DataGeneral

DIAGNOSTIC LISTING

LISTING

096-000448-00

PROGRAM

MICRO NOVA I/O TESTER
DIAGNOSTIC

TAPE

095-000448-00

ABSTRACT

THIS DIAGNOSTIC IS DESIGNED TO TEST THE MICRO NOVA I/O TESTER BOARD, A SPECIAL PURPOSE I/O EXERCISER FOR THE MICRO NOVA DATA CHANNEL.

```
ØØØ1 MNIOT MACRO REV Ø4.ØØ              13:3Ø:22 12/Ø3/76
Ø1
Ø2
Ø3
Ø4
Ø5
Ø6
Ø7              ;*****************************************************************
Ø8              ;
Ø9              ; NAME: MNIOT.SR                          PART NUMBER: Ø94-ØØØ846
1Ø              ;
11              ;
12              ; DESCRIPTION: MICRO NOVA I/O TESTER DIAGNOSTIC
13              ;
14              ;
15              ; REVISION HISTORY:
16              ;
17              ;       REV.            DATE
18              ;
19              ;       Ø4              12/Ø3/76
2Ø              ;
21              ;
22              ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1976
23              ; ALL RIGHTS RESERVED.
24              ;*****************************************************************
```

```
ØØØ2 MNIOT
Ø1
                        .TITL   MNIOT
Ø3      ØØØØØØ          .UO     Ø
Ø4              1.      ABSTRACT
Ø5
Ø6                      THIS DIAGNOSTIC IS DESIGNED TO TEST THE MICRO-NOVA
Ø7                      I/O TESTER BOARD, A SPECIAL PURPOSE I/O EXERCISER FOR
Ø8                      THE MICRO-NOVA DATA CHANNEL.
Ø9
1Ø              2.      MACHINE REQUIREMENTS
11
12              2.1     A MICRO-NOVA PROCESSOR
13              2.2     4K OF READ/WRITE MEMORY
14              2.3     A MICRO-NOVA I/O TESTER BOARD
15              2.4     SOME MEANS OF REPORTING ERRORS
16
17              3.      OPERATING PROCEDURE
18
19                      PROGRAM MAY BE LOADED VIA THE BINARY LOADER OR THE DTOS
2Ø                      OR DFOS SYSTEMS AND WILL START AT LOCATION 2ØØ.  IF IT'S
21                      DESIRED, "SWREG" AND "USREG" OPTIONS MAY BE CHANGED AT
22                      THIS TIME THROUGH THE HAND-HELD CONSOLE OR THE CONSOLE
23                      DEBUG OPTION.
24
25              4.      ERROR DESCRIPTION
26
27                      THIS PROGRAM IS DESIGNED TO PROVIDE A SNAPSHOT OF ALL
28                      REGISTER CONTENTS IF AN ERROR IS DETECTED.  THESE ARE
29                      SAVED IN A MEMORY STACK AND, DEPENDING ON THE "USREG"
3Ø                      OPTIONS, REPORTED TO THE USER VIA SOME LISTING OUTPUT
31                      DEVICE.  A RUNNING COUNT OF ERRORS IS ALSO SAVED BY
32                      THE PROGRAM, AND FACILITIES ARE PROVIDED FOR LOOPING
33                      OR HALTING ON ERROR DETECTION.  IN ADDITION THE DEVICE
34                      BAUD RATE IS CALCULATED AND THE CONSOLE DEBUG ROMS
35                      AND RAMS ARE VERIFIED IF INSTALLED.  THE ERRORS ARE SAVE
36                      IN MEMORY AS FOLLOWS:
37
38                        LOCATION (OCTAL)      VARIABLE      INTERPRETATION
39
4Ø                              ØØ2Ø1           HELP        CURRENT SUBTEST START
41                              ØØ2Ø3           PASS        TEST PASS COUNTER
42                              ØØ2Ø7           SWREG       SWITCH REGISTER
43                              ØØ21Ø           USREG       USER REGISTER
44                              ØØ211           INTVL       SUBTEST LOGOUT INTVL
45                              ØØ212           ERCNT       TOTAL ERROR COUNT
46                              ØØ213           TSTNM       CURRENT SUBTEST NUMBER
47                              ØØ214           ERNUM       LATEST ERROR NUMBER
48                              ØØ215           STACK       ERROR STACK POINTER
49                              ØØ216           .BLK        AC0 SAVE LOCATION
5Ø                              ØØ217                       AC1 SAVE LOCATION
51                              ØØ22Ø                       AC2 SAVE LOCATION
52                              ØØ221                       AC3 SAVE LOCATION
53                              ØØ222                       CARRY & PCR SAVE
54
55                      DETAILED ERROR MESSAGES PRINT OUT THE REGISTER
56                      CONTENTS AT THE TIME OF THE FAILURE, AS WELL AS
57                      IDENTIFYING THE SUBTEST AND ERROR NUMBER CAUSING
58                      THE PROBLEM.  THE MESSAGE FORMAT IS:
59
6Ø                      ERROR NUMBER XXX ENCOUNTERED SUBTEST XX
```

CRY	ALM	AC1	AC2	AL3	PC
X	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX

THESE REGISTER CONTENTS SHOULD BE COMPARED TO THOSE DESIRED BY THE FAILING SUBTEST TO ISOLATE THE ERROR.

5. SWITCH SETTINGS

LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER DTOS/DFOS THIS LOCATION WILL BE LOADED BY THE MONITOR, HOWEVER UNDER STAND-ALONE AND PROGRAM LOAD MODES THIS LOCATION MAY BE SET BY THE USER USING EITHER THE HAND-HELD CONSOLE OR A TELETYPE WITH THE CONSOLE DEBUG FEATURE. ANY OF THESE OPTIONS MAY BE OVERRIDDEN BY SETTING OF OPTIONS IN THE "USREG".

5.1 SWITCH OPTIONS

DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION "SWREG" ARE AS FOLLOWS:

BIT	OCTAL	BINARY	INTERPRETATION
1		0	LOOP ON ERROR
	400000	1	SKIP LOOPING ON ERROR
2		0	PRINT TO CONSOLE
	200000	1	ABORT CONSOLE PRINTOUT
3		0	PRINT DETAILED ERROR ON SELECTED DEVICE/DEVICES
	100000	1	% ERROR PRINTOUT ONLY
4		0	ALLOW END OF PASS PRINT
	040000	1	SUPPRESS PASS PRINTOUT
5		0	DON'T USE LINE PRINTER
	020000	1	USE LINE PRINTER
6		0	DON'T HALT ON ERROR
	010000	1	HALT ON ERROR
7		0	DON'T PRINT SUBTEST COMP
	004000	1	PRINT SUBTEST COMPLETION
8-15		RESERVED FOR FUTURE USE	

6. USER REGISTER CONFIGURATION

THIS DIAGNOSTIC USES BIT 0 OF THE USER REGISTER TO OVERRIDE THE SWITCH REGISTER OPTIONS. THESE DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION "USREG" ARE AS FOLLOWS:

BIT	OCTAL	BINARY	INTERPRETATION
0		0	USE "SWREG" FOR BITS 1-8
	100000	1	IGNORE "SWREG"
1-7		SAME SIGNIFICANCE AS "SWREG"	
8		0	USE STANDARD ADDRESS FOR UNIT UNDER TEST
	000200	1	USE ADDRESS FROM "UUTAD"
9		0	USE STANDARD CONSOLE ADD
	000100	1	USE ADDRESS FROM "CONAD"

10-15	RESERVED FOR FUTURE USE

6. USER REGISTER OPTIONS

BECAUSE OF DIFFERENCES BETWEEN MICRO-NOVA, NOVA, AND ECLIPSE SYSTEMS THE ABOVE DEFAULT OPTIONS ARE NOT ALWAYS THE BEST FOR A GIVEN DIAGNOSTIC. A USER'S REGISTER IS PROVIDED TO DEAL WITH THESE SITUATIONS. THIS REGISTER MAY BE ASSEMBLED WITH ANY DEFAULT VALUES DESIRED, AND MAY BE CHANGED BY THE USER TO SUIT A GIVEN SYSTEM CONFIGURATION.

