Comm-Stor II/PDE INTERFACE UNIT

Prepared by Sykes Datatronics, Inc. for ABI

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

The Comm-Stor II unit, by itself, has been verified to comply with FCC radiation requirements. However, to minimize the radiation emissions when EIA cables are connected to the ports, an RFI filter (Sykes #100J14303) should be added to each port in use. Remember, it is the responsibility of the end user to make sure the entire system will pass the FCC radiation emission specification.

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Chapter 1

HARDWARE DESCRIPTIONS

1.1 GENERAL

This chapter discusses the various hardware components of the Comm-Stor II PDE Interface unit. Each component is described in detail to give you an idea of the component's purpose.

1.2 SYSTEM OVERVIEW

The Comm-Stor II with the PDE option allows the user to transmit data from a PDE 100/200 hand-held terminal to the Comm-Stor II. The Comm-Stor II, when interfaced with the PDE 100/200 terminal, makes up the Comm-Stor II PDE Interface unit. The primary purpose of the Comm-Stor II with the PDE option is to provide an off-line data concentrator designed to work in conjunction with the PDE 100/200 terminal. The system provides a diskette which can be read on any IBM 3740 reader or the system can be directly interfaced into the CPU via an asynchronous port. The Comm-Stor II/PDE Interface unit has the following features:

- checks data transmission for parity and character format;

- writes data transmission (call) status to indicate good or bad calls;

- prints call status logs for good or bad calls;

- sends signal to 100/200 hand-held terminal operator to indicate call status by providing a steady or intermittent tone;

- time-stamps each call that appears on the call record;

- minimizes data lost in case of a power failure by use of a power fail recovery feature;

- saves all data transmission or just good calls to efficiently use disk space;

- may be preprogrammed so user can determine the percentage of bad calls the system will accept before a particular call will be listed on the call status log as a bad call;

- stores data on bottom disk when top disk is filled
  (Comm-Stor II, dual drive);

- acts as an unattended or attended data receiver; and

- converts ASCII to EBCIDIC as data is being received.

In order for the system to perform these features, the
following is required:

- Comm-Stor II

- 4K Expanded RAM

- Comm-Stor II/PDE Interface Unit Option Upgrade Kit

- Configuration diskette

- maximum of two blank diskettes

See Figure 1-1 for an illustration of the Comm-Stor II PDE
Interface unit with PDE 100/200 hand-held terminal and
interface options.

1.2.1 Comm-Stor II/PDE Interface Unit Block Diagram Descriptions

The Comm-Stor II/PDE Interface units are microprocessor-
based systems which consist of the following components
(Figure 1-2):

- Base Board

- MP/RAM Board

- ROM II Board

- Printer Port/Expanded RAM Board

- Communications Ports Board

- Disk Interface Board

- Diskette Drive (one or two)

