BSC2780/ BSC3780

2780/3780 Terminal Emulator

USER'S GUIDE

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codex

Preface

      This User's Guide is intended for the operator with a
basic familiarity with Codex Intelligent Terminal Systems and
provides a course of instruction in the use of the Codex
BSC2780/BSC3780 Emulator. After reading this Guide, the
reader should be able to send, receive, and print data in
conjunction with a remote host computer or terminal. The
2780/3780 Emulator operates under the direction of the CODOS
Disk Operating System, and takes full advantage of its
features.

      Other Codex publications that may be of interest include
the Codex Disk Operating System (CODOS) User's Guide, the
CODOS Reference Manual, the EDITOR User's Guide, and the
Hardware Reference Manuals and Operator's Guides appropriate
to the user's system configuration.

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CHAPTER 1. INTRODUCTION

Introduction

    The Codex 2780/3780 Intelligent Batch Terminal (IBT)
enables users to communicate with an IBM 2780 or 3780
Information Display Terminal, another Codex Intelligent Batch
Terminal, or a suitably configured host computer in a manner
logically compatible with the operation of an IBM 2780 or
3780.

    The 3780 protocol includes space compression, along with
a more efficient link message format than that used by the
2780 protocol. Conversational reply is unique to the 3780,
representing an improved method of reversed communications.
The operation of the 2780 and the 3780 IBTs is identical,
however, and all statements that refer to the 2780 emulator
apply also to the 3780 emulator unless specifically stated
otherwise.

    The Intelligent Batch Terminal is available in a variety
of configurations, including:

    a receive-only terminal (optional character and
    line printers are supported)

    disk or diskette systems used as a logical card
    reader and punch or printer

Minimum System Configuration

The minimum configuration required to use the 2780/3780
emulator in conjunction with Codex Intelligent Terminal
Systems consists of:

    Basic Display Terminal (CDX-68) with appropriate
        firmware options

    32K bytes of user memory (RAM)

    10 Mb Disk Storage (CDX-DS/FR) or .5 Mb or 1 Mb Diskette
        Storage (CDX-FS Series)

    Bisynchronous Communications Adapter

Additional Hardware Supported

    BSC2780/BSC3780 supports a variety of optional printers,
including Character and Matrix Printers (the Codex SP
Series). These printers are linked to the Basic Display
Terminal through either the Microcomputer Module D
(CDX-SBC/D) or the Printer Interface Module (CDX-PI).

Support Software Required

BSC2780/BSC3780 is used in conjunction with the Codex
Disk Operating System (CODOS); no additional support software
is required.

Software Installation

There is no software installation that needs to be
performed in order to use the BSC2780/BSC3780 package.

System Features

The Codex 2780/3780 Intelligent Batch Terminal (IBT)
uses the binary synchronous (BSC) method of communications
line control, allowing the Terminal to communicate with most
IBM 2770 and 3770 batch terminal devices. The IBT connects
to data-sets or modems which are EIA RS-232-C compatible.

The IBT operates on either a dedicated leased or private
(non-switched) line or a dial-up line on the public
(switched) network. Transmission can take place on both 2-
and 4-wire communication lines. Although the BSC Protocol is
half duplex, a 4-wire full duplex communication line can be
used to significantly reduce line turnaround time. Line
speeds from 1200 to 9600 bps can be achieved with the
appropriate modems.

When operating using switched facilities, DTR (Data
Terminal Ready) is turned on automatically by the emulator to
permit dialing or auto answer.

BSC protocol provides for two logical line states; a
control mode and a text mode. In the control mode, no data
is transferred over the data link. The stations respond only
to line contention sequences. The line is in the control
mode when the initial connection is made; the line also
enters the control mode when either station terminates
transmission with an EOT.

BSC protocol requires that a station bid for the line.
If the line bid is positively acknowledged by the remote
station, the line enters the text mode and data transfer is
permitted from the bidding station (master) to the receiving
station (slave).

A complete message (typically a job) is then transmitted
from master to slave. Blocks of 512 (3780) or 400 (2780)
characters are individually acknowledged by the receiving
station. After successfully sending the complete message,
the master station sends EOT and both stations return to
control mode.

Should both stations bid at the same time, the terminal

designated as the primary (1 second retry) subsequently wins
against the secondary (3 second retry). Normally, the host
system assumes the role of the secondary.

The 2780 Intelligent Batch Terminal (IBT) runs under the
control of the Codex Disk Operating System (CODOS). All disk
input and output is executed by the CODOS file management
system.

The 2780 IBT software consists of two distinct
components: a line protocol handler (LPH) and a user
interface module (UIM).

The LPH performs modem control communication link I/O,
link level message formatting, and character translation, as
well as error recovery. A simple command interface exists
between the LPH and the UIM so that the UIM can be replaced
by other modules which use the protocol handler alone.