.END
.EJECT

```
 0005 MNIOT
01                      ;*****************************************************************
02                      ;MACRO DEFINITIONS FOLLOW
03                      ;*****************************************************************
04
05          061401 .DIAC    PSHA=061401
06          061601 .DIAC    POPA=061601
07          061001 .DIAC    MTSP=061001
08          060001 .DIAC    MTFP=060001
09          061201 .DIAC    MFSP=061201
10          060201 .DIAC    MFFP=060201
11          073301 .DUSR    MUL=073301
12          073101 .DUSR    DIV=073101
13          062401 .DUSR    SAV=062401
14          062601 .DUSR    RET=062601
15          100010 .DXOP    TRP=100010      ;STD MICRO-NOVA TRAP W/O BITS 10&11
16          000000  ?A=0
17          000000  ?B=0
18          000000  ?C=0
19          000000  ?D=0
20          000000  ?E=0
21                  .MACRO  SETUP
22                  **      ?E=?E+1
23                  **      ?F=(?E&700)/100+1
24                  **      ?G=(?E&70)/10+1
25                  **      ?H=(?E&7)+1
26                  **      SET?P 0,1,2,3,4,5,6,7
27                          A1
28                          NIOL    35      ;SYNC PULSE FOR XOR TESTER
29                  %
30                  .MACRO  SET?P
31                  TS^?F^?G^?H:    JSR @   ISETUP
32                  %
33                  .MACRO  EMALT
34                  **      ?D=?D+1
35                  **      ?C=?C+1
36                  **      .IFE    (?C-40)
37                  **      ?B=?B+1
38                  **      ?C=0
39                  **      .ENDC
40                  **      .IFE    (?B-4)
41                  **      ?A=?A+1
42                  **      ?B=0
43                  **      .ENDC
44                  **      ?X=(?D&700)/100+1
45                  **      ?Y=(?D&70)/10+1
46                  **      ?Z=(?D&7)+1
47                  **      A=?A+1
48                  **      B=?B+1
49                  **      C=(?C&70)/10+1
50                  **      D=(?C&7)+1
51                  **EML?T 0,1,2,3,4,5,6,7
52                  %
53                  .MACRO  EML?T
54                          TRP     AA,AB,ACAD      ;ERROR NUMBER A?X^?Y^?Z
55                  %
56                  .MACRO  LOOP
57                          JSR @   ILOOP
58                  %
59                          ;MACROS
60
```

```
 0006 MNIOT
01                  .MACRO  DB
02                  SETUP   100.
03                  LDA     0,=A1
04                  DOA     0,IOT           ;COMPARE DB=A2
05                  DIA     1,IOT           ;SENT TO IO
06                  SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
07                  EMALT                   ;EXACTLY
08                  LOOP
09                  %
10
11                  .MACRO  FUNC
12                  SUB     0,0
13                  UNIOP   0,IOT           ;CLEAR PULSE CATCHER
14                  LDA     1,DEV0
15                  A1      A2 A3           ;LOAD FUNCTION A1
16                  LDA     0,=(A4+185+1815)
17                  DIC     1,IOT           ;A5 PULSE BIT(S)
18                  SUB#    0,1,SZR         ;SHOULD BE PRESENT
19                  EMALT
20                  LOOP
21                  %
22
23                  .MACRO  SDRC
24          SRA1:   SETUP   100.
25                  LDA     0,DEV0
26                  UNIOP   0,IOT           ;SET XREG
27                  A2      A3,A4           ;A5
28                  A6      0,IOT           ;SEND PATTERN FROM TESTER
29                  A7      1,IOT           ;SEE WHAT'S IN IO
30                  SUB#    0,1,SZR
31                  EMALT
32                  LOOP
33
34                  %
```

```
 1 ØØØ7 MNIOT
                        .TITL   MNIOT
 2
 3                      ;PAGE ZERO
 4
 5        Ø6Ø3ØØ        .DIOA   UNIOP=  6Ø3ØØ
 6        Ø61277        .DUSR   RESET=  DOAC    Ø,77
 7        ØØØØØØ        .LOC Ø
 8
 9 ØØØØØ ØØ2224         DIRT
10 ØØØØ1 ØØ22Ø1         INTER                   ;INTERRUPT ENRTY
11 ØØØØ2 ØØ22E1         INTER
12
13        ØØØØ45        .LOC    45
14
15 ØØØ45 ØØ1325         EGGS
16 ØØØ46 ØØØØØØ         Ø                       ;TRAP LOCATIONS
17 ØØØ47 ØØØØØØ         Ø
18                      .ZREL
19 ØØØØ-ØØØ1Ø           .BLK    8.              ;LEAVE ROOM FOR DEBUG
20                                              ;LEAVE ROOM FOR LITERALS
21
22
23                      ;*****************************************************************
24                      ;PROGRAM STARTS HERE- JUMP TO INITIALIZE ROUTINE
25                      ;*****************************************************************
26        ØØ2ØØ         .LOC    2ØØ
27 ØØ2ØØ ØØ22Ø2         JMP @   ISTART
28
29
30                      ;*****************************************************************
31                      ;PAGE Ø CONSTANTS FOLLOW
32                      ;*****************************************************************
33 ØØ2Ø1 ØØØØØØ HELP:   Ø
34        ØØ2Ø1  LOOPR=HELP
35 ØØ2Ø2 ØØØ5ØØ ISTART: START
36 ØØ2Ø3 ØØØØØØ PASS:   Ø
37 ØØ2Ø4 ØØØ566 REPST:  IOSTR
38 ØØ2Ø5 ØØØØØØ RTN21:  Ø
39 ØØ2Ø6 ØØØØØØ RTN22:  Ø
40 ØØ2Ø7 ØØØØØØ SWREG:  Ø
41 ØØ21Ø ØØØ7ØØ USWEG:  Ø
42 ØØ211 ØØØØØ1 INTVL:  1
43 ØØ212 ØØØØØØ ERCNT:  Ø       ;TOTAL ERROR COUNT FOR ALL TESTS
44 ØØ213 ØØØØØØ TSTNM:  Ø       ;CURRENT SUBTEST NUMBER
45 ØØ214 ØØØØØØ ERNUM:  Ø       ;NUMBER OF LATEST ERROR
46 ØØ215 ØØØ215 STACK:  .       ;REGISTER SAVE STACK HERE
47 ØØ216 ØØØØØ5         .BLK    5
48 ØØ223 ØØØØ2Ø C2Ø:    2Ø
49 ØØ224 ØØØ144 D1ØØ:   1ØØ.
50 ØØ225 ØØØØØØ TIMER:  Ø       ;DELAY IN CASE OF IOT HANG
51 ØØ226 1ØØØ2Ø MSKØ:   1ØØØØØ  ;MASK WORDS FOR BITS Ø-15
52 ØØ227 Ø4ØØØØ MSK1:   Ø4ØØØØ
53 ØØ23Ø Ø2ØØØØ MSK2:   Ø2ØØØØ
54 ØØ231 Ø1ØØØØ MSK3:   Ø1ØØØØ
55 ØØ232 ØØ4ØØØ MSK4:   Ø4ØØØ
56 ØØ233 ØØ2ØØØ MSK5:   Ø2ØØØ
57 ØØ234 ØØ1ØØØ MSK6:   Ø1ØØØ
58 ØØ235 ØØØ4ØØ MSK7:   ØØ4ØØ
59 ØØ236 ØØØ2ØØ MSK8:   ØØ2ØØ
60 ØØ237 ØØØ1ØØ MSK9:   ØØ1ØØ

 ØØØ8 MNIOT
 1 ØØ24Ø ØØØØ4Ø MSK1Ø:  ØØØØ4Ø
 2 ØØ241 ØØØØ2Ø MSK11:  ØØØØ2Ø
 3 ØØ242 ØØØØ1Ø MSK12:  ØØØØ1Ø
 4 ØØ243 ØØØØØ4 MSK13:  ØØØØØ4
 5 ØØ244 ØØØØØ2 MSK14:  ØØØØØ2
 6 ØØ245 ØØØØØ1 MSK15:  ØØØØØ1
 7 ØØ246 ØØ2312 IEHALT: XEHALT
 8 ØØ247 ØØ2272 ISETUP: XSETUP
 9 ØØ25Ø ØØ2527 ILOUP:  XLOUP
10 ØØ251 ØØ3ØD4 ITYPTE: TYPTE
11 ØØ252 ØØ2727 IPOCTT: POCTT
12 ØØ253 ØØ2723 IZOCTT: ZOCTT
13 ØØ254 ØØ2735 IPDCTS: PDCTS
14 ØØ255 ØØ2745 IPDETC: PDETC
15 ØØ256 ØØ2636 IMESTS: MESTS
16 ØØ257 ØØ2713 ICRLTF: CRLTF
17 ØØ26Ø Ø2ØØØØ MSK:   Ø2ØØØØ
18 ØØ261 Ø2ØØØ1 IMSK1:  Ø2ØØØ1
19
20 ØØ262 ØØØØØØ CARRY:  Ø
21
22 ØØ263 Ø1Ø2ØØ DEVØ:   Ø1Ø2ØØ
23 ØØ264 Ø1Ø225 DEV1:   Ø1Ø225
24 ØØ265 Ø1Ø252 DEV2:   Ø1Ø252
25 ØØ266 Ø1Ø3ØØ DEV3:   Ø1Ø3ØØ
26
27 ØØ267 ØØØØØØ ISAVØ:  Ø
28 ØØ27Ø ØØØØØØ ISAV1:  Ø
29 ØØ271 ØØØØØØ ISAV2:  Ø
30 ØØ272 ØØØØØØ ISAV3:  Ø
31
32 ØØ273 1Ø3377 MADR:   DCSIR+1ØØ
33 ØØ274 Ø7ØØØØ MDCM:   7ØØØØ
34
35 ØØ275 Ø3ØØØØ SBUSY:  Ø3ØØØØ
36 ØØ276 Ø4ØØØØ SDONE:  Ø4ØØØØ
37 ØØ277 Ø6ØØØØ SDCM:   Ø6ØØØØ
38 ØØ3ØØ Ø5ØØØ1 SINT:   ØD5ØØ1
39
40 ØØ3Ø1 Ø5ØØØØ RINT:   Ø5ØØØØ
41 ØØ3Ø2 ØØØØØØ RN.SØ:  Ø
42 ØØ3Ø3 ØØØØØØ RN.S1:  Ø
43 ØØ3Ø4 ØØØØØØ RN.S2:  Ø
44 ØØ3Ø5 ØØØØØØ RN.C1:  Ø
45 ØØ3Ø6 ØØØØØ7 RN.K1:  7
46 ØØ3Ø7 123456 RN.C2:  123456
47 ØØ31Ø ØØ3311 RTABLE: .+1
48 ØØ311 Ø27247         027247
49 ØØ312 145651         145651
50 ØØ313 162724         162724
51 ØØ314 Ø71352         Ø71352
52 ØØ315 134565         134565
53 ØØ316 116272         116272
54 ØØ317 Ø47135         Ø47135
55 ØØ32Ø 113523         113523
56
57 ØØ321 ØØ4ØØØ WCT:    256.
58
59
60        ØØØØØØ IOT=Ø
```

```
 0000 MNIOT
0001 000322 004322 CLEAR=  JSR     .
0002 000322 000524         CLR
0003 000323 004323 RAND=   JSR     .
0004 000323 000534         .RAND
0005
0006 000324 000325 IEGGS:  EGGS
0007 000325 000006 EGGS:   .BLK     6
```

```
;0010 MNIOT
                           .TITL   MNPAC
0012
0013                ;*****************************************************************
0014                ;INITILIZATION MODULE -INITIALIZES POINTERS AND
0015                ;ALL COUNTERS FOR START OF DIAGNOSTIC
0016                ;*****************************************************************
0017          000500            .LOC    500
0018 000500 002246 START:  LDA     0,IEHALT
0019 000501 014047         STA     0,47     ;STORE LINK TO ERROR IN TRAP ADDRESS.
0020 000502 002215         LDA     0,STACK
0021 000503 061001         MTSP    0        ;INITIALIZE STACK AND FRAME POINTERS.
0022 000504 063001         MTFP    0
0023 000505 102400         SUB     0,0
0024 000506 014212         STA     0,ERCNT ;RESET ERROR COUNTER
0025 000507 014213         STA     0,TSTNM ;CLEAR SUBTEST COUNTER
0026 000510 040203         STA     0,PASS  ;CLEAR PASS COUNTER
0027
0028                ;*****************************************************************
0029                ;*****************************************************************
0030                ;
0031                ;  INSERT DIAGNOSTIC PROGRAM HERE !!
0032                ;
0033                ;*****************************************************************
0034                ;*****************************************************************
0035
```

```
10011 MNIOT
                        .TITL   MNIOT
02 000511 020210 INIT:  LDA     0,OSWREG
03 000512 101113        MOVL#   0,0,SNC ;IGNORE SWREG?
04 000513 020207        LDA     0,SWREG ;NO, USE SWREG
05 000514 040207        STA     0,SWREG ;SET UP SWREG FOR TEST
06 000515 034324        LDA     3,IEGGS ;GET EGGS BLOCK POINTER
07 000516 021400        LDA     0,0,3
08 000517 101005        MOV     0,0,SNR ;AUTO MODE?
09 000520 000403        JMP     .+3
10 000521 021405        LDA     0,5,3   ;YES, SET UP FROM EGGS
11 000522 040207        STA     0,SWREG
12
13 000523 000443        JMP     IOSTR           ;GO TO MAIN PROGRAM
14
15              ; SUBROUTINES
16
17              ; CLEAR SUBROUTINE ZEROS DATA CHANNEL ADDRESS AREA
18
19 000524 030006-CLR:   LDA     2,=IOCSTR
20 000525 024005-        LDA     1,=-512.
21 000526 102400         SUB     0,0
22 000527 041000         STA     0,0,2
23 000530 151400         INC     2,2
24 000531 125404         INC     1,1,SZR
25 000532 000775         JMP     .-3
26 000533 001400         JMP     0,3
27
28              ; RANDOM NUMBER GENERATOR
29
30 000534 040302 .RAND:  STA     0,RN.S0
31 000535 040303         STA     1,RN.S1
32 000536 050304         STA     2,RN.S2         ;SAVE AC1,AC2
33 000537 030306         LDA     2,RN.A1
34 000540 020307         LDA     0,RN.C2         ;CYCLIC CONSTANT
35 000541 020305         LDA     1,RN.C1
36 000542 133404         AND     1,2,SZR         ;ROTATE C2 EVERY 6
37 000543 000404         JMP     RAN.1
38 000544 101122         MOVZL   0,0,SZC
39 000545 101400         INC     0,0
40 000546 040307         STA     0,RN.C2
41
42 000547 024310 RAN.1:  LDA     1,RTABL
43 000550 133000         ADD     1,2
44 000551 025000         LDA     1,0,2
45 000552 123000         ADD     1,0
46 000553 041000         STA     0,0,2
47 000554 020302         LDA     1,RN.S0
48 000555 123000         ADDS    1,0
49 000556 040302         STA     0,RN.S0
50 000557 024064-        LDA     1,=377          ;TAKE RIGHT BYTE ONLY
51 000560 125400         AND     1,0
52 000561 020303         LDA     1,RN.S1
53 000562 030304         LDA     2,RN.S2
54 000563 014306         ISZ     RN.C1
55 000564 001400         JMP     0,3
56 000565 001400         JMP     0,3
```

```
10012 MNIOT
01                      ;MAIN PROGRAM
02
03
04 000566 061277 IOSTR:  RESET                   ;RESET WORLD
05 000567 000323         RAND                    ;RANDOMIZE ADDRESS AND WORD COUN
06 000570 101005         MOV     0,0,SNR         ;WORD COUNT CAN'T BE ZERO
07 000571 000776         JMP     .-2
08 000572 024063-        LDA     1,=(IOCSTR+100) ;FOR DATA CHANNEL TEST
09 000573 102000         ADD     0,1
10 000574 044273         STA     1,MADR
11 000575 040321         STA     0,WCT
12 000576 061277         RESET
13 000577 061277         RESET
14 000600 020263         LDA     0,DEV0          ;SET DEVICE=0, +POLARITY, X=REG
15 000601 063000         DINIOP  0,IOT
16 000602 061277         RESET
17
18              IOT0:    SETUP   100.
19 000603 000247 TS001:  JSR @   ISETUP
20 000604 000144         100.
21 000605 060235         NIOC    35      ;SYNC PULSE FOR XOR TESTER
22 000606 102400         SUB     0,0
23 000607 061000         DOA     0,IOT           ;OUTPUT "0" TO TESTER
24 000610 060400         DIA     1,IOT
25 000611 100414         SUB#    0,1,SZR         ;COMPARE
26                       EMALT
27 000612 101110         TRP     0,0,01  ;ERROR NUMBER 001
28                       LOOP
29 000613 000250         JSR @   ILOOP
30
31              IOT1:    SETUP   100.
32 000614 000247 TS002:  JSR @   ISETUP
33 000615 000144         100.
34 000616 060235         NIOC    35      ;SYNC PULSE FOR XOR TESTER
35 000617 102000         AOC     0,0
36 000620 061000         DOA     0,IOT           ;OUTPUT "1'S" TO TESTER
37 000621 060400         DIA     0,IOT           ;COMPARE FOR "0'S" AFTER INC
38 000622 101404         INC     0,0,SZR
39                       EMALT
40 000623 100210         TRP     0,0,02  ;ERROR NUMBER 002
41                       LOOP
42 000624 000250         JSR @   ILOOP
```

```
1000 MNIOT
01                          ;THESE TESTS CHECK EACH DATA BIT
02
03                  DIO0:   DB      100000,0
04                          SETUP   100.
05 00025 000247 TS003:      JSR @   ISETUP
06 00026 000144             100.
07 00027 060235             NIOC    35      ;SYNC PULSE FOR XOR TESTER
08 00030 020002-            LDA     0,=100000
09 00031 061000             DOA     0,IOT           ;COMPARE DB=0
10 00032 064400             DIA     1,IOT           ;SENT TO IO
11 00033 100414             SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
12                          EMALT                   ;EXACTLY
13 00034 100310             TRP     0,0,03  ;ERROR NUMBER 003
14                          LOOP
15 00035 000250             JSR @   ILOOP
16
17                  DIO1:   DB      040000,1
18                          SETUP   100.
19 00036 000247 TS004:      JSR @   ISETUP
20 00037 000144             100.
21 00040 060235             NIOC    35      ;SYNC PULSE FOR XOR TESTER
22 00041 020001-            LDA     0,=040000
23 00042 061000             DOA     0,IOT           ;COMPARE DB=1
24 00043 064400             DIA     1,IOT           ;SENT TO IO
25 00044 100414             SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
26                          EMALT                   ;EXACTLY
27 00045 100410             TRP     0,0,04  ;ERROR NUMBER 004
28                          LOOP
29 00046 000250             JSR @   ILOOP
30
31                  DIO2:   DB      020000,2
32                          SETUP   100.
33 00047 000247 TS005:      JSR @   ISETUP
34 00050 000144             100.
35 00051 060235             NIOC    35      ;SYNC PULSE FOR XOR TESTER
36 00052 020000-            LDA     0,=020000
37 00053 061000             DOA     0,IOT           ;COMPARE DB=2
38 00054 064400             DIA     1,IOT           ;SENT TO IO
39 00055 100414             SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
40                          EMALT                   ;EXACTLY
41 00056 100510             TRP     0,0,05  ;ERROR NUMBER 005
42                          LOOP
43 00057 000250             JSR @   ILOOP
44
45                  DIO3:   DB      010000,3
46                          SETUP   100.
47 00060 000247 TS006:      JSR @   ISETUP
48 00061 000144             100.
49 00062 060235             NIOC    35      ;SYNC PULSE FOR XOR TESTER
50 00063 020057-            LDA     0,=010000
51 00064 061000             DOA     0,IOT           ;COMPARE DB=3
52 00065 064400             DIA     1,IOT           ;SENT TO IO
53 00066 100414             SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
54                          EMALT                   ;EXACTLY
55 00067 100610             TRP     0,0,06  ;ERROR NUMBER 006
56                          LOOP
57 00070 000250             JSR @   ILOOP
58
59                  DIO4:   DB      004000,4
60                          SETUP   100.
```

```
0014 MNIOT
01 00071 000247 TS007:      JSR @   ISETUP
02 00072 000144             100.
03 00073 060235             NIOC    35      ;SYNC PULSE FOR XOR TESTER
04 00074 020056-            LDA     0,=004000
05 00075 061000             DOA     0,IOT           ;COMPARE DB=4
06 00076 064400             DIA     1,IOT           ;SENT TO IO
07 00077 100414             SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
08                          EMALT                   ;EXACTLY
09 00100 100710             TRP     0,0,07  ;ERROR NUMBER 007
10                          LOOP
11 00101 000250             JSR @   ILOOP
12
13                  DIO5:   DB      002000,5
14                          SETUP   100.
15 00102 000247 TS010:      JSR @   ISETUP
16 00103 000144             100.
17 00104 060235             NIOC    35      ;SYNC PULSE FOR XOR TESTER
18 00105 020055-            LDA     0,=002000
19 00106 061000             DOA     0,IOT           ;COMPARE DB=5
20 00107 064400             DIA     1,IOT           ;SENT TO IO
21 00110 100414             SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
22                          EMALT                   ;EXACTLY
23 00111 101010             TRP     0,0,10  ;ERROR NUMBER 010
24                          LOOP
25 00112 000250             JSR @   ILOOP
26
```

```
1ØØ15 MNIOT
01                DIO6:   DB      ØØ1ØØØ,6
02                        SETUP   1ØØ.
03 ØØ713 ØØ6247 TSØ11:    JSR *   ISETUP
04 ØØ714 ØØØ144           1ØØ.
05 ØØ715 Ø6Ø235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
06 ØØ716 Ø2ØØ54-          LDA     Ø,=ØØ1ØØØ
07 ØØ717 Ø61ØØØ           DOA     Ø,IOT           ;COMPARE DB=6
08 ØØ72Ø Ø64ØØØ           DIA     1,IOT           ;SENT TO IO
09 ØØ721 1Ø6414           SUB#    Ø,1,SZR         ;IO WHAT IS RECEIVED
10                        EHALT                   ;EXACTLY
11 ØØ722 1Ø1110           TRP     Ø,Ø,11  ;ERROR NUMBER Ø11
12                        LOOP
13 ØØ723 ØØ625Ø           JSR *   ILOOP
14
15                DIO7:   DB      ØØ4ØØØ,7
16                        SETUP   1ØØ.
17 ØØ724 ØØ6247 TSØ12:    JSR *   ISETUP
18 ØØ725 ØØØ144           1ØØ.
19 ØØ726 Ø6Ø235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
20 ØØ727 Ø2ØØ53-          LDA     Ø,=ØØØ4ØØ
21 ØØ73Ø Ø61ØØØ           DOA     Ø,IOT           ;COMPARE DB=7
22 ØØ731 Ø64ØØØ           DIA     1,IOT           ;SENT TO IO
23 ØØ732 1Ø6414           SUB#    Ø,1,SZR         ;IO WHAT IS RECEIVED
24                        EHALT                   ;EXACTLY
25 ØØ733 1Ø121Ø           TRP     Ø,Ø,12  ;ERROR NUMBER Ø12
26                        LOOP
27 ØØ734 ØØ625Ø           JSR *   ILOOP
28
29                DIO8:   DB      ØØØ2ØØ,8
30                        SETUP   1ØØ.
31 ØØ735 ØØ6247 TSØ13:    JSR *   ISETUP
32 ØØ736 ØØØ144           1ØØ.
33 ØØ737 Ø6Ø235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
34 ØØ74Ø Ø2ØØ52-          LDA     Ø,=ØØØ2ØØ
35 ØØ741 Ø61ØØØ           DOA     Ø,IOT           ;COMPARE DB=8
36 ØØ742 Ø64ØØØ           DIA     1,IOT           ;SENT TO IO
37 ØØ743 1Ø6414           SUB#    Ø,1,SZR         ;IO WHAT IS RECEIVED
38                        EHALT                   ;EXACTLY
39 ØØ744 1Ø131Ø           TRP     Ø,Ø,13  ;ERROR NUMBER Ø13
40                        LOOP
41 ØØ745 ØØ625Ø           JSR *   ILOOP
42
43                DIO9:   DB      ØØ1ØØ,9
44                        SETUP   1ØØ.
45 ØØ746 ØØ6247 TSØ14:    JSR *   ISETUP
46 ØØ747 ØØØ144           1ØØ.
47 ØØ75Ø Ø6Ø235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
48 ØØ751 Ø2ØØ51-          LDA     Ø,=ØØØ1ØØ
49 ØØ752 Ø61ØØØ           DOA     Ø,IOT           ;COMPARE DB=9
50 ØØ753 Ø64ØØØ           DIA     1,IOT           ;SENT TO IO
51 ØØ754 1Ø6414           SUB#    Ø,1,SZR         ;IO WHAT IS RECEIVED
52                        EHALT                   ;EXACTLY
53 ØØ755 1Ø141Ø           TRP     Ø,Ø,14  ;ERROR NUMBER Ø14
54                        LOOP
55 ØØ756 ØØ625Ø           JSR *   ILOOP
56
57                DIO1Ø:  DB      ØØØ4Ø,1Ø
58                        SETUP   1ØØ.
59 ØØ757 ØØ6247 TSØ15:    JSR *   ISETUP
60 ØØ76Ø ØØØ144           1ØØ.
```

```
ØØ16 MNIOT
Ø1 ØØ761 Ø6Ø235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
Ø2 ØØ762 Ø2ØØ5Ø-          LDA     Ø,=ØØØØ4Ø
Ø3 ØØ763 Ø61ØØØ           DOA     Ø,IOT           ;COMPARE DB=1Ø
Ø4 ØØ764 Ø64ØØØ           DIA     1,IOT           ;SENT TO IO
Ø5 ØØ765 1Ø6414           SUB#    Ø,1,SZR         ;IO WHAT IS RECEIVED
Ø6                        EHALT                   ;EXACTLY
Ø7 ØØ766 1Ø151Ø           TRP     Ø,Ø,15  ;ERROR NUMBER Ø15
Ø8                        LOOP
Ø9 ØØ767 ØØ625Ø           JSR *   ILOOP
1Ø
11                DIO11:  DB      ØØØØ2Ø,11
12                        SETUP   1ØØ.
13 ØØ77Ø ØØ6247 TSØ16:    JSR *   ISETUP
14 ØØ771 ØØØ144           1ØØ.
15 ØØ772 Ø6Ø235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
16 ØØ773 Ø2ØØ47-          LDA     Ø,=ØØØØ2Ø
17 ØØ774 Ø61ØØØ           DOA     Ø,IOT           ;COMPARE DB=11
18 ØØ775 Ø64ØØØ           DIA     1,IOT           ;SENT TO IO
19 ØØ77Ø 1Ø6414           SUB#    Ø,1,SZR         ;IO WHAT IS RECEIVED
2Ø                        EHALT                   ;EXACTLY
21 ØØ777 1Ø161Ø           TRP     Ø,Ø,16  ;ERROR NUMBER Ø16
22                        LOOP
23 Ø1ØØØ ØØ625Ø           JSR *   ILOOP
24
```

```
100017 MNIOT
01                      DIO12:  DB      000010,12
02                              SETUP   100.
03 01001 000247 TS017:  JSR #   ISETUP
04 01002 000144                 100.
05 01003 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
06 01004 020046-                LDA     0,=000010
07 01005 061000                 DOA     0,IOT           ;COMPARE DB=12
08 01006 064000                 DIA     1,IOT           ;SENT TO IO
09 01007 100414                 SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
10                              EHALT                   ;EXACTLY
11 01010 101710                 TRP     0,0,17  ;ERROR NUMBER 017
12                              LOOP
13 01011 000250                 JSR #   ILOOP
14
15                      DIO13:  DB      000004,13
16                              SETUP   100.
17 01012 000247 TS020:  JSR #   ISETUP
18 01013 000144                 100.
19 01014 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
20 01015 020045-                LDA     0,=000004
21 01016 061000                 DOA     0,IOT           ;COMPARE DB=13
22 01017 064000                 DIA     1,IOT           ;SENT TO IO
23 01020 100414                 SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
24                              EHALT                   ;EXACTLY
25 01021 101010                 TRP     0,0,20  ;ERROR NUMBER 020
26                              LOOP
27 01022 000250                 JSR #   ILOOP
28
29                      DIO14:  DB      000002,14
30                              SETUP   100.
31 01023 000247 TS021:  JSR #   ISETUP
32 01024 000144                 100.
33 01025 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
34 01026 020044-                LDA     0,=000002
35 01027 061000                 DOA     0,IOT           ;COMPARE DB=14
36 01030 064000                 DIA     1,IOT           ;SENT TO IO
37 01031 100414                 SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
38                              EHALT                   ;EXACTLY
39 01032 102110                 TRP     0,0,21  ;ERROR NUMBER 021
40                              LOOP
41 01033 000250                 JSR #   ILOOP
42
43                      DIO15:  DB      000001,15
44                              SETUP   100.
45 01034 000247 TS022:  JSR #   ISETUP
46 01035 000144                 100.
47 01036 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
48 01037 020043-                LDA     0,=000001
49 01040 061000                 DOA     0,IOT           ;COMPARE DB=15
50 01041 064000                 DIA     1,IOT           ;SENT TO IO
51 01042 100414                 SUB#    0,1,SZR         ;TO WHAT IS RECEIVED
52                              EHALT                   ;EXACTLY
53 01043 102210                 TRP     0,0,22  ;ERROR NUMBER 022
54                              LOOP
55 01044 000250                 JSR #   ILOOP
56
```

```
100018 MNIOT
01                              ;THE FOLLOWING TESTS CHECK FUNCTION DECODER
02
03                      FIO4:   SETUP   100.
04 01045 000247 TS023:  JSR #   ISETUP
05 01046 000144                 100.
06 01047 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
07                              FUNC    DOA,0,IOT,180,DOA
08 01050 102400                 SUB     0,0
09 01051 063000                 UNIOP   0,IOT           ;CLEAR PULSE CATCHER
10 01052 024263                 LDA     1,DEV0
11 01053 061000                 DOA     0 IOT           ;LOAD FUNCTION DOA
12 01054 020042-                LDA     0,=(180+185+1815)
13 01055 064000                 DIC     1,IOT           ;DOA PULSE BIT(S)
14 01056 100414                 SUB#    0,1,SZR         ;SHOULD BE PRESENT
15                              EHALT
16 01057 102310                 TRP     0,0,23  ;ERROR NUMBER 023
17                              LOOP
18 01060 000250                 JSR #   ILOOP
19
20                      FIO1:   SETUP   100.
21 01061 000247 TS024:  JSR #   ISETUP
22 01062 000144                 100.
23 01063 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
24                              FUNC    DIA,0,IOT,181,DIA
25 01064 102400                 SUB     0,0
26 01065 063000                 UNIOP   0,IOT           ;CLEAR PULSE CATCHER
27 01066 024263                 LDA     1,DEV0
28 01067 064000                 DIA     0 IOT           ;LOAD FUNCTION DIA
29 01070 020041-                LDA     0,=(181+185+1815)
30 01071 064000                 DIC     1,IOT           ;DIA PULSE BIT(S)
31 01072 100414                 SUB#    0,1,SZR         ;SHOULD BE PRESENT
32                              EHALT
33 01073 102410                 TRP     0,0,24  ;ERROR NUMBER 024
34                              LOOP
35 01074 000250                 JSR #   ILOOP
36
37                      FIO2:   SETUP   100.
38 01075 000247 TS025:  JSR #   ISETUP
39 01076 000144                 100.
40 01077 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
41                              FUNC    DOB,0,IOT,182,DOB
42 01100 102400                 SUB     0,0
43 01101 063000                 UNIOP   0,IOT           ;CLEAR PULSE CATCHER
44 01102 024263                 LDA     1,DEV0
45 01103 062000                 DOB     0 IOT           ;LOAD FUNCTION DOB
46 01104 020040-                LDA     0,=(182+185+1815)
47 01105 064000                 DIC     1,IOT           ;DOB PULSE BIT(S)
48 01106 100414                 SUB#    0,1,SZR         ;SHOULD BE PRESENT
49                              EHALT
50 01107 102510                 TRP     0,0,25  ;ERROR NUMBER 025
51                              LOOP
52 01110 000250                 JSR #   ILOOP
53
54                      FIO3:   SETUP   100.
55 01111 000247 TS026:  JSR #   ISETUP
56 01112 000144                 100.
57 01113 060235                 NIOC    35      ;SYNC PULSE FOR XOR TESTER
58                              FUNC    DIB,0,IOT,183,DIB
59 01114 102400                 SUB     0,0
60 01115 063000                 UNIOP   0,IOT           ;CLEAR PULSE CATCHER
```

```
 0019 MNIOT
01 01116 024203          LDA     1,DEV0
02 01117 061400          DIB     0 IOT                   ;LOAD FUNCTION DIB
03 01120 020037-         LDA     0,=(1B5+1B5+1B15)
04 01121 060400          DIC     1,IOT                   ;DIB PULSE BIT(S)
05 01122 100414          SUB#    0,1,SZR                 ;SHOULD BE PRESENT
06                       EHALT
07 01123 102610          TRP     0,0,26  ;ERROR NUMBER 026
08                       LOOP
09 01124 000250          JSR @   ILOOP
10
```

```
 0020 MNIOT
01                 F104:  SETUP   100.
02 01125 000247 TS027:    JSR @   ISETUP
03 01126 000144           100.
04 01127 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
05                        FUNC    DOC,0,IOT,1B4,DOC
06 01130 102400           SUB     0,0
07 01131 060300           UNIOP   0,IOT           ;CLEAR PULSE CATCHER
08 01132 024263           LDA     1,DEV0
09 01133 063000           DOC     0 IOT           ;LOAD FUNCTION DOC
10 01134 020036-          LDA     0,=(1B4+1B5+1B15)
11 01135 060400           DIC     1,IOT           ;DOC PULSE BIT(S)
12 01136 100414           SUB#    0,1,SZR         ;SHOULD BE PRESENT
13                        EHALT
14 01137 102710           TRP     0,0,27  ;ERROR NUMBER 027
15                        LOOP
16 01140 000250           JSR @   ILOOP
17
18                 F105:  SETUP   100.
19 01141 000247 TS030:    JSR @   ISETUP
20 01142 000144           100.
21 01143 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
22                        FUNC    DIC,0,IOT,,DIC
23 01144 102400           SUB     0,0
24 01145 060300           UNIOP   0,IOT           ;CLEAR PULSE CATCHER
25 01146 024263           LDA     1,DEV0
26 01147 062400           DIC     0 IOT           ;LOAD FUNCTION DIC
27 01150 020035-          LDA     0,=(+1B5+1B15)
28 01151 060400           DIC     1,IOT           ;DIC PULSE BIT(S)
29 01152 100414           SUB#    0,1,SZR         ;SHOULD BE PRESENT
30                        EHALT
31 01153 103010           TRP     0,0,30  ;ERROR NUMBER 030
32                        LOOP
33 01154 000250           JSR @   ILOOP
34
35                 F106:  SETUP   100.
36 01155 000247 TS031:    JSR @   ISETUP
37 01156 000144           100.
38 01157 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
39                        FUNC    NIOS,,IOT,1B6,STRT
40 01160 102400           SUB     0,0
41 01161 060300           UNIOP   0,IOT           ;CLEAR PULSE CATCHER
42 01162 024263           LDA     1,DEV0
43 01163 064100           NIOS    IOT             ;LOAD FUNCTION NIOS
44 01164 020034-          LDA     0,=(1B6+1B5+1B15)
45 01165 060400           DIC     1,IOT           ;STRT PULSE BIT(S)
46 01166 100414           SUB#    0,1,SZR         ;SHOULD BE PRESENT
47                        EHALT
48 01167 103110           TRP     0,0,31  ;ERROR NUMBER 031
49                        LOOP
50 01170 000250           JSR @   ILOOP
51
52                 F107:  SETUP   100.
53 01171 000247 TS032:    JSR @   ISETUP
54 01172 000144           100.
55 01173 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
56                        FUNC    NIOC,,IOT,1B7,CLR
57 01174 102400           SUB     0,0
58 01175 060300           UNIOP   0,IOT           ;CLEAR PULSE CATCHER
59 01176 024203           LDA     1,DEV0
60 01177 060200           NIOC    IOT             ;LOAD FUNCTION NIOC
```

```
 0021 MNIOT
01 01200 020033-          LDA     0,=(167+165+1615)
02 01201 060400           DIC     1,IOT             ;CLR PULSE BIT(S)
03 01202 100414           SUB#    0,1,SZR           ;SHOULD BE PRESENT
04                        EMALT
05 01203 103210           TRP     0,0,32  ;ERROR NUMBER 032
06                        LOOP
07 01204 000250           JSR @   ILOOP
08
09                FIO8:   SETUP   100.
10 01205 000247 TS033:    JSR @   ISETUP
11 01206 000144           100.
12 01207 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
13                        FUNC    UNIOP,1,IOT,168,IUPLS
14 01210 102400           SUB     0,0
15 01211 060300           UNIOP   0,IOT             ;CLEAR PULSE CATCHER
16 01212 024263           LDA     1,DEV0
17 01213 060300           UNIOP   1 IOT             ;LOAD FUNCTION UNIOP
18 01214 020032-          LDA     0,=(168+165+1615)
19 01215 060400           DIC     1,IOT             ;IOPLS PULSE BIT(S)
20 01216 100414           SUB#    0,1,SZR           ;SHOULD BE PRESENT
21                        EMALT
22 01217 103310           TRP     0,0,33  ;ERROR NUMBER 033
23                        LOOP
24 01220 000250           JSR @   ILOOP
25
```

```
 0022 MNIOT
01                FIO9:   SETUP   100.
02 01221 000247 TS034:    JSR @   ISETUP
03 01222 000144           100.
04 01223 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
05                        FUNC    RESET,,,169,RESET
06 01224 102400           SUB     0,0
07 01225 060300           UNIOP   0,IOT             ;CLEAR PULSE CATCHER
08 01226 024263           LDA     1,DEV0
09 01227 061277           RESET                     ;LOAD FUNCTION RESET
10 01230 020031-          LDA     0,=(169+165+1615)
11 01231 060400           DIC     1,IOT             ;RESET PULSE BIT(S)
12 01232 100414           SUB#    0,1,SZR           ;SHOULD BE PRESENT
13                        EMALT
14 01233 103410           TRP     0,0,34  ;ERROR NUMBER 034
15                        LOOP
16 01234 000250           JSR @   ILOOP
17
18                FIO10:  SETUP   100.
19 01235 000247 TS035:    JSR @   ISETUP
20 01236 000144           100.
21 01237 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
22 01240 020200           LDA     0,MSK
23 01241 060300           UNIOP   0,ILT
24                        FUNC    MSKO,,0,1810,MSKO
25 01242 102400           SUB     0,0
26 01243 060300           UNIOP   0,IOT             ;CLEAR PULSE CATCHER
27 01244 024263           LDA     1,DEV0
28 01245 062077           MSKO    0                 ;LOAD FUNCTION MSKO
29 01246 020030-          LDA     0,=(1810+165+1615)
30 01247 060400           DIC     1,IOT             ;MSKO PULSE BIT(S)
31 01250 100414           SUB#    0,1,SZR           ;SHOULD BE PRESENT
32                        EMALT
33 01251 103510           TRP     0,0,35  ;ERROR NUMBER 035
34                        LOOP
35 01252 000250           JSR @   ILOOP
36
37                FIO11:  SETUP   100.
38 01253 000247 TS036:    JSR @   ISETUP
39 01254 000144           100.
40 01255 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
41 01256 020263           LDA     0,DEV0
42 01257 060300           UNIOP   0,IOT             ;SET EXTERNAL REG
43 01260 061277           RESET
44 01261 020027-          LDA     0,=DCSTR
45 01262 062000           DOB     0,IOT             ; SET ADDRESS
46 01263 102000           ADC     0,0
47 01264 063000           DOC     0,IOT             ; SET WORD COUNT
48 01265 102400           SUB     0,0
49 01266 060300           UNIOP   0,IOT             ;CLEAR PULSE CATCHER
50 01267 020274           LDA     0,MUCM            ;SET MULT DCH
51 01270 060300           UNIOP   0,IOT
52 01271 024263           LDA     1,DEV0
53 01272 060000           NIO     0                 ;LOAD FUNCTION NIO
54 01273 020026-          LDA     0,=(226+165+1615)
55 01274 060400           DIC     1,IOT             ;UCMA+DCMD+WCEZ PULSE BIT(S)
56 01275 100414           SUB#    0,1,SZR           ;SHOULD BE PRESENT
57                        EMALT
58 01276 103610           TRP     0,0,36  ;ERROR NUMBER 036
59 01277 063600           SKPDN   IOT               ;WCEZ SETS DONE
60                        EMALT
```

```
 0023 MNIOT
01 01300 103710          TRP     0,0,37  ;ERROR NUMBER 037
02                       LOOP
03 01301 000250          JSR #   ILOOP
04
05                 FIO12:SETUP   100.
06 01302 000247 TS037:   JSR #   ISETUP
07 01303 000144          100.
08 01304 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
09 01305 020263          LDA     0,DEV0
10 01306 006300          UNIOP   0,IOT           ;SET EXTERNAL REG
11 01307 001277          RESET
12 01310 020025-         LDA     0,=(DCSTR+100)
13 01311 002000          DOA     0,IOT           ; SET ADDRESS
14 01312 102000          ADC     0,0
15 01313 003000          DOC     0,IOT
16 01314 020277          LDA     3,SDCH          ;SET SINGLE DCH
17 01315 006300          UNIOP   0,IOT
18                       FUNC    UNIOP,1,IOT,100+186,DCHI
19 01316 102400          SUB     0,0
20 01317 006300          UNIOP   0,IOT           ;CLEAR PULSE CATCHER
21 01320 020263          LDA     1,DEV0
22 01321 006340          UNIOP   1 IOT           ;LOAD FUNCTION UNIOP
23 01322 020024-         LDA     0,=(100+186+185+1815)
24 01323 006400          DIC     1,IOT           ;DCHI PULSE BIT(S)
25 01324 100414          SUB#    0,1,SZR         ;SHOULD BE PRESENT
26                       EMALT
27 01325 104010          TRP     0,1,00  ;ERROR NUMBER 040
28                       LOOP
29 01326 000250          JSR #   ILOOP
30
```

```
 0024 MNIOT
01                       ;THE FOLLOWING TESTS CHECK BASIC
02                       ;DATA TRANSFER FUNCTIONS
03
04                 SDRC  A0,SUB,0,0,PATT0,DOA,DIA
05                 SKA0: SETUP 100.
06 01327 000247 TS040:   JSR #   ISETUP
07 01330 000144          100.
08 01331 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
09 01332 020263          LDA     0,DEV0
10 01333 006300          UNIOP   0,IOT           ;SET XREG
11 01334 102400          SUB     0,0             ;PATT0
12 01335 001000          DOA     0,IOT           ;SEND PATTERN FROM TESTER
13 01336 004000          DIA     1,IOT           ;SEE WHAT'S IN IO
14 01337 100414          SUB#    0,1,SZR
15                       EMALT
16 01340 104110          TRP     0,1,01  ;ERROR NUMBER 041
17                       LOOP
18 01341 000250          JSR #   ILOOP
19
20                       SDRC    A1,ADC,0,0,PATT1,DOA,DIA
21                 SKA1: SETUP   100.
22 01342 000247 TS041:   JSR #   ISETUP
23 01343 000144          100.
24 01344 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
25 01345 020263          LDA     0,DEV0
26 01346 006300          UNIOP   0,IOT           ;SET XREG
27 01347 102000          ADC     0,0             ;PATT1
28 01350 001000          DOA     0,IOT           ;SEND PATTERN FROM TESTER
29 01351 004000          DIA     1,IOT           ;SEE WHAT'S IN IO
30 01352 100414          SUB#    0,1,SZR
31                       EMALT
32 01353 104210          TRP     0,1,02  ;ERROR NUMBER 042
33                       LOOP
34 01354 000250          JSR #   ILOOP
35
36                       SDRC    A2,LDA,0,=052525,ALT0AND1,DOA,DIA
37                 SKA2: SETUP   100.
38 01355 000247 TS042:   JSR #   ISETUP
39 01356 000144          100.
40 01357 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
41 01360 020263          LDA     0,DEV0
42 01361 006300          UNIOP   0,IOT           ;SET XREG
43 01362 020023-         LDA     0,=052525               ;ALT0AND1
44 01363 001000          DOA     0,IOT           ;SEND PATTERN FROM TESTER
45 01364 004000          DIA     1,IOT           ;SEE WHAT'S IN IO
46 01365 100414          SUB#    0,1,SZR
47                       EMALT
48 01366 104310          TRP     0,1,03  ;ERROR NUMBER 043
49                       LOOP
50 01367 000250          JSR #   ILOOP
51
52                       SDRC    A3,LDA,0,=125252,ALT1AND0,DOA,DIA
53                 SKA3: SETUP   100.
54 01370 000247 TS043:   JSR #   ISETUP
55 01371 000144          100.
56 01372 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
57 01373 020263          LDA     0,DEV0
58 01374 006300          UNIOP   0,IOT           ;SET XREG
59 01375 020022-         LDA     0,=125252               ;ALT1AND0
60 01376 001000          DOA     0,IOT           ;SEND PATTERN FROM TESTER
```

```
 ;0025 MNIOT
01 01377 006400          DIA     1,IOT           ;SEE WHAT'S IN IO
02 01400 106414          SUB#    0,1,SZR
03                       EMALT
04 01401 104410          TRP     0,1,04  ;ERROR NUMBER 044
05                       LOOP
06 01402 000250          JSR @   ILOOP
07
```

```
;0026 MNIOT
01                       SDRC    B0,SUB,0,0,PATT0,DOB,DIB
02                SKB0:  SETUP   100.
03 01403 000247 TS044:   JSR @   ISETUP
04 01404 000144          100.
05 01405 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
06 01406 020263          LDA     0,DEV0
07 01407 006300          UNIOP   0,IOT           ;SET XREG
08 01410 102400          SUB     0,0             ;PATT0
09 01411 062000          DOB     0,IOT           ;SEND PATTERN FROM TESTER
10 01412 065400          DIB     1,IOT           ;SEE WHAT'S IN IO
11 01413 106414          SUB#    0,1,SZR
12                       EMALT
13 01414 104510          TRP     0,1,05  ;ERROR NUMBER 045
14                       LOOP
15 01415 000250          JSR @   ILOOP
16
17                       SDRC    B1,ADC,0,0,PATT1,DOB,DIB
18                SKB1:  SETUP   100.
19 01416 000247 TS045:   JSR @   ISETUP
20 01417 000144          100.
21 01420 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
22 01421 020263          LDA     0,DEV0
23 01422 006300          UNIOP   0,IOT           ;SET XREG
24 01423 102000          ADC     0,0             ;PATT1
25 01424 062000          DOB     0,IOT           ;SEND PATTERN FROM TESTER
26 01425 065400          DIB     1,IOT           ;SEE WHAT'S IN IO
27 01426 106414          SUB#    0,1,SZR
28                       EMALT
29 01427 104610          TRP     0,1,06  ;ERROR NUMBER 046
30                       LOOP
31 01430 000250          JSR @   ILOOP
32
33                       SDRC    B2,LDA,0,=052525,ALT0AND1,DOB,DIB
34                SKB2:  SETUP   100.
35 01431 000247 TS046:   JSR @   ISETUP
36 01432 000144          100.
37 01433 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
38 01434 020263          LDA     0,DEV0
39 01435 006300          UNIOP   0,IOT           ;SET XREG
40 01436 020023-         LDA     0,=052525               ;ALT0AND1
41 01437 062000          DOB     0,IOT           ;SEND PATTERN FROM TESTER
42 01440 065400          DIB     1,IOT           ;SEE WHAT'S IN IO
43 01441 106414          SUB#    0,1,SZR
44                       EMALT
45 01442 104710          TRP     0,1,07  ;ERROR NUMBER 047
46                       LOOP
47 01443 000250          JSR @   ILOOP
48
49                       SDRC    B3,LDA,0,=125252,ALT1AND0,DOB,DIB
50                SKB3:  SETUP   100.
51 01444 000247 TS047:   JSR @   ISETUP
52 01445 000144          100.
53 01446 006235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
54 01447 020263          LDA     0,DEV0
55 01450 006300          UNIOP   0,IOT           ;SET XREG
56 01451 020022-         LDA     0,=125252               ;ALT1AND0
57 01452 062000          DOB     0,IOT           ;SEND PATTERN FROM TESTER
58 01453 065400          DIB     1,IOT           ;SEE WHAT'S IN IO
59 01454 106414          SUB#    0,1,SZR
60                       EMALT
```

```
 00027 MNIOT
01 01455 105010          TRP     0,1,10  ;ERROR NUMBER 050
02                       LOOP
03 01456 006250          JSR @   ILOOP
04
```

```
00028 MNIOT
01                       ;THE FOLLOWING TESTS CHECK DONE, BUSY, AND
02              ;IO INTERRUPT SEQUENCE
03
04                       IIO0:   SETUP   100.
05 01457 005247 TS050:   JSR @   ISETUP
06 01460 000144          100.
07 01461 060235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
08 01462 061277          RESET
09 01463 063500          SKPBZ   IOT             ;CHECK BUSY AND
10                       EHALT                   ;DONE ZERO
11 01464 105110          TRP     0,1,11  ;ERROR NUMBER 051
12 01465 063700          SKPDZ   IOT
13                       EHALT
14 01466 105210          TRP     0,1,12  ;ERROR NUMBER 052
15                       LOOP
16 01467 006250          JSR @   ILOOP
17
18                       IIO1:   SETUP   100.
19 01470 006247 TS051:   JSR @   ISETUP
20 01471 000144          100.
21 01472 060235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
22 01473 060100          NIOS    IOT             ;START DEVICE
23 01474 063400          SKPBN   IOT             ;CHECK BUSY=1
24                       EHALT                   ;DONE=0
25 01475 105310          TRP     0,1,13  ;ERROR NUMBER 053
26 01476 063700          SKPDZ   IOT
27                       EHALT
28 01477 105410          TRP     0,1,14  ;ERROR NUMBER 054
29                       LOOP
30 01500 006250          JSR @   ILOOP
31
32                       IIO2:   SETUP   100.
33 01501 006247 TS052:   JSR @   ISETUP
34 01502 000144          100.
35 01503 060235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
36 01504 061277          RESET
37 01505 020275          LDA     0,SBUSY
38 01506 060300          UNIOP   0,IOT           ;CHECK 'SET BUSY'
39 01507 063400          SKPBN   IOT
40                       EHALT
41 01510 105510          TRP     0,1,15  ;ERROR NUMBER 055
42                       LOOP
43 01511 006250          JSR @   ILOOP
44
45                       IIO3:   SETUP   100.
46 01512 006247 TS053:   JSR @   ISETUP
47 01513 000144          100.
48 01514 060235          NIOC    35      ;SYNC PULSE FOR XOR TESTER
49 01515 061277          RESET
50 01516 020276          LDA     0,SDONE
51 01517 060300          UNIOP   0,IOT           ;CHECK 'SET DONE'
52 01520 063600          SKPDN   IOT
53                       EHALT
54 01521 105610          TRP     0,1,16  ;ERROR NUMBER 056
55                       LOOP
56 01522 006250          JSR @   ILOOP
57
58                       IIO4:   SETUP   100.
59 01523 006247 TS054:   JSR @   ISETUP
60 01524 000144          100.
```

```
 00029 MNIOT
01 01525 006235          NIOC    35       ;SYNC PULSE FOR XOR TESTER
02 01526 061277          RESET
03 01527 020276          LDA     0,SDONE
04 01530 063000          UNIOP   0,IOT            ;SET DONE
05 01531 062000          NIOC    IOT              ;CLEAR DEVICE
06 01532 063700          SKPDZ   IOT              ;CHECK 'DONE' CLEARED
07                       EMALT
08 01533 103710          TRP     0,1,17   ;ERROR NUMBER 057
09                       LOOP
10 01534 000250          JSR @   ILOOP
11
12               IIO5:   SETUP   100.
13 01535 000247 TS055:   JSR @   ISETUP
14 01536 000144          100.
15 01537 006235          NIOC    35       ;SYNC PULSE FOR XOR TESTER
16 01540 061277          RESET
17 01541 102620          SUBZR   0,0              ;JMP @0
18 01542 040001          STA     0,1
19 01543 020276          LDA     0,SDONE
20 01544 060177          INTEN
21 01545 063000          UNIOP   0,IOT            ;SET INTR
22 01546 101000          MOV     0,0
23 01547 101000          MOV     0,0              ;NOP'S
24 01550 063577          SKPBZ   CPU              ;DID INTR OCCUR
25                       EMALT
26 01551 100010          TRP     0,1,20   ;ERROR NUMBER 060
27 01552 060277          INTDS
28 01553 030002          LDA     2,2              ;RESTORE INTR SEQUENCE
29 01554 050001          STA     2,1
30                       LOOP
31 01555 000250          JSR @   ILOOP
```

```
 00030 MNIOT
01               IIO6:   SETUP   100.
02 01556 000247 TS056:   JSR @   ISETUP
03 01557 000144          100.
04 01560 006235          NIOC    35       ;SYNC PULSE FOR XOR TESTER
05 01561 061277          RESET
06 01562 020276          LDA     0,SDONE
07 01563 063000          UNIOP   0,IOT
08 01564 102400          SUB     0,0
09 01565 063000          UNIOP   0,IOT
10 01566 063700          SKPDZ   IOT              ;DOES IOPLS RESET 'DONE'
11                       EMALT
12 01567 100110          TRP     0,1,21   ;ERROR NUMBER 061
13                       LOOP
14 01570 000250          JSR @   ILOOP
15
16               IIO7:   SETUP   100.
17 01571 000247 TS057:   JSR @   ISETUP
18 01572 000144          100.
19 01573 006235          NIOC    35       ;SYNC PULSE FOR XOR TESTER
20 01574 061277          RESET
21 01575 102520          SUBZL   0,0              ;AC0 IS NOT ZERO
22 01576 060177          INTEN
23 01577 024300          LDA     1,SINT           ;SET INTR
24 01600 063000          UNIOP   1,IOT
25 01601 101000          MOV     0,0
26 01602 101000          MOV     0,0              ;NOP'S
27 01603 101004          MOV     0,0,SZR          ;DEVICE=0 (INTA DONE AT INTER)
28                       EMALT
29 01604 100210          TRP     0,1,22   ;ERROR NUMBER 062
30 01605 060277          INTDS
31                       LOOP
32 01606 000250          JSR @   ILOOP
33
34               IIO8:   SETUP   100.
35 01607 000247 TS060:   JSR @   ISETUP
36 01610 000144          100.
37 01611 006235          NIOC    35       ;SYNC PULSE FOR XOR TESTER
38 01612 061277          RESET
39 01613 102620          SUBZR   0,0
40 01614 040001          STA     0,1              ;JMP @0
41 01615 034061-         LDA     3,=040000        ;BASE MASK BIT
42 01616 030201          LDA     2,IMSK1          ;BASE BIT TO BE SET
43 01617 024061-         LDA     1,=040000        ;START BIT
44 01620 020276          LDA     0,SDONE          ;SET DONE
45
46 01621 073300 IIO8A:   UNIOP   2,IOT            ;SET BIT
47 01622 060077          MSKO    1
48 01623 060177          INTEN
49 01624 063300          UNIOP   0,IOT            ;INTR
50 01625 137414          AND#    1,3,SZR
51 01626 000412          JMP     IIO8B
52 01627 125222          MOVZR   1,1,SZC          ;ALL BITS TRIED
53 01630 000404          JMP     .+4
54 01631 063577          SKPBZ   CPU              ;INTR OCCURRED
55                       EMALT
56 01632 100310          TRP     0,1,23   ;ERROR NUMBER 063
57 01633 000766          JMP     IIO8A
58 01634 175220          MOVZR   3,3
59 01635 151400          INC     2,2
60 01636 000761          JMP     IIO8+10
```

```
 00031 MNIOT
01 01037 000406          JMP     II06C
02
03 01040 125222 II08A:   MOVZR   1,1,SZC
04 01041 000404          JMP     II06C
05 01042 063477          SKPBN   CPU
06                       EMALT
07 01043 100410          TRP     0,1,24  ;ERROR NUMBER 024
08 01044 000755          JMP     II08A
09
10 01045 020002 II08C:   LDA     0,2
11 01046 040001          STA     0,1             ;RESTORE INTR SEQ
12                       LOOP
13 01047 006250          JSR @   ILOOP
```

```
 00032 MNIOT
01                       ;THE FOLLOWING TESTS CHECK DATA CHANNEL OPERATION
02
03                       IODC0:  SETUP   100.
04 01050 006247          TS061:  JSR @   ISETUP
05 01051 000144                  100.
06 01052 063235                  NIOC    35      ;SYNC PULSE FOR XOR TESTER
07 01053 061277                  RESET
08 01054 006322                  CLEAR           ;CLEAR DATA AREA
09 01055 020021-                 LDA     0,=(DCSTR+100)
10 01056 061000                  DOA     0,IOT           ;SET DATA=ADDRESS
11 01057 062000                  DOB     0,IOT
12 01060 030277                  LDA     2,SDCH
13 01061 073000                  UNIOP   2,IOT
14 01062 024220-                 LDA     1,=-10.
15 01063 125404                  INC     1,1,SZR         ;GIVE CHANNEL A CHANCE
16 01064 000777                  JMP     .-1
17 01065 111120                  MOVZL   0,2
18 01066 151220                  MOVZR   2,2             ;DROP BIT 0
19 01067 025000                  LDA     1,0,2
20 01070 100414                  SUB#    0,1,SZR
21                               EMALT
22 01071 100510                  TRP     0,1,25  ;ERROR NUMBER 065
23                               LOOP
24 01072 006250                  JSR @   ILOOP
25
26                       IODC1:  SETUP   100.
27 01073 006247          TS062:  JSR @   ISETUP
28 01074 000144                  100.
29 01075 063235                  NIOC    35      ;SYNC PULSE FOR XOR TESTER
30 01076 061277                  RESET
31 01077 020017-                 LDA     0,=DCSTR
32 01100 042016-                 STA     0,@=DCSTR       ;SET DATA=ADDRESS
33 01101 062000                  DOB     0,IOT
34 01102 024020-                 LDA     1,=-10.
35 01103 030277                  LDA     2,SDCH          ;DO SINGLE DATA CHANNEL
36 01104 073000                  UNIOP   2,IOT
37 01105 125404                  INC     1,1,SZR         ;WAIT
38 01106 000777                  JMP     .-1
39 01107 064400                  DIA     1,IOT
40 01110 100414                  SUB#    0,1,SZR         ;IS DATA=ADDRESS
41                               EMALT