- Interface Panel

- Power Supply

Comm-Stor II/PDE UNIT

43 TELEPRINTER

202S MODEM
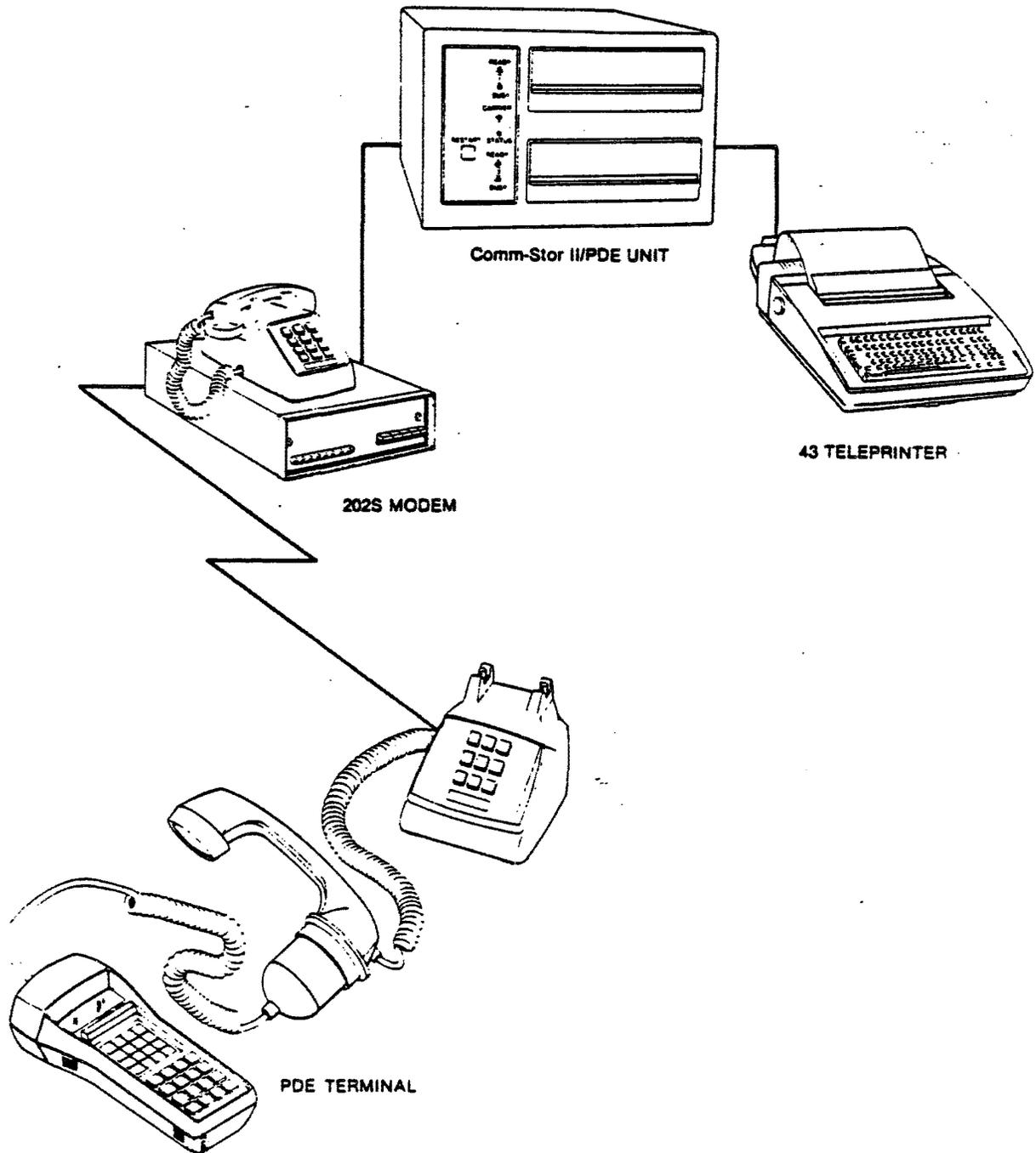
PDE TERMINAL

Figure 1-1   Comm-Stor II/PDE Interface Unit with
             PDE 100/200 Terminal and Interface Options
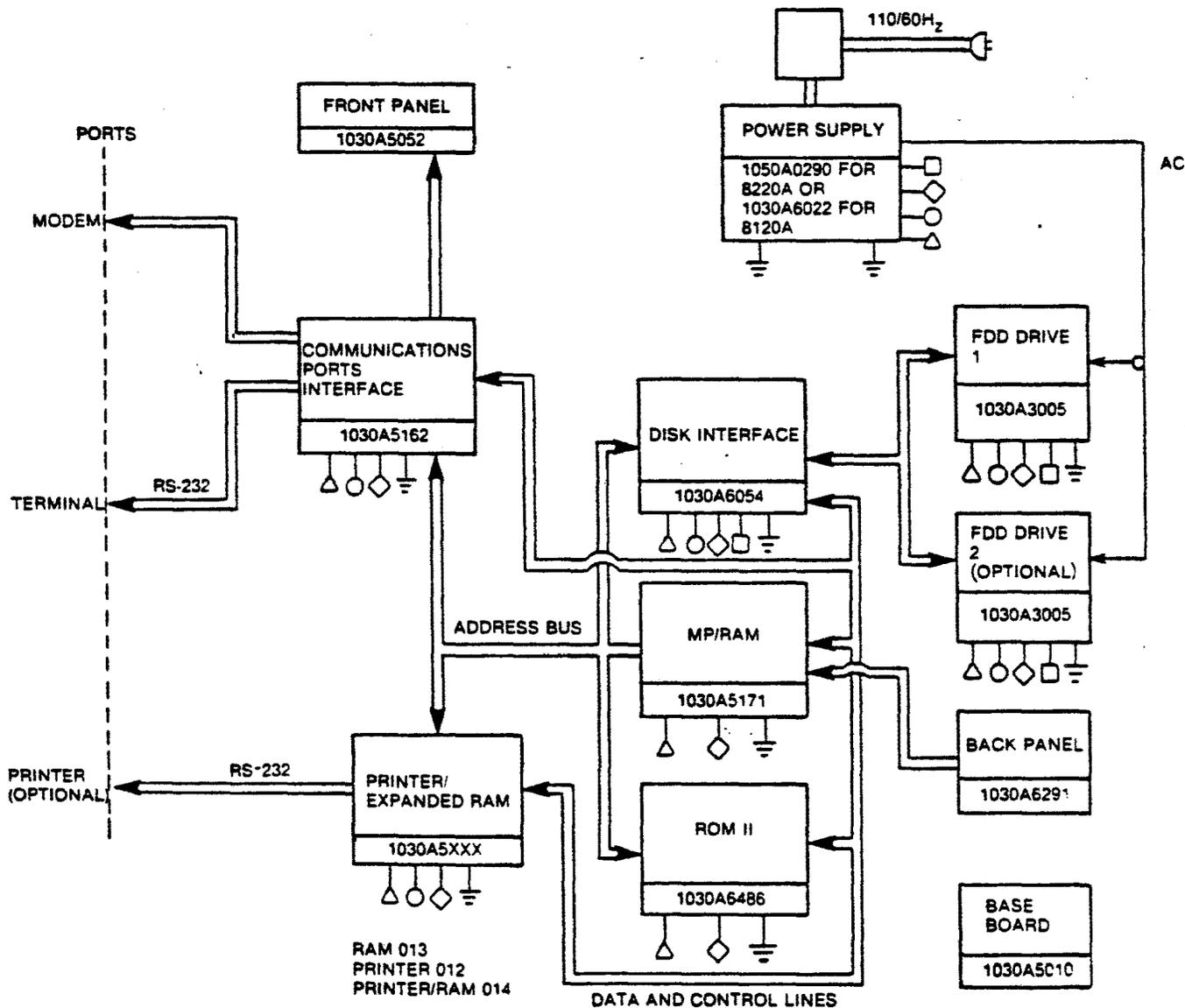
Figure 1-2 Comm-Stor II/PDE Interface Unit Block Diagram

The sections below provide brief descriptions of each of these components.

1.2.2 Base Board

The Base board contains receptacles for six printed circuit boards, a back plane containing a 100-pin bus, and a power connector.

1.2.3 MP/RAM Board

The MP/RAM board contains the following logic:

a) The microprocessor (MP) and supporting logic,

b) Random Access Memory (RAM) for microprocessor data buffering,

c) Complementary Metal Oxide Semi-conductor (CMOS) memory for storing configuration parameters, and

d) Thumbwheel switches for baud rate selection.

1.2.4 ROM II Board

The ROM II board consists of a series of Read Only Memory (ROM) devices which contain the operating system for the Comm-Stor II/PDE Interface unit.

1.2.5 Printer Port/Expanded RAM Board

This board is optional in Comm-Stor II/PDE Interface units and is only required when the system is equipped with additional hardware options (i.e. printer port expanded RAM). This board can hold up to 16K of RAM, which is available in 4K increments through an option update kit. The Comm-Stor II/PDE Interface unit must have a minimum of 4K of expanded RAM to function properly.

1.2.6 Communications Ports Board

The Communications Ports board contains the logic to control the terminal and modem port functions. It interfaces with the I/O panel through a 50-pin ribbon cable. This board also connects to the front panel indicators via a cable.

1.2.7 Disk Interface Board

The Disk Interface board contains circuitry to control the operations of the floppy diskette drive(s), a CRC generator/checker for error control, and a 32-byte First In First Out (FIFO) memory to buffer diskette read/write data.

1.2.8 Diskette Drive

The diskette drive(s) in the Comm-Stor II/PDE Interface
units accommodate one 8-inch single-sided single density
diskette capable of storing 256K characters of ASCII data.