The UIM communicates directly with the operator to
effect job transmissions, status displays, printing and file
handling.

Operator Interface

The CDX-68 Basic Display Terminal permits the operator
to communicate interactively with the IBT. The 1920
character screen is organized into 24 lines of 80 characters
each. The characteers used include a subset of the full 128
ASCII upper- and lower-case letters, numerals, and general
purpose symbols. (Appendix C summarizes the ASCII characters
and their meaning.) The keyboard control software module
accepts input from the keyboard and passes that value to the
emulator software for processing. The Display Control
software is used to position the cursor and display messages
on the screen. The DEL key, pressed while the SHIFT key is
depressed, functions as a backspace key; the control (CTRL)
key, pressed in combination with the "X" key functions as a
line delete key.

The display and keyboard allow for interactive
communication between the operator and the IBT software.
After loading the Emulator software into memory, the operator
is guided by messages displayed on the screen which provide
the information necessary for the execution and control of
the IBT emulator.

A simple command language is provided. After the IBT
emulator is loaded into memory, the operator simply types
HELP and presses the RETURN key, and a menu of all operator
commands and syntax is displayed on the screen.

Commands allow the transmitting of several disk files as
a single job, receiving output data files, and spooling print

files to disk.

The IBT also provides status information at any time, both automatically and as a result of the operator's entering the STATUS command. Included in a status display are record counts on a per-file and total basis, link errors, bid status, sign-on completed, and so on.

In addition to emulator commands, it is also possible to send keyboard messages to the host. The operator can enter either the MESSAGE command followed by message text or a single line command which begins with "$" or "/".

In addition, CODOS offers the capability of creating a file of instructions that can be executed by the CHAIN utility. This job control file allows for automatic execution of the IBT. A SEND command permits multiple file queueing within a job (for example, SE JCL,DATA) while the CHAIN feature permits several jobs to be queued.

CODOS File Handling

IBT input files may be created using the CODOS EDITOR (a text processing facility with extensive source file creation and update capability). In addition, files can be created by user-written COBOL programs (Codex COBOL is a display-oriented system that allows the user the ability to display a form on the screen, accept keyed-in data from the formatted screen, edit this data, and finally write it to disk for later transmission under the IBT emulation facility).

The following conventions apply to file naming:

Names may be up to eight alphanumeric characters in length

The first character must be alphabetic.

The file suffix is either one or two alphanumeric characters in length, where the first character must be alphabetic. "SA" is the default suffix for ASCII files.

The logical unit or drive number is an ASCII integer from 0 to 3. If none is specified, then 0 is assumed.

The standard format for specifying file names, suffixes, and drive numbers is:

<filename>.<suffix>:<drive number>

where the period and colon serve to delineate the start of the suffix and the logical drive number fields, respectively.

CODOS Utilities

The CODOS utility programs make up a powerful interactive command facility that ease file management operations. After the initial creation or receipt of a sequential file, the user can invoke CODOS commands to:

copy files from one disk to another

backup and compress a disk volume

delete files from the disk

list file names currently in the directory

display free disk space

list the contents of a file, with output being directed to either the printer or the Terminal display screen

merge or append one or more files into a new file

change the name or protection attributes of a file

Special Features

The Intelligent Batch Terminal supports line printers as well as matrix and letter quality printers.

The vertical forms length can be dynamically specified for all printers, allowing the operator to select the required number of lines per page. The default number of 66 lines is replaced by the number entered with the FORM command. This feature is especially useful for printing labels.

The CHAIN feature mentioned previously in conjunction with "auto answer" permits the IBT to be executed without human supervision and to perform more than one job transmission.

The IBT "spooling feature" allows an operator to peruse reports prior to printing them. Page level browsing and string oriented searching are possible, along with selective modification or deletion.

Logical concatenation of host input files in the SEND command permits JCL decks to be permanently available for inclusion in jobs which have variable data segments. This process does not increase the amount of file space required for the individual local files.

Also included is a status display , which can be invoked
at any time and which notes exceptions (these are generally
displayed automatically) including link errors, partial and
complete record totals, and readiness to send or receive.

