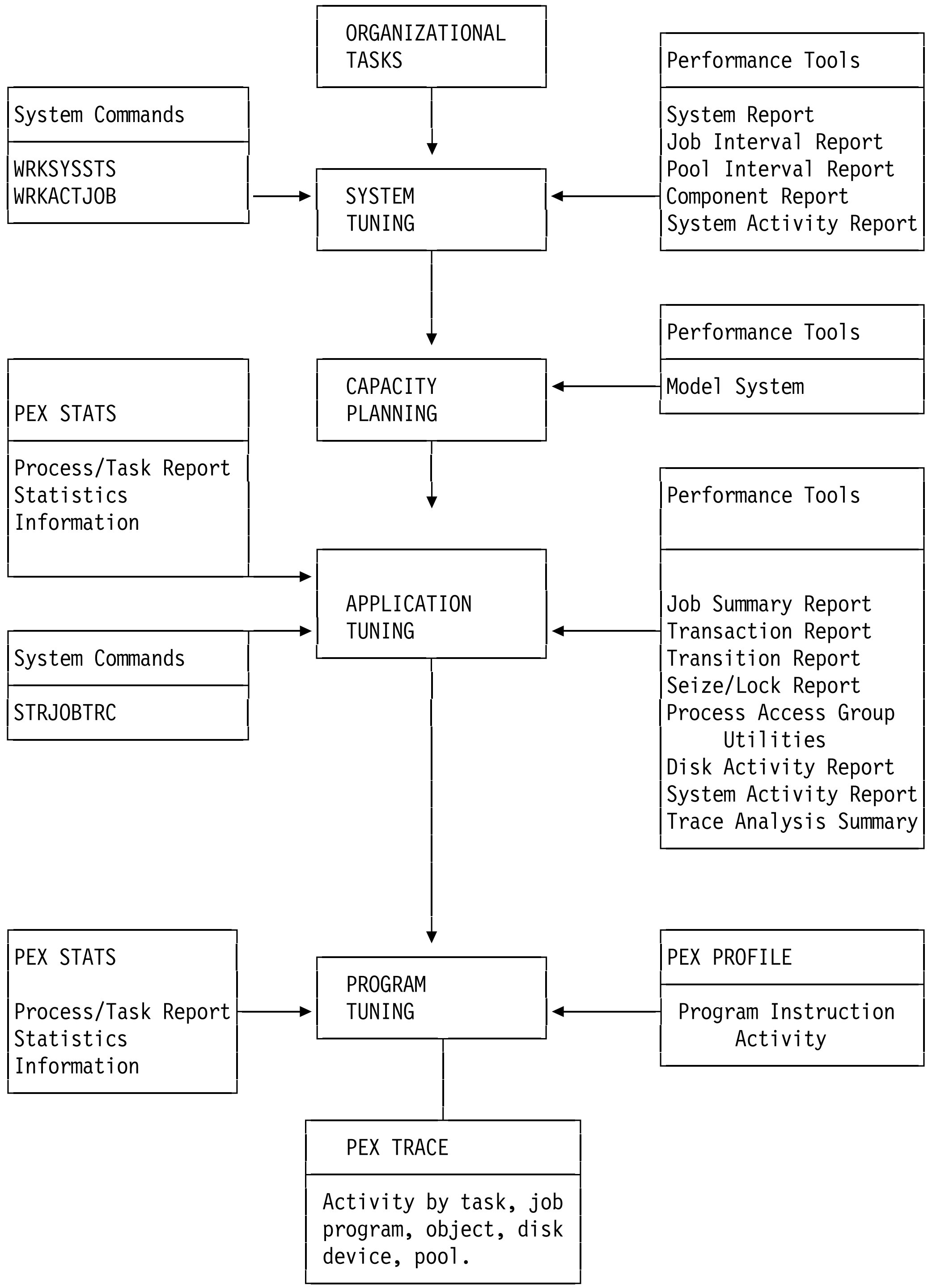

Figure 13. Performance Analysis Tools and Reports

3.2 Interpretation and Analysis of PEX Reports

The remainder of this chapter is designed to help you interpret the data recorded in the PEX STATS reports by explaining some of the entries you might see. Chapter 4, "PEX STATS Examples" on page 57 provides actual report examples.

Remember that PEX STATS shows the use of CPU time and disk read and write operations by tasks, processes, programs, OS/400 modules, and MI-Complex Instructions. The reports do not show how these resources are used, or whether they are used efficiently. PEX STATS also does not show wait times due to queuing problems, such as when a process goes from an active to wait state that may be ″normal″ in the case of an interactive transaction or ″potentially abnormal″ when waiting for a database record, data queue, message queue, or some other object lock to be released by another job or LIC task.

The differences between database (DB) and non-database (NDB) I/O (or read and write) operations should be discussed before examining the specific components of the reports. DB I/O operations generally represent productive work being done for your job, such as an update to a record in a file. NDB I/O is concerned primarily with system activities to manage tasks and sub-tasks, such as loading programs and other non-database objects.

There are many NDB objects that are an integral part of applications such as office documents, folders, data queues, user spaces, and user indexes.

The number of DB and NDB I/O operations that occur is typically influenced by the available main storage. In other words, if main storage is not a constraint, the number of reads and writes are usually lower than when memory is constrained, because more pages are held in main storage. Because of the change to a 4K page frame size, this assumption may not be totally true in a smaller main storage system with a high number of users. Also, the implementation of some functions always requires bringing into main storage some objects regardless of how much main storage is available.

Therefore, to understand how many of the I/O operations for a task are related to the task design itself, it is necessary to first measure the job stand-alone, and then in conjunction with other jobs sharing the same main storage pool. The latter case usually shows more I/O operations if some of the job′s memory is taken away to be used by other jobs.

3.2.1 Steps to Interpreting PEX STATS Reports

Perform the following steps to interpret PEX STATS reports:

1. Always ensure that the AS/400 system itself is well tuned. Refer to Section 1.5.2, "System Tuning Tasks" on page 10.
2. If you know what application you want to investigate, you can collect PEX STATS data on specific jobs that are part of that application.

   Otherwise, use a PEX STATS definition that specifies DTAORG(*FLAT) and selects all jobs the first time you run the data collection. While this doesn′t focus on one particular job, it does give you an idea of which jobs are using the most resources. In PEX, all IBM OS/400 supplied programs and LIC tasks are automatically collected so you see what their effect is. Refer to

Section 3.3, “What Does This Module Do?” on page 51 for more information on IBM programs.

Important

- Use PEX STATS DTAORG(*FLAT) MRGJOB(*YES) over all jobs for an overview.
- Avoid use of PEX STATS DTAORG(*FLAT) MRGJOB(*NO) over all jobs as this can adversely affect performance.
- Do not use run PEX STATS DTAORG(*HIER) over all jobs in the system.

3. If your collection specified STATS DTAORG(*FLAT) MRGJOB(*YES) then print two PEX reports, one sorted by CPU time and the other sorted by Cumulative CPU time. Otherwise, print one PEX report using the PRTPEXRPT command defaults.

   a. Check the Library Section of the PRTPEXDTA report to ensure that all the application libraries you wanted are included in the report.

   b. Review the Task Information section to see if the SLIC error log task (EL-ERRLOG) or SLIC MC error log task (MCxxxxx) has many I/O counts or consumes more than 2% to 3% of total CPU used. This can indicate considerable error reporting, which in turn requires investigating to determine why these errors are being reported.

      You can look at these logs by entering the PRTERRLOG command, and selecting the specific logs you want to look at. Alternatively, you may look at the Licensed Internal Code log and Product Activity Log through the Start Service Tools (STRSST) command.

      Note: Use system service tools only under direction from your service representative. The *Licensed Internal Code Diagnostic Aids* manual, LY44-4900, and *OS/400 Diagnostic Aids* manual, LY44-4907, provide assistance in using these tools.

   c. Review the STATS Statistics Information for both the CPU and Cumulative CPU sorted listings. The counts of primary interest are usually on the first page of either of these reports. From here, you can determine which programs are using the most resource and concentrate on them in subsequent PEX STATS runs. Focusing on programs with a count of less than 1% of CPU time is usually not worthwhile.

3.2.2 STATS Report Headings

The following describes some of the headings on the STATS report.

Definition Information
: Shows information about the collection definition; this part of the report is common to all PEX reports (STATS, PROFILE, TRACE).

  This heading appears only once in any type of PEX report.

Run Information
: Provides general system and session information about the collection; common to all PEX reports.

  This heading appears only once in any type of PEX report.

Stats Summary Information
: Shows CPU use information; unique to PEX STATS.

Library Information
Shows collection information for each library; provides data on call and complex MI counts, and CPU and disk I/O (both inline and cumulative).

Task Information
Shows information about all tasks and jobs in the collection including pool, priority, existence, and run time; the last common report section.

Statistics Information Section
Shows collection information for each program; provides data on call and complex MI counts, and CPU and disk I/O (both inline and cumulative).

The *Call Level* heading is only used for hierarchical collections. It shows the **relative** call stack position of programs (reconstructed from collected PEX data) and not the actual call level numbers that were used at run time. Thus, if program ITSOR1 shows a call level of 4 and program QDBGETKY appears at call level 5, you know that program ITSOR1 called the program QDBGETKY.

3.2.3 Sequence of STATS Report Sections

For a collection made using PEX STATS DTAORG(*FLAT) MRGJOB(*YES), only one set of statistics for all jobs is printed. Each section in the PEX report appears once only, in the following sequence:

1. Definition Information
2. Run Information
3. Stats CPU Summary Information
4. Library Information
5. Task Information
6. Statistics Information

For a collection involving separate statistics for **each active job**, there are multiple occurrences of certain sections. Examples of such STATS collections include:

- PEX STATS DTAORG(*FLAT) MRGJOB(*NO)
- PEX STATS DTAORG(*HIER)

Assuming that n jobs **were active and used CPU** during the collection, there are (n+1) occurrences of some sections as follows:

- Definition Information
- Run Information
- (n+1) x Stats CPU Summary Information
- (n+1) x Library Information
- (n+1) x Task Information
- (n+1) x Statistics Information

The Stats CPU Summary Information section indicates the start of a new statistical grouping, known as a *Partition*. There is a single Partition covering all jobs and tasks in the collection, and one for each individual job that used CPU during the collection. Therefore, even when a PEX STATS DTAORG(*HIER) collection is made over a single job, there are two partitions in the report, one for the job and all tasks (Partition 0) and one for just the job (Partition 1).

The first Stats Summary Information Section shows Partition 0, which represents the total of **all** jobs in the collection.

All subsequent Stats Summary Information Sections show Partition n, where n relates to one job that used CPU during the collection. The job to which Partition n relates is shown in the Task Information section that appears two pages following in the report (Partition section on page n and associated job information on page n+2).

3.2.4 Task Information Section

When reviewing the Task Information Section, be aware that PEX STATS does not show any wait times due to a queuing problem, or job state transition effects such as active to wait, ineligible to wait, lock wait, and seize waits. These are reported in the job summary-level Transaction Report of the AS/400 Performance Tools.

See the description for Figure 10 on page 31 for additional PEX Task interpretation assistance. Refer also to Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485 for a list of most of the LIC tasks that may have been active during the collection.

The following are the key elements to review in the Task Information Section.

3.2.4.1 CPU

Typically the CPU value is used to determine what processes/tasks were active during the data collection interval. Since PEX STATS can collect data either system-wide or by job, it helps you identify which tasks contributed to the data for modules/programs listed in the module section. Use this report to verify that you are indeed running stand-alone if that is what you are expecting.

If an unknown environment is being measured, concentrate on those tasks with the greatest CPU usage. You want to determine which programs were being run for these tasks. Once you identify the programs, you can refer to the module section for the resource usage for those programs. They are probably those with the highest CPU and Cumulative CPU times.

Use the following actions to determine which programs were running:

- Use a PEX Definition that specifies specific jobs.
- Use trace job commands to collect and print trace information about a user′s job.
- Talk to the programmer who understands the application.
- Ask the user, whose user ID is part of the full job name in the report, what he or she was doing.
- Enter the Start Copy Screen (STRCPYSCN) command against the user's display station, before starting PEX STATS, to verify what the user is doing on the system. Keep in mind that the application libraries are not necessarily identified on the user's menus and screens.
- Enter the WRKJOB command against the job that the user is running. One minor disadvantage of WRKJOB is that although the program stack is clearly displayed, it needs to be refreshed constantly to track what the user is doing. On the other hand, if your job (that is doing the refresh) is running at a high enough priority, you can get good information about what the job is doing by continuously refreshing the job′s program stack to see what the active program is (the bottom program name in the stack).

If the CPU for a LIC task is high, look at the *Name* field to determine what kind of task it is. It may be an I/O manager, such as a token ring line IOM. In this instance, a high usage may suggest a requirement for another token ring adapter.

The *AS/400 Licensed Internal Code Diagnostic Aids* manual, LY44-4900, contains brief descriptions of LIC tasks. Refer also to Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485 for a list of LIC task names. If LIC tasks appear to be using much CPU or disk I/O resource, compared to application programs, consider contacting IBM service for further assistance to determine if what you observe is normal or if it may indicate a system software problem.

3.2.4.2 DB Sync Reads

Synchronous DB reads are caused by obvious actions, such as reading a database file. However, they can also be caused by less obvious actions, such as adding to (when reuse deleted records is in use) or updating a database file, or creating a logical file.

Note, that, based on the current operating environment, there may be times when the system has to issue a synchronous read immediately before writing the updated data.

3.2.4.3 NDB Sync Reads

One of the more common forms of synchronous NDB reads is page faults. A high number of page faults can indicate an over-committed main storage pool; that is, too high of an activity level for the size of the pool. Other actions that cause synchronous NDB read (not necessarily in an over-committed environment) are:

- File Open/Close
- Add/Remove physical file member
- Sorts
- Save/Restore
- Index build
- Access to user objects that are not database files, such as:
  - Programs
  - Data areas
  - Office documents
  - Data queues
  - User spaces
  - User indexes
- System functions designed to touch many objects, such as:
  - DSPOBJD lib/X*
  - DSPFD lib/*ALL
  - DSPUSRPRF profile *OBJOWN
  - WRKACTJOB (one of the most common offenders)
  - WRKOUTQ *ALL (also seen often)
  - WRKWTR
  - File Transfer, especially SNADS

3.2.4.4 DB and NDB Sync Writes

Synchronous DB writes are associated with adding to or updating a database file, or creating a logical file. Actions that might cause synchronous NDB writes include:

- Sorts
- Creation or deletion of objects (with such commands as CRTPF, ADDPFM, and DLTF)
- Updating a data area
- Closing of files

3.2.4.5 DB and NDB Async Reads

These are typically performed by LIC tasks reading ahead on behalf of an OS/400 job, so that the data that is processed by that job (or program code that is run in that job) is already in main storage when it is to be used. These represent access to the auxiliary storage, and are usually associated with DB or sorts. High numbers (relative to CPU milliseconds) need not be a concern, because these usually represent efficient use of the auxiliary storage.

There can be cause for concern if asynchronous reads are being performed on one or only a few disk arms. If there are a high number of these I/Os being performed, the disk arm utilization may be significantly higher than normal guidelines and the disk arm becomes a bottleneck. PEX STATS does not identify disk arm utilizations. To view disk utilization statistics, you need to collect Performance Monitor data and examine the System Report *Disk Utilization* section, repetitively view WRKDSKSTS command output, or use the Enhanced PEX TRACE support described later in this redbook.

3.2.4.6 DB and NDB Async Writes

These are the write counterparts of the asynchronous read functions. The information for asynchronous reads applies here as well.

Note: If there are lots of unexplained disk I/O operations, use the PEX TRACE options to collect and analyze the I/O activity.

3.2.5 Statistics Information

With the Statistics Information, focus primarily on the number of calls, the amount of CPU used, and the amount of Cumulative CPU.

3.2.5.1 CPU

For those programs with the highest amount of CPU time (multiple milliseconds), and a Cumulative CPU time approximately equal to the CPU time, you need to investigate what each program is doing. Using PEX PROFILE data collection (the old Sampled Address Monitor) is the best analysis option here.

It is important not to just weigh the CPU time alone. With the Statistics Information, compare the CPU time against the number of calls for each count. Those programs with the highest CPU times *per call* warrant further investigation.

For OS/400 modules and MI Complex Instructions with high CPU utilization, you want to investigate your application design with the intent of decreasing the frequency of calling these modules. For example, in an application doing a lot of non-blocked I/O, the module QDBGETSQ (get sequential) is called a lot, and as a result may use a significant amount of CPU. If the order of processing and the file is such that database blocking can be used, you might see the module QDBGETM (get multiple) being called, which can result in less CPU utilization.

Refer to Section 3.3, "What Does This Module Do?" on page 51 and Section 3.3.2, "MI Complex Instructions" on page 54 for an explanation of some of the most commonly used modules and MI Complex Instructions. Be sure to read Chapter 4, "PEX STATS Examples" on page 57.

3.2.5.2 Cumulative CPU

If a program shows high Cumulative CPU usage and low CPU usage, you should collect a job trace with either the OS/400 TRCJOB command or the Performance Tools/400 interfaces to the TRCJOB function using the STRJOBTRC/ENDJOBTRC commands. You should review this trace job output along with a PEX collection of TYPE(*STATS) DTAORG(*HIER) and PRTPEXRPT output.

Comment on PEX STATS Hierarchical Support

Note that the CISC systems TPST PRPQ provides a Print Trace Summary (PRTTRCSUM) command that includes call/return and invocation level information to assist in understanding the flow of control between programs, and prioritizing programs within a job that should be further examined.

PEX does not provide the PRTTRCSUM function. In most cases the PEX STATS *HIER reports provide equivalent or better information using PRTPEXRPT.

The US National Technical Support Center has a set of additional performance tools known as IBMLIB. For V3R6 and V3R7 IBMLIB includes the PRTTRCSUM tool migrated from CISC systems. If you wish to explore using the IBMLIB set of tools contact the US National Technical Support Center in Rochester, Minnesota, USA. The tool is available only to IBM employees.

OS/400 modules with a high Cumulative CPU usage are possible. One example is deferred maintenance of an access path, where the first open uses a lot of CPU time.

MI Complex Instructions have identical CPU and Cumulative CPU usage, so ignore them at this time.

3.2.5.3 CALL OR XCTL

The count in this column is the number of calls or transfer controls (no return to calling program) to another program. This is useful to determine if high Cumulative CPU may be from programs called or from MI Complex Instructions.

3.2.5.4 Synchronous I/O

This is the total number of synchronous I/O operations issued by a program. Waiting for synchronous I/O to complete impacts performance. If this happens many times per second, performance can be noticeably degraded.

This heading includes the sum of all synchronous reads and writes, both DB and NDB. Remember that if the data is already in main storage, there is no synchronous I/O.

3.2.5.5 Asynchronous I/O

This is the total number of asynchronous I/O operations issued by a program. It is the sum of all asynchronous reads and writes, both DB and NDB.

3.3 What Does This Module Do?

OS/400 modules more easily relate to program function than do MI Complex Instructions. The purpose of the following list is to explain the activity of some of the most commonly used OS/400 modules.

Appendix B, "AS/400 Modules (Partial List)" on page 437 contains a more complete list of OS/400 modules, with one-line descriptions.

Module	Operation
QCA*	Command analyzer modules. These often represent CL commands used instead of HLL programs.
QCADRV	This module handles all CL commands and, in so doing, calls several other OS/400 modules. There is a one-to-one relationship between the number of calls of this module and the number of CL commands used in a CL program, run in an HLL program, and entered interactively. This module calls all QCA* modules.
QCAPOS	Called by the QCADRV module.
QCARULE	Called by the QCADRV module.
QC2IO	This is an ILE C program that interfaces between the user application program and OS/400 data management (for example, database and workstation I/O operations).
QDB*	Database module.
QDBGETKY	Accesses a file for input or update using a key for random access. An example is chaining in RPG.
QDBGETM	Sequential reads using blocking for input only. Refer to items and on page 54.
QDBGETSQ	Sequential reads, with each record retrieved individually. In this instance, an RPG program is not using blocking. Refer to item on page 54.
QDBPUT	Used to add or write non-blocked records to a database file. Refer to item on page 54.
QDBPUTM	Applies to the blocking in output files only. Refer to item on page 54.
QDBCLOSE	Full closes done against database files.
QDBOPEN	Full opens done against database files.
QDBSOPEN	Shared opens done against database files.
QDMCLOSE	The number of calls of this module is equal to the total number of all closes of all files except spooled files.
QDMCOPEN	The number of calls of this module is equal to the total number of file opens (excluding spooled files). This module is often called recursively for S36E opens (RPGII or System/36 COBOL programs).

QEX* System/36 environment module.

QEXCIFL Processes S36E // statements. Locks a file.

QEXCLSS Does OCL substitution and procedure control expression evaluation. When high, see if OCL can be simplified or reduced. For example, replace //FILE in each step with one at the beginning of the procedure with JOB-YES specified if possible.

QLN* This is an ILE COBOL module.

QLNRFSEQ This is an ILE COBOL program that interfaces between the user application program and OS/400 data management (for example, database and workstation I/O operations).

QLRMAIN Program initialization for OPM COBOL programs.

QMH* Message handling modules, such as `record not found` or `added record already existing`.

QMHSNJMQ Puts messages to the job log. When high, find out the cause and attempt to eliminate the problem. More than 1% of CPU time warrants further investigation.

QQQ* Modules used for QUERY and SQL. Use of traditional HLL programs with DB I/O and logical files instead of these may improve system performance.

QQQIMPLE Query initialization. Usually has high disk I/O and CPU use due to building a database index. Is called as a result of decisions made by QQQOPTIM.

QQQOPTIM Query optimizer. Decides how to run a query, SQL, or OPNQRYF and whether or not to build an index. Changes in each release and may give totally different results between releases, or as a result of logical files being added or taken away from a physical file.

QRGXINIT Program initialization for OPM RPG.

QRNXINIT Program initialization for ILE RPG.

QRNXIO This is an ILE RPG program that interfaces between the user application program and OS/400 data management (for example, database and workstation I/O operations).

QSF* Subfile module.

QSFCRT Each time this module is called, a subfile (part of a display file) is created.

QSFGET Each time this module is called, a record out of a subfile is read from a program.

QSFPUT Writing of subfile records to the subfile. This module is called every time you write a record to a subfile from your program.

QSNAPI ILE C generalized screen I/O interface module.

QSP* Spool modules.

QSPOPEN Full opens done for spooled files. Spooled files have two opens; one against the device file and one against the spooled file member where the physical data actually resides. The count for this module always equals the number of spooled files opened. Refer to item on page 54.

QUI* These are system **U**ser **I**nterface modules. These modules do most of the screen formatting for system commands and other functions.

QUIINMGR User Interface Manager Interaction program that interfaces to work station data management on behalf of system functions. The Performance Tools - Transaction report charges the calling program with all the resources used by any programs called by it, but which do not interact with the workstation. This may result in an inaccurate representation of programs that are high resource users. An example of this is the QUIINMGR program/module.

This program can be charged as a long transaction if a program called from the command screen displayed by QUIINMGR performs excessive processing but never issues a Write to the screen. Upon return to QUIINMGR, QUINMGR writes to the screen and gets charged with the long transaction because it issues the first write to the screen following input from the workstation.

Examples that assign poor performance to QUIINMGR include:

- SNDNETF for a large save file; copies the save file to an internal space for a SNADS send job to distribute
- SNDNETSPLF for a large spooled file; copies the printed output to an internal space for a SNADS send job to distribute
- A long running query that produces printed output only
- A program that builds a large database file

QWP* Work station printer support modules.

QWPPTFLD This module is used in conjunction with print files. It does formatting of print output for SNA/SCS protocols, and can be a high user of CPU time or cumulative CPU time, especially if 3270 device emulation is being used.

QWPPUT This module usually calls the QWPPTFLD module, and as such writes records to a print file.

QWS* Work station display support modules.

QWSGET Each call of this module represents the read of one display file format, or the second part of an RPG EXFMT. The number of calls of this module equals approximately the number of times the Enter key is pressed.

QWSOPEN Full opens for work station display files.

QWSPUT Sending of formats to the display screen. If Cumulative CPU for this module is high, you may see improved system performance by adding deferred writes. The call of this module represents the write of a format of a display file from a program to a display screen, or an RPG EXFMT.

QWSSFLCT This module is called when the subfile control record is written.

QWVPDAGE This module is called when an activation group destroy function is performed.

QZDA* These are OS/400 Host server (database, file, etc.) modules.

3.3.1 Examples of OS/400 Module Relationships

Examples of relationships between OS/400 modules include the following:

- Database blocking factors, and random versus sequential accessing can be determined (especially for a dedicated batch run) by looking at the call counts for QDBGETSQ, QDBGETM, QDBPUT, and QDBPUTM.
- If you know how many records were read or written by a job, you can determine the HLL blocking factor by comparing the number of records to the number of calls of QDBGETM and QDBPUTM. These are called once per block. If you see QDBGETSQ or QDBPUT instead, then no HLL program blocking occurred. This indicates that SEQONLY(*YES number-of-records) on the Override Database File (OVRDBF) command either needs to be used, or it is used but for some reason the system is ignoring the function. Check the job for a diagnostic message.

  Similar logic can be applied to OS/400 and LIC blocking.
- The total number of full opens = QDBOPEN + QWSOPEN + QSPOPEN. Therefore, the ratio of full to shared opens is approximately:

  ```
  (number of full opens) / ((QDMCOPEN + QSPOPEN) - number of full opens).
  ```
- The ratio of full DB opens to shared opens is

  ```
  QDBOPEN/QDBSOPEN.
  ```

  This information, combined with the total CPU for opens and closes (CCPU % - Cumulative CPU Utilization percentage for QDMCOPEN and QDMCLOSE) and the knowledge that shared opens cost approximately 90% less than a full open, allows you to calculate how much leverage you have in doing more shared opens or eliminating opens and closes by leaving programs active or by using group jobs.
- To get an approximate calculation of the Cumulative CPU opens and closes for systems running the System/36 environment, use the following formula:

  ```
  (QDMCOPEN ccpu - QEXOPN ccpu) + ((QCIOPENF + QCIOPEND + QCIOPENP) * 2) +
     QDMCLOSE ccpu
  ```
- A large number for QSPOPEN without many spooled files actually being produced indicates programs opening print files and not writing anything to them (an example is a debug file). In other words, an open and close of a spooled file is being done for no reason. *Open a spooled file only when you need it.* If QSPOPEN appears frequently as a result of running an interactive application, consider having a portion of the application partitioned to run in batch.

3.3.2 MI Complex Instructions

The purpose of this list is to explain some of the MI Complex Instructions and how they relate to OS/400 modules. Unless you are familiar with MI Complex Instructions, which were known as MI-SVLs (supervisor calls) on CISC systems, it is easier to determine what a program is doing by referring to the OS/400 modules. For a more complete list of MI Complex Instructions, refer to Appendix A, "AS/400 MI Complex Instructions (Partial List)" on page 433.

MI COMPLEX INSTRUCTION - OPERATION

*ACTCR — Activate Cursor. This MI Complex Instruction is used for full DB opens (includes spooled files opens from both intercept time and the printer writer).

*CRTCR Create Cursor. This is used for full DB opens.

*CRTDOBJ Create duplicate object. This MI Complex Instruction is used when the system duplicates an existing object; for example, to create an open data path (ODP).

*CRTDS The creation of any data space (DS) is the simplest form of a database object. It is used for PF members.

*CRTPG Program creation. This MI Complex Instruction usually means a compile operation was done during the data collection.

*DEQWAIT Dequeue, and wait if necessary, for a message. This is used to wait for:

- workstation I/Os
- most (except stream I/O operations) communications I/Os
- data queue dequeues

An *DEQWAIT is one point in which a Process Access Group (PAG) purge may occur. Therefore, CPU time may be high as a result of PAG purges/brings. This depends on whether PURGE(*YES) or PURGE(*NO) is in effect.

*DEQ Dequeue a message, similar to *DEQWAIT except that *DEQ never waits. This means it does not have the corresponding PAG PURGE considerations.

*DESCR Destroy Cursor. This is used for full DB closes.

*ENSOBJ Ensure changes to object by immediate write to auxiliary storage. Data area updates are handled with these.

*INSDSEN Insert data space entry, MI Complex Instruction for the random write (add) of a new record.

*INSSDSE Insert sequential data space entry MI Complex Instruction for the QDBPUTM module.

*MATPTR Materialize the pointer to an object already found and authorized to.

*UPDSEN Update of all records. The relationship between this and *RETDSEN shows the percentage of read records actually updated.

*RETDSEN MI Complex Instruction for the QDBGETSQ module - Unblocked DB reads.

*RETSDSE MI Complex Instruction for the QDBGETM module - Blocked DB reads.

*RSLVSP Resolve system pointer caused by full opens, commands, message handling, and late bound calls (calls using a variable).

*SETCR Set Cursor Index positioning.

*WAITEVT Work station I/O wait in System/36 environment.

3.4 Producing a Smaller STATS Report

Some PEX STATS reports produced using PRTPEXRPT may have a large number of pages. The size of the report depends on:

- The data organization (DTAORG) parameter of the PEX STATS collection definition

  DTAORG(*FLAT) produces significantly less pages than DTAORG(*HIER)

- Whether individual job or consolidated statistics are collected (MRGJOB parameter) of the PEX STATS collection definition

  This applies to DTAORG(*FLAT) collections only. Use of MRGJOB(*YES) ensures that consolidated statistics are kept for each program across all jobs in the collection; thus each program name appears once in the report. Using MRGJOB(*NO) ensures that individual program statistics are kept for each job in the collection; thus a program name appears separately within each individual job that used it.

We have provided an example query in Figure 19 on page 96 that reproduces the contents of just the Statistics Information Section of a PRTPEXRPT, excluding overall CPU percentages. Record selection criteria can be added to this query in order to **reduce** the size of the report.

Chapter 4. PEX STATS Examples

PEX STATS is useful for determining the CPU consumption and disk I/O activity for programs/modules active during the PEX STATS collection. This chapter shows examples of how to use the STATS reports from the PRTPEXRPT command.

PEX STATS is primarily a program-oriented performance tool, not a job-oriented tool. However, with STATS DTAORG(*HIER) you can link specific program usage to a specific job through some manual effort.

PEX STATS is able to capture precise data on each program′s resource usage by interrogating resource counters at each program-to-program transition. The ADDPEXDFN command establishes an operating environment for the PEX STATS monitor. Unlike TPST (CISC system Timing and Paging Statistics PRPQ), PEX STATS monitors data for all programs that are eligible for collection; there is no easy way to restrict collection to a subset of programs only. This is because PEX STATS uses an OPM program attribute and the ILE module attribute called Enable Performance Collection, which determines the level of data to be collected for a program.

Also unlike TPST, PEX STATS can collect data for all jobs or only specific jobs. We do this by specifying all jobs, specific job names, generic job names, or * (this job) on the ADDPEXDFN TYPE(*STATS) JOB parameter. By selecting this definition on the STRPEX command DFN parameter we determine what set of PEX collection functions to use.

Try to end PEX STATS collection as soon as possible because it may add significant CPU utilization on a busy system if the ENBPFRCOL attribute is set to other than Program Entry Procedure (PEP). ENBPFRCOL(*PEP), the only value for OPM programs, uses the least possible PEX STATS collection overhead. PEP is the default in V3R7 and, if PTF MF11968 has been installed, the V3R6 default.

See index entry *ENBPFRCOL* for more details.

Although PEX STATS is more powerful than previous TPST performance collection capabilities, there are two nice functions available with TPST for which there is no obvious equivalent function in RISC performance tools. These functions are:

- Print Trace Summary

  The TPST Print Trace Summary (PRTTRCSUM) command provides an interpretation of an OS/400 job trace placed into a database file. PRTTRCSUM output can show the call and return stack so you can view the interrelationships between user programs and OS/400 programs/modules in call sequence.

  PEX *STATS DTAOPT(*HIER) provides equivalent information, though the associated PRTPEXRPT does not indent the program names, based on call level number as TPST PRTTRCSUM does.

  Note: On RISC systems PRTRCSUM is available only in the IBM Services Library, IBMLIB. You should contact your IBM Technical Support group for details on how to obtain this library. However, please be aware that it is only available as part of an IBM Service offering. This is because it is an unsupported IBM tool, and only IBM Services professionals have been trained in how to interpret the reports.

You could write your own program to do the Call level indentation of PEX *HIER collected data.

We have run both the formally supported PRTTRCSUM on CISC systems and the RISC system IBMLIB PRTTRCSUM and they both produce equivalent output. When run against ILE programs, the first several pages contain ″unexpected program return″ messages, but the indented call and call level number section of the reports appear accurate. PEX *STATS DTAORG(*HIER), though not formatted as nicely as PRTTRCSUM, has no error messages for ILE programs.

- Compare TPST Tool

  CISC system TPST provides the Compare TPST (data) command CMPTPST. This command enables the comparison of up to 9 sets of collected TPST data.

  For RISC system PEX collected data you have to manually do the comparisons or write your own program to do this.

PEX STATS HIER provides similar capability to PRTTRCSUM as it can be used to determine the frequency of calls to user programs, HLL initialization routines, and file open and close routines. An advantage over TPST is that the PEX STATS HIER report shows the call stack level of each program or procedure.

Use PEX STATS FLAT when problem analysis has identified inexplicable CPU or disk activity within a job or system task. PEX STATS FLAT MERGE(*NO) produces program statistics against individual jobs and tasks. However, because this option causes the system to keep extra internal counters, use of MERGE(*NO) requires considerably higher overhead than use of MERGE(*YES). On busy systems, PRTPEXRPT of STATS MERGE(*NO) data may produce hundreds of pages in the report. See Section 4.6, “PEX STATS Query Example” on page 95 for more information. Recall that both job trace and the Performance Tools Transaction report output can identify programs used within a job.

To show how PEX STATS can help you in your environment we wrote sets of programs and analyzed them with PEX STATS. The following topics present a series of examples showing various PEX STATS collection options and associated PRTPEXRPT reports.

4.1 PEX STATS FLAT Example - Merge Jobs *YES

In this example, we show you both the PEX STATS HIER and PEX STATS FLAT reports so that you can compare them.

The program named OPENBAD calls the program OPEN5 100 times, which in turn opens five different files, producing 500 full opens. OPENGOOD overrides the files with SHARE(*YES) and pre-opens them using OPNDBF ...OPNOPT(*ALL), and calls OPEN5 100 times, producing five full opens and 500 shared opens. We analyzed both applications in an almost dedicated environment with PEX STATS. For PEX STATS FLAT we printed the reports sorted by cumulative CPU time; that is, the CPU time used by the program and all the programs invoked by the program directly or indirectly. Note that you cannot use a sort sequence against

PEX STATS HIER data; the sequence shown is chronological program call sequence, including invocation number.

First, we see the PEX STATS FLAT for the OPENBAD series of programs. Data was collected for one job only. All programs are enabled for PEX collection at the PEP level only. Please refer to Section 1.6, “Requirements for Collecting PEX Data” on page 14 for details on enabling programs for PEX STATS (and TRACE) performance data collection.

The following PEX STATS FLAT example was printed with programs in *descending cumulative CPU* sequence.

```
                                                   Performance Explorer Report                                    8/12/96 16:16:43
                                                     Definition Information                                                  Page
                                                                                                                                1
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : S_1J_F
Defined By . . . . . . . . . : A960123A
Definition Description . . . : Stats FLAT for 1 Job Only, Merge jobs *yes
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : YES
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *  C
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                                   Performance Explorer Report                                    8/12/96 16:16:43
                                                         Run Information                                                     Page
                                                                                                                                2
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
Sessions since IPL. . . . . . . . . . . . . :                        230
Session name. . . . . . . . . . . . . . . . : F_OPENBAD
Start time. . . . . . . . . . . . . . . . . : 1996-08-12-16.15.58.603928
Stop time . . . . . . . . . . . . . . . . . : 1996-08-12-16.16.18.253488
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.19.649560
Suspend time (us) . . . . . . . . . . . . . :                    174,264
Number of events. . . . . . . . . . . . . . :                     26,154
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054089
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . . :                        179
Jobs in session . . . . . . . . . . . . . . :                          1
                                                   Performance Explorer Report                                    8/12/96 16:16:43
                                                  Stats CPU Summary Information                                             Page
                                                                                                                               3
Library . . . . . :  QPEXDATA
Member. . . . . . :  F_OPENBAD
Description . . . :  OPENBAD PEX STATS FLAT EXAMPLE
Partition . . . . :          1
Total Raw CPU . . :      3410896 A
Overhead Removed. :       588690
Total CPU . . . . :      2822206 B
Task CPU. . . . . :        85744     3.0 %
Job CPU . . . . . :      2736462    97.0 %
                     ----------------------
   Pgm/Mod CPU. . :      2742950    97.2 %
   Unknown CPU. . :            0     0.0 %
                                                   Performance Explorer Report                                    8/12/96 16:16:43
                                                     Statistics Information                                        Page    3
                                                         Library Section
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
```

Name	Times Called	Calls Made	MI CPLX Issued	Inline Stats CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Cumulative Stats CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
HATT	101	1703	200	165,400	5.9	0	0	0	0	5,220,533	****	0	0	1108	0	0
QSYS	2807	1193	9766	352,377	12.5	0	0	0	0	3,565,406	****	0	0	1084	0	0
MI CPLX	9977	0	0	2,225,173	78.8	0	0	555	0	2,225,173	78.8	0	0	555	0	0
**LIC Task	0	0	0	85,743	3.0	0	0	0	0	85,743	3.0	0	0	0	0	0
**Unknown	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	0

*Figure 14 (Part 1 of 2). STATS FLAT - Full Opens SHARE(*NO) Example*

Performance Explorer Report — Task Information — 8/12/96 16:16:43 — Page 5

Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE

Task ID	Job/Task Name	Pool	Priority	Existence Start/End		Elapsed Time (us)	Run Time (us)	Run Time Percent
:	:	:		:		:		
(Jobs/tasks not using CPU have been removed)								
:	:	:		:		:		
44270	P23XWY32E A960123A 054089	4	160	Y	Y	17868688	3325152	97.49 [7]
40644	PA-T-P23XWY32E	1	40	Y	Y	17868688	3328	0.10
273	IPRO050103--2619	1	10	Y	Y	17846696	6712	0.20
146	SMXCSPRVSR	1	79	Y	Y	17841624	1464	0.04
85	RMTMSAFETASK	1	0	Y	Y	17834200	424	0.01
82	XMSPDBUS01000000	1	10	Y	Y	17834200	48	0.00
1	CFINT1	0	0	Y	Y	17868696	73768	2.16

Performance Explorer Report — Statistics Information — 8/12/96 16:16:43 — Page 9

Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE

Name	Times Called	Calls Made	MI CPLX Issued	Inline Stats CPU (us)	Inline %	Inline DB SIO	Inline DB AIO	Inline NDB SIO	Inline NDB AIO	Cumulative Stats CPU (us)	Cumulative %	Cumulative DB SIO	Cumulative DB AIO	Cumulative NDB SIO	Cumulative NDB AIO	Call Level
OPENBAD	[1] 1	203	0	81,215	2.9	0	0	0	0	[8] 2,681,872	95.0	0	0	554	0	0
[2] OPEN5	100	1500	200	84,185	3.0	0	0	0	0	2,538,660	90.0	0	0	554	0	0
[3] QDMCOPEN	501	501	3510	131,249	4.7	0	0	0	0	1,565,752	55.5	0	0	554	0	0
[4] QDBOPEN	500	0	1500	67,388	2.4	0	0	0	0	815,255	28.9	0	0	526	0	0
[5] *CRTS	503	0	0	[9] 617,866	21.9	0	0	[6] 526	0	617,866	21.9	0	0	526	0	0
QDMCLOSE	501	501	3005	58,318	2.1	0	0	0	0	494,346	17.5	0	0	0	0	0
QDBGETM	500	0	1000	34,534	1.2	0	0	0	0	396,228	14.0	0	0	0	0	0
*RETSDSE	500	0	0	350,248	12.4	0	0	0	0	350,248	12.4	0	0	0	0	0
*CRTDOBJ	501	0	0	325,582	11.5	0	0	28	0	325,582	11.5	0	0	28	0	0
*RSLVSP	1119	0	0	242,857	8.6	0	0	0	0	242,857	8.6	0	0	0	0	0
*DESCR	500	0	0	202,609	7.2	0	0	0	0	202,609	7.2	0	0	0	0	0
*DESS	504	0	0	185,406	6.6	0	0	0	0	185,406	6.6	0	0	0	0	0
[5] *ACTCR	500	0	0	112,054	4.0	0	0	0	0	112,054	4.0	0	0	0	0	0
**LIC Task	0	0	0	85,743	3.0	0	0	0	0	85,743	3.0	0	0	0	0	0
QCLCLCPR	100	0	500	11,536	0.4	0	0	0	0	61,190	2.2	0	0	0	0	0
*MATPTR	2157	0	0	50,876	1.8	0	0	0	0	50,876	1.8	0	0	0	0	0
QPTPARML	1	6	1	262	0.0	0	0	0	0	44,906	1.6	0	0	1	0	0
QPTPRCSS	1	56	0	3,566	0.1	0	0	0	0	36,096	1.3	0	0	1	0	0
*LOCK	504	0	0	35,675	1.3	0	0	0	0	35,675	1.3	0	0	0	0	0
*SETACST	502	0	0	25,552	0.9	0	0	1	0	25,552	0.9	0	0	1	0	0
QMHRCVPM	5	2	36	1,013	0.0	0	0	0	0	17,031	0.6	0	0	0	0	0
*UNLOCK	503	0	0	16,948	0.6	0	0	0	0	16,948	0.6	0	0	0	0	0
*MATINVIF	645	0	0	15,542	0.6	0	0	0	0	15,542	0.6	0	0	0	0	0
QMHGSD	2	22	15	1,426	0.1	0	0	0	0	14,644	0.5	0	0	0	0	0
QWSGET	12	5	12	2,422	0.1	0	0	0	0	13,964	0.5	0	0	0	0	0
QT3REQIO	9	0	18	538	0.0	0	0	0	0	11,600	0.4	0	0	0	0	0
QUIMGFLW	2	14	0	819	0.0	0	0	0	0	10,651	0.4	0	0	0	0	0
*DEQWAIT	6	0	0	9,809	0.3	0	0	0	0	9,809	0.3	0	0	0	0	0
*MATSOBJ	101	0	0	8,710	0.3	0	0	0	0	8,710	0.3	0	0	0	0	0
QDBCLOSE	500	0	0	8,220	0.3	0	0	0	0	8,220	0.3	0	0	0	0	0
QUIEXFMT	2	6	0	626	0.0	0	0	0	0	8,136	0.3	0	0	0	0	0
*MATPRATR	508	0	0	7,871	0.3	0	0	0	0	7,871	0.3	0	0	0	0	0
QPTGTINP	3	9	6	4,814	0.2	0	0	0	0	7,710	0.3	0	0	0	0	0
QWSPUT	23	6	25	4,528	0.2	0	0	0	0	6,993	0.2	0	0	0	0	0
QSFPUT	15	1	0	4,036	0.1	0	0	0	0	6,181	0.2	0	0	1	0	0
QUIINMGR	2	4	0	1,237	0.0	0	0	0	0	5,916	0.2	0	0	0	0	0
QCADRV2	7	23	2	1,043	0.0	0	0	0	0	4,499	0.2	0	0	0	0	0
QCMDEXC	2	8	12	574	0.0	0	0	0	0	4,161	0.1	0	0	0	0	0
*MODSOBJ	506	0	0	3,516	0.1	0	0	0	0	3,516	0.1	0	0	0	0	0
*LOCKSL	100	0	0	3,129	0.1	0	0	0	0	3,129	0.1	0	0	0	0	0

*Figure 14 (Part 2 of 2). STATS FLAT - Full Opens SHARE(*NO) Example*

Notes for STATS FLAT OPENBAD Example:

A The definition used to collect this data specified only one job (as indicated by the ***** character under *Selected Jobs*). Thus, this figure represents the CPU used by the one job and all tasks on the system, including any PEX collection overhead.

Note that work done by LIC tasks on behalf of our job is hp2.not apportioned to our job. That is, if TASKA spent 5% of the CPU it used on our job and 95% on some other job, this report includes all 100% of the CPU used by TASKA (and not just the 5% it really used for our job).

B Note that this figure is used as the base total CPU figure for the percentage calculations in the Statistics Information section. This is because the CPU overhead of PEX data collection can be removed at the program level, thus this figure is more accurate when reviewing individual program percentage statistics.

Be Careful on PEX CPU Utilization Removal

Since this example was created it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, “Performance Explorer PTF Summary” on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

C This collection was over one job only. The PEX definition that we used specified that data is collected for the one job in which the STRPEX command is issued.

Since this STATS example used DTAORG(*FLAT), we do not get any values under the *Call Level* heading on the report. Remember this report was printed in descending **cumulative CPU** sequence.

Note also, that under the *Task Information* section of the report we have omitted all the LIC tasks that used no CPU.

1 We called program OPENBAD once. Cumulatively, this program used 95% of the CPU used during the PEX measurement. However, its direct CPU was only 2.9%, indicating that one or more programs it called (203 calls made) were responsible for most of the CPU used.

2 Program OPEN5 was called 100 times. We cannot see which program called it from this report (however we know that it was called from program OPENBAD). Cumulatively, this program used 90% of the CPU used during the PEX measurement; however, it directly used 3%. This indicates that most of the CPU is being used by a program running at a lower call stack level than program OPEN5.

3 QDMCOPEN is the Data Management Common Open system module. It is always called as a first step in opening a file. Note that it was called 501 times and had a cumulative CPU figure of 55% and a direct CPU figure of 4.7%.

4 This is the database full file open module (QDBOPEN). It was called 500 times, issued 1500 MI complex instructions, used 28.9% of the cumulative CPU and 2.4% of the direct CPU. Perhaps the difference between the direct and cumulative CPU is accounted for in the MI complex instructions called - but we cannot see what they are from this report (we need STATS HIER for this).

5 Names beginning with ***** indicate MI complex instructions. *CRTS through *ACTCR are taking significant direct CPU. *RETSDSE might be normal as part of database *sequential only* processing, depending on how many records are retrieved for *RETSDSE. But hundreds of calls for *CRTS, *CRTDOBJ, *RSLVSP, *DESCR, *DESS, and *ACTCR indicate a high possibility of hundreds of file opens and closes going on. These MI complex instructions are using a lot of direct CPU. Note that the direct and cumulative CPU figure is identical for MI complex instructions as they do not call anything else.

Note that *CRTS - creating a space, is used by OS/400 for many functions, including full file opens, work station subfiles, SNADS send functions, and so on. **6** Note the number of synchronous non-database I/Os is 526, slightly more than one per call to *CRTS!

*RETSDSE (Retrieve Sequential Data Space Entries) is typically associated with sequential database reads such as those indicated by the OS/400 QDBGETM (database get multiple records) module.

*CRTDOBJ (Create Duplicate Object) is performed for many different OS/400 functions, but is certainly part of full file open, which creates an Open Data Path (ODP) by duplicating an ODP prototype that is part of the file object itself.

*RSLVSP (Retrieve System Pointer) is performed for many OS/400 functions as part of finding an object that could be a file object being opened or a program object being called the first time within a job.

*DESCR (Destroy Cursor) is part of full file close.

*DESS (Destroy Space) could be part of full file close.

*ACTCR (Activate (database) Cursor) is typical of full file open.

7 This job used 97.49% of the CPU used by all jobs and all tasks involved in the collection. Specifically, this is 97.49% of the total raw CPU as shown in **A**. When reviewing the percentage CPU used by individual jobs, the reported percentage is based on the Total Raw CPU for the collection; PEX collection overhead is not removed for job level statistics shown in the Task Information Section, it is only removed for program or procedure level statistics reported in the Statistics Information Section.

In this example, we collected data for one job and all tasks. Thus, the CPU represents 97.49% of all the CPU used by **this one job** and all the tasks on the system - it does not represent 97.49% of overall CPU utilization at the time of the trace. Overall system CPU utilization is not reported by PEX, only CPU used by all jobs being traced and all system tasks is reported.

8 Ninety-five percent of the CPU used by all jobs and tasks traced was used by this program and all programs/procedures called from this program. Specifically, this program cumulatively used 95% of the total CPU shown in **B** in the Stats CPU Summary Information Section. Since the PEX collection overhead is known at the program/procedure level, program/procedure CPU percentages are based against this adjusted total CPU total to ensure the maximum level of accuracy.

9 To determine which system routines are the most costly, we divide the direct CPU by the number of times called to evaluate the cost-per-invocation. Thus we can compare different routines and find the most expensive. In this example the Create Space *CRTS MI complex instruction uses 617866/503 = 1228 CPU microseconds each time it is invoked. We need to reduce the number of invocations to this routine whenever possible, as it is both expensive and called frequently.

CONCLUSION

This report enables us to see which programs are using excessive CPU. Unless we are already familiar with most of the system routines (who calls what and why) we cannot get a good understanding of how the system routines interrelate using this report.

4.2 PEX STATS HIER Example - Bad File Opens

The next example shows PEX STATS run over the same programs performing identical functions to those in Figure 14 on page 60. However, this example was produced using STATS HIER over a single job, so that we can see the program flow via the *Call Level* column in the Statistics Information section of the report.

```
                                        Performance Explorer Report                              8/12/96 16:14:21
                                          Definition Information                                         Page
                                                                                                            1
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : S_1J_H
Defined By . . . . . . . . . : A960123A
Definition Description . . . : Stats HIER for 1 Job Only
Data Organization. . . . . . : HIER
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                        Performance Explorer Report                              8/12/96 16:14:21
                                              Run Information                                            Page
                                                                                                            2
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Sessions since IPL. . . . . . . . . . . . . :                        228
Session name. . . . . . . . . . . . . . . . : H_OPENBAD
Start time. . . . . . . . . . . . . . . . . : 1996-08-12-16.13.34.333032
Stop time . . . . . . . . . . . . . . . . . : 1996-08-12-16.14.02.070552
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.27.737520
Suspend time (us) . . . . . . . . . . . . . :                    293,176
Number of events. . . . . . . . . . . . . . :                     26,140
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054089
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOMO5
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6MO
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                        179
Jobs/tasks in session . . . . . . . . . . . :                        179
Jobs in session . . . . . . . . . . . . . . :                          1
                                        Performance Explorer Report                              8/12/96 16:14:21
                                       Stats CPU Summary Information                                    Page
                                                                                                           3
Library . . . . . :  QPEXDATA
Member. . . . . . :  H_OPENBAD
Description . . . :  OPENBAD PEX HIER EXAMPLE
Partition . . . . :          0  C
Total Raw CPU . . :     3435504
Overhead Removed. :      591665
Total CPU . . . . :     2843839
Task CPU. . . . . :      110904     3.9 %
Job CPU . . . . . :     2732935    96.1 %
                     -----------------------
   Pgm/Mod CPU. . :     2738119    96.3 %
   Unknown CPU. . :           0     0.0 %
```

*Figure 15 (Part 1 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

```
                                             Performance Explorer Report                            8/12/96 16:14:21
                                                Task Information                                            Page
                                                                                                               4
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Task ID    Job/Task Name              Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                    Start/End                                           Percent
------------------------------------------------------------------------------------------------------------------------------
                                                                                                         10
E 44270 P23XWY32E  A960123A   054089     4      160   Y     Y            25979408            3324600     96.77
 (lines removed for jobs/tasks with 0 CPU)
    40644 PA-T-P23XWY32E              1       40   Y     Y            25979416               3344      0.10
      273 IPR0050103--2619            1       10   Y     Y            25963280               8872      0.26
      147 SMSTRIPEWATCHDOG            1       10   Y     Y            25942792                768      0.02
      146 SMXCSPRVSR                  1       79   Y     Y            25942792                416      0.01
       85 RMTMSAFETASK                1        0   Y     Y            25933672                808      0.02
       82 XMSPDBUS01000000            1       10   Y     Y            25933672                 48      0.00
       76 SMSIGNALEVENT               1       10   Y     Y            25930512              11752      0.34

                                                                                                              8
Library . . . . . :  QPEXDATA
Member. . . . . . :  H_OPENBAD
Description . . . :  OPENBAD PEX HIER EXAMPLE
Partition . . . . :          1  D
Total Raw CPU . . :    3409496  A
Overhead Removed. :     591665
Total CPU . . . . :    2817831  B
Task CPU. . . . . :      84896     3.0 %
Job CPU . . . . . :    2732935    97.0 %
                     -----------------------
   Pgm/Mod CPU. . :    2738119    97.2 %
   Unknown CPU. . :          0     0.0 %
                                             Performance Explorer Report                            8/12/96 16:14:21
                                               Statistics Information                                  Page    8
                                            M05

                                                Library Section
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
              Times   Calls MI CPLX            CPU        DB    DB   NDB   NDB            CPU        DB    DB   NDB   NDB  Call
Name          Called   Made  Issued         (us) /   %   SIO   AIO   SIO   AIO         (us) /   %   SIO   AIO   SIO   AIO Level
------------------------------------------------------------------------------------------------------------------------------
**LIC Task         0       0       0       84,895  3.0     0     0     0     0       84,895  3.0     0     0     0     0     0
**Unknown          0       0       0            0  0.0     0     0     0     0            0  0.0     0     0     0     0     0
QSYS            2805    1191    9761      346,328 12.3     0     0     0     0    3,569,675 ****     0     0  1094     0     0
MI CPLX         9972       0       0    2,227,615 79.1     0     0   561     0    2,227,615 79.1     0     0   561     0     0
HATT             101    1703     200      164,175  5.8     0     0     0     0    5,210,276 ****     0     0  1120     0     0
*Alias             0       0       0            0  0.0     0     0     0     0            0  0.0     0     0     0     0     0
                                             Performance Explorer Report                            8/12/96 16:14:21
                                                Task Information                                            Page
                                                                                                              10
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Task ID    Job/Task Name              Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                    Start/End                                           Percent
------------------------------------------------------------------------------------------------------------------------------
    44270 P23XWY32E  A960123A   054089     4      160   Y     Y            25979408           3324600     97.51
        1 CFINT1                      0        0   Y     Y            25979408             84896      2.49  F
------------------------------------------------------------------------------------------------------------------------------
                                                                                          3409496
```

*Figure 15 (Part 2 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

```
                                                         Performance Explorer Report                                    8/12/96 16:14:21
                                                           Statistics Information                                             Page   11
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX          CPU        DB    DB   NDB   NDB            CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued       (us) /   %   SIO   AIO   SIO   AIO         (us) /   %   SIO   AIO   SIO   AIO Level
------------------------------------------------------------------------------------------------------------------------------
**LIC Task       0       0       0       84,895  3.0     0     0     0     0        84,895  3.0     0     0     0     0     0
**Unknown        0       0       0            0  0.0     0     0     0     0             0  0.0     0     0     0     0     0
 (Lines removed for brevity.)
QCACALL          1       0       2           82  0.0     0     0     0     0           499  0.0     0     0     0     0     1
*RSLVSP          1       0       0          320  0.0     0     0     0     0           320  0.0     0     0     0     0     2
*MATSOBJ         1       0       0           96  0.0     0     0     0     0            96  0.0     0     0     0     0     2
                                          1                                                 11
OPENBAD          1     203       0       81,012  2.9     0     0     0     0     2,676,863 95.0     0     0   560     0     1
QCLRSLV          1       1      13          265  0.0     0     0     0     0           567  0.0     0     0     0     0     2
*MATINVAT        1       0       0           75  0.0     0     0     0     0            75  0.0     0     0     0     0     3
*MATPTRIF        1       0       0           28  0.0     0     0     0     0            28  0.0     0     0     0     0     3
QLIADOPT         1       0       1           12  0.0     0     0     0     0            63  0.0     0     0     0     0     3
*RSLVSP          1       0       0           51  0.0     0     0     0     0            51  0.0     0     0     0     0     4
*DEQ             6       0       0           76  0.0     0     0     0     0            76  0.0     0     0     0     0     3
*ENQ             5       0       0           58  0.0     0     0     0     0            58  0.0     0     0     0     0     3
QCLCLCPR       100       0     500       11,708  0.4     0     0     0     0        61,612  2.2     0     0     0     0     2
*MATPTR        100       0       0        2,563  0.1     0     0     0     0         2,563  0.1     0     0     0     0     3
*RSLVSP        100       0       0       33,284  1.2     0     0     0     0        33,284  1.2     0     0     0     0     3
*MATSOBJ       100       0       0        8,734  0.3     0     0     0     0         8,734  0.3     0     0     0     0     3
*LOCKSL        100       0       0        3,086  0.1     0     0     0     0         3,086  0.1     0     0     0     0     3
*UNLOCKSL      100       0       0        2,221  0.1     0     0     0     0         2,221  0.1     0     0     0     0     3
                                             2
OPEN5          100    1500     200       83,163  3.0    0      0     0     0     2,533,412 89.9     9     0   560     0     2
    OPEN5/_QRNP_PEP_OPEN5
*Alias           0       0       0            0  0.0     0     0     0     0             0  0.0     0     0     0     0     3
*MATINVIF      100       0       0        1,498  0.1     0     0     0     0         1,498  0.1     0     0     0     0     4
                                             3
QDMCOPEN       500     500    3500      130,998  4.6     0     0     0     0     1,561,512 55.4     0     0   560     0     4
                                             4
*MATINVIF      500       0       0       13,870  0.5     0     0     0     0        13,870  0.5     0     0     0     0     5
                                             4
*RSLVSP       1000       0       0      208,948  7.4     0     0     0     0       208,948  7.4     0     0     0     0     5
                                             4
*MATPTR        500       0       0       10,229  0.4     0     0     0     0        10,229  0.4     0     0     0     0     5
                                             4
*CRTDOBJ       500       0       0      319,520 11.3     0     0    30     0       319,520 11.3     0     0    30     0     5
                                             4
*SETACST       500       0       0       24,508  0.9     0     0     0     0        24,508  0.9     0     0     0     0     5
                                             4
*LOCK          500       0       0       35,306  1.3     0     0     0     0        35,306  1.3     0     0     0     0     5
                                             5
QDBOPEN        500       0    1500       62,455  2.2     0     0     0     0       817,628 29.0     0     0   530     0     5
                                             6
*MATPTR        500       0       0       13,217  0.5     0     0     0     0        13,217  0.5     0     0     0     0     6
                                             6
*CRTS          500       0       0      621,427 22.1     0     0   530     0       621,427 22.1     0     0   530     0     6
                                             6
*ACTCR         500       0       0      113,622  4.0     0     0     0     0       113,622  4.0     0     0     0     0     6
```

*Figure 15 (Part 3 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

Performance Explorer Report 8/12/96 16:14:21
Statistics Information Page 13

Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QDBGETM	500	0	1000	34,412	1.2	0	0	0	0	393,360	14.0	0	0	0	0	4
*MATPTR	500	0	0	11,157	0.4	0	0	0	0	11,157	0.4	0	0	0	0	5
*RETSDSE	500	0	0	347,752	12.3	0	0	0	0	347,752	12.3	0	0	0	0	5
				7												
QDMCLOSE	500	500	3000	57,260	2.0	0	0	0	0	492,210	17.5	0	0	0	0	4
*MATPRATR	500	0	0	7,339	0.3	0	0	0	0	7,339	0.3	0	0	0	0	5
*MATPTR	500	0	0	11,431	0.4	0	0	0	0	11,431	0.4	0	0	0	0	5
				8												
QDBCLOSE	500	0	0	8,316	0.3	0	0	0	0	8,316	0.3	0	0	0	0	5
*DESS	500	0	0	184,942	6.6	0	0	0	0	184,942	6.6	0	0	0	0	5
*MODSOBJ	500	0	0	3,116	0.1	0	0	0	0	3,116	0.1	0	0	0	0	5
*DESCR	500	0	0	202,512	7.2	0	0	0	0	202,512	7.2	0	0	0	0	5
*UNLOCK	500	0	0	17,088	0.6	0	0	0	0	17,088	0.6	0	0	0	0	5
				9												
*DEACTPG	100	0	0	1,345	0.0	0	0	0	0	1,345	0.0	0	0	0	0	4
QCLRTNE	1	0	0	22	0.0	0	0	0	0	22	0.0	0	0	0	0	2

*Figure 15 (Part 4 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

Notes for STATS HIER OPENBAD Example:

This report shows us the program flow; the Call Level column is filled in with invocation level numbers because the definition used to collect the data was STATS HIER.

1 We called program OPENBAD once and it ran at call level 1. Cumulatively, this program used 95% of the CPU used during the PEX measurement. However, its direct CPU was only 2.9%, indicating that a program it called was responsible for most of the CPU. These results are consistent with those in the STATS FLAT example, see Figure 14 on page 60.

2 Program OPEN5 was called 100 times, running at call level 2. Because control was not returned to call level 1 (**1**), we know that this program was called by program OPENBAD running at call level 1. Cumulatively, this program used 89.9% of the CPU used during the PEX measurement; however, it directly used 3%. This indicates that most of the CPU is being used by a program running at a lower call stack level than program OPEN5. So we need to check what is happening at call stack levels below 2 (for example, three or higher) to see what they are doing.

Notice the ***Alias** entry following the OPEN5 PEP entry (OPEN5/_QRNP_PEP_OPEN5). *Alias shows up for each ILE PEP, and adds one to the Call Level for the programs called by the ILE program. This makes the call level value one higher than you expect. PTF MF14447 became available in January 1997; it eliminates the *Alias entry, and the call level numbers for ILE programs are what you expect. See Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 for a hierarchical example with PTF MF14447 applied.

3 QDMCOPEN is running under program OPEN5. Recall that it is always called before a file open. Note that it was called 500 times and had a cumulative CPU figure of 55.4% and a direct CPU figure of 4.6%. Most CPU is being used by something QDMCOPEN is calling and not by

QDMCOPEN itself. Since QDMCOPEN is running at call level 4, we need to check what is happening at call levels 5 and below.

4 All these MI complex instructions are running under program QDMCOPEN. Note that the create duplicate object *CRTDOBJ MI complex instruction is using 11.3% of all CPU used by this single job and all tasks; this is expensive.

5 Here the full file open routine, QDBOPEN, used 29% of the cumulative CPU and 2.2% of the direct CPU. What is QDBOPEN calling that is so expensive?

6 These MI complex instructions are using a lot of CPU. Note that here the create space *CRTS instruction is responsible for 22.1% of the CPU used (see **B** for the exact total used). Also, it is the *CRTS instruction that is responsible for the 530 synchronous non-database IOs. Actually, the *CRTDOBJ instruction running under program QDMCOPEN is responsible for another 30 synchronous non-database IOs, which is why the total cumulative figure against program OPENBAD in **1** is 560.

7 This is the data management file close routine, always called as part of close file processing, irrespective of how database actually does the close.

8 Here is the database full file close routine, QDBCLOSE, clearly showing that we are not using shared file opens because we issued 500 calls to the full db file open routine QDBOPEN (see **5**) and 500 calls to this full db file close routine.

9 This MI complex instruction performs a deactivate program (*DEACTPG) indicating that all resources scoped to the program are being returned to the system. These resources might include static storage or an activation group.

10 This job used 96.77% of the Total Raw CPU as shown in **A** in the Stats CPU Summary Information Section. The Raw CPU figure is used to show the percentage each job is using, as we cannot make adjustments for PEX overhead at the job/task level. Such adjustment overhead can be made only at the program or procedure level.

In this example, we collected data for one job and all tasks. Thus, the CPU represents 96.77% of all the CPU used by this one job and all the tasks on the system - it does <u>not</u> represent 96.77% of all used CPU at the time of the trace (because there may be other jobs using a lot of CPU and the CPU data for these jobs was not included in this measurement; however, the task CPU data for <u>all</u> jobs is included in this measurement).

11 This program used 95% of the Total CPU as shown in **B** in the Stats CPU Summary Information Section. This is because at the program (or procedure) statistics level we are able to remove the PEX collection overhead.

A The definition used to collect this data specified only one job. Thus, this figure represents the CPU used by the one job and all tasks on the system, including any PEX collection overhead.

Note that work done by tasks on behalf of our one job is <u>not</u> pro-rated. That is, the report includes all LIC task work, not just LIC task work done on behalf of the jobs specified in the STATS collection (JOB keyword).

Please be sure you read remarks **B**, **C**, and **D** before using any CPU total figures in this report.

B Note that this figure is used as the base total CPU figure for the percentage calculations in the Statistics Information section. This is because the CPU overhead of PEX data collection can be removed at the program level, so this figure is more accurate when reviewing individual program percentage statistics.

Please be sure you read remarks **A**, **C**, and **D** before using any CPU total figures in this report.

Be Careful on PEX CPU Utilization Removal

Since this example was created, it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, “Performance Explorer PTF Summary” on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

C When doing PEX STATS DTAORG(*FLAT) MRGJOB(*NO), there is a partition section for each of the number of jobs included in the collection, except for the special Partition 0 section. Partition 0 represents all LIC tasks and all jobs included in the collection (ADDPEXDFN command JOB parameter. If you specified MRGJOB(*YES), Partition 1 (all jobs) should follow Partition 0 statistics. If you specified MRGJOB(*NO), you should have Partition 1 through Partition n, where n represents the number of jobs for which data was collected.

<u>Do not</u> use the data in *Stats CPU Summary Information* Partition 0 of a PEX STATS DTAORG(*HIER) report to represent the totals for the job you are investigating. Use Partition 1 statistics.

Partition ″n″ means the following pages are for a specific job and the actual job name appears two pages following its associated Partition page. Therefore, if you had collect data for five jobs, there are six partition sections, zero and partition one through partition five. (For an example of a PRTPEXRPT showing multiple partitions, see Section 4.4, “PEX STATS FLAT Example - Merge Jobs *NO” on page 77.)

Please be sure you read remarks **A**, **B**, and **D** before using any CPU total figures in this report.

D In this example, where a single job was tracked, the total figures in Partition 1 relate to our single job. Thus the program and job percentage figures are based against total figures from this section.

Please be sure you read remarks **A**, **B**, and **C** before using any CPU total figures in this report.

E This is the Task Dispatcher Element (TDE) number for the single job we were tracking.

F LIC Task CFINTn, where n represents the CFINT task for a specific processor, is the only LIC task included in every Partition 1 through Partition n report section. CFINT is a processor specific interrupt handler that normally consumes little CPU utilization. There are up to four of these (CFINT1-CFINT4) tasks for the current maximum supported number of CPU processors on a single system (530-2153, 530-2162, 53S-2156, 53S-2157 support 4 processors). See Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485 for a list of LIC tasks and a brief description of their functions.

Refer to Appendix A, "AS/400 MI Complex Instructions (Partial List)" on page 433 for a list of MI Complex Instructions and Appendix B, "AS/400 Modules (Partial List)" on page 437 for a list of AS/400 module names.

The next example (Section 4.3, "PEX STATS FLAT Example - Good File Opens") shows file opens that are shared opens.

Be Careful When Reviewing Partition Sections

When you produce a PEX STATS HIER report for, say three jobs, ensure that you use partitions 1, 2, and 3 to represent the CPU totals for each of the three jobs. In order to determine the job name to which a Partition and its associated information relate, locate the Task Information section immediately following the Stats CPU Summary section in which the Partition n appears; the job or jobs to which the partition relates are listed in this section. For further explanation, please refer to Section 3.2.3, "Sequence of STATS Report Sections" on page 46.

4.3 PEX STATS FLAT Example - Good File Opens

This example shows program OPENGOOD calling program OPEN5 100 times, where program OPEN5 opens 5 database files each time it is called. The only difference between this example and the OPENBAD FLAT example in Figure 14 on page 60 is that this example used shared file opens. Specifically, program OPENGOOD issued the OVRDBF... SHARE(*YES) and OPNDBF commands prior to calling program OPEN5.

```
                                                  Performance Explorer Report                                     8/12/96 16:15:39
                                                    Definition Information                                                 Page
                                                                                                                               1
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : S_1J_F
Defined By . . . . . . . . . : A960123A
Definition Description . . . : Stats FLAT for 1 Job Only, Merge jobs *yes
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : YES
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                                  Performance Explorer Report                                     8/12/96 16:15:39
                                                        Run Information                                                    Page
                                                                                                                               2
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
Sessions since IPL. . . . . . . . . . . . . :                        229
Session name. . . . . . . . . . . . . . . . : F_OPENGOOD
Start time. . . . . . . . . . . . . . . . . : 1996-08-12-16.14.58.740360
Stop time . . . . . . . . . . . . . . . . . : 1996-08-12-16.15.16.454656
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.17.714296
Suspend time (us) . . . . . . . . . . . . . :                    156,200
Number of events. . . . . . . . . . . . . . :                     16,218
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054089
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . . :                        179
Jobs in session . . . . . . . . . . . . . . :                          1
                                                  Performance Explorer Report                                     8/12/96 16:15:39
                                                 Stats CPU Summary Information                                            Page
                                                                                                                              3
Library . . . . . :  QPEXDATA
Member. . . . . . :  F_OPENGOOD
Description . . . :  OPENGOOD STATS FLAT EXAMPLE
Partition . . . . :          1
Total Raw CPU . . :       873232 A
Overhead Removed. :       256083
Total CPU . . . . :       617149 B
Task CPU. . . . . :        24336     3.9 %
Job CPU . . . . . :       592813    96.1 %
                     -----------------------
   Pgm/Mod CPU. . :       581781    94.3 %
   Unknown CPU. . :        11032     1.8 %
                                                  Performance Explorer Report                                     8/12/96 16:15:39
                                                    Statistics Information                                        Page    3
                                                       Library Section
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX           CPU       DB    DB   NDB   NDB            CPU       DB    DB   NDB   NDB  Call
Name        Called    Made  Issued       (us) /   %   SIO   AIO   SIO   AIO        (us) /   %   SIO   AIO   SIO   AIO Level
-----------------------------------------------------------------------------------------------------------------------------
HATT           101    1751     200      159,085 25.8     0     0     0     0      993,443 ****     0     0     0     0     0
QSYS          2989    1326    4600      226,679 36.7     0     0     0     0      687,379 ****     0     0     4     0     0
MI CPLX       4811       0       0      196,017 31.8     0     0     1     0      196,017 31.8     0     0     1     0     0
**LIC Task       0       0       0       24,336  3.9     0     0     0     0       24,336  3.9     0     0     0     0     0
**Unknown        0       0       0       11,031  1.8     0     0     0     0       11,031  1.8     0     0     0     0     0
```

*Figure 16 (Part 1 of 3). STATS FLAT - Full Opens SHARE(*YES) Example*

```
                                                   Performance Explorer Report                                       8/12/96 16:15:39
                                                        Task Information                                                         Page
                                                                                                                                    5
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
Task ID    Job/Task Name              Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                    Start/End                                           Percent
------------------------------------------------------------------------------------------------------------------------------------
     44270 P23XWY32E  A960123A   054089   4      160   Y    Y           15907520                 848896    97.21  8
     40644 PA-T-P23XWY32E                 1       40   Y    Y           15907528                   3464     0.40
       276 IPR3050103--2619               1       10   Y    Y           15889096                   6536     0.75
       146 SMXCSPRVSR                     1       79   Y    Y           15884104                    304     0.03
       122 SK-ASC002                      1       70   Y    Y           15881536                    640     0.07
       105 SMP00004                       1        1   Y    Y           15878840                   2808     0.32
        85 RMTMSAFETASK                   1        0   Y    Y           15876448                    568     0.07
        82 XMSPDBUS01000000               1       10   Y    Y           15876448                     24     0.00
```

*Figure 16 (Part 2 of 3). STATS FLAT - Full Opens SHARE(*YES) Example*

Performance Explorer Report 8/12/96 16:15:39
Statistics Information Page 9

Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
OPENGOOD	[1] 1	251	0	85,519	13.9	0	0	0	0	[9] 675,106	****	0	0	0	0	0
OPEN5	[2] 100	1500	200	73,565	11.9	0	0	0	0	318,336	51.6	0	0	0	0	0
QDMCOPEN	[3] 506	1011	545	72,197	11.7	0	0	0	0	138,469	22.4	0	0	0	0	0
QDBGETSQ	500	0	1500	25,804	4.2	0	0	0	0	75,020	12.2	0	0	0	0	0
QCLCLCPR	100	0	500	10,162	1.6	0	0	0	0	58,445	9.5	0	0	0	0	0
QDMCLOSE	506	6	1040	26,831	4.3	0	0	0	0	50,100	8.1	0	0	0	0	0
QPTPARML	1	6	1	260	0.0	0	0	0	0	46,465	7.5	0	0	1	0	0
*RSLVSP	145	0	0	39,248	6.4	0	0	0	0	39,248	6.4	0	0	0	0	0
QPTPRCSS	1	56	0	3,634	0.6	0	0	0	0	38,340	6.2	0	0	1	0	0
QMHRCVPM	5	2	36	1,019	0.2	0	0	0	0	28,549	4.6	0	0	0	0	0
QDMGETOV	510	0	510	17,614	2.9	0	0	0	0	28,103	4.6	0	0	0	0	0
*SETCR	500	0	0	27,247	4.4	0	0	0	0	27,247	4.4	0	0	0	0	0
*MATPTR	1228	0	0	26,504	4.3	0	0	0	0	26,504	4.3	0	0	0	0	0
QMHGSD	2	61	36	3,038	0.5	0	0	0	0	26,120	4.2	0	0	0	0	0
**LIC Task	0	0	0	24,336	3.9	0	0	0	0	24,336	3.9	0	0	0	0	0
*MATINVIF	1198	0	0	24,208	3.9	0	0	0	0	24,208	3.9	0	0	0	0	0
QDBOPENC	[4] 5	15	5	690	0.1	0	0	0	0	17,098	2.8	0	0	0	0	0
QWSGET	12	5	12	2,454	0.4	0	0	0	0	15,850	2.6	0	0	0	0	0
QT3REQIO	9	0	18	531	0.1	0	0	0	0	13,481	2.2	0	0	0	0	0
QDBSOPEN	[5] 500	0	0	12,743	2.1	0	0	0	0	12,743	2.1	0	0	0	0	0
QCADRV	16	53	32	2,929	0.5	0	0	0	0	12,337	2.0	0	0	0	0	0
*DEQWAIT	6	0	0	11,714	1.9	0	0	0	0	11,714	1.9	0	0	0	0	0
QUIMGFLW	2	14	0	846	0.1	0	0	0	0	11,381	1.8	0	0	0	0	0
*RETDSEN	500	0	0	11,104	1.8	0	0	0	0	11,104	1.8	0	0	0	0	0
**Unknown	0	0	0	11,031	1.8	0	0	0	0	11,031	1.8	0	0	0	0	0
QUIEXFMT	2	6	0	643	0.1	0	0	0	0	8,779	1.4	0	0	0	0	0
QPTGTINP	3	9	6	4,819	0.8	0	0	0	0	8,021	1.3	0	0	0	0	0
*MATSOBJ	101	0	0	7,856	1.3	0	0	0	0	7,856	1.3	0	0	0	0	0
QDBCLOSC	5	10	5	410	0.1	0	0	0	0	7,315	1.2	0	0	0	0	0
QMHRTMSS	21	0	82	3,335	0.5	0	0	0	0	7,222	1.2	0	0	0	0	0
QWSPUT	23	6	25	4,561	0.7	0	0	0	0	6,954	1.1	0	0	0	0	0
*CRTS	[6] 8	0	0	6,845	1.1	0	0	0	0	6,845	1.1	0	0	0	0	0
QSFPUT	15	1	0	4,041	0.7	0	0	0	0	6,736	1.1	0	0	1	0	0
*MATPRATR	515	0	0	6,633	1.1	0	0	0	0	6,633	1.1	0	0	0	0	0
QDBOPEN	[7] 5	0	15	662	0.1	0	0	0	0	6,588	1.1	0	0	0	0	0
QUIINMGR	2	4	0	1,292	0.2	0	0	0	0	6,506	1.1	0	0	0	0	0
QMHSNDPM	15	0	63	1,870	0.3	0	0	0	0	6,342	1.0	0	0	0	0	0
QCAFLD	29	0	1	4,614	0.7	0	0	0	0	4,679	0.8	0	0	0	0	0
QCADRV2	7	23	2	1,054	0.2	0	0	0	0	4,554	0.7	0	0	0	0	0
*FNDINXEN	53	0	0	4,492	0.7	0	0	0	0	4,492	0.7	0	0	0	0	0
QCMDEXC	2	8	12	650	0.1	0	0	0	0	4,335	0.7	0	0	0	0	0
QCARULE	20	0	40	960	0.2	0	0	0	0	4,049	0.7	0	0	0	0	0
*CRTDOBJ	[6] 6	0	0	4,019	0.7	0	0	0	0	4,019	0.7	0	0	0	0	0
*DESS	[6] 9	0	0	3,655	0.6	0	0	0	0	3,655	0.6	0	0	0	0	0
*LOCKSL	100	0	0	3,160	0.5	0	0	0	0	3,160	0.5	0	0	0	0	0

*Figure 16 (Part 3 of 3). STATS FLAT - Full Opens SHARE(*YES) Example*

Notes for STATS FLAT OPENGOOD Example:

Because this is STATS FLAT we do not get anything in the Call Level column on the report. This report was printed in descending cumulative CPU sequence.

1 We called program OPENGOOD once. Cumulatively, this program used 675106/617149 = 109.% of the CPU used by our job and any active tasks, after collection overhead has been removed.

Cumulative CPU PTF

In January of 1997, PEX PTF SF37834 became available that improved overhead calculations. With this PTF installed cumulative CPU time exceeds the collection time (which is impossible) in only a few cases. Development continues to work this issue.

We verified this change. However, we did not have time to rerun all these test programs to show adjusted values in these examples.

Compare the cumulative CPU figure of 675106 for OPENGOOD to the corresponding figure of 2681872 CPU microseconds for OPENBAD (see remark **8** in Figure 14 on page 60. The only difference between OPENGOOD and OPENBAD is that we used shared file opens in OPENGOOD and did not use them in OPENBAD. As a result of this difference, OPENGOOD uses 25.1% of the CPU used by OPENBAD. This infers that the CPU cost of a full database file open is at least 400% more than a shared file open.

2 Program OPEN5 was called 100 times. Cumulatively, it used 51.6% of the CPU used during the PEX measurement; however, it directly used 11.9%. Compare these figures to those for program OPEN5 when called from program OPENBAD (see Figure 14 on page 60). Note that under program OPENBAD we see OPEN5 using 2538660 CPU microseconds and under program OPENGOOD we see OPEN5 using 318336 CPU microseconds (12.5% of the CPU).

3 QDMCOPEN now uses considerably less CPU under OPENGOOD than it did under OPENBAD. This is not surprising; it is because QDMCOPEN is called for every full file open, and it needs significantly less CPU to service a shared file open than it does to service a full file open.

4 QDBOPENC is the command processing program for the CL OPNDBF command. QDBOPENC calls QDMCOPEN, which in turn calls either QDBOPEN for a full db file open or QDBSOPEN for a shared database file open.

5 QDBSOPEN is the database shared file open routine that is called when a file that is already open and has that open data path shared, is opened again with a compatible open option. These are using a lot of direct CPU. Note that the direct and cumulative CPU figure is identical for MI complex instructions as they do not call anything else.

After QDMCOPEN is called to process a database file open, either a full open (QDBOPEN) or a shared file open (QDBSOPEN) will result. Note that the CPU cost per invocation of QDBOPEN in the full opens example was 134.7 CPU microseconds and the cost per invocation of QDBSOPEN in this shared opens example is 25.5 CPU microseconds. Some customer systems have been known to perform in excess of 150 full database file opens per second and save significant CPU when shared opens are introduced.

6 Note that the create space *CRTS MI complex instruction is not showing any synchronous non-database IOs. Compare this to the OPENBAD example, where it did 526. Also, the number of times *CRTS was called dropped from 503 in the full open case to eight in the shared open case. Since this instruction uses a lot of CPU per invocation, and we are now performing significantly less of them, this is one of the underlying reasons why shared opens are so much cheaper than full file opens.

Another example of an MI complex instruction that it called much less frequently in the shared open scenario is the destroy space *DESS instruction. The less often expensive MI complex instructions are called, the better is performance.

7 The full database file open routine QDBOPEN is called 5 times in this shared open example (OPENGOOD) compared to 500 times in the full opens example (OPENBAD). This is because in the OPENGOOD example the opens are being done by program OPENGOOD itself using the OPNDBF command and sharing the resultant open data path with program OPEN5, which issues 500 calls to QDBSOPEN. In the OPENBAD example, program OPENBAD does not open any files and does not use shared open data path overrides, therefore program OPEN5 fully opens 5 files every time it is called. Because it is called 100 times in total and fully terminates after each call, it issues 500 calls to system routine QDBOPEN.

8 This job used 97.21% of the Total Raw CPU as shown in **A** in the Stats CPU Summary Information Section. The Raw CPU figure is used to show the percentage each job is using, as we cannot make adjustments for PEX overhead at the job/task level. Such adjustment overhead can be made only at the program or procedure level.

9 This program used 107% of the Total CPU as shown in **B** in the Stats CPU Summary Information Section. This is because at the program (or procedure) statistics level we are able to remove the PEX collection overhead. (Remember, this report was generated before PT SF37834 had been applied. See the label box following **1** discussion for more information on this PTF.)

A The definition used to collect this data specified only one job. Thus, this figure represents the CPU used by the one job and all tasks on the system, including any PEX collection overhead.

B Note that this figure is used as the base total CPU figure for the percentage calculations in the Statistics Information section. This is because the CPU overhead of PEX data collection can be removed at the program level, so this figure is more accurate when reviewing individual program percentage statistics.

Be Careful on PEX CPU Utilization Removal

Since this example was created, it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, "Performance Explorer PTF Summary" on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, "PEX STATS HIER Example - Program at Multiple Levels" on page 83 shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

4.4 PEX STATS FLAT Example - Merge Jobs *NO

The purpose of this example is to enable you to correctly interpret a STATS report produced from data collected with a definition using MERGE JOBS *NO.

First, find jobs or programs that are using the most resource. Use either the Performance Monitor with trace and review the Transaction Reports, or run a PEX collection using a PEX STATS DTAORG(*FLAT) with a definition covering all jobs and MRGJOBS(*YES).

Use PEX STATS FLAT with a definition specifying MRGJOBS(*NO) in order to see how certain jobs are using particular programs.

Why do this? Many package applications provide comprehensive search criteria against the database. During installation, setup, and education, it is agreed which of the many search criteria a particular customer will use. Indexes relating to the search agree search criteria are built; indexes for other search criteria are not built. New users join the customer; they are unaware of the **correct** search criteria to use and specify search fields for which there are no existing indexes (over millions of records). In this situation, certain users are using the application **differently**. We run PEX STATS FLAT MRGJOB(*NO) for all users of the search program and use the Statistics Information section for the traced users to see which users had the highest CPU utilization for this program.

Be Careful on PEX *HIER and MRGJOB(*NO) Performance Impact

PEX STATS HIER collections cause significantly greater overhead than PEX STATS FLAT collections. Running PEX using a definition with MRGJOBS(*NO) involves greater overhead than MRGJOBS(*YES), as separate counters must be maintained for all jobs in the collection.

Use PEX STATS HIER over only a small subset of jobs, <u>not</u> all jobs. A single job is preferred, if possible.

Use a PEX STATS definition with MRGJOBS(*NO) over only a small subset of jobs, <u>not</u> all jobs.

```
                                               Performance Explorer Report                                  9/11/96 10:33:43
                                                 Definition Information                                           Page
                                                                                                                     1
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : FLATMRGNO
Defined By . . . . . . . . . : A960123A
Definition Description . . . : EXAMPLE OF STATS FLAT MERGE JOBS *NO
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO   1
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL 1
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                               Performance Explorer Report                                  9/11/96 10:33:43
                                                    Run Information                                               Page
                                                                                                                     2
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Sessions since IPL. . . . . . . . . . . . . :                           104
Session name. . . . . . . . . . . . . . . . : FLATMRGNO
Start time. . . . . . . . . . . . . . . . . : 1996-09-11-10.32.56.593968
Stop time . . . . . . . . . . . . . . . . . : 1996-09-11-10.33.26.075048
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.29.481080
Suspend time (us) . . . . . . . . . . . . . :                  1,413,152
Number of events. . . . . . . . . . . . . . :                      3,518
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  057164
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                        290  2
Jobs/tasks in session . . . . . . . . . . . :                        290
Jobs in session . . . . . . . . . . . . . . :                        122
```

*Figure 17 (Part 1 of 4). STATS FLAT Merge Jobs(*NO) Example*

```
                                          Performance Explorer Report                                    9/11/96 10:33:43
                                          Stats CPU Summary Information                                        Page
                                                                                                                       3
Library . . . . . :  DHPEX
Member. . . . . . :  FLATMRGNO
Description . . . :  *BLANK
Partition . . . . :          0  3
Total Raw CPU . . :     758672  4
Overhead Removed. :      93595
Total CPU . . . . :     665077  5
Task CPU. . . . . :      66968    10.1 %
Job CPU . . . . . :     598109    89.9 %
                     -----------------------
   Pgm/Mod CPU. . :     523757    78.8 %
   Unknown CPU. . :      74352    11.2 %
```

```
                                          Performance Explorer Report                                    9/11/96 10:33:43
                                              Task Information                                                  Page

Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                      Start/End                                            Percent
-----------------------------------------------------------------------------------------------------------------------
7  5646 P23XWY32G  A960123A   057165     4      160   Y    Y        27187736               239688     31.59  6
8  5645 P23XWY32E  A960123A   057164     4      160   Y    Y        27187736               253760     33.45  6
(lines removed for brevity)
       1  CFINT1                         0        0   Y    Y        27187736                36976      4.87
----------------------------------------------------------------------------------------------------------

                                                                                           758672
```

```
                                          Performance Explorer Report                                  9/11/96 10:33:43
                                          Stats CPU Summary Information                                      Page
                                                                                                                 11
Library . . . . . :  DHPEX
Member. . . . . . :  FLATMRGNO
Description . . . :  *BLANK
Partition . . . . :          1  9
Total Raw CPU . . :     276664  10
Overhead Removed. :      30025
Total CPU . . . . :     246639  11
Task CPU. . . . . :      36976    15.0 %
Job CPU . . . . . :     209663    85.0 %
                     -----------------------
   Pgm/Mod CPU. . :     192959    78.2 %
   Unknown CPU. . :      16704     6.8 %
```

*Figure 17 (Part 2 of 4). STATS FLAT Merge Jobs(*NO) Example*

```
                                                 Performance Explorer Report                                                9/11/96 10:33:43
                                                   Statistics Information                                                     Page   11

                                                      Library Section
Library . . : DHPEX                                         12
Member. . . : FLATMRGNO
Description : *BLANK
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX           CPU       DB    DB   NDB   NDB           CPU       DB    DB   NDB   NDB  Call
Name        Called   Made  Issued        (us) /   %   SIO   AIO   SIO   AIO       (us) /   %   SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
HATT            12     36      99      167,947 68.1     0     0     0     0     193,307 78.4     0     0     0     0     0
**LIC Task       0      0       0       36,975 15.0     0     0     0     0      36,975 15.0     0     0     0     0     0
**Unknown        0      0       0       16,704  6.8     0     0     0     0      16,704  6.8     0     0     0     0     0
QSYS           122     82     102       12,937  5.2     0     0     0     0      36,834 14.9     0     0     0     0     0
MI CPLX        207      0       0       12,075  4.9     0     0     0     0      12,075  4.9     0     0     0     0     0


                                                 Performance Explorer Report                                                9/11/96 10:33:43
                                                      Task Information                                                          Page
                                                                                                                                    13
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Task ID    Job/Task Name                 Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                       Start/End                                            Percent
-------------------------------------------------------------------------------------------------------------------------------
13  5646 P23XWY32G  A960123A   057165     4      160   Y    Y        27187736                239688     86.64  14
       1 CFINT1                           0        0   Y    Y        27187736                 36976     13.36
-------------------------------------------------------------------------------------------------------------------------------
                                                                                             276664

                                                 Performance Explorer Report                                                9/11/96 10:33:43
                                                   Statistics Information  15                                           Page   14
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX           CPU       DB    DB   NDB   NDB           CPU       DB    DB   NDB   NDB  Call
Name        Called   Made  Issued        (us) /   %   SIO   AIO   SIO   AIO       (us) /   %   SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
ILEAGNEW         1     36      88      167,007 67.7     0     0     0     0     191,245 77.5     0     0     0     0     0
**LIC Task       0      0       0       36,975 15.0     0     0     0     0      36,975 15.0     0     0     0     0     0
**Unknown        0      0       0       16,704  6.8     0     0     0     0      16,704  6.8     0     0     0     0     0
QSQENDAG        11      0       0        5,070  2.1     0     0     0     0       5,070  2.1     0     0     0     0     0
 (lines removed for brevity)
```

*Figure 17 (Part 3 of 4). STATS FLAT Merge Jobs(*NO) Example*

```
                                          Performance Explorer Report                                   9/11/96 10:33:43
                                         Stats CPU Summary Information                                        Page
                                                                                                                 16
Library . . . . . :  DHPEX
Member. . . . . . :  FLATMRGNO
Description . . . :  *BLANK
Partition . . . . :            2  16
Total Raw CPU . . :       253760  17
Overhead Removed. :        37625
Total CPU . . . . :       216135  18
Task CPU. . . . . :            0     0.0 %
Job CPU . . . . . :       216135   100.0 %
                     -----------------------
   Pgm/Mod CPU. . :       205359    95.0 %
   Unknown CPU. . :        10776     5.0 %
                                          Performance Explorer Report                                   9/11/96 10:33:43
                                            Statistics Information                                            Page
                                                                                                                 17

                                                Library Section
Library . . : DHPEX                                   19
Member. . . : FLATMRGNO
Description : *BLANK
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX            CPU        DB    DB   NDB   NDB           CPU       DB    DB   NDB   NDB  Call
Name        Called    Made  Issued         (us) /   %   SIO   AIO   SIO   AIO         (us) /   %   SIO   AIO   SIO   AIO Level
------------------------------------------------------------------------------------------------------------------------------
HATT             9      27      72        123,452 57.1     0     0     0     0       135,827 62.8     0     0     0     0     0
QSYS           275     245     298         48,191 22.3     0     0     0     0       239,279 ****     0     0     4     0     0
MI CPLX        381       0       0         33,714 15.6     0     0     1     0        33,714 15.6     0     0     1     0     0
**Unknown        0       0       0         10,776  5.0     0     0     0     0        10,776  5.0     0     0     0     0     0
**LIC Task       0       0       0              0  0.0     0     0     0     0             0  0.0     0     0     0     0     0
                                          Performance Explorer Report                                   9/11/96 10:33:43
                                               Task Information                                                Page
                                                                                                                  18
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Task ID    Job/Task Name                 Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                       Start/End                                           Percent
------------------------------------------------------------------------------------------------------------------------------
20  5645 P23XWY32E  A960123A   057164      4       160   Y    Y       27187736                253760         100  21
------------------------------------------------------------------------------------------------------------------------------
                                                                                              253760

                                          Performance Explorer Report                                   9/11/96 10:33:43
                                            Statistics Information  22                               Page   19
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX            CPU        DB    DB   NDB   NDB           CPU       DB    DB   NDB   NDB  Call
Name        Called    Made  Issued         (us) /   %   SIO   AIO   SIO   AIO         (us) /   %   SIO   AIO   SIO   AIO Level
------------------------------------------------------------------------------------------------------------------------------
ILEAGNEW         1      27      64        122,729 56.8     0     0     0     0       134,238 62.1     0     0     0     0     0
**Unknown        0       0       0         10,776  5.0     0     0     0     0        10,776  5.0     0     0     0     0     0
QPTGTINP         3      12       6          8,450  3.9     0     0     0     0        11,427  5.3     0     0     0     0     0
  (lines removed for brevity)
```

*Figure 17 (Part 4 of 4). STATS FLAT Merge Jobs(*NO) Example*

Notes for STATS FLAT Merge Jobs *NO Example:

All CPU figures are in microseconds. Divide microseconds by 1000 to get milliseconds.

1 Separate statistics are kept for each job/task involved in the collection.

2 This collection involved 290 jobs/tasks, so 290 separate data areas are used to store each job/task's statistics.

3 Whenever separate job/task statistics are kept by PEX STATS (merge jobs NO is used) an overall section that includes statistics for all jobs/tasks involved in the collection is kept. These overall statistics are in the Stats CPU Summary Information section that is for Partition 0.

The presence of a Partition 0 entry in the Stats CPU Summary Information section implies that the STATS collection either used DTAORG(*FLAT) MRGJOB(*NO) or DTAORG(*HIER).

4 This is the total CPU for all jobs/tasks involved in the collection, including PEX collection CPU overhead.

This figure only represents the total system-wide used CPU if all jobs/tasks were involved in the collection. New jobs started after PEX collection has begun are included in this figure (when statistics for all jobs are being collected).

5 This is the total CPU for all jobs/tasks involved in the collection, with the PEX collection CPU overhead removed.

6 The Run Time Percent (from the Partition 0 statistics) represents the CPU percent used by each job in the collection. The total CPU figure used to calculate this percentage is **4**.

If a collection covered all jobs, this run time percent represents the percent of used CPU that was used by individual jobs.

7 Partition 0 Task Information list contains a list of all jobs/tasks involved in the trace. The relative position of a job on this list does not imply its Partition number in the following sections. This list is in descending TDE number sequence. If another job had started processing *after* PEX collection had been started, it is a newer job with a higher TDE number than all the jobs already existing. This new job would appear first on the Task Information list for Partition 0. However, it does not appear under Partition 1, as Partition 1 relates to the job with the highest TDE number that existed at the time the collection was started.

You must manually match this job with the Task Information section of Partition n, where n is non-zero, in order to find its program statistics in the Statistics Information section.

This job happens to appear under Partition 1 in this report, as no new jobs were started after PEX collection was started. **8**

This job happens to appear under Partition 2 in this report, as no new jobs were started after PEX collection was started.

9 To find which job Partition 1 refers to, locate the Task Information section *following* the Partition 1 Stats CPU Summary Information section. The job Partition 1 refers to is shown in **13** in this example.

10 This is the total CPU for the single job/task shown in **13**, including PEX collection CPU overhead.

11 This is the total CPU for the single job/task shown in **13**, with the PEX collection CPU overhead removed.

12 The figures in this Library Section relate to the single job shown in **13** in the Task Information Section. The total CPU figure used for percentage calculation is **11**.

13 This is the name of the job known as Partition 1 (see **9**).

14 The total CPU figure used for percentage calculation is **10**.

15 This Statistics Information section applies to job number 057165 only, as it only relates to Partition 1 (see **13** for full job name). The total CPU figure used for percentage calculation is **11**.

16 To find which job Partition 2 refers to, locate the Task Information section *following* the Partition 2 Stats CPU Summary Information section. The job Partition 2 refers to is shown in **20** in this example.

17 This is the total CPU for the single job/task shown in **20**, including PEX collection CPU overhead.

18 This is the total CPU for the single job/task shown in **20**, with the PEX collection CPU overhead removed.

Be Careful on PEX CPU Utilization Removal

Since this example was created, it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, "Performance Explorer PTF Summary" on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, "PEX STATS HIER Example - Program at Multiple Levels" shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

19 The figures in this Library Section relate to the single job shown in **20** in the Task Information Section. The total CPU figure used for percentage calculation is **16**.

20 This is the name of the job known as Partition 2 (see **16**).

21 The total CPU figure used for percentage calculation is **17**.

22 This Statistics Information section applies to job number 057164 only, as it only relates to Partition 2 (see **20** for full job name). The total CPU figure used for percentage calculation is **18**.

4.5 PEX STATS HIER Example - Program at Multiple Levels

This example is a STATS HIER example that is used as a basis for the PEX PROFILE example described in Chapter 5, "Performance Explorer *PROFILE Option" on page 103. It includes the same program (COMPTIMEE) being called at multiple call levels to show you how to identify this in a PRTPEXRPT.

Command CMDCSTPEXH interfaces to user program CLCSTPEXHI. CKCSTPEXHI interfaces to two programs, COMPTIMEE and CSTPEX. Program CSTPEX also calls COMPTIMEE.

Program CLCSTPEXHI sets up the database files, file members, and file libraries to be processed by program CSTPEX.

CSTPEX reads thousands of records from file CSTFIL and then randomly retrieves a single record from ITMFIL. CSTPEX also performs several heavy duty multiply and divide functions.

We use PEX STATS HIER to find the program taking significant CPU and in Chapter 5, "Performance Explorer *PROFILE Option" we use PEX PROFILE to identify the high CPU consumption application program statements. Notes for the figure parts follow the last part of Figure 18.

```
                                      Performance Explorer Report                            2/05/97 16:25:19
                                        Definition Information                                       Page
                                                                                                        1
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : RBSTAT1JOH
Defined By . . . . . . . . . : COOL
Definition Description . . . : RB STAT FOR *HIER TEST of CMDCSTPEXH
Data Organization. . . . . . : HIER
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
```

Figure 18 (Part 1 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                      Performance Explorer Report                            2/05/97 16:25:19
                                           Run Information                                           Page
                                                                                                        2
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Sessions since IPL. . . . . . . . . . . . . :                           2
Session name. . . . . . . . . . . . . . . . : COOLSHI
Start time. . . . . . . . . . . . . . . . . : 1997-02-05-16.23.23.551048
Stop time . . . . . . . . . . . . . . . . . : 1997-02-05-16.24.52.920640
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.01.29.369592
Suspend time (us) . . . . . . . . . . . . . :                     211,432
Number of events. . . . . . . . . . . . . . :                       4,502
Trace wrap count. . . . . . . . . . . . . . :                           0
Job creating session. . . . . . . . . . . . : COOLPCF   COOL      070512
Started by user . . . . . . . . . . . . . . : COOL
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     131,072  B
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                           1
Logical DASDs . . . . . . . . . . . . . . . :                           9
Data areas. . . . . . . . . . . . . . . . . :                         187
Jobs/tasks in session . . . . . . . . . . . :                         187
Jobs in session . . . . . . . . . . . . . . :                           1
```

Figure 18 (Part 2 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                          Performance Explorer Report                                      2/05/97 16:25:19
                                         Stats CPU Summary Information                                          Page
                                                                                                                      3
Library . . . . . :  COOL
Member. . . . . . :  COOLSHI
Description . . . :  STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Partition . . . . :          0
Total CPU . . . . :      10247176 A
Task CPU. . . . . :        292040     2.8 %
Job CPU . . . . . :       9955136    97.2 %
                     ----------------------
   Pgm/Mod CPU. . :       9945072    97.1 %
   Unknown CPU. . :         10064     0.1 %
```

Figure 18 (Part 3 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                          Performance Explorer Report                                      2/05/97 16:25:19
                                               Task Information                                                  Page
                                                                                                                       4
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                       Start/End                                          Percent
-----------------------------------------------------------------------------------------------------------------------------------
                                                  2                                                          1
       634 COOLPCF    COOL       070512    4     163   Y    Y              88053840             9955136     97.15
              C
       622 SMXCAGER03                      1      32   Y    Y              88033984               45176      0.44
       621 SMXCAGER02                      1      32   Y    Y              88033984                 112      0.00
       620 SMXCAGER01                      1      32   Y    Y              88033976               13672      0.13
       615 PA-T-P23ARVYBC                  1      40   Y    Y              88033976                   0         0
       611 PA-T-P23ARWCME                  1      40   Y    Y              88033984                   0         0

   (Lines removed for brevity.)

              3
       166 SMSTRIPEWATCHDOG                1      10   Y    Y              88003152                1296      0.01
              C
       165 SMXCSPRVSR                      1      79   Y    Y              88003152               14928      0.15

   (Lines removed for brevity.)

         1 CFINT1                          0       0   Y    Y              88053848               96568      0.94
-----------------------------------------------------------------------------------------------------------------------------------
                                                                                               10247176
```

Figure 18 (Part 4 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                          Performance Explorer Report                                      2/05/97 16:25:19
                                         Stats CPU Summary Information                                          Page
                                                                                                                      8
Library . . . . . :  COOL
Member. . . . . . :  COOLSHI
Description . . . :  STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Partition . . . . :          2
Total CPU . . . . :       9955136    A
Task CPU. . . . . :             0     0.0 %
Job CPU . . . . . :       9955136   100.0 %
                     ----------------------
   Pgm/Mod CPU. . :       9945072    99.9 %
   Unknown CPU. . :         10064     0.1 %
```

Figure 18 (Part 5 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                                    Performance Explorer Report                                         2/05/97 16:25:19
                                                      Statistics Information                                                   Page    8
                                                         Library Section
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
            Times    Calls MI CPLX            CPU       DB    DB    NDB   NDB            CPU       DB    DB    NDB   NDB  Call
Name        Called    Made  Issued        (us) /   %    SIO   AIO   SIO   AIO        (us) /   %    SIO   AIO   SIO   AIO Level
------------------------------------------------------------------------------------------------------------------------------------
**LIC Task      0       0       0             0  0.0     0     0     0     0             0  0.0     0     0     0     0     0
**Unknown       0       0       0        10,064  0.1     0     0     0     0        10,064  0.1     0     0     0     0     0
QSYS          783     330    1352       146,552  1.5     0     0    20     0       948,008  9.5    48    64    96     0     0
MI CPLX      1366       0       0       517,464  5.2    41    64    29     0       517,464  5.2    41    64    29     0     0
PFREXP          8     447       3     9,281,056 93.2     0     7    15     0    19,645,896 ****    82   142    71     0     0
```

Figure 18 (Part 6 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                                    Performance Explorer Report                                         2/05/97 16:25:19
                                                         Task Information                                                       Page
                                                                                                                                   10
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Task ID    Job/Task Name                   Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                         Start/End                                           Percent
------------------------------------------------------------------------------------------------------------------------------------
                                                      2
       634 COOLPCF    COOL       070512     4       163  Y    Y              88053840              9955136    100
------------------------------------------------------------------------------------------------------------------------------------
                                                                                                  9955136
```

Figure 18 (Part 7 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
**LIC Task	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	0
**Unknown	0	0	0	10,064	0.1	0	0	0	0	10,064	0.1	0	0	0	0	0
QMHSNDPM	1	0	7	328	0.0	0	0	0	0	1,040	0.0	0	0	0	0	1
*RSLVSP	2	0	0	360	0.0	0	0	0	0	360	0.0	0	0	0	0	2
*TESTAU	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	2
*FNDINXEN	1	0	0	120	0.0	0	0	0	0	120	0.0	0	0	0	0	2
*MATINVIF	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	2
*SNDPRMSG	1	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	2
*TESTEXCP	2	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	1
QMHRCVPM	2	2	14	760	0.0	0	0	0	0	18,360	0.2	0	0	2	0	1
*MATPRMSG	6	0	0	656	0.0	0	0	0	0	656	0.0	0	0	0	0	2
*MATINVIF	4	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	2
QMHGSD	2	20	14	1,880	0.0	0	0	0	0	16,584	0.2	0	0	2	0	2
*MATPRMSG	10	0	0	840	0.0	0	0	0	0	840	0.0	0	0	0	0	3
QUIVPMGR	8	0	0	544	0.0	0	0	0	0	544	0.0	0	0	0	0	3
QUILIST	10	0	1	896	0.0	0	0	0	0	984	0.0	0	0	0	0	3
*SETACST	1	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	4
*MODPRMSG	2	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	3
QUIMGFLW	2	14	0	1,080	0.0	0	0	0	0	11,880	0.1	0	0	2	0	3
QUIVPMGR	4	0	0	256	0.0	0	0	0	0	256	0.0	0	0	0	0	4
QUIICHK	4	0	0	384	0.0	0	0	0	0	384	0.0	0	0	0	0	4
QUIEXFMT	2	6	0	800	0.0	0	0	0	0	8,352	0.1	0	0	2	0	4
QMHRCVPM	2	0	14	576	0.0	0	0	0	0	1,104	0.0	0	0	0	0	5
*MATINVIF	6	0	0	200	0.0	0	0	0	0	200	0.0	0	0	0	0	6
*MATPTR	4	0	0	152	0.0	0	0	0	0	152	0.0	0	0	0	0	6
*MATPRMSG	4	0	0	152	0.0	0	0	0	0	152	0.0	0	0	0	0	6
QUIOCNV	2	0	0	1,080	0.0	0	0	0	0	1,080	0.0	0	0	0	0	5
QUIINMGR	2	4	0	1,496	0.0	0	0	0	0	5,360	0.1	0	0	2	0	5
QWSPUDDS	2	1	2	488	0.0	0	0	0	0	912	0.0	0	0	0	0	6
*MATPTR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	7
QWSRST	1	1	2	136	0.0	0	0	0	0	344	0.0	0	0	0	0	7
QT3REQIO	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	8
*LOCK	1	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	8
*UNLOCK	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	8
QWSGET	2	2	2	792	0.0	0	0	0	0	2,952	0.0	0	0	2	0	6
*MATPTR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	7
QT3REQIO	2	0	6	408	0.0	0	0	0	0	2,080	0.0	0	0	2	0	7
*REQIO	2	0	0	432	0.0	0	0	0	0	432	0.0	0	0	0	0	8
*MATPRATR	2	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	8
*DEQWAIT	2	0	0	1,152	0.0	0	0	2	0	1,152	0.0	0	0	2	0	8
QUIACT	2	2	0	432	0.0	0	0	0	0	1,312	0.0	0	0	0	0	4
QMHRMVPM	2	0	12	384	0.0	0	0	0	0	872	0.0	0	0	0	0	5

Figure 18 (Part 8 of 14). STATS HIER Example - Program Called at Multiple Levels

Performance Explorer Report 2/05/97 16:25:19
Statistics Information Page 12

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

Name	Times Called	Calls Made	MI CPLX Issued	Inline Stats CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Cumulative Stats CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
(Lines removed for brevity.)																
	:															
QDMCLOSE	2	2	10	456	0.0	0	0	0	0	5,264	0.1	0	0	0	0	2
*MATPRATR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
*MATPTR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
QWSCLOSE	2	2	14	648	0.0	0	0	0	0	3,536	0.0	0	0	0	0	3
*MATINVAT	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
*MATINVIF	2	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
*MATLUD	2	0	0	280	0.0	0	0	0	0	280	0.0	0	0	0	0	4
*MATSELLK	2	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	4
QT3REQIO	2	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	4
*MATPRATR	2	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	4
*DESS	4	0	0	2,144	0.0	0	0	0	0	2,144	0.0	0	0	0	0	4
*UNLOCK	2	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	3
*MODSOBJ	2	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
*DESS	2	0	0	936	0.0	0	0	0	0	936	0.0	0	0	0	0	3
*DESS	2	0	0	736	0.0	0	0	0	0	736	0.0	0	0	0	0	2
QMHRMVPM	2	0	8	264	0.0	0	0	0	0	544	0.0	0	0	0	0	2
*MATINVIF	4	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	3
*MATPTR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
*MODPRMSG	2	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	3
QCATRS	2	0	5	1,032	0.0	0	0	2	0	2,712	0.0	0	0	4	0	1
*MODSOBJ	2	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	2
*RSLVSP	3	0	0	1,632	0.0	0	0	2	0	1,632	0.0	0	0	2	0	2
4																
CLCSTPEXHI	1	19	0	3,960	0.0	0	0	4	0	9,825,816	98.7	41	71	44	0	1
CLCSTPEXHI/_CL_PEP																
QCLRSLV	1	1	10	1,376	0.0	0	0	3	0	2,208	0.0	0	0	4	0	2
*MATINVAT	1	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	3
*MATPTRIF	1	0	0	376	0.0	0	0	1	0	376	0.0	0	0	1	0	3
QLIADOPT	1	0	1	32	0.0	0	0	0	0	104	0.0	0	0	0	0	3
*RSLVSP	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
*DEQ	5	0	0	168	0.0	0	0	0	0	168	0.0	0	0	0	0	3
*ENQ	3	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	3
QCADRV	3	9	3	744	0.0	0	0	0	0	3,808	0.0	0	0	1	0	2
*MATPTR	3	0	0	120	0.0	0	0	0	0	120	0.0	0	0	0	0	3
QCARULE	3	0	6	272	0.0	0	0	0	0	1,288	0.0	0	0	1	0	3
*RSLVSP	3	0	0	936	0.0	0	0	1	0	936	0.0	0	0	1	0	4
*TESTAU	3	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	4
QCAPOS	3	3	0	864	0.0	0	0	0	0	1,008	0.0	0	0	0	0	3
QCAFSCAN	3	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	4
QCAFLD	3	0	0	632	0.0	0	0	0	0	632	0.0	0	0	0	0	3
QCATRS	3	0	3	424	0.0	0	0	0	0	488	0.0	0	0	0	0	2

Figure 18 (Part 9 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
*MODSOBJ	3	0	0	56	0.0	0	0	0	0	56	0.0	0	0	0	0	3
QLICUSRL	1	1	7	304	0.0	0	0	0	0	2,944	0.0	0	0	3	0	2
*LOCKSL	1	0	0	56	0.0	0	0	0	0	56	0.0	0	0	0	0	3
*RSLVSP	1	0	0	616	0.0	0	0	1	0	616	0.0	0	0	1	0	3
*TESTAU	1	0	0	16	0.0	0	0	0	0	16	0.0	0	0	0	0	3
*MATSOBJ	1	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	3
*LOCK	1	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
*UNLOCKSL	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
*UNLOCK	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
QMHSNDPM	1	0	4	760	0.0	0	0	1	0	1,680	0.0	0	0	2	0	3
*FNDINXEN	1	0	0	472	0.0	0	0	1	0	472	0.0	0	0	1	0	4
*MATINVIF	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
*SNDPRMSG	1	0	0	376	0.0	0	0	0	0	376	0.0	0	0	0	0	4
QDMOVERD	2	1	2	232	0.0	0	0	0	0	776	0.0	0	0	0	0	2
*MATINVIF	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	3
QMHSNDPM	1	0	4	168	0.0	0	0	0	0	480	0.0	0	0	0	0	3
*FNDINXEN	1	0	0	144	0.0	0	0	0	0	144	0.0	0	0	0	0	4
*MATINVIF	2	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	4
*SNDPRMSG	1	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	4
QCLCLCPR	3	0	12	1,200	0.0	0	0	2	0	4,232	0.0	0	0	5	0	2
*RSLVSP	3	0	0	1,976	0.0	0	0	2	0	1,976	0.0	0	0	2	0	3
*MATSOBJ	3	0	0	784	0.0	0	0	1	0	784	0.0	0	0	1	0	3
*LOCKSL	3	0	0	144	0.0	0	0	0	0	144	0.0	0	0	0	0	3
*UNLOCKSL	3	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	3
5																
COMPTIMEE	2	19	0	3,120	0.0	0	0	4	0	9,632	0.1	0	0	6	0	2
COMPTIMEE/_CL_PEP																
QCLRSLV	2	2	16	1,392	0.0	0	0	2	0	2,208	0.0	0	0	2	0	3
*MATINVAT	2	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	4
*MATPTRIF	2	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	4
QLIADOPT	2	0	2	72	0.0	0	0	0	0	208	0.0	0	0	0	0	4
*RSLVSP	2	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	5
*DEQ	8	0	0	216	0.0	0	0	0	0	216	0.0	0	0	0	0	4
*ENQ	4	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	4

Figure 18 (Part 10 of 14). STATS HIER Example - Program Called at Multiple Levels

Performance Explorer Report 2/05/97 16:25:19
Statistics Information Page 16

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QCADRV	2	6	2	520	0.0	0	0	0	0	1,896	0.0	0	0	0	0	3
*MATPTR	2	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	4
QCARULE	2	0	4	192	0.0	0	0	0	0	608	0.0	0	0	0	0	4
*RSLVSP	2	0	0	360	0.0	0	0	0	0	360	0.0	0	0	0	0	5
*TESTAU	2	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	5
QCAPOS	2	0	0	264	0.0	0	0	0	0	264	0.0	0	0	0	0	4
QCAFLD	2	0	0	408	0.0	0	0	0	0	408	0.0	0	0	0	0	4
QCATRS	2	0	2	168	0.0	0	0	0	0	216	0.0	0	0	0	0	3
*MODSOBJ	2	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
QWCSRTLR	2	2	0	184	0.0	0	0	0	0	360	0.0	0	0	0	0	3
QWCSCVTR	2	0	0	168	0.0	0	0	0	0	168	0.0	0	0	0	0	4
QCLCNVCN	5	0	10	360	0.0	0	0	0	0	832	0.0	0	0	0	0	3
*CVTEFN	5	0	0	288	0.0	0	0	0	0	288	0.0	0	0	0	0	4
*CVTCN,LB	5	0	0	168	0.0	0	0	0	0	168	0.0	0	0	0	0	4
QCLCNVNC	2	0	2	104	0.0	0	0	0	0	200	0.0	0	0	0	0	3
*CVTCN,LB	2	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	4
QCLRTNE	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
QCLCLNUP	2	0	8	304	0.0	0	0	0	0	696	0.0	0	0	0	0	3
*MATPTR	2	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	4
*MODS1	4	0	0	240	0.0	0	0	0	0	240	0.0	0	0	0	0	4
*ENQ	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
6																
CSTPEX	1	371	3	9,272,056	93.1	0	7	7	0	9,797,264	98.4	41	71	21	0	2
CSTPEX/_QRNP_PEP_CSTPEX																
*MATINVIF	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
QDMCOPEN	3	6	24	2,080	0.0	0	0	2	0	17,528	0.2	7	0	11	0	3
*MATINVIF	3	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	4
QDMGETOV	3	0	3	192	0.0	0	0	0	0	296	0.0	0	0	0	0	4
*MATINVIF	3	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	5
*RSLVSP	7	0	0	2,704	0.0	0	0	3	0	2,704	0.0	0	0	3	0	4
*MATPTR	3	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	4
*LOCK	4	0	0	984	0.0	0	0	2	0	984	0.0	0	0	2	0	4
*CRTDOBJ	3	0	0	2,528	0.0	0	0	0	0	2,528	0.0	0	0	0	0	4
*SETACST	3	0	0	280	0.0	0	0	0	0	280	0.0	0	0	0	0	4
*MNEVT	1	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	4
QWSOPEN	1	1	7	416	0.0	0	0	0	0	1,720	0.0	0	0	0	0	4
*MATINVAT	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	5
*MATINVIF	1	0	0	16	0.0	0	0	0	0	16	0.0	0	0	0	0	5
*MATLUD	1	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	5
*MODS1	1	0	0	480	0.0	0	0	0	0	480	0.0	0	0	0	0	5
*MATS	1	0	0	56	0.0	0	0	0	0	56	0.0	0	0	0	0	5
*CRTS	1	0	0	472	0.0	0	0	0	0	472	0.0	0	0	0	0	5

Figure 18 (Part 11 of 14). STATS HIER Example - Program Called at Multiple Levels

Performance Explorer Report 2/05/97 16:25:19
Statistics Information Page 17

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

Name	Times Called	Calls Made	MI CPLX Issued	Inline Stats CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Cumulative Stats CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QWSDECFT	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	5
*MNEVT	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	5
QDBOPEN	2	0	6	488	0.0	0	0	0	0	6,560	0.1	7	0	4	0	4
*MATPTR	2	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	5
*CRTS	2	0	0	1,264	0.0	0	0	0	0	1,264	0.0	0	0	0	0	5
*ACTCR	2	0	0	4,688	0.0	7	0	4	0	4,688	0.0	7	0	4	0	5
*RSLVSP	1	0	0	416	0.0	0	0	0	0	416	0.0	0	0	0	0	3
7																
COMPTIMEE COMPTIMEE/_CL_PEP	4	38	0	1,920	0.0	0	0	0	0	13,184	0.1	0	0	0	0	3
QCLRSLV	4	4	32	1,344	0.0	0	0	0	0	2,984	0.0	0	0	0	0	4
*MATINVAT	4	0	0	360	0.0	0	0	0	0	360	0.0	0	0	0	0	5
*MATPTRIF	4	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	5
QLIADOPT	4	0	4	152	0.0	0	0	0	0	424	0.0	0	0	0	0	5
*RSLVSP	4	0	0	272	0.0	0	0	0	0	272	0.0	0	0	0	0	6
*DEQ	16	0	0	440	0.0	0	0	0	0	440	0.0	0	0	0	0	5
*ENQ	8	0	0	216	0.0	0	0	0	0	216	0.0	0	0	0	0	5
QCADRV	4	12	4	984	0.0	0	0	0	0	3,632	0.0	0	0	0	0	4
*MATPTR	4	0	0	152	0.0	0	0	0	0	152	0.0	0	0	0	0	5
QCARULE	4	0	8	376	0.0	0	0	0	0	1,200	0.0	0	0	0	0	5
*RSLVSP	4	0	0	712	0.0	0	0	0	0	712	0.0	0	0	0	0	6
*TESTAU	4	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	6
QCAPOS	4	0	0	496	0.0	0	0	0	0	496	0.0	0	0	0	0	5
QCAFLD	4	0	0	792	0.0	0	0	0	0	792	0.0	0	0	0	0	5
QCATRS	4	0	4	336	0.0	0	0	0	0	432	0.0	0	0	0	0	4
*MODSOBJ	4	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	5
QWCSRTLR	4	4	0	344	0.0	0	0	0	0	680	0.0	0	0	0	0	4
QWCSCVTR	4	0	0	336	0.0	0	0	0	0	336	0.0	0	0	0	0	5
QCLCNVCN	10	0	20	728	0.0	0	0	0	0	1,632	0.0	0	0	0	0	4
*CVTEFN	10	0	0	560	0.0	0	0	0	0	560	0.0	0	0	0	0	5
*CVTCN,LB	10	0	0	336	0.0	0	0	0	0	336	0.0	0	0	0	0	5
QCLCNVNC	4	0	4	200	0.0	0	0	0	0	392	0.0	0	0	0	0	4
*CVTCN,LB	4	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	5
QCLRTNE	4	0	0	144	0.0	0	0	0	0	144	0.0	0	0	0	0	4
QCLCLNUP	4	0	16	592	0.0	0	0	0	0	1,328	0.0	0	0	0	0	4
*MATPTR	4	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	5
*MODS1	8	0	0	464	0.0	0	0	0	0	464	0.0	0	0	0	0	5
*ENQ	4	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	5

Figure 18 (Part 12 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats							Cumulative Stats							
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QDBGETM	358	0	716	46,408	0.5	0	0	1	0	482,056	4.8	31	63	1	0	3
*MATPTR	358	0	0	12,984	0.1	0	0	0	0	12,984	0.1	0	0	0	0	4
*RETSDSE	358	0	0	422,664	4.2	31	63	0	0	422,664	4.2	31	63	0	0	4
QDBGETKY	1	0	3	176	0.0	0	0	0	0	2,112	0.0	3	1	0	0	3
*MATPTR	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	4
*SETCR	1	0	0	1,832	0.0	3	1	0	0	1,832	0.0	3	1	0	0	4
*RETDSEN	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
QWSPUT	1	1	3	1,488	0.0	0	0	1	0	2,000	0.0	0	0	1	0	3
*MATPTR	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
*LOCK	1	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	4
*UNLOCK	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	4
QT3REQIO	1	0	1	112	0.0	0	0	0	0	312	0.0	0	0	0	0	4
*REQIO	1	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	5
QWSGET	1	1	2	520	0.0	0	0	0	0	1,696	0.0	0	0	0	0	3
*MATPTR	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
*DEQWAIT	1	0	0	400	0.0	0	0	0	0	400	0.0	0	0	0	0	4
QT3IOCMP	1	2	2	200	0.0	0	0	0	0	720	0.0	0	0	0	0	4
*RETEVTD	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	5
*DEQ	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	5
QT3REQIO	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	5
QWSMEEH	1	1	1	136	0.0	0	0	0	0	368	0.0	0	0	0	0	5
QWSGET	1	0	0	184	0.0	0	0	0	0	184	0.0	0	0	0	0	6
*ENQ	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	6
QDMCLOSE	3	3	19	768	0.0	0	0	0	0	6,104	0.1	0	0	1	0	3
*MATPRATR	3	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	4
*MATPTR	3	0	0	120	0.0	0	0	0	0	120	0.0	0	0	0	0	4
QWSCLOSE	1	2	5	312	0.0	0	0	0	0	1,264	0.0	0	0	0	0	4
*MATINVAT	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	5
*MATINVIF	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	5
*MATLUD	1	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	5
*MATSELLK	1	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	5
QT3REQIO	2	0	3	216	0.0	0	0	0	0	624	0.0	0	0	0	0	5
*REQIO	1	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	6

Figure 18 (Part 13 of 14). STATS HIER Example - Program Called at Multiple Levels

Performance Explorer Report 2/05/97 16:25:19
Statistics Information Page 19

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
*MATPRATR	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	6
*DEQWAIT	1	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	6
*MATPRATR	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	5
*UNLOCK	3	0	0	184	0.0	0	0	0	0	184	0.0	0	0	0	0	4
*CANEVTMN	1	0	0	416	0.0	0	0	1	0	416	0.0	0	0	1	0	4
*DESS	4	0	0	1,672	0.0	0	0	0	0	1,672	0.0	0	0	0	0	4
*MODSOBJ	3	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
QDBCLOSE	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
*DESCR	2	0	0	1,408	0.0	0	0	0	0	1,408	0.0	0	0	0	0	4
*DEACTPG	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	3
QCLRTNE	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	2
QCLCLNUP	1	0	4	136	0.0	0	0	0	0	328	0.0	0	0	0	0	2
*MATPTR	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	3
*MODS1	2	0	0	120	0.0	0	0	0	0	120	0.0	0	0	0	0	3
*ENQ	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	3
QDMDELOV	1	0	1	72	0.0	0	0	0	0	112	0.0	0	0	0	0	2
*MATPRATR	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	3
*MATINVAT	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	1
*MATPTR	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	1
*INVP	3	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	1
QCMDEXC	2	8	12	856	0.0	0	0	0	0	5,880	0.1	0	0	0	0	1
*MATINVAT	4	0	0	160	0.0	0	0	0	0	160	0.0	0	0	0	0	2
*DEQ	2	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	2
QCADRV2	2	10	0	552	0.0	0	0	0	0	2,464	0.0	0	0	0	0	2
QCANPARS	2	0	0	384	0.0	0	0	0	0	384	0.0	0	0	0	0	3
QCARULE	2	0	4	168	0.0	0	0	0	0	592	0.0	0	0	0	0	3
*RSLVSP	2	0	0	368	0.0	0	0	0	0	368	0.0	0	0	0	0	4
*TESTAU	2	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	4
QCAPOS	2	0	0	312	0.0	0	0	0	0	312	0.0	0	0	0	0	3
QCAFLD	2	0	0	512	0.0	0	0	0	0	512	0.0	0	0	0	0	3
QCAIFLD	2	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	3
QCATRS	2	0	2	160	0.0	0	0	0	0	200	0.0	0	0	0	0	2

(Remaining lines removed for brevity.)

Figure 18 (Part 14 of 14). STATS HIER Example - Program Called at Multiple Levels

Notes for STATS HIER CMDCSTPEXH Example:

Because this is a STATS HIER example, we get values in the *Call Level* column on the report.

At **1**, you can see job COOLPCF/COOL/070512 was active 97.15% of the PEX collection run time. It is interesting to note that the PEX collection captured the RISC system Dynamic Priority Scheduler (DPS) having changed job 070512 RUNPTY value to 23 (**2** 163-140). This means the normal RUNPTY value of 20 was changed to 23 because the DPS detected that this job was taking too much CPU for a single transaction and lowered the job's run priority to 23. For the next transaction, the DPS resets the job's RUNPTY to 20 (160 in the PRTPEXRPT).

Note that we have kept LIC task SMSTRIPEWATCHDOG **3** and tasks SMXCSPRVSR, SMXCAGER01-SMXCAGER03 (**C**) in our snapshot of the Task section of our report example. When task SMSTRIPEWATCHDOG has consumed at least some CPU, it is an indication that at least a minimum of *disk mirroring* is active on the system. When task SMXCSPRVSR (Expert Cache supervisor) and SMXCAGERnn tasks (Expert Cache pool ager tasks, one per pool) have consumed at least some CPU, it is an indication that up to nn pools have been set to use expert cache. In our example environment we used the WRKSHRPOOL command to see which shared storage pools were set to *CALC (expert cache active) and found pools *BASE, *INTERACT, and *SPOOL.

See *AS/400 Licensed Internal Code Diagnostics Aids*, LY44-4900, for more information on LIC task names.

4 ILE CL program CLCSTPEXHI and its PEP are shown running at call level 1 and cumulative CPU is the highest for any IBM function or application program during this data collection.

We collected this PEXT STATS HIER data after applying PTF MF14447. MF14447 removes an additional call level entry ***Alias** which may show up for ILE programs in the HIER reports. When *Alias is present, the call level counts for ILE programs are one number higher than you would expect.

If you do not have PTF MF14447 installed you see *Alias following each ILE program/PEP entry. With *Alias entries in the call level all programs/modules and MI Complex Instructions are *two* call levels below (higher number) the originating ILE program/PEP call level. In our example, OS/400 module QCLRSLV is at Call Level 2. If the PEX STATS HIER report showed an *Alias entry, OCLRSVL would have a Call Level of 3.

5 shows ILE CL program COMPTIMEE and its PEP at Call Level 2 when called from program CLCSTPEXHI. COMPTIMEE takes a moderate level of cumulative CPU and is called 2 times by CLCSTPEXHI.

6 shows ILE RPG program CSTPEX and its PEP at Call Level 2 when called from program CLCSTPEXHI.

At **7** we see COMPTIMEE and its PEP at Call Level 3 when called from CSTPEX. COMPTIMEE is called 4 times from CSTPEX.

This is the example of the same program being called at two different call levels - call level 2 at 5 (2 times) and call level 3 at 7 (4 times).

At **8** we can get an understanding of the database functions performed by program CSTPEX (call level 2) and its PEP. CSTPEX calls QDBGETM (call level 3) 358 times. QDBGETM calls *MATPTR (materialize pointer) 358 times and *RETSDSE (retrieve sequential data space entry) 358 times. *RETSDSE returns to CSTPEX, which promptly calls QDBGETKY for a random database read operation. QDBGETKY calls both *MATPTR and *SETCR (set cursor) to position to the record identified in a key field value. *RETDSEN (retrieve (non-sequential) data space entry) returns the record to the program (CSTPEX), which promptly does a workstation write (QWSPUT) to the interactive display device.

Remember, we did this PEX STATS HIER collection for a *single* work station transaction. Therefore, the high cumulative CPU time of 9.7 seconds shown at **6** and the relatively high number (358) of calls to QDBGETM for a single transaction alert us to some possible implementation problems with program CSTPEX.

In this simple example, we want to look further at program CSTPEX, so we run a PEX PROFILE collection against this program (and CLCSTPEXHI, just in case) in Chapter 5, “Performance Explorer *PROFILE Option” on page 103.

At **A**, we see *Total CPU*, *Task CPU*, and *Job CPU* percentages. The absence of values for *Overhead Removed* and *Total Raw CPU* values demonstrate that PTF SF37834 has been applied on our system.

See Appendix D, “Performance Explorer PTF Summary” on page 489 for more information on PEX PTFs.

At **B**, we see the number of 4K pages in main storage. The number 131072 means main storage is 512 megabytes as calculated in the following figure:

```
1. 131,072 / 1024(1K) = 128
2. 128 * 4 = 512
```

4.6 PEX STATS Query Example

The query shown in Figure 19 on page 96 enables you to produce program level information similar to that shown in the PRTPEXRPT Statistics Information Section.

Since PRTPEXRPT STATS output from large, busy systems can be lengthy, this query may be used to subset the PEX STATS program-level statistics. Consider the following ways of reducing the report using query record select/omit criteria, remembering that each record in the selection represents both inline (direct) and cumulative program level statistics:

- Select only programs using more than a certain amount of CPU time
- Select only programs performing more than a certain amount of physical disk I/Os
- Select database access programs only (MI programs beginning with characters ″QDB″) to see the pattern and volume of database activity

An example of the output produced using the query definition shown in Figure 19 on page 96 is shown in Figure 20 on page 100.

```
5716QU1  V3R6M0  950929           IBM Query/400            SYSASM05  2/21/97    9:14:42        Page    1
  Query . . . . . . . . . . . . . . . . . . PEXQ01
    Library . . . . . . . . . . . . . . . . ITSOEX01
  Query text  . . . . . . . . . . . . . . . PEX STATS Stats Info
  Query CCSID . . . . . . . . . . . . . . .    37
  Query language id . . . . . . . . . . . . ENU
  Query country id  . . . . . . . . . . . . US
    *** . is the decimal separator character for this query ***
  Collating sequence  . . . . . . . . . . . Hexadecimal

  Processing options
    Use rounding  . . . . . . . . . . . . . Yes (default)
    Ignore decimal data errors  . . . . . . No (default)
    Ignore substitution warnings  . . . . . Yes
    Use collating for all compares  . . . . Yes
  Special conditions
    *** All records selected by default ***

Selected files
  ID     File          Library       Member        Record Format
  T01    QAYPESTATS    ITSOEX01      FLAT          QYPESTATS
  T02    QAYPEMII      ITSOEX01      FLAT          QYPEMII
  T03    QAYPEMICPX    ITSOEX01      FLAT          QYPEMICPX
Join tests
  Type of join  . . . . . . . . . . . . . . Matched records with primary file
  Field             Test             Field
  T01.QSTTBT        EQ               T02.QMITBT
  T01.QSTCMI        EQ               T03.QCPIDX
Result fields
  Name       Expression                         Column Heading          Len  Dec
  MIPGM      substr(t02.qmipnm,1,10)            Pgm
                                                Name
                                                 M05
```

Figure 19 (Part 1 of 5). Example Query Definition PEX STATS Files

```
Result fields (continued)
  Name          Expression                       Column Heading          Len  Dec
  MICPGM        SUBSTR(t03.qcpsnm,1,10)          MI Complex
                                                 Instr
                                                 Name
  INSDB         t01.qiisdr+t01.qiisdw            Inline                   11    0
                                                 DB
                                                 SIO
  INADB         t01.QIIADR+T01.QIIADW            Inline                   11    0
                                                 DB
                                                 AIO
  INSNDB        t01.qiiwrt+t01.qiipwr+           Inline                   11    0
                t01.qiisnr+t01.qiisnw            NDB
                                                 SIO
  INANDB        T01.qiianr+t01.qiianw            Inline                   11    0
                                                 NDB
                                                 AIO
  CUSDB         T01.QCISDR+T01.QCISDW            Cum                      11    0
                                                 DB
                                                 SIO
  CUADB         T01.QCIADR+T01.QCIADW            Cum                      11    0
                                                 DB
                                                 AIO
  CUSNDB        T01.QCIWRT+T01.QCIPWR+           Cum                      11    0
                t01.qcisnr+t01.qcisnw            NDB
                                                 SIO
  CUANDB        t01.qcianr+t01.qcianw            Cum                      11    0
                                                 NDB
                                                 AIO
  INCPU         t01.qsticp/1000000               Inline                    7    3
                                                 CPU
                                                 Sec
  CUCPU         t01.qstccp/1000000               Cum                       7    3
                                                 CPU
                                                 Sec
Ordering of selected fields
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  MIPGM
  MICPGM
  T01.QSTINV                                   Procedure invocation count
  T01.QSTCCT                                   Number of procedures called
  T01.QSTXCT                                   MI complex inst count
  INCPU
  INSDB
  INADB
  INSNDB
```

Figure 19 (Part 2 of 5). Example Query Definition PEX STATS Files

```
                                          M05


                             IBM Query/400                      2/21/97    9:14:42         Page    3
Ordering of selected fields (continued)
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  INANDB
  CUCPU
  CUSDB
  CUADB
  CUSNDB
  CUANDB
  T01.QSTCLV                                   Call level
Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count           Overrides
  Field           Summary    Column                             Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings       Len  Pos  Cap   Len  Pos  Editing
  MIPGM                      0        Pgm                   10
                                      Name
  MICPGM                     0        MI CMPLX              10
                                      Instr
                                      Name
  T01.QSTINV                 0        Times                 20    0          5    0     Yes
                                      Called
  T01.QSTCCT                 0        Calls                 20    0          5    0     Yes
                                      Made
  T01.QSTXCT                 0        MI CMPLX              20    0          5    0     Yes
                                      Inst
                                      Calls
  INCPU                      0        Inline                 7    3
                                      CPU
                                      Sec
  INSDB                      0        Inline                11    0          7    0     Yes
                                      DB
                                      SIO
  INADB                      0        Inline                11    0          7    0     Yes
                                      DB
                                      AIO
  INSNDB                     0        Inline                11    0          7    0     Yes
                                      NDB
                                      SIO
  INANDB                     0        Inline                11    0          7    0     Yes
                                      NDB
                                      AIO
  CUCPU                      0        Cum                    7    3
                                      CPU
                                      Sec
  CUSDB                      0        Cum                   11    0          7    0     Yes
                                      DB
                                      SIO
                                          M05
```

Figure 19 (Part 3 of 5). Example Query Definition PEX STATS Files

```
                             IBM Query/400                     2/21/97    9:14:42         Page    4
Report column formatting and summary functions (continued)
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count           Overrides
  Field           Summary    Column                                 Dec  Null        Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  CUADB                      0        Cum                      11    0          7    0     Yes
                                      DB
                                      AIO
  CUSNDB                     0        Cum                      11    0          7    0     Yes
                                      NDB
                                      SIO
  CUANDB                     0        Cum                      11    0          7    0     Yes
                                      NDB
                                      AIO
  T01.QSTCLV                 2        Call                      9    0          3    0     Yes
                                      Lvl
Selected output attributes
  Output type . . . . . . . . . . . . . . Printer
  Form of output  . . . . . . . . . . . . Detail
  Line wrapping . . . . . . . . . . . . . No

Printer Output
  Printer device  . . . . . . . . . . . . *PRINT
  Report size
    Length  . . . . . . . . . . . . . . .  66 (default)
    Width . . . . . . . . . . . . . . . . 132
  Report start line . . . . . . . . . . .   6 (default)
  Report end line . . . . . . . . . . . .  60 (default)
  Report line spacing . . . . . . . . . . Single space
  Print definition  . . . . . . . . . . . No

Printer Spooled Output
  Spool the output  . . . . . . . . . . . (Defaults to value in print file, QPQUPRFIL)
  Form type . . . . . . . . . . . . . . . (Defaults to value in print file, QPQUPRFIL)
  Copies  . . . . . . . . . . . . . . . .   1
  Hold  . . . . . . . . . . . . . . . . . (Defaults to value in print file, QPQUPRFIL)

                                              M05
```

Figure 19 (Part 4 of 5). Example Query Definition PEX STATS Files

```
                              IBM Query/400                    2/21/97    9:14:42         Page    5
Cover Page
  Print cover page  . . . . . . . . . . . Yes
    Cover page title
      Sample Query over PEX STATS Data

Page headings and footings
  Print standard page heading . . . . . . No
    Page heading
    Page footing

Database file output
  File  . . . . . . . . . . . . . . . . . QQRYOUT
    Library . . . . . . . . . . . . . . . ITSOPEX
  Member  . . . . . . . . . . . . . . . . *FILE
  Data in file  . . . . . . . . . . . . . New file
  For a new file:
    Authority . . . . . . . . . . . . . . *LIBCRTAUT
    Text about
      the file  . . . . . . . . . . . . . PEX STATS Stats Info - Part I of II
  Print definition  . . . . . . . . . . . No

Output file record format
  Output record length  . . . . . . . . .   159
  Output CCSID value  . . . . . . . . . .    37
  Field list:
    Field         Begin   Len  Dec   Null  Data Type           Text
    MIPGM             1    10              Character           substr(t02.qmipnm,1,10)
    MICPGM           11    10              Character           SUBSTR(t03.qcpsnm,1,10)
    QSTINV           21    20    0         Packed decimal      Procedure invocation count
    QSTCCT           32    20    0         Packed decimal      Number of procedures called
    QSTXCT           43    20    0         Packed decimal      MI complex inst count
    INCPU            54     7    3         Zoned decimal       t01.qsticp/1000000
    INSDB            61    11    0         Zoned decimal       t01.qiisdr+t01.qiisdw
    INADB            72    11    0         Zoned decimal       t01.QIIADR+T01.QIIADW
    INSNDB           83    11    0         Zoned decimal       t01.qiiwrt+t01.qiipwr+          t01.qiisnr+t01.qi
    INANDB           94    11    0         Zoned decimal       T01.qiianr+t01.qiianw
    CUCPU           105     7    3         Zoned decimal       t01.qstccp/1000000
    CUSDB           112    11    0         Zoned decimal       T01.QCISDR+T01.QCISDW
                                                 M05


                              IBM Query/400                    2/21/97    9:14:42         Page    6
Output file record format (continued)
  Field list:
    Field         Begin   Len  Dec   Null  Data Type           Text
    CUADB           123    11    0         Zoned decimal       T01.QCIADR+T01.QCIADW
    CUSNDB          134    11    0         Zoned decimal       T01.QCIWRT+T01.QCIPWR+          t01.qcisnr+t01.qc
    CUANDB          145    11    0         Zoned decimal       t01.qcianr+t01.qcianw
    QSTCLV          156     9    0         Binary              Call level
                * * * * *   E N D   O F   Q U E R Y   P R I N T   * * * * *
```

Figure 19 (Part 5 of 5). Example Query Definition PEX STATS Files

The output from this query is similar to the Statistics Information Section of the PRTPEXRPT for STATS data.

This query and sample report do not identify any specific problem. They are provided only as examples for obtaining fewer printed pages than a PRTPEXRPT report would produce.

```
         Sample Query over PEX STATS Data
QUERY NAME . . . . . PEXQ01
LIBRARY NAME . . . . ITSOEX01
FILE          LIBRARY      MEMBER       FORMAT
QAYPESTATS    ITSOEX01     FLAT         QYPESTATS
QAYPEMII      ITSOEX01     FLAT         QYPEMII
QAYPEMICPX    ITSOEX01     FLAT         QYPEMICPX
DATE . . . . . . . . 02/21/97
TIME . . . . . . . . 09:14:52
               PEX STATS Stats Info
          M05
```

Figure 20 (Part 1 of 2). Example Query Output using PEX STATS Data

Pgm Name	MI CMPLX Instr Name	Times Called	Calls Made	MI CMPLX Inst Calls	Inline CPU Sec	Inline DB SIO	Inline DB AIO	Inline NDB SIO	Inline NDB AIO	Cum CPU Sec	Cum DB SIO	Cum DB AIO	Cum NDB SIO	Cum NDB AIO	Call Lvl
	*CVTCN,LB	4138	0	0	.251	0	0	0	0	.251	0	0	0	0	0
QLICRLIB	--------	1	11	32	.003	0	0	2	0	.081	0	2	114	8	0
QWSOPEN	--------	1	1	6	.000	0	0	0	0	.001	0	0	0	0	0
	*CVTEFN	416	0	0	.022	0	0	0	0	.022	0	0	0	0	0
QMHSNDPM	--------	28	0	187	.014	0	0	1	0	.033	0	0	3	0	0
	*MATACTAT	28	0	0	.001	0	0	0	0	.001	0	0	0	0	0
QSQRXTRT	--------	27	81	0	.005	0	0	0	0	.082	0	0	6	0	0
	*MATAGPAT	2	0	0	.000	0	0	0	0	.000	0	0	0	0	0
	*REQIO	8	0	0	.002	0	0	0	0	.002	0	0	0	0	0
QTOASND	--------	7	0	14	.004	0	0	0	0	.005	0	0	0	0	0
QCLRTVDA	--------	1	1	3	.001	0	0	0	0	.003	0	0	0	0	0
	*MATLUD	3	0	0	.000	0	0	0	0	.000	0	0	0	0	0
	*DEACTCR	5	0	0	.001	0	0	0	0	.001	0	0	0	0	0
QTVSREAD	--------	7	0	0	.001	0	0	0	0	.001	0	0	0	0	0
	*DESCR	40	0	0	.026	0	0	0	0	.026	0	0	0	0	0
QQQISVSU	--------	5	5	10	.007	0	0	1	0	.013	0	0	1	0	0
QWPALLOC	--------	1	7	4	.001	0	0	0	0	.003	0	0	0	0	0
	*DESDSINX	6	0	0	.011	12	0	24	0	.011	12	0	24	0	0
QMHRMVPM	--------	9	0	40	.001	0	0	0	0	.003	0	0	0	0	0
	*INSDSEN	10	0	0	.018	16	9	48	0	.018	16	9	48	0	0
QMHMOVPM	--------	66	0	484	.013	0	0	0	0	.032	0	0	0	2	0
QCAPOS	--------	25	0	0	.006	0	0	0	0	.006	0	0	0	0	0
	*SETCR	6	0	0	.001	0	0	0	0	.001	0	0	0	0	0
QDBGETSQ	--------	4	0	12	.000	0	0	0	0	.001	0	0	0	0	0
	*FNDINXEN	639	0	0	.067	0	0	1	0	.067	0	0	1	0	0
QWSSPEND	--------	1	2	0	.000	0	0	0	0	.001	0	0	0	0	0
	*INSINXEN	11	0	0	.004	0	0	6	3	.004	0	0	6	3	0
QCMDEXC	--------	22	100	120	.011	0	0	0	0	.090	0	0	4	0	0
	*CRTINX	1	0	0	.002	0	0	9	1	.002	0	0	9	1	0
	*RMVINXEN	4	0	0	.001	0	0	0	1	.001	0	0	0	1	0
	*GRANT	14	0	0	.003	0	0	15	0	.003	0	0	15	0	0
QLIDLOBJ	--------	1	3	8	.001	0	0	0	0	.005	0	0	7	1	0
QCAIFLD	--------	19	0	0	.001	0	0	0	0	.001	0	0	0	0	0
	*CRTS	194	0	0	.229	0	0	48	0	.229	0	0	48	0	0
	*MODS1	84	0	0	.022	0	0	0	0	.022	0	0	0	0	0
	*ACTCR	52	0	0	.021	0	0	0	0	.021	0	0	0	0	0
	*MATSSATR	14	0	0	.001	0	0	0	0	.001	0	0	0	0	0
	*CRTCR	25	0	0	.202	0	0	66	1	.202	0	0	66	1	0
QSYGRAUT	--------	2	6	14	.001	0	0	0	0	.010	0	2	6	0	0
	*CRTCTX	1	0	0	.057	0	0	53	2	.057	0	0	53	2	0
	*RSLVSP	956	0	0	.123	0	0	0	0	.123	0	0	0	0	0
	*TESTAU	449	0	0	.010	0	0	0	0	.010	0	0	0	0	0
QMHPDEH	--------	9	0	27	.002	0	0	0	0	.006	0	0	0	0	0
QMHCHGEM	--------	4	0	8	.000	0	0	0	0	.001	0	0	0	0	0
QSQRTBLS	--------	2	0	1	.000	0	0	0	0	.000	0	0	0	0	0
QSQRAPLY	--------	4	0	0	.002	0	0	0	0	.002	0	0	0	0	0
	*RTNEXCP	26	0	0	.001	0	0	0	0	.001	0	0	0	0	0
	*MATINVAT	89	0	0	.004	0	0	0	0	.004	0	0	0	0	0
	*MATINVIF	819	0	0	.029	0	0	4	1	.029	0	0	4	1	0
QPTKYPRC	--------	2	0	0	.000	0	0	0	0	.000	0	0	0	0	0
	*CRTQ	1	0	0	.001	0	0	0	0	.001	0	0	0	0	0

M05

(lines removed for brevity)
* * * E N D O F R E P O R T * * *

Figure 20 (Part 2 of 2). Example Query Output using PEX STATS Data

Chapter 5. Performance Explorer *PROFILE Option

The PEX PROFILE (ADDPEXDFN TYPE(*PROFILE)) option is used to localize CPU hot-spots within a program. To identify the hot-spots, we typically analyze either Performance Tools/400 Transaction (trace data collected) reports or a PRTPEXRPT of a PEX STATS definition collection. This analysis identifies one or more programs that need to be looked at in further detail.

5.1 How to use PEX *PROFILE

The following PEX command sequence to collect and print a PRTPEXRPT of PROFILE data is an example of some of the PROFILE options you may or may not want to use.

After this example we provide the exact commands used to define, collect, and report our actual program analysis example described in Section 5.2, "PEX PROFILE ILE Example" on page 105.

1. Add a PEX Definition (ADDPEXDFN).

   We recommend that you leave the INTERVAL default size at 1 millisecond.

   We define PEX PROFILE definition PROFILEALL to gather data for programs PGM01 and PGM02 in library APPLIB by entering the following command:

   ```
   ADDPEXDFN DFN(PROFILEALL) TYPE(*PROFILE) JOB(*ALL)
             PGM((APPLIB/PGM01)(APPLIB/PGM02)) INTERVAL(1)
             TEXT('PROF: ALL JOBS, PGMS APPLIB:PGM01,PGM02')
   ```

   You can specify program names that do not exist; however, these programs must exist before you issue the STRPEX command or the STRPEX command will fail.

   Ensure that you use a meaningful name for DFN and meaningful characters for TEXT parameters.

2. Start a PEX Data Collection (STRPEX).

   We start collecting data using PEX definition PROFILEALL by entering:

   ```
   STRPEX SSNID(PROFILEALL) OPTION(*NEW) DFN(PROFILEALL)
   ```

   While it is not necessary that the collection session (SSNID) name and the PEX definition (DFN) are the same, we recommended that you make them the same or keep the starting characters the same for ease of use.

   PEX support does not provide easy to use functions to *find a PEX definition* or *find a PEX data collection*. Minimizing the number of definitions and collections, and using easy to remember names is a requirement!

   To find all the PEX definitions you can do:

   ```
   DSPFD FILE(QUSRSYS/QAPEXDFN) TYPE(*MBRLIST)
   ```

   To find all the PEX collection sessions, you need to understand what libraries the collected data has been stored in (specified on the ENDPEX command). QPEXDATA is the ENDPEX command DTALIB parameter default. Do a display file description TYPE(*MBRLIST) for at least one of the PEX data collection database files. For example:

   ```
   DSPFD FILE(library-name/QAYPEBASE) TYPE(*MBRLIST)
   ```

Note: We recommend that you use OPTION(*NEW) to ensure that a fresh collection is started.

3. End a PEX Data Collection (ENDPEX).

   As an example, to stop collection data for session PROFILEALL, enter:

```
ENDPEX SSNID(PROFILEALL) OPTION(*END) DTAOPT(*LIB) DTALIB(QPEXDATA)
       DTAMBR(*SSNID) RPLDTA(*YES)
```

   Notes:

   a. We recommend that you use OPTION(*END).

      Suspend mode (OPTION(*SUSPEND)) can be used if you are measuring programs over a long period and want to avoid breaks, such as the lunch period. Avoid use of suspend mode until you are experienced with PEX.

   b. We recommend the use of RPLDTA(*YES) whenever the ENDPEX command is used. Replacing any previously collected data (RPLDTA(*YES)) that was stored with the *same DTAMBR(name)* ensures that the ENDPEX command will complete successfully.

      You may use the default collection storage library QPEXDATA. **However, we recommend using a specifically created library.** This makes deleting collections when no longer needed simply a matter of using the Delete Library (DLTLIB) command or Clear Library (CLRLIB) command, rather than remembering all the collection member names you have previously used and specifying them on the DLTPEXDTA command.

4. Print PEX Report for Collected Data (PRTPEXRPT).

   You print the report for PEX collection PROFILEALL by entering:

```
PRTPEXRPT MBR(PROFILEALL) LIB(QPEXDATA) TYPE(*PROFILE)
```

Please refer to the PEX chapter in *Performance Tools/400*, SC41-4340, for details of PRTPEXRPT *PROFILE report headings and full details of the PEX commands.

5.1.1 PEX PROFILE Limitations

PEX PROFILE data collection has some limitations you should be aware of:

- The capability to specify generic program names (such as program ABC* in library ITSO12 or program *ALL in library ITSOMLIB) is deliberately not provided with PEX PROFILE, because the maximum number of programs that can be specified in a PEX PROFILE definition is 16.
- When an OPM program is included in a PEX PROFILE collection, the HLL statement numbers that appear in the PRTPEXRPT *PROFILE report **are not the actual HLL source code statement numbers.**

  You can determine the actual source code statement number by doing the following steps:

  1. Compile the OPM program with an *LIST generation option.

     This listing includes the original HLL source statement number (the number you want to find) and the corresponding MI instructions generated for this HLL statement. These MI instructions are assigned their own INSTruction number on the listing.

  2. Collect PEX PROFILE data that includes the OPM program.
  3. PRTPEXRPT TYPE(*PROFILE) PROFILEOPT(*SAMPLECOUNT *STATEMENT)

4. Find the OPM program highest count statement number (in decimal) and convert to its corresponding hexadecimal value.

   For example, decimal 241 is hexadecimal F1 ((15 * 16) + 1).

5. Scan the MI statement portion of the listing (Generate Output section) obtained in 1 to find that hexadecimal instruction number under the column heading *INST*. On the right side of that same print line you also have the HLL source statement number under the *Break* column heading. Two lines preceding the matched *INST* line you also see **BRK ′HLL source statement number′**.

6. Find that statement number in your original source portion of the listing.

   We provide an example of this conversion in Section 5.3, "PEX PROFILE OPM Example" on page 112.

5.2 PEX PROFILE ILE Example

This PEX PROFILE example uses the same programs CLCSTPEXHI and CSTPEX that were used in Section 4.5, "PEX STATS HIER Example - Program at Multiple Levels" on page 83. The following PEX PROFILE definition, PEX collection run, and PRTPEXRPT commands were used:

```
ADDPEXDFN DFN(RBPROF2PGM) TYPE(*PROFILE) JOB(*ALL)
          PGM((PFREXP/CLCSTPEXHI)(PFREXP/CSTPEX)) INTERVAL(1)
          TEXT('RBPROF CLCSTPEXHI, CSTPEX')

STRPEX SSNID(RBPROF2PGM) OPTION(*NEW) DFN(RBPROF2PGM)

ENDPEX SSNID(RBPROF2PGM) OPTION(*END) DTAOPT(*LIB) DTALIB(COOL)
       DTAMBR(*SSNID) RPLDTA(*YES)
       TEXT('RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)')

PRTPEXRPT MBR(RBPROF2PGM) LIB(COOL) TYPE(*PROFILE)
          PROFILEOPT(*SAMPLECOUNT *STATEMENT)
```

The following figures show PRTPEXRPT PROFILE report output and a compiler listing of program CSTPEX.

```
                                        Performance Explorer Report                                    1/21/97 13:39:10
                                          Definition Information                                             Page
                                                                                                                    1
Library . . : COOL
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Type . . . . . . . . . . . . : PROFILE
Definition Name. . . . . . . : RBPROF2PGM
Defined By . . . . . . . . . : COOL
Definition Description . . . : RBPROF CLCSTPEXH, CSTPEX
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 1
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
Selected Programs:
    Pane Size  Library    Program    Type       Module     Procedure
    4          PFREXP     CLCSTPEXHI *PGM       *ALL       *ALL
    4          PFREXP     CSTPEX     *PGM       *ALL       *ALL
```

Figure 21 (Part 1 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                                        1/21/97 13:39:10
                                              Run Information                                                     Page
                                                                                                                          2
Library . . : COOL
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Sessions since IPL. . . . . . . . . . . . . :                        17
Session name. . . . . . . . . . . . . . . . : RBPROF2PGM
Start time. . . . . . . . . . . . . . . . . : 1997-01-21-13.36.35.475064
Stop time . . . . . . . . . . . . . . . . . : 1997-01-21-13.38.10.890248
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.01.35.415184
Suspend time (us) . . . . . . . . . . . . . :                   342,296
Number of events. . . . . . . . . . . . . . :                     2,506
Trace wrap count. . . . . . . . . . . . . . :                         0
Job creating session. . . . . . . . . . . . : QPADEV0006COOL      068399
Started by user . . . . . . . . . . . . . . : COOL
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                    98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                         1
Logical DASDs . . . . . . . . . . . . . . . :                         7
Data areas. . . . . . . . . . . . . . . . . :                         1
Jobs/tasks in session . . . . . . . . . . . :                       288
Jobs in session . . . . . . . . . . . . . . :                       118
```

Figure 21 (Part 2 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                                        1/21/97 13:39:10
                                      Profile CPU Summary Information                                            Page
                                                                                                                        3
Library . . . . :  COOL
Member. . . . . :  RBPROF2PGM
Description . . :  RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Total CPU . . . :       8480864
Job CPU . . . . :       8256856    97.4 %
Task CPU. . . . :        224008     2.6 %
                   ----------------------
Total Samples . :          7664
Total Hits. . . :          1108    14.5 %
```

Figure 21 (Part 3 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                                        1/21/97 13:39:10
                                           Profile Information                                                   Page    3

                                             Library Section
Library . . : COOK
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
                           Histogram     Hit   Hit   Cum   Start             Map   Stmt   Name
                                         Cnt    %     %    Addr              Flag  Numb
-----------------------------------------------------------------------------------------------------------------------------
************************************     1108 100.0 100.0 22B55B7DFD002360   MP        7  PFREXP
```

Figure 21 (Part 4 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                                    1/21/97 13:39:10
                                             Task Information                                                      Page
                                                                                                                      5
Library . . : COOK
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Task ID    Job/Task Name              Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                    Start/End                                           Percent
-----------------------------------------------------------------------------------------------------------------------------------
      2228 QPADEV0006 COOK      068399    4      160   Y     Y           93112512              7856616    92.64
      2227 QPADEV0004 TEAM96    068398    4      160   Y     Y           93083944                    0        0
      2007 QPADEV0009 SAKAI     068394    4      160   Y     Y           93064560                    0        0
      2006 QPADEV0021 COOK      068393    4      160   Y     Y           93064560                    0        0
      2003 T2-P23NPTT7                    1       75   Y     Y           93064568                    0        0
      1857 P23ARVYBC  AS0219R   068381    4      160   Y     Y           93032152                    0        0
      1854 QZDASOINIT QUSER     068378    2      160   Y     Y           93032152                    0        0
      1842 QZSCSRVS   QUSER     068366    2      160   Y     Y           93002440                    0        0
```

(Remaining task information omitted for brevity.)

Figure 21 (Part 5 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                                    1/21/97 13:39:10
                                            Profile Information                                                Page   12
Library . . : COOK
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
                           Histogram     Hit   Hit   Cum   Start             Map   Stmt   Name
                                         Cnt    %     %    Addr              Flag  Numb
-----------------------------------------------------------------------------------------------------------------------------------
                         ***********     349  31.5  31.5 22B55B7DFD002E48    MP       45  CSTPEX 1
                             *******     243  21.9  53.4 22B55B7DFD002DA0    MP       42  CSTPEX 2
                              ******     202  18.2  71.7 22B55B7DFD003E40    MP      106  CSTPEX 3
                                  **      82   7.4  79.1 22B55B7DFD002F20    MP       46  CSTPEX
                                  **      81   7.3  86.4 22B55B7DFD002D6C    MP       41  CSTPEX
                                   *      53   4.8  91.2 22B55B7DFD003ECC    MP      107  CSTPEX
                                   *      45   4.1  95.2 22B55B7DFD002E2C    MP       44  CSTPEX
                                          15   1.4  96.6 22B55B7DFD002F90    MP       47  CSTPEX
                                          10   0.9  97.5 22B55B7DFD003E38    MP      105  CSTPEX
                                           7   0.6  98.1 22B55B7DFD002FA0    MP       50  CSTPEX
                                           4   0.4  98.5 22B55B7DFD002360    MP        7  CSTPEX
                                           4   0.4  98.8 22B55B7DFD002500    MP       14  CSTPEX
                                           2   0.2  99.0 22B55B7DFD0023F4    MP       10  CSTPEX
                                           2   0.2  99.2 22B55B7DFD002D48    MP       40  CSTPEX
                                           2   0.2  99.4 22B55B7DFD003100    MP       55  CSTPEX
                                           2   0.2  99.5 22B55B7DFD003288    MP       69  CSTPEX
                                           2   0.2  99.7 22B55B7DFD00454C    MP      128  CSTPEX
                                           1   0.1  99.8 3567AA401D0024B8    MP     5400  CLCSTPEXHI  4
                                           1   0.1  99.9 22B55B7DFD0024B0    MP       13  CSTPEX
                                           1   0.1 100.0 22B55B7DFD002CC0    MP       38  CSTPEX
```

Figure 21 (Part 6 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

Notes for STATS PROFILE CSTPEX Program Example:

The sequence of asterisk (*****) characters under the *Histogram* column visually indicate the relative frequency of instruction hits during the PROFILE collection. The more hits, the more CPU resource the instruction consumed.

1 Statement number 45 consumed 31.5% of all statement hits during the collection. This is the highest hit percentage. See **1L** in Figure 22 on page 108 to determine that this is a divide function.

2 Statement number 42 consumed 21.9% of all statement hits during the collection. This is the second highest hit percentage. See **2L** in Figure 22 on page 108 to determine that this is a multiply function.

3 Statement number 106 consumed 18.2% of all statement hits during the collection. This is the third highest hit percentage. See **3L** in Figure 22 on page 108 to determine that this is a multiply function.

At **4**, we see that a statement (5400) from program CLCSTPEXHI was recorded. This is shown just for illustration purposes when more than one program is collected under PEX PROFILE. Statement 5400 has such a low hit percentage (0.1) that investigating program CLCSTPEXHI is not worth the effort.

In our simple program example, you can see that three statements were responsible for 71.75 of all hits. Investigating other statements does not seem to be worthwhile.

In a real application program, you may find the PEX PROFILE Profile Information showing high percentage hits for a single statement or similar percentages for multiple statements. You need to look at the program source code to determine if the high CPU cost is really because of a single statement or groups of statements, such as a processing loop of some kind.

You may conclude that a new algorithm should be written, a different HLL language may be more efficient for the function you want to perform, or the function is doing what it has to do as fast as it can and *no programming change* should be made!

```
5716RG1 V3R6M0  950929 RN       IBM ILE RPG/400        PFREXP/CSTPEX           RCHASM05   01/21/97 13:35:23        Page      1
 Command  . . . . . . . . . . . . :   CRTBNDRPG
   Issued by  . . . . . . . . . . :     COOL
 Program  . . . . . . . . . . . . :   CSTPEX
   Library  . . . . . . . . . . . :     PFREXP
 Text 'description' . . . . . . . :   *SRCMBRTXT
 Source Member  . . . . . . . . . :   CSTPEX
 Source File  . . . . . . . . . . :   QRPGLESRC
   Library  . . . . . . . . . . . :     PFREXP
   CCSID  . . . . . . . . . . . . :     37
 Text 'description' . . . . . . . :   ILE RPG READ CSTFIL/CHAIN ITMFIL for Perf Exp lan
 Last Change  . . . . . . . . . . :   01/21/97  13:35:18
 Generation severity level  . . . :   10
 Default activation group . . . . :   *YES
 Compiler options . . . . . . . . :   *XREF      *GEN       *NOSECLVL  *SHOWCPY
                                      *EXPDDS    *EXT       *NOEVENT
 Debugging views  . . . . . . . . :   *STMT
 Output . . . . . . . . . . . . . :   *PRINT
 Optimization level . . . . . . . :   *NONE
 Source listing indentation . . . :   *NONE
 Type conversion options  . . . . :   *NONE
 Sort sequence  . . . . . . . . . :   *HEX
 Language identifier  . . . . . . :   *JOBRUN
 Replace program  . . . . . . . . :   *YES
 User profile . . . . . . . . . . :   *USER
 Authority  . . . . . . . . . . . :   *LIBCRTAUT
 Truncate numeric . . . . . . . . :   *YES
 Fix numeric  . . . . . . . . . . :   *NONE
 Target release . . . . . . . . . :   *CURRENT
 Allow null values  . . . . . . . :   *NO
```

Figure 22 (Part 1 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
Line   <---------------------- Source Specifications ----------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
                          S o u r c e   L i s t i n g
     1 H DFTNAME(ITMINL)                                                                                         000000       000100
     2 F*CUSTOMER FILE READ PROGRAM FOR PERFORMANCE TEST                                                         920615       000200
     3 F*                                                                                                        000000       000300
     4 FCSTFIL    IF   E           K DISK    BLOCK(*YES)                         V3R6 BLOCK kwd                    950824       000400
        *---------------------------------------------------------------------------------------------*
        *                             RPG name        External name                                   *
        * File name. . . . . . . . . :  CSTFIL          PFREXP/CSTFIL                                   *
        * Record format(s) . . . . . :  CSTREC          CSTREC                                          *
        *---------------------------------------------------------------------------------------------*
     5 FITMFIL    IF   E           K DISK                                                                    950815       000500
        *---------------------------------------------------------------------------------------------*
        *                             RPG name        External name                                   *
        * File name. . . . . . . . . :  ITMFIL          PFREXP/ITMFIL                                   *
        * Record format(s) . . . . . :  ITMREC          ITMREC                                          *
        *---------------------------------------------------------------------------------------------*
     6 FBUPAP1ID  CF   E             WORKSTN                                                                 950815       000600
        *---------------------------------------------------------------------------------------------*
        *                             RPG name        External name                                   *
        * File name. . . . . . . . . :  BUPAP1ID        PFREXP/BUPAP1ID                                 *
        * Record format(s) . . . . . :  PROMPT          PROMPT                                          *
        *---------------------------------------------------------------------------------------------*
     7=ICSTREC                                                                                                          1000001
        *---------------------------------------------------------------------------------------------*          1
        * RPG record format  . . . . :  CSTREC                                                        *          1
        * External format  . . . . . :  CSTREC : PFREXP/CSTFIL                                        *          1
        *---------------------------------------------------------------------------------------------*          1
     8=I                           S    1    6 OCNUM                         CUSTOMER NUMBER                           1000002
     9=I                           A    7   26  CNAME                        CUSTOMER NAME                             1000003
    10=I                           A   27   66  ADRES1                       ADDRESS FIELD     1                       1000004
    11=I                           A   67  106  ADRES2                       ADDRESS FIELD     2                       1000005
    12=I                           A  107  107  STATUS                       STATUS FIELD                              1000006
    13=I                           S  108  119 OTIMSTC                        TIME STAMP FIELD                         1000007
    14=I                           A  120  269  CSTWKA                       CST WORK AREA                             1000008
    15=IITMREC                                                                                                          2000001
```

Figure 22 (Part 2 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
       *---------------------------------------------------------------------------------------*                2
       * RPG record format  . . . . :  ITMREC                                                  *                2
       * External format  . . . . . :  ITMREC : PFREXP/ITMFIL                                  *                2
       *---------------------------------------------------------------------------------------*                2
   16=I                            A    1    2  ITMID                         ITEM ID FLD                       2000002
   17=I                            S    3    8 0INUM                          ITEM NUMBER                       2000003
   18=I                            A    9   23  IDESC                         ITEM DESCRIPTION                  2000004
   19=I                            S   24   28 2IPRICE                        ITEM PRICE                        2000005
   20=I                            S   29   33 0ONHAND                        ON HAND                           2000006
   21=I                            A   34   34  IDELET                        ITEM DELETE CODE                  2000007
   22=I                            S   35   46 0TIMSTI                        TIME STAMP FIELD                  2000008
   23=I                            A   47  196  ITMWKA                        ITEM WORK AREA                    2000009
   24=IPROMPT                                                                                                   3000001
       *---------------------------------------------------------------------------------------*                3
       * RPG record format  . . . . :  PROMPT                                                  *                3
                                              M05
 5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX            RCHASM05   01/21/97 13:35:23        Page      3
Line   <---------------------- Source Specifications ----------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
       * External format  . . . . . :  PROMPT : PFREXP/BUPAP1ID                                *                3
       * Format text  . . . . . . . :  ITEM PROMPT FORMAT                                      *                3
       *---------------------------------------------------------------------------------------*                3
   25=I                            A    1    1  *IN01                         END PROGRAM                       3000002
   26=I                            S    2    7 OCNUM                          CUSTOMER NUMBER                   3000003
   27=I                            S    8   13 OINUM                          ITEM NUMBER                       3000004
   28 C     *ENTRY        PLIST                                                                  000000     000700
   29 C                   PARM                    MAXRCD           15 5                          920609     000800
   30 C                   PARM                    CPULUP           15 5                          940729     000900
   31 C                   PARM                    CMPCNM           15 5                          950814     001000
   32 C                   PARM                    STOP              1                            950814     001100
   33 C                   Z-ADD     1             CTR               6 0                          000000     001200
   34 C                   MOVE      '1'           INOUT                                          950815     001300
   35 C                   CALL      'COMPTIMEE'                                                  970121     001400
   36 C                   PARM                    TIMEC             6                            950815     001500
   37 C                   PARM                    INOUT             1                            950815     001600
   38 C     CTR           DOWLE     MAXRCD                                         B01           000000     001700
   39 C* DO TO CONSUME CPU                                                                     * 940204     001800
   40 C                   Z-ADD     CPULUP        CPUCTR           15 5              01           940729     001900
   41 C     CPUCTR        DOWGE     1                                              B02           940204     002000
    2L
   42 C     MAXRCD        MULT      CPUCTR        LUPVAL           15 5              02           940204     002100
   43 C* Do MULT in other area of program as well                                                970121     002200
   44 C                   EXSR      MULT                                            02           970121     002300
    1L
   45 C     LUPVAL        DIV       CPUCTR        LUPVAL                             02           940204     002400
   46 C     CPUCTR        SUB       1             CPUCTR                             02           940204     002500
   47 C                   END                                                     E02           940204     002600
   48 C* END CONSUME CPU                                                                       * 940204     002700
   49 C*** CHANGED TO READ CSTREC                                                               950814     002800
   50 C                   READ      CSTREC                      ----31              01           950814     002900
   51 C     *IN31         IFEQ      '1'                                            B02           950814     003000
   52 C                   GOTO      WTDSP                                           02           950814     003100
   53 C                   END                                                     E02           950815     003200
```

Figure 22 (Part 3 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
    54 C*********************************************************                                    950814     003300
    55 C     CMPCNM        IFEQ      CNUM                                                 B02        950814     003400
    56 C                   MOVE      CSTWKA        CWKA           150                      02        950814     003500
    57 C                   MOVE      CNAME         CNAMA           20                      02        950814     003600
    58 C                   MOVE      CNUM          CNUMA            6 0                    02        950814     003700
    59 C                   MOVE      ADRES1        ADRS1A          40                      02        950814     003800
    60 C                   MOVE      ADRES2        ADRS2A          40                      02        950814     003900
    61 C     STOP          IFEQ      'Y'                                                  B03        950814     004000
    62 C                   GOTO      WTDSP                                                 03        950814     004100
    63 C                   END                                                            E03        950814     004200
    64 C                   ELSE                                                           X02        950814     004300
    65 C********                                                                                     950815     004400
    66 C                   Z-ADD     1             CTRDMY           6 0                    02        950815     004500
    67 C********                                                                                     950815     004600
    68 C                   END                                                            E02        950814     004700
    69 C     CTR           ADD       1             CTR                                    01        950815     004800
    70 C                   END                                                            E01        950815     004900
    71 C     WTDSP         TAG                                                                      950814     005000
    72 C                   MOVE      '2'           INOUT                                            950815     005100
    73 C                   CALL      'COMPTIMEE'                                                     970121     005200
    74 C                   PARM                    TIMEC            6                               950815     005300
    75 C                   PARM                    INOUT            1                               950815     005400
                                                 M05
 5716RG1 V3R6M0  950929 RN       IBM ILE RPG/400        PFREXP/CSTPEX          RCHASM05   01/21/97 13:35:23       Page      4
Line   <--------------------- Source Specifications ----------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
    76 C******                                                                                       950815     005500
    77 C******  IF CUST NUMBER FIELD CNUM EQUAL CSTNBR DISPLAY SAVED FIELDS                           950815     005600
    78 C******  OTHERWISE USE LAST FIELDS LAST READ FROM CSTFIL - END OF FILE                         950815     005700
    79 C******  OR MAXRCD REACHED.                                                                   950815     005800
    80 C*****                                                                                        950815     005900
    81 C     *IN31         IFNE      '1'                                                  B01        950815     006000
    82 C     MAXRCD        ORNE      CTR                                                   01        950815     006100
    83 C                   MOVE      CWKA          CSTWKA                                  01        950814     006200
    84 C                   MOVE      CNAMA         CNAME                                   01        950814     006300
    85 C                   MOVE      CNUMA         CNUM                                    01        950814     006400
    86 C                   MOVE      ADRS1A        ADRES1                                  01        950814     006500
    87 C                   MOVE      ADRS2A        ADRES2                                  01        950814     006600
    88 C                   END                                                            E01        950815     006700
    89 C                   Z-ADD     CMPCNM        INUM                                             950815     006800
    90 C****************************************                                                     950815     006900
    91 C*****************************************                                                    950815     007000
    92 C                   MOVE      '1'           INOUT                                            950815     007100
    93 C                   CALL      'COMPTIMEE'                                                     970121     007200
    94 C                   PARM                    TIMEI            6                               950815     007300
    95 C                   PARM                    INOUT            1                               950815     007400
    96 C     INUM          CHAIN     ITMFIL                           44----                          950815     007500
    97 C                   MOVE      '2'           INOUT                                            950815     007600
    98 C                   CALL      'COMPTIMEE'                                                     970121     007700
    99 C                   PARM                    TIMEI            6                               950815     007800
   100 C                   PARM                    INOUT            1                               950815     007900
   101 C                   WRITE     PROMPT                                                          950814     008000
   102 C                   READ      BUPAP1ID                         ----97                          950815     008100
```

Figure 22 (Part 4 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
   103 C                   SETON                                        LR----                                  950815    008200
   104 C                   RETURN                                                                               000000    008300
   105 C     MULT          BEGSR                                                  MULT HERE TOO                 970121    008400
       3L
   106 C     MAXRCD        MULT      CPUCTR        LUPVAL           15 5                                        970121    008500
   107 C                   ENDSR                                                  Return to Caller              970121    008600
   108=OPROMPT                                                                                                          4000001
       *---------------------------------------------------------------------------------------*                        4
       * RPG record format  . . . . :  PROMPT                                                   *                        4
       * External format  . . . . . :  PROMPT : PFREXP/BUPAP1ID                                 *                        4
       * Format text  . . . . . . . :  ITEM PROMPT FORMAT                                       *                        4
       *---------------------------------------------------------------------------------------*                        4
   109=O                       *IN13                3A CHAR       1                                                    4000002
   110=O                       *IN26                1A CHAR       1                                                    4000003
   111=O                       *IN28                2A CHAR       1                                                    4000004
   112=O                       CNUM                 9S ZONE     6,0            CUSTOMER NUMBER                         4000005
   113=O                       DLTADD              18A CHAR       9                                                    4000006
   114=O                       TIMSTC              30S ZONE    12,0             TIME STAMP FIELD                       4000007
   115=O                       CNAME               50A CHAR      20            CUSTOMER NAME                           4000008
   116=O                       ADRES1              90A CHAR      40            ADDRESS FIELD     1                     4000009
   117=O                       ADRES2             130A CHAR      40            ADDRESS FIELD     2                     4000010
   118=O                       CSTWKA             280A CHAR     150            CST WORK AREA                           4000011
   119=O                       TIMEC              286A CHAR       6                                                    4000012
   120=O                       INUM               292S ZONE     6,0            ITEM NUMBER                             4000013
   121=O                       TIMSTI             304S ZONE    12,0            TIME STAMP FIELD                        4000014
   122=O                       IDESC              319A CHAR      15            ITEM DESCRIPTION                        4000015
   123=O                       IPRICE             324S ZONE     5,2            ITEM PRICE                              4000016
   124=O                       ONHAND             329S ZONE     5,0            ON HAND                                 4000017
   125=O                       ITMWKA             479A CHAR     150            ITEM WORK AREA                          4000018
   126=O                       TIMEI              485A CHAR       6                                                    4000019
                                                   M05
 5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX           RCHASM05   01/21/97 13:35:23        Page      5
Line   <---------------------- Source Specifications ----------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
   127=O                       DLTADI             494A CHAR       9                                                    4000020
   128=O                       CNLOTO             510A CHAR      16                                                    4000021
      * * * * *   E N D   O F   S O U R C E   * * * * *
```

(Remainder of Compiler Listing not included for brevity.)

Figure 22 (Part 5 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

5.3 PEX PROFILE OPM Example

This PEX PROFILE example uses the same program CLCSTPEXHI that was used in the PEX STATS example in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83, and in the PEX PROFILE ILE program example in Section 5.2, “PEX PROFILE ILE Example” on page 105. However, Program CSTPEXO (OPM) is called instead of ILE program CSTPEX.

Only the PRTPEXRPT TYPE(*PROFILE) *Profile Information* section is shown in Figure 23 on page 113. Figure 24 on page 114 shows a compiler listing of program OPM CSTPEXO.

As discussed earlier in this chapter, the OPM statement number that appears in the PRTPEXTRPT Profile Information section must be converted to its hexadecimal equivalent. Find this hexadecimal value under the *INST* column heading on the create program compile listing *Generated Output* (MI instructions) section.

On that same print line, you should see the HLL statement number under the *Break* column heading.

```
                                                 Performance Explorer Report                                         1/23/97  9:09:13
                                                     Profile Information                                                  Page   12
Library . . : COOL
Member. . . : BRPRFOPM
Description : RB PROFILE OPM CSTPEXO
                           Histogram     Hit   Hit   Cum   Start             Map    Stmt   Name
                                         Cnt    %     %    Addr              Flag   Numb
-----------------------------------------------------------------------------------------------------------------------------
                            ********      91  23.0  23.0 1D9627C2BB0039D8    MP       241  CSTPEXO  1
                              ******      66  16.7  39.6 1D9627C2BB0029D0    MP       105  CSTPEXO
                               *****      57  14.4  54.0 1D9627C2BB0027F8    MP        98  CSTPEXO
                                ****      52  13.1  67.2 1D9627C2BB002A7C    MP       107  CSTPEXO
                                 ***      33   8.3  75.5 1D9627C2BB0028B0    MP        99  CSTPEXO
                                  **      30   7.6  83.1 1D9627C2BB0027C4    MP        97  CSTPEXO
                                  **      24   6.1  89.1 1D9627C2BB003A98    MP       242  CSTPEXO
                                   *      17   4.3  93.4 1D9627C2BB003AF4    MP       243  CSTPEXO
                                           9   2.3  95.7 1D9627C2BB002924    MP       100  CSTPEXO
                                           3   0.8  96.5 1D9627C2BB002B04    MP       108  CSTPEXO
                                           3   0.8  97.2 1D9627C2BB00424C    MP       276  CSTPEXO
                                           2   0.5  97.7 1D9627C2BB002A6C    MP       106  CSTPEXO
                                           1   0.3  98.0 1D9627C2BB002B0C    MP       109  CSTPEXO
                                           1   0.3  98.2 1D9627C2BB002B30    MP       110  CSTPEXO
                                           1   0.3  98.5 1D9627C2BB002B88    MP       115  CSTPEXO
                                           1   0.3  98.7 1D9627C2BB002BC0    MP       119  CSTPEXO
                                           1   0.3  99.0 1D9627C2BB002C88    MP       126  CSTPEXO
                                           1   0.3  99.2 1D9627C2BB002DCC    MP       135  CSTPEXO
                                           1   0.3  99.5 1D9627C2BB0041E0    MP       275  CSTPEXO
                                           1   0.3  99.7 1D9627C2BB005AC4    MP       398  CSTPEXO
                                           1   0.3 100.0 1D9627C2BB005B00    MP       399  CSTPEXO
```

Figure 23. PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEXO (OPM)

Notes for STATS PROFILE CSTPEXO (OPM) Program Example:

This example describes how to find the *real HLL source statement number* for the highest CPU consumption statement in this PEX PROFILE report showing an OPM program - CSTPEXO.

In Figure 23, you see statement number 241 at **1** had the highest hit percentage of 23.0. If you look at the source statement listing in Figure 24 on page 114, you see there is no source statement 24100.

As we discussed earlier in this chapter, for OPM programs in PEX PROFILE reports you must convert the 241 to its hexadecimal equivalent of X′F1.′ X′F1′ is actually the hexadecimal instruction number of the MI instruction generated by the HLL compiler.

To find the actual HLL source statement number, you must have compiled the program with the *LIST (show generated MI instructions) option. Take the hexadecimal value and scan for it within the *Generated Output* section of the compiler listing. Scan for the hexadecimal value under the *INST* heading. If you are patient, you find this at **1MI** in Figure 24 on page 114. In our example, this is at the line with **685** under the *SEQ*uence number column in the leftmost margin. In the middle of that line, you see BRK ′8500′ and in the rightmost margin, under the column *Break*, you see 8500. 8500 is the HLL source statement number you see in this example at **1L**.

```
5716RG1 V3R6M0  950929              IBM RPG/400                       PFREXP/CSTPEXO       01/23/97  08:55:12      Page       1
Compiler . . . . . . . . . . . . . :   IBM RPG/400
Command Options:
  Program  . . . . . . . . . . . . :   PFREXP/CSTPEXO
  Source file  . . . . . . . . . . :   PFREXP/QRPGSRC
  Source member  . . . . . . . . . :   CSTPEXO
  Source listing options . . . . . :   *SOURCE     *XREF       *GEN        *NODUMP     *NOSECLVL   *NOSRCDBG   *NOLSTDBG
  Generation options . . . . . . . :   *LIST       *NOXREF     *NOATR      *NODUMP     *NOOPTIMIZE
  Source listing indentation . . . :   *NONE
  Type conversion options  . . . . :   *NONE
  Sort sequence  . . . . . . . . . :   *HEX
  Language identifier  . . . . . . :   *JOBRUN
  SAA flagging . . . . . . . . . . :   *NOFLAG
  Generation severity level  . . . :   9
  Print file . . . . . . . . . . . :   *LIBL/QSYSPRT
  Replace program  . . . . . . . . :   *YES
  Target release . . . . . . . . . :   *CURRENT
  User profile . . . . . . . . . . :   *USER
  Authority  . . . . . . . . . . . :   *LIBCRTAUT
  Text . . . . . . . . . . . . . . :   *SRCMBRTXT
  Phase trace  . . . . . . . . . . :   *NO
  Intermediate text dump . . . . . :   *NONE
  Snap dump  . . . . . . . . . . . :   *NONE
  Codelist . . . . . . . . . . . . :   *NONE
  Ignore decimal data error  . . . :   *NO
  Allow null values  . . . . . . . :   *NO
Actual Program Source:
  Member . . . . . . . . . . . . . :   CSTPEXO
  File . . . . . . . . . . . . . . :   QRPGSRC
  Library  . . . . . . . . . . . . :   PFREXP
  Last Change  . . . . . . . . . . :   01/23/97  08:54:57
  Description  . . . . . . . . . . :   RPG READ CSTFIL/CHAIN ITMFIL OPM for Perf Exp lab
```

Figure 24 (Part 1 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
SEQUENCE                                                                            IND    DO     LAST       PAGE   PROGRAM
NUMBER   *...1....+....2....+....3....+....4....+....5....+....6....+....7...*  USE    NUM    UPDATE     LINE   ID
                         S o u r c e   L i s t i n g
     100  H                                                                                   08/18/95          CSTPEX
     200  F******* CSTPEXO - OPM VERSION                                                      08/18/95
     300  F*CUSTOMER FILE READ PROGRAM FOR PERFORMANCE TEST                                   06/15/92
     400  F*
     500  FCSTFIL  IF  E           K        DISK                                              08/14/95
           RECORD FORMAT(S):  LIBRARY PFREXP FILE CSTFIL.
                    EXTERNAL FORMAT CSTREC RPG NAME CSTREC
     600  FITMFIL  IF  E           K        DISK                                              08/15/95
           RECORD FORMAT(S):  LIBRARY PFREXP FILE ITMFIL.
                    EXTERNAL FORMAT ITMREC RPG NAME ITMREC
     700  FBUPAP1IDCF  E                    WORKSTN                                           08/15/95
           RECORD FORMAT(S):  LIBRARY PFREXP FILE BUPAP1ID.
                    EXTERNAL FORMAT PROMPT RPG NAME PROMPT
 A000000   INPUT  FIELDS FOR RECORD CSTREC FILE CSTFIL FORMAT CSTREC.
 A000001                                       1   60CNUM               CUSTOMER NUMBER
 A000002                                       7  26 CNAME              CUSTOMER NAME
 A000003                                      27  66 ADRES1             ADDRESS FIELD     1
 A000004                                      67 106 ADRES2             ADDRESS FIELD     2
 A000005                                     107 107 STATUS             STATUS FIELD
 A000006                                     108 1190TIMSTC              TIME STAMP FIELD
 A000007                                     120 269 CSTWKA             CST WORK AREA
 B000000   INPUT  FIELDS FOR RECORD ITMREC FILE ITMFIL FORMAT ITMREC.
 B000001                                       1   2 ITMID              ITEM ID FLD
 B000002                                       3   80INUM               ITEM NUMBER
 B000003                                       9  23 IDESC              ITEM DESCRIPTION
 B000004                                      24  282IPRICE             ITEM PRICE
 B000005                                      29  330ONHAND             ON HAND
 B000006                                      34  34 IDELET             ITEM DELETE CODE
 B000007                                      35  460TIMSTI             TIME STAMP FIELD
 B000008                                      47 196 ITMWKA             ITEM WORK AREA
 C000000   INPUT  FIELDS FOR RECORD PROMPT FILE BUPAP1ID FORMAT PROMPT.
 C000000         ITEM PROMPT FORMAT
 C000001                                       1   1 *IN01              END PROGRAM
 C000002                                       2   70CNUM               CUSTOMER NUMBER
 C000003                                       8  130INUM               ITEM NUMBER
     800  C           *ENTRY    PLIST
     900  C                     PARM           MAXRCD 155                                     06/09/92
    1000  C                     PARM           CPULUP 155                                     07/29/94
    1100  C                     PARM           CMPCNM 155                                     08/14/95
    1200  C                     PARM           STOP    1                                      08/14/95
    1300  C                     Z-ADD1         CTR     60
    1400  C                     MOVE '1'       INOUT                                          08/15/95
    1500  C                     CALL 'COMPTIME'                                               08/15/95
    1600  C                     PARM           TIMEC   6                                      08/15/95
    1700  C                     PARM           INOUT   1                                      08/15/95
```

Figure 24 (Part 2 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929              IBM RPG/400                        PFREXP/CSTPEXO      01/23/97  08:55:12      Page      3
SEQUENCE                                                                                IND    DO    LAST       PAGE   PROGRAM
NUMBER    *...1....+....2....+....3....+....4....+....5....+....6....+....7...*  USE    NUM   UPDATE     LINE   ID
    1800  C           CTR       DOWLEMAXRCD                                                B001
    1900  C* DO TO CONSUME CPU                                                                   02/04/94      *
    2000  C                     Z-ADDCPULUP    CPUCTR 155                                   001  07/29/94        S
    2100  C           CPUCTR    DOWGE1                                                     B002  02/04/94
    2200  C           MAXRCD    MULT CPUCTR    LUPVAL 155                                   002  02/04/94
    2300  C           LUPVAL    DIV  CPUCTR    LUPVAL                                       002  02/04/94
    2400  C                     EXSR MULT                                                   002  01/23/97
    2500  C           CPUCTR    SUB  1         CPUCTR                                       002  02/04/94
    2600  C                     END                                                        E002  02/04/94
    2700  C* END CONSUME CPU                                                                     02/04/94      *
    2800  C*** CHANGED TO READ CSTREC                                                            08/14/95        S
    2900  C                     READ CSTREC                  31                      3    001  08/14/95
    3000  C           *IN31     IFEQ '1'                                                   B002  08/14/95
    3100  C                     GOTO WTDSP                                                  002  08/14/95
    3200  C                     END                                                        E002  08/15/95
    3300  C*********************************************************                             08/14/95
    3400  C           CMPCNM    IFEQ CNUM                                                  B002  08/14/95
    3500  C                     MOVE CSTWKA    CWKA  150                                    002  08/14/95
    3600  C                     MOVE CNAME     CNAMA  20                                    002  08/14/95
    3700  C                     MOVE CNUM      CNUMA   60                                   002  08/14/95
    3800  C                     MOVE ADRES1    ADRS1A 40                                    002  08/14/95
    3900  C                     MOVE ADRES2    ADRS2A 40                                    002  08/14/95
    4000  C           STOP      IFEQ 'Y'                                                   B003  08/14/95
    4100  C                     GOTO WTDSP                                                  003  08/14/95
    4200  C                     END                                                        E003  08/14/95
    4300  C                     ELSE                                                       X002  08/14/95
    4400  C********                                                                              08/15/95
    4500  C                     Z-ADD1         CTRDMY  60                                   002  08/15/95
    4600  C********                                                                              08/15/95
    4700  C                     END                                                        E002  08/14/95
    4800  C           CTR       ADD  1         CTR                                          001  08/15/95
    4900  C                     END                                                        E001  08/15/95
    5000  C           WTDSP     TAG                                                              08/14/95
    5100  C                     MOVE '2'       INOUT                                             08/15/95
    5200  C                     CALL 'COMPTIME'                                                  08/15/95
    5300  C                     PARM           TIMEC   6                                         08/15/95
    5400  C                     PARM           INOUT   1                                         08/15/95
    5500  C******                                                                                08/15/95
    5600  C******  IF CUST NUMBER FIELD CNUM EQUAL CSTNBR DISPLAY SAVED FIELDS                   08/15/95
    5700  C******  OTHERWISE USE LAST FIELDS LAST READ FROM CSTFIL - END OF FIL                  08/15/95          E
    5800  C******  OR MAXRCD REACHED.                                                            08/15/95
    5900  C*****                                                                                 08/15/95
    6000  C           *IN31     IFNE '1'                                                   B001  08/15/95
    6100  C           MAXRCD    ORNE CTR                                                    001  08/15/95
    6200  C                     MOVE CWKA      CSTWKA                                       001  08/14/95
    6300  C                     MOVE CNAMA     CNAME                                        001  08/14/95
    6400  C                     MOVE CNUMA     CNUM                                         001  08/14/95
    6500  C                     MOVE ADRS1A    ADRES1                                       001  08/14/95
    6600  C                     MOVE ADRS2A    ADRES2                                       001  08/14/95
    6700  C                     END                                                        E001  08/15/95
    6800  C                     Z-ADDCMPCNM    INUM                                              08/15/95
    6900  C***************************************                                               08/15/95
    7000  C****************************************                                              08/15/95
    7100  C                     MOVE '1'       INOUT                                             08/15/95
```

Figure 24 (Part 3 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929                IBM RPG/400                        PFREXP/CSTPEXO       01/23/97  08:55:12      Page        4
SEQUENCE                                                                            IND     DO     LAST       PAGE   PROGRAM
NUMBER    *...1....+....2....+....3....+....4....+....5....+....6....+....7...*  USE     NUM    UPDATE     LINE   ID
    7200  C                    CALL 'COMPTIME'                                                     08/15/95
    7300  C                    PARM           TIMEI   6                                            08/15/95
    7400  C                    PARM           INOUT   1                                            08/15/95
    7500  C          INUM      CHAINITMFIL                44                 1                     08/15/95
    7600  C                    MOVE '2'       INOUT                                                08/15/95
    7700  C                    CALL 'COMPTIME'                                                     08/15/95
    7800  C                    PARM           TIMEI   6                                            08/15/95
    7900  C                    PARM           INOUT   1                                            08/15/95
    8000  C                    WRITEPROMPT                                                         08/14/95
    8100  C                    READ BUPAP1ID                  97                    3              08/15/95
    8200  C                    SETON                      LR                 1                     08/15/95
    8300  C                    RETRN
    8400  C          MULT      BEGSR                                                               01/23/97
         1L
    8500  C          MAXRCD    MULT CPUCTR    LUPVAL 155                                           01/23/97
    8600  C                    ENDSR                                                               01/23/97
 D000000   OUTPUT FIELDS FOR RECORD PROMPT FILE BUPAP1ID FORMAT PROMPT.
 D000000         ITEM PROMPT FORMAT
 D000001                        *IN13      3  CHAR    1
 D000002                        *IN26      1  CHAR    1
 D000003                        *IN28      2  CHAR    1
 D000004                        CNUM       9  ZONE  6,0                    CUSTOMER NUMBER
 D000005                        DLTADD    18  CHAR    9
 D000006                        TIMSTC    30  ZONE 12,0                     TIME STAMP FIELD
 D000007                        CNAME     50  CHAR   20                    CUSTOMER NAME
 D000008                        ADRES1    90  CHAR   40                    ADDRESS FIELD     1
 D000009                        ADRES2   130  CHAR   40                    ADDRESS FIELD     2
 D000010                        CSTWKA   280  CHAR  150                    CST WORK AREA
 D000011                        TIMEC    286  CHAR    6
 D000012                        INUM     292  ZONE  6,0                    ITEM NUMBER
 D000013                        TIMSTI   304  ZONE 12,0                    TIME STAMP FIELD
 D000014                        IDESC    319  CHAR   15                    ITEM DESCRIPTION
 D000015                        IPRICE   324  ZONE  5,2                    ITEM PRICE
 D000016                        ONHAND   329  ZONE  5,0                    ON HAND
 D000017                        ITMWKA   479  CHAR  150                    ITEM WORK AREA
 D000018                        TIMEI    485  CHAR    6
 D000019                        DLTADI   494  CHAR    9
 D000020                        CNLOTO   510  CHAR   16
          * * * * *   E N D   O F   S O U R C E   * * * * *
         A d d i t i o n a l   D i a g n o s t i c   M e s s a g e s
* 7086      500   RPG PROVIDES BLOCK OR UNBLOCK SUPPORT FOR FILE CSTFIL.
```

Figure 24 (Part 4 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
 5716RG1 V3R6M0  950929                IBM RPG/400                       PFREXP/CSTPEXO       01/23/97  08:55:12      Page        5
                  K e y   F i e l d   I n f o r m a t i o n

                      PHYSICAL    LOGICAL
        FILE/RCD      FIELD       FIELD       ATTRIBUTES

    01  CSTFIL
             CSTREC
                      CNUM                    ZONE  6,0  SIGNED
    02  ITMFIL
             ITMREC
                      INUM                    ZONE  6,0  SIGNED
 5716RG1 V3R6M0  950929                IBM RPG/400                       PFREXP/CSTPEXO       01/23/97  08:55:12      Page        6
                        C r o s s   R e f e r e n c e

 File and Record References:
        FILE/RCD    DEV/RCD     REFERENCES (D=DEFINED)
    03  BUPAP1ID    WORKSTN         700D    8100
          PROMPT                    700D C000000     8000  D000000
    01  CSTFIL      DISK            500D
          CSTREC                    500D A000000     2900
    02  ITMFIL      DISK            600D    7500
          ITMREC                    600D B000000

 Field References:
        FIELD       ATTR    REFERENCES (M=MODIFIED D=DEFINED)
        *ENTRY      PLIST       800D
* 7031  *IN01       A(1)    C000001
        *IN13       A(1)    D000001D
        *IN26       A(1)    D000002D
        *IN28       A(1)    D000003D
        *IN31       A(1)       3000      6000
        ADRES1      A(40)   A000003D    3800      6500M D000008D
        ADRES2      A(40)   A000004D    3900      6600M D000009D
```

(Remainder of field and indicator references and summary sections removed for brevity.)

Figure 24 (Part 5 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
 5716RG1 V3R6M0  950929                IBM RPG/400                       PFREXP/CSTPEXO       01/23/97  08:55:12      Page        9
                            F i n a l   S u m m a r y
 Message Count:  (by Severity Number)
           TOTAL    00     10     20     30     40     50
             8       8      0      0      0      0      0
 Program Source Totals:
    Records . . . . . . . . . . . :   86
    Specifications  . . . . . . . :   70
    Table Records . . . . . . . . :   0
    Comments  . . . . . . . . . . :   16
 PRM has been called.
```

Figure 24 (Part 6 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                              Generated Output                                  01/23/97 08:55:12  Page    10
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8  Break
00001                                                                                                                  ;
00002                                             BRK '.ENTRY  '                             /*Z1STBRK*/               ;  .ENTRY
                                                                                                                          .ENTRY
                                                  /* QRGSF 06/14/94 */                                                    .ENTRY
00003                                                                                                                  ;  .ENTRY
                                                  /* QRGSI 04/15/94 */                                                    .ENTRY
00004                                                                                                                  ;  .ENTRY
                                                  /* QRGSC 05/18/93 */                                                    .ENTRY
00005                                                                                                                  ;  .ENTRY
                                                  /* QRGSO 10/17/94 */                                                    .ENTRY
00006                                                                                                                  ;  .ENTRY
                                                  /* QRGD1 04/20/94 */                                                    .ENTRY
00007                                                                                                                  ;  .ENTRY
                                                  /* QRGAE 04/19/95 */                                                    .ENTRY
00008                                                                                                                  ;  .ENTRY
00009                                             ENTRY .ENTRY(*ENTRY) EXT                   /*ZENTRY*/                ;  .ENTRY
00010  0001 000004  2252 000A 0481                SETIEXIT .RPGXIEX,.RPXIEXP                 /*SET UP INVOCATION EXIT P   .ENTRY
                                                                                             GM*/                      ;  .ENTRY
00011  0002 00000A  1011 046E                     B .START                                   /*BEGIN OF PROGRAM */     ;  .ENTRY
00012                                             BRK '.STOP'                                                          ;  .STOP
00013                                    .STOP:                                                                        ;  .STOP
00014  0003 00000E  3147 0008 2001                SUBN(S) .INVOCNT, 1                        /*ALLOW CALL TO THIS PGM*/;  .STOP
00015  0004 000014  02A1 0000                     RTX *                                      /* RETURN */                 .STOP
                                                                                             /*ZSTAR*/                 ;  .STOP
                                                                                                                          .STOP
                                                  /*START OF THE PROGRAM*/                                                .STOP
00016                                                                                                                  ;  .STOP
                                                  /* STATIC AREA FOR INDIC/FIELDS */                                      .STOP
00017                                                                                                                  ;  .STOP
                                                  /* START OF STRUCTURE POINTED BY .DMPTRLT*/                             .STOP
00018                                                                                                                  ;  .STOP
00019                                             DCL DD .RPGPGM CHAR(1) BDRY(16) INIT                                 ;  .STOP
00020                                             DCL DD .FIRSTSW CHAR(1) INIT('0')          /* PROGRAM CALLED BEFORE *   .STOP
                                                                                             /                         ;  .STOP
00021                                             DCL DD .EOJSW CHAR(1) INIT('0')            /*PROGRAM WENT TO EOJ*/   ;  .STOP
00022                                             DCL DD .DUMPSW CHAR(1) INIT('0')           /* DUMP REQUESTED*/       ;  .STOP
00023                                             DCL DD .ERRTERM CHAR(1) INIT('0')          /*PROGRAM TERMINATED */   ;  .STOP
00024                                             DCL DD .INVOCNT ZND(1,0) INIT(Z'0')                                  ;  .STOP
00025                                             DCL DD .INVOCER CHAR(4) INIT('8888')                                 ;  .STOP
00026                                             DCL SYSPTR .RPGXIEX INIT('QRGXINVX', TYPE(PGM,1))                       .STOP
                                                                                             /*INVOCATION EXIT PROGRAM*   .STOP
                                                                                             /                         ;  .STOP
00027                                             DCL DD .INVXLVL BIN(2) INIT(2)             /*INTERFACE LEVEL FOR QRGX   .STOP
                                                                                             INVX*/                       .STOP
                                                                                             /*END OF STATIC AREA STRUC   .STOP
                                                                                             TURE*/                    ;  .STOP
00028                                             DCL DD .BLANKS CHAR(140) INIT((140)' ')                              ;  .STOP
00029                                             DCL DD .ZEROS CHAR(30) INIT((30)'0')                                 ;  .STOP
00030                                             DCL CON *ON CHAR(1) INIT('1')              /* SET/CHECK INDICATORS ON   .STOP
                                                                                              */                       ;  .STOP
00031                                             DCL CON *OFF CHAR(1) INIT('0')             /* SET/CHECK INDICATORS OF   .STOP
                                                                                             F */                      ;  .STOP
00032                                             DCL DD .INDIC CHAR(1) BAS(*)                                         ;  .STOP
00033                                             DCL DD *INIT CHAR(1) INIT('0')             /*START INDIC AREA, DUMMY    .STOP
                                                                                             INDIC*/                   ;  .STOP
00034                                             DCL DD *INXX CHAR(1) INIT('1')             /*INDICATOR ALWAYS ON*/      .STOP
```

Figure 24 (Part 7 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                              Generated Output                                  01/23/97 08:55:12  Page    11
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8  Break
                                                                                             /*ZSTART*/                ;  .STOP
00035                                             DCL DD *INKA CHAR(1) INIT('0')             /*ZFIXIND*/               ;  .STOP
00036                                             DCL DD *INKB CHAR(1) INIT('0')             /*ZFIXIND*/               ;  .STOP
00037                                             DCL DD *INKC CHAR(1) INIT('0')             /*ZFIXIND*/               ;  .STOP
00038                                             DCL DD *INKD CHAR(1) INIT('0')             /*ZFIXIND*/               ;  .STOP
00039                                             DCL DD *INKE CHAR(1) INIT('0')             /*ZFIXIND*/               ;  .STOP
```

(Remaining DCL (declare variables) have been removed for brevity,)

Figure 24 (Part 8 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                              Generated Output                              01/23/97 08:55:12  Page    11
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8  Break
                                                                                           /*ZSTART*/                ;  .STOP
```

(*GETIN is the start of RPG generated instructions for the *GETIN (input) part of the RPG cycle.)