1.2.9 Interface Panel

The Interface panel is located at the rear of the Comm-Stor
II/PDE Interface unit. It contains three DB-25 connectors
for the terminal, modem, and printer ports. Baud rate
switches for each connector, and a binary data switch are
also located on the Interface panel.

1.2.10 Power Supply

The Comm-Stor II/PDE Interface unit uses a multiple voltage
power supply to provide the following regulated voltages:

+24 VDC at 2.4 A
+12 VDC at 400 mA
+ 5 VDC at 6.0 A (single-drive unit only)
+ 5 VDC at 9.0 A (dual-drive unit only)
-12 VDC at 650 mA

1.3 Comm-Stor II/PDE INTERFACE UNIT HARDWARE INTERFACE DESCRIPTIONS

1.3.1 Interface Connections

The Comm-Stor II/PDE Interface unit conforms to EIA RS-232C
specifications, and all port connections are made with a
standard D-type 25-pin connector. Table 1-1 provides a list
of pin assignments, and the direction of the signal as
related to each port.

1.3.1.1 Transmit/Receive Signaling Protocol

When the modem port of the Comm-Stor II/PDE Interface unit
has data to transmit to a data communications device, it
sets Request-to-Send (pin 4) high. When the data communi-
cations device responds with Clear-to-Send (pin 5), the
Comm-Stor II/PDE Interface unit transmits the data on pin 2
of the modem port.

When the terminal port of the Comm-Stor II/PDE Interface
unit has data to transmit to a data terminal device, it sets
Data Set Ready (pin 6) high. When the data terminal device
sets Data Terminal Ready (pin 6) low, the Comm-Stor II/PDE
Interface unit transmits the data on pin 3.

TABLE 1-1

EIA RS-232C INTERFACE CONNECTIONS

PIN	DESCRIPTION	TERMINAL PORT		MODEM PORT		PRINTER PORT	
		USED	DIRECTION	USED	DIRECTION	USED	DIRECTION
1	Chassis Ground (FG)	X	--	X	--	X	--
2	Transmitted Data (SD)	X	in	X	out		
3	Received Data (RD)	X	out	X	in	X	out
4	Request-to-Send (RS)	X	in	X	out	X	in
5	Clear-to-Send (CS)	X	out	X	in	X	out
6	Data Set Ready (DR)	X	out	X	in	X	out
7	Circuit Ground (CG)	X	--	X	--	X	--
8	Carrier Detect (CD)	X	out	X	in	X	out
11	Secondary Request-to-Send (SRS)	X	in	X	out	X	in
12	Secondary Carrier Detect (SCD)	X	out	X	in	X	out
20	Data Terminal Ready (DTR)	X	in	X	out	X	in
22	Ring Indicator (RI)	X	out	X	in	X	out

NOTE: Direction refers to signal direction with respect to the Comm-Stor II/PDE Interface unit at each port, e.g., transmitted data is out of the unit on pin #2 at the modem port.

1.3.2 ASCII Data Table

The Comm-Stor II/PDE Interface unit receives standard ASCII data as shown in the ASCII Conversion Table, Figure 1-3.