CHAPTER 2.   SYSTEM OPERATION

Introduction

        The following steps summarize the Intelligent Batch
Terminal (IBT) system initialization:

        - Apply power to the system (see Appendix A)

        - Insert the CODOS-based IBT disk into drive 0

        - Insert the disk with those data files to be transferrred
          into drive 1 (data files may also reside on the system
          disk)

        - After the CODOS ready prompt ("=") is displayed, enter
          BSC2780<;options> or BSC3780<;options>

        - Dial host if operating over a switched line or wait to
          be called

        - Enter "HELP" to display commands and syntax as shown
          below:


```
*****************************************
BYE                     /TERMINATE EMULATOR
FO nn                   /DEFINE FORMS LENGTH - DEFAULT 66
HELP                    /DISPLAY COMMANDS AND SYNTAX
ME                      /ENTER MULTIPLE LINE MESSAGE (MAX 8)
     text ... CTRL-T    /TRANSMITS MESSAGE, CTRL-C CANCELS
RE [*]                  /RECEIVE AND PRINT; * INDEFINITELY - DEFAULT 1 FILE
RE file-name[,R]        /RECEIVE TO FILE; R REPLACE - DEFAULT NEW
SE file-list            /SEND ONE OR MORE FILES AS A SINGLE JOB
STATUS                  /DISPLAY CURRENT HAPPENINGS
/host command           /SEND MESSAGE FROM KEYBOARD, / INCLUDED
$host command           /SEND MESSAGE FROM KEYBOARD, $ INCLUDED
*****************************************
file-name = AAAAAAAA[,BB:N]   name[.suffix:drive] DEFAULT [.SA:0]
file-list = file-name1[,file-name2...file-nameN]
SYMBOLS:  [ ] OPTIONAL
```


                 Figure 1. Display of HELP Command

System Commands

The appropriate IBT Emulator is invoked under CODOS by typing:

=BSC2780[;<options>]

or:

=BSC3780[;<options>]

and pressing the RETURN key. The <options> field may include one or more of the letters described below.

Option	Function
A	Auto Answer – if the modem is properly configured, then a switched connection may occur after the IBT is loaded into memory.
C	Compress Input – applies to 3780 only. Host must be configured accordingly.
Q	Quality Printer – directs data to the 55 CPS Character Printer (Codex CDX-SP4) for printing.
S	Secondary Terminal – when operating terminal-to-terminal, one should be primary and the other secondary to preclude simultaneous contention.
T	Transparent Text – host must be configured accordingly.

Commands are of two basic types – those which control the emulator and those which send messages to the host computer or remote terminal.

Commands can be entered at any time, although a given command may not be legal in certain contexts; for example, a SEND command is not allowed while a RECEIVE operation is in progress. Status requests are honored at all times.

CODOS conversational conventions apply to emulator commands as well; use capital letters, use CTRL-X for line delete and use shift DEL for backspace. (Refer to the CODOS User's Guide for a complete description of these conventions.) However, the emulator requires only the first two characters of the commands. If parameters follow, then exactly two characters must be entered.

Operator Commands

The following commands affect the local operation of the
Intelligent Batch Terminal:

Command	Function
BYE	Terminate the emulator and return to CODOS. A physical disconnect occurs if the communications facilities are switched (DTR is reset). All files are closed if an abnormal termination (such as a complete loss of the communications channel) is necessary.
FO nn	Define vertical forms length (lines per page). The default value is 66 (11 inch paper, 6 lines per inch).
HELP	Display commands and syntax
KE	Operator input device switches to the keyboard. This command is relevant only while operating under the direction of a CHAIN file (see page 2-09)
RE [*]	Receive a file and print. The default is a single host file while * accepts such files indefinitely. In the event that the host bids while no RECEIVE command is in effect, the user is prompted accordingly. If the host uses extended retry, then the command must be entered within 48 seconds. Without extended retry, the bidding may stop within 9 seconds.
RE filename[;R]	Receive the next output file on disk. This can be a print file (spooled) or a card image file. If no options are specified, then the file is assumed to be a new one. "R" means that an existing file is to be replaced. If the user is mistaken as to the existence of the file, an error message is displayed and the command is ignored.
SE Filelist	Send one or more CODOS files as a single host job. This allows

frequently used Job Control segments
to be logically concatenated with
data. File names in the list must
conform to CODOS conventions and are
separated by commas with no embedded
blanks. The entire list must fit on
a single entry line. A record
total is displayed for each filename
once it has been successfully
transmitted to the host. Totals are
displayed at the end of the last
file name along with communications
error status.
If a file name in the list cannot
be found, then the terminal operator
is prompted to re-enter the command
starting from the file name which
was in error.

STATUS   Display current status of the
                              emulator. The information displayed
                              depends upon emulator activities at
                              the instant the command is issued.
                              If the emulator is receiving data,
                              then partial record counts and
                              communication errors are reported.
                              If non-critical exception conditions
                              have occurred, then these are
                              displayed. See Appendix B for
                              further details.

Remote Commands

    These messages are sent intact to the remote host or
emulator.

        Command   Function
        -------   --------

        ME   Send a multiple line message to the
                                  remote system. The message begins
                                  with the next input line. A maximum
                                  of 8 lines is allowed.

        text...CTRL-T   The CTRL-T transmits the message. A
                                  CTRL-C cancels the ME message.