42 01111 100610                  TRP     0,1,26  ;ERROR NUMBER 066
43                               LOOP
44 01112 006250                  JSR @   ILOOP
```

```
100033 MNIOT
01                IODC2:  SETUP   100.
02 001713 006247  TS063:  JSR @   ISETUP
03 001714 000144          100.
04 001715 006235          NIOC    35        ;SYNC PULSE FOR XOR TESTER
05 001716 001277          RESET
06 001717 034015-         LDA     3,=DCSTR
07 001720 020014-         LDA     0,=7777
08 001721 110400          SUB     0,3               ;DETERMINE AVAILABLE
09 001722 077000          DOC     3,IOT             ;IN 4K SYSTEM
10 001723 024225          LDA     1,TIMER ;***JLB*** SET UP DELAY COUNTER
11 001724 020013-         LDA     0,=(DCSTR+100)
12 001725 061000          DOA     0,IOT             ;SET DATA=ADDRESS
13 001726 062000          DOB     0,IOT
14 001727 030274          LDA     2,MDCH            ;DO MULTIPLE DATA CHANNEL
15 001730 073300          UNIOP   2,IOT
16 001731 063700          SKPDZ   IOT       ;***JLB*** IOT DONE?
17 001732 000404          JMP     .+4       ;***JLB*** YES, LET'S GO
18 001733 125404          INC     1,1,SZR           ;WAIT
19 001734 000775          JMP     .-3       ;***JLB*** TRY AGAIN
20                        EMALT             ;***JLB*** ERROR- IOT HUNG
21 001735 100710          TKP     0,1,27    ;ERROR NUMBER 067
22 001736 111120          MOVZL   0,2
23 001737 151220          MOVZR   2,2               ;REMOVE BIT 0
24 001740 021000          LDA     0,0,2
25 001741 142554          SUBOL#  2,0,SZR
26                        EMALT
27 001742 107010          TKP     0,1,30    ;ERROR NUMBER 070
28 001743 151400          INC     2,2
29 001744 175404          INC     3,3,SZR
30 001745 000773          JMP     .-5
31                        LOOP
32 001746 006250          JSR @   ILOOP
```

```
100034 MNIOT
01                IODC3:  SETUP   100.
02 001747 006247  TS064:  JSR @   ISETUP
03 001750 000144          100.
04 001751 006235          NIOC    35        ;SYNC PULSE FOR XOR TESTER
05 001752 001277          RESET
06 001753 006322          CLEAR             ;CLEAR DATA AREA
07 001754 034273          LDA     3,MADR            ;GET ADDRESS AND WORD COUNT
08 001755 175132          MOVZL#  3,3,SZC
09 001756 000403          JMP     .+3
10 001757 152620          SUBZR   2,2
11 001760 157000          ADD     2,3               ;ADD BIT 0
12 001761 030321          LDA     2,WCT
13 001762 154400          NEG     2,2
14 001763 075000          DOA     3,IOT
15 001764 076000          DOB     3,IOT
16 001765 073000          DOC     2,IOT
17 001766 024225          LDA     1,TIMER ;***JLB*** SET UP DELAY COUNTER
18 001767 020274          LDA     0,MDCH
19 001770 060300          UNIOP   0,IOT             ;INITIATE DATA CHANNEL
20 001771 063700          SKPDZ   IOT       ;***JLB*** IOT DONE?
21 001772 000404          JMP     .+4       ;***JLB*** YES, LET'S GO
22 001773 125404          INC     1,1,SZR           ;WAIT
23 001774 000775          JMP     .-3       ;***JLB*** TRY AGAIN
24                        EMALT             ;***JLB*** ERROR- IOT HUNG
25 001775 107110          TKP     0,1,31    ;ERROR NUMBER 071
26 001776 175120          MOVZL   3,3
27 001777 175220          MOVZR   3,3               ;DROP BIT 0
28 002000 021400          LDA     0,0,3
29 002001 162554          SUBOL#  3,0,SZR
30                        EMALT
31 002002 107210          TKP     0,1,32    ;ERROR NUMBER 072
32 002003 175400          INC     3,3
33 002004 151404          INC     2,2,SZR           ;CHECK ALL ENTRIES
34 002005 000773          JMP     .-5
35 002006 020273          LDA     0,MADR            ;RANDOMIZE NEXT ADDRESS
36 002007 000323          RAND
37 002010 024012-         LDA     1,=(DCSTR+100)
38 002011 123000          ADD     1,0
39 002012 040273          STA     0,MADR
40 002013 020321          LDA     0,WCT             ;RANDOMIZE NEXT WORD COUNT
41 002014 000323          RAND
42 002015 101005          MOV     0,0,SNR           ;WORD COUNT CANNOT BE ZERO
43 002016 000776          JMP     .-2
44 002017 040321          STA     0,WCT
45                        LOOP
46 002020 006250          JSR @   ILOOP
```

```
100035 MNIOT
01                IODC4:  SETUP   100.
02 002021 000247 TS065:   JSR @   ISETUP
03 002022 000144          100.
04 002023 060235          NIOC    35        ;SYNC PULSE FOR XOR TESTER
05 002024 061277          RESET
06 002025 030011-         LDA     2,=DCSTR          ;DETERMINE AVAILABLE MEMORY
07 002026 002057-         LDA     0,=100000         ;FOR 4K SYSTEM
08 002027 142400          SUB     2,0
09 002030 024225          LDA     1,TIMER ;***JLB*** SET UP DELAY COUNTER
10 002031 100400          NEG     0,0
11 002032 063000          DOC     0,IOT
12 002033 072000          DOB     2,IOT
13 002034 051000          STA     2,3,2             ;SET DATA=ADDRESS
14 002035 151400          INC     2,2
15 002036 101404          INC     0,0,SZR
16 002037 000775          JMP     .-3
17 002040 020274          LDA     0,MUCM
18 002041 063000          UNIOP   0,IOT
19 002042 063700          SKPDZ   IOT       ;***JLB*** IOT DONE?
20 002043 000404          JMP     .+4       ;***JLB*** YES, LET'S GO
21 002044 125404          INC     1,1,SZR           ;WAIT
22 002045 000775          JMP     .-3       ;***JLB*** TRY AGAIN
23                        EMALT             ;***JLB*** ERROR= IOT HUNG
24 002046 107310          TRP     0,1,33    ;ERROR NUMBER 073
25 002047 022214-         LDA     0,@=7777
26 002050 064000          DIA     1,IOT
27 002051 100414          SUB#    0,1,SZR           ;IS DATA=ADDRESS
28                        EMALT
29 002052 107410          TRP     0,1,34    ;ERROR NUMBER 074
30                        LOOP
31 002053 000250          JSR @   ILOOP
```

```
100036 MNIOT
01                IODC5:  SETUP   100.
02 002054 000247 TS066:   JSR @   ISETUP
03 002055 000144          100.
04 002056 060235          NIOC    35        ;SYNC PULSE FOR XOR TESTER
05 002057 061277          RESET
06 002060 000322          CLEAR             ;CLEAR DATA AREA
07 002061 034273          LDA     3,MADR
08 002062 175123          MOVZL   3,3
09 002063 175220          MOVZR   3,3               ;SET ADDRESS AND
10 002064 076000          DOB     3,IOT             ;WORD COUNT (DROP BIT 0)
11 002065 034321          LDA     2,WCT
12 002066 150400          NEG     2,2
13 002067 024225          LDA     1,TIMER ;***JLB*** SET UP DELAY COUNTER
14 002070 073000          DOC     2,IOT
15 002071 055400          STA     3,0,3             ;SET DATA=ADDRESS
16 002072 175400          INC     3,3
17 002073 151404          INC     2,2,SZR
18 002074 000775          JMP     .-3
19 002075 020274          LDA     0,MUCM
20 002076 063000          UNIOP   0,IOT             ;DO MULTIPLE DATA CHANNEL
21 002077 063700          SKPDZ   IOT       ;***JLB*** IOT DONE?
22 002100 000404          JMP     .+4       ;***JLB*** YES, LET'S GO
23 002101 125404          INC     1,1,SZR           ;WAIT
24 002102 000775          JMP     .-3       ;***JLB*** TRY AGAIN
25                        EMALT             ;***JLB*** ERROR= IOT HUNG
26 002103 107510          TRP     0,1,35    ;ERROR NUMBER 075
27 002104 060400          DIA     0,IOT
28 002105 174400          NEG     3,3
29 002106 174400          COM     3,3               ;ADDRESS-1
30 002107 110414          SUB#    0,3,SZR           ;IS DATA=ADDRESS FOR DCHO
31                        EMALT
32 002110 107610          TRP     0,1,36    ;ERROR NUMBER 076
33 002111 020273          LDA     0,MADR
34 002112 000323          RAND              ;RANDOMIZE ADDRESS
35 002113 024120-         LDA     1,=DCSTR
36 002114 123400          ADD     1,0
37 002115 040273          STA     0,MADR
38 002116 020321          LDA     0,WCT             ;RANDOMIZE WORD COUNT
39 002117 000323          RAND
40 002120 101005          MOV     0,0,SNR           ;WORD COUNT CANNOT BE ZERO
41 002121 000776          JMP     .-2
42 002122 040321          STA     0,WCT
43                        LOOP
44 002123 000250          JSR @   ILOOP
```

```
10037 MNIOT
01                ;THE FOLLOWING TESTS CHECK DEVICE
02                ;CODE AND POLARITY
03
04                IODV0:  SETUP   100.
05 02124 000247 TS067:    JSR #   ISETUP
06 02125 000144           100.
07 02126 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
08 02127 061277           RESET             ;DEFAULT DEVICE=0
09 02130 061277           RESET
10 02131 020264           LDA     0,DEV1    ;SET DEVICE=25
11 02132 060300           UNIOP   0,IOT
12 02133 061277           RESET
13 02134 102520           SUBZL   0,0       ;SEND BIT 15
14 02135 061025           DOA     0,25
15 02136 064425           DIA     1,25      ;READ DEVICE 25
16 02137 077452           DIA     2,52      ;READ NON-EXISTANT DEVICE
17 02140 106414           SUB#    0,1,SZR   ;COMPARE
18                        EMALT
19 02141 107710           TRP     0,1,37  ;ERROR NUMBER 077
20 02142 151414           INC#    2,2,SZR   ;ALL "1'S" FOR NO DEVICE
21                        EMALT
22 02143 110010           TRP     0,2,00  ;ERROR NUMBER 100
23 02144 020265           LDA     0,DEV2    ;SET DEVICE=52
24 02145 060325           UNIOP   0,25
25 02146 061277           RESET
26 02147 102520           SUBZR   0,0       ;SEND BIT 0
27 02150 061052           DOA     0,52
28 02151 064452           DIA     1,52
29 02152 106414           SUB#    0,1,SZR   ;COMPARE
30                        EMALT
31 02153 110110           TRP     0,2,01  ;ERROR NUMBER 101
32                        LOOP
33 02154 000250           JSR #   ILOOP
34
35                IODV1:  SETUP   100.
36 02155 000247 TS070:    JSR #   ISETUP
37 02156 000144           100.
38 02157 060235           NIOC    35      ;SYNC PULSE FOR XOR TESTER
39 02160 061277           RESET
40 02161 061277           RESET             ;DEFAULT DEVICE=0
41 02162 020266           LDA     0,DEV3    ;SET POLARITY=0
42 02163 060300           UNIOP   0,IOT
43 02164 061277           RESET
44 02165 020023-          LDA     0,=052525 ;SEND ALT 0 AND 1
45 02166 061000           DOA     0,IOT
46 02167 024263           LDA     1,DEV0    ;RESET POLARITY=1
47 02170 124000           COM     1,1       ;SEND COMPLEMENT
48 02171 064300           UNIOP   1,IOT
49 02172 061277           RESET
50 02173 064400           DIA     1,IOT
51 02174 124000           COM     1,1       ;FLIP BITS
52 02175 106414           SUB#    0,1,SZR
53                        EMALT
54 02176 110210           TRP     0,2,02  ;ERROR NUMBER 102
55                        LOOP
56 02177 000250           JSR #   ILOOP
57
58 02200 000442 IODN:     JMP     DONE      ;MAIN PROGRAM END
```

```
10038 MNIOT
01                ;INTERRUPT SEQUENCES
02
03 02201 040267 INTER:    STA     0,ISAV0
04 02202 044270           STA     1,ISAV1   ;SAVE AC'S AND CARRY
05 02203 050271           STA     2,ISAV2
06 02204 054272           STA     3,ISAV3
07 02205 101200           MOVR    0,0
08 02206 040262           STA     0,CARRY
09
10 02207 061477           INTA    0
11 02210 101005           MOV     0,0,SNR   ;WHO ARE YOU?
12
13 02211 040267 IIOT:     STA     0,ISAV0   ;RETURN WITH DEVICE
14 02212 020301           LDA     0,RINT
15 02213 060300           UNIOP   0,IOT     ;RESET INTR
16
17 02214 020262 DISMIS:   LDA     0,CARRY
18 02215 101100           MOVL    0,0       ;RESTORE AC'S AND CARRY
19 02216 034272           LDA     3,ISAV3
20 02217 030271           LDA     2,ISAV2
21 02220 024270           LDA     1,ISAV1
22 02221 020267           LDA     0,ISAV0
23 02222 060177           INTEN
24 02223 002000           JMP     @0        ;GO BACK TO WHERE YOU BELONG
```

```
1#039 MNIUT
01 #2224 #47115 DINT:   .TXTF !MN101    #01
#2        147711
#3        124324
#4        12#24#
#5        #30240
#6        #####0
#7 #2232  #####0          0
#8 #2233  ####20          2#0
#9 #2234  172#01          172#01
10 #2235  1#####          1#####
11 #2236  ######          0
12 #2237  ######          0
13 #224#  ######          0
14 #2241  ######          0
15
```

```
1#040 MNIUT
                        .TITL   MNPAC
#2
#3                  ;*****************************************************************
#4                  ;TERMINATION MODULE - INITIALIZES SUBTEST COUNTER, UPDATES
#5                  ;PASS NUMBER, AND OUTPUTS PASS COMPLETE MESSAGE
#6                  ;*****************************************************************
#7
#8 #2242 #1#2#3 DONE:   ISZ     PASS    ;INCREMENT PASS COUNTER
#9 #2243 ####4#1        JMP     .+1     ;NOP
1# #2244 #2#2#7         LDA     0,SWREG
11 #2245 #242#2         LDA     1,MSK4
12 #2246 1#7#04         AND     0,1,SZR
13 #2247 ####4#         JMP     .+6
14 #225# ##6256         JSR @   IMES?S
15 #2251 ##337#         HDG?2                   ;OUTPUT TEST COMPLETED MESSAGE
16 #2252 #24263         LDA     1,PASS  ;GET PASS NUMBER
17 #2253 ##6253         JSR @   IZDC?T  ;OUTPUT
18 #2254 ##6257         JSR @   ICRL?F
19 #2255 1#2###         SUB     0,0
20 #2256 #4#213         STA     0,TSTNM ;CLEAR SUBTEST COUNTER
21 #2257 #34324         LDA     3,IEGGS ;GET DTOS MODE
22 #226# #214##         LDA     0,0,3
23 #2261 1#1#05         MOV     0,0,SNR ;MANUAL OR AUTO?
24 #2262 ##22#4         JMP @   REP?T   ;MANUAL MODE
25 #2263 #154#3         DSZ     3,3     ;AUTO- DECREMENT PASS COUNT
26 #2264 ##22#4         JMP @   REP?T   ;NOT COMPLETED
27 #2265 #214#3         LDA     0,3,3   ;GET PASS CNT
28 #2266 #314#4 RTRN:   LDA     2,4,3   ;ALL DONE, RETURN TO DTOS
29 #2267 #41376         STA     0,-2,2
3# #227# #61277         DUAL    0,CPU   ;PERFORM IO RESET
31 #2271 ##1###         JMP     #,2     ;RETURN TO DTOS
32
33
34
35                  ;*****************************************************************
36                  ;FOLLOWING IS A PACKAGE OF SUBROUTINES TO HANDLE THE SETUP,
37                  ;HALT, AND LOOP FUNCTIONS.  THEY ARE INTENDED TO FORM A
38                  ;STANDARD PACKAGE USABLE BY ANY MICRO-NOVA DIAGNOSTIC.
39                  ;*****************************************************************
4#
41
42                  ;*****************************************************************
43                  ;THE SETUP SUBROUTINE CLEARS SUBTEST ERROR COUNTS, INCREMENTS
44                  ;THE SUBTEST POINTER, PERFORMS AN I/O RESET, INITIALIZES THE
45                  ;ITERATION COUNTS, AND CLEARS ALL THE REGISTERS.
46                  ;*****************************************************************
47 #2272 #214## XSETUP: LDA     #,0,3   ;GET NO. OF PASSES
48 #2273 #4#5#6         STA     0,ITR   ;INITIALIZE PASS COUNTER.
49 #2274 #4#5#6         STA     0,ITRCT
5# #2275 1754##         INC     3,3
51 #2276 #542#1         STA     3,LOOPR ;SAVE SUBTEST START ADDRESS.
52 #2277 #24#4#         LDA     0,REP?T
53 #23#### 1#1#05       MOV     #,0,SNR ;IS THIS THE FIRST SUBTEST?
54 #2301 #4#2#4         STA     0,REP?T ;YES, SAVE IT
55 #2302 #1#213         ISZ     TSTNM   ;INCREMENT TEST COUNTER
56 #2303 1#24##         SUB     0,0
57 #2304 #4#5#1         STA     0,ERRCT ;CLEAR SUBROUTINE ERROR COUNT
58 #2305 1#3###         MOV     0,1     ;CLEAR REGISTERS
59 #2306 131###         MOV     1,2
6# #2307 153###         MOV     2,3
```

```
 0041 MNIUT
01 02310 061277          DOAC    0,CPU    ;PERFORM IO RESET
02 02311 002201          JMP @   LOOPR    ;START SUBTEST
03
04                ;*************************************************************
05                ;THE EHALT SERVICE ROUTINE IS ACCESSED THROUGH A HARDWARE TRAP
06                ;INSTRUCTION.  IT PERFORMS VARIOUS FUNCTIONS DEPENDING ON THE
07                ;CONTENTS OF "SWREG", INCLUDING DETAILED ERROR PRINTOUTS AND
08                ;LOOPING OR HALTING ON ERRORS.  ALL REGISTERS ARE SAVED IN
09                ;A MEMORY STACK AND, IF LOOP ON ERROR IS NOT SELECTED, THEY
10                ;ARE RESTORED PRIOR TO RETURNING TO THE SUB-TEST.
11                ;*************************************************************
12 02312 074001 XEHALT: MTFP    3        ;SAVE REGISTER 3
13 02313 034046          LDA     3,46     ;LOAD ADDRESS OF ERROR
14 02314 062401          SAV              ;SAVE EVERYTHING IN STACK
15 02315 102400          SUB     0,0
16 02316 020046          LDA     1,@46    ;GET TRAP INSTRUCTION
17 02317 030537          LDA     2,TRP0   ;GET TRAP 0 MASK
18 02320 146405          SUB     2,1,SNR  ;IS IT A USER TRAP?
19 02321 004534          JSR     USER     ;YES
20 02322 030535          LDA     2,C7100
21 02323 073101          DIV              ;SHIFT RIGHT 6 BITS
22 02324 044214          STA     1,ERNUM  ;SAVE ERROR NUMBER
23 02325 102400          SUB     0,0
24 02326 040540          STA     0,EFWRD  ;CLEAR ERROR FLAG WORD POINTER
25 02327 063477          SKPBN   CPU      ;TEST FOR INTERRUPTS ENABLED
26 02330 102000          ADC     0,0
27 02331 040527          STA     0,INTFLG ;SET FLAG
28 02332 060277          INTDS
29 02333 014212          ISZ     ERCNT
30 02334 000402          JMP     .+2
31 02335 014212          DSZ     ERCNT    ;AVOID ZERO ERROR CNT FROM WRAP-AROUND
32 02336 000401          JMP     .+1
33 02337 010526          ISZ     ERRCT    ;INCREMENT SUBTEST ERROR COUNT
34 02340 020227          LDA     0,MSK1   ;GET BIT 1
35 02341 061035          DOA     0,35     ;NOTIFY XOR TESTER OF MASTER FAIL
36 02342 020223          LDA     0,C20
37 02343 030214          LDA     2,ERNUM  ;GET ERROR NUMBER
38 02344 112423 DECR:    SUBZ    0,2,SNC  ;INDEX EFWRD AGAIN?
39 02345 000403          JMP     FWORD    ;NO
40 02346 010520          ISZ     EFWRD    ;YES
41 02347 000775          JMP     DECR     ;TRY AGAIN
42 02350 034516 FWORD:   LDA     3,EFWRD  ;GET FLAG WORD POINTER
43 02351 113000          ADD     0,2      ;MAKE POINTER POSITIVE AGAIN
44 02352 024511          LDA     1,MASK   ;GET MASK TABLE BASE ADDRESS
45 02353 133000          ADD     1,2      ;ADD TO INDEX VALUE
46 02354 024510          LDA     1,FLAG   ;GET ERROR FLAG TABLE BASE ADDRESS
47 02355 137000          ADD     1,3      ;ADD TO INDEX VALUE
48 02356 025000          LDA     1,0,2    ;GET ERROR MASK BIT
49 02357 021400          LDA     0,0,3    ;GET FLAG TABLE WORD
50 02360 107415          ANDZ    0,1,SNR  ;FIRST TIME FOR THIS ERROR?
51 02361 000406          JMP     BITON    ;YES- PRINT IT
52 02362 034500          LDA     3,ITRCT
53 02363 030476          LDA     2,ITR    ;TEST FOR FIRST PASS
54 02364 156404          SUB     2,3,SZR  ;OF THIS SUBTEST
55 02365 000450          JMP     MULTI    ;MULTIPLE ERRORS
56 02366 000403          JMP     PRINT
57 02367 123000 BITON:   ADD     1,0      ;OR IN BIT FOR THIS FAILURE
58 02370 041400          STA     0,0,3
59 02371 020207 PRINT:   LDA     0,SWREG  ;CHECK BITS 0-6
60 02372 024231          LDA     1,MSK3
```

```
 0042 MNIUT
01 02373 107404          AND     0,1,SZR  ;TEST FOR DETAILED ERROR LOG
02 02374 000441          JMP     MULTI    ;% ERROR PRINTOUT ONLY
03 02375 000256          JSR @   IMES?S   ;PRINT OUT DETAILED ERROR MESSAGE
04 02376 000253          ERMS1
05 02377 024214          LDA     1,ERNUM
06 02400 000253          JSR @   IZOC?I   ;INCLUDING ERROR NUMBER,
07 02401 000256          JSR @   IMES?S
08 02402 000262          EMS1A
09 02403 024213          LDA     1,TSTNM
10 02404 000253          JSR @   IZOC?I   ;FAILING TEST NUMBER,
11 02405 000257          JSR @   ICRL?F
12 02406 000256          JSR @   IMES?S
13 02407 000275          ERMS2            ;AND CONTENTS OF ALL REGISTERS
14 02410 000257          JSR @   ICRL?F
15 02411 024222          LDA     0,STACK+5        ;GET CRY AND PC
16 02412 101120          MOVZL   0,0      ;MOVE CRY TO CARRY BIT
17 02413 126500          SUBCL   1,1      ;MOVE CRY TO AC1 BIT 15
18 02414 000253          JSR @   IZOC?I   ;CARRY BIT
19 02415 024215          LDA     1,STACK+1
20 02416 000252          JSR @   IPOC?I   ;AC0
21 02417 024217          LDA     1,STACK+2
22 02420 000252          JSR @   IPOC?I   ;AC1
23 02421 024220          LDA     1,STACK+3
24 02422 000252          JSR @   IPOC?I   ;AC2
25 02423 024221          LDA     1,STACK+4
26 02424 000252          JSR @   IPOC?I   ;AC3
27 02425 105220          MOVZR   0,1      ;GET FAILING PC
28 02426 000252          JSR @   IPOC?I   ;PROGRAM COUNTER
29 02427 000257          JSR @   ICRL?F
30 02430 034324          LDA     3,IEGGS  ;GET DTOS EGGS POINTER
31 02431 020222          LDA     0,STACK+5        ;GET FAILING PC
32 02432 025400          LDA     1,0,3    ;GET DTOS AUTO MODE FLAG
33 02433 125004          MOV     1,1,SZR  ;ARE WE IN AUTO MODE?
34 02434 000632          JMP     RTRN     ;YES, EXIT TEST
35 02435 020207 MULTI:   LDA     0,SWREG
36 02436 024234          LDA     1,MSK6
37 02437 107405          AND     0,1,SNR  ;HALT ON ERROR?
38 02440 000405          JMP     .+5      ;NO
39 02441 000256          JSR @   IMES?S   ;YES- OUTPUT MESSAGE
40 02442 003335          ERMS4
41 02443 000257          JSR @   ICRL?F
42 02444 063077          HALT             ;ERROR HALT IS HERE
43 02445 020207          LDA     0,SWREG
44 02446 024227          LDA     1,MSK1
45 02447 107405          AND     0,1,SNR  ;LOOP ON ERROR?
46 02450 000250          JSR @   ILOOP    ;YES
47 02451 014222          ISZ     STACK+5
48 02452 014406          ISZ     INTFLG   ;WERE INTERRUPTS ENABLED?
49 02453 063177          INTEN            ;YES
50 02454 062601          RET              ;RETURN TO TEST
51 02455 001400 USER:    JMP     0,3      ;USER MAY CHANGE THIS TO USE TRAP 0
52 02456 100010 TRP0:    100010
53 02457 000100 C7100:   100
54 02460 000000 INTFLG:  0
55 02461 000144 IIR:     144
56 02462 000000 ITRCT:   0
57 02463 000226 MASK:    MSK0
58 02464 002467 FLAG:    ERFLG
59 02465 000000 ERRCT:   0
60 02466 000000 EFWRD:   0                ;ERROR FLAG WORD POINTER
```

```
 0043 MNIUT
01 02467 000040 ERFLG:  .BLK     40      ;ERROR FLAG WORDS, 1 BIT FOR EACH ERNUM
02
03              ;*****************************************************************
04              ;THE LOOP SUBROUTINE KEEPS TRACK OF THE NUMBER OF SUBTEST
05              ;ITERATIONS AND ERROR LOOPS, AND PRINTS OUT ERROR PERCENT
06              ;AND SUBTEST COMPLETION HEADINGS IF SO DIRECTED BY
07              ;THE "SWREG" CONTENTS.
08              ;*****************************************************************
09 02527 054205 XLOOP:  STA     3,RTN?1
10 02530 014752          DSZ     ITRCT   ;DECREMENT ITERATION COUNT
11 02531 000447          JMP     RLOOP
12 02532 024733 NXTST:  LDA     1,ERRCT
13 02533 125005          MOV     1,1,SNR ;ERRORS ENCOUNTERED?
14 02534 000430          JMP     NOERR   ;NO ERRORS
15 02535 006256          JSR @   IMES?S  ;PRINT ERROR % HEADING
16 02536 003323          EMSSA
17 02537 024213          LDA     1,TSTNM ;GET FAILING TEST NO.
18 02540 006253          JSR @   IZOC?T  ;PRINT IT
19 02541 006256          JSR @   IMES?S
20 02542 003330          EMSSB
21 02543 102400          SUB     0,0
22 02544 024224          LDA     1,D100
23 02545 030714          LDA     2,ITR
24 02546 073101          DIV
25 02547 030716          LDA     2,ERRCT
26 02550 073301          MUL             ;CALCULATE TRUE ERROR PERCENT
27 02551 006254          JSR @   IPDC?S  ;AND VALUE
28 02552 000245          .TXTF   /%/
29 02553 006257          JSR @   ICRL?F
30 02554 152400          SUB     2,2
31 02555 050710          STA     2,ERRCT ;CLEAR ERROR COUNT
32 02556 030703          LDA     2,ITR
33 02557 050703          STA     2,ITRCT ;INITIALIZE PASS COUNTER
34 02560 020207          LDA     0,SWREG
35 02561 024227          LDA     1,MSK1
36 02562 107405          AND     0,1,SNR ;LOOP ON ERROR?
37 02563 000415          JMP     RLOOP   ;YES
38 02564 020207 NOERR:  LDA     0,SWREG
39 02565 063635          SKPDN   33      ;CHECK FOR XOR TESTER FAIL
40 02566 000406          JMP     .+6     ;NO FAILURE
41 02567 010212          ISZ     ERCNT   ;INCREMENT ERROR COUNT
42 02570 000401          JMP     .+1
43 02571 024227          LDA     1,MSK1
44 02572 107405          AND     0,1,SNR ;LOOP ON ERROR?
45 02573 000405          JMP     RLOOP   ;YES
46 02574 024235          LDA     1,MSK7
47 02575 107404          AND     0,1,SZR ;OUTPUT SUBTEST NUMBER?
48 02576 004422          JSR     TSTOUT  ;YES
49 02577 022205          JMP @   RTN?1   ;PERFORM NEXT SUBTEST
50 02600 020215 RLOOP:  LDA     0,STACK ;GET STACK POINTER
51 02601 061001          MTSP    0       ;RESET STACK
52 02602 060001          MTFP    0       ;AND FRAME POINTERS
53 02603 020207          LDA     0,SWREG
54 02604 024227          LDA     1,MSK1
55 02605 107404          AND     0,1,SZR ;LOOP ON ERROR?
56 02606 002401          JMP @   LOOPR   ;NO
57 02607 024212          LDA     0,ERCNT ;YES
58 02610 101005          MOV     0,0,SNR ;ANY ERRORS?
59 02611 002401          JMP @   LOOPR   ;NO, NOT YET
60 02612 101224          MOVZR   0,0,SZR ;FIRST TIME FOR ERROR LOOP?
```

```
 0044 MNIUT
01 02613 000404          JMP     .+4     ;NO
02 02614 006256          JSR @   IMES?S
03 02615 003345          ERMSS           ;OUTPUT LOOPING ON ERROR MESSAGE
04 02616 006257          JSR @   ICRL?F
05 02617 002201          JMP @   LOOPR
06 02620 054206 TSTOUT: STA     3,RTN?2
07 02621 102400          SUB     0,0
08 02622 024213          LDA     1,TSTNM
09 02623 030211          LDA     2,INTVL
10 02624 073101          DIV             ;PERFORM PRINT-SUB CALCULATIONS
11 02625 101004          MOV     0,0,SZR ;IS THERE A REMAINDER?
12 02626 000406          JMP     .+6     ;YES, DON'T PRINT THIS TIME
13 02627 006256          JSR @   IMES?S
14 02630 003356          MSG?1           ;OUTPUT SUBTEST COMPLETION HEADING
15 02631 024213          LDA     1,TSTNM
16 02632 006253          JSR @   IZOC?T  ;AND SUBTEST NUMBER
17 02633 006257          JSR @   ICRL?F
18 02634 034206          LDA     3,RTN?2
19 02635 001400          JMP     0,3     ;RETURN TO TEST
20
21              ;*****************************************************************
22              ;FOLLOWING IS A GROUP OF TTY/LPT DRIVER AND SERVICE ROUTINES
23              ;*****************************************************************
24
25              ;FILENAME=TTY10
26
27              ;TELETYPE NON INTERRUPT PACKAGE
28              ;CARRY,AC0,AC1,AC2 SAVED
29              ;"MES?S" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLER
30              ;"CRL?F" PRINTS A CARRIAGE RETURN
31              ;"POC?T" PRINTS C(1) IN OCTAL
32              ;"ZOC?T" PRINTS C(1) IN OCTAL, LEADING ZEROS SUPPRESSED
33              ;"PDE?C" PRINTS C(1) IN DECIMAL, LEADING ZEROS SUPPRESSED,
34              ;THE ABOVE THREE ARE FOLLOWED BY A TAB
35              ;"POC?S" PRINTS C(1) IN DECIMAL, LEADING ZEROS SUPPRESSED,
36              ;FOLLOWED BY THE CHARACTER STORED AT CALLING LOCATION +1.
37              ;PROGRAM RETURNS TO CALLING LOCATION +2.
38              ;"TIN?O" ACCEPTS OCTAL, AND
39              ;"TIN?D" ACCEPTS DECIMAL SINGLE PRECISION SIGNED INTEGERS
40              ;INTO AC1 FROM THE TTI.  LEADING NULLS, TABS,
41              ;AND SPACES ARE IGNORED.  A 16 BIT UNSIGNED INTEGER IS
42              ;FORMED, THEN NEGATED IF A MINUS SIGN IS TYPED.
43              ;EXIT AT CALL+1 IF INPUT ERROR WITH AC0=BAD CHARACTER.
44              ; (NOT A LEGAL DIGIT OR TERMINATING CHARACTER)
45              ;EXIT AT CALL+2 UPON TERMINATING CHARACTER
46              ; WITH AC0=0, 0, 40, 12, 15, 55
47              ; FOR NULL, SPACE, LINE-FEED, CARRIAGE RETURN, COMMA
48              ;THE ABOVE WAIT FOR TTO DONE, THEN CLEAR TTO.
49              ;"CHC?I" PRINTS ASCII CHARACTER IN C(0)R; C(0)L MUST BE 0.
50              ;EXITS CALL +2 IF C(0)R=0; SIMULATES TAB
51              ;"TYP?E" PRINTS C(0)R TO THE TTO OR LPT OR BOTH AS PER THE
52              ;SWITCH SELECTION REGISTER 'SWREG'.
53              ;EXITS AT CALL+1.  REPLACE "TYP?E" WITH
54              ;INTERRUPT 'TYP?E' IF DESIRED.
55              ;"TPS?P" PRINTS A SPACE AND EXITS AT CALL+1 WITH AC0 = 40
56
57 02636 054551 MES?S:  STA     3,RTN?A         ;SAVE THE RTN ADDRESS
58 02637 004562          JSR     SAV?E           ;SAVE THE STATE OF MACHINE
59 02640 034547          LDA     3,RTN?A         ;
60 02641 014546          ISZ     RTN?A
```

```
 00045 MNIOT
01 02642 031400          LDA     2,0,3           ;C(2) POINTS TO MESSAGE
02 02643 024417          LDA     1,P377?         ;A 8 BIT MASK
03 02644 021000 MES?M:   LDA     0,0,2           ;C(2)=DATA WORD
04 02645 125112          MOVL#   1,1,SZC
05 02646 123701          ANDS    1,0,SKP
06 02647 123401          AND     1,0,SKP         ;C(0)=DATA CHARACTOR RIGHT
07 02650 151400          INC     2,2             ;INC TO NEXT WORD
08 02651 124000          COM     1,1             ;FLIP MASK
09 02652 004414          JSR     CHC?T           ;PRINT
10 02653 000771          JMP     MES?M           ;ANOTHER
11 02654 000402          JMP     .+2
12 02655 004411 PLS?T:   JSR     CHC?T
13 02656 004551 PEX?T:   JSR     RST?R           ;RESTORE THE STATE OF MACHINE
14 02657 002530          JMP     @RTN?A          ;EXIT
15
16 02660 000000 PSP?:    0
17 02661 000000 SPT?G:   0
18 02662 000377 P377?:   377
19 02663 000011 PC1?1:   11
20 02664 000000 CHR?E:   0
21 02665 000000 CAC?0:   0                       ;AC0 SAVE IN CHC?T ROUTINE
22
23 02666 040777 CHC?T:   STA     0,CAC?0         ;SAVE AC0
24 02667 101315          MOVS#   0,0,SNR         ;RETURN +2 IF NULL
25 02670 001401          JMP     1,3
26 02671 175100          MOVL    3,3             ;FOR CARRY SAVE
27 02672 054772          STA     3,CHR?E         ;PRINT C(0) RIGHT
28 02673 034770          LDA     3,PC1?1         ;AC3 = 11
29 02674 116415          SUB#    0,3,SNR         ;SKIP IF A TAB IS NOT TO
30                                               ;BE SIMULATED
31 02675 000403          JMP     CHA?3
32 02676 004556          JSR     TYP?E           ;PRINT IT
33 02677 000407          JMP     CHE?X           ;EXIT
34 02700 004551 CHA?3:   JSR     TPS?P           ;PRINT A SPACE
35 02701 020513          LDA     0,CHR?Z
36 02702 034410          LDA     3,PC7?          ;AC3 = 7
37 02703 163404          AND     3,0,SZR
38 02704 000774          JMP     CHA?3           ;SIMULATE A TAB WITH 1
39                                               ;TO 7 SPACES
40 02705 040507          STA     0,CHR?Z
41 02706 020757 CHE?X:   LDA     0,CAC?0         ;RESTORE AC0
42 02707 034755          LDA     3,CHR?E         ;RESTORE CRY
43 02710 175200          MOVR    3,3             ;
44 02711 001400          JMP     0,3             ;EXIT
45
46 02712 000007 PC7?:    7
47
48 02713 054474 CRL?F:   STA     3,RTN?A         ;SAVE RETURN
49 02714 004505          JSR     SAV?E           ;SAVE THE WORLD
50 02715 020405          LDA     0,K15?
51 02716 004536          JSR     TYP?E           ;PRINT CARRIAGE AND LF
52 02717 020402          LDA     0,K12?
53 02720 000735          JMP     PLS?T           ;GO TO RESTORE THE WORLD
54 02721 000012 K12?:    12
55 02722 000015 K15?:    15
56
57
58
59 02723 054464 ZOC?T:   STA     3,RTN?A         ;SAVE THE RTN ADDRESS
60 02724 004475          JSR     SAV?E           ;SAVE THE WORLD
```

```
 00046 MNIOT
01 02725 102400          SUB     0,0             ;
02 02726 000404          JMP     ZPO?T           ;
03 02727 054460 PUC?T:   STA     3,RTN?A         ;SAVE THE RTN ADDRESS
04 02730 004471          JSR     SAV?E           ;SAVE THE WORLD
05 02731 020464          LDA     0,PC6?0         ;
06 02732 152620 ZPO?T:   SUBZR   2,2             ;PRINT C(1) IN OCTAL
07 02733 034463          LDA     3,PC1?0         ;C(2)=100000, C(3)=10
08 02734 000416          JMP     PUC?1           ;
09 02735 175400 PDC?S:   INC     3,3             ;UPDATE THE RTN ADDR PNTR
10 02736 054451          STA     3,RTN?A         ;
11 02737 004462          JSR     SAV?E           ;SAVE THE WORLD
12 02740 034447          LDA     3,RTN?A         ;
13 02741 021777          LDA     0,-1,3          ;READ THE CHARACTER TO BE
                                                 ;PRINTED AFTER THE DECIMAL
                                                 ;NUMBER
14
15
16 02742 040716          STA     0,PSP?          ;SAVE THE SPECIAL CHAR.
17 02743 102000          ADC     0,0             ;AC0= =1
18 02744 000404          JMP     PDC?2           ;
19 02745 054442 PDE?C:   STA     3,RTN?A         ;SAVE THE RTN ADDRESS
20 02746 004453          JSR     SAV?E           ;SAVE THE WORLD
21 02747 102400          SUB     0,0             ;
22 02750 034751 PDC?2:   LDA     3,K12?          ;C(3)=12
23 02751 030446          LDA     2,DET?B         ;PRINT C(1) IN DECIMAL
24 02752 040707 PDC?1:   STA     0,SPT?G         ;ACTIVATE/DEACTIVATE THE TAG FOR
                                                 ;SPECIAL CHARACTER
25                                               ;BOTH ENTRIES PRINT NUMBER
26
27 02753 101415          INC#    0,0,SNR         ;SKIP IF AC0 IS NOT -1
28 02754 101400          INC     0,0
29 02755 040542          STA     0,ZSU?P         ;THEN TAB TO NEXT POSITION
30 02756 054442          STA     3,TMP?          ;SAVE AC3
31 02757 034540 DCO?T:   LDA     3,ZSU?P         ;ZEROS SUPPRESS STUF
32 02760 102001 DEC?T:   ADC     0,0,SKP         ;SKIP FIRST TIME HERE PER DIGIT
33 02761 146400          SUB     2,1             ;DIVIDE C(AC1)  BY C(AC2)
34 02762 101405          INC     0,0,SNR         ;
35 02763 151235          MOVZR#  2,2,SNR         ;FOR ZERO SUPPRESS
36 02764 034431          LDA     3,PC6?0         ;
37 02765 146453          SUBO#   2,1,SNC         ;SUBTRACT MORE?
38 02766 000773          JMP     .-5             ;YES,GO BACK
39 02767 054530          STA     3,ZSU?P         ;NO,SAVE ZERO SUPPRESS FLAG
40                                               ;C(0)=DIGIT
41 02770 163004          ADD     3,0,SZR         ;MAKE ASCII
42 02771 004675          JSR     CHC?T           ;PRINT
43 02772 034426          LDA     3,TMP?          ;RESTORE AC3
44 02773 102400          SUB     0,0             ;
45 02774 172423          SUBZ    3,2,SNC         ;DIVIDE C(AC2) BY C(AC3)
46
47 02775 000403          JMP     .+3             ;SKIP IF AC3 > AC2
48 02776 101400          INC     0,0             ;AC3 < AC2
49 02777 000775          JMP     .-3             ;SUBTRACT MORE
50 03000 111004          MOV     0,2,SZR         ;WAS IT LAST DIGIT?
51 03001 000756          JMP     DCO?T           ;NO,GET NEXT DIGIT
52 03002 034657          LDA     3,SPT?G         ;YES,CHECK THE SPECIAL CHAR FLAG
53 03003 020660          LDA     0,PC1?1         ;FOLLOW THE PRINTOUT WITH
54 03004 175405          INC     3,3,SNR         ;TAB IF NOT SPCL CHAR FLAG
55 03005 020653          LDA     0,PSP?          ;OTHERWISE FOLLOW WITH THE CHAR
56 03006 000647          JMP     PLS?T           ;TO EXIT
57
58 03007 000000 RTN?A:   0
59 03010 000000 PCR?Y:   0                       ;CRY SAVE LOCATION
60 03011 000000 PAC?0:   0                       ;AC0 SAVE LOCATION
```

```
 0047 MNIOT
01 003412 000000 PAC?1:  0                       ;AC1 SAVE LOCATION
02 003413 000000 PAC?2:  0                       ;AC2 SAVE LOCATION
03 003414 000000 CHR?Z:  0
04 003415 000060 PC6?0:  60
05 003416 000010 PC1?0:  10
06 003417 023420 DET?8:  10000.
07 003420 000000 TMP?:   0
08
09               ;
10               ; SAV?E , SAVE THE WORLD ROUTINE
11               ;
12               ; THIS ROUTINE SAVES AC0,AC1,AC2 AND CRY
13               ;
14
15 003421 040770 SAV?E:  STA     0,PAC?0         ;
16 003422 044770         STA     1,PAC?1         ;
17 003423 045770         STA     2,PAC?2         ;
18 003424 101100         MOVL    0,0             ;
19 003425 044763         STA     0,PLR?Y         ;
20 003426 001400         JMP     0,3             ;
21
22
23               ;
24               ; RST?R , RESTORE THE WORLD ROUTINE
25               ;
26               ; THIS ROUTINE RESTORES THE AC0,AC1,AC2 AND CRY
27               ;
28
29 003427 042761 RST?R:  LDA     0,PLR?Y         ;
30 003430 101200         MOVR    0,0             ;
31 003431 042760         LDA     0,PAC?0         ;
32 003432 042760         LDA     1,PAC?1         ;
33 003433 043760         LDA     2,PAC?2         ;
34 003434 001400         JMP     0,3             ;
35
36
37 003435 135005 RUB?:   MOV     1,3,SNR         ;CAN'T RUB-OUT IF AC1 = 0
38 003436 000466         JMP     TIN?R           ;RETURN WITH ILLEGAL CHARACTER
39 003437 126400         SUB     1,1
40 003440 156422         SUBZ    2,3,SZC         ;SKIP IF AC3 IS LESS THAN AC2
41 003441 125401         INC     1,1,SKP
42 003442 157001         ADD     2,3,SKP
43 003443 000775         JMP     .-3
44 003444 054500         STA     3,FST?D         ;"FST?D" IS NON -1
45 003445 042750         LDA     0,PC6?0         ;AC0 = 60
46 003446 163000         ADD     3,0
47 003447 004405         JSR     TYP?E           ;ECHO AND DELETE THE DIGIT
48 003450 000523         JMP     TIN?W
49
50 003451 040444 TPS?P:  STA     0,TAC?0         ;SAVE AC0
51 003452 042446         LDA     0,PL420
52 003453 101001         MOV     0,0,SKP         ;SKIP OVER AC0 SAVE
53 003454 040441 TYP?E:  STA     0,TAC?0         ;SAVE AC0
54 003455 175100         MOVL    3,3             ;SAVE CRY AND RTN ADDR
55 003456 054440         STA     3,TYP?R         ;TYPE THE RIGHT BYTE OF AC0
56 003457 034565         LDA     3,INT?          ;IF IT IS HERE DUE TO SWITCH
57                                               ;SETTING ROUTINE THEN THE TYPE
58                                               ;OUTS TO THE TTY WILL BE ENABLED
59 003460 175004         INC     3,3,SZR         ;SKIP IF INT? IS -1
60 003461 034207         LDA     3,SWREG         ;READ THE SWITCHES
```

```
 0048 MNIOT
01 003462 177100         ADDL    3,3             ;SHIFT AC3 BY 2 PLACES
02 003463 175112         MOVL#   3,3,SZC         ;SKIP IF TYPEOUTS ARE NOT
                                                 ;SUPPRESSED
03
04 003464 000405         JMP     PLP?T
05 003465 061111 TTY?:   DOAS    0,TTO
06 003466 063511         SKPBZ   TTO
07 003467 000777         JMP     .-1
08 003470 060211         NIOC    TTO             ;CLEAR TTO DONE FLAG
09 003471 177100 PLP?T:  ADDL    3,3             ;SHIFT AC3 BY 2 PLACES
10 003472 177103         ADDL    3,3,SNC         ;SKIP IF THE OUTPUT IS
                                                 ;REQUIRED ON THE LPT
11
12 003473 000405         JMP     TPR?T
13 003474 061117         DOAS    0,LPT           ;OUTPUT THE CHARACTER TO LPT
14 003475 063517         SKPBZ   LPT             ;WAIT FOR LPT
15 003476 000777         JMP     .-1
16 003477 060217         NIOC    LPT             ;CLEAR THE DONE FLAG FOR LPT
17 003500 034545 TPR?T:  LDA     3,P1777         ;STRIP THE PARITY BIT
18 003501 163400         AND     3,0
19 003502 110043         ADCO    0,3,SNC         ;SKIP IF IT WAS RUBOUT
20 003503 034415         LDA     3,PC470         ;AC3 = 40
21 003504 162432         SUBZ#   3,0,SZC         ;SKIP FOR NON PRINTING CHR.
22 003505 014707         ISZ     CHR?Z
23 003506 034541         LDA     3,PC1?5         ;AC3 = 15
24 003507 116445         SUBO    0,3,SNR         ;SKIP IF IT WAS NOT A "CR"
25 003510 054704         STA     3,CHR?Z         ;CLEAR THE MONZ PUS
26 003511 042404         LDA     0,TAC?0         ;RESTORE AC0
27 003512 044404         LDA     3,TYP?R ;RESTORE CRY AND RTN ADDR
28 003513 175200         MOVR    3,3             ;
29 003514 001400         JMP     0,3             ;RETURN
30 003515 000000 TAC?0:  0
31 003516 000000 TYP?R:  0
32 003517 000000 ZSU?P:  0
33 003520 000040 PC47?:  40
34
35 003521 042525 TIN?C:  LDA     0,PC1?2
36 003522 000732         JSR     TYP?E
37 003523 014664 TIN?X:  ISZ     RIN?A
38 003524 044420 TIN?R:  STA     0,FST?D         ;"FST?D" IS NON -1
39 003525 152000         SUB     2,2             ;AC2 = -1
40 003526 042771 TSI?:   LDA     0,ZSU?P
41 003527 175620         INCZR   3,3             ;AC3 IS 1 IF THE CHARACTER
                                                 ;TYPED WAS A + AND A 100000
42                                               ;IF IT WAS A -.
43
44 003530 054767         STA     3,ZSU?P
45 003531 101112         MOVL#   0,0,SZC         ;SKIP IF THE PREVIOUS SIGN
                                                 ;WAS A PLUS
46
47 003532 124400         NEG     1,1             ;TAKE TWO'S COMPLEMENT IF
                                                 ;THE PREVIOUS SIGN WAS "-"
48
49 003533 034657         LDA     3,PAC?1
50 003534 167000         ADD     3,1
51 003535 044655         STA     1,PAC?1         ;PAC?1 HAS THE INTERMEDIATE
                                                 ;RESULT
52
53 003536 126400         SUB     1,1
54 003537 151113         MOVL#   2,2,SNC         ;SKIP IF EXIT IS REQUIRED
55 003540 000433         JMP     TIN?W
56 003541 004606         JSR     RST?R           ;RESTORE THE WORLD
57 003542 042642         LDA     0,FST?D         ;RESTORE AC0
58 003543 002644         JMP     @RTN?A          ;RETURN
59
60 003544 000000 FST?D:  0
```

```
 0049 MNIOT
01
02 03145 054642 TUO?T:  STA     3,RTN?A         ;SAVE THE RTN ADDR
03 03146 004653         JSR     SAV?E           ;SAVE THE WORLD
04 03147 102060         ADC     0,0             ;AC1 = -1 (ENTRY FOR ODT)
05 03150 040774         STA     0,FST?D         ;LOOK FOR FIRST DIGIT
06 03151 101120         MOVZL   0,0             ;AC1 = -2
07 03152 000411         JMP     TIN?Z
08 03153 054634 TIN?O:  STA     3,RTN?A         ;OCTAL ENTRY,SAVE RTN ADDR
09 03154 004645         JSR     SAV?E           ;SAVE THE WORLD
10 03155 102120         ADCZL   0,0             ;OCTAL ENTRY SWITCH
11 03156 000404         JMP     TIN?O
12 03157 054630 TIN?D:  STA     3,RTN?A         ;DECIMAL ENTRY,RTN SAVED
13 03160 004641         JSR     SAV?E           ;SAVE THE WORLD
14 03161 102440         SUBO    0,0             ;DECIMAL ENTRY SWITCH
15 03162 126400 TIN?Q:  SUB     1,1
16 03163 030463 TIN?Z:  LDA     2,PC1?2
17 03164 113000         ADD     0,2             ;AC2 IS 10 FOR OCTAL AND 12
18                                              ;FOR DECIMAL NUMBERS
19 03165 102440         SUBO    0,0
20 03166 040731         STA     0,ZSU?P         ;SIGN AND LEADING SPACES FLAG
21 03167 034730 TIN?S:  LDA     3,ZSU?P
22 03170 175014         MOV#    3,3,SZR         ;SKIP FOR LEADING SPACES
23 03171 000732         JMP     TIN?X
24 03172 054620         STA     3,PAC?1
25 03173 063610 TIN?W:  SKPDN   TTI
26 03174 000777         JMP     .-1
27 03175 060610         DIAC    0,TTI
28 03176 004656         JSR     TYP?E
29 03177 034446         LDA     3,P1?7?
30 03200 163400         AND     3,0             ;STRIP THE PARITY BIT
31 03201 116415         SUB#    0,3,SNR         ;SKIP IF NOT A RUB-OUT
32 03202 000633         JMP     RUB?
33 03203 034715         LDA     3,PC4?0
34 03204 116414         SUB#    0,3,SZR
35 03205 101015         MOV#    0,0,SNR
36 03206 000761         JMP     TIN?S           ;SPACE, OR NULL
37 03207 034442         LDA     3,TIN?2
38 03210 116405         SUB     0,3,SNR         ;COMMA
39 03211 000712         JMP     TIN?X
40 03212 175414         INC#    3,3,SZR         ;MINUS
41 03213 175235         MOVZR#  3,3,SNR         ;OR PLUS ?
42 03214 000712         JMP     TSI?            ;MODIFY THE SIGN
43 03215 034432 TIN?M:  LDA     3,PC1?5         ;AC3 = 15
44 03216 110415         SUB#    0,3,SNR         ;IS IT A CARRIAGE RETURN?
45 03217 000702         JMP     TIN?C           ;IF CR THEN GO TO TIN?C
46 03220 034426         LDA     3,PC1?2         ;AC3 = 12
47 03221 116404         SUB     0,3,SZR         ;SKIP FOR LINE FEED
48 03222 000403         JMP     TIN?N
49 03223 020424         LDA     0,PC1?5         ;AC0 = 15
50 03224 000676         JMP     TIN?C+1
51 03225 034423 TIN?N:  LDA     3,TIN?1
52 03226 117022         ADDZ    0,3,SZC         ;SKIP IF NOT A DIGIT
53 03227 156513         SUBL#   2,3,SNC         ;SKIP IF DIGIT
54 03230 000674         JMP     TIN?R
55 03231 010666         ISZ     ZSU?P           ;OUT OF LEADING SPACES
56 03232 102400         SUB     0,0             ;AC0 = 0
57 03233 010711         ISZ     FST?D           ;SKIP IF IT WAS FIRST DIGIT
58                                              ;FOR ODT
59 03234 121120         MOVZL   1,0
60 03235 100120         MOVZL   0,1
```

```
 0050 MNIOT
01 03236 125120         MOVZL   1,1             ;AC1 IS SHIFTED BY 3 PLACES
02 03237 167000         ADD     3,1             ;& OLD PAC?1'S + NEW DIGIT
03 03240 155220         MOVZR   2,3
04 03241 175232         MOVZR#  3,3,SZC         ;SKIP IF OCTAL MODE
05 03242 107000         ADD     0,1             ;ADD 2 OLD PAC?1'S
06 03243 000730         JMP     TIN?W
07
08 03244 000000 INT?:   0                       ;TYPE OUTSS CAN BE FORCED TO
09                                              ;TTY BY PLACING -1 IN THIS LOC.
10 03245 000177 P1?7?:  177
11 03246 000012 PC1?2:  12
12 03247 000015 PC1?5:  15
13 03250 177720 TIN?1:  -60
14 03251 000054 TIN?2:  54
15 03252 001100 C10?0:  100
16
17                      ;*****************************************************************
18                      ;TEXT BUFFERS FOLLOW
19                      ;*****************************************************************
20 03253 151305 ERMS1:  .TXTE   /ERROR NUMBER /
21       147722
22       120322
23       052516
24       041115
25       151305
26       000240
27 03262 142640 EMS1A:  .TXTE   / ENCOUNTERED SUBTEST /
28       141516
29       052717
30       152116
31       151305
32       042305
33       051640
34       041125
35       142724
36       152123
37       000240
38 03275 151303 ERMS2:  .TXTE   /CR    AC0     AC1     AC2     AC3     PC/
39       120131
40       120240
41       120240
42       141501
43       120060
44       120240
45       120240
46       141501
47       120261
48       120240
49       120240
50       141501
51       120262
52       120240
53       120240
54       141501
55       120063
56       120240
57       120240
58       141520
59       000000
60 03323 051640 EMS3A:  .TXTE   / SUBTEST /
```

```
 0051 MNIOT
01          041125
02          142724
03          152123
04          000240
05 03330 143240 EMS38:  .IXTE   / FAILED /
06          144501
07          142714
08          124104
09          000000
10 03335 044510 ERMS4:  .IXTE   /HALTED ON ERROR/
11          152314
12          042305
13          147640
14          120116
15          151305
16          147722
17          000322
18 03345 147714 ERMS5:  .IXTE   /LOOPING ON ERROR/
19          050317
20          047311
21          120107
22          047317
23          142640
24          151322
25          151317
26          000000
27 03360 141640 HDG71:  .IXTE   / COMPLETED SUBTEST /
28          046717
29          140120
30          152305
31          042305
32          051640
33          041125
34          142724
35          152123
36          000240
37 03570 142640 HDG72:  .IXTE   / END OF PASS /
38          042116
39          147640
40          120306
41          040520
42          051523
43          000240
44
```

```
1 0052 MNIOT
                        .TITL   MNIOT
02
03          000000      .NOLOC  0
04 03577 000777 DCSTR:  .BLK    511.
05 04376 000000 ESTR:   0
06
07
08 04377 047503         .TXT    /COPYRIGHT (C) DGC, 1975
09          054520
10          044522
11          044107
12          020124
13          041450
14          020051
15          043504
16          025103
17          030440
18          033471
19 04412 040466 ALL RIGHTS RESERVED./
20          040114
21          051040
22          043511
23          052110
24          022123
25          042522
26          042523
27          053122
28          042105
29          000056
30
31                      .END
32 0001A=000377
33          000377
34          100377
35          100377
36          007777
37          000377
38          000377
39          000377
40          177766
41          100377
42          125252
43          052525
44          002211
45          100377
46          002227
47          000377
48          002041
49          002101
50          002201
51          002401
52          003001
53          002001
54          004001
55          012001
56          022001
57          042001
58          102001
59          000001
60          000002
```

```
 0053 MAIN
01          000004
02          000010
03          000020
04          000040
05          000100
06          000200
07          000400
08          001000
09          002000
10          004000
11          010000
12          020000
13          040000
14          100000
15          103377
16          000377
17          177000
16          003377

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS
```

```
 0054 MAIN
A       000001    2/07   2/12   2/14   2/27   2/29   2/31   3/15
                  4/07   4/11   12/27  12/40  13/13  13/27  13/41
                 13/55  14/09  14/23  15/11  15/25  15/39  15/53
                 16/07  16/21  17/11  17/25  17/39  17/53  18/16
                 18/33  18/50  19/07  20/14  20/31  20/48  21/05
                 21/22  22/14  22/33  22/58  23/01  23/27  24/16
                 24/32  24/46  25/04  26/13  26/29  26/45  27/01
                 28/11  28/14  28/25  28/28  28/41  28/54  29/08
                 29/26  30/12  30/29  30/56  31/07  32/22  32/42
                 33/21  33/27  34/25  34/31  35/24  35/29  36/26
                 36/32  37/19  37/22  37/31  37/54
B       000003    12/27  12/40  13/13  13/27  13/41  13/55  14/09
                  14/23  15/11  15/25  15/39  15/53  16/07  16/21
                  17/11  17/25  17/39  17/53  18/16  18/33  18/50
                  19/07  20/14  20/31  20/48  21/05  21/22  22/14
                  22/33  22/58  23/01  23/27  24/16  24/32  24/48
                  25/04  26/13  26/29  26/45  27/01  28/11  28/14
                  28/25  28/26  28/41  28/54  29/08  29/26  30/12
                  30/29  30/56  31/07  32/22  32/42  33/21  33/27
                  34/25  34/31  35/24  35/29  36/26  36/32  37/19
                  37/22  37/31  37/54
BITON   002367    41/51  41/57
C       000001    12/27  12/40  13/13  13/27  13/41  13/55  14/09
                  14/23  15/11  15/25  15/39  15/53  16/07  16/21
                  17/11  17/25  17/39  17/53  18/16  18/33  18/50
                  19/07  20/14  20/31  20/48  21/05  21/22  22/14
                  22/33  22/58  23/01  23/27  24/16  24/32  24/48
                  25/04  26/13  26/29  26/45  27/01  28/11  28/14
                  28/25  28/28  28/41  28/54  29/08  29/26  30/12
                  30/29  30/56  31/07  32/22  32/42  33/21  33/27
                  34/25  34/31  35/24  35/29  36/26  36/32  37/19
                  37/22  37/31  37/54
C1070   003252    50/15
C20     000223     7/48  41/36
CAC?P   002665    45/21  45/23  45/41
CARRY   000262     2/53   8/20  38/08  38/17
CHA?3   002700    45/31  45/34  45/38
CHC?T   002666    45/09  45/12  45/23  46/42
CHE?X   002706    45/33  45/41
CHR?E   002664    45/20  45/27  45/42
CHR?Z   003014    45/35  45/40  47/03  48/22  48/25
CLEAR   006322     9/01  32/08  34/06  36/06
CLR     000524     9/02  11/19
CRL?F   002713     8/16  45/48
C?100   002457    41/20  42/53
D       000003    12/27  12/40  13/13  13/27  13/41  13/55  14/09
                  14/23  15/11  15/25  15/39  15/53  16/07  16/21
                  17/11  17/25  17/39  17/53  18/16  18/33  18/50
                  19/07  20/14  20/31  20/48  21/05  21/22  22/14
                  22/33  22/58  23/01  23/27  24/16  24/32  24/48
                  25/04  26/13  26/29  26/45  27/01  28/11  28/14
                  28/25  28/26  28/41  28/54  29/08  29/26  30/12
                  30/29  30/56  31/07  32/22  32/42  33/21  33/27
                  34/25  34/31  35/24  35/29  36/26  36/32  37/19
                  37/22  37/31  37/54
D100    000224     7/49  43/22
DB      000071  MC  6/01  13/03  13/17  13/31  13/45  13/59  14/13
                  15/01  15/15  15/29  15/43  15/57  16/11  17/01
                  17/15  17/29  17/43
```