Nontyping

Control
Functions
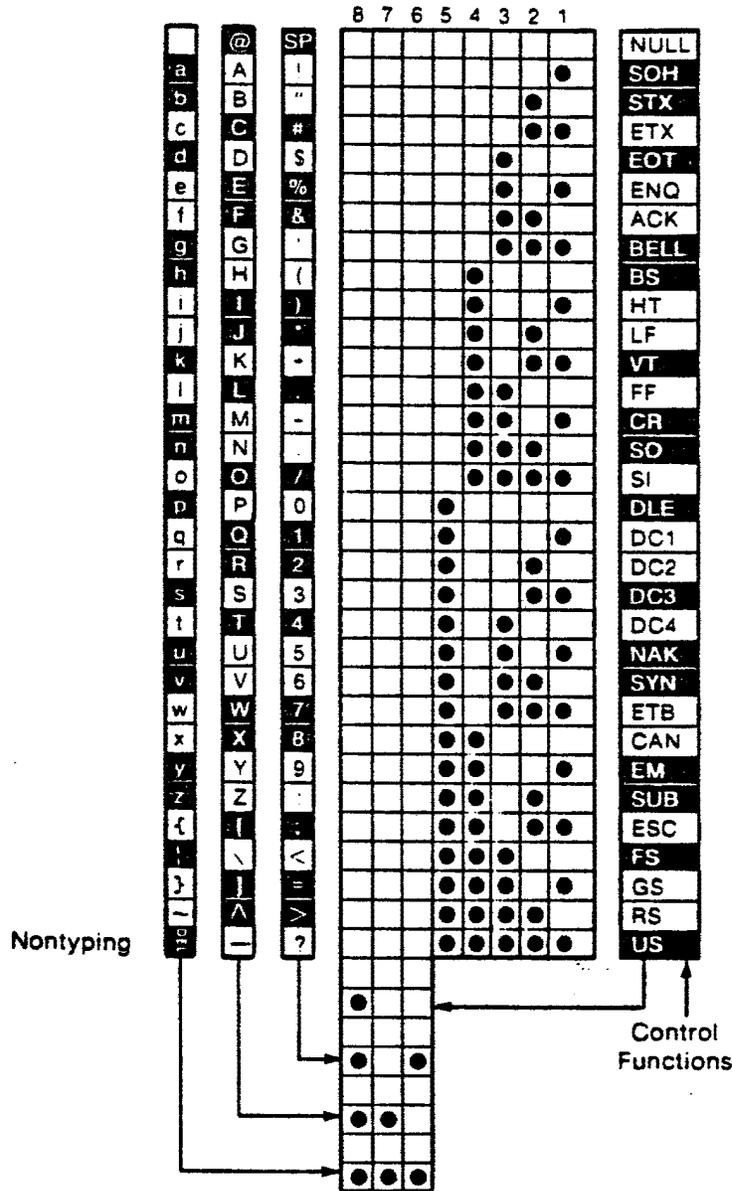
☐ Space: electrical positive. logical 0

▣ Mark electrical negative. logical 1

Note: To obtain even parity. the characters and functions shown with shaded
backgrounds have 8th bit marking.

**Figure 1-3 Conversion Table for American Standard Code
for Information Interchange (ASCII)**

Chapter 2

USER SOFTWARE DESCRIPTIONS

2.1 GENERAL

This chapter describes the software capabilities of the
Comm-Stor II/PDE Interface unit. After reading this
chapter, you should be familiar with how a call is trans-
mitted from a PDE 100/200 terminal and recorded on diskette
by the Comm-Stor II unit.

2.1.1 Selectable Receive Protocols

The Comm-Stor II/PDE Interface unit can be configured to
receive one of two transmitted protocols. One character in
parameter #138 will be used to make this selection. Refer
to parameter #138, Table 2-3, for specific selection
criteria. Also, see Table 2-3 for an explanation of
required PDE configuration requirements.

2.1.1.1 PDE Standard and Block Protocol Mode

Table 2-1 provides the PDE standard and block protocol. A
character falling outside of this set will be treated as a
parity error and the previously selected parity error symbol
(parameter #15, Table 2-3) will be substituted.

2.1.1.2 PDE A/N Protocol Mode

This mode allows the full ASCII character set, as well as
the PDE Standard and Block Protocol, to be received and
processed with the standard PDE error checking.

2.1.2 Call Detection and Disconnect

Upon detection of "RING", the Comm-Stor II/PDE Interface
unit initiates a 20-second timeout period. If data is not
detected within 20 seconds, the system disconnects the
line. No messages will be issued and no data will be
written on the diskette. Once data is detected, a pre-
programmed timeout period, ranging from 200 milliseconds
(ms) to 1800 ms, will commence and will be used to detect
the end-of-data. The preprogrammed timeout period is
selectable in 200 ms increments. Refer to parameter #138,
Table 2-3.

TABLE 2-I

PDE STANDARD AND BLOCK PROTOCOL MODE

RECEIVED ASCII CHARACTER	HEX VALUE
NULL	00
SOH	01
STX	02
ETX	03
EOT	04
LF	0A
CR	0D
FS	1C
SOB	1A
+	2B
−	2D
.	2E
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
:	3A
;	3B
<	3C
=	3D
>	3E
?	3F
A	41
C	43
E	45

For example, if a 200 ms timeout has been selected when a
200 ms gap in data is encountered, the unit interprets the
gap as the end-of-data for that particular call. If carrier
is lost before the end-of-data timeout period expires, a
terminal disconnect condition will be assumed, the system
will disconnect the line, and the call status will be a D
(DISCONNECT).