        {$or/}host command   Send a single line command message
                                  to the remote host or emulator. The
                                  first character of the command is $
                                  or /.

USING THE 2780/3780 EMULATOR

 Before attempting to use the BSC Emulator, the Terminal display screen should be displaying the CODOS prompt ("="). (See APPENDIX A for instruction on basic system operation.)

Initialization

 First depress the ALL CAPS key; the light contained in the key is illuminated. Type:

  BSC2780

or:

  BSC3780

and press the RETURN key. This loads the emulator program and displays:

  BISYNC 2780 Emulator n.nn nn.nn
  Copyright Codex Corp 11/79

(where n.nn nn.nn is the version and revision number).

 It is suggested at this point to key in the STATUS command to insure that the emulator is ready for execution.

 Type "STATUS" or simply "ST" and press the RETURN key to obtain a display of the current system status. The emulator responds with:

  ****
  READY TO SEND
  ****

Dial-Up Instructions

 If the remote station must be dialed, the following procedure establishes communications between the terminals:

  Depress the talk button on the handset and dial the remote terminal. When the connection is made, a high-pitched tone is transmitted initially, followed by a low-pitched tone.

  When the low-pitched tone is heard, press the data button and place the handset in the cradle (hang up the phone).

The talk button remains lit. The IBT is ready to send or

receive data.

    At this time, you have the option to receive a file or
print job from the host or to initiate batch transmission of
files from the disk.

    The system displays the following message if the host is
requesting permission to transmit a file.

    BID RECEIVED - NO RECEIVE COMMAND ISSUED

Examples

Example 1.
Sign-on with the host, send a single job from diskette, and
print the received results.

Command   Action
-------   ------

/*SIGNONbbbbbbbREMOTE21   Identifies the terminal to the host.

SE JOBFIL   Sends the file, JOBFIL, to the host.
                                 The emulator shows the number of
                                 records sent by displaying:

                                 ****
                                 00002 RECORDS SENT FROM JOBFIL
                                 ****

RE   The data is printed as it is
                                 received from the host. At the
                                 completion of transmission, the
                                 emulator shows the number of records
                                 received and the status:

                                 ****
                                 00035 RECORDS RECEIVED TO PR
                                 READY TO SEND
                                 ****

Example 2.
Send a multiple file job.

Command   Action
-------   ------

SE JCL,DATA1,DATA2   The emulator sends the data from
                                 each file and states the number of
                                 records transmitted:

```
                    00002 RECORDS SENT FROM JCL
                    00105 RECORDS SENT FROM DATA1
                    00022 RECORDS SENT FROM DATA2
                    ******************************
```

Example 3.
Send a job from the keyboard.

Command   Action
-------   ------

ME   The emulator recognizes the ME
                                command for multiple line message.

//JOBID JOB   (XX250),..The emulator retains this informa-
//   SYSOUT=A   tion in memory for transmission.
//THIS IS DATA
      .
      .
(CTRL-T)   The emulator transmits the retained
                                data to the host.

Example 4.
Receive data to diskette, edit the received data, and print
the received data.

Command	Action
RE DISKFILE:1	The emulator saves the date received from the host on diskette in the file named DISKFILE on drive one.
BYE	The emulator terminates and returns control to CODOS.
=EDIT DISKFILE:1	Invokes the EDITOR in order to edit the file DISKFILE on drive one.
. .	The EDITOR performs the specified editing commands.
QUIT	The EDITOR saves the edited file, DISKFILE, and returns control to CODOS.
=LIST DISKFILE:1;LF132	CODOS calls the LIST program; it lists the file, DISKFILE, on the printer using a line length of 132 characters.

CHAIN File Execution

        The CODOS CHAIN command allows predefined procedures to
be automatically executed. A procedure consists of any
sequence of CODOS command lines that has been put into a disk
file, known as a CHAIN file. Instead of obtaining successive
command lines from the console, CHAIN will fetch commands
from the CHAIN file. This feature allows complicated and
lengthy operations to be defined once, and then invoked any
number of times, requiring no operator intervention. The
additional capabilities of conditional directives to the
CHAIN command and string substition permit an almost
unlimited number of applications to be handled by a CHAIN
file.

        If commands similar to those in Appendix E were executed
from a CHAIN file, it is possible for the IBT to have
terminated processing (BYE) before the job information was
received from the host. The following CHAIN file execution
sequence insures the receipt of the job information before
termination:

                                                              2-09

          CODOS calling sequence:
          CHAIN CHN2780.CF:1;DATAFILE%DATA%

          BSC2780
          SE SO2780
          SE JCL:1,%DATAFILE%:1
          RE
          RE
          ST
          BYE

Example 1. CHAIN File for IBT Execution

     The KE command can be used to establish the keyboard as
the input device for the IBT; if it is present, it should be
the last command in the CHAIN file, since the commands
following KE will not be executed by the Emulator.