INIT	000511	11/02						
INTER	002201	2/38	3/22	3/25	3/48	3/51	7/10	7/11
		38/03						
INTFL	002400	41/27	42/46	42/54				
INTVL	000211	2/44	3/41	7/42	44/09			
INT?	003244	47/56	50/08					
IODC0	001650	32/03						
IODC1	001673	32/26						
IODC2	001713	33/01						
IODC3	001747	34/01						
IODC4	002021	35/01						
IODC5	002054	36/01						
IODN	002200	37/58						
IODV0	002124	37/04						
IODV1	002155	37/35						
IOSTR	000560	7/37	11/13	12/04				
IOT	000000	8/60	12/15	12/23	12/24	12/36	12/37	13/09
		13/10	13/23	13/24	13/37	13/38	13/51	13/52
		14/05	14/06	14/19	14/20	15/07	15/08	15/21
		15/22	15/35	15/36	15/49	15/50	16/03	16/04
		16/17	16/18	17/07	17/08	17/21	17/22	17/35
		17/36	17/49	17/50	18/09	18/11	18/13	18/26
		18/28	18/30	18/43	18/45	18/47	18/60	19/02
		19/04	20/07	20/09	20/11	20/24	20/26	20/28
		20/41	20/43	20/45	20/58	20/60	21/02	21/15
		21/17	21/19	22/07	22/11	22/23	22/26	22/30
		22/42	22/45	22/47	22/49	22/51	22/55	22/59
		23/10	23/13	23/15	23/17	23/20	23/22	23/24
		24/10	24/12	24/13	24/26	24/28	24/29	24/42
		24/44	24/45	24/58	24/60	25/01	26/07	26/09
		26/10	26/23	26/25	26/26	26/39	26/41	26/42
		26/55	26/57	26/58	28/09	28/12	28/22	28/23
		28/26	28/38	28/39	28/51	28/52	29/04	29/05
		29/06	29/21	30/07	30/09	30/10	30/24	30/46
		30/49	32/10	32/11	32/13	32/33	32/36	32/39
		33/09	33/12	33/13	33/15	33/16	34/14	34/15
		34/16	34/19	34/20	35/11	35/12	35/18	35/19
		35/20	36/10	36/14	36/20	36/21	36/27	37/11
		37/42	37/45	37/48	37/50	38/15		
IOT0	000603	12/18						
IOT1	000614	12/31						
IPDC?	000254	8/13	43/27					
IPDE?	000255	8/14						
IPDO?	000252	8/11	42/20	42/22	42/24	42/26	42/28	
ISAV0	000267	8/27	38/03	38/13	38/22			
ISAV1	000270	8/28	38/04	38/21				
ISAV2	000271	8/29	38/05	38/20				
ISAV3	000272	8/30	38/06	38/19				
ISETU	000247	8/08	12/19	12/32	13/05	13/19	13/33	13/47
		14/01	14/15	15/03	15/17	15/31	15/45	15/59
		16/13	17/03	17/17	17/31	17/45	18/04	18/21
		18/38	18/55	20/02	20/19	20/36	20/53	21/10
		22/02	22/19	22/38	23/06	24/06	24/22	24/38
		24/54	26/03	26/19	26/35	26/51	28/05	28/19
		28/33	28/46	28/56	29/13	30/02	30/17	30/35
		32/04	32/27	33/02	34/02	35/02	36/02	37/05
		37/36						
ISTAK	000202	7/27	7/35					