```
00240                                             BRK '*GETIN'                                                     ;  *GETIN
00241                                    *GETIN:                                           /*BEGIN OF GET INPUT RECOR   *GETIN
                                                                                           D*/                       ;  *GETIN
00242  0016 00008C  30B2 0096 00C9                CPYBLA .PGMERRN,'*GETIN  '               /*ZDRBEG*/                ;  *GETIN
00243  0017 000092  1CC2 4000 002C 000F           CMPBLA(B) *INLR,*OFF/EQ(.DRLROFF)        /* LR OFF?*/              ;  *GETIN
                    00CA                                                                                                *GETIN
00244  0018 00009C  10BE 002B 000E                CPYBREP .INLVLS,*ON                      /* SET ON ALL LEVEL INDICA   *GETIN
                                                                                           TORS */                   ;  *GETIN
00245  0019 0000A2  1011 00E2                     B *TOTC                                  /* GOTO TOTAL CALCS */    ;  *GETIN
00246                                    .DRLROFF:                                                                   ;  *GETIN
00247  001A 0000A6  30BE 002B 000F                CPYBREP .INLVLS,*OFF                     /* SET OFF L1-L9,LR */       *GETIN
                                                                                           /*ZDLVLCK*/               ;  *GETIN
00248  001B 0000AC  1CC2 4000 00CB 000E           CMPBLA(B) .LVLSW,*ON/EQ(*TOTC)           /* BYPASS SW */              *GETIN
                    00E2                                                                   /*ZDRL03*/                ;  *GETIN
```

(More lines have been removed for brevity,)

Figure 24 (Part 9 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                              Generated Output                              01/23/97 08:55:12  Page    19
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8  Break
00326  004C 0001D8  1CC2 4000 002C 000E           CMPBLA(B) *INLR,*ON/EQ(.END)             /* END OF PROGRAM*/          *OFL
                    0493                                                                   /*ZCKLR*/                 ;  *OFL
00327                                             BRK '*DETC  '                                                      ;  *DETC
00328                                    *DETC:                                            /* BEGIN OF DETAIL CALCULA   *DETC
                                                                                           TIONS */                     *DETC
                                                                                                                     ;  *DETC
00329  004D 0001E2  30B2 0096 00E9                CPYBLA .PGMERRN,'*DETC   '               /*ZDC*/                   ;  *DETC
                                                                                                                        *DETC
                                                  /* QRGGC 05/01/92 */                                                  *DETC
00330                                                                                                                ;  *DETC
                                                  /*  GC  DETAIL            BASE CALC CODE GEN */                       *DETC
```

(Source statement references under Break column start here.)

```
00331                                                                                                                ;  *DETC
00332                                             BRK '1300    '                                                     ;  1300
                                                  /* QRGAC 08/29/91 */                                                  1300
00333                                                                                                                ;  1300
00334  004E 0001E8  1042 0048 00EA                CPYNV CTR,P'1'                                                     ;  1300
                                                  /* QRGGC 05/01/92 */                                                  1300
00335                                                                                                                ;  1300
00336                                             BRK '1400    '                                                     ;  1400
                                                  /* QRGMC 10/05/95 */                                                  1400
00337                                                                                                                ;  1400
00338  004F 0001EE  10B6 0049 20F1                CPYBRA INOUT,C'1'                                                  ;  1400
                                                  /* QRGGC 05/01/92 */                                                  1400
00339                                                                                                                ;  1400
```

(More lines have been removed for brevity,)

Figure 24 (Part 10 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8  Break
                                                                                    /*ZCALER*/               ;  1500
00355  005C 00024C  1011 00DF                      B .ERX                            /*NO ERR INDICATOR*/        1500
                                                                                    /*ZCALERB*/              ;  1500
00356                                     .CRC0001:                                  /*RETURN WITH NO ERR*/   ;  1500
00357  005D 000250  3042 0093 0465                 CPYNV .PGMERST,.RPGRC             /*INDIC TYPE OF RETURN*/    1500
                                                                                    /*ZCALLRCB*/             ;  1500
00358  005E 000256  0293 0153 0000 014A            CALLI .PL001.2,*,.PLISTRT         /*ZCALLPB*/              ;  1500
00359                                     .CER0001 :                                 /*ERR on CALL*/             1500
                                                                                    /*ZCALERD*/              ;  1500
                                                                                                                1500
                                                   /* QRGGC 05/01/92 */                                         1500
00360                                                                                                        ;  1500
00361                                              BRK '1800     '                                           ;  1800
                                                   /* QRGCC 08/06/92 */                                         1800
00362                                                                                                        ;  1800
00363                                     .DOF0001:                                                          ;  1800
00364  005F 00025E  3C46 1000 0048 0044            CMPNV(B) CTR,MAXRCD/HI( .ELF0001)                         ;  1800
                    0109                                                                                        1800
00365                                     .BLF0001:                                                          ;  1800
00366                                              BRK '2000     '                                           ;  2000
                                                   /* QRGAC 08/29/91 */                                         2000
00367                                                                                                        ;  2000
00368  0060 000268  3042 004B 0045                 CPYNV CPUCTR,CPULUP                                       ;  2000
                                                   /* QRGGC 05/01/92 */                                         2000
00369                                                                                                        ;  2000
00370                                              BRK '2100     '                                           ;  2100
                                                   /* QRGCC 08/06/92 */                                         2100
00371                                                                                                        ;  2100
00372                                     .DOF0002:                                                          ;  2100
00373  0061 00026E  3C46 2000 004B 00F3            CMPNV(B) CPUCTR,P'1'/LO( .ELF0002)                        ;  2100
                    00FA                                                                                        2100
00374                                     .BLF0002:                                                          ;  2100
00375                                              BRK '2200     '                                           ;  2200
                                                   /* QRGAC 08/29/91 */                                         2200
00376                                                                                                        ;  2200
00377                                              DCL DD .PKDWORK PKD(26,10)        /*ARITH WORK AREA*/         2200
                                                                                    /*ZWKAR*/                ;  2200
00378  0062 000278  304B 00F5 0044 004B            MULT .PKDWORK,MAXRCD,CPUCTR                               ;  2200
00379  0063 000280  1042 004C 00F5                 CPYNV LUPVAL,.PKDWORK                                     ;  2200
                                                   /* QRGGC 05/01/92 */                                         2200
00380                                                                                                        ;  2200
00381                                              BRK '2300     '                                           ;  2300
                                                   /* QRGAC 08/29/91 */                                         2300
00382                                                                                                        ;  2300
00383  0064 000286  1C46 C000 004B 2000            CMPNV(B) CPUCTR ,0/NEQ(.0001DVD)  /*IS DIVISOR ZERO*/     ;  2300
                    00F8                                                                                        2300
```

Figure 24 (Part 11 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8  Break
00384  0065 000290  1042 0094 0093                CPYNV .PGMPROR,.PGMERST                      /*SAVE LAST STATUS*/       ;  2300
00385  0066 000296  10B2 0095 00F6                CPYBLA .PGMERSQ,'2300     '                  /*SEQ NUM OF ERR*/         ;  2300
00386  0067 00029C  10B2 0093 00F7                CPYBLA .PGMERST,'00102'                      /*ATTEMPT TO DIV BY ZERO*/;  2300
00387  0068 0002A2  1011 00DF                     B .ERX                                       /*GO TO ERROR HANDLER*/    ;  2300
00388                                    .0001DVD:                                             /*ZDIVCK*/                 ;  2300
00389  0069 0002A6  304F 004C 004C 004B           DIV LUPVAL ,LUPVAL ,CPUCTR                   /*DIV AND NO MVR*/            2300
                                                                                               /*ZDIV*/                   ;  2300
                                                                                                                             2300
                                                  /* QRGGC 05/01/92 */                                                       2300
00390                                                                                                                     ;  2300
00391                                             BRK '2400     '                                                         ;  2400
                                                  /* QRGBC 03/10/92 */                                                       2400
00392                                                                                                                     ;  2400
00393  006A 0002AE  0293 0130 0000 0131           CALLI MULT ,*,.SBR0002                       /*ZEXSRA*/                 ;  2400
                                                                                                                             2400
                                                  /* QRGGC 05/01/92 */                                                       2400
00394                                                                                                                     ;  2400
00395                                             BRK '2500     '                                                         ;  2500
                                                  /* QRGAC 08/29/91 */                                                       2500
00396                                                                                                                     ;  2500
00397  006B 0002B6  3147 004B 00F9                SUBN (S) CPUCTR,P'1'                                                    ;  2500
                                                  /* QRGGC 05/01/92 */                                                       2500
00398                                                                                                                     ;  2500
00399                                             BRK '2600     '                                                         ;  2600
                                                  /* QRGCC 08/06/92 */                                                       2600
00400                                                                                                                     ;  2600
00401  006C 0002BC  1011 00F2                     B .DOF0002                                   /*ZBR*/                    ;  2600
00402                                    .ELF0002:                                                                        ;  2600
00403                                             BRK '2900     '                                                         ;  2900
                                                  /* QRGIC 06/25/96 */                                                       2900
00404                                                                                                                     ;  2900
00405  006D 0002C0  30B2 0033 000F                CPYBLA *IN31,*OFF                            /*ZSETIND*/                ;  2900
00406  006E 0002C6  10B2 0284 00FB                CPYBLA .F01XSET ,C'00000READ R*DETC   2900    CSTREC  '                  2900
                                                                                               /*ZIOSUA*/                 ;  2900
00407  006F 0002CC  0082 0161 0241                SETSPP .FIBPTR,.F01FIB                       /* LOCATE FIB */              2900
                                                                                               /*ZIOSUB*/                 ;  2900
00408  0070 0002D2  10B2 0259 000F                CPYBLA .F01EIND ,*OFF                        /* SET ERROR INDIC COND */    2900
                                                                                               /*ZIOB*/                   ;  2900
00409  0071 0002D8  1CC2 4000 0261 000F           CMPBLA(B) .F01OPEN,*OFF/EQ(.DMEXL2)          /* ERROR IF NOT OPEN*/        2900
                    041F                                                                       /*ZIOSUPA*/                ;  2900
00410  0072 0002E2  10B2 03A1 00FC                CPYBLA .EXTRECN,C'CSTREC    '                  /*ZEXT*/                   ;  2900
00411  0073 0002E8  0293 03E8 0000 016D           CALLI .XRVRR01,*,.DRIVRTN                    /*ZICALLI*/                ;  2900
00412  0074 0002F0  3CC2 C000 0258 000E           CMPBLA(B) .F01EOF,*ON/NEQ(.OID0001)          /*END OF FILE IS ON? */    ;  2900
                    00FD                                                                                                     2900
00413  0075 0002FA  10B2 0033 0258                CPYBLA *IN31,.F01EOF                                                    ;  2900
00414                                    .OID0001:                                             /*ZI02*/                   ;  2900
00415  0076 000300  3CC2 4000 0258 000E           CMPBLA(B) .F01EOF,*ON/EQ(.OID0002)           /*ZI05*/                   ;  2900
                    00FF                                                                                                     2900
```

Starting in the middle of HLL statement 2900 (READ CSTREC) we remove several pages preceding the MI X'F1' instruction.

Figure 24 (Part 12 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
```

We resume the generated MI instructions with the end of HLL statement 7700 (CALL ′COMPTIME′).

```
                                                                                                                     7700
                                                    /* QRGGC 05/01/92 */                                             7700
00626                                                                                                            ;   7700
00627                                               BRK '8000    '                                               ;   8000
                                                    /* QRGIC 06/25/96 */                                             8000
00628                                                                                                            ;   8000
00629  00D3 00057E  30B2 005E 0124                  CPYBLA .CURROP,C'WRITE'                /* SET OP */               8000
                                                                                           /*ZIOSUR*/            ;   8000
00630  00D4 000584  0082 0161 0330                  SETSPP .FIBPTR,.F03FIB                 /* LOCATE FIB */           8000
                                                                                           /*ZIOSUB*/            ;   8000
00631  00D5 00058A  10B2 0348 000F                  CPYBLA .F03EIND ,*OFF                  /* SET ERROR INDIC COND */ 8000
                                                                                           /*ZIOB*/              ;   8000
00632  00D6 000590  1CC2 4000 0350 000E             CMPBLA(B) .F03OPEN,*ON/EQ (.IOD0007)   /*ZIOSUPB*/           ;   8000
                    0126                                                                                             8000
00633  00D7 00059A  10B2 0373 0125                  CPYBLA .F03XSET ,C'00000WRITER*DETC   8000   PROMPT  '            8000
                                                                                           /*ZIOSUA*/            ;   8000
00634  00D8 0005A0  1011 041F                       B .DMEXL2                              /* ERROR IF NOT OPEN*/ ;   8000
00635                                        .IOD0007:                                     /*ZIOSUPC*/           ;   8000
00636  00D9 0005A4  2293 0133 0000 0132             CALLI PROMPT ,*,.LINERTN               /*ZEXP*/              ;   8000
00637  00DA 0005AC  30B2 03A1 0127                  CPYBLA .EXTRECN,C'PROMPT    '          /*ZEXT*/              ;   8000
00638  00DB 0005B2  10B2 0373 0128                  CPYBLA .F03XSET ,C'00000WRITER*DETC   8000   PROMPT  '            8000
                                                                                           /*ZIOSUA*/            ;   8000
00639  00DC 0005B8  0293 03D4 0000 016D             CALLI .XRVRW03,*,.DRIVRTN              /*ZICALLI*/           ;   8000
                                                                                                                     8000
                                                    /* QRGGC 05/01/92 */                                             8000
00640                                                                                                            ;   8000
00641                                               BRK '8100    '                                               ;   8100
                                                    /* QRGIC 06/25/96 */                                             8100
00642                                                                                                            ;   8100
00643  00DD 0005C0  30B2 0035 000F                  CPYBLA *IN97,*OFF                      /*ZSETIND*/           ;   8100
00644  00DE 0005C6  10B2 0373 0129                  CPYBLA .F03XSET ,C'00000READ F*DETC   8100            '            8100
                                                                                           /*ZIOSUA*/            ;   8100
00645  00DF 0005CC  0082 0161 0330                  SETSPP .FIBPTR,.F03FIB                 /* LOCATE FIB */           8100
                                                                                           /*ZIOSUB*/            ;   8100
00646  00E0 0005D2  10B2 0348 000F                  CPYBLA .F03EIND ,*OFF                  /* SET ERROR INDIC COND */ 8100
                                                                                           /*ZIOB*/              ;   8100
00647  00E1 0005D8  1CC2 4000 0350 000F             CMPBLA(B) .F03OPEN,*OFF/EQ(.DMEXL2)    /* ERROR IF NOT OPEN*/     8100
                    041F                                                                   /*ZIOSUPA*/           ;   8100
00648  00E2 0005E2  0293 03C1 0000 016D             CALLI .XRVFR03,*,.DRIVRTN              /*ZICALLI*/           ;   8100
00649  00E3 0005EA  3CC2 C000 0347 000E             CMPBLA(B) .F03EOF,*ON/NEQ(.OID0005)    /*END OF FILE IS ON? */ ;  8100
                    012A                                                                                             8100
00650  00E4 0005F4  10B2 0035 0347                  CPYBLA *IN97,.F03EOF                                         ;   8100
00651                                        .OID0005:                                     /*ZIO2*/              ;   8100
00652  00E5 0005FA  3CC2 4000 0347 000E             CMPBLA(B) .F03EOF,*ON/EQ(.OID0006)     /*ZIO5*/              ;   8100
                    012D                                                                                             8100
00653  00E6 000604  1022 00DB 012B                  SETIP .DRTRTN,.IOD0009                                       ;   8100
00654  00E7 00060A  1011 40DC 0339                  B .DRTYPE(.F03NDRT)                    /*DETERMINE RECORD TYPE*/ ; 8100
00655                                        .IOD0009:                                     /*ZIO6*/              ;   8100
00656  00E8 000610  3CC2 4000 037E 012C             CMPBLA(B) .F03MJMN,'03'/EQ(.OID0006)   /*ZIO6D*/             ;   8100
                    012D                                                                                             8100
00657  00E9 00061A  10B2 8010 0335 000E             CPYBLA .F03RIDP->.INDIC,*ON            /* SET RECORD ID */   ;   8100
00658  00EA 000622  1022 00DD 012D                  SETIP .IEFRTN,.OID0006                                       ;   8100
```

Figure 24 (Part 13 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                               Generated Output                                01/23/97 08:55:12  Page    30
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
00659  00EB 000628  1011 40DE 033A                B .FLDETRT(.F03NFET)                        /*EXTRACT FIELDS*/          8100
                                                                                              /*ZI06 /* EXTRACT FIELDS *   8100
                                                                                              /                            8100
                                                                                                                           8100
                                                                                              /*ZI06A*/                 ;  8100
00660                                    .OID0006:                                            /*ZLABL*/                 ;  8100
                                                                                                                           8100
                                                  /* QRGGC 05/01/92 */                                                     8100
00661                                                                                                                   ;  8100
00662                                             BRK '8200    '                                                        ;  8200
                                                  /* QRGBC 03/10/92 */                                                     8200
00663                                                                                                                   ;  8200
00664  00EC 00062E  30B2 002C 000E                CPYBLA *INLR,*ON                            /*ZSETIND*/               ;  8200
                                                                                                                           8200
                                                  /* QRGGC 05/01/92 */                                                     8200
00665                                                                                                                   ;  8200
00666                                             BRK '8300    '                                                        ;  8300
                                                  /* QRGBC 03/10/92 */                                                     8300
00667                                                                                                                   ;  8300
00668  00ED 000634  1011 0494                     B .RETURN                                   /*RETURN TO CALLER*/         8300
                                                                                              /*ZRETURN*/               ;  8300
                                                                                                                           8300
                                                  /* QRGGC 05/01/92 */                                                     8300
00669                                                                                                                   ;  8300
                                                  /* ROOT PHASE GENERATES THE FOLLOWING CODE*/                             8300
                                                  /*ZROOTMSG*/                                                             8300
00670                                                                                                                   ;  8300
00671  00EE 000638  1011 012E                     B *DETL                                     /*SEPERATES BRK POINTS,LAS   8300
                                                                                              T DCALC AND DLINE*/       ;  8300
00672                                             BRK '*DETL   '                                                        ;  *DETL
00673                                    *DETL:                                               /* BEGIN OF DETAIL LINES *   *DETL
                                                                                              /                            *DETL
                                                                                                                        ;  *DETL
00674  00EF 00063C  30B2 0096 012F                CPYBLA .PGMERRN,'*DETL   '                  /*ZDL*/                   ;  *DETL
                                                                                                                           *DETL
                                                  /* ROOT PHASE GENERATES THE FOLLOWING CODE*/                             *DETL
                                                  /*ZROOTMSG*/                                                             *DETL
00675                                                                                                                   ;  *DETL
00676  00F0 000642  1011 00C8                     B *GETIN                                    /* GOTO GET NEXT RECORD */   *DETL
                                                                                              /*ZDLEND*/                ;  *DETL
                                                                                                                           *DETL
                                                  /* QRGGC 05/01/92 */                                                     *DETL
00677                                                                                                                   ;  *DETL
                                                  /*  GC  SUBROUTINES        BASE CALC CODE GEN */                         *DETL
00678                                                                                                                   ;  *DETL
```

Figure 24 (Part 14 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                               Generated Output                                01/23/97 08:55:12  Page    31
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break

00679                                             BRK '8400    '                                                        ;  8400
                                                  /* QRGBC 03/10/92 */                                                     8400
00680                                                                                                                   ;  8400
00681                                             ENTRY MULT INT                              /*ZBEGSR*/                ;  8400
                                                                                                                           8400
                                                  /* QRGGC 05/01/92 */                                                     8400
00682                                                                                                                   ;  8400
                                                     1MI
00683                                             BRK '8500    '                                                        ;  8500
                                                  /* QRGAC 08/29/91 */                                                     8500
00684  1MI                                                                                        1MI ;      8500
00685  00F1 000646  304B 00F5 0044 004B           MULT .PKDWORK,MAXRCD,CPUCTR                                           ;  8500
00686  00F2 00064E  1042 004C 00F5                CPYNV LUPVAL,.PKDWORK                                                 ;  8500
                                                  /* QRGGC 05/01/92 */                                                     8500
00687                                                                                                                   ;  8500
00688                                             BRK '8600    '                                                        ;  8600
                                                  /* QRGBC 03/10/92 */                                                     8600

  (Remaining MI instruction statements removed for brevity.)
```

Figure 24 (Part 15 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

Chapter 6. Performance Explorer *TRACE Option

The PEX TRACE tool provides the most granular level of performance detail of any performance analysis tool available on RISC AS/400 systems. It is assumed that users of this TRACE option already have a detailed understanding of AS/400 performance.

PEX TRACE is included as part of standard RISC-based OS/400. As shipped, PEX TRACE provides a single set of PEX TRACE *performance trace events* that can be collected. While you can create a PEX definition to use this single event-group, you are unable to run *tailored* collections in order to gather only the TRACE event data that is relevant to the problem your system is experiencing.

There are two primary reasons for collecting PEX TRACE data on a system:

1. IBM Support has asked you to run it.

   The intent is for the collected data to be sent to IBM for analysis. In this case, you should read Section 6.1, "Getting PEX TRACE for IBM Support Analysis of Data" in this redbook. All other sections in this chapter are not applicable.

2. You want to perform in-depth performance analysis using PEX TRACE.

   You are analyzing the collected trace data and you have a detailed understanding of AS/400 performance.

   In this case, proceed to Section 6.2, "Getting PEX TRACE for In-house Analysis of Data" on page 126. Do not read Section 6.1, "Getting PEX TRACE for IBM Support Analysis of Data."

The following topics discuss these two uses of collected PEX TRACE data.

6.1 Getting PEX TRACE for IBM Support Analysis of Data

The data collected is sent to IBM Support for analysis and is not intended for in-house review. You do not need to have the Performance Tools/400 installed on your system in order to collect this type of data for IBM.

IBM Support explains what type of PEX TRACE data collection is needed. This collection, or grouping of event data, is one of the following data:

- PEX TRACE standard definition support available on every RISC-based OS/400.
- One of the *extended* base PEX TRACE definitions that is contained in PTF SF28949 (V3R6) and PTF SF33744 (V3R7) and is listed in Table 2 on page 126.

In this redbook, we refer to both the single set of events TRACE definition and the definitions available under PTF SF28949 or SF33744 as "base" PEX TRACE support. If you are asked to use one of these definitions and you are not sure if they are available on your system, enter the following command:

```
DSPFD FILE(QUSRSYS/QAPEXDFN) TYPE(*MBRLIST)
```

This displays a list of all available PEX definitions.

The following table lists the PEX definitions shipped with PTFs SF28949 and 33744. Actually, one of these PTFs relates to PEX STATS and not PEX TRACE, providing a definition close to TPST.

Table 2. Extended PEX TRACE Definitions Shipped in PTF SF28949(V3R6), PTF 33744(V3R7)

Definition Name	**Descriptions**
QBUSYARM1	Trace mode, DASD start events
QBUSYARM2	Trace mode, DASD start, page fault start & SAR start events
QGENSYSP1	Trace mode, General system performance definition
QGENSYSP2	Trace mode, General system perf + mi exception
QGENSYSP3	Trace mode, General system perf + long seize wait
QGENSYSP4	Trace mode, Gen sys perf + seize/wait, exception
QMITRCEXT	Trace mode, call/return, activation group & mi exception
QTASKSWT	Trace mode, task switch in/out events
QTPST	Stats mode, TPST-like definition
QTRCASM	Trace mode, Auxiliary Storage Management events
QTRCPROFnn **1**	System wide CPU profiler, nn millisecond intervals where nn=01,05,10 and 20

Note the following:

1 An example of how to use this definition is shown in Section 8.1, "What Programs are Using Most CPU on the System?" on page 189.

The PEX TRACE data collected using these definitions is not meant for analysis outside of IBM Software Support.

Follow the instructions supplied by IBM Support for collecting, saving, and sending the data to IBM.

6.2 Getting PEX TRACE for In-house Analysis of Data

In order to collect the most detailed performance data available using PEX TRACE, you first need to obtain *additional* commands that enable you to:

- Tailor the type of data collected (known as events) to the type of performance problem you want to investigate.
- Produce reports that are not available in either the Performance Tools/400 LPP or OS/400.

The advanced collection and reporting capability provided through these commands is collectively referred to throughout this document as **Enhanced PEX TRACE**.

This advanced collection and reporting capability is intended only for use by AS/400 customers, IBM Services Professionals, and Business Partners that are already experienced in performance investigation on the AS/400 system.

Notes:

1. First, you need to obtain the PEX TRACE additional commands and reports. Please refer to Section 6.3, "How to Get the Enhanced PEX TRACE Functions" on page 127 for instructions on how to proceed.
2. The Performance Tools/400 Licensed Program Product must be installed in order to use the Print PEX Report command, which is a necessary part of any PEX performance reporting,

6.3 How to Get the Enhanced PEX TRACE Functions

The Enhanced PEX TRACE collection and reporting functions are provided through a set of ″fake″ and real PTFs. The PTF mechanism has been chosen as the easiest method of delivery for making these functions immediately available. Some of the PEX TRACE PTFs listed in Table 3 on page 127 (V3R6) and and Table 4 on page 130 (V3R7) act only as containers for the enhanced PEX TRACE function. These PTFs do not change any system run-time routines and do not fix any system problems. These PTFs include two libraries:

- Library QYPINT:

  This library contains the PEX TRACE Main Menu (PEXTRC01) and the supporting commands to simplify the collection and reporting of detailed PEX TRACE data.

- Library SMTRACE:

  This library contains the reports (queries) over data collected using the PEX TRACE commands from the PEX TRACE Main Menu in library QYPINT.

Note

The real PTFs listed in Table 3 on page 127 and Table 4 on page 130 are current as of February 28, 1997. Please use DIAL IBM or speak to IBM Software Support for a list of the latest PEX or PDC PTFs, especially to determine PTF supersedes.

Table 3 (Page 1 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and ″Fake″)

PTF Number	Library Name	Description of Contents
MA13057	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menus PEXTRC01 and PEXTRC02. This includes the Storage Management Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.

Table 3 (Page 2 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
MA13058	SMTRACE	Part one of 3 *SAVFs that contain the objects in library SMTRACE. This PTF and the following 2 PTFs (MA13059 and MA14450) must be restored as objects (RSTOBJ command) into library SMTRACE, which you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA13059	SMTRACE	Part 2 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14450	SMTRACE	Part 3 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MF11593 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF12290 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF12309 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF09615 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10062 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10845 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10856 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10867 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10868 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF11015 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.

Table 3 (Page 3 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
MF14622 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14447 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This PTF applies to PEX STATS HIER reports and removes the "*Alias" Call Level entry for ILE programs on the PRTPEXRPT report for a STATS HIER collection. When *Alias entries are *not included* in the report, Call Level values are as the programmer would expect them.
SF35974 to 5716-PT1	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This ensures that PRTPEXRPT command detail output prints *CPU milliseconds used* rather than CPU run cycles. **This PTF has been superseded by SF37834.** SF35974 is documented here since the cover letter to SF37834 does not describe the change to the CPU run cycle value.

SF37834
to 5716-PT1
	--------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It supersedes PTF SF35974 and adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and would then not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values:
		
		`Total Raw CPU . . :     2756288 <- dropped`
		`Overhead Removed. :      220397 <- dropped`
		`Total CPU . . . . :     2535891 <- 2756288`
		`Task CPU. . . . . :       135184    05.3 %`
		`Job CPU . . . . . :      2400707    94.7 %`
		`                       -----------------------`
		`Pgm/Mod CPU. . :         xxxxxxx    mm.m %`
		`Unknown CPU. . :         yyyyyyy    nn.n %`
		
		As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF37834) to review full details.

SF35964 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35964) to review the details.

Table 3 (Page 4 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
SF29899 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF29899) to review the details.
SF28949 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28949) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF28154 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28154) to review the details.

Table 4 (Page 1 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
MA14697	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menus PEXTRC01 and PEXTRC02. This includes the Storage Managemment Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.
MA14698	SMTRACE	Part one of 3 *SAVFs that contain the objects in library SMTRACE. This PTF and the following 2 PTFs (MA14699 and MA14700) must be restored as objects (RSTOBJ command) into library SMTRACE, which you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA14699	SMTRACE	Part 2 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14700	SMTRACE	Part 3 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
SF33744 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF33744) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF35321 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35321) to review the details.

<table>
<tr><td colspan="3">Table 4 (Page 2 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and ”Fake”)</td></tr>
<tr><th>PTF Number</th><th>Library Name</th><th>Description of Contents</th></tr>
<tr><td>SF38029
to 5716-PT1</td><td>-------</td><td>This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and would then not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows Overhead Removed or Total Raw CPU values:
<pre>
Total Raw CPU . . :   2756288 <- dropped
Overhead Removed. :   220397 <- dropped
Total CPU . . . . :   2535891 <- 2756288
Task CPU. . . . . :   135184   05.3 %
Job CPU . . . . . :   2400707   94.7 %

Pgm/Mod CPU. . :   xxxxxxx   mm.m %
Unknown CPU. . :   yyyyyyy   nn.n %
</pre>
As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF38029) to review full details.</td></tr>
<tr><td>MF13355
to SLIC</td><td>-------</td><td>This is included in V3R7 GA code. No need to apply.</td></tr>
<tr><td>MF13420
to SLIC</td><td>-------</td><td>This is a real PTF.</td></tr>
<tr><td>MF14469
to SLIC</td><td>--------</td><td>This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.</td></tr>
<tr><td>MF14263
to SLIC</td><td>-------</td><td>This is a real PTF.</td></tr>
</table>

Notes:

1. If you already have a library called SMTRACE on your system, please either rename it or save/delete it before restoring the V3R7 SMTRACE library from these PTFs.
2. The queries in library SMTRACE are contained within **three** PTFs.
3. Follow the instructions in the PTF cover letter for restoring the objects contained in these PTFs.

PEX PTFs Consideration

This chapter lists the ″extra PEX TRACE PTFs″ and the ″enhanced PEX TRACE PTFs.″ Over time, PEX PTFs for all PEX functions will become available. Appendix D, "Performance Explorer PTF Summary" on page 489 contains the list of all known PEX PTFs as of February 28, 1997.

6.4 How to Use Enhanced PEX TRACE

Important!

This section explains how to use the additional PEX TRACE functions obtained using the PTFs in Section 6.3, "How to Get the Enhanced PEX TRACE Functions" on page 127. If you do not have these PTFs and have not restored libraries QYPINT and SMTRACE to your system, please do so before continuing with this section.

In order to successfully run Enhanced PEX TRACE and produce Enhanced PEX TRACE reports, please read the following section. All functions are accessed from menu PEXTRC01 in library QYPINT.

6.4.1 PEX Trace Main Menu (PEXTRC01)

All collection and reporting commands are available from the PEX TRACE Main Menu (PEXTRC01) in library QYPINT. Therefore, in order to run Enhanced PEX TRACE, you should first enter:

1. ADDLIBLE QYPINT
2. ADDLIBLE QSMTRACE
3. GO PEXTRC01

The following menu is displayed:

```
PEXTRC01                    PEX Trace Main Menu
                                                         System:   SYSASROD
Select one of the following:
     1. Display Active PEX Session Name
     2. Start PEX Trace Data Collection
     3. End PEX Trace Data Collection
     4. PEX Trace Reports Menu
     5. Query Active PEX Session Status
     6. Display Collected PEX Session Names
     7. Display PEX Trace Run Information for a Session
     8. Display PEX Trace Run Time for a Session
     9. Work with Submitted Jobs
    10. Delete PEX Trace Session Data
Selection or command
===>_______________________________________________________
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant  F16=AS/400 main menu
```

Figure 25. PEX Trace Main Menu

Before proceeding, please be aware that the actual command sequence you use is identical to PEX STATS and PEX PROFILE. We have, however, deliberately packaged these commands into a menu-driven interface to simplify ease-of-use because extra steps are necessary to successfully collect data and produce reports using the Enhanced PEX TRACE Menu PEXTRC01.

Notes:

1. The actual Add PEX Definition Command used for this collection is different from the one provided as standard with OS/400 PEX.
2. Using the ADDPEXDFN command in library QYPINT is available through the PEX Main Menu, PEXTRC01. Using this command outside of the menu interface is not recommended **and is not supported**.

6.4.2 Displaying Active PEX Sessions

Prior to collecting any TRACE data, you should verify that there are no other PEX sessions (collections) currently active.

In order to do this, take option 1 from the PEX Main Menu. An example of the Display Active PEX Sessions display is shown:

```
                    Display Active PEX Sessions
        Session Name       Total Active Sessions =        1
        ITSOTRC1



                                                                Bottom



 F3=Exit
```

Figure 26. Display Active PEX Session Name

If an active PEX session exists, it must be ended (using the ENDPEX command) before a new PEX TRACE session can be started.

In some situations, a PEX Session appears as active but the ENDPEX command fails (with message CPFAF06) indicating that the PEX session is **not** active. If this situation occurs on your system, you should use the WRKOBJ OBJ(QUSRSYS/*ALL) OBJTYPE(*USRSPC) command and delete the data area with the name that matches the PEX session showing as active.

Option 1 (Display Active PEX Session Name) uses a DSPOBJD command for a User Space object in library QUSRSYS to find if there is an active PEX session. This works on V3R6 and V3R7.

On V3R7, ENDPEX supports SSNID(*SELECT), which does the same function and, if an active session is found, lets you select it so it can be ended.

When there are no active PEX sessions, PEX TRACE data can be collected.

6.4.3 Collecting Enhanced PEX TRACE Data

Take option 3 on the PEXTRC01 Menu and the command Storage Management Trace in Batch (SMTBCH) is prompted. The following display is shown:

```
                     V3R6 VERSION OF SMTBCH (SMTBCH)
 Type choices, press Enter.
Definition/MBR name . . . . . . 1  __________ Name
Type of problem  . . . . . . . . 2  __________ Name, *PERF, *DASDPERF1...
Length of trace in minutes . . . 3  ______________
Maxdata to collect . . . . . . . 4  500000____   1-2000000000
Library for collected data . . . 5  QYPINT____   Character value
Min CPU sample (milliseconds)  .    200          10-2000
Trace MI CALL Events?  . . . . . 6  *ENTEXTMI    *ENTRYEXIT, *MICMPLX...
Break MSG when time is up? . . . A  N            Y, N
Submit job to batch? . . . . . .    Y            Y, N
Job queue name . . . . . . . . .    QCTL______   Name
Job queue library  . . . . . . .    *LIBL_____   Name, *LIBL
Trace specific jobs/tasks? . . . 7  N            Y, N
Convert Pex Trace Data?  . . . . 8  N            Y, N
PRTPEXRPT & CPYSPLF to LIB?  . . 9  N            Y, N
Job Priority for PRTPEXRPT . . . 10 51           10-90

                                                              Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 27. Start PEX Trace Data Collection

In the following notes section, you should use the **specific values that are recommended.** All values that are not explicitly mentioned in the notes section should be left as the default value.

The value you specify for PROBLEM is used to build a PEX TRACE definition that collects the **minimum** types of TRACE events necessary to enable report generation. The less events collected, the longer the TRACE can be run.

For some PROBLEM types, the MIBRACKET keyword is also used to determine which TRACE events should be collected. Please refer to each of the individual PROBLEM type keyword values shown in this document to determine the effect of the MIBRACKET keyword value.

Notes:

1 DFN Keyword (Definition/MBR name)

Try to use a member name representative of the date, type of TRACE collection, and sequence. For example, you can use:

OP0804A

where:
OP represents an OPENS type of collection.
0804 represents the day and month of the collection (April 8).
A indicates that it was the first collection of that type on that day.

2 PROBLEM Keyword (Type of problem)

Choose one of the problem types defined in the following list. If you have no idea what may be causing the performance problems, you should use *PERF.

Please refer to Table 13 on page 168 for details of what type of PEX TRACE data must be collected in order to run each of the PEX TRACE reporting commands.

- *PERF

  This choice causes collection of general PERFormance related data such that most of the subsequent reports may be produced. Use a short collection time for this problem type (5-10 minutes), as many events may be collected. For example, on a model 530 running at approximately 50% CPU utilization, we have seen 1 000 000 trace events collected per minute.

  This PROBLEM value is used together with the MIBRACKET keyword (Trace MI CALL Events?) value to determine which TRACE events to collect.

  Specify MIBRACKET(*ENTEXTMI) if you need to see program names in the reports (this, however, collects many more events than using *NONE).

- *DASDPERF1

  This choice causes collection of DASD events, read start and completion events, and write start and write completion events.

  The value specified against Trace MI Call Events (MIBRACKET) is ignored.

  This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*NONE). Therefore, you do not see application program names in data collected using this value.

- *DASDPERF2

  This choice causes collection of DASD events, read start and completion events, and write start and write completion events. In addition, page fault events are collected along with SAR events.

  The value specified against Trace MI Call Events (MIBRACKET) is ignored.

  This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*NONE). Therefore, you do not see application program names in data collected using this value.

- *ADDRESSES

  This choice enables you to see which programs are using a lot of temporary and permanent addresses. Use a long collection time for this problem type (60+ minutes).

  This PROBLEM value is used together with the MIBRACKET value to determine which TRACE events to collect.

- *BUSYDISK

  This choice enables you to see what activity is occurring per disk arm and what objects are being accessed by disk arm. Use a short collection time for this problem type (5-10 minutes).

  This PROBLEM value is used together with the MIBRACKET value to determine which TRACE events to collect.

- *DISKSPACE

  This option allows you to see the actual size (allocated size) of objects on disk. Use a long collection time for this problem type (60+ minutes).

This PROBLEM value is used together with the MIBRACKET value to determine which TRACE events to collect.

- *OPENS

  This choice causes collection of data relating to full file opens only.

  Use this option if you have a high synchronous non-database IO rate and need to determine whether the cause is a lot of full file opens. Use a short collection time for this problem type (5-10 minutes).

- *ACTGRP

  This choice causes collection of data relating to activation group creations only.

  Use this option if you have a high synchronous non-database IO rate and need to determine whether the cause is a lot of activation group creations.

  The value specified against Trace MI Call Events (MIBRACKET) is ignored.

  This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*ENTEXTMI). This is done so that both application program names and appropriate MI Complex Instruction names are collected.

- *JOBWAITS1

  This is a V3R7 choice that collects base events relative to task switching along with DASD events for read and write starts and completions.

  The value specified against Trace MI Call Events (MIBRACKET) is ignored.

  This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*NONE). Therefore, you do not see application program names in data collected using this value.

- *DEACTS

  This value enables you to investigate OPM and ILE program activations and deactivations. If you have use another tool such as Performance Monitor Trace and determine high usage CPU programs, use this value to check whether these programs are:

  – OPM or ILE compatibility mode programs fully terminating on each call that are repetitively called by individual jobs.
  – ILE programs causing heavy activation group create/delete activity. These may involve incorrect usage of the RCLACTGRP command or inappropriate use of the ″end run unit″ support.

  Programming techniques causing unnecessary program activation and activation group creations should be **avoided**; it is expensive in terms of CPU to activate a program (with static storage) and create or delete an activation group.

  The value specified against Trace MI Call Events (MIBRACKET) is ignored.

  This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*ENTEXTMI). This is done so that both application program names and appropriate MI Complex Instruction names are collected.

3 DURATION Keyword (Length of trace in minutes)

Use a value of 5 (representing 5 minutes) or more. It represents the elapsed trace time before the collection ends.

We suggest that for SMTBCH PROBLEM types of *PERF, *OPENS, *ACTGRP *DASDPERF1, *DASDPERF2, *JOBWAITS1, and *DEACTS, you consider using a value of 5-10 minutes; for SMBTCH PROBLEM types of *ADDRESSES, *BUSYDISK, and *DISKSPACE, consider using a longer value such as 30-60 minutes.

4 MAXDATA Keyword (Maxdata to collect)

500000 is the default amount of space in K bytes to store PEX TRACE event data. This allocates DASD space to record the trace data and should be sufficient for as long as a TRACE collection should be run. You can assume 80 bytes per trace event; therefore, 500000K gives approximately 500000 x 1024 / 80 = 6 400 000 events.

5 DATALIB Keyword (Library for collected data)

If you specify a library name other than QYPINT, the library is created if it does not already exist.

6 MIBRACKET Keyword (Trace MI CALL Events?)

Use only one of two values against this keyword:

- `*NONE`

  Use this value if you do not want to see application program names in any of the PEX Reports. This means that you do not get application program names in any PEX reports produced from a command that has **REQUIRES MI CALL TRACE on it. Refer to Chapter 10, "Examples of PEX TRACE Reports" on page 249 for more information on PEX TRACE reports that can be produced.

  On a system performing many call/returns, the number of events collected to show the call/return of programs is high. Consider using the value of *NONE the first time you collect data using SMTBCH .. PROBLEM(*PERF) for general performance analysis.

- `*ENTEXTMI`

  Use this value if you want to see application program names in your PEX reports.

  This option causes more data to be collected than *NONE, however, all PEX reports for the problem type you are investigating can now be produced.

  On a busy system, significantly more trace events are collected using this value; therefore, you should limit the collection time to 5-10 minutes when you use this value.

7 ADDJOBS Keyword (Trace specific jobs/tasks?)

The default of N (no) ensures that you are tracing all jobs on the system.

Use Y if you want to enter an individual job name/user/number to be traced; this causes a lower collection overhead than ADDJOBS(N).

IBM Support: please note that this keyword is ignored when the PROBLEM type is *DEFN.

8 CVTPEX Keyword (Convert Pex Trace Data?)

If you specify PRTPEX(Y), this keyword is ignored.

By default (N), when PEX TRACE collection data is dumped at the end of a collection as specified in the DURATION keyword, it is collected into a single binary file that contains multiple members. The intent is to minimize the amount of disk storage until it needs to be analyzed. You can take this data to a remote location and run the QYPINT/CVTPEXDTA command over the single file to produce the QAYPExxxx database files that PRTPEXRPT requires to function correctly.

By specifying CVTPEX(Y), the set of QAYPExxxxx files expected by the PRTPEXRPT command is produced when the PEX collection is ended based on the DURATION keyword. The single binary file with multiple members is not produced.

9 PRTPEX Keyword (PRTPEXRPT & CPYSPLF to LIB?)

Specify PRTPEX(N) if you do not want the PRTPEXRPT command to be automatically run and do not want to produce any of the Enhanced PEX TRACE reports.

Use PRTPEX(Y) to ensure that the data is dumped to the PEX QAYPExxxxx files and the PRTPEXRPT command is automatically run.

PRTPEX(Y) causes the value specified against CVTPEX to be ignored. We recommend that you use CVTPEX(N) PRTPEX(N) if you want to produce a single binary, multi-member file and take it to a **different system** to produce reports. We recommend that you use CVTPEX(Y) PRTPEX(Y) to produce the QAYPExxxxx PEX files and automatically run the PRTPEXRPT command for subsequent Enhanced PEX TRACE reporting on the **same system**.

10 PRTPEXPTY keyword (Job Priority for PRTPEXRPT)

This keyword is only used if PRTPEX(Y) is specified. It ensures that, after data collection has completed and the data has been dumped to the QAYPExxxxx files, the PRTPEXRPT command is run at the specified priority (the default is priority 51) and **not** at the priority of the collection job (which is priority 10).

A BREAKMSG keyword (Break MSG when time is up?)

Normally you specify N (No) for this keyword, permitting the PEX Enhanced TRACE to complete without operator intervention. If you want to be prompted when the trace collection has been completed you can specify Y. If Y is specified, a QSYSOPR reply message is sent when the trace collection completes. The operator must respond with one of these options: F=end the trace and dump the data into a single file (ENDPEX OPTION(*END) DATOPT(*FILE)), E=end the trace and discard the collected data (ENDPEX OPTION(*END) DATOPT(*DLT)), R=discard the data and restart the collection, or D=end the trace and dump the collected data into the session name members ((ENDPEX OPTION(*END) DATOPT(*LIB)) as shown in the following display:

```
 Message ID . . . . . . :   CPF9898       Severity . . . . . . . :   40
 Message type . . . . . :   Inquiry
 Date sent  . . . . . . :   02/11/97      Time sent  . . . . . . :   17:25:55

 Message . . . . :   PEXTRACE: F=dump      data and end trace, *FILE option,
   E=Discard data and end trace,      R=Discard data and restart trace, D=Dump
   data and end trace, *LIB option.
 Cause . . . . . :   This message is used by application programs as a general
   escape message.

                                                                       Bottom
Type reply below, then press Enter.
Reply  . . . . D________________________________________________________

F3=Exit   F6=Print   F9=Display message details
F10=Display messages in job log   F12=Cancel   F21=Select assistance level
F12=Cancel
```

You can run the Storage Management Trace interactively but the default is to run the functions in batch, submitting the job to subsystem QCTL, just as the Start Performance Monitor (STRPFRMON) command defaults to subsystem QCTL. We recommend running in batch.

The SMTBCH command performs the following functions:

1. **Add a PEX Definition (ADDPEXDFN)**:

   This definition is tailored to the type of problem you want to analyze. Thus, if you use problem type of Full Opens (*OPENS) and later run the Activation Group reports over this collection, there is no data in the reports because activation group PEX event data was not collected.

   The name of the definition added is set to the member name you specify on the SMTBCH command. If a definition already exists with this name, **it is replaced**.

2. **Start a PEX Data Collection (STRPEX)**:

   PEX TRACE collection is collected using a definition name the same as the member name you specified on the SMTBCH command.

   This collection runs for the period (in minutes) specified on SMTBCH, collecting the maximum amount of trace events specified on the SMTBCH command. If the specified number of maximum trace events is reached before the elapsed trace time is reached, PEX TRACE stops the collection.

   You can also end the trace at any time using Option 3 (End PEX Trace Data Collection) on the PEXTRC01 menu.

3. **End a PEX Data Collection (ENDPEX)**:

   Collection automatically ends after either the elapsed trace time is reached or the maximum number of trace events is reached.

   The SMTBCH command always runs ENDPEX .. OPTION(*LIB), which dumps the data to the PEX TRACE files described in the PEX Chapter of *Performance Tools/400*, SC41-4340.

Please refer to Figure 28 on page 140 for details on how to prematurely end PEX TRACE collection.

4. **Print PEX Report for Collected Data (PRTPEXRPT)**:

   This command is run as part of the SMTBCH command if you specified Y for the PRTPEX prompt. It causes the standard PRTPEXRPT command to be run for TRACE data in TASK sequence. It is run at the priority specified for PRTPEXPTY on the SMTBCH command (the default is 51).

5. **Prepare PRTPEXRPT output for Further Analysis**:

   This step happens only if you specified Y for the PRTPEX prompt on the SMTBCH command. The spooled file resulting from running the PRTPEXRPT (QPVPERPT) command is copied to database file PF132. The member name is the same member name specified for the DFN keyword on the SMTBCH command. The library is the same as the library specified for the DATALIB keyword on the SMTBCH command. The PF132 file is used as input for all of the reporting commands in library SMTRACE.

   The QPVPERPT spooled file produced by the PRTPEXRPT command is deleted; it can be large and its contents cannot be easily interpreted outside of IBM Software Support.

6.4.4 End Enhanced PEX TRACE Data Collection

Take option 3 on the PEXTRC01 menu if you need to end Enhanced PEX TRACE collection before the elapsed trace time specified on the SMTBCH command is reached. Use this option if you need to:

- Have PEX TRACE data saved in a single file (in binary) for sending to IBM for analysis.
- Stop PEX TRACE collection and not save the data because the problem you are investigating did not occur.
- Stop PEX TRACE collection prematurely because you know that the problem you are investigating has occurred; therefore, you do not need to collect further data.

If you end PEX collection using this command, the following display is shown:

```
                             END SMTBCH CMD (ENDSMTBCH)
Type choices, press Enter.
End SMTBCH . . . . . . . . . . 1  ________   *END, *DUMP, *FILE, *RESTART







                                                                       Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 28. End PEX Trace Data Collection

Notes:

1 Specify whether you want to keep the PEX TRACE data collected or not by using:

- *DUMP

Use this value to stop collecting data and place (dump) the collected data into the PEX TRACE files in the library specified on the SMTBCH command. If these files do not already exist in this library, they are created by this command.

Use this value to perform the same function as ENDPEX..OPTION(*END) DTAOPT(*LIB).

Use this option when analysis of the data is performed on your system. If you are sending the data back to IBM for analysis, we recommend you use the *FILE option.

When this option is taken, there are a few moments before collection ends if the SMTBCH command is being run in batch. This is usual, because the ENDSMTBCH command is communicating with the job running the SMTBCH command through a data queue.

- *END

  Use this value to stop collecting data because the problem you are trying to capture has not occurred. Data is not placed into the PEX TRACE files using this option.

  Use this value to perform the same function as ENDPEX..OPTION(*END) DTAOPT(*DLT).

- *FILE

  All of the collected performance data for the session is stored in a single physical file named, by default, to match the collection session. Use this option if the collected information is sent to IBM for analysis or if you do want to produce the reports on a different system. This performs the same function as ENDPEX OPTION(*FILE) and means that there is only one file object to be saved rather than an entire PEX data library. The *FILE option is also available on the SMTBCH command directly, by specifying CVTPEX(N) PRTPEX(N).

  Note that after using *FILE, it is necessary to:

  1. Run the QYPINT/CVTPEXDTA command to expand the single file into the PEX QAYPExxxxx files.
  2. Run the PRTPEXRPT command.

  before running the Enhanced PEX TRACE reports.

- *RESTART

  We recommend that you do not use this option. It is provided for IBM Software Support use only.

6.4.5 Enhanced PEX TRACE Reports Menu

Take option 4 on the PEXTRC01 menu to access the Reports Menu (PEXTRC02).

The options available from the following menu are described in Section 6.6, “PEX TRACE Reports Menu” on page 145 For examples of the reports produced from this menu, please refer to Section 7.4, “How Does the Enhanced PEX TRACE Differ?” on page 178.

```
PEXTRC02                    PEX Trace Reports Menu
                                                            System:   SYSASROD
Select one of the following:
     1. Full File Opens
     2. Physical Disk IOs
     3. Activation Group Creates
     4. Faults
     5. Disk Space Consumption
     6. Address Consumption
     7. Size of Objects Used During PEX Trace Collection
     8. CPU Utilization
     9. Program Activations and Deactivations


Selection or command
===>
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant  F16=AS/400 main menu
```

Figure 29. PEX Trace Reports Menu

6.4.6 Query Active PEX Session Status

Access this command with Option 5 of the PEXTRC01 menu to display the number of trace events collected by the specified active PEX session. The prompt for the active PEX session name is shown in the following display:

```
                          QUERY PEX SESSION (QRYPEX)
Type choices, press Enter.
SESSION  . . . . . . . . . . . .   _______       Name






                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 30. Query Active PEX Session Status

Enter the name of the active PEX session in which you are interested. If you cannot remember the name of the PEX session, go back to the Enhanced PEX Main Menu, PEXTRC01, and take option 1.

The current status of the collection is shown on the status line of the display, similar to the following example.

```
Session: DHPERF4  Mode: *TRACE  State: ACTIVE  Event count: 4274.
```

6.4.7 Display Collected PEX Session Names

Accessed with Option 6 of the PEXTRC01 menu, this option displays the names of all existing PEX TRACE collections.

Use this option to determine what the collection names are in the specified library. Subsequently, you can produce reports for these collections or delete them. Displays similar to the following display are shown:

```
                     Display PEX Trace Sessions (DSPTRCCOL)
Type choices, press Enter.
PF132 and PEX file library . . .   __________     Name







                                                                         Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 31. Display Collected PEX Session Names

Type the PEX data library name on the previous display and press Enter for a display similar to the following one to be shown.

```
                           Display PEX Session Names
         Session Name    Total Number of Sessions =       16
         ACTGRP1
         ACTGRP2
         ACTPGM1
         AGNEW
         ALLX2
         ALLX3
         ALL1
         ALL1X
         EX1
         EX2
                                                                        More...


F3=Exit
```

Figure 32. Example - Collected PEX Trace Session Names

6.4.8 Display PEX TRACE Run Information for a Session

Take option 7 on the PEXTRC01 menu to determine the following information for a session:

- Start time and date
- Stop time and date
- USERID performing the collection
- Number of jobs and tasks involved in the collection
- Number of PEX TRACE events collected
- Number of PEX TRACE missed during collection
- Seconds for which collection was suspended

Take option 8 on the PEXTRC01 menu to display the run time in seconds for an existing Enhanced PEX TRACE collection.

Enter the PEX collection name and PEX data library name on the following display.

Complete the following display by providing the Enhanced PEX TRACE session (member) name and the PEX data library name.

```
                    Display Trace Run Information (DSPRUNINF)
Type choices, press Enter.
PF132 and PEX files mbr name . .   _______       Name, *FIRST
PF132 and PEX file library . . .   __________    Name
Submit as batch job? . . . . . .   *NO           *YES, *NO

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 33. Display PEX Trace Run Information for a Session

Information similar to the following example is either displayed or produced in the query spooled file, QPQUPRFIL.

```
07/31/96  10:03:06                             PEX TRACE Run Information                                  PAGE    1
Collection Creation Creation Started  Start    Stop     Number of  Total             Total                  Total
name       Date     Time     by user  Time     Time     Jobs/Tasks Suspended         events                 Missed
                                                                   Secs                                     Events
DEACT02    07/30/96 14:32:25 A960123A 14:32:25 14:34:11        328         0          3,110                      0
```

Figure 34. Example: Display PEX Trace Run Information for a Session

6.4.9 Display PEX TRACE Run Time for a Session

```
                       Query Active Trace Time (PEXTRCSEC)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST        Name, *FIRST
PF132 and PEX file library . . .   __________    Name




                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 35. Display PEX Trace Run Time for a Session

Once you have selected the session name and Library name, a message similar to the following one is shown at the bottom of the PEXTRC01 menu.

```
Run time for trace session ITSOTST in library ITSOLIB is 000000258 seconds
```

The run time is also written to a member name equal to the collection name in file TRACESEC in the same PEX data library. This is provided so that users can develop their own queries to determine the rate per second for chosen events.

6.4.10 Work with Submitted Jobs

Option 9 from the PEXTRC01 menu runs the command:

```
WRKSBMJOB SBMFROM(*JOB)
```

This enables review of the status of any PEX TRACE commands run in batch submitted from this job.

6.4.11 Delete PEX TRACE Session Data

Use option 10 on the PEXTRC01 menu to delete PEX TRACE data. It is important that PEX data is regularly deleted from the system because it can take up a considerable amount of disk space.

This command uses the Delete PEX Data (DLTPEXDTA) command to delete the PEX Session from all PEX data collection-related files described in Chapter 12 of the *Performance Tools/400* Manual. It also removes the specified Enhanced PEX TRACE collection data from the additional files:

- SMTRMOD
- TASKINFO
- PF132
- TRACESEC

These are used as part of the Enhanced PEX Main Menu (PEXTRC01) function and Enhanced PEX Reports Menu (PEXTRC02) function.

The following display is shown:

```
                          Cleanup PEX Data (CLNPEXDTA)
 Type choices, press Enter.
 PF132 and PEX files mbr name . .   _______        Name, *FIRST
 PF132 and PEX file library . . .   __________     Name
 Submit as batch job? . . . . . .   *YES           *YES, *NO




                                                                       Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 36. Delete PEX Trace Session Data

Note that this command is not named DLTPEXDTA; it deletes data from the additional Enhanced PEX files not handled by the DLTPEXDTA command.

6.5 PEX TRACE Reports

The reports described in this section are available only if you have collected PEX TRACE data using the PEX Main Menu PEXTRC01 Option 2.

6.6 PEX TRACE Reports Menu

Each of the options on this menu runs a particular reporting command.

Once PEX data collection has finished, Table 13 on page 168 shows which reporting commands can be run for each of the SMTBCH problem types.

The enhanced PEX TRACE Reports Menu is now shown.

```
PEXTRC02                    PEX Trace Reports Menu
                                                          System:   SYSASROD
Select one of the following:
1  1. Full File Opens
2  2. Physical Disk IOs
3  3. Activation Group Creates
4  4. Faults
5  5. Disk Space Consumption
6  6. Address Consumption
7  7. Size of Objects Used During PEX Trace Collection
8  8. CPU Utilization
9  9. Program Activations and Deactivations


Selection or command
===>____________________________________________________________
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant  F16=AS/400 main menu
```

Figure 37. PEX Trace Reports Menu

The commands run by these options are:

1 OPENS Command

This command is shown in Section 6.6.1, “OPENS Reporting Command” on page 147.

2 IOS Command

This command is shown in Section 6.6.2, “IOS Reporting Command” on page 149.

3 ACTGRP Command

This command is shown in Section 6.6.3, “ACTGRP Reporting Command” on page 153.

4 FLTS Command

This command is shown in Section 6.6.4, “FLTS Reporting Command” on page 155.

5 NETSIZE Command

This command is shown in Section 6.6.5, “NETSIZE Reporting Command” on page 157.

6 ADDR Command

This command is shown in Section 6.6.6, “ADDR Reporting Command” on page 160.

7 OBJSIZE Command

This command is shown in Section 6.6.7, “OBJSIZE Reporting Command” on page 161.

8 PRTPEXCPUB Command

This command is shown in Section 6.6.8, “CPU Reporting Command” on page 162.

8 DEACTS Command

This command is shown in Section 6.6.9, “DEACTS Reporting Command” on page 163.

Options on each of these commands are explained in the following sections.

6.6.1 OPENS Reporting Command

Use this option to see, at a job level, which files are being fully opened multiple times.

Application program names only appear on the OPENS reports if you:

1. Specify *ENTEXTMI as the value for the MIBRACKET keyword on the SMTBCH trace collection command with PROBLEM type of *PERF.

   If you specify PROBLEM(*OPENS), the MIBRACKET value is ignored and application program information is always collected.
2. Specify Y for *Program Call Data* on the OPENS command.

```
                           Query FULL FILE OPENS (OPENS)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
PF132 and PEX file library . . .   _______ 2    Name
Delete query files created?  . .   *YES    3    *YES, *NO
Submit as batch job? . . . . . .   *NO     4    *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5    *YES, *NO
Type of Opens  . . . . . . . . .   *DB     6    *ALL, *DB, *NDB
Program Call Data (ENT/EXIT)?  .   *NO     7    **REQUIRES MI CALL TRACE

                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 38. Query Full File Opens

Notes for OPENS command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

6 Do you want to investigate All opens, Database-only opens, or non-database-only opens? If unsure, use *ALL, otherwise choose one of the following values:

***ALL** All full opens resulting from database files, communication files, display files, and spooled files.
***DB** Database file full opens only.
***NDB** All full opens, excluding those for database files.

7 Application program names are in the TRACE data if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*PERF) MIBRACKET(*ENTRYEXIT)
3. PROBLEM(*OPENS)

Use *YES to print application program names in the reports **if you collected them** using one of the previous options.

If you do not want application program level detail, or you did not collect this information, use *NO.

The following table provides a high level view of the reports available using this command. Section 10.1, "Full File Opens (OPENS Command)" on page 249 provides examples of all the reports available from this command.

Table 5. Full File Opens (OPENS Command)

First Level of Detail	Second Level of Detail
JOB - See Section 10.1.1, “Report Title - Percent xxx Full Opens by Job” on page 250.	JOB/FILE - See Section 10.1.3, “Report Title - Full xxx Opens by File within Job” on page 251. JOB/PROG - See Section 10.1.4, “Report Title - Percent Full xxx Opens by Program within Job” on page 251. JOB/PROG/FILE - See Section 10.1.5, “Report Title-Percent Full xxx Opens by File within Program within Job” on page 252.
FILE - See Section 10.1.2, “Report Title - Percent Full xxx Opens by File” on page 250.	FILE/PROG - See Section 10.1.7, “Report Title - Percent Full xxx Opens by Program within File” on page 253. FILE/PROG/JOB - See Section 10.1.9, “Report Title - Percent Full xxx Opens by Job within Program within File” on page 254.
PROG - See Section 10.1.8, “Report Title - Percent Full xxx Opens by Program” on page 253.	PROG/FILE - See Section 10.1.6, “Report Title - Percent Full xxx Opens by File within Program” on page 252. PROG/FILE/JOB - See Section 10.1.10, “Report Title - Detail Full xxx Opens” on page 254.

Note:

```
Acronyms               Description
************************************************************************
FILE    - File name.  This may be a database or non-database file.
JOB     - Qualified Job name
PGM     - Program name.  This may be a user program, IBM system program,
          or System Licensed Internal Code program.
```

6.6.2 IOS Reporting Command

Use this option to see what physical disk I/O is occurring at both a summary and detail level. These reports provide more detail on physical disk I/O than any other performance reports available. As an example of the level of detail, you can produce a report showing PDIO (physical disk I/O) by type (read, write, synchronous, asynchronous) for object by program within job.

```
                          Query physical I/Os (IOS)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
PF132 and PEX file library . . .   _______ 2    Name
Delete query files created?  . .   *YES    3    *YES, *NO
Submit as batch job? . . . . . .   *NO     4    *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5    *YES, *NO
By Job/Task name and I/O type  .   N            Y, N
By Job/Task name and obj name  .   N            Y, N
By Job/Task name and disk unit     N            Y, N
By Job/Task name + mstore pool     N            Y, N
Objects with 100+ I/Os . . . . .   N       6    Y, N
By object and Job/Task name  . .   N            Y, N
By object and disk unit  . . . .   N            Y, N
Fault reads by Job/Task  . . . .   N            Y, N
Fault reads by Job/Task, obj . .   N            Y, N
Objects with 100+ fault reads  .   N            Y, N
Fault reads by obj, job/task . .   N            Y, N
                                                                   More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 39. Query Physical I/Os - Display 1 of 2

```
                          Query physical I/Os (IOS)
Type choices, press Enter.
By unit (arm)  . . . . . . . . .   N            Y, N
By unit (arm) and Job/Task . . .   N            Y, N
By unit (arm) and object . . . .   N            Y, N
By mainstore pool  . . . . . . .   N            Y, N
By pool and Job/Task . . . . . .   N            Y, N
By pool and object . . . . . . .   N            Y, N
By object/segment type . . . . .   N            Y, N
By **pgm . . . . . . . . . . . .   N  7         Y,N **REQUIRES MI CALL TRACE
By job/**pgm/objname . . . . . .   N  7         Y,N **REQUIRES MI CALL TRACE
By job/**pgm/objtype . . . . . .   N  7         Y,N **REQUIRES MI CALL TRACE
By **pgm/objtype . . . . . . . .   N  7         Y,N **REQUIRES MI CALL TRACE

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 40. Query Physical I/Os - Display 2 of 2

Notes for IOS command:

Select only reports that are necessary; producing all reports available on this command takes both a long time and produces a large amount of output to analyze.

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

6 Take Y for this option if you want to investigate SETOBJACC candidates, communication files, display files, and spooled files.

7 Application program names are in the TRACE data if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*PERF) MIBRACKET(*ENTRYEXIT)
3. PROBLEM(*BUSYDISK) MIBRACKET(*ENTEXTMI)
4. PROBLEM(*BUSYDISK) MIBRACKET(*ENTRYEXIT)

Use *YES to print application program names in the reports **if you collected them** using one of the previous options.

If you do not want application program level detail, or you did not collect this information, use *NO.

The following table provides a high level view of the reports available using this command. Section 10.2, “Physical Disk I/Os (IOS Command)” on page 255 provides examples of all the reports available from this command.

Table 6 (Page 1 of 2). Physical Disk I/Os (IOS Command)	
First Level of Detail	**Second Level of Detail**
IOTYP - See Section 10.2.1, “Report Title - DASD I/Os - System Wide Summary by I/O Type” on page 255.	None.
JOB - See Section 10.2.2, “Report Title - DASD I/Os by Job/Task Name and I/O Type” on page 256.	JOB/OBJNAM/OBJTYP - See Section 10.2.3, “Report Title - DASD I/Os by Job/Task and Object Name/Type” on page 257. JOB/ARM - See Section 10.2.4, “Report Title - DASD I/Os by Job/Task and Dasd Unit (Arm) Number” on page 267. JOB/POOL - See Section 10.2.5, “Report Title - DASD I/Os by Job/Task and Mainstore Pool Number” on page 271. JOB/FLTIO - See Section 10.2.9, “Report Title -Page Fault DASD Read I/Os by Job/Task Name and I/O Type” on page 291. JOB/OBJNAM/FLTIO - See Section 10.2.10, “Report Title - Page Fault DASD Read I/Os by Job/Task and Object Name/Type” on page 292. JOB/PGM/OBJNAM - See Section 10.2.21, “Report Title - I/O by Object Name within Program within Job” on page 328. JOB/PGM/OBJTYP - See Section 10.2.22, “Report Title - I/O by Object Type within Program within Job” on page 343.
ARM - See Section 10.2.13, “Report Title - Physical I/Os by Disk Unit (Arm) Number” on page 298.	ARM/JOB - See Section 10.2.14, “Report Title - Physical Disk I/Os by Unit (Arm) and Job” on page 300. ARM/OBJNAM - See Section 10.2.15, “Report Title - Physical Disk I/Os by Unit (Arm) and Object” on page 305.
POOL - See Section 10.2.16, “Report Title - Physical I/Os by Mainstore Pool” on page 311.	POOL/JOB - See Section 10.2.17, “Report Title - Physical Disk I/Os by Mainstore Pool and Job/Task” on page 312. POOL/OBJNAM - See Section 10.2.18, “Report Title - Physical Disk I/Os by Mainstore Pool and Object Name” on page 315.

Table 6 (Page 2 of 2). Physical Disk I/Os (IOS Command)	
First Level of Detail	**Second Level of Detail**
OBJTYP - See Section 10.2.19, “Report Title - I/O by Object Type” on page 320.	OBJNAM/OBJTYP >100 I/O - See Section 10.2.6, “Report Title - Objects with 100 or More DASD I/Os” on page 273. OBJ/JOB/IO - See Section 10.2.7, “Report Title - DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task Name and I/O Type” on page 276. OBJNAM/OBJTYP/ARM - See Section 10.2.8, “Report Title - DASD I/Os by Object Name/Type and Disk Unit Number” on page 285. OBJ >100 FLTIO - See Section 10.2.11, “Report Title - Objects with 100 or More Page Fault DASD Read I/Os” on page 294. OBJ/JOB/FLTIO - See Section 10.2.12, “Report Title - Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads” on page 296.
PGM - See Section 10.2.20, “Report Title - Program I/O Type Detail” on page 323.	PGM/OBJTYP - See Section 10.2.23, “Report Title - I/O by Object Type within Program” on page 352.

Note:

```
Acronyms               Description
**********************************************************************
ARM     - Disk Unit number
FLTIO   - Count of number of Page Faults that resulted in a disk read
          input operation
IO      - Count of number of DISK Input Output operations
IOTYP   - Type of DISK Input Output operation.
          The IO Types are documented in Table 16 on page 233.
JOB     - Qualified Job name
OBJDESC - Object Description or where the Virtual address segment does
          not address an object or part of an object, this field gives
          the description of the segment type.
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
POOL    - Main Storage Pool Number
PGM     - Program name.  This may be a user program, IBM system program,
          or System Licensed Internal Code program.
```

6.6.3 ACTGRP Reporting Command

Use this command to determine if any ILE programs are causing excessive activation group creation/deletion, which is CPU intensive.

This is the only tool that clearly indicates the ILE application program name responsible for excessive activation group create/delete activity.

The value you specify against MIBRACKET is not used by the SMTBCH command when PROBLEM (*ACTGRP) is specified. The actual value used is always set to MIBRACKET(*ENTEXTMI) so that both application program names and appropriate MI complex instructions are collected in the TRACE data.)

```
                     Activation Group Details (ACTGRP)
 Type choices, press Enter.
 PF132 and PEX files mbr name . .   *FIRST  1   Name, *FIRST
 PF132 and PEX file library . . .   ______  2   Name
 Delete query files created?  . .   *YES    3   *YES, *NO
 Submit as batch job? . . . . . .   *NO     4   *YES, *NO
 Force rescan of PF132 mbr? . . .   *NO     5   *YES, *NO



                                                                  Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 41. Query Activation Group Creations

Notes for ACTGRP command:

This command should only be used if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*ACTGRP)
3. PROBLEM(*DEACTS)

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

The following table provides a high level view of the reports available using this command. Section 10.3, "Activation Group Details (ACTGRP Command)" on page 361 provides examples of all the reports available from this command.

Table 7 (Page 1 of 2). Activation Group Details (ACTGRP Command)

First Level of Detail	**Second Level of Detail**
JOB - See Section 10.3.1, "Report Title - Activation Group Creates by Job" on page 361.	JOB/PGM - See Section 10.3.2, "Report Title - Activation Group Creates by Program within Job" on page 361.

Table 7 (Page 2 of 2). Activation Group Details (ACTGRP Command)	
First Level of Detail	**Second Level of Detail**
PGM - See Section 10.3.3, "Report Title - Activation Group Creates by Program" on page 362.	

Note:

```
Acronyms             Description
**********************************************************************
JOB      - Qualified Job name
PGM      - Program name.  This may be a user program, IBM system program
           or System Licensed Internal Code program.
```

6.6.4 FLTS Reporting Command

Use this command to see both a summary and the detail of faults occurring on the system. Faults are a natural occurrence on the AS/400 system because they are the mechanism that causes certain resources that are not in main storage to be brought into main storage. However, high fault rates in memory pools or against individual objects may indicate a problem. Refer to *AS/400 Work Management*, SC41-4306, for page fault guidelines.

Important Disk I/O Counting Information!

The total faults shown on these reports may be less than the total fault count using a different performance measurement tool, such as the Performance Monitor. Program names are not available on the physical disk I/O events; they are found by ″pairing″ the physical disk I/O for the fault to the event causing the physical disk I/O (event type SAR) where the program name is available. **Only physical disk I/O fault events where this matching has occurred are counted in these reports.** The number of unpaired fault events (the physical I/O cannot be paired with its matching SAR event to find the program name) is shown in the job log.

Add the number of unpaired faults found in the job log to the total system faults shown in these reports in order to get the same fault count found using tools such as the WRKSYSSTS command or the Performance Monitor.

```
                           Page faulting info (FLTS)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1   Name, *FIRST
PF132 and PEX file library . . .   _______ 2   Name
Delete query files created?  . .   *YE     3   *YES, *NO
Submit as batch job? . . . . . .   *NO     4   *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5   *YES, *NO
By object/segment name . . . . .   N           Y, N
By object and job/task . . . . .   N           Y, N
By job/task  . . . . . . . . . .   N           Y, N
By job/task and object/seg . . .   N           Y, N
By mainstore pool  . . . . . . .   N           Y, N
By MI PGM  . . . . . . . . . . .   N           Y, N
By SLIC PGM  . . . . . . . . . .   N           Y, N

                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 42. Query Page Faults

Notes for FLTS command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

The following table provides a high level view of the reports available using this command. Section 10.4, "Page Fault Information (FLTS Command)" on page 363 provides examples of all the reports available from this command.

Table 8 (Page 1 of 2). Page Faulting (FLTS Command)

First Level of Detail	**Second Level of Detail**
OBJNAM - See Section 10.4.1, "Report Title - Page Faults by Object/Segment Name and Description" on page 363.	OBJNAM/JOB - See Section 10.4.2, "Report Title - Page Faults by Object and Job/Task." on page 364.
JOB - See Section 10.4.3, "Report Title - Page Faults by Job/Task" on page 366.	JOB/OBJNAM - See Section 10.4.4, "Report Title - Page Faults by Job/Task and Object Name/Segment Type" on page 367. JOB/PGM/OBJNAM - See Section 10.4.5, "Report Title - Object Faults within MI Program within Job" on page 369.

Table 8 (Page 2 of 2). Page Faulting (FLTS Command)

First Level of Detail	**Second Level of Detail**
POOL - See Section 10.4.6, “Report Title - Page Faults by Mainstore Pool” on page 374	POOL/OBJNAM - See Section 10.4.7, “Report Title - % of Faults by Pool and Object” on page 375. POOL/JOB/OBJNAM - BUG - See Section 10.4.8, “Report Title - Faults by POOL/TDE/OBJ That Are >= 1.0% of the System Page Faults” on page 376.
PGM - See Section 10.4.9, “Report Title - Faults by MI Program that are >= %1.0 of Total System Faults” on page 377.	PGM/OBJNAM - See Section 10.4.10, “Report Title - Page Faults by Program and Object” on page 378. PGM/SLIC - See Section 10.4.11, “Report Title - Faults by Program and Low-level SLIC Program” on page 382. PGM/JOB - See Section 10.4.12, “Report Title - Page Fault by Program and Job/Task Within Program” on page 385.
SLIC - See Section 10.4.13, “Report Title - Faults by SLIC Program that are >=1% of Total System Faults” on page 387.	

Note:

```
Acronyms              Description
**********************************************************************
JOB     - Qualified Job name
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
          See also index entry MI Object Names in this redbook.
POOL    - Main Storage Pool Number
PGM     - Program name.  This may be a user program, IBM system program
          or System Licensed Internal Code program.
```

6.6.5 NETSIZE Reporting Command

Use this command to see the change in net size of objects, both at the job level and at the individual object level. This command can help to spot ″rogue″ jobs.

The reports produced using this command can be difficult to interpret without reference to the *Diagnostics Aids Reference Manual*.

```
                    Net size change from PEX run (NETSIZE)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
PF132 and PEX file library . . .   _______ 2    Name
Delete query files created?  . .   *YES    3    *YES, *NO
Submit as batch job? . . . . . .   *NO     4    *YES, *NO
FORCE RESCAN OF PF132 MBR? . . .   *NO     5    *YES, *NO
Both TEMPs and PERMs?  . . . . .   Y       6    Y, N
TEMP segment/objects?  . . . . .   N       7    Y, N
PERM segments/objects? . . . . .   N       7    Y, N


                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 43. Object Net Size Change During PEX Run

Notes for NETSIZE command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Allow this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Allow this value to default to *NO.

6 Allow this value to default to Y so that temporary and permanent objects are combined.

7 Allow this value to default to N. Only IBM Support representatives need to split out temporary and permanent objects in these reports.

The following table provides a high level view of the reports available using this command. Section 10.5, “Disk Space Consumption - Net Size Change from PEX Run (NETSIZE Command)” on page 388 provides examples of all the reports available from this command.

Table 9. Disk Space Consumption - Net change (NETSIZE Command)	
First Level of Detail	**Second Level of Detail**
ALL/OBJNAM/OBJTYP - See Section 10.5.1, “Report Title - Net Size Change (in Bytes) of Individual Segments” on page 388.	ALL/OBJNAM/OBJTYP/SEGTYP - See Section 10.5.2, “Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)” on page 390. ALL/OBJDESC - See Section 10.5.3, “Report Title - Net Size Change, Grouped by Object/Segment Description” on page 391. ALL/JOB OR TASK - See Section 10.5.4, “Report Title - Net Size Change by Job or Task” on page 391.
TEMP/OBJNAM/OBJTYP - See Section 10.5.5, “Report Title - Net Size Change (in Bytes) of Individual Segments” on page 392.	TEMP/OBJNAM/OBJTYP/SEGTYP - See Section 10.5.6, “Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)” on page 393. TEMP/OBJDESC - See Section 10.5.7, “Report Title - Net Size Change, Grouped by Object/Segment Description” on page 393. TEMP/JOB OR TASK - See Section 10.5.8, “Report Title - Net Size Change by Job or Task” on page 394.
PERM/OBJNAM/OBJTYP - See Section 10.5.9, “Report Title - Net Size Change (in Bytes) of Individual Segments” on page 395.	PERM/OBJNAM/OBJTYP/SEGTYP - See Section 10.5.10, “Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)” on page 396. PERM/OBJDESC - See 10.5.11, “Report Title - Net Size Change, Grouped by Object/Segment Description” on page 397. PERM/JOB OR TASK - See 10.5.12, “Report Title - Net Size Change by Job or Task” on page 398.

Note:

```
Acronyms              Description
********************************************************************
ALL     - Temporary and Permanent space
JOB     - Qualified Job name
OBJDESC - Object Description or where the Virtual address segment does
          not address an object or part of an object, this field gives
          the description of the segment type.
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
PERM    - Permanent space
SEGTYP  - Four-digit code defining a virtual address segment.
          The four-digit segment type codes are documented in Section
          9.6.2, “Object and Segment Types Appearing in TRACE Reports” on page 243.
TEMP    - Temporary space
```

6.6.6 ADDR Reporting Command

Use this command to see which programs and jobs are consuming the most temporary and permanent addresses. This command can help to spot ″rogue″ jobs.

The reports produced using this command can be difficult to interpret without reference to the *Diagnostics Aids Reference Manual*.

```
                          Query TEMP/PERM ADDRESSES (ADDR)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1   Name, *FIRST
PF132 and PEX file library . . .   _______ 2   Name
Delete query files created?  . .   *YES    3   *YES, *NO
Submit as batch job? . . . . . .   *NO     4   *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5   *YES, *NO

                                                                   Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 44. Query Address Utilization

Notes for ADDR command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

6 Leave this value to default to Y so that temporary and permanent objects are combined.

7 Leave this value to default to N. Only IBM Support representatives need to split out temporary and permanent objects in these reports.

The following table provides a high level view of the reports available using this command. Section 10.6, “Address Consumption - Query Temporary/Permanent Addresses (ADDR Command)” on page 399 provides examples of all the reports available from this command.

Table 10. Address Consumption (ADDR Command)	
First Level of Detail	**Second Level of Detail**
JOB or TASK - See Section 10.6.1, "Report Title - Big Sid Creates per TDE, in Descending Sequence" on page 399	
PGM - See Section 10.6.3, "Report Title - Big Sid Creates by MI Program Without Offset" on page 401	PGM/OFFSET - See Section 10.6.2, "Report Title - SID Creates by MI Program and Offset" on page 400 PGM/ADRTYP - See Section 10.6.4, "Report Title - Big Sid Creates per MI/SLIC Program and Type" on page 402 and Section 10.6.5, "Report Title - Big Sid Creates per MI/SLIC Program and Type" on page 403

Note:

```
Acronyms              Description
**********************************************************************
ADRTYP  - Division of virtual address ranges into Permanent, Temporary
          or Process Access Group Member
JOB     - Qualified Job name
OFFSET  - Program instruction offset
PGM     - Program name.  This may be a user program, IBM system program
          or System Licensed Internal Code program.
TASK    - Task ID number if not associated with a JOB
```

6.6.7 OBJSIZE Reporting Command

Use this command to see the total object size of objects that are touched during the PEX TRACE run. The maximum and average size of objects is also shown; this can help identify out-of-line situations.

```
                    Obj/Seg sizes from PEX files (OBJSIZE)
Type choices, press Enter.
QAYPESEGI file mbr name  . . . .   *FIRST  1   Name, *FIRST
QAYPESEGI library name . . . . .           2   Name
Delete query files created?  . .   *YES    3   *YES, *NO
Submit as batch job? . . . . . .   *NO     4   *YES, *NO

                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 45. Object Sizes during PEX Collection

Notes for OBJSIZE command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

The following table provides a high level view of the reports available using this command. Section 10.7, "Size of Objects Used During PEX Trace Collection - Obj/Seg Sizes from PEX Files (OBJSIZE Command)" on page 404 provides examples of all the reports available from this command.

Table 11. Size of Objects Used (OBJSIZE Command)

First Level of Detail	**Second Level of Detail**
SIZE (OBJNAM, OBJTYP)	See Section 10.7.1, "Report Title-Size of Objects Which Were Touched During the STRPEX Run" on page 404.
OBJNAM/OBJDESC (MIN,MAX,AVG)	See Section 10.7.2, "Report Title - Object/Segment Sizes, Grouped by Name and Description" on page 410.
OBJDESC	See Section 10.7.3, "Report Title-Object/Segment Sizes, Grouped by Object/Segment Type (Description) Only" on page 415.

Note:

```
Acronyms               Description
**********************************************************************
OBJDESC - Object Description or, where the Virtual address segment does
          not address an object or part of an object, this field gives
          the description of the segment type.
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
```

6.6.8 CPU Reporting Command

Use this command to graphically represent CPU utilization over time. This can be used to identify times when the CPU was either 100% busy or when the CPU appears not busy for a few intervals during an otherwise heavy usage period. Clearly, what was occurring at these identified times requires further investigation.

Important CPU Information!

This command requires a lot of CPU and can take a long time to run. Do **not** run it interactively.

```
                        Print PEX CPU % Report (PRTPEXCPUB)
Type choices, press Enter.
Member . . . . . . . . . . . .   _________ 1    Name
Library  . . . . . . . . . . .   QPEXDATA  2    Name
Millisecond intervals  . . . .   1000      3    10-60000
Select Task ID . . . . . . . .   *ALL      4    Character value, *ALL
Submit as batch job? . . . . .   *YES      5    *YES, *NO



                                                                   Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 46. Print CPU Utilization Report

Notes for PRTPEXCPUB command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Either leave the default at one second or **increase** it. Changing this to a value smaller than one second may cause the PRTPEXCPU command to take a long time to complete.

4 If you know the task dispatcher element (TDE) numbers for specific jobs in which you are interested, enter them against this keyword.

5 Run this command in batch whenever possible, changing this value to *YES.

There is only one report available using this command; please refer to Section 10.8, "CPU Utilization - Print PEX CPU % Report (PRTPEXCPUB Command)" on page 416 for an example.

6.6.9 DEACTS Reporting Command

Use this command to investigate which programs are being activated and deactivated most frequently on your system. This can be used to help save CPU time being wasted doing the following tasks:

- Program full terminations (OPM and ILE compatibility mode programs only)
- Activation group creation and deletion

The value you specify against MIBRACKET is not used by the SMTBCH command when PROBLEM (*DEACTS) is specified. The actual value used is always set to MIBRACKET(*ENTEXTMI) so that both application program names and appropriate MI complex instructions are collected in the TRACE data.)

```
                    Query PROGRAM DEACTIVATIONS (DEACTS)

 Type choices, press Enter.

 PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
 PF132 and PEX file library . . .   ______  2    Name
 Delete query files created?  . .   *YES    3    *YES, *NO
 Submit as batch job? . . . . . .   *NO     4    *YES, *NO
 Force rescan of PF132 mbr? . . .   *NO     5    *YES, *NO


                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 47. Query Program Activations and Deactivations

Notes for DEACTS command:

This command should only be used if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*DEACTS)
3. PROBLEM(*ACTGRP)

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

The following table provides a high level view of the reports available using this command. Section 10.9, “Program Activations and Deactivations (PRTPEXCPUB Command)” on page 430 provides examples of all the reports available from this command.

Table 12 (Page 1 of 2). Program Activation/Deactivation Details (DEACTS Command)

First Level of Detail	Second Level of Detail
JOB - See Section 10.9.2, “Report Title - Total Program Deactivates by Job” on page 430.	JOB/PGM - See Section 10.9.1, “Report Title - Program Activates and Deactivates in Program within Job Sequence” on page 430.
PGM - See Section 10.9.4, “Report Title - Total Activations and Deactivations by Program” on page 431.	PGM/JOB - See Section 10.9.3, “Report Title - Program Activations and Deactivations in Pgm/Job Descending Activation Sequence” on page 431.

Table 12 (Page 2 of 2). Program Activation/Deactivation Details (DEACTS Command)	
First Level of Detail	**Second Level of Detail**
PGMA - See Section 10.9.5, "Report Title - Total Activations and Deactivations by Non-system Program" on page 431.	

Note:
`Acronyms               Description`
`**********************************************************************`
`JOB     - Qualified Job name`
`PGM     - Program name.  This may be a user program, IBM system program`
`          or System Licensed Internal Code program.`
`PGMA    - User program name`	

Chapter 7. Using PEX TRACE

This chapter provides an overview of the data collection and reporting provided for both the Enhanced PEX TRACE and the standard PEX TRACE functions provided in OS/400.

7.1 Why Use the Enhanced PEX TRACE Function?

This function provides extensive reporting capability over and above that provided with the PRTPEXRPT command in the Performance Tools Licensed Program Product. The reports simplify analysis of the collected PEX TRACE data.

If you have ever asked **business** questions such as:

- Can application performance be improved so that I do not have to upgrade my processor?
- Can performance of a function be improved before I roll it into production?
- If application performance can be improved, exactly what areas should the money be spent on to achieve maximum performance payback?
- Within these identified areas, exactly what should be done first (what priorities should be assigned)?

The Enhanced PEX TRACE tools prove to be invaluable.

If you have ever asked **technical** questions such as:

- What database physical files and indexes are SETOBJACC candidates?
- Can overall CPU utilization be reduced by implementing shared open data paths?
- What files are being repetitively opened within individual jobs?
- What object names are all these IOs occurring against?
- My program is doing a lot of IO; what object names are these IOs on and exactly where are they synchronous/asynchronous and database or non-database?
- What objects/IOs are causing unbalanced disk arm utilization?
- Has my ILE application been designed with a view to performance?
- What is the IO breakdown by object name within pool?
- What object names are (page) faults occurring against?

The Enhanced PEX TRACE tool provides this information.

While the PRTPEXRPT command is an essential part of any PEX TRACE analysis because it provides the first phase formatting of PEX TRACE data, additional reports are usually necessary to facilitate analysis of the collected data rather than manually reviewing pages of low-level detail output.

7.1.1.1 What Data Must Be Collected for Reports?

The following table describes what types of data must be collected using the SMTBCH command (see Figure 27 on page 134 for details of this command).

Table 13 (Page 1 of 2). Enhanced PEX TRACE Data Collection and Reporting Options

Data to Collect for SMTBCH Command ″Problem Type″	**Report Menu Option Available on PEXTRC02 Menu**	**Reporting Command**
Performance[1] *PERF[3]	01. Full File Opens[1] 02. Physical Disk IO[1] 03. Activation Group Creates 04. Faults 05. Disk Space Consumption[2] 06. Address Consumption[2] 07. Size of Objects used During Pextrace Collection 08. CPU Utilization 09. Program Activations and Deactivations	OPENS IOS ACTGRP FLTS NETSIZE ADDR OBJSIZE PRTPEXCPUB DEACTS
Performance *DASDPERF1[5]	02. Physical Disk IO[5] 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Performance *DASDPERF2[6]	02. Physical Disk IO[6] 04. Faults 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS FLTS OBJSIZE PRTPEXCPUB
Virtual Addresses *ADDRESSES[4]	06. Address Consumption 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	ADDR OBJSIZE PRTPEXCPUB
Disk Utilization/IO *BUSYDISK[1]	02. Physical Disk IO[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Object size/Change in Size *DISKSPACE[4]	05. Disk Space Consumption[4] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	NETSIZE OBJSIZE PRTPEXCPUB
Full File Opens *OPENS[1]	1. Full File Opens[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	OPENS OBJSIZE PRTPEXCPUB
Activation Groups *ACTGRP	03. Activation Group Creates 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	ACTGRP OBJSIZE PRTPEXCPUB DEACTS
Program Deactivations *DEACTS	03. Activation Group Creates 07. Size of Objects used during PEX Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	DEACTS ACTGRP OBJSIZE PRTPEXCPUB

Table 13 (Page 2 of 2). Enhanced PEX TRACE Data Collection and Reporting Options		
Data to Collect for SMTBCH Command ″Problem Type″	**Report Menu Option Available on PEXTRC02 Menu**	**Reporting Command**
Job Task switches[7] *JOBSWAIT[7]	None[7]	None[7]

Note:

[1] = Must specify MI *ENTEXTMI in order to get application program names.

[2] = While these reports run from *PERF data, normally the *PERF data run is too short for these reports to be meaningful.

[3] = More data is collected using *PERF than any other choice. Choose a short run time for *PERF collections of 5 to 10 minutes only.

[4] = Use a long run time for these options (consider using 10+ hours). Long run times are essential for meaningful reports to be produced from these options. Thus, do not run these reports against *PERF runs (short trace time) as results are misleading.

[5] = Application program names are not collected using this option; application program name appears as ′TOPOFSTACK′ on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- BASE events - PMCO:

  ASM and SAR events are not collected.

[6] = Application program names are not collected using this option; application program name appears as ′TOPOFSTACK′ on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- SAR events
- BASE events - PMCO:

  ASM events are not collected.

[7] = This option is provided for IBM Software Support use only. There are no reports available.

7.1.2 Can PEX TRACE Fill Up DASD?

When running standard PEX TRACE or Enhanced PEX trace, there is a concern that recording trace data may possibly fill up all remaining physical disk storage. You need to be aware of the following considerations in this area.

While PEX TRACE does collect a large amount of data, the maximum amount of disk space it is allowed to consume in a single run is limited to one-third of all available disk space. If this threshold is reached, data collection is automatically suspended. PEX collection is implemented in LIC through the Performance Data Collector (PDC) and it is the PDC that has this built-in check to ensure that all disk space is not filled up with PEX data.

However, the Enhanced PEX TRACE support includes options to automatically generate reformatted collection data and produce printed reports from supplied queries. It is this ″post-collection″ processing that may cause all remaining disk to be consumed.

You should not collect PEX STATS or PEX TRACE data on a system that already indicates auxiliary storage is above 90% occupied.

7.2 What Does the Enhanced PEX TRACE Function Provide?

1. A simple menu interface. Follow the options on this menu in the numeric sequence provided (the menu is PEXTRC01 in library QYPINT). See Section 6.4.1, “PEX Trace Main Menu (PEXTRC01)” on page 132 for a picture of this menu.

2. A single command called SMTBCH to:

   a. Automatically create a PEX TRACE definition tailored to your collection requirements.
   b. Automatically start collecting PEX TRACE data using the newly-created definition.
   c. Automatically end PEX TRACE collection after reaching either a specified elapsed trace time or reaching a specified amount of trace data.
   d. Automatically run the PRTPEXRPT command and process the formatted spooled file data back into database files such that it is ready for the reporting functions.

3. Provides additional reporting capability to that available using the PRTPEXRPT command. Typically, these reports are classified into categories such as IOs, and are available from the PEX Reports Menu PEXTRC02.

   Note that these reports use PEX TRACE data that is a processed version of the PRTPEXRPT (base data) detail output. Thus, these reports are at a much higher level and, consequently, easier to interpret.

Many application performance problems have a high degree of commonality. Some of these common problems are:

1. Application (ILE or OPM) does not use shared open data paths (or has this facility implemented incorrectly). This wastes CPU and disk IOs.
2. ILE application programs are ″abusing″ the ILE architectural environment (creating/deleting activation groups unnecessarily). This wastes CPU.
3. Application function is wasting much CPU or IO resource due to poor design, poor implementation, or both.
4. Certain users are using the application in a ″strange″ way such that they use unreasonable system resources.

The Enhanced PEX TRACE reports provide the following type of information:

1. Detail of which files are SETOBJACC candidates, together with the size of the file (if it was used during the PEX TRACE collection).

2. Detail of which files are being fully opened, such that you can quantify whether the amount occurring is a problem. If there is a problem, names of the files/jobs needing attention are provided.

3. Detail of which ILE programs are causing lots of activation groups to be created/deleted, such that you can quantify whether the rate occurring on your system is a problem. If there is a problem, names of the programs needing attention are provided.

4. Detail of which programs are doing lots of IO, together with the names of the objects that these IOs were occurring against.

5. Detail of which programs incur heavy paging, together with the names of the objects that were being paged.

7.2.1 Getting Started Using the Enhanced PEX TRACE Function

Data collection and reporting are simple; report interpretation is the challenging area.

Assuming you have no idea what sort of performance problem is occurring on the system, follow these steps to collect PEX TRACE data:

1. Ensure that library QYPINT is in your library list:

   ```
   ADDLIBLE QYPINT
   ```

2. Call the PEX TRACE Main Menu, by entering the following command;

   ```
   GO PEXTRC01
   ```

3. Since there can be only one active PEX collection session (of any type, STATS, TRACE, or PROFILE) at one time, use PEXTRC01 Menu option 1 to verify that there are no PEX collections already active. If a session is already active, it must be ended before yours can be started.

4. Use the SMTBCH command shown in Figure 48 to collect performance information for all possible problem types and ensure that application program name information is available in the reports.

   Note that we have suggested values for the SMTBCH command options in order to get you started using Enhanced PEX TRACE. You may change these values once you are familiar with using this command.

```
                      V3R6 VERSION OF SMTBCH (SMTBCH)
Type choices, press Enter.
Definition/MBR name  . . . . . . > ITSO01  1     Name
Type of problem  . . . . . . . . > *PERF   2     *PERF, *ADDRESSES...
Length of trace in minutes . . . > 10      3
Maxdata to collect . . . . . . . > 500000  4     1-2000000000
Library for collected data . . . > DTALIB  5     Character value
Min CPU sample (milliseconds)  .   200     6     50-2000
Trace MI CALL Events?  . . . . . > *ENTEXTMI 7   *ENTRYEXIT, *MICMPLX...
Break MSG when time is up? . . .   N       8     Y, N
Submit job to batch? . . . . . .   Y       9     Y, N
Job queue name . . . . . . . . .   QCTL   10     Name
Job queue library  . . . . . . .   *LIBL  11     Name, *LIBL
Trace specific jobs/tasks? . . .   N      12     Y, N
Convert Pex Trace Data?  . . . .   N      13     Y, N
PRTPEXRPT & CPYSPLF to LIB?  . . > Y      13     Y, N
Job Priority for PRTPEXRPT . . .   51     14     10-90

                                                              Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 48. PEX Trace Main Menu

Notes for Fastpath Use of SMTBCH Command:

1 The member name to be used for storing PEX TRACE data.

2. Use *PERF as the type of problem, as this is the catch-all category and encompasses all other problem types.

3 Since you are collecting all possible performance information, do not run this command for more than 10 minutes.

4 The default value of 500 000K should allocate sufficient DASD storage to hold all of the necessary trace data. The parameter can be changed, but this value is an excellent starting value.

5 Place the trace collection in a specially created library so that trace data can easily be saved, copied, and deleted as necessary without worrying about other data in the same library.

6 Leave this at the default of 200 milliseconds (changing it to a smaller value increases the overhead of running PEX TRACE).

7 Use *ENTEXTMI to ensure that application names are available on all Enhanced PEX TRACE reports. If the real program name cannot be determined from the collected data, this is shown on Enhanced PEX TRACE reports as ′TOPOFSTACK′ under the Program Name heading.

8 Leave this to default to N. We do not encourage unnecessary use of break message handling on the system; use WRKSBSJOB SBS(QCTL) to check for the presence of job PEXTRACE in order to see whether SMTBCH batch data collection is still active.

9 Always run the SMTBCH command in batch. Use the default of Y.

10 Always run the SMTBCH command from the job queue in the controlling subsystem (usually this is QCTL). Leave this to default to QCTL unless your system has had another controlling subsystem created, in which case you need to find an appropriate job queue to use (ensuring that the SMTBCH batch collection job runs at priority 10).

11 See point **10**.

12 The default of N ensures that all jobs are traced. If you know that the problem is localized to a few jobs, enter Y in order to collect data for those jobs only. Clearly, the less jobs that are being traced system-wide, the lower the overhead of the trace tool.

13 Ensure that either (or both) ″Convert Pex Trace Data?″ or ″PRTPEXRPT & CPYSPLF to LIB?″ is set to Y so that you can produce the reports once the SMTBCH collection job PEXTRACE has completed.

If you use CVTPEX(Y) PRTPEX(N), you must run the PRTPEXRPT command before you can produce the Enhanced PEX TRACE reports.

If you use CVTPEX(N) PRTPEX(Y) or CVTPEX(Y) PRTPEX(Y), PRTPEXRPT is run automatically, enabling you to produce the appropriate Enhanced PEX TRACE reports.

14 This run priority is only used when PRTPEX(Y) is specified. Since the PRTPEXRPT command can be resource-intensive, we recommend that you do **not** change this value.

5. Check whether the collection is still running or has finished by entering WRKSBSJOB SBS(QCTL) and checking for job name PEXTRACE, which is the Enhanced PEX TRACE collection job.

   Alternatively, use option 1 of the PEXTRC01 menu to see whether a collection is active with the same name as the value specified against Definition/Member name on the SMTBCH command.

7.3 What Does the Standard PEX TRACE Function Provide?

The PEX TRACE function provides the ability to collect PEX TRACE data for some or all jobs on the system and subsequently produce a detail-level only report. High-level reports with summarized information are not provided, only one single low-level detail report.

It is the inability to create additional PEX TRACE definitions for collecting tailored subsets of PEX TRACE data that is the constraining factor.

You can, however, obtain extra PEX TRACE definitions (see Table 2 on page 126 for a list) that allow considerably greater collection flexibility. For example, one of these definitions is a CPU profiler, enabling you to produce a histogram showing CPU utilization by program system wide. Please refer to the PTF cover letter to use this ″extra base″ PEX TRACE support.

To run the **base** PEX TRACE support provided with OS/400, you use the familiar sequence of steps:

1. Use the ADDPEXDFN command enabling you to create a PEX definition to be used for PEX TRACE data collection - ADDPEXDFN .... TYPE(*TRACE).
2. Issue the STRPEX command to collect data using your definition.
3. Issue the ENDPEX command to stop data collection.
4. Issue the PRTPEXRPT command to provide a detail level PEX TRACE report.

   Remember, PRTPEXRPT must specify *TRACE to get the trace report printed successfully.

If you collected PEX TRACE data for all jobs on the system, an example of the detail portion of the PRTPEXRPT output is shown in Figure 49 on page 174.

If you are able to readily interpret this PEX TRACE report and ascertain what, if any, are the performance bottlenecks, you do not need to obtain/run the Enhanced PEX TRACE function. Note that this report does **not** show any physical disk IO or fault activity. However, if you feel that the ability to collect data that tells you in **detail** what your application is doing, you must know:

1. What file names a program is using and how it is using them.
2. The physical disk IOs being performed by each program and which object names these IOs are occurring against.
3. The page faults being caused by each program and what object names these faults are occurring against.

You should obtain the Enhanced PEX TRACE function PTFs.

The following figure is an example of a PRTPEXRPT of standard PEX TRACE support:

```
                                          Performance Explorer Report                              8/01/96  9:20:47
                                            Definition Information                                       Page
                                                                                                              1
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : STDTRC
Defined By . . . . . . . . . : A960123A
Definition Description . . . : STD TRACE DFN FOR 1 JOB
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 10000
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
Selected Events:
    Category  : MIBKT Event          -  Machine Interface Program Bracketing Events
         *MISTART            MISTR  -  Machine Interface Instruction Start
         *MICPL              MICPL  -  Machine Interface Instruction Complete
         *EXIT               EXIT   -  Exit
         *ENT                ENTRY  -  Entry
         *PRECALL            PRECL  -  Pre Call
         *POSTCALL           PSTCL  -  Post Call
         *MISUBENT           MISEN  -  Machine Interface Subassembly Entry
         *MISUBEX            MISEX  -  Machine Interface Subassembly Exit
```

Figure 49 (Part 1 of 5). Standard PEX TRACE Detail Report - Example

```
                                                  Performance Explorer Report                                    8/01/96 10:40:35
                                                     Trace Information                                                    Page
                                                                                                                             9
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Time Stamp. : 09.19.58.5296 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          265896 Percent: 92.79
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-----------------------------------------------------------------------------------------------------------------------------------

58.531 0   000083C2                                                      EXIT
                                      QCACALL        2516    1232318
58.531 0   000083C2                                                      ENTRY
                                      OPENBAD        2443    1234761
58.531 0   000083C2                                                      PRECL
                                         1
                                      OPENBAD        1237    1235998
58.531 0   000083C2                                                      ENTRY
                                      QCLRSLV        1917    1237915
58.531 0   000083C2                                                      MISTR
                    QCLRSLV    000059 *MATINVAT      2788    1240703
58.531 0   000083C2                                                      MICPL
                    QCLRSLV    00005A *MATINVAT      5353    1246056
58.532 0   000083C2                                                      MISTR
                    QCLRSLV    000069 *MATPTRIF       667    1246723
58.532 0   000083C2                                                      MICPL
                    QCLRSLV    00006A *MATPTRIF      2186    1248909
58.532 0   000083C2                                                      ENTRY
                                      QLIADOPT       1651    1250560
58.532 0   000083C2                                                      MISTR
                    QLIADOPT   000003 *RSLVSP         688    1251248
58.532 0   000083C2                                                      MICPL
                    QLIADOPT   000004 *RSLVSP        3252    1254500
58.532 0   000083C2                                                      EXIT
                                      QLIADOPT        306    1254806
58.532 0   000083C2                                                      MISTR
                    QCLRSLV    000189 *DEQ           5622    1260428
58.532 0   000083C2                                                      MICPL
                    QCLRSLV    000189 *DEQ           2133    1262561
58.532 0   000083C2                                                      MISTR
                    QCLRSLV    000189 *DEQ            431    1262992
58.532 0   000083C2                                                      MICPL
                    QCLRSLV    000189 *DEQ            829    1263821
58.532 0   000083C2                                                      MISTR
                    QCLRSLV    000189 *DEQ            745    1264566
58.532 0   000083C2                                                      MICPL
                    QCLRSLV    000189 *DEQ            794    1265360
58.532 0   000083C2                                                      MISTR
                    QCLRSLV    000189 *DEQ            675    1266035
58.532 0   000083C2                                                      MICPL
                    QCLRSLV    000189 *DEQ            739    1266774
58.532 0   000083C2                                                      MISTR
                    QCLRSLV    000189 *DEQ            822    1267596
58.532 0   000083C2                                                      MICPL
                    QCLRSLV    000189 *DEQ            737    1268333
58.548 0   000083C2                                                      MISTR
                    QCLRSLV    00019F *ENQ          37854    1306187

                                                  M05
```

Figure 49 (Part 2 of 5). Standard PEX TRACE Detail Report - Example

```
                                                   Performance Explorer Report                                      8/01/96  9:20:47
                                                      Trace Information                                                    Page
                                                                                                                              10
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Time Stamp. : 09.19.58.5484 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          265896 Percent: 92.79
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-----------------------------------------------------------------------------------------------------------------------------------
58.548 0   000083C2                                                      MICPL
                    QCLRSLV    0001A0 *ENQ            1764    1307951
58.548 0   000083C2                                                      MISTR
                    QCLRSLV    00019F *ENQ             340    1308291
58.548 0   000083C2                                                      MICPL
                    QCLRSLV    0001A0 *ENQ             804    1309095
58.548 0   000083C2                                                      MISTR
                    QCLRSLV    00019F *ENQ             330    1309425
58.548 0   000083C2                                                      MICPL
                    QCLRSLV    0001A0 *ENQ             769    1310194
58.548 0   000083C2                                                      MISTR
                    QCLRSLV    00019F *ENQ             319    1310513
58.548 0   000083C2                                                      MICPL
                    QCLRSLV    0001A0 *ENQ             755    1311268
58.548 0   000083C2                                                      MISTR
                    QCLRSLV    00019F *ENQ             300    1311568
58.548 0   000083C2                                                      MICPL
                    QCLRSLV    0001A0 *ENQ             765    1312333
58.548 0   000083C2                                                      MISTR
                    QCLRSLV    0001A9 *DEQ            3876    1316209
58.548 0   000083C2                                                      MICPL
                    QCLRSLV    0001A9 *DEQ            1561    1317770
58.548 0   000083C2                                                      EXIT
                                      QCLRSLV         3621    1321391
58.548 0   000083C2                                                      PSTCL
                                      OPENBAD          746    1322137
58.548 0   000083C2                                                      PRECL
                                      OPENBAD          619    1322756
58.548 0   000083C2                                                      ENTRY
                                      QCLCLCPR        2059    1324815
58.548 0   000083C2                                                      MISTR
                    QCLCLCPR   000051 *MATPTR         3390    1328205
58.548 0   000083C2                                                      MICPL
                    QCLCLCPR   000052 *MATPTR         2083    1330288
58.548 0   000083C2                                                      MISTR
                    QCLCLCPR   000098 *RSLVSP         1517    1331805
58.549 0   000083C2                                                      MICPL
                    QCLCLCPR   000099 *RSLVSP        29679    1361484
58.549 0   000083C2                                                      MISTR
                    QCLCLCPR   00012D *MATSOBJ        1921    1363405
58.549 0   000083C2                                                      MICPL
                    QCLCLCPR   00012E *MATSOBJ        6107    1369512
58.549 0   000083C2                                                      MISTR
                    QCLCLCPR   000133 *LOCKSL          458    1369970
58.549 0   000083C2                                                      MICPL
                    QCLCLCPR   000134 *LOCKSL         3089    1373059
58.549 0   000083C2                                                      MISTR
                    QCLCLCPR   000153 *UNLOCKSL        549    1373608
58.549 0   000083C2                                                      MICPL
                    QCLCLCPR   000154 *UNLOCKSL       2298    1375906
58.549 0   000083C2                                                      EXIT
                                      QCLCLCPR        1553    1377459
                                         2
58.550 0   000083C2                   OPEN5          63339    1440798    ENTRY   OPEN5/_QRNP_PEP_OPEN5
58.550 0   000083C2                                                      MISTR
                    QRNXIE     000004 *MATINVIF       8249    1449047
58.550 0   000083C2                                                      MICPL
                    QRNXIE     000005 *MATINVIF       1091    1450138
58.550 0   000083C2                                                      ENTRY
```

Figure 49 (Part 3 of 5). Standard PEX TRACE Detail Report - Example

```
                                             3
                                             QDMCOPEN       3246    1453384
58.550 0   000083C2                                                            MISTR
                   QDMCOPEN   000007 *MATINVIF      2543    1455927
58.550 0   000083C2                                                            MICPL
                   QDMCOPEN   000008 *MATINVIF      2340    1458267
58.550 0   000083C2                                                            MISTR
                   QDMCOPEN   0001DD *RSLVSP        4645    1462912
58.551 0   000083C2                                                            MICPL
                   QDMCOPEN   0001DE *RSLVSP       33220    1496132
58.551 0   000083C2                                                            MISTR
                   QDMCOPEN   000214 *MATPTR         563    1496695
58.551 0   000083C2                                                            MICPL
                   QDMCOPEN   000215 *MATPTR        1751    1498446
58.551 0   000083C2                                                            MISTR
                   QDMCOPEN   00033D *CRTDOBJ       2189    1500635
58.552 0   000083C2                                                            MICPL
                   QDMCOPEN   00033E *CRTDOBJ      55230    1555865
58.552 0   000083C2                                                            MISTR
                   QDMCOPEN   0003D2 *RSLVSP        2272    1558137
58.552 0   000083C2                                                            MICPL
                   QDMCOPEN   0003D3 *RSLVSP        5601    1563738
58.552 0   000083C2                                                            MISTR
                   QDMCOPEN   0003D8 *SETACST        612    1564350
58.552 0   000083C2                                                            MICPL
                   QDMCOPEN   0003D9 *SETACST       4840    1569190
58.552 0   000083C2                                                            MISTR
                   QDMCOPEN   0005F6 *LOCK          6289    1575479
58.552 0   000083C2                                                            MICPL
                   QDMCOPEN   0005F7 *LOCK          7138    1582617
58.552 0   000083C2                                                            ENTRY
                                             3
                                             QDBOPEN        2968    1585585
58.552 0   000083C2                                                            MISTR
                   QDBOPEN    00000B *MATPTR        3541    1589126
58.552 0   000083C2                                                            MICPL
                   QDBOPEN    00000C *MATPTR        2631    1591757
58.552 0   000083C2                                                            MISTR
                   QDBOPEN    0007E9 *CRTS          4566    1596323
58.566 0   000083C2                                                            MICPL
                   QDBOPEN    0007EA *CRTS        145310    1741633
58.566 0   000083C2                                                            MISTR
                   QDBOPEN    0005A1 *ACTCR         3930    1745563

                                                          M05
```

Figure 49 (Part 4 of 5). Standard PEX TRACE Detail Report - Example

```
                                                         Performance Explorer Report                                   8/01/96  9:20:47
                                                            Trace Information                                                Page
                                                                                                                               11
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Time Stamp. : 09.19.58.5672 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          265896 Percent: 92.79
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-----------------------------------------------------------------------------------------------------------------------------------
58.567 0   000083C2                                                            MICPL
                   QDBOPEN    0005A2 *ACTCR        26747    1772310
58.567 0   000083C2                                                            EXIT
                                             QDBOPEN        1875    1774185
58.567 0   000083C2                                                            EXIT
                                             QDMCOPEN       1730    1775915
58.567 0   000083C2                                                            ENTRY
                                             QDMCOPEN       4443    1780358
58.567 0   000083C2                                                            MISTR
                   QDMCOPEN   000007 *MATINVIF      2213    1782571
```

Figure 49 (Part 5 of 5). Standard PEX TRACE Detail Report - Example

Notes for PEX Standard TRACE Report Example:

This example traced calling program OPENBAD PARM(5), where OPENBAD is an OPM CL program that calls an ILE compatibility mode RPG program OPEN5 a total of five times. The RPG program OPEN5 opens five database files (PF01, PF02, PF03, PF04, and PF05). Shared open data paths are not used in the calling CL program, so the PFnn files are fully opened upon each call to program OPEN5.

A ″standard″ PEX TRACE definition (with an invariant set of PEX event types that can be traced) was used to collect the data. This definition was created using the QSYS/ADDPEXDFN command which is part of standard OS/400 PEX TRACE support.

1 This is where OPM CL program OPENBAD was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPENBAD″.

2 This is where ILE RPG program OPEN5 was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPEN5″.

3 A database file open always involves a call to QDMCOPEN (data management common open) followed by a call to either QDBOPEN (full database file open) or QDBSOPEN (shared database file open).

While there are a lot of MI complex instructions (that begin with ′*′) in this report, there are no Segment Address Range (SAR) events. This is because a PEX TRACE definition created using the QSYS/ADDPEXDFN command does **not** collect Segment Address Request (SAR) events or physical disk IO events. It is necessary to collect Segment Address Range (SAR) events in order to determine the name of the file being opened.

We can conclude from this example that, without the capability to collect SAR events or physical disk IO events, the standard PEX TRACE definition is of limited use. It does, however, enable us to see the flow of program control in a job; but for a single job, it is easier to see the control flow using PEX STATS hierarchical option, which gives invocation levels against program names.

7.4 How Does the Enhanced PEX TRACE Differ?

Enhanced PEX TRACE allows you to:

- Automatically build a definition that can collect more types of trace events than available with the standard PEX TRACE. For example, you can collect physical disk IO events using Enhanced PEX TRACE.
- Have this definition tailored to the type of analysis you want to perform. In the case of analyzing full file opens, we need to collect:
  1. SAR events of type ″Exchange Read″ to provide us with the file name being opened.
  2. MIBRACKET events of type ″Entry″ and ″Exit″ such that we see application program names as well as the system routines QMCOPEN and QDBOPEN that are involved in a full file open.
  3. Performance Measurement Counter Overflow (PMCO) events, such that we get an incremented CPU used counter on each of the statements.

Since more complex data is collected using Enhanced PEX TRACE, a reporting capability exceeding that provided by the base PRTPEXRPT command is essential in order to be able to extract useful information from all this data. Note that the preceding extract report was produced using the PRTPEXRPT command against data collected using Enhanced PEX TRACE. The additional reports in Enhanced PEX TRACE are implemented using commands tailored to the type of data collected; thus, a command called OPENS is used to analyze a collection of type SMTBCH ...PROBLEM(*OPENS).

7.4.1 Enhanced PEX TRACE - Detail Report on Full Opens Scenario

An example of the base data collected using Enhanced PEX TRACE follows. This report was produced using the standard PRTPEXRPT command available with the Performance Tools LPP. We can, therefore, conclude that the PRTPEXRPT command is capable of formatting a detail report that includes all possible types of PEX TRACE data. Its output is, however, limited by the types of PEX event data that can be collected.

```
                                                Performance Explorer Report                                8/01/96  8:51:46
                                                  Definition Information                                        Page
                                                                                                                    1
Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : OPENSA
Defined By . . . . . . . . . : A960123A
Definition Description . . . : *BLANK
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 50000
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 200
Selected Jobs:
    Name       User       Number
    P23XWY32E  A960123A   053411
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *NONE
Selected Events:
    Category  : BASE                -  Base Events
         *PMCO               PMCO   -  Performance Measurement Counter OverFlow
    Category  : SAR                 -  Segment Address Register Events
         *EXCHREAD           RXN S  -  Exchange Read
    Category  : MIBKT Event         -  Machine Interface Program Bracketing Events
         *EXIT               EXIT   -  Exit
         *ENT                ENTRY  -  Entry


                                               M05
                                                Performance Explorer Report                                8/01/96  8:51:46
                                                      Run Information                                           Page
                                                                                                                    2
Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Sessions since IPL. . . . . . . . . . . . . :                       167
Session name. . . . . . . . . . . . . . . . : OPENSA
Start time. . . . . . . . . . . . . . . . . : 1996-08-01-08.47.23.959864
Stop time . . . . . . . . . . . . . . . . . : 1996-08-01-08.47.48.315824
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.24.355960
Suspend time (us) . . . . . . . . . . . . . :                    30,192
Number of events. . . . . . . . . . . . . . :                       715
Trace wrap count. . . . . . . . . . . . . . :                         0
Job creating session. . . . . . . . . . . . : PEXTRACE  A960123A  053415
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                    98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                         1
Logical DASDs . . . . . . . . . . . . . . . :                         7
Data areas. . . . . . . . . . . . . . . . . :                         1
Jobs/tasks in session . . . . . . . . . . . :                       183
Jobs in session . . . . . . . . . . . . . . :                         1

                                               M05
```

Figure 50 (Part 1 of 3). Enhanced PEX TRACE Detail Report - from OPENS Command Collection

```
                                                    Performance Explorer Report                                    8/01/96  8:51:46
                                                         Task Information                                                  Page
                                                                                                                              3
Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Task ID    Job/Task Name                  Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                        Start/End                                            Percent
-------------------------------------------------------------------------------------------------------------------------------
  000083C2 P23XWY32E  A960123A   053411     4      160   Y    Y            24256096             479000     45.54
-------------------------------------------------------------------------------------------------------------------------------
37.105 0   000083C2                                                  EXIT
                                     QCACALL        43309 2134222699
37.105 0   000083C2                                                  ENTRY
                                        1
                                     OPENBAD         2432 2134225131
37.105 0   000083C2                                                  ENTRY
                                     QCLRSLV         3296 2134228427
37.105 0   000083C2                                                  ENTRY
                                     QLIADOPT       12054 2134240481
37.105 0   000083C2                                                  EXIT
                                     QLIADOPT        4016 2134244497
37.106 0   000083C2                                                  EXIT
                                     QCLRSLV        23024 2134267521
37.106 0   000083C2                                                  ENTRY
                                     QCLCLCPR        3104 2134270625
37.106 0   000083C2                                                  EXIT
                                     QCLCLCPR       48014 2134318639

                                                    M05
```

Figure 50 (Part 2 of 3). Enhanced PEX TRACE Detail Report - from OPENS Command Collection

```
                                           Performance Explorer Report                                   8/01/96  8:51:46
                                              Trace Information                                                 Page
                                                                                                                      11
Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Time Stamp. : 08.47.37.1075 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):           479000 Percent: 45.54
                    Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                           T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
------------------------------------------------------------------------------------------------------------------------------
                                     2
37.107 0   000083C2                  OPEN5          63393 2134382032    ENTRY   OPEN5/_QRNP_PEP_OPEN5
37.107 0   000083C2                                                     ENTRY
                                     3
                                     QDMCOPEN       11789 2134393821
                                       4
37.108 0   000083C2 2403BB1E57 000000 PF05      PF05       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.108 0   000083C2 2403BB1E57 000000 PF05      PF05       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.109 0   000083C2                                                     ENTRY
                                     3
                                     QDBOPEN       124257 2134518078
37.124 0   000083C2                                                     EXIT
                                     QDBOPEN       178108 2134696186
37.124 0   000083C2                                                     EXIT
                                     QDMCOPEN        1596 2134697782
37.124 0   000083C2                                                     ENTRY
                                     QDMCOPEN        3748 2134701530
                                       5
37.135 0   000083C2 0006AFB9B4 000000 PF04      PF04       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.135 0   000083C2 0006AFB9B4 000000 PF04      PF04       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.135 0   000083C2                                                     ENTRY
                                     QDBOPEN       141538 2134843068
37.151 0   000083C2                                                     EXIT
                                     QDBOPEN       171460 2135014528
37.151 0   000083C2                                                     EXIT
                                     QDMCOPEN        1338 2135015866
37.151 0   000083C2                                                     ENTRY
                                     QDMCOPEN        3675 2135019541
                                       6
37.152 0   000083C2 039789275C 000000 PF03      PF03       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.152 0   000083C2 039789275C 000000 PF03      PF03       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.152 0   000083C2                                                     ENTRY
                                     QDBOPEN       112276 2135131817
37.171 0   000083C2                                                     EXIT
                                     QDBOPEN       181116 2135312933
37.171 0   000083C2                                                     EXIT
                                     QDMCOPEN        1384 2135314317
37.171 0   000083C2                                                     ENTRY
                                     QDMCOPEN        3695 2135318012
                                       7
37.172 0   000083C2 1F9A7DC2B9 000000 PF02      PF02       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.173 0   000083C2 1F9A7DC2B9 000000 PF02      PF02       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.173 0   000083C2                                                     ENTRY
                                     QDBOPEN       111601 2135429613
37.188 0   000083C2                                                     EXIT
                                     QDBOPEN       112794 2135542407
37.188 0   000083C2                                                     EXIT
                                     QDMCOPEN        1278 2135543685
37.188 0   000083C2                                                     ENTRY
                                     QDMCOPEN        3619 2135547304
                                       8
37.189 0   000083C2 1A88262EF5 000000 PF01      PF01       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.189 0   000083C2 1A88262EF5 000000 PF01      PF01       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.189 0   000083C2                                                     ENTRY
                                                         10
                                     QDBOPEN       115201 2135662505
37.206 0   000083C2                                                     EXIT
                                     QDBOPEN       180040 2135842545
37.206 0   000083C2                                                     EXIT
                                     QDMCOPEN        1293 2135843838
37.206 0   000083C2                                                     ENTRY
                                     QDBGETM         5437 2135849275
37.207 0   000083C2                                                     EXIT
                                     QDBGETM        67348 2135916623
37.207 0   000083C2                                                     ENTRY
                                     QDBGETM         4342 2135920965
37.208 0   000083C2                                                     EXIT
                                     QDBGETM        62787 2135983752
            (TWO ENTRY EXIT SETS TO QDBGETM REMOVED FOR BREVITY.)
37.209 0   000083C2                                                     ENTRY
                                     QDBGETM         4180 2136116630
37.210 0   000083C2                                                     EXIT
                                     QDBGETM        59878 2136176508
37.210 0   000083C2                                                     ENTRY
                                       9
                                     QDMCLOSE        4357 2136180865
37.210 0   000083C2                                                     ENTRY
                                       9
                                     QDBCLOSE        8524 2136189389
37.210 0   000083C2                                                     EXIT
37.340 0   000083C2                                                     ENTRY
```

Figure 50 (Part 3 of 3). Enhanced PEX TRACE Detail Report - from OPENS Command Collection

Note the following:

This example traced the following program:

```
CALL OPENBAD 5
```

Where OPENBAD is an OPM CL program that calls an ILE compatibility mode RPG program OPEN5 a total of five times. The RPG program OPEN5 opens five database files (PF01, PF02, PF03, PF04 and PF05). Shared open data paths are not used in the calling CL program so the PFnn files are fully opened upon each call to program OPEN5.

The SMTBCH Enhanced PEX TRACE command was used to collect PROBLEM data of type *OPENS. This caused the SMTBCH command to build a new PEX definition using the QYPINT/ADDPEXDFN command; this definition collected event data that is not available using standard PEX TRACE support (it collected SAR events so that we can find the file names being opened).

1 This is where OPM CL program OPENBAD was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPENBAD″.

2 This is where ILE RPG program OPEN5 was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPEN5″.

3 A database file open always involves a call to QDMCOPEN (data management common open) followed by a call to either QDBOPEN (full database file open) or QDBSOPEN (shared database file open).

Contrast this report with the Standard PEX TRACE report over exactly the same programs, shown in Figure 49 on page 174. In this report, the lines between QDMCOPEN and QDBOPEN are completely different to those in Standard PEX; we collected SAR events and did not collect MI complex instructions. The standard report in Figure 49 on page 174 shows MI complex instructions (which do not include the file name being opened); however, neither SAR events or physical disk IOs can be collected so we do not see any file names.

It is necessary to collect SAR events in order to determine the name of the file being opened.

4 This is a SAR event record. It shows that file name PF05 member name PF05 is being opened.

It is interesting to note that the original RPG source specified the files to be opened in the order PF01, PF02, PF03, PF04, and PF05. Thus, we can see that files are opened in the reverse order in which they are specified in RPG.

5 This SAR event record shows that file name PF04 member PF04 is being opened.

6 This SAR event record shows that file name PF03 member PF03 is being opened.

7 This SAR event record shows that file name PF02 member PF02 is being opened.

8 This SAR event record shows that file name PF01 member PF01 is being opened.

9 Note that the combination of QDMCLOSE (data management close) followed by QDBCLOSE (database file close) indicates that a full database file close has occurred.

10 The value under ″Run Cycles″ is a representation of the amount of cumulative CPU used at that instruction within the job.

All though the heading is *Run Cycles*, the values shown are CPU milliseconds.

We can conclude from this example that we need the capability to collect SAR events or physical disk IO events in order to see the names of objects (files, in this case) being operated on. This is one of the primary reasons for using Enhanced PEX TRACE. Finally, it is much easier to use the reports produced from the Enhanced PEX TRACE OPENS command than plow through this level of detail. Please refer to Section 10.1, “Full File Opens (OPENS Command)” on page 249 for examples of all Enhanced PEX reports produced using the OPENS command.

7.4.2 Enhanced PEX TRACE - Detail Report on Data Queue Send Scenario

The technique of converting the CPU cycles figure into cumulative CPU milliseconds used at that event within the job can be useful because it enables us to see the CPU time being used between events such as data queue reads.

We have used this technique to investigate data queue server jobs at client sites. The low level trace data has been used to highlight design problems with data queue server jobs, as it clearly illustrates where CPU time is being spent. We have seen data queue server jobs where 60% of the CPU time is being spent processing the CL commands RTVDTAARA and CHGDTAAARA, and the remaining 40% of the CPU time is being spent doing the work of processing the data queue entries. Clearly, such low level analysis of trace data can assist with determining application design changes (in the case of this client, the RTVDTAARA and CHGDTAARA commands were being issued prior to every data queue read and were only being issued in order to determine whether the data queue server job should be ended). Note that the recommendation, in this case, was to change the processing and remove the RTVDTAARA and CHGDTAARA commands completely, and send a special entry to the data queue saying ″ENDME″ when the job should be ended. Thanks to PEX TRACE, we were able to prove exactly where the CPU time was being spent and see where significant savings could be made since the cumulative CPU time within the job is placed in each PEX TRACE event.

In this example, we find out what the CPU service time is for placing an entry on a data queue.

We used SMTBCH to collect the TRACE data for an RPG program called SNDDTAQ, which put four entries on a data queue called DQ01.

We specified:

- Data collection using:

  ```
  SMTBCH DFN(DTAQ) PROBLEM(*PERF) DURATION(5) DATALIB(DHPERF) MIBRACKET(*EN
  TEXTMI) ADDJOBS(Y) PRTPEX(Y)
  ```

  1. Our job as the only job for which to collect data on the ADDJOBS (Additional Jobs) prompt.
  2. Use MIBRACKET(*ENTEXTMI) in order to collect both program names (that show as ENTRY and EXIT in the ″EVENT″ column of the PRTPEXRPT report and program name under the ″CurrentPgm″ column) and MI complex instructions.

We need to see the MI complex instructions *ENQ (enqueue) resulting from writing an entry to our data queue (CurrentPgm = QSNDDTAQ). There are both MISTR (MI start) and MICPL (MI completion) entries for the MI complex instructions; we are only interested in the CPU time in between *ENQ MISTR (enqueue starts) in order to determine the CPU time taken to send an entry to the data queue.

SMTBCH always prints the PEX TRACE detail report using *TASK as the value against the TRACEOPT keyword, as shown in the following example:

```
PRTPEXRPT MBR(DTAQ) LIB(DHPERF) TYPE(*TRACE) TRACEOPT(*TASK)
```

This produces the following report, of which only part of the Trace Information section is shown.

```
                   12
Time Stamp. : 15.38.41.4027 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          557256 Percent: 53.79
                    Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                           T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-----------------------------------------------------------------------------------------------------------------------------------
  (some entries removed here)
41.469 0   000083C2                                                      EXIT
                                      QCACALL        2565 2146011346
                                                                           1                         1
41.469 0   000083C2                                                      AGAPR                    SNDDTAQ
                                                     2170 2146013516
41.469 0   000083C2 24C8126D33 000000 SNDDTAQ             0201 0001  P   WRT A 0001 #domodso 0007FC QCACALL    003AE0      00
41.469 0   000083C2 24C8126D33 000000 SNDDTAQ             0201 0001  P   *WS A 0001 0030 022746       N   N                04 01
41.470 0   000083C2 24C8126D33 0001B4 SNDDTAQ             0201 0001  P   PFS        #aiaa    0005EC QCACALL    003AE0
                                          2                                2
41.470 0   000083C2                   SNDDTAQ       72093 2146085609     ENTRY  2SNDDTAQ/_QRNP_PEP_SNDDTAQ
41.471 0   000083C2 0C55F7F7E 000504 SNDDTAQ              0201 0022  P   PFS                        SNDDTAQ    0013A4
41.471 0   000083C2 0000000003 A1B003 SM PERM DIR SEGMENT  0000 0000  P   PFS        IxRadix3 000238
41.471 0   000083C2 0000000003 A1B000 SM PERM DIR SEGMENT  0000 0000  P   *RSF  0001 0080 02A61B       N   N                01 01
41.485 0   000083C2 0C55F7F7E 000000 SNDDTAQ              0201 0022  P   *RSF  0001 0080 02340D       N   N                04 01
41.494 0   000083C2                                                      AGAPR                    QSNDDTAQ
                                                    77315 2146162924
41.494 0   000083C2                                                      ENTRY  3
                                          3
                                      QSNDDTAQ       6302 2146169226
41.495 0   000083C2 0761B29A61 000020 DQ01                0A01 0002  P   PFS                        QSNDDTAQ   0037FC
41.495 0   000083C2 0761B29A61 000000 DQ01                0A01 0002  P   *RSF  0001 0080 018658       N   N                04 01
41.501 0   000083C2 1FD3CDC816 000000 DQ01                0A01 0001  P   WRT A 0001 #domodso 000300 QSNDDTAQ   00392C      00
41.502 0   000083C2 1FD3CDC816 000022 DQ01                0A01 0001  P   PFS        #sv14ckp 00007C QSNDDTAQ   003B20
41.502 0   000083C2                                                      MISTR
                    QSNDDTAQ   000194 *LOCKSL       86317 2146255543
41.502 0   000083C2                                                      MICPL
   13
                        QSNDDTAQ   000195 *LOCKSL         3419 2146258962
41.502 0   000083C2                                                      MISTR  4
                          4                4
                    QSNDDTAQ   00007E *ENQ           1593 2146260555
41.502 0   000083C2 1FD3CDC816 001418 DQ01                0A01 0001  P   PFS        QuQueueC 000004 QSNDDTAQ   0021BC
41.502 0   000083C2 1FD3CDC816 001000 DQ01                0A01 0001  PM *RSF  0001 0011 03739B       N   N                04 01
41.521 0   000083C2 1FD3CDC816 000000 DQ01                0A01 0001  PM *WS A 0001 0011 03739A       N   N                04 01
41.522 0   000083C2 1FD3CDC816 000000 DQ01                0A01 0001  PM *WS A 0001 0012 03739A       N   N                04 01
41.538 0   000083C2                                                      MICPL
                    QSNDDTAQ   00007F *ENQ          31797 2146292352
41.538 0   000083C2                                                      MISTR
                    QSNDDTAQ   0000CF *UNLOCKSL       956 2146293308
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   0000D0 *UNLOCKSL      2535 2146295843
41.539 0   000083C2                                                      EXIT
                                      QSNDDTAQ        512 2146296355
41.539 0   000083C2                                                      ENTRY
                                      QSNDDTAQ       3793 2146300148
41.539 0   000083C2                                                      MISTR
                    QSNDDTAQ   00019C *LOCKSL        4165 2146304313
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   00019D *LOCKSL        2569 2146306882
41.539 0   000083C2                                                      MISTR  5
                          5                5
                    QSNDDTAQ   00007E *ENQ           1052 2146307934
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   00007F *ENQ           2525 2146310459
41.539 0   000083C2                                                      MISTR
                    QSNDDTAQ   0000CF *UNLOCKSL       512 2146310971
41.539 0   000083C2                                                      MICPL
41.539 0   000083C2                                                      EXIT
                                      QSNDDTAQ        379 2146313084
41.539 0   000083C2                                                      ENTRY
                                      QSNDDTAQ       2914 2146315998
41.539 0   000083C2                                                      MISTR
                    QSNDDTAQ   00019C *LOCKSL        3652 2146319650
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   00019D *LOCKSL        2348 2146321998
                    QSNDDTAQ   0000D0 *UNLOCKSL      1734 2146312705

                                                  M05
```

Figure 51 (Part 1 of 3). Detail DTAQ Enhanced PEX TRACE Example

```
                                                      Performance Explorer Report                                         8/01/96 18:05:08
                                                         Trace Information                                                     Page
                                                                                                                                    79
Library . . : DHPERF
Member. . . : DTAQ
Description : *BLANK
Time Stamp. : 15.38.41.5390 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          557256 Percent: 53.79
                    Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                           T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
------------------------------------------------------------------------------------------------------------------------------
41.539 0   000083C2                                                      MISTR 6
                       6                6
                    QSNDDTAQ   00007E *ENQ             860 2146322858
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   00007F *ENQ            2476 2146325334
41.539 0   000083C2                                                      MISTR
                    QSNDDTAQ   0000CF *UNLOCKSL        505 2146325839
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   0000D0 *UNLOCKSL       1795 2146327634
41.539 0   000083C2                                                      EXIT
                                      QSNDDTAQ         393 2146328027
41.539 0   000083C2                                                      ENTRY
                                      QSNDDTAQ        2761 2146330788
41.539 0   000083C2                                                      MISTR
                    QSNDDTAQ   00019C *LOCKSL         3614 2146334402
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   00019D *LOCKSL         2384 2146336786
41.539 0   000083C2                                                      MISTR 7
                       7                7
                    QSNDDTAQ   00007E *ENQ             849 2146337635
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   00007F *ENQ            2414 2146340049
41.539 0   000083C2                                                      MISTR
                    QSNDDTAQ   0000CF *UNLOCKSL        500 2146340549
41.539 0   000083C2                                                      MICPL
                    QSNDDTAQ   0000D0 *UNLOCKSL       1721 2146342270
41.539 0   000083C2                                                      EXIT
                                      QSNDDTAQ         379 2146342649
                                        8                                  8
41.540 0   000083C2                   SNDDTAQ         5344 2146347993    EXIT    SNDDTAQ/_QRNP_PEP_SNDDTAQ
41.540 0   000083C2                                                      ENTRY
   .
 (intermediate non QSNDDTAQ *ENQ MISTR related entries removed)
   .
                                      QMHRCVPM        6842 2146354835
55.667 0   000083C2                                                      ENTRY
55.667 0   000083C2                                             14    EXIT
                                      QCATRS         28147 2136424795
55.667 0   000083C2                                                      ENTRY 9
                                         9
                                      ENDSTATS        2292 2136427087
55.667 0   000083C2                                                      ENTRY
                                      QCLRSLV         3023 2136430110
   .
 (intermediate non QSNDDTAQ *ENQ MISTR related entries removed)
   .
                                      QCLCLCPR       71754 2136546767
55.669 0   000083C2                                                      ENTRY
                                      QSNDDTAQ        4599 2136551366
55.669 0   000083C2                                                      MISTR
                    QSNDDTAQ   00019C *LOCKSL         5893 2136557259
55.669 0   000083C2                                                      MICPL
                    QSNDDTAQ   00019D *LOCKSL         3910 2136561169
55.669 0   000083C2                                                      MISTR 10
                       10               10
                    QSNDDTAQ   00007E *ENQ            1243 2136562412
55.687 0   000083C2                                                      MICPL
                    QSNDDTAQ   00007F *ENQ            7440 2136569852
55.688 0   000083C2                                                      MISTR
                    QSNDDTAQ   0000CF *UNLOCKSL       1264 2136571116
55.688 0   000083C2                                                      MICPL
                    QSNDDTAQ   0000D0 *UNLOCKSL       2595 2136573711
55.688 0   000083C2                                                      EXIT
                                      QSNDDTAQ         795 2136574506
   .
 (intermediate non QSNDDTAQ *ENQ MISTR related entries removed)
   .
```

Figure 51 (Part 2 of 3). Detail DTAQ Enhanced PEX TRACE Example

```
                                   QCLCLNUP         632 2136605105
55.688 0   000083C2                                                   EXIT  11
                                    11
                                   ENDSTATS         889 2136605994
55.688 0   000083C2                                                   ENTRY
```

Figure 51 (Part 3 of 3). Detail DTAQ Enhanced PEX TRACE Example

Note the following:

ILE RPG program SNDDTAQ was run. It placed four records on a data queue DQ01 and then ended.

1 Event type AGAPR denotes the activation of a program. In this case, it is the activation of application program SNDDTAQ.

2 This ENTRY event denotes control being passed to program SNDDTAQ. We can see that this is an ILE RPG program because on the right hand side, we see _QRNP_PEP_SNDDTAQ indicating that this is where the program entry procedure (PEP) of ILE RPG program SNDDTAQ received control.

3 This ENTRY event indicates where MI program QSNDDTAQ received control. Program QSNDDTAQ is the system program used to write entries to a data queue.

″Run Cycles″ Heading

Although the heading is ″run cycles,″ the values shown under this column are CPU milliseconds used.

4 This is the first of the data queue write entries occurring from our program SNDDTAQ. The Parent-Pgm is QSNDDTAQ, the CurrentPgm column shows *ENQ MI complex instruction, and the event type is MISTR (start). This is our reference point for the subsequent data queue writes (enqueue) CPU performance.

This event occurred at 15.38.41.502. Where we get the hours and minutes from the timestamp **12** at the top of the page and the seconds and milliseconds from the ss.mmm column **13**.

5 This is the second of the data queue write entries occurring from our program SNDDTAQ.

6 This is the third of the data queue write entries occurring from our program SNDDTAQ.

7 This is the fourth of the data queue write entries occurring from our program SNDDTAQ.

8 This EXIT event against program SNDDTAQ indicates that our program SNDDTAQ is no longer in control.

9 This ENTRY event is against program ENDSTATS, the program run by the ENDSMTBCH option on the PEX TRACE Main Menu PEXTRC01. All events that follow are occurring as a result of Enhanced PEX Trace ENDSMTBCH command and **not** as a result of running program SNDDTAQ.

When looking at detail PEX TRACE data, ensure that you only review events occurring within your program.

10 Here is another event showing a write to a data queue. This one is nothing to do with our program SNDDTAQ. It is running under program ENDSMTBCH; therefore, we are not interested in this event.

Important!

This is why we cannot just select ″all events″ of a certain kind from the base data, as we do not want to capture events that are part of Enhanced PEX TRACE support and **not** part of the application we are investigating.

11 This EXIT event shows control being passed back from program ENDSTATS. Thus, events following would **not** be occurring under program ENDSTATS.

12 The starting timestamp for entries on this page.

13 The seconds and milliseconds timestamp for individual entries.

14 Note that here the cumulative CPU milliseconds value has gone **negative**. This is because a Performance Measurement Counter Overflow (PMCO) condition has occurred and it is not reflected on this report.

Refer to Appendix D, "Performance Explorer PTF Summary" on page 489 for a list of the PEX-related PTFs that were used to generate the examples in this redbook. After you have applied the recommended PEX PTFs, you must consider the following:

- PRTPEXRPT..TRACEOPT(*TASK) causes accurate cumulative CPU seconds (including the adjustments for PMCO conditions) to appear under the CPU cycles column.
- PRTPEXRPT..TRACEOPT(*TIMESTAMP) produces a report similar to this example, but with all jobs and tasks sorted in timestamp sequence. This report shows cumulative CPU cycles (**without** adjustment for PMCO conditions) under the CPU cycles column.

Chapter 8. Interpreting Standard PEX TRACE Reports

This chapter provides one example of using the PRTPEXRPT on trace data collected under the standard (not Enhanced) PEX TRACE support.

8.1 What Programs are Using Most CPU on the System?

We use an example that ″profiles″ CPU utilization of programs and modules active during the PEX TRACE collection. Use this technique to get a system wide view of which application and system programs (both MI and SLIC) are using most CPU on the system. A simple histogram of which programs are using most CPU can be produced enabling you to see which programs require attention.

8.1.1 Collecting the Data and Produce the Report

You are using one of the predefined PEX TRACE definitions shipped in the PTF described in Section 6.1, "Getting PEX TRACE for IBM Support Analysis of Data" on page 125. Once you have obtained this PTF, you have a set of PEX TRACE definitions called QTRCPROFnn, where nn is a CPU profiling number of 01, 05, 10, or 20 milliseconds. The QTRCPROFnn PEX TRACE definition collects trace data for:

- Performance Measurement Counter Overflow events (*PMCO base events)
- All MI Complex Instructions

Note for Enhanced PEX Trace

Since all of the problem types used by the Enhanced PEX Trace SMTBCH command use definitions that include *PMCO events, you can always produce a CPU profile histogram from data collected using the SMTBCH command. In other words, Enhanced PEX TRACE support includes the CPU profile capabilities described in this chapter.

We recommend that you use definition QTRCPROF05 in order to profile what programs are using CPU at five millisecond intervals. This collects program or module information system wide.

Ensure that you collect the data when the system is in a steady state (not during shift change, mass user sign on or mass user sign off times).

Enter the following commands in the sequence shown:

1. Start PEX TRACE using the command:

   ```
   STRPEX SSNID(ITSOTST) DFN(QTRCPROF05)
   ```

2. Run the trace for the desired time. We suggest 30 minutes during the peak time for your first run.

3. End PEX TRACE using the command:

   ```
   ENDPEX SSNID(ITSOTST) OPTION(*END) DTAOPT(*LIB) TEXT('CPU PROFILING EXAMP
   LE USING PEX TRACE DATA')
   ```

4. Print the CPU Profiling Report using the command:

   ```
   PRTPEXRPT MBR(ITSOTST) TYPE(*PROFILE)
   ```


Note: Although we collect PEX TRACE data, we must fool the PRTPEXRPT command into believing that it is PEX TRACE data so that we get a histogram of CPU usage printed rather than the standard PEX TRACE detail report.

The following figure is an example of the ″trace profile″ report. Notice that the definition type is TRACE even though the printed report is formatted as if PEX PROFILE was collected and reported.

```
                                          Performance Explorer Report                            8/14/96 15:24:58
                                            Definition Information                                   Page
                                                                                                           1
Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : QTRCPROF05
Defined By . . . . . . . . . : QPEX
Definition Description . . . : System wide CPU profiler, 5 millisecond intervals
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 102400
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 5
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
Selected Events:
    Category  : BASE                -  Base Events
         *PMCO               PMCO   -  Performance Measurement Counter OverFlow
                                          Performance Explorer Report                            8/14/96 15:24:58
                                                Run Information                                      Page
                                                                                                           2
Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
Sessions since IPL. . . . . . . . . . . . . :                        241
Session name. . . . . . . . . . . . . . . . : CPUPROFEX1
Start time. . . . . . . . . . . . . . . . . : 1996-08-14-15.21.37.333952
Stop time . . . . . . . . . . . . . . . . . : 1996-08-14-15.23.09.628032
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.01.32.294080
Suspend time (us) . . . . . . . . . . . . . :                    144,352
Number of events. . . . . . . . . . . . . . :                     10,176
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054178
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : SYSTEM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . . :                        304
Jobs in session . . . . . . . . . . . . . . :                        124
```

Figure 52 (Part 1 of 4). CPU Profiling Example

```
                                          Performance Explorer Report                            8/14/96 15:24:58
                                        Profile CPU Summary Information                             Page
                                                                                                          3
Library . . . . :  QPEXDATA
Member. . . . . :  CPUPROFEX1
Description . . :  PEX TRACE CPU PROFILE example
Total CPU . . . :      55960720
Job CPU . . . . :      54984088    98.3 %
Task CPU. . . . :        976632     1.7 %
                   -----------------------
Total Samples . :         10176
Total Hits. . . :         10176   100.0 %
```

Figure 52 (Part 2 of 4). CPU Profiling Example

```
                                      Performance Explorer Report                                         8/14/96 15:24:58
                                          Profile Information                                             Page     3
Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
                           Histogram     Hit   Hit   Cum   Start              Map   Stmt   Name
                                         Cnt    %     %    Addr               Flag  Numb
-------------------------------------------------------------------------------------------------------------------------------------
       *****************************  1  8395  82.5  82.5 8000000000003068   MP       0  LIC
                               *****  2  1562  15.3  97.8 008206D28B001388   MP       0  QSYS
                                      3   216   2.1 100.0 0006AFB9B4000710   MP       0  ITSO
                                            3   0.0 100.0 283A937B6F00A900   MP       0  QTCP
```

Figure 52 (Part 3 of 4). CPU Profiling Example

```
                                      Performance Explorer Report                                         8/14/96 15:24:58
                                          Profile Information                                             Page    12
Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
                           Histogram     Hit   Hit   Cum   Start              Map   Stmt   Name
                                         Cnt    %     %    Addr               Flag  Numb
-------------------------------------------------------------------------------------------------------------------------------------
                                  **     600   5.9   5.9 FFFFFFFFC1EDB810   MP       0  IxRadix3  4
                                   *     520   5.1  11.0 FFFFFFFFFE044904   MP       0  #aicapgm  5
                                   *     481   4.7  15.7 0462CF1A9D001388   MP       0  QDMCOPEN  6
                                   *     442   4.3  20.1 FFFFFFFFF42A3C70   MP       0  RmslInterf
                                   *     432   4.2  24.3 FFFFFFFFFF006000   MP       0  string
                                   *     317   3.1  27.4 800000000017CE9C   MP       0  SmPageDesc
                                         257   2.5  30.0 FFFFFFFFF416B744   MP       0  RmslHoldRe
                                         232   2.3  32.2 80000000000106A8   MP       0  bzero4kp_C
                                         228   2.2  34.5 FFFFFFFFC1F336F8   MP       0  #dbrsqmn
                                         218   2.1  36.6 3339F4CA5E001384   MP       0  QDBGETSQ
                                         212   2.1  38.7 FFFFFFFFF4168AE4   MP       0  RmslHoldHa
                                         198   1.9  40.7 FFFFFFFFC1CC56AC   MP       0  #cfochkr
                                         181   1.8  42.4 FFFFFFFFC1E04530   MP       0  #dbsetcr
                                         173   1.7  44.1 023BFD7099001380   MP       0  QDMCLOSE
                                         157   1.5  45.7 032EEF6C2F0019C8   MP       0  OPEN5  7
                                         156   1.5  47.2 02412F9DAF004E80   MP       0  QRNXIO
                                         143   1.4  48.6 FFFFFFFFC1A3F480   MP       0  IxRadix3Fi
                                         141   1.4  50.0 FFFFFFFFF46EFAE0   MP       0  StackFrame
                                         139   1.4  51.4 0377FE186C001380   MP       0  QDMGETOV
                                         131   1.3  52.7 1048E8F9CD00138C   MP       0  QDBSOPEN
                                         127   1.2  53.9 FFFFFFFFC3183880   MP       0  #domtptr
```

Figure 52 (Part 4 of 4). CPU Profiling Example

Note the following:

1 Percent of samples where CPU was running LIC routines.

2 Percent of samples where CPU was running OS/400 routines.

3 Percent of samples where CPU was running programs in library ITSO.

4 The index module used by system programs (including database) for processing a binary radix tree (index structure).

5 The program to support inter-MI program calls.

6 If the start address does not begin with 'FFFF' or '8000', it does not represent a LIC program. If the start address begins with 'FFFF', the program is a pageable LIC program. If the start address begins with '8000', the program is a LIC program resident in main storage.

The Rochester development lab has chosen not to externally document the functions provided by the LIC programs or LIC program procedure names that appear on this report.

7 This is an application program.

8.1.2 Conclusions

The PEX PROFILE CPU profile report can show work attributed **differently** than how it appears in a PEX STATS or PEX TRACE report. Some of the reasons for this are:

- MI complex instructions are not visible to PEX PROFILE. It is the LIC procedure performing the MI complex instruction that is ″seen″ by PEX PROFILE and, therefore, appears on the CPU profile report.
- Certain MI instructions get into LIC by methods that PEX cannot capture through STATS or TRACE collections. This means that STATS or TRACE attributes work to a MI module/procedure where PEX PROFILE attributes that same work to a LIC procedure.

  Finding LIC tasks and MI Complex Instructions

  For LIC task names, you must refer to *Licensed Internal Code Diagnostic Aids* LY44-4900. For a list of MI complex instructions, refer to Appendix A, "AS/400 MI Complex Instructions (Partial List)" on page 433.

- Other LIC programs or procedures:

  Some of the LIC program names or procedure names, such as IxRadix3, #aicapgm, string, #dbrsqmn, and so on, appear in trace output as shown in our example in Figure 52 on page 190 The development lab has determined not to externally document the functions of these programs/procedures.

  The ″Hit Cnt″ and ″Hit %″ for these programs or procedure names are useful only to IBM software service personnel.

Chapter 9. Interpreting Enhanced PEX TRACE Reports

The purpose of this chapter is to enable the reader to better interpret the information provided in the Enhanced PEX TRACE reports that can be produced from the PEX Reports Menu PEXTRC02. It is **not** to provide the reader with either application performance tuning skills or system performance tuning skills, as those are considered a prerequisite for analysis of performance using PEX TRACE.

> **Enhanced PEX TRACE Example Disclaimer**
>
> In this chapter, we present several examples of the report capabilities of Enhanced PEX TRACE support. As you and IBM become more familiar with the ″Enhanced PEX″ capabilities, we may find additional uses and examples that we were not able to include in this redbook.

Each section is introduced with a heading identifying a particular ″problem type″ or ″set of information to be gathered″ (no actual problem).

9.1 Finding Set Object Access Candidates

Set Object Access support (SETOBJACC command) can be used to specifically tell OS/400 to place an object into main storage and keep it there. For example, do not give some of the main storage pages containing this object up for use by another object or another job.

You want to place an object into storage only if you know (or strongly suspect) there are a significant number of physical disk I/Os being issued to the object in a ″performance critical″ application.

9.1.1 Purpose

Given sufficient memory, performance can be improved **without** application change by explicit placement of physical files and indexes into a ″cache pool.″ This means that the part of response time spent performing physical disk I/O reads to these objects is reduced to zero when they are placed into memory using the SETOBJACC command.

Enhanced PEX TRACE is the **only tool** that provides a report showing which physical files and indexes are good candidates for being placed entirely into main storage and kept there while an application processes this ″cached data.″

When you specifically place an object into a main storage pool, you become responsible for that object and storage pool. So it is strongly recommended you do analysis to ensure you are placing an object into the storage pool that has a large number of I/Os issued against it and that the complete object fits into the allocated storage for that pool.

Please recall that for SETOBJACC to be effective once you have identified the most likely object, you must use the Display Object Description (DSPOBJD) command for the object to determine its size. To be safe, ensure the storage pool is at least 20% larger than the object size listed.

Note: To be effective, you must use the Clear Pool (CLRPOOL) command before issuing SETOBACC for the object to that storage pool. SETOBJACC issues a completion message after the object has been loaded. This message identifies the number of bytes **remaining in the pool** in case you want to load additional objects into the pool. If the storage pool is too small to contain the complete object, performance may actually degrade compared to normal ″demand paging of objects in and out of main storage.″

9.1.2 What Data to Collect

Use the Enhanced PEX TRACE main menu PEXTRC01 shown in Figure 25 on page 132. Select Option 2 of PEXTRC01 to start a PEX TRACE session. This leads to the SMTBCH data collection command. Specify *PERF or *BUSYDISK or *DASDPERF1 or *DASDPERF2 for the ″Type of Problem″ parameter on the SMTBCH command. See Section 6.4.3, "Collecting Enhanced PEX TRACE Data" on page 133 for a description of the SMTBCH command and the ″Type of Problem″ parameter. This report does not require that MI *ENTRYEXIT events be collected, so ″Trace MI Call Events″ can be left at the default of *NONE.

Specify as short a time as possible for the trace run time and press Enter. After the TRACE has completed, you are ready to print a report of the collected TRACE data.

9.1.3 How to Produce this Report

Use Option 2 on the PEX TRACE Reports Menu (PEXTRC02) to prompt the **IOS** disk I/O reporting command. The PEXTRC02 menu is shown in Figure 29 on page 142. The IOS command is shown in Section 6.6.2, "IOS Reporting Command" on page 149. Use the option ″Objects with 100+ IOs″ on the IOS command to produce the example report shown in Figure 53 on page 195.

Please refer to Section 10.2.6, "Report Title - Objects with 100 or More DASD I/Os" on page 273 for a complete example of IOS report.

9.1.4 Example Report

```
                                                    Objects with 100 or more DASD I/Os

Object name                        I/O    I/O     Average           Percent of
and type                           count  type    pages transferred all system
                                                  per I/O           I/Os
     3               1               2
CSTFIL    CSTFIL     0B90          5,361  *RS  A         1.00            65.96
                                       1  *RS  S         1.00              .01
                                       1  *RSF S         1.00              .01
                                       1  *WS  A         1.00              .01
                     TOTAL         5,364                                65.99
QWCBT01              19D0              1  *RS  A         1.00              .01
                                       1  *RS  S         3.00              .01
                                       9  *RSF S         1.00              .11
                                     358  *RX  A         7.15             4.40
                                       4  *WS  A         1.25              .05
                                       1  *WS  S         1.00              .01
                     TOTAL           374                                 4.59
                     1
CSTFIL    CSTFIL     0C90            159  *RSF S         1.00             1.96
                                      54  *WS  A         4.63              .66
                     TOTAL           213                                 2.62
                                                                           26
```

Partial report, used for report heading explanations.

Figure 53. Finding SETOBJACC Candidates - Physical Disk IO Example

What to look for:

This report is in descending sequence of total disk I/Os by object. We are only interested in the **read** type of physical disk I/Os for physical files and indexes over physical or logical files.

1 Object type = 0B90 for a physical file Object type = 0C90 for an index (over a physical or a logical file)

For a list of object types, refer to Section 9.6.2, "Object and Segment Types Appearing in TRACE Reports" on page 243 and Section 9.7, "MI Object Types" on page 246.

2 I/O Types starting with '*R', denoting physical READ I/Os

For a list of I/O types, refer to Table 16 on page 233.

3 Filename and member name

9.1.5 Report Analysis

Identify the read IOs for physical files and logical files. In the example shown in Figure 53 on page 195, the physical file CSTFIL member CSTFIL and the index over this file are both SETOBJACC candidates as most of the READ disk I/Os happened against these objects. Thus, response time for all jobs doing READ I/Os to these objects is reduced if the objects were resident in memory.

The next step is to determine whether these objects fit into the memory we have available for dedication as SETOBJACC pool (or pools).

Please refer to Section 10.7.1, "Report Title-Size of Objects Which Were Touched During the STRPEX Run" on page 404 for a complete example of the following sample report (Object Size Example).

```
 Size of object which where touched during the STRPEX run.
 Note: this is not the "size touched", but rather the gross obj/seg size
       of objects which were touched (at least once).

Object size   Segment start     Object/segment        Obj/Seg  Type description                     Library
(in bytes)    address           name                  type                                          name
 19,628,032   EE917707F7000000  PAG                    01EF    TEMPORARY - ACCESS GROUP
 16,777,216   FFFFFFFFC1000000  L/L RANGE 1            0000    L/L RANGE 1
 16,777,216   F1355BE79D000000  QCAWAREA               19EF    TEMPORARY - SPACE
 14,172,160   E9890758DA000000  P23XWY32E A960123A     1AEF    TEMPORARY - PROCESS CTL SPACE
        1
 13,647,872   21AA57F966000000  CSTFIL    CSTFIL       0B90    COMPOSITE PIECE - DATA SPACE         PFREXP
 11,800,576   250AFFDED4000000  QWCBT01                19D0    WORK CONTROL BLOCK TABLE             QSYS
 10,522,624   1CBD43CBE5000000  ITMFIL    ITMFIL       0B90    COMPOSITE PIECE - DATA SPACE         PFREXP
        2
  1,060,864   30C6219DFC000000  CSTFIL    CSTFIL       0C90    COMPOSITE PIECE - DATA SPACE INDEX
```

Figure 54. Finding SETOBJACC Candidates - Object Size Example

Look for object name and types that match those identified as SETOBJACC candidates.

What to look for:

1 This is the size in bytes of the data in PF CSTFIL member CSTFIL at the time PEX TRACE was run.

2 This is the size in bytes of the index for PF CSTFIL member CSTFIL at the time PEX TRACE was run.

Before deciding on the specific file (or file index) to be specified on the SETOBJACC command, we recommend you use a tool such as the Display File Description (DSPFD) command to check that there are few deleted records in the file (or files) you intend to place in memory. If you see a large number of deleted records (over 50), consider doing a Reorganize Physical File Member (RGZPFM) command to compress out the deleted record space.

9.2 Are Full Opens Causing High CPU Utilization?

One of the largest impacts to AS/400 performance is an excessive amount of file (usually a database file) opens and closes over a relatively short time period. Sometimes an application is ported to the AS/400 from a system where a file open uses much less system resource compared to the AS/400. It is not always easy to determine if an excessive file open rate is a cause of poor performance.

9.2.1 Purpose

Determine whether the amount of system resource being spent on doing full file opens can be reduced. Perhaps you have used the Performance Monitor and notice a high rate of synchronous NDB reads occurring on your system and want to explore whether these are occurring because of a high rate of full file opens. Perhaps you cannot understand the high level of CPU utilization on your system given your knowledge of what business functions the application is performing, and want to investigate whether application performance improvements can be made.

Full file opens continue to be a significant resource consumer on the RISC systems, just as they were on the CISC systems. Tests on a model 510 #2144 V3R6 system show that a shared file open uses approximately 20% of the CPU used to perform a full file open (results may vary by model). Thus, if you run an application that does **not** use shared opens, it is using approximately **five times more CPU** to open files than it uses if the files are opened as shared.

9.2.1.1 A Customer Experience

Management at a client site wanted application performance optimized in order to position them for significant growth and asked IBM Services to perform an application performance investigation.

The application was running on a V3R1 CISC four-way system; the full file open rate was found to exceed 180 per second. SMTRACE, the PEX TRACE predecessor tool on CISC, was used to identify which files were being opened how many times by which jobs. Database files formed the majority of the full file opens.

The interactive jobs were opening the same database files many times within the five-minute tracing period. Shared file opens were introduced, reducing the full file open rate to about 15 per second. Total CPU utilization reduced by over 30% was sustained when this change was implemented, since the full file opens/sec rate had been so high and was subsequently reduced to an acceptable level.

9.2.2 What Data to Collect

It is necessary to determine what rate of full opens is occurring on the system. This can be done using either Enhanced PEX TRACE or PEX STATS. However, it is easier to do this using Enhanced PEX TRACE than it is with PEX STATS.

Ensure that you pick a time for data collection that is after the users have signed on to the system and not during a shift change. Pick a time when any application startup programs (that may be doing many opens as part of user sign-on) have completed.

Once the rate of opens has been determined, Enhanced PEX TRACE is necessary to identify program names, files, and jobs involved in the opens.

9.2.3 How to Produce the Reports

This can be done by collecting data for all jobs using Enhanced PEX TRACE or PEX STATS as follows:

1. Enhanced PEX TRACE:

   Using Enhanced PEX enables you to determine **both** the rate of full opens and which programs, files, and jobs are involved.

   a. Use Menu PEXTRC01, Option 2 to Start PEX TRACE with the following values against the SMTBCH command keywords. Please refer to Figure 27 on page 134 for an explanation of the SMTBCH command.

      ```
      PROBLEM(*OPENS) DURATION(10) PRTPEX(*YES) MIBRACKET(*ENTRYEXIT)
      ```

      Note that MIBRACKET(*ENTRYEXIT) is not necessary to obtain an overall count of full opens; however, it is necessary if you want to investigate these opens by **program** name.

   b. Use PEX Reports Menu, PEXTRC02, Option 1 for Full File Open reports. This runs the OPENS command; ensure that you specify OPNPGM(*YES) so that application program names are available for detailed analysis **if** you collected MI *ENTRYEXIT information using the SMTBCH command. Please refer to Section 6.6.1, “OPENS Reporting Command” on page 147 for an explanation of the OPENS reporting command.

   c. Use Menu PEXTRC01 Option 8 to Display the PEX Trace Run Time. Please refer to Figure 33 on page 144 for an explanation of the DSPRUNINF command.

      Write down the number of seconds during which the trace was active.

   OR

2. PEX STATS:

   Using this method to find the full open rate per second involves more steps than using the PEX TRACE method. If the full open rate is high on your system, you still need to use PEX TRACE to pinpoint the programs and files involved.

   Follow the steps in the specified sequence.

   We need to identify the number of times that each of the system programs used for full opens was called:

   - QDBOPEN - full database file open
   - QSPOPEN - full spool file open
   - QTSOPEN - full DDM file open

- QWSOPEN - full workstation file open

a. ADDPEXDFN DFN(OPENS) DTAORG(*FLAT) MRGJOB(*YES) TEXT(′Stats, Flat, All Jobs, Merge *YES′)

   Ensure that you use DTAORG(*FLAT) MRGJOB(*YES) to get one total for each of the programs QDBOPEN, QWSOPEN, QSPOPEN and QTSOPEN.

b. STRPEX SSNID(OPENS) DFN(OPENS)

c. ENDPEX SSNID(OPENS)

d. PRTPEXRPT MBR(OPENS) STATSOPT(*PGMNAME)

   The report is in program name sequence to facilitate finding the QxxOPEN programs.

e. Using the Statistics Information section of the PEX STATS report adds together the number of ″Times Called″ for programs QDBOPEN, QWSOPEN, QSPOPEN, and QTSOPEN. This figure represents the total number of full opens during the measurement period.

   Now use the Run Information section to find the trace active time, where active time in seconds = (total time - suspend time/1000000).

   Divide the total opens by the number of seconds PEX was active for the rate of full opens per second.

9.2.3.1 Frequency of Data Collection

Consider at least three collections of PEX TRACE data to ensure that the results you are seeing are typical of ″normal″ system performance and not just the result of a ″one-of-a-kind″ operational environment. For example, one PEX TRACE collection may include a year-end payroll summary job and you need to understand if that job is in the data and if it should be included in the analysis.

Compare the results from the separate TRACEs to ensure that there is consistency. **Never** use data from one run only to make decisions about:

- Whether CPU spent doing full opens can be significantly reduced.
- Which files should be opened as shared.

9.2.4 Finding Full Opens Rate Per Second - PEX TRACE REPORT

The following report was produced using the OPENS command on the PEXTRC02 Reports Menu. Either *PERF or *OPENS must have been specified as the value against the PROBLEM keyword on the SMTBCH data collection command. However, only data related to full opens is collected with the *OPENS value. Therefore, the collection overhead is less than using the *PERF option.

```
07/24/96  12:17:43  Percent All Full Opens by Job  PAGE    1
Job                                 Full    Pct     TDE
                                    Opens   All
                      1                     Opens
P23XWY32G A960123A  052745            840   32.70   0000641D
                      1
BAD_BATCH A960123A  052763            669   26.04   000064B7
                      1
P23XWY32H A960123A  052744            631   24.56   0000641C
                      1
P23XWY32E A960123A  052752            416   16.19   0000645B
PEXTRACE  A960123A  052764              6     .23   000064B8
P23XWZ42E A960109B  052758              6     .23   000064B2
QBRMNET   QPGMR     050217              1     .04   0000014E
                      FINAL TOTALS
                      TOTAL         2,569  2
```

Figure 55. Full File Opens - Finding the Rate Per Second

9.2.4.1 Report Analysis

What to look for:

1 These jobs are responsible for a high number and percentage of full file opens during the trace period. Further investigation is required to determine why they are doing so many opens and if an application change can be made that could significantly improve performance.

2 This total represents the total number of full file opens occurring during the trace period. If you selected *ALL as the type of opens in which you are interested, this is equivalent to the sum of the number of calls made to programs:

- QDBOPEN - full database file open
- QWSOPEN - full workstation file open
- QSPOPEN - full spool file open
- QTSOPEN - full DDM file open

Follow these steps to find the rate of full opens per second:

1. Determine the active trace time using Option 8, Display PEX TRACE Run Time for a Session on the PEXTRC01 PEX TRACE Main Menu.

   For this example, active PEX TRACE run time was:

   ```
   Run time for trace session OPENS in library DHOPENS is 000000068 seconds.
   ```

2. Divide the total number of opens by the number of seconds for which the trace was active.

   For this example, the rate of full opens is:

   ```
   2,569 total opens / 68 seconds = 37.8 full opens per second
   ```

3. Find whether this rate is good or bad using the following table.

Table 14. Full File Open Guidelines		
Resource Description	**Good**	**Bad**
Full File Opens per Second:		
- Model 510	<10	>40
- Model 530	<40	>160
Note: These guidelines refer to the number of full file opens occurring per second system-wide and should be used to determine whether or not there is room for releasing CPU currently spent performing this work. The full opens may be required by the application or the system may be able to process higher rates of full opens. These values are merely guidelines to call your attention to functions affecting performance that should receive additional investigation. The numbers in this table do not represent physical limits achievable on the AS/400 system. They represent what is reasonable, given that the system is in a steady state (for example, users are staying signed-on and not doing sign-on/off) and given that appropriate file pre-opens are in use with SHARE(*YES). We could not perform testing for a wide variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.		

This table is reproduced in Appendix E, "Performance Explorer Tables" on page 495 for ease of use when reviewing PRTPEXRPT output in the customer environment.

Since we collected our data on a 510-2144, our rate of opens (37.8/second) approaches the Bad category. We need to investigate further to see where improvements can be made. We must now review the other queries produced by the OPENS command.

The first four jobs on the query in Figure 55 on page 200 marked as **2** are doing most of the opens. If your system has jobs that are significantly ″out of line″ (appear to be using more CPU or doing more DASD I/Os or doing more file opens than is reasonable), the programs being used by these jobs need investigation first.

Remaining at a high level view, we now see system-wide which programs are causing these opens.

```
07/24/96  12:17:48  Percent All Full Opens by Program  PAGE    1
Program             Full    Pct
                    Opens   ALL
                            Opens
OPEN5               1,749   68.08  1
TESTIO                602   23.43  1
OPN132                198    7.71  2
QDMCOPEN               11     .43
OPENGOOD                5     .19
GPHPGM2                 4     .16
      FINAL TOTALS
      TOTAL         2,569
```

Figure 56. Percent All Full Opens by Program - Example

Note:

1 Programs OPEN5 and TESTIO are doing 91% of all the opens.

We must now check whether programs OPEN5 and TESTIO are being used by any ″out of line″ jobs, such as those marked **2** in Figure 55 on page 200. We need to find out whether these programs are opening the same files many times or opening lots of different files a few times only.

2 At 7.7% of all opens, program OPN132 must also be investigated.

Next, we look at a breakdown of what programs our jobs are using.

```
07/24/96  12:17:45  Percent All Full Opens by Program within Job  PAGE    1
Job                         Program             Full    Pct     TDE
                                                Opens   ALL
                                                        Opens
                              1                   2
P23XWY32G A960123A  052745  OPEN5                 750   29.19   0000641D
                              1                   2
BAD_BATCH A960123A  052763  OPEN5                 669   26.04   000064B7
                              1                   2
P23XWY32H A960123A  052744  OPEN5                 330   12.85   0000641C
                              3
P23XWY32E A960123A  052752  TESTIO                301   11.72   0000645B
                              3
P23XWY32H A960123A  052744  TESTIO                301   11.72   0000641C
                              3
P23XWY32E A960123A  052752  OPN132                110    4.28   0000645B
                              3
P23XWY32G A960123A  052745  OPN132                 88    3.43   0000641D
PEXTRACE  A960123A  052764  QDMCOPEN                6     .23   000064B8
P23XWY32E A960123A  052752  OPENGOOD                5     .19   0000645B
P23XWZ42E A960109B  052758  GPHPGM2                 4     .16   000064B2
P23XWY32G A960123A  052745  QDMCOPEN                2     .08   0000641D
P23XWZ42E A960109B  052758  QDMCOPEN                2     .08   000064B2
QBRMNET   QPGMR     050217  QDMCOPEN                1     .04   0000014E
                                  FINAL TOTALS
                                  TOTAL         2,569
```

Figure 57. Full Opens by Program within Job - Example

Note the following programs:

1 Program OPEN5 is causing the majority of full opens in our "out of line" jobs. It also performs most opens system-wide, as marked by **2** in Figure 56 on page 201. We need to review what files these programs were opening.

2 Note that the total opens for these jobs by program OPEN5 is 1749 which matches the total opens for that program shown by **1** in Figure 56 on page 201. Thus, we have found all jobs using this program during the trace data collection.

3 Given that the trace period was 68 seconds, programs TESTIO and OPN132 are doing a lot of opens in this time; we need to see what files these programs were opening.

Having identified that programs OPEN5, TESTIO, and OPN132 are responsible for most of the opens on our system, we need to see what files these programs are using and whether they are opening the same files multiple times or opening many different files. The next example report provides these answers.

```
07/24/96  12:17:47  Percent All Full Opens by File within Program  PAGE    1
Program     File                          Full    Pct
                                          Opens   ALL
                                                  Opens
TESTIO      DSPOBJD   DSPOBJD   1          602    23.43
OPEN5       PF02      PF02      2          350    13.62
OPEN5       PF03      PF03      2          350    13.62
OPEN5       PF04      PF04      2          350    13.62
OPEN5       PF05      PF05      2          350    13.62
OPEN5       PF01      PF01      2          349    13.59
OPN132      PF132     DEBS      3           99     3.85
OPN132      PF132     DEBSSTS   3           99     3.85
QDMCOPEN    QPDSPSTS                         4      .16
GPHPGM2     GPHSMRYL  GPHSMRYL               2      .08
GPHPGM2     TESTPRT                          2      .08
QDMCOPEN    PEXTRC01                         2      .08
QDMCOPEN    PF132     OPENSSTS               2      .08
QDMCOPEN    QDPTDSP                          2      .08
OPENGOOD    PF01      PF01                   1      .04
OPENGOOD    PF02      PF02                   1      .04
OPENGOOD    PF03      PF03                   1      .04
OPENGOOD    PF04      PF04                   1      .04
                                                   M05

07/24/96  12:17:47  Percent All Full Opens by File within Program  PAGE    2
Program     File                          Full    Pct
                                          Opens   ALL
                                                  Opens
OPENGOOD    PF05      PF05                   1      .04
QDMCOPEN    QA1ANET   QA1ANET                1      .04
                            FINAL TOTALS
                            TOTAL         2,569
```

Figure 58. Full Opens by File within Program - Example

Note:

Note that we do not see the library name of the file being opened, only the file name and member name.

1 Program TESTIO opened file DSPOBJD member DSPOBJD 602 times in 68 seconds.

2 Program OPEN5 appears to fully open files PF01, PF02, PF03, PF04, and PF05 each time it is called.

3 Program OPN132 is opening file PF132 198 times in total; however, it is opening two different members, DEBS and DEBSSTS, 99 times each.

Discussion: The jobs marked as **2** in Figure 55 on page 200 are prime candidates for the implementation of shared opens. The files used by programs OPEN5, TESTIO, and OPN132 should be opened as shared in these jobs, marked as **1**, **2**, and **3** respectively in Figure 58.

Be aware that a report is available showing total full opens by file in descending sequence system-wide. This is most useful for identifying which files should be opened as shared. Please refer to Section 10.1.2, "Report Title - Percent Full xxx Opens by File" on page 250 for an example of this report. Please refer to Section 10.1, "Full File Opens (OPENS Command)" on page 249 for examples of **all** reports produced from the OPENS command.

When implementing shared file opens, also known as shared open data paths, remember the following points:

1. Code:

```
OVRDBF FILE(filename) SHARE(*YES) 1
OPNDBF FILE(filename) OPNOPT(nnn) 2  3
```

1 This statement has an additional keyword, override scope OVRSCOPE, that defaults to "activation group defined." This default causes the override to exist/be visible at the CALL level when the override is issued in the default activation group and causes the override to exist/be visible at the ACTIVATION GROUP level when issued in a non-default ILE activation group.

2 This statement has an additional keyword, open scope OPNSCOPE, whose default value of 'activation group defined' causes the open to exist/be visible at the CALL level when run in the default activation group and causes the open to exist/be visible at the ACTIVATION GROUP level when run outside the default activation group.

This means that the file sharing characteristics of a full function ILE program (an ILE program **not created** using CRTBNDPGM..DFTACTGRP(*YES)) is **different** depending on whether the program is run in the default activation group or in a non-default activation group.

For further information, refer to the *ILE Concepts Manual* and the redbook *Moving to ILE for RPG IV Programmers*, GG24-4358.

3 Note that if the file to be shared is used for both input and output by programs in the job, you must specify OPNOPT(*ALL). However, if the file is actually used for input only, you should use OPNOPT(*INP) to ensure that the system tries to maximize default blocking.

2. Once a file is opened as shared, there is only one file cursor.

   This may require programming changes if shared files were not being used.

   For example, assume PGMA is doing sequential reads on file PF1 and last read record 8. At this time the file cursor is positioned so that record 9 would be read if a sequential read were the next read operation to the file. PGMA calls program PGMB and PGMB does another operation, such as a random read against record 54, and then returns to program PGMA. When PGMA issues its next read sequential operation, it reads record 55 and not record 9. Thus, you should inspect the application to check whether this situation can occur and make appropriate coding changes to ensure that the calling program does not have its file cursor repositioned to an unexpected value by a called program.

9.3 Are Activation Group Creates/Deletes Causing High CPU Utilization?

In application environments where there may be a large number of calls to ILE programs, an excessive rate of activation group creates and deletes may degrade performance.

9.3.1 Purpose

Determine whether the amount of system resource being spent on doing activation group creates/deletes is reduced. Perhaps you have used the Performance Monitor trace and noticed high CPU against certain ILE programs.

If your application is built using an ILE language, but the programs were built using the Create Bound Program command CRTBNDxxx .... DFTACTGRP(*YES) (performs both a compile of a module and a bind of that module into a program), the DFTACTGRP(*YES) setting ensures that your program can only run in the default activation group that always exists for every job. In this case, CPU cannot be saved through activation group analysis as your application only uses the default activation group, which is created at job initiation and cannot be deleted. It is only full-function ILE programs built with an activation group attribute of *NEW or NAMED using either the Create Program (CRTPGM) command or CRTBNDPGM command that should be reviewed using this section.

Heavy activation group create/delete activity can occur due to any of the following reasons:

1. An ILE program created with an activation group attribute of *NEW being frequently called and returned from within a job:

   A ″create activation group″ trace event is reported each time this program is called. The activation group delete is, however, implicit to the program through the ACTGRP(*NEW) attribute, so the ″delete activation group″ trace event is reported against the CALLER of the program and not against this program itself.

   Each time the program is called, an ″activate program″ event is reported. The ″deactivate program″ is, however, implicit through the ACTGRP(*NEW) attribute, so a ′deactivate program′ event is **not reported** when this program returns control to the caller.
2. Inappropriate use of the Reclaim Activation Group (RCLACTGRP) command to delete activation groups that should be left around in a job for later use:

   A ″delete activation group″ trace event is reported for each activation group deleted by the program issuing the RCLACTGRP command.

   Beware of applications using RCLACTGRP ACTGRP(*ELIGIBLE) as these cause **any** activation groups in a job that do not have procedures on the call stack to be deleted and these other activation groups may be for a DIFFERENT application.
3. Inappropriate use of the ″End Run Unit″ bindable APIs CEETREC (end run unit normal) and CEE4ABN (end run unit abnormal):

   These APIs exist to enable controlled cleanup of ILE resources such as activation groups and activated programs within a job.

9.3.2 What Data to Collect

It is necessary to determine what rate of activation group creation is occurring on the system. This can be done using either Enhanced PEX TRACE or PEX STATS. This example concentrates on Enhanced PEX TRACE.

Please refer to Table 13 on page 168 for the types of data to collect using the SMTBCH command that enables activation group analysis through the ACTGRP command.

Once the rate of activation group creates has been determined, Enhanced PEX TRACE is the easiest tool to use to identify the program names causing activation group creation **system-wide**.

9.3.3 How to Produce the Reports

Use Enhanced PEX TRACE to collect the data. This enables you to determine the rate of activation group creation per second and identify which programs are causing excessive activation group create activity.

1. Use Option 2 on the PEXTRC01 menu to Start Enhanced PEX TRACE with the following values for the SMTBCH command keywords. See Section 6.4.3,

"Collecting Enhanced PEX TRACE Data" on page 133 for a description of the SMTBCH command parameters.

```
PROBLEM(*ACTGRP) DURATION(10) PRTPEX(*YES) MIBRACKET(*NONE)
```

Note that MIBRACKET(*ENTRYEXIT) is not necessary to obtain the application program names performing activation group creations.

2. Use Option 3 on the PEX Reports Menu, PEXTRC02, for Activation Group Creates. This runs the ACTGRP command.

   See Section 6.6.3, "ACTGRP Reporting Command" on page 153 for a description of the ACTGRP command.

3. Use Option 8 on the PEXTRC01 menu to Display the Enhanced PEX Trace Run Time. Write down the number of seconds during which the trace was active.

9.3.3.1 Frequency of Data Collection

Consider at least three collections of Enhanced PEX TRACE data to ensure that the results you are seeing are typical of ″normal″ system performance and not just the result of a ″one-of-a-kind″ operational environment. Avoid collecting data at start of day, shift change or end of day working times.

Compare the results from the separate TRACEs to ensure that there is consistency.

9.3.4 Finding Activation Group Create Rate Per Second - PEX TRACE REPORT

In this example, a total of six ILE programs were run. There are three pairs of ILE CL and ILE RPG programs each of which perform identical functions; the only difference between these programs is the activation group attribute on the ILE RPG programs.

ILE CL program ILEAGNEW was created to run in activation group name NEW; it called ILE RPG program ILEAGN 100 times. Program ILEAGN was created to run in a **new** activation group.

ILE CL program ILEAGCALLR was created to run in activation group name CALLER; it called ILE RPG program ILEAGC 100 times. Program ILEAGC was created to run in the activation group name of the calling program, thus, it ran in activation group CALLER.

ILE CL program ILEAGNAMED was created to run in activation group name NAMED; it called ILE RPG program ILEAGM 100 times. Program ILEAGM was created to run in activation group name NAMED1.

These programs were run in a single job.

The following report was produced using the ACTGRP command on the PEXTRC02 Reports Menu. Either *PERF or *ACTGRP must be specified as the value against the PROBLEM keyword on the SMTBCH data collection command; however, only data related to activation groups is collected with the *ACTGRP value. Therefore, the collection overhead is less than using the *PERF option.

Activation Group Creates - Part 2 (Job Name)

```
08/05/96  09:35:59  Activation Group Creates by Job  PAGE    1
Job                               ACTGRP   Pct ALL   TDE
                                  Creates  ACTGRP
                                           Creates
P23XWY32E A960123A  053703           104    100.00   000092B9
                      FINAL TOTALS
                      TOTAL          104   1
```

Figure 59. Activation Group Creates - Finding the Rate Per Second

9.3.4.1 Activation Group TRACE Report Analysis

What to look for:

1 This total represents the total number of activation group creations occurring system-wide during the trace period.

Note that in this example there is only one job.

Follow these steps to find the rate of activation group creates per second:

1. Determine the active trace time using Option 8, Display Enhanced PEX TRACE Run Time for a Session on the PEXTRC01 Enhanced PEX TRACE menu.

   For this example, active Enhanced PEX TRACE run time was:

   `Run time for trace session AGTRACE in library DHPEX is 000000028 seconds.`

2. Divide the total number of activation group creates by the number of seconds for which the trace was active.

   For this example, the rate of activation group creates is:

   `104 / 28 seconds = 3.7 activation group creates per second`

Consider the rates in the following table when determining whether or not to make changes to an application performing a lot of activation group creates.

Table 15. Activation Group Creates per Second Guidelines

Model	Maximum Rate Per Second[1]	Maximum Rate Per Second[2]
510 - 2144	55	2.7
530 - 2153	440	22

Note:

[1] = These figures represent 100% CPU being used to perform activation group creates.

[2] = These figures represent 5% CPU being used to perform activation group creates.

We could not perform testing for a wide-variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

This table is reproduced in Appendix E, "Performance Explorer Tables" on page 495 for ease of use when doing performance analysis.

Since our example reports were generated on a 510 #2144, we are spending more than 5% of our total CPU on the activation group create/deletes (in this case, being performed by a single job). We need to investigate further to see where improvements can be made. Specifically, we need to find out which programs called in this job caused all the activation groups to be created.

```
                                            Activation Group Creates - Part 3 (Job/Pgm

08/05/96  09:35:59  Activation Group Creates by Program within Job   PAGE    1
Job                         Program Causing       ACTGRP   Pct ALL   TDE
                            ACTGRP Creation       Creates  ACTGRP
                                                           Creates
P23XWY32E A960123A  053703    ILEAGN          1       100    96.15   000092B9
P23XWY32E A960123A  053703    ILEAGCALLR      2         1      .96   000092B9
P23XWY32E A960123A  053703    ILEAGM          2         1      .96   000092B9
P23XWY32E A960123A  053703    ILEAGNAMED      2         1      .96   000092B9
P23XWY32E A960123A  053703    ILEAGNEW        2         1      .96   000092B9
                                       FINAL TOTALS
                                       TOTAL            104
```

Figure 60. Activation Group Creates by Program within Job Example

Note the following:

1 Program ILEAGN is responsible for 100 of the 104 activation group creates in this job.

The activation group in which program ILEAGN runs is continually being deleted. This can be for one of two reasons:

1. Program ILEAGN has activation group *NEW as is being repeatedly called within the job. In this case, program ILEAGN is directly responsible for the performance overhead.

2. The activation group in which program ILEAGN runs is continually being deleted by some other program in the job, thus causing program ILEAGN to be implicitly deactivated. Note that the activation group in which program ILEAGN runs can only be deleted when there are no programs/procedures on the call stack for that activation group.

   This situation occurs when another program in the job issues either the RCLACTGRP command against the activation group in which program ILEAGN is running or issues a bound call to an ″end run unit″ API and program ILEAGN is in the run unit that is being ended.

   In this situation, program ILEAGN has an activation group attribute other than *NEW and is not directly responsible for the performance overhead. We must find which program is issuing the RCLACTGRP or ″end run unit″.

First, use the DSPPGM command to check the activation group attribute on program ILEAGN. In this case, it was *NEW, meaning that each time the program was called a new activation group is built before the program is run. We can conclude that this program was called 100 times in the job and should certainly not be created with activation group *NEW if it is being invoked this frequently.

2 These programs each caused one activation group to be created during the 28-second trace period. If the rate of activation group creates were high (say greater than 5% of the available CPU), and a few programs were not responsible for most of these creates, we have to inspect all programs doing activation group creates and identify the cause. In this example, however, we have already found the problem in **1**.

9.3.4.2 Activation Group STATS Report Analysis

Activation group analysis is significantly more difficult using PEX STATS than it is using Enhanced PEX TRACE.

Use STATS FLAT over all jobs to determine the rate of activation group creates by finding the number of calls to program QWVPDAGE (destroy activation group exit router) and dividing by the trace time.

STATS HIER MRGJOB(*NO) must be used for individual ″who called who″ program flow analysis within a job. Note that the call levels shown in PEX STATS HIER reports do not match the call levels used within the job. The call levels on the PEX STATS HIER report are reconstructed from collected data. This means that, when an ILE application is enabled for performance collection at the PEP level, the call stack numbers do not reflect calls to service program procedures.

Important!

Be aware that activation group creates are reported against the caller of the program causing them. This makes activation group create analysis difficult using PEX STATS.

Use Enhanced PEX TRACE to perform activation group analysis wherever possible.

Use of PEX STATS HIER MRGJOB(*NO), which keeps separate CPU counters for each job/program combination, is likely to be a much greater overhead than using Enhanced PEX TRACE. Try to limit using PEX STATS HIER for tracing a single job only and avoid using against all jobs on the system.

This example is included in order to prove that it is much more difficult to perform activation group analysis using PEX STATS than it is using Enhanced PEX TRACE.

```
                                                 Performance Explorer Report                               8/05/96  8:58:18
                                                   Definition Information                                          Page
                                                                                                                      1
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : AGS
Defined By . . . . . . . . . : A960123A
Definition Description . . . : *BLANK
Data Organization. . . . . . : HIER
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
   (lines removed for brevity)
                                                 Performance Explorer Report                               8/05/96  8:58:18
                                                   Statistics Information                                          Page   11
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX            CPU        DB    DB   NDB   NDB            CPU       DB    DB   NDB   NDB  Call
Name        Called    Made  Issued         (us) /   %   SIO   AIO   SIO   AIO         (us) /   %  SIO   AIO   SIO   AIO Level
-----------------------------------------------------------------------------------------------------------------------------
**LIC Task       0       0       0        50,751  2.4     0     0     0     0        50,751  2.4    0     0     0     0     0
**Unknown        0       0       0        58,639  2.8     0     0     0     0        58,639  2.8    0     0     0     0     0
  (lines removed for brevity)
                                                 Performance Explorer Report                               8/05/96  8:58:18
                                                   Statistics Information                                          Page   12
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
                                                                                                                         13
             Times   Calls MI CPLX            CPU        DB    DB   NDB   NDB            CPU       DB    DB   NDB   NDB  Call
Name        Called    Made  Issued         (us) /   %   SIO   AIO   SIO   AIO         (us) /   %  SIO   AIO   SIO   AIO Level
-----------------------------------------------------------------------------------------------------------------------------
  (lines removed for brevity)
QCACALL          1       0       4            88  0.0     0     0     0     0           622  0.0    0     0     0     0     1
*RSLVSP          1       0       0           322  0.0     0     0     0     0           322  0.0    0     0     0     0     2
*MATSOBJ         1       0       0           161  0.0     0     0     0     0           161  0.0    0     0     0     0     2
*LOCKSL          1       0       0            31  0.0     0     0     0     0            31  0.0    0     0     0     0     2
*UNLOCKSL        1       0       0            19  0.0     0     0     0     0            19  0.0    0     0     0     0     2
                                                   1                                           2
ILEAGNEW         1     303     800     1,570,737 75.7     0     0     7     0     1,741,446 83.9    0     0     7     0     1
    ILEAGNEW/_CL_PEP
     14
*Alias           0       0       0             0  0.0     0     0     0     0             0  0.0    0     0     0     0     2
QCLRSLV          1       1      13           284  0.0     0     0     0     0           609  0.0    0     0     0     0     3
*MATINVAT        1       0       0            76  0.0     0     0     0     0            76  0.0    0     0     0     0     4
*MATPTRIF        1       0       0            40  0.0     0     0     0     0            40  0.0    0     0     0     0     4
QLIADOPT         1       0       1            14  0.0     0     0     0     0            75  0.0    0     0     0     0     4
*RSLVSP          1       0       0            61  0.0     0     0     0     0            61  0.0    0     0     0     0     5
*DEQ             6       0       0            73  0.0     0     0     0     0            73  0.0    0     0     0     0     4
*ENQ             5       0       0            58  0.0     0     0     0     0            58  0.0    0     0     0     0     4
QCLCLCPR       100       0     400         9,699  0.5     0     0     0     0        58,999  2.8    0     0     0     0     3
*RSLVSP        100       0       0        34,945  1.7     0     0     0     0        34,945  1.7    0     0     0     0     4
*MATSOBJ       100       0       0         8,497  0.4     0     0     0     0         8,497  0.4    0     0     0     0     4
*LOCKSL        100       0       0         3,631  0.2     0     0     0     0         3,631  0.2    0     0     0     0     4
*UNLOCKSL      100       0       0         2,224  0.1     0     0     0     0         2,224  0.1    0     0     0     0     4
                                                   3                                           4
ILEAGN         100       0     100         8,605  0.4     0     0     0     0        18,946  0.9    0     0     0     0     3
    ILEAGN/_QRNP_PEP_ILEAGN
     14
*Alias           0       0       0             0  0.0     0     0     0     0             0  0.0    0     0     0     0     4
*SNDPRMSG      100       0       0        10,340  0.5     0     0     0     0        10,340  0.5    0     0     0     0     5
*MATPTR        200       0       0         6,340  0.3     0     0     0     0         6,340  0.3    0     0     0     0     3
*MATINVAT      200       0       0         6,406  0.3     0     0     0     0         6,406  0.3    0     0     0     0     3
*MATINVIF      200       0       0         4,214  0.2     0     0     0     0         4,214  0.2    0     0     0     0     3
```

Figure 61 (Part 1 of 3). Activation Group PEX STATS Example

```
                                                  Performance Explorer Report                                   8/05/96  8:58:18
                                                    Statistics Information                                            Page   13
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX          CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued       (us) /  %    SIO   AIO   SIO   AIO          (us) /  %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
                 5
*INVP          100       0       0          738  0.0     0     0     0     0            738  0.0     0     0     0     0
                 5
QWVPDAGE       100     100       0        2,974  0.1     0     0     0     0         73,105  3.5     0     0     0     0
                 5
QDMRCLSE       100     400       0       16,270  0.8     0     0     0     0         70,130  3.4     0     0     0     0
                 5
QUIRCLAP       100       0       0        2,236  0.1     0     0     0     0          2,236  0.1     0     0     0     0
                 5
QOLCLNUP       100       0       0        2,289  0.1     0     0     0     0          2,289  0.1     0     0     0     0
                 5
QSQENDAG       100       0       0       47,530  2.3     0     0     0     0         47,530  2.3     0     0     0     0
                 5
QCNSMCTL       100       0       0        1,729  0.1     0     0     0     0          1,729  0.1     0     0     0     0
                 5
*DESAGP        100       0       0        1,053  0.1     0     0     0     0          1,053  0.1     0     0     0     0
QCLRTNE          1       0       0           25  0.0     0     0     0     0             25  0.0     0     0     0     0     3
QCLCLNUP         1       0       4          117  0.0     0     0     0     0            270  0.0     0     0     0     0     3
*MATPTR          1       0       0           26  0.0     0     0     0     0             26  0.0     0     0     0     0     4
 (lines removed for brevity)
                                                  Performance Explorer Report                                   8/05/96  8:58:18
                                                    Statistics Information                                            Page   14
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX          CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued       (us) /  %    SIO   AIO   SIO   AIO          (us) /  %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
QCACALL          1       0       4           83  0.0     0     0     0     0            553  0.0     0     0     0     0     3
*RSLVSP          1       0       0          314  0.0     0     0     0     0            314  0.0     0     0     0     0     4
*MATSOBJ         1       0       0           97  0.0     0     0     0     0             97  0.0     0     0     0     0     4
*LOCKSL          1       0       0           33  0.0     0     0     0     0             33  0.0     0     0     0     0     4
*UNLOCKSL        1       0       0           24  0.0     0     0     0     0             24  0.0     0     0     0     0     4
                                                  6                                             7
ILEAGNAMED       1     203       0       12,248  0.6     0     0     6     0         76,056  3.7     0     0     6     0     3
    ILEAGNAMED/_CL_PEP
      14
*Alias           0       0       0            0  0.0     0     0     0     0              0  0.0     0     0     0     0     4
QCLRSLV          1       1      13          276  0.0     0     0     0     0            601  0.0     0     0     0     0     5
*MATINVAT        1       0       0           82  0.0     0     0     0     0             82  0.0     0     0     0     0     6
*MATPTRIF        1       0       0           38  0.0     0     0     0     0             38  0.0     0     0     0     0     6
QLIADOPT         1       0       1           13  0.0     0     0     0     0             64  0.0     0     0     0     0     6
*RSLVSP          1       0       0           51  0.0     0     0     0     0             51  0.0     0     0     0     0     7
*DEQ             6       0       0           76  0.0     0     0     0     0             76  0.0     0     0     0     0     6
*ENQ             5       0       0           62  0.0     0     0     0     0             62  0.0     0     0     0     0     6
QCLCLCPR       100       0     400        7,863  0.4     0     0     0     0         48,146  2.3     0     0     0     0     5
*RSLVSP        100       0       0       29,469  1.4     0     0     0     0         29,469  1.4     0     0     0     0     6
*MATSOBJ       100       0       0        6,732  0.3     0     0     0     0          6,732  0.3     0     0     0     0     6
*LOCKSL        100       0       0        2,448  0.1     0     0     0     0          2,448  0.1     0     0     0     0     6
*UNLOCKSL      100       0       0        1,578  0.1     0     0     0     0          1,578  0.1     0     0     0     0     6
                 8                                9
ILEAGM         100       0       0        3,795  0.2     0     0     0     0          3,795  0.2     0     0     0     0     5
    ILEAGM/_QRNP_PEP_ILEAGM
                 8
QCLRTNE          1       0       0           25  0.0     0     0     0     0             25  0.0     0     0     0     0     5
QCLCLNUP         1       0       4          116  0.0     0     0     0     0            257  0.0     0     0     0     0     5
```

Figure 61 (Part 2 of 3). Activation Group PEX STATS Example

```
                                                   Performance Explorer Report                                 8/05/96  8:58:18
                                                     Statistics Information                                          Page   16
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                                  +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX           CPU         DB    DB   NDB   NDB            CPU         DB    DB   NDB   NDB  Call
Name        Called    Made  Issued       (us) /   %     SIO   AIO   SIO   AIO        (us) /   %     SIO   AIO   SIO   AIO Level
---------------------------------------------------------------------------------------------------------------------------------
 (lines removed for brevity)
QCACALL          1       0       4          85  0.0      0     0     0     0           546  0.0      0     0     0     0     5
*RSLVSP          1       0       0         314  0.0      0     0     0     0           314  0.0      0     0     0     0     6
*MATSOBJ         1       0       0          91  0.0      0     0     0     0            91  0.0      0     0     0     0     6
*LOCKSL          1       0       0          34  0.0      0     0     0     0            34  0.0      0     0     0     0     6
*UNLOCKSL        1       0       0          19  0.0      0     0     0     0            19  0.0      0     0     0     0     6
                                                10                                          11
ILEAGCALLR       1     203       0       8,024  0.4      0     0     0     0        62,268  3.0      0     0     0     0     5
    ILEAGCALLR/_CL_PEP
      14
*Alias           0       0       0           0  0.0      0     0     0     0             0  0.0      0     0     0     0     6
QCLRSLV          1       1      13         265  0.0      0     0     0     0           593  0.0      0     0     0     0     7
*MATINVAT        1       0       0          80  0.0      0     0     0     0            80  0.0      0     0     0     0     8
*MATPTRIF        1       0       0          41  0.0      0     0     0     0            41  0.0      0     0     0     0     8
QLIADOPT         1       0       1          13  0.0      0     0     0     0            69  0.0      0     0     0     0     8
*RSLVSP          1       0       0          55  0.0      0     0     0     0            55  0.0      0     0     0     0     9
*DEQ             6       0       0          75  0.0      0     0     0     0            75  0.0      0     0     0     0     8
*ENQ             5       0       0          60  0.0      0     0     0     0            60  0.0      0     0     0     0     8
QCLCLCPR       100       0     400       7,881  0.4      0     0     0     0        49,744  2.4      0     0     0     0     7
*RSLVSP        100       0       0      29,768  1.4      0     0     0     0        29,768  1.4      0     0     0     0     8
aMATSOBJ       100       0       0       6,928  0.3      0     0     0     0         6,928  0.3      0     0     0     0     8
*LOCKSL        100       0       0       3,112  0.1      0     0     0     0         3,112  0.1      0     0     0     0     8
*UNLOCKSL      100       0       0       2,052  0.1      0     0     0     0         2,052  0.1      0     0     0     0     8
                12
ILEAGC         100       0       0       3,650  0.2      0     0     0     0         3,650  0.2      0     0     0     0     7
    ILEAGC/_QRNP_PEP_ILEAGC
                12
QCLRTNE          1       0       0          25  0.0      0     0     0     0            25  0.0      0     0     0     0     7
QCLCLNUP         1       0       4         102  0.0      0     0     0     0           231  0.0      0     0     0     0     7
```

Figure 61 (Part 3 of 3). Activation Group PEX STATS Example

Note the following:

STATS HIER was run over a single job to produce this example.

PEX STATS accumulates CPU used within a program. If an ILE program has been created with activation group *NEW and is called multiple times within a job, the CPU overhead of activation group creation is charged to the caller of the ILE program and **not against the ILE program causing the CPU overhead (the activation group creation).** This is because the activation group needed to run a program is created **before** the program itself is activated. Thus, the CPU for activation group creation can only be charged to the caller as the called program may not be active at the time the CPU accounting occurs.

This is a simple example with data captured over a single job running a total of six programs. In a production environment with hundreds or thousands of programs, we need another tool to identify the programs **causing** the activation group creations; the only tool that does this is Enhanced PEX TRACE.

1 Application program CPU analysis involves checking:

1. **Cumulative CPU**

   The CPU used by the program and all other application programs it called (that ran at a lower call stack level).

2. **Direct CPU**

The CPU used by the program, excluding any other application programs it called.

The direct CPU for program ILEAGNEW was high at 75.7% of the total CPU used by the job (as in the Total CPU line of the Stats CPU Summary Information for the job immediately preceding the Library Section and after the Task Information Section and **not** the one at the beginning of a PEX STATS HIER report).

In this case, this CPU is not actually being caused by statements in program ILEAGNEW; it is being caused by the call to program ILEAGN, where a new activation group must be built to run program ILEAGN and is deleted **every one of the 100 times** program ILEAGN is called. This is because the new activation group is built **before** program ILEAGN is invoked (its PEP is not yet on the call stack) so the CPU cannot be charged against program ILEAGN and gets charged against its caller, ILEAGNEW.

2 The cumulative CPU for program ILEAGNEW was 82.8% of the job′s CPU. Since most of the CPU is in the direct figure, this indicates that there may be a problem within program ILEAGNEW.

This can be misleading in an ILE application environment.

We know from **1** that it is the activation group attribute of program ILEAGN that is causing the problem and that program ILEAGNEW is not a problem (it is showing up as one in STATS because of the way CPU accounting works).

3 Program ILEAGN is called 100 times from program ILEAGNEW. Its direct CPU is 0.4% of the job′s CPU, indicating that there is no problem with this program. While there is no direct problem with the contents of program ILEAGN, there is a problem with the program creation option of activation group *NEW.

Conclude that for programs frequently invoked within a job, you should check that the activation group attribute is not *NEW.

4 Cumulative CPU for program ILEAGN is 0.9% of the job′s CPU. This does not appear to be a major contributor to the 82.8% cumulative figure shown for program ILEAGNEW in **2**.

5 These programs are called as part of activation group deletion. Program QWVPDAGE (Destroy activation group entry) always occurs as part of activation group deletion. In addition, the MI complex instruction *DESAGP is always run as part of activation group deletion irrespective of how the activation group is being deleted (through *NEW, RCLACTGRP, or ″end run unit″).

Note that these activation group delete processing programs are run after program ILEAGN.

6 The direct CPU for program ILEAGNAMED is low, indicating that there is no problem with this program.

7 The cumulative CPU for program ILEAGNAMED is low, indicating that there is no problem with this program. Contrast this figure of 3.7% of the job′s CPU with the 83.9% figure in **2** for program ILEAGNEW.

8 Program ILEAGM is called from program ILEAGNAMED 100 times. Note that the delete activation group programs present after program ILEAGN in **5** are not present here. This indicates that program ILEAGM was created with an activation group attribute of either *CALLER or ″named″.

9 Note that the direct CPU for program ILEAGM is smaller than the direct CPU for program ILEAGN in **3**. Both programs perform identical functions, the only difference is the activation group attribute (which cannot be detected using PEX STATS). We needed to use the DSPPGM command to detect this difference.

10 The direct CPU for program ILEAGCALLR is low, indicating that this program is not a problem. Contrast this figure of 0.4% CPU with the 0.6% CPU for program ILEAGNAMED in **6**. Again, we used the DSPPGM command to see that ILEAGCALLR was created with a named activation group and program ILEAGCALLR was created to use the *CALLER activation group. We can conclude that, if these programs performed identical functions, the difference is due to the extra activation group creation.

11 The cumulative CPU for program ILEAGCALLR is low, indicating that there is no problem with this program. Contrast this figure of 3.0% of the job′s CPU with the 83.9% figure in **2** for program ILEAGNEW and 3.7% of the job′s CPU for program ILEAGNAMED in **7**.

12 Program ILEAGC is called from program ILEAGCALLR 100 times. Note that the delete activation group programs present after program ILEAGN in **5** are not present here. This indicates that program ILEAGC was created with an activation group attribute of either *CALLER or ″named″.

13 The call levels shown in this example do **not** represent the actual call levels in the job at run time. They represent the call levels reconstructed by PEX STATS from the collected data.

14 Following each ILE program/PEP entry, you see the ***Alias** function. *Alias call level is always one more than its ″partner″ ILE program/PEP entry call level number. Therefore, all programs/modules and MI Complex Instructions call levels after an *Alias entry are one higher than you expect.

The correct relative call positions are as follows:

1. The PEP for program ILEAGNEW was at call level 1.
2. The PEP for program ILEAGN shows on the report as call level 3. However, since there was Alias on an intermediate call level (call level 2, in this case), the PEP for program ILEAGN really was at call level 2.

   We recommend applying PTF MF14447 to V3R6. PTF MF14447 became available in January 1997 that eliminates the *Alias entry and the call level numbers for ILE programs are what you expect. See Section 4.5,

“PEX STATS HIER Example - Program at Multiple Levels” on page 83 for a hierarchical example with PTF MF14447 applied.

V3R7 included support equivalent to V3R6 MF14447.

CONCLUSIONS

1. Using activation group attribute of *CALLER on ILE programs gives the best performance. Beware, however, of running these programs in the default activation group, which may cause behavioral differences.
2. Use of activation group attribute of NAMED is the next best performance option, assuming that the NAMED activation group is not continually being deleted in the job by some other program issuing a RCLACTGRP ACTGRP(*ELIGIBLE), RCLACTGRP(NAMED), or incorrectly using ″end run unit″ support.
3. Using activation group attribute of *NEW for programs frequently invoked in a job causes worst possible performance (uses a lot of CPU just to support the create/delete of the activation groups.
4. PEX STATS direct CPU, while technically correct, can be misleading in an ILE application environment.
5. In order to see the correct flow for ILE programs and ILE service program procedures at minimal overhead, use the following values for the enable performance collection value on the modules:
    a. Use ENBPFRCOL(*PEP) for ILE programs.
    b. Use ENBPFRCOL(*ENTRYEXIT *ALLPRC) for ILE service programs.

    The previous options ensure that the STATS HIER report show entries and call stack number for ILE programs and ILE service program procedures. It does not cause individual call stack entries to appear for individual ILE program procedures.

9.4 Are Program Activations/Deactivations Causing High CPU Utilization?

In application environments where there may be a large number of calls to programs, an excessive rate of program activations and deactivations may degrade performance.

9.4.1 Purpose

If many programs are called during transaction processing and the programs are activated and deactivated excessively, high CPU utilization may result. Why do we care about this? Because program activation involves allocation and initialization of static storage and this can be expensive in terms of CPU and disk IO. In many cases of program activation/deactivation, files are opened and closed as well.

Therefore, we want to identify:

1. The system-wide rate per second of application program activations
2. Whether any application programs are being repetitively activated and deactivated within a job

Based on the results of the first step of program activation and deactivation analysis, we may perform step two of this analysis to determine whether application performance improvements can be achieved through:

1. Ensuring the program′s activation group is not deleted in the job for an ILE program.
2. Changing the program to ″merely return″ instead of fully terminating in an OPM or ILE compatibility mode environment.

Recall that for OPM RPG, we used to be concerned about the number of times QRGXINIT (OPM RPG program that initializes static storage) was called by an RPG program. If called more than once by the program in a job, this indicated that the program was being fully terminated (for example, the RPG program set on indicator LR (Last Record)) rather than returning (the RPG RETRN operation code). When this call and full termination sequence is repeated many times in a job, it uses a lot of CPU (CPU that is better utilized executing the statements that do real work in the program).

Recall also that beginning with V3R1 ILE RPG, we had the QRNXINIT system routine that performed the initialization of program or service program static storage for ILE RPG and ILE RPG compatibility mode programs.

At V3R6, we still see QRGXINIT being called for OPM RPG programs, but we do not see any explicit static storage initialization routine being called for ILE RPG and ILE RPG compatibility mode programs. For this reason, we need to be concerned with program activations, as program activations are the ILE measure used to determine how much static storage allocate/initialize activity is being performed.

9.4.1.1 What is Program Activation and Program Deactivation?

Within a job, the **first time** an ILE program is called (through a dynamic call, such as an RPG CALL operation), the CALL processing involves:

- Location of the program in the library list
- Authority checking
- Create activation group for ILE program being called, if it does not already exist in the job

Once the preceding processing has completed, the program must be activated. This *activation process* involves getting program resources (and associated service programs and their resources) ready to run as follows:

- Create program activation scoped to the specified activation group.
- Allocate static storage needed by the program.

  This storage is scoped to the activation group of the program.
- Initialize static storage needed by the program.
- Complete any binding to associated service programs, resolve linkages such that ILE bound procedure calls work successfully.
- Activate associated service programs.
- Allocate static storage needed by the associated service programs.

  This storage is scoped to the activation group of the service program.
- Initialize static storage needed by the associated service programs.
- Create a call stack entry in the job for the program.
- Initialize dynamic storage.
- Invoke the ILE program′s PEP.

Program deactivation is the process of returning program resources, such as static storage, to the system. There are two types of program deactivation that occur:

1. Explicit Deactivation:

   For OPM and ILE compatibility mode programs, a special ″deactivate program″ trace event (known as a *DEACTPG MI complex instruction) can be tracked. Hence, the term ″explicit″ as there is evidence that this has occurred through a trace record.

2. Implicit Deactivation:

   ILE programs are never explicitly deactivated, so no ″deactivate″ trace event occurs. These programs are only deactivated as part of activation group deletion, hence, they are implicitly deactivated when their activation group is deleted.

We need to review the difference in activation and deactivation of OPM and ILE compatibility mode programs compared with ILE programs.

- OPM and ILE Compatibility Mode Programs:

  This section relates to all OPM programs and all ILE programs created using the CRTBNDxxx command with keyword DFTACTGRP(*YES) to ensure that they behave the same as OPM programs (referred to as running in OPM compatibility mode). The DSPPGM command can be used to see whether an ILE program was created with ″OPM compatibility mode″; if the ″Activation Group Attribute″ shows ″*DFTACTGRP″, an ILE program was created with ″compatibility mode.″

  Within a job, the first time the program is called (through a dynamic call such as an RPG CALL operation), it is activated with its resources scoped to the default activation group.

  If the program is fully terminated (using RPG SETON LR, COBOL STOP RUN, or C EXIT), program resources such as static storage are returned to the system and the program is **deactivated** within the default activation group.

  If the program is ″returned from″ without being fully terminated (using RPG/400 RETRN, ILE RPG RETURN, COBOL EXIT PROCEDURE), the program is no longer on the call stack but it still has its resources allocated (such as static storage) and is, therefore, still **activated** within the default activation group within the job.

- ILE Programs:

  This section relates to all ILE programs that were created with either CRTBNDxxx DFTACTGRP(*NO) or the CRTPGM command. These programs are normally run outside the default activation group. In fact, they can only be run in the default activation group as a result of their being created with activation group *CALLER and subsequently being called by a program running in the default activation group, such as QCMD.

  The DSPPGM command can be used to see the activation group attribute of an ILE program; the ″Activation Group Attribute″ does **not** show the value *DFTACTGRP.

  Within a job, the first time the program is called (through a dynamic call such as an RPG CALL operation), it is activated with its resources scoped to the activation group specified at program creation. The activation group attribute of an ILE program can be one of the following attributes:

– ***CALLER**

  The program runs in the activation group of the program that called it.

– **NAMED**

  The program runs in the ″named″ activation group. If this ″named″ activation group does not already exist in the job, it must be created before the program can be activated.

– ***NEW**

  A new activation group is built. The program is activated with its resources scoped to this activation group. When control is passed back from the program, both the program and the activation group disappear from the job.

Unlike OPM, if the ILE program is RPG and uses SETON LR, it is **not** deactivated as a result of the SETON LR and its resources are **not** returned to the system (static storage gets flagged for re-initialization, but the program stays activated). If the program is running in a *NEW activation group, it is automatically deactivated when it passes control back to a program/procedure in a different activation group. This deactivation occurs as a result of the *NEW activation group being automatically deleted.

To further emphasize this point, even if you have an ILE RPG program (built to run in a *NEW activation group) that uses RETURN to pass control back to its caller, the *NEW activation group is deleted and the program is implicitly deactivated.

ILE programs that have been activated within an activation group other than new (for example, caller or named) can only be deactivated through the deletion of the activation group in which they are activated. This can occur by one of two methods:

1. Using the Reclaim Activation Group command (RCLACTGRP).
2. A bound call being issued to an ″end run unit″ API.

Irrespective of how control is passed back from an ILE program (that does not use a *NEW activation group), the program remains activated in the activation group in the job (its static storage remains allocated).

At any point in time, a program or service program can be active once only within an activation group within a job. It can be activated multiple times within an activation group within a job **only if** each activation is followed by a deactivation (which is explicit for OPM and implicit for ILE). A program or service program can be activated within **different** activation groups within the same job. Only one copy of the executable program code held in main storage as it is the program variable resources (such as static storage variables) that are kept at the activation group level.

9.4.2 What Data to Collect

Please refer to Section 6.4.3, “Collecting Enhanced PEX TRACE Data” on page 133 for the types of data to collect using the SMTBCH command that enable program activation/deactivation analysis using the DEACTS reporting command.

Once the rate of program deactivations has been determined, Enhanced PEX TRACE is the easiest tool to use to identify the program names that are continually being deactivated.

9.4.3 How to Produce the Reports

Use Enhanced PEX TRACE to collect the data; this enables you to determine the rate of program deactivations per second and identify which programs are being repetitively deactivated by job.

1. Use Option 2 on the PEXTRC01 menu to Start Enhanced PEX TRACE using the following values for the SMTBCH command keywords:

   ```
   PROBLEM(*DEACTS) DURATION(10) PRTPEX(*YES) MIBRACKET(*NONE)
   ```

   Note that MIBRACKET(*ENTRYEXIT) is not necessary to obtain the application program names performing activation group creations, the definition created by the SMTBCH command always includes event data that has program names for a collection of type *DEACTS.

2. Use Option 9 on the PEX Reports Menu, PEXTRC02, for Program Activations and Deactivations. This runs the DEACTS command.

3. Use Option 8 on the PEXTRC01 menu to Display the PEX Trace run time. Write down the number of seconds during which the trace was active.

9.4.3.1 Frequency of Data Collection

Consider at least three collections of Enhanced PEX TRACE data to ensure that the results you are seeing are typical of ″normal″ system performance and not just the result of a ″one-of-a-kind″ operational environment. Avoid collecting data at start of day, shift change, or end of day working times.

Compare the results from the separate TRACEs to ensure that there is consistency among the application program names being most frequently activated and deactivated.

9.4.4 Program Activation/Deactivation Example

All of the following reports were produced using the DEACTS command on the PEXTRC02 Reports Menu. See Section 6.6.9, “DEACTS Reporting Command” on page 163 for more information on the DEACTS command parameters.

Either *DEACTS or *ACTGRP must be specified as the value against the PROBLEM keyword on the SMTBCH data collection command.

We need to determine whether we have a problem with:

1. The rate of program activation/deactivation system-wide.

2. The rate of program activation/deactivation within individual jobs.

On a 530 #2153 (4 way system) running an ILE application, consider a rate higher than 60 non-system program activations per second to indicate room for improvement, given that the system is operating in a steady state.

On a 530 #2153 (4 way system) running an OPM application, consider a rate higher than 60 non-system program deactivations per second to indicate room for improvement, given that the system is operating in a steady state.

The term "steady state" as used previously means that these measurements should be taken after the users have signed on and not during start of day or during shift change.

9.4.4.1 Finding the System Rate of Program Activation/Deactivation Example

```
08/09/96  13:22:25  Total Non-System Program Activations/Deactivations by Program      PAGE    1
                    (application program names starting with 'Q' will not be counted)
Non-system  Non-system        Non-system          Pct
Program     Program Activate  Program Deactivate  Systemwide
            Count             Count               Activations
ILEP2     4             203                   0       74.09
ILEAGN    4              23                   0        8.39
ILEP3     3              13                  13        4.74
RUNIT01   4               9                   0        3.28
OPMP01    3               8                   8        2.92
ILEAGNEW  4               3                   0        1.09
RUNIT02   4               3                   0        1.09
OPMP02    4               2                   0         .73
ILEP1                     1                   0         .36
        FINAL TOTALS
        TOTAL           265  2                  21  1
```

Figure 62. Total Program Activations/Deactivations by Non-system Program Example

Note the following:

Ensure that you are using the correct report entitled *Total Non-System Program Activations/Deactivations by Program*.

This report is used to determine whether the overall system rate program activation/deactivation shows room for improvement. It should not be used to draw conclusions about specific programs.

1 If you are running OPM or ILE compatibility mode applications, use this figure to determine your system-wide rate of program activation/deactivation.

2 If you are running ILE applications (that are not compatibility mode), use this figure **instead** of **1** to determine your system-wide rate of program (implicit) deactivations.

3 These programs may be candidates for change. They are either OPM or ILE compatibility mode and are always being left through a full program termination (for example, SETON LR in RPG) rather than returning (for example, RETRN in OPM RPG).

If, however, program ILEP3 is activated/deactivated once in each of 13 jobs, there is no room for improvement through leaving the program in a returned state. We need to investigate further using the *job within program* report.

4 The number of explicit deactivations for these programs is zero and there were >1 activations. Therefore, this can be a case of one of the following:

- OPM issuing a return (and not a full terminate)
- ILE compatibility mode issuing a return (and not a full terminate)

- Full ILE programs either running in different activation groups in the same job or being implicitly deactivated and subsequently reactivated within the same activation group. The activation group attribute on the program is helpful in this analysis. We need to investigate further, using the *job within program* report.

Follow these steps to find the rate of program activations/deactivations per second:

1. Determine the active trace time using Option 8, Display Enhanced PEX TRACE Run Time for a Session, on the PEXTRC01 Enhanced PEX TRACE Main Menu.

   For this example, active Enhanced PEX TRACE run time was:

   ```
   Run time for trace session DEACTEX in library DHPEX is 000000107 seconds.
   ```

2. Given that above 90 activations/deactivations per second indicates room for improvement on a 530 #2153 and that these examples were run on a 510 #2144, using the CPW ratio of 85/299, we use 26 activations/deactivations per second as a guideline for the 510-2144.

   We know that some full function ILE programs were running in this example, so we use the total activations figure to compare to a rate of 26 activations per second.

   For this example, the rate of activations is:

   ```
   265 total activations / 107 seconds = 2.5 per second
   ```

3. Comparing 2.5 activations/second to 26 activations/second indicates that there is no problem with the overall amount of program activate/deactivate activity.

Next, we must check individual jobs to see whether there is any high activate/deactivate activity.

9.4.4.2 Checking the Job rate of Program Activation/Deactivation Example

We can use either of the two reports shown in this section to check for ″out of line″ activity within a job.

The following report is shown first because there are few jobs on this system. We also use this report to check the activation/deactivation rate of individual programs within jobs.