     The Error Status Flag is set during Emulator execution
if an illegal command is encountered or if any CODOS standard
error condition occurs. Unless the Error Mask Flag (bit B)
is a 1, the keyboard is established as the input device. The
latter case allows the operator to type commands, but can
result in mixed-mode operation because CODOS believes the
CHAIN file is still the source of the commands.

     In CHAIN file operations, the RE filename command (one
file and print) results in the Emulator cycling until one
file is received from the host.

Appendices

APPENDIX A.   BASIC SYSTEM OPERATION

        This appendix is intended for the new user of Codex
Intelligent Terminal Systems, and provides instruction on how
to start the system, load the Disk Operating System (CODOS),
and prepare the system for use with BSC2780/BSC3780. Please
read the entire Appendix before attempting any operation of
the system.

        Codex Intelligent Terminal Systems are composed of the
Basic Display Terminal (CDX-68) with the appropriate firmware
options, Disk or Diskette Storage, and an optional Character
or Matrix Printer. While the system you are using may differ
in appearance or configuration, its operation is
fundamentally the same.

Back Panel Switches

        There are three groups of switches located along the top
left-hand side of the Terminal's rear panel. These switches
are the slide type and may be slid to the right and left to
select the setting labeled on the right and left. There are
three separate groups of switches which must be set as
follows for proper operation:

ENABLE	ON	DUPLEX	FULL	9600	ON
DISPLAY	OFF	PARITY	NO	4800	OFF
TRANSMODE	OFF		EVEN	2400	OFF
VIDEO INV	OFF	XMIT WORDS	8-BIT	1800	OFF
A	OFF	STOP BIT	1	1200	OFF
B	OFF	CONNECTION	DIRECT	600	OFF
C	OFF	MODEM TYPE	103	300	OFF
SPEC CHAR	OFF	TURN AROUND	8-CHAN	150	OFF
LINE FREQ	60	CODE SEL	EDT	110	OFF

Two of the settings, LINE FREQ (in the left-most group of
switches) and Baud Rate (the entire right-most group of
switches), may vary according to your application. LINE FREQ
should be set to match the frequency of the power provided
the Terminal (usually 60 Hz). Baud Rate should be set to the
same setting as is specified on the Microcomputer Module D
(usually 9600 baud). (Your supervisor or Codex service
representative can provide help here.)

Applying Power to the System

     After the back panel switches have been set, apply power
to the system by pressing the small rectangular switch in the
lower right-hand corner of the front face of the terminal
(when the switch has been pressed and power applied, the red
light embedded in the switch lights). Apply power next to
the disk or diskette unit (the power switch for the disk is
on the front panel; the diskette unit power switch is the red
button on the unit's front face). If your system includes a
printer, it should be turned on now, too (the printer power
switch is located on the right side of the printer's back
panel, next to the power cord).

     Always apply power to the system in the same order;
Terminal first, then disk or diskette drive, then the
printer, and then any other peripherals that may be
connected. When turning the system off, follow the same
process in reverse order; other peripherals, the printer, the
disk or diskette drive, and then the terminal.

Loading the Operating System

     The Codex Disk Operating System (CODOS) is the master
control program used by your Intelligent Terminal System; it
must be loaded into the system before any other program
(including the emulator) can be used. In addition to
functioning as a master control program, CODOS includes a
number of special functions, known as utility programs, that
can prove quite useful (for more detail on the utility
programs, as well as a complete description of CODOS, refer
to the CODOS User's Guide).

     To load the CODOS Disk Operating System, power must
first be applied to the system as described in the preceding
section. After power has been applied, the following message
is listed on the display screen:

          SYSTEM SELF TEST   5.0
          Insert Disk 0

(The number 5.0 in the example above may be different for
your system; there is no differentce in operation.)

     The System Self Test is a program which examines the
components of the system to make sure that everything is
functioning normally. If you have a diskette system, insert
the system diskette into drive zero (the left-most opening)
and close the door.

NOTE! THE DISKETTE MUST BE INSERTED INTO THE DRIVE WITH THE
LABEL FACING UPWARDS AND OUTWARDS. INSERTING IT ANY OTHER
WAY MAY CAUSE DAMAGE TO YOUR SYSTEM OR THE LOSS OF DATA ON
THE DISKETTE.

If your system uses a cartridge disk instead of diskettes,
load the disk by sliding the drive out of the cabinet to its
full extended position. With the handle on the disk
cartridge flush with the top of the disk (folded down), move
the small insert on the disk handle to the left. The bottom
cover of the disk pack is loosened; raise the disk handle to
the upright position and insert the disk into the drive (with
the handle parallel to the front edge of the drive; the disk
cannot be inserted any other way, so if there is resistance,
the disk is not properly aligned). Push the handle back to
where it is flush with the disk itself, and place the bottom
of the pack on top of the disk. Close the disk drive door
and press the switch labelled "RUN." When the "RUN" light is
illuminated, the drive is ready for use (please note that the
disk is not available until it has reached operating
temperature; this may take one to two minutes).