ITK	002461	40/48	41/53	42/55	43/23	43/32			
ITRLT	002462	40/49	41/52	42/56	43/10	43/33			
ITYP?	000251	8/10							
IZOL?	000253	8/12	46/17	42/06	42/10	42/18	43/18	44/16	
K12?	002721	45/52	45/54	46/22					
K15?	002722	45/50	45/55						
LOOP	000467 MC	3/27	5/56	12/26	12/41	13/14	13/28	13/42	
		13/56	14/10	14/24	15/12	15/26	15/40	15/54	
		16/06	16/22	17/12	17/26	17/40	17/54	18/17	
		18/34	18/51	19/08	20/15	20/32	20/49	21/06	
		21/23	22/15	22/34	23/02	23/28	24/17	24/33	
		24/49	25/05	26/14	26/30	26/46	27/02	28/15	
		28/29	28/42	28/55	29/09	29/30	30/13	30/31	
		31/12	32/23	32/43	33/31	34/45	35/30	36/43	
		37/32	37/55						
LOOPR	002021	7/34	40/51	41/02	43/56	43/59	44/05		
MADR	000273	8/32	12/10	34/07	34/35	34/39	36/07	36/33	
		36/37							
MASK	002463	41/44	42/57						
MDCM	000274	8/33	22/50	33/14	34/18	35/17	36/19		
MES?M	002644	45/03	45/10						
MES?S	002636	8/15	44/57						
MSK	000260	8/17	22/22						
MSK0	000226	7/51	42/57						
MSK1	000227	7/52	41/34	42/44	43/35	43/43	43/54		
MSK10	000240	8/01							
MSK11	000241	8/02							
MSK12	000242	8/03							
MSK13	000243	8/04							
MSK14	000244	8/05							
MSK15	000245	8/06							
MSK2	000230	7/53							
MSK3	000231	7/54	41/60						
MSK4	000232	7/55	40/11						
MSK5	000233	7/56							
MSK6	000234	7/57	42/30						
MSK7	000235	7/58	43/46						
MSK8	000236	7/59							
MSK9	000237	7/60							
MULTI	002435	41/55	42/02	42/35					
NDENR	002564	43/14	43/38						
NXTST	002532	43/12							
P17?7	003245	48/17	49/29	50/10					
P37?7	002662	45/02	45/16						
PAC?0	003011	46/60	47/15	47/31					
PAC?1	003012	47/01	47/16	47/32	48/49	48/51	49/24		
PAC?2	003013	47/02	47/17	47/33					
PASS	000203	2/41	3/34	3/35	7/36	10/16	40/08	40/16	
PC1?0	003016	46/07	47/05						
PL1?1	002663	45/19	45/28	46/53					
PL1?2	003246	48/35	49/16	49/46	50/11				
PC1?5	003247	48/23	49/43	49/49	50/12				
PC42?	003120	47/51	48/20	48/33	49/33				
PC6??	003015	46/05	46/36	47/04	47/45				
PC7?	002712	45/36	45/46						
PCR?Y	003016	46/59	47/19	47/29					
PDC?1	002752	46/08	46/24						
PDC?2	002750	46/16	46/22						