```
08/09/96  13:22:14          Program Activate/Deactivate in Job/Pgm Sequence         PAGE    1
Job                         Program         Program     Program    Pct Pgm Activates Total
                                            Activate    Deactivate of Job Activates  Activates
                                            Count       Count                        for Job
BATCHSTUFFA960123A  053978 ILEP2                201            0       100.00             201
                                TOTAL           201 1          0
P23XWY32E A960123A  053983 ILEAGN                10 2          0        35.71              28
                           ILEP3                  6 3          6        21.43              28
                           OPMP01                 3 4          3        10.71              28
                           RUNIT01                3 5          0        10.71              28
                           ILEAGNEW               1            0         3.57              28
                           ILEP2                  1            0         3.57              28
                           OPMP02                 1            0         3.57              28
                           QRGXINIT               1            0         3.57              28
                           QYPEENDP               1            0         3.57              28
                           RUNIT02                1            0         3.57              28
                                TOTAL            28            9
P23XWY32G A960123A  053980 ILEP3                  7 3          7        30.43              23
                           OPMP01                 5 4          5        21.74              23
                           ILEAGN                 4 2          0        17.39              23
                           RUNIT01                2 5          0         8.70              23
                           ILEAGNEW               1            0         4.35              23
                           ILEP2                  1            0         4.35              23
                           QLEDAGE                1            0         4.35              23
                           QRGXINIT               1            0         4.35              23
                           RUNIT02                1            0         4.35              23
                                TOTAL            23           12
P23XWY32H A960123A  053979 ILEAGN                 9 2          0        47.37              19
                           RUNIT01                4 5          0        21.05              19
                           ILEAGNEW               1            0         5.26              19
                           ILEP1                  1            0         5.26              19
                           OPMP02                 1            0         5.26              19
                           QLEDAGE                1            0         5.26              19
                           QRGXINIT               1            0         5.26              19
                                                 M05

08/09/96  13:22:14          Program Activate/Deactivate in Job/Pgm Sequence         PAGE    2
Job                         Program         Program     Program    Pct Pgm Activates Total
                                            Activate    Deactivate of Job Activates  Activates
                                            Count       Count                        for Job
P23XWY32H A960123A  053979 RUNIT02                1            0         5.26              19
                                TOTAL            19            0
JUNK      QSPLJOB   053464 QTMPLPRC               3            0       100.00               3
                                TOTAL             3            0
                                FINAL TOTALS
                                TOTAL           274           21
```

Figure 63. Program Activations/Deactivations in Job/Pgm Sequence Example

Note the following:

1 This job is performing the most activations at a rate of almost two per second; it certainly merits further investigation. Since only program ILEP2 is being repetitively activated in the job, we used DSPPGM to find that the activation group attribute was NAMED. This means that a program in this job is regularly deleting program ILEP2's activation group through either the RCLACTGRP command or issuing an "end run unit". We have to refer to the PEX DETAIL report for this job to see what is happening. Please refer to Figure 65 on page 226 for further discussion.

2 We used DSPPGM on program ILEAGN and found that it is an ILE program created with activation group attribute *NEW. Since it is called multiple times within single jobs the activation group attribute is not appropriate. Re-create the program with an activation group attribute of *CALLER or NAMED and test to ensure it functions correctly.

3 This program is clearly being fully terminated each time it is called. We used DSPPGM to see that it is an ILE RPG compatibility mode program (the activation group attribute was *DFTACTGRP); we reviewed the source and verified that it uses RPG SETON LR. Since it is called multiple times within single jobs, it should be changed to use RETURN.

4 This program is clearly being fully terminated each time it is called. We used DSPPGM to see that it is an OPM RPG program; we reviewed the source and verified that it uses RPG SETON LR. Since it is called multiple times within single jobs, it should be changed to use RETRN.

5 We used DSPPGM to find that the activation group attribute was named (TESTAG). This means that a program in this job is regularly deleting activation group TESTAG through either the RCLACTGRP command or issuing an ″end run unit″. We have to refer to the PEX DETAIL report for this job to see what is happening. Please refer to Figure 66 on page 229 for further discussion.

On a system with many jobs, consider using the following report first **as the programs requiring the most immediate attention tend to be at the top of the report.**

```
08/09/96  13:22:23       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    1
Program     Job                                Activates    Deactivates  Pct Pgm/Job
                                               for          for          Activates
                                               Pgm/Job      Pgm/Job      of All Pgm Activates
   1
ILEP2       BATCHSTUFFA960123A  053978           201            0         99.01
            P23XWY32G A960123A  053980             1            0           .49
            P23XWY32E A960123A  053983             1            0           .49
                                 TOTAL           203            0
   2
ILEAGN      P23XWY32E A960123A  053983            10            0         43.48
            P23XWY32H A960123A  053979             9            0         39.13
            P23XWY32G A960123A  053980             4            0         17.39
                                 TOTAL            23            0
   3
ILEP3       P23XWY32G A960123A  053980             7            7         53.85
            P23XWY32E A960123A  053983             6            6         46.15
                                 TOTAL            13           13
   4
RUNIT01     P23XWY32H A960123A  053979             4            0         44.44
            P23XWY32E A960123A  053983             3            0         33.33
            P23XWY32G A960123A  053980             2            0         22.22
                                 TOTAL             9            0
   3
OPMP01      P23XWY32G A960123A  053980             5            5         62.50
            P23XWY32E A960123A  053983             3            3         37.50
                                 TOTAL             8            8
ILEAGNEW    P23XWY32G A960123A  053980             1            0         33.33
            P23XWY32E A960123A  053983             1            0         33.33
            P23XWY32H A960123A  053979             1            0         33.33
                                 TOTAL             3            0
QRGXINIT    P23XWY32G A960123A  053980             1            0         33.33
            P23XWY32E A960123A  053983             1            0         33.33
                                                   M05

08/09/96  13:22:23       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    2
Program     Job                                Activates    Deactivates  Pct Pgm/Job
                                               for          for          Activates
                                               Pgm/Job      Pgm/Job      of All Pgm Activates
QRGXINIT    P23XWY32H A960123A  053979             1            0         33.33
                                 TOTAL             3            0
QTMPLPRC    JUNK      QSPLJOB   053464             3            0        100.00
                                 TOTAL             3            0
RUNIT02     P23XWY32G A960123A  053980             1            0         33.33
            P23XWY32E A960123A  053983             1            0         33.33
            P23XWY32H A960123A  053979             1            0         33.33
                                 TOTAL             3            0
OPMP02      P23XWY32E A960123A  053983             1            0         50.00
            P23XWY32H A960123A  053979             1            0         50.00
                                 TOTAL             2            0
QLEDAGE     P23XWY32G A960123A  053980             1            0         50.00
            P23XWY32H A960123A  053979             1            0         50.00
                                 TOTAL             2            0
ILEP1       P23XWY32H A960123A  053979             1            0        100.00
                                 TOTAL             1            0
QYPEENDP    P23XWY32E A960123A  053983             1            0        100.00
                                 TOTAL             1            0
                                 FINAL TOTALS
                                 TOTAL           274           21
```

Figure 64. Program Activations/Deactivations in Pgm/Job Descending Activate Sequence Example

Note the following:

1 A lot of activation group creates are occurring as a result of program ILEP2 being called in this job. The DSPPGM command showed that the activation group attribute of this program was NAMED. This means that a program in this job is either issuing the RCLACTGRP command or performing an "end run unit" causing the activation group for program ILEP2 to be deleted. We must refer to the Enhanced PEX TRACE detail report for this job to find out what is actually happening; please refer to Figure 65 on page 226 for the detail.

2 This program is responsible for more than one activation group creation in every job using it. We used the DSPPGM command and found that it had an activation group attribute of *NEW (clearly, this should be changed to *CALLER or named).

3 This program is either OPM or ILE compatibility mode and is always being fully terminated. Note that the jobs using it are calling it more than once; therefore, it should be changed to use a soft return.

4 We used DSPPGM to find that the activation group attribute was NAMED. This means that a program in this job is regularly deleting this program′s activation group through either the RCLACTGRP command or issuing an ″end run unit″. Refer to the PEX DETAIL report shown in Figure 66 on page 229 for further discussion.

We now review the PEX DETAIL reports for two jobs that are:

1. Responsible for most activation group creates system-wide.
2. Responsible for the most activation group creates for program RUNIT01, which was found to be activation group NAMED.

We need to review this level of detail in order to find out why program RUNIT01 and program ILEP2 are responsible for so many activation group creations on the system. Recall that the DSPPGM command shows that both these programs have an activation group attribute of NAMED.

9.4.4.3 PEX DETAIL TRACE Reports - Program Activation Example

We know that program RUNIT01 and program ILEP2 are either using the RCLACTGRP command or using the ″end run unit″ support to repeatedly delete activation groups in certain jobs. Recall that we verified that these programs do not have activation group *NEW. Since these programs are responsible for a large number of activation group creations, we need to identify why their activation groups are being deleted (clearly these two programs expect their activation groups to persist and not be continually deleted), which is why they were built using activation group NAMED.

Figure 65 on page 226 shows trace information for program ILEP2. Figure 66 on page 229 shows trace information for program RUNIT01.

Example

```
                                                    Performance Explorer Report                                    8/09/96 13:19:52
                                                      Definition Information                                       Page    1
Library . . : DHPEX
Member. . . : DEACTEX
Description : DEACTS EXAMPLE
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : DEACTS
Defined By . . . . . . . . . : A960123A
Definition Description . . . : DEACTS example
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 10240
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 200
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *DEACTPG
    *DESAGP
Selected Events:
    Category  : BASE                 -  Base Events
         *PMCO               PMCO   -  Performance Measurement Counter OverFlow
         *ACTGRPACTPRG       AGAPR  -  Activation Grp Act Program
         *ACTGRPCRT          AGCRT  -  Activation Group Create
         *ACTGRPDST          AGDST  -  Activation Group Destroy
    Category  : MIBKT Event          -  Machine Interface Program Bracketing Events
         *MISTART            MISTR  -  Machine Interface Instruction Start
         *MICPL              MICPL  -  Machine Interface Instruction Complete
         *EXIT               EXIT   -  Exit
         *ENT                ENTRY  -  Entry
  (lines removed for the sake of brevity)
                                                    Performance Explorer Report                                    8/09/96 13:19:52
                                                       Trace Information                                           Page   27
Library . . : DHPEX
Member. . . : DEACTEX
Description : DEACTS EXAMPLE
Time Stamp. : 13.17.07.1964 Task ID: 0000A2D8 Name: BATCHSTUFF A960123A   053978 Run Time (us):         5784336 Percent: 71.23
                    Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                           T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-----------------------------------------------------------------------------------------------------------------------------------
07.196 0   0000A2D8                  QWCDLYJB          0 2130826235    EXIT
07.196 0   0000A2D8                  QCLCLCPR       4727 2130830962    ENTRY
07.197 0   0000A2D8                  QCLCLCPR      37731 2130868693    EXIT
07.197 0   0000A2D8                  CALLILEP2      2649 2130871342    ENTRY 1
07.197 0   0000A2D8                  QCLRSLV        2850 2130874192    ENTRY
07.197 0   0000A2D8                  QLIADOPT      12384 2130886576    ENTRY
07.197 0   0000A2D8                  QLIADOPT       4529 2130891105    EXIT
07.197 0   0000A2D8                  QCLRSLV       22047 2130913152    EXIT
07.197 0   0000A2D8                  QCLCLCPR       2599 2130915751    ENTRY
07.198 0   0000A2D8                  QCLCLCPR      33615 2130949366    EXIT
07.198 0   0000A2D8                                 1853 2130951219    AGCRT 2
07.199 0   0000A2D8                               104541 2131055760    AGAPR 3         ILEP2
                                     4
07.213 0   0000A2D8                  ILEP2       1039063 2132094823    ENTRY   ILEP2/_QRNP_PEP_ILEP2
                                     5
07.213 0   0000A2D8                  ILEP2          7278 2132102101    EXIT    ILEP2/_QRNP_PEP_ILEP2
                                                M05


                                     6                                 A
07.213 0   0000A2D8                  QCLCLCPR       3816 2132105917    ENTRY
                                     6
07.213 0   0000A2D8                  QCLCLCPR      39826 2132145743    EXIT
                                     6
07.213 0   0000A2D8                  ILEP2          3058 2132148801    ENTRY   ILEP2/_QRNP_PEP_ILEP2
                                     6
07.214 0   0000A2D8                  ILEP2          2920 2132151721    EXIT    ILEP2/_QRNP_PEP_ILEP2
```

Figure 65 (Part 1 of 2). Program Activations/Deactivations Detail TRACE - Job BATCHSTUFF A960123A 053978

```
                                                 Performance Explorer Report                                           8/09/96 13:19:52
                                                    Trace Information                                                  Page   28
Library . . : DHPEX
Member. . . : DEACTEX
Description : DEACTS EXAMPLE
Time Stamp. : 13.17.07.2182 Task ID: 0000A2D8 Name: BATCHSTUFF A960123A   053978 Run Time (us):         5784336 Percent: 71.23
                    Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                           T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
                                                   M05


ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
 (lines removed for brevity)
                                        7
07.218 0   0000A2D8                  QCLCLCPR        2675 2132457283    ENTRY
                                        7
07.218 0   0000A2D8                  QCLCLCPR       29556 2132486839    EXIT
                                        7
07.218 0   0000A2D8                  ILEP2           2666 2132489505    ENTRY   ILEP2/_QRNP_PEP_ILEP2
                                        7
07.218 0   0000A2D8                  ILEP2           2893 2132492398    EXIT    ILEP2/_QRNP_PEP_ILEP2
07.218 0   0000A2D8                  QCLRTNE         3093 2132495491    ENTRY
07.219 0   0000A2D8                  QCLRTNE         1861 2132497352    EXIT
07.219 0   0000A2D8                  QCLCLNUP        2292 2132499644    ENTRY
07.219 0   0000A2D8                  QCLCLNUP       17497 2132517141    EXIT
07.219 0   0000A2D8                  CALLILEP2        836 2132517977    EXIT  8
07.219 0   0000A2D8                  QCADRV          4898 2132522875    ENTRY
07.219 0   0000A2D8                  QCARULE        10277 2132533152    ENTRY
07.219 0   0000A2D8                  QCARULE        16705 2132549857    EXIT
07.219 0   0000A2D8                  QCAPOS          3348 2132553205    ENTRY
07.219 0   0000A2D8                  QCAPOS          8104 2132561309    EXIT
07.219 0   0000A2D8                  QCAFLD          2948 2132564257    ENTRY
07.220 0   0000A2D8                  QCAFLD          7730 2132571987    EXIT
07.220 0   0000A2D8                  QCADRV          1565 2132573552    EXIT
07.220 0   0000A2D8                  QCATRS          2883 2132576435    ENTRY
07.220 0   0000A2D8                  QCATRS          5753 2132582188    EXIT
07.220 0   0000A2D8                  QWVCCDLA        2281 2132584469    ENTRY
                             9           9
07.220 0   0000A2D8 QWVCCDLA  900006B *DESAGP        7805 2132592274    MISTR
07.220 0   0000A2D8 QWVCCDLA   00006C *DESAGP        1923 2132594197    MICPL
07.220 0   0000A2D8                  QWVPDAGE       15359 2132609556    ENTRY
07.220 0   0000A2D8                  QDMRCLSE        1768 2132611324    ENTRY
07.220 0   0000A2D8                  QUIRCLAP        2827 2132614151    ENTRY
07.220 0   0000A2D8                  QUIRCLAP         933 2132615084    EXIT
07.220 0   0000A2D8                  QOLCLNUP        1849 2132616933    ENTRY
07.220 0   0000A2D8                  QOLCLNUP        1867 2132618800    EXIT
07.220 0   0000A2D8                  QSQENDAG        2606 2132621406    ENTRY
07.221 0   0000A2D8                  QSQENDAG       65698 2132687104    EXIT
07.221 0   0000A2D8                  QCNSMCTL        4892 2132691996    ENTRY
07.221 0   0000A2D8                  QCNSMCTL        1343 2132693339    EXIT
07.221 0   0000A2D8                  QDMRCLSE        1883 2132695222    EXIT
07.221 0   0000A2D8                  QWVPDAGE         648 2132695870    EXIT
                                          10
07.222 0   0000A2D8 QLEDAGE    000003 *DESAGP        4217 2132700087    MISTR
07.222 0   0000A2D8                                   998 2132701085    AGDST  11
07.225 0   0000A2D8 QLEDAGE    000004 *DESAGP      254461 2132955546    MICPL
                                                   M05


07.225 0   0000A2D8                  QMHSNDPM        6763 2132962309    ENTRY
07.225 0   0000A2D8                  QMHSNDPM       27885 2132990194    EXIT
07.225 0   0000A2D8                  QMHSNDPM        2215 2132992409    ENTRY
07.226 0   0000A2D8                  QMHSNDPM       18401 2133010810    EXIT
07.226 0   0000A2D8                  QWVCCDLA        2016 2133012826    EXIT
07.226 0   0000A2D8                  QCLCLCPR        4833 2133017659    ENTRY
07.226 0   0000A2D8                  QCLCLCPR       32048 2133049707    EXIT
```

Figure 65 (Part 2 of 2). Program Activations/Deactivations Detail TRACE - Job BATCHSTUFF A960123A 053978

Note the following:

1 This ENTRY event shows program CALLILEP2 being invoked.

2 This AGCRT event shows that an activation group was created. An activation group is a result of calling a program that requires it. The caller of the program causing the activation group to be created was CALLILEP2 in **1**.

3 An activate program follows an activation group creation; here we see the activate program event AGAPR. The program being activated is the one causing the activation group to be created. This is shown on the next line.

4 Program ILEP2 is the program being called; we know this because of the ENTRY event against program name ILEP2. Because this program immediately follows the activate program and create activation group events, we know that this program caused an activation group to be created. Note that the trace data cannot provide the name of the activation group; it is available on the DSPPGM command.

5 Control is now returning to the caller of ILEP2 since here we see an EXIT event against program ILEP2.

6 This sequence is repeated 10 times in total, indicating that program ILEP2 is called 11 times in total by its caller. Note that **A** denotes the second call that occurred to program ILEP2 and that this second call was **not** preceded by either an activate program (AGAPR event) or a create activation group (AGCRT event). This shows that program ILEP2 does not have the *NEW activation group attribute.

7 This is the last of the sequence of 11 calls to program ILEP2.

8 Program CALLILEP2 is returning control to its caller due to the EXIT event.

9 Here we see an activation group being deleted since the MI complex instruction *DESAGP. Note that program QWVCCDLA is causing this delete to occur; this is the command processing program for the RCLACTGRP command. Now we know that the caller of program CALLILEP2 is issuing the RCLACTGRP command, causing the activation group of program ILEP2 to be deleted.

If this activation group delete had occurred as a result of either a program with ACTGRP(*NEW) returning control or an ″end run unit″, system program QWVCCDLA is not present.

10 Note the long list of system programs that are called as part of activation group deletion shown between **9** and **10**.

11 Here we see the destroy activation group event AGDST, showing that the activation group has now been deleted.

```
                                                    Performance Explorer Report                                           8/09/96 13:19:52
                                                       Trace Information                                                         Page  437
Library . . : DHPEX
Member. . . : DEACTEX
Description : DEACTS EXAMPLE
Time Stamp. : 13.18.32.0663 Task ID: 0000A2D9 Name: P23XWY32H  A960123A   053979 Run Time (us):          459448 Percent:  5.66
                    Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                          T ST T ST FIX          Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-----------------------------------------------------------------------------------------------------------------------------
  (lines removed for brevity)
32.067 0   0000A2D9                                1700 2134934532    AGCRT
32.069 0   0000A2D9                              101744 2135036276    AGAPR
                                       1
32.081 0   0000A2D9                  RUNIT01     928623 2135964899    ENTRY   RUNIT01/_QRNP_PEP_RUNIT01
32.081 0   0000A2D9                               35526 2136000425    AGCRT
32.083 0   0000A2D9                               99629 2136100054    AGAPR                      RUNIT02
                                       2
32.153 0   0000A2D9                  RUNIT02    1254411 2137354465    ENTRY   RUNIT02/_QRNP_PEP_RUNIT02
                                       3
32.154 0   0000A2D9                  RUNIT02       6292 2137360757    EXIT    RUNIT02/_QRNP_PEP_RUNIT02
32.154 0   0000A2D9                  QMHSNDPM     24679 2137385436    ENTRY
32.155 0   0000A2D9                  QMHSNDPM     50402 2137435838    EXIT
32.155 0   0000A2D9                  QMHPDEH      34060 2137469898    ENTRY
32.155 0   0000A2D9                  QMHPDEH       8724 2137478622    EXIT
32.156 0   0000A2D9                  QWVPDAGE     63633 2137542255    ENTRY
32.156 0   0000A2D9                  QDMRCLSE      2139 2137544394    ENTRY
32.156 0   0000A2D9                  QUIRCLAP      3304 2137547698    ENTRY
32.156 0   0000A2D9                  QUIRCLAP      1991 2137549689    EXIT
32.156 0   0000A2D9                  QOLCLNUP      1804 2137551493    ENTRY
32.156 0   0000A2D9                  QOLCLNUP      2117 2137553610    EXIT
32.156 0   0000A2D9                  QSQENDAG      2786 2137556396    ENTRY
32.157 0   0000A2D9                  QSQENDAG     39462 2137595858    EXIT
32.157 0   0000A2D9                  QCNSMCTL      4078 2137599936    ENTRY
32.157 0   0000A2D9                  QCNSMCTL      1456 2137601392    EXIT
32.157 0   0000A2D9                  QDMRCLSE      1811 2137603203    EXIT
32.157 0   0000A2D9                  QWVPDAGE       600 2137603803    EXIT
                                        4
32.157 0   0000A2D9 QLEDAGE    000003 *DESAGP      4151 2137607954    MISTR
                                        4
32.157 0   0000A2D9 QLEDAGE    000004 *DESAGP      1126 2137609080    MICPL
                                        5
32.157 0   0000A2D9                  RUNIT01       5517 2137614597    EXIT    RUNIT01/_QRNP_PEP_RUNIT01
32.157 0   0000A2D9                                3535 2137618132    AGDST
```

Figure 66. Program Activations/Deactivations Detail TRACE - Job BATCHSTUFF A960123A 053978

Note the following:

1 This ENTRY event shows that program RUNIT01 is being called. Note that immediately preceding this entry, we see both an activate program ACPRG and a create activation group AGCRT event. This means that program RUNIT01 is created to run in an activation group that did not exist in the job (either *NEW or NAMED).

2 This ENTRY event shows that program RUNIT02 is being called. Note that immediately preceding this entry, we see both an activate program ACPRG and a create activation group AGCRT event. This means that program RUNIT02 is created to run in an activation group that did not exist in the job (either *NEW or NAMED). Note also that since RUNIT01 was the application program with an ENTRY event immediately preceding this event, that program RUNIT02 must have called program RUNIT02.

3 This EXIT event shows that control is now being passed out of program RUNIT02. Thus, following trace events are not running as a result of program RUNIT02 being called. Since we know that program RUNIT02 has been entered but not exited, we know that following events either show an exit from program RUNIT01 or events that are as a result of statements being executed by program RUNIT01.

4 Here we see an activation group being deleted. Note that this time, the RCLACTGRP command processing program, QWVCCDLA, is not present in the preceding trace events and is not present as the Parent Program running the MI complex instruction *DESAGP. This means that program RUNIT01 caused an activation group to be deleted, since we know from previous events that program RUNIT01 is the closest application program on the stack and program RUNIT02 is no longer on the stack.

Either program RUNIT01 has activation group *NEW attribute or it is issuing the RCLACTGRP command. We use the DSPPGM command to check the activation group attribute. In this example, it was TESTNAME. Thus, we know that program RUNIT01 is performing an ″end run unit″.

5 This EXIT event shows program RUNIT01 passing control back to its caller.

9.5 Interpreting Enhanced PEX TRACE IOS and FLTS Reports

In order to be able to fully utilize the IOS and FLTS reports, it is necessary to have a good understanding of how the system works. Please refer to Section 10.2, "Physical Disk I/Os (IOS Command)" on page 255 for examples of all reports that you can produce using the IOS command. Please refer to Section 10.4, "Page Fault Information (FLTS Command)" on page 363 for examples of all reports that you can produce using the FLTS command.

9.5.1 What are Physical Disk I/Os and What Causes Them?

We must first review how different types of physical disk I/Os can occur.

If you use the Enhanced PEX TRACE SMTBCH command to collect general performance (*PERF) or disk I/O (*BUSYDISK) trace data, you can produce reports showing detailed physical disk I/O. You can also use the PRTPEXRPT command to print a detail TRACE report, where the Definition Information section of this report shows what DASD event types were traced. An example of the DASD events that are collected using SMTBCH PROBLEM(*PERF) follows.

```
                                                   Performance Explorer Report
                                                     Definition Information
Library . . : QYPINT
Member. . . : DFNEX01
Description : *BLANK
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : DFNEX01
Defined By . . . . . . . . . : A960123A
Definition Description . . . : *BLANK
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 50000
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 200
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *REQIO
    *SNSEXCPD
    *DEQ
    *ENQ
    *WAITEVT
    *RETEVTD
    *SUSPR
    *TERMPR
    *INITPR
    *RESPR
    *SIGEVT
    *UNLOCKSL
    *LOCK
    *LOCKSL
    *UNLOCK
    *SETIEXIT
Selected Events:
   Category  : BASE                 -  Base Events
         *PMCO                PMCO   -  Performance Measurement Counter OverFlow
         *FLSHRHDNBKPT        BRKPT  -  Flasher BreakPoint
         *ACTGRPACTPRG        AGAPR  -  Activation Grp Act Program
         *ACTGRPCRT           AGCRT  -  Activation Group Create
```

*Figure 67 (Part 1 of 2). PEX Physical IO Events Collected using SMTBCH PROBLEM(*BUSYDISK)*

```
    Category  : ASM                 -  Auxiliary Storage Management Events
         USER              USR    -  User Defined
         CRTSEG            CRT *  -  Create Segment
         DSTRSEG           DST *  -  Destroy Segment
         EXDSEG            EXT *  -  Extend Segment
         FNDSEGSIZ         FSZ *  -  Find Segment Size
         TRUNCSEG          TRN *  -  Truncate Segment
    Category  : DASD 1          -  Direct Access Storage Device Events
         *READSTR          *RS    -  Read Start
                           *RSF   -  Read Start Due to a Page Fault
                           *RCF   -  Read Complete Due to a Page Fault
                           *WSP   -  Write Start of a Purgeable Page
                           *WCP   -  Write Complete of a Purgeable Page
                           *xx A  -  DASD Event due to an Asynchronous Reque
         *WRTSTR           *WS    -  Write Start
                                                Performance Explorer Report
                                                  Definition Information
Library . . : QYPINT
Member. . . : DFNEX01
Description : *BLANK
    Category  : PGFLT               -  Page Fault Events
         *PGFLTSTR         PFS    -  Page Fault Start
    Category  : SAR                 -  Segment Address Register Events
         *CLR              CLR S  -  Clear
         *CLRPIN           CLP S  -  Clear Pin
         *EXCHCLR          CXP S  -  Exchange Clear
         *READ             RD  S  -  Read
         *READASYNC        RD  A  -  Read Asynchronous
         *READPIN          RDP S  -  Read Pin
         *EXCHREAD         RXN S  -  Exchange Read
         *EXCHREADASYNC    RXN A  -  Exchange Read Asynchronous
         *WRT              WRT S  -  Write
         *WRTASYNC         WRT A  -  Write Asynchronous
         *WRTASYNCMSGQ     WMQ A  -  Write Asynchronous Track Message Queue
         *WRTASYNCMSGQLAST WML A  -  Write Asynchronous Track Message QueueL
         *WRTASYNCTASK     WTT A  -  Write Asynchronous Track Task
         *WRTASYNCWAIT     WTW A  -  Write Asynchronous Track Wait
         *WRTRMV           WRM    -  Write Remove
         *RMV              RMV S  -  Remove
         *UNPIN            UNP S  -  Unpin
         *UNPINRMV         RMU S  -  Unpin Remove
         *UNPINWRT         WTU S  -  Unpin Write
         *WRTPGOUT         WPO S  -  Write For Page Out
    Category  : MIBKT Event         -  Machine Interface Program Bracketing Ev
         *EXIT             EXIT   -  Exit
         *ENT              ENTRY  -  Entry
```

*Figure 67 (Part 2 of 2). PEX Physical IO Events Collected using SMTBCH PROBLEM(*BUSYDISK)*

Note the following:

1 These are the physical disk IO events that are collected using either SMTBCH...PROBLEM(*PERF) or SMTBCH...PROBLEM(*BUSYDISK).

An explanation of these mnemonics is provided in Table 16 on page 233.

The first report produced using the Enhanced PEX TRACE IOS command is shown in the following figure. This report is useful for determining:

- If your system is doing more physical reads or physical writes:

  This information is useful for large AS/400 customers considering using cross system journaling products.
- If your system is performing these I/Os synchronously or asynchronously.
- If performance improves by using write cache DASD, assuming you do not already have write cache drives.

Note that if mirroring is active on your system, only one and not both of the mirrored writes appear on this report.

```
Type of Dasd  I/O Count  Percent of all       Total pages   Average pages   Minimum pages   Maximum pages
I/O                      system I/Os          transferred   transferred     transferred     transferred
                 94,651      100.00            151,175.00            1.60            1.00           31.00
   *RSF S        46,161       48.77             63,853.00            1.38            1.00            4.00
   *WSP S        26,301       27.79             56,960.00            2.17            1.00           31.00
   *RX  A        13,031       13.77             20,338.00            1.56            1.00            8.00
   *RS  S         6,036        6.38              6,747.00            1.12            1.00           12.00
   *RS  A         2,980        3.15              2,993.00            1.00            1.00            6.00
   *WS  S           111         .12                253.00            2.28            1.00           21.00
   *WS  A            18         .02                 18.00            1.00            1.00            1.00
   *WSP A            13         .01                 13.00            1.00            1.00            1.00
```

Figure 68. Systemwide Disk IOs by IO Type

The mnemonics in the preceding example (and others) are explained in Table 16. This I/O type table is duplicated in Section E.2, "Physical Disk I/O Types" on page 496 for ease of use when reviewing a PRTPEXRPT report in the customer environment.

Table 16. Physical Disk IO TRACE Mnemonics

Physical IO Type	**Description**
*RS S	Start of a synchronous explicit DASD read I/O initiated by an explicit SAR READ/BRING request (as opposed to an ***implicit*** DASD read due to a page fault).
*RS A	Same as *RS S except performed asynchronously.
*RX S	Similar to *RS S except the program (LIC, OS/400) issuing the SAR READ/BRING request has additionally provided the address of pages which are to be ***replaced*** with the newly read data. The 'X' in the mnemonic stands for ***exchange*** and the full name is ***exchange read*** or ***exchange bring***.
*RX A	Same as *RX S except performed asynchronously.
*RC	Marks the completion of either an *RS S, *RS A, *RX S or *RX A.
*RSF S	Start of a synchronous implicit DASD read I/Os due to a page fault.
*RSF A	Start of a synchronous implicit DASD read I/Os due to a page fault which occurs during the servicing of some asynchronous I/O request (fairly rare).
*RCF	Marks the completion of an *RSF S or *RSF A.
*WS S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are not made "easy steal candidates".
*WS A	Same as *WS S except performed asynchronously.
*WC	Marks the completion of either a *WS S or *WS A.
*WSP S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are made "easy steal candidates" following the I/O.
*WSP A	Same as *WSP S except performed asynchronously.
*WCP	Marks the completion of either a *WSP S or *WSP A.
*PR	Start of a non-virtual READ-SECTOR type physical DASD read. This is redundant because it is followed by an *RS which denotes the "real" start of the I/O.
*PR C	Marks the completion of a *PR. This is redundant, it is preceded by an *RC.
*PW	Start of a non-virtual WRITE-SECTOR type physical DASD write. This is redundant because it is followed by a *WS which denotes the "real" start of the I/O.
*PW C	Marks the completion of a *PW. This too is redundant, it is preceded by a *WC.

Notes on these Physical I/O mnemonics:

Each of these represent a trace event record that MAY be seen in the Enhanced PEX TRACE detail report using PRTPEXRPT ..TYPE(*TRACE).

The ″S″ or ″A″ following the mnemonic indicate either Synchronous or Asynchronous. However, sometimes Synchronous operations omit the ″S″... a blank should be treated as an ″S″ = synchronous.

9.5.1.1 Physical Disk I/O Versus Logical I/O

All the physical I/Os mnemonics represent true, physical DASD operations. This may sound obvious, but it is important to understand the difference between ***logical*** DASD operations verses ***physical***.

An example: Suppose an RPG program is sequentially reading a data base file member, using the appropriate OVRBDBF...SEQONLY(*YES n) type of access. In such a case, the LIC layer of the operating system is performing ***explicit*** ″read aheads″ through issuing **SAR READ** logical DASD requests. Each **SAR READ** may result in 0-to-N physical DASD reads. A **SAR READ** results in physical DASD read (or reads) if the requested pages are valid and ***not already somewhere in mainstore***. LIC Storage Management (just as its parent, CISC/IMPI Storage Management did) avoids unnecessary DASD operations. In particular, it does not do a DASD read for a page already in mainstore (anywhere) and it does not do a DASD write for a page that has not been changed (modified) since it was read in from DASD.

A large percentage of write-type I/Os on ″healthy″ systems are performed asynchronously.

9.5.1.2 Virtual Pages Versus Sector I/O

Physical reads and writes to DASD can be divided into two categories:

- **Virtual Page** - the address field (columns 21-37 in a TRACE detail report (from PRTPEXRPT) are NOT set to ′0000000000 000000′).
- **Sector I/O** - the address field (columns 21-37 in a TRACE detail report ARE ′0000000000 000000′).

Virtual Page I/O is ″normal″ reads and writes of objects ″and jobs″ pages (for example, faulting on a page of program variable storage, reading pages of a physical file member, or writing pages of a library after creating an object into the library).

Sector I/O are DASD reads and writes **not** associated with virtual pages (that is, objects, jobs′ storage, and so on). Examples include:

- Reading/writing of objects during a SAVE/RESTORE command (yes, this is a contradiction of terms... but Save/Restore uses **READ SECTOR** for performance reasons).
- Reading/writing information about the state of mirror DASD stripes.
- Reading capacity/status information on RAIDed drives.
- Writing what are known as ″extent headers″ during the creation, deletion, or size change of permanent segments (objects). A high rate of ″extent header″ writes can indicate a high rate of CRTxxx/DLTxx activity.

The main differences that might be noticed are: **Sector I/O** does **not** have an object/segment name, type, or subtype and they do **not** have a mainstore pool ID (both of which **are** present for **Virtual Page** I/Os).

Even though Sector I/O does not have an object name associated with it, it can be a contributor to performance problems. Sector I/O can make DASD arms busy (just the same as virtual I/O) and can take a relatively long time (15ms) to complete (just the same as virtual I/O). Therefore, depending on the number (or better yet, the percentage) of all I/Os that are Sector type I/Os, it may warrant further investigation.

9.5.1.3 Synchronous Versus Asynchronous DASD I/O

Physical DASD read and write I/Os can be performed either synchronously or asynchronously. Asynchronous I/Os are DASD reads and writes that are started by a job/task, but that are not (implicitly) waited upon for completion....control returns to the program requesting the I/O before the I/O is complete. This permits overlapping DASD operations with other (CPU) processing. Keep in mind, however, that asynchronous requests are not always as benign as they might first appear. Asynchronous I/Os:

- Consume CPU (just as synchronous I/Os do).
- Can make for busy DASD arm (or arms) (just as synchronous I/Os can).
- Can be ***waited for later***, thereby masking a synchronous activity in order to gain a little bit of overlapped I/O and CPU processing.

Writes: Most write-type I/Os are performed asynchronously (which, in general, are better performing than synchronous writes). Examples of common activities that can cause **synchronous writes** include:

- CRTxxx/DLTxxx activity, such as CRTPF (or ADDPFM) and DLTF (or RMVM).
- FRCRATIO(1) on physical files being written to.
- The pool-maintenance write-purges that take place in the storage management ***Page Out Tasks*** (tasks with names that begin **SMPO**).
- The PAG writes that occur when jobs enter long wait and have the **PURGE(*YES)** attribute ***and*** the LIC code has determined that a true PAG purge is necessary (this time).

Typical **asynchronous write** activities include:

- Writes to journal receivers.
- FRCRATIO(*NONE) physical files being written to.
- Writes against **library** objects during CRT/DLT activity into/from the libraries. This, by the way, is typically an async write that is ***waited upon for completion***, making it nearly as ″bad″ as a synchronous write.

Reads: There is less ″typical″ typing of read I/Os concerning their sync/async attribute (as opposed to write I/Os). **Page faults**, of course, are by nature synchronous. In general, if the OS/400 and LIC ″know″ that a set of pages ***is*** referenced in the near future (typically tens to hundreds of milliseconds), an explicit asynchronous read request facilitates overlapping the I/O delay with CPU processing. Examples of common activities that can cause **asynchronous reads** include:

- **OVRDBF SEQONLY(*YES nnnn)** data base reads
- Access path builds
- Query record selection ″scanning″
- ″Extra″ read-aheads performed in an Expert Cache (*CALC) pool

User Control over Synchronous/Asynchronous Attribute: Neither the application developer nor the system administrator has direct control over whether I/Os are performed synchronously or asynchronously. However, using the PEX Trace Tool described in this section, one can get clues to possible poorly performing applications/programs. For example, if a set of database files is incurring a massive number of synchronous writes, this is a possible indication of FRCRATIO(1).

9.5.1.4 Reads: Page Fault Reads Versus Explicit Reads

There are two methods of reading virtual pages into mainstore from DASD:

- Explicit SAR READ requests
- Page faults

Explicit SAR READ requests are logical DASD read requests coded into OS/400 and LIC/400 operating system code. A common example are the ″read-aheads″ issued by database while an application program is sequentially reading a physical file member. In general, whenever system code thinks a page fault might occur ***and it is beneficial to read in MORE pages than are normally read in due to the page fault***, the code issues some type of **SAR READ** to request as many pages as it thinks are appropriate to be read into mainstore. Also, explicit SAR READ can be requested to be performed asynchronously contrasting with page faults that are always synchronous in nature.

Page fault DASD reads occur whenever a legitimate virtual address is touched that is not resident in mainstore. The program that incurred the fault stops while the faulted-on page (or pages) are synchronously read into mainstore.

Page faults require additional explanation. There can be (and usually is) a **big** difference in the number of ***logical page faults*** and ***page fault DASD reads***. First, what is meant by ***logical page faults***? Answer: the low level action that occurs when a virtual page is ″touched″ and that page is not ″ready, willing and able″ in mainstore. This action can occur but is ***not*** followed by a DASD read. The following table illustrates the common page fault conditions and the resulting actions.

- The touched page is a valid virtual page that is not in mainstore (in any state).
  - **Resulting action:** A physical DASD read (*RSF)
- The touched page is a valid virtual page that **is** in mainstore, but a physical DASD **write** is currently in progress.
  - **Resulting action:** LIC ″clones″ the current content of the virtual page into another location in mainstore and the faulting program is resumed ***without*** starting or waiting for any DASD operation (or operations).
- The touched page is a valid virtual page that is not in mainstore, but a physical DASD **read** is currently in progress that eminently makes it available in mainstore.
  - **Resulting action:** The faulting program simply waits for the previously started DASD read to complete.

    Note: This read may have been asynchronously started by the faulting job/task, or started (synchronous or asynchronous) by some other job/task.

- The touched page is **not** a valid virtual page (that is, a ″bad″ address is touched).
  - **Resulting action:** An exception is presented to the faulting program (no DASD I/O is started or waited upon).

9.5.1.5 Writes: Easy Steal (Purge) Versus Non-Easy Steal (Write)

First, keep in mind that a DASD write of a virtual page (see earlier) **never**, in and of itself, causes the written page (or pages) to be removed from mainstore. DASD writes, however, can cause page (or pages) to become ***easy steal candidates***. This type of DASD write is usually referred to as either:

- **Easy steal**, - or -
- **Purge**

So, DASD writes that are of the purge/easy-steal nature differ from ″normal″ DASD write only in that the former also makes the mainstore pages (after the write I/O) easy-steal candidates.

This is of significance if pages are **PURGED** (instead of **WRITTEN**) and soon thereafter (milliseconds) faulted on.

9.5.2 The ″Cost″ of DASD I/Os

Each DASD I/O requires a small amount of CPU resource and DASD IOP, controller, and disk arm resource. When there are a large number of physical DASD I/Os during a ″transaction,″ performance degradation may occur. This topic discusses the ″cost″ of a DASD I/O from different viewpoints.

9.5.2.1 All DASD I/Os

All DASD I/Os (sync/async, reads/writes/faults):

- Consume **some** main CPU to initiate and complete.
- Incur at least one task switch or processor interrupt, both of which disrupt processor instruction/data caching optimizations.
- Represent traffic on a system bus.
- Compete (and queue) with other DASD requests to the same DASD subsystem/arm.
- Imply that the LIC Storage Management component must obtain system-wide serialization semaphores for at least ***some*** time (typically microseconds, but can be longer) to manage the mapping of DASD sectors to mainstore page frames. These semaphores imply possible additional contention/queueing.

9.5.2.2 All Synchronous DASD I/Os

All **synchronous** physical disk I/Os imply waiting for a response from the DASD subsystem indicating that the I/O has completed (hopefully successfully!). Modern non-cached DASD subsystems, if not over-utilized, take (order of) 10 milliseconds per operation. Cached DASD subsystems take (order of) one millisecond per operation. One or 10 milliseconds may not sound ″significant″, but represent (in general) a large component of response time in AS/400 applications. Minimizing synchronous disk I/Os is something that should be strived for. This is (somewhat) less true if the DASD subsystem is ***cached***.

9.5.2.3 Read I/Os

Both synchronous and asynchronous DASD read I/Os incur a higher cost of CPU and Storage Management Semaphore Queueing (see previous section) than do DASD write I/Os. Why? Storage Management has to ″find″ a home (in some mainstore pool) for the inbound page images. This is **less** true if the read I/O was an ***exchange read*** (***RX** PRTPEXRPT mnemonic). This type of I/O means that the LIC coding issuing the read has provided (in addition to the addresses of the pages it wants read into mainstore) the address of pages ***it wants replaced, if possible***, by the inbound pages. This reduces the CPU/Semaphore processing time normally used to locate ″stealable pages″.

9.5.2.4 Asynchronous Read I/Os

An asynchronous read I/O does **not** guarantee that some job or task will not wait for the DASD operation to complete. If the virtual address is touched prior to completion, a page fault occurs and the touching code waits for the previously started asynchronous read to complete.

9.5.2.5 Asynchronous Write I/Os

An asynchronous write I/O does **not** guaranty that some job or task will not wait for the DASD operation to complete. OS/400 and LIC code can, at their discretion, ***wait for outstanding write I/Os to complete***.

9.5.3 ″Bad″ DASD I/Os

This discussion is based on experiences of examining SMTRACE runs from CISC (IMPI) machines and PEX trace runs from RISC machines. Included are examples of object names/types and I/O types that ***have***, at least once, been an indication of a less-than-optimal application (or system!) design. **It does not represent hard and fast rules, and should not be used to incriminate any software without additional investigation.** It is but one of many **starting points** along the path of possible performance improvements.

The sub-topics that follow focus on a high ***rate*** of I/Os. It is important to keep the ***rate*** in mind, particularly because the current set of PEX queries do **not** report rates, just counts. So, the question might be asked: ″What is a high rate for such-and-such?″ That is, of course, an extremely difficult question to answer since it is contains many ″...it depends on...″ conditions. As a general rule, however, on a ″normal″ application system, one wants or expects the top object ***types*** that are incurring I/Os to be physical and logical file members (object types 0B90 and 0C90 respectively). On systems with ″lots″ of jobs active, another normal object type to incur lots of I/Os is a ″Process Control Space″ (object type 1AEF), which is used to keep track of the work being done by a job.

Refer to Table 16 on page 233 for a summary of the I/O type acronym definitions used in the following sub-topics.

9.5.3.1 Writes (*WS, *WSP) Against QTEMP Objects

This is a possible indication of many CRTxxx/DLTxxx object commands being issued, probably within CL programs, inserting and deleting objects from QTEMP libraries. On all systems at a QSECURITY level of **less** than 50, QTEMP libraries are really permanent objects that, therefore, incur physical disk writes when objects are created-into or deleted-from. In addition to the writes against QTEMP, there are usually writes against the objects (possibly ***many*** more than the number against QTEMP) that are being created and deleted into or from QTEMP. However, these are much harder to ***see*** in the PEX queries because most of these I/Os are grouped under the object name ***DESTROYED**, which makes it more difficult to ascertain this activity. So QTEMP activity can highlight a ***bigger*** problem than just the disk writes against QTEMP.

Additionally, libraries with a relatively small number of objects in them (such as QTEMP) tend themselves to be relatively small so the pages that are written during the CRT/DLT activity tend to be the same small set of pages, which can lead to busy disk arm (or arms).

9.5.3.2 Writes (*WS, *WSP) Against Library Objects (Object Type 0401)

These types of writes exhibit the same object usage and disk I/O attributes as discussed for library QTEMP in Section 9.5.3.1, "Writes (*WS, *WSP) Against QTEMP Objects" on page 238.

9.5.3.3 Writes (*WS, *WSP) Against User Profiles (Object Type 0801)

This can also be similar to the I/Os to QTEMP and other libraries as previously described. Writes to user profiles occur when:

- An object is created to be owned by the profile.
- An object owned by the profile is deleted.
- Private authorities are changed to an object.

Therefore, user profile writes are also an indicator that ″excessive″ CRTxxx/DLTxxx activity is present.

9.5.3.4 Writes (*WS, *WSP) Against Data Areas (Object Type 190A)

This can be an indication of frequent **CHGDTAARA** commands. The following has been observed more than once: Some application performing many CHGDTAARA commands against the same data area (or areas) but always (or nearly so) setting the ***same*** value into the data area (or areas). Neither data area management nor Storage Management ″know″ that the data area ″already contains this value″ so this is treated the same as a CHGDTAARA that ***does*** change the value (that is, induces several page writes per command). If this occurs frequently against one or two data areas, it can lead to busy disk arm (or arms) (data areas are small, and the ***same*** small set of pages is written over and over again).

9.5.3.5 Synchronous Writes (*WS S, *WSP S) Against Database Objects

Synchronous writes against physical file members (object type 0B90) may indicate the presence of a non-zero value for a file′s **FRCRATIO** (records to force a write) parameter. Synchronous writes against access paths members (object type 0C90) may indicate the presence of a non-zero **FRCACCPTH** parameter value.

Note: This is a good example of why additional investigation is ***required***. Synchronous writes against these objects are not ***necessarily*** caused solely by the previously mentioned attributes.

9.5.3.6 Sizes of Read and Write I/Os Against Database Objects

Keeping in mind that a page size is 4096 bytes on a RISC machine, the I/O ***average number of pages transferred*** value can give an indication if blocking has been properly utilized. This probably requires additional investigation:

- Are the files being randomly accessed (QDBGETKY is involved)? Random access is less likely to use blocked record I/O (that is, it is more likely to see QDBGETSQ rather than QDBGETM). ***However, it is possible to use blocked record I/O even if reading a file through an access path***.
- Are the files open for input only or output only? This can be (mostly) determined by the presence or lack-of PUT type modules (QDBPUT, QDBPUTM) for the same file being read (or the update/delete module QDBUDR) or for GET type modules (QDBGETSQ, QDBGETM) for the same file being written.
- Are the virtual addresses of the physical file data space segments (object type 0B90, segment type 0003) perfectly marching forward? If so, the file is truly being accessed in arrival sequence and the best OS/400 module to do this efficiently is QDBGETM. The presence of QDBGETSQ instead of QDBGETM indicates the open is lacking OVRDBF SEQONLY(*YES ...), or that it might be open for input and output.

9.5.3.7 Reads (*RS, *RSF) Against QWCBTxx Objects

A high rate of I/Os to a Work Control Block Table (WCBT) is an indication that the internal OS/400 control block (or blocks) that keeps track of all ***jobs in the system*** is ″large″ (and that it is being accessed frequently). This control block, under normal circumstances, is as large as the ″high water mark″ of ***jobs in the system (JIS)*** (as displayed by WRKSYSSTS). For example, if JIS was 14 000 during an overnight batch run, but spooled files are cleared and the current JIS is 8000, the QWCBTxx control block is ***at least*** large enough to hold 14 000 jobs. Over time, the maximum ″job entries″ are reused by new jobs. If no one uses many of the available job entries, you have significant storage occupied on your system and functions that use the job entries can exhibit poor performance.

These functions include Work with Active Jobs (WRKACTJOB), Work with Subsystem Jobs (WRKSBSJOB), and Work with User Jobs (WRKUSRJOB).

You can assist the system in compressing out unneeded job entry space and returning to the number of entries specified in system value QTOTJOB by creating a data area and setting values in the data area.

The compression is made capable through a PTF for V3R1 and is included in base V3R2, V3R6, and V3R7. On V3R6 or V3R7, you can use the following commands to have the system compress the space **during the next IPL**:

1. Create a specific data area:

   ```
   CRTDTAATA    DTAARA(QSYS/QWCBTCMPTB) TYPE(*CHAR) LEN(1)
   ```

2. After creating the data area QWCBTCMPTB, set the data area value to 1 to have the WCBT entries compressed **on the next IPL**:

   ```
   CHGDTAARA  DTAARA(QSYS/QWCBTCMPTB) VALUE('1')
   ```

3. Turn the power off for the system and IPL.

   IPL time is dependent on how many WCB table entries there are to clean up, which is done by OS/400 job QWCBTCLNUP during IPL.

Some time later you may turn off WCBT compression during IPL by setting the data area to 0:

```
CHGDTAARA  DTAARA(QSYS/QWCBTCMPTB) VALUE('0')
```

Typically, you can use ″1″ for a while and set compression to not occur. You may determine to set system value QTOTJOB to a value smaller than before. If QTOTJOB has to be extended frequently during run time, overall system performance is degraded. You may want to increase the QTOTJOB value. See *AS/400 Work Management*, SC41-4306, for more details.

9.5.3.8 Reads (*RS, *RSF) Against Journal Receiver Objects

Read I/Os against journal receiver objects (object type 0701) usually indicate either or both of the following situations:

- Excessive Commit **ROLLBACK** activity.
- The presence of some application to keep database files synchronized across multiple systems.

9.5.3.9 Reads or Writes Against *DTAQ Objects

″Large″ numbers of read type I/Os (*RS, *RSF) or write type I/Os (*WS, *WSP) against data queue objects (object type 0A01) might indicate excessively large data queue objects. Large data queue objects may imply a CPU burden during SNDDTAQ or RCVDTAQ operations. A general guideline is to keep the number of unprocessed data queue entries to 100 or less for best performance.

9.5.3.10 Reads Against SM xxx DIRECTORY ″Objects″

A high rate of read I/Os (*RSF, most likely) against internal micro-code objects with the following names or types can indicate performance problems:

- SM PERMANENT DIRECTORY
- SM TEMPORARY DIRECTORY
- SM FREE SPACE BIT MAP

Problems can be in one or more of the following activities:

- A high rate of CRTxxx/DLTxxx activity
- A constricted machine pool
- A high rate of internal OS/400 or microcode objects/segment creates/deletes

9.5.3.11 Fault Reads (*RSF) against ″MWS″ Segments

The term **M**achine **W**ide **S**torage stands for an internal LIC heap used to manage small chunks of ″run-time storage″. Several LIC components use MWS, but communications is probably the ″biggest″ user. Lots of page fault reads against MWS (frequently in the machine pool) can indicate either or both:

- Some ″runaway″ communications application
- A high frequency of communication control unit or line protocol errors
- A broadcasting remote device such as is possible with IP networks
- A constrained machine pool

There are other LIC uses of MWS that can indicate problems, so similar to all items in this list, further investigation is probably required.

9.5.3.12 Fault Reads (*RSF) Against ″L/L″ or ″L/L Range X″

The term ″L/L″ stands for Link Loader. LIC programs are managed (loaded, PTFed, relocated) by the Link Loader, which is itself a LIC component. Paging (faulting) against the segments with names containing ″L/L″ simply means that LIC programs are paging. A certain amount of LIC paging is normal. Higher page rates on RISC versus CISC systems is ″normal.″ This is primarily due to the growth in instruction stream size on a RISC system as compared to CISC architecture.

However, excessive LIC paging is also a sign of a constrained memory pool.

Note: Some LIC code always pages in the machine pool. Other LIC code pages may be stored in the pool that the job or LIC task is running in.

9.6 Object Names and Types Appearing in TRACE Reports

This topic is provided to enable you to better interpret the Enhanced PEX Trace reports produced from the IOS, FLTS, OBJSIZE, and NETSIZE commands.

9.6.1 Selected System Object Names Appearing in TRACE Reports

This first topic describes some common ″items″ (segments, objects, and control blocks) that might appear in query output that contains **object names**.

Note: In the following descriptions, ″xxx″ might be ″blanks″ or one or more additional words.

SM PERM DIR SEGMENT, PERM DIR SID xxx
Internal micro-code **S**torage **M**anagement control block that keeps track of all permanent objects/segments by virtual address and disk address.

SM TEMPORARY DIR SEG, TEMP DIR SID xxx
Same as PERM, but for temporary segments/objects.

MACHINE CONTEXT
Internal micro-code control block that is essentially the root library. The addresses of all libraries, user profiles, device/controller/line descriptions are kept in here.

DATA BASE IN-USE TBL
Internal micro-code control block that keeps system wide information about each open physical and logical file member.

xxx ERR LOG SID, ERROR LOG xxx
Internal micro-code control block that holds information about problems/errors in the **Product Activity Log**.

xxx VLOG SID, VLOG xxx
Internal micro-code control block that holds information about problems/errors in the **Licensed Internal Code log**.

APPN xxx Information about APPN topology. High paging against this object might indicate an APPN topology ″storm″.

L/L xxx The segments that hold the LIC micro-code.

FREE SPACE xxx BIT MAP xxx
Internal micro-code control block that keeps track of all DASD ***free space***.

SEIZE LOCK xxx
Internal micro-code control block that keeps track of all LOCKs and SEIZEs active on a machine. High paging against this can indicate a large number of LOCKs and SEIZEs.

9.6.2 Object and Segment Types Appearing in TRACE Reports

Object is a term that has several meanings on an AS/400 system depending on who you are talking with. Many users consider a keyed physical file that contains a single member as one object. From a PEX trace point of view, however, that file and member is viewed as:

- A **FILE** space object (1901) comprised of a single segment
- A **FILE FORMAT** space object (1951) comprised of a single segment
- A **COMPOSITE PIECE - DATA SPACE** object (0B90):
  - Comprised of a base segment
  - At least one data segment
  - Probably an ″associated space″ segment
  - Maybe a field mapping segment
- A **COMPOSITE PIECE - DATA SPACE INDEX** object (0C90):
  - Comprised of a base segment
  - Maybe additional index segments
  - Probably an ″associated space″ segment

Each of the ***segments*** in the previous discussion have a unique five or six-byte ″SID address″ (the segment address portion of an eight-byte virtual address. It might be five or six, depending on whether the segment was a ″big″ or ″little″ segment).

This topic describes some common ***object types*** that might appear in query output that contains object types. There are many object types that print a description that is just as valuable as one that might be provided here (such as ″User Profile″); those **are not** included in the following list. This list contains (mostly) obscure type names for common objects. (As used in this redbook, the word ″obscure″ means rarely used and not well known).

Each item in the following list is preceded by the internal object type 4 hexadecimal characters number. These numbers correspond to the data found in column 60 to column 63 of a PRTPEXRPT.

1901: FILE
The anchor object of all database, display, communications or *SAVF files. For database, this is ***not*** a member; it is the anchor point for all (if any) members.

1390: DUMP SPACE
The part of an *SAVF that contains the actual (save/restore) data.

1951: FILE FORMAT
The part of a field level file that contains (remembers) the file′s field definitions/descriptions.

0D50: DATA BASE FILE MEMBER
The part of a database file member (physical or logical files) that ***anchors*** the member. It does not contain the data for a physical file member nor the access path for a logical file member (it does have

pointers to these other pieces). During a full file (member) OPEN, it is these objects that are duplicated (into 0DEF objects) and that are called the ODPs (Open Data Paths).

0DEF: DATA BASE OPERATIONAL CURSOR
An **OPEN** instance of a DATA BASE FILE MEMBER.

1952: OIR SPACE
The part of a library object that contains the text and other generic information common to all objects similar to last save date.

0B90: COMPOSITE PIECE - DATA SPACE
The part of a physical file member that actually contains the data (records).

0C90: COMPOSITE PIECE - DATA SPACE INDEX
The part of keyed physical file member or of a keyed logical file member that contains the access path. (It ***is*** the access path).

19E2: DISTRIBUTION TRACKING OBJECT
Part of SNADS inbound/outbound distributions.

0EC4: INTERACTIVE PROFILE
The object that remembers items on a per User Profile bases such as ″the last file used with WRKMBRPDM″ or ″the last library used with WRKQRY″.

18A0: JOB MESSAGE QUEUE
The object internal to all active jobs that holds the messages processed with SNDPGMMSG or RCVMSG commands and also the messages that are ultimately printed in the job log when the job ends.

19EE: PERMANENT MISCELLANEOUS SPACE
A generic chunk of permanent storage in the form of a Space Object, the simplest of all object types.

19A1: PERMANENT GENERIC SPACE
Similar to PERMANENT MISCELLANEOUS SPACE.

19FC: PROTECTED SPACE
Used for **OPEN** instances of ***non-***database files.

01EF: TEMPORARY - ACCESS GROUP
Jobs′ PAGs (Process Access Groups).

1AEF: TEMPORARY - PROCESS CTL SPACE
The large collection of internal segments that hold execution/activation information about jobs′ active or executing programs (that is, invocation stack areas, STATIC storage areas, HEAP storage areas, Activation Group information, and so on).

19EF: TEMPORARY - SPACE
A generic chunk of temporary storage in the form of a Space Object, the simplest of all object types.

19C2: SPOOL CTL BLOCK
The control block every job has to keep track of spooled files it may have created.

19D0: WORK CONTROL BLOCK TABLE
The system wide Work Management control block that keeps information about every ″Job In System″ (both active jobs and ended jobs that have spooled files). This object can be larger than the

current ″Jobs In System″ because it tends to grow to the high water mark of ″Jobs In System″. The system values QTOTJOB and QADLTOTJOB tend to affect its size also.

See also Section 9.5.3.7, "Reads (*RS, *RSF) Against QWCBTxx Objects" on page 240.

9.6.3 Some Common Segment Types

This topic describes some common ***segment types*** that might appear in query output that contains segment types. Many of the segment types are parts of MI objects. In such case, the queries probably replicate the MI object type we have previously described in this chapter. Also, many stand-alone segment types are rather obscure (rarely used and not well known). The following table lists only a few ″popular″ segment types (some segment types that are always part of MI objects and some stand-alone segment types).

Each item in the following list is preceded by the internal segment type 4 hex char number. These numbers match the data found in column 65 through column 68 of a PRTPEXRPT.

0003: DATA SPACE RECORDS
The specific segments within a COMPOSITE PIECE - DATA SPACE (previously described in this chapter) that contains the actual records.

0006: IWA
The segment that contains the ″true″ (internal) invocation stack (**I**nvocation **W**ork **A**rea). This ″true″ invocation stack includes both MI programs (applications, OS/400, LPPs) and LIC program invocation information.

0079: HEAP CONTROL SEG MI OBJ, 007A: HEAP DATA SEG MI OBJ
Segments that are part of above-the-MI heaps.

007C: USER-DOMAIN PROCESS SEG
Segments used to hold user domain (that is, non OS/400, LPP) program variables (automatic, static, and some heap).

007B: LIC ADDR PROCESS SEG
Segments used to hold LIC program variables (automatic, static, and some heap) for LIC programs running in a job.

007D: SYSTEM-DOMAIN PROCESS SEG
Segments used to hold system domain (that is, OS/400, LPP) program variables (automatic, static, and some heap).

2080: MWS, 20AA: MWS CREATED BLOCK
The LIC internal storage chunks (of machine-wide storage) used primarily by AS/400 communications support to hold such data as buffered input, buffered output, info (messages) to pass between communications tasks.

20AB: MWS AREA CTL SID, 20AC: MWS AREA DATA SID
Same as the MWS ″chunks″ just described.

2081: HOLD RECORD SEG
The segments used to keep track of all LOCKs and SEIZEs active on a machine.

2082: ACTIVE DEVICE LIST
The LIC internal control block that keeps track of all varied-on device descriptions.

2083: DB IN USE TABLE
The LIC internal control block that keeps trace of all open physical file members and access paths in use.

20A1: LOAD DUMP SID
Storage used during a SAVE/RESTORE session.

20B1: DATA SPACE RUN TIME SID
The LIC internal control block created and attached to every data space (physical file member records) the first time the data space is ″touched″ in an IPL.

20B6: DATA SPACE INDEX RUN TIME SID
The LIC internal control block created and attached to every data space index (key portion of a keyed physical or logical file member) the first time the data space index is ″touched″ in an IPL.

20D5: HEAP CONTROL SEGMENT, 20D6: HEAP DATA SEGMENT TYPE
Segments that are part of LIC internal heaps.

20D9: TOMBSTONE SEGMENT
A tombstone segment is used within a job to manage invocation pointers (pointers to program invocations that are temporal in nature).

9.7 MI Object Types

This topic lists MI object types. For a further description, please refer to Chapter 16 of the *OS/400 Diagnostics Aids Manual*, LY44-4907-00.

Note: System Objects are defined by a two-digit object type code followed by a two-digit object subtype code.

For Example:

- 0B90 is the object type/subtype of the data space portion of a physical file.
- 0C90 is the data space index portion of a physical or logical file.

The following table lists all of the object types available.

Table 17 (Page 1 of 2). List of System Object Types

Type	Name
01	Access group
02	Program
03	Module
04	Context, permanent or temporary
06	Byte string space
07	Journal space
08	User profile
09	Journal port
0A	Queue
0B	Data space
0C	Data space index
0D	Cursor
0E	Index

Table 17 (Page 2 of 2). List of System Object Types	
Type	**Name**
0F	Commit block
10	Logical unit description
11	Network description
12	Controller description
13	Dump space
14	Service description
15	Mode description
16	Network interface description
17	Connection list
18	Queue space
19	Space
1A	Process control space
1B	Authorization list
1C	Spelling aid dictionary
1D	Auxiliary server description
1E	Stream file
81	Machine context

This table is reproduced in Appendix E, "Performance Explorer Tables" on page 495 for ease of reference when reviewing PRTPEXRPT output in the customer environment.

Chapter 10. Examples of PEX TRACE Reports

This chapter contains the complete list of reports that are produced for each of the PEXTRC02 menu reports. The topics are in the same sequence as the report command options shown on the PEXTRC02 menu. See the example descriptions for some of the reports within each option in Chapter 9, "Interpreting Enhanced PEX TRACE Reports" on page 193.

You also need to use the topics and tables contained in the following list to interpret the reports shown in this chapter:

- Section 9.5.3, "″Bad″ DASD I/Os" on page 238
- Section 9.6, "Object Names and Types Appearing in TRACE Reports" on page 242
- Section 9.6.2, "Object and Segment Types Appearing in TRACE Reports" on page 243
- Section 9.6.3, "Some Common Segment Types" on page 245
- Appendix A, "AS/400 MI Complex Instructions (Partial List)" on page 433
- Appendix B, "AS/400 Modules (Partial List)" on page 437
- Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485
- Appendix E, "Performance Explorer Tables" on page 495

Note: IBM devlopment has determined not to document descriptions for the SLIC program/module names that appear in some of the reports. Examples of these include: IxRadix3, #domptr, #dbixuse, RmslHold, #aixxxxx, and VBNxxxx.

10.1 Full File Opens (OPENS Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.1, "OPENS Reporting Command" on page 147 for details of how to use the OPENS command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

Notes:

1. All reports produced from the OPENS command specify ″Full xxx Opens″ in the title, where ″xxx″ is:
   a. ″All″ if you selected *ALL for the ″Type of Opens″ on the OPENS command.
   b. ″DB″ if you selected *DB for the ″Type of Opens″ on the OPENS command.
   c. ″NDB″ if you selected *NDB for the ″Type of Opens″ on the OPENS command.
2. All examples in this book were produced using ′*DB′ (Database) for the ″Type of Opens″ on the OPENS command.

10.1.1 Report Title - Percent xxx Full Opens by Job

Note: Since full database file opens were chosen for this example, the ″xxx″ in the sample report shows ″DB″.

```
                                   Percent Full DB Opens
                                   by
                                   Job
                    QUERY NAME . . . . . OPENADB02
                    LIBRARY NAME . . . . HATT
                    FILE         LIBRARY      MEMBER       FORMAT
                    OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                    OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                    DATE . . . . . . . . 08/02/96
                    TIME . . . . . . . . 18:48:20
                                Pct Job DB Opens - Part 3

08/02/96  18:48:20  Percent Full DB Opens by Job   PAGE    1
Job                               Full DB   Pct     TDE
                                  Opens     All
                                            Opens
OPENBAD   A960126A  053546          1,850   70.26   00008814
TSTIOC    A960126A  053543            745   28.29   00008810
JUNK      QSPLJOB   053464             30    1.14   00008408
QBRMNET   QPGMR     053289              4     .15   00007F2E
PEXTRACE  A960126A  053555              3     .11   0000881E
SCPF      QSYS      000000              1     .04   000000EC
                      FINAL TOTALS
                      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 69. Percent Full xxx Opens by Job

10.1.2 Report Title - Percent Full xxx Opens by File

Note: Since full database file opens were chosen for this example, the ″xxx″ in the sample report shows ″DB″.

```
                                   Percent Full DB Opens
                                   by
                                   File
                    QUERY NAME . . . . . OPENADB05
                    LIBRARY NAME . . . . HATT
                    FILE         LIBRARY      MEMBER       FORMAT
                    OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
                    OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
                    DATE . . . . . . . . 08/02/96
                    TIME . . . . . . . . 18:48:21
                                Pct Fil DB Opens - Part 6


08/02/96  18:48:21  Percent Full DB Opens by File  PAGE    1
File                        Full DB   Pct
                            Opens     ALL
                                      Opens
DSPOBJD   DSPOBJD               745   28.29
PF01      PF01                  370   14.05
PF02      PF02                  370   14.05
PF03      PF03                  370   14.05
PF04      PF04                  370   14.05
PF05      PF05                  370   14.05
QATOCTCPIPCONFIG                 18     .68
QATOCLS1  SERVICES               12     .46
QA1ANET   QA1ANET                 4     .15
PF132     PEXTRACSTS              3     .11
QHST96213DQHST96213D              1     .04
                FINAL TOTALS
                TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 70. Percent Full xxx Opens by File

10.1.3 Report Title - Full xxx Opens by File within Job

```
                                                  Full DB Opens
                                                  File within Job
                                                  Descending Job-Opens Sequence
                                        QUERY NAME . . . . . OPENADB12
                                        LIBRARY NAME . . . . HATT
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        OPENADB11    PFREXP2      PEXTRACE     OPENADB11
                                        OPENADB11A   PFREXP2      PEXTRACE     OPENADB11A
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 18:48:21
                                            Full DB Opens (Desc Job detail) - Part 13


08/02/96  18:48:21  Full DB Opens - File within Job (Descending Job-Opens Sequence)  PAGE    1
Job                         File                        Full DB  Pct ALL   TDE
                                                        Opens    Opens
OPENBAD   A960126A  053546  PF01      PF01                  370    14.05   00008814
                            PF02      PF02                  370    14.05
                            PF03      PF03                  370    14.05
                            PF04      PF04                  370    14.05
                            PF05      PF05                  370    14.05
                                            TOTAL         1,850
TSTIOC    A960126A  053543  DSPOBJD   DSPOBJD               745    28.29   00008810
                                            TOTAL           745
JUNK      QSPLJOB   053464  QATOCTCPIPCONFIG                 18      .68   00008408
                            QATOCLS1  SERVICES               12      .46
                                            TOTAL            30
QBRMNET   QPGMR     053289  QA1ANET   QA1ANET                 4      .15   00007F2E
                                            TOTAL             4
PEXTRACE  A960126A  053555  PF132     PEXTRACSTS              3      .11   0000881E
                                            TOTAL             3
SCPF      QSYS      000000  QHST96213DQHST96213D              1      .04   000000EC
                                            TOTAL             1
                                            FINAL TOTALS
                                            TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 71. Full xxx Opens by File within Job

10.1.4 Report Title - Percent Full xxx Opens by Program within Job

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                                                      Percent Full DB Opens
                                                      by
                                                      Program within Job
                                        QUERY NAME . . . . . OPENADB03
                                        LIBRARY NAME . . . . HATT
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                                        OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 18:48:22
                                                  Pct Job/Pgm DB Opens - Part 4


08/02/96  18:48:22  Percent Full DB Opens by Program within Job  PAGE    1
Job                         Program          Full DB   Pct     TDE
                                             Opens     ALL
                                                       Opens
OPENBAD   A960126A  053546  OPEN5              1,850   70.26   00008814
TSTIOC    A960126A  053543  TESTIO               745   28.29   00008810
JUNK      QSPLJOB   053464  QDMCOPEN              30    1.14   00008408
QBRMNET   QPGMR     053289  QDMCOPEN               4     .15   00007F2E
PEXTRACE  A960126A  053555  QDMCOPEN               3     .11   0000881E
SCPF      QSYS      000000  QDMCOPEN               1     .04   000000EC
                                  FINAL TOTALS
                                  TOTAL        2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 72. Percent Full xxx Opens by Program within Job

10.1.5 Report Title-Percent Full xxx Opens by File within Program within Job

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                                          Percent Full DB Opens
                                          by
                                          File within Program within Job
                                QUERY NAME . . . . . OPENADB04
                                LIBRARY NAME . . . . HATT
                                FILE          LIBRARY      MEMBER       FORMAT
                                OPENADB01     PFREXP2      PEXTRACE     OPENADB01
                                OPENADB01     PFREXP2      PEXTRACE     OPENADB01
                                DATE . . . . . . . . 08/02/96
                                TIME . . . . . . . . 18:48:22
                                        Pct Job/Pgm/Fil DB Opens - Part 5


08/02/96  18:48:22      Percent Full DB Opens by File within Program within Job      PAGE    1
Job                         Program     File                        Full DB   Pct     TDE
                                                                    Opens     ALL
                                                                              Opens
TSTIOC    A960126A  053543  TESTIO      DSPOBJD   DSPOBJD               745   28.29   00008810
OPENBAD   A960126A  053546  OPEN5       PF01      PF01                  370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF02      PF02                  370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF03      PF03                  370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF04      PF04                  370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF05      PF05                  370   14.05   00008814
JUNK      QSPLJOB   053464  QDMCOPEN    QATOCTCPIPCONFIG                 18     .68   00008408
JUNK      QSPLJOB   053464  QDMCOPEN    QATOCLS1  SERVICES               12     .46   00008408
QBRMNET   QPGMR     053289  QDMCOPEN    QA1ANET   QA1ANET                 4     .15   00007F2E
PEXTRACE  A960126A  053555  QDMCOPEN    PF132     PEXTRACSTS              3     .11   0000881E
SCPF      QSYS      000000  QDMCOPEN    QHST96213DQHST96213D              1     .04   000000EC
                                                        FINAL TOTALS
                                                        TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 73. Percent Full xxx Opens by File within Program within Job

10.1.6 Report Title - Percent Full xxx Opens by File within Program

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                                              Percent Full DB Opens
                                              by
                                              File within Program
                                QUERY NAME . . . . . OPENADB06
                                LIBRARY NAME . . . . HATT
                                FILE          LIBRARY      MEMBER       FORMAT
                                OPENADB01A    PFREXP2      PEXTRACE     OPENADB01A
                                OPENADB01A    PFREXP2      PEXTRACE     OPENADB01A
                                DATE . . . . . . . . 08/02/96
                                TIME . . . . . . . . 18:48:23
                                          Pct Pgm/Fil DB Opens - Part 7


08/02/96  18:48:23  Percent Full DB Opens by File within Program  PAGE    1
Program     File                        Full DB   Pct
                                        Opens     ALL
                                                  Opens
TESTIO      DSPOBJD   DSPOBJD               745   28.29
OPEN5       PF01      PF01                  370   14.05
OPEN5       PF02      PF02                  370   14.05
OPEN5       PF03      PF03                  370   14.05
OPEN5       PF04      PF04                  370   14.05
OPEN5       PF05      PF05                  370   14.05
QDMCOPEN    QATOCTCPIPCONFIG                 18     .68
QDMCOPEN    QATOCLS1  SERVICES               12     .46
QDMCOPEN    QA1ANET   QA1ANET                 4     .15
QDMCOPEN    PF132     PEXTRACSTS              3     .11
QDMCOPEN    QHST96213DQHST96213D              1     .04
                        FINAL TOTALS
                        TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 74. Percent Full xxx Opens by File within Program

10.1.7 Report Title - Percent Full xxx Opens by Program within File

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
              Percent Full DB Opens
              by
              File/Program
QUERY NAME . . . . . OPENADB07
LIBRARY NAME . . . . HATT
FILE          LIBRARY      MEMBER       FORMAT
OPENADB01B    PFREXP2      PEXTRACE     OPENADB01B
OPENADB01B    PFREXP2      PEXTRACE     OPENADB01B
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:48:23
            Pct Fil/Pgm Opens - Part 8
```

```
08/02/96  18:48:23  Percent Full DB Opens by File/Program  PAGE    1
File                  Program           Full DB   Pct
                                        Opens     ALL
                                                  Opens
DSPOBJD    DSPOBJD    TESTIO                745   28.29
PF01       PF01       OPEN5                 370   14.05
PF02       PF02       OPEN5                 370   14.05
PF03       PF03       OPEN5                 370   14.05
PF04       PF04       OPEN5                 370   14.05
PF05       PF05       OPEN5                 370   14.05
QATOCTCPIPCONFIG      QDMCOPEN               18     .68
QATOCLS1   SERVICES   QDMCOPEN               12     .46
QA1ANET    QA1ANET    QDMCOPEN                4     .15
PF132      PEXTRACSTS QDMCOPEN                3     .11
QHST96213DQHST96213D  QDMCOPEN                1     .04
                            FINAL TOTALS
                            TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 75. Percent Full xxx Opens by Program within File

10.1.8 Report Title - Percent Full xxx Opens by Program

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
              Percent Full DB Opens
              by
              Program
QUERY NAME . . . . . OPENADB08
LIBRARY NAME . . . . HATT
FILE          LIBRARY      MEMBER       FORMAT
OPENADB01A    PFREXP2      PEXTRACE     OPENADB01A
OPENADB01A    PFREXP2      PEXTRACE     OPENADB01A
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:48:24
          Pct Pgm DB      Opens - Part 9
```

```
08/02/96  18:48:24  Percent Full DB Opens by Program  PAGE    1
Program           Full DB   Pct
                  Opens     ALL
                            Opens
OPEN5               1,850   70.26
TESTIO                745   28.29
QDMCOPEN               38    1.44
      FINAL TOTALS
      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 76. Percent Full xxx Opens by Program

10.1.9 Report Title - Percent Full xxx Opens by Job within Program within File

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                         Percent Full DB Opens
                         by
                         File/Program/Job
              QUERY NAME . . . . . OPENADB09
              LIBRARY NAME . . . . HATT
              FILE         LIBRARY      MEMBER       FORMAT
              OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
              OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
              DATE . . . . . . . . 08/02/96
              TIME . . . . . . . . 18:48:24
                       Pct Fil/Pgm/Job Opens - Part 10


08/02/96  18:48:24            Percent Full DB Opens by File/Program/Job           PAGE    1
File                 Program    Job                           Full DB   Pct      TDE
                                                              Opens     ALL
                                                                        Opens
DSPOBJD   DSPOBJD    TESTIO     TSTIOC    A960126A  053543        745   28.29    00008810
PF01      PF01       OPEN5      OPENBAD   A960126A  053546        370   14.05    00008814
PF02      PF02       OPEN5      OPENBAD   A960126A  053546        370   14.05    00008814
PF03      PF03       OPEN5      OPENBAD   A960126A  053546        370   14.05    00008814
PF04      PF04       OPEN5      OPENBAD   A960126A  053546        370   14.05    00008814
PF05      PF05       OPEN5      OPENBAD   A960126A  053546        370   14.05    00008814
QATOCTCPIPCONFIG     QDMCOPEN   JUNK      QSPLJOB   053464         18     .68    00008408
QATOCLS1  SERVICES   QDMCOPEN   JUNK      QSPLJOB   053464         12     .46    00008408
QA1ANET   QA1ANET    QDMCOPEN   QBRMNET   QPGMR     053289          4     .15    00007F2E
PF132     PEXTRACSTS QDMCOPEN   PEXTRACE  A960126A  053555          3     .11    0000881E
QHST96213DQHST96213D QDMCOPEN   SCPF      QSYS      000000          1     .04    000000EC
                                                      FINAL TOTALS
                                                      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 77. Percent Full xxx Opens by Job within Program within File

10.1.10 Report Title - Detail Full xxx Opens

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                          Detail Full DB Opens
                          Program Sequence
              QUERY NAME . . . . . OPENADB14
              LIBRARY NAME . . . . HATT
              FILE         LIBRARY      MEMBER       FORMAT
              OPENADB13    PFREXP2      PEXTRACE     OPENADB13
              OPENADB13    PFREXP2      PEXTRACE     OPENADB13
              OPENADB01    PFREXP2      PEXTRACE     OPENADB01
              DATE . . . . . . . . 08/02/96
              TIME . . . . . . . . 18:48:25
                         Full DB Opens - Part 15


08/02/96  18:48:25                                 Detail Full DB Opens                              PAGE    1
                                                   Program Sequence
Program     File                  Job                           DB Opens              PGM         JOB     TDE
                                                                per                   Total       Total
                                                                JOB/PGM/FILE
OPEN5       PF01      PF01        OPENBAD   A960126A  053546             370          1,850       1,850   00008814
            PF02      PF02        OPENBAD   A960126A  053546             370          1,850       1,850   00008814
            PF03      PF03        OPENBAD   A960126A  053546             370          1,850       1,850   00008814
            PF04      PF04        OPENBAD   A960126A  053546             370          1,850       1,850   00008814
            PF05      PF05        OPENBAD   A960126A  053546             370          1,850       1,850   00008814
QDMCOPEN    PF132     PEXTRACSTS  PEXTRACE  A960126A  053555               3             38           3   0000881E
            QATOCLS1  SERVICES    JUNK      QSPLJOB   053464              12             38          30   00008408
            QATOCTCPIPCONFIG      JUNK      QSPLJOB   053464              18             38          30   00008408
            QA1ANET   QA1ANET     QBRMNET   QPGMR     053289               4             38           4   00007F2E
            QHST96213DQHST96213D  SCPF      QSYS      000000               1             38           1   000000EC
TESTIO      DSPOBJD   DSPOBJD     TSTIOC    A960126A  053543             745            745         745   00008810
                                                      FINAL TOTALS
                                                      TOTAL            2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 78. Detail Full xxx Opens

10.2 Physical Disk I/Os (IOS Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.2, “IOS Reporting Command” on page 149 for details of how to use the IOS command to produce these reports.

Refer to Table 13 on page 168 for details on the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.2.1 Report Title - DASD I/Os - System Wide Summary by I/O Type

This report is produced from All Options on the IOS Command

Note: Only one copy of this report is produced irrespective of how many options are responded to with ″Y″ on the IOS command.

```
                                   DASD I/Os - system wide summary by I/O type
                                QUERY NAME . . . . . IOS3
                                LIBRARY NAME . . . . SMTRACE
                                FILE         LIBRARY      MEMBER       FORMAT
                                IOS1         PFREXP2      PEXTRACE     IOS1
                                IOS2         PFREXP2      PEXTRACE     IOS2
                                DATE . . . . . . . . 08/02/96
                                TIME . . . . . . . . 18:49:37

Type of Dasd  I/O Count  Percent of all        Total pages   Average pages   Minimum pages   Maximum pages
I/O                      system I/Os           transferred   transferred     transferred     transferred
                 94,651      100.00            151,175.00             1.60            1.00           31.00
   *RSF S        46,161       48.77             63,853.00             1.38            1.00            4.00
   *WSP S        26,301       27.79             56,960.00             2.17            1.00           31.00
   *RX  A        13,031       13.77             20,338.00             1.56            1.00            8.00
   *RS  S         6,036        6.38              6,747.00             1.12            1.00           12.00
   *RS  A         2,980        3.15              2,993.00             1.00            1.00            6.00
   *WS  S           111         .12                253.00             2.28            1.00           21.00
   *WS  A            18         .02                 18.00             1.00            1.00            1.00
   *WSP A            13         .01                 13.00             1.00            1.00            1.00
* * *  E N D  O F  R E P O R T  * * *
```

Figure 79. DASD I/Os - System Wide Summary by I/O Type

10.2.2 Report Title - DASD I/Os by Job/Task Name and I/O Type

This report is produced from Command Option - By Job/Task Name and I/O Type.

```
DASD I/Os by Job/Task name and I/O type
Includes only TDE's that had 1% or more of all system I/Os
    QUERY NAME . . . . . IOTDE3
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    IOTDE2       PFREXP2      PEXTRACE     IOTDE2
    IOTDE1       PFREXP2      PEXTRACE     IOTDE1
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    IOTDE1A      PFREXP2      PEXTRACE     IOTDE1A
    DATE . . . . . . . . 08/02/96
    TIME . . . . . . . . 18:50:00

TDE       Job/Task          Job         Job     I/O          I/O  Average       Percent of this  Percent of TOTAL
number    name              user        number  type       count  pages         TDE's I/Os       system I/Os
                                                                  transferred
00008810  TSTIOC            A960126A    053543  *RS  A     1,370        1.00          6.15              1.45
                                                *RS  S     1,218        1.00          5.47              1.29
                                                *RSF S     7,724        1.32         34.67              8.16
                                                *RX  A    11,969        1.00         53.72             12.65
                                                          22,281        1.11        100.00             23.54
0000880E  ILEAGNEW          A960126A    053541  *RS  S     1,127        1.07          5.74              1.19
                                                *RSF S    18,500        1.46         94.20             19.55
                                                *WS  S         2        1.50           .01               .00
                                                *WSP S        10        5.20           .05               .01
                                                          19,639        1.44        100.00             20.75
00008814  OPENBAD           A960126A    053546  *RS  A     1,595        1.00          8.13              1.69
                                                *RS  S     3,470        1.04         17.69              3.67
                                                *RSF S    14,535        1.21         74.10             15.36
                                                *WSP S        16        9.75           .08               .02
                                                          19,616        1.17        100.00             20.72
00008408  JUNK              QSPLJOB     053464  *RS  A        12        1.00           .23               .01
                                                *RS  S       170        3.59          3.27               .18
                                                *RSF S     4,995        1.72         96.15              5.28
                                                *WS  S        12        8.92           .23               .01
                                                *WSP S         6        8.83           .12               .01
                                                           5,195        1.80        100.00              5.49
0000006B  SMP00006                                      *WSP S     3,932        2.20        100.00              4.15
                                                           3,932        2.20        100.00              4.15
00000068  SMP00003                                      *WSP S     3,853        2.17        100.00              4.07
                                                           3,853        2.17        100.00              4.07
00000069  SMP00004                                      *WSP S     3,768        2.20        100.00              3.98
                                                           3,768        2.20        100.00              3.98
00000067  SMP00002                                      *WSP S     3,698        2.14        100.00              3.91
                                                           3,698        2.14        100.00              3.91
00000066  SMP00001                                      *WSP S     3,670        2.12        100.00              3.88
                                                    M05

TDE       Job/Task          Job         Job     I/O          I/O  Average       Percent of this  Percent of TOTAL
number    name              user        number  type       count  pages         TDE's I/Os       system I/Os
                                                                  transferred
00000066  SMP00001                                         3,670        2.12        100.00              3.88
0000006A  SMP00005                                      *WSP S     3,663        2.15        100.00              3.87
                                                           3,663        2.15        100.00              3.87
0000006C  SMP00007                                      *WSP S     3,651        2.13        100.00              3.86
                                                           3,651        2.13        100.00              3.86
00007F6C  P23ARTVKE         A960126A    053319  *RS  A         3        5.33           .23               .00
                                                *RS  S        14        2.29          1.06               .01
                                                *RSF S       231        1.03         17.46               .24
                                                *RX  A     1,062        7.88         80.27              1.12
                                                *WS  A         7        1.00           .53               .01
                                                *WS  S         6        1.00           .45               .01
                                                           1,323        6.55        100.00              1.40
* * *  E N D  O F  R E P O R T  * * *
```

Figure 80. DASD I/Os by Job/Task Name and I/O Type

10.2.3 Report Title - DASD I/Os by Job/Task and Object Name/Type

This report is produced from Command Option - By Job/Task Name and Object Name.

```
                DASD I/Os by Job/Task and Object Name/Type
                Only includes Jobs/Tasks that performed 1% or more of all I/Os and
                Only include objects that had 1% or more of each Job's/Task's I/Os
                        QUERY NAME . . . . . IOTOBJ3
                        LIBRARY NAME . . . . SMTRACE
                        FILE          LIBRARY       MEMBER       FORMAT
                        IOTOBJ2       PFREXP2       PEXTRACE     IOTOBJ2
                        IOTOBJ2A      PFREXP2       PEXTRACE     IOTOBJ2A
                        IOTOBJ1B      PFREXP2       PEXTRACE     IOTOBJ1B
                        TASKINFO      PFREXP2       PEXTRACE     TASKINFO
                        IOTOBJ1A      PFREXP2       PEXTRACE     IOTOBJ1A
                        DATE . . . . . . . . 08/02/96
                        TIME . . . . . . . . 18:50:31

TDE       Task name         Job         Job          NAMETYPE  OPR     NAMETYPE                        Percent of this  Percent of ALL
                            user        number       COUNT                                             TDE's I/Os       system I/Os
00008810  TSTIOC            A960126A    053543         11,969  *RX  A  DSPOBJD   DSPOBJD     0B90            53.72            12.65
                                                        1,455  *RSF S                                         6.53             1.54
                                                        1,370  *RS  A                                         6.15             1.45
                                                          473  *RS  S                                         2.12              .50
                                         TOTAL         15,267                                                68.52            16.14
                                                        1,929  *RSF S  TESTIO                0201             8.66             2.04
                                         TOTAL          1,929                                                 8.66             2.04
                                                        1,246  *RSF S  HATT                  0401             5.59             1.32
                                         TOTAL          1,246                                                 5.59             1.32
                                                          871  *RSF S  TESTIOC               0201             3.91              .92
                                         TOTAL            871                                                 3.91              .92
                                                          745  *RS  S  *DESTROYED            0000             3.34              .79
                                         TOTAL            745                                                 3.34              .79
                                                          447  *RSF S  QDBGETM               0201             2.01              .47
                                         TOTAL            447                                                 2.01              .47
                                                          404  *RSF S  QDFTOWN               0801             1.81              .43
                                         TOTAL            404                                                 1.81              .43
                                                          385  *RSF S  DSPOBJD               1901             1.73              .41
                                         TOTAL            385                                                 1.73              .41
                                                          367  *RSF S  QCAWAREA              19EF             1.65              .39
                                         TOTAL            367                                                 1.65              .39
                                                   M05

TDE       Task name         Job         Job          NAMETYPE  OPR     NAMETYPE                        Percent of this  Percent of ALL
                            user        number       COUNT                                             TDE's I/Os       system I/Os
00008810  TSTIOC            A960126A    053543            354  *RSF S  F86D14F54004          0000             1.59              .37
                                         TOTAL            354                                                 1.59              .37
                                         TOTAL         22,015                                                98.81            23.28
0000880E  ILEAGNEW          A960126A    053541          4,543  *RSF S  FCFA2024DA00          0000            23.13             4.80
                                         TOTAL          4,543                                                23.13             4.80
                                                        4,090  *RSF S  ILEAGNEW  A960126A    1AEF            20.83             4.32
                                         TOTAL          4,090                                                20.83             4.32
                                                        2,063  *RSF S  *DESTROYED            0000            10.50             2.18
                                         TOTAL          2,063                                                10.50             2.18
                                                        1,461  *RSF S  ILEAGN                0201             7.44             1.54
                                         TOTAL          1,461                                                 7.44             1.54
                                                        1,012  *RSF S  QRNXDUMP              0203             5.15             1.07
                                         TOTAL          1,012                                                 5.15             1.07
                                                          833  *RSF S  QSQENDAG              0201             4.24              .88
                                         TOTAL            833                                                 4.24              .88
                                                          828  *RSF S  QLEAWI                0203             4.22              .87
                                         TOTAL            828                                                 4.22              .87
                                                          732  *RSF S  D7A782247200          0000             3.73              .77
                                         TOTAL            732                                                 3.73              .77
                                                          623  *RSF S  C3E62C036004          0000             3.17              .66
```

Figure 81 (Part 1 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE’s I/Os	Percent of ALL system I/Os
			TOTAL	623					3.17	.66
0000880E	ILEAGNEW	A960126A	053541	550	*RS S	QWVPDAGE		0201	2.80	.58
			TOTAL	550					2.80	.58
				567	*RSF S	ILEAGNEW		0201	2.89	.60
			TOTAL	567					2.89	.60
				551	*RS S	QUIRCLAP		0201	2.81	.58
			TOTAL	551					2.81	.58
				281	*RSF S	APLIST		19EF	1.43	.30
			TOTAL	281					1.43	.30
				280	*RSF S	D56C3B528F00		0000	1.43	.30
			TOTAL	280					1.43	.30
				276	*RSF S	QCAWAREA		19EF	1.41	.29
			TOTAL	276					1.41	.29
				274	*RSF S	QJOBMSGQ		18A0	1.40	.29
			TOTAL	274					1.40	.29
				272	*RSF S	SEIZE LOCK RANGE		0000	1.38	.29
			TOTAL	272					1.38	.29
			TOTAL	19,236					97.96	20.32
00008814	OPENBAD	A960126A	053546	1,856	*RS S	*DESTROYED		0000	9.46	1.96
				1,789	*RSF S				9.12	1.89

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE’s I/Os	Percent of ALL system I/Os
			TOTAL	3,645					18.58	3.85
00008814	OPENBAD	A960126A	053546	2,385	*RSF S	OPEN5		0201	12.16	2.52
			TOTAL	2,385					12.16	2.52
				1,187	*RSF S	OPENBAD	A960126A	1AEF	6.05	1.25
			TOTAL	1,187					6.05	1.25
				545	*RSF S	PF04	PF04	0B90	2.78	.58
				317	*RS A				1.62	.33
				316	*RS S				1.61	.33
			TOTAL	1,178					6.01	1.24
				522	*RSF S	PF03	PF03	0B90	2.66	.55
				322	*RS A				1.64	.34
				317	*RS S				1.62	.33
			TOTAL	1,161					5.92	1.22
				509	*RSF S	PF05	PF05	0B90	2.59	.54
				318	*RS A				1.62	.34
				317	*RS S				1.62	.33
			TOTAL	1,144					5.83	1.21
				495	*RSF S	PF02	PF02	0B90	2.52	.52
				319	*RS A				1.63	.34
				318	*RS S				1.62	.34
			TOTAL	1,132					5.77	1.20
				469	*RSF S	PF01	PF01	0B90	2.39	.50
				319	*RS A				1.63	.34
				319	*RS S				1.63	.34
			TOTAL	1,107					5.65	1.18

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE’s I/Os	Percent of ALL system I/Os
00008814	OPENBAD	A960126A	053546	965	*RSF S	OPENBAD		0201	4.92	1.02
			TOTAL	965					4.92	1.02
				728	*RSF S	SEIZE LOCK RANGE		0000	3.71	.77
			TOTAL	728					3.71	.77
				621	*RSF S	QCAWAREA		19EF	3.17	.66
			TOTAL	621					3.17	.66
				493	*RSF S	F5075E554004		0000	2.51	.52
			TOTAL	493					2.51	.52
				490	*RSF S	FD3057655004		0000	2.50	.52
			TOTAL	490					2.50	.52
				480	*RSF S	C2E7BB3D7004		0000	2.45	.51
			TOTAL	480					2.45	.51
				469	*RSF S	D3334BC40004		0000	2.39	.50
			TOTAL	469					2.39	.50
				457	*RSF S	F3CA6CD12004		0000	2.33	.48
			TOTAL	457					2.33	.48
				308	*RSF S	PF01		1901	1.57	.33
			TOTAL	308					1.57	.33
				308	*RSF S	PF02		1901	1.57	.33
			TOTAL	308					1.57	.33

Figure 81 (Part 2 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008814	OPENBAD	A960126A	053546	306	*RSF S	PF05	1901	1.56	.32
			TOTAL	306				1.56	.32
				305	*RSF S	PF04	1901	1.55	.32
			TOTAL	305				1.55	.32
				304	*RSF S	PF03	1901	1.55	.32
			TOTAL	304				1.55	.32
				265	*RSF S	QUSRSYS	0401	1.35	.28
			TOTAL	265				1.35	.28
			TOTAL	19,438				99.10	20.55
00008408	JUNK	QSPLJOB	053464	787	*RSF S	D2FB76C77200	0000	15.15	.83
			TOTAL	787				15.15	.83
				690	*RSF S	JUNK QSPLJOB	1AEF	13.28	.73
				56	*RS S			1.08	.06
			TOTAL	746				14.36	.79
				371	*RSF S	QSOSRV2	0203	7.14	.39
			TOTAL	371				7.14	.39
				266	*RSF S	QTMPLPRC	0201	5.12	.28
			TOTAL	266				5.12	.28
				239	*RSF S	*DESTROYED	0000	4.60	.25
			TOTAL	239				4.60	.25

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008408	JUNK	QSPLJOB	053464	214	*RSF S	QSOKERN3	0203	4.12	.23
			TOTAL	214				4.12	.23
				188	*RSF S	L/L RANGE 1	0000	3.62	.20
			TOTAL	188				3.62	.20
				143	*RSF S	QSOSRV1	0203	2.75	.15
			TOTAL	143				2.75	.15
				139	*RSF S	QJOBMSGQ	18A0	2.68	.15
			TOTAL	139				2.68	.15
				110	*RSF S	SQCCSID1	0ED2	2.12	.12
			TOTAL	110				2.12	.12
				90	*RSF S	E7CB3ED36004	0000	1.73	.10
			TOTAL	90				1.73	.10
				84	*RSF S	CB409AF8A004	0000	1.62	.09
			TOTAL	84				1.62	.09
				84	*RSF S	F4E3FAD8D004	0000	1.62	.09
			TOTAL	84				1.62	.09
				81	*RSF S	QTQICONV	0203	1.56	.09
			TOTAL	81				1.56	.09
				72	*RSF S	QC2UTIL1	0203	1.39	.08
			TOTAL	72				1.39	.08

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008408	JUNK	QSPLJOB	053464	72	*RSF S	QPOLLIB1	0203	1.39	.08
			TOTAL	72				1.39	.08
				69	*RSF S	E43BF962E500	0000	1.33	.07
			TOTAL	69				1.33	.07
				52	*RSF S	QATOCTCPIPCONFIG	0B90	1.00	.05
			TOTAL	52				1.00	.05
				67	*RSF S	QATOCTCPIPCONFIG	0C90	1.29	.07
			TOTAL	67				1.29	.07
				66	*RSF S	QYPPRT	0203	1.27	.07
			TOTAL	66				1.27	.07
				61	*RSF S	EEE05252CB00	0000	1.17	.06
			TOTAL	61				1.17	.06
				60	*RSF S	QSO_DNS_INDEX	0EEF	1.15	.06
			TOTAL	60				1.15	.06
				60	*RSF S	SEIZE LOCK RANGE	0000	1.15	.06
			TOTAL	60				1.15	.06
			TOTAL	4,121				79.33	4.36
0000006B	SMP00006			673	*WSP S	ILEAGNEW A960126A	1AEF	17.12	.71
			TOTAL	673				17.12	.71
				532	*WSP S	*DESTROYED	0000	13.53	.56

Figure 81 (Part 3 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	532					13.53	.56
0000006B	SMP00006			523	*WSP S	FCFA2024DA00		0000	13.30	.55
			TOTAL	523					13.30	.55
				185	*WSP S	SEIZE LOCK RANGE		0000	4.70	.20
			TOTAL	185					4.70	.20
				157	*WSP S	QCAWAREA		19EF	3.99	.17
			TOTAL	157					3.99	.17
				114	*WSP S	OPENBAD	A960126A	1AEF	2.90	.12
			TOTAL	114					2.90	.12
				113	*WSP S	C3E62C036004		0000	2.87	.12
			TOTAL	113					2.87	.12
				100	*WSP S	F5075E554004		0000	2.54	.11
			TOTAL	100					2.54	.11
				95	*WSP S	F86D14F54004		0000	2.42	.10
			TOTAL	95					2.42	.10
				93	*WSP S	F3CA6CD12004		0000	2.37	.10
			TOTAL	93					2.37	.10
				92	*WSP S	PF05	PF05	0B90	2.34	.10
			TOTAL	92					2.34	.10
				87	*WSP S	FD3057655004		0000	2.21	.09

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	87					2.21	.09
0000006B	SMP00006			85	*WSP S	PF04	PF04	0B90	2.16	.09
			TOTAL	85					2.16	.09
				84	*WSP S	QJOBMSGQ		18A0	2.14	.09
			TOTAL	84					2.14	.09
				83	*WSP S	D3334BC40004		0000	2.11	.09
			TOTAL	83					2.11	.09
				83	*WSP S	JUNK	QSPLJOB	1AEF	2.11	.09
			TOTAL	83					2.11	.09
				81	*WSP S	PF01	PF01	0B90	2.06	.09
			TOTAL	81					2.06	.09
				80	*WSP S	DSPOBJD	DSPOBJD	0B90	2.03	.08
			TOTAL	80					2.03	.08
				79	*WSP S	PF03	PF03	0B90	2.01	.08
			TOTAL	79					2.01	.08
				77	*WSP S	PF02	PF02	0B90	1.96	.08
			TOTAL	77					1.96	.08
				76	*WSP S	C2E7BB3D7004		0000	1.93	.08
			TOTAL	76					1.93	.08
				58	*WSP S	QRNXDUMP		0203	1.48	.06

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	58					1.48	.06
0000006B	SMP00006			57	*WSP S	QRNXIE		0203	1.45	.06
			TOTAL	57					1.45	.06
				52	*WSP S	TESTIO		0201	1.32	.05
			TOTAL	52					1.32	.05
				47	*WSP S	OPEN5		0201	1.20	.05
			TOTAL	47					1.20	.05
				41	*WSP S	ILEAGN		0201	1.04	.04
			TOTAL	41					1.04	.04
			TOTAL	3,747					95.29	3.96
00000068	SMP00003			665	*WSP S	ILEAGNEW	A960126A	1AEF	17.26	.70
			TOTAL	665					17.26	.70
				509	*WSP S	*DESTROYED		0000	13.21	.54
			TOTAL	509					13.21	.54
				474	*WSP S	FCFA2024DA00		0000	12.30	.50
			TOTAL	474					12.30	.50
				164	*WSP S	SEIZE LOCK RANGE		0000	4.26	.17
			TOTAL	164					4.26	.17
				146	*WSP S	QCAWAREA		19EF	3.79	.15
			TOTAL	146					3.79	.15

Figure 81 (Part 4 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000068	SMP00003			135	*WSP S	OPENBAD	A960126A	1AEF	3.50	.14
			TOTAL	135					3.50	.14
				110	*WSP S	JUNK	QSPLJOB	1AEF	2.85	.12
			TOTAL	110					2.85	.12
				96	*WSP S	C3E62C036004		0000	2.49	.10
			TOTAL	96					2.49	.10
				90	*WSP S	QJOBMSGQ		18A0	2.34	.10
			TOTAL	90					2.34	.10
				88	*WSP S	PF03	PF03	0B90	2.28	.09
			TOTAL	88					2.28	.09
				85	*WSP S	F5075E554004		0000	2.21	.09
			TOTAL	85					2.21	.09
				83	*WSP S	C2E7BB3D7004		0000	2.15	.09
			TOTAL	83					2.15	.09
				83	*WSP S	PF01	PF01	0B90	2.15	.09
			TOTAL	83					2.15	.09
				80	*WSP S	DSPOBJD	DSPOBJD	0B90	2.08	.08
			TOTAL	80					2.08	.08
				80	*WSP S	FD3057655004		0000	2.08	.08
			TOTAL	80					2.08	.08
				M05						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000068	SMP00003			79	*WSP S	D3334BC40004		0000	2.05	.08
			TOTAL	79					2.05	.08
				79	*WSP S	PF04	PF04	0B90	2.05	.08
			TOTAL	79					2.05	.08
				77	*WSP S	D2FB76C77200		0000	2.00	.08
			TOTAL	77					2.00	.08
				77	*WSP S	F3CA6CD12004		0000	2.00	.08
			TOTAL	77					2.00	.08
				75	*WSP S	PF02	PF02	0B90	1.95	.08
			TOTAL	75					1.95	.08
				71	*WSP S	F86D14F54004		0000	1.84	.08
			TOTAL	71					1.84	.08
				66	*WSP S	PF05	PF05	0B90	1.71	.07
			TOTAL	66					1.71	.07
				59	*WSP S	QRNXDUMP		0203	1.53	.06
			TOTAL	59					1.53	.06
				56	*WSP S	D56C3B528F00		0000	1.45	.06
			TOTAL	56					1.45	.06
				54	*WSP S	OPEN5		0201	1.40	.06
			TOTAL	54					1.40	.06
				M05						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000068	SMP00003			48	*WSP S	TESTIO		0201	1.25	.05
			TOTAL	48					1.25	.05
				39	*WSP S	QRNXIE		0203	1.01	.04
			TOTAL	39					1.01	.04
			TOTAL	3,668					95.19	3.86
00000069	SMP00004			716	*WSP S	ILEAGNEW	A960126A	1AEF	19.00	.76
			TOTAL	716					19.00	.76
				493	*WSP S	*DESTROYED		0000	13.08	.52
			TOTAL	493					13.08	.52
				414	*WSP S	FCFA2024DA00		0000	10.99	.44
			TOTAL	414					10.99	.44
				207	*WSP S	SEIZE LOCK RANGE		0000	5.49	.22
			TOTAL	207					5.49	.22
				130	*WSP S	QCAWAREA		19EF	3.45	.14
			TOTAL	130					3.45	.14
				127	*WSP S	OPENBAD	A960126A	1AEF	3.37	.13
			TOTAL	127					3.37	.13
				111	*WSP S	C3E62C036004		0000	2.95	.12
			TOTAL	111					2.95	.12
				102	*WSP S	JUNK	QSPLJOB	1AEF	2.71	.11

Figure 81 (Part 5 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	102					2.71	.11
00000069	SMP00004			94	*WSP S	QJOBMSGQ		18A0	2.49	.10
			TOTAL	94					2.49	.10
				91	*WSP S	F86D14F54004		0000	2.42	.10
			TOTAL	91					2.42	.10
				88	*WSP S	D3334BC40004		0000	2.34	.09
			TOTAL	88					2.34	.09
				85	*WSP S	PF05	PF05	0B90	2.26	.09
			TOTAL	85					2.26	.09
				84	*WSP S	PF03	PF03	0B90	2.23	.09
			TOTAL	84					2.23	.09
				78	*WSP S	C2E7BB3D7004		0000	2.07	.08
			TOTAL	78					2.07	.08
				78	*WSP S	F5075E554004		0000	2.07	.08
			TOTAL	78					2.07	.08
				76	*WSP S	FD3057655004		0000	2.02	.08
			TOTAL	76					2.02	.08
				72	*WSP S	DSPOBJD	DSPOBJD	0B90	1.91	.08
			TOTAL	72					1.91	.08
				69	*WSP S	F3CA6CD12004		0000	1.83	.07
				M05						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	69					1.83	.07
00000069	SMP00004			69	*WSP S	PF04	PF04	0B90	1.83	.07
			TOTAL	69					1.83	.07
				65	*WSP S	PF02	PF02	0B90	1.73	.07
			TOTAL	65					1.73	.07
				63	*WSP S	QRNXDUMP		0203	1.67	.07
			TOTAL	63					1.67	.07
				62	*WSP S	PF01	PF01	0B90	1.65	.07
			TOTAL	62					1.65	.07
				49	*WSP S	QRNXIE		0203	1.30	.05
			TOTAL	49					1.30	.05
				47	*WSP S	D2FB76C77200		0000	1.25	.05
			TOTAL	47					1.25	.05
				41	*WSP S	D7A782247200		0000	1.09	.04
			TOTAL	41					1.09	.04
				39	*WSP S	TESTIO		0201	1.04	.04
			TOTAL	39					1.04	.04
				38	*WSP S	ILEAGN		0201	1.01	.04
			TOTAL	38					1.01	.04
			TOTAL	3,588					95.25	3.80
				M05						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000067	SMP00002			649	*WSP S	ILEAGNEW	A960126A	1AEF	17.55	.69
			TOTAL	649					17.55	.69
				502	*WSP S	FCFA2024DA00		0000	13.57	.53
			TOTAL	502					13.57	.53
				457	*WSP S	*DESTROYED		0000	12.36	.48
			TOTAL	457					12.36	.48
				169	*WSP S	SEIZE LOCK RANGE		0000	4.57	.18
			TOTAL	169					4.57	.18
				123	*WSP S	QCAWAREA		19EF	3.33	.13
			TOTAL	123					3.33	.13
				117	*WSP S	OPENBAD	A960126A	1AEF	3.16	.12
			TOTAL	117					3.16	.12
				110	*WSP S	JUNK	QSPLJOB	1AEF	2.97	.12
			TOTAL	110					2.97	.12
				107	*WSP S	QJOBMSGQ		18A0	2.89	.11
			TOTAL	107					2.89	.11
				98	*WSP S	C3E62C036004		0000	2.65	.10
			TOTAL	98					2.65	.10
				94	*WSP S	C2E7BB3D7004		0000	2.54	.10
			TOTAL	94					2.54	.10

Figure 81 (Part 6 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000067	SMP00002			94	*WSP S	F86D14F54004		0000	2.54	.10
			TOTAL	94					2.54	.10
				82	*WSP S	F3CA6CD12004		0000	2.22	.09
			TOTAL	82					2.22	.09
				80	*WSP S	FD3057655004		0000	2.16	.08
			TOTAL	80					2.16	.08
				80	*WSP S	PF02	PF02	0B90	2.16	.08
			TOTAL	80					2.16	.08
				80	*WSP S	PF03	PF03	0B90	2.16	.08
			TOTAL	80					2.16	.08
				79	*WSP S	F5075E554004		0000	2.14	.08
			TOTAL	79					2.14	.08
				75	*WSP S	D3334BC40004		0000	2.03	.08
			TOTAL	75					2.03	.08
				70	*WSP S	PF04	PF04	0B90	1.89	.07
			TOTAL	70					1.89	.07
				68	*WSP S	PF05	PF05	0B90	1.84	.07
			TOTAL	68					1.84	.07
				65	*WSP S	PF01	PF01	0B90	1.76	.07
			TOTAL	65					1.76	.07

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000067	SMP00002			61	*WSP S	DSPOBJD	DSPOBJD	0B90	1.65	.06
			TOTAL	61					1.65	.06
				54	*WSP S	TESTIO		0201	1.46	.06
			TOTAL	54					1.46	.06
				49	*WSP S	OPEN5		0201	1.33	.05
			TOTAL	49					1.33	.05
				49	*WSP S	QRNXDUMP		0203	1.33	.05
			TOTAL	49					1.33	.05
				49	*WSP S	QRNXIE		0203	1.33	.05
			TOTAL	49					1.33	.05
				40	*WSP S	D7A782247200		0000	1.08	.04
			TOTAL	40					1.08	.04
				38	*WSP S	D2FB76C77200		0000	1.03	.04
			TOTAL	38					1.03	.04
				38	*WSP S	D56C3B528F00		0000	1.03	.04
			TOTAL	38					1.03	.04
				37	*WSP S	ILEAGN		0201	1.00	.04
			TOTAL	37					1.00	.04
			TOTAL	3,614					97.73	3.79
00000066	SMP00001			650	*WSP S	ILEAGNEW	A960126A	1AEF	17.71	.69

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	650					17.71	.69
00000066	SMP00001			485	*WSP S	*DESTROYED		0000	13.22	.51
			TOTAL	485					13.22	.51
				484	*WSP S	FCFA2024DA00		0000	13.19	.51
			TOTAL	484					13.19	.51
				146	*WSP S	SEIZE LOCK RANGE		0000	3.98	.15
			TOTAL	146					3.98	.15
				141	*WSP S	QCAWAREA		19EF	3.84	.15
			TOTAL	141					3.84	.15
				123	*WSP S	C3E62C036004		0000	3.35	.13
			TOTAL	123					3.35	.13
				113	*WSP S	OPENBAD	A960126A	1AEF	3.08	.12
			TOTAL	113					3.08	.12
				108	*WSP S	JUNK	QSPLJOB	1AEF	2.94	.11
			TOTAL	108					2.94	.11
				87	*WSP S	C2E7BB3D7004		0000	2.37	.09
			TOTAL	87					2.37	.09
				83	*WSP S	QJOBMSGQ		18A0	2.26	.09
			TOTAL	83					2.26	.09
				81	*WSP S	F86D14F54004		0000	2.21	.09

Figure 81 (Part 7 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	81					2.21	.09
00000066	SMP00001			79	*WSP S	PF05	PF05	0B90	2.15	.08
			TOTAL	79					2.15	.08
				77	*WSP S	D3334BC40004		0000	2.10	.08
			TOTAL	77					2.10	.08
				73	*WSP S	FD3057655004		0000	1.99	.08
			TOTAL	73					1.99	.08
				72	*WSP S	DSPOBJD	DSPOBJD	0B90	1.96	.08
			TOTAL	72					1.96	.08
				70	*WSP S	F5075E554004		0000	1.91	.07
			TOTAL	70					1.91	.07
				70	*WSP S	PF04	PF04	0B90	1.91	.07
			TOTAL	70					1.91	.07
				65	*WSP S	F3CA6CD12004		0000	1.77	.07
			TOTAL	65					1.77	.07
				64	*WSP S	PF01	PF01	0B90	1.74	.07
			TOTAL	64					1.74	.07
				63	*WSP S	PF02	PF02	0B90	1.72	.07
			TOTAL	63					1.72	.07
				63	*WSP S	PF03	PF03	0B90	1.72	.07

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	63					1.72	.07
00000066	SMP00001			56	*WSP S	QRNXDUMP		0203	1.53	.06
			TOTAL	56					1.53	.06
				54	*WSP S	TESTIO		0201	1.47	.06
			TOTAL	54					1.47	.06
				50	*WSP S	ILEAGN		0201	1.36	.05
			TOTAL	50					1.36	.05
				46	*WSP S	OPEN5		0201	1.25	.05
			TOTAL	46					1.25	.05
				45	*WSP S	QRNXIE		0203	1.23	.05
			TOTAL	45					1.23	.05
				39	*WSP S	D56C3B528F00		0000	1.06	.04
			TOTAL	39					1.06	.04
				38	*WSP S	D2FB76C77200		0000	1.04	.04
			TOTAL	38					1.04	.04
			TOTAL	3,525					96.06	3.73
0000006A	SMP00005			613	*WSP S	ILEAGNEW	A960126A	1AEF	16.73	.65
			TOTAL	613					16.73	.65
				483	*WSP S	*DESTROYED		0000	13.19	.51
			TOTAL	483					13.19	.51

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006A	SMP00005			469	*WSP S	FCFA2024DA00		0000	12.80	.50
			TOTAL	469					12.80	.50
				158	*WSP S	SEIZE LOCK RANGE		0000	4.31	.17
			TOTAL	158					4.31	.17
				146	*WSP S	QCAWAREA		19EF	3.99	.15
			TOTAL	146					3.99	.15
				132	*WSP S	OPENBAD	A960126A	1AEF	3.60	.14
			TOTAL	132					3.60	.14
				114	*WSP S	JUNK	QSPLJOB	1AEF	3.11	.12
			TOTAL	114					3.11	.12
				109	*WSP S	C3E62C036004		0000	2.98	.12
			TOTAL	109					2.98	.12
				102	*WSP S	F5075E554004		0000	2.78	.11
			TOTAL	102					2.78	.11
				86	*WSP S	F86D14F54004		0000	2.35	.09
			TOTAL	86					2.35	.09
				84	*WSP S	QJOBMSGQ		18A0	2.29	.09
			TOTAL	84					2.29	.09
				81	*WSP S	C2E7BB3D7004		0000	2.21	.09
			TOTAL	81					2.21	.09

Figure 81 (Part 8 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006A	SMP00005			76	*WSP S	PF04	PF04	0B90	2.07	.08
			TOTAL	76					2.07	.08
				72	*WSP S	D3334BC40004		0000	1.97	.08
			TOTAL	72					1.97	.08
				72	*WSP S	FD3057655004		0000	1.97	.08
			TOTAL	72					1.97	.08
				71	*WSP S	DSPOBJD	DSPOBJD	0B90	1.94	.08
			TOTAL	71					1.94	.08
				69	*WSP S	PF05	PF05	0B90	1.88	.07
			TOTAL	69					1.88	.07
				65	*WSP S	F3CA6CD12004		0000	1.77	.07
			TOTAL	65					1.77	.07
				64	*WSP S	QRNXDUMP		0203	1.75	.07
			TOTAL	64					1.75	.07
				63	*WSP S	PF01	PF01	0B90	1.72	.07
			TOTAL	63					1.72	.07
				61	*WSP S	PF02	PF02	0B90	1.67	.06
			TOTAL	61					1.67	.06
				60	*WSP S	D2FB76C77200		0000	1.64	.06
			TOTAL	60					1.64	.06

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006A	SMP00005			59	*WSP S	PF03	PF03	0B90	1.61	.06
			TOTAL	59					1.61	.06
				49	*WSP S	TESTIO		0201	1.34	.05
			TOTAL	49					1.34	.05
				47	*WSP S	QRNXIE		0203	1.28	.05
			TOTAL	47					1.28	.05
				46	*WSP S	OPEN5		0201	1.26	.05
			TOTAL	46					1.26	.05
				40	*WSP S	D7A782247200		0000	1.09	.04
			TOTAL	40					1.09	.04
				39	*WSP S	D56C3B528F00		0000	1.06	.04
			TOTAL	39					1.06	.04
			TOTAL	3,530					96.36	3.75
0000006C	SMP00007			626	*WSP S	ILEAGNEW	A960126A	1AEF	17.15	.66
			TOTAL	626					17.15	.66
				458	*WSP S	FCFA2024DA00		0000	12.54	.48
			TOTAL	458					12.54	.48
				441	*WSP S	*DESTROYED		0000	12.08	.47
			TOTAL	441					12.08	.47
				162	*WSP S	SEIZE LOCK RANGE		0000	4.44	.17

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	162					4.44	.17
0000006C	SMP00007			152	*WSP S	QCAWAREA		19EF	4.16	.16
			TOTAL	152					4.16	.16
				139	*WSP S	OPENBAD	A960126A	1AEF	3.81	.15
			TOTAL	139					3.81	.15
				103	*WSP S	JUNK	QSPLJOB	1AEF	2.82	.11
			TOTAL	103					2.82	.11
				99	*WSP S	F86D14F54004		0000	2.71	.10
			TOTAL	99					2.71	.10
				98	*WSP S	C3E62C036004		0000	2.68	.10
			TOTAL	98					2.68	.10
				85	*WSP S	QJOBMSGQ		18A0	2.33	.09
			TOTAL	85					2.33	.09
				82	*WSP S	C2E7BB3D7004		0000	2.25	.09
			TOTAL	82					2.25	.09
				82	*WSP S	F5075E554004		0000	2.25	.09
			TOTAL	82					2.25	.09
				79	*WSP S	PF04	PF04	0B90	2.16	.08
			TOTAL	79					2.16	.08
				77	*WSP S	D3334BC40004		0000	2.11	.08

Figure 81 (Part 9 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	77					2.11	.08
0000006C	SMP00007			72	*WSP S	FD3057655004		0000	1.97	.08
			TOTAL	72					1.97	.08
				71	*WSP S	PF01	PF01	0B90	1.94	.08
			TOTAL	71					1.94	.08
				69	*WSP S	D2FB76C77200		0000	1.89	.07
			TOTAL	69					1.89	.07
				69	*WSP S	PF05	PF05	0B90	1.89	.07
			TOTAL	69					1.89	.07
				68	*WSP S	PF02	PF02	0B90	1.86	.07
			TOTAL	68					1.86	.07
				68	*WSP S	QRNXDUMP		0203	1.86	.07
			TOTAL	68					1.86	.07
				64	*WSP S	F3CA6CD12004		0000	1.75	.07
			TOTAL	64					1.75	.07
				62	*WSP S	DSPOBJD	DSPOBJD	0B90	1.70	.07
			TOTAL	62					1.70	.07
				61	*WSP S	PF03	PF03	0B90	1.67	.06
			TOTAL	61					1.67	.06
				52	*WSP S	D7A782247200		0000	1.42	.05
				M05						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	52				1.42	.05
0000006C	SMP00007			50	*WSP S	QRNXIE	0203	1.37	.05
			TOTAL	50				1.37	.05
				47	*WSP S	TESTIO	0201	1.29	.05
			TOTAL	47				1.29	.05
				43	*WSP S	OPEN5	0201	1.18	.05
			TOTAL	43				1.18	.05
				38	*WSP S	D56C3B528F00	0000	1.04	.04
			TOTAL	38				1.04	.04
			TOTAL	3,517				96.32	3.71
00007F6C	P23ARTVKE	A960126A	053319	1,062	*RX A	QWCBT01	19D0	80.27	1.12
				99	*RSF S			7.48	.10
			TOTAL	1,161				87.75	1.22
			TOTAL	1,161				87.75	1.22
			FINAL TOTALS						
			TOTAL	91,160				1,135.15	96.33

* * * E N D O F R E P O R T * * *

Figure 81 (Part 10 of 10). DASD I/Os by Job/Task and Object Name/Type

10.2.4 Report Title - DASD I/Os by Job/Task and Dasd Unit (Arm) Number

This report is produced from Command Option - By Job/Task Name and Disk Unit.

```
DASD I/Os by Job/Task and Dasd Unit (arm) number
Only includes Jobs/Tasks that performed 1% or more of all I/Os and
Only include units that had 1% or more of each Job's/Task's I/Os
        QUERY NAME . . . . . IOTUNIT3
        LIBRARY NAME . . . . SMTRACE
        FILE         LIBRARY      MEMBER       FORMAT
        IOTUNIT2     PFREXP2      PEXTRACE     IOTUNIT2
        IOTUNIT2A    PFREXP2      PEXTRACE     IOTUNIT2A
        IOTUNIT1B    PFREXP2      PEXTRACE     IOTUNIT1B
        TASKINFO     PFREXP2      PEXTRACE     TASKINFO
        IOTUNIT1A    PFREXP2      PEXTRACE     IOTUNIT1A
        DATE . . . . . . . . 08/02/96
        TIME . . . . . . . . 18:50:57
```

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
00008810	TSTIOC	A960126A	053543	11,969	*RX A	008	53.72	12.65
				1,997	*RSF S		8.96	2.11
				1,370	*RS A		6.15	1.45
				595	*RS S		2.67	.63
			TOTAL	15,931			71.50	16.84
				2,476	*RSF S	001	11.11	2.62
			TOTAL	2,476			11.11	2.62
				1,406	*RSF S	004	6.31	1.49
			TOTAL	1,406			6.31	1.49
				724	*RSF S	007	3.25	.76
			TOTAL	724			3.25	.76
				442	*RSF S	005	1.98	.47
			TOTAL	442			1.98	.47
				424	*RSF S	006	1.90	.45
			TOTAL	424			1.90	.45
				255	*RSF S	003	1.14	.27
			TOTAL	255			1.14	.27
			TOTAL	21,658			97.19	22.90
0000880E	ILEAGNEW	A960126A	053541	6,291	*RSF S	001	32.03	6.65
			TOTAL	6,291			32.03	6.65
				3,506	*RSF S	003	17.85	3.70
				275	*RS S		1.40	.29

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	3,781			19.25	3.99
0000880E	ILEAGNEW	A960126A	053541	2,733	*RSF S	008	13.92	2.89
				560	*RS S		2.85	.59
			TOTAL	3,293			16.77	3.48
				2,535	*RSF S	005	12.91	2.68
			TOTAL	2,535			12.91	2.68
				1,516	*RSF S	004	7.72	1.60
			TOTAL	1,516			7.72	1.60
				1,320	*RSF S	007	6.72	1.39
			TOTAL	1,320			6.72	1.39
				599	*RSF S	006	3.05	.63
				277	*RS S		1.41	.29
			TOTAL	876			4.46	.92
			TOTAL	19,612			99.86	20.71
00008814	OPENBAD	A960126A	053546	2,169	*RSF S	005	11.06	2.29
				914	*RS S		4.66	.97
				637	*RS A		3.25	.67
			TOTAL	3,720			18.97	3.93
				2,987	*RSF S	007	15.23	3.16
				280	*RS S		1.43	.30
			TOTAL	3,267			16.66	3.46
				2,968	*RSF S	004	15.13	3.14
				280	*RS S		1.43	.30

Figure 82 (Part 1 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	3,248			16.56	3.44
00008814	OPENBAD	A960126A	053546	2,696	*RSF S	008	13.74	2.85
				246	*RS S		1.25	.26
			TOTAL	2,942			14.99	3.11
				1,548	*RSF S	006	7.89	1.64
				636	*RS A		3.24	.67
				597	*RS S		3.04	.63
			TOTAL	2,781			14.17	2.94
				1,475	*RSF S	003	7.52	1.56
				890	*RS S		4.54	.94
				322	*RS A		1.64	.34
			TOTAL	2,687			13.70	2.84
				692	*RSF S	001	3.53	.73
				263	*RS S		1.34	.28
			TOTAL	955			4.87	1.01
			TOTAL	19,600			99.92	20.73
00008408	JUNK	QSPLJOB	053464	957	*RSF S	005	18.42	1.01
			TOTAL	957			18.42	1.01
				837	*RSF S	006	16.11	.88
			TOTAL	837			16.11	.88
				825	*RSF S	001	15.88	.87
			TOTAL	825			15.88	.87
				803	*RSF S	008	15.46	.85

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	803			15.46	.85
00008408	JUNK	QSPLJOB	053464	770	*RSF S	003	14.82	.81
			TOTAL	770			14.82	.81
				434	*RSF S	007	8.35	.46
			TOTAL	434			8.35	.46
				369	*RSF S	004	7.10	.39
			TOTAL	369			7.10	.39
			TOTAL	4,995			96.14	5.27
0000006B	SMP00006			813	*WSP S	001	20.68	.86
			TOTAL	813			20.68	.86
				795	*WSP S	008	20.22	.84
			TOTAL	795			20.22	.84
				725	*WSP S	005	18.44	.77
			TOTAL	725			18.44	.77
				550	*WSP S	004	13.99	.58
			TOTAL	550			13.99	.58
				520	*WSP S	003	13.22	.55
			TOTAL	520			13.22	.55
				376	*WSP S	007	9.56	.40
			TOTAL	376			9.56	.40

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006B	SMP00006			153	*WSP S	006	3.89	.16
			TOTAL	153			3.89	.16
			TOTAL	3,932			100.00	4.16
00000068	SMP00003			794	*WSP S	001	20.61	.84
			TOTAL	794			20.61	.84
				783	*WSP S	008	20.32	.83
			TOTAL	783			20.32	.83
				730	*WSP S	005	18.95	.77
			TOTAL	730			18.95	.77
				517	*WSP S	004	13.42	.55
			TOTAL	517			13.42	.55
				507	*WSP S	003	13.16	.54
			TOTAL	507			13.16	.54
				363	*WSP S	007	9.42	.38
			TOTAL	363			9.42	.38
				159	*WSP S	006	4.13	.17
			TOTAL	159			4.13	.17
			TOTAL	3,853			100.01	4.08
00000069	SMP00004			816	*WSP S	001	21.66	.86
			TOTAL	816			21.66	.86

Figure 82 (Part 2 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
00000069	SMP00004			729	*WSP S	008	19.35	.77
			TOTAL	729			19.35	.77
				712	*WSP S	005	18.90	.75
			TOTAL	712			18.90	.75
				513	*WSP S	004	13.61	.54
			TOTAL	513			13.61	.54
				503	*WSP S	003	13.35	.53
			TOTAL	503			13.35	.53
				338	*WSP S	007	8.97	.36
			TOTAL	338			8.97	.36
				157	*WSP S	006	4.17	.17
			TOTAL	157			4.17	.17
			TOTAL	3,768			100.01	3.98
00000067	SMP00002			776	*WSP S	001	20.98	.82
			TOTAL	776			20.98	.82
				774	*WSP S	008	20.93	.82
			TOTAL	774			20.93	.82
				657	*WSP S	005	17.77	.69
			TOTAL	657			17.77	.69
				494	*WSP S	004	13.36	.52

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	494			13.36	.52
00000067	SMP00002			470	*WSP S	003	12.71	.50
			TOTAL	470			12.71	.50
				370	*WSP S	007	10.01	.39
			TOTAL	370			10.01	.39
				157	*WSP S	006	4.25	.17
			TOTAL	157			4.25	.17
			TOTAL	3,698			100.01	3.91
00000066	SMP00001			802	*WSP S	001	21.85	.85
			TOTAL	802			21.85	.85
				775	*WSP S	008	21.12	.82
			TOTAL	775			21.12	.82
				684	*WSP S	005	18.64	.72
			TOTAL	684			18.64	.72
				481	*WSP S	004	13.11	.51
			TOTAL	481			13.11	.51
				445	*WSP S	003	12.13	.47
			TOTAL	445			12.13	.47
				335	*WSP S	007	9.13	.35
			TOTAL	335			9.13	.35

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
00000066	SMP00001			148	*WSP S	006	4.03	.16
			TOTAL	148			4.03	.16
			TOTAL	3,670			100.01	3.88
0000006A	SMP00005			777	*WSP S	001	21.21	.82
			TOTAL	777			21.21	.82
				732	*WSP S	008	19.98	.77
			TOTAL	732			19.98	.77
				679	*WSP S	005	18.54	.72
			TOTAL	679			18.54	.72
				513	*WSP S	004	14.00	.54
			TOTAL	513			14.00	.54
				474	*WSP S	003	12.94	.50
			TOTAL	474			12.94	.50
				340	*WSP S	007	9.28	.36
			TOTAL	340			9.28	.36
				148	*WSP S	006	4.04	.16
			TOTAL	148			4.04	.16
			TOTAL	3,663			99.99	3.87
0000006C	SMP00007			766	*WSP S	008	20.98	.81
			TOTAL	766			20.98	.81

Figure 82 (Part 3 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006C	SMP00007			734	*WSP S	001	20.10	.78
			TOTAL	734			20.10	.78
				705	*WSP S	005	19.31	.74
			TOTAL	705			19.31	.74
				508	*WSP S	004	13.91	.54
			TOTAL	508			13.91	.54
				473	*WSP S	003	12.96	.50
			TOTAL	473			12.96	.50
				324	*WSP S	007	8.87	.34
			TOTAL	324			8.87	.34
				141	*WSP S	006	3.86	.15
			TOTAL	141			3.86	.15
			TOTAL	3,651			99.99	3.86
00007F6C	P23ARTVKE	A960126A	053319	318	*RX A	006	24.04	.34
				54	*RSF S		4.08	.06
			TOTAL	372			28.12	.40
				326	*RX A	005	24.64	.34
				21	*RSF S		1.59	.02
			TOTAL	347			26.23	.36
				129	*RX A	001	9.75	.14
				24	*RSF S		1.81	.03

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	153			11.56	.17
00007F6C	P23ARTVKE	A960126A	053319	75	*RX A	008	5.67	.08
				41	*RSF S		3.10	.04
			TOTAL	116			8.77	.12
				84	*RX A	007	6.35	.09
				28	*RSF S		2.12	.03
			TOTAL	112			8.47	.12
				74	*RX A	003	5.59	.08
				33	*RSF S		2.49	.03
			TOTAL	107			8.08	.11
				56	*RX A	004	4.23	.06
				30	*RSF S		2.27	.03
			TOTAL	86			6.50	.09
			TOTAL	1,293			97.73	1.37
			FINAL TOTALS					
			TOTAL	93,393			1,190.86	98.72

* * * E N D O F R E P O R T * * *

Figure 82 (Part 4 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

10.2.5 Report Title - DASD I/Os by Job/Task and Mainstore Pool Number

This report is produced from Command Option - By Job/Task Name + Mainstore Pool.

DASD I/Os by Job/Task and Mainstore Pool Number

```
DASD I/Os by Job/Task and Mainstore Pool Number
Only includes Jobs/Tasks that performed 1% or more of all I/Os and
Only include pools that had 1% or more of each Job's/Task's I/Os
        QUERY NAME . . . . . IOTPOOL3
        LIBRARY NAME . . . . SMTRACE
        FILE         LIBRARY      MEMBER       FORMAT
        IOTPOOL2     PFREXP2      PEXTRACE     IOTPOOL2
        IOTPOOL2A    PFREXP2      PEXTRACE     IOTPOOL2A
        IOTPOOL1B    PFREXP2      PEXTRACE     IOTPOOL1B
        TASKINFO     PFREXP2      PEXTRACE     TASKINFO
        IOTPOOL1A    PFREXP2      PEXTRACE     IOTPOOL1A
        DATE . . . . . . . . . 08/02/96
        TIME . . . . . . . . . 18:51:20
```

TDE	Task name	Job user	Job number	POOL COUNT	OPR	POOL	Percent of this TDE's I/Os	Percent of ALL system I/Os
00008810	TSTIOC	A960126A	053543	11,969	*RX A	07	53.72	12.65
				7,724	*RSF S		34.67	8.16
				1,370	*RS A		6.15	1.45
				1,218	*RS S		5.47	1.29
			TOTAL	22,281			100.01	23.55
			TOTAL	22,281			100.01	23.55
0000880E	ILEAGNEW	A960126A	053541	18,499	*RSF S	07	94.20	19.54
				1,127	*RS S		5.74	1.19
			TOTAL	19,626			99.94	20.73
			TOTAL	19,626			99.94	20.73
00008814	OPENBAD	A960126A	053546	14,532	*RSF S	07	74.08	15.35
				3,470	*RS S		17.69	3.67
				1,595	*RS A		8.13	1.69
			TOTAL	19,597			99.90	20.71
			TOTAL	19,597			99.90	20.71
00008408	JUNK	QSPLJOB	053464	4,995	*RSF S	03	96.15	5.28
				170	*RS S		3.27	.18
			TOTAL	5,165			99.42	5.46
			TOTAL	5,165			99.42	5.46
0000006B	SMP00006			3,662	*WSP S	07	93.13	3.87
			TOTAL	3,662			93.13	3.87
				208	*WSP S	03	5.29	.22
			TOTAL	208			5.29	.22

M05

TDE	Task name	Job user	Job number	POOL COUNT	OPR	POOL	Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006B	SMP00006			50	*WSP S	04	1.27	.05
			TOTAL	50			1.27	.05
			TOTAL	3,920			99.69	4.14
00000068	SMP00003			3,487	*WSP S	07	90.50	3.68
			TOTAL	3,487			90.50	3.68
				304	*WSP S	03	7.89	.32
			TOTAL	304			7.89	.32
				45	*WSP S	04	1.17	.05
			TOTAL	45			1.17	.05
			TOTAL	3,836			99.56	4.05
00000069	SMP00004			3,439	*WSP S	07	91.27	3.63
			TOTAL	3,439			91.27	3.63
				265	*WSP S	03	7.03	.28
			TOTAL	265			7.03	.28
				54	*WSP S	04	1.43	.06
			TOTAL	54			1.43	.06
			TOTAL	3,758			99.73	3.97
00000067	SMP00002			3,385	*WSP S	07	91.54	3.58
			TOTAL	3,385			91.54	3.58
				244	*WSP S	03	6.60	.26

Figure 83 (Part 1 of 2).

TDE	Task name	Job user	Job number	POOL COUNT	OPR	POOL	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	244			6.60	.26
00000067	SMP00002			61	*WSP S	04	1.65	.06
			TOTAL	61			1.65	.06
			TOTAL	3,690			99.79	3.90
00000066	SMP00001			3,360	*WSP S	07	91.55	3.55
			TOTAL	3,360			91.55	3.55
				256	*WSP S	03	6.98	.27
			TOTAL	256			6.98	.27
				40	*WSP S	04	1.09	.04
			TOTAL	40			1.09	.04
			TOTAL	3,656			99.62	3.86
0000006A	SMP00005			3,320	*WSP S	07	90.64	3.51
			TOTAL	3,320			90.64	3.51
				288	*WSP S	03	7.86	.30
			TOTAL	288			7.86	.30
				41	*WSP S	04	1.12	.04
			TOTAL	41			1.12	.04
			TOTAL	3,649			99.62	3.85
0000006C	SMP00007			3,315	*WSP S	07	90.80	3.50
			TOTAL	3,315			90.80	3.50

M05

TDE	Task name	Job user	Job number	POOL COUNT	OPR	POOL	Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006C	SMP00007			276	*WSP S	03	7.56	.29
			TOTAL	276			7.56	.29
				47	*WSP S	04	1.29	.05
			TOTAL	47			1.29	.05
			TOTAL	3,638			99.65	3.84
00007F6C	P23ARTVKE	A960126A	053319	1,062	*RX A	04	80.27	1.12
				222	*RSF S		16.78	.23
				14	*RS S		1.06	.01
			TOTAL	1,298			98.11	1.36
			TOTAL	1,298			98.11	1.36
			FINAL TOTALS					
			TOTAL	94,114			1,195.04	99.42

* * * E N D O F R E P O R T * * *

M05

Figure 83 (Part 2 of 2).

10.2.6 Report Title - Objects with 100 or More DASD I/Os

This report is produced from Command Option - Objects with 100+ I/Os.

Objects with 100 or More DASD I/Os

```
                                                Objects with 100 or more DASD I/Os
                                        QUERY NAME . . . . . IOOBJ2
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE          LIBRARY       MEMBER        FORMAT
                                        IOOBJ1B       PFREXP2       PEXTRACE      IOOBJ1B
                                        IOOBJ1        PFREXP2       PEXTRACE      IOOBJ1
                                        IOOBJ1A       PFREXP2       PEXTRACE      IOOBJ1A
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 18:51:47


Object name                        I/O    I/O     Average             Percent of
and type                           count  type    pages transferred   all system
                                                  per I/O             I/Os
DSPOBJD   DSPOBJD    0B90          1,370  *RS  A          1.00              1.45
                                     473  *RS  S          1.00               .50
                                   1,455  *RSF S          1.00              1.54
                                  11,969  *RX  A          1.00             12.65
                                     498  *WSP S          1.00               .53
                     TOTAL        15,765                                   16.67
*DESTROYED           0000          2,602  *RS  S          1.00              2.75
                                   4,204  *RSF S          1.00              4.44
                                       2  *WS  A          1.00               .00
                                       1  *WS  S          1.00               .00
                                   3,400  *WSP S          3.43              3.59
                     TOTAL        10,209                                   10.78
ILEAGNEW  A960126A   1AEF             19  *RS  S          5.58               .02
                                   4,090  *RSF S          1.84              4.32
                                   4,601  *WSP S          4.63              4.86
                     TOTAL         8,710                                    9.20
FCFA2024DA00         0000          4,543  *RSF S          1.00              4.80
                                   3,324  *WSP S          1.58              3.51
                     TOTAL         7,867                                    8.31
OPEN5                0201          2,385  *RSF S          1.89              2.52
                                     322  *WSP S          1.00               .34
                     TOTAL         2,707                                    2.86
SEIZE LOCK RANGE     0000          1,093  *RSF S          1.00              1.15
                                   1,191  *WSP S          1.08              1.26
                     TOTAL         2,284                                    2.41
TESTIO               0201          1,929  *RSF S          1.38              2.04

Object name                        I/O    I/O     Average             Percent of
and type                           count  type    pages transferred   all system
                                                  per I/O             I/Os
TESTIO               0201            343  *WSP S          1.00               .36
                     TOTAL         2,272                                    2.40
QCAWAREA             19EF          1,264  *RSF S          1.00              1.34
                                     995  *WSP S          1.00              1.05
                     TOTAL         2,259                                    2.39
OPENBAD   A960126A   1AEF             23  *RS  S          6.83               .02
                                   1,187  *RSF S          1.54              1.25
                                     893  *WSP S          1.79               .94
                     TOTAL         2,103                                    2.21
ILEAGN               0201          1,461  *RSF S          1.33              1.54
                                     272  *WSP S          1.00               .29
                     TOTAL         1,733                                    1.83
PF04      PF04       0B90            317  *RS  A          1.00               .33
                                     316  *RS  S          1.00               .33
                                     545  *RSF S          1.00               .58
                                     528  *WSP S          1.00               .56
                     TOTAL         1,706                                    1.80
PF03      PF03       0B90            322  *RS  A          1.00               .34
                                     317  *RS  S          1.00               .33
                                     522  *RSF S          1.00               .55
                                     514  *WSP S          1.00               .54
                     TOTAL         1,675                                    1.76
PF05      PF05       0B90            318  *RS  A          1.00               .34
                                     317  *RS  S          1.00               .33
                                     509  *RSF S          1.00               .54
                                     528  *WSP S          1.00               .56
```

Figure 84 (Part 1 of 4).

Object name and type			I/O count	I/O type	Average pages transferred per I/O	Percent of all system I/Os
		TOTAL	1,672			1.77
PF02	PF02	0B90	319	*RS A	1.00	.34
			318	*RS S	1.00	.34
			495	*RSF S	1.00	.52
			489	*WSP S	1.00	.52
		TOTAL	1,621			1.72
PF01	PF01	0B90	319	*RS A	1.00	.34
			319	*RS S	1.00	.34
			469	*RSF S	1.00	.50
			489	*WSP S	1.00	.52
		TOTAL	1,596			1.70
JUNK	QSPLJOB	1AEF	56	*RS S	7.86	.06
			690	*RSF S	1.74	.73
			12	*WS S	8.92	.01
			736	*WSP S	4.19	.78
		TOTAL	1,494			1.58
QRNXDUMP		0203	1,012	*RSF S	1.00	1.07
			417	*WSP S	1.00	.44
		TOTAL	1,429			1.51
C3E62C036004		0000	623	*RSF S	1.00	.66
			748	*WSP S	1.00	.79
		TOTAL	1,371			1.45
HATT		0401	1,246	*RSF S	1.00	1.32
		TOTAL	1,246			1.32
QWCBT01		19D0	3	*RS A	5.33	.00

Object name and type			I/O count	I/O type	Average pages transferred per I/O	Percent of all system I/Os
QWCBT01		19D0	3	*RS S	4.67	.00
			107	*RSF S	1.00	.11
			1,062	*RX A	7.88	1.12
		TOTAL	1,175			1.23
D2FB76C77200		0000	787	*RSF S	1.00	.83
			368	*WSP S	1.34	.39
		TOTAL	1,155			1.22
F5075E554004		0000	493	*RSF S	1.00	.52
			596	*WSP S	1.00	.63
		TOTAL	1,089			1.15
C2E7BB3D7004		0000	480	*RSF S	1.00	.51
			581	*WSP S	1.00	.61
		TOTAL	1,061			1.12
QJOBMSGQ		18A0	422	*RSF S	1.00	.45
			1	*WS S	1.00	.00
			627	*WSP S	1.52	.66
		TOTAL	1,050			1.11
FD3057655004		0000	490	*RSF S	1.00	.52
			540	*WSP S	1.00	.57
		TOTAL	1,030			1.09
D3334BC40004		0000	469	*RSF S	1.00	.50
			551	*WSP S	1.00	.58
		TOTAL	1,020			1.08
D7A782247200		0000	732	*RSF S	3.08	.77

Object name and type			I/O count	I/O type	Average pages transferred per I/O	Percent of all system I/Os
D7A782247200		0000	279	*WSP S	1.00	.29
		TOTAL	1,011			1.06
F3CA6CD12004		0000	457	*RSF S	1.00	.48
			515	*WSP S	1.00	.54
		TOTAL	972			1.02
F86D14F54004		0000	354	*RSF S	1.00	.37
			617	*WSP S	1.00	.65
		TOTAL	971			1.02
OPENBAD		0201	965	*RSF S	1.34	1.02
		TOTAL	965			1.02
TESTIOC		0201	871	*RSF S	1.49	.92
		TOTAL	871			.92
QSQENDAG		0201	840	*RSF S	1.33	.89
		TOTAL	840			.89
QLEAWI		0203	837	*RSF S	3.97	.88
		TOTAL	837			.88
QRNXIE		0203	296	*RSF S	1.00	.31
			336	*WSP S	1.00	.35
		TOTAL	632			.66
QWVPDAGE		0201	556	*RS S	1.00	.59
			25	*RSF S	1.00	.03

Figure 84 (Part 2 of 4).

```
Object name                        I/O    I/O     Average            Percent of
and type                           count  type    pages transferred  all system
                                                  per I/O            I/Os
                     TOTAL           581                                    .62
ILEAGNEW             0201            567  *RSF S          1.50              .60
                     TOTAL           567                                    .60
D56C3B528F00         0000            280  *RSF S          1.00              .30
                                     281  *WSP S          1.00              .30
                     TOTAL           561                                    .60
QUIRCLAP             0201            556  *RS  S          1.00              .59
                     TOTAL           556                                    .59
QUSRSYS              0401            450  *RSF S          1.00              .48
                     TOTAL           450                                    .48
QDBGETM              0201            447  *RSF S          3.98              .47
                     TOTAL           447                                    .47
QDFTOWN              0801            404  *RSF S          1.00              .43
                     TOTAL           404                                    .43
DSPOBJD              1901            385  *RSF S          1.00              .41
                     TOTAL           385                                    .41
QSOSRV2              0203            371  *RSF S          2.98              .39
                                      13  *WSP S          1.00              .01
                     TOTAL           384                                    .40
PF01                 1901            308  *RSF S          1.00              .33
                                                   M05
```

```
Object name                        I/O    I/O     Average            Percent of
and type                           count  type    pages transferred  all system
                                                  per I/O            I/Os
                     TOTAL           308                                    .33
PF02                 1901            308  *RSF S          1.00              .33
                     TOTAL           308                                    .33
PF05                 1901            306  *RSF S          1.00              .32
                     TOTAL           306                                    .32
PF04                 1901            305  *RSF S          1.00              .32
                     TOTAL           305                                    .32
PF03                 1901            304  *RSF S          1.00              .32
                     TOTAL           304                                    .32
APLIST               19EF            281  *RSF S          1.00              .30
                     TOTAL           281                                    .30
QTMPLPRC             0201            266  *RSF S          2.83              .28
                                      14  *WSP S          1.00              .01
                     TOTAL           280                                    .29
QSOKERN3             0203            214  *RSF S          3.61              .23
                     TOTAL           214                                    .23
E7CB3ED36004         0000             90  *RSF S          1.00              .10
                                     106  *WSP S          1.00              .11
                     TOTAL           196                                    .21
L/L RANGE 1          0000            192  *RSF S          1.00              .20
```

Figure 84 (Part 3 of 4).

```
Object name                        I/O    I/O     Average            Percent of
and type                           count  type    pages transferred  all system
                                                  per I/O            I/Os
                     TOTAL           192                                    .20
QSOSRV1              0203            143  *RSF S          1.78              .15
                                      13  *WSP S          1.00              .01
                     TOTAL           156                                    .16
SQCCSID1             0ED2            114  *RSF S          1.00              .12
                                      31  *WSP S          1.00              .03
                     TOTAL           145                                    .15
E43BF962E500         0000             81  *RSF S          1.00              .09
                                      55  *WSP S          1.76              .06
                     TOTAL           136                                    .15
QATOCTCPIPCONFIG     0C90             67  *RSF S          1.00              .07
                                      41  *WSP S          1.00              .04
                     TOTAL           108                                    .11
                     FINAL TOTALS
                     TOTAL        91,972                                  97.16
* * *  E N D  O F  R E P O R T  * * *
```

Figure 84 (Part 4 of 4).

10.2.7 Report Title - DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task Name and I/O Type

This report is produced from Command Option - By Object and Job/Task Name.

```
DASD I/Os for objects with 1% or more of all system I/Os by
Job/Task name and I/O type. Only includes Jobs/Tasks with 1% or
more of the object's I/Os.
       QUERY NAME . . . . . IOOBJT3
       LIBRARY NAME . . . . SMTRACE
       FILE         LIBRARY      MEMBER       FORMAT
       IOOBJT2      PFREXP2      PEXTRACE     IOOBJT2
       TASKINFO     PFREXP2      PEXTRACE     TASKINFO
       DATE . . . . . . . . 08/02/96
       TIME . . . . . . . . 18:52:16
```

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
DSPOBJD	DSPOBJD	0B90	00008810	TSTIOC	A960126A	053543	1,370	*RS A	8.69	1.00
							473	*RS S	3.00	1.00
							1,455	*RSF S	9.23	1.00
							11,969	*RX A	75.92	1.00
						TOTAL	15,267		96.84	
						TOTAL	15,267		96.84	
*DESTROYED		0000	00008814	OPENBAD	A960126A	053546	1,856	*RS S	18.18	1.00
							1,789	*RSF S	17.52	1.00
						TOTAL	3,645		35.70	
			0000880E	ILEAGNEW	A960126A	053541	2,063	*RSF S	20.21	1.00
						TOTAL	2,063		20.21	
			00008810	TSTIOC	A960126A	053543	745	*RS S	7.30	1.00
							99	*RSF S	.97	1.00
						TOTAL	844		8.27	
			0000006B	SMP00006			532	*WSP S	5.21	3.65
						TOTAL	532		5.21	
			00000068	SMP00003			509	*WSP S	4.99	3.47
						TOTAL	509		4.99	
			00000069	SMP00004			493	*WSP S	4.83	3.38
						TOTAL	493		4.83	
			00000066	SMP00001			485	*WSP S	4.75	3.27
						TOTAL	485		4.75	

M05

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
*DESTROYED		0000	0000006A	SMP00005			483	*WSP S	4.73	3.40
						TOTAL	483		4.73	
			00000067	SMP00002			457	*WSP S	4.48	3.45
						TOTAL	457		4.48	
			0000006C	SMP00007			441	*WSP S	4.32	3.37
						TOTAL	441		4.32	
			00008408	JUNK	QSPLJOB	053464	239	*RSF S	2.34	1.00
						TOTAL	239		2.34	
						TOTAL	10,191		99.83	
ILEAGNEW	A960126A	1AEF	0000880E	ILEAGNEW	A960126A	053541	18	*RS S	.21	5.44
							4,090	*RSF S	46.96	1.84
							9	*WSP S	.10	5.44
						TOTAL	4,117		47.27	
			00000069	SMP00004			716	*WSP S	8.22	4.68
						TOTAL	716		8.22	
			0000006B	SMP00006			673	*WSP S	7.73	4.76
						TOTAL	673		7.73	
			00000068	SMP00003			665	*WSP S	7.63	4.67
						TOTAL	665		7.63	
			00000066	SMP00001			650	*WSP S	7.46	4.48
						TOTAL	650		7.46	

Figure 85 (Part 1 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
ILEAGNEW A960126A	1AEF	00000067	SMP00002			649	*WSP S	7.45	4.49
					TOTAL	649		7.45	
		0000006C	SMP00007			626	*WSP S	7.19	4.55
					TOTAL	626		7.19	
		0000006A	SMP00005			613	*WSP S	7.04	4.79
					TOTAL	613		7.04	
					TOTAL	8,709		99.99	
FCFA2024DA00	0000	0000880E	ILEAGNEW	A960126A	053541	4,543	*RSF S	57.75	1.00
					TOTAL	4,543		57.75	
		0000006B	SMP00006			523	*WSP S	6.65	1.59
					TOTAL	523		6.65	
		00000067	SMP00002			502	*WSP S	6.38	1.58
					TOTAL	502		6.38	
		00000066	SMP00001			484	*WSP S	6.15	1.59
					TOTAL	484		6.15	
		00000068	SMP00003			474	*WSP S	6.03	1.59
					TOTAL	474		6.03	
		0000006A	SMP00005			469	*WSP S	5.96	1.57
					TOTAL	469		5.96	
		0000006C	SMP00007			458	*WSP S	5.82	1.59

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	458		5.82	
FCFA2024DA00	0000	00000069	SMP00004			414	*WSP S	5.26	1.57
					TOTAL	414		5.26	
					TOTAL	7,867		100.00	
OPEN5	0201	00008814	OPENBAD	A960126A	053546	2,385	*RSF S	88.10	1.89
					TOTAL	2,385		88.10	
		00000068	SMP00003			54	*WSP S	1.99	1.00
					TOTAL	54		1.99	
		00000067	SMP00002			49	*WSP S	1.81	1.00
					TOTAL	49		1.81	
		0000006B	SMP00006			47	*WSP S	1.74	1.00
					TOTAL	47		1.74	
		0000006A	SMP00005			46	*WSP S	1.70	1.00
					TOTAL	46		1.70	
		00000066	SMP00001			46	*WSP S	1.70	1.00
					TOTAL	46		1.70	
		0000006C	SMP00007			43	*WSP S	1.59	1.00
					TOTAL	43		1.59	
		00000069	SMP00004			37	*WSP S	1.37	1.00
					TOTAL	37		1.37	

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	2,707		100.00	
SEIZE LOCK RANGE	0000	00008814	OPENBAD	A960126A	053546	728	*RSF S	31.87	1.00
					TOTAL	728		31.87	
		0000880E	ILEAGNEW	A960126A	053541	272	*RSF S	11.91	1.00
					TOTAL	272		11.91	
		00000069	SMP00004			207	*WSP S	9.06	1.06
					TOTAL	207		9.06	
		0000006B	SMP00006			185	*WSP S	8.10	1.10
					TOTAL	185		8.10	
		00000067	SMP00002			169	*WSP S	7.40	1.02
					TOTAL	169		7.40	
		00000068	SMP00003			164	*WSP S	7.18	1.09
					TOTAL	164		7.18	
		0000006C	SMP00007			162	*WSP S	7.09	1.12
					TOTAL	162		7.09	
		0000006A	SMP00005			158	*WSP S	6.92	1.08
					TOTAL	158		6.92	
		00000066	SMP00001			146	*WSP S	6.39	1.08
					TOTAL	146		6.39	
		00008408	JUNK	QSPLJOB	053464	60	*RSF S	2.63	1.00

Figure 85 (Part 2 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	60		2.63	
SEIZE LOCK RANGE	0000	00008810	TSTIOC	A960126A	053543	25	*RSF S	1.09	1.00
					TOTAL	25		1.09	
					TOTAL	2,276		99.64	
TESTIO	0201	00008810	TSTIOC	A960126A	053543	1,929	*RSF S	84.90	1.38
					TOTAL	1,929		84.90	
		00000066	SMP00001			54	*WSP S	2.38	1.00
					TOTAL	54		2.38	
		00000067	SMP00002			54	*WSP S	2.38	1.00
					TOTAL	54		2.38	
		0000006B	SMP00006			52	*WSP S	2.29	1.00
					TOTAL	52		2.29	
		0000006A	SMP00005			49	*WSP S	2.16	1.00
					TOTAL	49		2.16	
		00000068	SMP00003			48	*WSP S	2.11	1.00
					TOTAL	48		2.11	
		0000006C	SMP00007			47	*WSP S	2.07	1.00
					TOTAL	47		2.07	
		00000069	SMP00004			39	*WSP S	1.72	1.00
					TOTAL	39		1.72	

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	2,272		100.01	
QCAWAREA	19EF	00008814	OPENBAD	A960126A	053546	621	*RSF S	27.49	1.00
					TOTAL	621		27.49	
		00008810	TSTIOC	A960126A	053543	367	*RSF S	16.25	1.00
					TOTAL	367		16.25	
		0000880E	ILEAGNEW	A960126A	053541	276	*RSF S	12.22	1.00
					TOTAL	276		12.22	
		0000006B	SMP00006			157	*WSP S	6.95	1.00
					TOTAL	157		6.95	
		0000006C	SMP00007			152	*WSP S	6.73	1.00
					TOTAL	152		6.73	
		0000006A	SMP00005			146	*WSP S	6.46	1.00
					TOTAL	146		6.46	
		00000068	SMP00003			146	*WSP S	6.46	1.00
					TOTAL	146		6.46	
		00000066	SMP00001			141	*WSP S	6.24	1.00
					TOTAL	141		6.24	
		00000069	SMP00004			130	*WSP S	5.75	1.00
					TOTAL	130		5.75	
		00000067	SMP00002			123	*WSP S	5.44	1.00

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	123		5.44	
					TOTAL	2,259		99.99	
OPENBAD A960126A	1AEF	00008814	OPENBAD	A960126A	053546	23	*RS S	1.09	6.83
						1,187	*RSF S	56.44	1.54
						16	*WSP S	.76	9.75
					TOTAL	1,226		58.29	
		0000006C	SMP00007			139	*WSP S	6.61	1.65
					TOTAL	139		6.61	
		00000068	SMP00003			135	*WSP S	6.42	1.59
					TOTAL	135		6.42	
		0000006A	SMP00005			132	*WSP S	6.28	1.50
					TOTAL	132		6.28	
		00000069	SMP00004			127	*WSP S	6.04	1.70
					TOTAL	127		6.04	
		00000067	SMP00002			117	*WSP S	5.56	1.65
					TOTAL	117		5.56	
		0000006B	SMP00006			114	*WSP S	5.42	1.72
					TOTAL	114		5.42	
		00000066	SMP00001			113	*WSP S	5.37	1.74
					TOTAL	113		5.37	
					TOTAL	2,103		99.99	

Figure 85 (Part 3 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
ILEAGN		0201	0000880E	ILEAGNEW	A960126A	053541	1,461	*RSF S	84.30	1.33
						TOTAL	1,461		84.30	
			00000066	SMP00001			50	*WSP S	2.89	1.00
						TOTAL	50		2.89	
			0000006B	SMP00006			41	*WSP S	2.37	1.00
						TOTAL	41		2.37	
			00000069	SMP00004			38	*WSP S	2.19	1.00
						TOTAL	38		2.19	
			00000067	SMP00002			37	*WSP S	2.14	1.00
						TOTAL	37		2.14	
			00000068	SMP00003			37	*WSP S	2.14	1.00
						TOTAL	37		2.14	
			0000006A	SMP00005			35	*WSP S	2.02	1.00
						TOTAL	35		2.02	
			0000006C	SMP00007			34	*WSP S	1.96	1.00
						TOTAL	34		1.96	
						TOTAL	1,733		100.01	
PF04	PF04	0B90	00008814	OPENBAD	A960126A	053546	317	*RS A	18.58	1.00
							316	*RS S	18.52	1.00
							545	*RSF S	31.95	1.00
						TOTAL	1,178		69.05	

M05

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF04	PF04	0B90	0000006B	SMP00006			85	*WSP S	4.98	1.00
						TOTAL	85		4.98	
			0000006C	SMP00007			79	*WSP S	4.63	1.00
						TOTAL	79		4.63	
			00000068	SMP00003			79	*WSP S	4.63	1.00
						TOTAL	79		4.63	
			0000006A	SMP00005			76	*WSP S	4.45	1.00
						TOTAL	76		4.45	
			00000066	SMP00001			70	*WSP S	4.10	1.00
						TOTAL	70		4.10	
			00000067	SMP00002			70	*WSP S	4.10	1.00
						TOTAL	70		4.10	
			00000069	SMP00004			69	*WSP S	4.04	1.00
						TOTAL	69		4.04	
						TOTAL	1,706		99.98	
PF03	PF03	0B90	00008814	OPENBAD	A960126A	053546	322	*RS A	19.22	1.00
							317	*RS S	18.93	1.00
							522	*RSF S	31.16	1.00
						TOTAL	1,161		69.31	
			00000068	SMP00003			88	*WSP S	5.25	1.00
						TOTAL	88		5.25	

M05

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF03	PF03	0B90	00000069	SMP00004			84	*WSP S	5.01	1.00
						TOTAL	84		5.01	
			00000067	SMP00002			80	*WSP S	4.78	1.00
						TOTAL	80		4.78	
			0000006B	SMP00006			79	*WSP S	4.72	1.00
						TOTAL	79		4.72	
			00000066	SMP00001			63	*WSP S	3.76	1.00
						TOTAL	63		3.76	
			0000006C	SMP00007			61	*WSP S	3.64	1.00
						TOTAL	61		3.64	
			0000006A	SMP00005			59	*WSP S	3.52	1.00
						TOTAL	59		3.52	
						TOTAL	1,675		99.99	
PF05	PF05	0B90	00008814	OPENBAD	A960126A	053546	318	*RS A	19.02	1.00
							317	*RS S	18.96	1.00
							509	*RSF S	30.44	1.00
						TOTAL	1,144		68.42	
			0000006B	SMP00006			92	*WSP S	5.50	1.00
						TOTAL	92		5.50	
			00000069	SMP00004			85	*WSP S	5.08	1.00
						TOTAL	85		5.08	

Figure 85 (Part 4 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

```
Object name              TDE       Job/Task name      Job         Job              I/O    I/O      Percent this   Average pages
and type                 number                       user        number           count  type     object's I/Os  transferred
PF05      PF05     0B90  00000066  SMP00001                                            79  *WSP S           4.72           1.00
                                                                  TOTAL                79                   4.72
                         0000006A  SMP00005                                            69  *WSP S           4.13           1.00
                                                                  TOTAL                69                   4.13
                         0000006C  SMP00007                                            69  *WSP S           4.13           1.00
                                                                  TOTAL                69                   4.13
                         00000067  SMP00002                                            68  *WSP S           4.07           1.00
                                                                  TOTAL                68                   4.07
                         00000068  SMP00003                                            66  *WSP S           3.95           1.00
                                                                  TOTAL                66                   3.95
                                                                  TOTAL             1,672                 100.00
PF02      PF02     0B90  00008814  OPENBAD            A960126A    053546              319  *RS  A          19.68           1.00
                                                                                      318  *RS  S          19.62           1.00
                                                                                      495  *RSF S          30.54           1.00
                                                                  TOTAL             1,132                  69.84
                         00000067  SMP00002                                            80  *WSP S           4.94           1.00
                                                                  TOTAL                80                   4.94
                         0000006B  SMP00006                                            77  *WSP S           4.75           1.00
                                                                  TOTAL                77                   4.75
                         00000068  SMP00003                                            75  *WSP S           4.63           1.00
                                                                  TOTAL                75                   4.63
                                                   M05

Object name              TDE       Job/Task name      Job         Job              I/O    I/O      Percent this   Average pages
and type                 number                       user        number           count  type     object's I/Os  transferred
PF02      PF02     0B90  0000006C  SMP00007                                            68  *WSP S           4.19           1.00
                                                                  TOTAL                68                   4.19
                         00000069  SMP00004                                            65  *WSP S           4.01           1.00
                                                                  TOTAL                65                   4.01
                         00000066  SMP00001                                            63  *WSP S           3.89           1.00
                                                                  TOTAL                63                   3.89
                         0000006A  SMP00005                                            61  *WSP S           3.76           1.00
                                                                  TOTAL                61                   3.76
                                                                  TOTAL             1,621                 100.01
PF01      PF01     0B90  00008814  OPENBAD            A960126A    053546              319  *RS  A          19.99           1.00
                                                                                      319  *RS  S          19.99           1.00
                                                                                      469  *RSF S          29.39           1.00
                                                                  TOTAL             1,107                  69.37
                         00000068  SMP00003                                            83  *WSP S           5.20           1.00
                                                                  TOTAL                83                   5.20
                         0000006B  SMP00006                                            81  *WSP S           5.08           1.00
                                                                  TOTAL                81                   5.08
                         0000006C  SMP00007                                            71  *WSP S           4.45           1.00
                                                                  TOTAL                71                   4.45
                         00000067  SMP00002                                            65  *WSP S           4.07           1.00
                                                                  TOTAL                65                   4.07
                                                   M05

Object name              TDE       Job/Task name      Job         Job              I/O    I/O      Percent this   Average pages
and type                 number                       user        number           count  type     object's I/Os  transferred
PF01      PF01     0B90  00000066  SMP00001                                            64  *WSP S           4.01           1.00
                                                                  TOTAL                64                   4.01
                         0000006A  SMP00005                                            63  *WSP S           3.95           1.00
                                                                  TOTAL                63                   3.95
                         00000069  SMP00004                                            62  *WSP S           3.88           1.00
                                                                  TOTAL                62                   3.88
                                                                  TOTAL             1,596                 100.01
JUNK      QSPLJOB  1AEF  00008408  JUNK               QSPLJOB     053464               56  *RS  S           3.75           7.86
                                                                                      690  *RSF S          46.18           1.74
                                                                                       12  *WS  S            .80           8.92
                                                                                        6  *WSP S            .40           8.83
                                                                  TOTAL               764                  51.13
                         0000006A  SMP00005                                           114  *WSP S           7.63           3.74
                                                                  TOTAL               114                   7.63
                         00000067  SMP00002                                           110  *WSP S           7.36           4.51
                                                                  TOTAL               110                   7.36
                         00000068  SMP00003                                           110  *WSP S           7.36           4.10
                                                                  TOTAL               110                   7.36
                         00000066  SMP00001                                           108  *WSP S           7.23           3.68
                                                                  TOTAL               108                   7.23
                         0000006C  SMP00007                                           103  *WSP S           6.89           4.84
```

Figure 85 (Part 5 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
						TOTAL	103		6.89	
JUNK	QSPLJOB	1AEF	00000069	SMP00004			102	*WSP S	6.83	3.74
						TOTAL	102		6.83	
			0000006B	SMP00006			83	*WSP S	5.56	4.63
						TOTAL	83		5.56	
						TOTAL	1,494		99.99	
QRNXDUMP		0203	0000880E	ILEAGNEW	A960126A	053541	1,012	*RSF S	70.82	1.00
						TOTAL	1,012		70.82	
			0000006C	SMP00007			68	*WSP S	4.76	1.00
						TOTAL	68		4.76	
			0000006A	SMP00005			64	*WSP S	4.48	1.00
						TOTAL	64		4.48	
			00000069	SMP00004			63	*WSP S	4.41	1.00
						TOTAL	63		4.41	
			00000068	SMP00003			59	*WSP S	4.13	1.00
						TOTAL	59		4.13	
			0000006B	SMP00006			58	*WSP S	4.06	1.00
						TOTAL	58		4.06	
			00000066	SMP00001			56	*WSP S	3.92	1.00
						TOTAL	56		3.92	

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
QRNXDUMP	0203	00000067	SMP00002			49	*WSP S	3.43	1.00
					TOTAL	49		3.43	
					TOTAL	1,429		100.01	
C3E62C036004	0000	0000880E	ILEAGNEW	A960126A	053541	623	*RSF S	45.44	1.00
					TOTAL	623		45.44	
		00000066	SMP00001			123	*WSP S	8.97	1.00
					TOTAL	123		8.97	
		0000006B	SMP00006			113	*WSP S	8.24	1.00
					TOTAL	113		8.24	
		00000069	SMP00004			111	*WSP S	8.10	1.00
					TOTAL	111		8.10	
		0000006A	SMP00005			109	*WSP S	7.95	1.00
					TOTAL	109		7.95	
		0000006C	SMP00007			98	*WSP S	7.15	1.00
					TOTAL	98		7.15	
		00000067	SMP00002			98	*WSP S	7.15	1.00
					TOTAL	98		7.15	
		00000068	SMP00003			96	*WSP S	7.00	1.00
					TOTAL	96		7.00	
					TOTAL	1,371		100.00	

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
HATT	0401	00008810	TSTIOC	A960126A	053543	1,246	*RSF S	100.00	1.00
					TOTAL	1,246		100.00	
					TOTAL	1,246		100.00	
QWCBT01	19D0	00007F6C	P23ARTVKE	A960126A	053319	3	*RS A	.26	5.33
						3	*RS S	.26	4.67
						99	*RSF S	8.43	1.00
						1,062	*RX A	90.38	7.88
					TOTAL	1,167		99.33	
					TOTAL	1,167		99.33	
D2FB76C77200	0000	00008408	JUNK	QSPLJOB	053464	787	*RSF S	68.14	1.00
					TOTAL	787		68.14	
		00000068	SMP00003			77	*WSP S	6.67	1.38
					TOTAL	77		6.67	
		0000006C	SMP00007			69	*WSP S	5.97	1.38
					TOTAL	69		5.97	
		0000006A	SMP00005			60	*WSP S	5.19	1.38
					TOTAL	60		5.19	
		00000069	SMP00004			47	*WSP S	4.07	1.30
					TOTAL	47		4.07	
		0000006B	SMP00006			39	*WSP S	3.38	1.38
					TOTAL	39		3.38	

Figure 85 (Part 6 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

```
Object name              TDE       Job/Task name     Job         Job            I/O    I/O      Percent this   Average pages
and type                 number                      user        number         count  type     object's I/Os  transferred
D2FB76C77200      0000   00000066  SMP00001                                        38  *WSP S            3.29           1.21
                                                                   TOTAL           38                    3.29
                         00000067  SMP00002                                        38  *WSP S            3.29           1.29
                                                                   TOTAL           38                    3.29
                                                                   TOTAL        1,155                  100.00
F5075E554004      0000   00008814  OPENBAD           A960126A    053546           493  *RSF S           45.27           1.00
                                                                   TOTAL          493                   45.27
                         0000006A  SMP00005                                       102  *WSP S            9.37           1.00
                                                                   TOTAL          102                    9.37
                         0000006B  SMP00006                                       100  *WSP S            9.18           1.00
                                                                   TOTAL          100                    9.18
                         00000068  SMP00003                                        85  *WSP S            7.81           1.00
                                                                   TOTAL           85                    7.81
                         0000006C  SMP00007                                        82  *WSP S            7.53           1.00
                                                                   TOTAL           82                    7.53
                         00000067  SMP00002                                        79  *WSP S            7.25           1.00
                                                                   TOTAL           79                    7.25
                         00000069  SMP00004                                        78  *WSP S            7.16           1.00
                                                                   TOTAL           78                    7.16
                         00000066  SMP00001                                        70  *WSP S            6.43           1.00
                                                     M05

Object name              TDE       Job/Task name     Job         Job            I/O    I/O      Percent this   Average pages
and type                 number                      user        number         count  type     object's I/Os  transferred
                                                                   TOTAL           70                    6.43
                                                                   TOTAL        1,089                  100.00
C2E7BB3D7004      0000   00008814  OPENBAD           A960126A    053546           480  *RSF S           45.24           1.00
                                                                   TOTAL          480                   45.24
                         00000067  SMP00002                                        94  *WSP S            8.86           1.00
                                                                   TOTAL           94                    8.86
                         00000066  SMP00001                                        87  *WSP S            8.20           1.00
                                                                   TOTAL           87                    8.20
                         00000068  SMP00003                                        83  *WSP S            7.82           1.00
                                                                   TOTAL           83                    7.82
                         0000006C  SMP00007                                        82  *WSP S            7.73           1.00
                                                                   TOTAL           82                    7.73
                         0000006A  SMP00005                                        81  *WSP S            7.63           1.00
                                                                   TOTAL           81                    7.63
                         00000069  SMP00004                                        78  *WSP S            7.35           1.00
                                                                   TOTAL           78                    7.35
                         0000006B  SMP00006                                        76  *WSP S            7.16           1.00
                                                                   TOTAL           76                    7.16
                                                                   TOTAL        1,061                   99.99
QJOBMSGQ          18A0   0000880E  ILEAGNEW          A960126A    053541           274  *RSF S           26.10           1.00
                                                     M05

Object name              TDE       Job/Task name     Job         Job            I/O    I/O      Percent this   Average pages
and type                 number                      user        number         count  type     object's I/Os  transferred
QJOBMSGQ          18A0   0000880E  ILEAGNEW          A960126A    053541             1  *WS  S             .10           1.00
                                                                   TOTAL          275                   26.20
                         00008408  JUNK              QSPLJOB     053464           139  *RSF S           13.24           1.00
                                                                   TOTAL          139                   13.24
                         00000067  SMP00002                                       107  *WSP S           10.19           1.51
                                                                   TOTAL          107                   10.19
                         00000069  SMP00004                                        94  *WSP S            8.95           1.53
                                                                   TOTAL           94                    8.95
                         00000068  SMP00003                                        90  *WSP S            8.57           1.53
                                                                   TOTAL           90                    8.57
                         0000006C  SMP00007                                        85  *WSP S            8.10           1.53
                                                                   TOTAL           85                    8.10
                         0000006A  SMP00005                                        84  *WSP S            8.00           1.49
                                                                   TOTAL           84                    8.00
                         0000006B  SMP00006                                        84  *WSP S            8.00           1.52
                                                                   TOTAL           84                    8.00
                         00000066  SMP00001                                        83  *WSP S            7.90           1.55
                                                                   TOTAL           83                    7.90
                                                                   TOTAL        1,041                   99.15
FD3057655004      0000   00008814  OPENBAD           A960126A    053546           490  *RSF S           47.57           1.00
```

Figure 85 (Part 7 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	490		47.57	
FD3057655004	0000	0000006B	SMP00006			87	*WSP S	8.45	1.00
					TOTAL	87		8.45	
		00000067	SMP00002			80	*WSP S	7.77	1.00
					TOTAL	80		7.77	
		00000068	SMP00003			80	*WSP S	7.77	1.00
					TOTAL	80		7.77	
		00000069	SMP00004			76	*WSP S	7.38	1.00
					TOTAL	76		7.38	
		00000066	SMP00001			73	*WSP S	7.09	1.00
					TOTAL	73		7.09	
		0000006A	SMP00005			72	*WSP S	6.99	1.00
					TOTAL	72		6.99	
		0000006C	SMP00007			72	*WSP S	6.99	1.00
					TOTAL	72		6.99	
					TOTAL	1,030		100.01	
D3334BC40004	0000	00008814	OPENBAD	A960126A	053546	469	*RSF S	45.98	1.00
					TOTAL	469		45.98	
		00000069	SMP00004			88	*WSP S	8.63	1.00
					TOTAL	88		8.63	

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
D3334BC40004	0000	0000006B	SMP00006			83	*WSP S	8.14	1.00
					TOTAL	83		8.14	
		00000068	SMP00003			79	*WSP S	7.75	1.00
					TOTAL	79		7.75	
		0000006C	SMP00007			77	*WSP S	7.55	1.00
					TOTAL	77		7.55	
		00000066	SMP00001			77	*WSP S	7.55	1.00
					TOTAL	77		7.55	
		00000067	SMP00002			75	*WSP S	7.35	1.00
					TOTAL	75		7.35	
		0000006A	SMP00005			72	*WSP S	7.06	1.00
					TOTAL	72		7.06	
					TOTAL	1,020		100.01	
D7A782247200	0000	0000880E	ILEAGNEW	A960126A	053541	732	*RSF S	72.40	3.08
					TOTAL	732		72.40	
		0000006C	SMP00007			52	*WSP S	5.14	1.00
					TOTAL	52		5.14	
		00000069	SMP00004			41	*WSP S	4.06	1.00
					TOTAL	41		4.06	
		0000006A	SMP00005			40	*WSP S	3.96	1.00

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	40		3.96	
D7A782247200	0000	00000067	SMP00002			40	*WSP S	3.96	1.00
					TOTAL	40		3.96	
		00000068	SMP00003			38	*WSP S	3.76	1.00
					TOTAL	38		3.76	
		00000066	SMP00001			35	*WSP S	3.46	1.00
					TOTAL	35		3.46	
		0000006B	SMP00006			33	*WSP S	3.26	1.00
					TOTAL	33		3.26	
					TOTAL	1,011		100.00	
F3CA6CD12004	0000	00008814	OPENBAD	A960126A	053546	457	*RSF S	47.02	1.00
					TOTAL	457		47.02	
		0000006B	SMP00006			93	*WSP S	9.57	1.00
					TOTAL	93		9.57	
		00000067	SMP00002			82	*WSP S	8.44	1.00
					TOTAL	82		8.44	
		00000068	SMP00003			77	*WSP S	7.92	1.00
					TOTAL	77		7.92	
		00000069	SMP00004			69	*WSP S	7.10	1.00
					TOTAL	69		7.10	

Figure 85 (Part 8 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
F3CA6CD12004	0000	0000006A	SMP00005			65	*WSP S	6.69	1.00
					TOTAL	65		6.69	
		00000066	SMP00001			65	*WSP S	6.69	1.00
					TOTAL	65		6.69	
		0000006C	SMP00007			64	*WSP S	6.58	1.00
					TOTAL	64		6.58	
					TOTAL	972		100.01	
F86D14F54004	0000	00008810	TSTIOC	A960126A	053543	354	*RSF S	36.46	1.00
					TOTAL	354		36.46	
		0000006C	SMP00007			99	*WSP S	10.20	1.00
					TOTAL	99		10.20	
		0000006B	SMP00006			95	*WSP S	9.78	1.00
					TOTAL	95		9.78	
		00000067	SMP00002			94	*WSP S	9.68	1.00
					TOTAL	94		9.68	
		00000069	SMP00004			91	*WSP S	9.37	1.00
					TOTAL	91		9.37	
		0000006A	SMP00005			86	*WSP S	8.86	1.00
					TOTAL	86		8.86	
		00000066	SMP00001			81	*WSP S	8.34	1.00

M05

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	81		8.34	
F86D14F54004	0000	00000068	SMP00003			71	*WSP S	7.31	1.00
					TOTAL	71		7.31	
					TOTAL	971		100.00	
OPENBAD	0201	00008814	OPENBAD	A960126A	053546	965	*RSF S	100.00	1.34
					TOTAL	965		100.00	
					TOTAL	965		100.00	
					FINAL TOTALS				
					TOTAL	80,676		2,994.79	

* * * E N D O F R E P O R T * * *

Figure 85 (Part 9 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

10.2.8 Report Title - DASD I/Os by Object Name/Type and Disk Unit Number

This report is produced from Command Option - By Object and Disk Unit.

```
                                         DASD I/Os by object name/type and disk unit number
                                         Includes only objects with 1% or more of all system I/Os.
                                         Only I/Os with 1% or more of the unit's I/Os
                                             QUERY NAME . . . . . IOOBJU2
                                             LIBRARY NAME . . . . SMTRACE
                                             FILE         LIBRARY      MEMBER       FORMAT
                                             IOOBJU1B     PFREXP2      PEXTRACE     IOOBJU1B
                                             IOOBJU1C     PFREXP2      PEXTRACE     IOOBJU1C
                                             IOOBJU1      PFREXP2      PEXTRACE     IOOBJU1
                                             DATE . . . . . . . . 08/02/96
                                             TIME . . . . . . . . 18:52:46


Object name               Disk         I/O   I/O     Percent this   Average pages
and type                  unit         count type    object's I/Os  transferred
DSPOBJD   DSPOBJD    0B90 008          1,370 *RS  A          8.69           1.00
                                         473 *RS  S          3.00           1.00
                                         464 *RSF S          2.94           1.00
                                      11,969 *RX  A         75.92           1.00
                          TOTAL       14,276                90.55
                          001            991 *RSF S          6.29           1.00
                                         498 *WSP S          3.16           1.00
                          TOTAL        1,489                 9.45
                          TOTAL       15,765               100.00
*DESTROYED           0000 003            367 *RS  S          3.59           1.00
                                       1,366 *RSF S         13.38           1.00
                                           2 *WS  A           .02           1.00
                                           1 *WS  S           .01           1.00
                                         767 *WSP S          7.51           6.13
                          TOTAL        2,503                24.51
                          008            367 *RS  S          3.59           1.00
                                       1,227 *RSF S         12.02           1.00
                                         824 *WSP S          8.07           5.13
                          TOTAL        2,418                23.68
                          005            382 *RS  S          3.74           1.01
                                         748 *RSF S          7.33           1.00
                                       1,047 *WSP S         10.26           1.16
                          TOTAL        2,177                21.33
                          004            373 *RS  S          3.65           1.00
                                         261 *RSF S          2.56           1.00
                                         193 *WSP S          1.89           2.25
                          TOTAL          827                 8.10

Object name               Disk         I/O   I/O     Percent this   Average pages
and type                  unit         count type    object's I/Os  transferred
*DESTROYED           0000 006            371 *RS  S          3.63           1.00
                                         210 *RSF S          2.06           1.00
                                         186 *WSP S          1.82           1.92
                          TOTAL          767                 7.51
                          007            371 *RS  S          3.63           1.00
                                         211 *RSF S          2.07           1.00
                                         182 *WSP S          1.78           1.95
                          TOTAL          764                 7.48
                          001            371 *RS  S          3.63           1.00
                                         181 *RSF S          1.77           1.00
                                         201 *WSP S          1.97           1.89
                          TOTAL          753                 7.37
                          TOTAL       10,209                99.98
ILEAGNEW  A960126A   1AEF 001             11 *RS  S           .13           6.18
                                       3,323 *RSF S         38.15           1.91
                                       2,127 *WSP S         24.42           4.75
                          TOTAL        5,461                62.70
                          005              1 *RS  S           .01           6.00
                                         676 *RSF S          7.76           1.50
                                       2,146 *WSP S         24.64           4.38
                          TOTAL        2,823                32.41
                          008              7 *RS  S           .08           4.57
                                          91 *RSF S          1.04           1.95
                                         328 *WSP S          3.77           5.53
                          TOTAL          426                 4.89
                          TOTAL        8,710               100.00
```

Figure 86 (Part 1 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
FCFA2024DA00	0000	003	861	*RSF S	10.94	1.00
			680	*WSP S	8.64	1.99
		TOTAL	1,541		19.58	
		008	1,151	*RSF S	14.63	1.00
			372	*WSP S	4.73	1.66
		TOTAL	1,523		19.36	
		004	745	*RSF S	9.47	1.00
			685	*WSP S	8.71	1.72
		TOTAL	1,430		18.18	
		001	822	*RSF S	10.45	1.00
			583	*WSP S	7.41	1.00
		TOTAL	1,405		17.86	
		005	646	*RSF S	8.21	1.00
			549	*WSP S	6.98	1.96
		TOTAL	1,195		15.19	
		007	318	*RSF S	4.04	1.00
			455	*WSP S	5.78	1.00
		TOTAL	773		9.82	
		TOTAL	7,867		99.99	
OPEN5	0201	007	1,459	*RSF S	53.90	2.24
		TOTAL	1,459		53.90	
		008	301	*RSF S	11.12	1.00
			322	*WSP S	11.90	1.00
				M05		

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
		TOTAL	623		23.02	
OPEN5	0201	006	319	*RSF S	11.78	1.99
		TOTAL	319		11.78	
		005	306	*RSF S	11.30	1.00
		TOTAL	306		11.30	
		TOTAL	2,707		100.00	
SEIZE LOCK RANGE	0000	007	436	*RSF S	19.09	1.00
			491	*WSP S	21.50	1.05
		TOTAL	927		40.59	
		006	299	*RSF S	13.09	1.00
			301	*WSP S	13.18	1.03
		TOTAL	600		26.27	
		003	285	*RSF S	12.48	1.00
			305	*WSP S	13.35	1.07
		TOTAL	590		25.83	
		004	50	*RSF S	2.19	1.00
			60	*WSP S	2.63	1.45
		TOTAL	110		4.82	
		001	19	*RSF S	.83	1.00
			26	*WSP S	1.14	1.38
		TOTAL	45		1.97	
		TOTAL	2,272		99.48	

Figure 86 (Part 2 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
TESTIO		0201	008	1,006	*RSF S	44.28	1.73
			TOTAL	1,006		44.28	
			001	222	*RSF S	9.77	1.00
				343	*WSP S	15.10	1.00
			TOTAL	565		24.87	
			006	402	*RSF S	17.69	1.00
			TOTAL	402		17.69	
			007	299	*RSF S	13.16	1.00
			TOTAL	299		13.16	
			TOTAL	2,272		100.00	
QCAWAREA		19EF	003	692	*RSF S	30.63	1.00
				404	*WSP S	17.88	1.00
			TOTAL	1,096		48.51	
			008	296	*RSF S	13.10	1.00
				312	*WSP S	13.81	1.00
			TOTAL	608		26.91	
			004	276	*RSF S	12.22	1.00
				279	*WSP S	12.35	1.00
			TOTAL	555		24.57	
			TOTAL	2,259		99.99	
OPENBAD	A960126A	1AEF	004	15	*RS S	.71	6.60
				1,063	*RSF S	50.55	1.49
				755	*WSP S	35.90	1.82

M05

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
			TOTAL	1,833		87.16	
OPENBAD	A960126A	1AEF	006	4	*RS S	.19	8.00
				124	*RSF S	5.90	2.00
				132	*WSP S	6.28	1.00
			TOTAL	260		12.37	
			TOTAL	2,093		99.53	
ILEAGN		0201	005	620	*RSF S	35.78	1.77
			TOTAL	620		35.78	
			006	284	*RSF S	16.39	1.00
				272	*WSP S	15.70	1.00
			TOTAL	556		32.09	
			001	279	*RSF S	16.10	1.00
			TOTAL	279		16.10	
			004	278	*RSF S	16.04	1.00
			TOTAL	278		16.04	
			TOTAL	1,733		100.01	
PF04	PF04	0B90	005	541	*RSF S	31.71	1.00
				528	*WSP S	30.95	1.00
			TOTAL	1,069		62.66	
			003	316	*RS S	18.52	1.00
				4	*RSF S	.23	1.00
			TOTAL	320		18.75	

M05

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF04	PF04	0B90	006	317	*RS A	18.58	1.00
			TOTAL	317		18.58	
			TOTAL	1,706		99.99	
PF03	PF03	0B90	004	520	*RSF S	31.04	1.00
				514	*WSP S	30.69	1.00
			TOTAL	1,034		61.73	
			003	322	*RS A	19.22	1.00
				317	*RS S	18.93	1.00
				2	*RSF S	.12	1.00
			TOTAL	641		38.27	
			TOTAL	1,675		100.00	
PF05	PF05	0B90	001	500	*RSF S	29.90	1.00
				528	*WSP S	31.58	1.00
			TOTAL	1,028		61.48	
			005	318	*RS A	19.02	1.00
				317	*RS S	18.96	1.00
				9	*RSF S	.54	1.00
			TOTAL	644		38.52	
			TOTAL	1,672		100.00	
PF02	PF02	0B90	007	493	*RSF S	30.41	1.00
				489	*WSP S	30.17	1.00
			TOTAL	982		60.58	
			006	319	*RS A	19.68	1.00
				318	*RS S	19.62	1.00

Figure 86 (Part 3 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF02	PF02	0B90	006	2	*RSF S	.12	1.00
			TOTAL	639		39.42	
			TOTAL	1,621		100.00	
PF01	PF01	0B90	008	469	*RSF S	29.39	1.00
				489	*WSP S	30.64	1.00
			TOTAL	958		60.03	
			005	319	*RS A	19.99	1.00
				319	*RS S	19.99	1.00
			TOTAL	638		39.98	
			TOTAL	1,596		100.01	
JUNK	QSPLJOB	1AEF	005	17	*RS S	1.14	7.71
				492	*RSF S	32.93	1.72
				4	*WS S	.27	4.75
				278	*WSP S	18.61	3.45
			TOTAL	791		52.95	
			008	9	*RS S	.60	7.67
				64	*RSF S	4.28	1.56
				225	*WSP S	15.06	5.08
			TOTAL	298		19.94	
			003	21	*RS S	1.41	8.00
				76	*RSF S	5.09	2.00
				4	*WS S	.27	1.00
				158	*WSP S	10.58	4.77
			TOTAL	259		17.35	
			001	9	*RS S	.60	8.00
					M05		

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
JUNK	QSPLJOB	1AEF	001	58	*RSF S	3.88	1.78
				73	*WSP S	4.89	2.62
			TOTAL	140		9.37	
			TOTAL	1,488		99.61	
QRNXDUMP		0203	003	1,012	*RSF S	70.82	1.00
				417	*WSP S	29.18	1.00
			TOTAL	1,429		100.00	
			TOTAL	1,429		100.00	
C3E62C036004		0000	001	291	*RSF S	21.23	1.00
				372	*WSP S	27.13	1.00
			TOTAL	663		48.36	
			007	166	*RSF S	12.11	1.00
				189	*WSP S	13.79	1.00
			TOTAL	355		25.90	
			005	156	*RSF S	11.38	1.00
				175	*WSP S	12.76	1.00
			TOTAL	331		24.14	
			004	10	*RSF S	.73	1.00
				12	*WSP S	.88	1.00
			TOTAL	22		1.61	
			TOTAL	1,371		100.01	
HATT		0401	001	1,246	*RSF S	100.00	1.00
			TOTAL	1,246		100.00	