After a few moments, the Terminal screen displays the
message:

          SYSTEM SELF TEST 5.0
          Insert Disk 0

          56K operational

          END SYSTEM SELFTEST 5.0

          CODOS 5.0
          =

(The 56K in the message above refers to the amount of memory
contained in the system; this number may differ without
causing any difference in your system's operation).

     The equal sign in the message above is an indication
that the CODOS operating system has completed its previous
task and is ready to accept another one. This is the only
time that CODOS accepts commands; it is also the only time
that disks or diskettes may be removed from their drives and
the only time that power to the system may be turned off.
Removing a disk or diskette from its drive or turning the
power off at any other time may cause damage to the system or
the loss of data on the disk or diskette.

Power Considerations

        Your Intelligent Terminal System has been designed with
the greatest care to give you reliable service; however,
there are some precautions that you can observe to insure
that no damage to the system occurs or that no data is lost.

        The main consideration is the power supplied to your
system. The system should not be plugged in on the same
circuit with an elevator, electric motors, or other heavy
power consumers, as irregularities in the power supplied to
the Terminal can, in extreme cases, cause the loss of data.
For the same reason, you should not operate the system when
severe electrical storms are in the area (lightning striking
a power line can cause even more pronounced irregularities in
the power supplied to the Terminal).

Removing Power from the System

        As a general rule, power to the system should be turned
on when the system is first needed and then left on all day
(the system consumes very little power when idle). When the
system is no longer needed, it may be turned off.

        Before removing power from the system, make sure that
the CODOS ready message (the equal sign) is being displayed
on the screen. Remove all disks and diskettes from their
drives, and then turn off power to the printer and disk or
diskette drive. Power to the system may then be removed.

APPENDIX B. ERRORS AND MESSAGES

This chapter contains a summary and explanation of all of the standard error messages that can be displayed during operation of the Intelligent Batch Terminal.

Standard IBT error messages include those displayed by the emulator due to incorrect operator input, and messages that signify exceptional conditions such as a break in the host communication, printer unavailability, and so on.

In addition, file management errors, detected while reading or writing disk, are displayed in full CODOS error message format; that is, 2 asterisks followed by the two-digit reference number and the error message (refer to the CODOS User's Guide for a complete listing of error messages).

IBT Error Messages

HOST EOT ABORT -- OPERATION TERMINATED

The host is out of operation or has terminated the batch job activity. The status of the jobs sent to the host is undetermined.

Wait until the host comes up, reestablish communications, and submit the jobs again.

ILLEGAL COMMAND

The operator has keyed in an unrecognizable command or the command format is illegal.

The operator must enter the command again.

BIDDING TERMINATED NO ACKNOWLEDGEMENT RECEIVED

The terminal could not get the host to acknowledge its request to transmit a file.

If on a switched line, the operator should dial the remote station again. If on a leased private line, the operator should verify that the IBT is the primary station or check for hardware problems.

PHYSICAL CONNECT ERROR - DIAL IF NECESSARY

> The emulator software detected that Data Set Ready (DSR) was not on when the user issued a SEND command.
>
> If communicating on a switched line, either the communication link has been broken or the host has not been dialed.

COMMAND IGNORED

> This message indicates that although the command format was correct, the IBT software was unable to execute the command. An example of this would be an attempt to SEND a nonexistent file. The COMMAND IGNORED message from the 2780 software is preceded by the CODOS error message:
>
>> ** 04 FILE NAME NOT FOUND
>> COMMAND IGNORED
>
> Also, certain commands are not accepted by the emulator while in given execution modes. While printing, for example, the SEND command is not accepted.

RE-ENTER SEND COMMAND STARTING WITH FILE NAME IN ERROR

> The IBT, in transmitting a series of files as a single job, has encountered an invalid file name in the string of names specified in the SEND command.
>
> The operator must resubmit the SEND command beginning with the corrected file name (previous ones have already been sent).

DISKETTE IS FULL INSERT NEW DISKETTE AND EXECUTE RE filename
    COMMAND

> In the process of receiving a PRINT or PUNCH file that was being spooled to disk, the disk became 100% full. The file was closed and is available for transcription to the printer under the CODOS LIST command.
>
> The operator should insert a new diskette and enter the RECEIVE command again. This allows the remainder of the output file to be queued on the second and subsequent disks.