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TS034	001221	22/02						
TS035	001235	22/19						
TS036	001253	22/38						
TS037	001302	23/06						
TS040	001327	24/06						
TS041	001342	24/22						
TS042	001355	24/38						
TS043	001370	24/54						
TS044	001403	26/03						
TS045	001416	26/19						
TS046	001431	26/35						
TS047	001444	26/51						
TS050	001457	28/05						
TS051	001471	28/19						
TS052	001501	28/33						
TS053	001512	28/46						
TS054	001523	28/56						
TS055	001535	29/13						
TS056	001550	30/02						
TS057	001571	30/17						
TS060	001607	30/35						
TS061	001654	32/04						
TS062	001673	32/27						
TS063	001713	33/02						
TS064	001747	34/02						
TS065	002001	35/02						
TS066	002054	36/02						
TS067	002124	37/05						
TS070	002155	37/36						
TSI?	003126	48/46	49/42					
TSTNM	000213	2/46	7/44	10/15	40/20	40/55	42/09	43/17
		44/06	44/15					
TSTUU	002020	43/48	44/06					
TTY?	003065	48/05						
TYP?E	003054	8/10	45/32	45/51	47/47	47/53	48/36	49/28
TYP?R	003116	47/55	48/27	48/31				
USER	002455	2/30	2/43	3/14	3/44	3/46	4/03	4/07
		4/10	41/19	42/51				
USREG	000210	2/43	7/41	11/02				
WCT	000321	8/57	12/11	34/12	34/40	34/44	36/11	35/38
		36/42						
XEMAL	002312	8/07	41/12					
XLOOP	002527	8/09	43/09					
XSETU	002272	8/08	40/47					
ZUC?T	002723	8/12	45/59					
ZHO?T	002732	46/02	46/06					
ZSU?P	003117	46/29	46/31	46/39	48/32	48/40	48/44	49/20
		49/21	49/55					
.KAND	000534	9/04	11/30					
?A	000000	5/16	12/27	12/40	13/13	13/27	13/41	13/55
		14/09	14/23	15/11	15/25	15/39	15/53	16/07
		16/21	17/11	17/25	17/39	17/53	18/16	18/33
		18/50	19/07	20/14	20/31	20/48	21/05	21/22
		22/14	22/33	22/58	23/01	23/27	24/16	24/32
		24/48	25/04	26/13	26/29	26/45	27/01	28/11
		28/14	28/25	28/28	28/41	28/54	29/08	29/26
		30/12	30/29	30/56	31/07	32/22	32/42	33/21
		33/27	34/25	34/31	35/24	35/29	36/26	36/32