Figure 86 (Part 4 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
		TOTAL	1,246		100.00	
QWCBT01	19D0	006	45	*RSF S	3.83	1.00
			318	*RX A	27.06	7.81
		TOTAL	363		30.89	
		005	3	*RS A	.26	5.33
			5	*RSF S	.43	1.00
			326	*RX A	27.74	7.98
		TOTAL	334		28.43	
		001	4	*RSF S	.34	1.00
			129	*RX A	10.98	7.92
		TOTAL	133		11.32	
		007	7	*RSF S	.60	1.00
			84	*RX A	7.15	7.87
		TOTAL	91		7.75	
		003	3	*RS S	.26	4.67
			11	*RSF S	.94	1.00
			74	*RX A	6.30	7.95
		TOTAL	88		7.50	
		008	9	*RSF S	.77	1.00
			75	*RX A	6.38	7.72
		TOTAL	84		7.15	
		004	26	*RSF S	2.21	1.00
			56	*RX A	4.77	7.70
		TOTAL	82		6.98	

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
		TOTAL	1,175		100.02	
D2FB76C77200	0000	004	166	*RSF S	14.37	1.00
			97	*WSP S	8.40	1.48
		TOTAL	263		22.77	
		008	188	*RSF S	16.28	1.00
			67	*WSP S	5.80	1.39
		TOTAL	255		22.08	
		006	130	*RSF S	11.26	1.00
			59	*WSP S	5.11	1.34
		TOTAL	189		16.37	
		007	106	*RSF S	9.18	1.00
			41	*WSP S	3.55	1.41
		TOTAL	147		12.73	
		005	99	*RSF S	8.57	1.00
			32	*WSP S	2.77	1.00
		TOTAL	131		11.34	
		003	52	*RSF S	4.50	1.00
			46	*WSP S	3.98	1.00
		TOTAL	98		8.48	
		001	46	*RSF S	3.98	1.00
			26	*WSP S	2.25	1.62
		TOTAL	72		6.23	
		TOTAL	1,155		100.00	

Figure 86 (Part 5 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

```
Object name          Disk          I/O    I/O      Percent this   Average pages
and type             unit          count  type     object's I/Os  transferred
F5075E554004   0000  004             493  *RSF S          45.27           1.00
                                     596  *WSP S          54.73           1.00
                     TOTAL         1,089                 100.00
                     TOTAL         1,089                 100.00
C2E7BB3D7004   0000  008             480  *RSF S          45.24           1.00
                                     581  *WSP S          54.76           1.00
                     TOTAL         1,061                 100.00
                     TOTAL         1,061                 100.00
QJOBMSGQ       18A0  008             276  *RSF S          26.29           1.00
                                       1  *WS  S            .10           1.00
                                     556  *WSP S          52.95           1.50
                     TOTAL           833                  79.34
                     005             114  *RSF S          10.86           1.00
                                      71  *WSP S           6.76           1.72
                     TOTAL           185                  17.62
                     004              25  *RSF S           2.38           1.00
                     TOTAL            25                   2.38
                     TOTAL         1,043                  99.34
FD3057655004   0000  008             490  *RSF S          47.57           1.00
                                     540  *WSP S          52.43           1.00
                     TOTAL         1,030                 100.00
                     TOTAL         1,030                 100.00
D3334BC40004   0000  003             469  *RSF S          45.98           1.00
                                             M05
```

```
Object name          Disk          I/O    I/O      Percent this   Average pages
and type             unit          count  type     object's I/Os  transferred
D3334BC40004   0000  003             551  *WSP S          54.02           1.00
                     TOTAL         1,020                 100.00
                     TOTAL         1,020                 100.00
D7A782247200   0000  001             732  *RSF S          72.40           3.08
                                     279  *WSP S          27.60           1.00
                     TOTAL         1,011                 100.00
                     TOTAL         1,011                 100.00
F3CA6CD12004   0000  007             457  *RSF S          47.02           1.00
                                     515  *WSP S          52.98           1.00
                     TOTAL           972                 100.00
                     TOTAL           972                 100.00
F86D14F54004   0000  008             354  *RSF S          36.46           1.00
                                     617  *WSP S          63.54           1.00
                     TOTAL           971                 100.00
                     TOTAL           971                 100.00
OPENBAD        0201  004             327  *RSF S          33.89           2.00
                     TOTAL           327                  33.89
                     005             314  *RSF S          32.54           1.00
                     TOTAL           314                  32.54
                     008             309  *RSF S          32.02           1.00
                     TOTAL           309                  32.02
                                             M05
```

```
Object name          Disk          I/O    I/O      Percent this   Average pages
and type             unit          count  type     object's I/Os  transferred
OPENBAD        0201  003              15  *RSF S           1.55           1.00
                     TOTAL            15                   1.55
                     TOTAL           965                 100.00
                     FINAL TOTALS
                     TOTAL        81,183               2,997.96
* * *  E N D  O F  R E P O R T  * * *
```

Figure 86 (Part 6 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

10.2.9 Report Title -Page Fault DASD Read I/Os by Job/Task Name and I/O Type

This report is produced from Command Option - Fault Reads by Job/Task.

```
Page fault DASD read I/Os by Job/Task name and I/O type
Includes only Jobs/Tasks that had 1% or more of all system
page fault DASD reads
    QUERY NAME . . . . . IFTDE3
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    IOTDE2       PFREXP2      $$FLT        IOTDE2
    IOTDE1       PFREXP2      $$FLT        IOTDE1
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    IOTDE1A      PFREXP2      $$FLT        IOTDE1A
    DATE . . . . . . . . 08/02/96
    TIME . . . . . . . . 18:53:11

TDE       Job/Task          Job         Job     Fault DASD  Average      Percent of this   Percent of TOTAL
number    name              user        number  read count  pages        TDE's DASD fault  DASD fault reads
                                                            transferred  reads
0000880E  ILEAGNEW          A960126A    053541      18,500        1.46        100.00             40.08
00008814  OPENBAD           A960126A    053546      14,535        1.21        100.00             31.49
00008810  TSTIOC            A960126A    053543       7,724        1.32        100.00             16.73
00008408  JUNK              QSPLJOB     053464       4,995        1.72        100.00             10.82
* * *  E N D  O F  R E P O R T  * * *
```

Figure 87. Page Fault DASD Read I/Os by Job/Task Name and I/O Type

10.2.10 Report Title - Page Fault DASD Read I/Os by Job/Task and Object Name/Type

This report is produced from Command Option - Fault Reads by Job/Task, Object.

```
Page fault DASD read I/Os by Job/Task and Object Name/Type
Only includes Jobs/Tasks that performed 1% or more of all fault I/Os
Only include objects that had 1% or more of each Job's/Task's fault I/Os
           QUERY NAME . . . . . IFTOBJ3
           LIBRARY NAME . . . . SMTRACE
           FILE         LIBRARY      MEMBER       FORMAT
           IOTOBJ2      PFREXP2      $$FLT        IOTOBJ2
           IOTOBJ2A     PFREXP2      $$FLT        IOTOBJ2A
           IOTOBJ1B     PFREXP2      $$FLT        IOTOBJ1B
           TASKINFO     PFREXP2      PEXTRACE     TASKINFO
           IOTOBJ1A     PFREXP2      $$FLT        IOTOBJ1A
           DATE . . . . . . . . 08/02/96
           TIME . . . . . . . . 18:53:21
```

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type		Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
0000880E	ILEAGNEW	A960126A	053541	4,543	FCFA2024DA00	0000	24.56	9.84
				4,090	ILEAGNEW A960126A	1AEF	22.11	8.86
				2,063	*DESTROYED	0000	11.15	4.47
				1,461	ILEAGN	0201	7.90	3.17
				1,012	QRNXDUMP	0203	5.47	2.19
				833	QSQENDAG	0201	4.50	1.80
				828	QLEAWI	0203	4.48	1.79
				732	D7A782247200	0000	3.96	1.59
				623	C3E62C036004	0000	3.37	1.35
				567	ILEAGNEW	0201	3.06	1.23
				281	APLIST	19EF	1.52	.61
				280	D56C3B528F00	0000	1.51	.61
				276	QCAWAREA	19EF	1.49	.60
				274	QJOBMSGQ	18A0	1.48	.59
				272	SEIZE LOCK RANGE	0000	1.47	.59
			TOTAL	18,135			98.03	39.29
00008814	OPENBAD	A960126A	053546	2,385	OPEN5	0201	16.41	5.17
				1,789	*DESTROYED	0000	12.31	3.88
				1,187	OPENBAD A960126A	1AEF	8.17	2.57

M05

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type		Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
00008814	OPENBAD	A960126A	053546	965	OPENBAD	0201	6.64	2.09
				728	SEIZE LOCK RANGE	0000	5.01	1.58
				621	QCAWAREA	19EF	4.27	1.35
				545	PF04 PF04	0B90	3.75	1.18
				522	PF03 PF03	0B90	3.59	1.13
				509	PF05 PF05	0B90	3.50	1.10
				495	PF02 PF02	0B90	3.41	1.07
				493	F5075E554004	0000	3.39	1.07
				490	FD3057655004	0000	3.37	1.06
				480	C2E7BB3D7004	0000	3.30	1.04
				469	D3334BC40004	0000	3.23	1.02
				469	PF01 PF01	0B90	3.23	1.02
				457	F3CA6CD12004	0000	3.14	.99
				308	PF01	1901	2.12	.67
				308	PF02	1901	2.12	.67
				306	PF05	1901	2.11	.66
				305	PF04	1901	2.10	.66
				304	PF03	1901	2.09	.66
				265	QUSRSYS	0401	1.82	.57

Figure 88 (Part 1 of 2). Page Fault DASD Read I/Os by Job/Task and Object Name/Type

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type			Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
			TOTAL	14,400				99.08	31.21
00008810	TSTIOC	A960126A	053543	1,929	TESTIO		0201	24.97	4.18
				1,455	DSPOBJD	DSPOBJD	0B90	18.84	3.15
				1,246	HATT		0401	16.13	2.70
				871	TESTIOC		0201	11.28	1.89
				447	QDBGETM		0201	5.79	.97
				404	QDFTOWN		0801	5.23	.88
				385	DSPOBJD		1901	4.98	.83
				367	QCAWAREA		19EF	4.75	.80
				354	F86D14F54004		0000	4.58	.77
				112	QRNXIE		0203	1.45	.24
				99	*DESTROYED		0000	1.28	.21
			TOTAL	7,669				99.28	16.62
00008408	JUNK	QSPLJOB	053464	787	D2FB76C77200		0000	15.76	1.70
				690	JUNK	QSPLJOB	1AEF	13.81	1.49
				371	QSOSRV2		0203	7.43	.80
				266	QTMPLPRC		0201	5.33	.58
				239	*DESTROYED		0000	4.78	.52
				214	QSOKERN3		0203	4.28	.46

M05

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type		Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
00008408	JUNK	QSPLJOB	053464	188	L/L RANGE 1	0000	3.76	.41
				143	QSOSRV1	0203	2.86	.31
				139	QJOBMSGQ	18A0	2.78	.30
				110	SQCCSID1	0ED2	2.20	.24
				90	E7CB3ED36004	0000	1.80	.19
				84	CB409AF8A004	0000	1.68	.18
				84	F4E3FAD8D004	0000	1.68	.18
				81	QTQICONV	0203	1.62	.18
				72	QC2UTIL1	0203	1.44	.16
				72	QPOLLIB1	0203	1.44	.16
				69	E43BF962E500	0000	1.38	.15
				67	QATOCTCPIPCONFIG	0C90	1.34	.15
				66	QYPPRT	0203	1.32	.14
				61	EEE05252CB00	0000	1.22	.13
				60	QSO_DNS_INDEX	0EEF	1.20	.13
				60	SEIZE LOCK RANGE	0000	1.20	.13
				52	QATOCTCPIPCONFIG	0B90	1.04	.11
				50	F836A3DBEA00	0000	1.00	.11
				50	QSPRMTDR	0201	1.00	.11

M05

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type	Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
			TOTAL	4,165		83.35	9.02
			FINAL TOTALS				
			TOTAL	44,369		379.74	96.14

* * * E N D O F R E P O R T * * *

Figure 88 (Part 2 of 2). Page Fault DASD Read I/Os by Job/Task and Object Name/Type

10.2.11 Report Title - Objects with 100 or More Page Fault DASD Read I/Os

This report is produced from Command Option - Objects with 100+ Fault Reads.

```
Objects with 100 or more page fault DASD read I/Os.
 QUERY NAME . . . . . IFOBJ2
 LIBRARY NAME . . . . SMTRACE
 FILE         LIBRARY      MEMBER       FORMAT
 IOOBJ1B      PFREXP2      $$FLT        IOOBJ1B
 IOOBJ1       PFREXP2      $$FLT        IOOBJ1
 IOOBJ1A      PFREXP2      $$FLT        IOOBJ1A
 DATE . . . . . . . . 08/02/96
 TIME . . . . . . . . 18:53:31
```

Object name and type		Fault DASD read count	Average pages transferred per I/O	Percent of all system fault reads
FCFA2024DA00	0000	4,543	1.00	9.84
*DESTROYED	0000	4,204	1.00	9.11
ILEAGNEW A960126A	1AEF	4,090	1.84	8.86
OPEN5	0201	2,385	1.89	5.17
TESTIO	0201	1,929	1.38	4.18
ILEAGN	0201	1,461	1.33	3.17
DSPOBJD DSPOBJD	0B90	1,455	1.00	3.15
QCAWAREA	19EF	1,264	1.00	2.74
HATT	0401	1,246	1.00	2.70
OPENBAD A960126A	1AEF	1,187	1.54	2.57
SEIZE LOCK RANGE	0000	1,093	1.00	2.37
QRNXDUMP	0203	1,012	1.00	2.19
OPENBAD	0201	965	1.34	2.09
TESTIOC	0201	871	1.49	1.89
QSQENDAG	0201	840	1.33	1.82
QLEAWI	0203	837	3.97	1.81
D2FB76C77200	0000	787	1.00	1.70
D7A782247200	0000	732	3.08	1.59
JUNK QSPLJOB	1AEF	690	1.74	1.49

M05

Object name and type		Fault DASD read count	Average pages transferred per I/O	Percent of all system fault reads
C3E62C036004	0000	623	1.00	1.35
ILEAGNEW	0201	567	1.50	1.23
PF04 PF04	0B90	545	1.00	1.18
PF03 PF03	0B90	522	1.00	1.13
PF05 PF05	0B90	509	1.00	1.10
PF02 PF02	0B90	495	1.00	1.07
F5075E554004	0000	493	1.00	1.07
FD3057655004	0000	490	1.00	1.06
C2E7BB3D7004	0000	480	1.00	1.04
D3334BC40004	0000	469	1.00	1.02
PF01 PF01	0B90	469	1.00	1.02
F3CA6CD12004	0000	457	1.00	.99
QUSRSYS	0401	450	1.00	.97
QDBGETM	0201	447	3.98	.97
QJOBMSGQ	18A0	422	1.00	.91
QDFTOWN	0801	404	1.00	.88
DSPOBJD	1901	385	1.00	.83
QSOSRV2	0203	371	2.98	.80
F86D14F54004	0000	354	1.00	.77

Figure 89 (Part 1 of 2). Objects with 100 or More Page Fault DASD Read I/Os

Object name and type		Fault DASD read count	Average pages transferred per I/O	Percent of all system fault reads
PF01	1901	308	1.00	.67
PF02	1901	308	1.00	.67
PF05	1901	306	1.00	.66
PF04	1901	305	1.00	.66
PF03	1901	304	1.00	.66
QRNXIE	0203	296	1.00	.64
APLIST	19EF	281	1.00	.61
D56C3B528F00	0000	280	1.00	.61
QTMPLPRC	0201	266	2.83	.58
QSOKERN3	0203	214	3.61	.46
L/L RANGE 1	0000	192	1.00	.42
QSOSRV1	0203	143	1.78	.31
SQCCSID1	0ED2	114	1.00	.25
QWCBT01	19D0	107	1.00	.23
	FINAL TOTALS			
	TOTAL	43,967		95.26

* * * E N D O F R E P O R T * * *

Figure 89 (Part 2 of 2). Objects with 100 or More Page Fault DASD Read I/Os

10.2.12 Report Title - Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads

This report is produced from Command Option - Fault Reads by Object, Job/Task.

```
                           Page fault DASD read I/Os for objects with 1% or more of all page fault reads.
                           Job/Task name and I/O type. Only includes Jobs/Tasks with 1% or
                           more of the object's page fault reads.
                                         QUERY NAME . . . . . IFOBJT3
                                         LIBRARY NAME . . . . SMTRACE
                                         FILE         LIBRARY      MEMBER       FORMAT
                                         IOOBJT2      PFREXP2      $$FLT        IOOBJT2
                                         TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                         DATE . . . . . . . . 08/02/96
                                         TIME . . . . . . . . 18:53:42
Object name                TDE       Job/Task name     Job         Job         Fault DASD  Percent this   Average pages
and type                   number                      user        number      read count  object's fault transferred
                                                                                           read I/Os
FCFA2024DA00         0000  0000880E  ILEAGNEW          A960126A    053541           4,543      100.00            1.00
                                                                     TOTAL          4,543      100.00
*DESTROYED           0000  0000880E  ILEAGNEW          A960126A    053541           2,063       49.07            1.00
                           00008814  OPENBAD           A960126A    053546           1,789       42.55            1.00
                           00008408  JUNK              QSPLJOB     053464             239        5.69            1.00
                           00008810  TSTIOC            A960126A    053543              99        2.35            1.00
                                                                     TOTAL          4,190       99.66
ILEAGNEW  A960126A   1AEF  0000880E  ILEAGNEW          A960126A    053541           4,090      100.00            1.84
                                                                     TOTAL          4,090      100.00
OPEN5                0201  00008814  OPENBAD           A960126A    053546           2,385      100.00            1.89
                                                                     TOTAL          2,385      100.00
TESTIO               0201  00008810  TSTIOC            A960126A    053543           1,929      100.00            1.38
                                                                     TOTAL          1,929      100.00
ILEAGN               0201  0000880E  ILEAGNEW          A960126A    053541           1,461      100.00            1.33
                                                                     TOTAL          1,461      100.00
DSPOBJD   DSPOBJD    0B90  00008810  TSTIOC            A960126A    053543           1,455      100.00            1.00
                                                                     TOTAL          1,455      100.00
QCAWAREA             19EF  00008814  OPENBAD           A960126A    053546             621       49.13            1.00
                           00008810  TSTIOC            A960126A    053543             367       29.03            1.00
                                                   M05

Object name                TDE       Job/Task name     Job         Job         Fault DASD  Percent this   Average pages
and type                   number                      user        number      read count  object's fault transferred
                                                                                           read I/Os
QCAWAREA             19EF  0000880E  ILEAGNEW          A960126A    053541             276       21.84            1.00
                                                                     TOTAL          1,264      100.00
HATT                 0401  00008810  TSTIOC            A960126A    053543           1,246      100.00            1.00
                                                                     TOTAL          1,246      100.00
OPENBAD   A960126A   1AEF  00008814  OPENBAD           A960126A    053546           1,187      100.00            1.54
                                                                     TOTAL          1,187      100.00
SEIZE LOCK RANGE     0000  00008814  OPENBAD           A960126A    053546             728       66.61            1.00
                           0000880E  ILEAGNEW          A960126A    053541             272       24.89            1.00
                           00008408  JUNK              QSPLJOB     053464              60        5.49            1.00
                           00008810  TSTIOC            A960126A    053543              25        2.29            1.00
                                                                     TOTAL          1,085       99.28
QRNXDUMP             0203  0000880E  ILEAGNEW          A960126A    053541           1,012      100.00            1.00
                                                                     TOTAL          1,012      100.00
OPENBAD              0201  00008814  OPENBAD           A960126A    053546             965      100.00            1.34
                                                                     TOTAL            965      100.00
TESTIOC              0201  00008810  TSTIOC            A960126A    053543             871      100.00            1.49
                                                                     TOTAL            871      100.00
QSQENDAG             0201  0000880E  ILEAGNEW          A960126A    053541             833       99.17            1.33
                                                                     TOTAL            833       99.17
```

Figure 90 (Part 1 of 2). Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads

Object name and type			TDE number	Job/Task name	Job user	Job number	Fault DASD read count	Percent this object's fault read I/Os	Average pages transferred
QLEAWI		0203	0000880E	ILEAGNEW	A960126A	053541	828	98.92	3.97
			00008408	JUNK	QSPLJOB	053464	9	1.08	4.00
						TOTAL	837	100.00	
D2FB76C77200		0000	00008408	JUNK	QSPLJOB	053464	787	100.00	1.00
						TOTAL	787	100.00	
D7A782247200		0000	0000880E	ILEAGNEW	A960126A	053541	732	100.00	3.08
						TOTAL	732	100.00	
JUNK	QSPLJOB	1AEF	00008408	JUNK	QSPLJOB	053464	690	100.00	1.74
						TOTAL	690	100.00	
C3E62C036004		0000	0000880E	ILEAGNEW	A960126A	053541	623	100.00	1.00
						TOTAL	623	100.00	
ILEAGNEW		0201	0000880E	ILEAGNEW	A960126A	053541	567	100.00	1.50
						TOTAL	567	100.00	
PF04	PF04	0B90	00008814	OPENBAD	A960126A	053546	545	100.00	1.00
						TOTAL	545	100.00	
PF03	PF03	0B90	00008814	OPENBAD	A960126A	053546	522	100.00	1.00
						TOTAL	522	100.00	
PF05	PF05	0B90	00008814	OPENBAD	A960126A	053546	509	100.00	1.00
						TOTAL	509	100.00	

M05

Object name and type			TDE number	Job/Task name	Job user	Job number	Fault DASD read count	Percent this object's fault read I/Os	Average pages transferred
PF02	PF02	0B90	00008814	OPENBAD	A960126A	053546	495	100.00	1.00
						TOTAL	495	100.00	
F5075E554004		0000	00008814	OPENBAD	A960126A	053546	493	100.00	1.00
						TOTAL	493	100.00	
FD3057655004		0000	00008814	OPENBAD	A960126A	053546	490	100.00	1.00
						TOTAL	490	100.00	
C2E7BB3D7004		0000	00008814	OPENBAD	A960126A	053546	480	100.00	1.00
						TOTAL	480	100.00	
D3334BC40004		0000	00008814	OPENBAD	A960126A	053546	469	100.00	1.00
						TOTAL	469	100.00	
PF01	PF01	0B90	00008814	OPENBAD	A960126A	053546	469	100.00	1.00
						TOTAL	469	100.00	
						FINAL TOTALS			
						TOTAL	37,224	2,998.11	

* * * E N D O F R E P O R T * * *

Figure 90 (Part 2 of 2). Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads

10.2.13 Report Title - Physical I/Os by Disk Unit (Arm) Number

This report is produced from Command Option - By Unit (Arm).

```
     Physical I/Os by disk unit (arm) number
QUERY NAME . . . . . IOUNIT4
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
IOUNIT3      PFREXP2      PEXTRACE     IOUNIT3
IOUNIT1      PFREXP2      PEXTRACE     IOUNIT1
IOUNIT2      PFREXP2      PEXTRACE     IOUNIT2
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:54:04
```

```
                                          M05

UNIT  I/O         I/O   Percent of all  Average bytes
      type      count   system I/Os     transferred
008   *RS  A    1,370        1.45               4,096
      *RS  S    1,437        1.52               4,355
      *RSF S    8,315        8.78               4,643
      *RX  A   12,044       12.72               4,267
      *WS  A        6         .01               4,096
      *WS  S        4         .00               6,144
      *WSP A        5         .01               4,096
      *WSP S    5,381        5.69               8,989
               28,562       30.18               5,263
001   *RS  S      396         .42               5,379
      *RSF S   10,339       10.92               6,088
      *RX  A      129         .14              32,450
      *WS  A        4         .00               4,096
      *WS  S       42         .04               5,071
      *WSP A        5         .01               4,096
      *WSP S    5,517        5.83              10,283
               16,432       17.36               7,683
005   *RS  A      640         .68               4,179
      *RS  S    1,041        1.10               4,674
      *RSF S    6,147        6.49               5,321
                                                  M05

UNIT  I/O         I/O   Percent of all  Average bytes
      type      count   system I/Os     transferred
005   *RX  A      326         .34              32,705
      *WS  S       40         .04               8,499
      *WSP S    4,900        5.18              11,422
               13,094       13.83               8,189
003   *RS  A      322         .34               4,096
      *RS  S    1,313        1.39               4,608
      *RSF S    6,054        6.40               4,844
      *RX  A       74         .08              32,547
      *WS  A        3         .00               4,096
      *WS  S        9         .01               4,096
      *WSP A        1         .00               4,096
      *WSP S    3,395        3.59              10,403
               11,171       11.80               6,667
004   *RS  S      443         .47               5,233
      *RSF S    6,309        6.67               5,617
      *RX  A       56         .06              31,525
      *WS  S        1         .00               4,096
      *WSP S    3,591        3.79               5,725
               10,400       10.99               5,777
007   *RS  A       12         .01               4,096
```

Figure 91 (Part 1 of 2). Physical I/Os by Disk Unit (arm) Number

```
UNIT  I/O          I/O    Percent of all  Average bytes
      type         count  system I/Os     transferred
007   *RS  S         420         .44              4,233
      *RSF S       5,510        5.82              7,429
      *RX  A          84         .09             32,232
      *WS  A           1         .00              4,096
      *WS  S           3         .00             12,288
      *WSP A           1         .00              4,096
      *WSP S       2,446        2.58              4,454
                   8,477        8.96              6,654
006   *RS  A         636         .67              4,096
      *RS  S         986        1.04              4,295
      *RSF S       3,487        3.68              6,189
      *RX  A         318         .34             32,008
      *WS  A           4         .00              4,096
      *WS  S          12         .01             31,744
      *WSP A           1         .00              4,096
      *WSP S       1,071        1.13              5,106
                   6,515        6.88              6,826
* * *  E N D  O F  R E P O R T  * * *
```

Figure 91 (Part 2 of 2). Physical I/Os by Disk Unit (arm) Number

10.2.14 Report Title - Physical Disk I/Os by Unit (Arm) and Job

This report is produced from Command Option - By Unit (Arm) and Job/Task.

```
  Physical disk I/Os by unit (arm) and Job/Task
QUERY NAME . . . . . UNITT7
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
UNITT4       PFREXP2      PEXTRACE     UNITT4
UNITT6       PFREXP2      PEXTRACE     UNITT6
UNITT1       PFREXP2      PEXTRACE     UNITT1
UNITT2       PFREXP2      PEXTRACE     UNITT2
TASKINFO     PFREXP2      PEXTRACE     TASKINFO
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:54:35
```

08/02/96 18:54:35 PAGE 1

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
008	00008810	TSTIOC	A960126A	053543	*RS A	1,370	1.45	4.80	4,096
					*RS S	595	.63	2.08	4,096
					*RSF S	1,997	2.11	6.99	5,612
					*RX A	11,969	12.65	41.91	4,096
						15,931	16.83	55.78	4,286
	0000880E	ILEAGNEW	A960126A	053541	*RS S	560	.59	1.96	4,279
					*RSF S	2,733	2.89	9.57	4,225
					*WS S	2	.00	.01	6,144
					*WSP S	6	.01	.02	13,653
						3,301	3.49	11.56	4,252
	00008814	OPENBAD	A960126A	053546	*RS S	246	.26	.86	4,096
					*RSF S	2,696	2.85	9.44	4,098
						2,942	3.11	10.30	4,097
	00008408	JUNK	QSPLJOB	053464	*RS S	26	.03	.09	13,548
					*RSF S	803	.85	2.81	5,478
						829	.88	2.90	5,731
	0000006B	SMP00006			*WSP S	795	.84	2.78	8,908
						795	.84	2.78	8,908

M05

08/02/96 18:54:35 PAGE 2

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
008	00000068	SMP00003			*WSP S	783	.83	2.74	9,175
						783	.83	2.74	9,175
	00000066	SMP00001			*WSP S	775	.82	2.71	9,027
						775	.82	2.71	9,027
	00000067	SMP00002			*WSP S	774	.82	2.71	8,811
						774	.82	2.71	8,811
	0000006C	SMP00007			*WSP S	766	.81	2.68	9,240
						766	.81	2.68	9,240
	0000006A	SMP00005			*WSP S	732	.77	2.56	9,238
						732	.77	2.56	9,238
	00000069	SMP00004			*WSP S	729	.77	2.55	8,613
						729	.77	2.55	8,613
001	0000880E	ILEAGNEW	A960126A	053541	*RS S	10	.01	.06	24,576
					*RSF S	6,291	6.65	38.29	7,228
					*WSP S	4	.00	.02	32,768
						6,305	6.66	38.37	7,271
	00008810	TSTIOC	A960126A	053543	*RS S	108	.11	.66	4,096
					*RSF S	2,476	2.62	15.07	4,096

Figure 92 (Part 1 of 5). Physical Disk I/Os by Unit (Arm) and Job

08/02/96 18:54:35 PAGE 3

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
001	00008810	TSTIOC	A960126A	053543		2,584	2.73	15.73	4,096
	00008814	OPENBAD	A960126A	053546	*RS S	263	.28	1.60	4,096
					*RSF S	692	.73	4.21	4,096
						955	1.01	5.81	4,096
	00008408	JUNK	QSPLJOB	053464	*RS S	9	.01	.05	32,768
					*RSF S	825	.87	5.02	5,139
						834	.88	5.08	5,437
	00000069	SMP00004			*WSP S	816	.86	4.97	10,682
						816	.86	4.97	10,682
	0000006B	SMP00006			*WSP S	813	.86	4.95	10,550
						813	.86	4.95	10,550
	00000066	SMP00001			*WSP S	802	.85	4.88	9,811
						802	.85	4.88	9,811
	00000068	SMP00003			*WSP S	794	.84	4.83	10,013
						794	.84	4.83	10,013
	0000006A	SMP00005			*WSP S	777	.82	4.73	10,543
						777	.82	4.73	10,543
	00000067	SMP00002			*WSP S	776	.82	4.72	10,277

M05

08/02/96 18:54:35 PAGE 4

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
001	00000067	SMP00002				776	.82	4.72	10,277
	0000006C	SMP00007			*WSP S	734	.78	4.47	9,967
						734	.78	4.47	9,967
005	00008814	OPENBAD	A960126A	053546	*RS A	637	.67	4.86	4,096
					*RS S	914	.97	6.98	4,217
					*RSF S	2,169	2.29	16.56	4,096
					*WSP S	6	.01	.05	65,536
						3,726	3.94	28.46	4,225
	0000880E	ILEAGNEW	A960126A	053541	*RS S	1	.00	.01	24,576
					*RSF S	2,535	2.68	19.36	5,418
						2,536	2.68	19.37	5,425
	00008408	JUNK	QSPLJOB	053464	*RS S	17	.02	.13	31,563
					*RSF S	957	1.01	7.31	6,570
					*WS S	4	.00	.03	19,456
					*WSP S	2	.00	.02	18,432
						980	1.04	7.48	7,080
	00000068	SMP00003			*WSP S	730	.77	5.58	11,469
						730	.77	5.58	11,469

M05

08/02/96 18:54:35 PAGE 5

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
005	0000006B	SMP00006			*WSP S	725	.77	5.54	11,593
						725	.77	5.54	11,593
	00000069	SMP00004			*WSP S	712	.75	5.44	11,759
						712	.75	5.44	11,759
	0000006C	SMP00007			*WSP S	705	.74	5.38	11,295
						705	.74	5.38	11,295
	00000066	SMP00001			*WSP S	684	.72	5.22	11,168
						684	.72	5.22	11,168
	0000006A	SMP00005			*WSP S	679	.72	5.19	11,094
						679	.72	5.19	11,094
	00000067	SMP00002			*WSP S	657	.69	5.02	11,041
						657	.69	5.02	11,041
	00008810	TSTIOC	A960126A	053543	*RS S	108	.11	.82	4,096
					*RSF S	442	.47	3.38	8,053
						550	.58	4.20	7,276
	00007F6C	P23ARTVKE	A960126A	053319	*RS A	3	.00	.02	21,845
					*RSF S	21	.02	.16	4,291
					*RX A	326	.34	2.49	32,705

Figure 92 (Part 2 of 5). Physical Disk I/Os by Unit (Arm) and Job

08/02/96 18:54:35 PAGE 6

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
005	00007F6C	P23ARTVKE	A960126A	053319	*WS S	4	.00	.03	4,096
						354	.37	2.70	30,604
003	0000880E	ILEAGNEW	A960126A	053541	*RS S	275	.29	2.46	4,096
					*RSF S	3,506	3.70	31.38	4,096
						3,781	3.99	33.85	4,096
	00008814	OPENBAD	A960126A	053546	*RS A	322	.34	2.88	4,096
					*RS S	890	.94	7.97	4,096
					*RSF S	1,475	1.56	13.20	4,096
						2,687	2.84	24.05	4,096
	00008408	JUNK	QSPLJOB	053464	*RS S	30	.03	.27	24,986
					*RSF S	770	.81	6.89	9,953
					*WS S	4	.00	.04	4,096
					*WSP S	2	.00	.02	4,096
						806	.85	7.22	10,469
	0000006B	SMP00006			*WSP S	520	.55	4.65	11,169
						520	.55	4.65	11,169
	00000068	SMP00003			*WSP S	507	.54	4.54	10,898
						507	.54	4.54	10,898

M05

08/02/96 18:54:35 PAGE 7

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
003	00000069	SMP00004			*WSP S	503	.53	4.50	10,545
						503	.53	4.50	10,545
	0000006A	SMP00005			*WSP S	474	.50	4.24	9,981
						474	.50	4.24	9,981
	0000006C	SMP00007			*WSP S	473	.50	4.23	9,534
						473	.50	4.23	9,534
	00000067	SMP00002			*WSP S	470	.50	4.21	10,894
						470	.50	4.21	10,894
	00000066	SMP00001			*WSP S	445	.47	3.98	9,683
						445	.47	3.98	9,683
	00008810	TSTIOC	A960126A	053543	*RS S	110	.12	.98	4,096
					*RSF S	255	.27	2.28	4,096
						365	.39	3.27	4,096
004	00008814	OPENBAD	A960126A	053546	*RS S	280	.30	2.69	5,325
					*RSF S	2,968	3.14	28.54	5,266
					*WSP S	6	.01	.06	38,229
						3,254	3.44	31.29	5,332
	0000880E	ILEAGNEW	A960126A	053541	*RS S	4	.00	.04	4,096

M05

08/02/96 18:54:35 PAGE 8

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
004	0000880E	ILEAGNEW	A960126A	053541	*RSF S	1,516	1.60	14.58	4,101
						1,520	1.61	14.62	4,101
	00008810	TSTIOC	A960126A	053543	*RS S	110	.12	1.06	4,096
					*RSF S	1,406	1.49	13.52	7,976
						1,516	1.60	14.58	7,695
	0000006B	SMP00006			*WSP S	550	.58	5.29	5,697
						550	.58	5.29	5,697
	00000068	SMP00003			*WSP S	517	.55	4.97	5,585
						517	.55	4.97	5,585
	0000006A	SMP00005			*WSP S	513	.54	4.93	5,461
						513	.54	4.93	5,461
	00000069	SMP00004			*WSP S	513	.54	4.93	5,765
						513	.54	4.93	5,765
	0000006C	SMP00007			*WSP S	508	.54	4.88	5,749
						508	.54	4.88	5,749
	00000067	SMP00002			*WSP S	494	.52	4.75	5,671
						494	.52	4.75	5,671
	00000066	SMP00001			*WSP S	481	.51	4.63	5,799

Figure 92 (Part 3 of 5). Physical Disk I/Os by Unit (Arm) and Job

08/02/96 18:54:35 PAGE 9

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
004	00000066	SMP00001				481	.51	4.63	5,799
	00008408	JUNK	QSPLJOB	053464	*RS S	38	.04	.37	8,300
					*RSF S	369	.39	3.55	5,817
						407	.43	3.91	6,048
007	00008814	OPENBAD	A960126A	053546	*RS S	280	.30	3.30	4,096
					*RSF S	2,987	3.16	35.24	6,574
						3,267	3.45	38.54	6,362
	0000880E	ILEAGNEW	A960126A	053541	*RSF S	1,320	1.39	15.57	11,720
						1,320	1.39	15.57	11,720
	00008810	TSTIOC	A960126A	053543	*RS S	91	.10	1.07	4,096
					*RSF S	724	.76	8.54	4,096
						815	.86	9.61	4,096
	00008408	JUNK	QSPLJOB	053464	*RS A	12	.01	.14	4,096
					*RS S	41	.04	.48	4,096
					*RSF S	434	.46	5.12	6,116
						487	.51	5.74	5,896
	0000006B	SMP00006			*WSP S	376	.40	4.44	4,466
						376	.40	4.44	4,466

M05

08/02/96 18:54:35 PAGE 10

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
007	00000067	SMP00002			*WSP S	370	.39	4.36	4,517
						370	.39	4.36	4,517
	00000068	SMP00003			*WSP S	363	.38	4.28	4,389
						363	.38	4.28	4,389
	0000006A	SMP00005			*WSP S	340	.36	4.01	4,482
						340	.36	4.01	4,482
	00000069	SMP00004			*WSP S	338	.36	3.99	4,375
						338	.36	3.99	4,375
	00000066	SMP00001			*WSP S	335	.35	3.95	4,536
						335	.35	3.95	4,536
	0000006C	SMP00007			*WSP S	324	.34	3.82	4,412
						324	.34	3.82	4,412
	00007F6C	P23ARTVKE	A960126A	053319	*RS S	2	.00	.02	4,096
					*RSF S	28	.03	.33	4,096
					*RX A	84	.09	.99	32,232
					*WS A	1	.00	.01	4,096
						115	.12	1.36	24,647
006	00008814	OPENBAD	A960126A	053546	*RS A	636	.67	9.76	4,096

M05

08/02/96 18:54:35 PAGE 11

Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
006	00008814	OPENBAD	A960126A	053546	*RS S	597	.63	9.16	4,302
					*RSF S	1,548	1.64	23.76	5,260
					*WSP S	4	.00	.06	4,096
						2,785	2.94	42.75	4,787
	0000880E	ILEAGNEW	A960126A	053541	*RS S	277	.29	4.25	4,155
					*RSF S	599	.63	9.19	6,017
						876	.93	13.45	5,429
	00008408	JUNK	QSPLJOB	053464	*RS S	9	.01	.14	9,557
					*RSF S	837	.88	12.85	9,259
					*WS S	4	.00	.06	86,016
					*WSP S	2	.00	.03	86,016
						852	.90	13.08	9,803
	00008810	TSTIOC	A960126A	053543	*RS S	96	.10	1.47	4,096
					*RSF S	424	.45	6.51	4,096
						520	.55	7.98	4,096
	00007F6C	P23ARTVKE	A960126A	053319	*RS S	3	.00	.05	4,096
					*RSF S	54	.06	.83	4,248
					*RX A	318	.34	4.88	32,008

Figure 92 (Part 4 of 5). Physical Disk I/Os by Unit (Arm) and Job

08/02/96	18:54:35								PAGE 12
Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average bytes transferred
006	00007F6C	P23ARTVKE	A960126A	053319		375	.40	5.76	27,787
	00000068	SMP00003			*WSP S	159	.17	2.44	5,049
						159	.17	2.44	5,049
	00000067	SMP00002			*WSP S	157	.17	2.41	4,957
						157	.17	2.41	4,957
	00000069	SMP00004			*WSP S	157	.17	2.41	4,957
						157	.17	2.41	4,957
	0000006B	SMP00006			*WSP S	153	.16	2.35	5,087
						153	.16	2.35	5,087
	0000006A	SMP00005			*WSP S	148	.16	2.27	4,843
						148	.16	2.27	4,843
	00000066	SMP00001			*WSP S	148	.16	2.27	4,816
						148	.16	2.27	4,816
	0000006C	SMP00007			*WSP S	141	.15	2.16	4,997
						141	.15	2.16	4,997

* * * E N D O F R E P O R T * * *

Figure 92 (Part 5 of 5). Physical Disk I/Os by Unit (Arm) and Job

10.2.15 Report Title - Physical Disk I/Os by Unit (Arm) and Object

This report is produced from Command Option - By Unit (Arm) and Object.

```
Physical disk I/Os by unit (arm) and object
Only includes objects which had 1+% of all system I/Os or
1+% of an arm′s I/Os
   QUERY NAME . . . . . UNIT07
   LIBRARY NAME . . . . SMTRACE
   FILE         LIBRARY      MEMBER       FORMAT
   UNIT04       PFREXP2      PEXTRACE     UNIT04
   UNIT06       PFREXP2      PEXTRACE     UNIT06
   UNIT01       PFREXP2      PEXTRACE     UNIT01
   UNIT02       PFREXP2      PEXTRACE     UNIT02
   DATE . . . . . . . . 08/02/96
   TIME . . . . . . . . 18:55:08
```

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
008	DSPOBJD	DSPOBJD	0B90	*RS A	1,370	1.45	4.80	4,096
				*RS S	473	.50	1.66	4,096
				*RSF S	464	.49	1.62	4,096
				*RX A	11,969	12.65	41.91	4,096
					14,276	15.08	49.98	4,096
	*DESTROYED		0000	*RS S	367	.39	1.28	4,096
				*RSF S	1,227	1.30	4.30	4,096
				*WSP S	824	.87	2.88	21,007
					2,418	2.55	8.47	9,859
	FCFA2024DA00		0000	*RSF S	1,151	1.22	4.03	4,096
				*WSP S	372	.39	1.30	6,783
					1,523	1.61	5.33	4,752
	C2E7BB3D7004		0000	*RSF S	480	.51	1.68	4,096
				*WSP S	581	.61	2.03	4,096
					1,061	1.12	3.71	4,096
	FD3057655004		0000	*RSF S	490	.52	1.72	4,096
				*WSP S	540	.57	1.89	4,096
					1,030	1.09	3.61	4,096
	TESTIO		0201	*RSF S	1,006	1.06	3.52	7,101
					M05			

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
008	TESTIO		0201		1,006	1.06	3.52	7,101
	F86D14F54004		0000	*RSF S	354	.37	1.24	4,096
				*WSP S	617	.65	2.16	4,096
					971	1.03	3.40	4,096
	PF01	PF01	0B90	*RSF S	469	.50	1.64	4,096
				*WSP S	489	.52	1.71	4,096
					958	1.01	3.35	4,096
	QJOBMSGQ		18A0	*RSF S	276	.29	.97	4,096
				*WS S	1	.00	.00	4,096
				*WSP S	556	.59	1.95	6,144
					833	.88	2.92	5,463
	OPEN5		0201	*RSF S	301	.32	1.05	4,096
				*WSP S	322	.34	1.13	4,096
					623	.66	2.18	4,096
	QCAWAREA		19EF	*RSF S	296	.31	1.04	4,096
				*WSP S	312	.33	1.09	4,096
					608	.64	2.13	4,096
	QUIRCLAP		0201	*RS S	556	.59	1.95	4,096
					556	.59	1.95	4,096

Figure 93 (Part 1 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
008	ILEAGNEW	A960126A	1AEF	*RS S	7	.01	.02	18,725
				*RSF S	91	.10	.32	7,967
				*WSP S	328	.35	1.15	22,640
					426	.45	1.49	19,442
	OPENBAD		0201	*RSF S	309	.33	1.08	4,096
					309	.33	1.08	4,096
	PF04		1901	*RSF S	305	.32	1.07	4,096
					305	.32	1.07	4,096
	JUNK	QSPLJOB	1AEF	*RS S	9	.01	.03	31,403
				*RSF S	64	.07	.22	6,400
				*WSP S	225	.24	.79	20,789
					298	.31	1.04	18,020
001	ILEAGNEW	A960126A	1AEF	*RS S	11	.01	.07	25,321
				*RSF S	3,323	3.51	20.22	7,814
				*WSP S	2,127	2.25	12.94	19,475
					5,461	5.77	33.23	12,391
	DSPOBJD	DSPOBJD	0B90	*RSF S	991	1.05	6.03	4,096
				*WSP S	498	.53	3.03	4,096
					1,489	1.57	9.06	4,096

M05

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
001	FCFA2024DA00		0000	*RSF S	822	.87	5.00	4,096
				*WSP S	583	.62	3.55	4,096
					1,405	1.48	8.55	4,096
	HATT		0401	*RSF S	1,246	1.32	7.58	4,096
					1,246	1.32	7.58	4,096
	PF05	PF05	0B90	*RSF S	500	.53	3.04	4,096
				*WSP S	528	.56	3.21	4,096
					1,028	1.09	6.26	4,096
	D7A782247200		0000	*RSF S	732	.77	4.45	12,596
				*WSP S	279	.29	1.70	4,096
					1,011	1.07	6.15	10,250
	*DESTROYED		0000	*RS S	371	.39	2.26	4,096
				*RSF S	181	.19	1.10	4,096
				*WSP S	201	.21	1.22	7,723
					753	.80	4.58	5,064
	C3E62C036004		0000	*RSF S	291	.31	1.77	4,096
				*WSP S	372	.39	2.26	4,096
					663	.70	4.03	4,096
	TESTIO		0201	*RSF S	222	.23	1.35	4,096

M05

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
001	TESTIO		0201	*WSP S	343	.36	2.09	4,096
					565	.60	3.44	4,096
	D56C3B528F00		0000	*RSF S	280	.30	1.70	4,096
				*WSP S	281	.30	1.71	4,096
					561	.59	3.41	4,096
	APLIST		19EF	*RSF S	281	.30	1.71	4,096
					281	.30	1.71	4,096
	QSQENDAG		0201	*RSF S	281	.30	1.71	8,134
					281	.30	1.71	8,134
	ILEAGN		0201	*RSF S	279	.29	1.70	4,096
					279	.29	1.70	4,096
	L/L RANGE 1		0000	*RSF S	192	.20	1.17	4,096
					192	.20	1.17	4,096
005	ILEAGNEW	A960126A	1AEF	*RS S	1	.00	.01	24,576
				*RSF S	676	.71	5.16	6,144
				*WSP S	2,146	2.27	16.39	17,928
					2,823	2.98	21.56	15,109
	*DESTROYED		0000	*RS S	382	.40	2.92	4,150
				*RSF S	748	.79	5.71	4,096

Figure 93 (Part 2 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
005	*DESTROYED		0000	*WSP S	1,047	1.11	8.00	4,749
					2,177	2.30	16.63	4,420
	FCFA2024DA00		0000	*RSF S	646	.68	4.93	4,096
				*WSP S	549	.58	4.19	8,020
					1,195	1.26	9.13	5,899
	PF04	PF04	0B90	*RSF S	541	.57	4.13	4,096
				*WSP S	528	.56	4.03	4,096
					1,069	1.13	8.16	4,096
	JUNK	QSPLJOB	1AEF	*RS S	17	.02	.13	31,563
				*RSF S	492	.52	3.76	7,035
				*WS S	4	.00	.03	19,456
				*WSP S	278	.29	2.12	14,130
					791	.84	6.04	10,118
	PF05	PF05	0B90	*RS A	318	.34	2.43	4,096
				*RS S	317	.33	2.42	4,096
				*RSF S	9	.01	.07	4,096
					644	.68	4.92	4,096
	PF01	PF01	0B90	*RS A	319	.34	2.44	4,096
				*RS S	319	.34	2.44	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
005	PF01	PF01	0B90		638	.67	4.87	4,096
	ILEAGN		0201	*RSF S	620	.66	4.73	7,267
					620	.66	4.73	7,267
	TESTIOC		0201	*RSF S	429	.45	3.28	8,173
					429	.45	3.28	8,173
	QUSRSYS		0401	*RSF S	420	.44	3.21	4,096
					420	.44	3.21	4,096
	QWCBT01		19D0	*RS A	3	.00	.02	21,845
				*RSF S	5	.01	.04	4,096
				*RX A	326	.34	2.49	32,705
					334	.35	2.55	32,179
	C3E62C036004		0000	*RSF S	156	.16	1.19	4,096
				*WSP S	175	.18	1.34	4,096
					331	.35	2.53	4,096
	OPENBAD		0201	*RSF S	314	.33	2.40	4,096
					314	.33	2.40	4,096
	OPEN5		0201	*RSF S	306	.32	2.34	4,096
					306	.32	2.34	4,096
	ILEAGNEW		0201	*RSF S	280	.30	2.14	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
005	ILEAGNEW		0201		280	.30	2.14	4,096
	QJOBMSGQ		18A0	*RSF S	114	.12	.87	4,096
				*WSP S	71	.08	.54	7,038
					185	.20	1.41	5,225
	D2FB76C77200		0000	*RSF S	99	.10	.76	4,096
				*WSP S	32	.03	.24	4,096
					131	.14	1.00	4,096
003	*DESTROYED		0000	*RS S	367	.39	3.29	4,096
				*RSF S	1,366	1.44	12.23	4,096
				*WS A	2	.00	.02	4,096
				*WS S	1	.00	.01	4,096
				*WSP S	767	.81	6.87	25,121
					2,503	2.64	22.41	10,539
	FCFA2024DA00		0000	*RSF S	861	.91	7.71	4,096
				*WSP S	680	.72	6.09	8,156
					1,541	1.63	13.79	5,888
	QRNXDUMP		0203	*RSF S	1,012	1.07	9.06	4,096
				*WSP S	417	.44	3.73	4,096
					1,429	1.51	12.79	4,096

Figure 93 (Part 3 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
003	QCAWAREA		19EF	*RSF S	692	.73	6.19	4,096
				*WSP S	404	.43	3.62	4,096
					1,096	1.16	9.81	4,096
	D3334BC40004		0000	*RSF S	469	.50	4.20	4,096
				*WSP S	551	.58	4.93	4,096
					1,020	1.08	9.13	4,096
	PF03	PF03	0B90	*RS A	322	.34	2.88	4,096
				*RS S	317	.33	2.84	4,096
				*RSF S	2	.00	.02	4,096
					641	.68	5.74	4,096
	SEIZE LOCK RANGE		0000	*RSF S	285	.30	2.55	4,096
				*WSP S	305	.32	2.73	4,391
					590	.62	5.28	4,249
	PF04	PF04	0B90	*RS S	316	.33	2.83	4,096
				*RSF S	4	.00	.04	4,096
					320	.34	2.86	4,096
	PF01		1901	*RSF S	308	.33	2.76	4,096
					308	.33	2.76	4,096
	QSQENDAG		0201	*RSF S	279	.29	2.50	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
003	QSQENDAG		0201		279	.29	2.50	4,096
	QWVPDAGE		0201	*RS S	278	.29	2.49	4,096
					278	.29	2.49	4,096
	JUNK	QSPLJOB	1AEF	*RS S	21	.02	.19	32,768
				*RSF S	76	.08	.68	8,192
				*WS S	4	.00	.04	4,096
				*WSP S	158	.17	1.41	19,521
					259	.27	2.32	17,032
	QSOKERN3		0203	*RSF S	156	.16	1.40	14,704
					156	.16	1.40	14,704
	QSOSRV2		0203	*RSF S	140	.15	1.25	14,746
					140	.15	1.25	14,746
004	OPENBAD	A960126A	1AEF	*RS S	15	.02	.14	27,034
				*RSF S	1,063	1.12	10.22	6,100
				*WSP S	755	.80	7.26	7,449
					1,833	1.94	17.63	6,827
	FCFA2024DA00		0000	*RSF S	745	.79	7.16	4,096
				*WSP S	685	.72	6.59	7,050
					1,430	1.51	13.75	5,511

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Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
004	F5075E554004		0000	*RSF S	493	.52	4.74	4,096
				*WSP S	596	.63	5.73	4,096
					1,089	1.15	10.47	4,096
	PF03	PF03	0B90	*RSF S	520	.55	5.00	4,096
				*WSP S	514	.54	4.94	4,096
					1,034	1.09	9.94	4,096
	*DESTROYED		0000	*RS S	373	.39	3.59	4,096
				*RSF S	261	.28	2.51	4,096
				*WSP S	193	.20	1.86	9,232
					827	.87	7.95	5,295
	QRNXIE		0203	*RSF S	296	.31	2.85	4,096
				*WSP S	336	.35	3.23	4,096
					632	.67	6.08	4,096
	QCAWAREA		19EF	*RSF S	276	.29	2.65	4,096
				*WSP S	279	.29	2.68	4,096
					555	.59	5.34	4,096
	QDBGETM		0201	*RSF S	447	.47	4.30	16,292
					447	.47	4.30	16,292
	TESTIOC		0201	*RSF S	435	.46	4.18	4,096

Figure 93 (Part 4 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
004	TESTIOC	0201		435	.46	4.18	4,096
	DSPOBJD	1901	*RSF S	385	.41	3.70	4,096
				385	.41	3.70	4,096
	OPENBAD	0201	*RSF S	327	.35	3.14	8,192
				327	.35	3.14	8,192
	PF05	1901	*RSF S	306	.32	2.94	4,096
				306	.32	2.94	4,096
	ILEAGN	0201	*RSF S	278	.29	2.67	4,096
				278	.29	2.67	4,096
	D2FB76C77200	0000	*RSF S	166	.18	1.60	4,096
			*WSP S	97	.10	.93	6,081
				263	.28	2.53	4,828
	SEIZE LOCK RANGE	0000	*RSF S	50	.05	.48	4,096
			*WSP S	60	.06	.58	5,939
				110	.12	1.06	5,101
007	OPEN5	0201	*RSF S	1,459	1.54	17.21	9,169
				1,459	1.54	17.21	9,169
	PF02 PF02	0B90	*RSF S	493	.52	5.82	4,096
			*WSP S	489	.52	5.77	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
007	PF02 PF02	0B90		982	1.04	11.58	4,096
	F3CA6CD12004	0000	*RSF S	457	.48	5.39	4,096
			*WSP S	515	.54	6.08	4,096
				972	1.03	11.47	4,096
	SEIZE LOCK RANGE	0000	*RSF S	436	.46	5.14	4,096
			*WSP S	491	.52	5.79	4,305
				927	.98	10.94	4,206
	QLEAWI	0203	*RSF S	837	.88	9.87	16,252
				837	.88	9.87	16,252
	FCFA2024DA00	0000	*RSF S	318	.34	3.75	4,096
			*WSP S	455	.48	5.37	4,096
				773	.82	9.12	4,096
	*DESTROYED	0000	*RS S	371	.39	4.38	4,096
			*RSF S	211	.22	2.49	4,096
			*WSP S	182	.19	2.15	7,967
				764	.81	9.01	5,018
	QDFTOWN	0801	*RSF S	404	.43	4.77	4,096
				404	.43	4.77	4,096
	C3E62C036004	0000	*RSF S	166	.18	1.96	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
007	C3E62C036004	0000	*WSP S	189	.20	2.23	4,096
				355	.38	4.19	4,096
	TESTIO	0201	*RSF S	299	.32	3.53	4,096
				299	.32	3.53	4,096
	D2FB76C77200	0000	*RSF S	106	.11	1.25	4,096
			*WSP S	41	.04	.48	5,794
				147	.16	1.73	4,570
	QWCBT01	19D0	*RSF S	7	.01	.08	4,096
			*RX A	84	.09	.99	32,232
				91	.10	1.07	30,067
006	*DESTROYED	0000	*RS S	371	.39	5.69	4,096
			*RSF S	210	.22	3.22	4,096
			*WSP S	186	.20	2.85	7,862
				767	.81	11.77	5,009
	PF02 PF02	0B90	*RS A	319	.34	4.90	4,096
			*RS S	318	.34	4.88	4,096
			*RSF S	2	.00	.03	4,096
				639	.68	9.81	4,096
	SEIZE LOCK RANGE	0000	*RSF S	299	.32	4.59	4,096

Figure 93 (Part 5 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
006	SEIZE LOCK RANGE		0000	*WSP S	301	.32	4.62	4,205
					600	.63	9.21	4,151
	ILEAGN		0201	*RSF S	284	.30	4.36	4,096
				*WSP S	272	.29	4.17	4,096
					556	.59	8.53	4,096
	TESTIO		0201	*RSF S	402	.42	6.17	4,096
					402	.42	6.17	4,096
	QWCBT01		19D0	*RSF S	45	.05	.69	4,096
				*RX A	318	.34	4.88	32,008
					363	.38	5.57	28,548
	OPEN5		0201	*RSF S	319	.34	4.90	8,153
					319	.34	4.90	8,153
	PF04	PF04	0B90	*RS A	317	.33	4.87	4,096
					317	.33	4.87	4,096
	PF02		1901	*RSF S	308	.33	4.73	4,096
					308	.33	4.73	4,096
	PF03		1901	*RSF S	304	.32	4.67	4,096
					304	.32	4.67	4,096
	QWVPDAGE		0201	*RS S	278	.29	4.27	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
006	QWVPDAGE		0201	*RSF S	25	.03	.38	4,096
					303	.32	4.65	4,096
	ILEAGNEW		0201	*RSF S	281	.30	4.31	8,192
					281	.30	4.31	8,192
	OPENBAD	A960126A	1AEF	*RS S	4	.00	.06	32,768
				*RSF S	124	.13	1.90	8,192
				*WSP S	132	.14	2.03	4,096
					260	.27	3.99	6,491
	D2FB76C77200		0000	*RSF S	130	.14	2.00	4,096
				*WSP S	59	.06	.91	5,484
					189	.20	2.90	4,529
	QTMPLPRC		0201	*RSF S	188	.20	2.89	14,053
					188	.20	2.89	14,053
	QSOSRV2		0203	*RSF S	164	.17	2.52	13,012
					164	.17	2.52	13,012
	QSOSRV1		0203	*RSF S	119	.13	1.83	7,951
				*WSP S	13	.01	.20	4,096
					132	.14	2.03	7,571
	E7CB3ED36004		0000	*RSF S	44	.05	.68	4,096

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Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm′s I/Os	Average types transferred
006	E7CB3ED36004	0000	*WSP S	53	.06	.81	4,096
				97	.10	1.49	4,096

* * * E N D O F R E P O R T * * *

Figure 93 (Part 6 of 6). Physical Disk I/Os by Unit (Arm) and Object

10.2.16 Report Title - Physical I/Os by Mainstore Pool

This report is produced from Command Option - By Mainstore Pool.

```
         Physical I/Os by mainstore pool.
QUERY NAME . . . . . IOPOOL4
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
IOPOOL3      PFREXP2      PEXTRACE     IOPOOL3
IOPOOL1      PFREXP2      PEXTRACE     IOPOOL1
IOPOOL2      PFREXP2      PEXTRACE     IOPOOL2
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:55:32


Mainstore  I/O         I/O  Percent of all  Average bytes
pool       type      count  system I/Os     transferred
   07      *RS  A    2,965        3.13            4,096
           *RS  S    5,821        6.15            4,254
           *RSF S   40,763       43.07            5,508
           *RX  A   11,969       12.65            4,096
           *WSP S   23,972       25.33            8,757
                    85,490       90.32            6,087
   03      *RS  A       12         .01            4,096
           *RS  S      170         .18           14,722
           *RSF S    4,995        5.28            7,035
           *WS  S        4         .00            4,096
           *WSP S    1,843        1.95           10,190
                     7,024        7.42            8,042
   04      *RS  A        3         .00           21,845
           *RS  S       14         .01            9,362
           *RSF S      222         .23            4,225
           *RX  A    1,062        1.12           32,278
           *WS  A        3         .00            4,096
           *WS  S       28         .03            6,290
           *WSP S      338         .36            7,586
                     1,670        1.76           22,854
                                              M05


Mainstore  I/O         I/O  Percent of all  Average bytes
pool       type      count  system I/Os     transferred
   02      *RS  S       30         .03            6,827
           *RSF S      125         .13            5,833
           *WS  A       12         .01            4,096
           *WS  S       73         .08           10,773
           *WSP A       13         .01            4,096
           *WSP S      118         .12           13,815
                       371         .39            9,307
   01      *RS  S        1         .00           32,768
           *RSF S       56         .06            4,096
           *WS  A        3         .00            4,096
           *WS  S        2         .00           16,384
           *WSP S       30         .03           13,380
                        92         .10            7,702
   00      *WS  S        4         .00            6,144
                         4         .00            6,144
* * *  E N D  O F  R E P O R T  * * *
```

Figure 94. Physical I/Os by Mainstore Pool

10.2.17 Report Title - Physical Disk I/Os by Mainstore Pool and Job/Task

This report is produced from Command Option - By Pool and Job/Task.

```
Physical disk I/Os by mainstore pool and job/task
Only includes jobs/tasks with 1% or more of a pool's I/Os
    QUERY NAME . . . . . POOLT7
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    POOLT4       PFREXP2      PEXTRACE     POOLT4
    POOLT6       PFREXP2      PEXTRACE     POOLT6
    POOLT1       PFREXP2      PEXTRACE     POOLT1
    POOLT2       PFREXP2      PEXTRACE     POOLT2
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    DATE . . . . . . . . 08/02/96
    TIME . . . . . . . . 18:55:57
```

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
07	00008810	TSTIOC	A960126A	053543	*RS A	1,370	1.45	1.60	4,096
					*RS S	1,218	1.29	1.42	4,096
					*RSF S	7,724	8.16	9.03	5,421
					*RX A	11,969	12.65	14.00	4,096
						22,281	23.54	26.06	4,555
	0000880E	ILEAGNEW	A960126A	053541	*RS S	1,127	1.19	1.32	4,401
					*RSF S	18,499	19.54	21.64	5,968
						19,626	20.74	22.96	5,878
	00008814	OPENBAD	A960126A	053546	*RS A	1,595	1.69	1.87	4,096
					*RS S	3,470	3.67	4.06	4,262
					*RSF S	14,532	15.35	17.00	4,969
					*WSP S	4	.00	.00	19,456
						19,601	20.71	22.93	4,776
	0000006B	SMP00006			*WSP S	3,662	3.87	4.28	8,890
						3,662	3.87	4.28	8,890
	00000068	SMP00003			*WSP S	3,487	3.68	4.08	8,831
						3,487	3.68	4.08	8,831
	00000069	SMP00004			*WSP S	3,439	3.63	4.02	9,005
						3,439	3.63	4.02	9,005
	00000067	SMP00002			*WSP S	3,385	3.58	3.96	8,624

M05

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
07	00000067	SMP00002				3,385	3.58	3.96	8,624
	00000066	SMP00001			*WSP S	3,360	3.55	3.93	8,605
						3,360	3.55	3.93	8,605
	0000006A	SMP00005			*WSP S	3,320	3.51	3.88	8,761
						3,320	3.51	3.88	8,761
	0000006C	SMP00007			*WSP S	3,315	3.50	3.88	8,550
						3,315	3.50	3.88	8,550
03	00008408	JUNK	QSPLJOB	053464	*RS A	12	.01	.17	4,096
					*RS S	170	.18	2.42	14,722
					*RSF S	4,995	5.28	71.11	7,035
					*WS S	4	.00	.06	4,096
					*WSP S	2	.00	.03	4,096
						5,183	5.48	73.79	7,277
	00000068	SMP00003			*WSP S	304	.32	4.33	9,755
						304	.32	4.33	9,755
	0000006A	SMP00005			*WSP S	288	.30	4.10	9,500
						288	.30	4.10	9,500
	0000006C	SMP00007			*WSP S	276	.29	3.93	11,116
						276	.29	3.93	11,116
	00000069	SMP00004			*WSP S	265	.28	3.77	9,135

Figure 95 (Part 1 of 3). Physical Disk I/Os by Mainstore Pool

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
03	00000069	SMP00004				265	.28	3.77	9,135
	00000066	SMP00001			*WSP S	256	.27	3.64	9,616
						256	.27	3.64	9,616
	00000067	SMP00002			*WSP S	244	.26	3.47	11,096
						244	.26	3.47	11,096
	0000006B	SMP00006			*WSP S	208	.22	2.96	11,599
						208	.22	2.96	11,599
04	00007F6C	P23ARTVKE	A960126A	053319	*RS A	3	.00	.18	21,845
					*RS S	14	.01	.84	9,362
					*RSF S	222	.23	13.29	4,225
					*RX A	1,062	1.12	63.59	32,278
					*WS A	3	.00	.18	4,096
					*WS S	3	.00	.18	4,096
						1,307	1.38	78.26	27,114
	00000067	SMP00002			*WSP S	61	.06	3.65	7,453
						61	.06	3.65	7,453
	00000069	SMP00004			*WSP S	54	.06	3.23	7,206
						54	.06	3.23	7,206
	0000006B	SMP00006			*WSP S	50	.05	2.99	7,619
						50	.05	2.99	7,619

M05

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
04	0000006C	SMP00007			*WSP S	47	.05	2.81	7,495
						47	.05	2.81	7,495
	00000068	SMP00003			*WSP S	45	.05	2.69	7,646
						45	.05	2.69	7,646
	0000006A	SMP00005			*WSP S	41	.04	2.46	7,792
						41	.04	2.46	7,792
	00000066	SMP00001			*WSP S	40	.04	2.40	8,090
						40	.04	2.40	8,090
	0000881E	PEXTRACE	A960126A	053555	*WS S	24	.03	1.44	6,656
						24	.03	1.44	6,656
02	0000881E	PEXTRACE	A960126A	053555	*RS S	29	.03	7.82	6,921
					*RSF S	113	.12	30.46	5,763
					*WS A	8	.01	2.16	4,096
					*WS S	57	.06	15.36	5,461
					*WSP A	11	.01	2.96	4,096
					*WSP S	32	.03	8.63	4,096
						250	.26	67.39	5,489
	000000EC	SCPF	QSYS	000000	*RS S	1	.00	.27	4,096
					*RSF S	4	.00	1.08	4,096
					*WS A	1	.00	.27	4,096

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
02	000000EC	SCPF	QSYS	000000	*WS S	4	.00	1.08	8,192
					*WSP A	2	.00	.54	4,096
					*WSP S	1	.00	.27	4,096
						13	.01	3.50	5,356
	00000066	SMP00001			*WSP S	13	.01	3.50	9,767
						13	.01	3.50	9,767
	0000006B	SMP00006			*WSP S	12	.01	3.23	9,557
						12	.01	3.23	9,557
	00000068	SMP00003			*WSP S	12	.01	3.23	13,312
						12	.01	3.23	13,312
	00008408	JUNK	QSPLJOB	053464	*WS S	8	.01	2.16	52,736
					*WSP S	4	.00	1.08	52,224
						12	.01	3.23	52,565
	00000069	SMP00004			*WSP S	10	.01	2.70	10,650
						10	.01	2.70	10,650
	0000006A	SMP00005			*WSP S	9	.01	2.43	8,647
						9	.01	2.43	8,647
	0000006C	SMP00007			*WSP S	9	.01	2.43	13,198
						9	.01	2.43	13,198
	00000067	SMP00002			*WSP S	7	.01	1.89	8,777

Figure 95 (Part 2 of 3). Physical Disk I/Os by Mainstore Pool

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
02	00000067	SMP00002				7	.01	1.89	8,777
	00007F37	QTGTELNETS	QTCP	053298	*RSF S	7	.01	1.89	7,607
						7	.01	1.89	7,607
	00007F6C	P23ARTVKE	A960126A	053319	*WS A	3	.00	.81	4,096
					*WS S	3	.00	.81	4,096
						6	.01	1.62	4,096
	00008814	OPENBAD	A960126A	053546	*WSP S	6	.01	1.62	65,536
						6	.01	1.62	65,536
01	0000881E	PEXTRACE	A960126A	053555	*RSF S	20	.02	21.74	4,096
					*WS A	2	.00	2.17	4,096
					*WS S	1	.00	1.09	4,096
					*WSP S	1	.00	1.09	4,096
						24	.03	26.09	4,096
	00000116	SK-ASC007P			*RSF S	13	.01	14.13	4,096
						13	.01	14.13	4,096
	00007F6C	P23ARTVKE	A960126A	053319	*RSF S	9	.01	9.78	4,096
					*WS A	1	.00	1.09	4,096
						10	.01	10.87	4,096
	00008814	OPENBAD	A960126A	053546	*RSF S	3	.00	3.26	4,096
					*WSP S	6	.01	6.52	27,989

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
01	00008814	OPENBAD	A960126A	053546		9	.01	9.78	20,025
	0000880E	ILEAGNEW	A960126A	053541	*RSF S	1	.00	1.09	4,096
					*WSP S	7	.01	7.61	12,288
						8	.01	8.70	11,264
	0000006A	SMP00005			*WSP S	5	.01	5.43	8,192
						5	.01	5.43	8,192
	00000068	SMP00003			*WSP S	5	.01	5.43	10,650
						5	.01	5.43	10,650
	00000055	RMTMSAFETASK			*RS S	1	.00	1.09	32,768
					*RSF S	3	.00	3.26	4,096
						4	.00	4.35	11,264
	0000006C	SMP00007			*WSP S	4	.00	4.35	9,216
						4	.00	4.35	9,216
	0000004C	SMSIGNALEVENT			*RSF S	2	.00	2.17	4,096
						2	.00	2.17	4,096
	00007F37	QTGTELNETS	QTCP	053298	*RSF S	2	.00	2.17	4,096
						2	.00	2.17	4,096
	00008808	PEXSBSD	QSYS	053539	*RSF S	2	.00	2.17	4,096
						2	.00	2.17	4,096
	00000066	SMP00001			*WSP S	1	.00	1.09	8,192

M05

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
01	00000066	SMP00001				1	.00	1.09	8,192
	00000067	SMP00002			*WSP S	1	.00	1.09	4,096
						1	.00	1.09	4,096
	00000092	SMXCSPRVSR			*RSF S	1	.00	1.09	4,096
						1	.00	1.09	4,096
	00007F0B	QSERVER	QSYS	053254	*WS S	1	.00	1.09	28,672
						1	.00	1.09	28,672
00	0000881E	PEXTRACE	A960126A	053555	*WS S	3	.00	75.00	5,461
						3	.00	75.00	5,461
	0000880E	ILEAGNEW	A960126A	053541	*WS S	1	.00	25.00	8,192
						1	.00	25.00	8,192

* * * E N D O F R E P O R T * * *

Figure 95 (Part 3 of 3). Physical Disk I/Os by Mainstore Pool

10.2.18 Report Title - Physical Disk I/Os by Mainstore Pool and Object Name

This report is produced from Command Option - By Pool and Object.

```
                                                         Physical disk I/Os by mainstore pool and object name.
                                                         Only includes objects which had 1+% of all system I/Os or
                                                         1+% of a pool's I/Os
                                                             QUERY NAME . . . . . POOL07
                                                             LIBRARY NAME . . . . SMTRACE
                                                             FILE         LIBRARY      MEMBER       FORMAT
                                                             POOL04       PFREXP2      PEXTRACE     POOL04
                                                             POOL06       PFREXP2      PEXTRACE     POOL06
                                                             POOL01       PFREXP2      PEXTRACE     POOL01
                                                             POOL02       PFREXP2      PEXTRACE     POOL02
                                                             DATE . . . . . . . . 08/02/96
                                                             TIME . . . . . . . . 18:56:39

Mainstore  Object name            I/O type      I/O    Percent of ALL  Percent of this  Average types
pool       and type/subtype                     count  system I/Os     pool's I/Os      transferred
   07      DSPOBJD   DSPOBJD    0B90   *RS  A   1,370       1.45             1.60              4,096
                                       *RS  S     473        .50              .55              4,096
                                       *RSF S   1,455       1.54             1.70              4,096
                                       *RX  A  11,969      12.65            14.00              4,096
                                       *WSP S     498        .53              .58              4,096
                                               15,765      16.66            18.44              4,096
           *DESTROYED           0000   *RS  S   2,601       2.75             3.04              4,104
                                       *RSF S   3,951       4.17             4.62              4,096
                                       *WSP S   3,300       3.49             3.86             14,074
                                                9,852      10.41            11.52              7,440
           ILEAGNEW  A960126A   1AEF   *RS  S      18        .02              .02             22,300
                                       *RSF S   4,090       4.32             4.78              7,541
                                       *WSP S   4,586       4.85             5.36             18,988
                                                8,694       9.19            10.17             13,610
           FCFA2024DA00         0000   *RSF S   4,543       4.80             5.31              4,096
                                       *WSP S   3,324       3.51             3.89              6,484
                                                7,867       8.31             9.20              5,105
           OPEN5                0201   *RSF S   2,385       2.52             2.79              7,742
                                       *WSP S     322        .34              .38              4,096
                                                2,707       2.86             3.17              7,308

Mainstore  Object name            I/O type      I/O    Percent of ALL  Percent of this  Average types
pool       and type/subtype                     count  system I/Os     pool's I/Os      transferred
   07      TESTIO               0201   *RSF S   1,929       2.04             2.26              5,663
                                       *WSP S     343        .36              .40              4,096
                                                2,272       2.40             2.66              5,426
           QCAWAREA             19EF   *RSF S   1,264       1.34             1.48              4,096
                                       *WSP S     995       1.05             1.16              4,096
                                                2,259       2.39             2.64              4,096
           OPENBAD   A960126A   1AEF   *RS  S      23        .02              .03             27,960
                                       *RSF S   1,187       1.25             1.39              6,318
                                       *WSP S     881        .93             1.03              6,807
                                                2,091       2.21             2.45              6,762
           SEIZE LOCK RANGE     0000   *RSF S   1,025       1.08             1.20              4,096
                                       *WSP S   1,050       1.11             1.23              4,264
                                                2,075       2.19             2.43              4,181
           ILEAGN               0201   *RSF S   1,461       1.54             1.71              5,442
                                       *WSP S     272        .29              .32              4,096
                                                1,733       1.83             2.03              5,230
           PF04      PF04       0B90   *RS  A     317        .33              .37              4,096
                                       *RS  S     316        .33              .37              4,096
                                       *RSF S     545        .58              .64              4,096
                                       *WSP S     528        .56              .62              4,096
```

Figure 96 (Part 1 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	PF04	PF04	0B90		1,706	1.80	2.00	4,096
	PF03	PF03	0B90	*RS A	322	.34	.38	4,096
				*RS S	317	.33	.37	4,096
				*RSF S	522	.55	.61	4,096
				*WSP S	514	.54	.60	4,096
					1,675	1.77	1.96	4,096
	PF05	PF05	0B90	*RS A	318	.34	.37	4,096
				*RS S	317	.33	.37	4,096
				*RSF S	509	.54	.60	4,096
				*WSP S	528	.56	.62	4,096
					1,672	1.77	1.96	4,096
	PF02	PF02	0B90	*RS A	319	.34	.37	4,096
				*RS S	318	.34	.37	4,096
				*RSF S	495	.52	.58	4,096
				*WSP S	489	.52	.57	4,096
					1,621	1.71	1.90	4,096
	PF01	PF01	0B90	*RS A	319	.34	.37	4,096
				*RS S	319	.34	.37	4,096
				*RSF S	469	.50	.55	4,096
				*WSP S	489	.52	.57	4,096

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	PF01	PF01	0B90		1,596	1.69	1.87	4,096
	QRNXDUMP		0203	*RSF S	1,012	1.07	1.18	4,096
				*WSP S	417	.44	.49	4,096
					1,429	1.51	1.67	4,096
	C3E62C036004		0000	*RSF S	623	.66	.73	4,096
				*WSP S	748	.79	.87	4,096
					1,371	1.45	1.60	4,096
	HATT		0401	*RSF S	1,246	1.32	1.46	4,096
					1,246	1.32	1.46	4,096
	F5075E554004		0000	*RSF S	493	.52	.58	4,096
				*WSP S	596	.63	.70	4,096
					1,089	1.15	1.27	4,096
	C2E7BB3D7004		0000	*RSF S	480	.51	.56	4,096
				*WSP S	581	.61	.68	4,096
					1,061	1.12	1.24	4,096
	FD3057655004		0000	*RSF S	490	.52	.57	4,096
				*WSP S	540	.57	.63	4,096
					1,030	1.09	1.20	4,096
	D3334BC40004		0000	*RSF S	469	.50	.55	4,096
				*WSP S	551	.58	.64	4,096
					M05			

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	D3334BC40004		0000		1,020	1.08	1.19	4,096
	D7A782247200		0000	*RSF S	732	.77	.86	12,596
				*WSP S	279	.29	.33	4,096
					1,011	1.07	1.18	10,250
	F3CA6CD12004		0000	*RSF S	457	.48	.53	4,096
				*WSP S	515	.54	.60	4,096
					972	1.03	1.14	4,096
	F86D14F54004		0000	*RSF S	354	.37	.41	4,096
				*WSP S	617	.65	.72	4,096
					971	1.03	1.14	4,096
	OPENBAD		0201	*RSF S	965	1.02	1.13	5,484
					965	1.02	1.13	5,484
	TESTIOC		0201	*RSF S	871	.92	1.02	6,104
					871	.92	1.02	6,104
03	JUNK	QSPLJOB	1AEF	*RS S	56	.06	.80	32,183
				*RSF S	690	.73	9.82	7,123
				*WS S	4	.00	.06	4,096
				*WSP S	732	.77	10.42	16,988
					1,482	1.57	21.10	12,935
	D2FB76C77200		0000	*RSF S	787	.83	11.20	4,096

Figure 96 (Part 2 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	D2FB76C77200	0000	*WSP S	368	.39	5.24	5,498
				1,155	1.22	16.44	4,543
	QSOSRV2	0203	*RSF S	371	.39	5.28	12,189
			*WSP S	13	.01	.19	4,096
				384	.41	5.47	11,915
	*DESTROYED	0000	*RSF S	239	.25	3.40	4,096
			*WSP S	100	.11	1.42	13,517
				339	.36	4.83	6,875
	QTMPLPRC	0201	*RSF S	266	.28	3.79	11,580
			*WSP S	14	.01	.20	4,096
				280	.30	3.99	11,205
	QSOKERN3	0203	*RSF S	214	.23	3.05	14,776
				214	.23	3.05	14,776
	QJOBMSGQ	18A0	*RSF S	139	.15	1.98	4,096
			*WSP S	71	.08	1.01	7,038
				210	.22	2.99	5,091
	E7CB3ED36004	0000	*RSF S	90	.10	1.28	4,096
			*WSP S	106	.11	1.51	4,096
				196	.21	2.79	4,096
	L/L RANGE 1	0000	*RSF S	188	.20	2.68	4,096
				M05			

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	L/L RANGE 1	0000		188	.20	2.68	4,096
	QSOSRV1	0203	*RSF S	143	.15	2.04	7,304
			*WSP S	13	.01	.19	4,096
				156	.16	2.22	7,037
	SQCCSID1	0ED2	*RSF S	110	.12	1.57	4,096
			*WSP S	31	.03	.44	4,096
				141	.15	2.01	4,096
	E43BF962E500	0000	*RSF S	69	.07	.98	4,096
			*WSP S	47	.05	.67	6,536
				116	.12	1.65	5,085
	SEIZE LOCK RANGE	0000	*RSF S	60	.06	.85	4,096
			*WSP S	56	.06	.80	4,315
				116	.12	1.65	4,202
	QATOCTCPIPCONFIG	0C90	*RSF S	67	.07	.95	4,096
			*WSP S	41	.04	.58	4,096
				108	.11	1.54	4,096
	QATOCTCPIPCONFIG	0B90	*RS S	17	.02	.24	4,096
			*RSF S	52	.05	.74	4,096
			*WSP S	30	.03	.43	4,096
				99	.10	1.41	4,096

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	QTQICONV	0203	*RSF S	81	.09	1.15	6,018
			*WSP S	13	.01	.19	4,096
				94	.10	1.34	5,752
	QPOLLIB1	0203	*RSF S	72	.08	1.03	9,842
			*WSP S	13	.01	.19	4,096
				85	.09	1.21	8,963
	CB409AF8A004	0000	*RSF S	84	.09	1.20	4,096
				84	.09	1.20	4,096
	EEE05252CB00	0000	*RSF S	61	.06	.87	15,175
			*WSP S	23	.02	.33	4,096
				84	.09	1.20	12,142
	F4E3FAD8D004	0000	*RSF S	84	.09	1.20	4,096
				84	.09	1.20	4,096
	FC64411FC004	0000	*RSF S	41	.04	.58	4,096
			*WSP S	42	.04	.60	4,096
				83	.09	1.18	4,096
	QYPPRT	0203	*RSF S	66	.07	.94	9,185
			*WSP S	13	.01	.19	4,096
				79	.08	1.12	8,348
	F836A3DBEA00	0000	*RSF S	50	.05	.71	4,096

Figure 96 (Part 3 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	F836A3DBEA00	0000	*WSP S	25	.03	.36	4,096
				75	.08	1.07	4,096
	QC2UTIL1	0203	*RSF S	72	.08	1.03	16,384
				72	.08	1.03	16,384
	QSO_DNS_INDEX	0EEF	*RSF S	60	.06	.85	4,096
			*WSP S	12	.01	.17	4,096
				72	.08	1.03	4,096
04	QWCBT01	19D0	*RS A	3	.00	.18	21,845
			*RS S	3	.00	.18	19,115
			*RSF S	99	.10	5.93	4,096
			*RX A	1,062	1.12	63.59	32,278
				1,167	1.23	69.88	29,827
	QJOBMSGQ	18A0	*RSF S	9	.01	.54	4,096
			*WS S	1	.00	.06	4,096
			*WSP S	278	.29	16.65	8,192
				288	.30	17.25	8,050
	SEIZE LOCK RANGE	0000	*RSF S	3	.00	.18	4,096
			*WSP S	60	.06	3.59	4,779
				63	.07	3.77	4,746
02	Q04079N002Q097276464	0B90	*RSF S	2	.00	.54	4,096
				M05			

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
02	Q04079N002Q097276464	0B90	*WS S	30	.03	8.09	5,461
			*WSP A	10	.01	2.70	4,096
			*WSP S	5	.01	1.35	4,096
				47	.05	12.67	4,967
	SEIZE LOCK RANGE	0000	*RSF S	5	.01	1.35	4,096
			*WSP S	25	.03	6.74	10,322
				30	.03	8.09	9,284
	D1EDE9BC4700	0000	*RSF S	1	.00	.27	4,096
			*WSP S	26	.03	7.01	8,350
				27	.03	7.28	8,192
	QSPSCB	19C2	*WS S	1	.00	.27	4,096
			*WSP S	23	.02	6.20	4,096
				24	.03	6.47	4,096
	ECB9E6FE0E00	0000	*WSP S	21	.02	5.66	13,848
				21	.02	5.66	13,848
	PF132 PEXTRACSTS	0B90	*WS A	5	.01	1.35	4,096
			*WS S	9	.01	2.43	4,096
			*WSP A	1	.00	.27	4,096
			*WSP S	4	.00	1.08	4,096
				19	.02	5.12	4,096

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
02	UIM_TEMPORARY_WORKSP	19EF	*RS S	16	.02	4.31	4,096
			*RSF S	3	.00	.81	4,096
				19	.02	5.12	4,096
	DATA BASE IN-USE TBL	0000	*WS S	17	.02	4.58	7,228
				17	.02	4.58	7,228
	*DESTROYED	0000	*RS S	1	.00	.27	4,096
			*RSF S	10	.01	2.70	4,096
			*WS A	2	.00	.54	4,096
			*WS S	1	.00	.27	4,096
				14	.01	3.77	4,096
	JUNK QSPLJOB	1AEF	*WS S	8	.01	2.16	52,736
			*WSP S	4	.00	1.08	52,224
				12	.01	3.23	52,565
	QSYS	0401	*RSF S	8	.01	2.16	4,096
				8	.01	2.16	4,096
	OPENBAD A960126A	1AEF	*WSP S	6	.01	1.62	65,536
				6	.01	1.62	65,536
	QSPCPYF	0201	*RS S	2	.00	.54	26,624
			*RSF S	4	.00	1.08	7,168
				6	.01	1.62	13,653

Figure 96 (Part 4 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
02	QWPALLOC	0201	*RSF S	6	.01	1.62	10,923
				6	.01	1.62	10,923
	A960126A	0801	*RSF S	5	.01	1.35	4,096
				5	.01	1.35	4,096
	FD4657807900	0000	*RSF S	5	.01	1.35	4,096
				5	.01	1.35	4,096
	QCPFMSG	0E03	*RSF S	5	.01	1.35	4,096
				5	.01	1.35	4,096
	QHST96213DQHST96213D	0B90	*WS S	2	.00	.54	4,096
			*WSP A	1	.00	.27	4,096
			*WSP S	1	.00	.27	4,096
				4	.00	1.08	4,096
	QSPCNSPF	0201	*RSF S	4	.00	1.08	9,216
				4	.00	1.08	9,216
	QSPHNMLT	0201	*RS S	2	.00	.54	10,240
			*RSF S	2	.00	.54	10,240
				4	.00	1.08	10,240
	QTGTNTOC	0201	*RSF S	4	.00	1.08	8,192
				4	.00	1.08	8,192
	QUICLOSE	0201	*RS S	2	.00	.54	10,240

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
02	QUICLOSE	0201	*RSF S	2	.00	.54	8,192
				4	.00	1.08	9,216
	SQCCSID1	0ED2	*RSF S	4	.00	1.08	4,096
				4	.00	1.08	4,096
01	SM PERM DIR SEGMENT	0000	*RSF S	33	.03	35.87	4,096
				33	.03	35.87	4,096
	E43BF962E500	0000	*RSF S	12	.01	13.04	4,096
			*WSP S	8	.01	8.70	11,264
				20	.02	21.74	6,963
	ILEAGNEW A960126A	1AEF	*RS S	1	.00	1.09	32,768
			*WSP S	13	.01	14.13	10,082
				14	.01	15.22	11,703
	OPENBAD A960126A	1AEF	*WSP S	6	.01	6.52	27,989
				6	.01	6.52	27,989
	PF132 PEXTRACSTS	0D50	*WS A	2	.00	2.17	4,096
			*WS S	1	.00	1.09	4,096
			*WSP S	1	.00	1.09	4,096
				4	.00	4.35	4,096
	D1EDE9BC4700	0000	*RSF S	3	.00	3.26	4,096
				3	.00	3.26	4,096

M05

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
01	*DESTROYED	0000	*RSF S	2	.00	2.17	4,096
				2	.00	2.17	4,096
	FE38ECDB8004	0000	*WSP S	2	.00	2.17	4,096
				2	.00	2.17	4,096
	RLSJOB	1905	*RSF S	1	.00	1.09	4,096
			*WS A	1	.00	1.09	4,096
				2	.00	2.17	4,096
	CPYSPLF	1905	*RSF S	1	.00	1.09	4,096
				1	.00	1.09	4,096
	C2D22017B100	0000	*RSF S	1	.00	1.09	4,096
				1	.00	1.09	4,096
	ENDPEX	1905	*RSF S	1	.00	1.09	4,096
				1	.00	1.09	4,096
	FC88D12A5700	0000	*RSF S	1	.00	1.09	4,096
				1	.00	1.09	4,096
	FREE SPACE MAP RANGE	0000	*RSF S	1	.00	1.09	4,096
				1	.00	1.09	4,096
	QSERVER QSYS	1AEF	*WS S	1	.00	1.09	28,672
				1	.00	1.09	28,672
00	*SECTOR I/O	0000	*WS S	4	.00	100.00	6,144

Figure 96 (Part 5 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
00	*SECTOR I/O	0000		4	.00	100.00	6,144

* * * E N D O F R E P O R T * * *

Figure 96 (Part 6 of 6). Physical I/Os by Mainstore Pool and Object Name

10.2.19 Report Title - I/O by Object Type

This report is produced from Command Option - By Object/Segment Type.

```
                         IO bu Object Type
         QUERY NAME . . . . . IOOBJT07
         LIBRARY NAME . . . . SMTRACE
         FILE         LIBRARY      MEMBER       FORMAT
         IOOBJT06     PFREXP2      PEXTRACE     IOOBJT06
         IOOBJT05     PFREXP2      PEXTRACE     IOOBJT05
         DATE . . . . . . . . 08/02/96
         TIME . . . . . . . . 18:57:36
                    IO by Object Type - Part 12


08/02/96  18:57:36                IO by Object Type               PAGE    1
Description                          PDIO            PDIO     Pct       Pct
                                     Oper            Count    Oper      All
                                                              PDIO      PDIO
COMPOSITE PIECE - DATA SPACE         *RX  A          11,969   49.40     12.65
                                     *RSF S           4,049   16.71      4.28
                                     *WSP S           3,086   12.74      3.26
                                     *RS  A           2,977   12.29      3.15
                                     *RS  S           2,089    8.62      2.21
                                     *WS  S              41     .17       .04
                                     *WSP A              12     .05       .01
                                     *WS  A               5     .02       .01
                                       TOTAL         24,228

TEMPORARY - PROCESS CTL SPACE        *WSP S           6,230   50.31      6.58
                                     *RSF S           6,041   48.78      6.38
                                     *RS  S              98     .79       .10
                                     *WS  S              14     .11       .01
                                       TOTAL         12,383
PROGRAM                              *RSF S           9,989   82.11     10.55
                                     *RS  S           1,226   10.08      1.30
                                     *WSP S             951    7.82      1.00
                                       TOTAL         12,166
*UNKNOWN***************************  *RSF S           4,418   42.42      4.67
                                     *WSP S           3,388   32.53      3.58
                                     *RS  S           2,602   24.98      2.75
                                     *WS  S               5     .05       .01
                                     *WS  A               2     .02       .00
                                       TOTAL         10,415
HEAP DATA SEGMENT TYPE               *RSF S           5,345   59.15      5.65
                                     *WSP S           3,692   40.85      3.90
                                       TOTAL          9,037
                                                   M05

08/02/96  18:57:36                IO by Object Type               PAGE    2
Description                          PDIO            PDIO     Pct       Pct
                                     Oper            Count    Oper      All
                                                              PDIO      PDIO
DATA SPACE RUN TIME SID              *WSP S           3,442   55.28      3.64
                                     *RSF S           2,785   44.72      2.94
                                       TOTAL          6,227
SERVICE PROGRAM                      *RSF S           3,460   80.63      3.66
                                     *WSP S             831   19.37       .88
                                       TOTAL          4,291
TEMPORARY - SPACE                    *RSF S           1,579   60.18      1.67
                                     *WSP S           1,027   39.14      1.09
                                     *RS  S              18     .69       .02
                                       TOTAL          2,624
HOLD RECORD SEG                      *WSP S           1,191   52.15      1.26
                                     *RSF S           1,093   47.85      1.15
                                       TOTAL          2,284
FILE                                 *RSF S           1,933   99.90      2.04
                                     *WS  A               2     .10       .00
                                       TOTAL          1,935
LIBRARY                              *RSF S           1,774   99.27      1.87
                                     *WSP S               7     .39       .01
                                     *WS  S               6     .34       .01
                                       TOTAL          1,787
TOMBSTONE SEGMENT                    *WSP S             886   54.22       .94
                                     *RSF S             748   45.78       .79
                                       TOTAL          1,634
```

Figure 97 (Part 1 of 4). IO by Object Type

```
08/02/96  18:57:36              IO by Object Type               PAGE    3
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
WORK CONTROL BLOCK TABLE           *RX  A          1,062   90.38     1.12
                                   *RSF S            107    9.11      .11
                                   *RS  A              3     .26      .00
                                   *RS  S              3     .26      .00
                                     TOTAL         1,175
MODUL2 STATIC STORE                *RSF S            793   72.42      .84
                                   *WSP S            302   27.58      .32
                                     TOTAL         1,095
JOB MESSAGE QUEUE                  *WSP S            627   59.71      .66
                                   *RSF S            422   40.19      .45
                                   *WS  S              1     .10      .00
                                     TOTAL         1,050
HEAP CONTROL SEGMENT               *WSP S            281   50.09      .30
                                   *RSF S            280   49.91      .30
                                     TOTAL           561
USER PROFILE                       *RSF S            460   99.14      .49
                                   *WS  S              4     .86      .00
                                     TOTAL           464
MWS AREA DATA SID                  *RSF S            174   60.63      .18
                                   *WSP S            113   39.37      .12
                                     TOTAL           287
ACTIVATION PROC REF TBL            *RSF S            168  100.00      .18
                                     TOTAL           168
                                                M05
```

```
08/02/96  18:57:36              IO by Object Type               PAGE    4
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
CCSID INFORMATION OBJECT           *RSF S            114   78.62      .12
                                   *WSP S             31   21.38      .03
                                     TOTAL           145
COMPOSITE PIECE - DATA SPACE INDEX *RSF S             67   62.04      .07
                                   *WSP S             41   37.96      .04
                                     TOTAL           108
PROTECTED SPACE                    *RSF S             53   52.48      .06
                                   *WSP S             48   47.52      .05
                                     TOTAL           101
TEMPORARY - INDEX                  *RSF S             61   83.56      .06
                                   *WSP S             12   16.44      .01
                                     TOTAL            73
MESSAGE FILE                       *RSF S             63   91.30      .07
                                   *WSP S              6    8.70      .01
                                     TOTAL            69
MUTEX TEMP SEGMENT                 *RSF S             32   60.38      .03
                                   *WSP S             21   39.62      .02
                                     TOTAL            53
DATA SPACE INDEX RUN TIME          *WSP S             27   51.92      .03
                                   *RSF S             25   48.08      .03
                                     TOTAL            52
ACCESS GROUP                       *RSF S             26   68.42      .03
```

Figure 97 (Part 2 of 4). IO by Object Type

```
08/02/96  18:57:36                IO by Object Type                PAGE    5
Description                          PDIO           PDIO     Pct       Pct
                                     Oper           Count    Oper      All
                                                             PDIO      PDIO
ACCESS GROUP                         *WSP S            12   31.58       .01
                                       TOTAL           38
SPOOL CTL BLOCK                      *WSP S            23   63.89       .02
                                     *RSF S             9   25.00       .01
                                     *WS  S             4   11.11       .00
                                       TOTAL           36
MWS AREA CTL SID                     *WSP S            17   54.84       .02
                                     *RSF S            14   45.16       .01
                                       TOTAL           31
DB IN USE TABLE                      *WS  S            17  100.00       .02
                                       TOTAL           17
OUTPUT QUEUE                         *WS  S            15   88.24       .02
                                     *RSF S             2   11.76       .00
                                       TOTAL           17
LOCAL DATA AREA                      *RSF S            14  100.00       .01
                                       TOTAL           14
PANEL GROUP DEFINITION               *RSF S            14  100.00       .01
                                       TOTAL           14
FILE FORMAT                          *RSF S            13  100.00       .01
                                       TOTAL           13
                                                  M05


08/02/96  18:57:36                IO by Object Type                PAGE    6
Description                          PDIO           PDIO     Pct       Pct
                                     Oper           Count    Oper      All
                                                             PDIO      PDIO
TEMPORARY - QUEUE                    *WSP S             7   53.85       .01
                                     *RSF S             6   46.15       .01
                                       TOTAL           13
PRINT QUEUE                          *RSF S            12  100.00       .01
                                       TOTAL           12
MESSAGE QUEUE                        *WS  A             6   60.00       .01
                                     *WS  S             3   30.00       .00
                                     *RSF S             1   10.00       .00
                                       TOTAL           10
TABLE                                *RSF S             6  100.00       .01
                                       TOTAL            6
COMMAND                              *RSF S             3   75.00       .00
                                     *WS  A             1   25.00       .00
                                       TOTAL            4
DATA BASE FILE MEMBER                *WS  A             2   50.00       .00
                                     *WS  S             1   25.00       .00
                                     *WSP S             1   25.00       .00
                                       TOTAL            4
OIR SPACE                            *RSF S             1   50.00       .00
                                     *WSP A             1   50.00       .00
                                       TOTAL            2
CHANGED PAGE BITMAP                  *RSF S             1  100.00       .00
```

Figure 97 (Part 3 of 4). IO by Object Type

```
08/02/96  18:57:36                IO by Object Type                PAGE    7
Description                          PDIO           PDIO     Pct       Pct
                                     Oper           Count    Oper      All
                                                             PDIO      PDIO
                                       TOTAL            1
COMPOSITE PIECE - INDEX              *RSF S             1  100.00       .00
                                       TOTAL            1
DATA BASE OPERATIONAL CURSOR         *WSP S             1  100.00       .00
                                       TOTAL            1
FILE AVAIL CTL BLOCK                 *RSF S             1  100.00       .00
                                       TOTAL            1
SUBSYSTEM DESCRIPTION                *RSF S             1  100.00       .00
                                       TOTAL            1
TEMPORARY - ACCESS GROUP             *RSF S             1  100.00       .00
                                       TOTAL            1
                                       FINAL TOTALS
                                       TOTAL       94,649
* * *  E N D  O F  R E P O R T  * * *
```

Figure 97 (Part 4 of 4). IO by Object Type

10.2.20 Report Title - Program I/O Type Detail

This report is produced from Command Option - By **PGM.

```
                 Program IO Type Detail
QUERY NAME . . . . . PGMIO07
LIBRARY NAME . . . . SMTRACE
FILE          LIBRARY       MEMBER        FORMAT
PGMIO06       PFREXP2       PEXTRACE      PGMIO06
PGMIO05       PFREXP2       PEXTRACE      PGMIO05
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:58:07
              Pgm IO Detail - Part 8
```

```
08/02/96  18:58:07      Program IO Type Detail      PAGE    1
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
TOPOFSTACK  *WSP S         26,235   98.66    27.72     28.09
            *RSF S            329    1.24      .35     28.09
            *RS  S             26     .10      .03     28.09
            *WS  S              2     .01      .00     28.09
              TOTAL        26,592
TESTIO      *RX  A         11,969   65.33    12.65     19.36
            *RSF S          3,765   20.55     3.98     19.36
            *RS  A          1,370    7.48     1.45     19.36
            *RS  S          1,218    6.65     1.29     19.36
              TOTAL        18,322
ILEAGNEW    *RSF S         17,042   93.84    18.01     19.19
            *RS  S          1,117    6.15     1.18     19.19
            *WS  S              2     .01      .00     19.19
              TOTAL        18,161
OPEN5       *RSF S         11,761   69.96    12.43     17.76
            *RS  S          3,456   20.56     3.65     17.76
            *RS  A          1,595    9.49     1.69     17.76
              TOTAL        16,812
TESTIOC     *RSF S          3,936  100.00     4.16      4.16
              TOTAL         3,936
QCMDEXC     *RSF S          3,513   97.69     3.71      3.80
            *RS  S             83    2.31      .09      3.80
              TOTAL         3,596
OPENBAD     *RSF S          2,687   99.78     2.84      2.85


08/02/96  18:58:07      Program IO Type Detail      PAGE    2
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
OPENBAD     *RS  S              6     .22      .01      2.85
              TOTAL         2,693
ILEAGN      *RSF S          1,428  100.00     1.51      1.51
              TOTAL         1,428
QWTCCRLJ    *RX  A          1,062   97.97     1.12      1.15
            *RSF S             15    1.38      .02      1.15
            *RS  S              4     .37      .00      1.15
            *RS  A              3     .28      .00      1.15
              TOTAL         1,084
QDMCOPEN    *RSF S            324  100.00      .34       .34
              TOTAL           324
QDBOPEN     *RSF S            267   98.52      .28       .29
            *RS  S              4    1.48      .00       .29
              TOTAL           271
QDBGETKY    *RSF S            143   77.72      .15       .19
            *RS  S             29   15.76      .03       .19
            *RS  A             12    6.52      .01       .19
              TOTAL           184
QMHSNDPM    *RSF S            159   99.38      .17       .17
            *RS  S              1     .63      .00       .17
              TOTAL           160
QWCDLYJB    *WSP S             32   44.44      .03       .08
```

Figure 98 (Part 1 of 5). Program IO Type Detail

```
08/02/96  18:58:07       Program IO Type Detail       PAGE    3
Program     PDIO              PDIO        PCT      PCT    PCT PGM
            Oper             Count        Pgm      ALL    IO of
                                          IO       IO     ALL IO
QWCDLYJB    *RSF S              27      37.50      .03        .08
            *WS  S              12      16.67      .01        .08
            *RS  S               1       1.39      .00        .08
              TOTAL             72
QCLCLCPR    *RSF S              68      98.55      .07        .07
            *RS  S               1       1.45      .00        .07
              TOTAL             69
QMHRSNEM    *RSF S              61     100.00      .06        .06
              TOTAL             61
QLIDLOBJ    *RSF S              53     100.00      .06        .06
              TOTAL             53
QSPRCMBR    *WS  S              31      64.58      .03        .05
            *WSP S              12      25.00      .01        .05
            *RSF S               5      10.42      .01        .05
              TOTAL             48
QCATRS      *RSF S              43      97.73      .05        .05
            *WS  A               1       2.27      .00        .05
              TOTAL             44
QDMCLOSE    *RSF S              37      86.05      .04        .05
            *WS  S               4       9.30      .00        .05
            *RS  S               1       2.33      .00        .05
            *WS  A               1       2.33      .00        .05
              TOTAL             43
                                                         M05
```

```
08/02/96  18:58:07       Program IO Type Detail       PAGE    4
Program     PDIO              PDIO        PCT      PCT    PCT PGM
            Oper             Count        Pgm      ALL    IO of
                                          IO       IO     ALL IO
QSPOPEN     *RSF S              23      54.76      .02        .04
            *WSP S              10      23.81      .01        .04
            *WS  S               7      16.67      .01        .04
            *RS  S               2       4.76      .00        .04
              TOTAL             42
QMHMOVPM    *RSF S              36     100.00      .04        .04
              TOTAL             36
QSQENDAG    *RSF S              36     100.00      .04        .04
              TOTAL             36
QCANPARS    *RSF S              35     100.00      .04        .04
              TOTAL             35
QSPCLOSE    *WS  S              16      47.06      .02        .04
            *WSP A              10      29.41      .01        .04
            *WSP S               6      17.65      .01        .04
            *RSF S               2       5.88      .00        .04
              TOTAL             34
QDBCRTME    *WS  S              13      40.63      .01        .03
            *RSF S              10      31.25      .01        .03
            *WS  A               9      28.13      .01        .03
              TOTAL             32
QLICHLLE    *RSF S              32     100.00      .03        .03
              TOTAL             32
```

Figure 98 (Part 2 of 5). Program IO Type Detail

```
08/02/96  18:58:07       Program IO Type Detail      PAGE    5
Program     PDIO            PDIO       PCT       PCT   PCT PGM
            Oper           Count       Pgm       ALL   IO of
                                       IO        IO    ALL IO
QCADRV2     *RS  S            26   89.66       .03       .03
            *RSF S             3   10.34       .00       .03
              TOTAL           29
QMHPDEH     *RSF S            27  100.00       .03       .03
              TOTAL           27
QCARULE     *RSF S            26  100.00       .03       .03
              TOTAL           26
QCACHLBL    *RSF S            13   52.00       .01       .03
            *RS  S            12   48.00       .01       .03
              TOTAL           25
QCAIEXIT    *RSF S            25  100.00       .03       .03
              TOTAL           25
QUIMGFLW    *RS  S            13   52.00       .01       .03
            *RSF S            12   48.00       .01       .03
              TOTAL           25
QUSRJOBI    *RSF S            22  100.00       .02       .02
              TOTAL           22
QWCCDSTC    *RSF S            18   81.82       .02       .02
            *RS  S             4   18.18       .00       .02
              TOTAL           22
                                                    M05


08/02/96  18:58:07       Program IO Type Detail      PAGE    6
Program     PDIO            PDIO       PCT       PCT   PCT PGM
            Oper           Count       Pgm       ALL   IO of
                                       IO        IO    ALL IO
QDBFEOD     *WS  S            13   68.42       .01       .02
            *WSP S             4   21.05       .00       .02
            *WSP A             2   10.53       .00       .02
              TOTAL           19
QMHCHGEM    *RSF S            14  100.00       .01       .01
              TOTAL           14
QMHSNSTQ    *WS  A             6   42.86       .01       .01
            *RSF S             5   35.71       .01       .01
            *WS  S             3   21.43       .00       .01
              TOTAL           14
QCADRV      *RS  S             8   61.54       .01       .01
            *RSF S             5   38.46       .01       .01
              TOTAL           13
QDBCLOSE    *RSF S            13  100.00       .01       .01
              TOTAL           13
QUSDLTUS    *RSF S            13  100.00       .01       .01
              TOTAL           13
QDCXLATE    *RSF S            12  100.00       .01       .01
              TOTAL           12
QDMRCLSE    *RSF S             6   54.55       .01       .01
            *RS  S             5   45.45       .01       .01
```

Figure 98 (Part 3 of 5). Program IO Type Detail

```
08/02/96  18:58:07       Program IO Type Detail       PAGE    7
Program     PDIO             PDIO       PCT      PCT    PCT PGM
            Oper            Count       Pgm      ALL    IO of
                                        IO       IO     ALL IO
              TOTAL            11
QSPCNSPF    *RSF S              5    50.00      .01        .01
            *WS  S              5    50.00      .01        .01
              TOTAL            10
QUIPRINT    *RS  S              7    70.00      .01        .01
            *RSF S              3    30.00      .00        .01
              TOTAL            10
QMHRTMSS    *RSF S              9   100.00      .01        .01
              TOTAL             9
QWTMMRLJ    *RSF S              9   100.00      .01        .01
              TOTAL             9
QMHRCVPM    *RSF S              8   100.00      .01        .01
              TOTAL             8
QSPCPYF     *RSF S              6    75.00      .01        .01
            *RS  S              2    25.00      .00        .01
              TOTAL             8
QTMPCKP     *RSF S              7   100.00      .01        .01
              TOTAL             7
QWTMESBC    *RS  S              6    85.71      .01        .01
            *RSF S              1    14.29      .00        .01


08/02/96  18:58:07       Program IO Type Detail       PAGE    8
Program     PDIO             PDIO       PCT      PCT    PCT PGM
            Oper            Count       Pgm      ALL    IO of
                                        IO       IO     ALL IO
              TOTAL             7
QLICNV      *RSF S              6   100.00      .01        .01
              TOTAL             6
QTQGESP     *RSF S              6   100.00      .01        .01
              TOTAL             6
QUICMD      *RS  S              4    66.67      .00        .01
            *RSF S              2    33.33      .00        .01
              TOTAL             6
QWPALLOC    *RSF S              6   100.00      .01        .01
              TOTAL             6
QSYGRTSA    *RSF S              3    60.00      .00        .01
            *WSP S              2    40.00      .00        .01
              TOTAL             5
QSPCHJOB    *WS  S              3    75.00      .00        .00
            *RSF S              1    25.00      .00        .00
              TOTAL             4
QUIRCLAP    *RSF S              4   100.00      .00        .00
              TOTAL             4
QLIMROIR    *RSF S              2    66.67      .00        .00
            *WSP A              1    33.33      .00        .00


08/02/96  18:58:07       Program IO Type Detail       PAGE    9
Program     PDIO             PDIO       PCT      PCT    PCT PGM
            Oper            Count       Pgm      ALL    IO of
                                        IO       IO     ALL IO
              TOTAL             3
QUICLOSE    *RSF S              3   100.00      .00        .00
              TOTAL             3
QUIICHK     *RSF S              3   100.00      .00        .00
              TOTAL             3
QCAIFLD     *RSF S              2   100.00      .00        .00
              TOTAL             2
QEZWRAST    *RSF S              2   100.00      .00        .00
              TOTAL             2
QSPDSPFX    *RSF S              2   100.00      .00        .00
              TOTAL             2
QTGTNTOC    *RSF S              2   100.00      .00        .00
              TOTAL             2
QUICBINT    *RSF S              2   100.00      .00        .00
              TOTAL             2
QUIEXFMT    *RSF S              2   100.00      .00        .00
              TOTAL             2
QUIINMGR    *RSF S              2   100.00      .00        .00
```

Figure 98 (Part 4 of 5). Program IO Type Detail

```
08/02/96  18:58:07      Program IO Type Detail      PAGE   10
Program     PDIO          PDIO      PCT      PCT   PCT PGM
            Oper          Count      Pgm      ALL   IO of
                                     IO       IO    ALL IO
              TOTAL           2
QUILIST     *RSF S            2  100.00      .00        .00
              TOTAL           2
QUIOPEN     *RSF S            2  100.00      .00        .00
              TOTAL           2
QMHLOGER    *WS  A            1  100.00      .00        .00
              TOTAL           1
QSPHNMLT    *RSF S            1  100.00      .00        .00
              TOTAL           1
QSYACCIP    *RSF S            1  100.00      .00        .00
              TOTAL           1
QTOASND     *RSF S            1  100.00      .00        .00
              TOTAL           1
QUIALIST    *RSF S            1  100.00      .00        .00
              TOTAL           1
QUIVPMGR    *RSF S            1  100.00      .00        .00
              TOTAL           1
QWCSHUIC    *RSF S            1  100.00      .00        .00


08/02/96  18:58:07      Program IO Type Detail      PAGE   11
Program     PDIO          PDIO      PCT      PCT   PCT PGM
            Oper          Count      Pgm      ALL   IO of
                                     IO       IO    ALL IO
              TOTAL           1
QWPPUT      *RSF S            1  100.00      .00        .00
              TOTAL           1

                                                   M05
QWTMEPJP    *RSF S            1  100.00      .00        .00
              TOTAL           1
              FINAL TOTALS
              TOTAL      94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 98 (Part 5 of 5). Program IO Type Detail

10.2.21 Report Title - I/O by Object Name within Program within Job

This report is produced from Command Option - By Job/**PGM/Objname.

```
   IO by Object Name within Program within Job
QUERY NAME . . . . . JPNOBJ08
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
JPNOBJ07     PFREXP2      PEXTRACE     JPNOBJ07
TASKINFO     PFREXP2      PEXTRACE     TASKINFO
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:58:45
        Job/Pgm IO by Object Name - Part 9
```

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    1
Process   Job        Job    Program    Object                   PDIO           PDIO    PCT     PCT
job name  user       number            Name/Type                Oper           Count   Job     ALL
                                                                                       IO      IO
TSTIOC    A960126A   053543 TESTIO     DSPOBJD   DSPOBJD   0B90 *RX  A        11,969  53.72   12.65
                            TESTIO     DSPOBJD   DSPOBJD   0B90 *RSF S         1,455   6.53    1.54
                            TESTIO     DSPOBJD   DSPOBJD   0B90 *RS  A         1,370   6.15    1.45
                            TESTIO     TESTIO              0201 *RSF S           998   4.48    1.05
                            TESTIO     *DESTROYED          0000 *RS  S           745   3.34     .79
                            TESTIO     DSPOBJD   DSPOBJD   0B90 *RS  S           473   2.12     .50
                            TESTIO     QDBGETM             0201 *RSF S           447   2.01     .47
                            TESTIO     DSPOBJD             1901 *RSF S           385   1.73     .41
                            TESTIO     F86D14F54004        0000 *RSF S           354   1.59     .37
                            TESTIO     *DESTROYED          0000 *RSF S            99    .44     .10
                            TESTIO     SEIZE LOCK RANGE    0000 *RSF S            25    .11     .03
                            TESTIO     QWCBT01             19D0 *RSF S             1    .00     .00
                            TESTIO     TESTIOC             0201 *RSF S             1    .00     .00
                            TESTIOC    HATT                0401 *RSF S         1,246   5.59    1.32
                            TESTIOC    TESTIO              0201 *RSF S           931   4.18     .98
                            TESTIOC    TESTIOC             0201 *RSF S           861   3.86     .91
                            TESTIOC    QDFTOWN             0801 *RSF S           404   1.81     .43
                            TESTIOC    QCAWAREA            19EF *RSF S           367   1.65     .39
                            TESTIOC    QRNXIE              0203 *RSF S           112    .50     .12
                            TESTIOC    QCAPLIST            19EF *RSF S             4    .02     .00
                            TESTIOC    QCAPLIST            19FC *RSF S             4    .02     .00
                            TESTIOC    QCAWAREA            19FC *RSF S             4    .02     .00
                            TESTIOC    QLDA                19CE *RSF S             3    .01     .00
                            QCLCLCPR   TESTIOC             0201 *RSF S             9    .04     .01
                            QCLCLCPR   QSYS                0401 *RSF S             3    .01     .00
                            QCLCLCPR   QUSRSYS             0401 *RSF S             2    .01     .00
                            TOPOFSTACK D1EDE9BC4700        0000 *RSF S             2    .01     .00
                            TOPOFSTACK QWCDLYJB            0201 *RSF S             2    .01     .00
                            TOPOFSTACK QWTPMHDJ            0201 *RSF S             1    .00     .00
                            QCADRV     QCAPLIST            19FC *RSF S             2    .01     .00
                            QCARULE    QCAWAREA            19FC *RSF S             2    .01     .00
                                                                 TOTAL        22,281
ILEAGNEW  A960126A   053541 ILEAGNEW   FCFA2024DA00        0000 *RSF S         4,353  22.17    4.60
                            ILEAGNEW   ILEAGNEW  A960126A  1AEF *RSF S         3,636  18.51    3.84
```

Figure 99 (Part 1 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45             IO by Object Name within Program within Job               PAGE    2
Process   Job       Job    Program    Object                  PDIO            PDIO     PCT      PCT
job name  user      number            Name/Type               Oper            Count    Job      ALL
                                                                                       IO       IO
ILEAGNEW  A960126A  053541 ILEAGNEW   *DESTROYED           0000 *RSF S        2,063   10.50    2.18
                           ILEAGNEW   ILEAGN               0201 *RSF S        1,181    6.01    1.25
                           ILEAGNEW   QRNXDUMP             0203 *RSF S        1,012    5.15    1.07
                           ILEAGNEW   QSQENDAG             0201 *RSF S          833    4.24     .88
                           ILEAGNEW   QLEAWI               0203 *RSF S          828    4.22     .87
                           ILEAGNEW   D7A782247200         0000 *RSF S          730    3.72     .77
                           ILEAGNEW   ILEAGNEW             0201 *RSF S          558    2.84     .59
                           ILEAGNEW   QUIRCLAP             0201 *RS  S          551    2.81     .58
                           ILEAGNEW   QWVPDAGE             0201 *RS  S          550    2.80     .58
                           ILEAGNEW   APLIST               19EF *RSF S          281    1.43     .30
                           ILEAGNEW   D56C3B528F00         0000 *RSF S          280    1.43     .30
                           ILEAGNEW   QCAWAREA             19EF *RSF S          276    1.41     .29
                           ILEAGNEW   QJOBMSGQ             18A0 *RSF S          274    1.40     .29
                           ILEAGNEW   SEIZE LOCK RANGE     0000 *RSF S          272    1.38     .29
                           ILEAGNEW   QRNXIE               0203 *RSF S          160     .81     .17
                           ILEAGNEW   QUSRSYS              0401 *RSF S          152     .77     .16
                           ILEAGNEW   C3E62C036004         0000 *RSF S          113     .58     .12
                           ILEAGNEW   QWVPDAGE             0201 *RSF S           25     .13     .03
                           ILEAGNEW   ILEAGNEW  A960126A   1AEF *RS  S           16     .08     .02
                           ILEAGNEW   QCAPLIST             19EF *RSF S            4     .02     .00
                           ILEAGNEW   QCAWAREA             19FC *RSF S            4     .02     .00
                           ILEAGNEW   QCAPLIST             19FC *RSF S            3     .02     .00
                           ILEAGNEW   QLDA                 19CE *RSF S            3     .02     .00
                           ILEAGNEW   *SECTOR I/O          0000 *WS  S            1     .01     .00
                           ILEAGNEW   QJOBMSGQ             18A0 *WS  S            1     .01     .00
                           ILEAGNEW   SM PERM DIR SEGMENT  0000 *RSF S            1     .01     .00
                           ILEAGN     C3E62C036004         0000 *RSF S          510    2.60     .54
                           ILEAGN     ILEAGNEW  A960126A   1AEF *RSF S          454    2.31     .48
                           ILEAGN     ILEAGN               0201 *RSF S          280    1.43     .30
                           ILEAGN     FCFA2024DA00         0000 *RSF S          184     .94     .19
                           QWCDLYJB   ILEAGNEW  A960126A   1AEF *WSP S            9     .05     .01
                           QWCDLYJB   QWCDLYJB             0201 *RSF S            6     .03     .01
                           QWCDLYJB                        0000 *RSF S            2     .01     .00
                           QWCDLYJB   Q04079N001QSPL       0DEF *WSP S            1     .01     .00
                           QCLCLCPR   ILEAGNEW             0201 *RSF S            9     .05     .01
                           QCLCLCPR   D7A782247200         0000 *RSF S            2     .01     .00
```

```
08/02/96  18:58:45             IO by Object Name within Program within Job               PAGE    3
Process   Job       Job    Program    Object                  PDIO            PDIO     PCT      PCT
job name  user      number            Name/Type               Oper            Count    Job      ALL
                                                                                       IO       IO
ILEAGNEW  A960126A  053541 QCLCLCPR   ILEAGNEW  A960126A   1AEF *RS  S            1     .01     .00
                           QCLCLCPR   QUSRSYS              0401 *RSF S            1     .01     .00
                           TOPOFSTACK FCFA2024DA00         0000 *RSF S            6     .03     .01
                           TOPOFSTACK QWCDLYJB             0201 *RS  S            4     .02     .00
                           TOPOFSTACK D1EDE9BC4700         0000 *RSF S            2     .01     .00
                           TOPOFSTACK ILEAGNEW  A960126A   1AEF *RS  S            1     .01     .00
                           QCADRV     QCAIFLD              0201 *RS  S            4     .02     .00
                           QCARULE    QSYS                 0401 *RSF S            2     .01     .00
                                                                TOTAL        19,639
OPENBAD   A960126A  053546 OPEN5      *DESTROYED           0000 *RS  S        1,856    9.46    1.96
                           OPEN5      OPEN5                0201 *RSF S        1,810    9.23    1.91
                           OPEN5      *DESTROYED           0000 *RSF S        1,789    9.12    1.89
                           OPEN5      OPENBAD   A960126A   1AEF *RSF S          963    4.91    1.02
                           OPEN5      SEIZE LOCK RANGE     0000 *RSF S          728    3.71     .77
                           OPEN5      PF04      PF04       0B90 *RSF S          545    2.78     .58
                           OPEN5      PF03      PF03       0B90 *RSF S          522    2.66     .55
                           OPEN5      PF05      PF05       0B90 *RSF S          509    2.59     .54
                           OPEN5      PF02      PF02       0B90 *RSF S          495    2.52     .52
                           OPEN5      F5075E554004         0000 *RSF S          493    2.51     .52
                           OPEN5      FD3057655004         0000 *RSF S          490    2.50     .52
                           OPEN5      C2E7BB3D7004         0000 *RSF S          480    2.45     .51
                           OPEN5      D3334BC40004         0000 *RSF S          469    2.39     .50
                           OPEN5      PF01      PF01       0B90 *RSF S          469    2.39     .50
                           OPEN5      F3CA6CD12004         0000 *RSF S          457    2.33     .48
                           OPEN5      PF03      PF03       0B90 *RS  A          322    1.64     .34
                           OPEN5      PF01      PF01       0B90 *RS  A          319    1.63     .34
                           OPEN5      PF01      PF01       0B90 *RS  S          319    1.63     .34
                           OPEN5      PF02      PF02       0B90 *RS  A          319    1.63     .34
                           OPEN5      PF02      PF02       0B90 *RS  S          318    1.62     .34
                           OPEN5      PF05      PF05       0B90 *RS  A          318    1.62     .34
                           OPEN5      PF03      PF03       0B90 *RS  S          317    1.62     .33
                           OPEN5      PF04      PF04       0B90 *RS  A          317    1.62     .33
                           OPEN5      PF05      PF05       0B90 *RS  S          317    1.62     .33
                           OPEN5      PF04      PF04       0B90 *RS  S          316    1.61     .33
```

Figure 99 (Part 2 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 4

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
OPENBAD	A960126A	053546	OPEN5	PF01	1901 *RSF S	308	1.57	.33
			OPEN5	PF02	1901 *RSF S	308	1.57	.33
			OPEN5	PF05	1901 *RSF S	306	1.56	.32
			OPEN5	PF04	1901 *RSF S	305	1.55	.32
			OPEN5	PF03	1901 *RSF S	304	1.55	.32
			OPEN5	OPENBAD A960126A	1AEF *RS S	13	.07	.01
			OPEN5	OPENBAD	0201 *RSF S	5	.03	.01
			OPEN5	QWCBT01	19D0 *RSF S	5	.03	.01
			OPEN5	SM PERM DIR SEGMENT	0000 *RSF S	1	.01	.00
			OPENBAD	OPENBAD	0201 *RSF S	933	4.76	.99
			OPENBAD	QCAWAREA	19EF *RSF S	610	3.11	.64
			OPENBAD	OPEN5	0201 *RSF S	575	2.93	.61
			OPENBAD	QUSRSYS	0401 *RSF S	257	1.31	.27
			OPENBAD	OPENBAD A960126A	1AEF *RSF S	224	1.14	.24
			OPENBAD	QRNXIE	0203 *RSF S	24	.12	.03
			OPENBAD	FE38ECDB8004	0000 *RSF S	15	.08	.02
			OPENBAD	QCAPLIST	19FC *RSF S	14	.07	.01
			OPENBAD	QCAPLIST	19EF *RSF S	13	.07	.01
			OPENBAD	QCAWAREA	19FC *RSF S	13	.07	.01
			OPENBAD	QLDA	19CE *RSF S	8	.04	.01
			OPENBAD	OPENBAD A960126A	1AEF *RS S	6	.03	.01
			OPENBAD	SM PERM DIR SEGMENT	0000 *RSF S	1	.01	.00
			QCLCLCPR	OPENBAD	0201 *RSF S	24	.12	.03
			QCLCLCPR	QCAWAREA	19EF *RSF S	8	.04	.01
			QCLCLCPR	QUSRSYS	0401 *RSF S	8	.04	.01
			QCLCLCPR	SM PERM DIR SEGMENT	0000 *RSF S	1	.01	.00
			TOPOFSTACK	FE38ECDB8004	0000 *RSF S	14	.07	.01
			TOPOFSTACK	QCAPLIST	19EF *RSF S	7	.04	.01
			TOPOFSTACK	OPENBAD A960126A	1AEF *RS S	4	.02	.00
			TOPOFSTACK	OPENBAD	0201 *RSF S	3	.02	.00
			TOPOFSTACK	QWCDLYJB	0201 *RS S	2	.01	.00
			TOPOFSTACK	QWCDLYJB	0201 *RSF S	2	.01	.00
			TOPOFSTACK	D1EDE9BC4700	0000 *RSF S	1	.01	.00
			TOPOFSTACK	QWTPMHDJ	0201 *RSF S	1	.01	.00
			QWCDLYJB	OPENBAD A960126A	1AEF *WSP S	16	.08	.02
			QWCDLYJB		0000 *RSF S	6	.03	.01

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 5

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
OPENBAD	A960126A	053546	QWCDLYJB	QWCDLYJB	0201 *RSF S	1	.01	.00
			QCARULE	QCAWAREA	19FC *RSF S	7	.04	.01
			QCARULE	QSYS	0401 *RSF S	1	.01	.00
			QCADRV	QCAWAREA	19EF *RSF S	3	.02	.00
			QCADRV	QCAIFLD	0201 *RS S	2	.01	.00
					TOTAL	19,616		
JUNK	QSPLJOB	053464	QCMDEXC	D2FB76C77200	0000 *RSF S	650	12.51	.69
			QCMDEXC	JUNK QSPLJOB	1AEF *RSF S	462	8.89	.49
			QCMDEXC	QSOSRV2	0203 *RSF S	291	5.60	.31
			QCMDEXC	QTMPLPRC	0201 *RSF S	220	4.23	.23
			QCMDEXC	QSOKERN3	0203 *RSF S	214	4.12	.23
			QCMDEXC	*DESTROYED	0000 *RSF S	193	3.72	.20
			QCMDEXC	L/L RANGE 1	0000 *RSF S	164	3.16	.17
			QCMDEXC	QSOSRV1	0203 *RSF S	143	2.75	.15
			QCMDEXC	CB409AF8A004	0000 *RSF S	84	1.62	.09
			QCMDEXC	F4E3FAD8D004	0000 *RSF S	84	1.62	.09
			QCMDEXC	QTQICONV	0203 *RSF S	81	1.56	.09
			QCMDEXC	E7CB3ED36004	0000 *RSF S	72	1.39	.08
			QCMDEXC	QPOLLIB1	0203 *RSF S	72	1.39	.08
			QCMDEXC	E43BF962E500	0000 *RSF S	69	1.33	.07
			QCMDEXC	QYPPRT	0203 *RSF S	66	1.27	.07
			QCMDEXC	QSO_DNS_INDEX	0EEF *RSF S	60	1.15	.06
			QCMDEXC	QC2UTIL1	0203 *RSF S	54	1.04	.06
			QCMDEXC	F836A3DBEA00	0000 *RSF S	50	.96	.05
			QCMDEXC	QPOSSRV3	0203 *RSF S	45	.87	.05
			QCMDEXC	JUNK QSPLJOB	1AEF *RS S	41	.79	.04
			QCMDEXC	QTQICVC2	0203 *RSF S	38	.73	.04
			QCMDEXC	QPOLLFS1	0203 *RSF S	36	.69	.04
			QCMDEXC	ECB9E6FE0E00	0000 *RSF S	32	.62	.03
			QCMDEXC	QPOLDC1	0203 *RSF S	32	.62	.03
			QCMDEXC	QPOSSRV4	0203 *RSF S	26	.50	.03
			QCMDEXC	QPOWPID	0203 *RSF S	26	.50	.03
			QCMDEXC	QPOWPIDI	0203 *RSF S	26	.50	.03
			QCMDEXC	QWPZHPT1	0203 *RSF S	26	.50	.03

Figure 99 (Part 3 of 15). I/O by Object Name within Program within Job

08/02/96	18:58:45		IO by Object Name within Program within Job				PAGE	6
Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QCMDEXC	QJOBMSGQ	18A0 *RSF S	25	.48	.03
			QCMDEXC	D1EDE9BC4700	0000 *RSF S	24	.46	.03
			QCMDEXC	QTQSRVP2	0203 *RSF S	24	.46	.03
			QCMDEXC	QSECOFR	0801 *RSF S	15	.29	.02
			QCMDEXC	EEE05252CB00	0000 *RSF S	14	.27	.01
			QCMDEXC	FCAE14909A00	0000 *RSF S	14	.27	.01
			QCMDEXC	C517F58CA900	0000 *RSF S	12	.23	.01
			QCMDEXC	QCACHLBL	0201 *RS S	12	.23	.01
			QCMDEXC	QCAIEXIT	0201 *RS S	12	.23	.01
			QCMDEXC	QMHRSNEM	0201 *RSF S	12	.23	.01
			QCMDEXC	QSYS	0401 *RSF S	12	.23	.01
			QCMDEXC	QWCDLYJB	0201 *RS S	12	.23	.01
			QCMDEXC	SQCCSID1	0ED2 *RSF S	12	.23	.01
			QCMDEXC	QLEAWI	0203 *RSF S	9	.17	.01
			QCMDEXC	D48576756100	0000 *RSF S	6	.12	.01
			QCMDEXC	QCASQ	0AEF *RSF S	6	.12	.01
			QCMDEXC	QC2IO	0203 *RSF S	6	.12	.01
			QCMDEXC	QTCP	0401 *RSF S	6	.12	.01
			QCMDEXC	QWVPDAGE	0201 *RS S	6	.12	.01
			QDMCOPEN	D2FB76C77200	0000 *RSF S	101	1.94	.11
			QDMCOPEN	QSOSRV2	0203 *RSF S	80	1.54	.08
			QDMCOPEN	JUNK QSPLJOB	1AEF *RSF S	35	.67	.04
			QDMCOPEN	QUSRSYS	0401 *RSF S	30	.58	.03
			QDMCOPEN	QSECOFR	0801 *RSF S	28	.54	.03
			QDMCOPEN	EEE05252CB00	0000 *RSF S	19	.37	.02
			QDMCOPEN	QATOCTCPIP	1901 *RSF S	17	.33	.02
			QDMCOPEN	QC2IO	0203 *RSF S	6	.12	.01
			QDMCOPEN	QWCBT01	19D0 *RSF S	2	.04	.00
			QDMCOPEN	QTMPLPRC	0201 *RSF S	1	.02	.00
			QDBOPEN	SQCCSID1	0ED2 *RSF S	74	1.42	.08
			QDBOPEN	SEIZE LOCK RANGE	0000 *RSF S	38	.73	.04
			QDBOPEN	JUNK QSPLJOB	1AEF *RSF S	34	.65	.04
			QDBOPEN	QDBOPEN	0201 *RSF S	27	.52	.03
			QDBOPEN	QTMPLPRC	0201 *RSF S	25	.48	.03
			QDBOPEN	FC64411FC004	0000 *RSF S	17	.33	.02
			QDBOPEN	QATOCTCPIPCONFIG	0B90 *RSF S	17	.33	.02

08/02/96	18:58:45		IO by Object Name within Program within Job				PAGE	7
Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QDBOPEN	QATOCTCPIPCONFIG	0C90 *RSF S	16	.31	.02
			QDBOPEN	QATTR	1951 *RSF S	13	.25	.01
			QDBOPEN	*DESTROYED	0000 *RSF S	6	.12	.01
			QDBOPEN	JUNK QSPLJOB	1AEF *RS S	3	.06	.00
			QDBGETKY	QATOCTCPIPCONFIG	0C90 *RSF S	39	.75	.04
			QDBGETKY	F5428E447004	0000 *RSF S	25	.48	.03
			QDBGETKY	L/L RANGE 1	0000 *RSF S	24	.46	.03
			QDBGETKY	QATOCTCPIPCONFIG	0B90 *RSF S	23	.44	.02
			QDBGETKY	QATOCTCPIPCONFIG	0B90 *RS S	17	.33	.02
			QDBGETKY	JUNK QSPLJOB	1AEF *RSF S	16	.31	.02
			QDBGETKY	FC64411FC004	0000 *RSF S	12	.23	.01
			QDBGETKY	QATOCPS SERVICES	0B90 *RS A	12	.23	.01
			QDBGETKY	QATOCPS SERVICES	0B90 *RS S	12	.23	.01
			QDBGETKY	*DESTROYED	0000 *RSF S	4	.08	.00
			QMHSNDPM	QJOBMSGQ	18A0 *RSF S	47	.90	.05
			QMHSNDPM	QTCPMSGF	0E03 *RSF S	30	.58	.03
			QMHSNDPM	QCPFMSG	0E03 *RSF S	26	.50	.03
			QMHSNDPM	QTCP	0401 *RSF S	18	.35	.02
			QMHSNDPM	EEE05252CB00	0000 *RSF S	6	.12	.01
			QMHSNDPM	QUSDLTUS	0201 *RSF S	6	.12	.01
			QMHSNDPM	D2FB76C77200	0000 *RSF S	5	.10	.01
			QMHSNDPM	JUNK QSPLJOB	1AEF *RSF S	4	.08	.00
			QMHSNDPM	E7CB3ED36004	0000 *RSF S	1	.02	.00
			QMHSNDPM	JUNK QSPLJOB	1AEF *RS S	1	.02	.00
			TOPOFSTACK	QSPRMTDR	0201 *RSF S	26	.50	.03
			TOPOFSTACK	JUNK QSPLJOB	1AEF *RSF S	21	.40	.02
			TOPOFSTACK	QC2UTIL1	0203 *RSF S	18	.35	.02
			TOPOFSTACK	D2FB76C77200	0000 *RSF S	13	.25	.01
			TOPOFSTACK	JUNK QSPLJOB	1AEF *RS S	10	.19	.01
			TOPOFSTACK	QJOBMSGQ	18A0 *RSF S	2	.04	.00
			TOPOFSTACK	E7CB3ED36004	0000 *RSF S	1	.02	.00
			QMHRSNEM	QSPRMTDR	0201 *RSF S	18	.35	.02
			QMHRSNEM	QMHRSNEM	0201 *RSF S	12	.23	.01
			QMHRSNEM	EEE05252CB00	0000 *RSF S	9	.17	.01
			QMHRSNEM	D2FB76C77200	0000 *RSF S	6	.12	.01
			QMHRSNEM	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01

Figure 99 (Part 4 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 8

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QMHRSNEM	QJOBMSGQ	18A0 *RSF S	6	.12	.01
			QMHRSNEM	E7CB3ED36004	0000 *RSF S	3	.06	.00
			QMHRSNEM	QTMPLPRC	0201 *RSF S	1	.02	.00
			QLIDLOBJ	QJOBMSGQ	18A0 *RSF S	17	.33	.02
			QLIDLOBJ	E7CB3ED36004	0000 *RSF S	12	.23	.01
			QLIDLOBJ	D2FB76C77200	0000 *RSF S	6	.12	.01
			QLIDLOBJ	EEE05252CB00	0000 *RSF S	6	.12	.01
			QLIDLOBJ	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01
			QLIDLOBJ	QLIDLOBJ	0201 *RSF S	6	.12	.01
			QCATRS	QTCP	0401 *RSF S	14	.27	.01
			QCATRS	QTMPCKP	0201 *RSF S	14	.27	.01
			QCATRS	QTMPLPRC	0201 *RSF S	12	.23	.01
			QDMCLOSE	FC64411FC004	0000 *RSF S	12	.23	.01
			QDMCLOSE	QATOCTCPIPCONFIG	0B90 *RSF S	12	.23	.01
			QDMCLOSE	QATOCTCPIPCONFIG	0C90 *RSF S	12	.23	.01
			QMHMOVPM	QJOBMSGQ	18A0 *RSF S	25	.48	.03
			QMHMOVPM	D2624DD3F004	0000 *RSF S	6	.12	.01
			QMHMOVPM	JUNK QSPLJOB	1AEF *RSF S	4	.08	.00
			QMHMOVPM	E7CB3ED36004	0000 *RSF S	1	.02	.00
			QSQENDAG	JUNK QSPLJOB	1AEF *RSF S	20	.38	.02
			QSQENDAG	D2FB76C77200	0000 *RSF S	6	.12	.01
			QSQENDAG	EEE05252CB00	0000 *RSF S	6	.12	.01
			QSQENDAG	QJOBMSGQ	18A0 *RSF S	2	.04	.00
			QSQENDAG	QSQENDAG	0201 *RSF S	2	.04	.00
			QLICHLLE	QLICHLLE	0201 *RSF S	13	.25	.01
			QLICHLLE	SEIZE LOCK RANGE	0000 *RSF S	12	.23	.01
			QLICHLLE	QTCP	0401 *RSF S	7	.13	.01
			QWCDLYJB	JUNK QSPLJOB	1AEF *WS S	12	.23	.01
			QWCDLYJB	*DESTROYED	0000 *RSF S	6	.12	.01
			QWCDLYJB	JUNK QSPLJOB	1AEF *WSP S	6	.12	.01
			QWCDLYJB	QWCDLYJB	0201 *RSF S	6	.12	.01
			QWCDLYJB	JUNK QSPLJOB	1AEF *RS S	1	.02	.00
			QCANPARS	SQCCSID1	0ED2 *RSF S	24	.46	.03
			QCANPARS	SEIZE LOCK RANGE	0000 *RSF S	6	.12	.01
			QCADRV2	QLICHLLE	0201 *RS S	14	.27	.01
			QCADRV2	QCAIFLD	0201 *RS S	12	.23	.01

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 9

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QCADRV2	JUNK QSPLJOB	1AEF *RSF S	2	.04	.00
			QCADRV2	SEIZE LOCK RANGE	0000 *RSF S	1	.02	.00
			QMHPDEH	QJOBMSGQ	18A0 *RSF S	15	.29	.02
			QMHPDEH	JUNK QSPLJOB	1AEF *RSF S	12	.23	.01
			QCACHLBL	QLICHLLE	0201 *RS S	12	.23	.01
			QCACHLBL	*DESTROYED	0000 *RSF S	6	.12	.01
			QCACHLBL	QCACHLBL	0201 *RSF S	6	.12	.01
			QCACHLBL	SEIZE LOCK RANGE	0000 *RSF S	1	.02	.00
			QCAIEXIT	*DESTROYED	0000 *RSF S	12	.23	.01
			QCAIEXIT	QCAIEXIT	0201 *RSF S	6	.12	.01
			QCAIEXIT	QSECOFR	0801 *RSF S	6	.12	.01
			QCAIEXIT	SEIZE LOCK RANGE	0000 *RSF S	1	.02	.00
			QUSRJOBI	JUNK QSPLJOB	1AEF *RSF S	16	.31	.02
			QUSRJOBI	QSPSCB	19C2 *RSF S	6	.12	.01
			QMHCHGEM	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01
			QMHCHGEM	QSPRMTDR	0201 *RSF S	6	.12	.01
			QMHCHGEM	EEE05252CB00	0000 *RSF S	1	.02	.00
			QMHCHGEM	QTMPLPRC	0201 *RSF S	1	.02	.00
			QDBCLOSE	*DESTROYED	0000 *RSF S	12	.23	.01
			QDBCLOSE	SEIZE LOCK RANGE	0000 *RSF S	1	.02	.00
			QUSDLTUS	JUNK QSPLJOB	1AEF *RSF S	7	.13	.01
			QUSDLTUS	QTMPLPRC	0201 *RSF S	6	.12	.01
			QDCXLATE	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01
			QDCXLATE	QTCPASC	1906 *RSF S	6	.12	.01
			QDMRCLSE	QSQENDAG	0201 *RSF S	5	.10	.01
			QDMRCLSE	QUIRCLAP	0201 *RS S	5	.10	.01
			QDMRCLSE	JUNK QSPLJOB	1AEF *RSF S	1	.02	.00
			QMHRCVPM	JUNK QSPLJOB	1AEF *RSF S	8	.15	.01
			QTMPCKP	QTMPCKP	0201 *RSF S	7	.13	.01
			QCARULE	QSYS	0401 *RSF S	6	.12	.01
			QLICNV	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01
			QMHRTMSS	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01
			QTQGESP	JUNK QSPLJOB	1AEF *RSF S	6	.12	.01
			QUIRCLAP	JUNK QSPLJOB	1AEF *RSF S	4	.08	.00
			QCAIFLD	JUNK QSPLJOB	1AEF *RSF S	2	.04	.00

Figure 99 (Part 5 of 15). I/O by Object Name within Program within Job

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08/02/96  18:58:45                IO by Object Name within Program within Job              PAGE   10
Process   Job       Job    Program   Object                    PDIO          PDIO     PCT       PCT
job name  user      number           Name/Type                 Oper          Count    Job       ALL
                                                                                      IO        IO
                                                                TOTAL        5,195
                           TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S         673   17.12      .71
                           TOPOFSTACK *DESTROYED           0000 *WSP S         532   13.53      .56
                           TOPOFSTACK FCFA2024DA00         0000 *WSP S         523   13.30      .55
                           TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S         185    4.70      .20
                           TOPOFSTACK QCAWAREA             19EF *WSP S         157    3.99      .17
                           TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S         114    2.90      .12
                           TOPOFSTACK C3E62C036004         0000 *WSP S         113    2.87      .12
                           TOPOFSTACK F5075E554004         0000 *WSP S         100    2.54      .11
                           TOPOFSTACK F86D14F54004         0000 *WSP S          95    2.42      .10
                           TOPOFSTACK F3CA6CD12004         0000 *WSP S          93    2.37      .10
                           TOPOFSTACK PF05      PF05       0B90 *WSP S          92    2.34      .10
                           TOPOFSTACK FD3057655004         0000 *WSP S          87    2.21      .09
                           TOPOFSTACK PF04      PF04       0B90 *WSP S          85    2.16      .09
                           TOPOFSTACK QJOBMSGQ             18A0 *WSP S          84    2.14      .09
                           TOPOFSTACK D3334BC40004         0000 *WSP S          83    2.11      .09
                           TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S          83    2.11      .09
                           TOPOFSTACK PF01      PF01       0B90 *WSP S          81    2.06      .09
                           TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S          80    2.03      .08
                           TOPOFSTACK PF03      PF03       0B90 *WSP S          79    2.01      .08
                           TOPOFSTACK PF02      PF02       0B90 *WSP S          77    1.96      .08
                           TOPOFSTACK C2E7BB3D7004         0000 *WSP S          76    1.93      .08
                           TOPOFSTACK QRNXDUMP             0203 *WSP S          58    1.48      .06
                           TOPOFSTACK QRNXIE               0203 *WSP S          57    1.45      .06
                           TOPOFSTACK TESTIO               0201 *WSP S          52    1.32      .05
                           TOPOFSTACK OPEN5                0201 *WSP S          47    1.20      .05
                           TOPOFSTACK ILEAGN               0201 *WSP S          41    1.04      .04
                           TOPOFSTACK D2FB76C77200         0000 *WSP S          39     .99      .04
                           TOPOFSTACK D56C3B528F00         0000 *WSP S          37     .94      .04
                           TOPOFSTACK D7A782247200         0000 *WSP S          33     .84      .03
                           TOPOFSTACK E7CB3ED36004         0000 *WSP S          11     .28      .01
                           TOPOFSTACK D1EDE9BC4700         0000 *WSP S           6     .15      .01
                           TOPOFSTACK E43BF962E500         0000 *WSP S           6     .15      .01
                           TOPOFSTACK FC64411FC004         0000 *WSP S           6     .15      .01
                           TOPOFSTACK QCAWAREA             19FC *WSP S           6     .15      .01

08/02/96  18:58:45                IO by Object Name within Program within Job              PAGE   11
Process   Job       Job    Program   Object                    PDIO          PDIO     PCT       PCT
job name  user      number           Name/Type                 Oper          Count    Job       ALL
                                                                                      IO        IO
                           TOPOFSTACK SQCCSID1             0ED2 *WSP S           6     .15      .01
                           TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S           5     .13      .01
                           TOPOFSTACK FE38ECDB8004         0000 *WSP S           4     .10      .00
                           TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S           4     .10      .00
                           TOPOFSTACK QCAPLIST             19EF *WSP S           3     .08      .00
                           TOPOFSTACK QCAPLIST             19FC *WSP S           3     .08      .00
                           TOPOFSTACK FCAE14909A00         0000 *WSP S           2     .05      .00
                           TOPOFSTACK F5428E447004         0000 *WSP S           2     .05      .00
                           TOPOFSTACK QCASQ                0AEF *WSP S           2     .05      .00
                           TOPOFSTACK ECB9E6FE0E00         0000 *WSP S           1     .03      .00
                           TOPOFSTACK EEE05252CB00         0000 *WSP S           1     .03      .00
                           TOPOFSTACK F836A3DBEA00         0000 *WSP S           1     .03      .00
                           TOPOFSTACK QPOLLIB1             0203 *WSP S           1     .03      .00
                           TOPOFSTACK QPOSSRV3             0203 *WSP S           1     .03      .00
                           TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S           1     .03      .00
                           TOPOFSTACK QTCP                 0401 *WSP S           1     .03      .00
                           TOPOFSTACK QTCPMSGF             0E03 *WSP S           1     .03      .00
                           TOPOFSTACK QTMPLPRC             0201 *WSP S           1     .03      .00
                           TOPOFSTACK QYPPRT               0203 *WSP S           1     .03      .00
                           TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S         665   17.26      .70
                           TOPOFSTACK *DESTROYED           0000 *WSP S         509   13.21      .54
                           TOPOFSTACK FCFA2024DA00         0000 *WSP S         474   12.30      .50
                           TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S         164    4.26      .17
                           TOPOFSTACK QCAWAREA             19EF *WSP S         146    3.79      .15
                           TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S         135    3.50      .14
                           TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S         110    2.85      .12
                           TOPOFSTACK C3E62C036004         0000 *WSP S          96    2.49      .10
                           TOPOFSTACK QJOBMSGQ             18A0 *WSP S          90    2.34      .10
                           TOPOFSTACK PF03      PF03       0B90 *WSP S          88    2.28      .09
                           TOPOFSTACK F5075E554004         0000 *WSP S          85    2.21      .09
                           TOPOFSTACK C2E7BB3D7004         0000 *WSP S          83    2.15      .09
                           TOPOFSTACK PF01      PF01       0B90 *WSP S          83    2.15      .09
                           TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S          80    2.08      .08
                           TOPOFSTACK FD3057655004         0000 *WSP S          80    2.08      .08
                           TOPOFSTACK D3334BC40004         0000 *WSP S          79    2.05      .08
                           TOPOFSTACK PF04      PF04       0B90 *WSP S          79    2.05      .08
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Figure 99 (Part 6 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 12

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
			TOPOFSTACK	D2FB76C77200	0000 *WSP S	77	2.00	.08
			TOPOFSTACK	F3CA6CD12004	0000 *WSP S	77	2.00	.08
			TOPOFSTACK	PF02 PF02	0B90 *WSP S	75	1.95	.08
			TOPOFSTACK	F86D14F54004	0000 *WSP S	71	1.84	.08
			TOPOFSTACK	PF05 PF05	0B90 *WSP S	66	1.71	.07
			TOPOFSTACK	QRNXDUMP	0203 *WSP S	59	1.53	.06
			TOPOFSTACK	D56C3B528F00	0000 *WSP S	56	1.45	.06
			TOPOFSTACK	OPEN5	0201 *WSP S	54	1.40	.06
			TOPOFSTACK	TESTIO	0201 *WSP S	48	1.25	.05
			TOPOFSTACK	QRNXIE	0203 *WSP S	39	1.01	.04
			TOPOFSTACK	D7A782247200	0000 *WSP S	38	.99	.04
			TOPOFSTACK	ILEAGN	0201 *WSP S	37	.96	.04
			TOPOFSTACK	E43BF962E500	0000 *WSP S	15	.39	.02
			TOPOFSTACK	E7CB3ED36004	0000 *WSP S	15	.39	.02
			TOPOFSTACK	FE38ECDB8004	0000 *WSP S	8	.21	.01
			TOPOFSTACK	ECB9E6FE0E00	0000 *WSP S	6	.16	.01
			TOPOFSTACK	EEE05252CB00	0000 *WSP S	6	.16	.01
			TOPOFSTACK	FC64411FC004	0000 *WSP S	5	.13	.01
			TOPOFSTACK	QATOCTCPIPCONFIG	0B90 *WSP S	5	.13	.01
			TOPOFSTACK	D1EDE9BC4700	0000 *WSP S	4	.10	.00
			TOPOFSTACK	F836A3DBEA00	0000 *WSP S	4	.10	.00
			TOPOFSTACK	QATOCTCPIPCONFIG	0C90 *WSP S	4	.10	.00
			TOPOFSTACK	QCAWAREA	19FC *WSP S	4	.10	.00
			TOPOFSTACK	QPOLLIB1	0203 *WSP S	4	.10	.00
			TOPOFSTACK	QSOSRV1	0203 *WSP S	4	.10	.00
			TOPOFSTACK	QYPPRT	0203 *WSP S	4	.10	.00
			TOPOFSTACK	F5428E447004	0000 *WSP S	3	.08	.00
			TOPOFSTACK	QCAPLIST	19FC *WSP S	3	.08	.00
			TOPOFSTACK	SQCCSID1	0ED2 *WSP S	3	.08	.00
			TOPOFSTACK	FCAE14909A00	0000 *WSP S	2	.05	.00
			TOPOFSTACK	QCAPLIST	19EF *WSP S	2	.05	.00
			TOPOFSTACK	QPOSSRV3	0203 *WSP S	2	.05	.00
			TOPOFSTACK	QSOSRV2	0203 *WSP S	2	.05	.00
			TOPOFSTACK	QTCP	0401 *WSP S	2	.05	.00
			TOPOFSTACK	QSO_DNS_INDEX	0EEF *WSP S	1	.03	.00
			TOPOFSTACK	QTCPMSGF	0E03 *WSP S	1	.03	.00

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 13

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
			TOPOFSTACK	QTQICONV	0203 *WSP S	1	.03	.00
			TOPOFSTACK	ILEAGNEW A960126A	1AEF *WSP S	716	19.00	.76
			TOPOFSTACK	*DESTROYED	0000 *WSP S	493	13.08	.52
			TOPOFSTACK	FCFA2024DA00	0000 *WSP S	414	10.99	.44
			TOPOFSTACK	SEIZE LOCK RANGE	0000 *WSP S	207	5.49	.22
			TOPOFSTACK	QCAWAREA	19EF *WSP S	130	3.45	.14
			TOPOFSTACK	OPENBAD A960126A	1AEF *WSP S	127	3.37	.13
			TOPOFSTACK	C3E62C036004	0000 *WSP S	111	2.95	.12
			TOPOFSTACK	JUNK QSPLJOB	1AEF *WSP S	102	2.71	.11
			TOPOFSTACK	QJOBMSGQ	18A0 *WSP S	94	2.49	.10
			TOPOFSTACK	F86D14F54004	0000 *WSP S	91	2.42	.10
			TOPOFSTACK	D3334BC40004	0000 *WSP S	88	2.34	.09
			TOPOFSTACK	PF05 PF05	0B90 *WSP S	85	2.26	.09
			TOPOFSTACK	PF03 PF03	0B90 *WSP S	84	2.23	.09
			TOPOFSTACK	C2E7BB3D7004	0000 *WSP S	78	2.07	.08
			TOPOFSTACK	F5075E554004	0000 *WSP S	78	2.07	.08
			TOPOFSTACK	FD3057655004	0000 *WSP S	76	2.02	.08
			TOPOFSTACK	DSPOBJD DSPOBJD	0B90 *WSP S	72	1.91	.08
			TOPOFSTACK	F3CA6CD12004	0000 *WSP S	69	1.83	.07
			TOPOFSTACK	PF04 PF04	0B90 *WSP S	69	1.83	.07
			TOPOFSTACK	PF02 PF02	0B90 *WSP S	65	1.73	.07
			TOPOFSTACK	QRNXDUMP	0203 *WSP S	63	1.67	.07
			TOPOFSTACK	PF01 PF01	0B90 *WSP S	62	1.65	.07
			TOPOFSTACK	QRNXIE	0203 *WSP S	49	1.30	.05
			TOPOFSTACK	D2FB76C77200	0000 *WSP S	47	1.25	.05
			TOPOFSTACK	D7A782247200	0000 *WSP S	41	1.09	.04
			TOPOFSTACK	TESTIO	0201 *WSP S	39	1.04	.04
			TOPOFSTACK	ILEAGN	0201 *WSP S	38	1.01	.04
			TOPOFSTACK	OPEN5	0201 *WSP S	37	.98	.04
			TOPOFSTACK	D56C3B528F00	0000 *WSP S	34	.90	.04
			TOPOFSTACK	E7CB3ED36004	0000 *WSP S	18	.48	.02
			TOPOFSTACK	QATOCTCPIPCONFIG	0C90 *WSP S	11	.29	.01
			TOPOFSTACK	FC64411FC004	0000 *WSP S	9	.24	.01
			TOPOFSTACK	D1EDE9BC4700	0000 *WSP S	7	.19	.01
			TOPOFSTACK	QATOCTCPIPCONFIG	0B90 *WSP S	7	.19	.01
			TOPOFSTACK	FE38ECDB8004	0000 *WSP S	6	.16	.01

Figure 99 (Part 7 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 14

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
			TOPOFSTACK	F5428E447004	0000 *WSP S	6	.16	.01
			TOPOFSTACK	QCAPLIST	19EF *WSP S	6	.16	.01
			TOPOFSTACK	E43BF962E500	0000 *WSP S	4	.11	.00
			TOPOFSTACK	F836A3DBEA00	0000 *WSP S	4	.11	.00
			TOPOFSTACK	QCAPLIST	19FC *WSP S	4	.11	.00
			TOPOFSTACK	QTQICONV	0203 *WSP S	4	.11	.00
			TOPOFSTACK	FCAE14909A00	0000 *WSP S	3	.08	.00
			TOPOFSTACK	QCAWAREA	19FC *WSP S	3	.08	.00
			TOPOFSTACK	QYPPRT	0203 *WSP S	3	.08	.00
			TOPOFSTACK	ECB9E6FE0E00	0000 *WSP S	2	.05	.00
			TOPOFSTACK	EEE05252CB00	0000 *WSP S	2	.05	.00
			TOPOFSTACK	QPOSSRV3	0203 *WSP S	2	.05	.00
			TOPOFSTACK	QTMPLPRC	0201 *WSP S	2	.05	.00
			TOPOFSTACK	SQCCSID1	0ED2 *WSP S	2	.05	.00
			TOPOFSTACK	QPOLLIB1	0203 *WSP S	1	.03	.00
			TOPOFSTACK	QSO_DNS_INDEX	0EEF *WSP S	1	.03	.00
			TOPOFSTACK	QSOSRV1	0203 *WSP S	1	.03	.00
			TOPOFSTACK	QSOSRV2	0203 *WSP S	1	.03	.00
			TOPOFSTACK	ILEAGNEW A960126A	1AEF *WSP S	649	17.55	.69
			TOPOFSTACK	FCFA2024DA00	0000 *WSP S	502	13.57	.53
			TOPOFSTACK	*DESTROYED	0000 *WSP S	457	12.36	.48
			TOPOFSTACK	SEIZE LOCK RANGE	0000 *WSP S	169	4.57	.18
			TOPOFSTACK	QCAWAREA	19EF *WSP S	123	3.33	.13
			TOPOFSTACK	OPENBAD A960126A	1AEF *WSP S	117	3.16	.12
			TOPOFSTACK	JUNK QSPLJOB	1AEF *WSP S	110	2.97	.12
			TOPOFSTACK	QJOBMSGQ	18A0 *WSP S	107	2.89	.11
			TOPOFSTACK	C3E62C036004	0000 *WSP S	98	2.65	.10
			TOPOFSTACK	C2E7BB3D7004	0000 *WSP S	94	2.54	.10
			TOPOFSTACK	F86D14F54004	0000 *WSP S	94	2.54	.10
			TOPOFSTACK	F3CA6CD12004	0000 *WSP S	82	2.22	.09
			TOPOFSTACK	FD3057655004	0000 *WSP S	80	2.16	.08
			TOPOFSTACK	PF02 PF02	0B90 *WSP S	80	2.16	.08
			TOPOFSTACK	PF03 PF03	0B90 *WSP S	80	2.16	.08
			TOPOFSTACK	F5075E554004	0000 *WSP S	79	2.14	.08
			TOPOFSTACK	D3334BC40004	0000 *WSP S	75	2.03	.08
			TOPOFSTACK	PF04 PF04	0B90 *WSP S	70	1.89	.07

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 15

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
			TOPOFSTACK	PF05 PF05	0B90 *WSP S	68	1.84	.07
			TOPOFSTACK	PF01 PF01	0B90 *WSP S	65	1.76	.07
			TOPOFSTACK	DSPOBJD DSPOBJD	0B90 *WSP S	61	1.65	.06
			TOPOFSTACK	TESTIO	0201 *WSP S	54	1.46	.06
			TOPOFSTACK	OPEN5	0201 *WSP S	49	1.33	.05
			TOPOFSTACK	QRNXDUMP	0203 *WSP S	49	1.33	.05
			TOPOFSTACK	QRNXIE	0203 *WSP S	49	1.33	.05
			TOPOFSTACK	D7A782247200	0000 *WSP S	40	1.08	.04
			TOPOFSTACK	D2FB76C77200	0000 *WSP S	38	1.03	.04
			TOPOFSTACK	D56C3B528F00	0000 *WSP S	38	1.03	.04
			TOPOFSTACK	ILEAGN	0201 *WSP S	37	1.00	.04
			TOPOFSTACK	E7CB3ED36004	0000 *WSP S	18	.49	.02
			TOPOFSTACK	QATOCTCPIPCONFIG	0C90 *WSP S	7	.19	.01
			TOPOFSTACK	D1EDE9BC4700	0000 *WSP S	6	.16	.01
			TOPOFSTACK	QTMPLPRC	0201 *WSP S	6	.16	.01
			TOPOFSTACK	SQCCSID1	0ED2 *WSP S	6	.16	.01
			TOPOFSTACK	EEE05252CB00	0000 *WSP S	4	.11	.00
			TOPOFSTACK	QCAPLIST	19FC *WSP S	4	.11	.00
			TOPOFSTACK	FC64411FC004	0000 *WSP S	3	.08	.00
			TOPOFSTACK	QATOCTCPIPCONFIG	0B90 *WSP S	3	.08	.00
			TOPOFSTACK	QCAPLIST	19EF *WSP S	3	.08	.00
			TOPOFSTACK	QTCP	0401 *WSP S	3	.08	.00
			TOPOFSTACK	QTQICONV	0203 *WSP S	3	.08	.00
			TOPOFSTACK	ECB9E6FE0E00	0000 *WSP S	2	.05	.00
			TOPOFSTACK	E43BF962E500	0000 *WSP S	2	.05	.00
			TOPOFSTACK	FE38ECDB8004	0000 *WSP S	2	.05	.00
			TOPOFSTACK	F836A3DBEA00	0000 *WSP S	2	.05	.00
			TOPOFSTACK	QPOLLIB1	0203 *WSP S	2	.05	.00
			TOPOFSTACK	QSO_DNS_INDEX	0EEF *WSP S	2	.05	.00
			TOPOFSTACK	F5428E447004	0000 *WSP S	1	.03	.00
			TOPOFSTACK	QCASQ	0AEF *WSP S	1	.03	.00
			TOPOFSTACK	QCAWAREA	19FC *WSP S	1	.03	.00
			TOPOFSTACK	QPOSSRV3	0203 *WSP S	1	.03	.00
			TOPOFSTACK	QSOSRV2	0203 *WSP S	1	.03	.00
			TOPOFSTACK	QTCPMSGF	0E03 *WSP S	1	.03	.00
			TOPOFSTACK	ILEAGNEW A960126A	1AEF *WSP S	650	17.71	.69

Figure 99 (Part 8 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 16

Process job name	Job user	Job number	Program	Object Name/Type		PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
			TOPOFSTACK	*DESTROYED		0000 *WSP S	485	13.22	.51
			TOPOFSTACK	FCFA2024DA00		0000 *WSP S	484	13.19	.51
			TOPOFSTACK	SEIZE LOCK RANGE		0000 *WSP S	146	3.98	.15
			TOPOFSTACK	QCAWAREA		19EF *WSP S	141	3.84	.15
			TOPOFSTACK	C3E62C036004		0000 *WSP S	123	3.35	.13
			TOPOFSTACK	OPENBAD	A960126A	1AEF *WSP S	113	3.08	.12
			TOPOFSTACK	JUNK	QSPLJOB	1AEF *WSP S	108	2.94	.11
			TOPOFSTACK	C2E7BB3D7004		0000 *WSP S	87	2.37	.09
			TOPOFSTACK	QJOBMSGQ		18A0 *WSP S	83	2.26	.09
			TOPOFSTACK	F86D14F54004		0000 *WSP S	81	2.21	.09
			TOPOFSTACK	PF05	PF05	0B90 *WSP S	79	2.15	.08
			TOPOFSTACK	D3334BC40004		0000 *WSP S	77	2.10	.08
			TOPOFSTACK	FD3057655004		0000 *WSP S	73	1.99	.08
			TOPOFSTACK	DSPOBJD	DSPOBJD	0B90 *WSP S	72	1.96	.08
			TOPOFSTACK	F5075E554004		0000 *WSP S	70	1.91	.07
			TOPOFSTACK	PF04	PF04	0B90 *WSP S	70	1.91	.07
			TOPOFSTACK	F3CA6CD12004		0000 *WSP S	65	1.77	.07
			TOPOFSTACK	PF01	PF01	0B90 *WSP S	64	1.74	.07
			TOPOFSTACK	PF02	PF02	0B90 *WSP S	63	1.72	.07
			TOPOFSTACK	PF03	PF03	0B90 *WSP S	63	1.72	.07
			TOPOFSTACK	QRNXDUMP		0203 *WSP S	56	1.53	.06
			TOPOFSTACK	TESTIO		0201 *WSP S	54	1.47	.06
			TOPOFSTACK	ILEAGN		0201 *WSP S	50	1.36	.05
			TOPOFSTACK	OPEN5		0201 *WSP S	46	1.25	.05
			TOPOFSTACK	QRNXIE		0203 *WSP S	45	1.23	.05
			TOPOFSTACK	D56C3B528F00		0000 *WSP S	39	1.06	.04
			TOPOFSTACK	D2FB76C77200		0000 *WSP S	38	1.04	.04
			TOPOFSTACK	D7A782247200		0000 *WSP S	35	.95	.04
			TOPOFSTACK	E7CB3ED36004		0000 *WSP S	22	.60	.02
			TOPOFSTACK	E43BF962E500		0000 *WSP S	8	.22	.01
			TOPOFSTACK	FC64411FC004		0000 *WSP S	8	.22	.01
			TOPOFSTACK	F5428E447004		0000 *WSP S	6	.16	.01
			TOPOFSTACK	QATOCTCPIPCONFIG		0C90 *WSP S	6	.16	.01
			TOPOFSTACK	QCAPLIST		19EF *WSP S	6	.16	.01
			TOPOFSTACK	SQCCSID1		0ED2 *WSP S	6	.16	.01
			TOPOFSTACK	D1EDE9BC4700		0000 *WSP S	5	.14	.01

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 17

Process job name	Job user	Job number	Program	Object Name/Type		PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
			TOPOFSTACK	EEE05252CB00		0000 *WSP S	5	.14	.01
			TOPOFSTACK	QATOCTCPIPCONFIG		0B90 *WSP S	5	.14	.01
			TOPOFSTACK	FE38ECDB8004		0000 *WSP S	4	.11	.00
			TOPOFSTACK	F836A3DBEA00		0000 *WSP S	4	.11	.00
			TOPOFSTACK	ECB9E6FE0E00		0000 *WSP S	3	.08	.00
			TOPOFSTACK	QCAWAREA		19FC *WSP S	3	.08	.00
			TOPOFSTACK	QPOSSRV3		0203 *WSP S	3	.08	.00
			TOPOFSTACK	QSOSRV2		0203 *WSP S	3	.08	.00
			TOPOFSTACK	FCAE14909A00		0000 *WSP S	2	.05	.00
			TOPOFSTACK	QCAPLIST		19FC *WSP S	2	.05	.00
			TOPOFSTACK	QCASQ		0AEF *WSP S	2	.05	.00
			TOPOFSTACK	QSO_DNS_INDEX		0EEF *WSP S	2	.05	.00
			TOPOFSTACK	QSOSRV1		0203 *WSP S	1	.03	.00
			TOPOFSTACK	QTCPMSGF		0E03 *WSP S	1	.03	.00
			TOPOFSTACK	QTMPLPRC		0201 *WSP S	1	.03	.00
			TOPOFSTACK	QTQICONV		0203 *WSP S	1	.03	.00
			TOPOFSTACK	QYPPRT		0203 *WSP S	1	.03	.00
			TOPOFSTACK	ILEAGNEW	A960126A	1AEF *WSP S	613	16.73	.65
			TOPOFSTACK	*DESTROYED		0000 *WSP S	483	13.19	.51
			TOPOFSTACK	FCFA2024DA00		0000 *WSP S	469	12.80	.50
			TOPOFSTACK	SEIZE LOCK RANGE		0000 *WSP S	158	4.31	.17
			TOPOFSTACK	QCAWAREA		19EF *WSP S	146	3.99	.15
			TOPOFSTACK	OPENBAD	A960126A	1AEF *WSP S	132	3.60	.14
			TOPOFSTACK	JUNK	QSPLJOB	1AEF *WSP S	114	3.11	.12
			TOPOFSTACK	C3E62C036004		0000 *WSP S	109	2.98	.12
			TOPOFSTACK	F5075E554004		0000 *WSP S	102	2.78	.11
			TOPOFSTACK	F86D14F54004		0000 *WSP S	86	2.35	.09
			TOPOFSTACK	QJOBMSGQ		18A0 *WSP S	84	2.29	.09
			TOPOFSTACK	C2E7BB3D7004		0000 *WSP S	81	2.21	.09
			TOPOFSTACK	PF04	PF04	0B90 *WSP S	76	2.07	.08
			TOPOFSTACK	D3334BC40004		0000 *WSP S	72	1.97	.08
			TOPOFSTACK	FD3057655004		0000 *WSP S	72	1.97	.08
			TOPOFSTACK	DSPOBJD	DSPOBJD	0B90 *WSP S	71	1.94	.08
			TOPOFSTACK	PF05	PF05	0B90 *WSP S	69	1.88	.07
			TOPOFSTACK	F3CA6CD12004		0000 *WSP S	65	1.77	.07
			TOPOFSTACK	QRNXDUMP		0203 *WSP S	64	1.75	.07

Figure 99 (Part 9 of 15). I/O by Object Name within Program within Job

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08/02/96  18:58:45               IO by Object Name within Program within Job              PAGE   18
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                             TOPOFSTACK PF01       PF01       0B90 *WSP S          63   1.72      .07
                             TOPOFSTACK PF02       PF02       0B90 *WSP S          61   1.67      .06
                             TOPOFSTACK D2FB76C77200          0000 *WSP S          60   1.64      .06
                             TOPOFSTACK PF03       PF03       0B90 *WSP S          59   1.61      .06
                             TOPOFSTACK TESTIO                0201 *WSP S          49   1.34      .05
                             TOPOFSTACK QRNXIE                0203 *WSP S          47   1.28      .05
                             TOPOFSTACK OPEN5                 0201 *WSP S          46   1.26      .05
                             TOPOFSTACK D7A782247200          0000 *WSP S          40   1.09      .04
                             TOPOFSTACK D56C3B528F00          0000 *WSP S          39   1.06      .04
                             TOPOFSTACK ILEAGN                0201 *WSP S          35    .96      .04
                             TOPOFSTACK E7CB3ED36004          0000 *WSP S          13    .35      .01
                             TOPOFSTACK FC64411FC004          0000 *WSP S           9    .25      .01
                             TOPOFSTACK E43BF962E500          0000 *WSP S           7    .19      .01
                             TOPOFSTACK F5428E447004          0000 *WSP S           5    .14      .01
                             TOPOFSTACK F836A3DBEA00          0000 *WSP S           5    .14      .01
                             TOPOFSTACK QATOCTCPIPCONFIG      0C90 *WSP S           5    .14      .01
                             TOPOFSTACK QCAPLIST              19EF *WSP S           5    .14      .01
                             TOPOFSTACK QCAPLIST              19FC *WSP S           5    .14      .01
                             TOPOFSTACK QATOCTCPIPCONFIG      0B90 *WSP S           4    .11      .00
                             TOPOFSTACK QSOSRV1               0203 *WSP S           4    .11      .00
                             TOPOFSTACK D1EDE9BC4700          0000 *WSP S           3    .08      .00
                             TOPOFSTACK ECB9E6FE0E00          0000 *WSP S           3    .08      .00
                             TOPOFSTACK EEE05252CB00          0000 *WSP S           3    .08      .00
                             TOPOFSTACK FCAE14909A00          0000 *WSP S           3    .08      .00
                             TOPOFSTACK QTMPLPRC              0201 *WSP S           3    .08      .00
                             TOPOFSTACK SQCCSID1              0ED2 *WSP S           3    .08      .00
                             TOPOFSTACK FE38ECDB8004          0000 *WSP S           2    .05      .00
                             TOPOFSTACK QCASQ                 0AEF *WSP S           2    .05      .00
                             TOPOFSTACK QCAWAREA              19FC *WSP S           2    .05      .00
                             TOPOFSTACK QPOLLIB1              0203 *WSP S           2    .05      .00
                             TOPOFSTACK QPOSSRV3              0203 *WSP S           2    .05      .00
                             TOPOFSTACK QSO_DNS_INDEX         0EEF *WSP S           2    .05      .00
                             TOPOFSTACK QSOSRV2               0203 *WSP S           2    .05      .00
                             TOPOFSTACK QTQICONV              0203 *WSP S           2    .05      .00
                             TOPOFSTACK QTCPMSGF              0E03 *WSP S           1    .03      .00
                             TOPOFSTACK QYPPRT                0203 *WSP S           1    .03      .00


08/02/96  18:58:45               IO by Object Name within Program within Job              PAGE   19
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                             TOPOFSTACK ILEAGNEW  A960126A    1AEF *WSP S         626  17.15      .66
                             TOPOFSTACK FCFA2024DA00          0000 *WSP S         458  12.54      .48
                             TOPOFSTACK *DESTROYED            0000 *WSP S         441  12.08      .47
                             TOPOFSTACK SEIZE LOCK RANGE      0000 *WSP S         162   4.44      .17
                             TOPOFSTACK QCAWAREA              19EF *WSP S         152   4.16      .16
                             TOPOFSTACK OPENBAD   A960126A    1AEF *WSP S         139   3.81      .15
                             TOPOFSTACK JUNK      QSPLJOB     1AEF *WSP S         103   2.82      .11
                             TOPOFSTACK F86D14F54004          0000 *WSP S          99   2.71      .10
                             TOPOFSTACK C3E62C036004          0000 *WSP S          98   2.68      .10
                             TOPOFSTACK QJOBMSGQ              18A0 *WSP S          85   2.33      .09
                             TOPOFSTACK C2E7BB3D7004          0000 *WSP S          82   2.25      .09
                             TOPOFSTACK F5075E554004          0000 *WSP S          82   2.25      .09
                             TOPOFSTACK PF04       PF04       0B90 *WSP S          79   2.16      .08
                             TOPOFSTACK D3334BC40004          0000 *WSP S          77   2.11      .08
                             TOPOFSTACK FD3057655004          0000 *WSP S          72   1.97      .08
                             TOPOFSTACK PF01       PF01       0B90 *WSP S          71   1.94      .08
                             TOPOFSTACK D2FB76C77200          0000 *WSP S          69   1.89      .07
                             TOPOFSTACK PF05       PF05       0B90 *WSP S          69   1.89      .07
                             TOPOFSTACK PF02       PF02       0B90 *WSP S          68   1.86      .07
                             TOPOFSTACK QRNXDUMP              0203 *WSP S          68   1.86      .07
                             TOPOFSTACK F3CA6CD12004          0000 *WSP S          64   1.75      .07
                             TOPOFSTACK DSPOBJD    DSPOBJD    0B90 *WSP S          62   1.70      .07
                             TOPOFSTACK PF03       PF03       0B90 *WSP S          61   1.67      .06
                             TOPOFSTACK D7A782247200          0000 *WSP S          52   1.42      .05
                             TOPOFSTACK QRNXIE                0203 *WSP S          50   1.37      .05
                             TOPOFSTACK TESTIO                0201 *WSP S          47   1.29      .05
                             TOPOFSTACK OPEN5                 0201 *WSP S          43   1.18      .05
                             TOPOFSTACK D56C3B528F00          0000 *WSP S          38   1.04      .04
                             TOPOFSTACK ILEAGN                0201 *WSP S          34    .93      .04
                             TOPOFSTACK E43BF962E500          0000 *WSP S          13    .36      .01
                             TOPOFSTACK E7CB3ED36004          0000 *WSP S           9    .25      .01
                             TOPOFSTACK QCAPLIST              19EF *WSP S           7    .19      .01
                             TOPOFSTACK FE38ECDB8004          0000 *WSP S           6    .16      .01
                             TOPOFSTACK FCAE14909A00          0000 *WSP S           5    .14      .01
                             TOPOFSTACK F836A3DBEA00          0000 *WSP S           5    .14      .01
                             TOPOFSTACK SQCCSID1              0ED2 *WSP S           5    .14      .01
```

Figure 99 (Part 10 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45                  IO by Object Name within Program within Job                 PAGE   20
Process   Job       Job    Program    Object                     PDIO              PDIO     PCT      PCT
job name  user      number            Name/Type                  Oper              Count    Job      ALL
                                                                                            IO       IO
                           TOPOFSTACK ECB9E6FE0E00        0000 *WSP S                4     .11      .00
                           TOPOFSTACK F5428E447004        0000 *WSP S                4     .11      .00
                           TOPOFSTACK QCAPLIST            19FC *WSP S                4     .11      .00
                           TOPOFSTACK QCAWAREA            19FC *WSP S                4     .11      .00
                           TOPOFSTACK QSOSRV2             0203 *WSP S                4     .11      .00
                           TOPOFSTACK QATOCTCPIPCONFIG    0C90 *WSP S                3     .08      .00
                           TOPOFSTACK QPOLLIB1            0203 *WSP S                3     .08      .00
                           TOPOFSTACK QSO_DNS_INDEX       0EEF *WSP S                3     .08      .00
                           TOPOFSTACK QSOSRV1             0203 *WSP S                3     .08      .00
                           TOPOFSTACK QYPPRT              0203 *WSP S                3     .08      .00
                           TOPOFSTACK D1EDE9BC4700        0000 *WSP S                2     .05      .00
                           TOPOFSTACK EEE05252CB00        0000 *WSP S                2     .05      .00
                           TOPOFSTACK FC64411FC004        0000 *WSP S                2     .05      .00
                           TOPOFSTACK QATOCTCPIPCONFIG    0B90 *WSP S                2     .05      .00
                           TOPOFSTACK QPOSSRV3            0203 *WSP S                2     .05      .00
                           TOPOFSTACK QTQICONV            0203 *WSP S                2     .05      .00
                           TOPOFSTACK QTCP                0401 *WSP S                1     .03      .00
                           TOPOFSTACK QTCPMSGF            0E03 *WSP S                1     .03      .00
                           TOPOFSTACK QTMPLPRC            0201 *WSP S                1     .03      .00
                                                                TOTAL           26,235
P23ARTVKE  A960126A  053319 QWTCCRLJ   QWCBT01             19D0 *RX  A            1,062   80.27     1.12
                           QWTCCRLJ   QWCBT01             19D0 *RSF S                7     .53      .01
                           QWTCCRLJ   QSPSCB              19C2 *RSF S                3     .23      .00
                           QWTCCRLJ   QWCBT01             19D0 *RS  A                3     .23      .00
                           QWTCCRLJ   QWCBT01             19D0 *RS  S                3     .23      .00
                           QWTCCRLJ   D1EDE9BC4700        0000 *RSF S                2     .15      .00
                           QWTCCRLJ   QWTCCRLJ            0201 *RSF S                2     .15      .00
                           QWTCCRLJ   QSPCHJOB            0201 *RS  S                1     .08      .00
                           QWTCCRLJ   SM PERM DIR SEGMENT  0000 *RSF S               1     .08      .00
                           TOPOFSTACK QWCBT01             19D0 *RSF S               89    6.73      .09
                           TOPOFSTACK P23XWY32   A960123A  1AEF *RSF S               3     .23      .00
                           TOPOFSTACK SEIZE LOCK RANGE    0000 *RSF S                2     .15      .00
                           TOPOFSTACK ASJ1LU     QSNADS   1AEF *RSF S                1     .08      .00
                           TOPOFSTACK CENTRAL    QGATE    1AEF *RSF S                1     .08      .00


08/02/96  18:58:45                  IO by Object Name within Program within Job                 PAGE   21
Process   Job       Job    Program    Object                     PDIO              PDIO     PCT      PCT
job name  user      number            Name/Type                  Oper              Count    Job      ALL
                                                                                            IO       IO
P23ARTVKE  A960126A  053319 TOPOFSTACK COOKPCF    COOK     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK L/L RANGE 1         0000 *RSF S                1     .08      .00
                           TOPOFSTACK PAG                 01EF *RSF S                1     .08      .00
                           TOPOFSTACK PRTASM01   QSPLJOB  1AEF *RSF S                1     .08      .00
                           TOPOFSTACK P23ARTVK   A960126A 1AEF *RSF S                1     .08      .00
                           TOPOFSTACK P23LK296   MRK      1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QAPPCTCP   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QBATCH     QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDBSRV01   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDBSRV02   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDBSRV03   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDBSRV04   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDBSRV05   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDCPOBJ1   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDCPOBJ2   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDIA       QSNADS   1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDIAHSTPRTQSNADS    1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDIAINDUSRQSNADS    1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QDIALOCAL QSNADS    1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QJOBSCD    QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QNMAPINGD QUSER     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QNMAREXECDQUSER     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QNPSERVR  QUSER     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QPFRADJ    QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QPWFSERVSDQUSER     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QPWFSERVSOQUSER     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QROUTER    QSNADS   1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSERVER    QPGMR    1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSNADS              1909 *RSF S                1     .08      .00
                           TOPOFSTACK QSNADS     QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSNMPSA    QTCP     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSPL       QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSYSARB2   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSYSARB4   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSYSARB5   QSYS     1AEF *RSF S                1     .08      .00
                           TOPOFSTACK QSYSSCD    QPGMR    1AEF *RSF S                1     .08      .00
```

Figure 99 (Part 11 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 22

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
P23ARTVKE	A960126A	053319	TOPOFSTACK	QTCPIP QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTFTP00148QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTFTP00176QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTFTP00182QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTFTP12182QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTLPD12902QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTLPD12931QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTMSNMP QTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTMSNMPRCVQTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTSMTPBRCLQTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTSMTPBRSRQTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTSMTPCLNTQTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QTSMTPSRVRQTCP	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZDAINITP2QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZDASOINITQUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZDASRVSD QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZHQSRVD QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZHQSSRV QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZRCSRVR QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZRCSRVS QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	QZRCSRVSD QUSER	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	Q400FILSVRQSYS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASA05 QGATE	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM01 QGATE	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM01 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM02 QGATE	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM02 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM03 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM06 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM09 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM12 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHASM13 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	RCHAS040 QSNADS	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			TOPOFSTACK	TARGET1 QGATE	1AEF *RSF S	1	.08	.00
			TOPOFSTACK	TARGET2 QGATE	1AEF *RSF S	1	.08	.00

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 23

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
P23ARTVKE	A960126A	053319	TOPOFSTACK	TCPIPLOC QGATE	1AEF *RSF S	1	.08	.00
			QMHSNDPM	QJOBMSGQ	18A0 *RSF S	9	.68	.01
			QMHSNDPM	QCPFMSG	0E03 *RSF S	2	.15	.00
			QMHSNDPM	QMHSNDPM	0201 *RSF S	1	.08	.00
			QMHSNDPM	QUIALIST	0201 *RSF S	1	.08	.00
			QMHSNDPM	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			QMHSNSTQ	QSYSOPR	1902 *WS A	6	.45	.01
			QMHSNSTQ	QHST	1902 *WS S	3	.23	.00
			QMHSNSTQ	QWCBT01	19D0 *RSF S	3	.23	.00
			QMHSNSTQ	QSYSOPR	1902 *RSF S	1	.08	.00
			QMHSNSTQ	QWTCCRLJ	0201 *RSF S	1	.08	.00
			QUIMGFLW	QGWCAJOB	1915 *RSF S	5	.38	.01
			QUIMGFLW	QUIALIST	0201 *RS S	2	.15	.00
			QUIMGFLW	UIM_TEMPORARY_WORKSP	19EF *RS S	2	.15	.00
			QUIMGFLW	QGWCSSTS	1915 *RSF S	1	.08	.00
			QUIMGFLW	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			QUICMD	QWCSHUIC	0201 *RS S	2	.15	.00
			QUICMD	QWTCCRLJ	0201 *RS S	2	.15	.00
			QUICMD	QUICMD	0201 *RSF S	1	.08	.00
			QUICMD	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			QWCCDSTC	*DESTROYED	0000 *RSF S	2	.15	.00
			QWCCDSTC	QEZWRAST	0201 *RS S	2	.15	.00
			QWCCDSTC	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			QSPCHJOB	QSPSCB	19C2 *WS S	3	.23	.00
			QSPCHJOB	SEIZE LOCK RANGE	0000 *RSF S	1	.08	.00
			QUIICHK	QGWCAJOB	1915 *RSF S	2	.15	.00
			QUIICHK	QUIICHK	0201 *RSF S	1	.08	.00
			QCARULE	RLSJOB	1905 *RSF S	1	.08	.00
			QCARULE	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			QEZWRAST	QEZWRAST	0201 *RSF S	1	.08	.00
			QEZWRAST	SM PERM DIR SEGMENT	0000 *RSF S	1	.08	.00
			QUIEXFMT	QGWCAJOB	1915 *RSF S	2	.15	.00
			QUIINMGR	UIM_TEMPORARY_WORKSP	19EF *RSF S	2	.15	.00
			QCATRS	RLSJOB	1905 *WS A	1	.08	.00
			QUIALIST	QUIALIST	0201 *RSF S	1	.08	.00
			QUILIST	UIM_TEMPORARY_WORKSP	19EF *RSF S	1	.08	.00

Figure 99 (Part 12 of 15). I/O by Object Name within Program within Job

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 24

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
P23ARTVKE	A960126A	053319	QUIVPMGR	QGWCAJOB 1915	*RSF S	1	.08	.00
			QWCSHUIC	QWCSHUIC 0201	*RSF S	1	.08	.00
					TOTAL	1,323		
PEXTRACE	A960126A	053555	QSPRCMBR	Q04079N002Q097276464 0B90	*WS S	25	8.31	.03
			QSPRCMBR	QSPSCB 19C2	*WSP S	7	2.33	.01
			QSPRCMBR	DATA BASE IN-USE TBL 0000	*WS S	6	1.99	.01
			QSPRCMBR	Q04079N002Q097276464 0B90	*WSP S	5	1.66	.01
			QSPRCMBR	L/L RANGE 1 0000	*RSF S	2	.66	.00
			QSPRCMBR	QSPFACB 0EC6	*RSF S	1	.33	.00
			QSPRCMBR	QSPRCMBR 0201	*RSF S	1	.33	.00
			QSPRCMBR	Q04079N002Q097276464 0B90	*RSF S	1	.33	.00
			QSPOPEN	QSPSCB 19C2	*WSP S	10	3.32	.01
			QSPOPEN	A960126A 0E02	*WS S	5	1.66	.01
			QSPOPEN	SM PERM DIR SEGMENT 0000	*RSF S	4	1.33	.00
			QSPOPEN	QSPFRMQ 0EC7	*RSF S	3	1.00	.00
			QSPOPEN	QSPQJBQ 0EC7	*RSF S	3	1.00	.00
			QSPOPEN	QSPUDTQ 0EC7	*RSF S	3	1.00	.00
			QSPOPEN	SEIZE LOCK RANGE 0000	*RSF S	3	1.00	.00
			QSPOPEN	A960126A 0E02	*RSF S	2	.66	.00
			QSPOPEN	QSPDEVQ 0EC7	*RSF S	2	.66	.00
			QSPOPEN	QSYCPYIP 0201	*RS S	2	.66	.00
			QSPOPEN	*SECTOR I/O 0000	*WS S	1	.33	.00
			QSPOPEN	EB01856CB900 0000	*RSF S	1	.33	.00
			QSPOPEN	QSPL 0801	*RSF S	1	.33	.00
			QSPOPEN	QSPSCB 19C2	*WS S	1	.33	.00
			QSPOPEN	QSPSIDQ 0EC7	*RSF S	1	.33	.00
			QSPCLOSE	Q04079N002Q097276464 0B90	*WSP A	10	3.32	.01
			QSPCLOSE	DATA BASE IN-USE TBL 0000	*WS S	6	1.99	.01
			QSPCLOSE	QSPSCB 19C2	*WSP S	6	1.99	.01
			QSPCLOSE	A960126A 0E02	*WS S	5	1.66	.01
			QSPCLOSE	Q04079N002Q097276464 0B90	*WS S	5	1.66	.01
			QSPCLOSE	QSPCLOSE 0201	*RSF S	1	.33	.00
			QSPCLOSE	Q04079N002Q097276464 0B90	*RSF S	1	.33	.00
			QDBCRTME	PFREXP2 0401	*WS S	6	1.99	.01

08/02/96 18:58:45 IO by Object Name within Program within Job PAGE 25

Process job name	Job user	Job number	Program	Object Name/Type	PDIO Oper	PDIO Count	PCT Job IO	PCT ALL IO
PEXTRACE	A960126A	053555	QDBCRTME	PF132 PEXTRACSTS 0B90	*WS A	4	1.33	.00
			QDBCRTME	SM PERM DIR SEGMENT 0000	*RSF S	3	1.00	.00
			QDBCRTME	1D34	*RSF S	2	.66	.00
			QDBCRTME	*DESTROYED 0000	*WS A	2	.66	.00
			QDBCRTME	A960126A 0801	*RSF S	2	.66	.00
			QDBCRTME	A960126A 0801	*WS S	2	.66	.00
			QDBCRTME	PF132 PEXTRACSTS 0D50	*WS A	2	.66	.00
			QDBCRTME	QDBSHR 0801	*WS S	2	.66	.00
			QDBCRTME	*DESTROYED 0000	*WS S	1	.33	.00
			QDBCRTME	*SECTOR I/O 0000	*WS S	1	.33	.00
			QDBCRTME	D2AF210B2004 0000	*RSF S	1	.33	.00
			QDBCRTME	FREE SPACE MAP RANGE 0000	*RSF S	1	.33	.00
			QDBCRTME	PF132 1901	*WS A	1	.33	.00
			QDBCRTME	PF132 PEXTRACSTS 0D50	*WS S	1	.33	.00
			QDBCRTME	QDBSHR 0801	*RSF S	1	.33	.00
			QWCCDSTC	*DESTROYED 0000	*RSF S	10	3.32	.01
			QWCCDSTC	FD4657807900 0000	*RSF S	5	1.66	.01
			QWCCDSTC	QUICLOSE 0201	*RS S	2	.66	.00
			TOPOFSTACK	QC2UTIL1 0203	*RSF S	3	1.00	.00
			TOPOFSTACK	SM PERM DIR SEGMENT 0000	*RSF S	3	1.00	.00
			TOPOFSTACK	QSPCNSPF 0201	*RSF S	2	.66	.00
			TOPOFSTACK	QSPCPYF 0201	*RS S	2	.66	.00
			TOPOFSTACK	QSPHNMLT 0201	*RS S	2	.66	.00
			TOPOFSTACK	QYPESVSE 0203	*RSF S	2	.66	.00
			TOPOFSTACK	QSPHNMLT 0201	*RSF S	1	.33	.00
			TOPOFSTACK	QYPEENDP 0201	*RSF S	1	.33	.00
			QDBFEOD	PF132 PEXTRACSTS 0B90	*WS S	6	1.99	.01
			QDBFEOD	DATA BASE IN-USE TBL 0000	*WS S	3	1.00	.00
			QDBFEOD	PF132 PEXTRACSTS 0B90	*WSP S	3	1.00	.00
			QDBFEOD	*SECTOR I/O 0000	*WS S	1	.33	.00
			QDBFEOD	PF132 PEXTRACSTS 0B90	*WSP A	1	.33	.00
			QUIMGFLW	UIM_TEMPORARY_WORKSP 19EF	*RS S	9	2.99	.01
			QUIMGFLW	QGWCSSTS 1915	*RSF S	2	.66	.00
			QUIMGFLW	QUIMGFLW 0201	*RSF S	2	.66	.00
			QUIMGFLW	UIM_TEMPORARY_WORKSP 19EF	*RSF S	1	.33	.00
			QSPCNSPF	A960126A 0E02	*WS S	5	1.66	.01

Figure 99 (Part 13 of 15). I/O by Object Name within Program within Job

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08/02/96  18:58:45              IO by Object Name within Program within Job                PAGE   26
Process   Job       Job    Program   Object                   PDIO            PDIO     PCT      PCT
job name  user      number           Name/Type                Oper            Count    Job      ALL
                                                                                       IO       IO
PEXTRACE  A960126A  053555 QSPCNSPF  QSPCNSPF             0201 *RSF S             2     .66      .00
                           QSPCNSPF  QSPRCMBR             0201 *RSF S             2     .66      .00
                           QSPCNSPF  SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QUIPRINT  UIM_TEMPORARY_WORKSP 19EF *RS  S             7    2.33      .01
                           QUIPRINT  UIM_TEMPORARY_WORKSP 19EF *RSF S             2     .66      .00
                           QUIPRINT  QGWCSSTS             1915 *RSF S             1     .33      .00
                           QSPCPYF   QSPCPYF              0201 *RSF S             4    1.33      .00
                           QSPCPYF   QSPDSPFX             0201 *RS  S             2     .66      .00
                           QSPCPYF   PFREXP2              0401 *RSF S             1     .33      .00
                           QSPCPYF   SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QCARULE   QSYS                 0401 *RSF S             4    1.33      .00
                           QCARULE   CPYSPLF              1905 *RSF S             1     .33      .00
                           QCARULE   ENDPEX               1905 *RSF S             1     .33      .00
                           QDMCLOSE  PF132     PEXTRACSTS 0B90 *WS  S             3    1.00      .00
                           QDMCLOSE  PF132     PEXTRACSTS 0B90 *WS  A             1     .33      .00
                           QDMCLOSE  QSPCLOSE             0201 *RS  S             1     .33      .00
                           QDMCLOSE  SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QWPALLOC  QWPALLOC             0201 *RSF S             6    1.99      .01
                           QCANPARS  SQCCSID1             0ED2 *RSF S             4    1.33      .00
                           QCANPARS  SEIZE LOCK RANGE     0000 *RSF S             1     .33      .00
                           QSYGRTSA  A960126A             0801 *RSF S             3    1.00      .00
                           QSYGRTSA  PF132     PEXTRACSTS 0B90 *WSP S             1     .33      .00
                           QSYGRTSA  PF132     PEXTRACSTS 0D50 *WSP S             1     .33      .00
                           QDMCOPEN  EE32788FC300         0000 *RSF S             1     .33      .00
                           QDMCOPEN  L/L RANGE 1          0000 *RSF S             1     .33      .00
                           QDMCOPEN  QSYS                 0401 *RSF S             1     .33      .00
                           QDMCOPEN  QUIOPEN              0201 *RSF S             1     .33      .00
                           QCATRS    QYPEENDP             0201 *RSF S             2     .66      .00
                           QCATRS    SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QUICLOSE  QUICLOSE             0201 *RSF S             2     .66      .00
                           QUICLOSE  SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QCADRV    QCAIFLD              0201 *RS  S             2     .66      .00
                           QLIMROIR  QSYS                 0E90 *RSF S             1     .33      .00
                           QLIMROIR  QSYS                 1952 *RSF S             1     .33      .00
                           QMHSNDPM  QCPFMSG              0E03 *RSF S             2     .66      .00
                           QSPDSPFX  QSPDSPFX             0201 *RSF S             1     .33      .00

08/02/96  18:58:45              IO by Object Name within Program within Job                PAGE   27
Process   Job       Job    Program   Object                   PDIO            PDIO     PCT      PCT
job name  user      number           Name/Type                Oper            Count    Job      ALL
                                                                                       IO       IO
PEXTRACE  A960126A  053555 QSPDSPFX  SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QUICBINT  QUICBINT             0201 *RSF S             1     .33      .00
                           QUICBINT  SM PERM DIR SEGMENT  0000 *RSF S             1     .33      .00
                           QUIOPEN   QUICBINT             0201 *RSF S             2     .66      .00
                           QCLCLCPR  QSYS                 0401 *RSF S             1     .33      .00
                           QMHRTMSS  QCPFMSG              0E03 *RSF S             1     .33      .00
                           QSPHNMLT  QSPHNMLT             0201 *RSF S             1     .33      .00
                           QSYACCIP  QSYS                 0401 *RSF S             1     .33      .00
                           QUILIST   QUILIST              0201 *RSF S             1     .33      .00
                           QWPPUT    SEIZE LOCK RANGE     0000 *RSF S             1     .33      .00
                                                               TOTAL            301
PEXSBSD   QSYS      053539 QWTMMRLJ  QWTMMRLJ             0201 *RSF S             6   37.50      .01
                           QWTMMRLJ  D1EDE9BC4700         0000 *RSF S             2   12.50      .00
                           QWTMMRLJ  SM PERM DIR SEGMENT  0000 *RSF S             1    6.25      .00
                           QWTMESBC  QWTMMRLJ             0201 *RS  S             6   37.50      .01
                           QWTMESBC  SM PERM DIR SEGMENT  0000 *RSF S             1    6.25      .00
                                                               TOTAL             16
SCPF      QSYS      000000 QDBFEOD   DATA BASE IN-USE TBL 0000 *WS  S             2   15.38      .00
                           QDBFEOD   QHST96213DQHST96213D 0B90 *WS  S             1    7.69      .00
                           QDBFEOD   QHST96213DQHST96213D 0B90 *WSP A             1    7.69      .00
                           QDBFEOD   QHST96213DQHST96213D 0B90 *WSP S             1    7.69      .00
                           QMHRTMSS  QCPFMSG              0E03 *RSF S             2   15.38      .00
                           QDBOPEN   *DESTROYED           0000 *RS  S             1    7.69      .00
                           QDMCLOSE  QHST96213DQHST96213D 0B90 *WS  S             1    7.69      .00
                           QDMCOPEN  QSYS                 0401 *RSF S             1    7.69      .00
                           QLIMROIR  QSYS                 1952 *WSP A             1    7.69      .00
                           QMHLOGER  QHST96213D           1901 *WS  A             1    7.69      .00
                           TOPOFSTACK D1EDE9BC4700        0000 *RSF S             1    7.69      .00
                                                               TOTAL             13
                           TOPOFSTACK E43BF962E500        0000 *RSF S            12   92.31      .01
```

Figure 99 (Part 14 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45                IO by Object Name within Program within Job                PAGE   28
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT       PCT
job name   user       number            Name/Type                 Oper           Count    Job       ALL
                                                                                          IO        IO
                             TOPOFSTACK FC88D12A5700         0000 *RSF S             1    7.69      .00
                                                                  TOTAL             13
QTGTELNETS QTCP       053298 TOPOFSTACK QPXXDISP             0201 *RSF S             2   22.22      .00
                             TOPOFSTACK QTGTNTOC             0201 *RSF S             2   22.22      .00
                             TOPOFSTACK SM PERM DIR SEGMENT  0000 *RSF S             2   22.22      .00
                             QTGTNTOC   QTGTNTOC             0201 *RSF S             2   22.22      .00
                             QTOASND    FC88D12A5700         0000 *RSF S             1   11.11      .00
                                                                  TOTAL              9
                             TOPOFSTACK D1EDE9BC4700         0000 *RSF S             3   75.00      .00
                             TOPOFSTACK ILEAGNEW  A960126A   1AEF *RS  S             1   25.00      .00
                                                                  TOTAL              4
QSERVER    QSYS       053254 TOPOFSTACK QSERVER   QSYS       1AEF *WS  S             2   66.67      .00
                             QWTMEPJP   QWTPIPJ              0EEF *RSF S             1   33.33      .00
                                                                  TOTAL              3
                             TOPOFSTACK *DESTROYED           0000 *RSF S             2  100.00      .00
                             TOPOFSTACK C2D22017B100         0000 *RSF S             1  100.00      .00
                                                                  TOTAL              3
                                                                  FINAL TOTALS
                                                                  TOTAL         94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 99 (Part 15 of 15). I/O by Object Name within Program within Job

10.2.22 Report Title - I/O by Object Type within Program within Job

This report is produced from Command Option - By Job/**PGM/Objtype.

```
   IO by Object Type within Program within Job
QUERY NAME . . . . . JPIOOBJ08
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
JPIOOBJ07    PFREXP2      PEXTRACE     JPIOOBJ07
TASKINFO     PFREXP2      PEXTRACE     TASKINFO
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 18:59:40
       Job/Pgm IO by Object Type - Part 15
```

```
08/02/96  18:59:40                             IO by Object Type within Program within Job                        PAGE    1
```

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
TSTIOC	A960126A	053543	TESTIO	COMPOSITE PIECE - DATA SPACE	*RX A	11,969	82.23	53.72	12.65
			TESTIO	COMPOSITE PIECE - DATA SPACE	*RSF S	1,455	82.23	6.53	1.54
			TESTIO	PROGRAM	*RSF S	1,446	82.23	6.49	1.53
			TESTIO	COMPOSITE PIECE - DATA SPACE	*RS A	1,370	82.23	6.15	1.45
			TESTIO	*UNKNOWN***************************	*RS S	745	82.23	3.34	.79
			TESTIO	COMPOSITE PIECE - DATA SPACE	*RS S	473	82.23	2.12	.50
			TESTIO	FILE	*RSF S	385	82.23	1.73	.41
			TESTIO	DATA SPACE RUN TIME SID	*RSF S	354	82.23	1.59	.37
			TESTIO	*UNKNOWN***************************	*RSF S	99	82.23	.44	.10
			TESTIO	HOLD RECORD SEG	*RSF S	25	82.23	.11	.03
			TESTIO	WORK CONTROL BLOCK TABLE	*RSF S	1	82.23	.00	.00
			TESTIOC	PROGRAM	*RSF S	1,792	17.67	8.04	1.89
			TESTIOC	LIBRARY	*RSF S	1,246	17.67	5.59	1.32
			TESTIOC	USER PROFILE	*RSF S	404	17.67	1.81	.43
			TESTIOC	TEMPORARY - SPACE	*RSF S	371	17.67	1.67	.39
			TESTIOC	SERVICE PROGRAM	*RSF S	112	17.67	.50	.12
			TESTIOC	PROTECTED SPACE	*RSF S	8	17.67	.04	.01
			TESTIOC	LOCAL DATA AREA	*RSF S	3	17.67	.01	.00
			QCLCLCPR	PROGRAM	*RSF S	9	.06	.04	.01
			QCLCLCPR	LIBRARY	*RSF S	5	.06	.02	.01
			TOPOFSTACK	PROGRAM	*RSF S	3	.02	.01	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	2	.02	.01	.00
			QCADRV	PROTECTED SPACE	*RSF S	2	.01	.01	.00
			QCARULE	PROTECTED SPACE	*RSF S	2	.01	.01	.00
					TOTAL	22,281			
ILEAGNEW	A960126A	053541	ILEAGNEW	HEAP DATA SEGMENT TYPE	*RSF S	4,353	92.47	22.17	4.60
			ILEAGNEW	TEMPORARY - PROCESS CTL SPACE	*RSF S	3,636	92.47	18.51	3.84
			ILEAGNEW	PROGRAM	*RSF S	2,597	92.47	13.22	2.74
			ILEAGNEW	*UNKNOWN***************************	*RSF S	2,064	92.47	10.51	2.18
			ILEAGNEW	SERVICE PROGRAM	*RSF S	2,000	92.47	10.18	2.11
			ILEAGNEW	PROGRAM	*RS S	1,101	92.47	5.61	1.16
			ILEAGNEW	MODUL2 STATIC STORE	*RSF S	730	92.47	3.72	.77
			ILEAGNEW	TEMPORARY - SPACE	*RSF S	561	92.47	2.86	.59
			ILEAGNEW	HEAP CONTROL SEGMENT	*RSF S	280	92.47	1.43	.30