IBT Information Messages

Some messages can be solicited by the operator's entering the STATUS command, while others are displayed automatically.

nnnn RECORDS SENT FROM filename

count of records sent from the specified file.

nnnn RECORDS RECEIVED ON filename or PR

count of records received and stored in the specified file or sent to the printer.

READY TO SEND

The system is in the idle state and is telling the operator it is ready to accept a SEND command.

READY TO SEND OR RECEIVE

The system is in the idle state and has been issued a RECEIVE command; the system is prepared to accept a SEND command.

NNNN RE-TRANSMISSIONS

Count of corrected error blocks.

BID RECEIVED - NO RECEIVE COMMAND ISSUED

The remote terminal (host) has issued a bid for the line but the IBT cannot accept the bid until the operator issues a RECEIVE command. The RECEIVE command tells the system where to put the host output data. The operator may also choose to ignore the bid request and issue a SEND command.

BIDDING FOR LINE

This message is displayed in response to a STATUS command entered by the operator during execution of the terminal bid sequence.

ENTER CONTROL-T or CONTROL-C

This message is associated with the use of the ME command.
Up to eight lines of operator message destined for the host
is allowable under the ME command. The last or eighth line
of the operator message must be terminated by either a CTRL-C
to cancel the command or CTRL-T to transmit the message.

After display of the message, the operator is allowed to
enter one last line with the CTRL-C or CTRL-T control
character. If either is omitted, the message:

    ME COMMAND CANCELLED

is displayed. This message is also displayed if the CTRL-C
is specified.

APPENDIX C. ASCII CHARACTER SET

BITS 4 TO 6 --		0	1	2	3	4	5	6	7
	0	NUL	DLE	SP	0	@	P	'	p
B	1	SOH	DC1	!	1	A	Q	a	q
I	2	STX	DC2	"	2	B	R	b	r
T	3	ETX	DC3	#	3	C	S	c	s
S	4	EOT	DC4	$	4	D	T	d	t
	5	ENQ	NAK	%	5	E	U	e	u
0	6	ACK	SYN	&	6	F	V	f	v
	7	BEL	ETB	'	7	G	W	g	w
T	8	BS	CAN	(	8	H	X	h	x
O	9	HT	EM	)	9	I	Y	i	y
	A	LF	SUB	*	:	J	Z	j	z
3	B	VT	ESC	+	;	K	[	k	{
	C	FF	FS	,	<	L			
1 |									
	D	CR	GS	-	=	M	] ^	m	}
	E	SO	RS	.	>	N		n	
	F	SI	US	/	?	O		o	DEL

APPENDIX D. DISK AND DISKETTE CARE AND HANDLING

Diskette Care and Handling

     The diskette, or flexible disk, is permanently enclosed
by a durable plastic covering. This outside jacked allows
the diskette to be handled and at the same time gives a
certain degree of protection for the oxide-coated surface
within. The covering is not, however, proof against
mistreatment or abuse.

     To extend the usable life of a diskette and to maximize
trouble-free operation, the diskette should be handled with
reasonable care. The following points of diskette care
should always be observed (most manufacturers usually list
these points on the protective envelope of the diskette as a
reminder.

     1. The diskette should be returned to its protective
        envelope when not in use.

     2. The diskette in its envelope should be stored
        vertically. It should not be stacked or placed under
        pressure, as this can cause the diskette surface to
        warp. Too many diskettes should not be stored in one
        box.

     3. The diskette should not be exposed to any magnetic
        field in excess of 50 oersteds. This level can be
        reached about three inches away from sources such as
        electric motors and transformers.

     4. Diskettes should not be exposed to extremes of
        temperature, especially heat. Exposure to direct
        sunlight or other heat sources can cause the surface
        of the diskette to warp.

     5. The label on the diskette should be written on only
        with a felt-tipped pen. Pencils, ballpoint pens, or
        extreme pressure from felt-tipped pen can emboss the
        oxide surface of the diskette and cause the loss of
        data.

     6. The oxide surface of the diskette should never be
        touched. Skin oils transferred to the surface in
        this manner can attract and retain dust and other
        contaminants. Do not attempt to clean the oxide
        surface; all physical contace is to be avoided.

     7. The diskette should never be forced into the drive.
        Similarly, the diskette should never be folded or

bent.

8. The door on the diskette drive should not be closed
   before the diskette has been inserted all the way, as
   damage to the drive hub hole can result. Likewise,
   the door on the drive must be fully opened before the
   diskette can be removed.

The diskette may or may not have a write-protect hole
along the edge that is inserted into the drive first. This
hole is located 6.25 inches from the right-hand edge of the
diskette (when viewed from above). When the hole is not
covered, the diskette is write-protected and cannot be
written on. The hole must be covered in order for writing to
be permitted (use an opaque label or tape to cover the hole
and permit writing).