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		37/19	37/22	37/31	37/54			
?B	000002	5/17	12/27	12/40	13/13	13/27	13/41	13/55
		14/09	14/23	15/11	15/25	15/39	15/53	16/07
		16/21	17/11	17/25	17/39	17/53	18/16	18/33
		18/50	19/07	20/14	20/31	20/48	21/05	21/22
		22/14	22/33	22/58	23/01	23/27	24/16	24/32
		24/48	25/04	26/13	26/29	26/45	27/01	28/11
		28/14	28/25	28/28	28/41	28/54	29/08	29/26
		30/12	30/29	30/56	31/07	32/22	32/42	33/21
		33/27	34/25	34/31	35/24	35/29	36/26	36/32
		37/19	37/22	37/31	37/54			
?C	000002	5/18	12/27	12/40	13/13	13/27	13/41	13/55
		14/09	14/23	15/11	15/25	15/39	15/53	16/07
		16/21	17/11	17/25	17/39	17/53	18/16	18/33
		18/50	19/07	20/14	20/31	20/48	21/05	21/22
		22/14	22/33	22/58	23/01	23/27	24/16	24/32
		24/48	25/04	26/13	26/29	26/45	27/01	28/11
		28/14	28/25	28/28	28/41	28/54	29/08	29/26
		30/12	30/29	30/56	31/07	32/22	32/42	33/21
		33/27	34/25	34/31	35/24	35/29	36/26	36/32
		37/19	37/22	37/31	37/54			
?D	000102	5/19	12/27	12/40	13/13	13/27	13/41	13/55
		14/09	14/23	15/11	15/25	15/39	15/53	16/07
		16/21	17/11	17/25	17/39	17/53	18/16	18/33
		18/50	19/07	20/14	20/31	20/48	21/05	21/22
		22/14	22/33	22/58	23/01	23/27	24/16	24/32
		24/48	25/04	26/13	26/29	26/45	27/01	28/11
		28/14	28/25	28/28	28/41	28/54	29/08	29/26
		30/12	30/29	30/56	31/07	32/22	32/42	33/21
		33/27	34/25	34/31	35/24	35/29	36/26	36/32
		37/19	37/22	37/31	37/54			
?E	000074	5/20	12/19	12/32	13/05	13/19	13/33	13/47
		14/01	14/15	15/03	15/17	15/31	15/45	15/59
		16/13	17/03	17/17	17/31	17/45	18/04	18/21
		18/38	18/55	20/02	20/19	20/36	20/53	21/10
		22/02	22/19	22/38	23/06	24/06	24/22	24/38
		24/54	26/03	26/19	26/35	26/51	28/05	28/19
		28/33	28/46	28/59	29/13	30/02	30/17	30/35
		32/04	32/27	33/02	34/02	35/02	36/02	37/05
		37/36						
?F	000001	12/19	12/32	13/05	13/19	13/33	13/47	14/01
		14/15	15/03	15/17	15/31	15/45	15/59	16/13
		17/03	17/17	17/31	17/45	18/04	18/21	18/38
		18/55	20/02	20/19	20/36	20/53	21/10	22/02
		22/19	22/38	23/06	24/06	24/22	24/38	24/54
		26/03	26/19	26/35	26/51	28/05	28/19	28/33
		28/46	28/59	29/13	30/02	30/17	30/35	32/04
		32/27	33/02	34/02	35/02	36/02	37/05	37/36
?G	000114	12/19	12/32	13/05	13/19	13/33	13/47	14/01
		14/15	15/03	15/17	15/31	15/45	15/59	16/13
		17/03	17/17	17/31	17/45	18/04	18/21	18/38
		18/55	20/02	20/19	20/36	20/53	21/10	22/02
		22/19	22/36	23/06	24/06	24/22	24/36	24/54
		26/03	26/19	26/35	26/51	28/05	28/19	28/33
		28/46	28/59	29/13	30/02	30/17	30/35	32/04
		32/27	33/02	34/02	35/02	36/02	37/05	37/36
?H	000001	12/19	12/32	13/05	13/19	13/33	13/47	14/01
		14/15	15/03	15/17	15/31	15/45	15/59	16/13