The unit can also be configured to monitor DSR at the modem
by setting parameter #60 (Table 2-4) to YES. In this
situation, if DSR goes low, the call is determined to be
bad, DTR is dropped and the call is disconnected. DSR can
go low during the time the response tone is being sent and
still be valid but will not affect the response tone. The
unit will then wait for the next call.

2.1.3 Call Number and Status

A call consists of three or more words received from a
transmitting PDE terminal. Each call is assigned a sequen-
tially incrementing three digit call number (nnn). This
number is recorded first, followed by the call data and then
the call status. Fill characters (00_{16}) will be used to
fill the remainder of the sector so that the next call will
be recorded beginning at a sector boundary. The format of
the recorded call is as follows:

       $nnn   data   *nnnCLLLLTTWWWWWWHH:MM

Where nnn = call number
        C = Call Status   G = Good Call
                                B = Bad Call (Excessive Errors)
                                D = Disconnect Call
                                F = Full Diskette
                                P = Power Failure

     LLLL = number of errors   ("Words in Error" if the PDE
                                 Standard and Block Protocol
                                 Mode or the PDE A/N Protocol
                                 Mode is used.)

       TT = Terminal Errors
   WWWWWW = Word Count   ("Words Received" if the PDE
                                 Standard and Block Protocol
                                 Mode or the PDE A/N Protocol
                                 Mode is used.)

2.1.4 Terminal Start Tone Validation

The Comm-Stor II/PDE Interface unit checks data from the PDE
terminal to ensure that at least 500 ms of mark frequency
occurs before the start of data. If the 500 ms of mark
frequency does not occur, the call is handled as an invalid
call. The message "Invalid Call" will be printed under the
Call Log status. This feature is enabled when the PDE
Standard and Block Protocol Mode or the PDE A/N Protocol
Mode has been selected.

If the start tone is not valid, the data will not be written
on the diskette and a bad tone will be issued at the end of
the data transmission.

2.1.5 Response Tone

After a call has been received and recorded, along with the
call number and status, a response tone is transmitted based
on the quality of the received data.

A good call is a call in which the number of errors is less
than that defined by the programmed error limit.

A bad call is a call in which the number of errors is equal
to or greater than the programmed error limit.

Good call response tone - Request-to-Send asserted for 20
seconds.

Bad call response tone - Request-to-Send pulsed for 20
seconds at a rate of .5 seconds on, and .5 seconds off.

A good call is indicated by the letter "G" in the call
status information. A bad call is indicated by a letter
other than "G."

2.1.6 Programmable Error Limits

A numeric character in parameter #138 on the Refresh disk-
ette will be used to set the Comm-Stor II/PDE Interface
error limit. See parameter #138, Table 2-4.

2.1.7 Call Log

The call log will be output to the system terminal port and
printer port (optional) to provide a quick reference to the
system operator.

The call log has two basic elements: the heading informa-
tion and call information. The heading information will be
output with the call information for the first call. On
subsequent calls, only the call information will be output.
However, if a power failure occurs, new heading information
is output with the call information for the first call
immediately following the power failure.

The call log heading and call information are displayed in
the format shown in Figure 2-1.

To conserve diskette storage space, the call log is not
written on diskette.

CALL NO.	FIRST 16 CHARACTERS	LAST 16 CHARACTERS	STATUS	WDS	WE	TE	STOP TIME
xxx	xxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxx	x	xxxx	xx	xx	HH:MM

WDS — This heading is used with the PDE Standard and Block Protocol Mode and the PDE A/N Protocol Mode and indicates the total number of words received during this call.

WE — This heading is used with the PDE Standard and Block Protocol Mode and the PDE A/N Protocol Mode and indicates the total number of words in error during this call.

TE (Terminal Errors) — unused

STOP TIME — This heading is used to indicate the time the call ended, based on the Comm-Stor II/PDE Interface unit's internal clock.

Figure 2-1 Call Log Format

If less than 32 characters are received, the remaining character locations in the call log will be filled with the ASCII "space" character.