The CDX-FS2 diskette drives use single-sided diskettes,
while the other diskette units use double-sided diskettes.
While a single-sided diskette may be used in a drive designed
for double-sided diskettes, the reverse is not true and can
cause equipment damage or the loss of data.

Disk Cartridge Care and Handling

The disk cartridge used by Codex 10 Mb Disk Storage
drives is a precision device capable of storing up to five
million characters of formatted data. Enclosed within the
plastic cartridge is a metal disk, covered with an oxide
coating. Data is stored on this metal disk through the use
of electrical impulses (much the same way that a tape
recorder stores sound). Since the disk drive can read from
and write on the disk without ever making physical contact, a
disk cartridge can last almost indefinitely. But there are
things that can shorten (or end) the life of a disk
cartridge: negligence or abuse on the part of the people who
handle the cartridge.

As with any piece of precision equipment, disk
cartridges are manufactured to close tolerances and are
extremely sensitive to shock and contamination. The following
rules, if diligently followed, permit a disk cartridge to be
used indefinitely:

1. Never operate disk drives beyond their environmental
   range! 10 Mb Disk Storage drives are designed to
   operate from 60 to 100 degrees Fahrenheit (15 to 38
   degrees Celsius) with from 8 to 80 percent relative
   humidity (non-condensing).

2. Disk cartridges which have been exposed to
   environmental conditions in excess of those describe
   above should be permitted to become acclimated to
   operating conditions for at least two hours before

being used. (Since the density at which information is stored on the disk, the variation in the size of the disk caused by termperature changes can result in information not being where it is supposed to be). For best results, always store the disk cartridge in the room where the disk drive is kept.

3. Disk cartridges may be stored in termperatures from minus 40 degrees to 150 degrees Fahrenheit (minus 40 to 65 degrees Celsius) with from 8 to 80 percent relative humidity (non-condensing).

4. For long periods of storage, the disk cartridge should be returned to its original packing carton for protection against dust, rapid or extreme temperature changes, and other potentially damaging agents.

5. Handle disk cartridges carefully! Dropping or otherwise mishandling a disk cartridge can bend the metal disk, causing damage to the disk drive or the loss of data on the disk (or both). If a disk has been dropped or is otherwise suspected of having been damaged, do not attempt to use it without a careful inspection by trained personnel.

6. Although the plastic cartridge is possessed of structural strength adequate to permit the stacking of disk cartridges, this is not recommended because of possible damage should they fall.

7. Never touch the surface of the disk itself! The mechanism by which data is written on and read from the disk is suspended over the disk surface on a microscopic cushion of air. Contamination by dust, smoke particles, or skin oil can interfere with this cushion and cause damage to the disk drive, the loss of the data stored on the disk, or both.

8. Always keep the bottom cover on the disk cartridge to reduce the possibility of contamination. Never place the disk cartridge on any surface without the bottom cover in place. When loading or unloading disk cartridges, place the cartridge (with the bottom cover in place) only on a clean, flat surface in a room free from cigarette smoke, dust, or other contaminants.

9. Carry disk cartridges only by the carrying handle provided. This handle supports the disk in the same way that the drive itself does, and thus prevents damage to the disk.

10. Periodically clean the bottom cover of the disk cartridge, both on the inside and outside, with a

lint-free cloth dampened with isopropyl alcohol.

11. Keep the disk cartridge away from strong magnetic
    fields such as those created by transformers or large
    electrical motors. Since data is recorded on the
    disk magnetically, exposing the disk to a strong
    magnetic field may erase data.

12. As a general rule, protect disk cartridges from
    contamination and rapid temperature changes by
    avoiding direct sunlight, heating and air
    conditioning vents, and dusty or smoke-laden air.

APPENDIX E.   EXAMPLE

To begin the example, type:

        =BSC2780

The screen displays:

        BISYNC 2780 EMULATOR 1.11 0305
        Copyright Codex Corp. Mar 1980
        Enter HELP for commands and syntax

Next, type:

        /* SIGNON   REMOTE63

and the screen displays:

        ****
        00001 TOTAL RECORDS SENT
        READY TO SEND
        ****

        RE *

Type:

        SE JCL:1,DATA:1

and the screen displays:

        00001 RECORDS SENT FROM JCL:1

        00002 RECORDS SENT FROM DATA:1

        ****
        00004 TOTAL RECORDS SENT
        READY TO SEND OR RECEIVE
        ****

        ****
        00004 TOTAL RECORDS SENT
        00100 TOTAL RECORDS RECEIVED
        READY TO SEND OR RECEIVE
        ****

To check the IBT status, type:

        ST

The screen displays:

```
**********************************
SIGNON COMPLETED
READY TO SEND OR RECEIVE
**********************************
```

To complete the example, type:

```
BYE
```

and the screen displays the CODOS prompt:

```
=
```