Figure 100 (Part 1 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 2

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
ILEAGNEW	A960126A	053541	ILEAGNEW	JOB MESSAGE QUEUE	*RSF S	274	92.47	1.40	.29
			ILEAGNEW	HOLD RECORD SEG	*RSF S	272	92.47	1.38	.29
			ILEAGNEW	LIBRARY	*RSF S	152	92.47	.77	.16
			ILEAGNEW	TOMBSTONE SEGMENT	*RSF S	113	92.47	.58	.12
			ILEAGNEW	TEMPORARY - PROCESS CTL SPACE	*RS S	16	92.47	.08	.02
			ILEAGNEW	PROTECTED SPACE	*RSF S	7	92.47	.04	.01
			ILEAGNEW	LOCAL DATA AREA	*RSF S	3	92.47	.02	.00
			ILEAGNEW	JOB MESSAGE QUEUE	*WS S	1	92.47	.01	.00
			ILEAGNEW	*UNKNOWN***************************	*WS S	1	92.47	.01	.00
			ILEAGN	TOMBSTONE SEGMENT	*RSF S	510	7.27	2.60	.54
			ILEAGN	TEMPORARY - PROCESS CTL SPACE	*RSF S	454	7.27	2.31	.48
			ILEAGN	PROGRAM	*RSF S	280	7.27	1.43	.30
			ILEAGN	HEAP DATA SEGMENT TYPE	*RSF S	184	7.27	.94	.19
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	9	.09	.05	.01
			QWCDLYJB	PROGRAM	*RSF S	6	.09	.03	.01
			QWCDLYJB	ACCESS GROUP	*RSF S	2	.09	.01	.00
			QWCDLYJB	DATA BASE OPERATIONAL CURSOR	*WSP S	1	.09	.01	.00
			QCLCLCPR	PROGRAM	*RSF S	9	.07	.05	.01
			QCLCLCPR	MODUL2 STATIC STORE	*RSF S	2	.07	.01	.00
			QCLCLCPR	LIBRARY	*RSF S	1	.07	.01	.00
			QCLCLCPR	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.07	.01	.00
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*RSF S	6	.07	.03	.01
			TOPOFSTACK	PROGRAM	*RS S	4	.07	.02	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	2	.07	.01	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.07	.01	.00
			QCADRV	PROGRAM	*RS S	4	.02	.02	.00
			QCARULE	LIBRARY	*RSF S	2	.01	.01	.00
					TOTAL	19,639			
OPENBAD	A960126A	053546	OPEN5	COMPOSITE PIECE - DATA SPACE	*RSF S	2,540	85.71	12.95	2.68
			OPEN5	DATA SPACE RUN TIME SID	*RSF S	2,389	85.71	12.18	2.52
			OPEN5	*UNKNOWN***************************	*RS S	1,856	85.71	9.46	1.96
			OPEN5	PROGRAM	*RSF S	1,815	85.71	9.25	1.92
			OPEN5	*UNKNOWN***************************	*RSF S	1,790	85.71	9.13	1.89
			OPEN5	COMPOSITE PIECE - DATA SPACE	*RS A	1,595	85.71	8.13	1.69

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 3

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
OPENBAD	A960126A	053546	OPEN5	COMPOSITE PIECE - DATA SPACE	*RS S	1,587	85.71	8.09	1.68
			OPEN5	FILE	*RSF S	1,531	85.71	7.80	1.62
			OPEN5	TEMPORARY - PROCESS CTL SPACE	*RSF S	963	85.71	4.91	1.02
			OPEN5	HOLD RECORD SEG	*RSF S	728	85.71	3.71	.77
			OPEN5	TEMPORARY - PROCESS CTL SPACE	*RS S	13	85.71	.07	.01
			OPEN5	WORK CONTROL BLOCK TABLE	*RSF S	5	85.71	.03	.01
			OPENBAD	PROGRAM	*RSF S	1,508	13.73	7.69	1.59
			OPENBAD	TEMPORARY - SPACE	*RSF S	623	13.73	3.18	.66
			OPENBAD	LIBRARY	*RSF S	257	13.73	1.31	.27
			OPENBAD	TEMPORARY - PROCESS CTL SPACE	*RSF S	224	13.73	1.14	.24
			OPENBAD	PROTECTED SPACE	*RSF S	27	13.73	.14	.03
			OPENBAD	SERVICE PROGRAM	*RSF S	24	13.73	.12	.03
			OPENBAD	TOMBSTONE SEGMENT	*RSF S	15	13.73	.08	.02
			OPENBAD	LOCAL DATA AREA	*RSF S	8	13.73	.04	.01
			OPENBAD	TEMPORARY - PROCESS CTL SPACE	*RS S	6	13.73	.03	.01
			OPENBAD	*UNKNOWN***************************	*RSF S	1	13.73	.01	.00
			QCLCLCPR	PROGRAM	*RSF S	24	.21	.12	.03
			QCLCLCPR	LIBRARY	*RSF S	8	.21	.04	.01
			QCLCLCPR	TEMPORARY - SPACE	*RSF S	8	.21	.04	.01
			QCLCLCPR	*UNKNOWN***************************	*RSF S	1	.21	.01	.00
			TOPOFSTACK	TOMBSTONE SEGMENT	*RSF S	14	.17	.07	.01
			TOPOFSTACK	TEMPORARY - SPACE	*RSF S	7	.17	.04	.01
			TOPOFSTACK	PROGRAM	*RSF S	6	.17	.03	.01
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	4	.17	.02	.00
			TOPOFSTACK	PROGRAM	*RS S	2	.17	.01	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	1	.17	.01	.00
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	16	.12	.08	.02
			QWCDLYJB	ACCESS GROUP	*RSF S	6	.12	.03	.01
			QWCDLYJB	PROGRAM	*RSF S	1	.12	.01	.00
			QCARULE	PROTECTED SPACE	*RSF S	7	.04	.04	.01
			QCARULE	LIBRARY	*RSF S	1	.04	.01	.00
			QCADRV	TEMPORARY - SPACE	*RSF S	3	.03	.02	.00
			QCADRV	PROGRAM	*RS S	2	.03	.01	.00
					TOTAL	19,616			

Figure 100 (Part 2 of 9). I/O by Object Type within Program within Job

08/02/96	18:59:40			IO by Object Type within Program within Job					PAGE 4
Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QCMDEXC	SERVICE PROGRAM	*RSF S	1,215	69.22	23.39	1.28
			QCMDEXC	HEAP DATA SEGMENT TYPE	*RSF S	662	69.22	12.74	.70
			QCMDEXC	TEMPORARY - PROCESS CTL SPACE	*RSF S	462	69.22	8.89	.49
			QCMDEXC	*UNKNOWN***************************	*RSF S	351	69.22	6.76	.37
			QCMDEXC	PROGRAM	*RSF S	232	69.22	4.47	.25
			QCMDEXC	ACTIVATION PROC REF TBL	*RSF S	168	69.22	3.23	.18
			QCMDEXC	MWS AREA DATA SID	*RSF S	143	69.22	2.75	.15
			QCMDEXC	TOMBSTONE SEGMENT	*RSF S	72	69.22	1.39	.08
			QCMDEXC	TEMPORARY - INDEX	*RSF S	60	69.22	1.15	.06
			QCMDEXC	PROGRAM	*RS S	42	69.22	.81	.04
			QCMDEXC	TEMPORARY - PROCESS CTL SPACE	*RS S	41	69.22	.79	.04
			QCMDEXC	MUTEX TEMP SEGMENT	*RSF S	32	69.22	.62	.03
			QCMDEXC	JOB MESSAGE QUEUE	*RSF S	25	69.22	.48	.03
			QCMDEXC	LIBRARY	*RSF S	18	69.22	.35	.02
			QCMDEXC	USER PROFILE	*RSF S	15	69.22	.29	.02
			QCMDEXC	MWS AREA CTL SID	*RSF S	14	69.22	.27	.01
			QCMDEXC	MODUL2 STATIC STORE	*RSF S	14	69.22	.27	.01
			QCMDEXC	CCSID INFORMATION OBJECT	*RSF S	12	69.22	.23	.01
			QCMDEXC	ACCESS GROUP	*RSF S	12	69.22	.23	.01
			QCMDEXC	TEMPORARY - QUEUE	*RSF S	6	69.22	.12	.01
			QDMCOPEN	HEAP DATA SEGMENT TYPE	*RSF S	101	6.14	1.94	.11
			QDMCOPEN	SERVICE PROGRAM	*RSF S	86	6.14	1.66	.09
			QDMCOPEN	TEMPORARY - PROCESS CTL SPACE	*RSF S	35	6.14	.67	.04
			QDMCOPEN	LIBRARY	*RSF S	30	6.14	.58	.03
			QDMCOPEN	USER PROFILE	*RSF S	28	6.14	.54	.03
			QDMCOPEN	MODUL2 STATIC STORE	*RSF S	19	6.14	.37	.02
			QDMCOPEN	FILE	*RSF S	17	6.14	.33	.02
			QDMCOPEN	WORK CONTROL BLOCK TABLE	*RSF S	2	6.14	.04	.00
			QDMCOPEN	PROGRAM	*RSF S	1	6.14	.02	.00
			QDBOPEN	CCSID INFORMATION OBJECT	*RSF S	74	5.20	1.42	.08
			QDBOPEN	PROGRAM	*RSF S	52	5.20	1.00	.05
			QDBOPEN	HOLD RECORD SEG	*RSF S	38	5.20	.73	.04
			QDBOPEN	TEMPORARY - PROCESS CTL SPACE	*RSF S	34	5.20	.65	.04
			QDBOPEN	COMPOSITE PIECE - DATA SPACE	*RSF S	17	5.20	.33	.02
			QDBOPEN	DATA SPACE RUN TIME SID	*RSF S	17	5.20	.33	.02
			QDBOPEN	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	16	5.20	.31	.02

08/02/96	18:59:40			IO by Object Type within Program within Job					PAGE 5
Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QDBOPEN	FILE FORMAT	*RSF S	13	5.20	.25	.01
			QDBOPEN	*UNKNOWN***************************	*RSF S	6	5.20	.12	.01
			QDBOPEN	TEMPORARY - PROCESS CTL SPACE	*RS S	3	5.20	.06	.00
			QDBGETKY	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	39	3.54	.75	.04
			QDBGETKY	COMPOSITE PIECE - DATA SPACE	*RS S	29	3.54	.56	.03
			QDBGETKY	*UNKNOWN***************************	*RSF S	28	3.54	.54	.03
			QDBGETKY	DATA SPACE INDEX RUN TIME	*RSF S	25	3.54	.48	.03
			QDBGETKY	COMPOSITE PIECE - DATA SPACE	*RSF S	23	3.54	.44	.02
			QDBGETKY	TEMPORARY - PROCESS CTL SPACE	*RSF S	16	3.54	.31	.02
			QDBGETKY	COMPOSITE PIECE - DATA SPACE	*RS A	12	3.54	.23	.01
			QDBGETKY	DATA SPACE RUN TIME SID	*RSF S	12	3.54	.23	.01
			QMHSNDPM	MESSAGE FILE	*RSF S	56	2.77	1.08	.06
			QMHSNDPM	JOB MESSAGE QUEUE	*RSF S	47	2.77	.90	.05
			QMHSNDPM	LIBRARY	*RSF S	18	2.77	.35	.02
			QMHSNDPM	PROGRAM	*RSF S	6	2.77	.12	.01
			QMHSNDPM	MODUL2 STATIC STORE	*RSF S	6	2.77	.12	.01
			QMHSNDPM	HEAP DATA SEGMENT TYPE	*RSF S	5	2.77	.10	.01
			QMHSNDPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	2.77	.08	.00
			QMHSNDPM	TEMPORARY - PROCESS CTL SPACE	*RS S	1	2.77	.02	.00
			QMHSNDPM	TOMBSTONE SEGMENT	*RSF S	1	2.77	.02	.00
			TOPOFSTACK	PROGRAM	*RSF S	26	1.75	.50	.03
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RSF S	21	1.75	.40	.02
			TOPOFSTACK	SERVICE PROGRAM	*RSF S	18	1.75	.35	.02
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*RSF S	13	1.75	.25	.01
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	10	1.75	.19	.01
			TOPOFSTACK	JOB MESSAGE QUEUE	*RSF S	2	1.75	.04	.00
			TOPOFSTACK	TOMBSTONE SEGMENT	*RSF S	1	1.75	.02	.00
			QMHRSNEM	PROGRAM	*RSF S	31	1.17	.60	.03
			QMHRSNEM	MODUL2 STATIC STORE	*RSF S	9	1.17	.17	.01
			QMHRSNEM	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	1.17	.12	.01
			QMHRSNEM	JOB MESSAGE QUEUE	*RSF S	6	1.17	.12	.01
			QMHRSNEM	HEAP DATA SEGMENT TYPE	*RSF S	6	1.17	.12	.01
			QMHRSNEM	TOMBSTONE SEGMENT	*RSF S	3	1.17	.06	.00
			QLIDLOBJ	JOB MESSAGE QUEUE	*RSF S	17	1.02	.33	.02
			QLIDLOBJ	TOMBSTONE SEGMENT	*RSF S	12	1.02	.23	.01
			QLIDLOBJ	PROGRAM	*RSF S	6	1.02	.12	.01

Figure 100 (Part 3 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 6

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QLIDLOBJ	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	1.02	.12	.01
			QLIDLOBJ	MODUL2 STATIC STORE	*RSF S	6	1.02	.12	.01
			QLIDLOBJ	HEAP DATA SEGMENT TYPE	*RSF S	6	1.02	.12	.01
			QCATRS	PROGRAM	*RSF S	26	.77	.50	.03
			QCATRS	LIBRARY	*RSF S	14	.77	.27	.01
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*RSF S	12	.69	.23	.01
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	12	.69	.23	.01
			QDMCLOSE	DATA SPACE RUN TIME SID	*RSF S	12	.69	.23	.01
			QMHMOVPM	JOB MESSAGE QUEUE	*RSF S	25	.69	.48	.03
			QMHMOVPM	TOMBSTONE SEGMENT	*RSF S	7	.69	.13	.01
			QMHMOVPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	.69	.08	.00
			QSQENDAG	TEMPORARY - PROCESS CTL SPACE	*RSF S	20	.69	.38	.02
			QSQENDAG	MODUL2 STATIC STORE	*RSF S	6	.69	.12	.01
			QSQENDAG	HEAP DATA SEGMENT TYPE	*RSF S	6	.69	.12	.01
			QSQENDAG	PROGRAM	*RSF S	2	.69	.04	.00
			QSQENDAG	JOB MESSAGE QUEUE	*RSF S	2	.69	.04	.00
			QLICHLLE	PROGRAM	*RSF S	13	.62	.25	.01
			QLICHLLE	HOLD RECORD SEG	*RSF S	12	.62	.23	.01
			QLICHLLE	LIBRARY	*RSF S	7	.62	.13	.01
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WS S	12	.60	.23	.01
			QWCDLYJB	PROGRAM	*RSF S	6	.60	.12	.01
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	6	.60	.12	.01
			QWCDLYJB	ACCESS GROUP	*RSF S	6	.60	.12	.01
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.60	.02	.00
			QCANPARS	CCSID INFORMATION OBJECT	*RSF S	24	.58	.46	.03
			QCANPARS	HOLD RECORD SEG	*RSF S	6	.58	.12	.01
			QCADRV2	PROGRAM	*RS S	26	.56	.50	.03
			QCADRV2	TEMPORARY - PROCESS CTL SPACE	*RSF S	2	.56	.04	.00
			QCADRV2	HOLD RECORD SEG	*RSF S	1	.56	.02	.00
			QMHPDEH	JOB MESSAGE QUEUE	*RSF S	15	.52	.29	.02
			QMHPDEH	TEMPORARY - PROCESS CTL SPACE	*RSF S	12	.52	.23	.01
			QCACHLBL	PROGRAM	*RS S	12	.48	.23	.01
			QCACHLBL	PROGRAM	*RSF S	6	.48	.12	.01
			QCACHLBL	*UNKNOWN***************************	*RSF S	6	.48	.12	.01
			QCACHLBL	HOLD RECORD SEG	*RSF S	1	.48	.02	.00
			QCAIEXIT	*UNKNOWN***************************	*RSF S	12	.48	.23	.01

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 7

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QCAIEXIT	PROGRAM	*RSF S	6	.48	.12	.01
			QCAIEXIT	USER PROFILE	*RSF S	6	.48	.12	.01
			QCAIEXIT	HOLD RECORD SEG	*RSF S	1	.48	.02	.00
			QUSRJOBI	TEMPORARY - PROCESS CTL SPACE	*RSF S	16	.42	.31	.02
			QUSRJOBI	SPOOL CTL BLOCK	*RSF S	6	.42	.12	.01
			QMHCHGEM	PROGRAM	*RSF S	7	.27	.13	.01
			QMHCHGEM	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.27	.12	.01
			QMHCHGEM	MODUL2 STATIC STORE	*RSF S	1	.27	.02	.00
			QDBCLOSE	*UNKNOWN***************************	*RSF S	12	.25	.23	.01
			QDBCLOSE	HOLD RECORD SEG	*RSF S	1	.25	.02	.00
			QUSDLTUS	TEMPORARY - PROCESS CTL SPACE	*RSF S	7	.25	.13	.01
			QUSDLTUS	PROGRAM	*RSF S	6	.25	.12	.01
			QDCXLATE	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.23	.12	.01
			QDCXLATE	TABLE	*RSF S	6	.23	.12	.01
			QDMRCLSE	PROGRAM	*RS S	5	.21	.10	.01
			QDMRCLSE	PROGRAM	*RSF S	5	.21	.10	.01
			QDMRCLSE	TEMPORARY - PROCESS CTL SPACE	*RSF S	1	.21	.02	.00
			QMHRCVPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	8	.15	.15	.01
			QTMPCKP	PROGRAM	*RSF S	7	.13	.13	.01
			QCARULE	LIBRARY	*RSF S	6	.12	.12	.01
			QLICNV	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.12	.12	.01
			QMHRTMSS	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.12	.12	.01
			QTQGESP	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.12	.12	.01
			QUIRCLAP	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	.08	.08	.00
			QCAIFLD	TEMPORARY - PROCESS CTL SPACE	*RSF S	2	.04	.04	.00
					TOTAL	5,195			
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	870	100.00	22.13	.92
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	562	100.00	14.29	.59
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	540	100.00	13.73	.57
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	530	100.00	13.48	.56
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	498	100.00	12.67	.53
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	185	100.00	4.70	.20
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	160	100.00	4.07	.17
			TOPOFSTACK	PROGRAM	*WSP S	141	100.00	3.59	.15

Figure 100 (Part 4 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 8

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	128	100.00	3.26	.14
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	118	100.00	3.00	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	84	100.00	2.14	.09
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	37	100.00	.94	.04
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	34	100.00	.86	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	13	100.00	.33	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	9	100.00	.23	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	6	100.00	.15	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	5	100.00	.13	.01
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	LIBRARY	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	910	100.00	23.62	.96
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	551	100.00	14.30	.58
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	506	100.00	13.13	.53
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	480	100.00	12.46	.51
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	476	100.00	12.35	.50
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	164	100.00	4.26	.17
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	148	100.00	3.84	.16
			TOPOFSTACK	PROGRAM	*WSP S	139	100.00	3.61	.15
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	119	100.00	3.09	.13
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	115	100.00	2.98	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	90	100.00	2.34	.10
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	56	100.00	1.45	.06
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	44	100.00	1.14	.05
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	23	100.00	.60	.02
			TOPOFSTACK	PROTECTED SPACE	*WSP S	7	100.00	.18	.01
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	4	100.00	.10	.00
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	3	100.00	.08	.00

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 9

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	LIBRARY	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	945	100.00	25.08	1.00
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	490	100.00	13.00	.52
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	489	100.00	12.98	.52
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	461	100.00	12.23	.49
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	444	100.00	11.78	.47
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	207	100.00	5.49	.22
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	136	100.00	3.61	.14
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	135	100.00	3.58	.14
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	124	100.00	3.29	.13
			TOPOFSTACK	PROGRAM	*WSP S	116	100.00	3.08	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	94	100.00	2.49	.10
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	43	100.00	1.14	.05
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	34	100.00	.90	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	15	100.00	.40	.02
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	11	100.00	.29	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	7	100.00	.19	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	ACCESS GROUP	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	876	100.00	23.69	.93
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	540	100.00	14.60	.57
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	507	100.00	13.71	.54
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	457	100.00	12.36	.48
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	427	100.00	11.55	.45
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	169	100.00	4.57	.18
			TOPOFSTACK	PROGRAM	*WSP S	146	100.00	3.95	.15
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	126	100.00	3.41	.13
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	118	100.00	3.19	.12

Figure 100 (Part 5 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 10

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	107	100.00	2.89	.11
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	105	100.00	2.84	.11
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	44	100.00	1.19	.05
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	38	100.00	1.03	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	10	100.00	.27	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	7	100.00	.19	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	LIBRARY	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	871	100.00	23.73	.92
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	522	100.00	14.22	.55
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	484	100.00	13.19	.51
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	461	100.00	12.56	.49
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	416	100.00	11.34	.44
			TOPOFSTACK	PROGRAM	*WSP S	151	100.00	4.11	.16
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	149	100.00	4.06	.16
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	147	100.00	4.01	.16
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	146	100.00	3.98	.15
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	110	100.00	3.00	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	83	100.00	2.26	.09
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	40	100.00	1.09	.04
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	39	100.00	1.06	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	17	100.00	.46	.02
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	2	100.00	.05	.00

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 11

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	859	100.00	23.45	.91
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	529	100.00	14.44	.56
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	487	100.00	13.30	.51
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	481	100.00	13.13	.51
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	403	100.00	11.00	.43
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	158	100.00	4.31	.17
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	151	100.00	4.12	.16
			TOPOFSTACK	PROGRAM	*WSP S	133	100.00	3.63	.14
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	124	100.00	3.39	.13
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	124	100.00	3.39	.13
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	84	100.00	2.29	.09
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	43	100.00	1.17	.05
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	39	100.00	1.06	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	15	100.00	.41	.02
			TOPOFSTACK	PROTECTED SPACE	*WSP S	7	100.00	.19	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	868	100.00	23.77	.92
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	527	100.00	14.43	.56
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	478	100.00	13.09	.51
			TOPOFSTACK	*UNKNOWN***************************	*WSP S	440	100.00	12.05	.46
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	412	100.00	11.28	.44
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	162	100.00	4.44	.17
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	159	100.00	4.35	.17
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	135	100.00	3.70	.14
			TOPOFSTACK	PROGRAM	*WSP S	125	100.00	3.42	.13
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	113	100.00	3.10	.12

Figure 100 (Part 6 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 12

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	85	100.00	2.33	.09
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	54	100.00	1.48	.06
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	38	100.00	1.04	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	20	100.00	.55	.02
			TOPOFSTACK	PROTECTED SPACE	*WSP S	8	100.00	.22	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	4	100.00	.11	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	4	100.00	.11	.00
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	LIBRARY	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	1	100.00	.03	.00
					TOTAL	26,235			
P23ARTVKE	A960126A	053319	QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RX A	1,062	81.93	80.27	1.12
			QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RSF S	7	81.93	.53	.01
			QWTCCRLJ	SPOOL CTL BLOCK	*RSF S	3	81.93	.23	.00
			QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RS A	3	81.93	.23	.00
			QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RS S	3	81.93	.23	.00
			QWTCCRLJ	PROGRAM	*RSF S	2	81.93	.15	.00
			QWTCCRLJ	MWS AREA DATA SID	*RSF S	2	81.93	.15	.00
			QWTCCRLJ	PROGRAM	*RS S	1	81.93	.08	.00
			QWTCCRLJ	*UNKNOWN***************************	*RSF S	1	81.93	.08	.00
			TOPOFSTACK	WORK CONTROL BLOCK TABLE	*RSF S	89	12.77	6.73	.09
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RSF S	74	12.77	5.59	.08
			TOPOFSTACK	HOLD RECORD SEG	*RSF S	2	12.77	.15	.00
			TOPOFSTACK	*UNKNOWN***************************	*RSF S	2	12.77	.15	.00
			TOPOFSTACK	TEMPORARY - ACCESS GROUP	*RSF S	1	12.77	.08	.00
			TOPOFSTACK	SUBSYSTEM DESCRIPTION	*RSF S	1	12.77	.08	.00
			QMHSNDPM	JOB MESSAGE QUEUE	*RSF S	9	1.06	.68	.01
			QMHSNDPM	MESSAGE FILE	*RSF S	2	1.06	.15	.00
			QMHSNDPM	PROGRAM	*RSF S	2	1.06	.15	.00
			QMHSNDPM	*UNKNOWN***************************	*RSF S	1	1.06	.08	.00

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 13

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
P23ARTVKE	A960126A	053319	QMHSNSTQ	MESSAGE QUEUE	*WS A	6	1.06	.45	.01
			QMHSNSTQ	WORK CONTROL BLOCK TABLE	*RSF S	3	1.06	.23	.00
			QMHSNSTQ	MESSAGE QUEUE	*WS S	3	1.06	.23	.00
			QMHSNSTQ	PROGRAM	*RSF S	1	1.06	.08	.00
			QMHSNSTQ	MESSAGE QUEUE	*RSF S	1	1.06	.08	.00
			QUIMGFLW	PANEL GROUP DEFINITION	*RSF S	6	.83	.45	.01
			QUIMGFLW	PROGRAM	*RS S	2	.83	.15	.00
			QUIMGFLW	TEMPORARY - SPACE	*RS S	2	.83	.15	.00
			QUIMGFLW	*UNKNOWN***************************	*RSF S	1	.83	.08	.00
			QUICMD	PROGRAM	*RS S	4	.45	.30	.00
			QUICMD	PROGRAM	*RSF S	1	.45	.08	.00
			QUICMD	*UNKNOWN***************************	*RSF S	1	.45	.08	.00
			QWCCDSTC	*UNKNOWN***************************	*RSF S	3	.38	.23	.00
			QWCCDSTC	PROGRAM	*RS S	2	.38	.15	.00
			QSPCHJOB	SPOOL CTL BLOCK	*WS S	3	.30	.23	.00
			QSPCHJOB	HOLD RECORD SEG	*RSF S	1	.30	.08	.00
			QUIICHK	PANEL GROUP DEFINITION	*RSF S	2	.23	.15	.00
			QUIICHK	PROGRAM	*RSF S	1	.23	.08	.00
			QCARULE	COMMAND	*RSF S	1	.15	.08	.00
			QCARULE	*UNKNOWN***************************	*RSF S	1	.15	.08	.00
			QEZWRAST	PROGRAM	*RSF S	1	.15	.08	.00
			QEZWRAST	*UNKNOWN***************************	*RSF S	1	.15	.08	.00
			QUIEXFMT	PANEL GROUP DEFINITION	*RSF S	2	.15	.15	.00
			QUIINMGR	TEMPORARY - SPACE	*RSF S	2	.15	.15	.00
			QCATRS	COMMAND	*WS A	1	.08	.08	.00
			QUIALIST	PROGRAM	*RSF S	1	.08	.08	.00
			QUILIST	TEMPORARY - SPACE	*RSF S	1	.08	.08	.00
			QUIVPMGR	PANEL GROUP DEFINITION	*RSF S	1	.08	.08	.00
			QWCSHUIC	PROGRAM	*RSF S	1	.08	.08	.00
					TOTAL	1,323			
PEXTRACE	A960126A	053555	QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*WS S	25	15.95	8.31	.03
			QSPRCMBR	SPOOL CTL BLOCK	*WSP S	7	15.95	2.33	.01
			QSPRCMBR	DB IN USE TABLE	*WS S	6	15.95	1.99	.01
			QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*WSP S	5	15.95	1.66	.01

Figure 100 (Part 7 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 14

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
PEXTRACE	A960126A	053555	QSPRCMBR	*UNKNOWN***************************	*RSF S	2	15.95	.66	.00
			QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*RSF S	1	15.95	.33	.00
			QSPRCMBR	FILE AVAIL CTL BLOCK	*RSF S	1	15.95	.33	.00
			QSPRCMBR	PROGRAM	*RSF S	1	15.95	.33	.00
			QSPOPEN	PRINT QUEUE	*RSF S	12	13.95	3.99	.01
			QSPOPEN	SPOOL CTL BLOCK	*WSP S	10	13.95	3.32	.01
			QSPOPEN	OUTPUT QUEUE	*WS S	5	13.95	1.66	.01
			QSPOPEN	*UNKNOWN***************************	*RSF S	4	13.95	1.33	.00
			QSPOPEN	HOLD RECORD SEG	*RSF S	3	13.95	1.00	.00
			QSPOPEN	OUTPUT QUEUE	*RSF S	2	13.95	.66	.00
			QSPOPEN	PROGRAM	*RS S	2	13.95	.66	.00
			QSPOPEN	USER PROFILE	*RSF S	1	13.95	.33	.00
			QSPOPEN	SPOOL CTL BLOCK	*WS S	1	13.95	.33	.00
			QSPOPEN	CHANGED PAGE BITMAP	*RSF S	1	13.95	.33	.00
			QSPOPEN	*UNKNOWN***************************	*WS S	1	13.95	.33	.00
			QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*WSP A	10	11.30	3.32	.01
			QSPCLOSE	SPOOL CTL BLOCK	*WSP S	6	11.30	1.99	.01
			QSPCLOSE	DB IN USE TABLE	*WS S	6	11.30	1.99	.01
			QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*WS S	5	11.30	1.66	.01
			QSPCLOSE	OUTPUT QUEUE	*WS S	5	11.30	1.66	.01
			QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*RSF S	1	11.30	.33	.00
			QSPCLOSE	PROGRAM	*RSF S	1	11.30	.33	.00
			QDBCRTME	LIBRARY	*WS S	6	10.63	1.99	.01
			QDBCRTME	COMPOSITE PIECE - DATA SPACE	*WS A	4	10.63	1.33	.00
			QDBCRTME	USER PROFILE	*WS S	4	10.63	1.33	.00
			QDBCRTME	*UNKNOWN***************************	*RSF S	4	10.63	1.33	.00
			QDBCRTME	USER PROFILE	*RSF S	3	10.63	1.00	.00
			QDBCRTME	DATA BASE FILE MEMBER	*WS A	2	10.63	.66	.00
			QDBCRTME		*RSF S	2	10.63	.66	.00
			QDBCRTME	*UNKNOWN***************************	*WS A	2	10.63	.66	.00
			QDBCRTME	*UNKNOWN***************************	*WS S	2	10.63	.66	.00
			QDBCRTME	DATA BASE FILE MEMBER	*WS S	1	10.63	.33	.00
			QDBCRTME	FILE	*WS A	1	10.63	.33	.00
			QDBCRTME	DATA SPACE RUN TIME SID	*RSF S	1	10.63	.33	.00
			QWCCDSTC	*UNKNOWN***************************	*RSF S	10	5.65	3.32	.01
			QWCCDSTC	MWS AREA DATA SID	*RSF S	5	5.65	1.66	.01

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 15

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
PEXTRACE	A960126A	053555	QWCCDSTC	PROGRAM	*RS S	2	5.65	.66	.00
			TOPOFSTACK	SERVICE PROGRAM	*RSF S	5	5.32	1.66	.01
			TOPOFSTACK	PROGRAM	*RS S	4	5.32	1.33	.00
			TOPOFSTACK	PROGRAM	*RSF S	4	5.32	1.33	.00
			TOPOFSTACK	*UNKNOWN***************************	*RSF S	3	5.32	1.00	.00
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WS S	6	4.65	1.99	.01
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WSP S	3	4.65	1.00	.00
			QDBFEOD	DB IN USE TABLE	*WS S	3	4.65	1.00	.00
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WSP A	1	4.65	.33	.00
			QDBFEOD	*UNKNOWN***************************	*WS S	1	4.65	.33	.00
			QUIMGFLW	TEMPORARY - SPACE	*RS S	9	4.65	2.99	.01
			QUIMGFLW	PROGRAM	*RSF S	2	4.65	.66	.00
			QUIMGFLW	PANEL GROUP DEFINITION	*RSF S	2	4.65	.66	.00
			QUIMGFLW	TEMPORARY - SPACE	*RSF S	1	4.65	.33	.00
			QSPCNSPF	OUTPUT QUEUE	*WS S	5	3.32	1.66	.01
			QSPCNSPF	PROGRAM	*RSF S	4	3.32	1.33	.00
			QSPCNSPF	*UNKNOWN***************************	*RSF S	1	3.32	.33	.00
			QUIPRINT	TEMPORARY - SPACE	*RS S	7	3.32	2.33	.01
			QUIPRINT	TEMPORARY - SPACE	*RSF S	2	3.32	.66	.00
			QUIPRINT	PANEL GROUP DEFINITION	*RSF S	1	3.32	.33	.00
			QSPCPYF	PROGRAM	*RSF S	4	2.66	1.33	.00
			QSPCPYF	PROGRAM	*RS S	2	2.66	.66	.00
			QSPCPYF	LIBRARY	*RSF S	1	2.66	.33	.00
			QSPCPYF	*UNKNOWN***************************	*RSF S	1	2.66	.33	.00
			QCARULE	LIBRARY	*RSF S	4	1.99	1.33	.00
			QCARULE	COMMAND	*RSF S	2	1.99	.66	.00
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*WS S	3	1.99	1.00	.00
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*WS A	1	1.99	.33	.00
			QDMCLOSE	PROGRAM	*RS S	1	1.99	.33	.00
			QDMCLOSE	*UNKNOWN***************************	*RSF S	1	1.99	.33	.00
			QWPALLOC	PROGRAM	*RSF S	6	1.99	1.99	.01
			QCANPARS	CCSID INFORMATION OBJECT	*RSF S	4	1.66	1.33	.00
			QCANPARS	HOLD RECORD SEG	*RSF S	1	1.66	.33	.00
			QSYGRTSA	USER PROFILE	*RSF S	3	1.66	1.00	.00
			QSYGRTSA	COMPOSITE PIECE - DATA SPACE	*WSP S	1	1.66	.33	.00
			QSYGRTSA	DATA BASE FILE MEMBER	*WSP S	1	1.66	.33	.00

Figure 100 (Part 8 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 16

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
PEXTRACE	A960126A	053555	QDMCOPEN	PROGRAM	*RSF S	1	1.33	.33	.00
			QDMCOPEN	LIBRARY	*RSF S	1	1.33	.33	.00
			QDMCOPEN	HEAP DATA SEGMENT TYPE	*RSF S	1	1.33	.33	.00
			QDMCOPEN	*UNKNOWN***************************	*RSF S	1	1.33	.33	.00
			QCATRS	PROGRAM	*RSF S	2	1.00	.66	.00
			QCATRS	*UNKNOWN***************************	*RSF S	1	1.00	.33	.00
			QUICLOSE	PROGRAM	*RSF S	2	1.00	.66	.00
			QUICLOSE	*UNKNOWN***************************	*RSF S	1	1.00	.33	.00
			QCADRV	PROGRAM	*RS S	2	.66	.66	.00
			QLIMROIR	COMPOSITE PIECE - INDEX	*RSF S	1	.66	.33	.00
			QLIMROIR	OIR SPACE	*RSF S	1	.66	.33	.00
			QMHSNDPM	MESSAGE FILE	*RSF S	2	.66	.66	.00
			QSPDSPFX	PROGRAM	*RSF S	1	.66	.33	.00
			QSPDSPFX	*UNKNOWN***************************	*RSF S	1	.66	.33	.00
			QUICBINT	PROGRAM	*RSF S	1	.66	.33	.00
			QUICBINT	*UNKNOWN***************************	*RSF S	1	.66	.33	.00
			QUIOPEN	PROGRAM	*RSF S	2	.66	.66	.00
			QCLCLCPR	LIBRARY	*RSF S	1	.33	.33	.00
			QMHRTMSS	MESSAGE FILE	*RSF S	1	.33	.33	.00
			QSPHNMLT	PROGRAM	*RSF S	1	.33	.33	.00
			QSYACCIP	LIBRARY	*RSF S	1	.33	.33	.00
			QUILIST	PROGRAM	*RSF S	1	.33	.33	.00
			QWPPUT	HOLD RECORD SEG	*RSF S	1	.33	.33	.00
					TOTAL	301			
PEXSBSD	QSYS	053539	QWTMMRLJ	PROGRAM	*RSF S	6	56.25	37.50	.01
			QWTMMRLJ	MWS AREA DATA SID	*RSF S	2	56.25	12.50	.00
			QWTMMRLJ	*UNKNOWN***************************	*RSF S	1	56.25	6.25	.00
			QWTMESBC	PROGRAM	*RS S	6	43.75	37.50	.01
			QWTMESBC	*UNKNOWN***************************	*RSF S	1	43.75	6.25	.00
					TOTAL	16			
SCPF	QSYS	000000	QDBFEOD	DB IN USE TABLE	*WS S	2	38.46	15.38	.00
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WS S	1	38.46	7.69	.00

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 17

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
SCPF	QSYS	000000	QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WSP A	1	38.46	7.69	.00
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WSP S	1	38.46	7.69	.00
			QMHRTMSS	MESSAGE FILE	*RSF S	2	15.38	15.38	.00
			QDBOPEN	*UNKNOWN***************************	*RS S	1	7.69	7.69	.00
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*WS S	1	7.69	7.69	.00
			QDMCOPEN	LIBRARY	*RSF S	1	7.69	7.69	.00
			QLIMROIR	OIR SPACE	*WSP A	1	7.69	7.69	.00
			QMHLOGER	FILE	*WS A	1	7.69	7.69	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	1	7.69	7.69	.00
					TOTAL	13			
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	12	100.00	92.31	.01
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*RSF S	1	100.00	7.69	.00
					TOTAL	13			
QTGTELNETS	QTCP	053298	TOPOFSTACK	PROGRAM	*RSF S	4	66.67	44.44	.00
			TOPOFSTACK	*UNKNOWN***************************	*RSF S	2	66.67	22.22	.00
			QTGTNTOC	PROGRAM	*RSF S	2	22.22	22.22	.00
			QTOASND	HEAP DATA SEGMENT TYPE	*RSF S	1	11.11	11.11	.00
					TOTAL	9			
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	3	100.00	75.00	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	1	100.00	25.00	.00
					TOTAL	4			
QSERVER	QSYS	053254	TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WS S	2	66.67	66.67	.00
			QWTMEPJP	TEMPORARY - INDEX	*RSF S	1	33.33	33.33	.00
					TOTAL	3			
			TOPOFSTACK	*UNKNOWN***************************	*RSF S	2	100.00	100.00	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	1	100.00	100.00	.00

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 18

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
					TOTAL	3			
					FINAL TOTALS				
					TOTAL	94,651			

* * * E N D O F R E P O R T * * *

Figure 100 (Part 9 of 9). I/O by Object Type within Program within Job

10.2.23 Report Title - I/O by Object Type within Program

This report is produced from Command Option - By **PGM/Objtype.

```
          IO bu Object Type within Program
QUERY NAME . . . . . PIOOBJ07
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
PIOOBJ06     PFREXP2      PEXTRACE     PIOOBJ06
PIOOBJ05     PFREXP2      PEXTRACE     PIOOBJ05
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:00:31
         Pgm IO by Object Type - Part 12
```

08/02/96 19:00:31 IO by Object Type within Program PAGE 1

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	6,199	23.31	6.55	28.09
	HEAP DATA SEGMENT TYPE	*WSP S	3,692	13.88	3.90	28.09
	DATA SPACE RUN TIME SID	*WSP S	3,442	12.94	3.64	28.09
	*UNKNOWN***************************	*WSP S	3,388	12.74	3.58	28.09
	COMPOSITE PIECE - DATA SPACE	*WSP S	3,076	11.57	3.25	28.09
	HOLD RECORD SEG	*WSP S	1,191	4.48	1.26	28.09
	TEMPORARY - SPACE	*WSP S	1,027	3.86	1.09	28.09
	PROGRAM	*WSP S	951	3.58	1.00	28.09
	TOMBSTONE SEGMENT	*WSP S	886	3.33	.94	28.09
	SERVICE PROGRAM	*WSP S	831	3.13	.88	28.09
	JOB MESSAGE QUEUE	*WSP S	627	2.36	.66	28.09
	MODUL2 STATIC STORE	*WSP S	302	1.14	.32	28.09
	HEAP CONTROL SEGMENT	*WSP S	281	1.06	.30	28.09
	MWS AREA DATA SID	*WSP S	113	.42	.12	28.09
	TEMPORARY - PROCESS CTL SPACE	*RSF S	95	.36	.10	28.09
	WORK CONTROL BLOCK TABLE	*RSF S	89	.33	.09	28.09
	PROTECTED SPACE	*WSP S	48	.18	.05	28.09
	PROGRAM	*RSF S	43	.16	.05	28.09
	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	41	.15	.04	28.09
	CCSID INFORMATION OBJECT	*WSP S	31	.12	.03	28.09
	DATA SPACE INDEX RUN TIME	*WSP S	27	.10	.03	28.09
	SERVICE PROGRAM	*RSF S	23	.09	.02	28.09
	MWS AREA DATA SID	*RSF S	22	.08	.02	28.09
	MUTEX TEMP SEGMENT	*WSP S	21	.08	.02	28.09
	HEAP DATA SEGMENT TYPE	*RSF S	20	.08	.02	28.09
	MWS AREA CTL SID	*WSP S	17	.06	.02	28.09
	TEMPORARY - PROCESS CTL SPACE	*RS S	16	.06	.02	28.09
	TOMBSTONE SEGMENT	*RSF S	15	.06	.02	28.09
	TEMPORARY - INDEX	*WSP S	12	.05	.01	28.09
	ACCESS GROUP	*WSP S	12	.05	.01	28.09
	PROGRAM	*RS S	10	.04	.01	28.09
	*UNKNOWN***************************	*RSF S	9	.03	.01	28.09
	TEMPORARY - QUEUE	*WSP S	7	.03	.01	28.09
	LIBRARY	*WSP S	7	.03	.01	28.09
	TEMPORARY - SPACE	*RSF S	7	.03	.01	28.09
	MESSAGE FILE	*WSP S	6	.02	.01	28.09

Figure 101 (Part 1 of 12). I/O by Object Type within Program

08/02/96 19:00:31 IO by Object Type within Program PAGE 2

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WS S	2	.01	.00	28.09
	JOB MESSAGE QUEUE	*RSF S	2	.01	.00	28.09
	HOLD RECORD SEG	*RSF S	2	.01	.00	28.09
	TEMPORARY - ACCESS GROUP	*RSF S	1	.00	.00	28.09
	SUBSYSTEM DESCRIPTION	*RSF S	1	.00	.00	28.09
		TOTAL	26,592			
TESTIO	COMPOSITE PIECE - DATA SPACE	*RX A	11,969	65.33	12.65	19.36
	COMPOSITE PIECE - DATA SPACE	*RSF S	1,455	7.94	1.54	19.36
	PROGRAM	*RSF S	1,446	7.89	1.53	19.36
	COMPOSITE PIECE - DATA SPACE	*RS A	1,370	7.48	1.45	19.36
	*UNKNOWN***************************	*RS S	745	4.07	.79	19.36
	COMPOSITE PIECE - DATA SPACE	*RS S	473	2.58	.50	19.36
	FILE	*RSF S	385	2.10	.41	19.36
	DATA SPACE RUN TIME SID	*RSF S	354	1.93	.37	19.36
	*UNKNOWN***************************	*RSF S	99	.54	.10	19.36
	HOLD RECORD SEG	*RSF S	25	.14	.03	19.36
	WORK CONTROL BLOCK TABLE	*RSF S	1	.01	.00	19.36
		TOTAL	18,322			
ILEAGNEW	HEAP DATA SEGMENT TYPE	*RSF S	4,353	23.97	4.60	19.19
	TEMPORARY - PROCESS CTL SPACE	*RSF S	3,636	20.02	3.84	19.19
	PROGRAM	*RSF S	2,597	14.30	2.74	19.19
	*UNKNOWN***************************	*RSF S	2,064	11.37	2.18	19.19
	SERVICE PROGRAM	*RSF S	2,000	11.01	2.11	19.19
	PROGRAM	*RS S	1,101	6.06	1.16	19.19
	MODUL2 STATIC STORE	*RSF S	730	4.02	.77	19.19
	TEMPORARY - SPACE	*RSF S	561	3.09	.59	19.19
	HEAP CONTROL SEGMENT	*RSF S	280	1.54	.30	19.19
	JOB MESSAGE QUEUE	*RSF S	274	1.51	.29	19.19
	HOLD RECORD SEG	*RSF S	272	1.50	.29	19.19
	LIBRARY	*RSF S	152	.84	.16	19.19
	TOMBSTONE SEGMENT	*RSF S	113	.62	.12	19.19
	TEMPORARY - PROCESS CTL SPACE	*RS S	16	.09	.02	19.19

08/02/96 19:00:31 IO by Object Type within Program PAGE 3

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
ILEAGNEW	PROTECTED SPACE	*RSF S	7	.04	.01	19.19
	LOCAL DATA AREA	*RSF S	3	.02	.00	19.19
	JOB MESSAGE QUEUE	*WS S	1	.01	.00	19.19
	*UNKNOWN***************************	*WS S	1	.01	.00	19.19
		TOTAL	18,161			
OPEN5	COMPOSITE PIECE - DATA SPACE	*RSF S	2,540	15.11	2.68	17.76
	DATA SPACE RUN TIME SID	*RSF S	2,389	14.21	2.52	17.76
	*UNKNOWN***************************	*RS S	1,856	11.04	1.96	17.76
	PROGRAM	*RSF S	1,815	10.80	1.92	17.76
	*UNKNOWN***************************	*RSF S	1,790	10.65	1.89	17.76
	COMPOSITE PIECE - DATA SPACE	*RS A	1,595	9.49	1.69	17.76
	COMPOSITE PIECE - DATA SPACE	*RS S	1,587	9.44	1.68	17.76
	FILE	*RSF S	1,531	9.11	1.62	17.76
	TEMPORARY - PROCESS CTL SPACE	*RSF S	963	5.73	1.02	17.76
	HOLD RECORD SEG	*RSF S	728	4.33	.77	17.76
	TEMPORARY - PROCESS CTL SPACE	*RS S	13	.08	.01	17.76
	WORK CONTROL BLOCK TABLE	*RSF S	5	.03	.01	17.76
		TOTAL	16,812			
TESTIOC	PROGRAM	*RSF S	1,792	45.53	1.89	4.16
	LIBRARY	*RSF S	1,246	31.66	1.32	4.16
	USER PROFILE	*RSF S	404	10.26	.43	4.16
	TEMPORARY - SPACE	*RSF S	371	9.43	.39	4.16
	SERVICE PROGRAM	*RSF S	112	2.85	.12	4.16
	PROTECTED SPACE	*RSF S	8	.20	.01	4.16
	LOCAL DATA AREA	*RSF S	3	.08	.00	4.16
		TOTAL	3,936			
QCMDEXC	SERVICE PROGRAM	*RSF S	1,215	33.79	1.28	3.80
	HEAP DATA SEGMENT TYPE	*RSF S	662	18.41	.70	3.80
	TEMPORARY - PROCESS CTL SPACE	*RSF S	462	12.85	.49	3.80
	*UNKNOWN***************************	*RSF S	351	9.76	.37	3.80

Figure 101 (Part 2 of 12). I/O by Object Type within Program

08/02/96 19:00:31 IO by Object Type within Program PAGE 4

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
QCMDEXC	PROGRAM	*RSF S	232	6.45	.25	3.80
	ACTIVATION PROC REF TBL	*RSF S	168	4.67	.18	3.80
	MWS AREA DATA SID	*RSF S	143	3.98	.15	3.80
	TOMBSTONE SEGMENT	*RSF S	72	2.00	.08	3.80
	TEMPORARY - INDEX	*RSF S	60	1.67	.06	3.80
	PROGRAM	*RS S	42	1.17	.04	3.80
	TEMPORARY - PROCESS CTL SPACE	*RS S	41	1.14	.04	3.80
	MUTEX TEMP SEGMENT	*RSF S	32	.89	.03	3.80
	JOB MESSAGE QUEUE	*RSF S	25	.70	.03	3.80
	LIBRARY	*RSF S	18	.50	.02	3.80
	USER PROFILE	*RSF S	15	.42	.02	3.80
	MWS AREA CTL SID	*RSF S	14	.39	.01	3.80
	MODUL2 STATIC STORE	*RSF S	14	.39	.01	3.80
	CCSID INFORMATION OBJECT	*RSF S	12	.33	.01	3.80
	ACCESS GROUP	*RSF S	12	.33	.01	3.80
	TEMPORARY - QUEUE	*RSF S	6	.17	.01	3.80
		TOTAL	3,596			
OPENBAD	PROGRAM	*RSF S	1,508	56.00	1.59	2.85
	TEMPORARY - SPACE	*RSF S	623	23.13	.66	2.85
	LIBRARY	*RSF S	257	9.54	.27	2.85
	TEMPORARY - PROCESS CTL SPACE	*RSF S	224	8.32	.24	2.85
	PROTECTED SPACE	*RSF S	27	1.00	.03	2.85
	SERVICE PROGRAM	*RSF S	24	.89	.03	2.85
	TOMBSTONE SEGMENT	*RSF S	15	.56	.02	2.85
	LOCAL DATA AREA	*RSF S	8	.30	.01	2.85
	TEMPORARY - PROCESS CTL SPACE	*RS S	6	.22	.01	2.85
	*UNKNOWN***************************	*RSF S	1	.04	.00	2.85
		TOTAL	2,693			
ILEAGN	TOMBSTONE SEGMENT	*RSF S	510	35.71	.54	1.51
	TEMPORARY - PROCESS CTL SPACE	*RSF S	454	31.79	.48	1.51
	PROGRAM	*RSF S	280	19.61	.30	1.51
	HEAP DATA SEGMENT TYPE	*RSF S	184	12.89	.19	1.51

Figure 101 (Part 3 of 12). I/O by Object Type within Program

08/02/96 19:00:31 IO by Object Type within Program PAGE 5

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
		TOTAL	1,428			
QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RX A	1,062	97.97	1.12	1.15
	WORK CONTROL BLOCK TABLE	*RSF S	7	.65	.01	1.15
	SPOOL CTL BLOCK	*RSF S	3	.28	.00	1.15
	WORK CONTROL BLOCK TABLE	*RS A	3	.28	.00	1.15
	WORK CONTROL BLOCK TABLE	*RS S	3	.28	.00	1.15
	PROGRAM	*RSF S	2	.18	.00	1.15
	MWS AREA DATA SID	*RSF S	2	.18	.00	1.15
	PROGRAM	*RS S	1	.09	.00	1.15
	*UNKNOWN***************************	*RSF S	1	.09	.00	1.15
		TOTAL	1,084			
QDMCOPEN	HEAP DATA SEGMENT TYPE	*RSF S	102	31.48	.11	.34
	SERVICE PROGRAM	*RSF S	86	26.54	.09	.34
	TEMPORARY - PROCESS CTL SPACE	*RSF S	35	10.80	.04	.34
	LIBRARY	*RSF S	32	9.88	.03	.34
	USER PROFILE	*RSF S	28	8.64	.03	.34
	MODUL2 STATIC STORE	*RSF S	19	5.86	.02	.34
	FILE	*RSF S	17	5.25	.02	.34
	PROGRAM	*RSF S	2	.62	.00	.34
	WORK CONTROL BLOCK TABLE	*RSF S	2	.62	.00	.34
	*UNKNOWN***************************	*RSF S	1	.31	.00	.34
		TOTAL	324			
QDBOPEN	CCSID INFORMATION OBJECT	*RSF S	74	27.31	.08	.29
	PROGRAM	*RSF S	52	19.19	.05	.29
	HOLD RECORD SEG	*RSF S	38	14.02	.04	.29
	TEMPORARY - PROCESS CTL SPACE	*RSF S	34	12.55	.04	.29
	COMPOSITE PIECE - DATA SPACE	*RSF S	17	6.27	.02	.29
	DATA SPACE RUN TIME SID	*RSF S	17	6.27	.02	.29
	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	16	5.90	.02	.29
	FILE FORMAT	*RSF S	13	4.80	.01	.29
	*UNKNOWN***************************	*RSF S	6	2.21	.01	.29

Figure 101 (Part 4 of 12). I/O by Object Type within Program

08/02/96	19:00:31	IO by Object Type within Program				PAGE 6
Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
QDBOPEN	TEMPORARY - PROCESS CTL SPACE	*RS S	3	1.11	.00	.29
	*UNKNOWN***************************	*RS S	1	.37	.00	.29
		TOTAL	271			
QDBGETKY	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	39	21.20	.04	.19
	COMPOSITE PIECE - DATA SPACE	*RS S	29	15.76	.03	.19
	*UNKNOWN***************************	*RSF S	28	15.22	.03	.19
	DATA SPACE INDEX RUN TIME	*RSF S	25	13.59	.03	.19
	COMPOSITE PIECE - DATA SPACE	*RSF S	23	12.50	.02	.19
	TEMPORARY - PROCESS CTL SPACE	*RSF S	16	8.70	.02	.19
	COMPOSITE PIECE - DATA SPACE	*RS A	12	6.52	.01	.19
	DATA SPACE RUN TIME SID	*RSF S	12	6.52	.01	.19
		TOTAL	184			
QMHSNDPM	MESSAGE FILE	*RSF S	60	37.50	.06	.17
	JOB MESSAGE QUEUE	*RSF S	56	35.00	.06	.17
	LIBRARY	*RSF S	18	11.25	.02	.17
	PROGRAM	*RSF S	8	5.00	.01	.17
	MODUL2 STATIC STORE	*RSF S	6	3.75	.01	.17
	HEAP DATA SEGMENT TYPE	*RSF S	5	3.13	.01	.17
	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	2.50	.00	.17
	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.63	.00	.17
	TOMBSTONE SEGMENT	*RSF S	1	.63	.00	.17
	*UNKNOWN***************************	*RSF S	1	.63	.00	.17
		TOTAL	160			
QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	31	43.06	.03	.08
	ACCESS GROUP	*RSF S	14	19.44	.01	.08
	PROGRAM	*RSF S	13	18.06	.01	.08
	TEMPORARY - PROCESS CTL SPACE	*WS S	12	16.67	.01	.08
	DATA BASE OPERATIONAL CURSOR	*WSP S	1	1.39	.00	.08
	TEMPORARY - PROCESS CTL SPACE	*RS S	1	1.39	.00	.08

Figure 101 (Part 5 of 12). I/O by Object Type within Program

08/02/96	19:00:31	IO by Object Type within Program				PAGE 7
Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
		TOTAL	72			
QCLCLCPR	PROGRAM	*RSF S	42	60.87	.04	.07
	LIBRARY	*RSF S	15	21.74	.02	.07
	TEMPORARY - SPACE	*RSF S	8	11.59	.01	.07
	MODUL2 STATIC STORE	*RSF S	2	2.90	.00	.07
	TEMPORARY - PROCESS CTL SPACE	*RS S	1	1.45	.00	.07
	*UNKNOWN***************************	*RSF S	1	1.45	.00	.07
		TOTAL	69			
QMHRSNEM	PROGRAM	*RSF S	31	50.82	.03	.06
	MODUL2 STATIC STORE	*RSF S	9	14.75	.01	.06
	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	9.84	.01	.06
	JOB MESSAGE QUEUE	*RSF S	6	9.84	.01	.06
	HEAP DATA SEGMENT TYPE	*RSF S	6	9.84	.01	.06
	TOMBSTONE SEGMENT	*RSF S	3	4.92	.00	.06
		TOTAL	61			
QLIDLOBJ	JOB MESSAGE QUEUE	*RSF S	17	32.08	.02	.06
	TOMBSTONE SEGMENT	*RSF S	12	22.64	.01	.06
	PROGRAM	*RSF S	6	11.32	.01	.06
	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	11.32	.01	.06
	MODUL2 STATIC STORE	*RSF S	6	11.32	.01	.06
	HEAP DATA SEGMENT TYPE	*RSF S	6	11.32	.01	.06
		TOTAL	53			
QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*WS S	25	52.08	.03	.05
	SPOOL CTL BLOCK	*WSP S	7	14.58	.01	.05
	DB IN USE TABLE	*WS S	6	12.50	.01	.05
	COMPOSITE PIECE - DATA SPACE	*WSP S	5	10.42	.01	.05
	*UNKNOWN***************************	*RSF S	2	4.17	.00	.05
	COMPOSITE PIECE - DATA SPACE	*RSF S	1	2.08	.00	.05
	FILE AVAIL CTL BLOCK	*RSF S	1	2.08	.00	.05

Figure 101 (Part 6 of 12). I/O by Object Type within Program

08/02/96 19:00:31 IO by Object Type within Program PAGE 8

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
QSPRCMBR	PROGRAM	*RSF S	1	2.08	.00	.05
		TOTAL	48			
QCATRS	PROGRAM	*RSF S	28	63.64	.03	.05
	LIBRARY	*RSF S	14	31.82	.01	.05
	COMMAND	*WS A	1	2.27	.00	.05
	*UNKNOWN***************************	*RSF S	1	2.27	.00	.05
		TOTAL	44			
QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*RSF S	12	27.91	.01	.05
	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	12	27.91	.01	.05
	DATA SPACE RUN TIME SID	*RSF S	12	27.91	.01	.05
	COMPOSITE PIECE - DATA SPACE	*WS S	4	9.30	.00	.05
	COMPOSITE PIECE - DATA SPACE	*WS A	1	2.33	.00	.05
	PROGRAM	*RS S	1	2.33	.00	.05
	*UNKNOWN***************************	*RSF S	1	2.33	.00	.05
		TOTAL	43			
QSPOPEN	PRINT QUEUE	*RSF S	12	28.57	.01	.04
	SPOOL CTL BLOCK	*WSP S	10	23.81	.01	.04
	OUTPUT QUEUE	*WS S	5	11.90	.01	.04
	*UNKNOWN***************************	*RSF S	4	9.52	.00	.04
	HOLD RECORD SEG	*RSF S	3	7.14	.00	.04
	OUTPUT QUEUE	*RSF S	2	4.76	.00	.04
	PROGRAM	*RS S	2	4.76	.00	.04
	USER PROFILE	*RSF S	1	2.38	.00	.04
	SPOOL CTL BLOCK	*WS S	1	2.38	.00	.04
	CHANGED PAGE BITMAP	*RSF S	1	2.38	.00	.04
	*UNKNOWN***************************	*WS S	1	2.38	.00	.04
		TOTAL	42			
QMHMOVPM	JOB MESSAGE QUEUE	*RSF S	25	69.44	.03	.04

Figure 101 (Part 7 of 12). I/O by Object Type within Program

08/02/96 19:00:31 IO by Object Type within Program PAGE 9

Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
QMHMOVPM	TOMBSTONE SEGMENT	*RSF S	7	19.44	.01	.04
	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	11.11	.00	.04
		TOTAL	36			
QSQENDAG	TEMPORARY - PROCESS CTL SPACE	*RSF S	20	55.56	.02	.04
	MODUL2 STATIC STORE	*RSF S	6	16.67	.01	.04
	HEAP DATA SEGMENT TYPE	*RSF S	6	16.67	.01	.04
	PROGRAM	*RSF S	2	5.56	.00	.04
	JOB MESSAGE QUEUE	*RSF S	2	5.56	.00	.04
		TOTAL	36			
QCANPARS	CCSID INFORMATION OBJECT	*RSF S	28	80.00	.03	.04
	HOLD RECORD SEG	*RSF S	7	20.00	.01	.04
		TOTAL	35			
QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*WSP A	10	29.41	.01	.04
	SPOOL CTL BLOCK	*WSP S	6	17.65	.01	.04
	DB IN USE TABLE	*WS S	6	17.65	.01	.04
	COMPOSITE PIECE - DATA SPACE	*WS S	5	14.71	.01	.04
	OUTPUT QUEUE	*WS S	5	14.71	.01	.04
	COMPOSITE PIECE - DATA SPACE	*RSF S	1	2.94	.00	.04
	PROGRAM	*RSF S	1	2.94	.00	.04
		TOTAL	34			
QDBCRTME	LIBRARY	*WS S	6	18.75	.01	.03
	COMPOSITE PIECE - DATA SPACE	*WS A	4	12.50	.00	.03
	USER PROFILE	*WS S	4	12.50	.00	.03
	*UNKNOWN***************************	*RSF S	4	12.50	.00	.03
	USER PROFILE	*RSF S	3	9.38	.00	.03
	DATA BASE FILE MEMBER	*WS A	2	6.25	.00	.03
		*RSF S	2	6.25	.00	.03
	*UNKNOWN***************************	*WS A	2	6.25	.00	.03

Figure 101 (Part 8 of 12). I/O by Object Type within Program

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08/02/96  19:00:31                   IO by Object Type within Program                      PAGE   10
Program    Object                               PDIO            PDIO      PCT       PCT    PCT
           Description                          Type            Total     PGM       ALL    PGM IO
                                                                          IO        IO     of ALL IO
QDBCRTME   *UNKNOWN***************************  *WS  S              2     6.25      .00          .03
           DATA BASE FILE MEMBER                *WS  S              1     3.13      .00          .03
           FILE                                 *WS  A              1     3.13      .00          .03
           DATA SPACE RUN TIME SID              *RSF S              1     3.13      .00          .03
                                                  TOTAL            32
QLICHLLE   PROGRAM                              *RSF S             13    40.63      .01          .03
           HOLD RECORD SEG                      *RSF S             12    37.50      .01          .03
           LIBRARY                              *RSF S              7    21.88      .01          .03
                                                  TOTAL            32
QCADRV2    PROGRAM                              *RS  S             26    89.66      .03          .03
           TEMPORARY - PROCESS CTL SPACE        *RSF S              2     6.90      .00          .03
           HOLD RECORD SEG                      *RSF S              1     3.45      .00          .03
                                                  TOTAL            29
QMHPDEH    JOB MESSAGE QUEUE                    *RSF S             15    55.56      .02          .03
           TEMPORARY - PROCESS CTL SPACE        *RSF S             12    44.44      .01          .03
                                                  TOTAL            27
QCARULE    LIBRARY                              *RSF S             13    50.00      .01          .03
           PROTECTED SPACE                      *RSF S              9    34.62      .01          .03
           COMMAND                              *RSF S              3    11.54      .00          .03
           *UNKNOWN***************************  *RSF S              1     3.85      .00          .03
                                                  TOTAL            26
QCACHLBL   PROGRAM                              *RS  S             12    48.00      .01          .03
           PROGRAM                              *RSF S              6    24.00      .01          .03
           *UNKNOWN***************************  *RSF S              6    24.00      .01          .03
           HOLD RECORD SEG                      *RSF S              1     4.00      .00          .03
                                                  M05
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08/02/96  19:00:31                   IO by Object Type within Program                      PAGE   11
Program    Object                               PDIO            PDIO      PCT       PCT    PCT
           Description                          Type            Total     PGM       ALL    PGM IO
                                                                          IO        IO     of ALL IO
                                                  TOTAL            25
QCAIEXIT   *UNKNOWN***************************  *RSF S             12    48.00      .01          .03
           PROGRAM                              *RSF S              6    24.00      .01          .03
           USER PROFILE                         *RSF S              6    24.00      .01          .03
           HOLD RECORD SEG                      *RSF S              1     4.00      .00          .03
                                                  TOTAL            25
QUIMGFLW   TEMPORARY - SPACE                    *RS  S             11    44.00      .01          .03
           PANEL GROUP DEFINITION               *RSF S              8    32.00      .01          .03
           PROGRAM                              *RS  S              2     8.00      .00          .03
           PROGRAM                              *RSF S              2     8.00      .00          .03
           TEMPORARY - SPACE                    *RSF S              1     4.00      .00          .03
           *UNKNOWN***************************  *RSF S              1     4.00      .00          .03
                                                  TOTAL            25
QUSRJOBI   TEMPORARY - PROCESS CTL SPACE        *RSF S             16    72.73      .02          .02
           SPOOL CTL BLOCK                      *RSF S              6    27.27      .01          .02
                                                  TOTAL            22
QWCCDSTC   *UNKNOWN***************************  *RSF S             13    59.09      .01          .02
           MWS AREA DATA SID                    *RSF S              5    22.73      .01          .02
           PROGRAM                              *RS  S              4    18.18      .00          .02
                                                  TOTAL            22
QDBFEOD    COMPOSITE PIECE - DATA SPACE         *WS  S              7    36.84      .01          .02
           DB IN USE TABLE                      *WS  S              5    26.32      .01          .02
           COMPOSITE PIECE - DATA SPACE         *WSP S              4    21.05      .00          .02
           COMPOSITE PIECE - DATA SPACE         *WSP A              2    10.53      .00          .02
           *UNKNOWN***************************  *WS  S              1     5.26      .00          .02
                                                  TOTAL            19
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Figure 101 (Part 9 of 12). I/O by Object Type within Program

08/02/96	19:00:31	IO by Object Type within Program				PAGE 12
Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
QMHCHGEM	PROGRAM	*RSF S	7	50.00	.01	.01
	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	42.86	.01	.01
	MODUL2 STATIC STORE	*RSF S	1	7.14	.00	.01
		TOTAL	14			
QMHSNSTQ	MESSAGE QUEUE	*WS A	6	42.86	.01	.01
	WORK CONTROL BLOCK TABLE	*RSF S	3	21.43	.00	.01
	MESSAGE QUEUE	*WS S	3	21.43	.00	.01
	PROGRAM	*RSF S	1	7.14	.00	.01
	MESSAGE QUEUE	*RSF S	1	7.14	.00	.01
		TOTAL	14			
QCADRV	PROGRAM	*RS S	8	61.54	.01	.01
	TEMPORARY - SPACE	*RSF S	3	23.08	.00	.01
	PROTECTED SPACE	*RSF S	2	15.38	.00	.01
		TOTAL	13			
QDBCLOSE	*UNKNOWN***************************	*RSF S	12	92.31	.01	.01
	HOLD RECORD SEG	*RSF S	1	7.69	.00	.01
		TOTAL	13			
QUSDLTUS	TEMPORARY - PROCESS CTL SPACE	*RSF S	7	53.85	.01	.01
	PROGRAM	*RSF S	6	46.15	.01	.01
		TOTAL	13			
QDCXLATE	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	50.00	.01	.01
	TABLE	*RSF S	6	50.00	.01	.01
		TOTAL	12			
QDMRCLSE	PROGRAM	*RS S	5	45.45	.01	.01
		M05				

08/02/96	19:00:31	IO by Object Type within Program				PAGE 13
Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO
QDMRCLSE	PROGRAM	*RSF S	5	45.45	.01	.01
	TEMPORARY - PROCESS CTL SPACE	*RSF S	1	9.09	.00	.01
		TOTAL	11			
QSPCNSPF	OUTPUT QUEUE	*WS S	5	50.00	.01	.01
	PROGRAM	*RSF S	4	40.00	.00	.01
	*UNKNOWN***************************	*RSF S	1	10.00	.00	.01
		TOTAL	10			
QUIPRINT	TEMPORARY - SPACE	*RS S	7	70.00	.01	.01
	TEMPORARY - SPACE	*RSF S	2	20.00	.00	.01
	PANEL GROUP DEFINITION	*RSF S	1	10.00	.00	.01
		TOTAL	10			
QMHRTMSS	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	66.67	.01	.01
	MESSAGE FILE	*RSF S	3	33.33	.00	.01
		TOTAL	9			
QWTMMRLJ	PROGRAM	*RSF S	6	66.67	.01	.01
	MWS AREA DATA SID	*RSF S	2	22.22	.00	.01
	*UNKNOWN***************************	*RSF S	1	11.11	.00	.01
		TOTAL	9			
QMHRCVPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	8	100.00	.01	.01
		TOTAL	8			
QSPCPYF	PROGRAM	*RSF S	4	50.00	.00	.01
	PROGRAM	*RS S	2	25.00	.00	.01
	LIBRARY	*RSF S	1	12.50	.00	.01
	*UNKNOWN***************************	*RSF S	1	12.50	.00	.01

Figure 101 (Part 10 of 12). I/O by Object Type within Program

08/02/96	19:00:31	IO by Object Type within Program					PAGE 14
Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO	
		TOTAL	8				
QTMPCKP	PROGRAM	*RSF S	7	100.00	.01	.01	
		TOTAL	7				
QWTMESBC	PROGRAM	*RS S	6	85.71	.01	.01	
	*UNKNOWN***************************	*RSF S	1	14.29	.00	.01	
		TOTAL	7				
QLICNV	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	100.00	.01	.01	
		TOTAL	6				
QTQGESP	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	100.00	.01	.01	
		TOTAL	6				
QUICMD	PROGRAM	*RS S	4	66.67	.00	.01	
	PROGRAM	*RSF S	1	16.67	.00	.01	
	*UNKNOWN***************************	*RSF S	1	16.67	.00	.01	
		TOTAL	6				
QWPALLOC	PROGRAM	*RSF S	6	100.00	.01	.01	
		TOTAL	6				
QSYGRTSA	USER PROFILE	*RSF S	3	60.00	.00	.01	
	COMPOSITE PIECE - DATA SPACE	*WSP S	1	20.00	.00	.01	
	DATA BASE FILE MEMBER	*WSP S	1	20.00	.00	.01	
		TOTAL	5				
QSPCHJOB	SPOOL CTL BLOCK	*WS S M05	3	75.00	.00	.00	

08/02/96	19:00:31	IO by Object Type within Program					PAGE 15
Program	Object Description	PDIO Type	PDIO Total	PCT PGM IO	PCT ALL IO	PCT PGM IO of ALL IO	
QSPCHJOB	HOLD RECORD SEG	*RSF S	1	25.00	.00	.00	
		TOTAL	4				
QUIRCLAP	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	100.00	.00	.00	
		TOTAL	4				
QLIMROIR	COMPOSITE PIECE - INDEX	*RSF S	1	33.33	.00	.00	
	OIR SPACE	*RSF S	1	33.33	.00	.00	
	OIR SPACE	*WSP A	1	33.33	.00	.00	
		TOTAL	3				
QUICLOSE	PROGRAM	*RSF S	2	66.67	.00	.00	
	*UNKNOWN***************************	*RSF S	1	33.33	.00	.00	
		TOTAL	3				
QUIICHK	PANEL GROUP DEFINITION	*RSF S	2	66.67	.00	.00	
	PROGRAM	*RSF S	1	33.33	.00	.00	
		TOTAL	3				
QCAIFLD	TEMPORARY - PROCESS CTL SPACE	*RSF S	2	100.00	.00	.00	
		TOTAL	2				
QEZWRAST	PROGRAM	*RSF S	1	50.00	.00	.00	
	*UNKNOWN***************************	*RSF S	1	50.00	.00	.00	
		TOTAL	2				
QSPDSPFX	PROGRAM	*RSF S	1	50.00	.00	.00	
	*UNKNOWN***************************	*RSF S	1	50.00	.00	.00	

Figure 101 (Part 11 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                    IO by Object Type within Program                        PAGE   16
Program    Object                                PDIO            PDIO      PCT       PCT    PCT
           Description                           Type            Total     PGM       ALL    PGM IO
                                                                            IO       IO     of ALL IO
                                                   TOTAL             2
QTGTNTOC   PROGRAM                               *RSF S              2   100.00      .00        .00
                                                   TOTAL             2
QUICBINT   PROGRAM                               *RSF S              1    50.00      .00        .00
           *UNKNOWN****************************  *RSF S              1    50.00      .00        .00
                                                   TOTAL             2
QUIEXFMT   PANEL GROUP DEFINITION                *RSF S              2   100.00      .00        .00
                                                   TOTAL             2
QUIINMGR   TEMPORARY - SPACE                     *RSF S              2   100.00      .00        .00
                                                   TOTAL             2
QUILIST    PROGRAM                               *RSF S              1    50.00      .00        .00
           TEMPORARY - SPACE                     *RSF S              1    50.00      .00        .00
                                                   TOTAL             2
QUIOPEN    PROGRAM                               *RSF S              2   100.00      .00        .00
                                                   TOTAL             2
QMHLOGER   FILE                                  *WS  A              1   100.00      .00        .00
                                                   TOTAL             1
QSPHNMLT   PROGRAM                               *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
                                                   M05

08/02/96  19:00:31                    IO by Object Type within Program                        PAGE   17
Program    Object                                PDIO            PDIO      PCT       PCT    PCT
           Description                           Type            Total     PGM       ALL    PGM IO
                                                                            IO       IO     of ALL IO
QSYACCIP   LIBRARY                               *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
QTOASND    HEAP DATA SEGMENT TYPE                *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
QUIALIST   PROGRAM                               *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
QUIVPMGR   PANEL GROUP DEFINITION                *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
QWCSHUIC   PROGRAM                               *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
QWPPUT     HOLD RECORD SEG                       *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
QWTMEPJP   TEMPORARY - INDEX                     *RSF S              1   100.00      .00        .00
                                                   TOTAL             1
                                                   FINAL TOTALS
                                                   TOTAL        94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 101 (Part 12 of 12). I/O by Object Type within Program

10.3 Activation Group Details (ACTGRP Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.3, “ACTGRP Reporting Command” on page 153 for a details of how to use the ACTGRP command to produce these reports.

Refer to Table 13 on page 168 for details on the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.3.1 Report Title - Activation Group Creates by Job

```
                                                     Activation Group Creates
                                                     by
                                                     Job
                                        QUERY NAME . . . . . ACTGRP03
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                        ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 19:00:44
                                              Activation Group Creates - Part 2 (Job

08/02/96  19:00:44  Activation Group Creates by Job  PAGE    1
Job                           ACTGRP   Pct ALL   TDE
                              Creates  ACTGRP
                                       Creates
ILEAGNEW  A960126A  053541        279    97.55   0000880E
JUNK      QSPLJOB   053464          7     2.45   00008408
                      FINAL TOTALS
                      TOTAL           286
* * *  E N D  O F  R E P O R T  * * *
```

Figure 102. Activation Group Creates by Job

10.3.2 Report Title - Activation Group Creates by Program within Job

```
                                                     Activation Group Creates
                                                     by
                                                     Program within Job
                                        QUERY NAME . . . . . ACTGRP04
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                        ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 19:00:45
                                            Activation Group Creates - Part 3 (Job/Pgm

08/02/96  19:00:45  Activation Group Creates by Program within Job   PAGE    1
Job                         Program Causing        ACTGRP   Pct ALL   TDE
                            ACTGRP Creation        Creates  ACTGRP
                                                            Creates
ILEAGNEW  A960126A  053541    ILEAGN                   279    97.55   0000880E
JUNK      QSPLJOB   053464    QTMPLPRC                   7     2.45   00008408
                                       FINAL TOTALS
                                       TOTAL           286
* * *  E N D  O F  R E P O R T  * * *
```

Figure 103. Activation Group Creates by Program within Job

10.3.3 Report Title - Activation Group Creates by Program

Note: Application program names appear in this report **irrespective** of the value specified for ″Trace MI CALL Events?″ on the PEX collection command SMTBCH.

```
             Activation Group Creates
             by
             Program
QUERY NAME . . . . . ACTGRP05
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ACTGRP02A    PFREXP2      PEXTRACE     ACTGRP02A
ACTGRP02A    PFREXP2      PEXTRACE     ACTGRP02A
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:00:45
      Activation Group Creates - Part 5 (Pgm


08/02/96  19:00:45  Activation Group Creates by Program  PAGE    1
Program Causing        ACTGRP   Pct ALL
ACTGRP Create          Creates  ACTGRP
                                Creates
  ILEAGN                   279    97.55
  QTMPLPRC                   7     2.45
           FINAL TOTALS
           TOTAL           286
* * *  E N D  O F  R E P O R T  * * *
```

Figure 104. Activation Group Creates by Program

10.4 Page Fault Information (FLTS Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.4, “FLTS Reporting Command” on page 155 for a details of how to use the FLTS command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.4.1 Report Title - Page Faults by Object/Segment Name and Description

This report is produced from Command Option - By Object/Segment Name.

```
                          Page faults by object/segment name and description.
                          (only obj/segs that had 1% or more of all system faults)
                             QUERY NAME . . . . . FLT3
                             LIBRARY NAME . . . . SMTRACE
                             FILE         LIBRARY      MEMBER       FORMAT
                             FLT1         PFREXP2      PEXTRACE     FLT1
                             FLT2         PFREXP2      PEXTRACE     FLT2
                             DATE . . . . . . . . 08/02/96
                             TIME . . . . . . . . 19:01:34


             Number  Percent of all  Object/Segment           Segment  Object/Segment
             of      system faults   name and obj type        type     description
             faults
              4,543        11.30     FCFA2024DA00        0000  20D6    HEAP DATA SEGMENT TYPE
              4,090        10.17     ILEAGNEW  A960126A  1AEF  0006    TEMPORARY - PROCESS CTL SPACE
              2,385         5.93     OPEN5               0201  0001    PROGRAM
              1,974         4.91     *DESTROYED          0000  0000
              1,929         4.80     TESTIO              0201  0001    PROGRAM
              1,461         3.63     ILEAGN              0201  0001    PROGRAM
              1,455         3.62     DSPOBJD   DSPOBJD   0B90  0001    COMPOSITE PIECE - DATA SPACE
              1,264         3.14     QCAWAREA            19EF  0001    TEMPORARY - SPACE
              1,246         3.10     HATT                0401  0001    LIBRARY
              1,187         2.95     OPENBAD   A960126A  1AEF  007B    TEMPORARY - PROCESS CTL SPACE
              1,093         2.72     SEIZE LOCK RANGE    0000  2081    HOLD RECORD SEG
              1,012         2.52     QRNXDUMP            0203  0001    SERVICE PROGRAM
                965         2.40     OPENBAD             0201  0001    PROGRAM
                871         2.17     TESTIOC             0201  0001    PROGRAM
                840         2.09     QSQENDAG            0201  0001    PROGRAM
                837         2.08     QLEAWI              0203  0001    SERVICE PROGRAM
                787         1.96     D2FB76C77200        0000  20D6    HEAP DATA SEGMENT TYPE
                732         1.82     D7A782247200        0000  20BB    MODUL2 STATIC STORE
                690         1.72     JUNK      QSPLJOB   1AEF  0006    TEMPORARY - PROCESS CTL SPACE
                567         1.41     ILEAGNEW            0201  0001    PROGRAM
                545         1.36     PF04      PF04      0B90  0001    COMPOSITE PIECE - DATA SPACE
                522         1.30     PF03      PF03      0B90  0001    COMPOSITE PIECE - DATA SPACE
                509         1.27     PF05      PF05      0B90  0001    COMPOSITE PIECE - DATA SPACE
                495         1.23     PF02      PF02      0B90  0001    COMPOSITE PIECE - DATA SPACE
                469         1.17     PF01      PF01      0B90  0001    COMPOSITE PIECE - DATA SPACE
                450         1.12     QUSRSYS             0401  0001    LIBRARY
                447         1.11     QDBGETM             0201  0001    PROGRAM
                422         1.05     QJOBMSGQ            18A0  0001    JOB MESSAGE QUEUE
                404         1.00     QDFTOWN             0801  0001    USER PROFILE
FINAL TOTALS
TOTAL        34,191        85.05
* * *  E N D  O F  R E P O R T  * * *
```

Figure 105. Page Faults by Object/Segment Name and Description

10.4.2 Report Title - Page Faults by Object and Job/Task.

This report is produced from Command Option - By Object and Job/Task.

```
Page faults by object and job/task.
Includes only objs/segs with 1% or more of all system faults.
Includes only jobs/tasks with 1% or more of the obj's/seg's faults.
        QUERY NAME . . . . . FLTOBJ3
        LIBRARY NAME . . . . SMTRACE
        FILE         LIBRARY      MEMBER       FORMAT
        FLTOBJ2      PFREXP2      PEXTRACE     FLTOBJ2
        FLTOBJ1      PFREXP2      PEXTRACE     FLTOBJ1
        FLT2         PFREXP2      PEXTRACE     FLT2
        TASKINFO     PFREXP2      PEXTRACE     TASKINFO
        DATE . . . . . . . . 08/02/96
        TIME . . . . . . . . 19:01:38
```

```
              Fault Object/Segment          Seg  Percent of ALL Percent of this TDE number Job/Task name    Job        Job
              count name and                type system faults  obj/seg faults  (hex)                       user       number
                    object type
              4,543 FCFA2024DA00           0000 20D6          11.3           100.0     0000880E  ILEAGNEW         A960126A   053541
TOTAL         4,543                                           11.3           100.0
              4,090 ILEAGNEW  A960126A     1AEF 0006          10.2           100.0     0000880E  ILEAGNEW         A960126A   053541
TOTAL         4,090                                           10.2           100.0
              2,385 OPEN5                  0201 0001           5.9           100.0     00008814  OPENBAD          A960126A   053546
TOTAL         2,385                                            5.9           100.0
              1,789 *DESTROYED             0000 0000           4.5            90.6     00008814  OPENBAD          A960126A   053546
                 99                                             .3             5.0     00008810  TSTIOC           A960126A   053543
                 72                                             .2             3.7     00008408  JUNK             QSPLJOB    053464
TOTAL         1,960                                            4.9            99.3
              1,929 TESTIO                 0201 0001           4.8           100.0     00008810  TSTIOC           A960126A   053543
TOTAL         1,929                                            4.8           100.0
              1,461 ILEAGN                 0201 0001           3.6           100.0     0000880E  ILEAGNEW         A960126A   053541
TOTAL         1,461                                            3.6           100.0
              1,455 DSPOBJD   DSPOBJD      0B90 0001           3.6           100.0     00008810  TSTIOC           A960126A   053543
TOTAL         1,455                                            3.6           100.0
                621 QCAWAREA               19EF 0001           1.5            49.1     00008814  OPENBAD          A960126A   053546
                367                                             .9            29.0     00008810  TSTIOC           A960126A   053543
                276                                             .7            21.8     0000880E  ILEAGNEW         A960126A   053541
TOTAL         1,264                                            3.1           100.0
              1,246 HATT                   0401 0001           3.1           100.0     00008810  TSTIOC           A960126A   053543

              Fault Object/Segment          Seg  Percent of ALL Percent of this TDE number Job/Task name    Job        Job
              count name and                type system faults  obj/seg faults  (hex)                       user       number
                    object type
TOTAL         1,246                                            3.1           100.0
              1,187 OPENBAD   A960126A     1AEF 007B           3.0           100.0     00008814  OPENBAD          A960126A   053546
TOTAL         1,187                                            3.0           100.0
                728 SEIZE LOCK RANGE       0000 2081           1.8            66.6     00008814  OPENBAD          A960126A   053546
                272                                             .7            24.9     0000880E  ILEAGNEW         A960126A   053541
                 60                                             .2             5.5     00008408  JUNK             QSPLJOB    053464
                 25                                             .1             2.3     00008810  TSTIOC           A960126A   053543
TOTAL         1,085                                            2.7            99.3
              1,012 QRNXDUMP               0203 0001           2.5           100.0     0000880E  ILEAGNEW         A960126A   053541
TOTAL         1,012                                            2.5           100.0
                965 OPENBAD                0201 0001           2.4           100.0     00008814  OPENBAD          A960126A   053546
TOTAL           965                                            2.4           100.0
                871 TESTIOC                0201 0001           2.2           100.0     00008810  TSTIOC           A960126A   053543
TOTAL           871                                            2.2           100.0
                833 QSQENDAG               0201 0001           2.1            99.2     0000880E  ILEAGNEW         A960126A   053541
TOTAL           833                                            2.1            99.2
                828 QLEAWI                 0203 0001           2.1            98.9     0000880E  ILEAGNEW         A960126A   053541
                  9                                             .0             1.1     00008408  JUNK             QSPLJOB    053464
TOTAL           837                                            2.1           100.0
                787 D2FB76C77200           0000 20D6           2.0           100.0     00008408  JUNK             QSPLJOB    053464
TOTAL           787                                            2.0           100.0
```

Figure 106 (Part 1 of 2). page Faults by Object and Job/Task

```
               Fault Object/Segment            Seg  Percent of ALL Percent of this TDE number Job/Task name    Job        Job
               count name and                  type system faults  obj/seg faults  (hex)                      user       number
                     object type
                 732 D7A782247200         0000 20BB            1.8            100.0   0000880E  ILEAGNEW         A960126A   053541
TOTAL            732                                           1.8            100.0
                 690 JUNK      QSPLJOB    1AEF 0006            1.7            100.0   00008408  JUNK             QSPLJOB    053464
TOTAL            690                                           1.7            100.0
                 567 ILEAGNEW             0201 0001            1.4            100.0   0000880E  ILEAGNEW         A960126A   053541
TOTAL            567                                           1.4            100.0
                 545 PF04      PF04       0B90 0001            1.4            100.0   00008814  OPENBAD          A960126A   053546
TOTAL            545                                           1.4            100.0
                 522 PF03      PF03       0B90 0001            1.3            100.0   00008814  OPENBAD          A960126A   053546
TOTAL            522                                           1.3            100.0
                 509 PF05      PF05       0B90 0001            1.3            100.0   00008814  OPENBAD          A960126A   053546
TOTAL            509                                           1.3            100.0
                 495 PF02      PF02       0B90 0001            1.2            100.0   00008814  OPENBAD          A960126A   053546
TOTAL            495                                           1.2            100.0
                 469 PF01      PF01       0B90 0001            1.2            100.0   00008814  OPENBAD          A960126A   053546
TOTAL            469                                           1.2            100.0
                 265 QUSRSYS              0401 0001             .7             58.9   00008814  OPENBAD          A960126A   053546
                 153                                            .4             34.0   0000880E  ILEAGNEW         A960126A   053541
                  30                                            .1              6.7   00008408  JUNK             QSPLJOB    053464
TOTAL            448                                           1.1             99.6


               Fault Object/Segment            Seg  Percent of ALL Percent of this TDE number Job/Task name    Job        Job
               count name and                  type system faults  obj/seg faults  (hex)                      user       number
                     object type
                 447 QDBGETM              0201 0001            1.1            100.0   00008810  TSTIOC           A960126A   053543
TOTAL            447                                           1.1            100.0
                 274 QJOBMSGQ             18A0 0001             .7             64.9   0000880E  ILEAGNEW         A960126A   053541
                 139                                            .4             32.9   00008408  JUNK             QSPLJOB    053464
                   9                                            .0              2.1   00007F6C  P23ARTVKE        A960126A   053319
TOTAL            422                                           1.1            100.0
                 404 QDFTOWN              0801 0001            1.0            100.0   00008810  TSTIOC           A960126A   053543
TOTAL            404                                           1.0            100.0
FINAL TOTALS
TOTAL         34,160                                          85.0          2,897.3
* * *  E N D  O F  R E P O R T  * * *
```

Figure 106 (Part 2 of 2). page Faults by Object and Job/Task

10.4.3 Report Title - Page Faults by Job/Task

This report is produced from Command Option - By Job/Task.

```
                                    Page faults by Job/Task.
                                    Includes jobs/tasks with 1% or more of all system faults.
                                        QUERY NAME . . . . . FLTTDE3
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        FLTTDE1      PFREXP2      PEXTRACE     FLTTDE1
                                        FLTTDE2      PFREXP2      PEXTRACE     FLTTDE2
                                        TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 19:01:52

              Fault  Percent of ALL  TDE       Job/Task name     Job         Job
              count  system faults   number                      user        number
                                     (hex)
             15,814         39.33    0000880E  ILEAGNEW          A960126A    053541
             12,117         30.14    00008814  OPENBAD           A960126A    053546
              7,370         18.33    00008810  TSTIOC            A960126A    053543
              4,498         11.19    00008408  JUNK              QSPLJOB     053464
FINAL TOTALS
TOTAL        39,799         98.99
* * *  E N D  O F  R E P O R T  * * *
```

Figure 107. Page Faults by Job/Task

10.4.4 Report Title - Page Faults by Job/Task and Object Name/Segment Type

This report is produced from Command Option - By Job/Task and Object/Seg.

```
Page faults by Job/Task and object name.
Includes Jobs/Tasks with 1% or more of all faults.
Include objects with 1% or more of included TDE's faults.
    QUERY NAME . . . . . FLTTDE03
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    FLTTDE01     PFREXP2      PEXTRACE     FLTTDE01
    FLTTDE02     PFREXP2      PEXTRACE     FLTTDE02
    FLTTDE2      PFREXP2      PEXTRACE     FLTTDE2
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    DATE . . . . . . . . 08/02/96
    TIME . . . . . . . . 19:01:56
```

```
             Fault TDE      Job/Task name     Job        Job        % this       % ALL   Object name and          Segment
             count number                     user       number     TDE's        sys     object type              type
                   (hex)                                            flts         flts
             4,543 0000880E ILEAGNEW          A960126A   053541       28.7        11.3   FCFA2024DA00         0000   20D6
             4,090                                                    25.9        10.2   ILEAGNEW  A960126A   1AEF   0006
             1,461                                                     9.2         3.6   ILEAGN               0201   0001
             1,012                                                     6.4         2.5   QRNXDUMP             0203   0001
               833                                                     5.3         2.1   QSQENDAG             0201   0001
               828                                                     5.2         2.1   QLEAWI               0203   0001
               732                                                     4.6         1.8   D7A782247200         0000   20BB
               567                                                     3.6         1.4   ILEAGNEW             0201   0001
               281                                                     1.8          .7   APLIST               19EF   0001
               280                                                     1.8          .7   D56C3B528F00         0000   20D5
               276                                                     1.8          .7   QCAWAREA             19EF   0001
               274                                                     1.7          .7   QJOBMSGQ             18A0   0001
               272                                                     1.7          .7   SEIZE LOCK RANGE     0000   2081
               160                                                     1.0          .4   QRNXIE               0203   0001
TOTAL       15,609                                                    98.7        38.8
             2,385 00008814 OPENBAD           A960126A   053546       19.7         5.9   OPEN5                0201   0001
             1,789                                                    14.8         4.5   *DESTROYED           0000   0000
             1,187                                                     9.8         3.0   OPENBAD   A960126A   1AEF   007B
               965                                                     8.0         2.4   OPENBAD              0201   0001
               728                                                     6.0         1.8   SEIZE LOCK RANGE     0000   2081
               621                                                     5.1         1.5   QCAWAREA             19EF   0001
               545                                                     4.5         1.4   PF04      PF04       0B90   0001
               522                                                     4.3         1.3   PF03      PF03       0B90   0001
               509                                                     4.2         1.3   PF05      PF05       0B90   0001
               495                                                     4.1         1.2   PF02      PF02       0B90   0001
               469                                                     3.9         1.2   PF01      PF01       0B90   0001
               308                                                     2.5          .8   PF01                 1901   0001
               308                                                     2.5          .8   PF02                 1901   0001
               306                                                     2.5          .8   PF05                 1901   0001
               305                                                     2.5          .8   PF04                 1901   0001
               304                                                     2.5          .8   PF03                 1901   0001
               265                                                     2.2          .7   QUSRSYS              0401   0001
TOTAL       12,011                                                    99.1        29.9
             1,929 00008810 TSTIOC            A960126A   053543       26.2         4.8   TESTIO               0201   0001
```

Figure 108 (Part 1 of 2). Page Faults by Job/Task and Object Name

```
             Fault TDE      Job/Task name    Job        Job        % this       % ALL      Object name and           Segment
             count number                    user       number     TDE's        sys        object type               type
                   (hex)                                           flts         flts
             1,455 00008810 TSTIOC           A960126A   053543       19.7         3.6      DSPOBJD    DSPOBJD   0B90   0001
             1,246                                                   16.9         3.1      HATT                 0401   0001
               871                                                   11.8         2.2      TESTIOC              0201   0001
               447                                                    6.1         1.1      QDBGETM              0201   0001
               404                                                    5.5         1.0      QDFTOWN              0801   0001
               385                                                    5.2         1.0      DSPOBJD              1901   0001
               367                                                    5.0          .9      QCAWAREA             19EF   0001
               112                                                    1.5          .3      QRNXIE               0203   0001
                99                                                    1.3          .3      *DESTROYED           0000   0000
TOTAL        7,315                                                   99.3        18.2
               787 00008408 JUNK             QSPLJOB    053464       17.5         2.0      D2FB76C77200         0000   20D6
               690                                                   15.3         1.7      JUNK       QSPLJOB   1AEF   0006
               371                                                    8.3          .9      QSOSRV2              0203   0001
               266                                                    5.9          .7      QTMPLPRC             0201   0001
               214                                                    4.8          .5      QSOKERN3             0203   0001
               188                                                    4.2          .5      L/L RANGE 1          0000   0000
               143                                                    3.2          .4      QSOSRV1              0203   0001
               139                                                    3.1          .4      QJOBMSGQ             18A0   0001
               110                                                    2.5          .3      SQCCSID1             0ED2   0001
                81                                                    1.8          .2      QTQICONV             0203   0001
                72                                                    1.6          .2      *DESTROYED           0000   0000
                72                                                    1.6          .2      QC2UTIL1             0203   0001
                72                                                    1.6          .2      QPOLLIB1             0203   0001
                69                                                    1.5          .2      E43BF962E500         0000   20AC
                67                                                    1.5          .2      QATOCTCPIPCONFIG     0C90   0001
                66                                                    1.5          .2      QYPPRT               0203   0001
                61                                                    1.4          .2      EEE05252CB00         0000   20BB
                60                                                    1.3          .2      QSO_DNS_INDEX        0EEF   0001
                60                                                    1.3          .2      SEIZE LOCK RANGE     0000   2081
                52                                                    1.2          .1      QATOCTCPIPCONFIG     0B90   0001
                50                                                    1.1          .1      F836A3DBEA00         0000   20AC
                50                                                    1.1          .1      QSPRMTDR             0201   0001
                49                                                    1.1          .1      QSECOFR              0801   0001
                45                                                    1.0          .1      QPOSSRV3             0203   0001
                45                                                    1.0          .1      QTCP                 0401   0001


             Fault TDE      Job/Task name    Job        Job        % this       % ALL      Object name and           Segment
             count number                    user       number     TDE's        sys        object type               type
                   (hex)                                           flts         flts
TOTAL        3,879                                                   86.2         9.6
FINAL TOTALS
TOTAL       38,814                                                  383.4        96.6
* * *  E N D  O F  R E P O R T  * * *
```

Figure 108 (Part 2 of 2). Page Faults by Job/Task and Object Name

10.4.5 Report Title - Object Faults within MI Program within Job

This report is produced from Command Option - By Mainstore Pool.

```
     Object faults within MI pgm, within Job.
QUERY NAME . . . . . FJOBPGMOB6
LIBRARY NAME . . . . SMTRACE
FILE          LIBRARY       MEMBER        FORMAT
FJOBPGMOB5    PFREXP2       PEXTRACE      FJOBPGMOB5
TASKINFO      PFREXP2       PEXTRACE      TASKINFO
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:02:33
```

```
08/02/96  19:02:33                                                                                PAGE    1
TDE       Process     Job         Job               Job   MIMOD                PGM  NAMETYPE                  OBJ
          job name    user        number          TOTAL                      TOTAL                          TOTAL
0000880E  ILEAGNEW    A960126A    053541         15,814   ILEAGNEW           6,503  FCFA2024DA00        0000    2,754
                                                                                    QRNXDUMP            0203    1,012
                                                                                    ILEAGNEW  A960126A  1AEF      980
                                                                                    ILEAGN              0201      757
                                                                                    ILEAGNEW            0201      558
                                                                                    D56C3B528F00        0000      280
                                                                                    QRNXIE              0203      160
                                                          QSQENDAG           3,219  ILEAGNEW  A960126A  1AEF    1,523
                                                                                    FCFA2024DA00        0000      882
                                                                                    QSQENDAG            0201      282
                                                                                    QJOBMSGQ            18A0      274
                                                                                    D7A782247200        0000      258
                                                          QLEAWI             1,590  QLEAWI              0203      828
                                                                                    D7A782247200        0000      278
                                                                                    FCFA2024DA00        0000      259
                                                                                    ILEAGNEW  A960126A  1AEF      225
                                                          QCLCLCPR           1,442  ILEAGN              0201      424
                                                                                    QCAWAREA            19EF      274
                                                                                    SEIZE LOCK RANGE    0000      272

08/02/96  19:02:33                                                                                PAGE    2
TDE       Process     Job         Job               Job   MIMOD                PGM  NAMETYPE                  OBJ
          job name    user        number          TOTAL                      TOTAL                          TOTAL
0000880E  ILEAGNEW    A960126A    053541         15,814   QCLCLCPR           1,442  D7A782247200        0000      196
                                                                                    QUSRSYS             0401      153
                                                                                    ILEAGNEW  A960126A  1AEF      111
                                                          *NONE                867  FCFA2024DA00        0000      567
                                                                                    ILEAGNEW  A960126A  1AEF      297
                                                          QDMRCLSE             855  QSQENDAG            0201      551
                                                                                    ILEAGNEW  A960126A  1AEF      252
                                                                                    FCFA2024DA00        0000       49
                                                          ILEAGN               509  ILEAGN              0201      280
                                                                                    ILEAGNEW  A960126A  1AEF      216
                                                                                    FCFA2024DA00        0000       13
                                                          QOLCLNUP             280  APLIST              19EF      278
                                                          NSED INTER           205  ILEAGNEW  A960126A  1AEF      205
                                                          QLEDAGE              157  ILEAGNEW  A960126A  1AEF      144
                                                                                    FCFA2024DA00        0000       13
                                                          QC2UTIL1             135  ILEAGNEW  A960126A  1AEF      135
                                                          QWVPDAGE              25  QWVPDAGE            0201       25
00008814  OPENBAD     A960126A    053546         12,117   OPEN5              2,215  OPEN5               0201    1,658
                                                                                    *DESTROYED          0000      438
```

Figure 109 (Part 1 of 5). Object Faults within MI Program within Job

```
08/02/96  19:02:33                                                                                           PAGE    3
TDE       Process     Job         Job              Job   MIMOD                PGM    NAMETYPE                        OBJ
          job name    user        number         TOTAL                        TOTAL                                  TOTAL
00008814  OPENBAD     A960126A    053546        12,117   OPEN5                2,215  OPENBAD    A960126A   1AEF        119
                                                         QDBOPEN              1,887  SEIZE LOCK RANGE      0000        505
                                                                                     PF01       PF01       0B90        301
                                                                                     PF02       PF02       0B90        289
                                                                                     PF03       PF03       0B90        276
                                                                                     PF04       PF04       0B90        235
                                                                                     PF05       PF05       0B90        185
                                                                                     OPEN5                 0201         71
                                                                                     *DESTROYED            0000         11
                                                         QCLCLCPR             1,823  OPENBAD               0201        627
                                                                                     OPEN5                 0201        550
                                                                                     QCAWAREA              19EF        303
                                                                                     QUSRSYS               0401        265
                                                                                     OPENBAD    A960126A   1AEF         54
                                                                                     QRNXIE                0203         24
                                                         QDBGETM              1,678  *DESTROYED            0000        565
                                                                                     PF05       PF05       0B90        310
                                                                                     OPENBAD    A960126A   1AEF        245
                                                                                     PF04       PF04       0B90        243


08/02/96  19:02:33                                                                                           PAGE    4
TDE       Process     Job         Job              Job   MIMOD                PGM    NAMETYPE                        OBJ
          job name    user        number         TOTAL                        TOTAL                                  TOTAL
00008814  OPENBAD     A960126A    053546        12,117   QDBGETM              1,678  PF03       PF03       0B90        123
                                                                                     SEIZE LOCK RANGE      0000        115
                                                                                     PF02       PF02       0B90         61
                                                                                     PF01       PF01       0B90         16
                                                         QDMCOPEN             1,558  PF01                  1901        308
                                                                                     PF02                  1901        308
                                                                                     PF05                  1901        306
                                                                                     PF04                  1901        305
                                                                                     PF03                  1901        304
                                                                                     OPENBAD    A960126A   1AEF         22
                                                         QDMCLOSE             1,066  *DESTROYED            0000        456
                                                                                     PF01       PF01       0B90        152
                                                                                     PF02       PF02       0B90        145
                                                                                     PF03       PF03       0B90        123
                                                                                     SEIZE LOCK RANGE      0000        108
                                                                                     PF04       PF04       0B90         67
                                                                                     PF05       PF05       0B90         14
                                                         OPENBAD                840  OPENBAD               0201        328
                                                                                     QCAWAREA              19EF        315
                                                   M05


08/02/96  19:02:33                                                                                           PAGE    5
TDE       Process     Job         Job              Job   MIMOD                PGM    NAMETYPE                        OBJ
          job name    user        number         TOTAL                        TOTAL                                  TOTAL
00008814  OPENBAD     A960126A    053546        12,117   OPENBAD                840  OPENBAD    A960126A   1AEF        170
                                                                                     OPEN5                 0201         27
                                                         QRNXIO                 462  *DESTROYED            0000        319
                                                                                     OPENBAD    A960126A   1AEF        143
                                                         *NONE                  306  OPENBAD    A960126A   1AEF        218
                                                                                     OPEN5                 0201         79
                                                         QLEAWI                 126  OPENBAD    A960126A   1AEF        126
                                                         SelectRUt               80  OPENBAD    A960126A   1AEF         80
00008810  TSTIOC      A960126A    053543         7,370   QCLCLCPR             2,952  HATT                  0401      1,246
                                                                                     TESTIO                0201        923
                                                                                     QDFTOWN               0801        404
                                                                                     QCAWAREA              19EF        365
                                                         QDBGETM              1,751  DSPOBJD    DSPOBJD    0B90      1,211
                                                                                     QDBGETM               0201        447
                                                                                     *DESTROYED            0000         83
                                                         TESTIOC                982  TESTIOC               0201        861
                                                                                     QRNXIE                0203        112
                                                         TESTIO                 932  TESTIO                0201        925
                                                         QDMCOPEN               386  DSPOBJD               1901        385
```

Figure 109 (Part 2 of 5). Object Faults within MI Program within Job

08/02/96 19:02:33 PAGE 6

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE			OBJ TOTAL
00008810	TSTIOC	A960126A	053543	7,370	QDBOPEN	266	DSPOBJD	DSPOBJD	0B90	207
							TESTIO		0201	56
					QDMCLOSE	57	DSPOBJD	DSPOBJD	0B90	37
							SEIZE LOCK RANGE		0000	15
					*NONE	16	TESTIO		0201	16
00008408	JUNK	QSPLJOB	053464	4,498	QCATRS	860	D2FB76C77200		0000	330
							QYPPRT		0203	48
							QPOLLIB1		0203	45
							QSOSRV2		0203	42
							QTMPLPRC		0201	39
							QSOSRV1		0203	38
							QTQICONV		0203	34
							QPOSSRV3		0203	33
							F836A3DBEA00		0000	26
							QPOLDC1		0203	26
							QPOSSRV4		0203	26
							QPOWPID		0203	26
							QPOWPIDI		0203	26
							QTQICVC2		0203	26

M05

08/02/96 19:02:33 PAGE 7

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE			OBJ TOTAL
00008408	JUNK	QSPLJOB	053464	4,498	QCATRS	860	QWPZHPT1		0203	26
							JUNK	QSPLJOB	1AEF	16
							QTCP		0401	14
							QTMPCKP		0201	14
							D1EDE9BC4700		0000	13
							QJOBMSGQ		18A0	12
					QSOKERN3	710	L/L RANGE 1		0000	164
							QSOKERN3		0203	118
							QSOSRV2		0203	78
							E43BF962E500		0000	69
							QSOSRV1		0203	63
							QSO_DNS_INDEX		0EEF	60
							QPOLLFS1		0203	30
							ECB9E6FE0E00		0000	26
							QTMPLPRC		0201	21
							JUNK	QSPLJOB	1AEF	17
							D2FB76C77200		0000	15
							QSECOFR		0801	15
							EEE05252CB00		0000	14

08/02/96 19:02:33 PAGE 8

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE			OBJ TOTAL
00008408	JUNK	QSPLJOB	053464	4,498	QSOKERN3	710	FCAE14909A00		0000	14
					*NONE	603	JUNK	QSPLJOB	1AEF	222
							D2FB76C77200		0000	129
							QC2UTIL1		0203	42
							QSOKERN3		0203	36
							QSOSRV2		0203	36
							*DESTROYED		0000	24
							QTMPLPRC		0201	24
							QTQSRVP2		0203	24
							C517F58CA900		0000	12
							QSOSRV1		0203	12
							QTQICONV		0203	12
							SQCCSID1		0ED2	12
					QDMCOPEN	319	D2FB76C77200		0000	101
							QSOSRV2		0203	80
							JUNK	QSPLJOB	1AEF	35
							QUSRSYS		0401	30
							QSECOFR		0801	28
							EEE05252CB00		0000	19

Figure 109 (Part 3 of 5). Object Faults within MI Program within Job

08/02/96 19:02:33 PAGE 9

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE		OBJ TOTAL
00008408	JUNK	QSPLJOB	053464	4,498	QDMCOPEN	319	QATOCTCPIP	1901	17
					QTMPLPRC	263	QTMPLPRC	0201	135
							JUNK QSPLJOB	1AEF	40
							D2FB76C77200	0000	35
							QSOSRV1	0203	12
							QSOSRV2	0203	12
					QSOSRV2	254	QSOSRV2	0203	111
							JUNK QSPLJOB	1AEF	90
							D2FB76C77200	0000	15
							QSOKERN3	0203	12
							QSYS	0401	12
							QTQICONV	0203	12
					QDBOPEN	250	SQCCSID1	0ED2	74
							SEIZE LOCK RANGE	0000	38
							JUNK QSPLJOB	1AEF	34
							QDBOPEN	0201	27
							QTMPLPRC	0201	25
							QATOCTCPIPCONFIG	0B90	17
							QATOCTCPIPCONFIG	0C90	16

08/02/96 19:02:33 PAGE 10

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE		OBJ TOTAL
00008408	JUNK	QSPLJOB	053464	4,498	QDBOPEN	250	QATTR	1951	13
					QCMDEXC	209	D2FB76C77200	0000	75
							JUNK QSPLJOB	1AEF	19
							F836A3DBEA00	0000	12
							QMHRSNEM	0201	12
							QPOLLIB1	0203	12
							QPOSSRV3	0203	12
							QSOSRV1	0203	12
							QSOSRV2	0203	12
							QYPPRT	0203	12
							QTQICONV	0203	11
					QMHSNDPM	141	QJOBMSGQ	18A0	47
							QTCPMSGF	0E03	30
							QCPFMSG	0E03	26
							QTCP	0401	18
					QDBGETKY	106	QATOCTCPIPCONFIG	0C90	39
							L/L RANGE 1	0000	24
							QATOCTCPIPCONFIG	0B90	23
							JUNK QSPLJOB	1AEF	16

M05

08/02/96 19:02:33 PAGE 11

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE		OBJ TOTAL
00008408	JUNK	QSPLJOB	053464	4,498	QC2UTIL1	86	QC2UTIL1	0203	24
							JUNK QSPLJOB	1AEF	22
							F836A3DBEA00	0000	12
					QMHRSNEM	58	QSPRMTDR	0201	18
							QMHRSNEM	0201	12
					QLIDLOBJ	41	QJOBMSGQ	18A0	17
					QSOSRV1	37	QSOKERN3	0203	30
					QTQICONV	36	D2FB76C77200	0000	12
							QTQICONV	0203	12
							QTQICVC2	0203	12
					QSQENDAG	36	JUNK QSPLJOB	1AEF	20
					QSPRMTDR	33	QSPRMTDR	0201	26
					QLICHLLE	32	QLICHLLE	0201	13
							SEIZE LOCK RANGE	0000	12
					QTQICVC2	30	JUNK QSPLJOB	1AEF	18
							D2FB76C77200	0000	12
					QCANPARS	30	SQCCSID1	0ED2	24
					QMHMOVPM	29	QJOBMSGQ	18A0	25
					QPOLLIB1	28	D2FB76C77200	0000	12

Figure 109 (Part 4 of 5). Object Faults within MI Program within Job

08/02/96 19:02:33 PAGE 12

TDE	Process job name	Job user	Job number	Job TOTAL	MIMOD	PGM TOTAL	NAMETYPE			OBJ TOTAL
00008408	JUNK	QSPLJOB	053464	4,498	QMHPDEH	27	QJOBMSGQ		18A0	15
							JUNK	QSPLJOB	1AEF	12
					QCAIEXIT	25	*DESTROYED		0000	12
					QDMCLOSE	24	QATOCTCPIPCONFIG		0B90	12
							QATOCTCPIPCONFIG		0C90	12
					QUSRJOBI	22	JUNK	QSPLJOB	1AEF	16
					QPOLLFS1	18	QSOKERN3		0203	18
					QDBCLOSE	13	*DESTROYED		0000	12
00007F6C	P23ARTVKE	A960126A	053319	231	QWCCDSAC	166	QWCBT01		19D0	88
0000881E	PEXTRACE	A960126A	053555	132	*NONE	19	SM PERM DIR SEGMENT		0000	17
00000116				13	*NONE	13	E43BF962E500		0000	12

* * * E N D O F R E P O R T * * *

Figure 109 (Part 5 of 5). Object Faults within MI Program within Job

10.4.6 Report Title - Page Faults by Mainstore Pool

This report is produced from Command Option - By Mainstore Pool.

```
                                                  Page faults by mainstore pool.
                                        QUERY NAME . . . . . FLTPOOL2
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        FLTPOOL1     PFREXP2      PEXTRACE     FLTPOOL1
                                        FLT2         PFREXP2      PEXTRACE     FLT2
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 19:02:34

Mainstore          Fault  % ALL
pool               count  system faults
(hex)
   07             35,305         87.81
   03              4,498         11.19
   04                222           .55
   02                124           .31
   01                 56           .14
     FINAL TOTALS
     TOTAL        40,205        100.00
* * *  E N D  O F  R E P O R T  * * *
```

Figure 110. Page Faults by Mainstore Pool

10.4.7 Report Title - % of Faults by Pool and Object

This report is produced from Command Option - By Mainstore Pool.

```
                 % of faults by pool and obj
          QUERY NAME . . . . . FLTSOBJ4
          LIBRARY NAME . . . . SMTRACE
          FILE         LIBRARY      MEMBER       FORMAT
          FLTSOBJ3     PFREXP2      PEXTRACE     FLTSOBJ3
          FLTSOBJ      PFREXP2      PEXTRACE     FLTSOBJ
          DATE . . . . . . . . 08/02/96
          TIME . . . . . . . . 19:02:37


08/02/96  19:02:37                                                                                 PAGE    1
POOL  Object/segment             % of system  % of pool  # of Flts  DESC
      name and type
 07                                  87.8       100.0      35,305
      FCFA2024DA00         0000      11.3        12.9       4,543  HEAP DATA SEGMENT TYPE
      ILEAGNEW  A960126A   1AEF      10.2        11.6       4,090  TEMPORARY - PROCESS CTL SPACE
      OPEN5                0201       5.9         6.8       2,385  PROGRAM
      TESTIO               0201       4.8         5.5       1,929  PROGRAM
      *DESTROYED           0000       4.7         5.3       1,888
      ILEAGN               0201       3.6         4.1       1,461  PROGRAM
      DSPOBJD   DSPOBJD    0B90       3.6         4.1       1,455  COMPOSITE PIECE - DATA SPACE
      QCAWAREA             19EF       3.1         3.6       1,264  TEMPORARY - SPACE
      HATT                 0401       3.1         3.5       1,246  LIBRARY
      OPENBAD   A960126A   1AEF       3.0         3.4       1,187  TEMPORARY - PROCESS CTL SPACE
      SEIZE LOCK RANGE     0000       2.5         2.9       1,025  HOLD RECORD SEG
      QRNXDUMP             0203       2.5         2.9       1,012  SERVICE PROGRAM
      OPENBAD              0201       2.4         2.7         965  PROGRAM
      TESTIOC              0201       2.2         2.5         871  PROGRAM
      QSQENDAG             0201       2.1         2.4         833  PROGRAM
      QLEAWI               0203       2.1         2.3         828  SERVICE PROGRAM
      D7A782247200         0000       1.8         2.1         732  MODUL2 STATIC STORE
      ILEAGNEW             0201       1.4         1.6         567  PROGRAM
      PF04      PF04       0B90       1.4         1.5         545  COMPOSITE PIECE - DATA SPACE
      PF03      PF03       0B90       1.3         1.5         522  COMPOSITE PIECE - DATA SPACE
      PF05      PF05       0B90       1.3         1.4         509  COMPOSITE PIECE - DATA SPACE
      PF02      PF02       0B90       1.2         1.4         495  COMPOSITE PIECE - DATA SPACE
      PF01      PF01       0B90       1.2         1.3         469  COMPOSITE PIECE - DATA SPACE
      QDBGETM              0201       1.1         1.3         447  PROGRAM
      QUSRSYS              0401       1.0         1.2         420  LIBRARY
      QDFTOWN              0801       1.0         1.1         404  USER PROFILE
      DSPOBJD              1901       1.0         1.1         385  FILE
 03                                  11.2       100.0       4,498
      D2FB76C77200         0000       2.0        17.5         787  HEAP DATA SEGMENT TYPE
      JUNK      QSPLJOB    1AEF       1.7        15.3         690  TEMPORARY - PROCESS CTL SPACE
* * *  E N D  O F  R E P O R T  * * *
```

Figure 111. Percentage of Faults by Pool and Object

10.4.8 Report Title - Faults by POOL/TDE/OBJ That Are >= 1.0% of the System Page Faults

This report is produced from Command Option - By Mainstore Pool.

```
          Flt's by POOL/TDE/OBJ that are
          >= 1.0% of the system faults
QUERY NAME . . . . . FLTTDEX8
LIBRARY NAME . . . . SMTRACE
FILE        LIBRARY     MEMBER      FORMAT
FLTTDEX7    PFREXP2     PEXTRACE    FLTTDEX7
TASKINFO    PFREXP2     PEXTRACE    TASKINFO
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:02:51
```

08/02/96 19:02:51 PAGE 1

POOL	TDE number (hex)	Job/Task name	Job user	Job number	Object/Segment name and type			Segment type	Num or faults	% of SYSTEM faults	% of this TDE faults	% of this POOL faults
07	00008814	OPENBAD	A960126A	053546	OPEN5		0201	0001	2,385	5.9	19.7	6.8
					*DESTROYED		0000	0000	1,789	4.4	14.8	5.1
					OPENBAD	A960126A	1AEF	007B	1,187	3.0	9.8	3.4
					OPENBAD		0201	0001	965	2.4	8.0	2.7
					SEIZE LOCK RANGE		0000	2081	728	1.8	6.0	2.1
					QCAWAREA		19EF	0001	621	1.5	5.1	1.8
					PF04	PF04	0B90	0001	545	1.4	4.5	1.5
					PF03	PF03	0B90	0001	522	1.3	4.3	1.5
					PF05	PF05	0B90	0001	509	1.3	4.2	1.4
					PF02	PF02	0B90	0001	495	1.2	4.1	1.4
					PF01	PF01	0B90	0001	469	1.2	3.9	1.3
	00008810	TSTIOC	A960126A	053543	TESTIO		0201	0001	1,929	4.8	26.2	5.5
					DSPOBJD	DSPOBJD	0B90	0001	1,455	3.6	19.7	4.1
					HATT		0401	0001	1,246	3.1	16.9	3.5
					TESTIOC		0201	0001	871	2.2	11.8	2.5
					QDBGETM		0201	0001	447	1.1	6.1	1.3
					QDFTOWN		0801	0001	404	1.0	5.5	1.1
					DSPOBJD		1901	0001	385	1.0	5.2	1.1
	0000880E	ILEAGNEW	A960126A	053541	FCFA2024DA00		0000	20D6	4,543	11.3	28.7	12.9
					ILEAGNEW	A960126A	1AEF	0006	4,090	10.2	25.9	11.6
					ILEAGN		0201	0001	1,461	3.6	9.2	4.1
					QRNXDUMP		0203	0001	1,012	2.5	6.4	2.9
					QSQENDAG		0201	0001	833	2.1	5.3	2.4
					QLEAWI		0203	0001	828	2.1	5.2	2.3
					D7A782247200		0000	20BB	732	1.8	4.6	2.1
					ILEAGNEW		0201	0001	567	1.4	3.6	1.6
03	00008408	JUNK	QSPLJOB	053464	D2FB76C77200		0000	20D6	787	2.0	17.5	17.5
					JUNK	QSPLJOB	1AEF	0006	690	1.7	15.3	15.3

* * * E N D O F R E P O R T * * *

Figure 112. Faults by Pool/TDE/Object that are > = 1 % of the System Faults

10.4.9 Report Title - Faults by MI Program that are >= %1.0 of Total System Faults

This report is produced from Command Option - By MI PGM.

```
Faults by program that are 1% or more of total system faults
     QUERY NAME . . . . . FLTMIPGMA2
     LIBRARY NAME . . . . SMTRACE
     FILE         LIBRARY      MEMBER       FORMAT
     FLTMIPGMA    PFREXP2      PEXTRACE     FLTMIPGMA
     FLTMIPGMA1   PFREXP2      PEXTRACE     FLTMIPGMA1
     DATE . . . . . . . . 08/02/96
     TIME . . . . . . . . 19:03:03


08/02/96  19:03:03       PAGE    1
Program     % of System     Total
            Faults          Faults
               100.0        40,205
ILEAGNEW        16.2         6,503
QCLCLCPR        15.5         6,218
QDBGETM          8.5         3,429
QSQENDAG         8.1         3,255
QDBOPEN          6.0         2,403
QDMCOPEN         5.6         2,268
OPEN5            5.5         2,215
*NONE            4.6         1,843
QLEAWI           4.3         1,742
QDMCLOSE         2.9         1,147
TESTIOC          2.4           982
TESTIO           2.3           932
QCATRS           2.1           864
QDMRCLSE         2.1           861
OPENBAD          2.1           840
QSOKERN3         1.8           710
ILEAGN           1.3           509
QRNXIO           1.2           464
                                              M05


08/02/96  19:03:03       PAGE    2
* * *  E N D  O F  R E P O R T  * * *
```

Figure 113. Faults by MI Program that are > = 1 % of Total System Faults

10.4.10 Report Title - Page Faults by Program and Object

This report is produced from Command Option - By MI PGM.

```
Page faults by program and object.
Includes only programs with 1% or more of system faults
and objects with 1% or more of the programs' faults
   QUERY NAME . . . . . FLTMIOBJ5
   LIBRARY NAME . . . . SMTRACE
   FILE         LIBRARY      MEMBER       FORMAT
   FLTMIOBJ4A   PFREXP2      PEXTRACE     FLTMIOBJ4A
   FLTMIOBJ1    PFREXP2      PEXTRACE     FLTMIOBJ1
   DATE . . . . . . . . 08/02/96
   TIME . . . . . . . . 19:03:19
```

```
08/02/96  19:03:19                                                                                 PAGE    1
Program       Program  % of SYS  Object name               Segment  Segment Type                 % of     # of Obj's
              faults   faults    and type                  Type     Description                  program  Faults
                                                                                                 faults
ILEAGNEW        6,503     16.2                                                                    100.0      6,503
                                 FCFA2024DA00         0000  20D6     HEAP DATA SEGMENT TYPE          42.3      2,754
                                 QRNXDUMP             0203  0001     MI SYSTEM OBJ BASE SEGMENT      15.6      1,012
                                 ILEAGN               0201  0001     MI SYSTEM OBJ BASE SEGMENT      11.6        757
                                 D56C3B528F00         0000  20D5     HEAP CONTROL SEGMENT             4.3        280
                                 QRNXIE               0203  0001     MI SYSTEM OBJ BASE SEGMENT       2.5        160
QCLCLCPR        6,218     15.5                                                                    100.0      6,218
                                 HATT                 0401  0001     MI SYSTEM OBJ BASE SEGMENT      20.0      1,246
                                 QCAWAREA             19EF  0001     MI SYSTEM OBJ BASE SEGMENT      15.1        942
                                 QUSRSYS              0401  0001     MI SYSTEM OBJ BASE SEGMENT       6.8        420
                                 QDFTOWN              0801  0001     MI SYSTEM OBJ BASE SEGMENT       6.5        404
                                 SEIZE LOCK RANGE     0000  2081     HOLD RECORD SEG                  4.4        272
                                 D7A782247200         0000  20BB     MODUL2 STATIC STORE              3.2        196
                                 ILEAGNEW  A960126A   1AEF  0006     IWA                              1.8        111
QDBGETM         3,429      8.5                                                                    100.0      3,429
                                 *DESTROYED           0000  0000                                     18.9        648
                                 QDBGETM              0201  0001     MI SYSTEM OBJ BASE SEGMENT      13.0        447
                                 OPENBAD   A960126A   1AEF  007C     USER-DOMAIN PROCESS SEG          7.1        245

08/02/96  19:03:19                                                                                 PAGE    2
Program       Program  % of SYS  Object name               Segment  Segment Type                 % of     # of Obj's
              faults   faults    and type                  Type     Description                  program  Faults
                                                                                                 faults
QDBGETM         3,429      8.5   SEIZE LOCK RANGE     0000  2081     HOLD RECORD SEG                  3.6        125
                                 PF04      PF04       0B90  0001     MI SYSTEM OBJ BASE SEGMENT       3.3        112
                                                            0001     MI SYSTEM OBJ BASE SEGMENT       2.5         85
                                 PF05      PF05       0B90  0001     MI SYSTEM OBJ BASE SEGMENT       2.2         75
                                 PF03      PF03       0B90  0001     MI SYSTEM OBJ BASE SEGMENT       2.0         68
                                 PF05      PF05       0B90  0001     MI SYSTEM OBJ BASE SEGMENT       1.3         46
                                                            0001     MI SYSTEM OBJ BASE SEGMENT       1.1         37
                                 PF03      PF03       0B90  0001     MI SYSTEM OBJ BASE SEGMENT       1.1         37
                                 PF02      PF02       0B90  0001     MI SYSTEM OBJ BASE SEGMENT       1.0         34
QSQENDAG        3,255      8.1                                                                    100.0      3,255
                                 ILEAGNEW  A960126A   1AEF  0006     IWA                             31.9      1,038
                                 FCFA2024DA00         0000  20D6     HEAP DATA SEGMENT TYPE          27.1        882
                                 QJOBMSGQ             18A0  0001     MI SYSTEM OBJ BASE SEGMENT       8.5        276
                                 D7A782247200         0000  20BB     MODUL2 STATIC STORE              7.9        258
                                 QSQENDAG             0201  0022     CONSTANT SPACE SEGMENT           6.1        199
                                                            0022     CONSTANT SPACE SEGMENT           2.3         74
QDBOPEN         2,403      6.0                                                                    100.0      2,403
                                 SEIZE LOCK RANGE     0000  2081     HOLD RECORD SEG                 22.6        543
                                 PF01      PF01       0B90  0001     MI SYSTEM OBJ BASE SEGMENT      12.5        301
                                 PF02      PF02       0B90  0001     MI SYSTEM OBJ BASE SEGMENT      12.0        289
```

Figure 114 (Part 1 of 4). Page Faults by Program and Object

```
08/02/96  19:03:19                                                                                    PAGE    3
Program      Program  % of SYS  Object name                  Segment  Segment Type                        % of     # of Obj's
             faults   faults    and type                     Type     Description                         program  Faults
                                                                                                          faults
QDBOPEN        2,403       6.0  PF03       PF03       0B90    0001    MI SYSTEM OBJ BASE SEGMENT             11.5         276
                                PF04       PF04       0B90    0001    MI SYSTEM OBJ BASE SEGMENT              9.8         235
                                DSPOBJD    DSPOBJD    0B90    0001    MI SYSTEM OBJ BASE SEGMENT              8.6         207
                                PF05       PF05       0B90    0001    MI SYSTEM OBJ BASE SEGMENT              7.7         185
                                SQCCSID1              0ED2    0001    MI SYSTEM OBJ BASE SEGMENT              3.1          74
                                OPEN5                 0201    0001    MI SYSTEM OBJ BASE SEGMENT              3.0          71
                                TESTIO                0201    0001    MI SYSTEM OBJ BASE SEGMENT              2.3          56
                                JUNK       QSPLJOB    1AEF    007D    SYSTEM-DOMAIN PROCESS SEG               1.4          34
                                QDBOPEN               0201    0001    MI SYSTEM OBJ BASE SEGMENT              1.1          27
                                QTMPLPRC              0201    0001    MI SYSTEM OBJ BASE SEGMENT              1.0          25
QDMCOPEN       2,268       5.6                                                                          100.0       2,268
                                DSPOBJD               1901    0001    MI SYSTEM OBJ BASE SEGMENT             17.0         385
                                PF02                  1901    0001    MI SYSTEM OBJ BASE SEGMENT             13.6         308
                                PF01                  1901    0001    MI SYSTEM OBJ BASE SEGMENT             13.6         308
                                PF05                  1901    0001    MI SYSTEM OBJ BASE SEGMENT             13.5         306
                                PF04                  1901    0001    MI SYSTEM OBJ BASE SEGMENT             13.4         305
                                PF03                  1901    0001    MI SYSTEM OBJ BASE SEGMENT             13.4         304
                                D2FB76C77200          0000    20D6    HEAP DATA SEGMENT TYPE                  4.5         101


08/02/96  19:03:19                                                                                    PAGE    4
Program      Program  % of SYS  Object name                  Segment  Segment Type                        % of     # of Obj's
             faults   faults    and type                     Type     Description                         program  Faults
                                                                                                          faults
QDMCOPEN       2,268       5.6  QSOSRV2               0203    0001    MI SYSTEM OBJ BASE SEGMENT              3.5          80
                                JUNK       QSPLJOB    1AEF    007D    SYSTEM-DOMAIN PROCESS SEG               1.5          35
                                QUSRSYS               0401    0001    MI SYSTEM OBJ BASE SEGMENT              1.3          30
                                QSECOFR               0801    0001    MI SYSTEM OBJ BASE SEGMENT              1.2          28
                                OPENBAD    A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                 1.0          22
OPEN5          2,215       5.5                                                                          100.0       2,215
                                *DESTROYED            0000    0000                                           19.8         438
                                OPENBAD    A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                 5.4         119
*NONE          1,843       4.6                                                                          100.0       1,843
                                FCFA2024DA00          0000    20D6    HEAP DATA SEGMENT TYPE                 30.8         567
                                OPENBAD    A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                11.8         218
                                D2FB76C77200          0000    20D6    HEAP DATA SEGMENT TYPE                  7.0         129
                                ILEAGNEW   A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                 4.9          91
                                JUNK       QSPLJOB    1AEF    007D    SYSTEM-DOMAIN PROCESS SEG               4.1          75
                                                              007D    SYSTEM-DOMAIN PROCESS SEG               2.3          42
                                                              007D    SYSTEM-DOMAIN PROCESS SEG               2.1          38
                                QSOSRV2               0203    0001    MI SYSTEM OBJ BASE SEGMENT              2.0          36
                                JUNK       QSPLJOB    1AEF    007D    SYSTEM-DOMAIN PROCESS SEG               2.0          36
                                SM PERM DIR SEGMENT   0000    0000                                            1.8          33
                                                   M05


08/02/96  19:03:19                                                                                    PAGE    5
Program      Program  % of SYS  Object name                  Segment  Segment Type                        % of     # of Obj's
             faults   faults    and type                     Type     Description                         program  Faults
                                                                                                          faults
*NONE          1,843       4.6  OPEN5                 0201    0001    MI SYSTEM OBJ BASE SEGMENT              1.8          33
                                JUNK       QSPLJOB    1AEF    007D    SYSTEM-DOMAIN PROCESS SEG               1.5          27
                                QTQSRVP2              0203    0001    MI SYSTEM OBJ BASE SEGMENT              1.3          24
                                ILEAGNEW   A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                 1.1          21
QLEAWI         1,742       4.3                                                                          100.0       1,742
                                QLEAWI                0203    0001    MI SYSTEM OBJ BASE SEGMENT             48.0         837
                                D7A782247200          0000    20BB    MODUL2 STATIC STORE                    16.0         278
                                FCFA2024DA00          0000    20D6    HEAP DATA SEGMENT TYPE                 14.9         259
                                OPENBAD    A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                 7.2         126
                                ILEAGNEW   A960126A   1AEF    007C    USER-DOMAIN PROCESS SEG                 1.9          33
QDMCLOSE       1,147       2.9                                                                          100.0       1,147
                                *DESTROYED            0000    0000                                           40.2         461
                                PF01       PF01       0B90    0001    MI SYSTEM OBJ BASE SEGMENT             13.3         152
                                PF02       PF02       0B90    0001    MI SYSTEM OBJ BASE SEGMENT             12.6         145
                                SEIZE LOCK RANGE      0000    2081    HOLD RECORD SEG                        10.7         123
                                PF03       PF03       0B90    0001    MI SYSTEM OBJ BASE SEGMENT             10.7         123
                                PF04       PF04       0B90    0001    MI SYSTEM OBJ BASE SEGMENT              5.8          67
                                DSPOBJD    DSPOBJD    0B90    0001    MI SYSTEM OBJ BASE SEGMENT              3.2          37
```

Figure 114 (Part 2 of 4). Page Faults by Program and Object

08/02/96 19:03:19 PAGE 6

Program	Program faults	% of SYS faults	Object name and type			Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QDMCLOSE	1,147	2.9	PF05	PF05	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	1.2	14
			QATOCTCPIPCONFIG		0C90	0001	MI SYSTEM OBJ BASE SEGMENT	1.0	12
			QATOCTCPIPCONFIG		0B90	0001	MI SYSTEM OBJ BASE SEGMENT	1.0	12
TESTIOC	982	2.4						100.0	982
			QRNXIE		0203	0001	MI SYSTEM OBJ BASE SEGMENT	11.4	112
TESTIO	932	2.3						100.0	932
QCATRS	864	2.1						100.0	864
			D2FB76C77200		0000	20D6	HEAP DATA SEGMENT TYPE	38.2	330
			QYPPRT		0203	0001	MI SYSTEM OBJ BASE SEGMENT	5.6	48
			QPOLLIB1		0203	0001	MI SYSTEM OBJ BASE SEGMENT	5.2	45
			QSOSRV2		0203	0001	MI SYSTEM OBJ BASE SEGMENT	4.9	42
			QTMPLPRC		0201	0001	MI SYSTEM OBJ BASE SEGMENT	4.5	39
			QSOSRV1		0203	0001	MI SYSTEM OBJ BASE SEGMENT	4.4	38
			QTQICONV		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.9	34
			QPOSSRV3		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.8	33
			QWPZHPT1		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QTQICVC2		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QPOWPIDI		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26

M05

08/02/96 19:03:19 PAGE 7

Program	Program faults	% of SYS faults	Object name and type			Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QCATRS	864	2.1	QPOWPID		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QPOSSRV4		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QPOLDC1		0203	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			F836A3DBEA00		0000	20AC	MWS AREA DATA SID	3.0	26
			JUNK	QSPLJOB	1AEF	007D	SYSTEM-DOMAIN PROCESS SEG	1.9	16
			QTMPCKP		0201	0001	MI SYSTEM OBJ BASE SEGMENT	1.6	14
			QTCP		0401	0001	MI SYSTEM OBJ BASE SEGMENT	1.6	14
			D1EDE9BC4700		0000	20AC	MWS AREA DATA SID	1.5	13
			QJOBMSGQ		18A0	0001	MI SYSTEM OBJ BASE SEGMENT	1.4	12
QDMRCLSE	861	2.1						100.0	861
			QSQENDAG		0201	0001	MI SYSTEM OBJ BASE SEGMENT	64.6	556
			ILEAGNEW	A960126A	1AEF	0006	IWA	29.3	252
			FCFA2024DA00		0000	20D6	HEAP DATA SEGMENT TYPE	5.7	49
OPENBAD	840	2.1						100.0	840
			QCAWAREA		19EF	0001	MI SYSTEM OBJ BASE SEGMENT	37.5	315
			OPENBAD		0201	0001	MI SYSTEM OBJ BASE SEGMENT	6.1	51
						0001	MI SYSTEM OBJ BASE SEGMENT	6.0	50
						0001	MI SYSTEM OBJ BASE SEGMENT	6.0	50
						0001	MI SYSTEM OBJ BASE SEGMENT	6.0	50
						0001	MI SYSTEM OBJ BASE SEGMENT	5.8	49

08/02/96 19:03:19 PAGE 8

Program	Program faults	% of SYS faults	Object name and type			Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
OPENBAD	840	2.1	OPENBAD	A960126A	1AEF	007B	SLIC ADDR PROCESS SEG	4.9	41
						007B	SLIC ADDR PROCESS SEG	4.6	39
						007B	SLIC ADDR PROCESS SEG	4.0	34
			OPENBAD		0201	0001	MI SYSTEM OBJ BASE SEGMENT	4.0	34
			OPEN5		0201	0001	MI SYSTEM OBJ BASE SEGMENT	3.2	27
			OPENBAD	A960126A	1AEF	007B	SLIC ADDR PROCESS SEG	2.6	22
			OPENBAD		0201	0001	MI SYSTEM OBJ BASE SEGMENT	2.4	20
						0001	MI SYSTEM OBJ BASE SEGMENT	1.1	9
			OPENBAD	A960126A	1AEF	007B	SLIC ADDR PROCESS SEG	1.0	8
QSOKERN3	710	1.8						100.0	710
			L/L RANGE 1		0000	0000		23.1	164
			E43BF962E500		0000	20AC	MWS AREA DATA SID	9.7	69
			QSO_DNS_INDEX		0EEF	0001	MI SYSTEM OBJ BASE SEGMENT	8.5	60
			QPOLLFS1		0203	0001	MI SYSTEM OBJ BASE SEGMENT	4.2	30
			ECB9E6FE0E00		0000	20DF	MUTEX TEMP SEGMENT	3.7	26
			QTMPLPRC		0201	0001	MI SYSTEM OBJ BASE SEGMENT	3.0	21
			QSOKERN3		0203	0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
						0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
						0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
						0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
						0001	MI SYSTEM OBJ BASE SEGMENT	2.5	18
			JUNK	QSPLJOB	1AEF	007D	SYSTEM-DOMAIN PROCESS SEG	2.4	17

Figure 114 (Part 3 of 4). Page Faults by Program and Object

```
08/02/96  19:03:19                                                                                             PAGE    9
Program       Program  % of SYS  Object name                 Segment  Segment Type                   % of     # of Obj's
              faults   faults    and type                    Type     Description                    program  Faults
                                                                                                     faults
QSOKERN3         710       1.8   QSOKERN3            0203     0001    MI SYSTEM OBJ BASE SEGMENT        2.1          15
                                 QSECOFR             0801     0001    MI SYSTEM OBJ BASE SEGMENT        2.1          15
                                 D2FB76C77200        0000     20D6    HEAP DATA SEGMENT TYPE            2.1          15
                                 FCAE14909A00        0000     20AB    MWS AREA CTL SID                  2.0          14
                                 EEE05252CB00        0000     20BB    MODUL2 STATIC STORE               2.0          14
                                 QSOSRV2             0203     0001    MI SYSTEM OBJ BASE SEGMENT        1.4          10
                                                              0001    MI SYSTEM OBJ BASE SEGMENT        1.3           9
                                                              0001    MI SYSTEM OBJ BASE SEGMENT        1.1           8
                                                              0001    MI SYSTEM OBJ BASE SEGMENT        1.1           8
                                                              0001    MI SYSTEM OBJ BASE SEGMENT        1.1           8
ILEAGN           509       1.3                                                                    100.0         509
                                 ILEAGN              0201     0022    CONSTANT SPACE SEGMENT           35.2         179
                                                              0022    CONSTANT SPACE SEGMENT           15.9          81
                                 ILEAGNEW  A960126A  1AEF     007C    USER-DOMAIN PROCESS SEG           9.4          48
                                                              007C    USER-DOMAIN PROCESS SEG           8.6          44
                                                              007C    USER-DOMAIN PROCESS SEG           7.9          40
                                                              007C    USER-DOMAIN PROCESS SEG           7.1          36
                                                              007C    USER-DOMAIN PROCESS SEG           4.5          23
                                                              007C    USER-DOMAIN PROCESS SEG           3.9          20
                                 ILEAGN              0201     0022    CONSTANT SPACE SEGMENT            3.5          18
                                 FCFA2024DA00        0000     20D6    HEAP DATA SEGMENT TYPE            2.6          13
QRNXIO           464       1.2                                                                    100.0         464
                                 *DESTROYED          0000     0000                                     69.2         321


08/02/96  19:03:19                                                                                             PAGE   10
Program       Program  % of SYS  Object name                 Segment  Segment Type                   % of     # of Obj's
              faults   faults    and type                    Type     Description                    program  Faults
                                                                                                     faults
QRNXIO           464       1.2   OPENBAD   A960126A  1AEF     007C    USER-DOMAIN PROCESS SEG          30.8         143
* * *  E N D  O F  R E P O R T  * * *
```

Figure 114 (Part 4 of 4). Page Faults by Program and Object

10.4.11 Report Title - Faults by Program and Low-level SLIC Program

This report is produced from Command Option - By MI PGM.

```
Faults by program and low-level SLIC (micro-code) program.
Includes only programs with 1% or more of system faults and
SLIC programs with 1% or more of the selected programs' faults
      QUERY NAME . . . . . FLTMISLIC5
      LIBRARY NAME . . . . SMTRACE
      FILE         LIBRARY      MEMBER       FORMAT
      FLTMISLIC4   PFREXP2      PEXTRACE     FLTMISLIC4
      FLTMISLIC1   PFREXP2      PEXTRACE     FLTMISLIC1
      DATE . . . . . . . . 08/02/96
      TIME . . . . . . . . 19:03:28
```

```
08/02/96  19:03:28                                PAGE    1
Program         Fault  Percent  SLIC       SLIC pgm  SLIC pgm %
                count  program  program    fault     of program
                       faults              count
ILEAGNEW        6,503    16.2   #ailesu      1,588       24.4
                                #aiaa          839       12.9
                                #airpi         695       10.7
                                *NONE          560        8.6
                                #airseol       527        8.1
                                #aicapgm       482        7.4
                                PmAttrib       281        4.3
                                #hmfrehs       277        4.3
                                #aidag         258        4.0
                                #cfressp       199        3.1
                                #aiaps         190        2.9
                                #aiabp         187        2.9
                                #aiisf2         82        1.3
                                SmUpdate        62        1.0
QCLCLCPR        6,218    15.5   *NONE        2,540       40.8
                                IxRadix3     1,255       20.2
                                VBNVRMCF       751       12.1
                                #mndgpck       472        7.6
                                #domtsob       422        6.8
                                RmslHold       272        4.4
                                VBNSERV2       196        3.2
                                #mnressp       111        1.8
                                RmslInte       111        1.8
QDBGETM         3,429     8.5   #dbrsqmn     1,322       38.6
                                *NONE        1,191       34.7
                                #dbreseq       727       21.2
                                RmslHold       108        3.1
                                #dbbring        64        1.9
QSQENDAG        3,255     8.1   #aisfiag     1,846       56.7
                                *NONE          278        8.5
                                ExIntHan       275        8.4
                                ExFanOut       273        8.4
                                VOXEXRUN       258        7.9
```

Figure 115 (Part 1 of 3). Faults by Program and Low-level SLIC Program

08/02/96 19:03:28 PAGE 2

Program	Fault count	Percent program faults	SLIC program	SLIC pgm fault count	SLIC pgm % of program
QSQENDAG	3,255	8.1	bzero_Co	138	4.2
			QsHdrMM	138	4.2
QDBOPEN	2,403	6.0	RmslInte	1,504	62.6
			RmslHold	543	22.6
			VBNTBSCH	109	4.5
			*NONE	70	2.9
			IxRadix3	50	2.1
			ExGetMod	44	1.8
			#dbacr	41	1.7
			#cfochkr	24	1.0
QDMCOPEN	2,268	5.6	#mndgpck	1,922	84.7
			VBNTBSCH	99	4.4
			#aimagpa	68	3.0
			*NONE	62	2.7
			IxRadix3	32	1.4
			#domtivf	31	1.4
			#cfauth	28	1.2
OPEN5	2,215	5.5	*NONE	1,771	80.0
			#aidactv	444	20.0
*NONE	1,843	4.6	*NONE	1,723	93.5
			IxRadix3	33	1.8
			SmAccess	27	1.5
			SmSegmen	19	1.0
QLEAWI	1,742	4.3	#domtptr	558	32.0
			VBNTBSCH	558	32.0
			*NONE	323	18.5
			#aitmbst	166	9.5
			#aifpa	86	4.9
			#exsndpm	40	2.3
QDMCLOSE	1,147	2.9	#domodso	545	47.5

M05

08/02/96 19:03:28 PAGE 3

Program	Fault count	Percent program faults	SLIC program	SLIC pgm fault count	SLIC pgm % of program
QDMCLOSE	1,147	2.9	#cfochkr	261	22.8
			#dbxdacr	202	17.6
			RmslHold	119	10.4
			#dbixuse	12	1.0
TESTIOC	982	2.4	*NONE	863	87.9
			#mndgpck	112	11.4
TESTIO	932	2.3	*NONE	726	77.9
			#aidactv	206	22.1
QCATRS	864	2.1	#airpi	199	23.0
			#mndgpck	98	11.3
			#aiaa	87	10.1
			#aiisp	85	9.8
			#cfressp	85	9.8
			#aiaps	73	8.4
			#aiabp	50	5.8
			#aiisf1	26	3.0
			HmDerive	26	3.0
			#hmalchs	21	2.4
			#mnressp	15	1.7
			#aigpa	14	1.6
			IxRadix3	14	1.6
			qugate_l	13	1.5
			QsHdrPub	12	1.4
			#aiisf2	9	1.0
			#aimxpre	9	1.0
QDMRCLSE	861	2.1	#aicapgm	605	70.3
			#pdcscvr	252	29.3
OPENBAD	840	2.1	*NONE	646	76.9
			#hmfrehs	167	19.9
			#ailesu	19	2.3
			#aidpa	8	1.0

Figure 115 (Part 2 of 3). Faults by Program and Low-level SLIC Program

```
08/02/96  19:03:28                                      PAGE    4
Program         Fault  Percent  SLIC       SLIC pgm  SLIC pgm %
                count  program  program    fault     of program
                       faults              count
QSOKERN3          710      1.8  #asmpuwp        148        20.8
                                *NONE           129        18.2
                                VBNTBSCH        117        16.5
                                #domtivf         99        13.9
                                IxRadix3         48         6.8
                                HmDerive         36         5.1
                                #asmptn          18         2.5
                                #skverb          18         2.5
                                PxspDLLi         18         2.5
                                vlosockm         13         1.8
                                #cfochkr         12         1.7
                                #aitmbst         11         1.5
                                QuLinked         11         1.5
                                #tomckp           9         1.3
                                qugate_l          9         1.3
ILEAGN            509      1.3  *NONE           428        84.1
                                #aicpp           72        14.1
QRNXIO            464      1.2  *NONE           464       100.0
     FINAL TOTALS
* * *  E N D  O F  R E P O R T  * * *
```

Figure 115 (Part 3 of 3). Faults by Program and Low-level SLIC Program

10.4.12 Report Title - Page Fault by Program and Job/Task Within Program

This report is produced from Command Option - By MI PGM.

```
Page faults by Program and Job/Task within Program.
Includes only Programs with 1% or more of system faults.
Includes only Jobs/Tasks with 1% or more of the Prrogram's faults.
     QUERY NAME . . . . . FLTMITDE5
     LIBRARY NAME . . . . SMTRACE
     FILE         LIBRARY      MEMBER       FORMAT
     FLTMITDE4    PFREXP2      PEXTRACE     FLTMIDE4
     FLTMITDE1    PFREXP2      PEXTRACE     FLTMIDE1
     TASKINFO     PFREXP2      PEXTRACE     TASKINFO
     DATE . . . . . . . . 08/02/96
     TIME . . . . . . . . 19:03:28
```

M05

Program	TDE number (hex)	Job/Task name	Job number	Job user	Num of faults	Percent of Sys faults	Percent of pgm faults
ILEAGNEW	0000880E	ILEAGNEW	053541	A960126A	6,503	16.2	100.0
				TOTAL	6,503	16.2	100.0
QCLCLCPR	00008810	TSTIOC	053543	A960126A	2,952	7.3	47.5
	00008814	OPENBAD	053546	A960126A	1,823	4.5	29.3
	0000880E	ILEAGNEW	053541	A960126A	1,442	3.6	23.2
				TOTAL	6,217	15.4	100.0
QDBGETM	00008810	TSTIOC	053543	A960126A	1,751	4.4	51.1
	00008814	OPENBAD	053546	A960126A	1,678	4.2	48.9
				TOTAL	3,429	8.6	100.0
QSQENDAG	0000880E	ILEAGNEW	053541	A960126A	3,219	8.0	98.9
	00008408	JUNK	053464	QSPLJOB	36	.1	1.1
				TOTAL	3,255	8.1	100.0
QDBOPEN	00008814	OPENBAD	053546	A960126A	1,887	4.7	78.5
	00008810	TSTIOC	053543	A960126A	266	.7	11.1
	00008408	JUNK	053464	QSPLJOB	250	.6	10.4
				TOTAL	2,403	6.0	100.0
QDMCOPEN	00008814	OPENBAD	053546	A960126A	1,558	3.9	68.7
	00008810	TSTIOC	053543	A960126A	386	1.0	17.0
	00008408	JUNK	053464	QSPLJOB	319	.8	14.1
				TOTAL	2,263	5.7	99.8
OPEN5	00008814	OPENBAD	053546	A960126A	2,215	5.5	100.0
				TOTAL	2,215	5.5	100.0
*NONE	0000880E	ILEAGNEW	053541	A960126A	867	2.2	47.0
	00008408	JUNK	053464	QSPLJOB	603	1.5	32.7
	00008814	OPENBAD	053546	A960126A	306	.8	16.6
	0000881E	PEXTRACE	053555	A960126A	19	.0	1.0
				TOTAL	1,795	4.5	97.3
QLEAWI	0000880E	ILEAGNEW	053541	A960126A	1,590	4.0	91.3
	00008814	OPENBAD	053546	A960126A	126	.3	7.2
	00008408	JUNK	053464	QSPLJOB	26	.1	1.5
				TOTAL	1,742	4.4	100.0
QDMCLOSE	00008814	OPENBAD	053546	A960126A	1,066	2.7	92.9
	00008810	TSTIOC	053543	A960126A	57	.1	5.0

M05

Figure 116 (Part 1 of 2). Faults by Program and Job/Task Within Program

```
Program     TDE       Job/Task name     Job     Job           Num of     Percent      Percent
            number                      number  user          faults     of Sys       of pgm
            (hex)                                                        faults       faults
QDMCLOSE    00008408  JUNK              053464  QSPLJOB           24         .1           2.1
                                                      TOTAL    1,147        2.9         100.0
TESTIOC     00008810  TSTIOC            053543  A960126A         982        2.4         100.0
                                                      TOTAL      982        2.4         100.0
TESTIO      00008810  TSTIOC            053543  A960126A         932        2.3         100.0
                                                      TOTAL      932        2.3         100.0
QCATRS      00008408  JUNK              053464  QSPLJOB          860        2.1          99.5
                                                      TOTAL      860        2.1          99.5
QDMRCLSE    0000880E  ILEAGNEW          053541  A960126A         855        2.1          99.3
                                                      TOTAL      855        2.1          99.3
OPENBAD     00008814  OPENBAD           053546  A960126A         840        2.1         100.0
                                                      TOTAL      840        2.1         100.0
QSOKERN3    00008408  JUNK              053464  QSPLJOB          710        1.8         100.0
                                                      TOTAL      710        1.8         100.0
ILEAGN      0000880E  ILEAGNEW          053541  A960126A         509        1.3         100.0
                                                      TOTAL      509        1.3         100.0
QRNXIO      00008814  OPENBAD           053546  A960126A         462        1.1          99.6
                                                      TOTAL      462        1.1          99.6
                                                      0
 * * *  E N D  O F  R E P O R T  * * *
                                                    M05
```

Figure 116 (Part 2 of 2). Faults by Program and Job/Task Within Program

10.4.13 Report Title - Faults by SLIC Program that are >=1% of Total System Faults

This report is produced from Command Option - By MI PGM.

```
          Faults by SLIC PGM that are
          >= %1.0 of Total System Faults
QUERY NAME . . . . . FLTSLICA2
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
FLTSLICA     PFREXP2      PEXTRACE     FLTSLICA
FLTSLICA1    PFREXP2      PEXTRACE     FLTSLICA1
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:03:50


08/02/96  19:03:50     PAGE    1
SLIC PGM  % of System     Total
          faults         Faults
             100.0       40,205
*NONE         33.6       13,513
#mndgpck       6.6        2,658
#aisfiag       4.6        1,857
#ailesu        4.3        1,739
RmslInte       4.1        1,639
IxRadix3       3.9        1,563
#dbrsqmn       3.3        1,322
#aicapgm       2.9        1,164
RmslHold       2.7        1,069
#aiaa          2.3          926
VBNTBSCH       2.3          922
#airpi         2.2          894
VBNVRMCF       1.9          751
#dbreseq       1.8          727
#aidactv       1.6          650
#domtptr       1.4          572
#domodso       1.4          545
#airseol       1.3          534
                                          M05


08/02/96  19:03:50     PAGE    2
SLIC PGM  % of System     Total
          faults         Faults
#hmfrehs       1.1          444
#domtsob       1.1          423
* * *  E N D  O F  R E P O R T  * * *
```

Figure 117. Faults by SLIC Program that are .=1% of Total System Faults

10.5 Disk Space Consumption - Net Size Change from PEX Run (NETSIZE Command)

This section provides an example of every report you can produce using this command.

Please refer to section 6.6.5, "NETSIZE Reporting Command" on page 157 for a details of how to use the NETSIZE command to produce these reports.

Refer to table Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.5.1 Report Title - Net Size Change (in Bytes) of Individual Segments

This report is produced from Command Option - Both TEMPs and PERMs?

```
Net size change (in bytes) of individual segments.
(total size change at bottom of report)
QUERY NAME . . . . . NETSIDRPT
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
NETSIDOBJ2   PFREXP2      PEXTRACE     NETSIDOBJ2
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:05:11


Net size     Object/segment  SID   Object/segment        Object  Segment  Description
change       address         type  name                  type    type
(in bytes)
   131,072    F18D42DC9300     T   PAG                    01EF    0007    TEMPORARY - ACCESS GROUP
    98,304    CD3A85130500     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
    73,728    E114192F4C00     T   QWCCDSACORDERINDEX     0EEF    0001    TEMPORARY - INDEX
    65,536    DB095007C004     T   *DESTROYED             0000    0000
    65,536    E22B02E31004     T   *DESTROYED             0000    0000
    40,960    ECCE531C0A00     T   QWCCDSACJOBINDEX       0EEF    0001    TEMPORARY - INDEX
    32,768    C3E43389E600     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
    24,576    EFAC0C01FF00     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
    16,384    EB72185C3100     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
    16,384    FA6CF93A2F00     T   A960126A               0EC4    0001    INTERACTIVE PROFILE
    16,384    315B69CF2300     P   QJOBMSGQ               18A0    0001    JOB MESSAGE QUEUE
    12,288    E5ACA040BA00     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
    12,288    1579A708B100    DP   PF132      PEXTRACSTS  0B90    0003    COMPOSITE PIECE - DATA SPACE
    12,288    C3E62C036004     T   C3E62C036004           0000    20D9    TOMBSTONE SEGMENT
     8,192    C20421F82A00     T   QCAWAREA               19EF    0001    TEMPORARY - SPACE
     8,192    C258AF143D00     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
     8,192    DAFA13F7C200     T   QCAWAREA               19FC    0001    PROTECTED SPACE
     8,192    DC564EB79B00     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
     8,192    EA15DD9C5800     T   QCAWAREA               19EF    0001    TEMPORARY - SPACE
     8,192    EFDB55B7CF00     T   QCAWAREA               19FC    0001    PROTECTED SPACE
     8,192    FCA197E7FE00     T   QCAWAREA               19FC    0001    PROTECTED SPACE
     8,192    FCC280AE9600     T   WMHQ Data Queue Cach   19EF    0001    TEMPORARY - SPACE
     8,192    FEF71F5C6500     T   QCAWAREA               19EF    0001    TEMPORARY - SPACE
     8,192    F1379077A800     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
     8,192    F2E858539400     T   QCAWAREA               19FC    0001    PROTECTED SPACE
     8,192    CBBD618C9400     T   *DESTROYED             0000    0000
     8,192    C5F7E9711D00     T   *DESTROYED             0000    0000
     8,192    DC3565F10300     T   *DESTROYED             0000    0000
     8,192    D2AF210B2004    DT   D2AF210B2004           0000    20B1    DATA SPACE RUN TIME SID
     8,192    ED85CE436800     T   *DESTROYED             0000    0000
     8,192    EE32788FC300     T   EE32788FC300           0000    20D6    HEAP DATA SEGMENT TYPE
     8,192    E42F7CBA4900     T   *DESTROYED             0000    0000
     8,192    F34B465EDF00     T   *DESTROYED             0000    0000
     4,096    CB5A73814900     T   QCAPLIST               19FC    0001    PROTECTED SPACE
     4,096    C287F8CA0D00     T   QCAPLIST               19EF    0001    TEMPORARY - SPACE
     4,096    C81E272FB400     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
     4,096    C84D70E58400     T   QCAPLIST               19FC    0001    PROTECTED SPACE
     4,096    DA763D25DF00     T   QCAPLIST               19EF    0001    TEMPORARY - SPACE
```

Figure 118 (Part 1 of 2). Net Size Change (in Bytes) of Individual Segments

Net size change (in bytes)	Object/segment address	SID type	Object/segment name		Object type	Segment type	Description
4,096	D0CB5E80AD00	T	D0CB5E80AD00		19EF	0001	TEMPORARY - SPACE
4,096	D513B315B300	T	QCAPLIST		19FC	0001	PROTECTED SPACE
4,096	D7693A8A1A00	T	QCAPLIST		19EF	0001	TEMPORARY - SPACE
4,096	E1FADE0C7A00	T	A960126A		0EC4	0002	INTERACTIVE PROFILE
4,096	E93D79AE6200	T	QMAIR		19EF	0001	TEMPORARY - SPACE
4,096	FE1EBB6E6F00	T	UIM_TEMPORARY_WORKSP		19EF	0001	TEMPORARY - SPACE
4,096	F36C2F257700	T	QCAPLIST		19FC	0001	PROTECTED SPACE
4,096	F8594352F800	T	UIM_TEMPORARY_WORKSP		19EF	0001	TEMPORARY - SPACE
4,096	2DEBC2366600	DP	PF132	PEXTRACSTS	0B90	0001	COMPOSITE PIECE - DATA SPACE
4,096	232D272FB900	P	QSPSCB		19C2	0001	SPOOL CTL BLOCK
4,096	3D078BDAFC00	P	PF132	PEXTRACSTS	0D50	0001	DATA BASE FILE MEMBER
4,096	CA4A7FFD5700	T	CA4A7FFD5700		0000	20AB	MWS AREA CTL SID
4,096	E7CB3ED36004	T	E7CB3ED36004		0000	20D9	TOMBSTONE SEGMENT
4,096	F4A7811EB800	T	*DESTROYED		0000	0000	
4,096-	C0D730EE2100	T	*DESTROYED		0000	0000	
8,192-	E86515C06C00	T	*DESTROYED		0000	0000	
16,384-	C1AF94DC1700	T	*DESTROYED		0000	0000	

FINAL TOTALS
TOTAL 823,296
* * * E N D O F R E P O R T * * *

Figure 118 (Part 2 of 2). Net Size Change (in Bytes) of Individual Segments

10.5.2 Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)

This report is produced from Command Option - Both TEMPs and PERMs?

```
                       Net size change, grouped by (name, obj-type, seg-type).
                       (total net change at bottom of report)
                          QUERY NAME . . . . . NETOBJRPT2
                          LIBRARY NAME . . . . SMTRACE
                          FILE         LIBRARY      MEMBER       FORMAT
                          NETOBJRPT1   PFREXP2      PEXTRACE     NETOBJRPT1
                          DATE . . . . . . . . 08/02/96
                          TIME . . . . . . . . 19:05:12


            Net size   Object/Segment                   Description
            change     name,
            (bytes)    obj type, seg type
             221,184   UIM_TEMPORARY_WORKSP 19EF 0001  TEMPORARY - SPACE
             155,648   *DESTROYED           0000 0000
             131,072   PAG                  01EF 0007  TEMPORARY - ACCESS GROUP
              73,728   QWCCDSACORDERINDEX   0EEF 0001  TEMPORARY - INDEX
              40,960   QWCCDSACJOBINDEX     0EEF 0001  TEMPORARY - INDEX
              32,768   QCAWAREA             19FC 0001  PROTECTED SPACE
              24,576   QCAWAREA             19EF 0001  TEMPORARY - SPACE
              16,384   QJOBMSGQ             18A0 0001  JOB MESSAGE QUEUE
              16,384   QCAPLIST             19FC 0001  PROTECTED SPACE
              16,384   A960126A             0EC4 0001  INTERACTIVE PROFILE
              12,288   QCAPLIST             19EF 0001  TEMPORARY - SPACE
              12,288   PF132     PEXTRACSTS 0B90 0003  COMPOSITE PIECE - DATA SPACE
              12,288   C3E62C036004         0000 20D9  TOMBSTONE SEGMENT
               8,192   WMHQ Data Queue Cach 19EF 0001  TEMPORARY - SPACE
               8,192   EE32788FC300         0000 20D6  HEAP DATA SEGMENT TYPE
               8,192   D2AF210B2004         0000 20B1  DATA SPACE RUN TIME SID
               4,096   QSPSCB               19C2 0001  SPOOL CTL BLOCK
               4,096   QMAIR                19EF 0001  TEMPORARY - SPACE
               4,096   PF132     PEXTRACSTS 0D50 0001  DATA BASE FILE MEMBER
               4,096   PF132     PEXTRACSTS 0B90 0001  COMPOSITE PIECE - DATA SPACE
               4,096   E7CB3ED36004         0000 20D9  TOMBSTONE SEGMENT
               4,096   D0CB5E80AD00         19EF 0001  TEMPORARY - SPACE
               4,096   CA4A7FFD5700         0000 20AB  MWS AREA CTL SID
               4,096   A960126A             0EC4 0002  INTERACTIVE PROFILE
FINAL TOTALS
TOTAL                  823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 119. Net Size Change, Grouped by Name/Object-Type/Segment-Type

10.5.3 Report Title - Net Size Change, Grouped by Object/Segment Description

This report is produced from Command Option - Both TEMPs and PERMs?

```
                                    Net size change, grouped by Object/Segment description.
                                    Destroyed and unknown types group under a blank description.
                                    Total net size change at bottom of report.
                                         QUERY NAME . . . . . NETDSCRPT2
                                         LIBRARY NAME . . . . SMTRACE
                                         FILE          LIBRARY       MEMBER        FORMAT
                                         NETDSCRPT1    PFREXP2       PEXTRACE      NETDSCRPT1
                                         DATE . . . . . . . . 08/02/96
                                         TIME . . . . . . . . 19:05:13

08/02/96  19:05:13                                          PAGE    1
                 Net size change   Description
                 (bytes)
                         274,432   TEMPORARY - SPACE
                         155,648
                         131,072   TEMPORARY - ACCESS GROUP
                         114,688   TEMPORARY - INDEX
                          49,152   PROTECTED SPACE
                          20,480   INTERACTIVE PROFILE
                          16,384   COMPOSITE PIECE - DATA SPACE
                          16,384   JOB MESSAGE QUEUE
                          16,384   TOMBSTONE SEGMENT
                           8,192   DATA SPACE RUN TIME SID
                           8,192   HEAP DATA SEGMENT TYPE
                           4,096   DATA BASE FILE MEMBER
                           4,096   MWS AREA CTL SID
                           4,096   SPOOL CTL BLOCK
FINAL TOTALS
TOTAL                    823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 120. Net Size Change, Grouped by Object/Segment Description

10.5.4 Report Title - Net Size Change by Job or Task

This report is produced from Command Option - Both TEMPs and PERMs?

```
                                                       Net size change by Job or Task.
                                         QUERY NAME . . . . . NETTDERPT2
                                         LIBRARY NAME . . . . SMTRACE
                                         FILE          LIBRARY       MEMBER        FORMAT
                                         NETTDERPT1    PFREXP2       PEXTRACE      NETTDERPT1
                                         TASKINFO      PFREXP2       PEXTRACE      TASKINFO
                                         DATE . . . . . . . . 08/02/96
                                         TIME . . . . . . . . 19:05:16


             Net size change   TDE       Job/Task name     Job         Job
             (bytes)           number                      user        number
                     360,448   0000881E  PEXTRACE          A960126A    053555
                     184,320   00007F6C  P23ARTVKE         A960126A    053319
                     118,784   0000880E  ILEAGNEW          A960126A    053541
                      69,632   00008408  JUNK              QSPLJOB     053464
                      65,536   00008814  OPENBAD           A960126A    053546
                      24,576   00008810  TSTIOC            A960126A    053543
FINAL TOTALS
TOTAL                823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 121. Net Size Change by Job or Task

10.5.5 Report Title - Net Size Change (in Bytes) of Individual Segments

This report is produced from Command Option - TEMP Segment/Objects?

```
Net size change (in bytes) of individual segments.
(total size change at bottom of report)
QUERY NAME . . . . . NETSIDRPT
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
NETSIDOBJ2   PFREXP2      PEXTRACE     NETSIDOBJ2
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:05:19
```

Net size change (in bytes)	Object/segment address	SID type	Object/segment name	Object type	Segment type	Description
131,072	F18D42DC9300	T	PAG	01EF	0007	TEMPORARY - ACCESS GROUP
98,304	CD3A85130500	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
73,728	E114192F4C00	T	QWCCDSACORDERINDEX	0EEF	0001	TEMPORARY - INDEX
65,536	DB095007C004	T	*DESTROYED	0000	0000	
65,536	E22B02E31004	T	*DESTROYED	0000	0000	
40,960	ECCE531C0A00	T	QWCCDSACJOBINDEX	0EEF	0001	TEMPORARY - INDEX
32,768	C3E43389E600	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
24,576	EFAC0C01FF00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
16,384	EB72185C3100	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
16,384	FA6CF93A2F00	T	A960126A	0EC4	0001	INTERACTIVE PROFILE
12,288	E5ACA040BA00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
12,288	C3E62C036004	T	C3E62C036004	0000	20D9	TOMBSTONE SEGMENT
8,192	C20421F82A00	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	C258AF143D00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	DAFA13F7C200	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	DC564EB79B00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	EA15DD9C5800	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	EFDB55B7CF00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	FCA197E7FE00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	FCC280AE9600	T	WMHQ Data Queue Cach	19EF	0001	TEMPORARY - SPACE
8,192	FEF71F5C6500	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	F1379077A800	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	F2E858539400	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	CBBD618C9400	T	*DESTROYED	0000	0000	
8,192	C5F7E9711D00	T	*DESTROYED	0000	0000	
8,192	DC3565F10300	T	*DESTROYED	0000	0000	
8,192	D2AF210B2004	DT	D2AF210B2004	0000	20B1	DATA SPACE RUN TIME SID
8,192	ED85CE436800	T	*DESTROYED	0000	0000	
8,192	EE32788FC300	T	EE32788FC300	0000	20D6	HEAP DATA SEGMENT TYPE
8,192	E42F7CBA4900	T	*DESTROYED	0000	0000	
8,192	F34B465EDF00	T	*DESTROYED	0000	0000	
4,096	CB5A73814900	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	C287F8CA0D00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	C81E272FB400	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	C84D70E58400	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	DA763D25DF00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	D0CB5E80AD00	T	D0CB5E80AD00	19EF	0001	TEMPORARY - SPACE
4,096	D513B315B300	T	QCAPLIST	19FC	0001	PROTECTED SPACE

Figure 122 (Part 1 of 2). Net Size Change (in Bytes) of Individual Segments

Net size change (in bytes)	Object/segment address	SID type	Object/segment name	Object type	Segment type	Description
4,096	D7693A8A1A00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	E1FADE0C7A00	T	A960126A	0EC4	0002	INTERACTIVE PROFILE
4,096	E93D79AE6200	T	QMAIR	19EF	0001	TEMPORARY - SPACE
4,096	FE1EBB6E6F00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	F36C2F257700	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	F8594352F800	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	CA4A7FFD5700	T	CA4A7FFD5700	0000	20AB	MWS AREA CTL SID
4,096	E7CB3ED36004	T	E7CB3ED36004	0000	20D9	TOMBSTONE SEGMENT
4,096	F4A7811EB800	T	*DESTROYED	0000	0000	
4,096-	C0D730EE2100	T	*DESTROYED	0000	0000	
8,192-	E86515C06C00	T	*DESTROYED	0000	0000	
16,384-	C1AF94DC1700	T	*DESTROYED	0000	0000	

```
FINAL TOTALS
TOTAL            782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 122 (Part 2 of 2). Net Size Change (in Bytes) of Individual Segments

10.5.6 Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)

This report is produced from Command Option - TEMP Segment/Objects?

```
                                Net size change, grouped by (name, obj-type, seg-type).
                                (total net change at bottom of report)
                                   QUERY NAME . . . . . NETOBJRPT2
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   NETOBJRPT1   PFREXP2      PEXTRACE     NETOBJRPT1
                                   DATE . . . . . . . . 08/02/96
                                   TIME . . . . . . . . 19:05:20


                  Net size   Object/Segment                 Description
                  change     name,
                  (bytes)    obj type, seg type
                   221,184   UIM_TEMPORARY_WORKSP 19EF 0001  TEMPORARY - SPACE
                   155,648   *DESTROYED           0000 0000
                   131,072   PAG                  01EF 0007  TEMPORARY - ACCESS GROUP
                    73,728   QWCCDSACORDERINDEX   0EEF 0001  TEMPORARY - INDEX
                    40,960   QWCCDSACJOBINDEX     0EEF 0001  TEMPORARY - INDEX
                    32,768   QCAWAREA             19FC 0001  PROTECTED SPACE
                    24,576   QCAWAREA             19EF 0001  TEMPORARY - SPACE
                    16,384   QCAPLIST             19FC 0001  PROTECTED SPACE
                    16,384   A960126A             0EC4 0001  INTERACTIVE PROFILE
                    12,288   QCAPLIST             19EF 0001  TEMPORARY - SPACE
                    12,288   C3E62C036004         0000 20D9  TOMBSTONE SEGMENT
                     8,192   WMHQ Data Queue Cach 19EF 0001  TEMPORARY - SPACE
                     8,192   EE32788FC300         0000 20D6  HEAP DATA SEGMENT TYPE
                     8,192   D2AF210B2004         0000 20B1  DATA SPACE RUN TIME SID
                     4,096   QMAIR                19EF 0001  TEMPORARY - SPACE
                     4,096   E7CB3ED36004         0000 20D9  TOMBSTONE SEGMENT
                     4,096   D0CB5E80AD00         19EF 0001  TEMPORARY - SPACE
                     4,096   CA4A7FFD5700         0000 20AB  MWS AREA CTL SID
                     4,096   A960126A             0EC4 0002  INTERACTIVE PROFILE
FINAL TOTALS
TOTAL                782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 123. Net Size Change, Grouped by Name/Object-Type/Segment-Type

10.5.7 Report Title - Net Size Change, Grouped by Object/Segment Description

This report is produced from Command Option - TEMP Segment/Objects?

```
                              Net size change, grouped by Object/Segment description.
                              Destroyed and unknown types group under a blank description.
                              Total net size change at bottom of report.
                                   QUERY NAME . . . . . NETDSCRPT2
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   NETDSCRPT1   PFREXP2      PEXTRACE     NETDSCRPT1
                                   DATE . . . . . . . . 08/02/96
                                   TIME . . . . . . . . 19:05:21


08/02/96  19:05:21                                         PAGE    1
                 Net size change   Description
                 (bytes)
                         274,432   TEMPORARY - SPACE
                         155,648
                         131,072   TEMPORARY - ACCESS GROUP
                         114,688   TEMPORARY - INDEX
                          49,152   PROTECTED SPACE
                          20,480   INTERACTIVE PROFILE
                          16,384   TOMBSTONE SEGMENT
                           8,192   DATA SPACE RUN TIME SID
                           8,192   HEAP DATA SEGMENT TYPE
                           4,096   MWS AREA CTL SID
FINAL TOTALS
TOTAL                    782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 124. Net Size Change, Grouped by Object/Segment Description

10.5.8 Report Title - Net Size Change by Job or Task

This report is produced from Command Option - TEMP Segment/Objects?

```
                                          Net size change by Job or Task.
                                 QUERY NAME . . . . . NETTDERPT2
                                 LIBRARY NAME . . . . SMTRACE
                                 FILE         LIBRARY      MEMBER       FORMAT
                                 NETTDERPT1   PFREXP2      PEXTRACE     NETTDERPT1
                                 TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                 DATE . . . . . . . . 08/02/96
                                 TIME . . . . . . . . 19:05:24


             Net size change   TDE       Job/Task name     Job         Job
             (bytes)           number                      user        number
                     335,872   0000881E  PEXTRACE          A960126A    053555
                     184,320   00007F6C  P23ARTVKE         A960126A    053319
                     102,400   0000880E  ILEAGNEW          A960126A    053541
                      69,632   00008408  JUNK              QSPLJOB     053464
                      65,536   00008814  OPENBAD           A960126A    053546
                      24,576   00008810  TSTIOC            A960126A    053543
FINAL TOTALS
TOTAL                782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 125. Net Size Change by Job or Task

10.5.9 Report Title - Net Size Change (in Bytes) of Individual Segments

This report is produced from Command Option - PERM Segment/Objects?

```
                                      Net size change (in bytes) of individual segments.
                                      (total size change at bottom of report)
                                      QUERY NAME . . . . . NETSIDRPT
                                      LIBRARY NAME . . . . SMTRACE
                                      FILE         LIBRARY      MEMBER       FORMAT
                                      NETSIDOBJ2   PFREXP2      PEXTRACE     NETSIDOBJ2
                                      DATE . . . . . . . . 08/02/96
                                      TIME . . . . . . . . 19:05:26


                  Net size     Object/segment  SID   Object/segment        Object  Segment  Description
                  change       address         type  name                  type    type
                  (in bytes)
                      16,384    315B69CF2300     P   QJOBMSGQ               18A0    0001    JOB MESSAGE QUEUE
                      12,288    1579A708B100    DP   PF132     PEXTRACSTS   0B90    0003    COMPOSITE PIECE - DATA SPACE
                       4,096    2DEBC2366600    DP   PF132     PEXTRACSTS   0B90    0001    COMPOSITE PIECE - DATA SPACE
                       4,096    232D272FB900     P   QSPSCB                 19C2    0001    SPOOL CTL BLOCK
                       4,096    3D078BDAFC00     P   PF132     PEXTRACSTS   0D50    0001    DATA BASE FILE MEMBER
FINAL TOTALS
TOTAL                 40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 126. Net Size Change (in bytes) of Individual Segments

10.5.10 Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)

This report is produced from Command Option - PERM Segment/Objects?

```
                                     Net size change, grouped by (name, obj-type, seg-type).
                                     (total net change at bottom of report)
                                        QUERY NAME . . . . . NETOBJRPT2
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        NETOBJRPT1   PFREXP2      PEXTRACE     NETOBJRPT1
                                        DATE . . . . . . . . 08/02/96
                                        TIME . . . . . . . . 19:05:27


                        Net size   Object/Segment                 Description
                        change     name,
                        (bytes)    obj type, seg type
                          16,384   QJOBMSGQ              18A0 0001  JOB MESSAGE QUEUE
                          12,288   PF132      PEXTRACSTS 0B90 0003  COMPOSITE PIECE - DATA SPACE
                           4,096   QSPSCB                19C2 0001  SPOOL CTL BLOCK
                           4,096   PF132      PEXTRACSTS 0D50 0001  DATA BASE FILE MEMBER
                           4,096   PF132      PEXTRACSTS 0B90 0001  COMPOSITE PIECE - DATA SPACE
FINAL TOTALS
TOTAL                     40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 127. Net Size Change, Grouped by Name/Object-Type/Segment-Type

10.5.11 Report Title - Net Size Change, Grouped by Object/Segment Description

This report is produced from Command Option - PERM Segment/Objects?