2.1.8 Counting Word or Character Errors

Word Error – Whenever the PDE Standard and Block Protocol Mode or the PDE A/N Protocol Mode is selected, one or more characters out of parity within a word are designated as a word error. Each word error causes the word error count in the status message to be incremented by one. Any characters received out of parity are substituted with a previously selected symbol (parameter #15, Table 2-3).

Terminal Errors – This feature was used by older PDE terminals which used magnetic tape memory. The newer solid state memory units do not use this feature.

2.1.9 Full Disk Condition

If the end-of-disk (TRACK 73, Sector 26) is encountered
while writing data, the disk system writes the standard
status block with an "F" character to indicate a full disk
condition. The remainder of the call is received but not
recorded. Upon detecting end-of-data, a bad tone is
transmitted, followed by a disconnect. With a dual drive
system, the second drive is enabled for subsequent call
recording and the next sequential call number is used. If
the Comm-Stor II/PDE Interface unit is dialed up and the
diskette(s) is (are) full, Data Terminal Ready (DTR) is
lowered and the modem will not answer.

2.1.10 Disconnect Call Condition

If, while receiving data, the carrier and data stop
simultaneously, a terminal disconnect is assumed. The
system immediately forces a disconnect from the modem. The
disconnect symbol "D" is placed in the call status
information.

2.1.11 Power Failure Recovery

The power failure recovery feature indicates that a power
failure or RESTART occurred during a transmission.

The "P" status will never appear in the call log status
display. It will, however, be included in the status
message on diskette. In the case of a power failure, one of
the following will occur:

a) If SAVE ALL CALLS is configured in parameter #138, then
    the User diskette will contain the call number followed
    by a "P". All data received up to the time of the power
    outage will be stored as NULL characters on diskette.
    However, the next transmission will utilize the same
    call number since the call was considered invalid.

    Example of data on diskette: the first call having
    incurred a power failure while the next call did not.

    $001P NULL NULL NULL NULL
    $001 ACE + 743C + 3701 . . . . .

b) If REJECT BAD CALLS is selected in parameter #138, then
    a call which incurred a power failure will be rejected
    as a bad call. The next call will contain the same call
    number.

2.1.12 Reject Bad Call/Save All Calls

When specified, the Reject Bad Call feature causes all calls with other than a good status "G" to be rejected. Only calls with a "G" status will be recorded on the diskette. The call number for a bad call will be reused on the status log. However, no number will be used more than once when stored on diskette. The Save All Calls feature stores all calls on diskette, regardless of the call status. See parameter #138, Table 2-3.

2.1.13 Call Stop Time

A stop time for each call is written onto the User diskette following the status information for the call, for example:

*001G00000003614915:19

2.1.14 Internal Clock

The Comm-Stor II/PDE Interface system incorporates an internal clock which provides a time reference of hours and minutes. The clock has an accuracy of $\pm$ 10 seconds per day. The time is based on a 24-hour system indicated as hours and minutes (HH:MM).

A means of setting the internal clock is provided by way of the terminal port. The prompt message "PLEASE ENTER TIME (HH:MM)" is output to the terminal when the User diskette is loaded. The operator will have 15 seconds to enter the time HH:MM[CR] to set the internal clock.

If the operator chooses not to enter the time, or if the system is not interfaced with a terminal, the internal clock starts at 00:00 (midnight) when the User diskette is inserted.

The clock increments in one minute intervals until reaching a time of 23:59, at which point the clock will reset to 00:00.

Upon a power failure, the internal clock will be reset to 00:00. The time cannot be displayed or changed while the CARRIER LED is lit.

NOTE: The time may be checked or changed if a terminal is in use. To do this:

a) Wait for the call log to be printed if there is a transmission in progress.

b) Type T. The current time will appear. To change the
time when the cursor stops, enter the new time in the
form HH:MM followed by a carriage return. To keep the
current time, type only a carriage return.

2.1.15 3740 Translation and Blocking

The 3740 translation function is incorporated in both
protocol modes. It allows the received data to be converted
from ASCII to EBCDIC (IBM) as it is received. After each
call is completed, the IBM Data Set Label is updated to
reflect the new end-of-data value.