		17/03	17/17	17/31	17/45	18/04	18/21	18/38
		18/55	20/02	20/19	20/36	20/53	21/10	22/02
		22/19	22/36	23/06	24/06	24/22	24/36	24/54
		26/03	26/19	26/35	26/51	28/05	28/19	28/33
		28/46	28/59	29/13	30/02	30/17	30/35	32/04
		32/27	33/02	34/02	35/02	36/02	37/05	37/36
72	[illegible]	12/27	12/40	13/13	13/27	13/41	13/55	14/09
		14/23	15/11	15/25	15/39	15/53	16/07	16/21
		17/11	17/25	17/39	17/53	18/10	18/33	18/50
		19/07	20/14	20/31	20/48	21/05	21/22	22/14
		22/33	22/50	23/01	23/27	24/10	24/32	24/48
		25/04	26/13	26/29	26/45	27/01	28/11	28/14
		28/25	28/26	28/41	28/54	29/08	29/26	30/12
		30/29	30/50	31/07	32/22	32/42	33/21	33/27
		34/25	34/31	35/24	35/29	36/26	36/32	37/19
		37/22	37/31	37/54				
71	[illegible]	12/27	12/40	13/13	13/27	13/41	13/55	14/09
		14/23	15/11	15/25	15/39	15/53	16/07	16/21
		17/11	17/25	17/39	17/53	18/10	18/33	18/50
		19/07	20/14	20/31	20/48	21/05	21/22	22/14
		22/33	22/50	23/01	23/27	24/10	24/32	24/48
		25/04	26/13	26/29	26/45	27/01	28/11	28/14
		28/25	28/26	28/41	28/54	29/08	29/26	30/12
		30/29	30/50	31/07	32/22	32/42	33/21	33/27
		34/25	34/31	35/24	35/29	36/26	36/32	37/19
		37/22	37/31	37/54				
72	[illegible]	12/27	12/40	13/13	13/27	13/41	13/55	14/09
		14/23	15/11	15/25	15/39	15/53	16/07	16/21
		17/11	17/25	17/39	17/53	18/10	18/33	18/50
		19/07	20/14	20/31	20/48	21/05	21/22	22/14
		22/33	22/50	23/01	23/27	24/10	24/32	24/48
		25/04	26/13	26/29	26/45	27/01	28/11	28/14
		28/25	28/26	28/41	28/54	29/08	29/26	30/12
		30/29	30/50	31/07	32/22	32/42	33/21	33/27
		34/25	34/31	35/24	35/29	36/26	36/32	37/19
		37/22	37/31	37/54				