```
Net size change, grouped by Object/Segment description.
Destroyed and unknown types group under a blank description.
Total net size change at bottom of report.
     QUERY NAME . . . . . NETDSCRPT2
     LIBRARY NAME . . . . SMTRACE
     FILE         LIBRARY      MEMBER       FORMAT
     NETDSCRPT1   PFREXP2      PEXTRACE     NETDSCRPT1
     DATE . . . . . . . . 08/02/96
     TIME . . . . . . . . 19:05:28
```

```
08/02/96  19:05:28                                          PAGE    1
                 Net size change   Description
                 (bytes)
                          16,384   COMPOSITE PIECE - DATA SPACE
                          16,384   JOB MESSAGE QUEUE
                           4,096   DATA BASE FILE MEMBER
                           4,096   SPOOL CTL BLOCK
FINAL TOTALS
TOTAL                     40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 128. Net Size Change, Grouped by Object/Segment Description

10.5.12 Report Title - Net Size Change by Job or Task

This report is produced from Command Option - PERM Segment/Objects?

```
                                             Net size change by Job or Task.
                                    QUERY NAME . . . . . NETTDERPT2
                                    LIBRARY NAME . . . . SMTRACE
                                    FILE         LIBRARY      MEMBER       FORMAT
                                    NETTDERPT1   PFREXP2      PEXTRACE     NETTDERPT1
                                    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                    DATE . . . . . . . . 08/02/96
                                    TIME . . . . . . . . 19:05:29

             Net size change   TDE       Job/Task name     Job         Job
             (bytes)           number                      user        number
                      24,576   0000881E  PEXTRACE          A960126A    053555
                      16,384   0000880E  ILEAGNEW          A960126A    053541
FINAL TOTALS
TOTAL                 40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 129. Net Size Change by Job or Task

10.6 Address Consumption - Query Temporary/Permanent Addresses (ADDR Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.6, "ADDR Reporting Command" on page 160 for a details of how to use the ADDR command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.6.1 Report Title - Big Sid Creates per TDE, in Descending Sequence

```
                                             Big Sid creates per TDE, in descending sequence.
                                            QUERY NAME . . . . . ASMADRCRT9
                                            LIBRARY NAME . . . . SMTRACE
                                            FILE         LIBRARY      MEMBER       FORMAT
                                            ASMADRCRT8   PFREXP2      PEXTRACE     ASMADRCRT8
                                            ASMADRCRT7   PFREXP2      PEXTRACE     ASMADRCRT7
                                            DATE . . . . . . . . 08/02/96
                                            TIME . . . . . . . . 19:05:50

TDE #     Task/Job         Job         Job #         Total     % of            Big    % of            Big    % of         Big
(HEX)     Name             user                      Big Sids  System          temps  System          Perms  System       PAG Mbrs
00008814 OPENBAD          A960126A    053546           3,704     68.9          1,854     68.1             0      .0          1,850
00008810 TSTIOC           A960126A    053543           1,494     27.8            749     27.5             0      .0            745
00008408 JUNK             QSPLJOB     053464              96      1.8             62      2.3             0      .0             34
0000881E PEXTRACE         A960126A    053555              51       .9             31      1.1             4   100.0             16
00007F6C P23ARTVKE        A960126A    053319               9       .2              9       .3             0      .0              0
00007F2E QBRMNET          QPGMR       053289               8       .1              4       .1             0      .0              4
00000116 SK-ASC007P                                        6       .1              6       .2             0      .0              0
0000880E ILEAGNEW         A960126A    053541               6       .1              4       .1             0      .0              2
000000EC SCPF             QSYS        000000               2       .0              1       .0             0      .0              1
0000004C SMSIGNALEVENT                                     2       .0              2       .1             0      .0              0
00000092 SMXCSPRVSR                                        1       .0              1       .0             0      .0              0
                                       TOTAL           5,379                   2,723                      4                  2,652
* * *  E N D  O F  R E P O R T  * * *
```

Figure 130. Big SID Creates per TDE, in Descending Sequence

10.6.2 Report Title - SID Creates by MI Program and Offset

```
        Sid creates by MI pgm and offset.
QUERY NAME . . . . . ASMMICRT5
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMMICRT2    PFREXP2      PEXTRACE     ASMMICRT2
ASMMICRT4    PFREXP2      PEXTRACE     ASMMICRT4
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:06:03

SLIC/MI PGM          # of Sid's  % of
& OFFSET             created     System
                        5,379   100.0
QDMCOPEN   006528       2,638    49.0
QDBOPEN    00D164       2,600    48.3
QDBOPEN    01850C          30      .6
QCMDEXC    002094          14      .3
QCMDEXC    001FB4          14      .3
QWCCDSTC   00BA4C          12      .2
QSYACCIP   0025E0          10      .2
QUIMGFLW   0038F0           4      .1
QUILIST    00C7BC           3      .1
QSPOPEN    014040           5      .1
QSPCPYF    0083C8           3      .1
QSOKERN3   017274           6      .1
QCLRSLV    00463C           3      .1
QCLRSLV    00455C           3      .1
QCLRSLV    004374           3      .1
QCLRSLV    004290           3      .1
QCATRS     0039C4           3      .1
#skverb    006298           6      .1
SmXcJobM   0000A4           1      .0
SmUcr      0000D0           1      .0
SmAcr      0000D0           1      .0
QWCCDSTC   00E6EC           1      .0
QWCCDSAC   003894           2      .0
QUIPRINT   011690           2      .0
QUIOPEN    004A44           2      .0
QUICBINT   00187C           1      .0
QRCVDTAQ   002F60           1      .0
QDBCRTME   0073A0           2      .0
QDBCRTME   00414C           1      .0
QDBCRTME   00ADF0           1      .0
QC2UTIL1   00591C           1      .0
ILEAGNEW   001968           2      .0
* * *  E N D  O F  R E P O R T  * * *
```

Figure 131. Sid Creates by MI Program and Offset

10.6.3 Report Title - Big Sid Creates by MI Program Without Offset

```
     Big Sid creates by MI PGM without Offset
QUERY NAME . . . . . ASMMICRT6
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMMICRT3    PFREXP2      PEXTRACE     ASMMICRT3
ASMMICRT4    PFREXP2      PEXTRACE     ASMMICRT4
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:06:04


08/02/96  19:06:04    PAGE    1
SLIC/MI     # of SID's  % of
PGM         created     System
                 5,379   100.0
QDMCOPEN         2,638    49.0
QDBOPEN          2,630    48.9
QCMDEXC             28      .5
QWCCDSTC            13      .2
QSYACCIP            10      .2
QCLRSLV             12      .2
QUIMGFLW             4      .1
QUILIST              3      .1
QSPOPEN              5      .1
QSPCPYF              3      .1
QSOKERN3             6      .1
QDBCRTME             4      .1
QCATRS               3      .1
#skverb              6      .1
SmXcJobM             1      .0
SmUcr                1      .0
SmAcr                1      .0
QWCCDSAC             2      .0
QUIPRINT             2      .0
QUIOPEN              2      .0
QUICBINT             1      .0
QRCVDTAQ             1      .0
QC2UTIL1             1      .0
ILEAGNEW             2      .0
* * *  E N D  O F  R E P O R T  * * *
```

Figure 132. Big Sid Creates by MI Program without Offset

10.6.4 Report Title - Big Sid Creates per MI/SLIC Program and Type

```
    Big Sid creates per MI/SLIC PGM  and type
QUERY NAME . . . . . ASMMITYPE8
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMMITYPE6   PFREXP2      PEXTRACE     ASMMITYPE6
ASMMITYPE7   PFREXP2      PEXTRACE     ASMMITYPE7
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:06:19
```

MI/SLIC PGM	Total Big Sids	% of System	Big temps	% of System	Big Perms	% of System	Big PAG Mbrs	% of system
QDMCOPEN	2,638	49.0	0	.0	0	.0	2,638	99.5
QDBOPEN	2,630	48.9	2,630	96.6	0	.0	0	.0
QCMDEXC	28	.5	28	1.0	0	.0	0	.0
QWCCDSTC	13	.2	13	.5	0	.0	0	.0
QCLRSLV	12	.2	12	.4	0	.0	0	.0
QSYACCIP	10	.2	10	.4	0	.0	0	.0
#skverb	6	.1	6	.2	0	.0	0	.0
QSOKERN3	6	.1	6	.2	0	.0	0	.0
QSPOPEN	5	.1	0	.0	0	.0	5	.2
QDBCRTME	4	.1	0	.0	4	100.0	0	.0
QUIMGFLW	4	.1	4	.1	0	.0	0	.0
QCATRS	3	.1	0	.0	0	.0	3	.1
QSPCPYF	3	.1	0	.0	0	.0	3	.1
QUILIST	3	.1	3	.1	0	.0	0	.0
ILEAGNEW	2	.0	0	.0	0	.0	2	.1
QUIOPEN	2	.0	2	.1	0	.0	0	.0
QUIPRINT	2	.0	2	.1	0	.0	0	.0
QWCCDSAC	2	.0	2	.1	0	.0	0	.0
QC2UTIL1	1	.0	0	.0	0	.0	1	.0
QRCVDTAQ	1	.0	1	.0	0	.0	0	.0
QUICBINT	1	.0	1	.0	0	.0	0	.0
SmAcr	1	.0	1	.0	0	.0	0	.0
SmUcr	1	.0	1	.0	0	.0	0	.0
SmXcJobM	1	.0	1	.0	0	.0	0	.0
TOTAL	5,379		2,723		4		2,652	

* * * E N D O F R E P O R T * * *

Figure 133. Big Sid Creates per MI/SLIC Program and Type

10.6.5 Report Title - Big Sid Creates per MI/SLIC Program and Type

```
    Big Sid creates per MI/SLIC PGM  and type
QUERY NAME . . . . . ASMMITYP8
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMMITYP6    PFREXP2      PEXTRACE     ASMMITYP6
ASMMITYP7    PFREXP2      PEXTRACE     ASMMITYP7
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:06:35
```

MI PGM crt's	with SLIC PGM	Total Big Sids	% of System	Big temps	% of System	Big Perms	% of System	Big PAG Mbrs	% of system
QDMCOPEN	#dbdupcr	2,633	48.9	0	.0	0	.0	2,633	99.3
QDBOPEN	#socrt	2,630	48.9	2,630	96.6	0	.0	0	.0
QCMDEXC	#socrt	28	.5	28	1.0	0	.0	0	.0
QCLRSLV	#socrt	12	.2	12	.4	0	.0	0	.0
QSYACCIP	#iicrtix	10	.2	10	.4	0	.0	0	.0
#skverb	#skverb	6	.1	6	.2	0	.0	0	.0
QSOKERN3	#skverb	6	.1	6	.2	0	.0	0	.0
QWCCDSTC	SmAcr	6	.1	6	.2	0	.0	0	.0
QWCCDSTC	SmUcr	6	.1	6	.2	0	.0	0	.0
QDMCOPEN	#rmcdupo	5	.1	0	.0	0	.0	5	.2
QSPOPEN	#dbdupcr	5	.1	0	.0	0	.0	5	.2
QUIMGFLW	#socrt	4	.1	4	.1	0	.0	0	.0
QCATRS	PmAttrib	3	.1	0	.0	0	.0	3	.1
QSPCPYF	#dbdupcr	3	.1	0	.0	0	.0	3	.1
QUILIST	#socrt	3	.1	3	.1	0	.0	0	.0
ILEAGNEW	PmAttrib	2	.0	0	.0	0	.0	2	.1
QUIOPEN	#socrt	2	.0	2	.1	0	.0	0	.0
QUIPRINT	#socrt	2	.0	2	.1	0	.0	0	.0
QWCCDSAC	#iicrtix	2	.0	2	.1	0	.0	0	.0
QC2UTIL1	PmAttrib	1	.0	0	.0	0	.0	1	.0
QDBCRTME	#dbbldcr	1	.0	0	.0	1	25.0	0	.0
QDBCRTME	#dbcds	1	.0	0	.0	1	25.0	0	.0
QDBCRTME	#dbxtnds	1	.0	0	.0	1	25.0	0	.0
QDBCRTME	#socrt	1	.0	0	.0	1	25.0	0	.0
QRCVDTAQ	#socrt	1	.0	1	.0	0	.0	0	.0
QUICBINT	#socrt	1	.0	1	.0	0	.0	0	.0
QWCCDSTC	#socrt	1	.0	1	.0	0	.0	0	.0
SmAcr	SmAcr	1	.0	1	.0	0	.0	0	.0
SmUcr	SmUcr	1	.0	1	.0	0	.0	0	.0
SmXcJobM	SmXcJobM	1	.0	1	.0	0	.0	0	.0
	TOTAL	5,379		2,723		4		2,652	

* * * E N D O F R E P O R T * * *

Figure 134. Big Sid Creates per MI/SLIC Program and Type

10.7 Size of Objects Used During PEX Trace Collection - Obj/Seg Sizes from PEX Files (OBJSIZE Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.7, “OBJSIZE Reporting Command” on page 161 for a details of how to use the OBJSIZE command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.7.1 Report Title-Size of Objects Which Were Touched During the STRPEX Run

```
                 Size of object which where touched during the STRPEX run.
                 Note: this is not the ″size touched″, but rather the gross obj/seg size
                       of objects which were touched (at least once).
                            QUERY NAME . . . . . OBJSIZ4
                            LIBRARY NAME . . . . SMTRACE
                            FILE         LIBRARY      MEMBER       FORMAT
                            OBJSIZ2      PFREXP2      PEXTRACE     OBJSIZ2
                            DATE . . . . . . . . 08/02/96
                            TIME . . . . . . . . 19:06:41


   Object size   Segment start     Object/segment        Obj/Seg  Type description                    Library
   (in bytes)    address           name                  type                                         name
 6,288,281,600   E7D83F7CEE000000  ILEAGNEW  A960126A     1AEF    TEMPORARY - PROCESS CTL SPACE
   845,504,512   ED19E0C682000000  JUNK      QSPLJOB      1AEF    TEMPORARY - PROCESS CTL SPACE
    39,645,184   EAE54218B3000000  OPENBAD   A960126A     1AEF    TEMPORARY - PROCESS CTL SPACE
    16,777,216   FFFFFFFFC3000000  L/L RANGE 1            0000    L/L RANGE 1
    16,777,216   FFFFFFFFC6000000  L/L RANGE 1            0000    L/L RANGE 1
    11,800,576   250AFFDED4000000  QWCBT01                19D0    WORK CONTROL BLOCK TABLE            QSYS
    10,485,760   FFFFFFFFC4000000  L/L RANGE 1            0000    L/L RANGE 1
     7,610,368   39A06455CF000000  QCPFMSG                0E03    MESSAGE FILE                        QSYS
     7,217,152   1E8C20653F000000  QSYS                   1952    OIR SPACE
     6,529,024   320A78C57E000000  PF01      PF01         0B90    COMPOSITE PIECE - DATA SPACE        PFREXP2
     3,178,496   EC4B832819000000  QSERVER   QSYS         1AEF    TEMPORARY - PROCESS CTL SPACE
     1,990,656   235AD66C7B000000  SQCCSID1               0ED2    CCSID INFORMATION OBJECT            QSYS
     1,851,392   C2D22017B1000000  C2D22017B1000000       20AC    MWS AREA DATA SID
     1,773,568   24519880B6000000  QSECOFR                0801    USER PROFILE
     1,748,992   3138C3777D000000  QDFTOWN                0801    USER PROFILE
     1,224,704   3095F015C2000000  QSYSOPR                1902    MESSAGE QUEUE                       QSYS
     1,220,608   C000002001000000  SEIZE LOCK RANGE       2081    SEIZE LOCK RANGE
     1,126,400   38C92A0D7A000000  QSOKERN3               0203    SERVICE PROGRAM                     QSYS
     1,048,576   D1EDE9BC47000000  D1EDE9BC47000000       20AC    MWS AREA DATA SID
       806,912   0081A1324C000000  QPOLLFS1               0203    SERVICE PROGRAM                     QSYS
       806,912   03618FB7D8000000  QDBSHR                 0801    USER PROFILE
       663,552   36FE3B92F4000000  QSYS                   0E90    COMPOSITE PIECE - INDEX
       552,960   1FBB7330C2000000  QC2IO                  0203    SERVICE PROGRAM                     QSYS
       536,576   27E271EE5E000000  QSYS                   0401    LIBRARY
       532,480   D485767561000000  D485767561000000       0000
       532,480   2F60307D81000000  QHST96213DQHST96213D   0B90    COMPOSITE PIECE - DATA SPACE        QSYS
       495,616   34D70EC6D7000000  QLEAWI                 0203    SERVICE PROGRAM                     QSYS
       483,328   13D9941C47000000  QSPL                   0801    USER PROFILE
       442,368   2949B8D65D000000  QC2UTIL1               0203    SERVICE PROGRAM                     QSYS
       409,600   ECB9E6FE0E000000  ECB9E6FE0E000000       20DF    MUTEX TEMP SEGMENT
       344,064   FC88D12A57000000  FC88D12A57000000       20D6    HEAP DATA SEGMENT TYPE
       335,872   1DAD0DD754000000  PF05      PF05         0B90    COMPOSITE PIECE - DATA SPACE        PFREXP2
       335,872   3D9568FC6C000000  PF02      PF02         0B90    COMPOSITE PIECE - DATA SPACE        PFREXP2
       335,872   3EF1A3BC45000000  PF04      PF04         0B90    COMPOSITE PIECE - DATA SPACE        PFREXP2
       335,872   219274610F000000  PF03      PF03         0B90    COMPOSITE PIECE - DATA SPACE        PFREXP2
       319,488   3E300EBD51000000  QYPPRT                 0203    SERVICE PROGRAM                     QSYS
       299,008   3B1FB248A9000000  QSOSRV2                0203    SERVICE PROGRAM                     QSYS
       286,720   C517F58CA9000000  C517F58CA9000000       20D6    HEAP DATA SEGMENT TYPE
       280,576   0E370654F8000000  QJOBMSGQ               18A0    JOB MESSAGE QUEUE
```

Figure 135 (Part 1 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
262,144	E43BF962E5000000	E43BF962E5000000	20AC	MWS AREA DATA SID	
262,144	129F787018000000	QTCPMSGF	0E03	MESSAGE FILE	QTCP
258,048	FF834BEEBC000000	PAG	01EF	TEMPORARY - ACCESS GROUP	
229,376	1A72CA4E6B000000	QWPALLOC	0201	PROGRAM	QSYS
217,088	0255BE6EF4000000	QDBOPEN	0201	PROGRAM	QSYS
180,224	0DE83DDD25000000	QPOLLIB1	0203	SERVICE PROGRAM	QSYS
167,936	3F32381BCB000000	QTQSRVP2	0203	SERVICE PROGRAM	QSYS
149,504	1C6389948D000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
147,456	0FC4E3DCBC000000	QUSRSYS	0401	LIBRARY	
143,360	0FF51A76C7000000	QSPSIDQ	0EC7	PRINT QUEUE	QSPL
135,168	07015FCEEC000000	QGWCSSTS	1915	PANEL GROUP DEFINITION	QSYS
135,168	241E2B25C8000000	QDBGETM	0201	PROGRAM	QSYS
131,072	180EBCA981000000	QTGTNTOC	0201	PROGRAM	QTCP
126,976	3F3A85EC1B000000	QMHSNDPM	0201	PROGRAM	QSYS
126,976	06972D6978000000	OPEN5	0201	PROGRAM	PFREXP2
122,880	D2FB76C772000000	D2FB76C772000000	20D6	HEAP DATA SEGMENT TYPE	
118,784	3CEBB73B4B000000	QTMPLPRC	0201	PROGRAM	QTCP
106,496	053444642E000000	TESTIO	0201	PROGRAM	HATT
106,496	14EDD2AFED000000	QRNXIE	0203	SERVICE PROGRAM	QSYS
98,304	CD3A851305000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
98,304	299FA1DB51000000	QSPCPYF	0201	PROGRAM	QSYS
94,208	EE32788FC3000000	EE32788FC3000000	20D6	HEAP DATA SEGMENT TYPE	
94,208	19C53AB375000000	A960126A	0801	USER PROFILE	
94,208	30ED4D9D71000000	QUIMGFLW	0201	PROGRAM	QSYS
94,208	1AF49857A2000000	DSPOBJD DSPOBJD	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
90,112	38E3AD9CF4000000	QSPCHJOB	0201	PROGRAM	QSYS
90,112	2E495FB3E8000000	QPOSSRV4	0203	SERVICE PROGRAM	QSYS
86,016	2EB8AEEFA2000000	QUILIST	0201	PROGRAM	QSYS
81,920	CB2F24EC42000000	CB2F24EC42000000	20D6	HEAP DATA SEGMENT TYPE	
81,920	0B494CF4EC000000	QMHRSNEM	0201	PROGRAM	QSYS
81,920	046826E382000000	QUICMD	0201	PROGRAM	QSYS
81,920	3065C001CB000000	QSPRMTDR	0201	PROGRAM	QSYS
81,920	171EF7AFE3000000	QUIOPEN	0201	PROGRAM	QSYS
73,728	FCFA2024DA000000	FCFA2024DA000000	20D6	HEAP DATA SEGMENT TYPE	
73,728	1CF2254F0A000000	QSPCLOSE	0201	PROGRAM	QSYS
73,728	1C96EBBC4D000000	QWPZHPT1	0203	SERVICE PROGRAM	QSYS
73,728	0B006AC516000000	ILEAGN	0201	PROGRAM	PFREXP2
73,728	232DBEB8B4000000	QUIICHK	0201	PROGRAM	QSYS
69,632	1D3EDC4ED2000000	QGWCAJOB	1915	PANEL GROUP DEFINITION	QSYS

Figure 135 (Part 2 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
65,536	FD46578079000000	FD46578079000000	20AC	MWS AREA DATA SID	
65,536	CB409AF8A0040000	CB409AF8A0040000	20D7	ACTIVATION PROC REF TBL	
65,536	F836A3DBEA000000	F836A3DBEA000000	20AC	MWS AREA DATA SID	
65,536	D2624DD3F0040000	D2624DD3F0040000	20D9	TOMBSTONE SEGMENT	
65,536	F4E3FAD8D0040000	F4E3FAD8D0040000	20D7	ACTIVATION PROC REF TBL	
65,536	03CABF2D39000000	QTQICVC2	0203	SERVICE PROGRAM	QSYS
65,536	16792E46BD000000	QLIDLOBJ	0201	PROGRAM	QSYS
61,440	1FCDB3C896000000	QTQICONV	0203	SERVICE PROGRAM	QSYS
57,344	38791EFBA8000000	QSOSRV1	0203	SERVICE PROGRAM	QSYS
49,152	02D13EC128000000	QSPCNSPF	0201	PROGRAM	QSYS
49,152	0F98F1D684000000	PFREXP2	0401	LIBRARY	
49,152	328070DA54000000	HATT	0401	LIBRARY	
49,152	04465BB6D5000000	QSPHNMLT	0201	PROGRAM	QSYS
49,152	C0A90C8129000000	QTEMP	04C1	INTERNAL QTEMP LIBRARY	
45,056	C3E62C0360040000	C3E62C0360040000	20D9	TOMBSTONE SEGMENT	
45,056	E7CB3ED360040000	E7CB3ED360040000	20D9	TOMBSTONE SEGMENT	
45,056	094FA2E92A000000	TESTIOC	0201	PROGRAM	PFREXP2
45,056	2EA8E90DA6000000	ILEAGNEW	0201	PROGRAM	PFREXP2
45,056	0C5CB9677C000000	QPOWPIDI	0203	SERVICE PROGRAM	QSYS
40,960	12466B188B000000	QPOWPID	0203	SERVICE PROGRAM	QSYS
40,960	3D7FEB7825000000	QUIALIST	0201	PROGRAM	QSYS
36,864	000000000E000000	DATA BASE IN-USE TBL	2083	DATA BASE IN-USE TBL	
36,864	2B6479F3E5000000	QTMPCKP	0201	PROGRAM	QTCP
36,864	14F2DA89E7000000	QRCVDTAQ	0201	PROGRAM	QSYS
36,864	2F98435534000000	QWTCCRLJ	0201	PROGRAM	QSYS
36,864	01E928D3C3000000	QUICLOSE	0201	PROGRAM	QSYS
36,864	E3780192EB000000	QWCCDSACJOBSPACE	19EF	TEMPORARY - SPACE	
34,816	0ABB0C0204000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
32,768	1CD4BDCBEB000000	QPOSSRV3	0203	SERVICE PROGRAM	QSYS
32,768	C3E43389E6000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
32,768	13B603C8EC000000	QLICHLLE	0201	PROGRAM	QSYS
32,768	0C4CD3B08A000000	QSPRCMBR	0201	PROGRAM	QSYS
28,672	3E093A4267000000	QEZWRAST	0201	PROGRAM	QSYS
28,672	28E370F22F000000	OPENBAD	0201	PROGRAM	PFREXP2
28,672	0BB6750747000000	QYPEENDP	0201	PROGRAM	QSYS
28,672	1E93026233000000	QTCP	0401	LIBRARY	
28,672	117EC2FAAF000000	QUSDLTUS	0201	PROGRAM	QSYS
24,576	2E96BC585F000000	QDMCRODP	0201	PROGRAM	QSYS
24,576	0296363C8E000000	QCAIFLD	0201	PROGRAM	QSYS

Figure 135 (Part 3 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
24,576	1BB77EC151000000	QUICBINT	0201	PROGRAM	QSYS
24,576	F08C744308000000	QWTPIPJ	0EEF	TEMPORARY - INDEX	
24,576	ECCE531C0A000000	QWCCDSACJOBINDEX	0EEF	TEMPORARY - INDEX	
24,576	2E355314CE000000	QYPESVSE	0203	SERVICE PROGRAM	QSYS
24,576	EFAC0C01FF000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
22,528	315B69CF23000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
20,480	0BEC87C5AD000000	QCAIEXIT	0201	PROGRAM	QSYS
20,480	21A38B5342000000	QPXXDISP	0201	PROGRAM	QSYS
20,480	257C9EC842000000	A960126A	0E02	OUTPUT QUEUE	A960126A
20,480	285B53632E000000	QWCSHUIC	0201	PROGRAM	QSYS
20,480	FA6CF93A2F000000	A960126A	0EC4	INTERACTIVE PROFILE	QTEMP
20,480	07155379A8000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
20,480	1CF421CAC9000000	QSPDSPFX	0201	PROGRAM	QSYS
20,480	043358E866000000	QRNXDUMP	0203	SERVICE PROGRAM	QSYS
20,480	2CA3A7F834000000	QPOLDC1	0203	SERVICE PROGRAM	QSYS
20,480	13E59BF964000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
16,384	D7A7822472000000	D7A7822472000000	20BB	MODUL2 STATIC STORE	
16,384	EEE05252CB000000	EEE05252CB000000	20BB	MODUL2 STATIC STORE	
16,384	02BEB6E9C8000000	QWTPMHDJ	0201	PROGRAM	QSYS
16,384	2DEBC23666000000	PF132 PEXTRACSTS	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
16,384	00D950D231000000	QSPUDTQ	0EC7	PRINT QUEUE	QSPL
16,384	1C6098F977000000	QUIRCLAP	0201	PROGRAM	QSYS
16,384	3BBB16FD1F000000	QWCDLYJB	0201	PROGRAM	QSYS
16,384	EB3F994F8E000000	QSO_DNS_INDEX	0EEF	TEMPORARY - INDEX	
16,384	E114192F4C000000	QWCCDSACORDERINDEX	0EEF	TEMPORARY - INDEX	
16,384	10D99BF32E000000	QCACHLBL	0201	PROGRAM	QSYS
16,384	15BA92923E000000	QSPQJBQ	0EC7	PRINT QUEUE	QSPL
16,384	286735A47C000000	QSPFRMQ	0EC7	PRINT QUEUE	QSPL
16,384	2E600057BC000000	QATOCLS1 SERVICES	0D50	DATA BASE FILE MEMBER	QUSRSYS
16,384	0DB384DE55000000	Q04079N002Q097276464	0B90	COMPOSITE PIECE - DATA SPACE	QSPL
16,384	22A1BD8905000000	QSPFACB	0EC6	FILE AVAIL CTL BLOCK	QSPL
16,384	182283D7D6000000	QATOCTCPIPCONFIG	0B90	COMPOSITE PIECE - DATA SPACE	QUSRSYS
16,384	31BD872D9B000000	QSPDEVQ	0EC7	PRINT QUEUE	QSPL
16,384	31F2256946000000	QWTMMRLJ	0201	PROGRAM	QSYS
16,384	0EEFFF08F4000000	QSQENDAG	0201	PROGRAM	QSYS
16,384	EB72185C31000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
16,384	03B0D326BA000000	QSYCPYIP	0201	PROGRAM	QSYS
12,288	D56C3B528F000000	D56C3B528F000000	20D5	HEAP CONTROL SEGMENT	
12,288	E5ACA040BA000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	

Figure 135 (Part 4 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
12,288	273E4D7C6C000000	QATOCTCPIPCONFIG	0C90	COMPOSITE PIECE - DATA SPACE INDEX	
12,288	D057C201C1000000	QCASQ	0AEF	TEMPORARY - QUEUE	
12,288	2E320245CE000000	QWVPDAGE	0201	PROGRAM	QSYS
8,192	FCAE14909A000000	FCAE14909A000000	20AB	MWS AREA CTL SID	
8,192	CA4A7FFD57000000	CA4A7FFD57000000	20AB	MWS AREA CTL SID	
8,192	FE38ECDB80040000	FE38ECDB80040000	20D9	TOMBSTONE SEGMENT	
8,192	DAFA13F7C2000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	EFDB55B7CF000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	C258AF143D000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	3420123416000000	QA1ANET QA1ANET	0D50	DATA BASE FILE MEMBER	QUSRBRM
8,192	CA5757D23F000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	FEF71F5C65000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	C20421F82A000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	FF061D40ED000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	365A172102000000	QATOCTCPIPCONFIG	0D50	DATA BASE FILE MEMBER	QUSRSYS
8,192	F050177F93000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	CB05E66536000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	F2E8585394000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	FCC280AE96000000	WMHQ Data Queue Cach	19EF	TEMPORARY - SPACE	QTEMP
8,192	F1379077A8000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	232D272FB9000000	QSPSCB	19C2	SPOOL CTL BLOCK	
8,192	FCA197E7FE000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	EA15DD9C58000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	DC564EB79B000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	0ECD835EEE000000	QHST	1902	MESSAGE QUEUE	QSYS
4,096	E33ADE8230040000	E33ADE8230040000	0007	ACCESS GROUP	
4,096	FF631683D0040000	FF631683D0040000	0007	ACCESS GROUP	
4,096	30AE3E05A5000000	PF03 PF03	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	045D335536000000	Q04079N002Q097276464	0D50	DATA BASE FILE MEMBER	QSPL
4,096	1F876EA75D000000	QSPSCB	19C2	SPOOL CTL BLOCK	
4,096	D7693A8A1A000000	QCAPLIST	19EF	TEMPORARY - SPACE	
4,096	2178D560F5000000	QATOCTCPIP	1901	FILE	QUSRSYS
4,096	0126426A14000000	PF01 PF01	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	35AE08B038000000	QSPSCB	19C2	SPOOL CTL BLOCK	
4,096	2301659DFA000000	QLDA	19CE	LOCAL DATA AREA	
4,096	CB5A738149000000	QCAPLIST	19FC	PROTECTED SPACE	
4,096	0CB132A102000000	PF02 PF02	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	F8594352F8000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
4,096	E0F0AADA32000000		19EF	TEMPORARY - SPACE	

Figure 135 (Part 5 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
4,096	0E914432BE000000	PF05	1901	FILE	PFREXP2
4,096	06EBBA858B000000	PF02	1901	FILE	PFREXP2
4,096	FE1EBB6E6F000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
4,096	E93D79AE62000000	QMAIR	19EF	TEMPORARY - SPACE	QTEMP
4,096	09CD84FCD8000000	QSPSCB	19C2	SPOOL CTL BLOCK	
4,096	D0CB5E80AD000000		19EF	TEMPORARY - SPACE	
4,096	C81E272FB4000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
4,096	DA763D25DF000000	QCAPLIST	19EF	TEMPORARY - SPACE	
4,096	C287F8CA0D000000	QCAPLIST	19EF	TEMPORARY - SPACE	
4,096	D5B7F5796E000000	Q04079N001QSPL	0DEF	DATA BASE OPERATIONAL CURSOR	
4,096	26A92182AD000000	QSPSCB	19C2	SPOOL CTL BLOCK	
4,096	3E7BFA2217000000	QHST96213DQHST96213D	0D50	DATA BASE FILE MEMBER	QSYS
4,096	00773373B9000000	QLDA	19CE	LOCAL DATA AREA	
4,096	0A58EEA38C000000	QTCPASC	1906	TABLE	QUSRSYS
4,096	C84D70E584000000	QCAPLIST	19FC	PROTECTED SPACE	
4,096	3D078BDAFC000000	PF132 PEXTRACSTS	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	0847F54564000000	PF04	1901	FILE	PFREXP2
4,096	2A1061FC38000000	DSPOBJD DSPOBJD	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	2CC8D77BEA000000	PF05 PF05	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	0BD8CEB30C000000	DSPOBJD	1901	FILE	PFREXP2
4,096	22EEAF20E8000000	PF01	1901	FILE	PFREXP2
4,096	28264A1AEF000000	PF132	1901	FILE	PFREXP2
4,096	30949F058B000000	QATTR	1951	FILE FORMAT	
4,096	2AE8C5EA2E000000	PF03	1901	FILE	PFREXP2
4,096	C60FD2C61A000000	APLIST	19EF	TEMPORARY - SPACE	
4,096	FB3B8E2DA9000000	QCAPLIST	19FC	PROTECTED SPACE	
4,096	1928ACB3E2000000	QSNADS	1909	SUBSYSTEM DESCRIPTION	QSYS
4,096	D513B315B3000000	QCAPLIST	19FC	PROTECTED SPACE	
4,096	C8C232AD48000000	QCAPLIST	19EF	TEMPORARY - SPACE	
4,096	F36C2F2577000000	QCAPLIST	19FC	PROTECTED SPACE	
4,096	0D68C1AAED000000	RLSJOB	1905	COMMAND	QSYS
4,096	359B523326000000	PF04 PF04	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	020CD38FBF000000	QHST96213D	1901	FILE	QSYS
4,096	3AA811F995000000	QPDSPSTS	1901	FILE	QSYS
4,096	37E86C0247000000	CPYSPLF	1905	COMMAND	QSYS
4,096	2E043D57B8000000	ENDPEX	1905	COMMAND	QSYS
4,096	3DBF01F089000000	QLDA	19CE	LOCAL DATA AREA	

Figure 135 (Part 6 of 7). Size of Objects that were Touched during the STRPEX Run

	Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
FINAL TOTALS						
TOTAL	7,282,597,888					
COUNT	232					

* * * E N D O F R E P O R T * * *

Figure 135 (Part 7 of 7). Size of Objects that were Touched during the STRPEX Run

10.7.2 Report Title - Object/Segment Sizes, Grouped by Name and Description

```
                                        Object/Segment sizes, grouped by name and description
                                          QUERY NAME . . . . . OBJSIZ6
                                          LIBRARY NAME . . . . SMTRACE
                                          FILE         LIBRARY      MEMBER       FORMAT
                                          OBJSIZ5      PFREXP2      PEXTRACE     OBJSIZ5
                                          DATE . . . . . . . . 08/02/96
                                          TIME . . . . . . . . 19:06:43
```

Object/Segment name and description			Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
			7,282,597,888	232	31,390,508	6,288,281,600
ILEAGNEW	A960126A	TEMPORARY - PROCESS CTL SPACE	6,288,281,600	1	6,288,281,600	6,288,281,600
JUNK	QSPLJOB	TEMPORARY - PROCESS CTL SPACE	845,504,512	1	845,504,512	845,504,512
L/L RANGE 1		L/L RANGE 1	44,040,192	3	14,680,064	16,777,216
OPENBAD	A960126A	TEMPORARY - PROCESS CTL SPACE	39,645,184	1	39,645,184	39,645,184
QWCBT01		WORK CONTROL BLOCK TABLE	11,800,576	1	11,800,576	11,800,576
QCPFMSG		MESSAGE FILE	7,610,368	1	7,610,368	7,610,368
QSYS		OIR SPACE	7,217,152	1	7,217,152	7,217,152
PF01	PF01	COMPOSITE PIECE - DATA SPACE	6,529,024	1	6,529,024	6,529,024
QSERVER	QSYS	TEMPORARY - PROCESS CTL SPACE	3,178,496	1	3,178,496	3,178,496
SQCCSID1		CCSID INFORMATION OBJECT	1,990,656	1	1,990,656	1,990,656
C2D22017B1000000		MWS AREA DATA SID	1,851,392	1	1,851,392	1,851,392
QSECOFR		USER PROFILE	1,773,568	1	1,773,568	1,773,568
QDFTOWN		USER PROFILE	1,748,992	1	1,748,992	1,748,992
QSYSOPR		MESSAGE QUEUE	1,224,704	1	1,224,704	1,224,704
SEIZE LOCK RANGE		SEIZE LOCK RANGE	1,220,608	1	1,220,608	1,220,608
QSOKERN3		SERVICE PROGRAM	1,126,400	1	1,126,400	1,126,400
D1EDE9BC47000000		MWS AREA DATA SID	1,048,576	1	1,048,576	1,048,576
QDBSHR		USER PROFILE	806,912	1	806,912	806,912
QPOLLFS1		SERVICE PROGRAM	806,912	1	806,912	806,912
QSYS		COMPOSITE PIECE - INDEX	663,552	1	663,552	663,552
QC2IO		SERVICE PROGRAM	552,960	1	552,960	552,960
QSYS		LIBRARY	536,576	1	536,576	536,576
D485767561000000			532,480	1	532,480	532,480
QHST96213DQHST96213D		COMPOSITE PIECE - DATA SPACE	532,480	1	532,480	532,480
QJOBMSGQ		JOB MESSAGE QUEUE	528,384	6	88,064	280,576
QLEAWI		SERVICE PROGRAM	495,616	1	495,616	495,616
QSPL		USER PROFILE	483,328	1	483,328	483,328
QC2UTIL1		SERVICE PROGRAM	442,368	1	442,368	442,368
ECB9E6FE0E000000		MUTEX TEMP SEGMENT	409,600	1	409,600	409,600
FC88D12A57000000		HEAP DATA SEGMENT TYPE	344,064	1	344,064	344,064
PF02	PF02	COMPOSITE PIECE - DATA SPACE	335,872	1	335,872	335,872
PF03	PF03	COMPOSITE PIECE - DATA SPACE	335,872	1	335,872	335,872
PF04	PF04	COMPOSITE PIECE - DATA SPACE	335,872	1	335,872	335,872
PF05	PF05	COMPOSITE PIECE - DATA SPACE	335,872	1	335,872	335,872
QYPPRT		SERVICE PROGRAM	319,488	1	319,488	319,488
QSOSRV2		SERVICE PROGRAM	299,008	1	299,008	299,008
C517F58CA9000000		HEAP DATA SEGMENT TYPE	286,720	1	286,720	286,720

Figure 136 (Part 1 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
E43BF962E5000000	MWS AREA DATA SID	262,144	1	262,144	262,144
QTCPMSGF	MESSAGE FILE	262,144	1	262,144	262,144
PAG	TEMPORARY - ACCESS GROUP	258,048	1	258,048	258,048
QWPALLOC	PROGRAM	229,376	1	229,376	229,376
UIM_TEMPORARY_WORKSP	TEMPORARY - SPACE	229,376	12	19,115	98,304
QDBOPEN	PROGRAM	217,088	1	217,088	217,088
QPOLLIB1	SERVICE PROGRAM	180,224	1	180,224	180,224
QTQSRVP2	SERVICE PROGRAM	167,936	1	167,936	167,936
QUSRSYS	LIBRARY	147,456	1	147,456	147,456
QSPSIDQ	PRINT QUEUE	143,360	1	143,360	143,360
QDBGETM	PROGRAM	135,168	1	135,168	135,168
QGWCSSTS	PANEL GROUP DEFINITION	135,168	1	135,168	135,168
QTGTNTOC	PROGRAM	131,072	1	131,072	131,072
OPEN5	PROGRAM	126,976	1	126,976	126,976
QMHSNDPM	PROGRAM	126,976	1	126,976	126,976
D2FB76C772000000	HEAP DATA SEGMENT TYPE	122,880	1	122,880	122,880
QTMPLPRC	PROGRAM	118,784	1	118,784	118,784
QRNXIE	SERVICE PROGRAM	106,496	1	106,496	106,496
TESTIO	PROGRAM	106,496	1	106,496	106,496
QSPCPYF	PROGRAM	98,304	1	98,304	98,304
A960126A	USER PROFILE	94,208	1	94,208	94,208
DSPOBJD DSPOBJD	COMPOSITE PIECE - DATA SPACE	94,208	1	94,208	94,208
EE32788FC3000000	HEAP DATA SEGMENT TYPE	94,208	1	94,208	94,208
QUIMGFLW	PROGRAM	94,208	1	94,208	94,208
QPOSSRV4	SERVICE PROGRAM	90,112	1	90,112	90,112
QSPCHJOB	PROGRAM	90,112	1	90,112	90,112
QUILIST	PROGRAM	86,016	1	86,016	86,016
CB2F24EC42000000	HEAP DATA SEGMENT TYPE	81,920	1	81,920	81,920
QMHRSNEM	PROGRAM	81,920	1	81,920	81,920
QSPRMTDR	PROGRAM	81,920	1	81,920	81,920
QUICMD	PROGRAM	81,920	1	81,920	81,920
QUIOPEN	PROGRAM	81,920	1	81,920	81,920
FCFA2024DA000000	HEAP DATA SEGMENT TYPE	73,728	1	73,728	73,728
ILEAGN	PROGRAM	73,728	1	73,728	73,728
QSPCLOSE	PROGRAM	73,728	1	73,728	73,728
QUIICHK	PROGRAM	73,728	1	73,728	73,728
QWPZHPT1	SERVICE PROGRAM	73,728	1	73,728	73,728
QGWCAJOB	PANEL GROUP DEFINITION	69,632	1	69,632	69,632

Figure 136 (Part 2 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
CB409AF8A0040000	ACTIVATION PROC REF TBL	65,536	1	65,536	65,536
D2624DD3F0040000	TOMBSTONE SEGMENT	65,536	1	65,536	65,536
FD46578079000000	MWS AREA DATA SID	65,536	1	65,536	65,536
F4E3FAD8D0040000	ACTIVATION PROC REF TBL	65,536	1	65,536	65,536
F836A3DBEA000000	MWS AREA DATA SID	65,536	1	65,536	65,536
QLIDLOBJ	PROGRAM	65,536	1	65,536	65,536
QTQICVC2	SERVICE PROGRAM	65,536	1	65,536	65,536
QTQICONV	SERVICE PROGRAM	61,440	1	61,440	61,440
QSOSRV1	SERVICE PROGRAM	57,344	1	57,344	57,344
HATT	LIBRARY	49,152	1	49,152	49,152
PFREXP2	LIBRARY	49,152	1	49,152	49,152
QCAWAREA	PROTECTED SPACE	49,152	6	8,192	8,192
QSPCNSPF	PROGRAM	49,152	1	49,152	49,152
QSPHNMLT	PROGRAM	49,152	1	49,152	49,152
QTEMP	INTERNAL QTEMP LIBRARY	49,152	1	49,152	49,152
C3E62C0360040000	TOMBSTONE SEGMENT	45,056	1	45,056	45,056
E7CB3ED360040000	TOMBSTONE SEGMENT	45,056	1	45,056	45,056
ILEAGNEW	PROGRAM	45,056	1	45,056	45,056
QPOWPIDI	SERVICE PROGRAM	45,056	1	45,056	45,056
TESTIOC	PROGRAM	45,056	1	45,056	45,056
QPOWPID	SERVICE PROGRAM	40,960	1	40,960	40,960
QUIALIST	PROGRAM	40,960	1	40,960	40,960
DATA BASE IN-USE TBL	DATA BASE IN-USE TBL	36,864	1	36,864	36,864
QRCVDTAQ	PROGRAM	36,864	1	36,864	36,864
QTMPCKP	PROGRAM	36,864	1	36,864	36,864
QUICLOSE	PROGRAM	36,864	1	36,864	36,864
QWCCDSACJOBSPACE	TEMPORARY - SPACE	36,864	1	36,864	36,864
QWTCCRLJ	PROGRAM	36,864	1	36,864	36,864
QCAWAREA	TEMPORARY - SPACE	32,768	4	8,192	8,192
QLICHLLE	PROGRAM	32,768	1	32,768	32,768
QPOSSRV3	SERVICE PROGRAM	32,768	1	32,768	32,768
QSPRCMBR	PROGRAM	32,768	1	32,768	32,768
OPENBAD	PROGRAM	28,672	1	28,672	28,672
QEZWRAST	PROGRAM	28,672	1	28,672	28,672
QTCP	LIBRARY	28,672	1	28,672	28,672
QUSDLTUS	PROGRAM	28,672	1	28,672	28,672
QYPEENDP	PROGRAM	28,672	1	28,672	28,672
QCAIFLD	PROGRAM	24,576	1	24,576	24,576

Figure 136 (Part 3 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
QDMCRODP	PROGRAM	24,576	1	24,576	24,576
QSPSCB	SPOOL CTL BLOCK	24,576	5	4,915	8,192
QUICBINT	PROGRAM	24,576	1	24,576	24,576
QWCCDSACJOBINDEX	TEMPORARY - INDEX	24,576	1	24,576	24,576
QWTPIPJ	TEMPORARY - INDEX	24,576	1	24,576	24,576
QYPESVSE	SERVICE PROGRAM	24,576	1	24,576	24,576
A960126A	INTERACTIVE PROFILE	20,480	1	20,480	20,480
A960126A	OUTPUT QUEUE	20,480	1	20,480	20,480
QCAIEXIT	PROGRAM	20,480	1	20,480	20,480
QCAPLIST	PROTECTED SPACE	20,480	5	4,096	4,096
QPXXDISP	PROGRAM	20,480	1	20,480	20,480
QPOLDC1	SERVICE PROGRAM	20,480	1	20,480	20,480
QRNXDUMP	SERVICE PROGRAM	20,480	1	20,480	20,480
QSPDSPFX	PROGRAM	20,480	1	20,480	20,480
QWCSHUIC	PROGRAM	20,480	1	20,480	20,480
D7A7822472000000	MODUL2 STATIC STORE	16,384	1	16,384	16,384
EEE05252CB000000	MODUL2 STATIC STORE	16,384	1	16,384	16,384
PF132 PEXTRACSTS	COMPOSITE PIECE - DATA SPACE	16,384	1	16,384	16,384
QATOCLS1 SERVICES	DATA BASE FILE MEMBER	16,384	1	16,384	16,384
QATOCTCPIPCONFIG	COMPOSITE PIECE - DATA SPACE	16,384	1	16,384	16,384
QCACHLBL	PROGRAM	16,384	1	16,384	16,384
QCAPLIST	TEMPORARY - SPACE	16,384	4	4,096	4,096
QSO_DNS_INDEX	TEMPORARY - INDEX	16,384	1	16,384	16,384
QSPDEVQ	PRINT QUEUE	16,384	1	16,384	16,384
QSPFACB	FILE AVAIL CTL BLOCK	16,384	1	16,384	16,384
QSPFRMQ	PRINT QUEUE	16,384	1	16,384	16,384
QSPQJBQ	PRINT QUEUE	16,384	1	16,384	16,384
QSPUDTQ	PRINT QUEUE	16,384	1	16,384	16,384
QSQENDAG	PROGRAM	16,384	1	16,384	16,384
QSYCPYIP	PROGRAM	16,384	1	16,384	16,384
QUIRCLAP	PROGRAM	16,384	1	16,384	16,384
QWCCDSACORDERINDEX	TEMPORARY - INDEX	16,384	1	16,384	16,384
QWCDLYJB	PROGRAM	16,384	1	16,384	16,384
QWTMMRLJ	PROGRAM	16,384	1	16,384	16,384
QWTPMHDJ	PROGRAM	16,384	1	16,384	16,384
Q04079N002Q097276464	COMPOSITE PIECE - DATA SPACE	16,384	1	16,384	16,384
D56C3B528F000000	HEAP CONTROL SEGMENT	12,288	1	12,288	12,288
QATOCTCPIPCONFIG	COMPOSITE PIECE - DATA SPACE INDEX	12,288	1	12,288	12,288

Figure 136 (Part 4 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
QCASQ	TEMPORARY - QUEUE	12,288	1	12,288	12,288
QLDA	LOCAL DATA AREA	12,288	3	4,096	4,096
QWVPDAGE	PROGRAM	12,288	1	12,288	12,288
	TEMPORARY - SPACE	8,192	2	4,096	4,096
CA4A7FFD57000000	MWS AREA CTL SID	8,192	1	8,192	8,192
FCAE14909A000000	MWS AREA CTL SID	8,192	1	8,192	8,192
FE38ECDB80040000	TOMBSTONE SEGMENT	8,192	1	8,192	8,192
QATOCTCPIPCONFIG	DATA BASE FILE MEMBER	8,192	1	8,192	8,192
QA1ANET QA1ANET	DATA BASE FILE MEMBER	8,192	1	8,192	8,192
QHST	MESSAGE QUEUE	8,192	1	8,192	8,192
WMHQ Data Queue Cach	TEMPORARY - SPACE	8,192	1	8,192	8,192
APLIST	TEMPORARY - SPACE	4,096	1	4,096	4,096
CPYSPLF	COMMAND	4,096	1	4,096	4,096
DSPOBJD	FILE	4,096	1	4,096	4,096
DSPOBJD DSPOBJD	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
ENDPEX	COMMAND	4,096	1	4,096	4,096
E33ADE8230040000	ACCESS GROUP	4,096	1	4,096	4,096
FF631683D0040000	ACCESS GROUP	4,096	1	4,096	4,096
PF01	FILE	4,096	1	4,096	4,096
PF01 PF01	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF02	FILE	4,096	1	4,096	4,096
PF02 PF02	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF03	FILE	4,096	1	4,096	4,096
PF03 PF03	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF04	FILE	4,096	1	4,096	4,096
PF04 PF04	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF05	FILE	4,096	1	4,096	4,096
PF05 PF05	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF132	FILE	4,096	1	4,096	4,096
PF132 PEXTRACSTS	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
QATOCTCPIP	FILE	4,096	1	4,096	4,096
QATTR	FILE FORMAT	4,096	1	4,096	4,096
QHST96213D	FILE	4,096	1	4,096	4,096
QHST96213DQHST96213D	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
QMAIR	TEMPORARY - SPACE	4,096	1	4,096	4,096
QPDSPSTS	FILE	4,096	1	4,096	4,096
QSNADS	SUBSYSTEM DESCRIPTION	4,096	1	4,096	4,096
QTCPASC	TABLE	4,096	1	4,096	4,096

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
Q04079N001QSPL	DATA BASE OPERATIONAL CURSOR	4,096	1	4,096	4,096
Q04079N002Q097276464	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
RLSJOB	COMMAND	4,096	1	4,096	4,096

* * * E N D O F R E P O R T * * *

Figure 136 (Part 5 of 5). Object/Segment Sizes, Grouped by Name and Description

10.7.3 Report Title-Object/Segment Sizes, Grouped by Object/Segment Type (Description) Only

```
Object/Segment sizes, grouped by obj/seg type (description) only
       QUERY NAME . . . . . OBJSIZ8
       LIBRARY NAME . . . . SMTRACE
       FILE         LIBRARY      MEMBER       FORMAT
       OBJSIZ7      PFREXP2      PEXTRACE     OBJSIZ7
       DATE . . . . . . . . 08/02/96
       TIME . . . . . . . . 19:06:44
```

Object/Segment name	Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size	Minimum size
	7,282,597,888	232	31,390,508	6,288,281,600	4,096
TEMPORARY - PROCESS CTL SPACE	7,176,609,792	4	1,794,152,448	6,288,281,600	3,178,496
L/L RANGE 1	44,040,192	3	14,680,064	16,777,216	10,485,760
WORK CONTROL BLOCK TABLE	11,800,576	1	11,800,576	11,800,576	11,800,576
COMPOSITE PIECE - DATA SPACE	8,548,352	10	854,835	6,529,024	16,384
MESSAGE FILE	7,872,512	2	3,936,256	7,610,368	262,144
OIR SPACE	7,217,152	1	7,217,152	7,217,152	7,217,152
SERVICE PROGRAM	5,029,888	21	239,518	1,126,400	20,480
USER PROFILE	4,907,008	5	981,402	1,773,568	94,208
MWS AREA DATA SID	3,293,184	5	658,637	1,851,392	65,536
PROGRAM	3,014,656	50	60,293	229,376	12,288
CCSID INFORMATION OBJECT	1,990,656	1	1,990,656	1,990,656	1,990,656
MESSAGE QUEUE	1,232,896	2	616,448	1,224,704	8,192
SEIZE LOCK RANGE	1,220,608	1	1,220,608	1,220,608	1,220,608
HEAP DATA SEGMENT TYPE	1,003,520	6	167,253	344,064	73,728
LIBRARY	811,008	5	162,202	536,576	28,672
COMPOSITE PIECE - INDEX	663,552	1	663,552	663,552	663,552
	532,480	1	532,480	532,480	532,480
JOB MESSAGE QUEUE	528,384	6	88,064	280,576	20,480
MUTEX TEMP SEGMENT	409,600	1	409,600	409,600	409,600
TEMPORARY - SPACE	339,968	26	13,076	98,304	4,096
TEMPORARY - ACCESS GROUP	258,048	1	258,048	258,048	258,048
PRINT QUEUE	208,896	5	41,779	143,360	16,384
PANEL GROUP DEFINITION	204,800	2	102,400	135,168	69,632
TOMBSTONE SEGMENT	163,840	4	40,960	65,536	8,192
ACTIVATION PROC REF TBL	131,072	2	65,536	65,536	65,536
TEMPORARY - INDEX	81,920	4	20,480	24,576	16,384
PROTECTED SPACE	69,632	11	6,330	8,192	4,096
DATA BASE FILE MEMBER	69,632	12	5,803	16,384	4,096
INTERNAL QTEMP LIBRARY	49,152	1	49,152	49,152	49,152
FILE	40,960	10	4,096	4,096	4,096
DATA BASE IN-USE TBL	36,864	1	36,864	36,864	36,864
MODUL2 STATIC STORE	32,768	2	16,384	16,384	16,384
SPOOL CTL BLOCK	24,576	5	4,915	8,192	4,096
OUTPUT QUEUE	20,480	1	20,480	20,480	20,480
INTERACTIVE PROFILE	20,480	1	20,480	20,480	20,480
MWS AREA CTL SID	16,384	2	8,192	8,192	8,192
FILE AVAIL CTL BLOCK	16,384	1	16,384	16,384	16,384

Object/Segment name	Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size	Minimum size
TEMPORARY - QUEUE	12,288	1	12,288	12,288	12,288
LOCAL DATA AREA	12,288	3	4,096	4,096	4,096
HEAP CONTROL SEGMENT	12,288	1	12,288	12,288	12,288
COMPOSITE PIECE - DATA SPACE INDEX	12,288	1	12,288	12,288	12,288
COMMAND	12,288	3	4,096	4,096	4,096
ACCESS GROUP	8,192	2	4,096	4,096	4,096
TABLE	4,096	1	4,096	4,096	4,096
SUBSYSTEM DESCRIPTION	4,096	1	4,096	4,096	4,096
FILE FORMAT	4,096	1	4,096	4,096	4,096
DATA BASE OPERATIONAL CURSOR	4,096	1	4,096	4,096	4,096

* * * E N D O F R E P O R T * * *

Figure 137. Object/Segment Sizes, Grouped by Obj/Seg Type (Description) Only

10.8 CPU Utilization - Print PEX CPU % Report (PRTPEXCPUB Command)

This section provides an example of the report you can produce using this command.

Please refer to Section 6.6.8, "CPU Reporting Command" on page 162 for a details of how to use the PRTPEXCPUB command to produce this reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

In this report, the *LIC task id* is listed first. If this task ID was a LIC only task, the task name is listed second. If this task ID was an OS/400 job, the OS/400 job name is listed second. We have omitted several print lines (time stamps) for most task IDs that showed no CPU activity (not even a single asterisk (*)) to reduce the number of pages shown in this sample report. Even so, the listing is quite long. Use the number of * characters to the right of the *CPU%* value to more easily identify jobs or LIC tasks that take more CPU than other listed in these examples.

Each asterisk character represents 1% of CPU utilization. For example, twelve astrisks (************) indicate 12% CPU utilization.

No significant CPU activity occurs until task ID **0007F6C - job P23ARTVKE/A960126A/053319**.

10.8.1 Report Title - Performance Explorer CPU Utilization Report

```
                                              Performance Explorer CPU Utilization Report
Member name . . . . . . : PEXTRACE
Library name. . . . . . : PFREXP2
System name . . . . . . : RCHASM05
System type . . . . . . : 9406
System model. . . . . . : 510
System VRM  . . . . . . : V3R6M0
Session start . . . . . : 1996-08-02-16.07.22.286408
Session stop. . . . . . : 1996-08-02-16.12.29.217888
Session CPU utilization : 30%
Number of processors    : 1
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000004C Name:            SMSIGNALEVENT        CPU % of Session: 0.004%     CPU % of Job existence: 0.004%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.31.265528    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000055 Name:            RMTMSAFETASK         CPU % of Session: 0.004%     CPU % of Job existence: 0.005%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.08.17.875776    0%:
16.09.26.474616    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000005F Name:            SMAI0001             CPU % of Session: 0.078%     CPU % of Job existence: 0.078%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.42.927456    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000060 Name:            SMAI0002             CPU % of Session: 0.702%     CPU % of Job existence: 0.707%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.08.19.365448    0%:
16.08.45.394736    0%:
16.09.18.480600    0%:
16.09.41.793856    0%:
16.10.30.047296    0%:
16.10.44.127656    1%:  *
16.11.14.734056    0%:
16.11.35.901568    0%:
16.11.55.328424    1%:  *
16.12.17.010728    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000061 Name:            SMAI0003             CPU % of Session: 0.122%     CPU % of Job existence: 0.122%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.42.989216    0%:
------------------------------------------------------------------------------------------------------------------------------------
```

```
Task ID: 00000063 Name:              SMAI0005            CPU % of Session: 0.658%     CPU % of Job existence: 0.662%
Timestamp        CPU%   Histogram
                                                        M05


---------------------------------------------------------------------------------------------------------------------------
16.07.44.037904    0%:
16.08.12.371752    0%:
16.08.41.691264    0%:
16.09.09.007288    0%:
16.09.51.929224    0%:
16.10.21.911920    0%:
16.11.02.986192    0%:
16.11.43.212720    0%:
16.12.14.367576    0%:
---------------------------------------------------------------------------------------------------------------------------
Task ID: 00000065 Name:              SMAI0007            CPU % of Session: 0.644%     CPU % of Job existence: 0.649%
Timestamp        CPU%   Histogram
---------------------------------------------------------------------------------------------------------------------------
16.07.42.082040    1%:  *
16.08.04.316680    0%:
16.08.33.517640    0%:
16.09.02.282504    0%:
16.09.38.745960    0%:
16.10.02.767640    0%:
16.10.41.012728    0%:
16.11.01.680032    0%:
16.12.02.056848    0%:
---------------------------------------------------------------------------------------------------------------------------
Task ID: 00000066 Name:              SMPO0001            CPU % of Session: 0.641%     CPU % of Job existence: 0.645%
Timestamp        CPU%   Histogram
---------------------------------------------------------------------------------------------------------------------------
16.07.36.455376    0%:
16.07.37.470544    0%:
16.07.38.483392    0%:
16.07.39.774848    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.38.769096    0%:
16.08.39.900136    1%:  *
16.08.40.974024    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.00.323488    0%:
16.09.01.499424    1%:  *
16.09.02.773640    0%:
16.09.04.173632    0%:
16.09.05.174680    0%:
16.09.06.292424    0%:
                                                        M05


16.09.07.457920    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.25.953096    0%:
16.09.26.960072    0%:
16.09.27.983696    1%:  *
16.09.29.191016    0%:
16.09.30.394816    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.03.052576    0%:
16.10.04.082400    0%:
16.10.05.082480    1%:  *
16.10.06.085288    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.40.434080    0%:
16.10.41.686936    0%:
16.10.42.724608    0%:
16.10.43.727936    1%:  *
16.10.45.048272    0%:
16.10.46.268936    0%:
16.10.47.760600    0%:
16.10.48.762688    0%:
16.10.50.114792    0%:
16.10.51.260680    0%:
16.10.52.302992    0%:
16.10.53.304856    1%:  *
16.10.54.491216    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.23.215696    0%:
16.11.24.349552    1%:  *
16.11.25.597464    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.39.444856    0%:
16.11.40.529800    1%:  *
16.11.41.651456    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.52.658032    1%:  *
16.11.53.984248    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.27.000056    0%:
16.12.28.274688    0%:
---------------------------------------------------------------------------------------------------------------------------
Task ID: 00000067 Name:              SMPO0002            CPU % of Session: 0.640%     CPU % of Job existence: 0.645%
Timestamp        CPU%   Histogram
---------------------------------------------------------------------------------------------------------------------------
16.07.36.451440    0%:
16.07.37.470360    0%:
16.07.38.483200    0%:
```

```
16.07.40.032304    0%:
16.07.41.658304    0%:
16.07.42.692336    1%:  *
16.07.43.692472    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.39.387064    0%:
16.08.40.544664    0%:
16.08.41.614864    1%:  *
16.08.42.624416    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.11.910248    0%:
16.09.12.970648    1%:  *
16.09.13.976408    0%:
16.09.15.013208    0%:
16.09.16.043800    0%:
16.09.17.046360    1%:  *
16.09.18.052320    0%:
16.09.19.279680    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.

16.09.30.297552    0%:
16.09.31.461384    1%:  *
16.09.32.747144    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.00.222584    0%:
16.10.01.223248    0%:
16.10.02.281472    1%:  *
16.10.03.372040    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.56.772592    0%:
16.10.57.775552    1%:  *
16.10.58.779808    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.19.103840    0%:
16.11.20.105408    1%:  *
16.11.21.172240    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.26.204360    0%:
16.12.27.267160    0%:
16.12.28.471168    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000068 Name:              SMP00003            CPU % of Session: 0.664%     CPU % of Job existence: 0.669%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.36.456872    0%:
16.07.37.468368    0%:
16.07.38.481944    0%:
16.07.39.878000    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.07.50.847848    0%:
16.07.52.028184    1%:  *
16.07.53.248200    0%:
16.07.54.322856    0%:
16.07.55.451064    0%:
16.07.56.475200    0%:
16.07.57.490712    0%:
16.07.58.987128    0%:
16.08.00.338592    0%:
16.08.01.942808    0%:
16.08.03.240936    1%:  *
16.08.04.363968    0%:
16.08.05.384296    0%:
16.08.06.804192    0%:
16.08.08.100656    0%:
16.08.09.289648    0%:
16.08.10.301208    0%:
16.08.11.337224    0%:
16.08.12.339992    0%:
16.08.13.480344    0%:
16.08.14.502336    1%:  *
16.08.15.591736    0%:
16.08.16.688336    0%:
16.08.18.182360    0%:
16.08.19.201200    0%:
16.08.20.361064    0%:
16.08.21.368264    0%:
16.08.22.639040    0%:
16.08.23.898152    0%:
16.08.24.972544    0%:
16.08.26.021576    0%:
16.08.27.030744    0%:
16.08.28.063768    1%:  *
16.08.29.116624    0%:
16.08.30.205656    0%:
16.08.31.285560    1%:  *
16.08.32.677192    0%:
16.08.33.914760    0%:
16.08.35.088624    1%:  *
16.08.36.225520    0%:
16.08.37.486808    0%:
16.08.38.667608    0%:
16.08.39.775592    1%:  *
16.08.40.808648    0%:
16.08.41.927464    0%:
16.08.43.143592    0%:
16.08.44.215528    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.16.645080    0%:
```

```
16.09.17.867968    1%:  *
16.09.19.009280    0%:
16.09.20.045160    0%:
16.09.21.165848    0%:
16.09.22.658400    0%:
16.09.24.746128    0%:
16.09.26.729280    0%:
16.09.27.952952    1%:  *
16.09.29.366792    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.51.026016    0%:
16.09.52.040656    0%:
16.09.53.116480    1%:  *
16.09.54.391968    0%:
16.09.55.743640    0%:
16.09.56.942464    0%:
16.09.57.949728    0%:
16.09.59.246968    0%:
16.10.00.292296    1%:  *
16.10.01.327824    0%:
16.10.16.789576    1%:  *
16.10.17.843504    0%:
16.10.18.903976    0%:
16.10.20.332896    0%:
16.10.21.564480    0%:
16.10.22.583296    1%:  *
16.10.23.953736    0%:
16.10.24.982704    1%:  *
16.10.26.379240    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.51.714448    0%:
16.10.52.797104    1%:  *
16.10.54.000048    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.21.150568    0%:
16.11.22.180488    1%:  *
16.11.23.193904    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.52.059576    1%:  *
16.11.53.241936    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.25.695168    0%:
16.12.26.699824    1%:  *
16.12.27.874400    0%:
16.12.28.935288    0%:
--------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000069 Name:              SMPO0004            CPU % of Session: 0.671%     CPU % of Job existence: 0.676%
Timestamp        CPU%   Histogram
--------------------------------------------------------------------------------------------------------------------------------
16.07.36.458752    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.40.736600    0%:
16.08.41.920056    1%:  *
16.08.43.035216    0%:
16.08.44.334648    0%:
16.08.45.500160    0%:
16.08.46.520816    0%:
16.08.47.724496    0%:
16.08.48.726752    0%:
16.08.50.368752    0%:
16.08.51.394272    0%:
16.08.52.430744    0%:
16.08.53.739640    0%:
16.08.54.902040    0%:
16.08.55.915136    1%:  *
16.08.56.920528    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.11.144344    0%:
16.09.12.144384    1%:  *
16.09.13.155280    1%:  *
16.09.14.347672    0%:
16.09.15.728032    0%:
16.09.16.745008    1%:  *
16.09.17.797392    0%:
16.09.19.160384    0%:
16.09.20.369944    1%:  *
16.09.23.672656    0%:
16.09.25.066960    0%:
16.09.26.601976    0%:
16.09.27.918480    1%:  *
16.09.29.201640    0%:
16.09.30.295848    0%:
16.09.31.462984    1%:  *
16.09.42.797088    0%:
16.09.44.034296    1%:  *
16.09.45.048776    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.05.083552    0%:
16.10.06.114576    1%:  *
16.10.07.305800    0%:
16.10.08.533568    0%:
16.10.09.539960    1%:  *
16.10.10.816904    0%:
16.10.11.818816    0%:
16.10.12.864720    0%:
16.10.13.883056    0%:
16.10.15.276592    0%:
16.10.16.278656    0%:
```

```
16.10.17.297480    0%:
16.10.18.576928    0%:
16.10.19.577128    1%:  *
16.10.20.697408    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.32.982472    0%:
16.10.33.990272    1%:  *
16.10.34.992728    0%:
16.10.35.992840    0%:
16.10.37.106960    0%:
16.10.38.107104    0%:
16.10.39.124168    0%:
16.10.40.155520    0%:
16.10.41.681448    0%:
16.10.42.721832    0%:
16.10.43.727560    0%:
16.10.44.727576    1%:  *
16.10.45.996280    0%:
16.10.47.174360    0%:
16.10.48.199848    0%:
16.10.49.377648    0%:
16.10.50.379216    0%:
16.10.51.440312    0%:
16.10.52.609072    1%:  *
16.10.53.804456    0%:
16.10.54.805808    1%:  *
16.10.55.919536    0%:
16.10.56.939184    0%:
16.10.57.954888    0%:
16.10.58.959152    1%:  *
16.11.00.259760    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.17.945128    0%:
16.11.18.963640    1%:  *
16.11.20.004168    0%:
16.11.21.070696    0%:
16.11.22.212136    0%:
16.11.23.221016    0%:
16.11.24.292048    0%:
16.11.25.594320    0%:
16.11.26.633896    0%:
16.11.27.635216    1%:  *
16.11.28.647200    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.28.460280    0%:
---------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000006A Name:               SMP00005            CPU % of Session: 0.635%     CPU % of Job existence: 0.639%
Timestamp        CPU%   Histogram
---------------------------------------------------------------------------------------------------------------------------------
16.07.36.459136    0%:
16.07.37.470736    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.07.57.492464    0%:
16.07.58.640920    1%:  *
16.07.59.651472    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.40.687416    0%:
16.08.41.736000    1%:  *
16.08.42.752216    1%:  *
16.08.44.118608    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.10.710200    0%:
16.09.12.009896    1%:  *
16.09.13.068040    1%:  *
16.09.14.089424    0%:
16.09.15.485544    0%:
16.09.16.658400    0%:
16.09.17.988320    1%:  *
16.09.19.144416    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.39.799664    1%:  *
16.09.41.092872    0%:
16.09.42.375936    0%:
16.09.43.394016    0%:
16.09.44.679952    1%:  *
16.09.45.871768    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.04.017704    0%:
16.10.05.088664    1%:  *
16.10.06.106896    1%:  *
16.10.07.259640    0%:
16.10.08.530552    0%:
16.10.09.531792    0%:
16.10.10.553240    0%:
16.10.11.635704    0%:
16.10.12.650360    0%:
16.10.13.653416    1%:  *
16.10.14.690728    0%:
16.10.15.703536    0%:
16.10.17.157528    0%:
16.10.18.502704    0%:
16.10.19.663024    0%:
16.10.20.700984    0%:
16.10.21.768816    0%:
16.10.23.131856    0%:
16.10.24.150008    1%:  *
16.10.25.221784    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
```

```
16.10.44.622264    0%:
16.10.45.660680    0%:
16.10.46.843704    1%:  *
16.10.48.108232    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.35.221440    0%:
16.11.36.285112    0%:
16.11.37.301336    1%:  *
16.11.38.315144    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.51.059360    0%:
16.11.52.076424    1%:  *
16.11.53.246000    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.08.569616    0%:
16.12.09.573264    1%:  *
16.12.10.576104    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.28.688016    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000006B Name:              SMPO0006            CPU % of Session: 0.683%     CPU % of Job existence: 0.687%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------

16.07.36.434112    0%:
16.07.37.468904    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.18.213928    0%:
16.08.19.219376    1%:  *
16.08.20.822176    0%:
16.08.21.863416    1%:  *
16.08.22.902952    0%:
16.08.23.903528    0%:
16.08.25.154200    0%:
16.08.26.411864    1%:  *
16.08.27.599272    0%:
16.08.28.801520    0%:
16.08.30.207312    0%:
16.08.31.235880    0%:
16.08.32.369496    0%:
16.08.33.370992    0%:
16.08.34.885160    0%:
16.08.36.133232    0%:
16.08.37.322072    0%:
16.08.38.391096    1%:  *
16.08.39.551552    0%:
                                                  M05


16.08.40.560352    1%:  *
16.08.41.808416    1%:  *
16.08.42.997056    0%:
16.08.44.369280    0%:
16.08.45.382400    0%:
16.08.46.735880    0%:
16.08.47.740152    1%:  *
16.08.49.366096    0%:
16.08.50.394504    0%:
16.08.51.396736    0%:
16.08.52.585728    0%:
16.08.53.750064    0%:
16.08.54.899808    0%:
16.08.55.902568    1%:  *
16.08.56.916096    0%:
16.08.57.919520    1%:  *
16.08.59.327480    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.11.153424    0%:
16.09.12.176784    1%:  *
16.09.13.199872    0%:
16.09.14.415856    0%:
16.09.15.637384    0%:
16.09.16.683024    0%:
16.09.17.747080    1%:  *
16.09.19.124264    0%:
16.09.20.310528    0%:
16.09.21.961744    0%:
16.09.24.156648    0%:
16.09.25.209912    0%:
16.09.26.616744    0%:
16.09.27.713936    0%:
16.09.28.716144    0%:
16.09.29.722008    1%:  *
16.09.30.927656    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.44.030568    0%:
16.09.45.047928    1%:  *
16.09.46.399608    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.09.471048    0%:
16.10.10.489096    1%:  *
16.10.11.601936    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.50.117160    0%:
16.10.51.118432    1%:  *
16.10.52.247360    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
```

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16.11.19.096208    0%:
16.11.20.120920    1%:  *
16.11.21.148896    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.56.720376    0%:
16.11.57.775592    0%:
16.11.58.884456    0%:
16.11.59.898880    1%:  *
16.12.01.121360    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.27.217784    0%:
16.12.28.460776    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000006C Name:              SMP00007            CPU % of Session: 0.628%     CPU % of Job existence: 0.632%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.453608    0%:
16.07.37.467880    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.07.50.852848    0%:
16.07.51.876888    1%:  *
16.07.52.897632    0%:
16.07.54.111760    0%:
16.07.55.349136    0%:
16.07.56.353248    1%:  *
16.07.57.443344    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.22.428232    0%:
16.08.23.435904    1%:  *
16.08.24.607568    0%:
16.08.25.639000    0%:
16.08.26.875656    0%:
16.08.27.918584    1%:  *
16.08.29.098672    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.39.538272    0%:
16.08.40.693792    1%:  *
16.08.41.809536    0%:
16.08.42.810704    1%:  *
16.08.44.119584    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.00.604680    0%:
16.09.01.677968    1%:  *
16.09.02.777488    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.26.615776    0%:
16.09.27.951696    1%:  *
16.09.29.350424    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.41.608888    0%:
16.09.42.625704    1%:  *
16.09.43.900528    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.15.033400    0%:
16.10.16.308952    1%:  *
16.10.17.318272    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.28.830176    0%:
16.11.30.022352    1%:  *
16.11.31.036512    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.20.949080    0%:
16.12.22.073904    1%:  *
16.12.23.154568    0%:
16.12.24.323728    0%:
16.12.25.553600    0%:
16.12.26.829232    0%:
16.12.27.867472    0%:
16.12.28.917424    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000092 Name:              SMXCSPRVSR          CPU % of Session: 0.007%     CPU % of Job existence: 0.007%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.42.742048    0%:
16.08.23.137464    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.25.563176    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 000000EC Name:   SCPF       QSYS       000000     CPU % of Session: 0.007%     CPU % of Job existence: 0.007%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.46.609392    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000116 Name:              SK-ASC007P          CPU % of Session: 0.014%     CPU % of Job existence: 0.014%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.47.950424    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.50.595120    0%:


-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F03 Name:   QCMN       QSYS       053251     CPU % of Session: 0.000%     CPU % of Job existence: 0.000%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.09.27.091544    0%:
-------------------------------------------------------------------------------------------------------------------------------
```

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Task ID: 00007F0B Name:   QSERVER    QSYS       053254     CPU % of Session: 0.001%     CPU % of Job existence: 0.001%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.09.27.318712    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F2E Name:   QBRMNET    QPGMR      053289     CPU % of Session: 0.020%     CPU % of Job existence: 0.020%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.08.17.883752    0%:
16.09.20.855680    0%:
16.10.23.833608    0%:
16.11.26.798168    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F35 Name:   QESTP      QSRVBAS    053296     CPU % of Session: 0.001%     CPU % of Job existence: 0.001%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.12.05.857056    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F37 Name:   QTGTELNETS QTCP       053298     CPU % of Session: 0.004%     CPU % of Job existence: 0.004%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.08.52.888944    0%:
16.10.55.773128    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F6C Name:   P23ARTVKE  A960126A   053319     CPU % of Session: 0.403%     CPU % of Job existence: 0.403%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.24.514664    1%:  *
16.07.25.519104    7%:  *******
16.07.32.995792    1%:  *
16.07.34.004104    3%:  ***
16.07.35.020552    3%:  ***
16.07.36.027456    3%:  ***
16.07.37.044608    2%:  **
16.07.38.052424    2%:  **
16.07.39.073576    1%:  *
16.07.40.074296    2%:  **
16.07.41.076480    2%:  **
16.07.42.081784    2%:  **
16.07.43.089000    2%:  **
16.07.44.103208    2%:  **
16.07.45.110952    2%:  **
16.07.46.126056    1%:  *


16.07.47.978576    1%:  *
16.07.48.978608   13%:  *************
16.07.50.456168    2%:  **
16.07.55.114912    3%:  ***
16.07.57.190848    7%:  *******
16.08.03.379680    0%:
16.08.06.067032    0%:
16.08.10.519888    0%:
16.08.11.747880    0%:
16.08.13.502504    0%:
16.08.14.639896    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008408 Name:   JUNK       QSPLJOB    053464     CPU % of Session: 1.130%     CPU % of Job existence: 1.131%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.431488    0%:
16.07.37.444000    4%:  ****
16.07.38.457224    3%:  ***
16.07.39.481392    2%:  **
16.07.40.494712    2%:  **
16.07.41.510208    2%:  **
16.07.42.513984    2%:  **
16.07.43.522536    2%:  **
16.07.44.528352    3%:  ***
16.07.45.551296    2%:  **
16.07.46.552120    3%:  ***
16.07.47.567680    2%:  **
16.07.48.567976    1%:  *
16.07.49.587576    2%:  **
16.07.50.674432    1%:  *
16.07.51.677456    3%:  ***
16.07.52.683952    2%:  **
16.07.53.723432    2%:  **
16.08.26.387088    0%:
16.08.27.387568    3%:  ***
16.08.28.403608    3%:  ***
16.08.29.414056    3%:  ***
16.08.30.434912    3%:  ***
16.08.31.512272    2%:  **
16.08.32.516248    3%:  ***
16.08.33.521536    3%:  ***
16.08.34.550704    2%:  **
16.08.35.570808    3%:  ***
16.08.36.570824    2%:  **
16.08.37.667056    2%:  **
16.08.38.676344    2%:  **
16.08.39.719064    3%:  ***
16.08.40.724920    3%:  ***
16.08.41.736392    2%:  **
16.08.42.790872    1%:  *
16.09.15.391736    0%:
16.09.16.392496    4%:  ****
```

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16.09.17.406096    4%:  ****
16.09.18.417136    3%:  ***
                                                 M05


16.09.19.434560    3%:  ***
16.09.20.445152    2%:  **
16.09.21.542424    3%:  ***
16.09.22.543384    3%:  ***
16.09.23.545560    3%:  ***
16.09.24.553696    4%:  ****
16.09.25.555248    3%:  ***
16.09.26.576784    3%:  ***
16.09.27.679528    4%:  ****
16.09.28.690408    2%:  **
16.09.29.707728    2%:  **
16.10.02.547480    0%:
16.10.03.592560    3%:  ***
16.10.04.597624    4%:  ****
16.10.05.722408    2%:  **
16.10.06.728088    3%:  ***
16.10.07.768536    2%:  **
16.10.08.843392    3%:  ***
16.10.09.874592    2%:  **
16.10.10.876080    2%:  **
16.10.11.887336    3%:  ***
16.10.12.896960    3%:  ***
16.10.13.941216    1%:  *
16.10.15.030304    2%:  **
16.10.16.045408    4%:  ****
16.10.17.076656    2%:  **
16.10.18.079368    2%:  **
16.10.50.906936    0%:
16.10.51.918216    2%:  **
16.10.52.919832    5%:  *****
16.10.53.924496    2%:  **
16.10.54.933208    3%:  ***
16.10.55.959640    2%:  **
16.10.56.968504    3%:  ***
16.10.57.985112    2%:  **
16.10.59.010480    3%:  ***
16.11.00.033864    3%:  ***
16.11.01.052672    3%:  ***
16.11.02.068480    2%:  **
16.11.03.068864    3%:  ***
16.11.04.093440    3%:  ***
16.11.05.110728    2%:  **
16.11.06.140240    2%:  **
16.11.38.813320    0%:
16.11.39.860712    4%:  ****
16.11.40.914744    4%:  ****
16.11.41.943328    2%:  **
16.11.42.945840    3%:  ***
16.11.43.952120    2%:  **
16.11.44.952632    4%:  ****
16.11.45.955088    3%:  ***
16.11.46.966096    2%:  **
16.11.47.966560    3%:  ***
16.11.48.984968    3%:  ***
16.11.49.992528    1%:  *
                                                 M05


16.11.51.026064    2%:  **
16.11.52.035744    4%:  ****
16.11.53.065080    2%:  **
16.11.54.124496    2%:  **
16.12.27.114928    0%:
16.12.28.124736    2%:  **
--------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008808 Name:   PEXSBSD    QSYS       053539     CPU % of Session: 0.003%     CPU % of Job existence: 0.003%
Timestamp        CPU%   Histogram
--------------------------------------------------------------------------------------------------------------------------------
16.07.36.050544    0%:
16.07.41.012656    0%:
16.07.46.410704    0%:
--------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000880E Name:   ILEAGNEW   A960126A   053541     CPU % of Session: 5.272%     CPU % of Job existence: 5.273%
Timestamp        CPU%   Histogram
--------------------------------------------------------------------------------------------------------------------------------
16.07.36.118760    0%:
16.07.37.119904    4%:  ****
16.07.38.121320    5%:  *****
16.07.39.129808    3%:  ***
16.07.40.211168    5%:  *****
16.07.41.243392    4%:  ****
16.07.42.291824    4%:  ****
16.07.43.293112    5%:  *****

 (REMAINDER OF TASK ID 0000880E REMOVED FOR BREVITY.)

--------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008810 Name:   TSTIOC     A960126A   053543     CPU % of Session: 6.364%     CPU % of Job existence: 6.366%
Timestamp        CPU%   Histogram
--------------------------------------------------------------------------------------------------------------------------------
16.07.46.466752    0%:
16.07.47.472728    2%:  **
16.07.48.482888    4%:  ****
```

```
16.07.49.484872    5%:  *****
16.07.50.488400    4%:  ****
16.07.51.555576    1%:  *
16.07.52.623736    5%:  *****
16.07.53.700736    4%:  ****
16.07.54.798664    4%:  ****
16.07.55.805640    3%:  ***
16.07.56.818984    5%:  *****
16.07.57.835328    6%:  ******
16.07.58.860848    6%:  ******
16.07.59.876240    9%:  *********
16.08.00.892504    5%:  *****
16.08.01.895376    7%:  *******
16.08.02.917936    4%:  ****
16.08.03.923648    6%:  ******
16.08.04.946224    8%:  ********
16.08.05.947248    4%:  ****
16.08.06.973824    6%:  ******
16.08.07.986840    7%:  *******
16.08.08.994472    7%:  *******
16.08.10.002608    6%:  ******
16.08.11.003352    6%:  ******
16.08.12.003704    8%:  ********
16.08.13.004960   12%:  ************
                                                      M05


16.08.14.105864    6%:  ******
16.08.15.107016    9%:  *********
16.08.16.108272    9%:  *********
16.08.17.108440    4%:  ****
16.08.18.108544   10%:  **********
16.08.19.240168    6%:  ******
16.08.20.260896    4%:  ****
16.08.21.261056   12%:  ************
16.08.22.279792    4%:  ****
16.08.23.279872    6%:  ******
16.08.24.290016    4%:  ****
16.08.25.298200    6%:  ******
16.08.26.307952    6%:  ******
16.08.27.336992    5%:  *****
16.08.28.343232    7%:  *******
16.08.29.358496    8%:  ********
16.08.30.358648    5%:  *****
16.08.31.367936    4%:  ****
16.08.32.390712    5%:  *****
16.08.33.407800    4%:  ****
16.08.34.416096    5%:  *****
16.08.35.416768    4%:  ****
16.08.36.420016    4%:  ****
16.08.37.426776    7%:  *******
16.08.38.443056    5%:  *****
16.08.39.456656    4%:  ****
16.08.40.465144    5%:  *****
16.08.41.470464    6%:  ******
16.08.42.473880    5%:  *****
16.08.43.625320    4%:  ****
16.08.44.636720    5%:  *****
16.08.45.636824    5%:  *****
16.08.46.651792    5%:  *****
16.08.47.660728    4%:  ****
16.08.48.671328    5%:  *****
16.08.49.681888    6%:  ******
16.08.50.689264    5%:  *****
16.08.51.689696    7%:  *******
16.08.52.701168    7%:  *******
16.08.53.701504    4%:  ****
16.08.54.731240    4%:  ****
16.08.55.740416    5%:  *****
16.08.56.753168    4%:  ****
16.08.57.768192    5%:  *****
16.08.58.773816    6%:  ******
16.08.59.777336   10%:  **********
16.09.00.784240    4%:  ****
16.09.01.831304    5%:  *****
16.09.02.832856    5%:  *****
16.09.03.840120    8%:  ********
16.09.04.847792    6%:  ******
16.09.05.847872    6%:  ******
16.09.06.847968    8%:  ********
16.09.07.866240    6%:  ******
16.09.08.907232    3%:  ***
                                                      M05


16.09.09.934816    8%:  ********
16.09.10.935056    5%:  *****
16.09.11.950296    8%:  ********
16.09.12.985400    5%:  *****
16.09.13.989592    6%:  ******
16.09.14.991296    5%:  *****
16.09.16.016344    8%:  ********
16.09.17.056976    4%:  ****
16.09.18.082088    5%:  *****
16.09.19.114440    4%:  ****
16.09.20.122632    3%:  ***
16.09.21.122856    5%:  *****
16.09.22.122872   11%:  ***********
```

```
16.09.23.132400   34%: **********************************
16.09.24.132616   43%: *******************************************
16.09.31.261048    0%:
16.09.32.307864    5%: *****
16.09.33.362088    6%: ******
16.09.34.393048    5%: *****
16.09.35.404784    4%: ****
16.09.36.434528    4%: ****
16.09.37.435248    6%: ******
16.09.38.435328    9%: *********
16.09.39.439872    6%: ******
16.09.40.440800    7%: *******
16.09.41.440872    8%: ********
16.09.42.448000    5%: *****
16.09.43.454264    6%: ******
16.09.44.465272    5%: *****
16.09.45.540176    4%: ****
16.09.46.551768    5%: *****
16.09.47.558600    6%: ******
16.09.48.566960    8%: ********
16.09.49.580696    6%: ******
16.09.50.583528    7%: *******
16.09.51.610840    6%: ******
16.09.52.620888    7%: *******
16.09.53.687624    6%: ******
16.09.54.688440    3%: ***
16.09.55.700592    9%: *********
16.09.56.706920    7%: *******
16.09.57.720192    5%: *****
16.09.58.733080    5%: *****
16.09.59.739032    5%: *****
16.10.00.752040    5%: *****
16.10.01.757064    6%: ******
16.10.02.757216    6%: ******
16.10.03.759528    4%: ****
16.10.04.760736    6%: ******
16.10.05.784072    4%: ****
16.10.06.805920    5%: *****
16.10.07.819864    5%: *****
16.10.08.826128    4%: ****
16.10.09.833816    3%: ***
16.10.10.866184    4%: ****
16.10.11.880800    5%: *****
16.10.12.907840    3%: ***
16.10.13.920400    6%: ******
16.10.14.941992    4%: ****
16.10.15.972320    4%: ****
16.10.17.049064    5%: *****
16.10.18.077208    2%: **
16.10.19.087032    3%: ***
16.10.20.114856    4%: ****
16.10.21.115072    4%: ****
16.10.22.120096    7%: *******
16.10.23.132624    4%: ****
16.10.24.168320    4%: ****
16.10.25.172008    4%: ****
16.10.26.172664    4%: ****
16.10.27.182968    4%: ****
16.10.28.191448    6%: ******
16.10.29.200280    7%: *******
16.10.30.213928    7%: *******
16.10.31.234488    4%: ****
16.10.32.247104    6%: ******
16.10.33.251184    7%: *******
16.10.34.253552    4%: ****
16.10.35.255464    5%: *****
16.10.36.286656    6%: ******
16.10.37.303960    5%: *****
16.10.38.316544    5%: *****
16.10.39.329456    5%: *****
16.10.40.331336    7%: *******
16.10.41.343568    4%: ****
16.10.42.371984    6%: ******
16.10.43.379976    8%: ********
16.10.44.380888    7%: *******
16.10.45.388616    6%: ******
16.10.46.403712    4%: ****
16.10.47.404952    8%: ********
16.10.48.411496    8%: ********
16.10.49.411608   10%: **********
16.10.50.423952    7%: *******
16.10.51.442528    5%: *****
16.10.52.442584    3%: ***
16.10.53.487640    4%: ****
16.10.54.490752    4%: ****
16.10.55.500000    4%: ****
16.10.56.507008    2%: **
16.10.57.508160    5%: *****
16.10.58.517328    4%: ****
16.10.59.518928    4%: ****
16.11.00.547952   10%: **********
16.11.01.549360   10%: **********
16.11.02.549800   11%: ***********
16.11.03.561016   11%: ***********
16.11.04.561080   10%: **********
16.11.05.586760    6%: ******
16.11.06.651744    3%: ***
16.11.07.652496    4%: ****
```

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16.11.08.683600    5%:  *****
16.11.09.688544    8%:  ********
16.11.10.698512   12%:  ************
16.11.11.700904    8%:  ********
16.11.12.755144   10%:  **********
16.11.13.762312    8%:  ********
16.11.14.763576    6%:  ******
16.11.15.767376    5%:  *****

 (REMAINDER OF TASK ID 0000880E REMOVED FOR BREVITY.)
-----------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008814 Name:   OPENBAD    A960126A   053546     CPU % of Session: 6.384%     CPU % of Job existence: 6.385%
Timestamp        CPU%   Histogram
-----------------------------------------------------------------------------------------------------------------------------------
16.07.41.050520    0%:
16.07.42.070640    4%:  ****
16.07.43.080536    6%:  ******
16.07.44.102864    5%:  *****
16.07.45.108144    5%:  *****
16.07.46.133952    7%:  *******
16.07.47.174776    6%:  ******
16.07.48.177752    6%:  ******
16.07.49.185296    6%:  ******
16.07.50.220352    6%:  ******
16.07.51.273392    8%:  ********
16.07.52.278640    7%:  *******
16.07.53.287144    8%:  ********
16.07.54.298456    7%:  *******
16.07.55.302208    7%:  *******
16.07.56.328400    4%:  ****
16.07.57.331128    6%:  ******
16.07.58.342120    7%:  *******
16.07.59.350696    9%:  *********
16.08.00.350832    7%:  *******
16.08.01.356288    8%:  ********
16.08.02.357560    8%:  ********
16.08.03.367832    7%:  *******
16.08.04.397480    9%:  *********
16.08.05.407104    5%:  *****
16.08.06.420104    6%:  ******
16.08.07.422184    8%:  ********
16.08.08.428888    7%:  *******
16.08.09.446472    6%:  ******
16.08.10.446632    7%:  *******
                                                  M05

16.08.11.456840    8%:  ********
16.08.12.469776    9%:  *********
16.08.13.477544    6%:  ******
16.08.18.293464    0%:
16.08.19.332280    6%:  ******
16.08.20.333576    8%:  ********
16.08.21.341280    9%:  *********
16.08.22.342696    9%:  *********
16.08.23.380192    9%:  *********
16.08.24.413744    6%:  ******
16.08.25.424232    8%:  ********
16.08.26.446352    9%:  *********
16.08.27.447368    5%:  *****
16.08.28.449056    6%:  ******
16.08.29.449760    7%:  *******
16.08.30.456640    8%:  ********
16.08.31.460928    8%:  ********
16.08.32.463152    8%:  ********
16.08.33.470400    7%:  *******
16.08.34.475008    7%:  *******
16.08.35.493376    7%:  *******
16.08.36.504096    5%:  *****
16.08.37.504184    8%:  ********
16.08.38.508952    8%:  ********
16.08.39.533720    8%:  ********
16.08.40.535520    6%:  ******
16.08.41.566160    8%:  ********
16.08.42.573800    7%:  *******
16.08.43.576840    8%:  ********
16.08.44.577344    7%:  *******
16.08.45.632728    7%:  *******
16.08.46.633136    6%:  ******
16.08.47.636792    7%:  *******
16.08.52.291600    0%:
16.08.53.295192    6%:  ******
16.08.54.306032    8%:  ********
16.08.55.354920    8%:  ********
16.08.56.411968    6%:  ******
16.08.57.468360    7%:  *******
16.08.58.469200    9%:  *********
16.08.59.494352   12%:  ************
16.09.00.546760    8%:  ********
16.09.01.547280    7%:  *******
16.09.02.550840    9%:  *********
16.09.03.563432    6%:  ******
16.09.04.577328    7%:  *******
16.09.05.605888    6%:  ******
16.09.06.618880    7%:  *******
16.09.07.634000   10%:  **********
16.09.08.635096    9%:  *********
16.09.09.657920    5%:  *****
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16.09.10.663976    8%:  ********
16.09.11.686872    8%:  ********
16.09.12.698400    6%:  ******
16.09.13.700648   10%:  **********
                                                   M05


16.09.14.712656    7%:  *******
16.09.15.712784    7%:  *******
16.09.16.714176    8%:  ********
16.09.17.761360    7%:  *******
16.09.18.763880    7%:  *******
16.09.19.812632    5%:  *****
16.09.24.669432    1%:  *
16.09.25.681768   14%:  **************
16.09.26.685328   29%:  *****************************
16.09.27.702480    9%:  *********
16.09.28.843344    5%:  *****
16.09.29.855456    5%:  *****
16.09.30.859376    8%:  ********
16.09.31.865480    7%:  *******
16.09.32.945616    6%:  ******
16.09.33.947488    4%:  ****
16.09.34.976824    6%:  ******
16.09.36.048848    6%:  ******
16.09.37.083480    5%:  *****
16.09.38.133984    8%:  ********
16.09.39.135472    9%:  *********
16.09.40.158328    5%:  *****
16.09.41.164864    5%:  *****
16.09.42.199032    5%:  *****
16.09.43.199488    6%:  ******
16.09.44.208696    7%:  *******
16.09.45.227216    3%:  ***
16.09.46.227240    7%:  *******
16.09.47.234784    7%:  *******
16.09.48.286576    6%:  ******
16.09.49.298952    7%:  *******
16.09.50.318840    5%:  *****
16.09.51.328648    5%:  *****
16.09.52.330568    6%:  ******
16.09.56.720416    0%:
16.09.57.724680    6%:  ******
16.09.58.746672    6%:  ******
16.09.59.746688    6%:  ******
16.10.00.808216    6%:  ******
16.10.01.822000    5%:  *****
16.10.02.837480    5%:  *****
16.10.03.837488    5%:  *****
16.10.04.864528    5%:  *****
16.10.05.878216    4%:  ****
16.10.06.904832    4%:  ****
16.10.07.920080    3%:  ***
16.10.08.930560    4%:  ****
16.10.09.970144    5%:  *****
16.10.10.978648    6%:  ******
16.10.12.020944    4%:  ****
16.10.13.094208    3%:  ***
16.10.14.103768    4%:  ****
16.10.15.109464    6%:  ******
16.10.16.188304    4%:  ****
16.10.17.189608    5%:  *****
                                                   M05


16.10.18.189624    4%:  ****
16.10.19.192376    5%:  *****
16.10.20.200512    4%:  ****
16.10.21.200976    4%:  ****
16.10.22.201176    5%:  *****
16.10.23.207072    6%:  ******
16.10.24.216672    6%:  ******
16.10.25.221360    6%:  ******
16.10.26.237936    4%:  ****
16.10.27.240112    5%:  *****
16.10.28.247296    5%:  *****
16.10.29.260208    5%:  *****
16.10.30.360528    6%:  ******
16.10.31.360696    4%:  ****
16.10.32.371104    6%:  ******
16.10.33.375248    6%:  ******
16.10.34.385456    5%:  *****
16.10.35.392640    6%:  ******
16.10.36.399064    3%:  ***
16.10.37.439608    6%:  ******
16.10.38.450664    5%:  *****
16.10.39.527120    6%:  ******
16.10.40.541536    5%:  *****
16.10.41.557232    5%:  *****
16.10.42.578448    5%:  *****
16.10.43.585384    7%:  *******
16.10.44.593240    6%:  ******
16.10.45.615224    6%:  ******
16.10.50.384120    0%:
16.10.51.411184    4%:  ****
16.10.52.442336    4%:  ****
16.10.53.455440    5%:  *****
16.10.54.503664    4%:  ****
```

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16.10.55.505232    5%:  *****
16.10.56.505824    5%:  *****
16.10.57.512376    4%:  ****
16.10.58.513608    5%:  *****
16.10.59.517656    4%:  ****
16.11.00.543712    6%:  ******
16.11.01.552944   20%:  ********************
16.11.02.554760   25%:  *************************
16.11.03.555824   28%:  ****************************
16.11.04.556504   25%:  *************************
16.11.05.571600   15%:  ***************
16.11.06.711936    3%:  ***
16.11.11.035160    0%:
16.11.12.036576    4%:  ****
16.11.13.048592    6%:  ******
16.11.14.058304    5%:  *****
16.11.15.089920    5%:  *****
16.11.16.115096    7%:  *******
16.11.17.122752    5%:  *****
16.11.18.201856    3%:  ***
16.11.19.288816    4%:  ****
16.11.20.326200    7%:  *******
                                                      M05


16.11.21.503952    5%:  *****
16.11.22.505080    5%:  *****
16.11.23.523704    6%:  ******
16.11.24.575728    5%:  *****
16.11.25.596664    7%:  *******
16.11.26.599504    4%:  ****
16.11.27.599520    4%:  ****
16.11.28.605392    6%:  ******
16.11.29.605576    7%:  *******
16.11.30.623616    5%:  *****
16.11.31.657912    6%:  ******
16.11.32.715632    5%:  *****
16.11.33.774368    5%:  *****
16.11.34.774408    5%:  *****
16.11.35.776424    6%:  ******
16.11.36.848664    3%:  ***
16.11.37.867392    3%:  ***
16.11.38.867952    8%:  ********
16.11.39.912048    5%:  *****
16.11.41.043016    5%:  *****
16.11.42.106312    4%:  ****
16.11.43.124568    6%:  ******
16.11.44.167960    5%:  *****
16.11.45.176488    4%:  ****
16.11.46.359768    3%:  ***
16.11.47.362856    4%:  ****
16.11.48.383208    5%:  *****
16.11.49.400808    4%:  ****
16.11.50.402624    3%:  ***
16.11.51.403184    6%:  ******
16.11.52.459440    3%:  ***
16.11.53.492920    4%:  ****
16.11.54.494288    5%:  *****
16.11.55.530520    3%:  ***
16.11.56.532872    6%:  ******
16.11.57.542048    4%:  ****
16.11.58.545896    7%:  *******
16.11.59.547568    5%:  *****
16.12.00.553536    5%:  *****
16.12.01.558152    3%:  ***
16.12.02.558248    5%:  *****
16.12.03.578976    7%:  *******
16.12.08.274352    0%:
16.12.09.309392    4%:  ****
16.12.10.443216    5%:  *****
16.12.11.634512    4%:  ****
16.12.12.635456    6%:  ******
16.12.13.646336    5%:  *****
16.12.14.646400    7%:  *******
16.12.15.649920    5%:  *****
16.12.16.690896    5%:  *****
16.12.17.700392    7%:  *******
16.12.18.710648    5%:  *****
16.12.19.720216    6%:  ******
16.12.20.722384    5%:  *****
                                                      M05


16.12.21.722672    4%:  ****
16.12.22.734616    5%:  *****
16.12.23.739112    5%:  *****
16.12.24.770632    4%:  ****
16.12.25.771608    6%:  ******
16.12.26.788080    4%:  ****
16.12.27.823136    3%:  ***
16.12.28.827272    4%:  ****
--------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000881E Name:   PEXTRACE   A960126A   053555     CPU % of Session: 0.388%     CPU % of Job existence: 0.388%
Timestamp          CPU%   Histogram
--------------------------------------------------------------------------------------------------------------------------------
16.07.24.509608    3%:  ***
16.07.25.517552   18%:  ******************
16.07.26.594800   19%:  *******************
```

```
16.07.27.607640   35%:  **********************************
16.12.27.721584    0%:
16.12.28.732536   19%:  *******************
```

10.9 Program Activations and Deactivations (PRTPEXCPUB Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.9, "DEACTS Reporting Command" on page 163 for a details of how to use the DEACTS command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.9.1 Report Title - Program Activates and Deactivates in Program within Job Sequence

```
                                           Program Activates and Deactivates
                                           in
                                           Program within Job Sequence
                                   QUERY NAME . . . . . DEACTJP04
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   DEACTJP03    DHPEX        DEACT02      DEACTJP03
                                   DEACTJP02    DHPEX        DEACT02      DEACTJP02
                                   DATE . . . . . . . . 08/12/96
                                   TIME . . . . . . . . 12:45:17
                                     Program Deactivates - part 5 - job/pgm report

08/12/96  12:45:17        Program Activate/Deactivate in Job/Pgm Sequence         PAGE    1
Job                       Program         Program     Program    Pct Pgm Activates Total
                                          Activate    Deactivate of Job Activates  Activates
                                          Count       Count                        for Job
QPADEV0006A960123A  053195 ILEP3                 7           7       46.67            15
                           OPMP01                5           5       33.33            15
                           ILEP2                 1           0        6.67            15
                           QCADRV2               1           0        6.67            15
                           QRGXINIT              1           0        6.67            15
                                TOTAL           15          12
P23XWY32G A960123A  053201 ILEP3                 6           6       46.15            13
                           OPMP01                3           3       23.08            13
                           ILEP2                 1           0        7.69            13
                           OPMP02                1           0        7.69            13
                           QRGXINIT              1           0        7.69            13
                           QYPEENDP              1           0        7.69            13
                                TOTAL           13           9
P23XWY32E A960123A  053197 ILEP1                 1           0       33.33             3
                           OPMP02                1           0       33.33             3
                           QRGXINIT              1           0       33.33             3
                                TOTAL            3           0
                                FINAL TOTALS
                                TOTAL           31          21
```

10.9.2 Report Title - Total Program Deactivates by Job

```
                                Total Program Deactivations
                                by Job
                                NOTE:  Jobs with 0 Deactivations are not included in this report
                                       QUERY NAME . . . . . DEACTJP06
                                       LIBRARY NAME . . . . SMTRACE
                                       FILE         LIBRARY      MEMBER       FORMAT
                                       DEACTJP05    DHPEX        DEACT02      DEACTJP05
                                       DEACTJPD01   DHPEX        DEACT02      DEACTJPD01
                                       DATE . . . . . . . . 08/12/96
                                       TIME . . . . . . . . 12:45:18
                                           Deact - part 7 - total deact by job report

08/12/96  12:45:18  Total Program Deactivations by Job  PAGE    1
Job                                 Job              Job  Pct
                                    Deact            Act  System
                                                          Deact
QPADEV0006A960123A  053195            12              15   57.14
P23XWY32G A960123A  053201             9              13   42.86
                      FINAL TOTALS
                      TOTAL           21              28
```

10.9.3 Report Title - Program Activations and Deactivations in Pgm/Job Descending Activation Sequence

```
                                            Program Activates and Deactivates
                                            in
                                            Job within Program Descending Activate Sequence
                                           QUERY NAME . . . . . DEACTPJO4A
                                           LIBRARY NAME . . . . SMTRACE
                                           FILE         LIBRARY      MEMBER       FORMAT
                                           DEACTPJO4    DHPEX        DEACT02      DEACTPJO4
                                           TASKINFO     DHPEX        DEACT02      TASKINFO
                                           DATE . . . . . . . . 08/12/96
                                           TIME . . . . . . . . 12:45:25
                                             Program DEACTS - pgm/job in desc act sequence

08/12/96  12:45:25       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    1
Program     Job                           Activates    Deactivates  Pct Pgm/Job
                                          for          for          Activates
                                          Pgm/Job      Pgm/Job      of All Pgm Activates
ILEP3       QPADEV0006A960123A  053195            7             7         53.85
            P23XWY32G A960123A  053201            6             6         46.15
                                TOTAL            13            13
OPMP01      QPADEV0006A960123A  053195            5             5         62.50
            P23XWY32G A960123A  053201            3             3         37.50
                                TOTAL             8             8
QRGXINIT    QPADEV0006A960123A  053195            1             0         33.33
            P23XWY32E A960123A  053197            1             0         33.33
            P23XWY32G A960123A  053201            1             0         33.33
                                TOTAL             3             0
ILEP2       QPADEV0006A960123A  053195            1             0         50.00
            P23XWY32G A960123A  053201            1             0         50.00
                                TOTAL             2             0
OPMP02      P23XWY32E A960123A  053197            1             0         50.00
            P23XWY32G A960123A  053201            1             0         50.00
                                TOTAL             2             0
ILEP1       P23XWY32E A960123A  053197            1             0        100.00
                                TOTAL             1             0
QCADRV2     QPADEV0006A960123A  053195            1             0        100.00
                                TOTAL             1             0
QYPEENDP    P23XWY32G A960123A  053201            1             0        100.00
                                                 M05


08/12/96  12:45:25       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    2
Program     Job                           Activates    Deactivates  Pct Pgm/Job
                                          for          for          Activates
                                          Pgm/Job      Pgm/Job      of All Pgm Activates
                                TOTAL             1             0
                                FINAL TOTALS
                                TOTAL            31            21
```

10.9.4 Report Title - Total Activations and Deactivations by Program

This report includes both application and system programs.

```
                                                Total Program Activations/Deactivations
                                                by Program
                                           QUERY NAME . . . . . DEACTPJ06
                                           LIBRARY NAME . . . . SMTRACE
                                           FILE         LIBRARY      MEMBER       FORMAT
                                           DEACTPJ05    DHPEX        DEACT02      DEACTPJ05
                                           DEACTPJA01   DHPEX        DEACT02      DEACTPJA01
                                           DATE . . . . . . . . 08/12/96
                                           TIME . . . . . . . . 12:45:26
                                                Deact - part 7 - total act/deact by pgm

08/12/96  12:45:26  Total Program Activations/Deactivations by Program  PAGE    1
Program          Program      Program     Pct
                 Activate     Deactivate  System
                 Count        Count       Activations
ILEP3                 13            13       41.94
OPMP01                 8             8       25.81
QRGXINIT               3             0        9.68
ILEP2                  2             0        6.45
OPMP02                 2             0        6.45
ILEP1                  1             0        3.23
QCADRV2                1             0        3.23
QYPEENDP               1             0        3.23
      FINAL TOTALS
      TOTAL           31            21
```

10.9.5 Report Title - Total Activations and Deactivations by Non-system Program

This report includes application programs only. All program names beginning with the letter ′Q′ will not appear on this report.

```
                                        Total Non-System Program Activations/Deactivations
                                        by Program
                                        QUERY NAME . . . . . DEACTPJ06A
                                        LIBRARY NAME . . . . SMTRACE
                                        FILE         LIBRARY      MEMBER       FORMAT
                                        DEACTPJ05    DHPEX        DEACT02      DEACTPJ05
                                        DEACTPJA01   DHPEX        DEACT02      DEACTPJA01
                                        DATE . . . . . . . . 08/12/96
                                        TIME . . . . . . . . 12:45:27
                                        Deact - part 8 - total appln pgm act/deact by pgm

08/12/96  12:45:27  Total Non-System Program Activations/Deactivations by Program      PAGE    1
                    (application program names starting with 'Q' will not be counted)
Non-system  Non-system        Non-system          Pct
Program     Program Activate  Program Deactivate  Systemwide
            Count             Count               Activations
ILEP3                    13                 13       41.94
OPMP01                    8                  8       25.81
ILEP2                     2                  0        6.45
OPMP02                    2                  0        6.45
ILEP1                     1                  0        3.23
        FINAL TOTALS
        TOTAL            26                 21
```

Appendix A. AS/400 MI Complex Instructions (Partial List)

This list of MI Complex Instructions is provided to assist you in determining the function being performed by the system to accomplish some application or OS/400 function.

*ACTBPGM	ACTIVATE BOUND PROGRAM	*DBGINT	DEBUG INTERPRETER
*ACTCR	ACTIVATE CURSOR	*DBLEVTMN	DISABLE EVENT MONITOR
*ACTPG	ACTIVATE PROGRAM	*DBMAINT	DATA BASE MAINTENANCE
*APYJCHG	APPLY JOURNAL CHANGES	*DBMATCH	DATA BASE PATTERN MATCH
*CANEVTMN	CANCEL EVENT MONITOR	*DCPDATA	DECOMPRESS DATA
*CANINV	CANCEL INVOCATION	*DEACTBM	DEACTIVATE PROGRAMS BY MARK
*CANINVTR	CANCEL INVOCATION TRACE	*DEACTCR	DE-ACTIVATE CURSOR
*CANTRINS	CANCEL TRACE INSTRUCTIONS	*DEACTPG	DE-ACTIVATE PROGRAM
*CDD	COMPUTE DATE DURATION	*DECD	DECREMENT DATE
*CHKDCT	CHECK DICTIONARY	*DECOMMIT	DECOMMIT
*CIPHER	CIPHER	*DECT	DECREMENT TIME
*CIPHERKY	CIPHER KEY	*DECTS	DECREMENT TIMESTAMP
*COMMIT	COMMIT	*DELDSEN	DELETE DATA SPACE ENTRY
*CPRDATA	COMPRESS DATA	*DELPGOBS	DELETE PROGRAM OBSERVABILITY
*CPYDSE	COPY DATA SPACE ENTRIES	*DEQ	DEQUEUE
*CRTAG	CREATE ACCESS GROUP	*DEQWAIT	DEQUEUE WAIT
*CRTAL	CREATE AUTHORIZATION LIST	*DESAG	DESTROY ACCESS GROUP
*CRTAUXSV	CREATE AUXILIARY SERVER	*DESAGP	DESTROY ACTIVATION GROUP
*CRTBPGM	CREATE BOUND PROGRAM	*DESAL	DESTROY AUTHORIZATION LIST
*CRTCB	CREATE COMMIT BLOCK	*DESAUXSV	DESTROY AUXILIARY SERVER
*CRTCD	CREATE CONTROLLER DESCRIPTION	*DESBSS	DESTROY BYTE STRING SPACE
*CRTCFGD	CREATE CONFIG. DESCRIPTION	*DESCB	DESTROY COMMIT BLOCK
*CRTCNNL	CREATE CONNECTION LIST	*DESCD	DESTROY CONTROLLER DESCRIPTION
*CRTCR	CREATE CURSOR	*DESCNNL	DESTROY CONNECTION LIST
*CRTCSD	CREATE CLASS OF SERVICE DESC.	*DESCR	DESTROY CURSOR
*CRTCTX	CREATE CONTEXT	*DESCSD	DESTROY CLASS OF SERVICE DESC.
*CRTDCT	CREATE DICTIONARY	*DESCTX	DESTROY CONTEXT
*CRTDMPS	CREATE DUMP SPACE	*DESDCT	DESTROY DICTIONARY
*CRTDOBJ	CREATE DUPLICATE OBJECT	*DESDMPS	DESTROY DUMP SPACE
*CRTDS	CREATE DATA SPACE	*DESDS	DESTROY DATA SPACE
*CRTDSIM	CREATE DATA SPACE ENTRY IMAGE	*DESDSINX	DESTROY DATA SPACE INDEX
*CRTDSINX	CREATE DATA SPACE INDEX	*DESHRI	DESTROY HARDWARE RESOURCE INFO
*CRTHS	CREATE HEAP SPACE	*DESHS	DESTROY HEAP SPACE
*CRTINX	CREATE INDEPENDENT INDEX	*DESINX	DESTROY INDEPENDENT INDEX
*CRTITER	CREATE ITERATOR	*DESITER	DESTROY ITERATOR
*CRTJP	CREATE JOURNAL PORT	*DESJP	DESTROY JOURNAL PORT
*CRTJS	CREATE JOURNAL SPACE	*DESJS	DESTROY JOURNAL SPACE
*CRTLUD	CREATE LOGICAL UNIT DESC.	*DESLUD	DESTROY LOGICAL UNIT DESC.
*CRTMD	CREATE MODE DESCRIPTION	*DESMD	DESTROY MODE DESCRIPTION
*CRTMOD	CREATE MODULE	*DESMOD	DESTROY MODULE
*CRTMTX	CREATE MUTEX	*DESMTX	DESTROY MUTEX
*CRTND	CREATE NETWORK DESCRIPTION	*DESND	DESTROY NETWORK DESCRIPTION
*CRTNWID	CREATE NETWORK INTERFACE DESC	*DESNWID	DESTROY NETWORK INTERFACE DESC
*CRTPCS	CREATE PROCESS CONTROL SPACE	*DESPCS	DESTROY PROCESS CONTROL SPACE
*CRTPG	CREATE PROGRAM	*DESPG	DESTROY PROGRAM
*CRTQ	CREATE QUEUE	*DESQ	DESTROY QUEUE
*CRTQS	CREATE QUEUE SPACE	*DESQS	DESTROY QUEUE SPACE
*CRTS	CREATE SPACE	*DESS	DESTROY SPACE
*CRTUP	CREATE USER PROFILE	*DESSOM	DESTROY SOM OBJECT
*CTD	COMPUTE TIME DURATION	*DESUP	DESTROY USER PROFILE
*CTSD	COMPUTE TIMESTAMP DURATION	*DIAG	DIAGNOSE
*CVTCM	CONVERT CHARACTER TO MRJE	*EBLEVTMN	ENABLE EVENT MONITOR
*CVTCN,LB	CONVERT CHAR/NUM, LB CPY NUM V	*ENQ	ENQUEUE
*CVTCS	CONVERT CHARACTER TO SNA	*ENSDSEN	ENSURE DATA SPACE ENTRIES
*CVTD	CONVERT DATE	*ENSOBJ	ENSURE OBJECT
*CVTEFN	CONVERT EXTERNAL FORM TO NUM	*ESTDSIKR	ESTIMATE SIZE OF DSI KEY RANGE
*CVTMC	CONVERT MRJE TO CHARACTER	*EXTRMOD	EXTRACT MODULE
*CVTSC	CONVERT SNA TO CHARACTER	*FNDINXEN	FIND INDEPENDENT INDEX ENTRY
*CVTT	CONVERT TIME	*FNDRINVN	FIND RELATIVE INVOCATION NUM.
*CVTTS	CONVERT TIMESTAMP	*FREHSSMK	FREE HEAP SPACE STG FROM MARK

*FSERVOP	FILE SERVER OPERATION
*FSREAD	FILE SYSTEM READ
*FSROUTE	FILE SERVER/SYSTEM ROUTER
*FSWRITE	FILE SYSTEM WRITE
*GENUUID	GENERATE UNIVERSAL UNIQUE ID
*GRANT	GRANT AUTHORITY
*GRNTLIKE	GRANT-LIKE AUTHORITY
*GRNTLIKO	GRANT-LIKE OBJECT AUTHORITY
*INCD	INCREMENT DATE
*INCT	INCREMENT TIME
*INCTS	INCREMENT TIMESTAMP
*INITPR	INITIATE PROCESS
*INSDMPD	INSERT DUMP DATA
*INSDSEN	INSERT DATA SPACE ENTRY
*INSINXEN	INSERT INDEPENDENT INDEX ENTRY
*INSSDSE	INSERT SEQ. DATA SPACE ENTRIES
*INVP	INVOCATION POINTER
*JRNLD	JOURNAL DATA
*JRNLOBJ	JOURNAL OBJECT
*LINKDIR	LINK DIRECTORY
*LOCK	LOCK OBJECT
*LOCKSL	LOCK SPACE LOCATION
*LOGICAL	LOGICAL AND, OR, EXCLUSIVE OR
*LOOKUP	LOOKUP DIRECTORY
*MATACTAT	MATERIALIZE ACTIVATION ATTRS.
*MATACTEX	MATERIALIZE ACTIVATION EXPORT
*MATAGAT	MATERIALIZE ACCESS GROUP ATTRS
*MATAGPAT	MATER. ACTIVATION GROUP ATTRS.
*MATAL	MATERIALIZE AUTHORIZATION LIST
*MATAOL	MATER. ALLOCATED OBJECT LOCKS
*MATAU	MATERIALIZE AUTHORITY
*MATAUOBJ	MATERIALIZE AUTHORIZED OBJECTS
*MATAUU	MATERIALIZE AUTHORIZED USERS
*MATAUXSV	MATERIALIZE AUXILIARY SERVER
*MATBPGM	MATERIALIZE BOUND PROGRAM
*MATBSS	MATERIALIZE BYTE STRING SPACE
*MATCBATR	MATERIALIZE COMMIT BLOCK ATTRS
*MATCD	MATERIALIZE CONTROLLER DESC.
*MATCFGD	MATER. CONFIG. DEFINITION
*MATCFGDC	MATER. CONFIG. DEF. CHOICES
*MATCNNL	MATERIALIZE CONNECTION LIST
*MATCRAT	MATERIALIZE CURSOR ATTRIBUTES
*MATCSD	MATER. CLASS OF SERVICE DESC.
*MATCTX	MATERIALIZE CONTEXT
*MATDCT	MATERIALIZE DICTIONARY ATTRS.
*MATDMPS	MATERIALIZE DUMP SPACE
*MATDRECL	MATER. DATA SPACE RECORD LOCKS
*MATDSAT	MATERIALIZE DATA SPACE ATTRS.
*MATDSIAT	MATER. DATA SPACE INDEX ATTRS.
*MATEVTMN	MATERIALIZE EVENT MONITORS
*MATEXCPD	MATERIALIZE EXCEPTION DESC.
*MATHRI	MATER. HARDWARE RESOURCE INFO.
*MATHRICD	MATER. HRI CLASS DETAILS
*MATHRIR	MATER. RESOURCE INFO. RELATIVE
*MATHSAT	MATERIALIZE HEAP SPACE ATTRS.
*MATINAT	MATERIALIZE INSTRUCTION ATTRS.
*MATINV	MATERIALIZE INVOCATION ATTRS.
*MATINVAT	MATERIALIZE INVOCATION ATTRS.
*MATINVIF	MATERIALIZE INVOCATION INFO.
*MATINVS	MATERIALIZE INVOCATION STACK
*MATINXAT	MATER. INDEPENDENT INDEX ATTRS
*MATJOAT	MATER. JOURNALED OBJECT ATTRS.
*MATJOBJ	MATERIALIZE JOURNALED OBJECTS
*MATJPAT	MATERIALIZE JOURNAL PORT ATTRS
*MATJSAT	MATERIALIZE JOURNAL SPACE ATTR
*MATLUD	MATERIALIZE LOGICAL UNIT DESC.
*MATMATR1	MATERIALIZE MACHINE ATTRS. 1
*MATMATR2	MATERIALIZE MACHINE ATTRS. 2
*MATMD	MATERIALIZE MODE DESCRIPTION
*MATMOD	MATERIALIZE MODULE
*MATMTX	MATERIALIZE MUTEX
*MATND	MATERIALIZE NETWORK DESC.
*MATNWID	MATERIALIZE NETWORK INT DESC
*MATOBJLK	MATERIALIZE OBJECT LOCKS
*MATOLNK	MATERIALIZE OBJECT LINKS
*MATPG	MATERIALIZE PROGRAM
*MATPID	MATPID
*MATPNSIG	MATPNSIG
*MATPRAGP	MATER. PROCESS ACTIV. GROUPS
*MATPRATR	MATERIALIZE PROCESS ATTRIBUTES
*MATPRECL	MATER. PROCESS RECORD LOCKS
*MATPRLK	MATERIALIZE PROCESS LOCKS
*MATPRMSG	MATERIALIZE PROCESS MESSAGE
*MATPRMTX	MATER. PROCESS MUTEX LOCKS
*MATPTR	MATERIALIZE POINTER
*MATPTRIF	MATERIALIZE POINTER INFO.
*MATPTRL	MATERIALIZE POINTER LOCATIONS
*MATPUID	MATER. PROCESS USER/GROUP IDS
*MATQAT	MATERIALIZE QUEUE ATTRIBUTES
*MATQMSG	MATERIALIZE QUEUE MESSAGES
*MATQSAT	MATERIALIZE QUEUE SPACE ATTRS.
*MATRMD	MATERIALIZE RESOURCE MGMT DATA
*MATS	MATERIALIZE SPACE ATTRIBUTES
*MATSELLK	MATERIALIZE SELECTED LOCKS
*MATSIGMN	MATSIGMN
*MATSOBJ	MATERIALIZE SYSTEM OBJECT
*MATSSATR	MATER. STATIC SECTION ATTRS.
*MATSSP	MATER. SECONDARY SPACE POINTER
*MATUP	MATERIALIZE USER PROFILE
*MATUPID	MATER. USER PROF. FROM UID GID
*MNEVT	MONITOR EVENT
*MODADR	MODIFY ADDRESSABILITY
*MODAL	MODIFY AUTHORIZATION LIST
*MODAUXSV	MODIFY AUXILIARY SERVER
*MODBPGM	MODIFY BOUND PROGRAM
*MODCB	MODIFY COMMIT BLOCK
*MODCD	MODIFY CONTROLLER DESCRIPTION
*MODCFGD	MODIFY CONFIG. DESCRIPTION
*MODCNNL	MODIFY CONNECTION LIST
*MODCSD	MODIFY CLASS OF SERVICE DESC.
*MODCTX	MODIFY CONTEXT
*MODDIRE	MODIFY DIRECTORY ENTRY
*MODDMPS	MODIFY DUMP SPACE
*MODDSAT	MODIFY DATA SPACE ATTRIBUTES
*MODDSIA	MODIFY DATA SPACE INDEX ATTRS.
*MODEXCPD	MODIFY EXCEPTION DESCRIPTION
*MODHRI	MODIFY HARDWARE RESOURCE INFO.
*MODINVAT	MODIFY INVOCATION ATTRIBUTES
*MODINX	MODIFY INDEPENDENT INDEX
*MODJP	MODIFY JOURNAL PORT
*MODLUD	MODIFY LOGICAL UNIT DESC.
*MODMATR	MODIFY MACHINE ATTRIBUTES
*MODMD	MODIFY MODE DESCRIPTION
*MODMOD	MODIFY MODULE
*MODND	MODIFY NETWORK DESCRIPTION
*MODNWID	MODIFY NETWORK INTERFACE DESC
*MODPEVTM	MODIFY PROCESS EVENT MASK
*MODPG	MODIFY PROGRAM
*MODPID	MODPID
*MODPRATR	MODIFY PROCESS ATTRIBUTES
*MODPRMSG	MODIFY PROCESS MESSAGE
*MODPSIGM	MODPSIGM

*MODQSAT	MODIFY QUEUE SPACE ATTRIBUTES	*SETOBPFI	SET OBJ. PTR. FROM SOM OBJ ID
*MODRMC	MODIFY RESOURCE MGMT CONTROLS	*SETOBPFP	SET OBJECT PTR. FROM PTR.
*MODSIGBM	MODSIGBM	*SETOINGR	SET OLDEST INV. IN ACT. GROUP
*MODSIGMN	MODSIGMN	*SIGEVT	SIGNAL EVENT
*MODSOBJ	MODIFY SYSTEM OBJECT	*SIGEXBRF	SIGNAL EXCEPTION BRIEF
*MODS1	MODIFY SPACE ATTRIBUTES 1	*SIGEXCP	SIGNAL EXCEPTION
*MODS2	MODIFY SPACE ATTRIBUTES 2	*SIGTIMER	SIGTIMER
*MODTRC	MODIFY TRACE	*SNDPRMSG	SEND PROCESS MESSAGE
*MODUP	MODIFY USER PROFILE	*SNDSIG	SNDSIG
*NFYHDWCH	NOTIFY WHEN HARDWARE CHANGES	*SNSEXCPD	SENSE EXCEPTION DESCRIPTION
*RECLAIM	RECLAIM LOST OBJECTS	*SRCHDCT	SEARCH DICTIONARY
*RENAME	RENAME OBJECT	*SRCHHRI	SEARCH HARDWARE RESOURCE INFO.
*REQIO	REQUEST I/O	*SUSOBJ	SUSPEND OBJECT
*REQPO	REQUEST PATH OPERATION	*SUSPR	SUSPEND PROCESS
*REQSO	REQUEST STATISTICS OPERATION	*TERMINST	TERMINATE INSTRUCTION
*RESAG	RESET ACCESS GROUP	*TERMMPR	TERMINATE MACHINE PROCESSING
*RESERVED	- RESERVED -- DO NOT USE -	*TERMPR	TERMINATE PROCESS
*RESPR	RESUME PROCESS	*TESTAU	TEST AUTHORITY
*RETDMPD	RETRIEVE DUMP DATA	*TESTAURC	TEST AUTH. RETURN COLLECTIVE
*RETDSEN	RETRIEVE DATA SPACE ENTRY	*TESTEAU	TEST EXTENDED AUTHORITIES
*RETEVTD	RETRIEVE EVENT DATA	*TESTEVT	TEST EVENT
*RETEXCPD	RETRIEVE EXCEPTION DATA	*TESTEXCP	TEST EXCEPTION
*RETJENT	RETRIEVE JOURNAL ENTRIES	*TESTSOBJ	TEST SYSTEM OBJECT
*RETRACT	RETRACT AUTHORITY	*TESTULA	TEST USER LIST AUTHORITY
*RETSDSE	RETRIEVE SEQ. DATA SPACE ENT.	*TRINS	TRACE INSTRUCTIONS
*RETSIMEN	RETRIEVE SIMPLE DS ENTRIES	*TRINV	TRACE INVOCATIONS
*RINZSTAT	REINITIALIZE STATIC STORAGE	*UNLINK	UNLINK DIRECTORY
*RLSDSEN	RELEASE DATA SPACE ENTRIES	*UNLOCK	UNLOCK OBJECT
*RMVINXEN	REMOVE INDEPENDENT INDEX ENTRY	*UNLOCKSL	UNLOCK SPACE LOCATION
*RNMDIRO	RENAME DIRECTORY OBJECT	*UPDSEN	UPDATE DATA SPACE ENTRY
*RSLVDP	RESOLVE DATA POINTER	*VALCFGD	VALIDATE CONFIG. DEFINITION
*RSLVSP	RESOLVE SYSTEM POINTER	*VFYCFGD	VERIFY CONFIG. DESCRIPTION
*RTNEXCP	RETURN FROM EXCEPTION	*WAITEVT	WAIT ON EVENT
*SELFNC	SELECT FUNCTIONS	*WAITSIG	WAITSIG
*SETACST	SET ACCESS STATE	*WAITTIME	WAIT ON TIME
*SETBPFP	SET BEHAVIOR PTR. FROM PTR.	*XFRGO	TRANSFER GROUP OWNERSHIP
*SETCR	SET CURSOR	*XFRLOCK	TRANSFER OBJECT LOCK
*SETHSSMK	SET HEAP SPACE STORAGE MARK	*XFRO	TRANSFER OWNERSHIP
*SETMPFP	SET METHOD PTR. FROM PTR.		

Appendix B. AS/400 Modules (Partial List)

This list is provided to assist you in interpreting what OS/400 or IBM licensed program module is being used to accomplish an application or other OS/400 program requested function.

$ARSP	AUTO RESPONSE
$BICR	S36EE--$BICR FILE TRANSFER UTILITY
$BMENU	CREATE A MENU FROM A MESSAGE FILE
$COPY	$COPY MAINLINE MODULE
$CPPE	PROC INTERFACE TO MESSAGE HANDLING
$DDST	$DDST-KEYSORT UTILITY
$DELET	$DELET - S/36 DELETE UTILITY
$DPGP	UTILITY FOR PRTGRAPH
$DPGR	UTILITY FOR BLDGRAPH
$DPGR2	UTILITY FOR BLDGRAPH
$DUPRD	$DUPRD - S/36 DISKETTE COPY UTILITY
$FBLD	$FBLD
$FREE	CONDENSE PROCEDURE MODULE
$HELP	MCH/36 ENVIRONMENT PROCESSOR
$INIT	PLATFORM INITIALIZE DISKETTE
$LABEL	VTOC/TAPE LABEL DISPLAY
$MAINT	$MAINT
$MGBLD	CREATE A MESSAGE FILE FROM S/36 MSG SRC
$PRPWD	S/36 E CHANGE PASSWORD UTILITY
$RENAM	$RENAM - S/36 RENAME UTILITY
$SETCF	S/36 E $SETCF UTILITY PROGRAM
$SFGR	CREATE A DISPLAY FILE FROM S/36 SFGR SRC
$SVCASRV	CACHE UTILITY PROCEDURE
$SYSLIST	HANDLE S/36 SYSLIST PRINTER PROCESSING
$SYSOVR	SET OVERRIDE INFO FROM SYSLIST ATTRIBUTE
$TCOPY	TAPECOPY BASE MODULE
$TINIT	S/36EE TAPE INITIALIZATION UTILITY
$UASC	USER ACCESS TO SPOOL - DISPLAY/PRINT
$UASF	USER ACCESS TO SPOOL - COPY MODULE
#DSIN	IDDU PROCEDURE HANDLER
#EMAD	S/36 BSC DISPLAY EMUALTION
#EMFP	S/36 BSC EMULATION PRE-PROCESSOR
#EM9D	S/36 BSC PRINTER EMUALTION
#ESAD	S/36 SNA DISPLAY EMUALTION
#ESEP	S/36 MODULE EMULATING RUN OF EP3270
#ESFP	S/36 SNA EMULATION PRE-PROCESSOR
#ESPI	S/36 SNA PRINTER EMUALTION
#GSORT	GENERAL SORT USING S/38 REFORMAT
#KASRT	IGC SORT USING REFORMAT
#MEEP	S/36 MODULE EMULATING RUN OF MS3270
#MEFP	S/36 SNA EMULATION PRE-PROCESSOR MS3270
#ORPR	S36 PGM: ORGANIZER PROFILE OPTIONS
#ORTS	S36 PGM: ORGANIZER INDICATION SETTER
#ORXT	S36 PGM: TERMINATE AND EXECUTE
#QUDA	S/36 PGM: INITIAL QUERY MODULE
#TUPH	OFFICE PROCEDURE HANDLER
#TUPQ	OFFICE PRINT QUEUE PROC HANDLER
#TVRT	TEXTDOC PRTFILE HANDLER FOR S/36 EE
#USYX	UTILITY CONTROL STATEMENT SYNTAX CHECKER
AFRIKAAN	FROM PC LEXAM MERGE CODE
ASREAD	GDDM ENTRY MODULE
BNEXCH	C EXCEPTION HANDLING ROUTINES
CDRCVRT	API TO CONVERT GRAPHIC DATA
CDRGCCN	API TO GET CCSID FOR NORMALIZATION
CDRGESP	API TO GET ENCODING SCHEME
CDRGRDC	API TO GET RELATED DEFAULT CCSID
CDRSCSP	API TO GET SHORT FORM CCSID
CHAATT	GDDM ENTRY MODULE
CHAREA	GDDM ENTRY MODULE
CHBAR	GDDM ENTRY MODULE
CHBATT	GDDM ENTRY MODULE
CHCGRD	GDDM ENTRY MODULE
CHCOL	GDDM ENTRY MODULE
CHDATT	GDDM ENTRY MODULE
CHDRAX	GDDM ENTRY MODULE
CHFINE	GDDM ENTRY MODULE
CHGAP	GDDM ENTRY MODULE
CHGATT	GDDM ENTRY MODULE
CHGGAP	GDDM ENTRY MODULE
CHHATT	GDDM ENTRY MODULE
CHHEAD	GDDM ENTRY MODULE
CHHIST	GDDM ENTRY MODULE
CHHMAR	GDDM ENTRY MODULE
CHKATT	GDDM ENTRY MODULE
CHKEY	GDDM ENTRY MODULE
CHKEYP	GDDM ENTRY MODULE
CHKMAX	GDDM ENTRY MODULE
CHKOFF	GDDM ENTRY MODULE
CHKRCVR	FROM PC LEXAM MERGE CODE
CHLATT	GDDM ENTRY MODULE
CHLT	GDDM ENTRY MODULE
CHLW	GDDM ENTRY MODULE
CHMARK	GDDM ENTRY MODULE
CHNATT	GDDM ENTRY MODULE
CHNOFF	GDDM ENTRY MODULE
CHNOTE	GDDM ENTRY MODULE
CHNUM	GDDM ENTRY MODULE
CHPAT	GDDM ENTRY MODULE
CHPCTL	NEW API CALL
CHPEXP	NEW API CALL
CHPIE	GDDM ENTRY MODULE
CHPIER	GDDM ENTRY MODULE
CHPLOT	GDDM ENTRY MODULE
CHRNIT	GDDM ENTRY MODULE
CHSET	GDDM ENTRY MODULE
CHSTRT	GDDM ENTRY MODULE
CHSURF	GDDM ENTRY MODULE
CHTATT	GDDM ENTRY MODULE
CHTERM	GDDM ENTRY MODULE
CHVATT	GDDM ENTRY MODULE
CHVCHR	GDDM ENTRY MODULE
CHVENN	GDDM ENTRY MODULE
CHVMAR	GDDM ENTRY MODULE
CHXDAY	GDDM ENTRY MODULE
CHXDTM	GDDM ENTRY MODULE
CHXINT	GDDM ENTRY MODULE
CHXLAB	GDDM ENTRY MODULE
CHXLAT	NEW API CALL
CHXMTH	GDDM ENTRY MODULE
CHXRNG	GDDM ENTRY MODULE
CHXSCL	GDDM ENTRY MODULE
CHXSEL	GDDM ENTRY MODULE
CHXSET	GDDM ENTRY MODULE
CHXTIC	GDDM ENTRY MODULE
CHXTTL	GDDM ENTRY MODULE
CHYDAY	GDDM ENTRY MODULE
CHYDTM	GDDM ENTRY MODULE
CHYINT	GDDM ENTRY MODULE
CHYLAB	GDDM ENTRY MODULE
CHYLAT	NEW API CALL
CHYMTH	GDDM ENTRY MODULE
CHYRNG	GDDM ENTRY MODULE
CHYSCL	GDDM ENTRY MODULE
CHYSEL	GDDM ENTRY MODULE
CHYSET	GDDM ENTRY MODULE
CHYTIC	GDDM ENTRY MODULE
CHYTTL	GDDM ENTRY MODULE
CMACCP	CPI-C ACCEPT CONVERSATION
CMALLC	CPI-C ALLOCATE CONVERSATION
CMCFM	CPI-C CONFIRM MODULE
CMCFMD	CPI-C CONFIRMED
CMCNVI	CPI-C CONVERT INCOMING
CMCNVO	CPI-C CONVERT OUTGOING
CMCOBOL	CPI-C API HEADER FOR CBL
CMCOBOL	CPI-C HEADER IN ILE/COBOL
CMDEAL	CPI-C DEALLOCATE_CONVERSATION

CMECS	CPI-C EXTRACT CONVERSATION STATE
CMECT	CPI-C EXTRACT CONVERSATION TYPE
CMEMBS	CPI-C EXTRACT MAXIMUM BUFFER SIZE
CMEMN	CPI-C EXTRACT_MODE_NAME
CMEPLN	CPI-C EXTRACT_PARTNER_LU_NAME
CMESL	CPI-C EXTRACT_SYNC_LEVEL
CMESUI	CPI-C EXTRACT_SECURITY_USER_ID
CMFLUS	CPI-C FLUSH MODULE
CMINIT	CPI-C INITIALIZE CONVERSATION
CMPTR	CPI-C PREPARE TO RECEIVE MODULE
CMRCV	CPI-C RECEIVE DATA MODULE
CMRPG	CPI-C API HEADER IN RPG
CMRPG	CPI-C HEADER IN ILE/RPG
CMRTS	CPI-C REQUEST TO SEND
CMSCSP	SET_CONVERSATION_SECURITY_PASSWORD
CMSCST	SET_CONVERSATION_SECURITY_TYPE
CMSCSU	SET_CONVERSATION_SECURITY_USER_ID
CMSCT	SET_CONVERSATION_TYPE
CMSDT	SET_DEALLOCATE_TYPE
CMSED	SET_ERROR_DIRECTION
CMSEND	CPI-C SEND DATA MODULE
CMSERR	CPI-C SEND ERROR MODULE
CMSF	SET_FILL
CMSLD	SET_LOG_DATA
CMSMN	SET_MODE_NAME
CMSPLN	SET_PARTNER_LU_NAME
CMSPTR	SET_PREPARE_TO_RECEIVE_TYPE
CMSRC	SET_RETURN_CONTROL
CMSRT	SET_RECEIVE_TYPE
CMSSL	SET_SYNC_LEVEL
CMSST	SET_SEND_TYPE
CMSTPN	SET_TP_NAME
CWCI	CMPD WORD COMPONENT ISOLATION
DEHYPHDE	FROM PC LEXAM MERGE CODE
DSCLS	GDDM ENTRY MODULE
DSDROP	GDDM ENTRY MODULE
DSOPEN	GDDM ENTRY MODULE
DSQCIC	QM C CALLABLE SHORT INTERFACE PROGRAM
DSQCICE	QM C CALLABLE EXTENDED INTERFACE PROGRAM
DSQCOMMB	QUERY MANAGEMENT COBOL CPI INCLUDE___
DSQCOMMR	QX INCLUDE MEMBER FOR RPG
DSQDEV	GDDM ENTRY MODULE
DSQUID	GDDM ENTRY MODULE
DSQUSE	GDDM ENTRY MODULE
DSRNIT	GDDM ENTRY MODULE
DSUSE	GDDM ENTRY MODULE
EALRTVA	ARRAYS FOR QALRTVA RPGINC
ECONV	ARRAY FOR ICONV
EDBLDBR	EDBLDBR API HEADER IN RPG
EDBRTVFD	EDBRTVFD API HEADER IN RPG
EDCRBODY	BODY STREAM PROCESSING FOR INLINER
EDCRCALL	CALL PROCESSING FOR INLINER
EDCRHEAD	HEADER STREAM PROCESSING FOR INLINER
EDCRMAIN	MAIN ENTRY POINT TO W-CODE INLINER
EDCRMISC	MISCELLANEOUS INLINER FUNCTIONS
EDCRPORD	POST ORDER PROCESSING FOR INLINER
EDCRSHAD	SHADOW GENERATION FOR INLINER
EESRSRVA	EESRSRVA API HEADER IN RPG
EFVLSTA	LIST ACTIVITIES
EFZLAA0A	TOKEN LIST UTILITY SOURCE FILES
EFZLAB0A	LINGUISTIC SERVICE LIBRARY ROUTINES
EFZLAC0A	OVERALL ACTIVATE DICTIONARY FUNCTION
EFZLBD0A	DANISH ABBREVIATION LIST
EFZLBE0A	SPANISH ABBREVIATION LIST
EFZLBF0A	FRENCH ABBREVIATION LIST
EFZLBG0A	GERMANIC ABBREVIATION LIST
EFZLBH0A	DUTCH ABBREVIATION LIST
EFZLBI0A	ITALIAN ABBREVIATION LIST
EFZLBK0A	SWITCHER
EFZLBN0A	NORWEGIAN ABBREVIATION LIST
EFZLBS0A	SWEDISH ABBREVIATION LIST
EFZLBT0A	TURKISH
EFZLBU0A	US-ENGLISH ABBREVIATION LIST
EFZLCN0A	TOKEN TO 'S'-FORMAT DATA ELEMENT CONVERT
EFZLCO0A	COORDINATOR 0

EFZLC10A	COORDINATOR 1
EFZLC20A	COORDINATOR 2
EFZLC30A	COORDINATOR 3
EFZLC40A	COORDINATOR 4 SCAFFOLDING
EFZLDE0A	EFZLDEAA_DEACT - DEACTIVATE DICTS & ADDS
EFZLDI0A	SYSTEM DICTIONARY ACTIVATE ROUTINE
EFZLD40A	COORDINATOR 4 MODULE
EFZLE40A	COORDINATOR 4
EFZLF40A	COORDINATOR 4 MODULE
EFZLGI0A	GENERATE INFLECTED FORMS
EFZLG40A	COORDINATOR 4 MODULE
EFZLH40A	COORDINATOR 4 MODULE
EFZLIS0A	SIMPLE TOKENIZATION SOURCE FILE
EFZLI40A	COORDINATOR 4 MODULE
EFZLMAIN	SWITCHER
EFZLMB0A	GET MORPHOLOGY PARADIGM INFORMATION
EFZLMB1A	MORPHOLOGY PREFIX PROCESSING
EFZLMB2A	GET FORM IDS AND ENDING STRINGS
EFZLMB3A	MORPHOLOGY RULE PROCESSING
EFZLMB4A	MORPHOLOGY FORMID SPELLING EXPANSION
EFZLMB5A	MATCH A WORD WITH THE ENDING LIST
EFZLMB6A	MORPHOLOGY OUTPUT DATA
EFZLMB7A	RUN LENGTH ENCODING FOR MORPHOLOGY
EFZLMB8A	LOAD MORPHOLOGY TRANSFORMATION RULES
EFZLME0A	MEMORY MANAGEMENT SOURCE FILE
EFZLMI0A	MORPHOLOGY ID
EFZLNLPS	SWITCHER
EFZLNO0A	WORD NORMALIZATION
EFZLPT0A	TAP UTILITIES FOR PROPERTY-RELATED INFO
EFZLSB0A	C VERSION OF SRCHBLK AND RELATED FUNCS
EFZLSF0A	STUBS FOR SYN & MORPH IN PC-LEXAM
EFZLSH0A	DAP TO PC-LEXAM SHELL CODE
EFZLSY0A	SYNONYM AID MAIN ENTRY
EFZLSY1A	P_SRCHBLK FOR SYNONYMS
EFZLSY2A	PERFORMS SYNONYM ADD SUFFIX FUNCTION
EFZLS40A	COORDINATOR 4 MODULE
EFZLTM0A	TAP MANAGER SOURCE FILE
EFZLTS0A	TEXT SEGMENT IDENTIFICATION SOURCE FILE
EFZLX00A	CORE ROUTINES FOR COMPLEX TOKEN ANALYSIS
EFZLX10A	ENGLISH STUFF FOR COMPLEX TOKEN ANALYSIS
EFZLX20A	NON-ENGLISH CMPLX TKN ANALYSIS ROUTINES
EFZLX30A	UTILITIES FOR COMPLEX TOKEN ANALYSIS
EFZLZD0A	P_SRCHDCT
EFZLZD1A	P_CHKWRD
EFZLZD2A	PARAMETERIZED GETBLK
EFZLZD3A	P_DL_CHK DICTIONARY LIST CHECK
EFZLZD4A	P_NXTNIB GET NEXT NIBBLE
EFZLZD5A	P_NXTBYT GET NEXT BYTE
EFZLZD6A	P_RTNWRD GET RETURN WORD
EFZLZD7A	P_ADDLET<> ADD LETTER
EFZLZD7B	P_MADDLE<> ADD LETTER FOR MORPHOL
EHF	ARRAYS FOR QHF RPGINC
EHFRDDR	ARRAYS FOR QHFRDDR RPGINC
EKICONR	CSTATUS PRINT MANAGER RPG INCLUDE
ELGSORT	ARRAYS FOR QLGSORT
ELGSRTIO	ARRYS FOR QLGSRTIO
EMHLJOBL	ARRAYS FOR QMHLJOBL API
EMHLSTM	ARRAYS FOR QMHLSTM API
EMHRTVM	ARRAYS FOR QMHRTVM
ENMRGFN	ENMRGFN HEADER IN RPG
EOGDOCH	EOGDOCH HEADER FOR CBL
EOGDOCH	EOGDOCH API HEADER IN RPG
EOGDOCH	EOGDOCH HEADER IN ILE/RPG
EOGDOCH	EOGDOCH HEADER IN ILE/COBOL
EOGDOCH1	EOGDOCH1 API HEADER FOR CBL
EOGDOCH1	EOGDOCH1 API HEADER IN RPG
EOGDOCH1	EOGDOCH1 HEADER IN ILE/RPG
EOGDOCH1	EOGDOCH1 HEADER IN ILE/COBOL
EOGDOCH2	EOGDOCH2 API HEADER FOR CBL
EOGDOCH2	EOGDOCH2 API HEADER IN RPG
EOGDOCH2	EOGDOCH2 HEADER IN ILE/RPG
EOGDOCH2	EOGDOCH2 HEADER IN ILE/COBOL
EOGDOCH3	EOGDOCH3 API HEADER FOR CBL
EOGDOCH3	EOGDOCH3 API HEADER IN RPG
EOGDOCH3	EOGDOCH3 HEADER IN ILE/RPG

EOGDOCH3	EOGDOCH3 HEADER IN ILE/COBOL
EOGDOCH4	EOGDOCH4 API HEADER FOR CBL
EOGDOCH4	EOGDOCH4 API HEADER IN RPG
EOGDOCH4	EOGDOCH4 HEADER IN ILE/RPG
EOGDOCH4	EOGDOCH4 HEADER IN ILE/COBOL
EOGDOCH5	EOGDOCH5 API HEADER FOR CBL
EOGDOCH5	EOGDOCH5 API HEADER IN RPG
EOGDOCH5	EOGDOCH5 HEADER IN ILE/RPG
EOGDOCH5	EOGDOCH5 HEADER IN ILE/COBOL
EOGDOCH6	EOGDOCH6 API HEADER FOR CBL
EOGDOCH6	EOGDOCH6 API HEADER IN RPG
EOGDOCH6	EOGDOCH6 HEADER IN ILE/RPG
EOGDOCH6	EOGDOCH6 HEADER IN ILE/COBOL
EOGDOCH7	EOGDOCH7 API HEADER FOR CBL
EOGDOCH7	EOGDOCH7 API HEADER IN RPG
EOGDOCH7	EOGDOCH7 HEADER IN ILE/RPG
EOGDOCH7	EOGDOCH7 HEADER IN ILE/COBOL
EOGDOCH9	EOGDOCH9 API HEADER FOR CBL
EOGDOCH9	EOGDOCH9 API HEADER IN RPG
EOGDOCH9	EOGDOCH9 HEADER IN ILE/RPG
EOGDOCH9	EOGDOCH9 HEADER IN ILE/COBOL
EOK	EOK API HEADER FOR CBL
EOK	EOK API HEADER IN RPG
EOK	EOK HEADER IN ILE/RPG
EOK	EOK HEADER IN ILE/COBOL
EOKDRSH1	EOKDRSH1 API HEADER FOR CBL
EOKDRSP	EOKDRSP API HEADER FOR CBL
EOKDRSP	EOKDRSP API HEADER IN RPG
EOKDRSP	EOKDRSP HEADER IN ILE/RPG
EOKDRSP	EOKDRSP1 HEADER IN ILE/COBOL
EOKDRSP1	EOKDRSP1 API HEADER FOR CBL
EOKDRSP1	EOKDRSP1 API HEADER IN RPG
EOKDRSP1	EOKDRSP1 HEADER IN ILE/RPG
EOKDRSP1	EOKDRSP1 HEADER IN ILE/COBOL
EOKDRSP2	EOKDRSP2 API HEADER FOR CBL
EOKDRSP2	EOKDRSP2 API HEADER IN RPG
EOKDRSP2	EOKDRSP2 HEADER IN ILE/RPG
EOKDRSP2	EOKDRSP2 HEADER IN ILE/COBOL
EOKDRSP3	EOKDRSP3 API HEADER FOR CBL
EOKDRSP3	EOKDRSP3 API HEADER IN RPG
EOKDRSP3	EOKDRSP3 HEADER IN ILE/RPG
EOKDRSP3	EOKDRSP3 HEADER IN ILE/COBOL
EOKDRVF	EOKDRVF API HEADER FOR CBL
EOKDRVF	EOKDRVF API HEADER IN RPG
EOKDRVF	EOKDRVF HEADER IN ILE/RPG
EOKDRVF	EOKDRVF1 HEADER IN ILE/COBOL
EOKDRVF1	EOKDRVF1 API HEADER FOR CBL
EOKDRVF1	EOKDRVF1 API HEADER IN RPG
EOKDRVF1	EOKDRVF1 HEADER IN ILE/RPG
EOKDRVF1	EOKDRVF1 HEADER IN ILE/COBOL
EOKDRVF2	EOKDRVF2 API HEADER FOR CBL
EOKDRVF2	EOKDRVF2 API HEADER IN RPG
EOKDRVF2	EOKDRVF2 HEADER IN ILE/RPG
EOKDRVF2	EOKDRVF2 HEADER IN ILE/COBOL
EOKDRVF3	EOKDRVF3 API HEADER FOR CBL
EOKDRVF3	EOKDRVF3 API HEADER IN RPG
EOKDRVF3	EOKDRVF3 HEADER IN ILE/RPG
EOKDRVF3	EOKDRVF3 HEADER IN ILE/COBOL
EPDTRCJB	EPDTRCJB HEADER FOR CBL
EPDTRCJB	EPDTRCJB HEADER IN RPG
EPDTRCJB	EPDTRCJB HEADER IN ILE/RPG
EPDTRCJB	EPDTRCJB HEADER IN ILE/COBOL
EQQQRY	EQQQRY HEADER IN RPG
ERCJOB	ERCJOB HEADER IN RPG
ESPBLSEP	ESPBLSEP API HEADER FOR CBL
ESPBLSEP	ESPBLSEP API HEADER IN RPG
ESPBLSEP	ESPBLSEP HEADER IN ILE/RPG
ESPBLSEP	ESPBLSEP HEADER IN ILE/COBOL
ESYLAUTU	LIST AUTHORIZED USERS ARRAY
ETASTGEX	ETASTGEX EXIT PROGRAM
ETASTGEX	ETASTGEX EXIT PROGRAM
ETASTGEX	ETASTGEX EXIT PROGRAM
ETATAPMG	ETATAPMG API HEADER IN RPG
ETATAPMG	ETATAPMG
ETATAPMG	ETATAPMG HEADER IN ILE/COBOL
ETERTVPV	ETERTVPV HEADER IN RPG
ETNCMTRB	ETNCMTRB EXIT PROGRAM HEADER
ETNCMTRB	ETNCMTRB EXIT PROGRAM HEADER
ETNCMTRB	ETNCMTRB HEADER IN ILE/RPG
ETNCMTRB	ETNCMTRB HEADER IN ILE/COBOL
EUIAFEX	EUIAFEX API HEADER FOR CBL
EUIAFEX	EUIAFEX HEADER IN ILE/RPG
EUIAFEX	EUIAFEX HEADER IN ILE/COBOL
EUIAFEX	QSYATUS OT-EUIAFEX API HEADER IN RPG
EUIALCL	EUIALCL API HEADER FOR CBL
EUIALCL	EUIALCL HEADER IN ILE/RPG
EUIALCL	EUIALCL HEADER IN ILE/COBOL
EUIALCL	QSYATUS OT-EUIALCL API HEADER IN RPG
EUIALEX	EUIALEX API HEADER FOR CBL
EUIALEX	EUIALEX HEADER IN ILE/RPG
EUIALEX	EUIALEX HEADER IN ILE/COBOL
EUIALEX	QSYATUS OT-EUIALEX API HEADER IN RPG
EUICSEX	EUICSEX API HEADER FOR CBL
EUICSEX	EUICSEX HEADER IN ILE/RPG
EUICSEX	EUICSEX HEADER IN ILE/COBOL
EUICSEX	QSYATUS OT-EUICSEX API HEADER IN RPG
EUIFKCL	EUIFKCL API HEADER FOR CBL
EUIFKCL	EUIFKCL HEADER IN ILE/RPG
EUIFKCL	EUIFKCL HEADER IN ILE/COBOL
EUIFKCL	QSYATUS OT-EUIFKCL API HEADER IN RPG
EUIGPEX	EUIGPEX API HEADER FOR CBL
EUIGPEX	EUIGPEX HEADER IN ILE/RPG
EUIGPEX	EUIGPEX HEADER IN ILE/COBOL
EUIGPEX	QSYATUS OT-EUIGPEX API HEADER IN RPG
EUIILEX	EUIILEX API HEADER FOR CBL
EUIILEX	EUIILEX HEADER IN ILE/RPG
EUIILEX	EUIILEX HEADER IN ILE/COBOL
EUIILEX	QSYATUS OT-EUIILEX API HEADER IN RPG
EUIMICL	EUIMICL API HEADER FOR CBL
EUIMICL	EUIMICL HEADER IN ILE/RPG
EUIMICL	EUIMICL HEADER IN ILE/COBOL
EUIMICL	QSYATUS OT-EUIMICL API HEADER IN RPG
EUITAEX	EUITAEX API HEADER FOR CBL
EUITAEX	EUITAEX HEADER IN ILE/RPG
EUITAEX	EUITAEX HEADER IN ILE/COBOL
EUITAEX	QSYATUS OT-EUITAEX API HEADER IN RPG
EUSREG	ARRAYS FOR QUSREG RPGINC
EUSRMBRD	EUSRMBRD API HEADER IN RPG
EUSRSPLA	EUSRSPLA HEADER IN RPG
FINDPRF	FROM PC LEXAM MERGE CODE
FINHYPH	FROM PC LEXAM MERGE CODE
FSALRM	GDDM ENTRY MODULE
FSEXIT	GDDM ENTRY MODULE
FSFRCE	GDDM ENTRY MODULE
FSINIT	GDDM ENTRY MODULE
FSPCLR	GDDM ENTRY MODULE
FSPCRT	GDDM ENTRY MODULE
FSPDEL	GDDM ENTRY MODULE
FSPQRY	GDDM ENTRY MODULE
FSPSEL	GDDM ENTRY MODULE
FSQCPG	GDDM ENTRY MODULE
FSQDEV	GDDM ENTRY MODULE
FSQERR	GDDM ENTRY MODULE
FSQUPG	GDDM ENTRY MODULE
FSREST	GDDM ENTRY MODULE
FSRNIT	GDDM ENTRY MODULE
FSTERM	GDDM ENTRY MODULE
GETBLK2	FROM PC LEXAM MERGE CODE
GSARC	GDDM ENTRY MODULE
GSAREA	GDDM ENTRY MODULE
GSCA	GDDM ENTRY MODULE
GSCB	GDDM ENTRY MODULE
GSCD	GDDM ENTRY MODULE
GSCH	GDDM ENTRY MODULE
GSCHAP	GDDM ENTRY MODULE
GSCHAR	GDDM ENTRY MODULE
GSCLP	GDDM ENTRY MODULE
GSCLR	GDDM ENTRY MODULE
GSCM	GDDM ENTRY MODULE
GSCOL	GDDM ENTRY MODULE

GSCS	GDDM ENTRY MODULE
GSCT	GD - SELECT COLOR TABLE ENTRY MODULE
GSCTD	GD - DEFINE COLOR TABLE ENTRY MODULE
GSELPS	GDDM ENTRY MODULE
GSENDA	GDDM ENTRY MODULE
GSFLD	GDDM ENTRY MODULE
GSFLW	GDDM ENTRY MODULE
GSGET	GDDM ENTRY MODULE FOR GSGET
GSGETE	GDDM ENTRY MODULE FOR GSGETE
GSGETS	GDDM ENTRY MODULE FOR GSGETS
GSIMG	GDDM ENTRY MODULE
GSIMGS	GDDM ENTRY MODULE
GSLINE	GDDM ENTRY MODULE
GSLSS	GDDM ENTRY MODULE
GSLT	GDDM ENTRY MODULE
GSLW	GDDM ENTRY MODULE
GSMARK	GDDM ENTRY MODULE
GSMIX	GDDM ENTRY MODULE
GSMOVE	GDDM ENTRY MODULE
GSMRKS	GDDM ENTRY MODULE
GSMS	GDDM ENTRY MODULE
GSMSC	GDDM ENTRY MODULE
GSPAT	GDDM ENTRY MODULE
GSPFLT	GDDM ENTRY MODULE
GSPLNE	GDDM ENTRY MODULE
GSPS	GDDM ENTRY MODULE
GSPUT	GDDM ENTRY MODULE FOR GSGETS
GSQCA	GDDM ENTRY MODULE
GSQCB	GDDM ENTRY MODULE
GSQCD	GDDM ENTRY MODULE
GSQCEL	GDDM ENTRY MODULE
GSQCH	GDDM ENTRY MODULE
GSQCLP	GDDM ENTRY MODULE
GSQCM	GDDM ENTRY MODULE
GSQCOL	GDDM ENTRY MODULE
GSQCP	GDDM ENTRY MODULE
GSQCS	GDDM ENTRY MODULE
GSQCT	GD - QUERY CURRENT COLOR TABLE MODULE
GSQCTD	GD - QUERY COLOR TABLE ENTRY MODULE
GSQCUR	GDDM ENTRY MODULE
GSQFLW	GDDM ENTRY MODULE
GSQLT	GDDM ENTRY MODULE
GSQLW	GDDM ENTRY MODULE
GSQMAX	GDDM ENTRY MODULE
GSQMIX	GDDM ENTRY MODULE
GSQMS	GDDM ENTRY MODULE
GSQMSC	GDDM ENTRY MODULE
GSQNSS	GDDM ENTRY MODULE
GSQPAT	GDDM ENTRY MODULE
GSQPS	GDDM ENTRY MODULE
GSQSEN	GDDM ENTRY MODULE
GSQSS	GDDM ENTRY MODULE
GSQTB	GDDM ENTRY MODULE
GSQVIE	GDDM ENTRY MODULE
GSQWIN	GDDM ENTRY MODULE
GSRSS	GDDM ENTRY MODULE
GSSCLS	GDDM ENTRY MODULE
GSSDEL	GDDM ENTRY MODULE
GSSEG	GDDM ENTRY MODULE
GSSEN	GDDM ENTRY MODULE
GSVECM	GDDM ENTRY MODULE
GSVIEW	GDDM ENTRY MODULE
GSWIN	GDDM ENTRY MODULE
HYPHRIL	RULE INTERPRETER FOR HYPH/PHON RULES__
ICONV	ICONV API HEADER IN RPG
ICONV	ICONV HEADER IN ILE/RPG
ICONV	ICONV HEADER IN ILE/COBOL
IXXBLT	IXXBLT COMMON CODE SOURCE
IXXBLT1	IXXBLT1 COMMON CODE SOURCE
IXXBLT2	IXXBLT2 COMMON CODE SOURCE
IXXBLT3	IXXBLT3 COMMON CODE SOURCE
IXXBLT4	IXXBLT4 COMMON CODE SOURCE
IXXBLT5	IXXBLT5 COMMON CODE SOURCE
IXXCONST	CONSTANT DECLARES FOR KERNAL
IXXDBCS	IXXDBCS COMMON CODE SOURCE
IXXDBEBC	IXXDBEBC COMMON CODE SOURCE
IXXDICT	IXXDICT COMMON CODE SOURCE
IXXEXPR	IXXEXPR COMMON CODE SOURCE
IXXFLOAT	IXXFLOAT COMMON CODE SOURCE
IXXHPRNT	IXXHPRNT COMMON CODE SOURCE
IXXHUGE	IXXHUGE COMMON CODE SOURCE
IXXHUGEB	IXXHUGEB COMMON CODE SOURCE
IXXINSTR	IXXINSTR COMMON CODE SOURCE
IXXINTRP	IXXINTRP COMMON CODE SOURCE
IXXJMP	IXXJMP COMMON CODE SOURCE
IXXLIT	IXXLIT COMMON CODE SOURCE
IXXMISC	IXXMISC COMMON CODE SOURCE
IXXPARSE	IXXPARSE COMMON CODE SOURCE
IXXPCODE	IXXPCODE COMMON CODE SOURCE
IXXPRNTF	IXXPRNTF COMMON CODE SOURCE
IXXROUTN	IXXROUTN COMMON CODE SOURCE
IXXSIGNL	IXXSIGNL COMMON CODE SOURCE
IXXSTOP	IXXSTOP COMMON CODE SOURCE
IXXTCODE	IXXTCODE COMMON CODE SOURCE
IXXTOKEN	IXXTOKEN COMMON CODE SOURCE
IXXTOKNZ	IXXTOKNZ COMMON CODE SOURCE
IXXTRACE	IXXTRACE COMMON CODE SOURCE
LETTREM	FROM PC LEXAM MERGE CODE
LEXAM	FROM PC LEXAM MERGE CODE
LXCBSRCH	SYSTEM DICTIONARY ACTIVATE ROUTINE__
PARSER2	FROM PC LEXAM MERGE CODE
PARTS2	PARTOFSP
PITHC	A C VERSION OF PITH BY IVAN WALKER
PORT	SWITCHER
PRSRTSS	FROM PC LEXAM MERGE CODE
PRTAPI	COBOL PRINTER OPTION SUBROUTINE
PRTBAR	COBOL BARCODE OPTION SUBROUTINE
PRTGRC	COBOL GRAPHICS OPTION SUBROUTINE
PVCJHAT	C SOURCE FOR PMCJMAIN; USED BY ALL PVCJ*
PVCJMAIN	C2 POINTER VERIFICATION C TC DRIVER
QACCLOSE	ICF-APPC CLOSE
QACDEVSL	APPC DEVICE SELECTION FUNCTION
QACEFEVH	ICF-APPC EXPEDITED FLOW EVENT HANDLER
QACERP1	ICF-APPC AP ERROR HANDLER
QACERP2	ICF-APPC FM ERROR HANDLER
QACFMH7	ICF-APPC FMH7 HANDLER
QACGET	ICF-APPC GET
QACINASP	ICF-APPC INITIALIZE PUT ASSOCIATED SPACE
QACIOCMP	ICF-APPC REQIO COMPLETION HANDLER
QACNFEVH	ICF-APPC NORMAL FLOW EVENT HANDLER
QACOPEN	ICF-APPC OPEN FILE
QACPSR	ICF-APPC PROGRAM START REQUEST MAINLINE
QACPSRIO	ICF-APPC PSR REQIO COMPLETION HANDLER
QACPUT	ICF-APPC PUT
QACRSP	ICF-APPC SEND RESPONSE
QACRSUME	AC FM MRT/RUF RESUME
QACRVPIP	ICF-APPC RECEIVE PIP DATA
QACSOTP	APPC SIGN-ON TRANSACTION PROGRAM
QACSUSPD	AC FM MRT/RUF SUSPEND
QACTPP	ICF-APPC TERMINATION CLOSE
QACVRYOF	ICF-APPC VARY OFF
QACVRYON	ICF-APPC VARY ON
QAEAPPL	NEW CSP AEF STUB PROGRAM
QAECHKA	PRINT CSP/AE APPLICATION
QAECHPGM	CHANGE CSP/AE PROGRAM
QAECHPOP	PROMPT OVERRIDE PGM FOR CHGCSPXXX
QAECRTM	CPP FOR CREATE CSP/AE USER MESSAGE FILE
QAECRTO	CREATE CSP/AE OBJECTS
QAECVTPG	THIS IS A SHARED PART
QAEDBIO	DATA BASE I/O FUNCTIONS
QAEDSPO	DISPLAY CSP/AE OBJECTS
QAEDSPRT	THIS IS A SHARED PART
QAEDYNAT	DYNAMIC TRACE SELECTION ROUTINE
QAEFMSRV	FORMAT MANAGEMENT PROGRAM
QAEINIT	INIT AND TERMINATE AEF
QAEINST	THIS IS A SHARED PART
QAEROUTE	THIS IS A SHARED PART
QAESQLIO	SQL DATA BASE SERVICE
QAESQL97	BUILD SQL AREA
QAESTORG	AEF STORAGE MANAGER

QAESTRA	TRACE CSP/AE APPLICATIONS
QAESTUB	CSP AEF STUB PROGRAM
QAESTUB3	CSP AEF POST R2 STUB PROGRAM
QAETRACE	CSP / AE TRACE MODULE
QAEUDLT	HANDLES DELETE CONFIRMATION
QAEUMM	CSP/AE UTILITIES MAIN MENU
QAEUM124	CSP/AE UTILITY OPTIONS 1,2 AND F18
QAEUTST	HANDLES OPTS FROM WRKCSPOBJ
QAEUWWE	WORK WITH CSP/AE OBJECTS
QAGC10	MODULUS 10 CHECK
QAGC11	MODULUS 11 CHECK
QAGG10	MODULUS 10 GENERATION
QAGG11	MODULUS 11 GENERATION
QALAALRD	COMMAND PROCESSOR FOR THE ADDALRD CMD
QALALRAD	EXIT PROGRAM FOR WRKALR PANEL PROCESSING
QALALREH	ALERT EVENT HANDLER
QALCADPX	CHGALRD PROMPTER EXIT PROGRAM
QALCALRD	COMMAND PROCESSOR FOR THE CHGALRD CMD
QALCATPX	CHGALRTBL PROMPTER EXIT PROGRAM
QALCHGAL	WRKALR PROCESSING - CHANGE ALERT
QALCHGFP	CHANGE FOCAL POINT
QALDLTAC	DLTALR DELETE ALERT - CPP
QALDLTAL	DELETE ALERT PGM WRKALR PANEL PROCESSING
QALDSPDT	DSP ALERT DETAIL WRKALR PANEL PROCESSING
QALDSPDY	DISPLAY ALERTS DYNAMIC
QALDSPHX	DSP ALERT IN HEX WRKALR PANEL PROCESSING
QALDSPMN	DSP DETAIL MENU WRKALR DETAIL PROCESSING
QALDSPRA	DSP ALERT RECOMMENDED ACTIONS WRKALR PRC
QALDTCOR	MSU CORRELATORS WRKALR DETAIL PROCESSING
QALDTHRL	ALERT DETAIL - HIERARCHY/RESOURCE LIST
QALDTLAN	ALERT DETAIL - LAN LINK DATA
QALDTPRD	ALERT DETAIL - PRODUCT SET ID
QALDTSUP	ALERT DETAIL - SUPPORTING DATA
QALDTSYM	ALERT DETAIL - SYMPTOM STRING
QALDTTIM	ALERT DETAIL - DATE/TIME
QALDTTXT	ALERT DETAIL - TEXT MESSAGE
QALFRAAE	COMMAND PROCESSOR FOR THE ADDALRACNE CMD
QALFRAPX	PROMPTER EXIT FOR THE CHGALRACNE COMMAND
QALFRAVL	VALIDATION ROUTINE FOR ADDALRSLTE
QALFRCAE	COMMAND PROCESSOR FOR THE CHGALRACNE CMD
QALFRCVL	VALIDATION ROUTINE FOR CHGALRSLTE
QALFRVAE	ALERT FILTER ACTION ENTRIES VALIDITY CHK
QALFRVAP	PARAMETER VALIDATION FOR ADD/CHG ALRACNE
QALGADSC	GET ALERT DESCRIPTION
QALGDTLQ	GET ALERT DETAIL QUALFIERS
QALGENA	GENERATE ALERT API
QALGTDTA	GET ALERT DATA FROM ALRTDTA
QALINEXT	EXIT PROGRAM FOR AL FILE CHANGES
QALMGR	ALERT MANAGER MAIN MODULE
QALPRALR	WRKALR PRINT PROCESSING
QALQRYAF	QUERY ALERT FILE
QALRALRD	COMMAND PROCESSOR FOR THE RMVALRD CMD
QALRPTAN	REPORT ANALYSIS RESULTS - ?RPTANZ MACRO
QALRTVA	QALRTVA API HEADER FOR CBL
QALRTVA	RETRIEVE ALERT API
QALRTVA	QALRTVA API HEADER IN RPG
QALRTVA	QALRTVA HEADER IN ILE/RPG
QALRTVA	QALRTVA HEADER IN ILE/COBOL
QALSGNAL	SIGNAL ALERT
QALSNDA	SEND ALERT API
QALSNDAL	SEND ALERT
QALSUBSA	SUBSET ALERTS CLEANUP FUNCTION
QALSYSEH	SYSTEM ALERT EVENT HANDLER
QALWADDA	DSP REC ACTIONS WRKALRD PNL PROCESSING
QALWADDT	DSP ALERT DETAIL WRKALRD PNL PROCESSING
QALWADEX	EXIT PROGRAM WRKALRD PANEL PROCESSING
QALWADPR	PRT ALERT DETAIL WRKALRD PNL PROCESSING
QALWALRD	WORK WITH ALERT DESCRIPTIONS CPP
QALWKALR	WORK WITH ALERTS CPP
QALWKALV	WRKALR VIEW HANDLING PROGRAM
QALWKPRB	CONNECT AL TO SX WKRPRB
QAPALCON	QAPALCON--ALLOCATE CONVERSATION
QAPALSND	QAPALSND--ALLOW SEND
QAPCANCL	QAPCANCL--CANCEL OUTSTANDING I/O
QAPCRTRB	CREATE RBS
QAPDEQUE	QAPDEQUE--DEQUEUE REQUEST I/O
QAPDLCON	QAPDLCON--DEALLOCATE CONVERSATION
QAPDSMOD	DISABLE OTHER MODULES
QAPDTACH	QAPDTACH--DETACH PROGRAM
QAPERROR	QAPERROR--QUEUE DESTROYED EXCP HANDLER
QAPEVOKE	QAPEVOKE--EVOKE PROGRAM
QAPGTSES	QAPGTSES--GET SESSION
QAPIOCMP	QAPIOCMP--I/O COMPLETION EVENT HANDLER
QAPRCV	QAPRCV--RECEIVE DATA
QAPRSPPS	QAPRSPPS--SEND POSITIVE RESPONSE
QAPRSTRB	RESET REQUEST BLOCKS
QAPSNDER	QAPSNDER--SEND ERROR DATA
QAPSNDMG	SEND MESSAGES TO CALLER
QAPSNDSG	QAPSNDSG--SEND SIGNAL DATA
QAPSNDTA	APSNDTA--SEND APPLICATION DATA
QAPUIEH	QAPUIEH--UNSOLICIT DATA EVENT HANDLER
QAPWAIT	QAPWAIT--WAIT FOR INPUT
QAPXMT	QAPXMT--TRANSMIT
QARCATTR	COLOR DISPLAY ATTRIBUTES
QARCFIGL	ARCTIC LOCAL CONFIGURATION DATA
QARCFIGR	ARCTIC REMOTE CONFIGURATION DATA
QARCHAR	DISPLAYABLE CHARACTERS
QARCONVT	CONSOLE TO ARCTIC DATA CONVERSION
QARDEVSL	ERAP DEVICE SELECTION PROMPT
QARERAP	ERAP OPTIONS
QARERHST	ERROR HISTORY TABLES
QAREVINP	TERMINAL INPUT EVENT HANDLER
QARFUNKY	COMMAND FUNCTION KEYS
QARGMENU	GRAPHICS VERIFICATION MENU
QARGPRNT	GRAPHICS PRINTER VERIFICATION
QARGPSEL	STUB
QARGVDO	VIDEO DEVICE SCREENS
QARG7372	IBM 7372 PLOTTER VERIFICATION
QARIPDS	QARIPDS
QARKCHAR	IDEOGRAPHIC DISPLAYABLE CHARACTERS
QAROUTSL	ERAP OUTPUT SELECTION
QARPRNT	5256 PRINT COMMAND MODULE
QARPSEL	PRINTER SELECTION
QARSPINP	SPECIFIED INPUT FIELDS
QARWSCO	CONSOLE TO ARCTIC DATA CONVERSION
QAR52IGC	IDEOGRAPHIC PRINTER VERIFICATION
QAR5219	QAR5219 PRINTER VERIFICATION MODULE
QAR5225	5256 PRINT COMMAND MODULE
QAR5256	5256 PRINT COMMAND MODULE
QA1CLOSE	INTRA CLOSE/RELEASE MODULE
QA1DEVSL	INTRA DEVICE SELECTION MODULE
QA1DTAEV	INTRA DATA AVAILABLE EVENT HANDLER
QA1ERP	INTRA ERROR HANDLER MODULE
QA1EVKEV	INTRA EVOKE EVENT HANDLER
QA1GET	INTRA GET MODULE
QA1INASP	INTRA INITIALIZE PUT ASSOC SPACE MODULE
QA1OPEN	INTRA OPEN/ACQUIRE MODULE
QA1PSR	INTRA PROCEDURE START REQUEST MODULE
QA1PUT	INTRA PUT MODULE
QA1RST	INTRA RESTORE MODULE
QA1SUSPD	INTRA SUSPEND MODULE
QA1VRYEV	INTRA VARY OFF EVENT HANDLER
QA1VRYOF	INTRA VARY OFF MODULE
QA1VRYON	INTRA VARY ON MODULE
QBIASYNC	BSCEL ASYNC EVENT HANDLER
QBIBID	BSCEL ASYNC EVENT HANDLER
QBICLOSE	BSCEL ASYNC EVENT HANDLER
QBIERP	BSCEL ASYNC EVENT HANDLER
QBIFSTIO	BSCEL ASYNC EVENT HANDLER
QBIGET	BSCEL ASYNC EVENT HANDLER
QBIOPEN	BSCEL ASYNC EVENT HANDLER
QBIPSR	BSCEL ASYNC EVENT HANDLER
QBIPUT	BSCEL ASYNC EVENT HANDLER
QBIPUTCP	BSCEL ASYNC EVENT HANDLER
QBIRST	BSCEL ASYNC EVENT HANDLER
QBISUSPD	BSCEL ASYNC EVENT HANDLER
QBLSS1OP	OPTIMIZATION EXIT FOR OS/400
QBMGZINS	BOOKMANAGER INSTALL EXIT PROGRAM
QBMRCDAT	BOOKMANAGER CNVDATE SPI
QBMRDLTS	BOOKMANAGER DLTSHF CPP

QBMRRFSH	REFRESH A BOOKMANAGER BOOK
QBMRRSTS	CPP FOR RSTSHF COMMAND
QBMRSAVS	CPP FOR SAVSHF COMMAND
QBMRSRV	BOOKMANAGER SERVICES
QBMRVCP	BOOKMANAGER VALIDITY CHECK PROGRAM
QBNADDAS	ADD ASSOCIATED SPACE ENTRY API
QBNADDAT	ADD ATTRIBUTE OIR API
QBNADDBD	CPP: ADDBNDDIRE COMMAND PROGRAM
QBNADDBE	ADD BIND-TIME EXIT API
QBNADDVR	ADD VERSION INFORMATION API
QBNADDWH	ADD WHERE-USED OIR API
QBNASEXT	EXTEND ASSOCIATED SPACE ENTRY
QBNBXIXT	XPF BINDER CLEANUP AND IEXIT
QBNCHGMD	CHANGE MODULE CPP
QBNCHGSP	CPP: CHGSRVPGM COMMAND PROGRAM
QBNCPYOI	COPY OIR INFO FROM PROGRAMS
QBNCRTBD	CREATE BINDING DIRECTORY
QBNCRTBI	CRT BOUND OBJECT INTERFACE
QBNCRTBP	EVENTUAL API TO CREATE A PGM
QBNCRTPG	CRTPGM CPP
QBNCRTSP	CRTSRVPGM CPP
QBNDSPBD	DSPBNDDIR COMMAND PROGRAM
QBNDSPMD	DSPMOD COMMAND PROGRAM
QBNDSPPA	DSPPGM *MODULE PANEL ENTRY OPTION PGM
QBNDSPSP	CPP FOR DSPSRVPGM
QBNFFDC	XPF FFDC ROUTINE FOR MODULA-2
QBNGTOSV	GET OPERATING SYSTEM VERSION
QBNILBD	DSPBNDDIR INCOMPLETE LIST PROGRAM
QBNINSOB	INSERT OBJECT INTO LIBRARY
QBNINZPP	INITIALIZE PRE-PROCESSOR API
QBNLPGMI	API: LIST BOUND PROGRAM INFORMATION
QBNLPGMI	QBNLPGMI API HEADER FOR CBL
QBNLPGMI	QBNLPGMI API HEADER IN RPG
QBNLPGMI	QBNLPGMI HEADER IN ILE/RPG
QBNLPGMI	QBNLPGMI HEADER IN ILE/COBOL
QBNLSPGM	API: LIST SERVICE PROGRAM INFORMATION
QBNLSPGM	QBNLSPGM API HEADER FOR CBL
QBNLSPGM	QBNLSPGM API HEADER IN RPG
QBNLSPGM	QBNLSPGM HEADER IN ILE/RPG
QBNLSPGM	QBNLSPGM HEADER IN ILE/COBOL
QBNMDIXT	MODULE CREATION IEXIT ROUTINE
QBNPPCHK	CHECK FOR PRE-PROCESSOR DATA
QBNPPEDT	PROCESS PRE-PROCESSOR DATA
QBNREGPP	REGISTER PRE-PROCESSOR API
QBNRMVBD	CPP: RMVBNDDIRE COMMAND PROGRAM
QBNRSPGM	QBNRSPGM API HEADER FOR CBL
QBNRSPGM	RETRIEVE SERVICE PROGRAM INFORMATION API
QBNRSPGM	QBNRSPGM API HEADER IN RPG
QBNRSPGM	QBNRSPGM HEADER IN ILE/RPG
QBNRSPGM	QBNRSPGM HEADER IN ILE/COBOL
QBNRTVAS	RETRIEVE ASSOC SPACE SPI
QBNRTVCM	PROMPT OVERRIDE FOR CHGMOD CMD
QBNRTVOI	RETRIEVE OIR INFO FROM MODULES
QBNRTVSP	POP: CHGSRVPGM COMMAND
QBNUPDBP	SETUP SPI TO CALL QBNUPDAT /UPD<SRV>PGM/
QBNUPDPG	STUB MODULE FOR PTFING RPLMOD
QBNUPDSP	STUB MODULE FOR PTFING RPLMOD
QBNUXIXT	STUB MODULE FOR PTFING RPLMOD
QBNUXTRA	FIX PROGRAM INFO RETURNED TO QBNUPDBP
QBNVCABD	VALIDITY CHECKER FOR ADDBNDDIRE COMMAND
QBNVCCPG	VALIDITY CHECKER PGM FOR CRTPGM
QBNVCCSP	VALIDITY CHECKER PGM FOR CRTSRVPGM
QBNVCDMD	VALIDITY CHECKER PGM FOR DSPMOD
QBNVCDSP	DSPSRVPGM CMD VALIDITY CHECKER PROGRAM
QBNVCSPE	STRPGMEXP VALIDITY CHECKER
QBNVCUPG	STUB MODULE FOR PTFING RPLMOD
QBNVCUSP	STUB MODULE FOR PTFING RPLMOD
QBNWRKBE	CPP: WRKBNDDIRE COMMAND PROGRAM
QBNWRKEO	WRKBNDDIRE WORK PANEL ENTRY OPTION PGM
QBNXXIXT	QBNXMAIN IEXIT PROGRAM
QBSASYNC	BSC FM REQIO CMPLT EVENT HANDLER
QBSBID	BSC FM BID
QBSCLOSE	BSC FM CLOSE
QBSERP	BSC FM ERROR MESSAGE PROCESSOR
QBSFSTIO	BSC FM FIRST I/O FOR SWITCHED LINES
QBSGET	BSC FM GET
QBSINASP	BSC INITIALIZE LUD ASP
QBSOPEN	BSC FM OPEN
QBSPUT	BSC FM PUT
QBSPUTCP	BSC FM PUT COMPLETE
QCABIFV	QCABIFV
QCACALL	INTERPRETIVE CALL PROCESSING
QCACHECK	CHECK AND PROMPT FOR COMMAND
QCACHLBL	CHANGE LIBRARY LIST FOR COMMAND LEVEL
QCADRV	COMMAND ANALYZER DRIVER
QCADRV2	COMMAND ANALYZER DRIVER
QCAEXEC	HLL INTERFACE TO COMMAND EXECUTION
QCAFBIF	PROCESS BUILT-IN FUNCTION
QCAFCMD	PROCESS EMBEDDED COMMAND
QCAFEXPR	PROCESS EXPRESSION
QCAFLD	PARAMETER VALIDATION AND CONVERSION
QCAFSCAN	SCAN AND CLASSIFY CHARACTER TOKEN
QCAIEXIT	QCAIEXIT - INVOCATION EXIT FOR QCAEXEC
QCAIFLD	INTERPARAMETER CHECKING
QCAINCMD	UNSUPPORTED COMMAND CPP
QCANPARS	NATIVE SYNTAX PARSER ROUTINE
QCANPBLD	STUB MODULE FOR BUILDS
QCAPARSE	COMMAND STRING PARSER
QCAPCMD	API: NATIVE COMMAND ANALYZER FUNCTIONS
QCAPCMD	QCAPCMD HEADER IN ILE/COBOL
QCAPCMD	QCAPCMD API HEADER IN RPG
QCAPCMD	QCAPCMD HEADER IN ILE/RPG
QCAPCMD	QCAPCMD HEADER IN ILE/COBOL
QCAPOS	CREATE POSITIONAL LIST
QCAPRBLD	BUILD PARSER TABLE PROGRAM
QCARULE	LOCATE COMMAND DEFINITION OBJECT
QCASPCRT	QCASPCRT - CASQ MODULE
QCATRS	CREATE ARGLIST AND INVOKE VCP AND CPP
QCAXTND	EXTEND SPACE OBJECT
QCCOPDEV	HANDLE OPTIONS FOR REMOTE CONTROLLERS
QCCOPSYS	HANDLE OPTIONS FOR REMOTE SYSTEMS
QCCWRKCC	OA COMM CONFIG "WORK WITH" PANEL
QCDCCMD	CHGCMD COMMAND CPP
QCDCHDFT	CPP TO CHANGE KEYWORD DEFAULTS
QCDCHKCS	CHECK CDO CALL STATES
QCDCHKC2	CHECK THE C2 TOLERANCE BIT
QCDDCMD	DSPCMD COMMAND CPP
QCDRCMD	CRTCMD COMMAND CPP - DRIVER
QCDRCMDI	QCDRCMDI HEADER IN ILE/COBOL
QCDRCMDI	RETRIEVE COMMAND INFORMATION API
QCDRCMDI	QCDRCMDI API HEADER IN RPG
QCDRCMDI	QCDRCMDI HEADER IN ILE/RPG
QCDRCMDI	QCDRCMDI HEADER IN ILE/COBOL
QCDRNNM1	N TO N-1 OBJECT HANDLER FOR COMMANDS
QCDRPAS1	CRTCMD COMMAND - FIRST PASS
QCDRPAS2	CRTCMD COMMAND - THIRD PASS
QCDRPAS3	CRTCMD COMMAND - THIRD PASS
QCDRTVCV	CHGCMD COMMAND PROMPT OVERRIDE PROGRAM
QCDSETC2	SET CRTCDO2 BIT FOR THE BUILD GROUP
QCIACCIN	ACCEPT INPUT - S36 E
QCICNFIG	S/36 AUTO-CONFIGURATION OF DEVICES
QCICPYCC	PROMPTER EXIT PGM, FROMFILE ON SAVS36F
QCICPYCP	CPP FOR RSTS36F/SAVS36F CL COMMANDS
QCICPYEX	EXECUTION MAINLINE FOR RSTS36F/SAVS36F
QCICPYIO	I/O PROCESSING FOR RSTS36F/SAVS36F
QCICPYIX	INVOCATION EXIT PGM FOR RSTS36F/SAVS36F
QCICPYRA	RESTORE ALL EXECUTION FOR RSTS36F
QCICPYSA	SAVE ALL EXECUTION FOR SAVS36F CMD
QCICPYVL	PROMPTER VALIDATE PGM FOR SAVS36F
QCICRTF	CREATE SYSTEM/36-LIKE FILE
QCIDSPMA	DISPLAY PROGRAM ATTRIBUTES
QCIDSPPA	DISPLAY PROCEDURE ATTRIBUTES
QCIDSPSA	DISPLAY SOURCE ATTRIBUTES
QCIENDJB	M/36 END OF JOB
QCIGETUL	READ TAPE USER HEADER/TRAILER LABELS
QCIMBRCP	CPP FOR RSTS36LIBM/SAVS36LIBM COMMANDS
QCIMBREX	DRIVER MODULE FOR RSTS36LIBM/SAVS36LIBM
QCIMBRIO	I/O PROCESSING FOR RSTS36LIBM/SAVS36LIBM
QCIMBRIX	INVOC EXIT PGM FOR RSTS36LIBM/SAVS36LIBM
QCIMRT	S/36 EE ACQ/REL/IO/DATA HOOKS

QCIMRTX	EX - QCIMRT IEXIT ROUTINE
QCIMRT2	S/36 EE ACQ/REL/IO/DATA HOOKS (PART 2)
QCIOBCHK	CHECK S/36 OBJECT EXISTENCE
QCIOPEN	WS SEND PENDED INVITES
QCIOPEND	S/36 ENV OPEN DISPLAY FILE
QCIOPENF	S/36 ENV DATABASE FILE OPEN
QCIOPENP	S/36 ENV PRINTER OPEN
QCIOPNDX	EX - QCIOPEND IEXIT ROUTINE
QCIOPNFA	M/36 OPEN CHECK FILE AUTHORIZATIONS
QCIPGMAT	CHANGE OR EDIT S/36 PROGRAM ATTRIBUTES
QCIPMPOP	PROMPT OVERRIDE PGM FOR CHGS36PGMA
QCIPRCAT	CHG OR DSP PROCEDURE MBR ATTRIBUTES
QCIRTVPA	RETRIVE PROCEDURE ATTRIBUTES
QCIRTVSA	CHG/RETRIEVE SOURCE MBR ATTRIBUTES
QCISBSI	MAKE STARTED SBS S/36 CAPABLE
QCISBSIX	IEXIT ROUTINE FOR QCISBSI
QCISBST	REMOVE S/36 CAPABLE SBS FROM S/36 ROSTER
QCISPPOP	POP FOR CHGS36PRCA AND CHGS36SRCA
QCISRCAT	CHANGE OR EDIT S/36 SOURCE ATTRIBUTES
QCJAEPM	AS/400 EPM STUBS
QCJAGPTR	RETREIVE PDG NAME FROM IUP
QCJASCB	CREATE & DELETE AS400 CIPHER CONTROL BLK
QCJASFVR	VERIFY MODCA DATA
QCJASTUB	AS/400 C INTERFACE STUBS
QCJASYS	AS/400 C SYSTEM SPECIFIC OPTION CODE
QCJBABRT	CANCEL SPOOL FILE
QCJBCLOS	CLOSE THE SPOOL FILE
QCJBCOPT	CURRENT OPTIONS ENCAPSULATION FUNCTIONS
QCJBECHO	ECHOS WHAT SPLWRITE CREATES TO A FILE
QCJBOPEN	OPEN THE SPOOL FILE
QCJBRSRC	INTERNAL RESOURCE PROCESSING
QCJBSCCA	SCCA FUNCTIONS
QCJBWRIT	WRITE TO THE SPOOL FILE
QCJCACCS	SPOOL/LP-EDIT-SESSION ACCESS ROUTINES
QCJCAUTH	CHECK USER AUTHORITY TO OBJECTS/FILES
QCJCDATC	COMMON DATA CONVERSION ROUTINES
QCJCERRH	PRTMGR ERROR VERBS/FUNCTIONS
QCJCFILE	INTERNAL FILE I/O FUNCTIONS
QCJCGENP	GENERAL PURPOSE ROUTINES
QCJCHGPR	CHANGE PDG PROFILE
QCJCLPDQ	COMMON DATA CONVERSION ROUTINES
QCJCMEMM	MEMORY MANAGEMENT ROUTINES
QCJCPROC	PRTMGR INIT AND TERMINATE
QCJCRTPD	CREATE PRINT DESCRIPTOR GROUP
QCJCSTRC	TRACE FACILITY GROUP
QCJCTRCE	TRACE INITIALIZATION
QCJDEALL	DESTROY AN AS/400 WRITE-PROTECTED SPACE
QCJDSPPN	DISPLAY PDG OBJECT GROUP NAME
QCJDSPPR	DISPLAY PDG PROFILE
QCJLBILD	LP BUILD VERB
QCJLFILE	LP FILE VERBS
QCJLGRPL	GROUP LIST
QCJLIMEX	LPIMPORT/LPEXPORT VERBS
QCJLOPTS	PRD- LIST/QUERY/SET/DELETE -OPTIONS
QCJLREFS	PRDQUERYREFLIST AND PRDSETREFLIST VERBS
QCJLSESS	L P SESSION VERBS
QCJLUTIL	PRDLIST AND PRDDELETE VERBS
QCJPBLKM	LP BLOCK-TO-MEMORY FUNCTIONS
QCJPCLOS	CLOSE AN AS400 OBJECT
QCJPCMPG	PRD GROUP COMPRESSION FUNCTION
QCJPEMPT	CHECK AN AS400 OBJECT FOR EMPTY STATE
QCJPGDIR	PRD GROUP DIRECTORY FUNCTIONS
QCJPGIO	PRD GROUP I/O FUNCTIONS
QCJPGRPL	PRD GROUP LIST INTERNAL FUNCTIONS
QCJPMBLK	LP MEMORY-TO-BLOCK LP FUNCTIONS
QCJPMERG	COMMON DATA CONVERSION ROUTINES
QCJPOPEN	OPEN AN AS400 OBJECT OR FILE
QCJPOPTS	PRD LOW LEVEL OPT/REF/GRPLIST FUNCTIONS
QCJPRDBF	PRD READ-PRD-FILE-TO-BUFFER FUNCTIONS
QCJPRDIM	PRD IMPORT READ/TRANSLATE FUNCTIONS
QCJPREAD	READ AN AS400 OBJECT
QCJPREFS	COMMON DATA CONVERSION ROUTINES
QCJPROP	CJ COMPONENT PROMPT OVERRIDE PROGRAM
QCJPSEEK	SEEK IN AS400 OBJECT TO OFFSET
QCJPWRIT	WRITE TO AN AS400 OBJECT
QCJPWTBF	PRD WRITE-PRD SUPPORT FUNCTIONS
QCJPWTIM	PRD EXPORT WRITE/CONVERT FUNCTIONS
QCJQHATM	HANDLE ALLOCATION TABLE MANAGER
QCJQNCIR	NON-C INTERFACE ROUTER
QCJQROUT	EPM ROUTER
QCJRTVPR	RETRIEVE PDG PROFILE
QCJSABRT	PRTMGRABORT VERB
QCJSADOC	PRTMGRADOC VERB
QCJSCLOS	PRTMGRCLOSE VERB
QCJSEDOC	SPLQMENDDOC VERB + ASSOCIATED FUNCTIONS
QCJSETPN	SET PDG OBJECT GROUP NAMES
QCJSOPEN	OPEN VERB AND SUBFUNCTIONS
QCJSOPT	PRTMGRSETPRTOPT VERB AND FUNCTIONS
QCJSQOPT	PRTMGR OPTIONS VERBS
QCJSSDOC	PRTMGRSTARTDOC VERB
QCJSWFIL	PRTMGRADDFILE VERB
QCJSWRIT	PRTMGRWRITE VERB
QCJWPSRC	CREATE AN AS/400 WRITE-PROTECTED SPACE
QCL	INTERPRETIVE COMMAND LANG PROCESSOR
QCLBIFCN	COMPILER: BUILT-IN FUNCTIONS MODULE
QCLCHEXT	CPP: CHGPGM EXIT ROUTINE
QCLCHGPG	CPP: CHGPGM COMMAND PROGRAM
QCLCHKBI	VALIDATE BUILT-IN OPERANDS
QCLCHVAR	PROCESS CHGVAR COMMAND
QCLCLCMD	PROCESS CALL COMMAND
QCLCLCPR	RUNTIME: CALL COMMAND PROCESSING
QCLCLNUP	RUNTIME: CL PROGRAM CLEANUP ROUTINE
QCLCMDPR	PROCESS COMMANDS
QCLCMPXH	EXTERNAL EXCEPTION HANDLER
QCLCMXRF	CPP: PRTCMDUSG COMMAND PROGRAM
QCLCNVCN	RUNTIME: CONVERT CHAR TO NUMERIC
QCLCNVDT	CPP: CVTDAT COMMAND PROGRAM
QCLCNVNC	RUNTIME: CONVERT NUMERIC TO CHAR
QCLCPCMD	PROCESS CALLPRC COMMAND
QCLCRPGM	CREATE CL PROGRAM FROM IRP
QCLCVTML	CONVERT CL SOURCE MAINLINE
QCLDECST	DECLARE COMMAND & SYMBOL TABLE BUILD
QCLDESS	CPP: CVTCLSRC COMMAND PROGRAM
QCLDMCMD	DATA MANIPULATION COMMANDS
QCLDMDCL	DATA MANIPULATION DECLARE
QCLDMFIN	DATA MANIPULATION WRAPUP
QCLDMIO	RUNTIME: DATA MANIPULATION I/O HANDLER
QCLDMWC	RUNTIME: DATA MANIPULATION <WAIT,CNLRCV>
QCLDSPPG	CPP: DSPPGM COMMAND PROGRAM
QCLDSPVC	DSPPGM CMD VALIDITY CHECKER PROGRAM
QCLDSVST	PROCESS DCLDTAARA COMMAND
QCLENTR	ENTRY AND DRIVER PROGRAM
QCLERROR	SEND MESSAGES MODULE
QCLGNEVL	GENERATE EXPRESSIONS EVALUATOR
QCLGTCMD	PROCESS GOTO COMMAND
QCLICP1	INITIAL COMMAND PROCESSING
QCLICP2	EXECUTABLE COMMAND PROCESSING
QCLIFCMD	PROCESS IF COMMAND
QCLINIT	INITIALIZATION ROUTINE
QCLIRPC	GENERATE CODE <IRP> COMPLETION
QCLLSCMD	PROCESS ELSE COMMAND
QCLMAP	RUNTIME: RESOLUTION OF SPECIAL VALUES
QCLMNMSG	PROCESS MONMSG COMMAND PHASE 1
QCLMSFIN	PROCESS MONMSG COMMAND PHASE 2
QCLPRCMD	GENERATE PROLOG CODE
QCLRDTAQ	CLEAR DATA QUEUE
QCLREGCL	GENERATE IRP FOR COMMANDS
QCLRPGAS	RETRIEVE FROM ASSOCIATED SPACE API
QCLRPGMI	QCLRPGMI HEADER IN ILE/COBOL
QCLRPGMI	RETRIEVE PROGRAM INFO API
QCLRPGMI	QCLRPGMI API HEADER IN RPG
QCLRPGMI	QCLRPGMI HEADER IN ILE/RPG
QCLRPGMI	QCLRPGMI HEADER IN ILE/COBOL
QCLRSLV	RUNTIME: PROGRAM INITIALIZAION ROUTINE
QCLRSVRC	PROCESS RCVDTAARA COMMAND
QCLRSVRE	RUNTIME: PROCESS RCVDTAARA COMMAND
QCLRTNE	RUNTIME: PROCESS RETURN COMMAND
QCLRTVCU	CPP: RTVCLSRC COMMAND CLEAN-UP ROUTINE
QCLRTVCV	POP: CHGPGM COMMAND
QCLRTVDA	RETRIEVE DATA AREA COMMAND CPP

QCLRTVDR	CPP: RTVCLSRC COMMAND DRIVER PROGRAM
QCLRTVEI	CPP: RTVCLSRC COMMAND EXTRACT PHASE
QCLRTVFS	CPP: RTVCLSRC COMMAND FORMAT PHASE
QCLRTVJA	RETRIEVE JOB ATTRIBUTES COMMAND
QCLRTVVI	CPP: RTVCLSRC COMMAND VALIDATE PHASE
QCLSCAN	API: SCAN FOR OCCURRENCE OF A STRING
QCLSPGAS	STORE IN ASSOCIATED SPACE API
QCLSSVRC	PROCESS SNDDTAARA COMMAND
QCLSSVRE	RUNTIME: PROCESS SNDDTAARA COMMAND
QCLSTOUT	SYMBOL TABLE OUTPUT
QCLSTRNG	CPP: CVTCLSRC COMMAND STRING CREATION
QCLSWTCH	RUNTIME: %SWITCH PROCESSOR
QCLWUIS	WHERE USED INFORMATION SAVE
QCLXCCMD	PROCESS TRFCTL COMMAND
QCLXCEXC	RUNTIME: TRFCTL CMD EXCEPTION HANDLER
QCLXDUMP	RUNTIME: CL PROGRAM DUMP ROUTINE
QCLXERR	RUNTIME: EXECUTION TIME ERROR HANDLER
QCMCNINF	WJ - CPIC DISPLAY CONNECTION INFO
QCMD	INTERPRETIVE COMMAND LANG PROCESSOR
QCMDCHK	CHECK AND PROMPT FOR COMMAND
QCMDEXC	HLL INTERFACE TO COMMAND EXECUTION
QCMIEXIT	WJ - CPI-C INVOCATION EXIT
QCMLSTEN	WJ - CPI-C BUILD LIST ENTRIES
QCMRCLRS	CPI-C RECLAIM RESOURCE
QCMREXX	INTERFACE BETWEEN REXX AND CPI-C
QCMTEXIT	CPI-C JOB TERMINATION SUPPORT
QCMWJOPT	WJ - OPTION HANDLER
QCMWKEVT	WJ - COLLECTS DATA FOR DISPLAY COMM STS
QCMWKEXT	WJ - CPI-C TERMINATION EXIT
QCMWRKJB	WJ - DISPLAY COMM STS DRIVER
QCMOIEXT	TRCCPIC INVOKATION EXIT PROGRAM
QCMOTCPC	TRCCPIC CPP
QCMOTRC	LOG TRACE RECORDS TO CPI-C TRACE FILE
QCNPCSUP	PC SUPPORT SERVER FOR DDM
QCNSCMDI	QCNSCMDI -- SBMRMTCMD INVOCATION EXIT
QCNSEVTH	QCNSEVTH -- SOURCE RECLAIM EVENT HANDLER
QCNSEXIT	QCNSEXIT -- SOURCE INVOCATION EXIT
QCNSINIT	QCNSINIT -- CN SOURCE INITIALIZATION
QCNSMCTL	QCNSMCTL -- CN SOURCE MACRO CONTROLLER
QCNSRCV	QCNSRCV -- CN SOURCE RECEIVE DDM DATA
QCNSRDDM	QCNSRDDM -- SOURCE SIDE RCLDDMCNV CPP
QCNSSCPP	QCNSSCPP -- CN SOURCE SBMRMTCMD CPP
QCNSSEND	QCNSSEND -- CN SOURCE SEND DDM DATA
QCNSTERM	QCNSTERM -- CN SOURCE SIDE TERMINATION
QCNTEDDM	QCNTEDDM -- CN TARGET EVOKED PROGRAM
QCNTEXCR	QCNTEXCR --TARGET EXCSAT REQUEST HANDLER
QCNTEXIT	QCNTEXIT -- TARGET INVOCATION EXIT
QCNTINIT	QCNTINIT -- CN TARGET INITIALIZATION
QCNTMCTL	QCNTMCTL -- CN TARGET MACRO CONTROLLER
QCNTRCV	QCNTRCV -- CN TARGET RECEIVE DDM DATA
QCNTSBMR	QCNTSBMR--TARGET SBMRMTCMD REQUEST HNDLR
QCNTSEND	QCNTSEND -- CN TARGET SEND DDM DATA
QCNTSRVC	CN TARGET SIDE SERVICE MODULE
QCNTXBUF	QCNTXBUF -- TARGET EXTEND OUTPUT BUFFER
QCNXBCMD	QCNXBCMD--BUILD COMMAND DSS PARSING TBL
QCNXBLD	QCNXBLD -- CN BUILD PARSER ASSOC SPACE
QCNXBOBJ	QCNXBOBJ--BUILD OBJECT DSS PARSING TABLE
QCNXBREP	QCNXBREP--BUILD REPLY DSS PARSING TABLE
QCNXDUMP	QCNXDUMP -- DUMP CN CONTROL BLOCKS
QCNXPRSE	QCNXPRSE -- CN DDM DATASTREAM PARSER
QCNXSTGM	QCNXSTGM -- CN STORAGE MANAGER
QCOVLFLD	DISPLAY CO/WS FM FIELD VALIDATION FUN
QCPCLNUP	COPY FILE CLEANUP PROGRAM
QCPCREAT	COPY FILE CREATE FILE/ADD MEMBERS
QCPEXCON	COPY FILE I/O EXECUTION DRIVER
QCPEXOFL	COPY FILE COMMAND PROCESSING PROGRAM
QCPFLD	COPY FILE FIELD-LEVEL PROCESSOR
QCPFRMBR	COPY FROM/TO FILE MBR/LABEL PROCESSOR
QCPGENIO	COPY FILE GENERAL I/O MODULE
QCPGRANT	COPY FILE GRANT CREATED FILE AUTHORITY
QCPPRINT	COPY FILE PRINT LISTING MODULE
QCSERVER	CENTRAL SERVER PROGRAM
QCSVLICM	CENTRAL SERVER LICENSE MANAGEMENT MODULE
QCSVNLSS	CENTRAL SERVER NLS SUPPORT MODULE
QCSVSYSM	CENTRAL SERVER SYSTEM MANAGEMENT MODULE
QCUCHGSI	CHANGE SIDE INFORMATION CPIC
QCUCRTSI	CREATE SIDE INFORMATION
QCUCSIPO	SIDE INFORMATION PROMPT OVERRIDE PGM
QCUDSPSI	DISPLAY SIDE INFORMATION
QC2IO	ILE C I-FACE TO DB OR WS DATA MANAGEMENT
QDBADDCT	DB CPP ADDPFCST CMD - ADD PF CONSTRAINT
QDBADDPK	DB ADDPRIKY FUNCTION - ADD PRIMARY KEY
QDBALTFI	ALTER TABLE
QDBAPMGR	DB MANAGE THE DBAPII
QDBAPPAN	DISPLAY ACCESS PATHS
QDBARCFR	DB ADD OR REMOVE CONSTRAINT RECOVERY
QDBAUERR	SIGNAL I/O AUTHORITY ERROR
QDBAUTFR	DB AUTHORITY RECOVERY
QDBCDFIR	DB CREATE FILE RECOVERY
QDBCDMER	DB CREATE MEMBER RECOVERY
QDBCDREC	DB FAST CREATE DELETE RECOVERY
QDBCDRED	DB FAST CREATE DELETE RECOVERY
QDBCFPOP	CHANGE FILE ATTR PROMPT OPTIONS
QDBCHEOD	DATA BASE CHANGE END OF DATA
QDBCHGCT	DB CPP CHGPFCST CMD-CHANGE PF CONSTRAINT
QDBCHGFI	CHANGE DB FILE ATTRIBUTES
QDBCHGFR	CHANGE DB FILE ATTRIBUTE RECOVERY
QDBCHGME	CHANGE DB MEMBER ATTRIBUTES
QDBCHGPL	DATABASE CHANGE PRIMARY LANGUAGE RECOVER
QDBCHKFI	DB CHECK FILE
QDBCHKLA	CHECK LOGICAL FILE AUTHORITIES
QDBCHKLK	CHECK RECORD LOCKS FOR JOB
QDBCLOSC	CPP FOR DB CLOSE COMMAND
QDBCLOSE	DATA BASE CLOSE
QDBCLRPF	CLEAR PHYSICAL FILE MEMBER
QDBCMPOP	PROMPT OVERRIDE PROGRAM FO FILE MEMBER
QDBCMPTH	DB COMPRESSION THRESHHOLD EVENT HNDLER
QDBCNVFI	DB FILE CONVERSION
QDBCNVFT	CONVERT DATABASE FILE FORMATS
QDBCNVXR	CONVERT DATABASE X-REF FILES
QDBCPMGR	VERIFY CP CONSTRAINTS
QDBCPPAN	CHECK PENDING PANELS
QDBCRTFI	CREATE DATA BASE FILE
QDBCRTFS	CREATE DATA BASE SELECT/OMIT PGM
QDBCRTME	CREATE DATA BASE MEMBER
QDBDICTR	DATA BASE DICTIONARY RECOVERY
QDBDIRUP	DATA BASE UPDATE DIRECTORY
QDBDLTFI	DELETE DB FILE
QDBDLTFS	DELETE DB FILES
QDBDLTME	DELETE DB MEMBER
QDBDMGMB	DB FILE MEMBER DAMAGE NOTIFICATION PGM
QDBDMPFI	DUMP DB FILE
QDBDSPCP	DISPLAY CHECK PENDING CONSTRAINT
QDBDUPFI	CREATE DUPLICATE FILE
QDBEVCP	EVENT MONITOR
QDBEXDFI	DB EXTRACT FILE
QDBEXDME	DB EXTRACT MEMBER INFORMATION
QDBEXEXT	EXIT PROGRAM FOR QDBEXS
QDBEXTWU	DB EXTRACT WHERE USED INFO
QDBFEOD	DATA BASE FORCE END OF DATA
QDBFFCPY	DATA BASE FAST COPY
QDBFFEXT	INVOCATION EXIT PROGRAM FOR QDBFFCPY
QDBFIXIQ	FIX THE DBAPII OR SERVER QUEUE
QDBFIXIT	DB DATA BASE RECOVERY MODULES
QDBFSTCD	DB FAST CREATE/DELETE S/36
QDBGETDR	DATA BASE GET DIRECT
QDBGETKY	DATA BASE GET BY KEY
QDBGETM	DATA BASE MULTIPLE GET
QDBGETSQ	DATA BASE GET SEQUENTIAL
QDBGRTFI	DB GRANT FILE AUTHORITY
QDBGRXFR	GRANT REVOKE XFER COMMIT RECOVERY
QDBIEXIT	INVOCATION EXIT PROGRAM
QDBINZPF	INITIALIZE PHYSICAL FILE MEMBER
QDBISHRX	PROCESS IMPLICITLY SHARED ACCESS PATHS
QDBIVLIX	REBUILD DSI EVENT HANDLER
QDBJOBLK	DB DISPLAY JOB LOCKS
QDBJOBRL	DB DISPLAY JOB RECORD LOCKS
QDBLDBR	COBOL INCLUDE FOR API QDBLDBR
QDBLDBR	LIST DB RELATIONS
QDBLDBR	QDBLDBR HEADER IN ILE/RPG

QDBLDBR	QDBLDBR HEADER IN ILE/COBOL
QDBLDBR	RPG INCLUDE FOR API QDBLDBR
QDBLNGMV	MOVE CHARACTER STRINGS OF MORE THAN 32K
QDBLVLID	DATA ABSE GENERATE LEVEL IDENTIFIER
QDBMAINT	DB REBUILD INDEXES
QDBMEEH	DATABASE IPL THRESHOLD EVENT HANDLER
QDBMOVFI	DB MOVE FILE
QDBMVRFR	DB MOVE/RENAME FILE RECOVERY
QDBNQEH	ENQUEUE EVENT HANDLER
QDBOBJLK	DB OBJECT LOCK
QDBOPEN	DATA BASE OPEN
QDBOPENC	CPP FOR OPNDBF COMMAND
QDBORDFS	DB ORDER FILES
QDBPOS	SET DATA BASE FILE POSITION
QDBPOSIX	DATA BASE EXTRACT FOR POSIX
QDBPRCRL	PROCESS DB RECOVERY OBJECT LIST
QDBPUT	DATA BASE PUT
QDBPUTD	DB PUT DELETED RECORDS
QDBPUTDR	DATA BASE PUT DIRECT
QDBPUTM	DATA BASE PUT MULTIPLE
QDBPUTMX	DATA BASE MULTIPLE PUT
QDBRCDLK	DISPLAY RECORD LOCKS
QDBRCDYN	DATA BASE SYNCHRONOUS RECOVERY
QDBRCIPO	OVERRIDE ACCESS PATH PANEL PGM
QDBRCIPS	DATA BASE IPL RECOVERY PHASE 1
QDBRCLMA	DATA BASE RECLAIM PHASE 1
QDBRCLMB	DATA BASE RECLAIM PHASE 2
QDBRCLMC	DATA BASE RECLAIM PHASE 3
QDBRCLXR	RECLAIM DATABASE SYSTEM FILES CPP
QDBRGZPF	REORGANIZE PHYSICAL FILE MEMBER
QDBRMVCT	DB CPP RMVPFCST CMD-REMOVE PF CONSTRAINT
QDBRMVPK	DB RMVPRIKY FUNCTION: REMOVE PRIMARY KEY
QDBRNMFI	DB RENAME FILE
QDBRNMLA	DB RENAME LIBRARY PART A
QDBRNMLB	DB RENAME LIBRARY PART B
QDBRNMME	DB RENAME MEMBER
QDBRSPRE	RESTORE DB FILE PRE-LOAD MODULE
QDBRSPST	RESTORE DB FILE POST-IO MODULE
QDBRSRCV	QDBRSRCV - RESTORE RECOVERY
QDBRTVFD	COBOL INCLUDE FOR API QDBRTVFD
QDBRTVFD	DB RETRIEVE FILE DESCRIPTION
QDBRTVFD	QDBRTVFD HEADER IN ILE/RPG
QDBRTVFD	QDBRTVFD HEADER IN ILE/COBOL
QDBRTVFD	RPG INCLUDE FOR API QDBRTVFD
QDBRVKFI	DB REVOKE FILE AUTHORITY
QDBSECOF	PROGRAM RUNNING QSECOFR
QDBSEQMP	DATA BASE SEQUENTIAL MEMBER PROCESSING
QDBSERVE	DB JOB SERVER
QDBSGXID	DB - FIND IDDU FIELD NAME FOR QDBSIGEX
QDBSIGEX	DATA BASE SIGNAL EXCPTION
QDBSIZFI	DB SIZE OF FILE
QDBSOPEN	DATA BASE SHARED OPEN
QDBSVPRE	DATA BASE SAVE FILE PRE-DUMP
QDBSVPST	DATA BASE SAVE FILE POST-DUMP
QDBSVRCV	QDBSVRCV - SAVE RECOVERY
QDBTREXT	INVOCATION EXIT PROGRAM FOR DB I/O
QDBTRIGG	ADD/REMOVE PF TRIGGERS
QDBTRISV	DB TRIGGER/RI SERVICE ROUTINE
QDBUDR	DATA BASE UPDATE/DELETE/RELEASE
QDBVFYCP	VERIFY CP CONSTRAINTS
QDBVFYCT	DB - RI VERIFY CONSTRAINT
QDBWHOCO	WHO CALLED OPEN? (USER OR SYSTEM)
QDBWRKCT	WORK PHYSICAL FILE CONSTRAINTS
QDBXCLOS	CROSS REFERENCE CLOSE
QDBXFIXQ	EXTERNAL EXCEPTION HANDLER FOR X-REF
QDBXFRFI	DB TRANSFER FILE OWNERSHIP
QDBXREF	CROSS REFERENCE
QDBXREFM	CROSS REFERENCE MAIN PROGRAM
QDBXREFR	DATABASE CROSS REFERENCE CLEANUP/RECOVER
QDCACCLW	AUTO-CONFIGURE LOCAL CONTROLLER
QDCACCTP	AUTO-CONFIGURE TAPE CONTROLLER
QDCACDDK	AUTO-CONFIGURE DISKETTE
QDCACDLD	AUTO-CONFIGURE LOCAL DISPLAY
QDCACDLP	AUTO-CONFIGURE LOCAL PRINTER
QDCACDTP	AUTO-CONFIGURE TAPE
QDCACFEH	AUTO-CONFIGURE MAIN LINE
QDCADFLE	ADD CONFIGURATION LIST ENTRIES
QDCADNLE	ADD CNNL ENTRIES TO UIM LIST
QDCAENL	EXIT PGM TO ADD CNNL ENTRIES TO UIM LIST
QDCCHCAP	CHANGE APPC CONTROLLER
QDCCHCAS	CHANGE ASYNC CONTROLLER
QDCCHCBS	CHANGE BSC CONTROLLER
QDCCHCFN	CHANGE FINANCE CONTROLLER
QDCCHCHS	CHANGE HOST CONTROLLER
QDCCHCLW	CHANGE LOCAL WORKSTATION CONTROLLER
QDCCHCNT	CHANGE CONTROLLER DESC (NETWORK)
QDCCHCPS	CHANGE VIRTUAL CONTROLLER
QDCCHCRL	CHANGE RETAIL CONTROLLER
QDCCHCRW	CHANGE REMOTE WORKSTATION CONTROLLER
QDCCHCTP	CHANGE TAPE CONTROLLER
QDCCHDAP	CHANGE APPC DEVICE
QDCCHDAS	CHANGE ASYNC DEVICE
QDCCHDBS	CHANGE BSC DEVICE
QDCCHDDK	CHANGE DISKETTE DEVICE
QDCCHDEH	CHANGE DEVICE EVENT HANDLER
QDCCHDFN	CHANGE FINANCE DEVICE
QDCCHDHS	CHANGE HOST DEVICE
QDCCHDIN	CHANGE INTRA DEVICE
QDCCHDLD	CHANGE DISPLAY DEVICE
QDCCHDLP	CHANGE PRINTER DEVICE
QDCCHDNT	CHANGE NET DEVICE
QDCCHDPT	CHANGE SNA PASSTHROUGH DEVICE
QDCCHDRL	CHANGE RETAIL DEVICE
QDCCHDSN	CHANGE SNUF DEVICE
QDCCHDTP	CHANGE TAPE DEVICE
QDCCHFL	CHANGE CONFIGURATION LIST
QDCCHFLE	CHANGE CONFIGURATION LIST ENTRIES
QDCCHIFR	CHANGE NETWORK INTERFACE FOR FRAME RELAY
QDCCHIIS	CHANGE ISDN NETWORK INTERFACE CPP
QDCCHLAS	CHANGE ASYNC ND
QDCCHLBS	CHANGE BSC ND
QDCCHLD	CHANGE LINE DESCRIPTION (S/R)
QDCCHLDI	CHANGE LINE DESCRIPTION DDI
QDCCHLET	CREATE ETHERNET LINE DESCRIPTION
QDCCHLFR	CHANGE FRAME RELAY ND
QDCCHLFX	CHANGE FAX LINE DESCRIPTION
QDCCHLID	CHANGE IDLC NETWORK LINE DESCRIPTION
QDCCHLNT	CHANGE NET NETWORK LINE DESCRIPTION
QDCCHLSD	CHANGE SDLC LINE DESCRIPTION
QDCCHLTD	CHANGE TDLC LINE DESCRIPTION
QDCCHLTR	CHANGE TOKEN RING NETWORK LINE DESCR
QDCCHLWL	CHANGE WIRELESS LINE DESCRIPTION
QDCCHL25	CHANGE X25 NETWORK LINE DESCR
QDCCHMD	CHANGE MODE DESCRIPTION
QDCCHNL	CHANGE CONNECTION LIST CPP
QDCCHNTB	CHGNTBD COMMAND PROCESSING PROGRAM
QDCCHNWS	CHANGE NWSD COMMAND PROCESSING PROGRAM
QDCCHSD	CHANGE CLASS-OF-SERVICE DESCRIPTION
QDCCHSPT	CHANGE DEVICE DESCRIPTION SNA PT
QDCCKCAP	CHECK APPC CONTROLLER PARMS
QDCCKCAS	CHECK ASYNC CONTROLLER PARMS
QDCCKCBS	CHECK BSC CONTROLLER PARMS
QDCCKCFN	CHECK FINANCE CONTROLLER PARMS
QDCCKCHS	CHECK HOST CONTROLLER PARMS
QDCCKCLW	VALIDITY CHECKER FOR CRTCTLLWS
QDCCKCRL	CHECK RETAIL CONTROLLER PARMS
QDCCKCRW	CHECK REMOTE WORKSTATION CONTROLLER PARM
QDCCKCTP	VALIDITY CHECKER FOR CRTCTLTAP
QDCCKDAP	CREATE APPC DEVICE DESCRIPTION
QDCCKDLD	VALIDITY CHECK LOCAL DISPLAY DEVICE CPP
QDCCKDLP	CHECK LOCAL PRINTER CPP
QDCCKDPT	CHECK SNA PASSTHROUGH DEVICE
QDCCKFL	CHECK CONFIGURATION LIST
QDCCKFST	WORK CONFIG STATUS VALIDITY CHECKING PGM
QDCCKIFR	CREATE NETWORK INTERFACE FOR FRAME RELAY
QDCCKIIS	VALIDITY CHECK CRTNWIISDN PARAMETERS
QDCCKLAS	VALIDITY CHECKING MODULE FOR ASYNC
QDCCKLDI	CHECK LINE DESCRIPTION DDI
QDCCKLET	CHECK ETHERNET LINE DESCRIPTION
QDCCKLFR	FRAME RELAY CHECK LIND

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QDCCKLFX  VALIDITY CHECKER FOR CRTLINFAX
QDCCKLID  CHECK IDLC NETWORK LINE DESCR
QDCCKLSD  VALIDITY CHECKING MODULE FOR SDLC
QDCCKLTR  CHECK TRN LINE DESCRIPTION
QDCCKLWL  CHECK WIRELESS LINE DESCRIPTION
QDCCKL25  CHECK X25 NETWORK LINE DESCR
QDCCKNLE  ADDCNNLE & CHGCNNLE VALIDITY CHECKER
QDCCKNTB  CREATE NETBIOS VALIDITY CHECKER
QDCCKNWS  CHECK NETWORK SERVER PARAMETERS
QDCCKRDB  ATOMICITY CHECK FOR SRM
QDCCKSD   CHECK CLASS-OF-SERVICE DESC
QDCCKSTG  CHECK SERVER STORAGE PARAMETERS
QDCCNFO   CONVERT CONFIGURATION OBJECTS
QDCCPCD   COPY CONTROLLER DESCRIPTION
QDCCPCD1  V1R3 COPY CONTROLLER DESC
QDCCPDD   COPY DEVICE DESCRIPTION
QDCCPDD1  COPY DEVICE DESCRIPTION
QDCCPFL   COPY CONFIGURATION LIST
QDCCPLD   COPY LINE DESCRIPTION CPP
QDCCPLD1  V1R3 COPY LINE DESC
QDCCPMD   COPY MODE DESCRIPTION
QDCCPNL   COPY CNNL
QDCCPNLE  COPY CNNL ENTRY PROGRAM
QDCCPNTB  COPY NTBD COMMAND PROCESSING PROGRAM
QDCCPNWS  COPY NWSD COMMAND PROCESSING PGM
QDCCPSD   COPY CLASS-OF-SERVICE DESCRIPTION
QDCCRCAP  CREATE APPC CONTROLLER
QDCCRCAS  CREATE ASYNC CONTROLLER
QDCCRCBS  CREATE BSC CONTROLLER
QDCCRCEH  CREATE CONTROLLER DESC EVENT HANDLER
QDCCRCFN  CREATE FINANCE CONTROLLER
QDCCRCHS  CREATE HOST CONTROLLER
QDCCRCLW  CREATE LOCAL WORKSTATION CONTROLLER DESC
QDCCRCNT  CREATE CONTROLLER DESC (NETWORK)
QDCCRCPS  CREATE PASSTHRU CONTROLLER
QDCCRCRL  CREATE RETAIL CONTROLLER
QDCCRCRW  CREATE REMOTE WORKSTATION CONTROLLER
QDCCRCTP  CREATE TAPE CONTROLLER
QDCCRDAP  CREATE APPC DEVICE DESCRIPTION
QDCCRDAS  CREATE ASYNC DEVICE DESCRIPTION CPP
QDCCRDBS  CREATE BSC DEVICE DESCRIPTION
QDCCRDDA  CREATE ASCII DISPLAY DEVICE DESCRIPTION
QDCCRDDK  CREATE DISKETTE DEVICE DESCRIPTION
QDCCRDFN  CREATE FINANCE DEVICE DESCRIPTION
QDCCRDHS  CREATE SNA HOST DEVICE DESCRIPTION
QDCCRDIN  CREATE INTRA DEVICE DESCRIPTION CPP
QDCCRDLD  CREATE DISPLAY DEVICE
QDCCRDLP  CREATE PRINTER DEVICE DESCRIPTION
QDCCRDNT  CREATE NET DEVICE DESCRIPTION CPP
QDCCRDPA  CREATE ASCII PRINTER DEVICE DESCRIPTION
QDCCRDPT  CREATE SNA PASS THROUGH DEVICE
QDCCRDRL  CREATE RETAIL DEVICE DESCRIPTION
QDCCRDSN  CREATE SNUF DEVICE DESCRIPTION
QDCCRDTP  CREATE TAPE DEVICE DESCRIPTION
QDCCRFD   F6 CREATE FROM WRKXXXX
QDCCRFL   CREATE CONFIGURATION LIST
QDCCRIFR  CREATE NETWORK INTERFACE FOR FRAME RELAY
QDCCRIIS  CREATE ISDN NETWORK INTERFACE DESC
QDCCRLAS  CREATE ASYNC LINE DESCRIPTION
QDCCRLBS  CREATE BSC ND
QDCCRLDI  CREATE LINE DESCRIPTION DDI
QDCCRLET  CREATE ETHERNET NETWORK LINE DESCR
QDCCRLFR  CREATE FRAME RELAY ND
QDCCRLFX  CREATE FAX ND
QDCCRLID  CREATE IDLC ND
QDCCRLNT  CREATE NET ND
QDCCRLSD  CREATE SDLC ND
QDCCRLTD  CREATE TDLC ND
QDCCRLTR  CREATE TOKEN RING NETWORK LINE DESCR
QDCCRLWL  CREATE WIRELESS LINE DESCR
QDCCRL25  CREATE X25 NETWORK LINE DESCR
QDCCRMD   CREATE MODE
QDCCRNL   CREATE CONNECTION LIST CPP
QDCCRNTB  CREATE NETBIOS DESCRIPTION CPP
QDCCRNWS  CREATE NETWORK SERVER DESCRIPTION CPP
QDCCRSD   CREATE CLASS-OF-SERVICE DESCRIPTION
QDCCRSPT  CREATE DEVICE DESCRIPTION SNA PT
QDCDCREC  DB FAST CREATE DELETE RECOVERY
QDCDLCD   DELETE CONTROLLER DESCRIPTION
QDCDLCEH  DELETE CONTROLLER DESC EVENT HANDLER
QDCDLDD   DELETE DEVICE DESCRIPTION
QDCDLDEH  DELETE DD ERROR HANDLER
QDCDLFL   DELETE CONFIGURATION LIST
QDCDLID   DELETE NETWORK INTERFACE DESCRIPTION
QDCDLLD   DELETE LINE DESCRIPTION
QDCDLMD   DELETE MODE DESCRIPTION
QDCDLNL   DELETE CONNECTION LIST CPP
QDCDLNTB  DLTNTBD COMMAND PROCESSING PROGRAM
QDCDLNWS  DELETE NWSD COMMAND PROCESSING PROGRAM
QDCDLSD   DELETE CLASS OF SERVICE DESCR
QDCDSCD   DISPLAY CONTROLLER DESCRIPTION
QDCDSDD   DISPLAY DEVICE DESCRIPTION
QDCDSFL   DISPLAY CONFIGURATION LIST
QDCDSID   DISPLAY NETWORK INTERFACE DESCRIPTION
QDCDSLD   DISPLAY LINE DESCRIPTION
QDCDSMD   DISPLAY MODE DESCRIPTION
QDCDSNL   DISPLAY CNNL ENTRIES
QDCDSNLE  DISPLAY SINGLE CNNL ENTRY
QDCDSNTB  DISPLAY NTBD COMMAND PROCESSING PROGRAM
QDCDSNWS  DISPLAY NWSD COMMAND PROCESSING PGM_
QDCDSSD   DISPLAY CLASS-OF-SERVICE DESC
QDCILFL   INCOMPLETE UIM LIST PROCESSING
QDCLCFGD  API TO RETURN LIST OF CONFIG DESCRIPTION
QDCLCFGD  QDCLCFGD API HEADER FOR CBL
QDCLCFGD  QDCLCFGD API HEADER IN RPG
QDCLCFGD  QDCLCFGD HEADER IN ILE/RPG
QDCLCFGD  QDCLCFGD HEADER IN ILE/COBOL
QDCLKSTG  LINK/UNLINK NWS STORAGE CPP
QDCLSFO   LIST CONFIGURATION DESCRIPTIONS
QDCLSFO1  V1R3 LIST CONFIGURATION DESC
QDCPOID   PROMPT OVERRIDE FOR CRTNWIISDN
QDCPOLP   PROMPT OVERIDE PROGRAM FOR CRTDPTL
QDCPONL   CRTCNNL PROMPT OVERRIDE PROGRAM
QDCPONLE  ADDCNNLE PROMPT OVERRIDE PROGRAM
QDCPSNL   EXIT PGM FOR POSITION TO IN CNNLS
QDCPTCA   PRINT CONFIGURATION ADDRESSES
QDCPTDLD  PORT SHARING CREATE DISPLAY
QDCPVDLD  PERMISSIBLE VALUES FOR CRTDEVDSP COMMAND
QDCPVDPA  VALUES FOR MFRTYPMDL IN CHG/CRT DEVPRT
QDCPVIIS  VALUES FOR NETTYPE IN CRTNWIISDN
QDCPVNWS  CRT/CHGNWSD CHOICES PROGRAM
QDCRCFGS  API TO RETRIEVE CONFIGURATION STATUS
QDCRCFGS  QDCRCFGS API HEADER FOR CBL
QDCRCFGS  QDCRCFGS API HEADER IN RPG
QDCRCFGS  QDCRCFGS HEADER IN ILE/RPG
QDCRCFGS  QDCRCFGS HEADER IN ILE/COBOL
QDCRCTLD  API TO RETRIEVE CONTROLLER DESCRIPTION
QDCRCTLD  QDCRCTLD API HEADER FOR CBL
QDCRCTLD  QDCRCTLD API HEADER IN RPG
QDCRCTLD  QDCRCTLD HEADER IN ILE/RPG
QDCRCTLD  QDCRCTLD HEADER IN ILE/COBOL
QDCRDEVD  API TO RETRIEVE DEVICE DESCRIPTION INFO
QDCRDEVD  QDCRDEVD API HEADER FOR CBL
QDCRDEVD  QDCRDEVD API HEADER IN RPG
QDCRDEVD  QDCRDEVD HEADER IN ILE/RPG
QDCRDEVD  QDCRDEVD HEADER IN ILE/COBOL
QDCRLIND  API TO RETRIEVE LINE DESCRIPTION INFO
QDCRLIND  QDCRLIND API HEADER FOR CBL
QDCRLIND  QDCRLIND API HEADER IN RPG
QDCRLIND  QDCRLIND HEADER IN ILE/RPG
QDCRLIND  QDCRLIND HEADER IN ILE/COBOL
QDCRMNLE  REMOVE ENTRY FROM CNNL
QDCRNFD   RENAME OBJECTS
QDCRNFRC  RENAME RECOVERY
QDCRNNLE  RENAME ENTRY IN CNNL
QDCRNWSD  RETRIEVE NETWORK SERVER DESCRIPTION API
QDCRSCD   RESTORE CONTROLLER DESCRIPTION
QDCRSCIG  RESET IGC CONTROLLER RAM
QDCRSDD   CREATE INSTALL DEVICE DESCRIPTIONS
QDCRSFL   RESTORE CONFIG LIST
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QDCRSID	RESTORE NETWORK INTERFACE CPP
QDCRSLD	RESTORE LINE DESCRIPTION CPP
QDCRSMD	RESTORE MODD MODULE
QDCRSNL	RESTORE CONNECTION LIST MODULE
QDCRSSD	RESTORE COSD DESCRIPTION
QDCRTADS	RETRIEVE ADDNWSSTGL COMMAND SOURCE
QDCRTCD	RETRIEVE CONTROLLER DESCRIPTION
QDCRTDD	RETRIEVE DEVICE DESCRIPTION
QDCRTFL	RETRIEVE CONFIG LIST
QDCRTFR	CHANGE NETWORK INTERFACE FOR FRAME RELAY
QDCRTFSR	RETRIEVE CONFIGURATION SOURCE
QDCRTFST	RETRIEVE CONFIGURATION STATUS
QDCRTID	RETRIEVE NWI DESCRIPTION
QDCRTLD	RETRIEVE LINE DESCRIPTION
QDCRTMD	COPY MODE DESCRIPTION
QDCRTNTB	RETRIEVE NETBIOS DESCRIPTION
QDCRTNWS	RETRIEVE NWSD COMMAND PROCESSING PGM
QDCRTSD	RETRIEVE CLASS-OF-SERVICE DESC
QDCRVFLE	REMOVE CONFIGURATION LIST ENTRIES
QDCSTF	START CONFIGURATION
QDCSTUBA	STUB MODULE A FOR DC FIXES
QDCSTUBB	STUB MODULE B FOR DC FIXES
QDCSTUBC	STUB MODULE C FOR DC FIXES
QDCSTUBD	STUB MODULE C FOR DC FIXES
QDCSTUBE	STUB MODULE E FOR DC FIXES
QDCTRF	TERMINATE CONFIGURATION
QDCVCCAP	CHECK CHANGE APPC CONTROLLER
QDCVCCAS	CHECK CHANGE ASYNC CONTROLLER
QDCVCCBS	CHECK CHANGE BSC CONTROLLER
QDCVCCFN	CHECK CHANGE FINANCE CONTROLLER
QDCVCCHS	CHECK CHANGE HOST CONTROLLER
QDCVCCRL	CHECK CHANGE RETAIL CONTROLLER
QDCVCCRW	CHECK CHANGE REMOTE WS CONTROLLER
QDCVCDAP	VALIDITY CHECK CHANGE APPC DEVICE
QDCVCDLD	VALIDITY CHECK CHANGE DISPLAY DEVICE
QDCVCDLP	VALIDITY CHECK CHANGE PRINTER DEVICE
QDCVCIFR	CHNAGE NETWORK INTERFACE FOR FRAME RELAY
QDCVCIIS	VALIDITY CHECK CHGNWIISDN PARAMETERS
QDCVCLAS	VALIDITY CHECKING MODULE FOR CHANGE ASC
QDCVCLDI	CHECK DDI LINE DESCRIPTION FOR CHANGE
QDCVCLET	VALIDITY CHECK ETHERNET LINE DESC
QDCVCLFR	VALIDITY CHECK FRAME RELAY LINE DESCR
QDCVCLID	CHECK IDLC NETWORK LINE DESCR
QDCVCLTR	CHECK TRN LINE DESCRIPTION FOR CHANGE
QDCVCLWL	VALIDITY CHECKER FOR CHGLINWLS CMD
QDCVCL25	CHECK X25 NETWORK LINE DESCR
QDCVCNL	CREATE/CHANGE CNNL VALIDITY CHECKER
QDCVCNTB	CHANGE NTBD VALIDITY CHECKER
QDCVCNWS	CHANGE NWSD VALIDITY CHECKING PROGRAM
QDCVCSD	CHECK CLASS-OF-SERVICE DESC ON CHANGE
QDCVRC	VARY CNTR DESCRIPTION ON OR OFF
QDCVRD	VARY DEVICE DESCRIPTION ON OR OFF
QDCVRDEH	VARY DEVICE EVENT HANDLER
QDCVRL	VARY LINE DESCRIPTION ON OR OFF
QDCVRN	VARY NETWORK INTERFACE ON OR OFF
QDCVRNWS	VRYCFG *NWS COMMAND PROCESSING PGM
QDCVRX	VARY CONFIGURATION OBJECT ON OR OFF
QDCWENLF	WORK WITH CNNL ENTRY FUNCTIONS
QDCWKCFG	WORK WITH CONFIGURATIONS FUNCTIONS
QDCWKFO	WORK WITH CONFIGURATION DESCRIPTIONS
QDCWKFOF	WORK WITH CONFIGURATION OBJECT FUNCTIONS
QDCWKFSF	QDCWKFSF - PROCESS OPTS FOR QDCWKFST
QDCWKFST	QDCWKFST - CPP FOR WRKCFGSTS
QDCWKNLE	WORK WITH CONNECTION LIST ENTRIES
QDCWKNTB	WORK WITH NTBDS COMMAND PROCESSING PGM
QDCWKNWS	WORK WITH NWSDS COMMAND PROCESSING PGM
QDCXLATE	TRANSLATE FUNCTION
QDDADDDV	ADD MIXED DEVICE ENTRY CPP
QDDCCMF	CREATE DEVICE FILE CPP (CMN/BSC)
QDDCDF	CREATE DEVICE FILE CPP-DSP/PRT/CRD/DKT
QDDCDFDV	DEVICE FILE IMS PROCESSOR
QDDCDPF	CPP FOR CRTDSPF AND CRTPRTF
QDDCHOIC	PARAMETER VALUE CHOICES PROGRAM FOR TAPF
QDDCKDB	DATA BASE FILE SYNTAX CHECKER
QDDCKDV	DEVICE FILE SYNTAX CHECKER
QDDCLF	CREATE LOGICAL FILE CPP
QDDCLFM	CREATE LOGICAL FILE MEMBER CPP
QDDCPF	CREATE PHYSICAL FILE CPP
QDDCPFM	CREATE PHYSICAL FILE MEMBER CPP
QDDDMBR	DELETE MEMBER CPP
QDDDVEPX	PROMPTER EXIT FOR CHGICFDEVE COMMAND
QDDESPEH	EXTEND SPACE EXCEPTION HANDLER
QDDFLSPX	PROMPTER EXIT FOR CHANGE DEVICE FILES
QDDINIT	INITIALIZE KWD TABLES
QDDLFFLD	LOGICAL FILE FIELD PROCESSOR
QDDMCMF	MODIFY DEVICE FILE CPP (CMN/BSC)
QDDMDF	MODIFY DEVICE FILE CPP-DSP/PRT/CRD/DKT
QDDPFFLD	PHYSICAL FILE FIELD PROCESSOR
QDDPRINT	DDS COMMON PRINT MODULE
QDDREAD	DDS COMMON READ MODULE
QDDREFER	DDS REFERENCE PROCESSOR
QDDRMVDV	MIXED FILE REMOVE DEVICE CPP
QDDSEU	SEU INTERFACE MODULE TO DDS CHECKERS
QDDSIDP	DDS QDDCDF/QDDREAD EMULATOR
QDDSPRDB	DATA BASE FILE SYNTAX PROCESSOR
QDDSPRDV	DEVICE FILE SYNTAX PROCESSOR
QDDVTAPF	VALIDITY CHECKING PROGRAM FOR TAPF PARMS
QDFANZR	ANALYZE DEVICE FILE FOR RESTORE
QDFBLDDF	BUILDS DEVICE FILE CONTROL MODULE
QDFCDF	CREATE DEVICE FILE MAINLINE
QDFCDFPR	FIELD LEVEL DEVICE FILE PROCESSOR
QDFCHKFL	CHECK DEVICE FILE STATUS
QDFCNVPP	MANAGE FILE CREATION/CONVERSION LEVELS
QDFCRTWU	CREATE WU SECTION
QDFDDF	DELETE DEVICE FILE
QDFDFTPR	BUILD NON-FIELD LEVEL FM/WU
QDFDMGNT	SAVE FILE DAMAGE NOTIFCATION PGM
QDFDMPDF	DMPSYSOBJ OBJECT HANDLER
QDFDUPDF	DUPLICATE SAVE FILE
QDFEDF	DEVICE FILE EXTRACT
QDFGRANT	GRANT AUTHORITY TO DEVICE FILE
QDFINIT	INITIALIZE CATAGORY ID TABLES
QDFKWDPR	DF KEYWORD PROCESSOR
QDFLVLGN	GENERATE LEVEL CHECK IDS
QDFMDF	MODIFY DEVICE FILE
QDFMODDF	MODIFY DF SPACE
QDFMOVE	MOVE DEVICE FILE
QDFRCDPR	DF FM SOURCE PROCESSOR
QDFRENAM	RENAME DEVICE FILE
QDFREVOK	REVOKE AUTHORITY TO DEVICE FILE
QDFRSTDF	RESTORE DEVICE FILE
QDFRTVFD	RETRIEVE DISPLAY FILE API
QDFSAVDF	SAVE DEVICE FILES
QDFSAVPV	DF OBJECT HANDLER FOR SAVES TO PREV REL
QDFSIZE	EXTRACT SIZE OF DEVICE FILE
QDFVDLST	VALIDATE DEVICE LIST
QDFXOWNR	TRANSFER OWNER FOR DEVICE FILE
QDKCHECK	QDKCHECK
QDKCHEXT	QDKCHEXT
QDKCLOSE	DISKETTE CLOSE ROUTINE
QDKDSPY	DISKETTE DISPLAY CPR
QDKDUP	QDKDUP
QDKEOV	DISKETTE END OF VOLUME PROCESSING
QDKERROR	DISKETTE EXCEPTIONS AND MESSAGES
QDKFEOD	DISKETTE FORCE END OF DATA ROUTINE
QDKGET	DISKETTE GET ROUTINE
QDKGETI	QDKGETI
QDKINZFY	INITIALIZE ON THE FLY
QDKLUDIN	DISKTTE - LUD ASSOCIATED SPACE INIT
QDKOPEN	QDKOPEN
QDKPUT	DISKETTE PUT ROUTINE
QDKPUTI	QDKPUTI
QDKUTIL	DISTETTE UTILITIES CPP
QDMACCIN	ACCEPT INPUT - NATIVE
QDMACCIX	ACCEPT INPUT INVOCATION EXIT MODULE
QDMACKEH	ACCEPT INPUT ACKNOWLEDGMENT EVENT HANDLR
QDMACQDP	ACQUIRE DISPLAY DEVICE - SIGN ON
QDMACQDV	ACQUIRE DEVICE - DISPLAY AND ICF
QDMAINIT	INITIALIZE QDMACQDV ASSOCIATED SPACE
QDMBKOUT	COMMON BACKOUT - UNMONITORED ESCAPE MSGS

QDMCDMQE	CLOSE DMCQ ENTRY - DB ONLY, UFCB DESTRYD
QDMCHOIC	DM OVERRIDE COMMAND CHOICES PROGRAM
QDMCLOSE	COMMON FILE CLOSE
QDMCOPEN	COMMON FILE OPEN
QDMCRODP	CREATE PROTOTYPE OPEN DATA PATH
QDMDELOV	DELETE OVERRIDE CPP
QDMDLTDV	DELETE PROGRAM DEVICE OVERRIDES CPP
QDMDMGNT	DATA MGT FILE DAMAGE NOTIFICATION PGM
QDMDSPIX	INVOCATION EXIT PGM - QDMDSPOV, QDMDSPOF
QDMDSPOF	DISPLAY OPEN FILES
QDMDSPOV	DISPLAY FILE OVERRIDES CPP
QDMDTAEV	ESTABLISH DATA AVAILABLE EVENT
QDMEHDES	HANDLE OBJ DSTRYD/PTR NOT SET - QDMCOPEN
QDMERRHP	COMMON DM ERROR HANDLING
QDMFCLSE	FILETYPE CLOSE MODULE
QDMGETDV	GET PROGRAM DEVICE OVERRIDES
QDMGETOV	GET FILE OVERRIDES - QDMCOPEN
QDMGETST	GET STATUS - DISPLAY AND ICF DEVICES
QDMIFERR	SIGNAL INTERFACE ERROR EXCEPTIONS
QDMLCKIX	INVOCATION EXIT PROGRAM FOR QDMLOCK
QDMLOCK	DM LOCK PROGRAM - CALLED BY LOCK MACRO
QDMMINIT	INITIALIZE QDMCOPEN ASSOCIATED SPACE
QDMNODEV	DM SIGNAL PROGRAM DEVICE NOT FOUND
QDMOVERD	OVERRIDE FILE COMMANDS CPP - ALL BUT PRT
QDMOVRDV	OVERRIDE PROGRAM DEVICE ENTRY CPP
QDMOVRPR	OVERRIDE PRINT FILE COMMAND CPP
QDMPASS	DM PASS DEVICE
QDMRCLSE	RECLAIM CLOSE
QDMRLSDV	RELEASE DEVICE - DISPLAY AND ICF
QDMROUTE	DM ROUTE FILE OPERATIONS
QDMRTVFO	COBOL INCLUDE FOR API QDMRTVFO
QDMRTVFO	EXTRACT FILE OVERRIDE INFORMATION API
QDMRTVFO	RPG INCLUDE FOR API QDMRTVFO
QDMRTVFO	RPGLE INCLUDE FOR API QDMRTVFO
QDMSIGNL	DM SEND EXCAPE MESSAGES FOR QDMCOPEN
QDMTCLSE	TERMINATION CLOSE
QDMUNLCK	DM UNLOCK - CALLED BY UNLOCK MACRO
QDMVOVRD	OVRTAPF COMMAND - VALIDITY CHECKER PGM
QDRDSPAL	DISKETTE REPAIR UTILITY DISPLAY/ALTER
QDRMAIN	DISKETTE REPAIR UTILITY MAINLINE
QDRPRINT	DISKETTE REPAIR UTILITY PRINT
QDRREAD	DISKETTE REPAIR UTILITY READ
QDRWRITE	DISKETTE REPAIR UTILITY WRITE
QDUMMY	MODULE TO VALIDATE CCSIDS
QDVCLRPL	CLEAR POOL CPP
QDVSOACC	SET OBJECT ACCESS CPP
QDXDDOER	DSNX DOER EXECUTION MAINLINE
QDXDDRA	DSNX DOER DELETE/REPLACE/ADD
QDXDEVNT	DSNX DOER INITIALIZATION
QDXDINIT	DSNX DOER INITIALIZATION
QDXDJOB	DSNX DOER BATCH JOB SUBMISSION CONTROL
QDXDMSG	DSNX DOER SEND MESSAGE MODULE
QDXDRTV	DSNX DOER RETRIEVE OBJECT
QDXHINIT	DSNX HOST INTERFACE INITIALIZATION
QDXHRCV	DX HOST INTERFACE RECEIVE DSX REQUEST
QDXHRTR	DSNX HOST INTERFACE ROUTER MODULE
QDXHSEND	DX HOST INTERFACE SEND DSX RESPONSE
QDXHTERM	DSNX HOST INTERFACE TERMINATION MODULE
QDXORCV	DSNX OBJECT DISTRIBUTION RECEIVE
QDXORCVX	DSNX OBJECT DISTRIBUTION RECEIVE IEXIT
QDXPDSPQ	DSNX PITCHER USER INTERFACE -WRKDPCQ
QDXPRCV	DSNX PITCHER TO PC RECEIVER
QDXPSEND	DSNX PITCHER TO PC SENDER FUNCTION
QDXPSNIX	PITCHER TO PC SENDER INVOCATION EXIT PGM
QDXRLSPH	DSNX CPP FOR RLSNDMPHS COMMAND
QDXXSTGM	DSNX DX STORAGE MANAGER
QDOENDTS	END DATA STREAM TRANSLATE SESSION
QDOSTRTS	START DATA STREAM TRANSLATE SESSION
QDOTRNDS	TRANSLATE DATA STREAM
QEAADMIN	CALL ADMIN MAIN DRIVER QEADRVR
QEACEXIT	TRNEDU COMMAND EXIT PROGRAM
QEADELET	COMMON DELETE ROUTINE
QEADRVR	ADMIN MAIN DRIVER
QEADRVR1	BREAK OUT STANDALONE ROUTINES
QEADSPD	SDE HANDLE DISPLAY DESCRIPTION
QEAIEXIT	ADMIN I_EXIT FOR QEADRVR
QEAMERGE	MERGE AUDIENCE PATH INFORMATION
QEAPRNT	SDE HANDLE PRINT LIST
QEARBKM	REMOVE STUDENT BOOKMARKS
QEARMVBM	REMOVE BOOKMARK - CUSTOMER INTERFACE
QEARST2	QSDE MRM/MRI PDA EXIT PGM
QEASWPST	PROGRAM TO DISALLOW ENDREQ
QEATPBTM	COMMON TOP/BOTTOM ROUTINE
QEATRAN	SDE HANDLE CONVERSION
QEAWAUD	SDE HANDLE WORKING WITH AUDIENCE PATHS
QEAWCRS	SDE HANDLE WORKING WITH COURSES
QEAWENR	SDE HANDLE STUDENT ENROLLMENT
QEAWMOD	SDE HANDLE MODULE PROCEDURES
QEAWSTU	ADMIN STUDENT VIEW MODULES
QECCRECD	CREATE EDIT CODE DESCRIPTION
QECCVTEC	CONVERT EDIT MASK API FOR EDIT CODE
QECCVTEW	CRTEAT EDIT MASK FROM EDIT WORD
QECDSECD	DISPLAY EDIT DESCRIPTION
QECEDITS	EXPAND STANDARD EDIT CODE
QECEDITU	USER EDIT CODE EXPANSION
QECEDITW	EDIT WORD EXPANSION
QECEDT	EDIT MI API
QEDADDR	ADD A RECORD TO THE REMOTE SYSTEM DATA
QEDCHGR	CHANGE A REMOTE SYSTEM DATA RECORD
QEDCLNUP	CLOSE AND CLEAN UP ANY OPEN FILES
QEDCRTR	CREATE CONTACT DATABASE RECORD
QEDDLTR	DELETE A RECORD FROM THE CONTACT DATABAS
QEDGETR	QUERY THE CONTACT DATABASE FILE
QEDIEXT	WRK/SLC SERVICE PROVIDER INVOCATION EXIT
QEDLANGL	CDB MODULE TO CREATE ALPHA LANGUAGE LIST
QEDLIST	CDB SERVICES LIST SCREEN MODULE
QEDLSACT	LIST ACTION HANDLER
QEDLSTQA	CDB Q&A LIST SCREEN
QEDMODES	CDB SSF MODIFY MODULE
QEDMODIA	CDB TIA MODIFY MODULE
QEDMODMA	CDB UOP MODIFY MODULE
QEDMODQA	CDB Q&A MODIFY MODULE
QEDMODTI	CDB TIE MODIFY MODULE
QEDOPEN	OPEN THE CONTACT DATABASE FILE
QEDRMVR	DELETE A RECORD FROM THE REMOTE SYS DATA
QEDRTVL	ADD LIST ENTRIES TO ED UIM LIST
QEDRTVR	RETREIVE A RECORD FROM REMOTE SYS DATA
QEDSCLL	SELECT COVER LETTER LANGUAGE
QEDSCTL	SCREEN CONTROLLER CPP
QEDSSP	SELECT SERVICE PROVIDER MODULE
QEDUPDR	UPDATE THE CONTACT DATABASE FILE
QEGAECON	CONVERSION TOOL FOR SDE
QEGANAL	CONVERSION TOOL FOR SDE
QEGCTRL	OPTION WINDOW AND PART OF SEDF TAGS
QEGDISP	CREATE 5250 DATA STREAM FOR SEDF
QEGENC	UNPACK RECORDS
QEGFILE	FILE HANDLING
QEGINPUT	INPUT HANDLING
QEGLIST	HANDLE CUA LIST GLOSSARY AND INFO WINDOW
QEGMAIN	MAIN PROGRAM OF SEDF
QEGNUM	COMPUTE NUMERIC EXPRESSION
QEGQUES	QUESTION HANDLER
QEGRSTRT	READ/WRITE RESTART FILE
QEGSTRUC	POP/PUSH DATA FOR CONTROL STRUCTURES
QEGUTIL	UTILLITIES FOR SEDF AND DBCS SUPPORT
QEGVAR	VARIABLE HANDLER FOR SEDF
QEGWIND	HANDLE WINDOW TAGS
QEMATTN	QEMATTN - 3270 DISPLAY EMULATION
QEMBSCEH	QEMBSCEH - 3270 DISPLAY EMULATION
QEMCFGEX	I-EXIT FOR CONFIGURATION UPDATES
QEMCFGIN	PTF FILE PROGRAM FOR CONFIGURATION
QEMCFGOV	RETRIEVE CONFIGURATION DESCRIPTION
QEMCFGSN	ADD/CHANGE/DELETE CONFIGURATION
QEMIEXIT	QEMIEXIT - 3270 DISPLAY EMULATION
QEMIOERR	QEMIOERR - 3270 EMULATION
QEMPCNTL	QEMPCNTL - 3270 PRINTER EMULATION
QEMPEBSC	QEMPEBSC - BSC 3270 PRINTER EMULATION
QEMPESCS	QEMPESCS - SNA 3270 PRINTER EMULATION
QEMPESEH	QENPESEH - SNA 3270 PRINTER EMULATION
QEMPESNA	QEMPESNA - SNA 3270 PRINTER EMULATION

QEMPESTR	QEMPESTR - 3270 PRINTER EMULATION
QEMPEXIT	QEMPEXIT - 3270 PRINTER EMULATION
QEMPRINT	QEMPRINT - 3270 PRINTER EMULATION
QEMRST	QEMRST - 3270 DISPLAY EMULATION
QEMSNAEH	QEMSNAEH - 3270 DISPLAY EMULATION
QEMSPEND	QEMSPEND - 3270 DISPLAY EMULATION
QEMSWSEH	QEMSWSEH - SNA 3270 DISPLAY EMULATION
QEMSYSRQ	QEMSYSRQ - SNA 3270 DISPLAY EMULATION
QEMTSTRQ	QEMTSTRQ - BSC 3270 DISPLAY EMULATION
QEMWFCEH	QEMWFCEH - 3270 DISPLAY EMULATION
QEMWSEH	QEMWSEH - BSC 3270 DISPLAY EMULATION
QEM3270	QEM3270 - 3270 DISPLAY EMULATION
QESANOTE	PROCESS AUTO NOTIFY
QESASRQS	AS/400 SERVICE REQUEST PROCESSING
QESASTST	COMMAND PROCESSING MODULE
QESAUTNF	SIGNAL AUTO NOTIFICATION
QESBLDSA	CREATE/CONVERT SYSTEM VALUE OBJECT
QESCARP	CALL RECORD PROCESSOR
QESCHGSA	CHANGE SERVICE ATTRIBUTES
QESCIEXT	COMM IEXIT PROGRAM FOR QESCARP
QESCSAPO	PROMPT OVERRIDE FOR CHG SRV ATTRIBUTES
QESCSRVA	GET/CREATE SERVICE ATTRIBUTE OBJECT
QESDSPSA	DISPLAY SERVICE ATTRIBUTES CPP
QESFXRCV	RECEIVES PTFS FROM ODF
QESFXSTR	STARTS A BATCH PROCESS IN QSNADS SUBSYS
QESIEXT	SSF IEXIT PROGRAM
QESMGR	ECS COMMUNICATIONS TARGET
QESPRCAU	PROCESS AUTO NOTIFY
QESPSR	PREPARE SERVICE REQUEST
QESPTF	CALL RECORD PROCESSOR
QESQRYPS	AS/400 SERVICE REQUEST PROCESSING
QESQRYSU	COMMAND PROCESSING MODULE
QESRCVAN	RECEIVE PROBLEM ANSWER
QESROUT	SSF ROUTER MODULE
QESRPT	PREPARE SERVICE REQUEST AND REPORT PROB
QESRSPTF	REQUEST PTF PROGRAM
QESRSRVA	API TO RETREIVE SERVICE ATTRIBUTES
QESRSRVA	QESRSRVA API HEADER FOR CBL
QESRSRVA	QESRSRVA API HEADER IN RPG
QESRSRVA	QESRSRVA HEADER IN ILE/RPG
QESRSRVA	QESRSRVA HEADER IN ILE/COBOL
QESSAVMA	UPDATE SYSTEM VALUE OBJECT
QESSETUP	SET UP COMMON DATA AREA
QESSRVRQ	COMMAND PROCESSING MODULE
QESUPD	SSF UPDATE OVERRIDE DATA MODULE
QEXCAFI	CACHE FILE INDEX MODULE
QEXCCCG	S/36 EE CHANGE COMMANDS
QEXCCCM	M/36 CANCEL COMMANDS
QEXCCHR	S/36 EE HOLD/RELEASE COMMANDS
QEXCCJQ	S/36 JOBQ COMMAND/OCL PROCESSOR
QEXCCMG	MESSAGE CMD PROCESSING
QEXCCMM	SCAFFOLD CODE FOR MESSAGE QUEUE MODE SET
QEXCCMU	S/36 EE MENU COMMAND OR OCL STATEMENT
QEXCCMX	DISPLAY MESSAGES
QEXCCOF	S/36 EE MENU COMMAND OR OCL STATEMENT
QEXCCRT	M/36 START AND STOP COMMANDS
QEXCCTP	S/36 E RESTART PRT (T P) COMMAND
QEXCCVA	S/36 EE VARY COMMAND
QEXCHGCF	CHANGE S/36E ATTRIBUTES
QEXCHJCB	S/36 CHANGE JCB PROGRAM
QEXCHPOP	CHGS36A PROMPT OVERRIDE PROGRAM
QEXCIAD	ALLOCATE/DEALLOC OCL STATEMENT
QEXCIAF	S/36 E ALLOCATE FSB
QEXCIEP	S/36 ENV OCL EVOKE-PROMPT PROCESSOR
QEXCIER	INITIATOR ERROR
QEXCIES	END OF JOB STEP PROCESSOR
QEXCIFL	M/36 FILE PROCESSOR
QEXCIHP	HEAP ALLOCATE AND DEALLOCATE FUNCTIONS
QEXCILD	LOAD-INCLUDE-ATTR-LOCAL-SWITCH OCL
QEXCIML	S/36 ENVIRONMENT INITIATOR MAINLINE
QEXCIM0	LIBRARY-MEMBER-SYSLIST S/36 OCL STATEMTS
QEXCIM1	JOBQ-MENU-MSG-POWER-VARY-INFOMSG-LOG-
QEXCIM2	FORMS-IMAGE-REGION-RESERVE S/36 OCL STMT
QEXCIM3	COMPILE-COMM-DATA-SESSION S/36 OCL STMTS
QEXCIM4	ABEND-DEBUG-WAIT S/36 OCL STATEMENTS
QEXCIN	MCH/36 QEXCIML INITIALIZATION
QEXCINX	S/36 E NAME INDEX SERVICES
QEXCIPW	MACHINE 36 OCL PROCESSOR PRT-WRKSTATN
QEXCIRF	S/36 E REMOVE FSB
QEXCIRN	RUN OCL STATEMENT PROCESSOR
QEXCIRP	PRINTER OVERRIDE RUN EXTENTION
QEXCIRR	FUNCTION RE-ROUTE MODULE
QEXCIRY	S/36 E RELEASE-YES
QEXCISL	SYSLIST FUNCTIONS
QEXCITD	S/36 E FILE SUPPORT FOR TAPE/DISKETTE
QEXCLCML	CHGS36MSGL COMMAND PROCESSOR
QEXCLCMV	VALIDITY CHECK PGM FOR CHGS36MSGL CMD
QEXCLEF	EXTRACT FILE INFORMATION
QEXCLIN	QEXCLSS ASSOCIATED SPACE INITIALIZATION
QEXCLMS	WORKSTATION MSG HANDLING
QEXCLNCI	CLEAN UP CACHE FILE INDEX
QEXCLOSE	CLOSE S/36 E FILE FOR NATIVE COMMANDS
QEXCLRCI	CLEAR CACHE FILE INDEX FOR DLTLICPGM
QEXCLSG	MESSAGE HANDLER
QEXCLSS	SYSTEM/36 ENVIRONMENT SYSIN MAINLING
QEXCMCU	M/36 CLEAN UP MODULE
QEXCPENV	MCH/36 ENVIRONMENT PROCESSOR
QEXCPML	S/36 E COMMAND ANALYZER
QEXCPMN	M/36 COMMAND PROCESSOR
QEXCPRS	M/36 FIRST OPERAND ROUTER
QEXCPRT	M/36 COMMAND ROUTER
QEXCVTDV	CONVERT S/36 ENVIRONMENT DEVICE NAMES
QEXCVTSP	CONVERT SESSION PRINTER CONFIGURATION
QEXDBLB	CALL COMMAND ANALYZER
QEXENVIX	ENVIROMENT INVOCATION EXIT
QEXERQS	S/36 ENVIRONMENT EXEOJ PROCESSOR
QEXEXIT	M/36 INVOCATION EXIT
QEXEXO2	S/36E INSTALL EXIT PROGRAM
QEXFPGM	S/36 E FIND SUBROUTINE
QEXHMNU	S/36 EE HELP <MENU NAME> PROCESSOR
QEXIEVK	S/36 EE ICF EVOKE PROCESSOR
QEXIGCP	S/36 EE IGC SESSION PROCEDURE
QEXIGCX	IGC PROCESSING
QEXLTO	S/36 ENVIRONMENT LOAD-TO-OLD
QEXMKEY	S/36 EE ATTN/SYS REQ/APPL HELP FOR MRT
QEXMRTR	ROUTE TO A MRT & MRT INITIATION
QEXMRTW	S/36 EE WAIT-ON-LOCK SUPPORT FOR MRT
QEXOXRF	M/36 OXREF MODULE
QEXPDMP	DUMP JOB MODULE
QEXPRTCF	PRINT S/36 CONFIGURATION
QEXPTFAP	EXIT PGM TO APPLY S/36 E PTFS
QEXPVFN	S/36 E SPECIALIZED FUNCTIONS
QEXRCDBK	S/36 ENV ENABLE/DISABLE RECORD BLOCKING
QEXRCLBS	S/36 E HANDLER FOR RCLSTG OF QS36BTH
QEXRMVDE	REMOVE DEVICE ENTRY API
QEXRTMS	RETRIEVE MESSAGE
QEXRTVCF	RETRIEVE S/36E ATTRIBUTES
QEXSETLB	SET PRODUCT LIBRARY ROUTINE
QEXSHRO	S/36 ENV ENABLE/DISABLE SHARED DB OPEN
QEXSIGN	M/36 SIGNON PROCESSOR
QEXSIGNP	M/36 STRS36/STRS36PRC PROMPT OVRD PGM
QEXSTAT	M/36 STATUS COMMAND PROCESSOR
QEXSTEX	M/36 STATUS IEXIT PROGRAM
QEXTERM	S/36 ENVIRONMENT TRMS36 COMMAND CPP
QEZATNWD	OA ATTENTION KEY WINDOW PROGRAM
QEZAUT	RETRIEVE SPECIAL AUTHORITIES
QEZBCKUP	OA BACKUP
QEZBKADL	OA BACKUP - LIBRARY LIST EXTENSION PGM
QEZBKHST	OA UPDATE BACKUP HISTORY
QEZBKMSG	SEND BACKUP LOAD TAPE MESSAGE
QEZBKPOP	OA BACKUP PROMPT OVERRIDE PROGRAM
QEZBKSCD	BACKUP SCHEDULE
QEZBKSLT	OA SELECTION LIST FOR BACKUP
QEZBKWM	CHECK WHETHER TO RUN WEEKLY/MONTHLY BKUP
QEZCHBL	OA CHANGE BACKUP LIST
QEZCHBL2	OA CHANGE BACKUP LIST (OPTIONS)
QEZCHCLU	CHGCLNUP CPP
QEZCHGBK	OA CHANGE BACKUP OPTIONS CPP
QEZCHGOP	CHANGE OS/400 OPTIONS
QEZCHGPW	CHANGE IBM-SUPPL USER PASSWORDS

QEZCHPRF	CHANGE OUTQ FOR PRINTER FILES
QEZCHPWS	CHGPWRSCH CPP
QEZCKCGF	OA BACKUP - CHECK FOR CHANGES IN FOLDERS
QEZCLDAT	CALCULATE CLEANUP CUTOFF DATE
QEZCLINT	CLEAN UP INTERFACE TO CL PGMS
QEZCLNMQ	CLEAN UP USER MESSAGE QUEUES
QEZCLNOQ	CLEAN UP OUTPUT QUEUES
QEZCLNUP	PERFORM CLEANUP ON OBJECTS IN INDEX
QEZCLOFC	CLEAN UP OFFICE RELATED ITEMS
QEZCLSLG	CLEAN UP JOURNALS AND SYSTEM LOGS
QEZCLSTG	OA CLEAN UP TEMP STORAGE
QEZCMPST	PROCESS COMPOSITE OBJECTS - OA RECLAIM
QEZCNPWR	CONFIRM POWER OFF
QEZCRBKL	OA BACKUP - CREATE A BACKUP LIST
QEZCRIDX	CREATE QEZPWRCLN
QEZDCSCD	DATA COLLECTION SCHEDULING
QEZDFTPM	GET PARMS NEEDED BY CL PGMS
QEZDOBJD	DISPLAY OBJECT DETAILS
QEZDSHST	DISPLAY BACKUP HISTORY
QEZDSPBK	OA DISPLAY BACKUP OPTIONS CPP
QEZDSSTS	DISPLAY SYSTEM STATUS
QEZENCLU	ENDCLNUP CPP
QEZEVTHL	OA CLEANUP/PWR SCHEDULER EVENT HANDLER
QEZEXCLU	CHGCLNUP PROMPT OVERRIDE PGM
QEZEXIT	INSTALL EXIT ROUTINE FOR OPER ASSISTANT
QEZEXPWS	CHGPWRSCH PROMPT OVERRIDE PGM
QEZGETMG	RECEIVE A MSG OFF OF A MESSAGE QUEUE
QEZGEXIT	GENERAL EXIT PROGRAM FOR REMOVE USER
QEZGRPGM	OA GROUP PROGRAM
QEZHNRPR	OA HANDLE REQUEST FOR PRINT
QEZINIT	OA INITIALIZE TAPE
QEZIXCLU	IEXIT PROGRAM FOR CLEANUP
QEZIXJOB	IEXIT FOR WORK WITH (BATCH) JOBS
QEZIXPWS	IEXIT PROGRAM FOR POWER ON/OFF SCHEDULE
QEZLSGNU	LIST SIGNED-ON USERS API
QEZLSGNU	QEZLSGNU API HEADER FOR CBL
QEZLSGNU	QEZLSGNU API HEADER IN RPG
QEZLSGNU	QEZLSGNU HEADER IN ILE/RPG
QEZLSGNU	QEZLSGNU HEADER IN ILE/COBOL
QEZLXPWS	LIST BUILDING PGM FOR POWER SCHEDULE
QEZMAIN	OA ATTENTION KEY PROGRAM
QEZMNAST	OA ASSIST MENU PANEL GROUP
QEZOPDEV	WORK WITH OPTIONS FROM WORK WITH DEVICE
QEZOPJOB	WORK WITH OPTIONS FROM WORK WITH JOBS
QEZOPSGN	OA WORK WITH SIGNED ON USERS OPTIONS
QEZPRDEV	PRINT LOCAL DEVICE ADDRESSES
QEZPRTDI	CPP FOR PRTDSKINF COMMAND
QEZRCLM	EZ VERSION OF RECLAIM STORAGE CODE
QEZRCVMG	RECEIVE MESSAGE
QEZRTCLU	RTVCLNUP CPP
QEZRTPWS	RTVPWRSCH CPP
QEZRTVBK	OA RETRIEVE BACKUP OPTIONS CPP
QEZRTVDI	CPP FOR RTVDSKINF COMMAND
QEZRUNBK	OA RUN BACKUP CPP
QEZRVLIB	OA BACKUP--WORK WITH INDEX ENTRIES
QEZSAVIN	SAVE PROBLEM HANDLING INFORMATION
QEZSCNEP	OA CLEANUP/SCHEDULE NEP
QEZSEPOB	SEPARATE OBJECTS OWNED INTO CLASSES
QEZSNDMG	SEND A MESSAGE API
QEZSNDM2	SEND A MESSAGE
QEZSNDM4	SELECT USERS
QEZSTCP	STRCLNUP & STRPWRSCH CPP
QEZSVIBM	OA BACKUP--IBM LIBRARIES
QEZS36E	DETERMINE IF IN S/36 ENVIRONMENT
QEZUSRPR	USER PROFILE FUNCTIONS FOR O/A
QEZWKSGN	OA WORK WITH SIGNED ON USERS
QEZWRAST	WORK WITH ASSISTANCE LEVEL
QEZWRCLU	WORK WITH CLEANUP PANELS
QEZWRDEV	WORK WITH DEVICES
QEZWRDSK	PRTDSKINF AND RTVDSKINF PANEL FLOW PGM
QEZWRJOB	OA WORK WITH (BATCH) JOBS
QEZWRPRT	OA WORK WITH PRINTED OUTPUT
QEZWRPWS	WORK WITH POWER ON/OFF PANELS
QEZWRWTR	OA WORK WITH WRITERS
QEZXTLPR	OA EXTEND LIST FOR PRINT

QFICHECK	OS/400 BOSS OPT1 CHECK EXIT ROUTINE
QFIEXIT1	BOSS OPTION 1 ROUTER FOR FI EXITS
QFIINT2	EXIT PROGRAM TO MERGE OFFICE MESSAGES
QFIOCCVT	CALENDAR -QAOC* FILE - CONVERSION MODULE
QFIOCR30	CALENDAR EXIT PROGRAM
QFIOCR50	CALENDAR EXIT PROGRAM
QFIOCR70	CONVERSION FOR REMOTE DEFFILE 2D35
QFIOECVT	OE EXIT PROGRAM
QFIOFCSZ	DETERMINE SIZE OF OFFICE OBJECTS
QFIOFCVT	OFC LP DB FILE CONVERSION MODULE
QFIOFR50	OFC LP DB FILE CONVERSION MODULE
QFIOKCVT	OK EXIT PROGRAM
QFIOKR50	OK EXIT PROGRAM
QFIOMXIT	INVOCATION EXIT FOR QFIOMR50
QFIOSCVT	DIA-QAOS*- FILE CONVERSION MODULE
QFIOSR50	OS EXIT PROGRAM FOR V2R2
QFIROUTE	FI ROUTER FOR QUSRSYS EXIT PROGRAMS
QFIUPIPE	UPDATE QDOC IPE DURING OV/400 RST/DLT
QFNIOMGR	QFNIOMGR
QFNMNMBR	MANAGE FILE MEMBER
QFNMNTBL	QFNMNTBL
QFNREAD	QFNREAD
QFNREADI	QFNREADI
QFNROUTE	QFNROUTE - ROUTER PROGRAM
QFNSBMJB	QFNSBMJB
QFNWRT	QFNWRT
QFNWRTI	QFNWRTI
QFOREFD	RUNTIME MODULE FOR EXTFILED FUNCTION
QFOREOVR	RUNTIME MODULE FOR EXTOVR FUNCTION
QFORLIO	MAIN FORTRAN IO INTERFACE MODULE
QFPAADSV	ADD REMOTE SERVER
QFPACHAL	CHANGE NETWORK SERVER ALIAS
QFPACKAL	VALIDITY CHECKER FOR CHANGE NWS ALIAS
QFPACRAL	CREATE NETWORK SERVER ALIAS
QFPACRSG	CREATE NETWORK SERVER STORAGE SPACE
QFPADLAL	DELETE NETWORK SERVER ALIAS
QFPADLSG	DELETE NETWORK SERVER STORAGE SPACE
QFPADMAT	MATERIALIZE THE NWSD
QFPADSAL	DISPLAY NETWORK SERVER ALIAS
QFPADSSC	DISPLAY NETWORK SERVER STATISTICS
QFPADSSG	DISPLAY NETWORK SERVER STORAGE SPACE
QFPADSSN	DISPLAY NETWORK SERVER SESSION
QFPADSUS	DISPLAY NETWORK SERVER USERS
QFPALOCK	LOCK/UNLOCK CLIENT STORAGE UNIT
QFPANCMD	SUBMIT COMMAND TO NETWORK SERVER
QFPAPOAL	PROMPT OVERRIDE FOR CHANGE NWS ALIAS
QFPAPOSG	PROMPT OVERRIDE FOR CHANGE NWS STORAGE
QFPASBCM	SUBMIT NETWORK SERVER COMMAND
QFPASDMS	SEND NETWORK SERVER MESSAGE
QFPASEND	SPI- SEND FSIOP ADMIN COMMANDS TO FSIOP
QFPASHAR	START/END NETWORK SERVER SHARING
QFPASTRT	START LAN SERVER IN NETWORK SERVER
QFPAVARY	VARY EXITS FOR VARY SERVER
QFPAVCAL	VALIDITY CHECKER FOR CREATE NWS ALIAS
QFPAWWAL	WORK WITH NETWORK SERVER ALIASES
QFPAWWSG	WORK WITH NETWORK SERVER STORAGE SPACES
QFPAWWSN	WORK WITH NWS SESSION
QFPAWWST	DISPLAY NETWORK SERVER STATUS
QFPAWXAL	WORK WITH NWS ALIAS EXIT PROGRAM
QFPAWXSG	WORK WITH NWS STORAGE EXIT PROGRAM
QFPAWXSN	WORK WITH NWS SESSION EXIT PROGRAM
QFPAWXST	WORK WITH NWS STATUS EXIT PROGRAM
QFPAXXX1	EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX2	EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX3	EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX4	EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX5	EXTRA STUB MODULE FOR XPF FPAD
QFPDDELF	FAT ERASE FILE SPI
QFPDFSIZ	FAT FILE SIZE SPI
QFPDGETF	FAT GET FILE SPI
QFPDGETS	FAT GET SECTORS SPI
QFPDPUTF	FAT PUT FILE SPI
QFPDRNMF	FAT RE-NAME FILE SPI
QFPDRSIZ	FAT DISK SIZE SPI
QFPDSIZE	FAT DISK SIZE SPI

QFPDTRNF	FAT TRUNCATE FILE SPI
QFPHCRSS	CREATE SERVER STORAGE SPACE
QFPHDELF	FAT ERASE FILE SPI
QFPHDLSS	DELETE SERVER STORAGE SPACE
QFPHERAS	FAT ERASE FILE SPI
QFPHRNF	FAT RE-NAME FILE SPI
QFPHVARY	NWSD VARY ON/OFF EXIT PROGRAM
QFPPAREX	FSIOP VARY ON PROCESSING
QFPPDELR	FSIOP DELETE PTF RECORDS FROM QFPXQ
QFPPDEX	FSIOP DISPLAY PTF ACTIVATION STATUS
QFPPEXIT	FSIOP PTF INVOCATION EXIT
QFPPVARY	FSIOP VARY ON PROCESSING
QFSCPVHM	FMA QFSCPVHM MODULE
QFSC7TO8	FMA QFSC7TO8 MODULE
QFSC8TO7	FMA QFSC8TO7 MODULE
QFSDWN	FMA QFSDWN MODULE
QFSMAIN	FMA QFSMAIN MODULE
QFSPCINT	FMA QFSPCINT MODULE
QFSSTRMA	QFSSTRMA
QFSUFH	FMA QFSUFH MODULE
QFSUPD	FMA QFSUPD MODULE
QFSUPDWN	FMA QFSUPDWN MODULE
QFVADDA	ADD ACTIVITY - API
QFVAPVNA	VERIFY AND NOTIFY CM AGENT
QFVCNVNL	NODE LIST CONVERSION PROGRAM
QFVCRCHG	CHANGE CHANGE REQUEST DESCRIPTION CPP
QFVCRCRT	CREATE CHANGE REQUEST DESCRIPTION CPP
QFVCRIDX	CRD INDEX OPERATIONS
QFVCRPX	CHANGE CRQD PROMPTER EXIT
QFVLSTA	LIST ACTIVITIES
QFVLSTA	LIST ACTIVITIES API
QFVLSTA	LIST ACTIVITIES
QFVLSTA	LIST ACTIVITIES
QFVLSTA	LIST ACTIVITIES
QFVLSTNL	LIST NODE LIST ENTRIES API
QFVLSTNL	QFVLSTNL API HEADER FOR CBL
QFVLSTNL	QFVLSTNL API HEADER IN RPG
QFVLSTNL	QFVLSTNL HEADER IN ILE/RPG
QFVLSTNL	QFVLSTNL HEADER IN ILE/COBOL
QFVNODAE	ADD NODE LIST ENTRY CPP
QFVNODCR	CREATE NODE LIST CPP
QFVNODEX	WRKNODLE UIM INCOMPLETE LIST PROCESSOR
QFVNODIX	NODE LIST INVOCATION EXIT
QFVNODRE	REMOVE NODE LIST ENTRY CPP
QFVNODWE	COMMAND PROCESSOR FOR THE WRKNODLE CMD
QFVRMVA	REMOVE ACTIVITY
QFVRTVCD	RETRIEVE CRQD
QFVRTVCD	RETRIEVE CHANGE REQUEST DESCRIPTION API
QFVRTVCD	RETRIEVE CRQD
QFVRTVCD	RETRIEVE CRQD
QFVRTVCD	RETRIEVE CRQD
QFVRTVSL	RETRIEVE MESSAGE API
QFVSVPRV	NODL SAVE *PRV OBJECT HANDLER
QGDACFP	GENERATED BY LC MACHINE FOR OWOS
QGDACIN	STUB
QGDACTRM	STUB
QGDACO	STUB
QGDAEP	STUB
QGDAINVP	STUB
QGDASCPH	STUB
QGDBADTM	API CALL#23
QGDBARS	API CALL QGD- -2 #1
QGDBASEL	API CALL#32
QGDBATT	API CALL#34
QGDBBGCI	NEW 14 MODULE
QGDBBGS	API CALL QGD- -2 #32
QGDBBLNK	API CALL#25
QGDBCHRT	API CALL QGD-
QGDBCHSG	API CALL QGD-
QGDBCHVU	API CALL#36
QGDBCONV	API CALL QGD-
QGDBCRNG	API CALL#39
QGDBDKEY	API CALL QGD-#14
QGDBDOAX	API CALL QGD-
QGDBDRAW	API CALL QGD- -2 #33
QGDBDRAX	API CALL QGD-#15
QGDBDRLB	PGM TO DRAW ANGLED LABELS
QGDBDSAX	API CALL QGD- -2 #34
QGDBDSDO	API CALL QGD- -2 #9
QGDBDTTL	API CALL QGD- -2 #54
QGDBEDTX	API CALL#26
QGDBEMSG	NEW 14 MODULE
QGDBGFMT	API CALL#27
QGDBGFTX	API CALL#38
QGDBGINT	API CALL QGD-
QGDBGLBS	API CALL QGD-
QGDBHIST	API CALL#58
QGDBLABL	API CALL QGD-#11
QGDBMAX	API CALL#37
QGDBMBG	NEW 14 MODULE
QGDBMISS	API CALL QGD-
QGDBMOVE	API CALL QGD- -2 #36
QGDBNOTE	API CALL QGD-#8
QGDBPIE	API CALL QGD- -2 #4
QGDBPLOT	API CALL QGD-
QGDBRNIT	API CALL#40
QGDBSET	API CALL QGD-#16
QGDBSTRT	API CALL#2
QGDBTRIG	S/1 SIN/COSINE MODULE
QGDBVENN	API CALL QGD- -2 #38
QGDCRTVS	QGDCRTVS
QGDDBCRT	STUB
QGDDBDEF	STUB
QGDDBDEL	STUB
QGDDBFN1	STUB
QGDDBFN2	STUB
QGDDBSEL	STUB
QGDDCAS	STUB
QGDDCCD	STUB
QGDDCDS	STUB
QGDDCES	STUB
QGDDCGS	STUB
QGDDCOS	STUB
QGDDCPC	STUB
QGDDCPS	STUB
QGDDCPU	STUB
QGDDCQD	STUB
QGDDCQS	STUB
QGDDCRS	STUB
QGDDCTE	STUB
QGDDCVS	STUB
QGDDCWIN	STUB
QGDDECRT	STUB
QGDDEDEF	STUB
QGDDEDEL	STUB
QGDDEFN1	STUB
QGDDEFN2	STUB
QGDDESEL	STUB
QGDDGAR	STUB
QGDDGCE	STUB
QGDDGCL	STUB
QGDDGCR	STUB
QGDDGCTF	GD - COLOR TABLE FUNCTION
QGDDGGI	STUB
QGDDGIG	STUB
QGDDGIO	STUB
QGDDGI1	GDF INITIALIZATION
QGDDGI4	GDP - PRINTER INITIALIZATION
QGDDGI5	STUB
QGDDGI6	STUB
QGDDGMM	STUB
QGDDGPA	STUB
QGDDGPC	STUB
QGDDGPE	STUB
QGDDGPI	STUB
QGDDGPM	STUB
QGDDGPO	STUB
QGDDGPR	STUB
QGDDGPS	STUB
QGDDGP1	GDF PRODUCTION MANAGEMENT

QGDDGP5	API CALL QGD-#4
QGDDGP6	STUB
QGDDGQC	STUB
QGDDGQI	STUB
QGDDGSE	STUB
QGDDGSQ	STUB
QGDDGS1	GDF SEGMENT MANAGEMENT
QGDDGS5	STUB
QGDDGWI	STUB
QGDDGXC	STUB
QGDDGXE	STUB
QGDDHI04	GDP - PRINTER DEFAULTS TABLE
QGDDHI05	STUB
QGDDHI06	DEFAULTS TABLE MODULE FOR 7372 PLOTTER
QGDDHI14	4214 PRINTER DEFAULTS
QGDDHI24	4217 (@ 15 CPI) PRINTER DEFAULTS
QGDDHI34	QGDDHI34
QGDDM	AI - GENERAL GDDM ENTRY POINT
QGDDSDQ	STUB
QGDDSDS	STUB
QGDDSEH	STUB
QGDDSF1	STUB
QGDDSOO	STUB
QGDDSPCS	PC COMMUNICATIONS CONTROL
QGDDSQP	QUERY REPLY PROCESSOR FOR OS/2 LINK
QGDDSRO	STUB
QGDD1C	GDF DATASTREAM PROCESSOR
QGDD3C	DATASTREAM PROCESSOR FOR GOCA DEVICES
QGDD5C	API CALL QGD-#19
QGDEABND	SL GDDM ESI ABEND ROUTINE
QGDEOSDO	STUB
QGDEROOF	STUB
QGDEXITI	MRI EXIT PROGRAM FOR BOSS OPTION 14
QGDEXIT2	MRM EXIT PROGRAM FOR BOSS OPTION 14
QGDILASP	STUB
QGDLAR1F	STUB
QGDLIN1F	API CALL QGD-#3
QGDLQU1F	3270 DEVICE INITIALIZATION
QGDLRN1F	API CALL QGD- -2 #16
QGDLROPF	TSI - PRINTER IO ROUTER
QGDLRO00	TSI - DUMMY DEVICE ROUTER/HANDLER
QGDLRO1F	API CALL QGD-#18
QGDLTM1F	STUB
QGDLTQ00	TSI - QUERY DEVICE
QGDNUMER	STUB
QGDYGQC	STUB
QGDYINTM	STUB
QGDYRO00	STUB
QGDYRSRL	STUB
QGDYTRIG	STUB
QGSCRTRS	CREATE RESOURCE COMMAND PROCESSOR
QGSCRTSP	CREATE AFP RESOURCE FROM SPACE@
QGSDLTRS	DLTFNTRSC COMMAND PROGRAM
QGSDSPFN	DISPLAY FONT RESOURCE ATTRIBUTES CPP
QGSGETRS	GS GET RESOURCE DATA
QGSSAVFR	N TO N-1 FONT RESOURCE OBJECT HANDLER
QHCCCFG	PC SUPPORT CREATE AS/400 CONFIG OBJECTS
QHCQRYEX	EXIT PROGRAM FOR QUERY LINE DESCRIPTIONS
QHCQRYLN	PC SUPPORT QUERY RESPONSE LINES
QHEACT	HOST ENROLLMENT LIST ACTION PROCESSING
QHEENRL	PC SUPPORT TO ENROLL AS/400 USERS
QHEIEXIT	HOST ENROLLMENT INVOCATION EXIT MODULE
QHEWRKAL	WORK WITH PC SUPPORT AUTHORIZATION LIST
QHF	QHF HEADER FOR CBL
QHF	QHF API HEADER IN RPG
QHF	QHF HEADER IN ILE/RPG
QHF	QHF HEADER IN ILE/COBOL
QHFCHGAT	HFS CHANGE DIRECTORY ENTRY ATTRIBUTES
QHFCHGFP	HFS CHANGE FILE POINTER API
QHFCLODR	HFS CLOSE DIRECTORY API
QHFCLOSF	HFS CLOSE STREAM FILE
QHFCPYSF	HFS COPY STREAM FILE API
QHFCRTDR	HFS CREATE DIRECTORY API
QHFCTLFS	HFS CONTROL FILE SYSTEM
QHFDLTDR	HFS DELETE DIRECTORY API
QHFDLTSF	HFS DELETE STREAM FILE API
QHFDMCLN	CLEANUP HFS FILES AND DIRS
QHFDRGFS	DEREGISTER A FILE SYSTEM W/HFS
QHFDSPFS	HFS DISPLAY HIERARCHICAL FILE SYSTEMS
QHFFRCSF	HFS FORCE BUFFERED DATA IN STREAM FILE
QHFFXREG	REPAIR AND CREATE REG OBJECT
QHFGETSZ	HFS GET STREAM FILE SIZE
QHFIEXIT	HFS INVOCATION EXIT PROGRAM
QHFINT2	REGISTER FILE SYSTEMS ON INSTALL
QHFLSTFS	LIST REGISTERED FILE SYSTEMS
QHFLSTFS	QHFLSTFS API HEADER FOR CBL
QHFLSTFS	QHFLSTFS API HEADER IN RPG
QHFLSTFS	QHFLSTFS HEADER IN ILE/RPG
QHFLSTFS	QHFLSTFS HEADER IN ILE/COBOL
QHFLULSF	HFS LOCK/UNLOCK BYTES IN STREAM FILE
QHFMCEXT	HFS MOVE/COPY IEXIT PGM
QHFMOVSF	HFS MOVE STREAM FILE API
QHFOPNDR	HFS OPEN DIRECTORY API
QHFOPNSF	HFS OPEN STREAM FILE API
QHFRDDR	HFS READ DIRECTORY ENTRIES API
QHFRDDR	QHFRDDR API HEADER FOR CBL
QHFRDDR	QHFRDDR API HEADER IN RPG
QHFRDDR	QHFRDDR HEADER IN ILE/RPG
QHFRDDR	QHFRDDR HEADER IN ILE/COBOL
QHFRDSF	HFS READ STREAM FILE API
QHFRGFS	REGISTER A FILE SYSTEM W/HFS
QHFRNMDR	HFS RENAME DIRECTORY API
QHFRNMSF	HFS RENAME STREAM FILE API
QHFRSLEP	RESOLVE TO USER EXIT PROGRAM
QHFRTVAT	HFS RETRIEVE DIRECTORY ENTRY ATTRIBUTES
QHFSETSZ	HFS SET STREAM FILE SIZE
QHFWRTSF	HFS WRITE STREAM FILE API
QIAEXIT	IEXIT FOR TIA
QIATIA	TIA MODULE
QICCLOSE	CLOSE ROUTINE FOR ICDM
QICCONIN	ICF DISPLAY CONNECTION INFO PROCESSOR
QICERP	ICDM ERROR HANDLING MODULE
QICFMERR	ICF MODULE FOR FM GENERATED I/O ERRORS
QICFMTSL	ICDM FMTSLT PROCESSOR
QICGET	ICDM INPUT OPERATION PROCESSOR
QICINASP	ICDM - INIT PUT ASSOC SPACE
QICLSTEN	ICF GATHER ACTIVE SESSION INFO PROCESSOR
QICOPEN	ICDM FILE OPEN MODULE
QICPUT	ICDM PUT MODULE
QICRSTR	ICDM RESTORE PROCESSING
QICSPND	ICDM SUSPEND PROCESSING
QICTPP	ICDM TERMINATION PHASE PROCESSING
QIDAFW	IDDU DM LINK MODULE
QIDAK	IDDU KEYED FILE SUPPORT
QIDA2	CREATE AND SELECT FIELDS FOR A FORMAT
QIDA3	CREATE AND SELECT FORMATS FOR A FILE
QIDCD	IDDU CREATE DICTIONARY MODULE
QIDCDW	IDDU DM CREATE DICTIONARY MODULE
QIDCF	WORK WITH DATA BASE FILES PROCESSOR
QIDCHKFI	IDDU DICTIONARY NAME CHECK FUNCTION
QIDCV	OPEN LOGICAL DICTIONARY FILE
QIDC1	CHARACTER/IGC/NUMERIC FIELD OPTIONS
QIDDCV	IDDU INITIAL MODULE ROUTER
QIDDD	IDDU DEFINE DICTIONARY MODULE
QIDDDW	IDDU DM CHANGE DICTIONARY FUNCTION
QIDDESS	IDDU DESTROY SPACES INVOCATION EXIT PGM
QIDDESW	IDDU DELETE EDIT SPACE FUNCTION
QIDDT	IDDU SELECT DEFINITION TYPE
QIDD1	IDDU CHANGE FIELD DEFINITION MODULE
QIDD2	CREATE/CHANGE FORMAT DEFINITION MODULE
QIDD3	CREATE/CHANGE FILE DEFINITION MODULE
QIDED	IDDU EXIT DEFINITION PROCESS
QIDEDW	IDDU DM EXTRACT DICTIONARY INFO MODULE
QIDEM	EDIT MODE OPTIONS
QIDEXTW	EXTRACT DDS FROM FDT WORK MODULE
QIDE1	DESCRIBE NUMERIC FIELD EDITING
QIDE2	DESCRIBE DATE/TIME FIELD EDITING
QIDE3	SPECIFY EDIT CODE
QIDE4	SPECIFY EDIT WORD
QIDFVW	IDDU DM FILE VERIFICATION MODULE

QIDF1	IDDU CREATE FIELD DEFINITION MODULE
QIDIN	IDDU INITIAL MODULE ROUTER
QIDKA	IDDU KEYED FILE SUPPORT
QIDKS	KEYBOARD SHIFT FOR CHARACTER/IGC/NUMERIC
QIDK1	CHANGE KEY FIELD SEQUENCE ATTRIBUTES
QIDK3	IDDU CHANGE FILE KEY ATTRIBUTES
QIDLLIB	SELECT A LIBRARY DISPLAY
QIDLS	SELECT A DATA DICTIONARY
QIDL1	SELECT A FIELD DEFINITION
QIDL2	SELECT A FORMAT DEFINITION
QIDL3	SELECT A FILE DEFINITION
QIDMODEL	CREATE/VERIFY IDDU DICTIONARY FILES
QIDMPW	IDDU DM IMPORT DEFINITION MODULE
QIDOCW	IDDU OPEN/CLOSE DICTIONARY FUNCTION
QIDOD	WORK WITH DICTIONARIES MODULE
QIDOF	WORK WITH DATA BASE FILES PROCESSOR
QIDOP	IDDU PRINT OPTIONS MODULE
QIDOR	IDDU RENAME DEFINITION MODULE
QIDO1	WORK WITH FIELD DEFINITIONS DISPLAY
QIDO2	WORK WITH RECORD FORMAT DEFINITIONS
QIDO3	WORK WITH FILE DEFINITIONS
QIDRC	IDDU DEFINITION RECOVERY MODULE
QIDRCMH	IDDU RECOVERY HANDLER FOR RECLAIM
QIDRI	IDDU RECORD IDS CODES
QIDRNW	IDDU RENAME DEFINITION FUNCTION
QIDRS1	DATA_DICTIONARY OBJECT RESTORE HANDLER
QIDSTRID	DISPLAY IDDU MENU
QIDSV1	DATA DICTIONARY OBJECT SAVE
QIDSYCW	IDDU SECURITY CHECK FUNCTION
QIDS1W	SAVE FIELD DEFINITION IN DICTIONARY
QIDS2W	SAVE FORMAT DEFINITION IN DICTIONARY
QIDS3W	SAVE FILE DEFINITIONS IN DICTIONARY
QIDTCW	IDDU DM TYPE CHECK DICTIONARY MODULE
QIDTDW	FILE DEFINITION DROP ENTRY POINT MODULE
QIDTOW	TRANSFER OWNERSHIP OF DATA DICTIONARY
QIDTUW	FILE DEFINITION DROP: WHAT USED LIST
QIDULW	IDDU DM UNLINK ALL FILES FROM DCT MODULE
QIDVD	IDDU DELETE DICT/DFN MODULE
QIDVDW	IDDU DM DELETE DICTIONARY MODULE
QIDVW	IDDU VIEW WHERE USE
QIDVXW	IDDU DELETE DEFINITION FUNCTION
QIDVY	CONFIRM COPY
QIDWUW	IDDU DICTIONARY WHERE USED: ENTRY MODULE
QIDWW	IDDU - IDDU SUPPORT
QIDWWW	IDDU - IDDU SUPPORT
QIDXD	IDDU EDIT LONG COMMENT
QIDXDDW	IDDU - EXTRACT DDS FROM DICTIONARY - CPP
QIDXPW	EXPORT DATA DICTIONARY
QIDXX	DEFINITION EXIT MODULE
QIDXXW	IDDU RESERVED MODULE
QIDYX	COPY DEFINITION
QIDYY	IDDU RESERVED MODULE
QIDYYW	IDDU RESERVED MODULE
QIDZZ	IDDU - IDDU SUPPORT
QIDZZW	IDDU - IDDU SUPPORT
QIFEXIT	TRCICF ERROR TRANSIENT MODULE
QIFPTREC	TRCICF OUTPUT DATA RECORDS
QIFTJOB	TRCICF COMMAND PROCESSING PROGRAM
QIFTRACE	TRCICF LOG TRACE DATA
QINCPF	INSTALLATION PART II DRIVER
QINERMSG	DISPLAY MESSAGE SCREEN
QINEXIT1	SECONDARY LANGUAGE INSTALL EXIT ROUTINE
QINEXIT2	SECONDARY LANGUAGE INSTALL EXIT ROUTINE
QININST	INSTALL PART 1 CONTROLLER
QINITT	INSTALLATION BOOTSTRAP
QINLDALO	LOAD ALL OBJECTS FOR CURRENT SRD
QINLDMRI	INSTALL MRI OBJECTS IN QSYS
QINLDSRD	LOAD S/R DESCRIPTOR FOR LIBRARY
QINOPTS	DISPLAY INSTALL OPTION SCREENS
QINPDEH	INSTALL PART 1 PROCESS DFLT EXCP HANDLER
QINPREP	INSTALL PREPARATION SECRET WEAPON
QINRIOOH	RESTORE I/O OBJECT HANDLER
QINSCRIO	INSTALL SCREEN I/O
QINSETUP	SET-UP FOR ANY TYPE INSTALL
QINTAPE	TAPE SUPPORT CODE

QINUPSL	HANDLE USER PROFILE STG LIMIT EXCEEDED
QIZACNUP	PERFORM CLEANUP ON OBJECTS IN INDEX
QIZACPST	PROCESS COMPOSITE OBJ - IZA RECLAIM
QIZARCLM	IZA VERSION OF RECLAIM STORAGE CODE
QIZARTVI	CPP FOR RTVINSINF COMMAND
QIZASOBJ	SEPARATE OBJECTS OWNED INTO CLASSES
QJOCAPPO	CHGRCYAP PROMPT OVERRIDE PROGRAM
QJOCDRJR	CREATE/DELETE/RESTORE JRN RECOVERY MOD
QJOCHGAP	CPP FOR THE CHGRCYAP COMMAND
QJOCHGJD	MODULE TO CHANGE JID XREF ENTRY
QJOCHGJN	CHANGE JOURNAL
QJOCHJNR	CHANGE JOURNAL RECOVERY MODULE
QJOCJOVR	CHGJRN PROMPT OVERRIDE PROGRAM
QJOCMPJE	COMPARE JOURNAL IMAGES CPP
QJOCRTJN	CPP FOR THE CRTJRN COMMAND
QJOCRTRC	CPP FOR THE CRTJRNRCV COMMAND
QJODFTJN	DEFAULT JOURNAL PROCESSING PROGRAM
QJODJAX	USREXIT ROUTINE FOR WRKJRNA DISPLAY
QJODLTJN	CPP FOR THE DLTJRN COMMAND
QJODLTRC	HANDLER FOR THE DLTJRNRCV COMMAND
QJODMGNT	JOURNAL RECEIVER DAMAGE NOTIVICATION
QJODRUPD	RECEIVER DIRECOTRY UPDATE MODULE
QJODSPJA	CPP FOR THE DSPJRNA COMMAND
QJODSPJE	CPP FOR THE DSPJRN COMMAND
QJODSPRC	CPP FOR THE DSPJRNRCV COMMAND
QJOEDTAP	CPP FOR THE EDT/DSPRCYAP COMMAND
QJOENDAP	END JOURNAL ACCESS PATH CPP
QJOENDJN	CPP FOR THE ENDJRN COMMAND
QJOFIXIT	PROCESS JOURNAL RECOVERY OBJECT
QJOGENJD	GENERATE JID/JOURNAL START MODULE
QJOIECHJ	CHANGE JOURNAL INVOCATION EXIT PROGRAM
QJOIEJRN	INVOCATION EXIT PROGRAM FOR JRNPF, JRNAP
QJOIPL	JOURNAL IPL PROCESSING PROGRAM
QJOJEJRC	JOURNAL/END-JOURNAL RECOVERY MODULE
QJOJMNUX	USREXIT ROUTINE FOR WRKJRN DISPLAY
QJOJNMNU	DSPJRNMNU COMMAND PROCESSING PROGRAM
QJOJNRCY	JOURNAL RECOVERY OPTION PROCESSOR
QJOJRNAP	JOURNAL ACCESS PATH CPP
QJOJRNPF	CPP FOR THE JRNPF COMMAND
QJOJSTAT	DSPJRNMNU MODULE - JOURNAL STATUS
QJOLGACT	ACTIVITY LOG PROGRAM
QJOMNEVT	DB/JO/TN EVENT MONITOR PROGRAM
QJOMTJOA	MATERIALIZE JOURNAL ATTRIBUTES FOR FCB
QJOMVOBJ	MOVE JOURNAL OBJECT
QJONJEVT	ENTRY NOT JOURNALED EVENT HANDLER
QJOREAPY	CPP FOR THE APYJRN/RMVJRN COMMAND
QJORECLM	JOURNAL RECLAIM PROCESSING PROGRAM
QJOREEXT	EXIT PROGRAM FOR QJOREAPY CPP
QJORETRY	EVENT HANDLER FOR RETRYING JRNL EVENTS
QJORJIDI	RETRIEVE JID INFORMATION
QJORJIDI	RETRIEVE JID INFORMATION
QJORJIDI	RETRIEVE JID INFORMATION API
QJORJIDI	QJORJIDI HEADER IN ILE/RPG
QJORJIDI	QJORJIDI HEADER IN ILE/COBOL
QJORNUSE	EVENT HANDLER FOR RCVR NOT IN USE EVT
QJORRDIR	RECEIVER DIRECTORY RECOVERY MODULE
QJORSTJN	OBJECT SPECIFIC RESTORE HNDLR - JOURNL
QJORSTRC	OBJECT SPECIFIC RESTORE HNDL - RECEIVR
QJORTHRS	EVENT HANDLER FOR RECVR THRESHOLD EVNT
QJORTVJE	RTVJRNE CPP
QJORUEVT	RECEIVER UNUSABLE EVENT HANDLER
QJORYDIR	DSPJRNMNU MODULE - RCV DIR RECOVERY
QJORYFIL	DSPJRNMNU MODULE - FILE RECOVERY
QJORYJRN	DSPJRNMNU MODULE - JOURNAL RECOVERY
QJORYRCV	DSPJRNMNU MODULE - RECEIVER RECOVERY
QJORYXRF	RECOVER RECEIVER JID CROSS REFERENCE
QJOSAVJN	OBJECT SPECIFIC SAVE HNDLR - JOURNAL
QJOSAVRC	OBJECT SPECIFIC SAVE HNDLR - RECEIVER
QJOSJRNE	SEND JOURNAL ENTRY API
QJOSMART	PROCESS THE SMART OBJECT
QJOSNDJE	CPP FOR THE SNDJRNE COMMAND
QJOUNJRN	UNJOURNAL ACCESS PATHS, JRN DAMAGED
QJOVLDCK	VALIDITY CHECKER FOR QJODSPJE
QJOVLIC	VLIC ERROR EVENT HANDLER
QJOXENNJ	ENTRY NOT JOURNALED EXCEPTION HNDLR

QKACAJOB	DUMMY CPP FOR STRJOBCCH & ENDJOBCCH CMDS
QKACAPOL	DUMMY CPP FOR SETCCHPOOL CL COMMAND
QKJCPTBL	CPP FOR THE CL COMMAND CPYIGCTBL
QKJCRDCT	CREATE IDEOGRAPHIC IGC DICTIONARY CPP
QKJDSDCT	DISPLAY IDEOGRAPHIC DICTIONARY CMD CPP
QKJEDIT	EDIT IDEOGRAPHIC DICTIONARY COMMAND
QKJEDSEL	EDIT IDEOGRAPHIC DIATIONARY CMD - SELECT
QKJEROOT	EDIT IDEOGRAPHIC DICTIONARY CMD CPP
QKJFIXUP	FIX UP IGC TABLES
QKJHNTBL	HANDLE THE EXISTENCE OF AN IGC TABLE
QKJIGCNV	IDEOGRAPHIC CONVERSION FUNCTION
QKJMDWRD	MODIFY IGC WORDS
QKJRMENT	REMOVE A MAIN ENTRY FROM IGC DICTIONARY
QKJRTENT	RETRIEVE MAIN ENTRY FROM IGC DICTIONARY
QKJRTWRD	RETRIEVE IGC WORDS
QLCCRTCD	AUTOMATIC CREATE APPC CONTROL UNIT
QLCCRTLD	AUTO CREATE OF APPN LUDS
QLEASIN	ILE MATH AWIS
QLEATAN	ILE MATH AWIS
QLEATANH	ILE MATH AWIS
QLECOND	PM/SC CWIS
QLECPLX	ILE MATH AWIS
QLECPLX1	ILE MATH AWIS
QLECPLX2	ILE MATH AWIS
QLECPLX3	ILE MATH AWIS
QLECPLX4	ILE MATH AWIS
QLEDAGE	STANDARD DAGE ROUTINE
QLEDEH	ILE DEFAULT EXCEPTION HANDLERS
QLEDTAWI	ILE DATE AND TIME AWIS
QLEDTCOM	ILE DATE AND TIME COMMON
QLEDTIN	ILE DATE AND TIME INPUT
QLEDTOUT	ILE DATE AND TIME OUTPUT
QLEERF	ILE MATH AWIS
QLEEXIT	DAGE ROUTER SRVPGM
QLEEXP	ILE MATH AWIS
QLEGAMMA	ILE MATH AWIS
QLEGOTO	CEEGOTO
QLEIMF1	INTERNAL MATH FUNCTIONS
QLEIMF2	INTERNAL MATH FUNCTIONS
QLEIMF3	INTERNAL MATH FUNCTIONS
QLEIMF4	INTERNAL MATH FUNCTIONS
QLEINT1	ILE MATH AWIS
QLEINT2	ILE MATH AWIS
QLEIOUTL	I/O FEEDBACK ROUTINES
QLEIT	STATIC INIT/TERM
QLELOG	ILE MATH AWIS
QLEMFCWI	ILE MATH CWIS
QLEMFINI	INITIALIZE POINTERS TO THE MATH TABLES
QLEMOD	ILE MATH AWIS
QLEMRCR	CEEMRCR
QLEMS	CEE MESSAGE SERVICES
QLENCOD	ENCODE CONDITION AWIS
QLEOD	ILE OD AWIS
QLEODCWI	ILE OD CWIS
QLEPC	ILE PC AWIS
QLEPM	PM AWIS
QLERAGE	CEE4RAGE AWI
QLERAND	ILE RANDOM NUM GEN
QLERTX	CEERTX/CEEUTX
QLESC	COND HANDLING
QLESCAW	COND HANDLING AWIS
QLESGL	CEESGL
QLESIN	ILE MATH AWIS
QLESM	ILE SM AWIS
QLESSNFP	EXTERNAL FUNCTION POINTERS FOR SESSION
QLESSNIN	EXTERNAL PROGRAM TO INITIALIZE POINTERS
QLESSNSY	INTERNAL FUNCTIONS FOR SESSION
QLESSNUS	EXTERNAL ROUTINES FOR SESSION
QLETAN	ILE MATH AWIS
QLETANH	ILE MATH AWIS
QLETOOL	GENERAL LE TOOLS
QLETPS	CEE THREAD PRIVATE STORAGE
QLETREC	CEETREC & CEE4ABN
QLGCASE	QLGCASE HEADER IN ILE/RPG
QLGCASE	QLGCASE HEADER IN ILE/COBOL

QLGCNVCS	QLGCNVCS API HEADER IN RPG
QLGCNVCS	QLGCNVCS HEADER IN ILE/RPG
QLGCNVCS	QLGCNVCS HEADER IN ILE/COBOL
QLGCNVSS	API TO CONVERT SORT SEQUENCE TABLE
QLGCVTUT	CONVERT TO/FROM UTC API
QLGDUM2	C DUMMY PROGRAM
QLGETTBL	GET LANGUAGE AND COUNTRY VALUES FRM PASA
QLGGLID	GIVEN LID GET LIB OF MRI API
QLGIEXIT	LG SORT API IEXIT PGM
QLGLDTBL	LOAD LANGUAGE AND COUNTRY TABLES IN PASA
QLGPG001	TEMPORY PROGRAM FOR LG
QLGPG002	TEMPORY PROGRAM FOR LG
QLGPMCHC	CHOICE PROMPT BUILDER
QLGPSID	DISPLAY/SELECT LANGUAGE & COUNTRY IDS
QLGPTLID	SELECT LANGUAGE ID
QLGRTVLI	API TO RETRIEVE LANGUAGE ID
QLGRTVLI	QLGRTVLI API HEADER FOR CBL
QLGRTVLI	QLGRTVLI API HEADER IN RPG
QLGRTVLI	QLGRTVLI HEADER IN ILE/RPG
QLGRTVLI	QLGRTVLI HEADER IN ILE/COBOL
QLGRTVSS	API TO RETRIEVE SORT SEQUENCE TABLE
QLGRTVSS	QLGRTVSS API HEADER FOR CBL
QLGRTVSS	QLGRTVSS API HEADER IN RPG
QLGRTVSS	QLGRTVSS HEADER IN ILE/RPG
QLGRTVSS	QLGRTVSS HEADER IN ILE/COBOL
QLGSCNMX	API TO SCAN STRING FOR MIXED DATA
QLGSORT	LGSORT API-SORT WITH NLSS
QLGSORT	QLGSORT API HEADER FOR CBL
QLGSORT	QLGSORT API HEADER IN RPG
QLGSORT	QLGSORT HEADER IN ILE/RPG
QLGSORT	QLGSORT HEADER IN ILE/COBOL
QLGSRTIO	LGSRTIO API-SORT INPUT/OUTPUT DATA
QLGSRTIO	QLGSRTIO API HEADER FOR CBL
QLGSRTIO	QLGSRTIO API HEADER IN RPG
QLGSRTIO	QLGSRTIO HEADER IN ILE/RPG
QLGSRTIO	QLGSRTIO HEADER IN ILE/COBOL
QLGTRDTA	API TO TRUNCATE CHARACTER DATA
QLGVLID	API TO VERIFY LANGUAGE ID
QLIADOPT	SET SPP FROM SYP UNDER OWNER PROFILE
QLICHGLB	CPP FOR CHGLIB
QLICHGLL	CHANGE LIBRARY LIST API
QLICHGOB	CPP FOR CHGLIB AND CHGOBJTXT COMMAND
QLICHLBL	ADD/REMOVE LIBRARY LIST ENTRY
QLICHLIB	CHANGE LIBRARY LIST CPP
QLICHLLE	CHANGE LIBRARY LIST MODULE
QLICKOBJ	CHECK OBJECT CPP
QLICLLIB	CLEAR LIBRARY CPP
QLICLNUP	CLEAN UP LIBRARIES DURING IMPL
QLICLPOP	PROMPTER OVERRIDE FOR CHGLIB COMMAND
QLICNACS	CONVERT ACS TABLE FUNCTION
QLICNV	CONVERT SYMBOLIC OBJECT TYPE
QLICOBJD	API TO CHANGE AN OBJECTS DESCRIPTION
QLICRDUP	CREATE DUPLICATE OBJECT CPP
QLICRLIB	CREATE LIBRARY CPP
QLICUSRL	CHANGE USER LIBRARY LIST MODULE
QLICVTTP	CONVERT OBJECT TYPE API
QLIDLCPF	DELETE CPF PROCEDURE
QLIDLFIL	DELETE FILE PROCESSING
QLIDLOBJ	DELETE OBJECT ROUTINE
QLIDLOIR	DELETE OIR MODULE
QLIDOBJD	DISPLAY OBJECT DESCRIPTION CPP
QLIDSLIB	DISPLAY LIBRARY CPP
QLIDSPLD	DISPLAY LIBRARY DESCRIPTION CPP
QLIDSPLL	DISPLAY LIBRARY LIST ROUTINE
QLIFITYP	TYPE FILES
QLIINSRT	INSERT OBJECT INTO LIBRARY
QLIINT1	FUNCTIONS FOR INSTALL TYPE 1
QLIINT2	LIBRARIAN PART 2 INSTALL MODULE
QLILBPOP	PROMPTER OVERRIDE FOR CHGLIBL COMMAND
QLILIST	LIST OBJECTS ROUTINE
QLILOBJI	QS API TO LIST OBJECT LOCKS
QLIMODRM	MODIFY RESOURCE MANAGEMENT CONTROLS
QLIMOVE	MOVE OBJECT UNDER OWNER PROFILE
QLIMROIR	MODIFY/RETRIEVE OIR ENTRIES
QLIMVOBJ	MOVE OBJECT CPP

QLIMVOIR	MOVE OIR ENTRIES
QLINEPTE	EPTE NOT SUPPORTED
QLIODPOP	PROMPTER OVERRIDE FOR CHGOBJD COMMAND
QLIOUTFL	DATA BASE OUTFILE VERIFICATION/CREATE
QLIPGM01	STUB MODULE FOR QLIPGM01
QLIPGM02	STUB MODULE FOR QLIPGM02
QLIPGM03	STUB MODULE FOR QLIPGM03
QLIPGM04	STUB MODULE FOR QLIPGM04
QLIPGM05	STUB MODULE FOR QLIPGM05
QLIPGM06	STUB MODULE FOR QLIPGM06
QLIPGM07	STUB MODULE FOR QLIPGM07
QLIPGM08	STUB MODULE FOR QLIPGM08
QLIPGM09	STUB MODULE FOR QLIPGM09
QLIPGM10	STUB MODULE FOR QLIPGM10
QLIRCLIB	QLIRCLIB
QLIRCOBJ	RENAME OBJECT TYPE LIB IPL SUPPORT
QLIREINS	REINSERT OBJECT INTO QRPLOBJ LIBRARY
QLIRLIBD	RETRIEVE LIBRARY DESCRIPTION
QLIRLIBD	RETRIEVE LIBRARY DESCRIPTION API
QLIRLIBD	QLIRLIBD HEADER IN ILE/COBOL
QLIRLIBD	RETRIEVE LIBRARY DESCRIPTION
QLIRLIBD	RETRIEVE LIBRARY DESCRIPTION
QLIRNMO	RENAME OBJECT API
QLIRNMOG	GRANT AUTHORITY FOR RENAME OBJECT API
QLIRNOBJ	RENAME OBJECT CPP
QLIRNOIR	RENAME OIR
QLIROHDL	RSLOBJ MACRO EXCEPTION HANDLER
QLIRSLOJ	RSLOBJ PROGRAM, CALLED BY C MACRO
QLIRTVLD	RETRIEVE LIBRARY DESCRIPTION CPP
QLIRTVOB	RETRIEVE OBJECT DESCRIPTION CPP
QLISETSS	SET JOBS SORT SEQUENCE
QLISVLIB	HANDLER FOR SAVSYS FOR LIBRARIES
QLIVLOIR	VALIDATE OIR ENTRIES
QLMADPRF	BUILD CRS FRAMES FOR LMPRF
QLMADPRM	BUILD CRS FRAMES FOR LMRMV
QLMADRMV	RMVTRA COMMAND PROCESSING
QLMAICMD	ADDLANADPI VALIDITY/COMMAND PROCESSING
QLMBLDF	BUILD SMT REQUEST FRAME
QLMCICMD	CHGLANADPI VALIDITY/COMMAND PROCESSING
QLMCRSHD	SEND AND RECIEVE CRS FRAMES
QLMDSPLF	DSPTRNSTS COMMAND PROCESSOR
QLMDSPPF	DSPLANADPP FOR DDI
QLMDSPRF	DSPTRAPRF COMMAND PROCESSING
QLMDSREM	DSPTRNSTS COMMAND PROCESSOR
QLMEVTHD	TOKEN RING NETWORK MANGER EVENT HANDLER
QLMEXTEX	EXIT TO EXTEND UIM LISTS
QLMFVECT	PARSE MAJOR VECTOR TO FIND VECTOR
QLMREMHD	SEND AND RECIEVE REM FRAMES
QLMREMST	BUILD REM FRAMES FOR LMREM
QLMRICMD	RMVLANADPI VALIDITY/COMMAND PROCESSOR
QLMRNCMD	RNMLANADPI VALIDITY/COMMAND PROCESSOR
QLMRNGIF	BUILD CRS FRAMES FOR LMRING
QLMSMTHD	SEND AND RECEIVE SMT FRAMES
QLMUSREX	EXIT TO UPDATE UIM LISTS
QLMVALAD	VALIDITY CHECK ADAPTER ADDRESSES
QLMVALPR	VALIDITY CHECK DSPTRAPRF COMMAND
QLMVALRA	VALIDITY CHECK RMVTRA COMMAND
QLMVALRM	VALIDITY CHECK DSPTRNSTS COMMAND
QLMWKADF	WRKLANADPT/WRKHDWRSC COMMAND PROCESSING
QLMWKADP	WRKTRA COMMAND PROCESSING
QLMWKVAL	VALIDITY CHECK WRKLANADPT COMMAND
QLNRFSEQ	ILE COBOL DATA MANAGEMENT INTERFACE
QLPBATIN	BATCH INSTALLING LICENSED PGMS
QLPBCPCL	IEXIT PROGRAM FOR MP INSTALL QLPCTLIN
QLPBIPCL	IEXIT PROGRAM FOR QLPBATIN
QLPCLNUP	IEXIT PROCESSING FOR QLPINLPP/QLPINATO
QLPCRTDT	PROMPT FOR INSTALLATION PROFILE
QLPCTLIN	MP INSTALL BATCH CONTROLLING PROCESS
QLPDLCPR	DELETE LICENSED PROGRAM CPP
QLPDLTIP	DELETE AN INSTALLATION PROFILE
QLPDSPIN	DISPLAY LP INSTALL ACTIVITY
QLPEXIT	LPS QGPL/QUSRSYS LIBRARY EXIT PGM
QLPEXIT1	BOSS OPTION 1 EXIT PGM
QLPEXIT2	BOSS OPTION 1 MRI EXIT PGM
QLPEXTM	BOSS OPTION 1 ROUTER FOR FI EXITS

QLPHNDIP	HANDLE INSTALLATION PROFILES
QLPINATO	AUTOMATIC INSTALL EXECUTION MODULE
QLPINITP	INITIALIZE ACTIVE INSTALLATION PROFILE
QLPINLPP	LICPGM INSTALL LICENSED PROGRAMS
QLPINZCP	INZSYS COMMAND PROCESSOR
QLPIVPD	INSTALL VERIFICATION & PROB DETERMN
QLPLPRDS	API TO DISPLAY CONTENTS OF PRODUCT SAVF
QLPLPRDS	COBOL INCLUDE FOR API QLPLPRDS
QLPLPRDS	COBOL INCLUDE FOR API QLPLPRDS
QLPLPRDS	RPG OPM INCLUDE FOR QLPLPRDS API
QLPLPRDS	RPGLE INCLUDE FOR API QLPLPRDS
QLPOCINS	OPEN/CLOSE INSTALLATION PROFILES
QLPRPCPR	RESTORE LICENSED PROGRAM CPP
QLPRQEVT	REQIO EVENT HANDLER FOR TRANSFORM
QLPRTVDA	RETRIEVE THE PRODUCT DATA AREA
QLPSININ	SINGLE PROCESS INSTALL
QLPSVCPR	SAVE LICENSED PROGRAM CPP
QLPTRANS	MP INSTALL TAPE TRANSFORM ROUTINE
QLPWRKIP	WORK WITH INSTALLATION PROFILE
QLSADDTO	APPN INFORMATION ADD-TO PROGRAMS
QLSAPPNI	APPN INFORMATION MAINLINE
QLSDIR	APPN INORMATION DIRECTORY PROCESSING
QLSDSMOD	DISPLAY MODE STATUS
QLSENSSN	APPN INFO ENDPNT SESSION DATA RETRIEVAL
QLSINSSN	RETRIEVE INTERMEDIATE SESSION DATA
QLSLOG	APPN INFORMATION SESSION LOGGING ROUTINE
QLSMDADD	DISPLAY MODE STATUS LIST EXIT PROGRAM
QLSSSN	APPN INFORMATION SESSION MODULE
QLSSSNI	APPN INTERMEDIATE SESSION MODULE
QLSTDB	APPN INFO TOPOLOGY DATABASE PROCESSING
QLYGETS	GET STATUS OF BUILD INFORMATION SPACE
QLYRDBI	READ BUILD INFO FROM SPACE
QLYSETS	SET STATUS OF BUILD INFORMATION SPACE
QLYWRTBI	QLYWRTBI HEADER IN ILE/COBOL
QLYWRTBI	QLYWRTBI API HEADER FOR CBL
QLYWRTBI	WRITE BUILD INFO TO SPACE
QLYWRTBI	QLYWRTBI API HEADER IN RPG
QLYWRTBI	QLYWRTBI HEADER IN ILE/RPG
QLZA	QLZA HEADER IN ILE/COBOL
QLZA	QLZA API HEADER FOR CBL
QLZA	QLZA HEADER IN RPG
QLZA	QLZA HEADER IN ILE/RPG
QLZAADDC	ADDLICKEY CPP
QLZAADDK	ADD LICENSE KEY INFORMATION API
QLZAADDK	QLZAADDK HEADER IN ILE/COBOL
QLZAADDK	QLZAADDK API HEADER FOR CBL
QLZAADDK	QLZAADDK API HEADER IN RPG
QLZAADDK	QLZAADDK HEADER IN ILE/RPG
QLZAALK	ADD LICENSE KEY INFORMATION MPP
QLZACHG	CHANGE/RESET PEAK OPTION PROGRAM
QLZACHGP	CHGLICINF - PROMPT OVERRIDE PROGRAM
QLZACRT	CREATE LZA OBJECTS
QLZADDLI	ADD PRODUCT LICENSE INFORMATION API
QLZADDLI	QLZADDLI HEADER IN ILE/COBOL
QLZADDLI	QLZADDLI API HEADER FOR CBL
QLZADDLI	QLZADDLI API HEADER IN RPG
QLZADDLI	QLZADDLI HEADER IN ILE/RPG
QLZADSP	DISPLAY/PRINT LICENSE INFO OPTION PROGRA
QLZADSPC	DSPLICKEY CPP
QLZAGENK	GENERATE LICENSE KEY API
QLZAGENK	QLZAGENK HEADER IN ILE/COBOL
QLZAGENK	QLZAGENK API HEADER FOR CBL
QLZAGENK	QLZAGENK API HEADER IN RPG
QLZAGENK	QLZAGENK HEADER IN ILE/RPG
QLZAIEXT	UBP INVOCATION EXIT PROGRAM
QLZAINST	LZAINSTL MPP: INSTALL LICENSE FROM LP
QLZAIPL	UBP IPL CLEANUP
QLZAJOB	UBP JOB TERMINATION CLEANUP
QLZAMACP	RENAME LICENSE USER
QLZARCOV	RECOVER DAMAGED OR DESTROYED UBP OBJECTS
QLZAREQ	REQUEST LICENSE API
QLZARHND	SAVE/RESTORE OBJECT HANDLER FOR *UBPSPC
QLZARLK	RETRIEVE LICENSE KEY INFORMATION MPP
QLZARLS	RELEASE LICENSE API
QLZARMVC	RMVLICKEY CPP

QLZARSPD	RESTORE OBJECT HANDLER FOR *PRDDFN
QLZARTV	QLZARTV HEADER IN ILE/COBOL
QLZARTV	QLZARTV API HEADER FOR CBL
QLZARTV	RETRIEVE LICENSE INFORMATION API
QLZARTV	QLZARTV API HEADER IN RPG
QLZARTV	QLZARTV HEADER IN ILE/RPG
QLZARTVI	RETRIEVE LICENSE INFORMATION INTERNAL
QLZARTVK	QLZARTVK HEADER IN ILE/COBOL
QLZARTVK	QLZARTVK API HEADER FOR CBL
QLZARTVK	RETRIEVE LICENSE KEY INFORMATION API
QLZARTVK	QLZARTVK API HEADER IN RPG
QLZARTVK	QLZARTVK HEADER IN ILE/RPG
QLZASAPD	SAVE OBJECT HANDLER FOR *PRDDFN
QLZASS1X	CHKPRDOPT EXIT PROGRAM
QLZAUPD	UPDATE LICENSE INFORMATION
QLZAUSRX	WORK LICENSE INFO UIM USER EXIT
QLZAWLUO	WORK WITH LICENSE USERS OPTION PROGRAM
QLZAWRK	WORK LICENSE INFO CPP
QL6ACERR	L6 APPC ERROR ROUTINE
QL6ACQ	L6 XLN SOURCE SIDE ACQUIRE SESSION
QL6ACQR	L6 TARGET XLN SESSION ACQUIRE
QL6ACRCV	L6 APPC RECEIVE DATA
QL6ACRT	L6 APPC ROUTER
QL6ATERM	L6 L6 APPC TERMINATION PROCEDURE
QL6CFAIL	L6 CONTROLLER FAILURE MODULE
QL6DCRCV	L6 DETACH/CONFIRM RECEIVE PROCESSOR
QL6EVRCV	L6 XLN TARGET LU RECEIVE
QL6EVSND	L6 XLN SOURCE EVOKE AND SEND
QL6IFRGT	L6 IMPLIED FORGET EVENT HANDLER
QL6INXDR	L6 LOCATION INDEX DAMAGE REPAIR
QL6LRPPP	QLUR PROCESS PROBLEM PHASE PROGRAM
QL6L6ERP	L6 ERROR PROCESSOR
QL6PSH	L6 PS HDR FORMATTER & CLASSIFY RESOURCE
QL6RCVCF	L6 SOURCE RECEIVE AN SEND CONFIRM
QL6RCVSD	L6 RESYNC SOURCE RECEIVE/SEND DETACH
QL6RLBLP	L6 BACKOUT LOOP
QL6ROLLB	L6 SEND A BACKOUT FMH-7 OR +RSP
QL6RSACQ	SOURCE RESYNC ACQUIRE MODULE
QL6RSRCV	L6 TARGET XLN RECEIVE +RSP
QL6RSSND	L6 SEND RESPONSE PROCESSO
QL6RSYNC	L6 SOURCE LU RESYNC PROCESSOR
QL6RXREV	L6 QLUR EVENT HANDLER
QL6STMGT	L6 STORAGE MANAGEMENT ROUTINE
QL6VRYOF	L6 LUD VARY OFF ROUTINE
QL6VRYON	L6 VARY ON MODULE
QL6XCSND	L6 TARGET RESYNC XLN AND CS SEND MODULE
QMAAUDIT	UPGRADE ORDER PROCESS AUDIT MODULE
QMABLDWO	WRKORDRQS SEND ORDER BUILD PGM
QMACNTIN	SAVE AND RETRIEVE CONTACT INFORMATION
QMACRTCF	CREATE SYSTEM CONFIGURATION FILE
QMACRTCT	CREATE SYTEM CONFIGURATION FILE E
QMAEXTCT	UPGRADE ORDER PROCESS EXTRACT MODULE
QMAFILE	UPGRADE ORDER PROCESS FILE RESOLVE
QMAIEXIT	WORK WITH ORDER INFORMATION IEXIT
QMAMEDIA	UPGRADE ORDER PROCESS READ/WRIT TO MEDIA
QMAORDRQ	REQUEST ORDER ASSISTANCE UIM INTERFACE
QMAORDRV	REQUEST ORDER ASSISTANCE DRIVER MODULE
QMAPRSWO	WRKORDRQS SEND ORDER PARSE PGM
QMARETAN	EUOP VIA RETAIN MODULE
QMARQSOA	API FOR REQUEST ORDER ASSISTANCE
QMAWKORI	WORK WITH ORDER INFORMATION
QMHADRLE	ADD REPLY LIST ENTRY
QMHALMSQ	ALLOCATE MESSAGE QUEUE
QMHAPD	AUTOMATIC PROBLEM DETERMINATION
QMHBREVT	HANDLE BREAK MESSAGE EVENT
QMHCHGEM	CHANGE EXCEPTION MESSAGE API
QMHCHMSD	CHANGE MESSAGE DESCRIPTION
QMHCHMSF	CHANGE MESSAGE FILE
QMHCHMSQ	CHANGE MESSAGE QUEUE
QMHCHRLE	CHANGE REPLY LIST ENTRY
QMHCLOSE	CLOSE QDGENDSP
QMHCLSAP	CLOSE COMMAND ENTRY UIM APPLICATION
QMHCLVER	CREATE LOG VERSION
QMHCRJMQ	MODULE FOR QMHCRJMQ
QMHCRMSD	CREATE MESSAGE DESCRIPTION
QMHCRMSF	CREATE MESSAGE FILE
QMHCRMSQ	CREATE MESSAGE QUEUE
QMHCRTDQ	CREATE DATA QUEUE CPP
QMHCRTRL	CREATE REPLY LIST
QMHCTLJL	CONTROL JOB LOG OUTPUT
QMHCTLJL	QMHCTLJL HEADER IN ILE/COBOL
QMHCTLJL	QMHCTLJL API HEADER IN RPG
QMHCTLJL	QMHCTLJL HEADER IN ILE/RPG
QMHCVJMQ	CONVERT OLD JMQ TO NEW JMQ-PQS
QMHDLMS	DELETE MESSAGE
QMHDLMSD	DELETE MESSAGE DESCRIPTION
QMHDLMSQ	DELETE MESSAGE QUEUE
QMHDLVMS	DELIVER MESSAGE
QMHDMGNT	MESSAGE QUEUE DAMAGE NOTIFICATION PGM
QMHDSEXT	DISPLAY PROGRAM MESSAGES *EXT
QMHDSMSD	DISPLAY MESSAGE DESCRIPTION
QMHDSMSF	DISPLAY MESSAGE FILE
QMHDSMSS	DISPLAY MESSAGES
QMHDSPJL	DISPLAY JOB LOG
QMHDSPLK	DISPLAY OBJECT LOCK SPECIAL HANDLER
QMHDSPRL	DISPLAY REPLY LIST ENTRIES
QMHDUPMQ	CREATE DUPLICATE MESSAGE QUEUE
QMHFLDMQ	FIX DAMAGED MESSAGE QUEUES
QMHFLTR	JOB LOG FILTER
QMHGSD	GENERAL SESSION DISPLAY
QMHJLDB	JOB LOG TO DB
QMHJLOG	WRITE JOB LOG
QMHJLOGO	WRITE JOB LOG FOR OLD JMQ
QMHLDISP	DISPLAY SYSTEM LOGS
QMHLINIT	SYSTEM LOG INITIALIZATION ROUTINE
QMHLJOBL	LIST JOB LOG MESSAGES
QMHLJOBL	LIST JOB LOG - API
QMHLJOBL	QMHLJOBL HEADER IN ILE/COBOL
QMHLJOBL	LIST JOB LOG MESSAGE
QMHLJOBL	QMHLJOBL HEADER IN ILE/RPG
QMHLOGER	LOG QHST ENTRIES TO DB FILE
QMHLSTEX	MESSAGE DESCRIPTION LIST EXIT FUNCTIONS
QMHLSTM	LIST NONPROGRAM MESSAGES
QMHLSTM	LIST STANDARD MESSAGE QUEUE MESSAGES
QMHLSTM	QMHLSTM HEADER IN ILE/COBOL
QMHLSTM	LIST NONPROGRAM MESSAGE
QMHLSTM	QMHLSTM HEADER IN ILE/RPG
QMHMFPOV	PROMPT OVERRIDE PROGRAM FOR MH COMMANDS
QMHMFSRH	MESSAGE FILE SEARCH
QMHMODQS	EXTEND/TRUNCATE MESSAGE QUEUES
QMHMOVPM	MOVE PROGRAM MESSAGES API
QMHMRCHK	CHECK MSG Q FOR MOVE/RENAME
QMHMRGMF	MERGE MESSAGE FILE
QMHMSSFL	ERROR MESSAGE DISPLAY MANAGER
QMHPDEH	PROCESS DEFAULT EXCEPTION HANDLER
QMHPOVR	PROMPT OVERRIDE PROGRAM FOR MH COMMANDS
QMHPQSEH	PQS THRESH-HOLD EVENT HANDLER
QMHPRMM	PROMOTE MESSAGE API
QMHPTMSD	PRINT MESSAGE DESCRIPTIONS
QMHQCRTQ	CREATE DATA QUEUE CPP
QMHQDLTQ	DELETE DATA QUEUE CPP
QMHQDRGQ	DEREGISTER DATA QUEUE
QMHQRDQD	QMHQRDQD HEADER IN ILE/COBOL
QMHQRDQD	RETRIEVE DESCRIPTON OF DATA
QMHQRDQD	RETRIEVE DATA QUEUE DESCRIPTION
QMHQRDQD	QMHQRDQD HEADER IN ILE/RPG
QMHQRDQD	RETRIEVE DATA QUEUE
QMHQREGQ	RECEIVE AND REGISTER DATA QUEUE
QMHQRSTQ	DATA QUEUE RESTORE OBJECT HANDLER
QMHQSAVQ	DATA QUEUE SAVE OBJECT HANDLER
QMHRCVIX	RECEIVE MESSAGE I-EXIT PROGRAM
QMHRCVM	QMHRCVM HEADER IN ILE/COBOL
QMHRCVM	RECEIVE NONPROGRAM MESSAGE
QMHRCVM	RECEIVE MESSAGE API
QMHRCVM	QMHRCVM HEADER IN ILE/RPG
QMHRCVM	RECEIVE NONPROGRAM MESSAGE
QMHRCVMS	RECEIVE MESSAGE CPP INTERFACE
QMHRCVPM	QMHRCVPM HEADER IN ILE/COBOL
QMHRCVPM	RECEIVE PROGRAM MESSAGE
QMHRCVPM	RECEIVE PROGRAM MESSAGE API

QMHRCVPM	QMHRCVPM HEADER IN ILE/RPG
QMHRCVPM	RECEIVE PROGRAM MESSAGE
QMHRDQM	QMHRDQM HEADER IN ILE/COBOL
QMHRDQM	RECEIVE DATA QUEUE MESSAGE
QMHRDQM	RETRIEVE DATA QUEUE MESSAGES
QMHRDQM	QMHRDQM HEADER IN ILE/RPG
QMHRDQM	RETRIEVE MESSAGE DATA QUEUE
QMHRLEX	SYSTEM REPLY LIST EXIT FUNCTION
QMHRMFAT	QMHRMFAT HEADER IN ILE/COBOL
QMHRMFAT	QMHRMFAT API HEADER FOR CBL
QMHRMFAT	RETRIEVE MESSAGE FILE ATTRIBUTES
QMHRMFAT	QMHRMFAT API HEADER IN RPG
QMHRMFAT	QMHRMFAT HEADER IN ILE/RPG
QMHRMQAT	QMHRMQAT HEADER IN ILE/COBOL
QMHRMQAT	RETRIEVE NONPROGRAM MESSAGE
QMHRMQAT	RETRIEVE NON-PORGRAM MSGQ ATTRIBUTES
QMHRMQAT	QMHRMQAT HEADER IN ILE/RPG
QMHRMQAT	RETRIEVE NONPROGRAM MESSAGE
QMHRMRLE	REMOVE REPLY LIST ENTRY
QMHRMVM	REMOVE MESSAGE API
QMHRMVPM	REMOVE PROGRAM MESSAGE API
QMHRPRQ	REPLACE REQUEST
QMHRSNEM	QMHRSNEM HEADER IN ILE/COBOL
QMHRSNEM	QMHRSNEM API HEADER FOR CBL
QMHRSNEM	RESEND EXCEPTION MESSAGE API
QMHRSNEM	QMHRSNEM API HEADER IN RPG
QMHRSNEM	QMHRSNEM HEADER IN ILE/RPG
QMHRSTMQ	RESTORE MESSAGE QUEUE
QMHRSTPR	RESET PRIORITY AFTER QMHAPD DUMPS
QMHRTMSS	RETRIEVE MESSAGE
QMHRTNEX	RETURN FROM EXCEPTION
QMHRTVM	QMHRTVM HEADER IN ILE/COBOL
QMHRTVM	RECEIVE MESSAGE
QMHRTVM	RETRIEVE MESSAGE API
QMHRTVM	QMHRTVM HEADER IN ILE/RPG
QMHRTVM	RETRIEVEM MESSAGE
QMHRTVMS	RETRIEVE MSG CPP INTERFACE
QMHRTVRQ	QMHRTVRQ HEADER IN ILE/COBOL
QMHRTVRQ	RETRIEVE REQUEST MESSAGE
QMHRTVRQ	RETRIEVE REQUEST MESSAGE
QMHRTVRQ	QMHRTVRQ HEADER IN ILE/RPG
QMHRTVRQ	RETRIEVE REQUEST MESSAGE
QMHSAVMQ	SAVE MESSAGE QUEUE
QMHSCLVL	DISPLAY ADDITIONAL MESSAGE INFO
QMHSCPEV	SCOPE PGM NOT INVOKED HANDLER
QMHSNBRK	SEND BREAK MESSAGE
QMHSNDBM	SEND BREAK MESSAGE API
QMHSNDM	SEND MESSAGE API
QMHSNDPM	SEND PROGRAM MESSAGE API
QMHSNDRM	SEND REPLY MESSAGE API
QMHSNDSM	SEND SCOPE MESSAGE API
QMHSNEVT	SEND NECESSARY EVENTS FOR MSG SENT
QMHSNINQ	SEND INQUIRYING TYPE MESSAGE
QMHSNMSG	SEND MESSAGE - SNDMSG COMMAND
QMHSNPGM	SEND PROGRAM MESSAGE - SNDPGMMSG CMD
QMHSNRPL	SEND REPLY
QMHSNRQ	SEND REQUEST
QMHSNSTA	SEND STATUS MESSAGE
QMHSNSTQ	SEND MESSAGE TO STANDARD MESSAGE QUEUE
QMHTSEVT	HANDLE CHGJOB BRKMSG CHANGES
QMHUNMSG	UNMONITORED MESSAGE ROUTINE
QMHVFYLT	VERIFY IF LIGHT IS TO BE TURNED ON
QMHWRMSS	WORK WITH MESSAGES
QMNCMDPM	QMNCMDPM
QMNCONFG	CONFIGURATION MENU CONTROLLER
QMNDSPWS	DISPLAY WORK STATION USER
QMNHCMD	PROCESS CMD GROUP CMDS
QMNPASWD	CHECK PASSWORD CPP
QMNSBS	EXT SBS NAME CPP
QMNSELCT	SLTCMD ROUTINE
QMNSYSRQ	SYSTEM REQUEST MENU
QMNUIM	DISPLAY A UIM PANEL
QMNWRKDS	DISPLAY ROUTINE FOR WRKF
QMNWRKXX	WORK WITH OBJ CPP
QMNWRKX1	WRKOBJ DELETE ROUTINE

QMNWRKX2	WORK WITH CMD DELETE ROUTINE
QMODIA59	ADOPT QSYS, ISSUE DIAG 59
QMODLTOT	DELETE OPTICAL TABLES
QND5CDIS	5394 ON LU62 INIT CD ASSOCIATED SPACE
QND5ITRM	5394 ON LU62 INVOCATION EXIT PROGRAM
QND5MAIN	5394 ON LU62 TRANSACTION PROGRAM
QND5VRYO	5394 ON LU62 VARY OFF CD
QNFBROWS	BROWSE PHYSICAL FILE MEMBER
QNFCLRQ	CLEAR RECIPIENT QUEUE
QNFCNJOP	PROMPT OVERRIDE PROGRAM
QNFDSPRC	DISPLAY NETWORK FILES
QNFDSTRB	DISTRIBUTE DATA TO LOCAL USERS
QNFIEXIT	NF INVOCATION EXIT PROGRAM
QNFJOBAU	ADD/CHG/RMV NETWORK JOB ENTRY
QNFJOBDS	DISPLAY NETWORK JOB ENTRIES
QNFPACK	COPY DATA TO FILE SERVER OBJECT
QNFRBLDQ	REBUILD NF MESSAGES ON RECIPIENT QUEUE
QNFRCDTA	CANCEL/RECEIVE NETWORK FILE
QNFRCLNF	RECLAIM NETWORK FILE OBJECTS
QNFREPAK	REBLOCK RSCS DATA IN FILE SERVER OBJECT
QNFRNUSR	RENAME DIRECTORY ENTRY
QNFSBMTP	SUBMIT TRANSACTION PROGRAM JOB
QNFSNDTA	SEND NETWORK FILE
QNFSNMSG	SEND NETWORK MESSAGE
QNFSNSPL	SEND NETWORK SPOOLED FILE
QNFTPDTA	TRANSACTION PROGRAM FOR DATA
QNFUNPAK	REFORMAT DATA INTO RECEIVING FILE
QNFUSREX	UIM USER EXIT PROGRAM
QNMACEH	SNA/MS APPL CTL EVENT HANDLER
QNMACIE	SNA/MS APPL CTL INVOC EXIT
QNMACP1	SNA/MS APPLICATION PROCESS 1
QNMACQFP	SNA/MS ACQUIRE FOCAL POINT
QNMADSCE	ADD SOC ENTRY CPP
QNMADSCM	ADD SOC ENTRY MACRO
QNMAMEH	SNA/MS ASSOC MGR EVT HANDLER
QNMAMEP	SNA/MS ASSOC MGR ENTRY POINT
QNMAMGR	SNA/MS ASSOCIATION MANAGER
QNMAMRC	SNA/MS MS CAPABILITIES RECEIVER
QNMAMSC	SNA/MS MS CAPABILITIES SENDER
QNMAMSL	NM/MS SEND FOCAL POINT LOOP DETECTION MV
QNMAMSOC	SNA/MS SOC MANAGER
QNMAPCTL	SNA/MS APPLICATION CONTROL
QNMAPYFR	APPLY FILTER API
QNMCHGMN	SNA/MS CHANGE MODE NAME
QNMDLSCM	DELETE SOC ENTRY MACRO
QNMDPSOC	DISPLAY SOC STATUS CPP
QNMDRGAP	SNA/MS TRANSPORT DEREGISTER APPLICATION
QNMDRGFN	DEREGISTER FOR FILTER NOTIFICATIONS
QNMDRGTI	DEREGSITER FOR APPN TOPOLOGY INFO API
QNMENDAP	SNA/MS END APPLICATION API
QNMEVK	MS XPORT EVOKED PROGRAM
QNMFRAAE	COMMAND PROCESSOR FOR THE ADDXXXACNE CMD
QNMFRASE	COMMAND PROCESSOR FOR THE ADDXXXSLTE CMD
QNMFRAXT	WRKFTRACNE COMMAND UIM EXIT PROCESSOR
QNMFRCAE	COMMAND PROCESSOR FOR THE CHGXXXACNE CMD
QNMFRCH	CHANGE FILTER
QNMFRCR	CREATE FILTER
QNMFRCSE	CHGXXXSLTE COMMAND PROCESSING PROGRAM
QNMFRIXT	FILTER PROCESSING INVOCATION EXIT
QNMFRMAE	WRKFTRACNE - MOVE/RENAME ACTION ENTRY
QNMFRMSE	WRKFTRSLTE - MOVE/COPY SELECTION ENTRY
QNMFRPRS	SELECTION ENTRY PARSER
QNMFRPX	CHGXXXFTR PROMPTER EXIT PROGRAM
QNMFRRAE	COMMAND PROCESSOR FOR THE RMVFTRACNE CMD
QNMFRRSE	COMMAND PROCESSOR FOR THE RMVFTRSLTE CMD
QNMFRSPX	CHGXXXSLTE PROMPTER EXIT PROGRAM
QNMFRSXT	WRKSLTE COMMAND UIM EXIT PROCESSOR
QNMFRUPR	SELECTION ENTRY UNPARSER
QNMFRWAE	COMMAND PROCESSOR FOR WRKFTRSLTE CMD
QNMFRWK	COMMAND PROCESSOR FOR THE WRKFTR CMD
QNMFRWSE	COMMAND PROCESSOR FOR THE WRKSLTE CMD
QNMFRXT	WRKFTR LIST EXIT
QNMFRXTP	WRKFTR LIST EXIT FOR PRINTING
QNMINDEX	FILTER INDEX OPERATIONS
QNMMSTEH	SNA/MS TRANSPORT EVENT HANDLER

QNMRCVDT	MS TRANSPORT RECEIVE DATA API
QNMRCVDT	QNMRCVDT HEADER IN ILE/COBOL
QNMRCVDT	QNMRCVDT API HEADER FOR CBL
QNMRCVDT	QNMRCVDT API HEADER IN RPG
QNMRCVDT	QNMRCVDT HEADER IN ILE/RPG
QNMRCVOC	SNA/MS TRANSP RCV DATA OPERATION COMPL
QNMREGAP	SNA/MS TRANSPORT REGISTER APPLICATION
QNMRGFN	QNMRGFN HEADER IN ILE/COBOL
QNMRGFN	QNMRGFN API HEADER FOR CBL
QNMRGFN	REGISTER FOR FILTERING NOTIFICATION
QNMRGFN	QNMRGFN API HEADER IN RPG
QNMRGFN	QNMRGFN HEADER IN ILE/RPG
QNMRGTI	QNMRGTI INCLUDE ILE/RPG
QNMRGTI	QNMRGTI API HEADER FOR CBL
QNMRGTI	REGISTER FOR TOPOLOGY INFORMATION API
QNMRGTI	QNMRGTI API HEADER IN RPG
QNMRGTI	QNMRGTI HEADER IN ILE/RPG
QNMRMSCE	REMOVE SOC ENTRY CPP
QNMRRGF	QNMRRGF HEADER IN ILE/COBOL
QNMRRGF	QNMRRGF API HEADER FOR CBL
QNMRRGF	RETRIEVE REGISTERED FILTERS API
QNMRRGF	QNMRRGF API HEADER IN RPG
QNMRRGF	QNMRRGF HEADER IN ILE/RPG
QNMRTVFP	SNA/MS TRANSPORT RETRIEVE FOCAL POINT
QNMRTVMN	SNA/MS TRANSPORT RETRIEVE MODE NAME
QNMSNDER	SNA/MS TRANSPORT SEND ERROR
QNMSNDRP	SNA/MS TRANSPORT SEND REPLY
QNMSNDRQ	SNA/MS TRANSPORT SEND REQUEST
QNMSOCXT	EXIT PROGRAM FOR WRKSOC PANEL PROCESSING
QNMSTRAP	MS START APPLICATION
QNMTEXIT	SNA/MS TRANSPORT JOB TERMINATION
QNMTIEH	NM TOPOLOGY INFORMATION EVENT HANDLER
QNMTIEXT	SNA/MS TRANSPORT INVOCATION EXIT
QNMTIXT	INVOCATION EXIT FOR NM TOPOLOGY APIS
QNMWKSOC	WORK WITH SOC CPP
QNPSEXFD	EXTRACT PRINTER DEVICE FILE ATTRIBUTES
QNPSXPFD	EXTRACT PRINTER DEVICE FILE ATTRIBUTES
QNXDMCLN	CLOSE JOBS NX WORKSTATION PRINTERS
QNXENDC	END CONNECTION
QNXERROR	NX UNSOLICITED DATA HANDLER
QNXIEXIT	NX API INVOCATION EXIT PROGRAM
QOCAUTO	AUTOMATICALLY PROCESS MEETING NOTICES
QOCCADRD	ADDRMTDFN COMMAND CPP
QOCCCHRD	CHGRMTDFN COMMAND CPP
QOCCDPRD	DSPRMTDFN COMMAND CPP
QOCCHITM	CHANGE CAL ITEM(S) PROGRAM (CHGCALIT)
QOCCHKCF	CHECK CALENDAR CONFLICTS PROGRAM
QOCCHPOP	CHGRMTDFN COMMAND POP OVERIDE
QOCCPP	CALENDAR SERVICE CPP
QOCCRITM	CREATE CAL ITEMS PROGRAM - CRTCALIT
QOCCRMRD	RMVRMTDFN COMMAND CPP
QOCCTLOF	STR/END/CHK OFFICE SERVICES API
QOCCWKRC	WRKRMTDFN COMMAND CONFIRM INPUT
QOCCWKRD	WRKRMTDFN COMMAND CPP
QOCCWKRP	WRKRMTDFN COMMAND POSITIONTO
QOCCWKRR	WRKRMTDFN COMMAND CONFIRM REMOVE
QOCCWKRU	WRKRMTDFN COMMAND UPDATE LIST
QOCDLITM	DELETE CAL ITEM(S) PROGRAM (DLTCALIT)
QOCDUMP	DUMP CALENDAR DATA AREAS
QOCEMNTI	EMN TO RFTAS400 DOCUMENT TRANSFORM
QOCEVOKE	CALENDAR TPN EVOKE PROGRAM
QOCEXIT	CALENDAR TERMINATION
QOCGTITM	GET CALENDAR ITEMS PROGRAM -GETCALIT
QOCINIT	CALENDAR INITIALIZATION
QOCLOADM	RELOAD TRANSLATABLE CONSTANT TABLE
QOCNFYMG	NOTIFY CALENDAR MANAGER PROGRAM
QOCOLEMN	OLD-NOTICE TO EMN DOCUMENT TRANSFORM
QOCPCAL	PROCESS CALENDAR PROGRAM (?XXXCAL)
QOCPGRP	PROCESS GROUPS PROGRAM (?XXXGRP)
QOCPINV	PROCESS INVITEE LIST PROGRAM - OCPRCINV
QOCPNTC	PROCESS MEETING NOTICES
QOCPTABB	PARSING TABLE FOR INTERNODAL CAL B
QOCPTABL	PARSING TABLE FOR INTERNODAL CALENDAR
QOCRNUSR	RENAME USER ID IN CALENDAR FILES
QOCVFYTM	VERIFY CALENDAR TIME PROGRAM
QOCXELP	DOCUMENT REQUEST EXECUTION
QOCXLTB	LOAD CONSTANT MESSAGE TABLE
QOCXNODE	CAL SERVICE INTERNODAL REQUEST ROUTER
QODADIR	HFS FOR DIRECTORY OPERATIONS
QODAINIT	INITIALIZATION SETUP FOR HFS FUNCTIONS
QODALMAP	DLO STORAGE MANAGEMENT
QODALOCK	HFS FOR LOCK/UNLOCK DATA SPACE
QODAMAIN	HFS FOR OPEN, READ, WRITE ETC FOR FILES
QODAMCDR	HFS FOR MOVE, COPY, DELETE AND RENAME
QODARGFS	REGISTER THE DLS FILE SYSTEM WITH API
QODATERM	TERMINATION CLEANUP FOR HFS FUNCTIONS
QODAUDIT	CREATE AUDITING ENTRY FOR DLOS
QODCHKCP	STUB MODULE FOR BUILDS
QODCHKEY	QDLS CHECKIN/CHECKOUT DOCUMENT
QODCHKVC	STUB MODULE FOR BUILDS
QODCLOSE	CLOSE DOCUMENT/FOLDER
QODCPPIX	CPP MODULES IEXIT HANDLER
QODCPYCP	COPY DOCUMENT CPP
QODCPYD	COPY DOCUMENT
QODCPYDS	COPY DATA STREAM
QODCPYTX	STUB MODULE FOR BUILDS
QODCPYVC	COPY DOC VALIDITY CHECKER PROGRAM
QODCRT	CREATE FOLDER OR DOCUMENT
QODCRTCP	CREATE FOLDER CPP
QODCRTSP	CREATE SECONDARY SPACE FOR FMS OBJECT
QODCRTVC	CRTFLR VALIDITY CHECKER PROGRAM
QODCVTCR	CONVERT DLO TO CURRENT RELEASE
QODDLSMA	DLS MODULE INTERFACE FOR HLL APPLICATION
QODDLT	DELETE FOLDER OR DOCUMENT
QODDLTAR	DELETE ASSOCIATE RECORD MODULE
QODDLTCP	DELETE DLO CPP
QODDLTDL	DELETE FMS OBJECTS FROM QTEMP
QODDLTDS	DELETE DATA STREAM
QODDLTTX	DELETE TEXT MODULE
QODDLTVC	DLTDLO VALIDITY CHECKER PROGRAM
QODDMPCP	DMPDLO CPP
QODDMPVC	DMPDLO VALIDITY CHECKER PROGRAM
QODDUMP	DUMP DOCUMENT LIBRARY OBJECT
QODDUMP2	QDLS DUMP PROGRAM
QODENSUR	ENSURE DOCUMENT/FOLDER OBJECTS
QODFIND	FIND DOCUMENT/FOLDER
QODFIXDB	FIX DIA DATABASE ANCHOR RECORD
QODFSO	RECOVER FSO
QODGETA	GET DOC/FLR ATTRIBUTES
QODGETAR	GET ASSOCIATE RECORD MODULE
QODGETDS	GET DATA STREAM
QODGETP	GET DOC/FLR PROFILE
QODGETTX	GET TEXT
QODIDXC	DOCUMENT INDEXING COMPLETE
QODINFTX	GET INFORMATION TEXT MODULE
QODINIT	FMS SESSION INITIALIZATION
QODIPL	FMS IPL PROGRAM
QODLCKDS	LOCK DATA STREAM
QODLIST	LIST DOCUMENTS/FOLDERS
QODLMRVY	LIST MANAGEMENT RECOVERY MODULE
QODLSTOB	OD LIST OBJECT MODULE
QODMISC1	LOG DOCUMENT/FOLDER SECURITY ERRORS
QODMISC2	STUB MODULE FOR BUILDS
QODMISC3	STUB MODULE FOR BUILDS
QODMISC4	FMS DUMMY EPT MODULE #4
QODMISC5	FMS DUMMY EPT MODULE #5
QODMOVCP	MOVE DOCUMENT CL COMMAND PROCESSOR
QODMOVD	MOVE DOCUMENT
QODMOVVC	MOVE DOCUMENT CL CMD VALIDITY CHECKER
QODOBJSZ	RETRIEVE DLO SIZE
QODOPEN	OPEN FOLDER AND/OR DOCUMENT
QODPUTA	PUT DOC/FLR ATTRIBUTES
QODPUTAR	PUT ASSOCIATE RECORD MODULE
QODPUTDS	PUT DATA STREAM
QODPUTP	PUT DOC/FLR PROFILE
QODPUTTX	PUT TEXT MODULE
QODRCL	RECLAIM DOCUMENT/FOLDER
QODRCLCP	RCLDLO CPP
QODRCLVC	RCLDLO VALIDITY CHECKER PROGRAM
QODRDKEY	READ ASSOCIATE RECORD KEY(S)

QODRECLM	RECLAIM STORAGE FOR FMS OBJECTS
QODRGZ	DOCUMENT REDUCTION MODULE
QODRGZCP	REORGANIZE DOCUMENT CPP
QODRGZVC	VALIDITY CHECKER FOR RGZDOC
QODRNM	RENAME FOLDER OR DOCUMENT
QODRNMCP	RENAME DLO CPP
QODRNMVC	RNMDLO VALIDITY CHECKER PROGRAM
QODROOT	RECOVER *ROOT FOLDER
QODRSTDL	MULTI-SPACE OBJECT HANDLER FOR RSTDLO
QODRTVCP	CPP FOR RTVDLONAM AND DSPDLONAM COMMANDS
QODRTVVC	VCP FOR RTVDLONAM AND DSPDLONAM COMMANDS
QODSAVDL	MULTI-SPACE OBJECT HANDLER FOR SAVDLO
QODSRPOS	RESTORE DIA DB POST-EXIT PROGRAM
QODSRPRE	RESTORE DIA DB PRE-EXIT PROGRAM
QODSWFIN	OD V3R1M0 SWFL CONVERSION
QODSWFL	RECOVER SWFL
QODSWILL	OD SYSTEM WIDE LADN LIST
QODSWRL	FMS SYSTEM WIDE RECOVERY LIST
QODTERM	FMS SESSION TERMINATION
QODXITPG	FMS EXIT PROGRAM API
QODXRTCD	TRANSLATE RETURN CODE TO EXCEPTION
QOEAS	BUILD EDITOR ROOT MODULE ASP
QOEAUT	RETRIEVE PLATFORM DATA AREA
QOEB01	BIDIRECTIONAL LANGUAGE MODULE 1
QOEB02	BIDIRECTIONAL LANGUAGE MODULE 2
QOEB03	BIDIRECTIONAL LANGUAGE MODULE 3
QOEB04	BIDIRECTIONAL LANGUAGE MODULE 4
QOEB05	BIDIRECTIONAL LANGUAGE MODULE 5
QOEB06	BIDIRECTIONAL LANGUAGE MODULE 6
QOEB07	BIDIRECTIONAL LANGUAGE MODULE 7
QOEB08	BIDIRECTIONAL LANGUAGE MODULE 8
QOEB09	BIDIRECTIONAL LANGUAGE MODULE 9
QOEB10	BIDIRECTIONAL LANGUAGE MODULE 10
QOEB11	BIDIRECTIONAL LANGUAGE MODULE 11
QOEB12	BIDIRECTIONAL LANGUAGE MODULE 12
QOEB13	BIDIRECTIONAL LANGUAGE MODULE 13
QOEB14	BIDIRECTIONAL LANGUAGE MODULE 14
QOEB15	BIDIRECTIONAL LANGUAGE MODULE 15
QOEB16	BIDIRECTIONAL LANGUAGE MODULE 16
QOECHECK	CHECK IF USER ENROLLED IN OFFICE
QOECMCRT	COMMAND PROCESSOR FOR CRTDOC COMMAND
QOECMDSF	COMMAND PROCESSOR FOR DSPFLR COMMAND
QOECMDSP	COMMAND PROCESSOR FOR DSPDOC COMMAND
QOECMEDT	COMMAND PROCESSOR FOR EDTDOC COMMAND
QOECMHLP	COMMAND PROCESSOR FOR DSPHLPDOC COMMAND
QOECMPRQ	COMMAND PROCESSOR FOR DSPDOCPRTQ COMMAND
QOECMPRT	COMMAND PROCESSOR FOR PRTDOC COMMAND
QOECMWKF	COMMAND PROCESSOR FOR WRKFLR COMMAND
QOECMWRK	COMMAND PROCESSOR FOR WRKDOC COMMAND
QOEDCTCR	CREATE SPELL AID DICTIONARY
QOEDD	CREATE/DESCRIBE DOCUMENTS
QOEDE	DOCUMENT REQUEST EXECUTION
QOEDH	DOCUMENT HANDLER MODULE
QOEDL	SELECT DOCUMENT
QOEDP	PRINT DOCUMENT LIST
QOEDW	WORK WITH DOCUMENTS
QOED2	DEEDIT SUBROUTINE
QOEEXIT	DW INVOCATION EXIT ROUTINE
QOEFFV	FORM FIELD EDITING/VALIDATION
QOEGD	VIEW OR PRINT GRAPHIC
QOEGO	GO TO ANOTHER LIST MENU
QOEGP	PRINT GRAPHIC OPTIONS
QOEHP	HELP INTERFACE
QOEHPEX	ONLINE BROWSE EXIT ROUTINE
QOEIEXIT	EXIT FOR CREATE OF SPELL AID DICTIONARY
QOEIO	INDEX OPTION MODULE
QOELD	CREATE/DESCRIBE FOLDER
QOELL	SELECT TEXT FOLDER DISPLAY
QOELT	FORM FIELD LOCATOR TABLE MANAGER
QOEMD	CREATE DOCUMENT FROM MESSAGE
QOEMN	TEXT FOLDER MAINTENANCE
QOEOL	SELECT NON-TEXT DOCUMENT DATA
QOEOW	WORK WITH OBJECTS MODULE
QOEPOCRT	PROMPT OVERRIDE PROGRAM FOR CRTDOC CMD
QOEPODSP	PROMPT OVERRIDE PROGRAM FOR DSPDOC

QOEPOEDT	PROMPT OVERRIDE PROGRAM FOR EDTDOC
QOEPOPRT	PROMPT OVERRIDE PROGRAM FOR PRTDOC
QOEPOWRK	PROMPT OVERRIDE PROGRAM FOR WRKDOC
QOEPQ	PRINT QUEUE
QOEPRTSW	PRINT STOP WORD LIST
QOERA	REVISE SUPPLEMENTAL DICTIONARY DISPLAY
QOERD	RETRIEVE DOCUMENT & CREATE VIRTUAL FILE
QOERT	OFFICE EDITOR ROOT MODULE
QOERTVSW	RETRIEVE STOP WORD LIST
QOERV	DOCUMENT RECOVERY MODULE
QOERZ	QOERT, THE SEQUEL
QOESAVDC	N TO N-1 SAVE *SPADCT OBJECT HANDLER
QOESETEX	QOERA CLEANUP ROUTINE
QOESTUB	STUB MODULE
QOESU	SUSPEND EDIT DISPLAY
QOETWAPI	GET STOP WORD LIST NAME
QOEVLCRT	VALIDITY CHECKER FOR CRTDOC COMMAND
QOEVLDSF	VALIDITY CHECKER FOR DSPFLR
QOEVLDSP	VALIDITY CHECKER FOR DSPDOC & PAGDOC
QOEVLEDT	VALIDITY CHECKER FOR EDT, CRT, DSP, PAG
QOEVLHLP	VALIDITY CHECKER FOR DSPHLPDOC
QOEVLPRT	VALIDITY CHECKER FOR PRTDOC
QOEVLWKF	VALIDITY CHECKER FOR WRKFLR COMMAND
QOEVLWRK	VALIDITY CHECKER FOR WRKDOC COMMAND
QOEXITPQ	CLOSE FILE ON ABNORMAL EXIT
QOFCHAUT	CHECK FOR ROOT FOLDER CREATE AUTHORITY
QOFDWMN	MAIN MODULE FOR DW MATCHER
QOFDWXFM	DOCUMENT XFORM MODULE FOR DW MATCHER
QOFFMS	RSTS36FLR - FMS INTERFACE MODULE
QOFIDP	IDP MODULE FOR DW MATCHER
QOFOPDKT	OPEN DISKETTE FILE FOR FOLDER RESTORE
QOFRSTCP	RESTORE S/36 FOLDER CPP
QOFRSTIX	RSTS36FLR IEXIT MODULE
QOFRSTVC	RSTS36FLR VALIDITY CHECKER PROGRAM
QOFRTVEN	RETRIEVE ENROLLMENT INFORMATION
QOFTAPDT	RSTS36FLR - TAPE DATA MODULE
QOFTPHDR	WRITE TAPE LABEL INFO TO FILES
QOFVALDV	FOLDER RESTORE DEVICE VALIDATAION
QOGCHGOE	API CHANGE OFFICE EXIT PROGRAMS
QOGCSHCL	INITIALIZE O1 CACHE STRUCTURE
QOGCSHIN	INITIALIZE O1 CACHE STRUCTURE
QOGRTVOE	QOGRTVOE HEADER IN ILE/COBOL
QOGRTVOE	QOGRTVOE API HEADER FOR CBL
QOGRTVOE	RETRIEVE OFFICE EXIT PROGRAMS
QOGRTVOE	QOGRTVOE API HEADER IN RPG
QOGRTVOE	QOGRTVOE HEADER IN ILE/RPG
QOHACK	MAIL SERVICE ACKNOWLEDGE ROUTINE
QOHACKRY	ACKNOWLEDGE I-EXIT PROCESSOR
QOHBLDDP	DISTRIBUTION SUBPROFILE BUILD
QOHCHGA	DIA API CHANGE DISTRIBUTION ATTRIBUTES
QOHFDRCV	FILE-DELIVERY RECOVERY MODULE
QOHFILDV	THIS IS STUB MODULE FOR EPT BUILD
QOHFIXIX	FIX DRX
QOHFIXQ	LIST DIA CPP
QOHFIXXX	IEXIT PROGRAM FOR QOHFIXIX
QOHGETDP	DISTRIBUTION SUBPROFILE GET
QOHICHG$	VALIDITY CHECKER FOR CHGDSTD
QOHICHGD	CHANGE DISTRIBUTION DESCRIPTION
QOHICHGV	VALIDITY CHECKER FOR CHGDSTD
QOHIOUTF	OH CREATE/UPDATE OUTFILE
QOHJBCNL	EVENT HANDLER FOR QDIAHSTPRT CNL W/ CTL
QOHLSTIB	LIST DIA CPP
QOHMAILP	THIS IS STUB MODULE FOR EPT BUILD
QOHMISC	MAIL SERVICES MISCELLANEOUS
QOHMLPRT	CMD PROCESSOR MAIL SERVICES HOST PRINT
QOHMLRCV	RECOVER MODULE - MAIL PRINT
QOHPRTCM	COMMON MODULE TO BUILD COVER PAGE
QOHRCVIX	RECOVER DRXS
QOHRNUSR	MAIL SERVICES SUPPORT FOR RNMDIRE
QOHRTVA	CPP FOR QOHCHGA CMD
QOHSTSL	STATUS LIST
QOHUPDDP	DISTRIBUTION SUBPROFILE UPDATE
QOHUPDEL	UPDATE ATTRIBUTES OF IN-MAIL-LOG ITEM
QOHUPRCV	DIA UPDATE-DEL INVOCATION EXIT
QOHZMAIL	LIST DIA CPP

QOJRSTCP RESTORE DLO COMMAND PROCESSOR
QOJRSTDL RESTORE DLO OBJECT HANDLER
QOJRSTIX RSTDLO INVOCATION EXIT
QOJRSTML RESTORE MAIL CPP
QOJRSTVC RSTDLO COMMAND VALIDITY CHECK PROGRAM
QOJSRIXT SAV/RSTLO INVOC EXIT FOR CALLED MODULES
QOJSVCPR SAVDLO COMMAND PROCESSOR
QOJSVCP2 SAVDLO MAINLINE CODE
QOJSVVCP SAVDLO COMMAND VALIDITY CHECK PROGRAM
QOKAPOP PROMPT OVERRIDE PGM FOR CHGDIRA CL CMD
QOKATTCP CHANGE DIRECTORY ATTRIBUTES
QOKCALCD DELETE, ADD AND PRINT COLLECTOR SYSTEMS
QOKCALDD CALL DEPARTMENT DETAILS PROGRAM
QOKCALLD CALL LOCATION DETAILS PROGRAM
QOKCALND CALL NICKNAME DETAILS PROGRAM
QOKCALSD DELETE, PRINT OR DISPLAY OF SHADOW SYSTE
QOKCAPPC APPC FUNCTIONS FOR SHADOWING
QOKCCTL SHADOW CONTROLLER FOR DIRECTORY
QOKCCTOR COLLECT SHADOW DATA
QOKCHEAB CHANGE THE EABID AND PROPAGATE CHANGES
QOKCHGDL CHANGE/RENAME DIST LIST FOR CL CMDS
QOKCHIPE CHANGE IPE - DIR ATTRIBUTES IN QDOC
QOKCHKOR CHECK O/R NAME FIELDS
QOKCNEXT NEXT SHADOW DETERMINATION
QOKCNFRM CONFIRM EXISTENCE USER EXIT PROGRAM
QOKCPYCP CPYFRMDIR/CPYTODIR CPP
QOKCQDOC CHECK QDOC USER PROFILE AFTER RESTORE
QOKCSUP DIRECTORY SHADOW SUPPLIER
QOKCVTDT CONVERT DATE/TIME FORMATS
QOKDIRVC VALIDITY CHECKER FOR DIR CL COMMANDS
QOKDLPOP PROMPT OVERRIDE PROGRAM FOR CHG/RNMDSTL
QOKDPTUP UPDATE DEPARTMENTS
QOKDRX AUTO CREATE DRX
QOKDSPDP DISPLAY DIR PNL - CHANGE DIR ENTRY
QOKDSPDP QOKDSPDP HEADER IN ILE/COBOL
QOKDSPDP QOKDSPDP API HEADER FOR CBL
QOKDSPDP QOKDSPDP API HEADER IN RPG
QOKDSPDP QOKDSPDP HEADER IN ILE/RPG
QOKDSPX4 DISPLAY/ADD O/R ADDRESS ENTRY
QOKFUTDT CALCULATE PAST/FUTURE SHADOW DATE
QOKGETD GET DIRECTORY DETAILS
QOKLOCCP CPP FOR WRKDIRLOC CL COMMAND
QOKLOCUP UPDATE LOCATIONS FILES
QOKMOD RENAME DIRECTORY ENTRY ROUTER MODULE
QOKNCKCP CMD PROCESSING PROGRAM FOR NNAM CMDS
QOKNNDTL NICKNAME DETAILS-PRINT AND DISPLAY
QOKNNPOP PROMPT OVERRIDE PROGRAM FOR NNAM CMDS
QOKPADOR ADD O/R NAME
QOKPALOC ADD AND CHANGE DIRECTORY LOCATION
QOKPCLOC COMBINE DIRECTORY LOCATIONS
QOKPCWRK WORK WITH SHADOWING COLLECTORS
QOKPDLOC DELETE AND DISPLAY DIRECTORY LOCATION
QOKPDSOR DISPLAY O/R NAME
QOKPLCHG CHANGE/RENAME DIST LIST PANEL PROGRAM
QOKPNADD ADD NICKNAME
QOKPNCHG CHANGE DIRECTORY NICKNAMES
QOKPNWRK WORK WITH NICKNAMES
QOKPOP PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPPLOC POSITION TO FOR LOCATIONS
QOKPSLOC SELECT DIRECTORY LOCATIONS
QOKPSPOS SHADOW SYSTEM POSITION LIST GENERAL EXIT
QOKPSRCH SYSTEM DIRECTORY SEARCH CONTROL PROGRAM
QOKPSTCH POST CHANGE LOGS FOR SHADOWING
QOKPSWRK PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTADD PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTADM PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTCHG PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTDTL PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTLST PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTMWK WORK WITH DEPT MEMBERS PROGRAM
QOKPTWRK WORK WITH DEPARTMENTS
QOKPUDF USER DEFINED FIELDS PANEL MODULE
QOKPWLOC WORK WITH DIRECTORY LOCATIONS
QOKRNIPL ISSUE RENAMES WHILE IPLING MODULE
QOKRNMCP RENAME DIRECTORY ENTRY CPP
QOKRNMPL RENAME DIRECTORY ENTRY PANEL MODULE
QOKRNPOP RNMDIRE PROMPT OVERRIDE PROGRAM
QOKRNUSR RENAME DIRECTORY ENTRY MODULE
QOKRTVOR RETRIEVE O/R NAME
QOKRTVRT RETRIEVE DIRECTORY ENTRY SYS NAME/GROUP
QOKSADDT ADD-TO-LIST DIRECTORY SEARCH EXIT
QOKSCHD QOKSCHD HEADER IN ILE/COBOL
QOKSCHD QOKSCHD API HEADER FOR CBL
QOKSCHD SEARCH DIRECTORY API
QOKSCHD QOKSCHD API HEADER IN RPG
QOKSCHD QOKSCHD HEADER IN ILE/RPG
QOKSCOND PROMPTER EXIT PROGRAM FOR KWD FRQ
QOKSHDCP PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSHDIN INITIALIZE SHADOWING TABLES
QOKSHPOP PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSHRMV PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSHUPD PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSJBCP STRDIRSHD AND ENDDIRSHD COMMAND CPP
QOKTADDT DS - ADD TO LIST DEPT/MBR EXIT
QOKTMBRO DEPARTMENT MEMBER OPTIONS PROCESSING
QOKTPOST DS - POSITION LIST GENERAL EXIT
QOKWSHCP PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKXITCK DIRECTORY ENTRY USER EXIT INTERFACE
QOKXLATE TRANSLATE NAME/DEPT FIELD
QOKXTRNS TRANSLATE FIELD PROGRAM
QOLCLNUP OPEN FM SET FILTERS MODULE
QOLCONIN OPEN FM WRKJOB CONNECTION INFO MODULE
QOLDLINK OPEN FM RECEIVE MODULE
QOLELINK OPEN FM RECEIVE MODULE
QOLERP OPEN FM WRKJOB CONNECTION INFO MODULE
QOLEVHLR OPEN FM WRKJOB CONNECTION INFO MODULE
QOLLSTEN OPEN FM WRKJOB CONNECTION INFO MODULE
QOLQLIND OPEN FM WRKJOB CONNECTION INFO MODULE
QOLQLIND QOLQLIND HEADER IN ILE/COBOL
QOLQLIND QOLQLIND API HEADER FOR CBL
QOLQLIND QOLQLIND API HEADER IN RPG
QOLQLIND QOLQLIND HEADER IN ILE/RPG
QOLRECV OPEN FM WRKJOB CONNECTION INFO MODULE
QOLRECV QOLRECV HEADER IN ILE/COBOL
QOLRECV QOLRECV API HEADER FOR CBL
QOLRECV QOLRECV API HEADER IN RPG
QOLRECV QOLRECV HEADER IN ILE/RPG
QOLSEND OPEN FM WRKJOB CONNECTION INFO MODULE
QOLSEND QOLSEND HEADER IN ILE/COBOL
QOLSEND QOLSEND API HEADER FOR CBL
QOLSEND QOLSEND API HEADER IN RPG
QOLSEND QOLSEND HEADER IN ILE/RPG
QOLSENDM OPEN FM WRKJOB CONNECTION INFO MODULE
QOLSETF OPEN FM WRKJOB CONNECTION INFO MODULE
QOLSETF QOLSETF HEADER IN ILE/COBOL
QOLSETF QOLSETF API HEADER FOR CBL
QOLSETF QOLSETF API HEADER IN RPG
QOLSETF QOLSETF HEADER IN ILE/RPG
QOLTIMER OPEN FM WRKJOB CONNECTION INFO MODULE
QOLTMREH OPEN FM WRKJOB CONNECTION INFO MODULE
QOLTRACE OPEN FM WRKJOB CONNECTION INFO MODULE
QONACFG OPEN FM SET FILTERS MODULE
QONDSCNN OPEN FM SET FILTERS MODULE
QONVERFY OPEN FM SET FILTERS MODULE
QONVRYON OPEN FM SET FILTERS MODULE
QONVRYSA OPEN FM SET FILTERS MODULE
QONX4REC OPEN FM SET FILTERS MODULE
QONX4RIX OPEN FM SET FILTERS MODULE
QOPADJ LINE ADJUST FOR DW/SL
QOPAI FORMAT INDEX PAGES
QOPAL ALLOCATE UFCBS FOR PRINTERS/FILES
QOPAT COPY PAGE/LINE FORMATS
QOPBL BELGUIM COLLATING SEQUENCE
QOPCA CANADA COLLATING SEQUENCE
QOPCHKFN FOOTNOTE INSTRUCTION VALIDITY CHECKER
QOPCP PRINT COVER PAGE
QOPDL DEALLOCATE DTFS FOR PRINTERS/FILES
QOPDN DENMARK COLLATING SEQUENCE
QOPED EDITING FOR DATA MERGE/SUMMARY MATH
QOPEF EXIT FORM DOCUMENT DISPLAY

QOPER	OPEN RESOLVED DOCUMENT
QOPEX	EXIT A DOCUMENT DISPLAY
QOPFP	FINAL PROCESSING
QOPFR	FRANCE COLLATING SEQUENCE
QOPFTGFT	GENERATED FORMATTED TEXT FOR FOOTNOTES
QOPFTGI	PRINT
QOPFTR	FOOTNOTE TEXT RESOLVER
QOPFTSP	FOOTNOTE TEXT SPACE CALCULATOR
QOPGB	UNITED KINGDOM COLLATING SEQUENCE
QOPGE	GERMANY COLLATING SEQUENCE
QOPGK	GREEK COLLATING SEQUENCE
QOPGU	PORTUGAL COLLATING SEQUENCE
QOPHB	HEBREW COLLATING SEQUENCE
QOPHF	ADD HEADERS AND FOOTERS
QOPHH	HELP AND HEADER TABLES
QOPIE	ICELANDIC COLLATING SEQUENCE
QOPIF	INCLUDE FORMAT CHANGES
QOPIN	INCLUDE PROCESSING
QOPIT	ITALY COLLATING SEQUENCE
QOPIX	INCLUDE AND TRANSFORMATION
QOPLO	LABEL OPTIONS
QOPLP	LABEL PRINTING
QOPMCT	PRINTABLE MULTI-COLUMN TEXT
QOPMCV	MULTI-COLUMN TEXT VIEW
QOPMD	MERGE FROM A DOCUMENT
QOPMG	MERGE FUNCTION
QOPMO	DW MERGE OPTIONS DISPLAY
QOPMP	MERGE INITIALIZATION FUNCTION
QOPMRGNM	MERGE DATA OPTIONS DISPLAY
QOPNH	NETHERLANDS COLLATING SEQUENCE
QOPNO	NORWEGIAN COLLATING SEQUENCE
QOPOH	HANDLE OUTLINE HEADING MARKUP
QOPPC	PC ORGANIZER SUPPORT
QOPPG	DW/36 SAVE OPTIONS MODULE
QOPPL	PRINT RESOLUTION
QOPPM	PRINT MAINLINE MODULE
QOPPO	PRINT OPTIONS DISPLAYS 1-3
QOPPP	OUTPUT PAGINATION
QOPPQ	DATA/TEXT MERGE FUNCTIONS
QOPPR	PRINT INSTRUCTION RESOLUTION
QOPPW	WIDOW LINE PROCESSING FOR OUTPUT
QOPRE	REMOVE SPELLING ERRORS
QOPRO	DW RESOLVED PRINT OPTIONS DISPLAY
QOPRUN	RUN INSTRUCTION
QOPSD	SWEDEN COLLATING SEQUENCE
QOPSF	SWEDISH/FINNISH COLLATING SEQUENCE
QOPSM	SUMMARY MATH
QOPSN	SPAIN COLLATING SEQUENCE
QOPSORT	SORT TEXT LINES
QOPSP	SOURCE PAGINATION
QOPSQ	READ COLLATING TABLE
QOPSW	SWISS COLLATING SEQUENCE
QOPTB	RESOLVE TABS FOR DATA/TEXT AND MATH
QOPTC	CREATE TABLE OF CONTENTS
QOPTK	TURKEY COLLATING SEQUENCE TABLES
QOPTU	PARSE INSTRUCTIONS
QOPWS	WIDOW LINES FOR SOURCE PAGINATE
QOPXF	TRANSFORMATIONS INTERFACE MODULE
QOQCTL	SESSION SERVICES CONTROLLER
QOQGETAU	GET ACTIVE USER TABLE ENTRY
QOQINIT	GLOBAL INIT COMMAND CPP
QOQPRAS2	PARSING TABLE FOR DIA VERSION 2 COMMANDS
QOQSESRV	TPN FOR RELEASE 20 OFFICE
QOQTERM	GLOBAL INIT COMMAND CPP
QOSADACP	ADD ACCESS CODE CL CPP
QOSADD	DIA V2 ADD CPP
QOSADDLE	ADD DISTRIBUTION LIST ENTRY FUNCTION
QOSADDSC	ADD DIRECTORY DESCRIPTION FUNCTION
QOSADDTO	DS - ADD TO LIST GENERAL EXIT
QOSADUSR	ADD DIRECTORY ENTRY FUNCTION
QOSAPIVC	API VALIDITY CHECKER
QOSAPPC	TPN FOR RELEASE 10 DIA
QOSASYCP	ADDDLOAUT,CHGDLOAUT,RMVDLOAUT CPP
QOSASYNC	QOSASYNC - DIA OFFICE SYSTEMS
QOSAUDVC	DSPDLOAUD AND CHGDLOAUD VALIDTY CHECKER
QOSCALDD	CALL DISPLAY DIRECTORY DETAILS PROGRAM
QOSCANL2	QOSCANL2 - DIA OFFICE SYSTEMS
QOSCHAUD	CHGDLOAUD CPP
QOSCHGCP	CHANGE DOCUMENT OWNER CL CPP
QOSCHGSY	QOSCHGSY
QOSCHKAF	SIGN ON/AFFINITY PROCESSOR
QOSCHUSR	CHANGE DIRECTORY ENTRY FUNCTION
QOSCKDLT	CHECK-DELETE DTOS AND DOCUMENTS
QOSCKRCV	CHECK DELETE RECOVERY ROUTINE
QOSCKRQS	QOSCKRQS - DIA OFFICE SYSTEMS
QOSCLAUT	DISPLAY DLO AUTHORITIES/ACCESS CODES
QOSCLRRQ	CLEAR RECIPIENT QUEUE
QOSCNLDS	CANCEL
QOSCNRCV	CANCEL RECOVERY
QOSCOPY	DIA V2 COPY COMMAND PROCESSOR
QOSCPGCP	CHANGE DLO PRIMARY GROUP CPP
QOSCPRCV	DIA COPY RECOVERY PROGRAM
QOSCRTDL	CREATE DISTRIBUTION LIST FUNCTION
QOSCRTRQ	CREATE RECIPIENT QUEUE
QOSCTDDD	QOSCTDDD - BUILD DOCUMENT DESCRIPTORS
QOSCTDOC	QOSCTDOC
QOSCTRLR	DIA SESSION STATE CONTROLLER
QOSCVTEA	CONVERT EXTENDED ATTRIBUTES
QOSCVTSC	QOSCVTSC - CONVERT SEARCH CRITERIA
QOSDAACP	DISPLAY ACCESS CODE AUTHORITY CPP
QOSDACP	DISPLAY/PRINT DLO AUTHORITIES CPP
QOSDALO	DISPLAY AUTHORIZATION LIST DLO CPP
QOSDATCP	DISPLAY ACCESS CODES CPP
QOSDDACP	DISPLAY USER PERMISSION CPP
QOSDELET	DELETE DIA CPP
QOSDIATP	DIA TRANSACTION PGM FOR SNADS
QOSDIEXT	WRKDIR/WRKDSTL INVOCATION EXIT
QOSDIRCP	DIRECTORY API COMMANDS CPP
QOSDIRF4	CALL F4 LIST PROCESSING
QOSDIRPT	DIRECTORY/DIST LIST PRINT/OUTFILE
QOSDLAUT	DISPLAY/VIEW DLO AUTHORITIES
QOSDLCP	DISTRIBUTION LIST API COMMANDS CPP
QOSDLDCP	DELETE DOCUMENT CL CPP
QOSDLLCP	DELETE DOCUMENT LIST CL CPP
QOSDLTDL	DELETE DISTRIBUTION LIST FUNCTION
QOSDLUSR	DELETE USER FROM DIRECTORY
QOSDSAUD	DSPDLOAUD CPP
QOSDSPCP	CPP FOR DSPDIR AND DSPDSTL CL COMMANDS
QOSDSPPR	DISPLAY DLO AUTHORITIES/ACCESS CODES
QOSDSRCV	QOSDSTRB INVOCATION EXIT
QOSDSTRB	GENERALIZED DISTRIBUTION
QOSEARCH	QOSEARCH
QOSEXEC	QOSEXEC
QOSEXRCV	QOSEXRCV
QOSFBKOT	QOSFBKOT
QOSFILE	QOSFILE
QOSFILE2	QOSFILE2 - DIA VERSION 2 FILE
QOSGAACP	GRANT ACCESS CODE AUTH CL CPP
QOSGDACP	GRANT DOC AUTHORITY CL CPP
QOSGETDP	GET DOCUMENT DESCRIPTORS
QOSGETEA	GET EXTENDED ATTRIBUTES QOSGETEA
QOSHNAUT	LOG DOCUMENT/FOLDER SECURITY ERRORS
QOSIAPIX	DIAAPI INVOCATION EXIT PROGRAM
QOSICHGD	DIA API CL CMD - CHANGE DOCUMENT DESC
QOSICNLD	DIA API CANCEL DISTRIBUTION
QOSIDPUP	QOSIDPUP
QOSIEXIT	QOSIEXIT MODULE
QOSIFILD	FILE DOCUMENT
QOSIFLSV	SNADS FILE SERVER INCOMING DIST
QOSIFSPC	CREATE TEMPORARY FILE SPACE
QOSIGNON	SIGN ON DIA CPP
QOSINIT	TRUE DIA SESSION INITIALIZATION
QOSINIT2	INIT PROCESSING FOR DIR AND DSTL WORK
QOSIOUTF	OS CREATE/UPDATE OUTFILE
QOSIPLR	DIA IPL RECOVERY ROUTINE
QOSIQDOC	DIA API CL COMMAND - QUERY DOC LIBRARY
QOSIQRYD	DIA API QUERY DISTRIBUTION
QOSIRCVD	DIA API RECEIVE DISTRIBUTION
QOSIRPLD	DIA API CL COMMAND - REPLACE DOCUMENT
QOSIRTVD	DIA API QUERY DISTRIBUTION

QOSISNDD	SEND DISTRIBUTION
QOSISNDV	VALIDITY CHECKING PGM FOR SNDDST CMD
QOSISNVU	SIGN ON AND VERIFY USER
QOSLFLSV	SNADS FILER SERVER LOCK/RELEASE
QOSLIBCK	CHECK EXISTENCE/TYPE OF DIA LIB
QOSLIST	LIST DIA CPP
QOSLSTAT	LIST PROCESSOR CPP
QOSLSTIX	LIST DIA CPP
QOSLSTPT	LIST DIA CPP
QOSLSTUF	LIST DIA CPP
QOSMAINT	QOSMAINT
QOSMDISP	FILE & REQ DIST MACRO PROCESSOR
QOSMLFMT	INDIRECT USER
QOSMLIST	LIST DIA CPP
QOSMMIDP	OSRPLIDP, QOPUTIDP, OSUPDIDP MACRO PROCE
QOSMODF2	DIA V2 MODIFY COMMAND
QOSMODIF	QOSMODIF
QOSMOVE	DIA V2 MOVE COMMAND
QOSMRECV	CANCEL MACRO PROCESSOR
QOSMREM	RETRIEVE/DELETE/EXECUTE MACRO PROCESSR
QOSMSCTL	SIGN ON & SIGN OFF MACRO PROCESSOR
QOSMSRCH	QOSMSRCH
QOSOBRCV	QOSOBTAN INVOCATION EXIT
QOSOBTAN	DIA OBTAIN DISTRIBUTION
QOSOFLSV	SNADS FILE SERVER OUTGOING DIST
QOSOPEN	OPEN OS DATA BASE FILE
QOSOSCB	QDLS OSSCB MODULE
QOSOXIT	OFFICE USER EXIT COMMAND PROCESSOR
QOSPADDE	DS - ADD NEW DIRECTORY ENTRY
QOSPADID	DS - ASSIGN DIFFERENT ID TO DESCRIPTIO
QOSPADLE	DS - ADD DISTRIBUTION LIST ENTRIES
QOSPADND	DS - ADD NEW DESCRIPTION
QOSPARSE	DIA AND SNADS DIU PARSE
QOSPBCTL	DIA PROCESS B SESSION CONTROLLER
QOSPCHGD	DS - CHANGE YOUR DIRECTORY ENTRY DETAI
QOSPCHGL	CHANGE DIST LIST ENTRIES PANEL PGM
QOSPCRTL	CREATE NEW DIST LIST PANEL PROGRAM
QOSPCYDE	DS - CHANGE YOUR DIRECTORY DETAILS
QOSPDELD	DS - DIRECTORY ENTRY DELETE CONFIRM
QOSPDELL	DS - DISTRIBUTION LIST DELETE CONFI
QOSPDSPD	DISPLAY DIRECTORY DETAILS PANEL PROCESSG
QOSPLEDC	DS - LIST ENTRY DELETE CONFIRMATION
QOSPRASP	QOSPRASP
QOSPRINT	QOSPRINT
QOSPRSMD	DIA V2 COMMON PARSE CODE MODIFY DATA
QOSPSPRF	DS - SELECT USER PROFILE
QOSPSSYS	DS - SELECT SYSTEM NAME/GROUP
QOSPUTEA	PUT EXTENDED ATTRIBUTES QOSPUTEA
QOSPWRKD	DS - WORK WITH DIRECTORY
QOSPWRKL	WORK WITH DISTRIBUTION LISTS
QOSRAACP	REVOKE ACCESS CODE AUTH CL CPP
QOSRCRCV	RECEIVE DIST VIA SNADS RECOVERY RTN
QOSRCVDC	RECEIVE DOCUMENTS FROM SNADS NETWORK
QOSRCVEA	RECOVERY MODULE FOR QOSUPDEA
QOSRCVIX	RECOVER RECIPIENT INDEX IEXIT
QOSRCVRQ	DRX RECOVERY
QOSRCVST	RECEIVE STATUS FROM SNADS NETWORK
QOSRDACP	REVOKE DOC AUTHORITY CL CPP
QOSRDIU	BUILD DIUS FOR REMOTE DLS REQUESTS
QOSRDLS	REMOTE DOCUMENT LIBRARY SERVICES
QOSRDRCV	QOSREQDS INVOCATION EXIT
QOSREASD	REASSIGN USER ID TO NEW DESCRIPTION
QOSREMOV	QOSREMOV DIA REMOVE COMMAND
QOSREQDS	DIA REQUEST DISTRIBUTE
QOSRETRV	RETRIEVE DIA CPP
QOSRETV2	DIA V2 RETRIEVE COMMAND
QOSRFLIX	FILE SERVER RECOVERY INVOCATION EXIT
QOSRFLSV	RECLAIM STORAGE ROUTINE
QOSRMACP	REMOVE ACCESS CODE CL CPP
QOSRMDLE	REMOVE DISTRIBUTION LIST ENTRY FUNCTION
QOSRMIEX	REMOVE ACCESS CODE RECOVERY ROUTINE
QOSRMTAT	REMOTE AUTHORITY CPP
QOSRNUSR	RNMDIRE OS SUPPORT
QOSRTRCV	RETRIEVE RECOVERY ROUTINE
QOSSBKOT	QOSSBKOT
QOSSBMTR	SUBMIT DIA TRANSACTION PGM TO SNADS
QOSSETCV	SET CONTROL VALUE DIA CPP
QOSSIIO	APPC - DIA I/O MANAGER
QOSSRCH2	DIA V2 SEARCH COMMAND
QOSSRLDD	QOSSRLDD
QOSSYEXT	QOSSYEXT
QOSTLMIT	SEARCH TIME LIMIT EVENT HANDLER
QOSTOPOS	DS - POSITION LIST GENERAL EXIT
QOSTRAL2	QOSTRAL2 - DIA OFFICE SYSTEMS
QOSUADDT	ADD TO PGM FOR QOSUCHK2 - ADD OFC USERS
QOSUCHK1	DIRECTORY/DIST LIST LIST DISPLAY
QOSUCHK2	OFFICE/AFFINITY LIST DISPLAY
QOSUPDEA	UPDATE EXTENDED ATTRIBUTES QOSUPDEA
QOSUPOST	POSITION TO GENERAL EXIT FOR QOSUCHK2
QOSVFUSR	VERIFY USER ENROLLED IN DIA
QOSVLCK1	QOSVLCK1 VALIDITY CHECKING PROGRAM
QOSWLOPT	CALL DISPLAY LIST ENTRIES PROGRAM
QOSWRKCP	CPP FOR WRKDIR AND WRKDSTL CL COMMANDS
QOTAHEAD	TEXT/38 TRANSFORM HEADER/FOOTER
QOTAR	TEXT/38 TO DW/SL TRANSFORM ROOT MODULE
QOTASRCD	TMS/38 TO TI TRANSFORM SOURCE DOCUMENTS
QOTATRCD	TMS/38 TO TI TRANSFORM TRAILER RECORDS
QOTATXTD	TMS/38 TO DW/3X TEXT MODULE
QOTDCCVN	OT USER EXIT INTERFACE
QOTDW	DW/36 TO DW/XX TRANSFORM
QOTEP	TI TO IPDS LARGE PRINT TRANSFORM
QOTFD	DOCUMENT TO FILE INIT AND DESCRIPTION
QOTFR	DOCUMENT TO FILE ROOT MODULE
QOTGR	S/XX SOURCE FILE TO DW/XX TRANSFORM
QOTIGRFI	QOTIGRPH - IPDS GRAPHICS MODULE
QOTIGRPH	VERIFY/TRANSFORM IMAGES AND GRAPHS
QOTIM	L2 (FFT) TO DW/XX TRANSFORM
QOTJM	FFTAS400 TO FFTDCA TRANSFORM
QOTKB	L3 INWARD - BEGIN LINE FORMAT CHANGE
QOTKC	L3 INWARD - COMPARE P/L FORMATS
QOTKD	L3 INWARD - DRIVER
QOTKF	L3 INWARD - FORMAT CHANGE
QOTKM	L3 INWARD - MARGIN TEXT
QOTKR	L3 INWARD - ROOT AND DOCUMENT PARAMETERS
QOTKS	L3 INWARD - MASTER FORMAT
QOTKT	L3 INWARD - TEXT AND SINGLE BYTES
QOTKU	L3 INWARD - MULTIBYTES
QOTLF	RFTDCA OUTWARD FORMAT CHANGE HANDLER
QOTLP	RFTDCA OUTWARD PAGE BREAK HANDLER
QOTLR	RFTDCA OUTWARD TRANSFORM ROOT MODULE
QOTLS	RFTDCA OUTWARD MARGIN TEXT HANDLER
QOTMR	1403 (PROFS) TO DW/XX TRANSFORM
QOTND	FFTAS400 TO 1403W6/PROFS TRANSFORM
QOTOG	COPY GRAPH DATA
QOTOI	COPY IMAGE DATA
QOTOP	L3 INWARD - ROOT AND DOCUMENT PARAMETERS
QOTPCGET	PC FILE TO TEXT INTERNAL (GET)
QOTRI	OFFICE TRANSFORMS INVOCATION EXIT
QOTRT	ROOT MODULE FOR OFFICE TRANSFORMS
QOTSCS	TI TO SCS TRANSFORM
QOTXE	TRANSFORMS ERROR LOGGER
QPAEND	END PASSTHRU CPP
QPAGJIEH	GAIJI TABLE UPDATE EVENT HANDLER
QPAITERM	INVOCATION TERMINATION
QPAPASI	INTERMEDIATE SYSTEM INITIATOR
QPAPASS	BEGIN PASSTHRU CPP
QPAPAST2	TARGET TRANSACTION PROGRAM
QPAPCEH	PROCESS CONTROL EVENT HANDLER
QPASYSRQ	PASSTHRU SYS/REQ HANDLER
QPDAIXIT	PD WRKPRB API IEXIT PGM
QPDAPIL	LOG ERROR IN PROBLEM LOG WHEN API INVOKE
QPDAUTPR	AUTO-PAR EVENT HANDLER PROGRAM
QPDAUTP2	AUTO-PAR PROGRAM #2 <SUBMITTED>
QPDCALLS	INTERFACE TO VMC SERVICE FUNCTIONS
QPDCRTDP	XPF CREATE FIRST CALL DATA PACKET
QPDDCTL	XPF DETECT LOOP IN PROBLEM LOG ENTRIES
QPDDLTDP	XPF DELETE FIRST CALL DATA PACKET
QPDDRMTI	DISPLAY REMOTE SYSTEM INFO PANEL
QPDDSP	DISPLAY PANEL MODULE
QPDELOG	INTERFACE TO VMC ERROR LOG

QPDFRUDP	PD DISPLAY FRUS
QPDGCNFG	GET CONFIGURATION INFORMATION
QPDHELP	HELP PANEL DISPLAY MODULE
QPDHERR	XPF DETECTED HARDWARE PROBLEMS MAIN PART
QPDIEXIT	PAR INVOCATION EXIT
QPDLOGC	MAP FFDC CUE MACRO TO QPDLOGER API
QPDLOGER	API TO FIRST FAILURE DATA CAPTURE
QPDMIR	INTERFACE TO VMC SERVICE FUNCTIONS
QPDPAALO	PAALOC PROCESSING MODULE
QPDPACDI	PACDIAG PROCESSING MODULE
QPDPACON	PACONVRT PROCESSING MODULE
QPDPACPG	PACPGM PROCESSING MODULE
QPDPADEA	PADEALOC PROCESSING MODULE
QPDPADSP	PADSPMSG PROCESSING MODULE
QPDPADUT	PADUTIL PROCESSING MODULE
QPDPAGEL	PAGELOG PROCESSING MODULE
QPDPAGRC	PAGRCTT PROCESSING MODULE
QPDPAGVS	PAGVSTAT PROCESSING MODULE
QPDPAIOP	PAIOPRST PROCESSING MODULE
QPDPAMIR	PAMIRROR PROCESSING MODULE
QPDPAMOD	PAMODIAG PROCESSING MODULE
QPDPARDR	PAR DRIVER MODULE
QPDPAVAR	PAVARY PROCESSING MODULE
QPDRSLPI	RESOLVE PANEL ID TO DSPF, LIB, RECFMT
QPDSERR	XPF DETECTED SOFTWARE PROBLEMS MAIN PART
QPDSEXIT	SOFTWARE PAR IEXIT MODULE
QPDSRVPG	COBOL HEADER FILE FOR FFDC ILE/API
QPDSRVPG	RPG HEADER FILE FOR ILE FFDC API
QPDSSG	MACHINE DETECTED SYMPTOM STRING
QPDTIMER	PD TIMER EVENT HANDLER PROGRAM
QPDUMPER	PD DEFAULT SMART DUMPER
QPDWRKPB	API TO WORK WITH PROBLEM
QPGMMENU	PROGRAMMER MENU
QPIEXITC	PERFORMS NUMBERIC CONVERSION FOR DBCS EM
QPIIEXIT	QPIIEXIT - 3270 DISPLAY PIPELINE IEXIT
QPIPCCNV	PERFORMS 8 TO 7 CONVERSION FOR 5555PC EM
QPIPCEH	QPIPCEH - 3270 DISPLAY PIPELINE EVENTS
QPIPIPE	QPIPIPE - 3270 DISPLAY PIPELINE SETUP
QPKPSFPT	PRINT COMMAND
QPMACLCT	PERFORMANCE DATA COLLECTOR
QPMAEVNT	PM API EVENT HANDLER
QPMAJOB	PROCESS PM API JOBS DATA
QPMASERV	PERFORMANCE COLLECTOR SERVER
QPMBCVTD	CVTPFRDTA CLP
QPMBDMPT	DUMP VMC TRACE PGM
QPMBODBF	OPEN DATABASE FILE MEMBER MODULE
QPMBPCS	SET PC SUPPORT FLAG
QPMCADD	ADD COLLECTION SCHEDULE CPP
QPMCENDP	END PERFORMANCE MONITOR CPP
QPMCEPC	END PERFORMANCE COLLECTION CPP
QPMCPCPO	CHANGE PFR COL PROMPT OVERRIDE
QPMCSPC	START PERFORMANCE COLLECTION CPP
QPMCSTAR	START PERFORMANCE MONITOR CPP
QPMCWRK	WORK COLLECTION SCHEDULE CPP
QPMECOFL	PM COUNTER OVERFLOW EVENT HANDLER
QPMEISDN	PM ISDN EVENT HANDLER
QPMEPMPO	END PERFORMANCE MONITOR PROMPT OVERRIDE
QPMERWS	PM REMOTE WS RESPONSE TIME EVENT HANDLER
QPMESTOP	STOP PERFORMANCE MONITOR EVENT HANDLER
QPMETIME	PERFORMANCE MONITOR TIMER EVENT HANDLER
QPMETRCF	TRACE TABLE FULL EVENT HANDLER
QPMHEAP	HEAP MANAGER FOR PERF COLLECTOR
QPMIEXIT	PERFORMANCE MONITOR INVOCATION EXIT PGM
QPMLCIE	PM COLLECTION COMMAND I EXIT
QPMLPFRD	LIST PERFORMANCE DATA API
QPMLPFRD	QPMLPFRD HEADER IN ILE/COBOL
QPMLPFRD	QPMLPFRD API HEADER FOR CBL
QPMLPFRD	QPMLPFRD API HEADER IN RPG
QPMLPFRD	QPMLPFRD HEADER IN ILE/RPG
QPMLSBM	AUTO COLLECTION SUBMIT EVENT HANDLER
QPMLSCD	AUTO COLLECTION SCHEDULER
QPMLSIE	PM COLLECTION SUBMITER I EXIT
QPMLWAIT	AUTO COLLECTION WAIT ROUTINE
QPMMCDEV	RETURN COMMUNICATIONS DEVICE INFO
QPMMINIT	PERFORMANCE MONITOR INITIALIZATION

QPMMIOBS	UPDATE OBSERVATIONS DATA BASE
QPMMJOBC	PM JOB COMPLETION EVENT HANDLER
QPMMMAIN	PERFORMANCE MONITOR MAIN MODULE
QPMMMRMD	RETRIEVE RESOURCE MGMT DATA
QPMMNDCD	RETURN LINE AND CU INFO
QPMMRJD	RETRIEVE JOB DATA
QPMMRQIO	ISSUE RTM REQIO REQUESTS
QPMMRSPT	PERFORMANCE MONITOR RESPONSE TIME
QPMMSLTT	SELECT INTERNAL OBSERVATIONS
QPMMSOBJ	PERF MONITOR SERVER OBJ MODULE
QPMMSTP	PERFORMANCE MONITOR STOP REQSO
QPMMSTPM	STOP INTERNAL OBSERVATIONS
QPMMSTR	PERFORMANCE MONITOR START REQSO SESSEION
QPMMSTRM	START INTERNAL OBSERVATIONS
QPMMTSKC	PM TASK COMPLETION EVENT HANDLER
QPMMWAIT	WAIT FOR STOP PERFORMANCE MONITOR EVENT
QPMWKCOL	WORK WITH COLLECTOR API
QPQCARTC	PROVIDE ACCESS TO LU4/ARCTIC SERVICES
QPQCCDRV	EPT PLACEHOLDER
QPQCCOMM	COMMUNICATIONS DRIVER ENTRY MODULE
QPQCICF	PROVIDE ACCESS TO APPC SERVICES
QPQCNACK	PROCESS DATA STREAM ERRORS
QPQCPINT	COMM DRIVER INITIALIZATION
QPQCTDRV	EPT PLACEHOLDER
QPQCTRC	PSF TRACE ROUTINE
QPQCXDRV	EPT PLACEHOLDER
QPQMPSF	PRINT SERVICES FACILITY MANAGER PROGRAM
QPQPDMGR	PD MANAGER MAIN MODULE
QPQPEXIT	PD INVOCATION EXIT/EXCEPTION MONITOR
QPQRMGR	RESOURCE MANAGER MAIN MODULE
QPQSASPC	LOCATE QPQSFC ASSOCIATED SPACE
QPQSCFIX	CFI DATA STREAM INTERFACE
QPQSDOCX	CCM DOCUMENT INTERFACE
QPQSFC	STRUCTURED FIELD CONVERTER PROGRAM
QPQSMSGX	SHELL EXIT ROUTINE FOR CCM MESSAGES
QPQSTRCX	CCM SHELL FOR TRACE
QPQXSPG	SEPARATOR PAGE GENERATOR MAIN MODULE
QPQYBLPZ	CCM BEGIN LINE PAGE
QPQYBPPZ	CCM BEGIN PAGE PROCESSING
QPQYDCSZ	CCM DOCUMENT START
QPQYEAGZ	CCM END ACTIVE ENVIRONMENT GROUP
QPQYELPZ	CCM END LINE PAGE PROCESSING
QPQYEPPZ	CCM END PAGE PROCESSING
QPQYFDPZ	CCM KERNEL FORMDEF PROCESSING
QPQYIFMT	FONT MAPPING TABLE INITIALIZATION
QPQYIFM2	FONT MAPPING TABLE INITIALIZATION
QPQYIFM3	FONT MAPPING TABLE INITIALIZATION
QPQYINVZ	CCM HANDLE INVOKE STRUCTURED FIELDS
QPQYOCAZ	CCM KERNEL OCA OBJECT PROCESSING
QPQYPDPZ	CCM KERNEL PAGEDEF PROCESSING
QPQYPOSZ	CCM STATE MACHINE PROGRAM
QPQYSTMZ	CCM STATE MACHINE PROGRAM
QPRCRASH	PRM INTERNAL ERROR DETECTION
QPRCRTPG	CREATE USER PROGRAM
QPRISTCK	PRM CHECK INTERNAL SYMBOL TABLE
QPRISTSM	PRM OBJECT SUMMARY LIST
QPRLIST	PRM INTERFACE TO PUT MACRO
QPRMICK	PRM INSTRUCTION STREAM SEMANTIC CHECK
QPRMICK1	QPRMICK1 STUB FOR EPT BUILD
QPRODTBL	PRM BUILD ODT PORTION OF PGM TEMPLATE
QPRPH01P	PRM LEXICAL, SYNTAX, SEMANTIC ANALYSIS
QPRPH02P	PRM BUILD SYMBOL TABLE, BOM TABLE, ODT
QPRPH03P	PRM FINISH PGM TEMPLATE, CREATE PGM
QPRPH11P	QPRPH11P STUB FOR EPT BUILD
QPRRNNM1	N->N-1 PROGRAM OBJECT HANDLER
QPRROOTP	PRM CONTROL PHASES, WORK AREA CREATION
QPRXRF	PRM CROSS REFERENCE LISTING
QPTCHECK	CHECK ENTIRE COMMAND
QPTCHKPC	CHECK PROMPT CONTROL CONDITIONS
QPTCMSRV	COMMAND STRING REVIEW
QPTDFT	SUPPLY DEFAULT VALUES
QPTDSPFK	DISPLAY ACTIVE FUNCTION KEYS
QPTERMSG	ERROR MESSAGE PROCESSOR
QPTERREV	ERROR REVIEW SCREEN
QPTEXDEV	PROMPTER EXIT PROGRAM FOR DEVICES

QPTGTINP	GET PARAMETER INPUT
QPTKYPRC	FUNCTION KEY PROCESSOR
QPTPARML	PROMPTER CONTROL MODULE
QPTPERMV	PERMISSIBLE VALUES DISPLAY
QPTPFKRV	PROMPTER HELP PROCESSING
QPTPOP	CALL PROMPT OVERRIDE PROGRAM
QPTPRCSS	PARAMETER AND LIST SCREEN PROCESSOR
QPTSETUP	MAIN PROCESSOR SETUP ROUTINE
QPTSTRNG	COMMAND STRING CREATION
QPTVLINP	VALIDATE INPUT
QPWFSTP	FILE SERVER TRANSACTION PROGRAM & INIT
QPYMINFO	SHR RETRIEVE MACHINE INFORMATION
QPYPAGD1	PAG DSPACCGRP ULTIMATE PROGRAM SOURCE
QPYSAMPD	SAM PRTSAMDTA ULTIMATE PROGRAM SOURCE
QPYVMCTS	DSK RETRIEVE VMC TRACE STATUS
QPZAPC	APPLY PROGRAM CHANGE
QPZARPC	APPLY/REMOVE/INSERT PC
QPZAUTCK	PC AUTHORITY CHECKER
QPZCMPTI	CONVERT MPCI
QPZCOVER	DISPLAY OR PRINT COVER LETTER
QPZCPFI	START CPF PC INTERFACE
QPZCPFIU	START CPF PC INTERFACE-UNATTENDED
QPZCRTEX	CRTPTF INVOCATION EXIT PROGRAM
QPZCRTFX	CREATE PROGRAM TEMPORARY FIX
QPZCRTFX	QPZCRTFX HEADER IN ILE/COBOL
QPZCRTFX	QPZCRTFX API HEADER FOR CBL
QPZCRTFX	QPZCRTFX API HEADER IN RPG
QPZCRTFX	QPZCRTFX HEADER IN ILE/RPG
QPZCRTPT	CREATE PROGRAM TEMPORARY FIX
QPZCVLET	CREATE/FIND COVER LETTERS
QPZDBMGR	PZ DATABASE MANAGER
QPZDLOBJ	DELETE QPZA AND QPZR OBJECTS
QPZDLT	DELETE PTF
QPZDSPPT	DISPLAY PTF STATUS
QPZEND	PZ DATABASE IEXIT
QPZEVNHN	PZ EVENT HANDLER
QPZGENID	GENERATE AND VERIFY PTF ID
QPZGENNM	GENERATE A PTF SAVE FILE OR COVER NAME
QPZGENNM	QPZGENNM HEADER IN ILE/COBOL
QPZGENNM	QPZGENNM API HEADER FOR CBL
QPZGENNM	QPZGENNM API HEADER IN RPG
QPZGENNM	QPZGENNM HEADER IN ILE/RPG
QPZIEXIT	UNLOCK THE MPCI IN QSYS
QPZINSFX	INSTALL PTF CPP
QPZINZSY	INZSYS INTERFACE PGM FOR PTF OBJ CLEANUP
QPZLLGET	GET LIC PTF HISTORY
QPZLLPUT	RESTORE LIC PTF HISTORY
QPZLOGFX	LOG PTFS
QPZLOGFX	QPZLOGFX HEADER IN ILE/COBOL
QPZLOGFX	QPZLOGFX API HEADER FOR CBL
QPZLOGFX	QPZLOGFX API HEADER IN RPG
QPZLOGFX	QPZLOGFX HEADER IN ILE/RPG
QPZLPC	LOAD PROGRAM CHANGES
QPZMODRP	PTF MODULE REPLACEMENT FUNCTION
QPZMRIEX	APPLY/REMOVE/INSERT MRI
QPZPCCR	CREATE PTF - SUPERSEDE CHAIN
QPZPCEXT	IEXIT PROGRAM FOR QPZPCSYS
QPZPTFDT	DISPLAY PTF DETAILS
QPZPTFIN	GO PTF OPTION 7 AND 8
QPZRAPTF	RETRIEVE ALL ACTIVE PTFS
QPZRPC	REMOVE PROGRAM CHANGE
QPZRSTLD	RESTORE OBJECT MANAGER
QPZRTVFX	QPZRTVFX HEADER IN ILE/COBOL
QPZRTVFX	QPZRTVFX API HEADER FOR CBL
QPZRTVFX	RETRIEVE PTF INFO
QPZRTVFX	QPZRTVFX API HEADER IN RPG
QPZRTVFX	QPZRTVFX HEADER IN ILE/RPG
QPZSAVF	COPY PTF
QPZSAVLD	SAVE OBJECT MANAGER
QPZSRD	SAVE/RESTORE/DELETE PTF INFO BY PVOL
QPZSYNC	SYNCHRONIZE PTF SAVFS AND PTF DATABASE
QPODDJIC	DIRECTORY JOURNAL IC
QPODDSRC	DIRECTORY DATA SPACE RECOVERY
QPODIPLR	DIRECTORY IPL RECOVERY
QPODRCLM	DIRECTORY RECLAIM
QPODRCLT	TREE PROCESSOR FOR IFS DIRECTORY RECLAIM
QPODROOT	CREATE/VERIFY ROOT DIRECTORY
QPOFFSWK	INITIALIZE HOME DIRECTORY
QPOLCDSN	F KEY PROGRAM FOR DISPLAY ENTIRE NAME
QPOLCIUP	WRKLNK INTERACTIVE USER PROFILE
QPOLCUAU	WRKLNK UIM DELETE OPTION UPDATE
QPOLIHOM	INITIALIZE HOME DIRECTORY
QPOMSJML	MUTEX STATUS DISPLAY SCREEN FRONT-END
QPOMSMTX	MUTEX STATUS DISPLAY SCREEN PROCESSOR
QPOQINIT	INIT QSYS FS PORTION OF SAG
QPOQUSTG	RETRIEVE POQ USER STORAGE AREA
QPOWINIT	POSIX PROCESS INIT PROGRAM
QPOWKRNL	KERNEL INITIALIZATION PROGRAM
QPOWTERM	POSIX PROCESS TERMINATION PROGRAM
QQAEXIT2	EXIT-2 PROG FOR LICENSED PROG 5738-QA1
QQAINSTL	Q&A EXIT PROGRAM FOR BOSS OPTION 1
QQAKASGN	ASSIGN SEARCH WORDS
QQAKAUTH	BUILD AUTHORIZED LIST ROUTINE
QQAKCLSE	CLOSE QUESTION AND ANSWER FILES
QQAKDSCR	REVISE DESCRIPTORS
QQAKESEL	CANDIDATES AVAILABLE FOR CHANGE
QQAKGETI	GET THE TITLES FROM THE ALT TITLE LIST
QQAKIEXT	MAIN PROCESSING ROUTINE FOR Q AND A
QQAKOPEN	Q&A OPEN FILE MODULE
QQAKPARM	CREATE CANDIDATE QUESTION, INPUT PARMS
QQAKQSR1	QQAKQSR1 INCLUDING QUERY
QQAKQSR2	DATA MANIPULATION ROUTINE FOR Q&A
QQAKSSW	Q&A SORT SEARCH WORDS
QQAKSWDL	Q&A BUILD TITLE LST A SW HASH
QQAKTEXT	WORK WITH QUESTION
QQAKXX50	Q&A MODULE TO DISPLAY TITLE LIST
QQAKXX99	CONTINUE Q&A SEARCH FOR ASNWER
QQAK0X00	DATABASE, TOPICS AND SEARCH WORD LISTS
QQAK0500	Q&A PANEL QAD0500 AND QAD1500 PROCESSOR
QQAK0510	PRESENT,PREPARE,PROCESS QAD0510
QQAK1000	Q&A MODULE TO WORK WITH A QUESTION
QQAK1199	Q&A SEARCH KEYS SELECTION
QQAK1299	Q&A SEARCH BY KEYS WITH HIT COUNTS
QQAYIEXT	IEXIT ROUTINE FOR QQAYSERV
QQAYRQTR	REQUESTOR FOR QA
QQAYSERV	Q & A SERVER
QQA0BTCH	Q&A BATCH SUPPORT
QQA0CPP	Q&A CPP
QQA0MAIN	MAIN PROCESSING ROUTINE FOR Q AND A
QQA2ANSR	ANSWER QUESTIONS AND ANSWERS
QQA2CHNG	CHANGE DATABASE ROUTINE FOR Q&A
QQA2DELT	DELETE QUESTIONS AND ANSWERS
QQA2EDIT	USE THE EDIT INTERFACE, MENU
QQA2REVW	Q&A MODULE TO DO REVIEW
QQA2SAVE	SAVE AND RESTORE Q&A DATABASE ROUTINE
QQA2SRCH	Q&A SEARCH MODULE
QQA4PUB	PUBLISH CANDIDATE QUESTIONS
QQMGBTBL	BUILD TABLE LIST FUNCTION
QQQACTIV	QUERY IMPLEMENTATION
QQQBLQDT	OPNQRYF COMMAND BUILD QUERY DEFINITION
QQQCHGA	CPP FOR CHGQRYA COMMAND
QQQCHGAP	CL PROMPTER FOR CHGQRYA COMMAND
QQQGET	QUERY I/O PROCESSING
QQQIMPLE	QUERY IMPLEMENTATION
QQQISVSU	QUERY ISV PROCESSING
QQQITEMP	QUERY IMPLEMENT TEMPORARY RESULT
QQQJDCMP	QUERY JOIN DECOMPOSITION
QQQJOBST	JOB SET UP PROCESSING FOR QUERY
QQQMKF	QUERY MULTI-KEY FROGGER
QQQOPNQF	OPNQRYF COMMAND PROCESSING PROGRAM
QQQOPTIM	QUERY OPTIMIZATION
QQQPARSE	OPNQRYF COMMAND PARSE EXPRESSION
QQQQEXIT	QUERY EXIT PROCESSING
QQQQFMSG	OPEN QUERY FILE MESSAGE MAPPING
QQQQRY	QQQQRY HEADER IN ILE/COBOL
QQQQRY	QQQQRY API HEADER FOR CBL
QQQQRY	QQQQRY API
QQQQRY	QQQQRY API HEADER IN RPG
QQQQRY	QQQQRY HEADER IN ILE/RPG
QQQQUERY	QUERY MAIN LINE PROCESSING

QQQSETUP	QUERY SET UP PROCESSING
QQQSQCMP	QUERY SUBQUERY COMPOSITION TO JOIN
QQQTKZ	TOKENIZER FOR NATIVE OPNQRYF COMMAND
QQQTKZ38	TOKENIZER FOR S/38-VIEW OPNQRYF COMMAND
QQQTSORT	QUERY SORT MODULE
QQQVALID	QUERY VALIDATION
QQQVAP	VALIDATE ACCESS PLAN
QQQVFMT	VALIDATE FORMAT
QQQVJOIN	VALIDATE JOIN SPECS
QQQVSEL	VALIDATE SELECTION
QQQVWCMP	QUERY VIEW COMPOSITION
QQQVWFLD	QUERY VIEW FILE FIELD PROCESSING
QQQVWRCY	QUERY VIEW FILE RECOVERY
QQUDA	QQUDA - QUERY INITIALIZATION
QQUDT	QQUDT - BUILD MASTER FIELD LIST
QQUDY	QQUDY - LANGUAGE COLLATING SEQUENCES
QQUMITXT	CONVERT TEXT DOCUMENTS TO QUERY DEF
QQUPD	QQUPD - PRINT QUERY DEFINITION
QQURA	QQURA - RUN-TIME INITIALIZATION, CLEANUP
QQURB	QQURB - RUN-TIME OUTPUT TO DISPLAY
QQURC	QQURC - GET MULTI-COPY DOCUMENTS
QQURD	QQURD - RUN-TIME OUTPUT TO PRINTER
QQURE	QQURE - DETERMINE THE REPORT FORMAT
QQURG	QQURG - RUN-TIME RECORD SELECTION
QQURI	QQURI - SUMMARY OUTPUT TO DATABASE FILE
QQURJ	QQURJ - DETAIL OUTPUT TO DATABASE FILE
QQUTA	QQUTA - OUTPUT TEXT/MERGE INSTRUCTIONS
QQUTB	QQUTB - DATA/TEXT MERGE DRIVER
QQUTC	QQUTC - OUTPUT TEXT/MERGE DATA
QQUTF	QQUTF - CREATE DCA L3 DOCUMENT
QQUTH	QQUTH - BUILD DCA L3 DOCUMENT BODY
QQUXQRYR	QUERY RUN EXIT-API
QQXBLDIF	MODULE TO BUILD OBJECT FROM QRYDFN
QQXCA	ANALYZE QRYDFN MODULE
QQXCF	EXTRACT FORM INFO MODULE
QQXCFQDT	SAA QUERY CREATEFILEFROMQDT M2 CF
QQXCHGOI	MODULE TO CHANGE OBJECT INFORMATION
QQXCI	INITIAL CONVERSION INFO REQUEST MODULE
QQXCKNAM	MODULE TO CHECK THE VALIDITY OF OBJ NAME
QQXCLIMX	CPP FOR CRT & RTV COMMANDS
QQXCLITF	QUERY CPI CL COMMAND INTERFACE RTN
QQXCLSTP	STRQMPRC CPP
QQXCLSTQ	CPP FOR STRQMQRY CL COMMAND
QQXCLVSP	STRQMPRC CPP
QQXCLVSQ	CPP FOR STRQMQRY CL COMMAND
QQXCQ	EXTRACT QUERY INFO MODULE
QQXCRTEM	BUILD EDIT MASK FOR VARIOUS EDIT TYPES
QQXDSPRT	MODULE TO DISPLAY A REPORT
QQXDSPRX	MODULE FOR QQXDSPRT EXIT PROGRAM
QQXDSTSP	MODULE TO DESTROY A TEMPORARY SPACE
QQXDTOBJ	QQXDTOBJ - PLMI ROUTINE TO DELETE AN OBJ
QQXEDBFD	SAA QUERY EXTRACT DB FILE DESC M2 CF
QQXEDBMD	QM EXTRACT DB MEMBER DESC M2 CF
QQXEDBOV	SAA QUERY EXTRACT DB OVRIDES M2 CF
QQXEE	ENVIRONMENT EXIT PROGRAM FOR QM CPI
QQXFILE	QUERY CPI FILE SUPPORT MODULE
QQXFRMPR	SAA QUERY PRINT FORM PLMI/UIM
QQXFRMPX	STUB MODULE FOR QQXFRMPR EXIT PROGRAM
QQXJBINF	RETRIEVE JOB INFO
QQXMAIN	MAIN ENTRY INTO THE QUERY MANAGER
QQXMAINX	STUB MODULE FOR QQXMAIN EXIT PROGRAM
QQXMKPSP	MODULE TO CREAT PERM OBJECT
QQXMKTSP	MODULE TO CREAT TEMPOARY SPACE
QQXMSGQU	QM JOB LOG MANIPULATION RTN
QQXOBJPR	MODULE TO PRINT OBJECTS
QQXOBJPX	STUB MODULE FOR QQXOBJPR EXIT PROGRAM
QQXPFINF	RETRIEVE PRINT FILE INFO
QQXQRYSV	QUERY CPI QUERY OBJECT SAVE HANDLER
QQXRPTLE	DISPLAY REPORT LIST EXIT
QQXRSLOB	MODULE TO RESOLVE (& LOCK & AUTH CHECK)
QQXRTTXT	RETRIEVE TEXT TRANSLATION
QQXRTVOI	MODULE TO RETRIEVE OBJECT INFORMATION
QQXSQL	SAA QUERY CPI SQL INTERFACE
QQXSQLEX	SAA QUERY CPI SQL EXIT MODULE
QQXSYSVL	RETRIEVE SYSTEM VALUES
QQXUNLCK	MODULE TO UNLOCK AN OBJECT
QQXXLATE	CCSID CONVERSION ROUTINE
QRAASNKB	3270 RA ASSIGN KBD ASSIGN MAP MODULE
QRAHELP	HELP MODULE FOR 3270 REMOTE ATTACH
QRCDEBUG	GENERAL DEBUG FUNCTIONS FOR RECLAIM
QRCDMGLG	LOGGING OF DAMAGE ON HISTORY LOG
QRCDMGNA	DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCDMGNT	DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCDMGNV	DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCIMPLN	DAMAGE NOTIFICATION DURING IMPL
QRCINSRT	INSERT OBJECT INTO QRCL LIBRARY
QRCLAIM	RECLAIM STORAGE DRIVER
QRCLENUP	PERFORM CLEANUP ON OBJECTS
QRCOMPST	PROCESS COMPOSITE OBJECTS
QRCPDMGL	LOGGING OF DAMAGE ON HISTORY LOG
QRCPDMGN	DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCSEPOB	SEPARATE OBJECTS OWNED INTO CLASSES
QRCSIMPL	PROCESS SIMPLE OBJECTS
QRCVDTAQ	QRCVDTAQ HEADER IN ILE/COBOL
QRCVDTAQ	QRCVDTAQ API HEADER FOR CBL
QRCVDTAQ	RECEIVE FROM DATA QUEUE
QRCVDTAQ	QRCVDTAQ API HEADER IN RPG
QRCVDTAQ	QRCVDTAQ HEADER IN ILE/RPG
QREBLT	SYSTEM DEPENDENT BUILTIN FUNCTIONS
QRECDBMI	CALLED BY CALLREXI TO DELETE DBMI META
QRECHGPR	CHGREXPRF COMMAND CPP
QRECKOVR	OBTAINS OVERRIDE STATUS OF STD FILES___
QRECMD	AS/400-SPECIFIC COMMAND HANDLER
QRECREXT	SYSTEM DEPENDENT REXX SEARCH FOR EXECS
QREDSPPR	DSPREXPRF COMMAND CPP
QREEXITS	AS/400 EXIT PACKAGE
QREFIO	SKELETON FILE I/O FOR 1ST REXX RELEASE
QREHUGE	AS/400-SPECIFIC HUGE ROUTINES
QREKBIO	AS400 TERMINAL I/O
QREMETA	AS/400-SPECIFIC FOR META
QREMISC	MISSING C LIBRARY FUNCTIONS
QREMSGRC	SETMSGRC() SOURCE CODE
QREPMSGS	MESSAGE HANDLING SUPPORT FOR REXX
QREQSRNK	REXX EXTERNAL DATA QUEUE CLEANUP
QREQUEUE	AS/400 QUEUEING
QRERMSGS	REXX MESSAGE SERVICES
QRERTVCV	CHGREXPRF COMMAND POP
QRERTVDQ	RETRIEVE REXX PROFILE FOR REXX DATA Q
QRERTVPR	RTVREXPRF COMMAND CPP
QRESTOR	MEMORY MANAGEMENT FOR AS400 REXX
QRESXCAL	PROGRAM TO CALL A USER EXIT PROGRAM
QRESXFND	PROGRAM TO RESOLVE USER SYSTEM EXITS
QRETOKNZ	AS/400-SPECIFIC FOR TOKENIZATION
QRETRACE	SYSTEM DEPENDENT MODULE FOR TRACE VALUE
QREVPOOL	REXX VARIABLE POOL REQUEST PROCESSOR
QREXBUF	PLMI CODE - ADDREXBUF/RMVREXBUF CPP
QREXCMD	PROGRAM TO INVOKE REXX COMMANDS
QREXFPGM	RESOLVE AND XCTL TO EXT FUNC PGM OBJ__
QREXIMPC	REXX IMPLIED COMMANDS HANDLER
QREXINTC	STRREXPRC CPP
QREXINTZ	REXX LOW LEVEL INITIALIZATION ROUTINE
QREXINVX	REXX INTERPRETER INVOCATION EXIT
QREXMETA	REXX META DATA INPUT/OUPUT TO DBMI ___
QREXQ	REXX QUEUEING API FUNCTION
QREXTOD	SYSTEM DEPENDENT MODULE FOR RETRIEVE TOD
QREXTRC	TRCREX CPP
QREXUNIN	LOW LEVEL UNINITIALIZATION MODULE
QREXVAR	REXX VARIABLE POOL EXTERNAL INTERFACE
QREXX	REXX START UP ROUTINE
QREXX	REXX INTERPRETER INVOCATION API
QREXXX	REXX C "MAIN" FUNCTION
QRFCLOSE	RF CLOSE - EOS OR RELEASE
QRFDWNLD	DOWNLOAD SUPPORT FOR 4701 CONTROLLER
QRFERP	RF ERROR PROCESSOR
QRFGET	RF GET MODULE
QRFIOCMP	RF REQIO COMPLETE EVENT HANDLER
QRFNTYEX	EXCEPTION HANDLER FOR PASSTHRU AND DWNLD
QRFOPEN	RF OPEN PROCESSING
QRFPSR	RETAIL/FINANCE PSR MODULE
QRFPSRDT	RF PSR DATA PROCESSOR

QRFPSREH RF PSR EVENT HANDLER FOR REQIO COMPLETE
QRFPTHRU RETAIL PASSTHRU PROGRAM
QRFPUT RETAIL/FINANCE FM PUT MODULE
QRFRST RF RESTORE MODULE
QRFSUSPD RF SUSPEND MODULE
QRFVRYON VARY ON PROCESSING
QRFXLT RF XLATE MODULE
QRGXINIT OPM RPG PROGRAM INITIALIZATION
QRMCANSE RM/COBOL-85 NON-NUMERIC STRING EDIT
QRMCCARG RM/COBOL-85 C$CARG
QRMCCOM RM/COBOL-85 COMMON SUBROUTINE
QRMCDBUG RM/COBOL 85 DEBUGGER
QRMCDEDT RM/COBOL-85 DE-EDIT NUMERIC STRING
QRMCEXPN RM/COBOL-85 EXPONENTIATE
QRMCLIO1 RM/COBOL-85 RUNTIME LIB I/O OPEN/CLOSE
QRMCLIO2 RM/COBOL-85 LOGICAL I/O READ
QRMCLIO3 RM/COBOL-85 LOGICAL I/O WRITE
QRMCLIXH RM/COBOL-85 LIO EXCEPTION HANDLER
QRMCLVIO LOW VOLUME (WORK STATION) I/O
QRMCMAIN M/COBOL-85 MAIN RUNTIME ENTRY
QRMCNARG RM/COBOL-85 C$NARG
QRMCNSE RM/COBOL-85 NUMERIC STRING EDIT
QRMCRERR RM/COBOL-85 C$RERR
QRMCSORT RM/COBOL-85 SORT/MERGE
QRMCWRU RM/COBOL-85 C$WRU
QRNXINIT ILE RPG PROGRAM INITIALIZATION
QRNXIO ILE RPG DATA MANAGEMENT INTERFACE
QRUADALC ADD ALERT CODE RECORDS TO ALERT TABLE
QRUADALD ADD ALERT DESC ID REC TO ALERT TABLE
QRUCHGAT CHANGE ALERT TABLE
QRUCRTAT CREATE ALERT TABLE
QRUDLTDS DELETE ALERT CODE REC AND ALERT DESC ID
QRUGETDS RETURN THE NEXT AVAILABLE ALERT DESC ID
QRUPTSAL LOG ENTRY IN SERVICE ACTIVITY LOG
QRURASEV HANDLER FOR RAS EVENT
QRURTVRD RETRIEVE RECORD FROM RCT
QRUSDMSG SEND RAS MESSAGE TO QSYSOPR
QRWADDDE RDB DIRECTORY ADDRDBDIRE PROGRAM
QRWCHGDE RDB DIRECTORY CHGRDBDIRE PROGRAM
QRWCHGPO RDB DIRECTORY CHGRDBDIRE PROMPT OVERRIDE
QRWDDMIF RW DDM INFORMATION
QRWDSPDE RDB DIRECTORY DSPRDBDIRE PROGRAM
QRWEVENT DDM EVENT HANDLER
QRWLJDRI RETRIEVE JOB DRDA/DFM INFORMATION API
QRWRMVDE RDB DIRECTORY RMVRDBDIRE PROGRAM
QRWSARDB DDM RW ACCESS RDB
QRWSBIND RW SOURCE SIDE BIND
QRWSCMMT DDM AR COMMITMENT CONTROL
QRWSDSCD RW SOURCE SIDE DESCRIBE COMMANDS
QRWSEXEC RW SOURCE SIDE EXECUTION ENVIRONMENT
QRWSINTR DDM AR INTERRUPT RDB
QRWSQRY RW SOURCE SIDE QUERY PROCESSOR
QRWTARDB DDM RW TARGET ACCESS RDB
QRWTBIND RW TARGET SIDE BIND
QRWTCMMT DDM TARGET COMMITMENT CONTROL
QRWTDSCD RW TARGET SIDE DESCRIBE COMMANDS
QRWTEXEC RW TARGET SIDE EXECUTION ENVIRONMENT
QRWTINTR DDM TARGET INTERRUPT RDB REQUEST
QRWTQRY RW TARGET SIDE QUERY PROCESSOR
QRWVLDCK VALIDITY CHECKER FOR RDB DIR COMMANDS
QRWWKEXT RDB DIRECTORY WRKRDBDIRE EXIT PROGRAM
QRWWRKDE RDB DIRECTORY WRKRDBDIRE PROGRAM
QRWXBLDF BUILD FDOCA DESCRIPTOR
QRWXPRSF RW PARSE FDOCA FUNCTIONS
QRZACT SRM EXT INT LIST ACTION MODULE
QRZBLDAS BUILD ASSOCIATED SPACE FOR SRM
QRZBLDIX BUILD SRM INDEX OBJECTS
QRZCEC SRM EXTERNAL INTERFACE DESIGN
QRZCEXIT QRZCHGDR INVOCATION EXIT MODULE
QRZCFG CONFIGURATION ACTION MODULE
QRZCFGA SRM ADD CFG DSC ACTION MODULE
QRZCFGD SRM WORK WITH CFG DSC MODULE
QRZCFGE CONFIGURATION EXIT MODULE
QRZCFGS SRM WORK WITH CFG STATUS MODULE
QRZCHGDR CHANGE DEVICE RESOURCE MODULE
QRZCLRTP RZ CLEAR THE TOPOLOGY DATA ROUTINE
QRZCMN SRM EXTERNAL INTERFACE DESIGN
QRZCNDL RETRIEVE PORT RESOURCE CANDIDATES LIST
QRZCNV SRM CONVERSION ROUTINE
QRZCRN CHANGE RESOURCE NAME TOOL
QRZCRTOB CREATE SRM INTERNAL OBJECTS
QRZCSA WORK WITH COUPLED RESOURCE
QRZDCCMN CREATE LIST OF LINE DESCRIPTIONS
QRZDCLST MAKE LIST OF WORK STATION CDS
QRZDCMN DSPHDWRSC *CMN OUTFILE SUPPORT
QRZDCOPY COPY DATA TO SRM INTERNAL OBJECTS
QRZDCSA WORK WITH COUPLED RESOURCE
QRZDCSTG CREATE LIST OF DEV DESCIPTIONS
QRZDEXIT SRM-DB DSPHDWRSC EXIT MODULE
QRZDHRRT DSPHDWRSC COMMAND ROUTER
QRZDHW DELETE HARDWARE RECORD
QRZDLT DELETE SRM DATA RECORDS
QRZDLWS DSPHDWRSC *LWS OUTFILE SUPPORT
QRZDPRC DSPHDWRSC *PRC OUTFILE SUPPORT
QRZDSTG CREATE AND POPULATE STG OUTFILE
QRZDSTG2 SRM BUILD STG OUTFILE RECORDS 2
QRZDTRA CREATE AND POPULATE TR LAN OUTFILE
QRZGET GET SRM DATA RECORDS
QRZGETRH GET RESOURCE HIERARCHY
QRZGTRNH GET RESOURCE NAME HIERARCHY
QRZHOUTF CREATE OUTFILE WITH HDW DATA
QRZHPRES HARDWARE RESOURCE PRESENTATION MODULE
QRZHRMEH RESOURCE ALTER EVENT HANDLER
QRZHRMIN HARDWARE RESOURCE MANAGER IPL INIT PGM
QRZHRMRN PUT RESOURCE TRACKING NAME IN ERROR LOG
QRZHWPRT PRINT SRM-DB HARDWARE DATA
QRZIEXIT SRM-DB INVOCATION EXIT MODULE
QRZINIT SRM INITIALIZATION MODULE
QRZLAN LAN SRM
QRZLANLI LIST TOKEN-RING LAN DATA
QRZLBLC LABEL MIGRATION AID CHANGE
QRZLBLD LABEL MIGRATION AID DISPLAY
QRZLBLHW LABEL MIGRATION AID HARDWARE ANALYSIS
QRZLBLST MIGRATION AID LABEL LIST BUILDER
QRZLBLUP LABEL MIGRATION AID UPDATE
QRZLBL01 LABEL MIGRATION AID - STUB 01
QRZLBL02 LABEL MIGRATION AID - STUB 02
QRZLBL03 LABEL MIGRATION AID - STUB 03
QRZLBL4I LABEL MIGRATION AID MIG4 INTERFACE
QRZLCPRT DISPLAY SOFTWARE RESOURCES CPP
QRZLEXIT SRM-DB QRZLOCK EXIT MODULE
QRZLIST SRM LIST LOCAL HARDWARE MODULE
QRZLOCK SRM LOCK PROCESSOR
QRZLOUTF CRT OUTFILE WITH SOFTWARE PRODUCT DATA
QRZLPRES DSP/PRT SOFTWARE PRODUCT DATA
QRZLWS SRM EXTERNAL INTERFACE DESIGN
QRZLWS2 SRM EXTERNAL INTERFACE DESIGN
QRZMGLVL MIGRATION AID PHASE 0
QRZMIG1 MIGRATION AID PHASE 1
QRZMIG2A MIGRATION AID PHASE 2A
QRZMIG2B HARDWARE MIGRATION AID PHASE 2B
QRZMIG3 MIGRATION AID PHASE 3
QRZMIG4 HARDWARE MIGRATION AID PHASE 4
QRZPTRA TRA PRINT FOR DSPHDWRSC *PRINT
QRZPUT PUT RECORDS TO SRM-DB
QRZRDHDW READ SRM-DB HARDWARE RESOURCE RECORD(S)
QRZRDPTH READ SRM-DB PATH CONNECTION DATA
QRZRECOV EXTERNAL SRM-DB RECOVERY MODULE
QRZROUTR SRM-DB MAINLINE ROUTER
QRZRSTOH RESTORE SRM SPACE OBJECTS
QRZRTDSA RETRIEVE DIRECT SELECT ADDRESS FOR VARY
QRZRTVSN RETRIEVE SYSTEM SERIAL NUMBER
QRZSAVFD HRM SAVE FILE DEFINITIONS
QRZSRMEH SRM-DB EVENT HANDLER
QRZSTG SRM EXTERNAL INTERFACE DESIGN
QRZSTG2 SRM EXTERNAL INTERFACE DESIGN
QRZSTG3 STORAGE ACTION MODULE FOR 370 TAPES
QRZTRA TRA DISPLAY EXTERNAL INTERFACE
QRZTRF TERMINATE CONFIGURATION
QRZUNLCK UNLOCK SRM INTERNAL OBJECTS

QRZUPD	UPDATE RECORDS IN SRM
QRZUPDTF	UPDATE TOPOLOGY FLAG
QRZWHRRT	PRINT SRM-DB HARDWARE DATA
QSACLOSE	SNUF FM CLOSE
QSADEVSL	SNUF DEVICE SELECTION
QSAEVMON	SNUF FM EVENT MONITORS
QSAGET	SNUF FM GET
QSAMSGBD	SNUF MESSAGE HANDLER
QSAOPEN	SNUF FM OPEN
QSAPUT	SNUF FM PUT
QSARSUME	SNUF FM RESUME PROCESSING ROUTINE
QSASUSPD	SNUF FM SUSPEND PROCESSING ROUTINE
QSAVRYON	SNUF FM VARY ON PROCESSING ROUTINE
QSAWMPSR	SNUF FM PSR PROCESSING ROUTINE
QSCAEXIT	LPDA-2 IEXIT MODULE
QSCAPIEX	SAVE APAR DATA I-EXIT PROGRAM
QSCAPLST	LIST APAR DATA PANEL
QSCAUTCK	PC AUTHORITY CHECKER
QSCAUTOS	SAVE APAR DATA
QSCAXFMT	FORMATTER FOR THE RUNLPDA COMMAND
QSCCHKCT	CHECK COMMUNICATIONS TRACE CPP
QSCCOPY	CALL COPY EXECUTION
QSCCPY	COPY SCREEN
QSCCPYB	BEGIN COPY SCREEN
QSCCPYE	END COPY SCREEN
QSCCPYLG	LIST ERROR LOG CPP
QSCDH	SERVICE DATA HANDLER
QSCDJI	DUMP JOB INTERNAL CPP
QSCDJOB	DUMP JOB CPP
QSCDLTAP	DELETE APAR DATA CPP
QSCDLTCT	DELETE COMMUNICATIONS TRACE CPP
QSCDMPPS	DUMP POINTERS IN A SPACE
QSCDOBJ	DUMP OBJECT CPR
QSCDSO	DUMP SYSTEM OBJECTS CPR
QSCDSS	DISPLAY SERVICE STATUS
QSCDSTSO	DESTROY SERVICE COMMUNICATION OBJECT
QSCEND	END SERVICE MODE CPP
QSCENDCT	END COMMUNICATIONS TRACE CPP
QSCEXTCT	INVOCATION EXIT FOR COMMUNICATIONS TRACE
QSCFSODD	FORMAT AND SENDOUT DUMP DATA
QSCGJI	GET INTERNAL JOB DUMP
QSCGJOB	GET JOB DUMP
QSCGSO	GET SYSTEM OBJECTS
QSCIEXIT	SC IEXIT PROGRAM
QSCINTDD	INTERNAL DUMP DATA
QSCJSDMP	JOB STORAGE DUMP ROUTINE
QSCLID	LIST INTERNAL DATA
QSCLOCSO	LOCATE SERVICE OBJECT
QSCMAG	MATERIALIZE AND DUMP ACCESS GROUP
QSCMAUTL	MATERIALIZE AND DUMP AUTH LIST
QSCMBSS	MATERIALIZE AND DUMP BYTE STRING SPACE
QSCMCB	DUMP COMMIT BLOCK ATTRIBUTES
QSCMCD	MTRLZ AND DUMP CONTROLLER DESCRIPTION
QSCMCNNL	MATERIALIZE AND DUMP CONNECTION LIST
QSCMCOS	MATERIALIZE AND DUMP CLASS OF SERVICES
QSCMCTX	MATERIALIZE AND DUMP CONTEXT
QSCMCUR	MATERIALIZE AND DUMP CURSOR
QSCMDICN	MATERIALIZE AND DUMP DICTIONARY
QSCMDMPS	MATERIALIZE AND DUMP DUMP SPACE
QSCMDS	MATERIALIZE & DUMP DATA SPACE
QSCMDSI	MATERIALIZE & DUMP DS INDEX
QSCMIDX	MATERIALIZE & DUMP INDEX
QSCMJMQ	MATERIALIZE AND DUMP JOB MSG QUEUE
QSCMJPRT	MATERIALIZE AND DUMP JOURNAL PORT
QSCMJSPC	MATERIALIZE AND DUMP JOURNAL SPACE
QSCMLUD	MTRLZ & DUMP LOGICAL UNIT DESCRIPTION
QSCMMCTX	MATERIALIZE AND DUMP MACHINE CONTEXT
QSCMMOD	MATERIALIZE AND DUMP MODE
QSCMMODL	MATERIALIZE AND DUMP MODULE
QSCMND	MTRLZ & DUMP NETWORK DESCRIPTION
QSCMNWID	MATERIALIZE AND DUMP PORT GROUP (NWID)
QSCMPGM	MATERIALIZE AND DUMP PROGRAM
QSCMQ	MATERIALIZE AND DUMP QUEUE
QSCMSP	MATERIALIZE AND DUMP SPACE
QSCMSTMF	MATERIALIZE AND DUMP BYTE STRING SPACE
QSCMUP	MATERIALIZE AND DUMP USER PROFILE
QSCOBJDM	OBJECT DUMP
QSCOIR	RETRIEVE SERVICE OIR
QSCONEOB	SERVICE SINGLE OBJECT DUMP
QSCPMTCT	PROMPT CONTROL FOR COMMUNICATIONS TRACE
QSCPRTCT	PRINT COMMUNICATIONS TRACE CPP
QSCPRTC1	PRINT COMMUNICATIONS TRACE
QSCPRTEL	PRINT ERROR LOG COMMAND PROCESSING
QSCPTFSN	UPDATE SRM WITH MPCI INFO
QSCPTMSG	VFYPRT MSG QUEUE HANDLER
QSCPTREC	TRACE RECORDS OUTPUT FORMATTER
QSCPUTR	SERVICE OPEN/CLOSE ROUTINE
QSCRH	SERVICE REQUEST HANDLER
QSCSAVAP	SAVE APAR DATA CPP
QSCSPCDM	SPACE DUMP ROUTINE
QSCSTRCT	START COMMUNICATIONS TRACE CPP
QSCSVJOB	SERVICE JOB CPR
QSCTEVTH	TRACE JOB EVENT HANDLER
QSCTI	TRACE INTERNAL DATA
QSCTJIEX	TRACE JOB INVOC EXIT
QSCTJOB	TRACE JOB CPP
QSCTJOBR	TRACE JOB REMOTE SETUP ROUTINE
QSCVFYPT	VERIFY PRINTER COMMAND
QSCVLICL	GET VLIC LOG ID
QSCVPIEX	VERIFY PRINTER IEXIT
QSCWMINT	SERVICE/WORK MANAGEMENT INTERFACE
QSDAMCJ2	CREATE TEMPORARY JOB STRUCTURES
QSFCRT	SFL CREATE SPACE
QSFGET	SFL GET & RETURN SFL RECORD
QSFHSFL	STUB
QSFMQDSP	STUB
QSFPUT	QSFPUT
QSGREPAK	SGREPAK - REPACK PGM OBJECT
QSHDCPLP	AUTO-DECOMPRESS LICENSED PROGRAMS
QSHDLPDP	DELETE PDP OBJECTS FROM QSYS
QSHINT1	AUTO DCPOBJ INSTALL CODE
QSHRCVOB	CMP/DCPOBJ RECOVERY CODE
QSHTERSE	COMPRESS OBJECTS CPP USING TERSE
QSICLOSE	FILE CLOSE CPP
QSIEFEVH	QSIEFEVH--EXPEDITED FLOW EVENT HANDLER
QSIERP1	QSIERP1--I/O ERROR HANDLER
QSIERP2	SI FM DETECTED ERROR PROCESSOR
QSIFMH7	QSIFMH7--PROCESS FMH-7
QSIGET	QSIGET--GET FROM ISS FILE
QSIINASP	QSIINASP
QSIIOCMP	QSIIOCMP--I/O COMPLETE EVENT HANDLER
QSINFEVH	QSINFEVH--NORMAL FLOW EVENT HANDLER
QSIOPEN	SI FM FILE OPEN MODULE
QSIPUT	SI APPC PUT MODULE
QSIRSP	QSIRSP--SEND RESPONSE
QSIRSPAT	QSIRSPAT--SEND RESPONSE TO ATTACH
QSIRVPIP	QSIRVPIP--RECEIVE PIP
QSITPP	QSITPP--TERMINATION PHASE PROCESSING
QSKDUMP	STREAMS OBJECT DUMP PROGRAM
QSKMAINT	STREAMS MAINTENANCE PROGRAM
QSLCLOSE	CLOSE FOR SLUT1
QSLERBLD	SLU1 MESSAGE BUILDER
QSLGET	QSLGET
QSLINASP	SLUT1 LUD ASP INITIALIZATION
QSLINLLS	QSLINLLS: SL INITIALIZE LU-LU SESSION
QSLOPEN	SL OPEN
QSLPUT	QSLPUT
QSLRST	QSLRST
QSLSNA	QSLSNA - SNA ENFORCER FOR STEADY STATE
QSLSPEND	QSLSPEND
QSLUSMON	QSLUSMON-UNSOL DATA HANDLER
QSMADDSF	ADD SERVICE FUNCTION AREA
QSMASFDR	ACTIVE SF PROMPT RESPONSE HANDLER
QSMAVPR	ALLOCATE/VARY/POWER DEVICE
QSMCCNLE	CONTROL CANCEL EVENT HANDLER
QSMCFKEY	CF KEY TABLE MANAGER
QSMCSMML	CSM MAINLINE
QSMCSMSU	CSM STARTUP
QSMDAE	CSM DATA AVAILABLE EVENT HANDLER
QSMDELSF	DELETE SF AREA

QSMDKTS	DISKETTE SELECTION
QSMDPM	DISPLAY PROMPT OR MENU
QSMHELP	CSM HELP MEUNS
QSMIEXIT	CSM IEXIT
QSMLDVMC	INTERFACE TO LINK/LOADER TO INSTALL VMC
QSMOODE	OBTAIN OFFLINE DEVICE EVENT HANDLER
QSMPSMR	PRIMARY MENU RESPONSE HANDLER
QSMREQIO	REQUEST I/O GENERATOR
QSMRQDQR	REQUEST QUEUE DEQUEUE ROUTINE
QSMSFDR	SF DISPLAY RESPONSE HANDLER
QSMSFEX	SF END EXCEPTION HANDLER
QSMSFMR	START SF MENU RESPONSE
QSMSSFX	START SF EXCEPTION HANDLER
QSMSTART	START CSM
QSMSTOP	STOP CSM
QSMSUIR	SERVICE UTILITY INTRFC DISPLAY HNDLR
QSMTAPS	TAPE SELECTION
QSNAPI	QSYSINC HEADER FOR FOR COBOL
QSNAPI	QSYSINC HEADER FILE FOR RPG
QSNDDTAQ	SEND TO DATA QUEUE
QSOCACTI	ACTIVATE/DEACTIVATE IPS & AF_SNA
QSOCALOC	ADDIPSLOC CPP
QSOCATPN	ADDSNSTPN CPP
QSOCCA	CHGSNSA CPP
QSOCCITL	CVTIPSIFC CPP
QSOCCLOC	CHGIPSLOC CPP
QSOCCLTI	CVTIPSLOC CPP
QSOCCTMP	CHGSNSTMP CPP
QSOCCTOS	CHGIPSTOS CPP
QSOCEVTH	ANYNET EVENT HANDLER
QSOCFGIP	CFGIPS CPP
QSOCFGSN	WORK WITH AF_SNA TRANSACTION PROGRAM NAM
QSOCIPO3	WORK WITH IPS LOCATION NAMES
QSOCIPO4	WORK WITH IPS TYPE OF SERVICE
QSOCPA	CHGSNSXXX CPP POP
QSOCPIPS	PRTIPSCFG CPP
QSOCPLOC	CHGIPSLOC POP
QSOCPTOS	CHGIPSTOS POP
QSOCRLOC	RMVIPSLOC CPP
QSOCRTPN	RMVSNSTPN CPP
QSOCSIFC	STR/ENDIPSIFC CPP
QSOCWIFC	WORK WITH IPS INTERFACES
QSOCWIFO	WORK WITH IPS INTERFACES OPTIONS
QSOCWLOO	WORK WITH IPS LOCATION OPTIONS
QSOCWRTE	WORK WITH IPS ROUTES
QSOCWRTO	WORK WITH IPS ROUTES OPTIONS
QSOTRACE	SOCKETS TRACING MODULE
QSOWRKSN	WORK WITH AF_SNA TP NAMES
QSPACCLG	LOG SPOOL & PRINT JOB ACCOUNTING
QSPBLNJE	BUILD NJE FORMAT FROM SPOPENG FORMAT
QSPBPDSK	BLOCK/PUT DISKETTE
QSPBPPRT	BLOCK/PUT PRINTER PUT TO DATA BASE
QSPBSEPP	BUILD SEPARATOR INFORMATION____
QSPCADSP	CONVERT AFPDS TO DISPLAY FORMAT
QSPCHGPI	CHANGE USER PRINT INFORMATION
QSPCHJOB	CHANGE JOB SPOOLED JOB/FILES
QSPCHQPO	CHGOUTQ PROMPT OVERRIDE PROGRAM
QSPCHQVC	CHANGE OUTQ VALIDITY CHECKER
QSPCHSPF	CHANGE SPOOL FILE ATTRIBUTES
QSPCHSPQ	CHANGE SPOOL OUTPUT QUEUE
QSPCHWTR	CHANGE SPOOL WRITER
QSPCIDSP	CONVERT IPDS TO DISPLAY FORMAT
QSPCIPRT	CONVERT IPDS TO PRINT FORMAT
QSPCKPRM	CHECK CARD/DISKETTE OPEN PARAMETERS
QSPCLDSP	CONVERT LINE AND AFPDSLINE FOR DSPSPLF
QSPCLNUP	CLEANUP RWCB JOB & OUTPUT QUEUES
QSPCLOSE	CLOSE SPOOLED FILES
QSPCLOSP	CLOSE SPOOLED FILE API
QSPCLPRT	CONVERT LINE AND AFPDSLINE FOR CPYSPLF
QSPCLSPQ	CLEAR SPOOL QUEUE
QSPCNJOB	CANCEL SPOOL JOB
QSPCNRDR	CANCEL SPOOL READER
QSPCNSPF	CANCEL SPOOL FILE
QSPCNVRT	TEMP VERSION
QSPCNWTR	CANCEL SPOOL WRITER
QSPCPIPO	CHANGE USER PRINT INFO PROMPT OVERRIDE
QSPCPYF	COPY SPOOL FILE
QSPCRQVC	CREATE OUTQ VALIDITY CHECKER
QSPCRSPQ	CREATE SPOOL JOB/OUTPUT QUEUE
QSPCRTSP	CREATE SPOOLED FILE API
QSPCTRDR	HOLD/RELEASE SPOOLING READER
QSPCVDSP	TEMP VERSION
QSPCVPAG	CONVERT SPOOL FILE PAGES
QSPCVPRT	TEMP VERSION
QSPCVSEP	BLOCK SEPARATOR CONVERSION PROGRAM
QSPDAMGE	SPOOL DAMAGE RECOVERY AT IPL
QSPDATAH	SPOOL DATA HANDLER
QSPDFTCP	DEFAULT CPP FOR DATA, ENDINP & ENDJOB
QSPDKTWT	SPOOL DISKETTE WRITER LOGIC
QSPDMGNT	SPOOL JOB DAMAGE NOTIFICATION PGM
QSPDSPF	DISPLAY SPOOL FILE
QSPDSPFA	DISPLAY SPOOL FILE ATTRIBUTES
QSPDSPFM	DISPLAY FILE SPECIFIC WRITER MESSAGES
QSPDSPFX	EXIT PROGRAM FOR QSPDSPF & CPYSPLF
QSPDSPJ	DISPLAY SPOOL JOB
QSPDSPPI	DISPLAY USER PRINT INFORMATION
QSPDSPQ	DISPLAY SPOOL QUEUE
QSPDSPQD	DISPLAY QUEUE DESCRIPTION
QSPDSPR	DISPLAY SINGLE READER
QSPDSPRW	WORK WITH ALL READERS/WRITERS CPP
QSPDSPW	DISPLAY SINGLE WRITER
QSPDSPWM	DISPLAY MESSAGES WRITER IS WAITING ON
QSPDUPQ	SPOOL OBJECT HANDLER FOR CRTDUPOBJ
QSPENDWA	END WRITER ABNORMAL
QSPEXTWI	EXTRACT WRITER PROCESSING INFO
QSPFEOD	SPOOL FORCED END OF DATA
QSPFFACB	SPOOL OBJECT VERIFY ROUTINE
QSPFILES	CREATE DATABASE MEMBERS
QSPFIXUP	SPOOL CLEANUP EVENT HANDLER
QSPFXDTA	SPOOL FIX DCA-L2 DATA MODULE
QSPGETF	COPY FROM SPOOLED FILE
QSPGETSP	GET SPOOLED FILE API
QSPGETSP	QSPGETSP HEADER IN ILE/COBOL
QSPGETSP	QSPGETSP API HEADER FOR CBL
QSPGETSP	QSPGETSP API HEADER IN RPG
QSPGETSP	QSPGETSP HEADER IN ILE/RPG
QSPGETST	GET DETAILED PRINT STATUS
QSPGPJOB	GET/PUT/GET JOB ON JOB QUEUE
QSPHLSPF	HOLD SPOOL FILE
QSPHLSPQ	HOLD SPOOL QUEUE
QSPHLWTR	HOLD WRITER
QSPHNCMD	HANDLE SUB-COMMANDS FROM SCREENS
QSPHNMLT	MULTIPLE OBJECT HANDLER
QSPHNSPQ	SPOOL QUEUE OBJECT HANDLER
QSPHNSTS	HANDLE PRINTING STATUS OPTIONS
QSPIERRS	ISSUE SPOOL INTERCEPT ERROR MESSAGES
QSPMAINT	MAIN MODULE FOR QSPLMAINT JOB
QSPMNCFA	CHANGE SPOOLED FILE ATTRIBUTES BY MENU
QSPMOVJB	CBL INCLUDE FOR QSPMOVJB
QSPMOVJB	MOVE JOB API
QSPMOVJB	QSPMOVJB HEADER IN ILE/COBOL
QSPMOVJB	CSTATUS OT - RPG INCLUDE FOR QSPMOVJB
QSPMOVJB	QSPMOVJB HEADER IN ILE/RPG
QSPMOVSP	CBL INCLUDE FOR QSPMOVSP
QSPMOVSP	MOVE SPOOLED FILE API
QSPMOVSP	QSPMOVSP HEADER IN ILE/COBOL
QSPMOVSP	CSTATUS OT - RPG INCLUDE FOR QSPMOVSP
QSPMOVSP	QSPMOVSP HEADER IN ILE/RPG
QSPOPEN	OPEN SPOOLED OUTPUT FILES
QSPOPENG	OPEN SPOOLED FILE AND GET ATTRIBUTES
QSPOPENP	OPEN SPOOLED FILE AND PUT ATTRIBUTES
QSPOPNSP	OPEN SPOOLED FILE API
QSPOPNWT	SPOOL GENERIC/OPEN WRITER
QSPOPNWX	INVOCATION EXIT PGM FOR OPEN WRITER
QSPPLSTX	WRKSPLF UIM INCOMPLETE LIST EXIT
QSPPMTFA	BUILD CHGSPLFA PROMPT STRING
QSPPMTHF	BUILD HLDSPLF PROMPT STRING
QSPPMTQD	PROMPT QUEUE DESCRIPTION
QSPPRTQ	HANDLE PRINT QUEUE
QSPPRTWT	SPOOL PRINT WRITER

QSPPSFEX	INVOCATION EXIT PGM FOR PSF WRITER
QSPPSFWT	SPOOL PSF PRINT WRITER
QSPPUTF	COPY TO SPOOLED FILE
QSPPUTSP	PUT SPOOLED FILE API
QSPQLSTX	DECLARES FOR OUTQ ENTRY WORKSPACE
QSPRCMBR	RECLAIM SPOOL MEMBER
QSPRCSTG	RECLAIM SPOOL STORAGE
QSPRDR	SPOOL READER
QSPRDRAP	SPOOL READER ADOPT QSYS PROFILE
QSPRESET	RESET SPOOLED DATABASE MEMBER
QSPRJOBQ	RETRIEVE JOB QUEUE INFORMATION
QSPRLSPF	RELEASE SPOOL FILE
QSPRLSPQ	RELEASE QUEUE
QSPRLWTR	RELEASE WRITER
QSPROUTQ	QSPROUTQ HEADER IN ILE/COBOL
QSPROUTQ	QSPROUTQ API HEADER FOR CBL
QSPROUTQ	RETRIEVE OUTPUTQ QUEUE INFORMATION
QSPROUTQ	QSPROUTQ API HEADER IN RPG
QSPROUTQ	QSPROUTQ HEADER IN ILE/RPG
QSPRSTQ	SPECIAL OBJECT HANDLER FOR RSTOBJ
QSPRTVPI	RETRIEVE USER PRINT INFORMATION
QSPRWTRI	QSPRWTRI API HEADER IN CBLLE
QSPRWTRI	QSPRWTRI API HEADER IN RPG
QSPRWTRI	RETRIEVE WRITER INFORMATION
QSPRWTRI	QSPRWTRI API HEADER IN RPG
QSPRWTRI	QSPRWTRI HEADER IN ILE/RPG
QSPSAVQ	SPECIAL OBJECT HANDLER FOR SAVOBJ
QSPSBMEX	INVOCATION EXIT PGM FOR SBMXXXJOB CMDS
QSPSBMJB	SUBMIT DATA BASE JOB
QSPSCAN	SCAN SPOOL LARGE RECORD
QSPSDTAQ	SEND ENTRY TO A DATA QUEUE
QSPSETWI	SET WRITER PROCESSING INFO
QSPSNDSP	SNDNETSPLF MACRO CALLER
QSPSNDWM	SEND MESSAGE WRITER IS WAITING ON
QSPSTCPF	KEEP OR CLEAR JOB OR OUTPUT QUEUES
QSPSTRDR	START READER
QSPSTWTR	START SPOOL WRITER
QSPTRMRW	TERMINATE READER/WRITER
QSPWKSTS	WORK WITH PRINTING STATUS CPP
QSPWRKF	WORK WITH SPOOLED FILES
QSPWTREH	SPOOL WRITER EVENT HANDLER
QSPWTRM1	SPOOL WRITER MAIN START
QSQALTER	ALTER TABLE
QSQANZPG	ANALYZE OR OPEN SQL PROGRAMS
QSQAUTH	HANDLE GRANT/REVOKE STATEMENTS
QSQBIND	SQL BIND
QSQBLQDT	SQL QUERY DEFINITION TEMPLATE BUILDER
QSQCALL	HANDLE CALL STATEMENT
QSQCHGPK	CHANGE SQL PACKAGE OBJECT HANDLER
QSQCHKS	API SQL SYNTAX CHECK
QSQCHKS	QSQCHKS HEADER IN ILE/COBOL
QSQCHKS	QSQCHKS API HEADER FOR CBL
QSQCHKS	QSQCHKS API HEADER IN RPG
QSQCHKS	QSQCHKS HEADER IN ILE/RPG
QSQCKAUT	CHECK EFFECTIVE AUTHORITIES
QSQCLOSE	SQL HARD CLOSE PSEUDO CLOSED CURSORS
QSQCMT	SQL COMMIT AND ROLLBACK
QSQCMTER	SQL COMMIT AND ROLLBACK
QSQCONN	SQL CONNECT
QSQCRTDB	SQL CREATE DATA BASE
QSQCRTI	SQL CREATE INDEX
QSQCRTT	CREATE TABLE
QSQCRTV	SQL CREATE VIEW
QSQDELET	SQL DELETE
QSQDESC	DESCRIBE RUNTIME SUPPORT - DYNAMIC SQL
QSQDLTPK	DELETE PACKAGE
QSQDROP	HANDLE DROP STATEMENT
QSQENDAG	ACTIVATION GROUP EXIT
QSQEXPLN	EXPLAIN - LIST CMD PARMS, ACCESS PLANS
QSQFLAG	SAA/ANS FLAGGING DRIVER
QSQFTABF	ANS FLAGGING PARSE TABLES
QSQFTABS	SAA/ANS SQL FLAGGING PARSE TABLES
QSQHSTLX	API HOST LEX
QSQICOLL	ISQL - COLUMN LIST SOURCE CODE
QSQICPKG	CREATE SQLPKG FOR USE BY ISQL
QSQICSTL	ISQL DATA BASE LIST SOURCE CODE
QSQIDBL	ISQL DATA BASE LIST SOURCE CODE
QSQIDUPR	ISQL DLTUSRPRF SESSION HANDLER
QSQIEDIT	FUNCTION KEY EDITING FOR SQL PROMPTING
QSQIFMT	ISQL STATEMENT FORMATTER
QSQIIXT	INVOCATION EXIT PROGRAM
QSQILVL1	PROMPT FOR LEVEL 1 SQL STATEMENTS
QSQILVL2	ISQL PROMPT SCREEN HANDLER
QSQILVL3	SQL PROMPTER LEVEL 3 STATEMENTS
QSQINS	SQL INSERT
QSQIPKGL	ISQL PACKAGE LIST SOURCE CODE
QSQIPLE	SQL PROMPTER LIST EXTENDER
QSQIPOP	ISQL - POPUP WINDOW SOURCE CODE
QSQIPRPT	SQL PROMPTER ROUTER
QSQIRDBL	ISQL RDB LIST SOURCE CODE
QSQISCAN	SCANS FOR CLEAR TEXT IN SQL PROMPTER
QSQISHOW	SHOW PROMPTED & FORMATTED SQL STATEMENT
QSQITABL	ISQL TABLE LIST SOURCE CODE
QSQITBLX	ISQL TABLE LIST SOURCE CODE
QSQLABEL	HANDLE COMMENT & LABEL STATEMENTS
QSQLCLS	SQL LOCK, CLOSE
QSQLCLSE	DO PSEUDO CLOSE OF FILE
QSQLCMIT	CALLED BY HLL PGM TO DO COMMIT/ROLLBACK
QSQLOPEN	SQL OPEN FOR PSEUDO CLOSED FILES
QSQMAC	SQL MACRO INTERFACE
QSQMSGAR	SQL MESSAGE AR
QSQMSGAS	SQL MESSAGE AS
QSQNAME	CONVERT SQL NAME TO SYSTEM NAME
QSQOPEN	SQL OPEN
QSQPCMD	CPP FOR CRTSQLPKG COMMAND
QSQPCPKG	AR SIDE OF CREATE PACKAGE
QSQPDBRM	HANDLE HOST VARIABLES
QSQPLIST	HANDLE ERR MSGS, XREF, ETC
QSQPRCED	EXTENDED DYNAMIC SQL API
QSQPRCED	QSQPRCED HEADER IN ILE/COBOL
QSQPRCED	QSQPRCED API HEADER FOR CBL
QSQPRCED	QSQPRCED API HEADER IN RPG
QSQPRCED	QSQPRCED HEADER IN ILE/RPG
QSQPREP	PREPARE RUNTIME SUPPORT - DYNAMIC SQL
QSQPSTAB	DICTIONARY SERVICES - PRECOMPILER/PARSER
QSQRAPLY	SQL SEMANTIC ROUTINES
QSQRCHK	SQL DATA CHECKER
QSQRCPKG	RECLAIM SQL PACKAGE OBJECT HANDLER
QSQRECOV	SQL RECOVERY OBJECT HANDLER
QSQREXX	SQL TO REXX INTERFACE
QSQRLEX	SQL LEXICAL SCAN ROUTINES
QSQRNNM1	STUB MODULE FOR QSQRNNM1
QSQROUTE	SQL ROUTER
QSQRPARS	SQL PARSER MACHINE
QSQRPTAB	SQL PARSE TABLES
QSQRSTPK	RESTORE SQL PACKAGE OBJECT HANDLER
QSQRTBLS	SCAN TABLES FOR THE SQL GRAMMAR
QSQRXLTR	SQL PARSER TRANSLATOR MODULE
QSQRXTRT	EXTRACT FIELD DEFINITIONS FOR TABLES
QSQSAVPK	SAVE SQL PACKAGE OBJECT HANDLER
QSQSCPKG	AS SIDE OF CREATE PACKAGE
QSQSQLNM	GET ALTERNATE FILE NAME
QSQSYSNM	GET ALTERNATE FILE NAME
QSQSYSPK	SQL CREATE SYSPACKAGE VIEW
QSQUPDAT	SQL UPDATE
QSQVFIX	SQL FIX DEPENDENT VIEWS
QSQVTCHG	SQL CHANGE VIEW CREATION TEMPLATE
QSQXCHK	SQL XGAM DATA CHECKER
QSQXCUTE	EXECUTION RUNTIME INTERPRETER MODULE
QSQXIT	SQL EXIT
QSQXPARS	PARSER FOR EXTENDED GRAMMAR
QSQXPGM	CREATE AND CLEAR EXTENDED SQL AREA
QSQXXLTR	TRANSLATOR FOR EXTENDED GRAMMAR
QSRADOPT	ADOPT AND PROPAGATE QSYS USER PROFILE
QSRCBALC	S/R ALLOCATE CONTROL BLOCK
QSRCLNUP	S/R IEXIT CLEANUP ROUTINE
QSRCLOSE	ONLINE SAVE FILE CLOSE
QSRCSAVF	CLEAR ONLINE SAVE FILE
QSRDSAVF	S/R DISPLAY SAVE FILE CPP
QSRDSPY	DISPLAY SAVE/RESTORE FILES ON TAPE

QSRDSVOL	DISPLAY SAVE/RESTORE FILES ON DISKETTE
QSREVTHD	S/R EVENT HANDLER
QSREXDEV	EXTRACT DEVICE TYPE USING PATHNAME
QSRFEOD	FEOD FOR AN ONLINE SAVE FILE
QSRFMERR	ONLINE SAVE FILE ERROR MESSAGE ROUTER
QSRFROBJ	FREE STORAGE FOR OBJECTS SAVED
QSRGET	GET RECORD FROM ONLINE SAVE FILE
QSRIPLXT	SAVE/RESTORE IPL EXIT FOR S/R STORAGE
QSRLSAVF	LIST SAVE FILE CONTENTS API
QSRLSAVF	QSRLSAVF HEADER IN ILE/COBOL
QSRLSAVF	QSRLSAVF API HEADER FOR CBL
QSRLSAVF	QSRLSAVF API HEADER IN RPG
QSRLSAVF	QSRLSAVF HEADER IN ILE/RPG
QSROPEN	OPEN ONLINE SAVE FILE
QSROUTFL	SAVE OUTPUT SUPPORT CODE
QSRPSCPR	SAVE SYSTEM CPP
QSRPSTIO	S/R POST I/O PROCESSING
QSRPUT	PUT RECORD TO ONLINE SAVE FILE
QSRRACPR	RESTORE OBJECT AUTHORIZATIONS CPP
QSRREQIO	S/R REQUEST I/O
QSRRLCPR	RESTORE LIBRARY CPP
QSRRLCP2	RESTORE LIBRARY MAINLINE CODE
QSRROCPR	RESTORE OBJECT CPP
QSRROCP2	RESTORE OBJECT MAINLINE CODE
QSRRSCUR	FIND *SAVVOL FILE TO RESTORE FROM
QSRRSDEQ	S/R RESTORE DEQUEUE PROCESSING
QSRRSFIL	FIND SPECIFIED FILE TO RESTORE FROM
QSRRSLIB	OBJECT VALIDATION DURING RESTORE
QSRRSOBJ	OBJ TYPE SPECIFIC PROCESSING - RESTORE
QSRRSOPN	OPEN FILE TO RESTORE FROM
QSRRSPST	S/R RESTORE POST I/O PROCESSING
QSRRSRQI	I/O MODULE FOR RESTORE
QSRRTVSF	S/R RETRIEVE FROM SAVE FILE MODULE
QSRRUCPR	RESTORE USER PROFILE CPP
QSRSAVO	CBL INCLUDE FOR QSRSAVO
QSRSAVO	QSRSAVO HEADER IN ILE/COBOL
QSRSAVO	SAVE LIST OF OBJECTS API
QSRSAVO	CSTATUS OT - RPG INCLUDE FOR QSRSAVO
QSRSAVO	QSRSAVO HEADER IN ILE/RPG
QSRSLCPR	SAVE LIBRARY CPP
QSRSLCP2	SAVE LIBRARY MAINLINE CODE
QSRSOCPR	SAVE OBJECT & SAVE CHANGED OBJECT CPP
QSRSOCP2	SAVE OBJECT & SAVE CHGD OBJ MAINLINE
QSRSVCHK	CHECK OBJECTS TO BE SAVED
QSRSVDEQ	SAVE DEQUEUE PROCESSING MODULE
QSRSVEOV	SAVE END OF VOLUME PROCESSING
QSRSVIOC	SAVE DEVICE CONFIGURATION OBJECTS
QSRSVIPL	SAVE THE INITIAL INSTALLATION OBJECTS
QSRSVPRE	SAVE PRE-IO PROCESSING
QSRSVPST	SAVE POST-IO PROCESSING
QSRSVRQI	I/O MODULE FOR SAVE
QSRSVSFD	S/R SAVE SAVE FILE DATA CPP
QSRSVUPR	SAVE USER PROFILE OBJECTS
QSRTGTRS	TARGET RELEASE FUNCTION
QSRTUNE	SAVE/RESTORE PERFORMANCE TUNING
QSTCMADL	ADD DELIMETERS TO ALT FILE NAME
QSTCMGFO	LIST FILE OBJECTS
QSTCMRDL	REMOVE DELIMITERS FROM NAME
QSTCMVOA	VALIDATE ALTERNATE FILE NAME
QSTLJLKI	LIST JOB LOCKS FOR STARVIEW
QSTRJOBI	RETRIEVE JOB INFORMATION-SQL INFORMATION
QSUACHLC	ADD S/370 CHANNEL CABLES
QSUADDRC	ADD FILLER PANELS TO SYS CONFIGURATION
QSUADOEM	IMA ADD OEM ENTRY TO SYS CONFIGURATION
QSUASGID	IMA ASSIGN ELEMENT IDENTIFIER
QSUCHKOB	CHECK EDF INTERNAL OBJECTS
QSUCNVRT	CONVERT TOPOLOGY TO CURRENT REL FORMAT
QSUCNV01	FIX TOPOLOGY FOR CARD CAGES
QSUCNV02	FIX EIA,DEVICE POSITION,PARENT 9336
QSUCNV03	CHANGE 5031 TO 5030 IN REPORTED TYPE
QSUCPYDT	COPY EDT DATA TO OBJECT
QSUCPYRC	COPY SYS CONFIGURATION FILE
QSUCRLTE	CORRELATE NEW TOPOLOGY WITH VPD
QSUDCHLC	DISPLAY S/370 CHANNEL CABLES
QSUDSPCL	IMA DISPLAY CABLE LIST
QSUDSPLE	DISPLAY SYSTEM CONFIGURATION - LEO
QSUDSPRC	IMA DISPLAY SYS CONFIGURATION
QSUDTMLS	IMA AUTOMATIC LOAD SOURCE UPDATE
QSUGETK	GET EDT RECORDS
QSUIMAMN	IMA WORK WITH SYS CONFIGURATION
QSUINDRC	IMA INDICATE SYS CONFIGURATION ITEM
QSUMOVLP	IMA MOVE LIST POINTER
QSUPRCDB	PROCESS SRM DATA BASE
QSUPRORC	IMA PROCESS SYS CONFIGURATION CHANGE
QSUPRTRC	PRINT SYS CONFIGURATION
QSUPUT	PUT AN EDT RECORD
QSURCVRC	SU RECEIVE INITIAL TOPOLOGY DATA
QSUUEXIT	IMA EXIT MODULE
QSUUPDAU	IMA AUTOMATIC CONFIGURATION UPDATE
QSUUPDCR	IMA AUTOMATIC UPDATE OF CARDS
QSUUPDDV	IMA AUTOMATIC DEVICE UPDATE
QSUUPDTS	UPDATE TOPOLOGY TIMESTAMP
QSUWHPCP	WORK WITH HW PRODUCTS CPP
QSWABAND	QSWABAND: DROP A SWITCHED CONNECTION
QSWALLOC	QSWALLOC: SWITCHED LINE LUD ALLOCATE
QSWANSWR	QSWANSWR: MANUAL ANSWER CPP
QSWCDCPP	STP/RSM-CTLRCY COMMAND CPP
QSWCDCR	CD CONTACT UNSUCCESSFUL EVENT MODULE
QSWCDCRH	QSWCDCRH: CD CONTACT REPLY HANDLER
QSWCDFR	CD FAILURE EVENT PROCESSOR
QSWCDFRH	CD FAILURE MSG REPLY HANDLER
QSWCDLST	QSWCDLST: CD LOST CONTACT PROCESSOR
QSWCDMAN	CD MANUAL INTERVENTION EVENT PROCESSOR
QSWCDMRH	CD MANUAL INTERVENTION MSG HANDLER
QSWCDNAV	QSWCDNAV: CD UNAVAILABLE PROCESSOR
QSWCDPRV	QSWCDPRV: CD PROTOCOL VIOLATION
QSWCDSEL	CD DIAL - ND SELECT EVENT HANDLER
QSWCDSTO	CD SSCP TAKEOVER EVENT HANDLER
QSWCDSUC	QSWCDSUC: CD CONTACT SUCCESSFUL
QSWCNSC	CNOS REQIO COMPLETE HANDLER
QSWCPFEV	QSWCPFEV: SW CPF EVENT ROUTER
QSWCUDEV	QSWCUDEV: SW CD EVENT ROUTER
QSWDAMGE	QSWDAMGE: PARTIAL OBJECT DAMAGE
QSWDIAL	QSWDIAL: DIAL A REMOTE SWITCHED CD
QSWDISC	QSWDISC: DISCONNECTING CPF EVENT
QSWDLTLD	QSWDLTLD: DELETE LUD ENTRY IN CD ASP
QSWHRCMN	HLD/RLS CMN DEVICE CPP
QSWIDLES	PEER LUD IDLE SESSIONS EVENT HANDLER
QSWILCS	PEER LUD CONTACT SUCCESSFUL - QLUS
QSWILUSM	PEER LUD IMPL-TIME PROCESSOR
QSWINTQ	QSWINTQ: INITIALIZE SW MESSAGE QUEUE
QSWINTSP	QSWINTSP: INITIALIZE CD ASP
QSWIOCMP	SW/QLUS REQIO COMPLETE HANDLER
QSWIVOFF	PEER LUD VARY OFF MODULE - QLUS
QSWIVON	PEER LUD VARY ON PROCESSOR - QLUS
QSWLCH1	PEER LUD EVENT ROUTER - VARY, CONTACT
QSWLCH2	PEER LUD EVENT ROUTER - CREATE, DELETE
QSWLDCPP	STP/RSM-DEVRCY COMMAND CPP
QSWLDCR	LUD CONTACT UNSUCCESSFUL EVENT HANDLER
QSWLDEV	LUD EVENT HANDLER
QSWLDFR	FAIL DEVICE EVENT HANDLER
QSWLDFRH	RECOVER DEVICE
QSWLDOSE	LUD OPEN SIOM ERROR EVENT HANDLER
QSWLDSNA	LUD SNA PASSTHROUGH EVENT HANDLER
QSWLDSUC	LUD CONTACT SUCCESSFUL EVENT HANDLER
QSWLD1SB	LUD FIRST SESSION BOUND EVENT HANDLER
QSWLOCLD	QSWLOCLD: LOCATE LUD ENTRY IN CD ASP
QSWLSH1	QLUS CNOS-REQUIRED EVENT HANDLER
QSWMCH	APPN MODE CONTACT HANDLER
QSWNDABC	ND ABANDON CALL MODULE
QSWNDCPP	STP/RSM-LINRCY COMMAND CPP
QSWNDCR	ND CONTACT UNSUCCESSFUL EVENT HANDLER
QSWNDCRH	ND CONTACT UNSUCC MESSAGE REPLY HANDLER
QSWNDEV	QSWNDEV: ND EVENT ROUTER
QSWNDFR	LINE FAILURE EVENT PROCESSOR
QSWNDFRH	LINE FAILURE MSG REPLY HANDLER
QSWNDIAL	SW ND DIAL MODULE
QSWNDISC	QSWNDISC: NON-DISCONNECTING CPF EVENT
QSWNDMAN	ND MANUAL INTERVENTION EVENT HANDLER
QSWNDMRH	SW ND MESSAGE REPLY HANDLER

QSWNDNOR	QSWNDNOR: ND NO RECOVERY EVENT HANDLER
QSWNDSUC	QSWNDSUC: ND CONTACT SUCCESSFUL
QSWNOSES	PEER CD NO-SESSIONS EVENT HANDLER
QSWNWEV	NETWORK EVENT HANDLER
QSWPDLSM	PEER LUD POWER DOWN MONITOR PROCESSOR
QSWPGCPP	END/RESUME PORT GROUP RECOVERY CPP
QSWPGEV	PORT GROUP EVENT HANDLER
QSWPGFR	PG FAILURE EVENT HANDLER
QSWPGFRH	PG FAILURE REPLY HANDLER
QSWPGNOR	PG NO RECOVERY NECESSARY EVENT HANDLER
QSWREPLY	QSWREPLY: OPERATOR REPLY HANDLER
QSWRWKSL	SW PAR ROUTINE
QSWSALC	CNOS SOURCE SIDE ALLOCATE CONVERSATION
QSWSALCC	CNOS ALLOCATE CONVERSATION COMPLETE
QSWSEMCP	STRMOD/ENDMOD/CHGSSNMAX CPP
QSWSNDMS	SW CD/ND FAILURE MSG SENDER
QSWSRCVC	CNOS SOURCE SIDE RECEIVE COMPLETE
QSWSVDEA	QSWSVDEA: SERVER DE-ACTIVATE SUCCESSFUL
QSWSVEV	SERVER EVENT HANDLER
QSWSVFR	SERVER FAILURE EVENT HANDLER
QSWSVSUC	QSWSVSUC: SERVER ACTIVATE SUCCESSFUL
QSWSWERP	SW/QLUS ERROR HANDLING MODULE
QSWTALC	CNOS TARGET SIDE PROCESSOR
QSWTALCC	TARGET SIDE CNOS XMIT COMPLETE
QSWUIMDP	SWITCHED LINES PAR
QSWUNUSE	QSWUNUSE: MARK CD UNSUSABLE
QSWXCDPC	X25 CD PENDING CONTACT EVENT HANDLER
QSWXCOR	X25 CALL OUT REQUEST REJECTED
QSXADDLS	ADD LIST ENTRY TO UIM LIST
QSXCGETV	EXTRACT SYSTEM VPD FOR API C FUNCTION
QSXCHGPB	CHANGE PROBLEM CPP
QSXCHGPO	CHANGE PROBLEM PROMPT OVERRIDE
QSXCLNUP	CLOSE AND CLEAN UP ANY OPEN FILES
QSXCRTAR	CREATE ASSOC RECORD FILES
QSXCRTPB	CREATE PROBLEM RECORD FILE
QSXDLTPB	DELTE PROBLEM AND ASSOC RECORDS
QSXDLTPS	DELETE SINGLE PROBLEM LOG ENTRY
QSXDSPD	DISPLAY PROBLEM DETAIL
QSXDSPD2	DISPLAY PROBLEM DETAILS UIM CALL PROGRAM
QSXDSPP	DISPLAY PROBLEMS
QSXFAPAE	COMMAND PROCESSOR FOR THE ADDPRBACNE CMD
QSXFCAPX	PROMPTER EXIT FOR THE CHGPRBACNE COMMAND
QSXFCPAE	COMMAND PROCESSOR FOR THE CHGPRBACNE CMD
QSXFIEXT	SX FILTERING I EXIT PGM
QSXFLTR	FILTERING AND PERFORMING ACTIONS
QSXFTRPB	FILTER PROBLEM API
QSXFTRPB	QSXFTRPB HEADER IN ILE/COBOL
QSXFTRPB	QSXFTRPB API HEADER FOR CBL
QSXFTRPB	QSXFTRPB API HEADER IN RPG
QSXFTRPB	QSXFTRPB HEADER IN ILE/RPG
QSXFVASE	VALIDATION ROUTINE FOR ADDPRBSLTE
QSXFVCSE	VALIDATION ROUTINE FOR CHGPRBSLTE
QSXGETPB	GET PROBLEM RECORD (USING QUERY)
QSXINEXT	COMPONENT EXIT ROUTINE FOR SAVE/RESTORE
QSXISOPB	ISOLATE PROBLEM
QSXLSACT	EXIT PROGRAM FOR UIM LIST ACTION
QSXOPEN	OPEN THE PROBLEM RECORD FILE
QSXPRTD	PRINT PROBLEM DETAILS
QSXPRTL	PRINT PROBLEM LIST
QSXPRTPB	PRINT PROBLEM
QSXPTFAL	EXIT PROGRAM FOR PTF LIST ACTION
QSXQRYAR	QUERY THE PROBLEM REOCRD FILE
QSXQRYPB	QUERY THE PROBLEM RECORD FILE
QSXQUERY	QUERY PROBLEM LOG FILE
QSXRMCLN	CLEAN UP FOR REMOTE SERVICES
QSXRMTL	REMOTE SERVICES LOCAL MODULE
QSXRMTR1	REMOTE SERVICES REMOTE MODULE 1
QSXRMTR2	REMOTE SERVICES REMOTE MODULE 2
QSXRTVPD	RETRIEVE PROBLEM DESCRIPTION
QSXSRVPL	QSXSRVPL HEADER IN ILE/COBOL
QSXSRVPL	QSXSRVPL HEADER IN ILE/RPG
QSXTXTAL	EXIT PROGRAM FOR TEXT LIST ACTION
QSXUPDPB	UPDATE THE PROBLEM RECORD FILE
QSXVLDSP	VALIDATE DISPLAY PROBLEMS PARAMETERS
QSXVLDWP	VALIDATE WORK WITH PROBLEMS PARAMETERS

QSXWRKP	WORK WITH PROBLEM LOG CPP
QSXWRKP1	WORK WITH A PROBLEM
QSXWRKTX	WORK WITH PROBLEM TEXT
QSXWRKT1	WORK WITH PROBLEM TEXT
QSY	QSY HEADER IN ILE/COBOL
QSY	QSY API HEADER FOR CBL
QSY	QSY API HEADER IN RPG
QSY	QSY HEADER IN ILE/RPG
QSYACCIP	ACCESS INTERACTIVE PROFILE FUNCTIONS
QSYADDAL	ADD AUTHORIZATION LIST ENTRY
QSYAULIB	RETRIEVE AUTHORIZED LIBRARY LIST
QSYAUTEV	SYSTEM AUTHORIZATION EVENT HANDLER
QSYCAUDR	CHECK IF AUDIT SHOULD OCCUR
QSYCGOBA	CPP FOR CHGOBJAUD
QSYCGURA	CPP FOR CHGUSRAUD
QSYCHGAL	CHANGE AUTHORIZATION LIST ENTRY
QSYCHGIP	CHANGE INTERACTIVE PROFILE ENTRY
QSYCHGMP	CHANGE MSF SECURITY OFFICER PASSWORD
QSYCHGPR	CHANGE PREVIOUS SIGN-ON DATE API
QSYCHGPW	CHANGE USER PASSWORD API
QSYCHGSP	CHANGE SECURITY OFFICER PASSWORD
QSYCHKIT	CHECK OBJECT INTEGRITY CPP
QSYCHONR	CHANGE OBJECT OWNER CPP
QSYCHPRF	CPP FOR CHGPRF COMMAND
QSYCKCMD	CHECK COMMAND AUTHORITY FOR DISPLAYS
QSYCKSCV	CHECK SECURITY VALUES MODULE
QSYCNV	CONVERT SYMBOLIC OBJECT AUTHORITY
QSYCPYIP	COPY INTERACTIVE PROFILE
QSYCPYUP	PGM FOR CPYUSRPRF WITH VALUES
QSYCRHLR	CREATE AUTHORITY HOLDER CPP
QSYCRTAL	CREATE AUTHORIZATION LIST CPP
QSYCRTIP	CREATE INTERACTIVE PROFILE
QSYCUSRA	CHECK USER AUTHORITY API
QSYCUSRS	CHECK USER SPECIAL AUTHORITY API
QSYCVTA	CONVERT TO MI AUTHORITY API
QSYDALO	DISPLAY AUTH LIST OBJECTS MODULE
QSYDLHLR	DELETE AUTHORITY HOLDER CPP
QSYDLTAL	DELETE AUTHORIZATION LIST CPP
QSYDLUP	DELETE USER PROFILE CPP
QSYDSAUT	DISPLAY OBJECT AUTHORITY CPP
QSYDSHLR	DISPLAY AUTHORITY HOLDERS CPP
QSYDSUP	DISPLAY USER PROFILE CPP
QSYDSUSR	DISPLAY AUTHORIZED USERS CPP
QSYEDAUT	EDIT OBJECT AUTHORITY CPP
QSYENCPW	ENCRYPT USER PASSWORD
QSYEVAUT	EVENT HNDLR FOR QSYGRAUT AND QSYRVAUT
QSYEVTAF	EVENT HANDLER FOR VMC AUDIT FAILURE
QSYEVTLK	EVENT HANDLER FOR QAUDJRN LOCKING
QSYEVTL2	TIMER EVENT HANDLER FOR QAUDJRN LOCK
QSYEVTNT	TIMER EVENT HANDLER FOR *NOTIFY
QSYEVTN2	TIMER EVENT HANDLER FOR *NOTIFY
QSYEXGRM	EXTRACT GROUP MEMBERS CPP
QSYEXTHD	EXTUPI OF HOME DIR FOR C SPI "QSYGETHD"
QSYEXTSL	EXTRACT SYSTEM SECURITY LEVEL
QSYEXUNP	EXTRACT USER NAME AND PASSWORD
QSYFIXPR	GRANT PRIVATE AUTHORITY TO *PRV COMMANDS
QSYFIXUP	GRANT PRIVATE AUTHORITY TO QSYS38 CMDS
QSYFIX2	ADD NEW AUTS TO PROFILES AND OBJECTS
QSYGETPH	GET PROFILEHANDLE API
QSYGRAUT	GRANT OBJECT AUTHORITY CPP
QSYGRHLR	GRANT TO OBJECT ITS AUTHORITY HOLDER
QSYGRSME	GRANT SAME AUTHORITY TO EXTERNAL OBJ
QSYGRTSA	GRANT SAME AUTHORITY PROCEDURE
QSYGRUSR	GRANT USER AUTHORITY
QSYHNAUT	AUTHORITY EXCEP HANDLER / EXT INIT PGM
QSYIEXIT	QSYIEXIT - GENERIC INVOCATION EXIT
QSYINT1	FUNCTIONS FOR INSTALL TYPE 1
QSYINT2	FUNCTIONS FOR INSTALL TYPE 2
QSYJRNLK	QAUDJRN JOURNAL LOCKING MODULE
QSYLATLO	API TO LIST OBJECTS SECURED BY AUTH LIST
QSYLATLO	LIST OBJECTS SECURED BY AUTL
QSYLATLO	QSYLATLO HEADER IN ILE/COBOL
QSYLATLO	LIST OBJECTS SECURED BY AUTL
QSYLATLO	QSYLATLO HEADER IN ILE/RPG
QSYLAUTU	API TO LIST AUTHORIZED USERS

QSYLAUTU	LIST AUTHORIZED USERS
QSYLAUTU	QSYLAUTU HEADER IN ILE/COBOL
QSYLAUTU	LIST AUTHORIZED USERS
QSYLAUTU	QSYLAUTU HEADER IN ILE/RPG
QSYLIBAU	SEND LIB AUDIT ENTRY FROM SYAUDDLT
QSYLOBJA	API TO LIST OBJECTS USER HAS AUT TO/OWNS
QSYLOBJA	LIST OBJECTS USER AUT/OWN/PG
QSYLOBJA	QSYLOBJA HEADER IN ILE/COBOL
QSYLOBJA	LIST OBJECTS USER AUT/OWN/PG
QSYLOBJA	QSYLOBJA HEADER IN ILE/RPG
QSYLOBJP	API TO LIST OBJECTS ADOPTING USER AUTH
QSYLOBJP	LIST OBJECTS THAT ADOPT AUTH
QSYLOBJP	QSYLOBJP HEADER IN ILE/COBOL
QSYLOBJP	LIST OBJECTS THAT ADOPT AUTH
QSYLOBJP	QSYLOBJP HEADER IN ILE/RPG
QSYLUSRA	API TO LIST USERS AUTHORIZED TO OBJECT
QSYLUSRA	LIST USERS AUTHORIZED TO OBJ
QSYLUSRA	QSYLUSRA HEADER IN ILE/COBOL
QSYLUSRA	LIST USERS AUTHORIZED TO OBJ
QSYLUSRA	QSYLUSRA HEADER IN ILE/RPG
QSYMDSPC	MODIFY SPECIAL AUTHORITIES AT IMPL
QSYPGMAD	DISPLAY PROGRAMS THAT ADOPT
QSYPGMCH	CHECK PROGRAM FOR ADOPTED PROFILE
QSYPRPOP	PROMPTER OVERRIDE FOR CHGPRF CHGUSRPRF
QSYPWDCR	PASSWORD COMPOSITION RULES CPP
QSYRAUTL	RECLAIM OBJECTS WITH DESTROYED AUTL
QSYRCATL	RECLAIM HANDLER FOR AUTHORIZATION LIST
QSYRCHLR	RECLAIM AUTHORITY HOLDERS MODULE
QSYRLSPH	RELEASE PROFILEHANDLE API
QSYRMAIP	REMOVE INTERACTIVE PROFILE ENTRY
QSYRMVAL	REMOVE AUTHORIZATION LIST ENTRY CPP
QSYRMVIP	REMOVE INTERACTIVE PROFILE ENTRY
QSYRSAUT	RESTORE AUTHORIZED USER TABLE
QSYRTVAL	RETRIEVE AUTHORIZATION LIST ENTRY
QSYRTVEP	RETRIEVE USERS ENCRYPTED PASSWORD
QSYRTVIP	RETRIEVE INTERACTIVE PROFILE ENTRY
QSYRTVUP	RETRIEVE USER PROFILE CPP
QSYRUSRA	QSYRUSRA HEADER IN ILE/COBOL
QSYRUSRA	RETRIEVE USER AUT TO OBJ
QSYRUSRA	RETRIEVE USER AUTHORITY API
QSYRUSRA	QSYRUSRA HEADER IN ILE/RPG
QSYRUSRA	RETRIEVE USER AUT TO OBJECT
QSYRUSRI	RETRIEVE INFO ABOUT USER
QSYRUSRI	RETRIEVE USER INFORMATION API
QSYRUSRI	RETRIEVE INFO ABOUT USER
QSYRVATL	REVOKE AUTH LIST IF PUBLIC IS *AUTL
QSYRVAUT	REVOKE OBJECT AUTHORITY CPP
QSYSAUDR	SEND AUDIT RECORD
QSYSGNON	HANDLE SIGN ON PROCESSING
QSYSMPVE	SIGNAL MSG FOR PARM VALIDATION ERRORS
QSYSVAUT	SAVE AUTHORIZED USER TABLE
QSYUP	CREATE/CHANGE USER PROFILE CPP
QSYUPASR	USER PROFILE ASSOICATED SPACE RECOVERY
QSYUPAUT	RESOLVE TO AUTHORIZED USER TABLE
QSYUPSIZ	RETRIEVE TOTAL SIZE OF USER PROFILE
QSYUUID1	UUID GEN MODULE
QSYVERFY	VERIFY SYSTEM ENTRY AUTHORITY
QSYVFCHP	VERIFY/CHANGE DOCUMENT PASSWORD
QSYWRKOW	WORK WITH OWNED OBJECTS FOR USER PROFILE
QSYWRKO1	WRKOWNOBJ CHANGE OBJECT OWNER ROUTINE
QSYWRKPG	WORK WITH PRIMARY GROUP OBJS FOR USRPRF
QSYWRKP1	WRKOBJPGP PROCESS OPTIONS MODULE
QSZBLDIX	BUILD ENTRIES FOR *PRDAVLI INDEX
QSZCHKPO	CHECK PRODUCT OPTION - CHKPRDOPT
QSZCIEXT	IEXIT PROGRAM FOR QSZCPDO & QSZCPLO
QSZCNLCG	BUILD LIST OF SOFTWARE PRODUCT DATA
QSZCPDO	CREATE PRODUCT DEFN OBJECT - CRTPDO CPP
QSZCPFID	CHANGE MRI PRODUCT FUNCTION ID
QSZCPLO	CREATE PRODUCT LOAD OBJECT - CRTPLO CPP
QSZCRTDF	PROGRAM TO CREATE PRODUCT DEFINITION
QSZCRTOP	PROGRAM TO CREATE PRODUCT OPTION/LOAD
QSZCRTPD	CREATE PRODUCT DEFINITION API: CRTPRDDFN
QSZCRTPD	QSZCRTPD HEADER IN ILE/COBOL
QSZCRTPD	QSZCRTPD API HEADER FOR CBL
QSZCRTPD	QSZCRTPD API HEADER IN RPG
QSZCRTPD	QSZCRTPD HEADER IN ILE/RPG
QSZCRTPL	CREATE PRODUCT LOAD API: CRTPRDLOD
QSZCRTPL	QSZCRTPL HEADER IN ILE/COBOL
QSZCRTPL	QSZCRTPL API HEADER FOR CBL
QSZCRTPL	QSZCRTPL API HEADER IN RPG
QSZCRTPL	QSZCRTPL HEADER IN ILE/RPG
QSZDLTPD	SZ DELETE PRODUCT DEF
QSZDLTPL	SZ DELETE PRODUCT LOAD
QSZEXPRD	SZ PRODUCT INFORMATION IEXIT
QSZGTPRD	GET PRODUCT INFORMATION
QSZIPL	SZ IPL ROUTINE
QSZLKPRD	CHECK PRDAVL LOCK BEFORE ALLOWING UPDATE
QSZPDDCR	*PRDAVL RECOVERY MODULE
QSZPDOUP	PRODUCT DEFINITION UPDATE ROUTINE
QSZPKG	PACKAGE PRODUCT OPTION
QSZPKGPO	PACKAGE PRODUCT OPTION - PKGPRDOPT API
QSZPKGPO	QSZPKGPO HEADER IN ILE/COBOL
QSZPKGPO	QSZPKGPO API HEADER FOR CBL
QSZPKGPO	QSZPKGPO API HEADER IN RPG
QSZPKGPO	QSZPKGPO HEADER IN ILE/RPG
QSZPREXB	PROMPT PROGRAM FOR INSTLD & SUPPTD PRODU
QSZPREXI	PROMPT PROGRAM FOR INSTALLED PRODUCTS
QSZRECOV	PRODUCT DIRECTORY RECOVERY
QSZRTVPD	PROCESSING MODULE FOR SZRTVPD MACRO
QSZRTVPR	QSZRTVPR HEADER IN ILE/COBOL
QSZRTVPR	QSZRTVPR API HEADER FOR CBL
QSZRTVPR	RETRIEVE PRODUCT INFORMATION API
QSZRTVPR	QSZRTVPR API HEADER IN RPG
QSZRTVPR	QSZRTVPR HEADER IN ILE/RPG
QSZSLTPR	QSZSLTPR API HEAD ILE/COBOL
QSZSLTPR	QSZSLTPR API HEADER FOR CBL
QSZSLTPR	SZ SELECT PRODUCT API
QSZSLTPR	QSZSLTPR API HEADER IN RPG
QSZSLTPR	QSZSLTPR HEADER IN ILE/RPG
QSZSPREX	SZSLTPR COMMAND EXIT PROGRAM
QSZSTPRD	STORE PRODUCT SUPPORT INFORMATION
QS2CRMUT	CM BRIDGE SNADS FS2 RCV PARSE TABLE INIT
QS2CSMUT	CM BRIDGE SNADS FS2 SND PARSE TABLE INIT
QS2DSTIX	CM BRIDGE DISTRIBUTE IEXIT MODULE_
QS2LSTPR	SNADS S2 SEND DISTRIBUTION FUNCTION
QS2RCVDS	SNADS S2 SEND DISTRIBUTION FUNCTION
QS2RCVIX	CM BRIDGE SNADS FS2 MU RECEIVER IEXIT
QS2RCVR	CM BRIDGE SNADS FS2 MU RECEIVER
QS2RCVSC	SNADS S2 SEND DISTRIBUTION FUNCTION
QS2RSVID	SNADS S2 RESERVE ID FUNCTION
QS2SCHGR	RGSTRY - S2SIASN/S2SICHG MACRO SUPP
QS2SCMUQ	CMUQ - S2SCGET & S2SCPUT MACRO SUPP
QS2SCREP	S2 SHELL UNIT REPORT CREATION
QS2SCRID	SNADS S2 SEND DISTRIBUTION FUNCTION
QS2SDELT	RGSTRY - S2SIDELT MACRO SUPP
QS2SENDR	CM BRIDGE SNADS FS2 MU SENDER
QS2SFINR	RGSTRY - S2SIFMU/S2SIFGT MACRO SUPP
QS2SIEXT	S2 MODULE QS2SRSEQ IEXIT MODULE
QS2SNDDS	SNADS S2 SEND DISTRIBUTION FUNCTION
QS2SNDSC	SNADS S2 SEND DISTRIBUTION FUNCTION
QS2SNPLD	LOCAL DELIVERY SNAP-IN FOR SNADS CM
QS2SNPMF	MESSAGE FORWARDING SNAP-IN FOR SNADS CM
QS2SNPND	NON-DELIVERY SNAP-IN FOR SNADS CM
QS2SRINT	RGSTRY - S2SIINIT RCVREG MACRO SUPP
QS2SRSEQ	SEQ # - S2SSGSEQ & S2SSRSEQ MACRO SUPP
QS2SRSET	RGSTRY - S2SIQURY & S2SIRSET MACRO SUPP
QS2SSINT	RGSTRY - S2SIINIT SNDREG MACRO SUPP
QS2STSIX	SNADS SENDER START MODULE IEXIT
QS2STSND	CM BRIDGE START SNADS FS2 MU SENDER
QTAADD	TAPE FM ADDTAPCTG COMMAND PROCESSING PGM
QTACDENS	TAPE DENSITY CHOICES PROGRAM
QTACGYCH	CHOICES FOR CGY PARM
QTACHECK	QTACHECK
QTACHOIC	CHOICES FOR DENSITY & TODENSITY PARM
QTACLOSE	CLOSE TAPE DEVICE FILE
QTACMLB	TAPE FM CRTDEVMLB CPP
QTACRTC	TAPE FM CRTTAPCGY CPP
QTACVOL	TAPE FM CHGTAPVOLA CPP
QTADENS	TAPE DENSITY CONVERSION PROGRAM
QTADEVCH	CHOICES FOR LIBRARY DEV PARM

QTADLTC	TAPE FM DLTTAPCGY CPP
QTADMLB	TAPE FM DLTDEVMLB CPP
QTADMPIO	DUMP I/O MODULE
QTADMT	TAPE FM DEMOUNT TAPE CARTRIDGE PROGRAM
QTADSPC	DISPLAY TAPE CATEGORY CPP
QTADSPY	DISPLAY TAPE CPP
QTADUMP	DUMP TAPE COMMAND PROCESSOR - DMPTAP
QTADUP	DUPLICATE TAPE CPP
QTADUPVC	DUPTAP TODENSITY VALIDITY CHECKER
QTADVOL	TAPE FM DSPTAPVOLA CPP
QTAEOV	TAPE END-OF-VOLUME PROCESSOR
QTAERR	TAPE ERROR HANDLER/MESSAGE ROUTER
QTAERRIN	TAPE ERROR TABLE INITIALIZATION
QTAEVMON	DEVICE EVENT HANDLER
QTAFEOD	TAPE FORCE END OF DATA
QTAFEOV	TAPE FORCE END OF VOLUME
QTAGET	TAPE RECORD GET
QTAINFO	TAPE FM DSPTAPSTS CPP
QTAINIT	INZTAP COMMAND PROCESSING PROGRAM
QTAINST	TAPE FM MSE INSTALL PROGRAM
QTAINZVC	INZTAP DENSITY VALIDITY CHECKER
QTAIXMGR	TAPE INDEX MANAGER
QTALUDIN	TAPE LUD INITIALIZTION
QTALVMGR	TAPE FM LIBRARY MANAGER
QTAMLD	TAPE FM MLD COMMAND EXECUTOR
QTAMNT	TAPE FM MOUNT TAPE CARTRIDGE PROGRAM
QTAOPCHK	TAPE FILE OPEN PARAMETER CHECKING
QTAOPEN	TAPE DEVICE FILE OPEN
QTAPUT	TAPE RECORD PUT
QTARBD	TAPE FM RBDTAPIDX CPP
QTARMV	TAPE FM RMVTAPCTG COMMAND PROCESSING PGM
QTASX400	TAPE FM SX/400 SIDELINE STORAGE HANDLER
QTASYSCH	CHOICES FOR CGYSYS PARM
QTATAPCH	CHOICES FOR TAPE DRIVES IN CONFIG LIBS
QTATAPEX	TAPE MANAGEMENT GATEWAY IN QMSE__
QTAUSREX	USER PROGRAM EXIT
QTAUSRLB	USER LABEL SUPPORT
QTAVCLOS	TAPE VOLUME CLOSE
QTAVDENS	TAPE DENSITY CHOICES PROGRAM
QTAVOPEN	QTAVOPEN - VOLUME OPEN
QTAWINFO	WORK WITH TAPE STATUS CPP
QTAWVOL	TAPE FM WRKTAPVOL CPP
QTBAECHS	ASCII-EBCDIC SIMPLIFIED CHINESE
QTBAECHT	ASCII-EBCDIC TRADITIONAL CHINESE
QTBAEJPN	ASCII-EBCDIC JAPANESE TRANSLATION
QTBAEKOR	ASCII-EBCDIC KOREAN TRANSLATION
QTBCCLST	CCSID PROMPT BUILDER
QTBCONST	GET CCSID FOR CONSTANT
QTBCRTBL	CREATE TABLE
QTBDSPTB	DISPLAY TABLE
QTBEACHS	EBCDIC-ASCII SIMPLIFIED CHINESE
QTBEACHT	EBCDIC-ASCII TRADITIONAL CHINESE
QTBEAJPN	EBCDIC-ASCII JAPANESE TRANSLATION
QTBEAKOR	EBCDIC-ASCII KOREAN TRANSLATION
QTBEXIT	TB INSTALL EXIT CODE
QTBMXSBX	SUPPORT CONVERSION BETWEEN SBCS & MBCS
QTBMXTMX	MIXED EBCDIC TO MIXED EBCDIC
QTBPOSTO	POSITION TO PROGRAM
QTBSBDBX	DBCS TRANSLATE MODULE
QTBTBLMG	TRANSLATION TABLE MANAGER
QTBXLATE	TRANSLATE FUNCTION
QTEADDVD	ADD_VIEW_DESCRIPTION API
QTEADDVF	START_VIEW_FILE API
QTEADDVM	ADD_VIEW_MAP API
QTEADDVT	ADD_VIEW_TEXT API
QTEBRKWK	CALLED BY UIM
QTECADBP	ADD BREAKPOINT CPP
QTECADPG	ADD PROGRAM CPP
QTECADTR	ADD TRACE CPP
QTECCHDB	CHANGE DEBUG CPP
QTECCHHP	CHANGE HLL POINTER CPP
QTECCHPT	CHANGE POINTER CPP
QTECCHVR	CHANGE PROGRAM VARIABLE CPP
QTECCLTD	CLEAR TRACE DATA CPP
QTECCNRQ	CANCEL REQUEST CPP
QTECDSBP	DISPLAY BREAKPOINT CPP
QTECDSDB	DISPLAY DEBUG CPP
QTECDSTD	DISPLAY TRACE DATA CPP
QTECDSTR	DISPLAY TRACE CPP
QTECDSVR	DISPLAY PROGRAM VARIABLE CPP
QTECENDB	END DEBUG MODE CPP
QTECNTDB	ENTER DEBUG MODE CPP
QTECRMBP	REMOVE BREAKPOINT CPP
QTECRMPG	REMOVE PROGRAM CPP
QTECRMTR	REMOVE TRACE CPP
QTECRSBP	RESUME BREAKPOINT CPP
QTEDBINT	INVOKE DEBUG INTERPRETER
QTEDMPV	QTEDMPV HEADER IN ILE/COBOL
QTEDMPV	QTEDMPV HEADER IN ILE/RPG
QTEDMPVB	DUMPMODULEVARIABLE OPM API
QTEENDDB	END_SOURCE_DEBUG API
QTEENDVC	END_VIEW_CREATION API
QTEEVLWK	CALLED BY UIM
QTEIRTVD	GET DEBUG INFORMATION
QTEMADPG	ADDPGM *SAME ELIMINATOR
QTEMAPST	MAP_VIEW_STATEMENT SPI
QTEMBKCU	BREAKPOINT CLEANUP MODULE
QTEMCHDB	CHGDBG *SAME ELIMINATOR
QTEMDBSV	PERFORM DEBUG SERVICE REQUEST
QTEMDEBP	DEFAULT EXCEPTION BKP HDLR
QTEMDIAG	PERFORM DIAG PRIVILEGED INSTRUCTION
QTEMEJCU	END OF JOB CLEANUP MODULE
QTEMGTHL	GET HLL STMT ID
QTEMGTVR	GET PROGRAM VARIABLE
QTEMLOBJ	LOCATE PROGRAM OBJECT
QTEMMEMW	WRITE TO MEMORY AS A USER STATE PROGRAM
QTEMRBCN	STUB MODULE
QTEMRBCU	CLEANUP IF REMOTE BREAKPOINT IS CANCELED
QTEMRCLM	RECLAIM RESOURCES MODULE
QTEMRLBP	RELEASE SERVICED JOB FROM BREAKPOINT
QTEMRPDS	REPLACE DEBUG DISPLAY WITH ANOTHER PGM
QTEMSJVC	ENDSRVJOB VALIDITY CHECKER
QTEMVFOR	VERIFY ODV LIST
QTEPGMWK	CALLED BY UIM
QTEPLSWK	CALLED BY UIM
QTERTVPV	QTERTVPV HEADER IN ILE/COBOL
QTERTVPV	QTERTVPV API HEADER FOR CBL
QTERTVPV	RETRIEVE PROGRAM VARIABLE API
QTERTVPV	QTERTVPV API HEADER IN RPG
QTERTVPV	QTERTVPV HEADER IN ILE/RPG
QTESESSH	DEBUG SESSION HANDLER
QTESTOPH	DEBUG STOP HANDLER
QTESTRVC	START_VIEW_CREATION API
QTESYFMT	SYMBOL TABLE IMAGE FORMATTER
QTESYSAV	SYMBOL TABLE IMAGE FILE CREATION
QTEVIREF	INSTRUCTION REFERENCE EVENT HANDLER
QTEVRLJQ	SERVICED JOB RELEASED FROM JOB Q HANDLER
QTEVSIRF	EVENT HANDLER FOR DEBUGGED SERVICED JOB
QTEXADRS	SYMBOL TABLE ADDRESS AND SIZE EXTRACTION
QTEXADRV	ADDRESS PROCESS VIEW SPACE
QTEXAWCB	ANCHOR SPCPTR IN WCB
QTEXCRTS	CREATE SPACE
QTEXCRTV	CREATE VIEW INITIALIZATION CODE
QTEXCWCB	COPY SPCPTR FROM WCB
QTEXDBGI	INVOKE DEBUG INTERPRETER
QTEXDDSH	CALL USER SUPPLIED SESSION HANDLER
QTEXDESS	DESTROY SPACE
QTEXDSTD	DESTROY DEBUG DATA ANCHORED TO WCB
QTEXDWCB	DELETE SPCPTR IN WCB
QTEXFMOD	FIND MODULE DEBUG DATA
QTEXLPDD	LIST PROGRAM DEBUG DATA
QTEXMMFD	MODULE MGR I/F TO CREATE DEBUG DATA
QTEXMMI	IMPLICIT PROGRAM PERMISSION ROUTINE
QTEXPPFD	BINDER I/F TO CREATE DEBUG DATA
QTEXRMDD	DSPMOD/CRTPGM I/F TO DEBUG DATA
QTEXRMVM	REMOVE MODULE OBJECT DEBUG DATA
QTEXRMVP	REMOVE PROGRAM OBJECT DEBUG DATA
QTEXRPDD	DSPPGM I/F TO PROGRAM DEBUG DATA
QTEXRPLP	RPLMOD I/F TO PROGRAM DEBUG DATA
QTEXRTSP	I/F TO RETRIEVE STOPPED POSITION

QTEXRTVS	I/F TO RETRIEVE STOPPED POSITION
QTEXSTOV	STORE VIEW SPACE TO FILE ASSOCIATED SPAC
QTEXUTIL	UTILITIES FOR SOURCE DEBUG API
QTEXVWIN	GET VIEW INFORMATION
QTICLNUP	CONNECT VAN - CLEANUP/IEXIT
QTICONCT	CONNECT VAN
QTIEXIT	END TIE ROUTINE
QTIHNPCS	CONNECT VAN - HNPC TRANSACTION PROC
QTIINQR1	INQUERY ROUTINE FOR TIE
QTIMAIN1	MAIN ROUTINE TO CALL TIE MODULES
QTIPARSE	PARSE CONNECT VAN DATASTREAMS
QTIRCV	TIE RECEIVE FILE MODULE
QTISEND1	SEND MODULE FOR TIE
QTNADDCR	ADD COMMITMENT RESOURCE API
QTNADDCR	QTNADDCR HEADER IN ILE/COBOL
QTNADDCR	QTNADDCR API HEADER FOR CBL
QTNADDCR	QTNADDCR API HEADER IN RPG
QTNADDCR	QTNADDCR HEADER IN ILE/RPG
QTNCHGCO	CHANGE COMMITMENT OPTIONS API
QTNCLOSE	CLOSE FILE UNDER COMMITMENT CONTROL
QTNCMT	COMMIT LOGICAL UNIT OF WORK CPP
QTNCMTEP	COMMIT LOGICAL UNIT OF WORK - EXTENDED
QTNCNLRS	DISPLAY -- CANCEL RESYNCHRONIZATION
QTNCRDAR	ADD OR REMOVE A CRD RESOURCE
QTNCRLBP	CALL ROLLBACK PROGRAM W/ADOPTED AUTH
QTNCTL	START COMMITMENT CONTROL CPP
QTNDFNBL	DISPLAY -- BUILD DEFINITION LIST
QTNDSPCD	DISPLAY -- BUILD COMMITMENT DEFINITION
QTNDSPCS	DISPLAY -- BUILD COMMIT STATUS
QTNDTCOB	DETACH COB AND END JOURNALING FOR IT
QTNECCID	EXTRACT CURRENT COMMIT CYCLE IDENTIFIER
QTNEND	END COMMITMENT CONTROL CPP
QTNENDAG	COMMITMENT CTL END ACTIVATION GROUP
QTNENDSV	SERVER JOB WATCHDOG FOR QTNEND COMPLETE
QTNEV1SV	HANDLE 8100 2304 RESCHEDULE RESYNC EVENT
QTNGETCD	DISPLAY -- GET A COMMITMENT DEFINITION
QTNHRD	DISPLAY -- INITIATE HEURISTIC DECISION
QTNHRDEH	HEURISTIC DECISION EVENT HANDLER
QTNIPL	COMMITMENT CONTROL IPL RECOVERY
QTNIPLSV	CMT CTL IPL/POST-IPL RECOVERY IN SRV JOB
QTNI4GET	IMPLIED FORGET
QTNLOG	EXCHANGE LOG NAMES
QTNMCDRI	MANAGE COMMIT DEFN RECOVERY INDEX
QTNNTFY	UPDATE NOTIFY OBJECT
QTNNTRS	VALIDATE NOTIFY OBJECT
QTNOPEN	OPEN FILE UNDER COMMITMENT CONTROL
QTNPREP	PREPARE FOR COMMIT
QTNPRINT	DISPLAY -- PRINT FUNCTION
QTNRBRQD	ROLLBACK REQUIRED API
QTNRCMTI	QTNRCMTI HEADER IN ILE/COBOL
QTNRCMTI	QTNRCMTI API HEADER FOR CBL
QTNRCMTI	RETRIEVE COMMIT INFORMATION API
QTNRCMTI	QTNRCMTI API HEADER IN RPG
QTNRCMTI	QTNRCMTI HEADER IN ILE/RPG
QTNRLBRQ	ROLLBACK REQUIRED
QTNRMVCR	REMOVE COMMITMENT RESOURCE API
QTNROLLB	ROLLBACK LOGICAL UNIT OF WORK CPP
QTNRSCBL	DISPLAY -- BUILD RESOURCE STATUS
QTNRSRSP	RESYNC RESPONSE
QTNRSYNC	USER-PROCESS RESYNC
QTNRSYSV	SERVER JOB RESYNC
QTNSAV	COMMITMENT CONTROL SAVE TIME PROCESSING
QTNSLTCV	DISPLAY -- SELECT A CONVERSATION
QTNSNDJE	SEND COMMIT-RELATED JOURNAL ENTRY
QTNTRACE	COMMITMENT CONTROL TRACE FUNCTIONS
QTNTREVT	RESYNC REPLY EVENT -8100 2303- HANDLER
QTNTRSYN	RESYNC TP PROCESSING
QTNT1EVT	PROCESS TERMINATION TIMER EVENT HANDLER
QTNT2EVT	IPL TIMER EVENT HANDLER
QTNUPAGA	UPDATE ACTIVATION GROUP ARRAY
QTNUQEVT	UNABLE TO QUIESCE EVENT HANDLER, SWA
QTNWRKCD	WORK WITH COMMITMENT DEFINITIONS CPP
QTOAABRT	TCPABORT STREAMS OPERATIONS
QTOAAPID	UN-MARK JOB IN-USE BY TCP/UDP API
QTOAAPIU	MARK JOB IN-USE BY TCP/UDP API
QTOACLS	TCPCLOSE STREAMS OPERATIONS
QTOACRTQ	CREATE QUEUE
QTOADELQ	DESTROY QUEUE
QTOADSPC	DELETE SPACE
QTOAEND	CLOSE A STREAM
QTOAENDJ	CLEAN UP IN ABNORMAL JOB TERMINATION
QTOAGHBN	GET HOST BY NAME
QTOAGTID	GET IDENTITY
QTOAISLA	IS LOCAL ADDRESS
QTOAISUP	CHECK IF TCP STACK IS UP
QTOAOPN	TCPOPEN PL/MI PART
QTOAPING	PINGREQUEST PL/MI SUPPORT
QTOAQRYD	QUERY HOST TABLE
QTOARCV	TCPRECEIVE STREAMS MACROS
QTOASND	TCPSEND STREAMS MACROS
QTOASTRM	API STREAM MESSAGE HANDLER
QTOASTT	TCPSTATUS PLMI
QTOATIME	DO TIMER STREAM OPERATIONS
QTOAUCLS	UDPCLOSE STREAMS OPERATIONS
QTOAUOPN	UDPOPEN STREAMS OPERATIONS
QTOAURCV	UDPRECEIVE STREAM OPERATIONS
QTOAUSND	UDPSEND STREAMS MACROS
QTOAUSTT	UDPSTATUS PLMI
QTOCAIFC	ADDXXXIFC CPP
QTOCAPCP	CFGTCPAPP CPP
QTOCAPOR	ADDTCPPORT CPP
QTOCARSI	ADDTCPRSI CPP
QTOCARTE	ADDXXXRTE CPP
QTOCATE	ADDXXXTBLE CPP
QTOCCAP	CHGTCPA CPP POP
QTOCCATR	CHGTCPA CPP
QTOCCFCP	CFGTCP CPP
QTOCCHT	CHGTCPHTE CPP
QTOCCIFC	CHGXXXIFC CPP
QTOCCRTE	CHGXXXRTE CPP
QTOCDCND	DC ND INTERFACE MODULE
QTOCDUPF	PGM FOR TCP OR IPS CLEANUP FOR DLTUSRPRF
QTOCEIFC	ENDTCPIFC CPP
QTOCETCP	ENDTCP CPP
QTOCETCT	ENDTCP CONTROLLED MODULE
QTOCGIXP	GENERAL INV EXIT PGM FOR TCP/IP MODULES
QTOCIX1	INVOCATION EXIT PGM FOR TBLE CPP PGMS
QTOCLDMD	CHANGE LOCAL DOMAIN NAME PANEL PGM
QTOCMHT	MRGTCPHT CPP
QTOCOPT	WRKXXXTBLE OPTION HANDLER
QTOCPIFC	CHGXXXIFC CPP POP
QTOCPING	PING/VFYTCPCNN CPP
QTOCPRTE	CHGXXXRTE CPP POP
QTOCRIFC	RMVXXXIFC CPP
QTOCRNHT	RNMTCPHTE CPP
QTOCRNME	CHANGE REMOTE NAME SERVER PANEL PGM
QTOCRPOR	RMVTCPPORT CPP
QTOCRRSI	RMVTCPRSI CPP
QTOCRRTE	RMVXXXRTE CPP
QTOCRTE	RMVXXXTBLE CPP
QTOCSIFC	STRTCPIFC CPP
QTOCSRV	STRTCPSVR/ENDTCPSVR CPP
QTOCSTCP	STRTCP CPP
QTOCSTIX	INVOCATION EXIT PGM FOR STRTCP & ENDTCP
QTOCTCIX	QTCPIP JOBS INVOCATION EXIT PROGRAM
QTOCTCPI	QTCPIP PERSISTENT JOB
QTOCUX1	UIM EXIT PGM FOR WRKXXXTBLE CPPS
QTOCVIFC	VALIDATE IFC EXTERNAL ROUTINE
QTOCVRSI	VERIFY RSI VALUES
QTOCVRTE	VALIDATE ROUTE EXTERNAL ROUTINE
QTOCWHTE	WORK WITH HOST TABLE ENTRIES
QTOCWHTO	WORK WITH HOST TABLE ENTRIES OPTIONS
QTOCWIFC	WORK WITH TCP/IP INTERFACES
QTOCWIFO	PROCESS INTERFACE OPTIONS FROM PANEL
QTOCWPOO	PROCESS IPS PORT OPTIONS FROM PANEL
QTOCWPOR	WORK WITH TCP/IP PORTS
QTOCWRSI	WORK WITH TCP/IP REMOTE SYSTEM INFORMATI
QTOCWRSO	PROCESS RSI OPTIONS FROM PANEL
QTOCWRTE	WORK WITH TCP/IP ROUTES
QTOCWRTO	PROCESS ROUTE OPTIONS FROM PANEL

QTOCWTE	WRKXXXTBLE CPP
QTOC4V3	ADJUST PRODUCT LIB LIST DURING CMD PROC
QTOICLCV	CVTTCPCL COMMAND PROCESSING PROGRAM
QTOICONV	CONVERSION AID FOR IFC, RTE, RSI, PORT
QTOIINS1	TCP/IP QUSRSYS INSTALL EXIT 1 PROGRAM
QTOISTRG	CVTTCPCL STRING PROCESSING
QTOITBLK	CVTTCPCL TABLE PROCESSING
QTONCLOS	ENDTCPCNN CPP
QTONQSRT	QUICK SORT UIM LIST PART OF NETSTAT
QTONSNAM	NETSTAT PORT & IP ADDR NAMES RESOLUTION
QTONSTAT	NETSTAT CPP <WRKTCPSTS CL CMD>
QTONUIXD	NETSTAT UIM EXIT PGM <DETAILS/PRT>
QTONUIXL	NETSTAT UIM EXIT PGM 1 <LISTS>
QTONVLIC	NETSTAT VLIC/STREAMS I/F MODULE
QTOSACC	ADD/CHANGE SNMP COMMUNITY CPP
QTOSACCV	ADD/CHG SNMP COMMUNITY VALIDITY CHECKING
QTOSACTJ	DETERMINE IF JOB IS ACTIVE
QTOSBCL	BUILD COMMUNITY LIST
QTOSCAT	CHANGE SNMP ATTRIBUTES CPP
QTOSCATP	CHANGE SNMP ATTRIBUTES PROMPT OVERRIDE
QTOSCATV	CHANGE SNMP ATTRIBUTES VALIDITY CHECKING
QTOSCCMP	CHANGE SNMP COMMUNITY PROMPT OVERRIDE
QTOSCFG	CFGTCPSNMP COMMAND PROCESSING PROGRAM
QTOSCFIE	IEXIT PROGRAM FOR SNMP CONFIGURATION
QTOSCTLJ	START/END SNMP AGENT JOB
QTOSGCDB	GET CONTACT DATABASE INFORMATION
QTOSINZF	INITIALIZE SNMP CONFIGURATION FILE
QTOSJRNL	PUT ENTRY IN SNMP JOURNAL
QTOSOPEN	OPEN SNMP CONFIGURATION FILE
QTOSPCM	PROCESS SNMP COMMUNITY LIST ENTRY
QTOSPRCF	PRINT SNMP CONFIGURATION INFORMATION
QTOSPRCM	PRINT SNMP COMMUNITY INFORMATION
QTOSRCM	REMOVE SNMP COMMUNITY CPP
QTOSSYSN	CHANGE/RETRIEVE SYSTEM NAME
QTQADDII	ADD SQCCSID1 INDEX ENTRIES AND MAPPINGS
QTQCVRT	API TO CONVERT GRAPHIC DATA
QTQGCCN	API TO GET CCSID FOR NORMALIZATION
QTQGESP	API TO GET ENCODING SCHEME
QTQGRDC	API TO GET RELATED DEFAULT CCSID
QTQMAPS	SET UP THE CDRA TABLES
QTQMAPS2	SET UP THE CDRA TABLES #2
QTQMKMAP	AUTOCREATE CCSID MAPPINGS
QTQMKMP1	AUTO CREATE CCSID MAPPINGS
QTQMKMP2	AUTO CREATE CCSID MAPPINGS
QTQMKMP3	AUTO CREATE CCSID MAPPINGS
QTQRECOV	REBUILD & RELINK THE CDRA INDEXES
QTQSCSP	API TO GET SHORT FORM CCSID
QTQSETUP	SET UP THE TRANSLATE TABLES
QTSBLFMT	TARGET/SOURCE BUILD FORMAT DEFINITION
QTSCLEAN	CLEAN-UP ROUTINE FOR WRKDDMF CMD
QTSCLOSE	DDM FILE SPECIFIC CLOSE
QTSCOPY	DDM SOURCE COPY FILE
QTSDIXIT	DDM SRC DELETE FILE INVOCATION EXIT
QTSDSDDM	DISPLAYS DETAILS OF A DDM FILE - DSPDDMF
QTSEXTCT	DDM FILE SOURCE DDM FILE EXTRACT
QTSFEOD	DDM FILE SOURCE FORCE END-OF-DATA
QTSGET	DDM FILE SOURCE GET SINGLE
QTSGETM	DDM FILE SOURCE GET MULTIPLE
QTSGETSQ	DDM FILE SOURCE GET SEQUENTIAL
QTSIEXIT	DDM FILE SOURCE I/O INVOCATION EXIT
QTSLIXIT	DDM FILE SOURCE LOCK INVOCATION EXIT
QTSLOCK	DDM FILE SOURCE LOCK DDM FILE
QTSMDDMF	DDM FILE SOURCE MANAGE DDM FILE
QTSMGAFT	DDM FILE SOURCE MNG ACTIVE FILE TABLE
QTSOPEN	DDM FILE SOURCE OPEN
QTSPUT	DDM FILE SOURCE PUT SINGLE
QTSPUTDR	DDM SOURCE PUT DIRECT SUPPORT
QTSPUTM	DDM FILE SOURCE PUT MULTIPLE
QTSQEXIT	SOURCE SIDE QUERY DDM FILE EXIT
QTSQUERY	DDM FILE SOURCE QUERY
QTSREGFS	REGISTER THE DDM FILE SYSTEM WITH API
QTSSALFM	DDM SOURCE ADDLFM
QTSSCHGF	DDM SOURCE SIDE FILE CHANGE
QTSSCRTF	DDM SOURCE SIDE FILE CREATE
QTSSDELF	SRC DELETE FILE
QTSSNMSG	SOURCE MESSAGE CONVERSION
QTSSRNMF	SRC RENAME FILE
QTSSTRMF	DDM SOURCE SIDE LOAD/UNLOAD STREAM FILE
QTSS8MSG	TARGET/SOURCE SOURCE MESSAGES
QTSTCHGD	DDM TRG CHANGE/QUERY CURRENT DIRECTORY
QTSTCHGF	DDM TARGET CHANGE FILE ATTRIBUTES
QTSTCLOS	TS TARGET CLOSE
QTSTCLRF	TS TARGET CLEAR FILE
QTSTCPYF	TS TARGET CPYFIL
QTSTCRTF	TS TARGET CREATE FILE
QTSTCSDR	CREATE STREAM FILE - TARGET/SOURCE
QTSTDCLF	TS TARGET DECLARE FILE
QTSTDELF	DDM TARGET DELETE FILE
QTSTFEXD	TS TARGET EXTRACT FILE
QTSTFRCB	TS TARGET FRCBFF - DB AND FMS
QTSTIO	TS TARGET GENERAL IO
QTSTIOS	TS TARGET STREAM IO
QTSTLCKF	TS TARGET LOCK/UNLOCK FILE
QTSTLODF	TS TARGET LOAD FILE
QTSTLODS	LOAD/UNLOAD STREAM FILE, TARGET
QTSTOPEN	TS TARGET OPEN
QTSTQRYS	QUERY SPACE MODULE
QTSTRNMF	TS TARGET RNMFIL
QTSTUIXT	TARGET/SOURCE USER INVOCATION EXIT
QTSTUNLF	TS TARGET UNLOAD FILE
QTSTWILD	GENERIC NAME PROCESSING MODULE
QTST8GEN	TS TARGET S/38 GENERAL
QTST8IO	TS TARGET S/38 IO
QTST8MSG	TS TARGET S/38 MESSAGE HANDLER
QTSUDR	DDM FILE UPD/DLT/RLS
QTSUIXIT	TARGET/SOURCE UNLOCK INVOCATION EXIT
QTSUNLCK	TARGET/SOURCE UNLOCK DDM FILE
QTSWKCHG	UPDATES WRKDDMF AFTER CHGDDMF OPTION
QTSWKDDM	WORK WITH DDM FILES COMMAND - WRKDDMF
QTVCLOVT	VT-API CLOSE VIRTUAL TERMINAL
QTVENDLN	DC INTERFACE TO ENDTCPIFC
QTVOPNVT	QTVOPNVT HEADER IN ILE/COBOL
QTVOPNVT	QTVOPNVT API HEADER FOR CBL
QTVOPNVT	VT-API CLOSE VIRTUAL TERMINAL
QTVOPNVT	QTVOPNVT API HEADER IN RPG
QTVOPNVT	QTVOPNVT HEADER IN ILE/RPG
QTVRDVT	VT-API CLOSE VIRTUAL TERMINAL
QTVSCMD	VTM/FM COMMAND HANDLER (SERVER)
QTVSEVHD	VTM/FM EVENT HANDLER (SERVER)
QTVSEXIT	VTM/FM EXIT ROUTINE (SERVER)
QTVSGETL	VTM/FM SERVER TCP/IP GET DEVICE LIST
QTVSINIT	VTM/FM INITIALIZATION ROUTINE (SERVER)
QTVSNDRQ	VT-API CLOSE VIRTUAL TERMINAL
QTVSREAD	VTM/FM READ DATA ROUTINE (SERVER)
QTVSSYSR	VTM/FM SERVER SYSTEM REQUEST HANDLER
QTVSTERM	VTM/FM TERMINATE ROUTINE (SERVER)
QTVSWRIT	VTM/FM WRITE DATA ROUTINE (SERVER)
QTVTBNAM	VTM/FM FIND MAPPING TABLE
QTVTRACE	VTM/FM TRACE MODULE
QTVUEH	VTM/FM USER EVENT HANDLER
QTVUEHRT	VTM/FM USER EVENT MONITOR HANDLER
QTVUGETL	VTM/FM USER GET DEVICE LIST
QTVUINIT	VTM/FM USER INITILAIZATION
QTVUINVE	VTM/FM USER INVOCATION EXIT PROGRAM
QTVUREAD	VTM/FM USER READ ROUTINE
QTVUTERM	VTM/FM USER TERMINATION ROUTINE
QTVUUI	VTM/FM VT100 USER INTERFACE
QTVUWRIT	VTM/FM USER WRITE ROUTINE
QTVWRTVT	VT-API CLOSE VIRTUAL TERMINAL
QTWAIDSP	QTWAIDSP HEADER IN ILE/COBOL
QTWAIDSP	QTWAIDSP API HEADER FOR CBL
QTWAIDSP	SPELLING AID API
QTWAIDSP	QTWAIDSP API HEADER IN RPG
QTWAIDSP	QTWAIDSP HEADER IN ILE/RPG
QTWCHKSP	QTWCHKSP HEADER IN ILE/COBOL
QTWCHKSP	QTWCHKSP API HEADER FOR CBL
QTWCHKSP	SPELL CHECK API
QTWCHKSP	QTWCHKSP API HEADER IN RPG
QTWCHKSP	QTWCHKSP HEADER IN ILE/RPG
QTWLGTBL	LANGUAGE TABLE

QTWRSLV	PLMI INTERFACE TO #DSTWAIN
QTWRSLV2	PLMI API INTERFACE TO #DSTWAIN
QTWSNDMS	PLMI API INTERFACE TO SNDPMSG
QTWSPCHK	C INTERFACE TO TWAIN FOR SPELL CHECK API
QTWSRCH	PLMI INTERFACE TO #DSTWAIN
QTWTRANS	PLMI API INTERFACE TO OTXTRANS
QT1ACFG	TDLC AUTOMATIC CONFIGURATION MODULE
QT1AVAIL	TDLC DATA AVAILABLE EVENT HANDLER
QT1ERPLD	TDLC IWS LUD ERP MODULE
QT1LUDCT	TDLC IWS LUD CONTACT MODULE
QT1LUDIN	TDLC INITIALIZE IWS LUD-ASP
QT1LUDRS	TDLC IWS LUD RESET MODULE
QT1VRYC	TDLC VARY LU 62 DEVICE COMPLETE HANDLER
QT3IOCMP	T3 REQIO COMPLETE EVENT HANDLER
QT3LUDIN	INITIALIZE T3 PORTION OF LUD-ASP
QT3LUDRS	RESET T3 PORTION OF LUD-ASP
QT3REQIO	T3-SNA MODULE FOR WS & WP
QT3UNSOL	UNSOLICITED DATA AVAILABLE EVENT HANDLER
QUCASDSP	COMPILE ASCII DISPLAY TAGS
QUCASPRT	COMPILE ASCII PRINTER TAGS
QUCCOMP	W/S CUSTOMIZATION RETRIEVE PDT
QUCCRTCO	WORKSTATION CUSTOMIZATION CRT CUST OBJ
QUCCVDAE	WSCST ASCII DISP ASCII TO EBCDIC CONVERS
QUCCVDAF	WSCST ASCII DISP ASCII TO KEYB F CONVERS
QUCCVDEA	WSCST ASCII DISP EBCDIC TO ASCII CONVERS
QUCCVDUS	WSCST ASCII DISP UPDATE SCRN TBL CONVERS
QUCCVPDM	WSCST PRINTER DEFAULT A->E TBL CONVERS
QUCCVPDT	WSCST PRINTER DEFINITION TBL CONVERSION
QUCCVPFT	WSCST PRINTER FUNCTION TABLE CONVERSION
QUCCVPMM	WSCST PRINTER MULTILANG A->E TBL CONVERS
QUCCVTKT	WSCST TWINX TRANSLATION TABLE CONVERSION
QUCCVXFM	WSCST EMULATOR ELIMINATOR TBL CONVERSION
QUCGETTB	WSCST GET CUSTOMIZED TABLE FOR EM ELIMIN
QUCRTDAE	W/S CUSTOMIZATION RETRIEVE DAET TABLE
QUCRTDAF	W/S CUSTOMIZATION RETRIEVE DAFT TABLE
QUCRTDEA	W/S CUSTOMIZATION RETRIEVE DEAT TABLE
QUCRTDUS	W/S CUSTOMIZATION RETRIEVE DUST TABLE
QUCRTNTB	WSCST RETURN CUST TABLE FOR EMUL ELIM
QUCRTPDM	WSCST PRINTER DEFAULT A->E TBL RETRIEVE
QUCRTPDT	W/S CUSTOMIZATION RETRIEVE PDT
QUCRTPFT	WSCST PRINTER FUNCTION TABLE RETRIEVE RO
QUCRTPMM	WSCST PRINTER MULTILANG A->E TBL RETRIEV
QUCRTTKT	W/S CUSTOMIZATION RETRIEVE TKTT TABLE
QUCRTVTB	WORKSTATION CUSTOMIZATION RETRIEVE TABLE
QUCRTVVC	WSCST VALIDITY CHECKER FOR RTVWSCST CMD
QUCRTXFM	WSCST RETRIEVE TRANSFORM TABLE
QUCTXDSP	COMPILE TWINAX DISPLAY TAGS
QUCTXPRT	COMPILE TWINAX PRINTER TAGS
QUCVRYOF	WORKSTATION CUSTOMIZATION VARY OFF PROC
QUCVRYON	WORKSTATION CUSTOMIZATION VARY ON PROC
QUCXFPRT	WSCST COMPILE EMULATOR ELIMINATOR TAGS
QUHADDIX	CPP FOR ADDSCHIDXE
QUHCHGIX	CPP FOR CHGSCHIDX COMMAND
QUHCRTIX	CPP FOR CRTSCHIDX COMMAND
QUHDSPH	DISPLAY HELP SERVICE
QUHEDTIX	EDIT SEARCH INDEX LIST FUNCTION
QUHFMT	UH/UIM ISIL FORMATTER
QUHHELP	HELP FACILITY DRIVER CPP
QUHHYPER	DISPLAY LIST OF HYPERTEXT LINKS TAKEN
QUHINFO	INDEX SEARCH FUNCTION OF HELP
QUHIXPOP	PROMPTER OVERRIDE FOR CHGSCHIX COMMAND
QUHPRINT	HELP FACILITY PRINT CPP
QUHPRTH	PRINT HELP SERVICE
QUHRMVIX	CPP FOR RMVSCHIDXE
QUHWIXXT	EXIT PROGRAM FOR WRKSCHIDXE
QUHWRKIX	CPP FOR WRKSCHIDXE
QUIACT	UIM ACTION DETERMINATION MODULE
QUIADDLE	ADD LIST ENTRY SERVICE
QUIADDLM	ADD LIST MULTIPLE ENTRIES SERVICE
QUIADDPA	ADD PRINT APPLICATION SERVICE
QUIADDPW	ADD POP-UP WINDOW SERVICE
QUIALIST	UIM ACTION LIST PROCESSOR
QUICBINT	UIM CONTROL BLOCK INITIALIZATION
QUICCHGM	CHANGE MENU CPP
QUICCRTM	CREATE MENU CPP
QUICDLTM	DELETE MENU CPP
QUICDSPM	DISPLAY MENU ATTRIBUTES CPP
QUICLINE	COMMAND LINE POP-UP PROGRAM
QUICLOA	CLOSE APPLICATION SERVICE
QUICLOSE	UIM APPLICATION CLOSE MODULE
QUICMD	UIM USER PROGRAM AND COMMAND INTERFACE
QUICMENU	GO COMMAND CPP
QUIDLTL	DELETE LIST SERVICE
QUIDSPP	DISPLAY PANEL SERVICE
QUIEXFMT	UIM EXECUTION TIME FORMATTER
QUIFDATA	UIM PRE-PROCESSOR FORMATTER: DATA AREA
QUIFINFO	UIM PRE-PROCESSOR FORMATTER: INFO AREA
QUIFLIST	UIM PRE-PROCESSOR FORMATTER: LIST AREA
QUIFMENU	UIM PRE-PROCESSOR FORMATTER: MENU AREA
QUIFPRT	UIM PRE-PROCESSOR FORMATTER: PRINT SHELL
QUIFSHLL	UIM PRE-PROCESSOR FORMATTER: PANEL SHELL
QUIFTEXT	UIM PRE-PROCESSOR FORMATTER: TEXT AREA
QUIGETLE	GET LIST ENTRY SERVICE
QUIGETLM	GET LIST MULTIPL ENTRIES SERVICE
QUIGETV	GET DIALOG VARIABLE SERVICE
QUIICHK	UIM INPUT FIELD AND CONDITION PROCESSING
QUIIEXIT	INVOCATION EXIT PROGRAM
QUIINMGR	UIM INTERACTION MANAGER
QUILIST	UIM LIST MANAGER
QUILNGNM	COMMAND LINE POP-UP OVER ANYTHING
QUILXLST	UIM EXTEND LIST
QUIMGFLW	UIM PANEL FLOW MANAGER - DSPPNL
QUIMIEXT	MENU DRIVER INVOCATION EXIT PROGRAM
QUIMNDRV	MENU DRIVER
QUIMNPOP	PROMPTER OVERRIDE FOR CHGMNU COMMAND
QUIMNSAV	SAVE MENU FOR N TO N-1
QUIMSTK	MANIPULATE MENU STACK
QUIOCNV	UIM OUTBOUND CONVERSION
QUIOPEN	UIM APPLICATION OPEN MODULE
QUIOPNDA	OPEN DISPLAY APPLICATION SERVICE
QUIOPNPA	OPEN PRINT APPLICATION SERVICE
QUIPOP	UIM POP-UP MANAGER : ADDPOP & RMVPOP
QUIPPAUG	PDL COMPILER - AUGMENT TREE
QUIPPCPP	PANEL DEFINITION LANGUAGE COMPILER CPP
QUIPPCTS	MODULE TO CALCULATE HASH TABLE SIZE__
QUIPPFMT	UIM PRE-PRECESSOR TIME FORMAT MANAGER
QUIPPGEN	PDL COMPILER - GENERATE OBJECT
QUIPPIEX	PDL COMPILER - INVOCATION EXIT
QUIPPLST	PDL COMPILER - GENERATE LISTING
QUIPPPH1	PDL COMPILER - PHASE 1
QUIPPPRT	PDL COMPILER - GENERATE PROTOTYPE NODES
QUIPPRD	PDL COMPILER - READ SOURCE
QUIPPRSL	PDL COMPILER - RESOLVE REFERENCES
QUIPPSTO	PDL COMPILER - STORAGE ALLOCATION
QUIPRINT	UIM EXECUTION TIME PRINT FORMATTER
QUIPRTP	PRINT PANEL SERVICE
QUIPUTV	PUT DIALOG VARIABLE SERVICE
QUIRCLAP	RECLAIM UIM APPLICATION RESOURCES
QUIRMVLE	REMOVE LIST ENTRY SERVICE
QUIRMVPA	REMOVE PRINT APPLICATION SERVICE
QUIRMVPW	REMOVE POP-UP WINDOW SERVICE
QUIRTVLA	RETRIEVE LIST ATTRIBUTES SERVICE
QUISAVE	UIM SAVE OBJECT HANDLER
QUISCRL	UIM SCROLL MODULE
QUISETLA	SET LIST ATTRIBUTES SERVICE
QUISETSC	SET SCREEN IMAGE SERVICE
QUISTSCN	UIM SAVE SCREEN IMAGE
QUIUPDLE	UPDATE LIST ENTRY SERVICE
QUIVPMGR	VARIABLE POOL MANAGER
QUOCMD	PDM CA INTERFACE
QUPCMNVR	VFYCMN MAIN DRIVER
QUPCNFG	UP CONFIG MODULE
QUPDRVR	UPPR MAIN DRIVER
QUPGENVR	UPPR MODULE FOR COMM VERIFICATION
QUPIEXIT	UPPR I-EXIT
QUPMENU	ANZPRB EXIT PRG TO SHOW MENU/CMD/PRC SCN
QUPSSG	UP SYMPTOM STRING GENERATOR
QUPTAPVR	UPPR MODULE FOR TAPE VERIFICATION
QUPUPPR	UP COMMAND PROCESSOR
QUPVLIC	ANZPRB EXIT PRG TO ADD VLIC KEYWORD

QURBAR40	R40 LANGUAGES EXIT PROGRAM FOR QGP
QUREZR40	INSTALL EXIT ROUTINE FOR OPER ASSISTANT
QURLOCK	LOCK ANCHOR FILES
QUROFC	OFFICE UMBRELLA FOR INZSYS PROCESSING
QUROHR40	LIST DIA CPP
QURTRNFL	PTF TRANSLATION FOR CALENDARS
QURUNLCK	UNLOCK ANCHOR FILES
QURUYR40	EXIT PROGRAM FOR UTILITIES
QUS	QUS HEADER IN ILE/COBOL
QUS	QUS API HEADER FOR CBL
QUS	QUS API HEADER IN RPG
QUS	QUS HEADER IN ILE/RPG
QUSADDEP	QUSADDEP API HEADER IN CBL
QUSADDUI	ADD USER INDEX ENTRIES API
QUSADDUI	QUSADDUI HEADER IN ILE/COBOL
QUSADDUI	QUSADDUI API HEADER FOR CBL
QUSADDUI	QUSADDUI API HEADER IN RPG
QUSADDUI	QUSADDUI HEADER IN ILE/RPG
QUSAXPGM	US ADD EXIT PROGRAM CPP
QUSCHGPA	CHANGE POOL ATTRIBUTES
QUSCHGUS	CHANGE USER SPACE
QUSCMDLN	COMMAND LINE POP-UP OVER ANYTHING
QUSCRTUI	CREATE USER INDEX
QUSCRTUQ	CREATE USER QUEUE
QUSCRTUS	CREATE USER SPACE
QUSCUSAT	CHANGE USER SPACE ATTRIBUTES
QUSCUSAT	QUSCUSAT HEADER IN ILE/COBOL
QUSCUSAT	QUSCUSAT API HEADER FOR CBL
QUSCUSAT	QUSCUSAT API HEADER IN RPG
QUSCUSAT	QUSCUSAT HEADER IN ILE/RPG
QUSDLTUI	DELETE USER INDEX API
QUSDLTUQ	DELETE USER QUEUE API
QUSDLTUS	DELETE USER SPACE FOR SPT
QUSEC	ERROR CODE
QUSEC	ERROR CODE
QUSEC	QUSEC HEADER IN ILE/COBOL
QUSEC	QUSEC HEADER IN ILE/RPG
QUSGEN	GENERIC HEADER USER SPACE
QUSGEN	GENERIC HEADER USER SPACE
QUSGEN	QUSGEN HEADER IN ILE/COBOL
QUSGEN	QUSGEN HEADER IN ILE/RPG
QUSIEXIT	US MODULES INVOCATION EXIT PROGRAM
QUSLFLD	QUSLFLD HEADER IN ILE/COBOL
QUSLFLD	QUSLFLD API HEADER FOR CBL
QUSLFLD	SPT: LIST FILE FIELD FORMATS
QUSLFLD	QUSLFLD API HEADER IN RPG
QUSLFLD	QUSLFLD HEADER IN ILE/RPG
QUSLJOB	LIST JOB API
QUSLJOB	QUSLJOB HEADER IN ILE/COBOL
QUSLJOB	QUSLJOB API HEADER FOR CBL
QUSLJOB	QUSLJOB API HEADER IN RPG
QUSLJOB	QUSLJOB HEADER IN ILE/RPG
QUSLMBR	QUSLMBR HEADER IN ILE/COBOL
QUSLMBR	QUSLMBR API HEADER FOR CBL
QUSLMBR	SPT: LIST FILE FIELD FORMATS
QUSLMBR	QUSLMBR API HEADER IN RPG
QUSLMBR	QUSLMBR HEADER IN ILE/RPG
QUSLOBJ	LIST OBJECT API
QUSLOBJ	QUSLOBJ HEADER IN ILE/COBOL
QUSLOBJ	QUSLOBJ API HEADER FOR CBL
QUSLOBJ	QUSLOBJ API HEADER IN RPG
QUSLOBJ	QUSLOBJ HEADER IN ILE/RPG
QUSLRCD	QUSLRCD HEADER IN ILE/COBOL
QUSLRCD	QUSLRCD API HEADER FOR CBL
QUSLRCD	SPT: LIST FILE RECORD FORMATS
QUSLRCD	QUSLRCD API HEADER IN RPG
QUSLRCD	QUSLRCD HEADER IN ILE/RPG
QUSLSPL	QUSLSPL HEADER IN ILE/COBOL
QUSLSPL	QUSLSPL API HEADER FOR CBL
QUSLSPL	SPT: LIST FILE RECORD FORMATS
QUSLSPL	QUSLSPL API HEADER IN RPG
QUSLSPL	QUSLSPL HEADER IN ILE/RPG
QUSPTRUS	LOCATE POINTER TO *USRSPC OBJECT
QUSREG	QUSREG HEADER IN ILE/COBOL
QUSREG	QUSREG API HEADER FOR CBL
QUSREG	QUSREG API HEADER IN RPG
QUSREG	QUSREG HEADER IN ILE/RPG
QUSRGPT	QUSRGPT API HEADER IN CBL
QUSRJOBI	QUSRJOBI HEADER IN ILE/COBOL
QUSRJOBI	QUSRJOBI API HEADER FOR CBL
QUSRJOBI	RETRIEVE JOB INFORMATION
QUSRJOBI	QUSRJOBI API HEADER IN RPG
QUSRJOBI	QUSRJOBI HEADER IN ILE/RPG
QUSRMBRD	COBOL INCLUDE FOR API QUSRMBRD
QUSRMBRD	QUSRMBRD HEADER IN ILE/COBOL
QUSRMBRD	SPT: RETRIEVE FILE MEMBER DESCRIPTION
QUSRMBRD	QUSRMBRD HEADER IN ILE/RPG
QUSRMBRD	RPG INCLUDE FOR API QUSRMBRD
QUSRMVUI	REMOVE USER INDEX ENTRIES
QUSROBJD	QUSROBJD HEADER IN ILE/COBOL
QUSROBJD	QUSROBJD API HEADER FOR CBL
QUSROBJD	RETRIEVE OBJECT DESCRIPTION
QUSROBJD	QUSROBJD API HEADER IN RPG
QUSROBJD	QUSROBJD HEADER IN ILE/RPG
QUSRSPLA	QUSRSPLA HEADER IN ILE/COBOL
QUSRSPLA	QUSRSPLA API HEADER FOR CBL
QUSRSPLA	RETURN SPOOL FILE ATTRIBUTES API
QUSRSPLA	QUSRSPLA API HEADER IN RPG
QUSRSPLA	QUSRSPLA HEADER IN ILE/RPG
QUSRSTUI	USER INDEX RESTORE OBJECT HANDLER
QUSRSTUQ	USER QUEUE RESTORE OBJECT HANDLER
QUSRSTUS	USER SPACE RESTORE OBJECT HANDLER
QUSRTVEI	QUSRTVEI API HEADER IN CBL
QUSRTVUI	RETRIEVE USER INDEX ENTRIES
QUSRTVUS	RETRIEVE CONTENTS OF A USER SPACE
QUSRUIAT	QUSRUIAT HEADER IN ILE/COBOL
QUSRUIAT	QUSRUIAT API HEADER FOR CBL
QUSRUIAT	RETRIEVE USER INDEX ATTRIBUTES API
QUSRUIAT	QUSRUIAT API HEADER IN RPG
QUSRUIAT	QUSRUIAT HEADER IN ILE/RPG
QUSRUSAT	QUSRUSAT HEADER IN ILE/COBOL
QUSRUSAT	QUSRUSAT API HEADER IN CBL
QUSRUSAT	RETRIEVE USER SPACE ATTRIBUTES
QUSRUSAT	QUSRUSAT API HEADER IN RPG
QUSRUSAT	QUSRUSAT HEADER IN ILE/RPG
QUSRXPGM	US REMOVE EXIT PROGRAM CPP
QUSSAVUQ	USER QUEUE SAVE OBJECT HANDLER
QUSWRKRI	US WORK WITH REGISTRATION INFO CPP
QUTBIIX	$BICR EXIT ROUTINE
QUTBMNU	CREATE A MENU FROM A MESSAGE FILE
QUTCOADP	QUTCOADP - PERF FUNCTION W/ ADOPTED AUTH
QUTCOEAV	$COPY EXTRACT AND VALIDATE FILE INFO
QUTCOFF	$COPY (FROM FIXED DISK TO FIXED DISK)
QUTCOIX	QUTCOIX - $COPY UTIL INVOCATION EXIT
QUTCORS	QUTCORS - COPY FROM DSKT/TAPE TO DISK
QUTCOSV	QUTCOSV - COPY FROM DISK TO DSKT/TAPE
QUTDEF1	QUTDEF1--DELETE FROM DISK
QUTDEIX	$DELET INVOCATION EXIT ROUTINE
QUTDEI1	QUTDEI1 - DELETE FROM DISKETTE
QUTDUIX	$DUPIX - $DUPRD INVOCATION EXIT
QUTHCLN	$HIST PROCEDURE INVOCATION EXIT
QUTHLPO	HELP OBJECT CREATION
QUTHLP1	CREATE HELP OBJECT PART2
QUTHLST	HELP OCL/PCE CONTROL INFORMATION
QUTINIX	$INIT EXIT ROUTINE
QUTLAF1	$LABF1 - DISPLAY OF DISK VTOC
QUTLAIX	$LABEL INVOCATION EXIT ROUTINE
QUTMAIX	$MAINT IEXIT PROGRAM
QUTMASA	$MAINT SUBROUTINE WITH ADOPT QSYS
QUTMASR	$MAINT PRIMARY SUBROUTINE
QUTMGBLD	CREATE A MESSAGE FILE FROM S/36 MSG SRC
QUTMSGID	GET MSG TEXT FOR WS/DDS MSGID KEYWORD
QUTREIX	$RENAM INVOCATION EXIT ROUTINE
QUTREN1	$RENAM SUBMODULE FOR EXISTENCE CHECKS
QUTRGZF	QUTRGZF MAINLINE MODULE
QUTSFCHK	SFGR SYNTAX CHECKER
QUTSFC01	CNVSFGR - MACRO PROCESSING PROGRAM
QUTSFGR	CREATE A DISPLAY FILE FROM S/36 SFGR SRC
QUTSFIGC	HANDLE IGC IN DDS OUTPUT FROM $SFGR
QUTSFPC	UPDATE POSITION CURSOR IN SFGR->DDS

QUTTCIX	$TCOPY (TAPECOPY) INVOCATION EXIT PGM
QUTUACHK	USER ACCESS TO SPOOL - VALIDATE VALUES
QUTUADP	USER ACCESS TO SPOOL - UIM DSP/PRT
QUTUASIX	USER ACCESS TO SPOOL - INVOCATION EXIT
QVTRMSTG	QVTRMSTG HEADER IN ILE/COBOL
QVTRMSTG	QVTRMSTG API HEADER FOR CBL
QVTRMSTG	VADOR API PROGRAM
QVTRMSTG	QVTRMSTG API HEADER IN RPG
QVTRMSTG	QVTRMSTG HEADER IN ILE/RPG
QVTSERVR	VADOR API SERVER PROGRAM
QWCADSVR	VARY OFF CONSOLE BEFORE HRM
QWCAHNAE	SYSTEM ARBITER INPUT QUEUE EVENT HANDL
QWCAHNKE	LOCK EVENT HANDLER
QWCAHNTM	HANDLE WCBT MSG PROCESSOR
QWCAINAR	SYSTEM ARBITER INITIATION
QWCAMCKE	SYSTEM MACHINE EVENT HANDLER
QWCAMNAR	SYSTEM ARBITER MAINLINE PROGRAM
QWCAROTE	24HR ROLLOVER EVENT HANDLER
QWCASCUE	SUBSYSTEM MONITOR TERMINATION EVH
QWCASDSM	TERMINATE SYSTEM MESSAGE PROCESSOR
QWCASDUM	TERMINATE SUBSYSTEM MESSAGE PROCESSOR
QWCASUUM	START SUBSYSTEM MESSAGE PROCESSOR
QWCATARE	MACH RESOURCE THRESHOLD AND TIMER EH
QWCAT1TE	SUBSYSTEM TERMINATION TIMER EVH
QWCAT2TE	SYSTEM TERMINATION TIMER EVH
QWCAUPRM	UPDATE ROLLOVER EVENT MSG PROCESSOR
QWCCAAYC	ADD JOB SCHEDULE ENTRY CPP
QWCCALOC	ALLOCATE OBJECT CPP
QWCCCHCC	CHANGE CLASS CPP
QWCCCHLC	CHANGE SYSTEM VALUE CPP
QWCCCHNC	CHANGE NETWORK ATTRIBUTES
QWCCCHPC	CHANGE SHARED POOL CPP
QWCCCHVC	CHANGE DATA AREA CPP
QWCCCHYC	CHANGE JOB SCHEDULE ENTRY CPP
QWCCCJOB	API TO CHANGE CURRENT JOB
QWCCCRCC	CREATE CLASS CPP
QWCCCRVC	CREATE DATA AREA CPP
QWCCDAOC	DEALLOCATE OBJECT CPP
QWCCDSAC	DISPLAY ACTIVE JOBS CPP
QWCCDSCC	DISPLAY CLASS CPP
QWCCDSDC	WORK WITH DISK STATUS
QWCCDSIC	DISPLAY JOB CALL STACK CPP
QWCCDSJC	DISPLAY JOB CPP
QWCCDSKC	OBJECT LOCK DISPLAY CPP
QWCCDSLC	DISPLAY SYSTEM VALUE CPP
QWCCDSNC	DISPLAY NETWORK ATTRIBUTES
QWCCDSPC	WORK WITH SHARED POOLS CPP
QWCCDSSC	DISPLAY SYSTEM CPP
QWCCDSTC	DISPLAY SYSTEM STATUS CPP
QWCCDSUC	DISPLAY SUBSYSTEM & SUBMITTED JOBS CPP
QWCCDSVC	DISPLAY DATA AREA CPP
QWCCHGTN	API TO CHANGE STORAGE POOL TUNING
QWCCHGTN	QWCCHGTN HEADER IN ILE/COBOL
QWCCHGTN	QWCCHGTN API HEADER FOR CBL
QWCCHGTN	QWCCHGTN API HEADER IN RPG
QWCCHGTN	QWCCHGTN HEADER IN ILE/RPG
QWCCHRYC	HOLD/RELEASE JOB SCHEDULE ENTRIES CPP
QWCCLFEC	SIGNOFF CPP
QWCCRCRC	RECLAIM RESOURCES CPP
QWCCRMYC	REMOVE JOB SCHEDULE ENTRIES CPP
QWCCRTEC	DUMP IPL PERFORMANCE DATA
QWCCRTNC	RETRIEVE NETWORK ATTRIBUTES CPP
QWCCSDSC	TRMCPF/PWRDWNSYS CPP
QWCCSDUC	TERMINATE SUBSYSTEM CPP
QWCCSUUC	START SUBSYSTEM CPP
QWCCVTDT	CONVERT DATE FORMAT API
QWCCWRLC	WORK WITH SYSTEM VALUE CPP
QWCCWRLR	WORK WITH SYSTEM VALUE SUPPORT ROUTINE
QWCCWRYC	WORK WITH JOB SCHEDULE ENTRIES CPP
QWCDLYJB	DELAY JOB (DLYJOB) CPP
QWCDMGNT	LOCAL DATA AREA DMG NOTIFICATION PGM
QWCIBAEQ	BUILD WCBT AVAILABLE ENTRY QUEUE
QWCICCWO	WCBT CONVERSION ROUTINE
QWCICKRR	IPL DASD CAPACITY CHECK
QWCICLSR	WCBT CLEANUP ROUTINE
QWCICLTR	WCBT SYSTEM JOB ROUTINE FOR CLNUP
QWCIDIOR	START XPF DISPLAY I/O ROUTINE
QWCIDSPR	INITIAL DEVICE HANDLING DURING THE IPL
QWCIDSWO	DESTROY WCBT OBJECTS ROUTINE
QWCIINSR	INITIAL SYSTEM ROUTINE
QWCILE1R	QSYS LPM EXIT PROGRAM - BEFORE
QWCILE2R	QSYS LPM EXIT PROGRAM - AFTER
QWCILE3R	QSYS LPM EXIT PROGRAM - BEFORE
QWCILE4R	QSYS LPM EXIT PROGRAM - AFTER
QWCILSVR	INSTALL LANGUAGE SENSITIVE SYSTEM VALUES
QWCINIPP	SYSTEM JOB INITIATION PHASE PROGRAM
QWCIPDEH	INITIAL PROCESS DEFAULT EXCP HNDLR
QWCISCFR	START XPF ROUTINE
QWCISTSJ	START SYSTEM JOB ROUTINE
QWCITRSE	SYSTEM TERMINATION EVENT HANDLER
QWCITUNR	IPL AUTO-TUNER
QWCJERYE	JOB SCHEDULER "END RESTRICTED STATE"
QWCJFXYE	JOB SCHEDULER "HANDLE FIXUP TIMER"
QWCJHNRE	JOB SCHEDULER "LOCK REQUEST GRANTED"
QWCJHTJE	SCHEDULED JOBS OCCURRENCE TIMER
QWCJHTYE	JOB SCHEDULER "HANDLE OCCURRENCE TIMER"
QWCJMNYR	JOB SCHEDULER MAINLINE PROGRAM
QWCJSRYR	JOB SCHEDULER IPL, DAMAGE, AND RESTORE
QWCJSTJE	SCHEDULED JOBS RESET OCCURRENCE TIMER
QWCJSTYE	JOB SCHEDULER "RESET OCCURRENCE TIMER"
QWCLASBS	API TO LIST JOBS IN A SUBSYSTEM
QWCLASBS	QWCLASBS HEADER IN ILE/COBOL
QWCLASBS	QWCLASBS API HEADER FOR CBL
QWCLASBS	QWCLASBS API HEADER IN RPG
QWCLASBS	QWCLASBS HEADER IN ILE/RPG
QWCLINSR	LUS PROCESS INITIATION PHASE PROGRAM
QWCLMNSR	LUS PROCESS PROBLEM PHASE PROGRAM
QWCLOBJL	QWCLOBJL HEADER IN ILE/COBOL
QWCLOBJL	QWCLOBJL API HEADER FOR CBL
QWCLOBJL	WC API TO LIST OBJECT LOCKS
QWCLOBJL	QWCLOBJL API HEADER IN RPG
QWCLOBJL	QWCLOBJL HEADER IN ILE/RPG
QWCLSCDE	API TO LIST JOB SCHEDULE ENTRIES
QWCLSCDE	QWCLSCDE HEADER IN ILE/COBOL
QWCLSCDE	QWCLSCDE API HEADER FOR CBL
QWCLSCDE	QWCLSCDE API HEADER IN RPG
QWCLSCDE	QWCLSCDE HEADER IN ILE/RPG
QWCOPYRT	COPYRIGHT MODULE
QWCPCRRR	DYNAMIC STORAGE POOL TUNER INIT
QWCPMNRR	MAINLINE FOR SYSTEM JOB QPFRADJ
QWCPRQRM	REQUEST RESOURCES MESSAGE PROCESSOR
QWCPRSRE	EVENT HANDLER FOR REQUEST RSC EVENT
QWCPUPRR	DYNAMIC STORAGE POOL TUNER
QWCRDTAA	API TO RETREIVE DATA AREA CONTENTS
QWCRDTAA	QWCRDTAA HEADER IN ILE/COBOL
QWCRDTAA	QWCRDTAA API HEADER FOR CBL
QWCRDTAA	QWCRDTAA API HEADER IN RPG
QWCRDTAA	QWCRDTAA HEADER IN ILE/RPG
QWCRNETA	API TO RETREIVE NETWORK ATTRIBUTES
QWCRNETA	QWCRNETA HEADER IN ILE/COBOL
QWCRNETA	QWCRNETA API HEADER FOR CBL
QWCRNETA	QWCRNETA API HEADER IN RPG
QWCRNETA	QWCRNETA HEADER IN ILE/RPG
QWCRSSTS	QWCRSSTS HEADER IN ILE/COBOL
QWCRSSTS	QWCRSSTS API HEADER FOR CBL
QWCRSSTS	RETRIEVE SYSTEM STATUS INFORMATION
QWCRSSTS	QWCRSSTS API HEADER IN RPG
QWCRSSTS	QWCRSSTS HEADER IN ILE/RPG
QWCRSVAL	API TO RETREIVE SYSTEM VALUES
QWCRSVAL	QWCRSVAL HEADER IN ILE/COBOL
QWCRSVAL	QWCRSVAL API HEADER FOR CBL
QWCRSVAL	QWCRSVAL API HEADER IN RPG
QWCRSVAL	QWCRSVAL HEADER IN ILE/RPG
QWCSADVR	ALCOBJ/DLCOBJ INPUT VALIDITY CHECKER
QWCSCDFR	CHANGE DATE FORMAT ROUTINE
QWCSCRLR	CREATE/CONVERT SYSTEM VALUE OBJECT
QWCSCVDR	CONVERT DATE SUPPORT ROUTINE
QWCSCVLR	CONVERT TO LARGER SYSTEM VALUE OBJECT
QWCSCVTR	CONVERT TIME SUPPORT ROUTINE
QWCSDSAR	DISPLAY ACTIVE JOBS EXCLUDE MODULE

QWCSDSFR	SPL FILES & INV STACK INTERFACE MODULE
QWCSDSIM	DISPLAY CALL STACK MESSAGE PROCESSOR
QWCSDSKC	JOB LOCK DISPLAY ROUTINE
QWCSDSKR	ADDITIONAL LOCK DISPLAY ROUTINE
QWCSDSKS	DISPLAY JOB LOCKS SETUP ROUTINE
QWCSDSMR	DISPLAY JOB MESSAGES FROM UIM MODULE
QWCSHCFR	QWCSHCFR
QWCSHUIC	HANDLE COMMAND FROM DISPLAY MODULE (3)
QWCSNSYR	CALCULATE NEXT SUBMISSION DATE
QWCSRSYR	RESTORE HANDLER FOR JOB SCHEDULE OBJECT
QWCSRTJR	RETRIEVE JOB INFORMATION
QWCSRTLR	RETRIEVE SYSTEM VALUE
QWCSRTVR	RETRIEVE DATA AREA ROUTINE
QWCSSLJR	SELECT JOB SUPPORT ROUTINE
QWCSSVYR	SAVE JOB SCHEDULER HANDLER
QWCSUPLR	UPDATE SYSTEM VALUE OBJECT
QWCSVRDR	VERIFY DATE ROUTINE
QWCSVRJR	VERIFY COMMAND FROM DISPLAY MODULE
QWCSVRTR	VERIFY TIME ROUTINE
QWCSWRYR	WRKJOBSCDE SUPPORT ROUTINE
QWCSXTCR	EXTRACT CLASS OBJECT INFO
QWCSXTJR	EXTRACT JOB INFO
QWCSXTYR	CHGJOBSCDE PROMPT OVERRIDE PROGRAM
QWDCADA	ADD AUTOSTART JOB ENTRY CPP
QWDCADC	ADD COMMUNICATIONS ENTRY CPP
QWDCADJ	QWDCADJ
QWDCADP	ADD PRESTARTED JOB ENTRY CPP
QWDCADQ	ADD JOB QUEUE ENTRY CPP
QWDCADR	ADD ROUTING ENTRY CPP
QWDCCHA	CHANGE AUTOSTART JOB ENTRY CPP
QWDCCHC	CHANGE COMMUNICATIONS ENTRY
QWDCCHD	CHANGE SUBSYSTEM DESCRIPTION CPP
QWDCCHG	QWDCCHG
QWDCCHJ	QWDCCHJ
QWDCCHP	CHANGE PRESTARTED JOB ENTRY
QWDCCHQ	CHANGE JOB QUEUE ENTRY CPP
QWDCCHR	CHANGE ROUTING ENTRY CPP
QWDCCRD	CREATE SUBSYSTEM DESCRIPTION CPP
QWDCCRG	QWDCCRG
QWDCDLJ	DELETE WORK ENTRY CPP
QWDCDLR	REMOVE ROUTING ENTRY CPP
QWDCDSD	QWDCDSD
QWDCDSG	QWDCDSG
QWDDMGNT	SUBSYSTEM DESCRIPTION DAMAGE NOTIF PGM
QWDGEXT	EXTRACT JOB DESCRIPTION OBJECT INFO
QWDGMSG	JOB DESCRIPTION MESSAGE MODULE
QWDJDVF	VERIFY DEVICE FILE
QWDJFNE	FIND WORK ENTRY MODULE
QWDLSJBQ	API TO LIST SBS JOB QUEUE ENTRIES
QWDLSJBQ	QWDLSJBQ HEADER IN ILE/COBOL
QWDLSJBQ	QWDLSJBQ API HEADER FOR CBL
QWDLSJBQ	QWDLSJBQ API HEADER IN RPG
QWDLSJBQ	QWDLSJBQ HEADER IN ILE/RPG
QWDMCNVT	SBSD LEVEL CONVERSION MODULE
QWDMMSG	QWDMMSG
QWDMPACK	PACK SUBSYSTEM DESCRIPTION CPP
QWDMRCVR	SUBSYSTEM DESCRIPTION RECOVERY MODULE
QWDMRSLV	EXTERNAL OBJECT RESOLVE MODULE
QWDMXTND	SUBSYSTEM DESCRIPTION EXTENSION MODULE
QWDRJOBD	QWDRJOBD HEADER IN ILE/COBOL
QWDRJOBD	QWDRJOBD API HEADER FOR CBL
QWDRJOBD	RETRIEVE JOB DESCRIPTION API
QWDRJOBD	QWDRJOBD API HEADER IN RPG
QWDRJOBD	QWDRJOBD HEADER IN ILE/RPG
QWDRSBSD	QWDRSBSD HEADER IN ILE/COBOL
QWDRSBSD	QWDRSBSD API HEADER FOR CBL
QWDRSBSD	RETRIEVE SUBSYSTEM INFORMATION
QWDRSBSD	QWDRSBSD API HEADER IN RPG
QWDRSBSD	QWDRSBSD HEADER IN ILE/RPG
QWDSYWRK	CALL PROGRAMS FOR QSYSWRK SUBSYSTEM
QWHCLEAN	WH CLEANUP MODULE
QWHDSDBR	DSPDBR CPR
QWHDSFFD	DSPFFD CPR
QWHDSPFD	DSPFD CPR
QWHDSPPR	DSPFD CPR
QWHFDCHK	VALIDITY CHECKER FOR DSPFD
QWHFDOUT	CPP FOR DSPFD OUTFILE
QWHOUTFL	OUTFILE VALIDATION/CREATION
QWHRMBRD	OUTFILE VALIDATION/CREATION
QWHRMCHK	RETRIEVE MEMBER DESCRIPTION VAL CHECKER
QWPALLOC	PRINTER OPEN TIME MODULE
QWPAPTFL	FIELD LEVEL AFPDS PUT MODULE
QWPAPUT	NON-FIELD LEVEL AFPDS PUT MODULE
QWPASPRT	PLACE ASCII DATA ON SPOOL
QWPCLOSE	REMOTE PRINTER CLOSE MODULE
QWPERROR	WORKSTATION PRINTER ERROR HANDLER
QWPEXPRT	EXTRACT PRINT MODULE FOR WP
QWPFEOD	REMOTE PRINTER FEOD MODULE
QWPFTSWP	QWPFTSWP
QWPGRAPH	QWPGRAPH
QWPGRCLS	QWPGRCLS
QWPGREOP	QWPGREOP
QWPIFLDF	QWPIFLDF
QWPIGRPH	QWPIGRPH - IPDS GRAPHICS MODULE
QWPINASP	INITIALIZE QWPALLOC ASSOCIATED SPACE
QWPIPTFL	QWPIPTFL
QWPIPTRN	TRANSFORM IPDS TO AFPDS
QWPIPUT	QWPIPUT
QWPIPUTF	QWPIPUTF
QWPLDPRT	1403 LINE DATA PASS THROUGH MODULE
QWPLDTRN	TRANSFORM 1403 LINE DATA TO SCS
QWPLUDIN	QWPLUDIN
QWPMODCA	PRINTER MODCA PASS THROUGH MODULE
QWPMOTRN	TRANSFORM MODCA TO SCS
QWPNWEVT	REMOTE PRINTER NO-WAIT EVENT HANDLER
QWPOERRS	PRINTER OPEN TIME ERRORS
QWPOPEN	QWPOPEN
QWPORDER	QWPORDER
QWPPERRS	PRINTER PUT TIME ERRORS
QWPPFLDF	QWPPUTF
QWPPSDS	PSDS PASS THROUGH MODULE
QWPPSUBR	IPDS ADVANCED PRINTER FUNCTION PRPQ
QWPPTFLD	SCS FIELD LEVEL PUT MODULE
QWPPUT	SCS PUT MODULE
QWPPUTF	QWPPUTF
QWPREOPN	QWPREOPN
QWPREQIO	WORKSTATION PRINTER REQIO
QWPSCPRT	HANDLE PRE-BUILT DATA STREAM
QWPSCTRN	TRANSFORM SCS TO IPDS
QWPSETPT	QWPSETPT
QWPUSEVH	QWPUSEVH
QWPXPRMA	QWPXPRMA
QWPXPUT	XTRA PUT MODULE FOR WP
QWPZGEED	RETRIEVE DEFAULTS FOR MANF TYPE
QWPZTAFP	POINTER VERIFICATION PROGRAM
QWPZTAFP	QWPZTAFP HEADER IN ILE/COBOL
QWPZTAFP	QWPZTAFP API HEADER FOR CBL
QWPZTAFP	QWPZTAFP API HEADER IN RPG
QWP4019	QWP4019
QWSCLOSE	WS/CL CLOSE
QWSCRTRB	WS/RB CREATE RB
QWSDSMSG	WS/DM DISPLAY STATUS MESSAGE HANDLER
QWSERROR	WS/ER T3 ERROR HANDLER
QWSEXTSA	QWSEXTSA
QWSGET	WS/GT GET
QWSGRID	WORKSTATION FM GRID LINE SUPPORT
QWSHELP	APPLICATION HELP
QWSHLGUI	HELP LIST MAINTENANCE GRAPHICAL USER INT
QWSHLM	AP HELP LIST MAINTANENCE MODULE
QWSLUDIN	WS/LI LUD-ASSOC SPACE INIT ROUTINE
QWSLUDRS	WS/LI RESET LUD ASP
QWSMEEH	WS/NW NOWAIT EVENT HANDLER
QWSMISC	WORKSTATION MISCELLANEOUS FUNCTIONS
QWSMSG	WS/ML MESSAGE LIGHT HANDLER
QWSMSWAP	WS MRT SWAP MODULE
QWSOPEN	WS/OP OPEN
QWSPBDVR	WS PREBUILD DRIVER
QWSPBFTD	WORKTATION PREBUILD CODE
QWSPBICF	WORKSTATION PREBUILD CODE
QWSPBOOF	WORKSTATION PREBUILD CODE

QWSPBRCD	WORKSTATION PREBUILD CODE
QWSPBSFE	WORKSTATION PREBUILD CODE
QWSPRINT	WS PRINT MODULE
QWSPTGUI	WORKSTATION PUT GRAPHICAL USER INTERFACE
QWSPTMSG	WS/DM DISPLAY AN OPERATOR MESSAGE
QWSPUDDS	WS PUT OF USER DEFINED DATA STREAMS
QWSPUT	WS/PT PUT
QWSQRYWS	QUERY WS OPTIONS ON A JOB BASIS
QWSRSCRC	WS/ML MESSAGE LIGHT HANDLER
QWSRST	QWSRST - WORKSTATION RESTORE MODULE
QWSRSTSC	RESTORE SCREEN AFTER INVOCATION
QWSRTSFL	SFL ROLL/FLOD/TRUNCATE HANDLER
QWSSETWS	SET WS OPTIONS ON A JOB BASIS
QWSSFLCT	SFL CONTROL RECORD FUNCTIONS
QWSSNDSC	WORKSTATION SEND SCOPE MESSAGE
QWSSPEND	WS/SP FILE SUSPEND
QWSSRPGM	QWSSRPGM
QWSSYSRQ	WS SIGNAL SYSTEM REQUEST EVENT
QWSUIEH	WS/UI UNSOLICITED INPUT EVENT HANDLER
QWSWINCT	WS WINDOW CONTROL MODULE
QWTAESRQ	ARBITER DEVICE RELATED HANDLER
QWTAEVRY	REQUEST FROM DST TO VARY ON CONSOLE
QWTAMABT	MONITOR ABNORMAL TERMINATION ROUTINE
QWTAMCJS	CREATE TEMPORARY JOB STRUCTURES
QWTCCBCI	INITIATE BATCH IMMEDIATE JOB
QWTCCCHG	CHANGE GROUP ATTRIBUTES
QWTCCCHJ	CHANGE JOB COMMAND PROCESSING PROGRAM
QWTCCCNJ	CANCEL JOB COMMAND PROCESSING PROGRAM
QWTCCCPA	INITIATE BATCH IMMEDIATE JOB
QWTCCDPJ	DISPLAY ACTIVE PJ CPP
QWTCCDSC	DISCONNECT COMMAND PROGRAM
QWTCCEPJ	END PRESTARTED JOB CPP
QWTCCHDJ	HOLD JOB COMMAND PROCESSING PROGRAM
QWTCCJOB	JOB COMMAND PROCESSING PROGRAM
QWTCCRLJ	RELEASE JOB COMMAND PROCESSING PROGRAM
QWTCCRRJ	REROUTE JOB COMMAND PROCESSING PROGRAM
QWTCCRTN	RETURN COMMAND PROCESSING PROGRAM
QWTCCRVG	RETRIEVE GROUP ATTRIBUTES
QWTCCSBJ	SUBMIT JOB COMMAND PROCESSING PROGRAM
QWTCCSPJ	START PRESTARTED JOB CPP
QWTCCSRQ	QWTCCSRQ - TFRSECJOB CPP
QWTCCSTA	SETATNPGM CPP
QWTCCTBJ	TRANSFER BATCH JOB COMMAND PROGRAM
QWTCCTFG	TRANSFER GROUP JOB COMMAND PROCESSOR
QWTCCTFJ	TRANSFER JOB COMMAND PROGRAM
QWTCCTRG	TERMINATE GROUP JOB COMMAND PROCESSOR
QWTCLNUP	MONITOR CLEANUP ROUTINE
QWTCTLTR	CONTROL EARLY TRACING API
QWTDMPFR	DUMP XPF FLIGHT RECORDER MODULE
QWTDMPLF	DUMP VLIC LOCK FLIGHT RECORDER
QWTLCALC	ALLOCATE MSCP CONVERSATIONS
QWTLCAMS	ALLOCATE MODE TO SUBSYSTEM
QWTLCATT	LU SERVICES ATTACH MANAGER
QWTLCDMA	DYNAMIC MODE ADDITION"
QWTLCRDT	CREATE LU SERVICES DEVICE TABLE
QWTLCVOF	VARY OFF PEER DEVICE
QWTLEARM	ATTACH RQST MAX EXCEEDED EVENT HANDLER
QWTLECEM	CANCEL SELECTED EVENT MONITORS
QWTLEDRQ	LUS DEVICE REQUEST EVENT HANDLER
QWTLEOBD	OBTAIN EVENT HANDLER
QWTLEOLK	OBJECT LOCKED EVENT HANDLER
QWTMCACE	ALLOCATE COMMUNICATION ENTRY
QWTMCAJE	QWTMCAJE MODULE
QWTMCATT	QWTMCATT MODULE
QWTMCAUF	ADD UFCB ENTRY TO SBS FILE TABLE
QWTMCCPJ	CREATE PRESTARTED JOBS
QWTMCDCE	DEALLOCATE COMMUNICATION ENTRIES
QWTMCDFT	CREATE MONITOR DEVICE AND FILE TABLE
QWTMCDSP	DISPLAY SIGNON PROMPT
QWTMCDVX	DEVICE ERROR RECOVERY HANDLING
QWTMCEOJ	QWTMCEOJ MODULE
QWTMCERP	ACTIVATE RESOURCE COMPLETION PROGRAM
QWTMCMNL	MONITOR MAINLINE
QWTMCPPJ	PROCESS PRESTARTED JOB ENTRY
QWTMCQAL	JOB QUEUE ALLOCATION
QWTMCQDA	DEALLOCATE JOB QUEUES
QWTMCSTD	MONITOR SHUTDOWN
QWTMCSTP	MONITOR STARTUP
QWTMEAST	ALLOCATE STORAGE EVENT HANDLER
QWTMEATR	QWTMEATR MODULE
QWTMEDDA	DYNAMIC DEVICE ALLOCATION (WORKSTATION)
QWTMEINA	INACTIVE WORKSTATION TIMEOUT
QWTMEJIN	JOB INITIATION EVENT HANDLER/MODULE
QWTMEJQA	JOB QUEUE AVAILABLE EVENT HANDLER
QWTMEOBD	OBTAIN DEVICE EVENT HANDLER
QWTMEPDA	PENDING DEVICE ALLOCATION HANDLER
QWTMEPJP	PRESTARTED JOB POOL SIZE CONTROL
QWTMESBC	SUBSYSTEM CONTROL EVENT HANDLER
QWTMESGN	SIGNON DATA AVAILABLE EVENT HANDLER
QWTMESRQ	SYSTEM REQUEST - MONITOR EVENT HANDLER
QWTMESTA	STORAGE ALLOCATED EVENT HANDLER
QWTMETMR	QWTMETMR CNLJOBABN TIMER EVENT HANDLER
QWTMETRI	TRIGGER INVITE EVENT HANDLER
QWTMETRP	PROCESS TERMINATION EVENT HANDLER
QWTMMALM	ALLOCATE MODE TO SUBSYSTEM
QWTMMBCI	INITIATE BATCH IMMEDIATE JOB
QWTMMBJT	BATCH JOB TERMINATION
QWTMMCHG	CHANGE GROUP ATTRIBUTES MSG PROC
QWTMMCHJ	CHANGE JOB MESSAGE PROCESSOR
QWTMMCJQ	CHGJOBQE MESSAGE PROCESSOR
QWTMMCME	ADD/CHG/RMVCMNE MESSAGE PROCESSOR
QWTMMCNJ	CANCEL JOB MESSAGE PROCESSOR
QWTMMCSD	CHANGE SBS DESCRIPTION MSG PROCESSOR
QWTMMDSC	SYSTEM EVENT MONITOR FOR DISCONNECT
QWTMMERH	MONITOR ERROR HANDLER
QWTMMFJB	FIND JOBS EVENT HANDLER
QWTMMHDJ	HOLD JOB MESSAGE PROCESSOR
QWTMMIJT	INTERACTIVE JOB TERMINATION
QWTMMPJE	CHANGE PRESTARTED JOB ENTRY
QWTMMPJR	PRESTARTED JOB READY PROCESSING
QWTMMRLJ	RELEASE JOB MESSAGE PROCESSOR
QWTMMRST	RESET PJ STATISTICS - EVENT HANDLER
QWTMMRTE	CHANGE ACTIVE ROUTING ENTRY
QWTMMRVG	RETRIEVE GROUP ATTRIBUTES MSG PROC
QWTMMSDJ	MONITOR FOR DISCONNECT ANOTHER JOB
QWTMMSEP	START/END PJ MESSAGE PROCESSOR
QWTMMTJT	TRANSFER JOB TERMINATION
QWTMMTRG	TERMINATE GROUP JOB MSG PROC
QWTMMTRS	TERMINATE SUBSYSTEM MESSAGE PROCESSOR
QWTMMWSE	ADD/CHG/RMVWSE MESSAGE PROCESSOR
QWTPCRJA	QWTPCRJA MODULE
QWTPCSRQ	SYSTEM REQUEST - SUSPEND PROGRAM
QWTPCUBP	QWTPCUBP MODULE
QWTPECTL	QWTPECTL
QWTPEETJ	END EARLY TRACING EVENT HANDLER
QWTPIIPP	QWTPIIPP MODULE
QWTPIPPP	PROBLEM PHASE PROGRAM FOR PIP
QWTPITDP	END OF JOB DISPLAY
QWTPITPP	TERMINATION PHASE PROGRAM
QWTPMCHJ	QWTPMCHJ
QWTPMCNJ	CANCEL JOB MESSAGE PROCESSOR
QWTPMHDJ	HOLD JOB PROCESS MESSAGE PROCESSOR
QWTPMSRQ	SYSTEM REQUEST - PROCESS HANDLER
QWTPMULK	UNLOCK OBJECT LOCK MESSAGE PROCESSOR
QWTSCBCI	BATCH IMMEDIATE JOB IEXIT MODULE
QWTSCCMD	IEXIT PROGRAM FOR DIABLING COMMAND LINE
QWTSCERP	ERP RECOVERY SCREEN MODULE
QWTSCJCC	JOB CONTROL CLEANUP IEXIT MODULE
QWTSCOPR	ATTN KEY SCOPE HANDLER
QWTSCPJR	PRESTARTED JOB READY PROCESSING
QWTSCPOP	POPATTN KEY ROUTINE
QWTSCPSH	PUSHATTN KEY ROUTINE
QWTSCSBJ	QWTSCSBJ MODULE
QWTSCSEL	TFRGRPJOB(*SELECT) MODULE
QWTSCSSM	SEND CPF1269 MESSAGE
QWTSCWSE	WORK STATION INTERFACE FOR DISCONNECT
QWTSEATN	ATTN KEY EVENT HANDLING ROUTINE
QWTSEDTO	TIMER EVENT FOR DISCONNECTED JOBS
QWTSETLF	TURN ON & OFF VLIC FLIGHT RECORDER
QWTSETME	CANCEL JOB TIMER EXPIRED HANDLER

QWTSETP	SET PROFILE
QWTSETTR	SETUP EARLY TRACING API
QWVCCDAG	DISPLAY ACTIVATION GROUP CPP
QWVCCDLA	DELETE ACTIVATION GROUP CPP
QWVPDAGE	DESTROY ACTIVATION GROUP EXIT ROUTER
QWVPMDAG	DISPLAY ACTIVATION GROUP EVENT PROCESSOR
QWVSCDTL	DISPLAY DETAILS PANEL
QXFAPPC	FILE SERVER TRANSACTION PROGRAM & INIT
QXICEXIT	D28620
QXOMRMCA	REMOVE CLASS ASSOCIATION
QYFCKLOC	ASYNC CHECK LOC MODULE
QYFCLOSE	ASYNC CLOSE FUNCTION
QYFERP1	ASYNC ERP1 FUNCTION
QYFERP2	ASYNC ERP2 FUNCTION
QYFGET	ASYNC GET FUNCTION
QYFIOCMP	ASYNC I/O COMPLETE MODULE
QYFOPEN	ASYNC OPEN FUNCTION
QYFPADPT	ASYNC PAD PUT MODULE
QYFPDERP	ASYNC PAD ERROR RECOVERY FUNCTION
QYFPSR	ASYNC PSR FUNCTION
QYFPUT	ASYNC PUT FUNCTION
QYFVRYOF	ASYNC VARY OFF FUNCTION
QYFVRYON	ASYNC VARY ON FUNCTION
QYYCCLOS	SOC VERSION OF QTSCLOSE
QYYCDTMN	SOC SERVER CODE
QYYCFEOD	SOC VERSION OF QTSFEOD
QYYCGETD	SOC VERSION OF QTSGETD
QYYCGETK	SOC VERSION OF QTSGETK
QYYCGETM	SOC VERSION OF QTSGETM
QYYCGETS	SOC VERSION OF QTSGETS
QYYCOPEN	SOC CODE
QYYCPUT	SOC VERSION OF QTSPUT
QYYCPUTD	SOC VERSION OF QTSPUTD
QYYCPUTM	SOC VERSION OF QTSPUTM
QYYCUDR	SOC VERSION OF QTSUDR
QY1ITFAT	THIS IS ATTN PROCESSING MODULE FOR ITF
QY1ITFML	THIS IS ITF MAINLINE CODE
QY1ITF36	THIS IS ITF PORTION FOR S36EE
QY2FILEX	APPLICATION PLMI PROGRAM
QY2FTEX	FILE TRANSFER ERROR TRANSIT
QY2FTML	FILE TRANSFER MAINLINE
QY2MSGX	FILE TRANSFER MESSAGE HANDLER
QZCADB	ZCA DATABASE MANAGMER
QZCPTRAP	EUOP VIA RETAIN MODULE
QZDAFBIX	QZDAFBIX
QZDAGFS	SNADS GENERAL FILE SERVER API
QZDASNAC	SNADS FSO ACCESS INTERFACE - ASSIGN ID
QZDASNFB	QZDASNFB
QZDBLDRQ	QZDBLDRQ
QZDCHGST	CHANGE DISTRIBUTION QUEUE STATUS
QZDCKCND	QZDCKCND
QZDCMDCF	BATCH UPDATE DISTRIBUTION QUEUE TABLE
QZDCMDNM	SECONDARY NODE ID COMMAND PROCESSING
QZDCMDRT	ROUTING TABLE COMMAND MODULE
QZDCRDCB	CREATE SNADS DCB FROM GET
QZDCRMSG	CREATE MSF MESSAGE FROM SNADS DCB
QZDDDSIX	QZDDDSIX
QZDDDTST	SNADS DISTRIBUTE DATA AND STATUS
QZDDEQRQ	QZDDEQRQ
QZDDLOG	DISPLAY DISTRIBUTION LOG
QZDDSPCF	DISPLAY NEXT SYSTEM TABLE
QZDDSPIX	QZDDSPIX
QZDDSPNM	SECONDARY NODE ID PROCESSING
QZDDSPRT	ROUTING TABLE DISPLAY MODULE
QZDDSPST	QZDDSPST
QZDDSPSV	CPP FOR DISTRIBUTION SERVICES COMMANDS
QZDEBIN	SNA/DS INBOUND EXTENDED BRIDGE
QZDEBOUT	SNA/DS EXTENDED BRIDGE FUNCTION
QZDENQRQ	QZDENQRQ
QZDEXTRT	QZDEXTRT
QZDGATE	SNADS GATEWAY SENDER
QZDGFSLR	QZDGFSLR
QZDGFSRC	QZDGFSRC
QZDGFSRD	QZDGFSRD
QZDGFSWT	QZDGFSWT
QZDINGAT	SNADS INPUT FROM A GATEWAY RECEIVER
QZDINSTL	SNADS INSTALL
QZDINZDQ	CPP FOR INZDSTQ INIT DIST QUEUE CMD
QZDKILLQ	SNADS KILL DISTRIBUTION QUEUE ENTRY
QZDLSTAC	SNADS FSO ACCESS INTERFACE - LIST IDS
QZDMFCLN	SNADS MAIL FRAMEWORK ATTACHMENT CLEANUP
QZDNKSF2	SNADS RECEIVER NACK/SUFFIX T2 HANDLER
QZDNQDQX	QZDNQDQX
QZDRCLIX	QZDRCLIX
QZDRCVDT	SNADS RECEIVE DISTRIBUTE MODULE
QZDRCVIX	QZDRCVIX
QZDRCVR	QZDRCVR
QZDRECLM	QZDRECLM
QZDRECOV	QZDRECOV
QZDROUTR	QZDROUTR
QZDROUTX	QZDROUTX
QZDRVKAC	SNADS FSO ACCESS INTERFACE - REVOKE ID
QZDSENDR	QZDSENDR
QZDSFIND	QUEUE - S2SQFKEY & S2SQRANG MACRO SUPP
QZDSFINX	QUEUE - S2SQFINX MACRO SUPP
QZDSIEXT	ZD MODULE QZDSFINX IEXIT MODULE
QZDSNDEH	QZDSNDEH
QZDSNDIX	QZDSNDIX
QZDSNPAC	ACCOUNTING SNAP-IN FOR SNADS
QZDSNPAD	ADDRESS RESOLUTION SNAP-IN FOR SNADS
QZDSNPAM	ATTACHMENT MNGMT SNAP-IN FOR SNADS
QZDSNPEC	ENVELOPE CONVERSION SNAP-IN FOR SNADS
QZDSNPIX	SNADS SNAP-IN IEXIT ROUTINE
QZDSNPLD	LOCAL DELIVERY SNAP-IN FOR SNADS FS1
QZDSNPMF	MESSAGE FORWARDING SNAP-IN FOR SNADS FS1
QZDSNPND	NON-DELIVERY SNAP-IN FOR SNADS FS1
QZDSNPOC	OBJECT CONVERSION SNAP-IN FOR SNADS
QZDSOPRD	OPERATIONS DELETE DISTR QUEUE ENTRY
QZDSQCLN	CLEAN UP SNADS QUEUE INDEX ENTRIES
QZDSTGAT	START SNADS GATEWAYS
QZDSTRIE	QZDSTRIE
QZDSTRUP	QZDSTRUP
QZDSTSND	QZDSTSND
QZDTIMEH	QZDTIMEH
QZMF	QZMF HEADER IN ILE/COBOL
QZMF	QZMF API HEADER FOR CBL
QZMF	QZMF API HEADER IN RPG
QZMF	QZMF HEADER IN ILE/RPG
QZMFACHG	ZMF CHANGE MAIL MESSAGE API
QZMFACRT	ZMF CREATE MAIL MESSAGE API
QZMFADDC	ADD MAIL SERVICES FRAMEWORK CFG API
QZMFAIXT	ZMF API MODULES QZMFAXXX IEXIT MODULE
QZMFALOG	ZMF MODULE QZMFALOG DSP LOG DATA
QZMFAPG1	ZMF MODULE QZMFAPG1 - EXTRA API PROGRAM
QZMFAQRY	ZMF QUERY MAIL MESSAGE API
QZMFARSV	ZMF MODULE QZMFARSV RSV MSGID
QZMFARTV	ZMF RETRIEVE MAIL MESSAGE API
QZMFASCR	ZMF MODULE QZMFASCR SCRATCH MSGID
QZMFASQC	ZMF MODULE QZMFASQC SEND SEQ COMPL
QZMFASRV	QZMFASRV HEADER IN ILE/COBOL
QZMFASRV	ZMF API ILE SERVICE PROGRAM
QZMFASRV	QZMFASRV HEADER IN ILE/RPG
QZMFBEIX	BIG E INVOCATION EXIT PROGRAM
QZMFBIGE	OEDS FRAMEWORK PROGRAM
QZMFCATR	ZMF MODULE QZMFCATR CONFIG ATTRIBUTES
QZMFCAXP	ZMF MODULE QZMFCAXP ADD EXIT POINT CHECK
QZMFCAXR	ZMF MODULE QZMFCAXR ADD EXIT POINT CHECK
QZMFCAXT	ZMF MODULE QZMFCAXT ADD EXIT PT TYPE CHK
QZMFCOPN	FIRST TOUCH INSTALL OF MSF TYPES
QZMFDLTC	DELETE MAIL SERVICS FRAMEWORK CFG API
QZMFEEND	ENDMAILFRM CPP
QZMFESIX	INVOCATION EXIT PGM FOR STRMAILFRM CPP
QZMFESTR	STRMAILFRM CPP
QZMFLSTC	LIST MAIL SERVICES FRAMEWORK CFG API
QZMFSNPA	GENERAL ADDRESS RESOLUTION SNAP-IN
QZMFTINT	INITIALIZE MAIL SERVER INTERNAL CONFIG
QZMFTIXT	IEXIT OF MAIL SERVER CONFIG PGM QZMFTINT
QZMFXCLN	ZMF MODULE QZMFXRCL SPACE CLEANUP
QZMFXFNQ	ZMF MODULE QZMFXFNQ UTIL GET PTR TO QUEU
QZMFXFNX	ZMF MODULE QZMFXFNX UTIL GET PTR TO INDX

QZMFXGSQ ZMF MODULE QZMFXGSQ UTIL GET/SET SEQ#
QZMFXIPL ZMF MODULE QZMFXRCL IPL TIME FUNCTIONS
QZMFXIXT ZMF MODULE QZMFXFNX IEXIT MODULE
QZMFXKQ ZMF MODULE QZMFXKQ UTIL KILL SPACE
QZMFXNDQ ZMF MODULE QZMFXNDQ UTIL ENQ/DEQ MSG QUE
QZMFXPG1 ZMF MODULE QZMFXPG1 - EXTRA UTIL PROGRAM
QZMFXPG2 ZMF MODULE QZMFXPG2 - EXTRA UTIL PROGRAM
QZMFXPG3 ZMF MODULE QZMFXPG3 - EXTRA UTIL PROGRAM
QZMFXPG4 ZMF MODULE QZMFXPG4 - EXTRA UTIL PROGRAM
QZMFXPG5 ZMF MODULE QZMFXPG5 - EXTRA UTIL PROGRAM
QZMFXPIN ZMF MODULE QZMFXPIN INIT/CRT ZMF SP POOL
QZMFXQIN ZMF MODULE QZMFXQIN INIT/CRT MESSAGE QUE
QZMFXRCL ZMF MODULE QZMFXRCL RCLSTG TIME FUNCTION
QZMFXSPF ZMF MODULE QZMFXSPF UTIL SPACE POOL MNG2
QZMFXSPM ZMF MODULE QZMFXSPM UTIL SPACE POOL MNGR
QZMFXSPX ZMF MODULE QZMFXSPM IEXIT MODULE
QZMFXSXT ZMF MODULE QZMFXGSQ IEXIT MODULE
QZPAIEND MPTN END NAMEMAPPER JOB
QZPAIJOB MPTN NAMEMAPPER JOB
QZPAISTR MPTN START NAMEMAPPER JOB
QZPAIXIT MPTN NAMEMAPPER JOB EXIT ROUTINE
QZPDOCE1 SPECIAL PTF EXIT PROGRAM FOR DOCUMENTS
QZPIEXIT DOCUMENT PTF INVOCATION EXIT
QZPPTFDI BUILD PTF DOCUMENT INDEX
RTNWORD FROM PC LEXAM MERGE CODE
SCHUML FROM PC LEXAM MERGE CODE
SORTIT FROM PC LEXAM MERGE CODE
SPRABRT NON-C PRTMGRABORT STUB
SPRADDF NON-C PRTMGRADDFILE STUB
SPRADOC NON-C PRTMGRABORTDOC STUB
SPRCLOS NON-C PRTMGRCLOSE STUB
SPREDOC NON-C PRTMGRENDDOC STUB
SPRFERI NON-C PRTMGRFREEERRORINFO STUB
SPRGEEM NON-C PRTMGRGETEXTERRORMSG STUB
SPRGERI NON-C PRTMGRGETERRORINFO STUB
SPRINIT NON-C PRTMGRINITIALIZE STUB
SPRLOPT NON-C PRTMGRLISTOPTIONS STUB
SPROPEN NON-C PRTMGROPEN STUB
SPRQOPT NON-C PRTMGRQUERYOPTION STUB
SPRSDOC NON-C PRTMGRSTARTDOC STUB
SPRSOPT NON-C PRTMGRSETOPTION STUB
SPRTERM NON-C PRTMGRTERMINATE STUB
SPRWRIT NON-C PRTMGRWRITE STUB
SRCHDCT2 AS/400 SPECIFIC SRCHDCTC
SUBRA1 ASYNC RPG/COBOL SUBROUTINE
SUBRF1 FILE TRANSFER COBOL SUBROUTINE
SUBRF2 FILE TRANSFER RPG SUBROUTINE
SUBR30 S/36 RPGII INTERFACE TO CRYPTOGRAPHY
SUBR31 S/36 COBOL INTERFACE TO CRYPTOGRAPHY
SUBR50 RPG PRINTER OPTION SUBROUTINE
SUBR51 RPG BARCODE OPTION SUBROUTINE
SUBR52 RPG GRAPHICS OPTION SUBROUTINE
TABLES FROM PC LEXAM MERGE CODE
TEADDPG ADD PROGRAM FOR NPT DEBUGGER
TEADDVD ADD_VIEW_DESCRIPTION API
TEADDVF ADD_VIEW_FILE API
TEADDVM ADD_VIEW_MAP API
TEADDVT ADD_VIEW_TEXT API
TEAPIIF COMMON API INTERFACE CODE
TECMDS NPT COMMAND PARSING ROUTINES
TEDBGIS DEBUG INTERFACE SERVICE PROGRAM
TEDBLDLL DUMP API - BUILD LINK LIST
TEDBLDRV DUMP API - BUILD RECEIVER VARIABLE
TEDDMPV DUMP MODULE VARIABLES API
TEDELPG DELETE PROGRAM ROUTINE FOR NPT DEBUGGER
TEDEXCH DUMP API EXCEPTION HANDLING ROUTINES
TEDRTVDD DUMP API - RETRIEVE DEBUG DATA
TEDUMPV VIEW DUMP CODE
TEENDDB END_SOURCE_DEBUG API
TEENDVC END_VIEW_CREATION API
TEEXCH C EXCEPTION HANDLING ROUTINES
TELBKP SUPPORT ROUTINES FOR BREAKPOINT LIST
TELMODL NPT LINKED LIST ROUTINES FOR MODULE DATA
TELPGM NPT LINKED LIST ROUTINES FOR PGM DATA
TELVIEW LINKED LIST ROUTINES FOR VIEW DATA
TEMALLC MALLOC AND FREE FOR NPT DEBUGGER
TEMAPVP MAP_VIEW_POSITION API
TEMPSPI MAPPING FUNCTIONS
TENTWRK CREATE VIEW NETWORK TABLE CODE
TEREGDV REGISTER_DEBUG_VIEW API
TERMVDV REMOVE_DEBUG_VIEW API
TERTCMD VIEW CACHE SUPPORT ROUTINES
TERTVDA RETRIEVE_DEBUG_ATTRIBUTE API
TERTVMV RETRIEVE_MODULE_VIEW API
TERTVSP RETRIEVE_STOPPED_POSITION API
TERTVVF RETRIEVE_VIEW_FILE API
TERTVVT RETRIEVE_VIEW_TEXT API
TESBMDC SUBMIT DEBUG COMMAND API IMPLEMENTATION
TESBRK BREAKPOINT LIST SCREEN C ROUTINES
TESCAPI SHORTCUT APIS
TESCREN SCREEN HANDLER FOR NPT DEBUGGER
TESDBGO DEBUG OPTIONS SCREEN C ROUTINES
TESDMSG SUPPORT ROUTINES FOR SENDING MESSAGES
TESETDA SET_DEBUG_ATTRIBUTE API
TESEVAL EVALUATE EXP SCREEN C ROUTINES
TESPACE SYMBOL TABLE SPACE MANAGEMENT
TESPGM PROGRAM LIST SCREEN C ROUTINES
TESSRC NPT PROGRAM SOURCE SCREEN C ROUTINES
TESTRDB START_SOURCE_DEBUG API
TESTRVC START_VIEW_CREATION API
TESVIEW VIEW SELECTION LIST C ROUTINES
TESYAPI SYMBOL TABLE API
TESYERR SYMBOL TABLE ERROR MANAGEMENT
TESYSPI SYMBOL TABLE SPI - 1ST PHASE
TESYTBL SYMBOL TABLE SPI - 2ND PHASE
TETRACE SOURCE DEBUGGER TRACE MANAGER
TEVIEW COMMON VIEW CODE
TEVIEWC VIEW CACHE SUPPORT ROUTINES
TEXGATE PARSER PRODUCED BY YACC
TEXGCON TRANSLATOR CONSTANTS MANAGER
TEXGCVT TRANSLATOR CONVERSIONS MANAGER
TEXGDCD TRANSLATOR DCODE MANAGER
TEXGERR TRANSLATOR ERROR MANAGER
TEXGEXP TRANSLATOR EXPRESSIONS MANAGER
TEXGEXPD DEBUGGER MACRO PREPROCESSOR
TEXGFLS TRANSLATOR FIELD LIST MANAGER
TEXGMAP TRANSLATOR LINE NUMBER MANAGER
TEXGNTP DEBUG INTERPRETER INVOCATION MANAGER
TEXGNVC INVOCATION POINTER RETRIEVAL MANAGER
TEXGPXP INVOCATION POINTER RETRIEVAL MANAGER
TEXGRES TRANSLATOR RESULTS BUFFER MANAGER
TEXGSTK TRANSLATOR PARSE STACK MANAGER
TEXGSTM TRANSLATOR STATEMENT SEMANTICS
TEXGSTR TRANSLATOR RESULT RECORD STRING MANAGER
TEXGSYM TRANSLATOR SYMBOL TABLE INTERFACE
TEXGTMP TRANSLATOR SYMBOL TABLE INTERFACE
TEXGTRC PARSE TRACE GENERATOR
TEXGTYP TYPE CHECKER
TEXGXPR TRANSLATOR EXPRESSION SEMANTICS
TEXLATE PARSER PRODUCED BY YACC
TEXLCAS TYPE CASTING SEMANTICS
TEXLCON TRANSLATOR CONSTANTS MANAGER
TEXLDCD TRANSLATOR DCODE MANAGER
TEXLERR TRANSLATOR ERROR MANAGER
TEXLEXP TRANSLATOR EXPRESSIONS MANAGER
TEXLFLS TRANSLATOR FIELD LIST MANAGER
TEXLMAP TRANSLATOR LINE NUMBER MANAGER
TEXLNTP DEBUG INTERPRETER INVOCATION MANAGER
TEXLNVC INVOCATION POINTER RETRIEVAL MANAGER
TEXLPXP INVOCATION POINTER RETRIEVAL MANAGER
TEXLRES TRANSLATOR RESULTS BUFFER MANAGER
TEXLSTK TRANSLATOR PARSE STACK MANAGER
TEXLSTM TRANSLATOR STATEMENT SEMANTICS
TEXLSTR TRANSLATOR RESULT RECORD STRING MANAGER
TEXLSYM TRANSLATOR SYMBOL TABLE INTERFACE
TEXLTMP TRANSLATOR SYMBOL TABLE INTERFACE
TEXLTRC PARSE TRACE GENERATOR
TEXLTYP TYPE CHECKER
TEXLXPR TRANSLATOR EXPRESSION SEMANTICS
TOPUIAFC COBOL UIM APPLICATION FORMAT EXIT

TOPUICPC	COBOL UIM CUSROSR SENSITIVE EXIT	TOPUILOC	COBOL UIM LIST/PULL-DOPWN OPTION CALL
TOPUIFKC	COBOL UIM FUNCTION KEY CALL	TOPUIMIC	COBOL UIM MENU ITEM CALL
TOPUIGEC	COBOL UIM GENERAL PANEL EXIT	USEREXIT	DEFAULT SOURCE FILE FOR NLPS USER EXIT
TOPUIILC	COBOL UIM INCOMPLETE LIST EXIT	VERIFY2	FROM PC LEXAM MERGE CODE
TOPUILEC	COBOL UIM LIST/PULL-DOWN OPTION EXIT	VERUTIL	FROM PC LEXAM MERGE CODE

B.1 AS/400 Client Access/400 Modules (Partial List)

```
QTFTDWNLD     Original client data transfer
QRQSRVX       Remote SQL: V2R2,later PCS/400 and CA/400 original clients
QRQSRV0       Remote SQL: pre V2R2  PCS/400 clients, commitment ctl=*NONE
QRQSRV1       Remote SQL: pre V2R2  PCS/400 clients, commitment ctl=*ALL
QHQRTRGT      Original client data queue requests
QMFRCVR       Original client message receiver
QMFSNDR       Original client message sender
QLZPSERV      Original client license management requests
QVPPRINT      Virtual print for original, CA/400 Windows 3.1 clients
DDM job       Submit remote command: original, CA/400 Windows 3.1 clients
QPWFSERVER    File server autostart job: Original and new clients
QPWFSERV      Main file server for each user
QPWFSTP0      Transaction program for original clients
QPWFSTP1      Transaction program for CA/400 optimized OS/2 client
QPWFSTP2      Transaction program for CA/400 Windows 3.1 client
QPWFSTP2      Transaction program for CA/400 Windows 3.1 client
QPWFSERVSO    File server for sockets
QPWFSERVSD    File server Daemon for sockets
QZDAINIT      Main program for all database server requests (eg ODBC)
QZDACMDP      Database server command processor (does all I/O to client)
QZDANDB       Program for native file database requests
QZDAROI       Database server requests for object information requests
              and SQL catalog functions (eg table/column definitions)
QZDASQL       Database server for SQL requests (will call QQQ programs)
QZDASOINIT    Database server for sockets
QZDASON2      Database server for sockets setup
QZDASRVSD     Database server daemon for sockets
QZHQTRG       Data queue requests for CA/400 Optimized OS/2, Windows95
QZHQSSRV      Data queue server sockets: CA/400 Optimized OS/2, Windows95
QZHQSRVD      Data queue daemon sockets: CA/400 Optimized OS/2, Windows95
QNPSERVR      Print server: CA/400 Optimized OS/2, Windows95
QNPSERVS      Print server sockets: CA/400 Optimized OS/2, Windows95
QNPSERVD      Print server daemon: CA/400 Optimized OS/2, Windows95
QZSCSRVR      Central server APPC: license/client management/EBCDIC-ASCII
              conversions for CA/400 Optimized, Windows95 clients
QZSCSRVS      Central server sockets: license/client management/EBCDIC-
              ACCII conversions for CA/400 Optimized, Windows95 clients
QZSCSRVD      Central server daemon: license/client management/EBCDIC-
              ASCII conversions for CA/400 Optimized, Windows95 clients
QZRCSRVR      Remote Command,Distributed Call APPC: for
              CA/400 Optimized OS/2dows95 clients
QZRCSRVS      Remote Command,Distributed Call socket: for
              CA/400 Optimized OS/2, Windows95 clients
QZRCSRVSD     Remote Command,Distributed Call daemon: for
              CA/400 Optimized OS/2, Windows95 clients
QACSOTP       APPC password sign on: for original, CA/400 Windows 3.1
              CA/400 Optimized OS/2,
QZSOSIGN      Socket sign on: for original, CA/400 Windows 3.1
              CA/400 Optimized OS/2, Windows95 clients
QZSOSIGND     Socket sign on daemon: for original, CA/400 Windows 3.1
              CA/400 Optimized OS/2, Windows95 clients
```

Appendix C. AS/400 LIC Tasks (Partial List)

This section contains a partial list of AS/400 RISC systems LIC tasks. Use this information to determine what functions a ″high CPU″ LIC task may be performing. Note that these functions may be normal rather than indicate a software defect problem. Refer to *AS/400 Licensed Internal Code Diagnostic Aids*, LY44-4900, for more information.

Table 18 (Page 1 of 3). Partial Listing of AS/400 LIC Tasks

Task Name	**Task Description**
AMxxxxx	Communications Answer Manager
AUxxxxxx	Authority Manager
ASCL-xxxxxx	Asynchronous Line IOM
ASCS-xxxxxx	Asynchronous Station IOM
BMxxxxxx	Bus Manager
CFxxxxx	Common Functions
- CFINTn	Task Dispatching Interrupt Handler (1 per processor. Consumes ″high″ CPU as interactive work grows on server models)
CPxxxxxx	Data Compression/Decompression
CRxxxxxx	Cryptographic Support
DBxxxxx	Database
- DBDOU	Database out of use task for removing objects no longer in use from the internal ″database in use″ table
- DBIOnn	Database storage management (1 per DASD unit)
- DBL2nn	Database level 2 server task (1 per DASD unit, max of 128)
- DBL3nn	Database level 3 server task (1 per DASD unit, max of 128)
DDI-line name	FDDI, DDI Line IOM varied on
DDxxxxxx	DASD Driver
DMxxxxx	DASD Management
DSTxxxx	Dedicated Service Tool Task
- DSTMAIN	Dedicated Service Tool Main Task
ELxxxxx	Error Logging
- EL-ERRLOG	Error Logging Task (1 per system)
EMxxxxxx	Event Management
ETH-ethernet line name	Ethernet Line IOM varied on
FAX-line name	FAX Line IOM varied on
FPxxxxxx	FSIOP(IPCS) Support Tasks
FR-line name	Frame Relay Line IOM varied on
FSnnnnn	Shared Folder Task (1 per Client Access controller using shared folder support)
IIxxxxx	Independent Index Support (database, message queue, etc.)
IOccccccc	I/O Task of Various Functions
- IOPxxxxx	IOP Object Tasks
- IOSTATSTASK	Services MI Requests for LIC Maintained I/O Statisics

Table 18 (Page 2 of 3). Partial Listing of AS/400 LIC Tasks	
Task Name	**Task Description**
- IOTxxxxx	Tape Device Scheduler and Driver Object
IPxxxxx	Interprocess Tasks
- IPSRVCbbuu-tttt	Interprocess Communication Support Service Controller Task (1 per IOP). For bbuu-tttt, explanation, see IPRnggbbuu-tttt description.
- IPnggbbuu-tttt	Interprocess Communication Support Multiple Router Task (1 or more per IOP). n = router task number or C for communications support gg = logical connection group bb = system bus number uu = logical address of IOP on the bus (00-31) tttt = IOP type (2617=ELAN, 2619=TRLAN, 9162/9163=MFIOP, 6050=local WSC, 6512=DASD Controller, etc.)
ISDN-line name	ISDN Line IOM varied on
JOxxxxxx	Journal Management (includes SMAPP support)
LCxxxxx	APPN Services Task Support
LDxxxxxx	Load/Dump (Save/Restore) Tasks
LMxxxxx	Location Manager
LOxxxxx	Local Sockets
LWS-station name	Local Workstation Control Unit Name varied on (CTL01 is first WSC)
MCxxxxxx	Machine Check Logging
MNxxxxxx	Context (library) Management
MNTASK	Contact Management Service Task
MSCP	Machine Services Control Point (Vary on, Vary off processing, line/controller/device description creation/deletion)
ND-station name	Network Remote Workstation Support (1 per 5394 or 5494 control unit name varied on)
NMxxxxx	Network Management Services
NUxxxxxx	SSP Emulator
OTxxxxx	Open Station (control unit) I/O Manager (IOM)
- OT-open station name	Open Station (control unit name) IOM varied on
PAxxxxx	Display Station Pass-Through Tasks
- PA-device name	3270 Data Stream Pass-Through (3270 display through AS/400 to remote system) (1 per active issued STREML3270 command on device name)
- PA-I-nnnn	Display Station Pass-Through Intermediate Task (1 per intermediate session)
- PA-S-device name	Display Station Pass-Through Source Task (1 per pass-through session from device name issuing STRPASTHR)
- PA-T-device name	Display Station Pass-Through Target Task (1 per pass-through session. device name is target system QPADEVnnnn virtual display device)
PDxxxxxx	Performance Data Collection
P0xxxxxx	POSIX (UNIX) Support
- P0FBAITnn	Byte Stream File Tasks (2 or more)
QMxxxxx	Queue Management
RAxxxxx	3270 Remote Attach/DHCF Data Translation Task

Table 18 (Page 3 of 3). Partial Listing of AS/400 LIC Tasks	
Task Name	**Task Description**
RCxxxxx	Reclaim Function Tasks
RMxxxxx	Resource Management row.
- RmTmSafeTask	A timer task that services LIC timer function requests that are not handled by an interrupt handler task already in main storage
- RMSRVCTKLO	Resource Management Services
RTxxxxxx	Run Time Support
SDLC-line name	SDLC Line IOM varied on
SKxxxxx	I/O Stream Management (communications buffer management)
- SK-ASCnnn, SK-ASCnnnP	Communications Asynchronous Buffer Management
SMxxxxx	Storage Management Tasks
- SMASMDRTASKMGR	Directory Recovery (1 per DASD unit)
- SMPOnnnn	Storage Management Page Out Task (many tasks, as needed)
- SMSWAINSnn	Storage Management Save While Active (as needed)
- SMDSTASKnn	Storage Management Save/Restore or FSIOP initializaton (2 or more)
- SMASPTASK	Storage Management ASP Managment
- SMMIRRORccccc	Storage Management ASP Mirroring Managment
- SMSTRIPEWATCHDOG	DASD Mirroring Monitor Task
SMXCSPRVSR	Expert Cache Supervisor
SMXCAGERnn	Expert Cache Task (1 per *CALC shared pool)
SNAP	SNA Pass-Through
TAxxxxx	Tape Management
TDxxxxx	Task Dispatching
TRN-line name	Token Ring LAN Line IOM varied on
TOxxxxx	TCP/IP Support
- TONAMTASK	TCP/IP Network Access Manager (1 per system)
TS-station name	Workstation Control Unit Name IOM (1 per station (controller description) varied on)
T1xxxxx	T1 P1 Line IOM
T2xxxxx	APPC (PU Type 2) Station (control unit) IOM
- T2-APPC station name	APPC Control Unit Name IOM (1 per station varied on)
VLxxxxx	LIC Log (VLOG) Task
- VLTASK	LIC Log Task
VTMTSK	Virtual Terminal Manager
WLS-line name	Wireless Line IOM varied on
XMxxxxxx	SPD Bus Tasks
- XMSPDBUSbb	SPD Bus Task where bb=bus number (1 per bus)
- XMSIOBUbb	SPD Bus IOBU Task. where bb=bus number (1 per bus)
ZSPxxxx	IPX/SPX Communications

Appendix D. Performance Explorer PTF Summary

This appendix contains a summary of all Performance Explorer PTFs known to be available as of February, 28, 1997. Two tables are included, one for V3R6 and one for V3R7.

Some of these PTFs are the ones needed to obtain the Enhanced PEX TRACE support, while others are fixes to general Performance Explorer functions, such as STATS and PROFILE and standard TRACE support.

Both release tables contain a PTF that enables ″extended PEX TRACE″ support that provides additional PEX definitions for standard PEX TRACE support. See PTF SF38949 and PTF SF33744.

You must contact your IBM software service provider to get the ″latest performance PTF″ list, especially for PTF supersedes.

D.1 PEX PTFs for V3R6

Table 19 (Page 1 of 3). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and ″Fake″)

PTF Number	**Library Name**	**Description of Contents**
MA13057	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menus PEXTRC01 and PEXTRC02. This includes the Storage Management Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.
MA13058	SMTRACE	Part one of three *SAVFs that contain the objects in library SMTRACE. This PTF and the following two PTFs (MA13059 and MA14450) must be restored as objects (RSTOBJ command) into library SMTRACE that you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA13059	SMTRACE	Part two of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14450	SMTRACE	Part three of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MF11593 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF12290 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.

Table 19 (Page 2 of 3). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
MF12309 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF09615 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10062 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10845 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10856 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10867 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10868 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF11015 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14622 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14447 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This PTF applies to PEX STATS HIER reports and removes the "*Alias" Call Level entry for ILE programs on the PRTPEXRPT report for a STATS HIER collection. When *Alias entries are *not included* in the report, Call Level values are as the programmer expects them to be.
SF35974 to 5716-PT1	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This ensures that PRTPEXRPT command detail output prints *CPU milliseconds used* rather than CPU run cycles. This PTF has been superseded by SF37834. SF35974 is documented here since the cover letter to SF37834 does not describe the change to the CPU run cycle value.

Table 19 (Page 3 of 3). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**

SF37834
to 5716-PT1
	--------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It supersedes PTF SF35974 and adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and does not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied, PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values:
		`Total Raw CPU . . :     2756288 <- dropped`
		`Overhead Removed. :      220397 <- dropped`
		`Total CPU . . . . :     2535891 <- 2756288`
		`Task CPU. . . . . :       135184    05.3 %`
		`Job CPU . . . . . :      2400707    94.7 %`
		`                      -----------------------`
		`Pgm/Mod CPU. . :        xxxxxxx    mm.m %`
		`Unknown CPU. . :        yyyyyyy    nn.n %`
		As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF37834) to review full details.

SF35964 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35964) to review the details.
SF29899 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF29899) to review the details.
SF28949 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28949) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF28154 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28154) to review the details.

Table 20 (Page 1 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and ″Fake″)		
PTF Number	**Library Name**	**Description of Contents**
MA14697	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menu PEXTRC01 and menu PEXTRC02. This includes the Storage Management Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.
MA14698	SMTRACE	Part one of three *SAVFs that contain the objects in library SMTRACE. This PTF and the following two PTFs (MA14699 and MA14700) must be restored as objects (RSTOBJ command) into library SMTRACE that you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA14699	SMTRACE	Part two of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14700	SMTRACE	Part three of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
SF33744 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF33744) to review the details. **This PTF provides the ″extended standard PEX TRACE definitions″** described in Table 2 on page 126.
SF35321 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35321) to review the details.

Table 20 (Page 2 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**

SF38029
to 5716-PT1
	-------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and does not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied, PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values:
		`Total Raw CPU . . :     2756288 <- dropped`
		`Overhead Removed. :      220397 <- dropped`
		`Total CPU . . . . :     2535891 <- 2756288`
		`Task CPU. . . . . :       135184    05.3 %`
		`Job CPU . . . . . :      2400707    94.7 %`
		`                     -----------------------`
		`Pgm/Mod CPU. . :         xxxxxxx    mm.m %`
		`Unknown CPU. . :         yyyyyyy    nn.n %`
		As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF38029) to review full details.

MF13355 to SLIC	-------	This is included in V3R7 GA code. No need to apply.
MF13420 to SLIC	-------	This is a real PTF.
MF14469 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14263 to SLIC	-------	This is a real PTF.

Appendix E. Performance Explorer Tables

This appendix contains a set of tables used in various redbook chapters. The tables are placed here for easier access when doing performance problem analysis.

1. Enhanced PEX TRACE Collection and Report Cross-Reference
2. Physical Disk I/O TRACE Mnemonics
3. MI Object Types
4. File Opens per Second Guidelines
5. Activation Group Creates per Second Guidelines

E.1 Enhanced PEX TRACE Data Collection-Report Options

This table lists the Problem Type data collection values and the associated reports for each Problem Type value.

Table 21 (Page 1 of 2). Enhanced PEX TRACE Data Collection and Reporting Options

Data to Collect for SMTBCH Command ″Problem Type″	Report Menu Option Available on PEXTRC02 Menu	Reporting Command
Performance[1] *PERF[3]	01. Full File Opens[1] 02. Physical Disk IO[1] 03. Activation Group Creates 04. Faults 05. Disk Space Consumption[2] 06. Address Consumption[2] 07. Size of Objects used During Pextrace Collection 08. CPU Utilization 09. Program Activations and Deactivations	OPENS IOS ACTGRP FLTS NETSIZE ADDR OBJSIZE PRTPEXCPUB DEACTS
Performance *DASDPERF1[5]	02. Physical Disk IO[5] 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Performance *DASDPERF2[6]	02. Physical Disk IO[6] 04. Faults 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS FLTS OBJSIZE PRTPEXCPUB
Virtual Addresses *ADDRESSES[4]	06. Address Consumption 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	ADDR OBJSIZE PRTPEXCPUB
Disk Utilization/IO *BUSYDISK[1]	02. Physical Disk IO[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Object size/Change in Size *DISKSPACE[4]	05. Disk Space Consumption[4] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	NETSIZE OBJSIZE PRTPEXCPUB
Full File Opens *OPENS[1]	1. Full File Opens[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	OPENS OBJSIZE PRTPEXCPUB

Table 21 (Page 2 of 2). Enhanced PEX TRACE Data Collection and Reporting Options		
Data to Collect for SMTBCH Command ″Problem Type″	**Report Menu Option Available on PEXTRC02 Menu**	**Reporting Command**
Activation Groups *ACTGRP	03. Activation Group Creates 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	ACTGRP OBJSIZE PRTPEXCPUB DEACTS
Program Deactivations *DEACTS	03. Activation Group Creates 07. Size of Objects used during PEX Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	DEACTS ACTGRP OBJSIZE PRTPEXCPUB
Job Task switches[7] *JOBSWAIT[7]	None[7]	None[7]

Note:

1. = Must specify MI *ENTEXTMI in order to get application program names.

2. = While these reports run from *PERF data, normally the *PERF data run is too short for these reports to be meaningful.

3. = More data is collected using *PERF than any other choice. Choose a short run time for *PERF collections of 5 to 10 minutes only.

4. = Use a long run time for these options (consider using 10+ hours). Long run times are essential for meaningful reports to be produced from these options. Thus, do not run these reports against *PERF runs (short trace time) as results are misleading.

5. = Application program names are not collected using this option; application program name appears as ′TOPOFSTACK′ on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- BASE events - PMCO:

  ASM and SAR events are not collected.

6. = Application program names are not collected using this option; application program name appears as ′TOPOFSTACK′ on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- SAR events
- BASE events - PMCO:

  ASM events are not collected.

7. = This option is provided for IBM Software Support use only. There are no reports available.

E.2 Physical Disk I/O Types

This topic lists physical disk I/O type mnemonics that appear in various Performance Explorer reports.

Table 22 (Page 1 of 2). Physical Disk IO TRACE Mnemonics	
Physical IO Type	**Description**
*RS S	Start of a synchronous explicit DASD read I/O initiated by an explicit SAR READ/BRING request (as opposed to an ***implicit*** DASD read due to a page fault).
*RS A	Same as *RS S except performed asynchronously.

Table 22 (Page 2 of 2). Physical Disk IO TRACE Mnemonics	
Physical IO Type	**Description**
*RX S	Similar to *RS S except the program (LIC, OS/400) issuing the SAR READ/BRING request has additionally provided the address of pages that are to be ***replaced*** with the newly read data. The ′X′ in the mnemonic stands for ***exchange*** and the full name is ***exchange read*** or ***exchange bring***.
*RX A	Same as *RX S except performed asynchronously.
*RC	Marks the completion of either an *RS S, *RS A, *RX S, or *RX A.
*RSF S	Start of a synchronous implicit DASD read I/Os due to a page fault.
*RSF A	Start of a synchronous implicit DASD read I/Os due to a page fault that occurs during the servicing of some asynchronous I/O request (fairly rare).
*RCF	Marks the completion of an *RSF S or *RSF A.
*WS S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are not made ″easy steal candidates″.
*WS A	Same as *WS S except performed asynchronously.
*WC	Marks the completion of either a *WS S or *WS A.
*WSP S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are made ″easy steal candidates″ following the I/O.
*WSP A	Same as *WSP S except performed asynchronously.
*WCP	Marks the completion of either a *WSP S or *WSP A.
*PR	Start of a non-virtual READ-SECTOR type physical DASD read. This is redundant because it is followed by an *RS which denotes the ″real″ start of the I/O.
*PR C	Marks the completion of a *PR. This is redundant; it is preceded by an *RC.
*PW	Start of a non-virtual WRITE-SECTOR type physical DASD write. This is redundant because it is followed by a *WS, which denotes the ″real″ start of the I/O.
*PW C	Marks the completion of a *PW. This, too, is redundant; it is preceded by a *WC.

E.3 MI Object Types

This topic lists MI object types. For a further description, please refer to Chapter 16 of the *OS/400 Diagnostics Aids Manual*, LY44-4907-00.

See also Section 9.6, “Object Names and Types Appearing in TRACE Reports” on page 242.

Note: System Objects are defined by a two-digit object type code followed by a two-digit object subtype code.

For Example:

- 0B90 is the object type/subtype of the data space portion of a physical file.
- 0C90 is the data space index portion of a physical or logical file.

This table lists all the object types available.

Table 23 (Page 1 of 2). List of System Object Types	
Type	**Name**
01	Access group
02	Program
03	Module

Table 23 (Page 2 of 2). List of System Object Types	
Type	**Name**
04	Context, permanent or temporary
06	Byte string space
07	Journal space
08	User profile
09	Journal port
0A	Queue
0B	Data space
0C	Data space index
0D	Cursor
0E	Index
0F	Commit block
10	Logical unit description
11	Network description
12	Controller description
13	Dump space
14	Service description
15	Mode description
16	Network interface description
17	Connection list
18	Queue space
19	Space
1A	Process control space
1B	Authorization list
1C	Spelling aid dictionary
1D	Auxiliary server description
1E	Stream file
81	Machine context

E.4 Full File Opens per Second Guidelines

This table provides guideline values for open file rates that are considered ″good″ and ″bad.″ You must compute the opens per second from the Enhanced PEX TRACE ″Full File Opens″ report open file counts.

Table 24. Full File Open Guidelines		
Resource Description	**Good**	**Bad**
Full File Opens per Second:		
- Model 510	<10	>40
- Model 530	<40	>160

Note: These guidelines refer to the number of full file opens occurring per second system-wide and should be used to determine whether or not there is room for releasing CPU currently spent performing this work. The full opens may be required by the application or the system may be able to process higher rates of full opens. These values are merely guidelines to call your attention to functions affecting performance that should receive additional investigation.

The numbers in this table do not represent physical limits achievable on the AS/400 system. They represent what is reasonable, given that the system is in a steady state (for example, users are staying signed-on and not doing sign-on/off) and given that appropriate file pre-opens are in use with SHARE(*YES).

We could not perform testing for a wide variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

E.5 Activation Group Creates per Second Guidelines

Too many program activation group creates, which may happen in an ILE environment, can degrade performance. You can obtain then number of activation group creates from the Enhanced PEX TRACE ″Activation Grou Creates″ report.

Table 25. Activation Group Creates per Second Guidelines		
Model	**Maximum Rate Per Second**[1]	**Maximum Rate Per Second**[2]
510 - 2144	55	2.7
530 - 2153	440	22

Note:

[1] = These figures represent 100% CPU being used to perform activation group creates.

[2] = These figures represent 5% CPU being used to perform activation group creates.

We could not perform testing for a wide-variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

Appendix F. Special Notices

This publication is intended to aid ″AS/400 performance experts″ in doing detailed performance analysis of either an entire application environment or specific applications or programs within the overall run-time environment. In general, the users of this redbook are assumed to be familiar with OS/400 performance considerations, usage of the Performance Tools/400 licensed program 5716-PT1, and are using the Performance Explorer capabilities because other tools have proven unsuccessful in identifying the cause of one or more performance problems. The information in this publication is not intended as the specification of any programming interfaces that are provided by OS/400 (5716-SS1) or the Performance Tools/400 licensed program 5716-PT1.

See the PUBLICATIONS section of the IBM Programming Announcement for these products for more information about what publications are considered to be product documentation.

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Appendix G. Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

G.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see "How to Get ITSO Redbooks" on page 505.

- *AS/400 Performance Management V3R6, V3R7*, SG24-4735

  Note, this redbook is scheduled for publication during 2Q, 1997.

G.2 Redbooks on CD-ROMs

Redbooks are also available on CD-ROMs. **Order a subscription** and receive updates 2-4 times a year at significant savings.

CD-ROM Title	Subscription Number	Collection Kit Number
System/390 Redbooks Collection	SBOF-7201	SK2T-2177
Networking and Systems Management Redbooks Collection	SBOF-7370	SK2T-6022
Transaction Processing and Data Management Redbook	SBOF-7240	SK2T-8038
AS/400 Redbooks Collection	SBOF-7270	SK2T-2849
RS/6000 Redbooks Collection (HTML, BkMgr)	SBOF-7230	SK2T-8040
RS/6000 Redbooks Collection (PostScript)	SBOF-7205	SK2T-8041
Application Development Redbooks Collection	SBOF-7290	SK2T-8037
Personal Systems Redbooks Collection	SBOF-7250	SK2T-8042

G.3 Other Publications

These publications are also relevant as further information sources:

- *AS/400 Work Management*, SC41-4306
- *Performance Tools/400*, SC41-4340
- *BEST/1 Capcity Planning Tool*, SC41-3341

How to Get ITSO Redbooks

This section explains how both customers and IBM employees can find out about ITSO redbooks, CD-ROMs, workshops, and residencies. A form for ordering books and CD-ROMs is also provided.

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  To get LIST3820s of redbooks, type one of the following commands:

  ```
  TOOLS SENDTO EHONE4 TOOLS2 REDPRINT GET SG24xxxx PACKAGE
  TOOLS SENDTO CANVM2 TOOLS REDPRINT GET SG24xxxx PACKAGE (Canadian users only)
  ```

  To get BookManager BOOKs of redbooks, type the following command:

  ```
  TOOLCAT REDBOOKS
  ```

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List of Abbreviations

CISC	Complex Instruction Computing System
CL	Control Language
CPU	Central Processing Unit
FSIOP	File Server I/O Processor
HLL	High Level Language
ILE	Integrated Language Environment
IMPI	Internal Microprogramming Interface
IOP	Input Output Processor
ITSO	International Technical Support Organization
LIC, VLIC	Licensed Internal Code (software and hardware) LIC and SLIC are identical terms for the same microcode
OPM	Original Program Model
PAG	Process Access Group
PEX	Performance Explorer
PDC	Performance Data Collector
PRPQ	Programming Request for Price Quotation
RISC	Reduced Instruction Computing System
SAR	Segment Address Range
SLIC	System Licensed Internal Code (software and hardware) LIC and SLIC are identical terms for the same software
TPST	Timing and Paging Statistics
WSF	Workstation Function

Index

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ITSO Redbook Evaluation

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