The ASCII to EBCDIC translation is the same as that present-
ly used to enable the convert function and to determine the
data blocking factor. The blocking factor is a two-digit
number in parameter #138 which, when multiplied by two,
determines the number of characters to be written per sector
on the User diskette.

The two bytes are interpreted as follows:

$\phi\phi$ = default to convert to EBCDIC (IBM) and block to 128
    characters per sector.

bb = record ASCII and block to 128 characters per sector.

nn = convert to EBCDIC (IBM) and block to nn x 2 characters
    per sector.

If the value of "nn" is greater than 64, the system defaults
to 128 characters per sector.

NOTE: The Comm-Stor II/PDE Interface unit has the capabil-
ity to convert the incoming data to EBCDIC as the data is
being received. However, the 3740 System diskette may be
ordered by users who desire to receive ASCII data and at a
later time convert to EBCDIC, or vice-versa. The kit
includes a How-to-Use manual and the System diskette.

2.1.16 Error Indicators

Because the Comm-Stor II/PDE Interface unit is often oper-
ated without a terminal, some means of error indication is
required. The front panel LEDs are used to indicate normal
and error conditions as shown in Table 2-2.

If all LEDs are flashing, the operator can use the BINARY
Switch to display the actual error number on the LEDs. Move
the BINARY Switch to the exit position and observe the front
panel LEDs.

TABLE 2-2*

ERROR INDICATIONS - FRONT PANEL LEDS

STATUS	CARRIER	BUSY 1	READY 1	ERROR NUMBER	MESSAGE
OFF	OFF	ON	OFF	NORMAL	Waiting to Receive
OFF	OFF	OFF	OFF	0	System
OFF	OFF	OFF	ON	1	Not Ready
OFF	OFF	ON	ON	2	Diskette
OFF	OFF	ON	ON	3	Bad Read
OFF	ON	OFF	OFF	4	Protect
OFF	ON	OFF	ON	5	Wrong Diskette
OFF	ON	ON	OFF	6	Prep System
OFF	ON	ON	ON	7	Full Diskette
ON	OFF	OFF	OFF	8	No Find
ON	OFF	OFF	ON	9	Illegal
ON	OFF	ON	OFF	10	Bad Size

*This table is for a Comm-Stor II single-drive unit. However, the same four LEDs are used in Comm-Stor II dual-drive units.

TABLE 2-2 (Cont)

STATUS	CARRIER	BUSY 1	READY 1	ERROR NUMBER	MESSAGE
ON	OFF	ON	ON	11	User Table
ON	ON	OFF	OFF	12	Modem
ON	ON	OFF	ON	13	No Room
ON	ON	ON	OFF	14	Overrun
ON	ON	ON	ON	15	Answer
Rippling in sequence				--	BINARY switch in EXIT position

The meaning of the numbered error messages above and some probable causes are listed below.

0-SYSTEM - This indicates that the system has detected an equipment problem, or a diskette with a bad directory. If the same error occurs when using a duplicate diskette, note the conditions which created the error and contact your AIS/ABI Account representative.

1-NOT READY - This indicates a diskette drive is not ready. This could be a diskette not inserted or inserted improperly, or an attempt to access drive 2 on a single drive system.

2-DISKETTE - This indicates the system was unable to locate the proper location on a diskette where data is stored or will be stored. The probable cause is a bad diskette.

3-BAD READ - This indicates data or a portion of data cannot be read without error after eight read attempts. The diskette is bad.

4-PROTECT - This indicates an attempt to write on a pro-
tected diskette.

5-WRONG DISKETTE - This indicates a diskette is not a User
(Data) diskette or it is a bad User diskette.

6-PREP SYSTEM - This indicates the system was not prepared
for the keyboard command. This would occur if the appropri-
ate baud rate switch was not placed in the KYBD (0) position
when a Baud Rate command was entered.

7-FULL DSK - Indicates the Directory is full. Either a file
must be canceled from the diskette before entering a new
file or a new diskette must be used.

8-NO FIND - Indicates a requested file does not exist in the
Directory. Check to see that file name and extension com-
pletely agree with the Directory entry.
                                or
A search string was not found in the forms mode.

9-ILLEGAL - An illegal operation has been attempted.

Examples:

Edit (.ED) a binary file,
                                or
When in the forms mode, attempting to Enter a non-forms file,
                                or
Requesting an Edit or Forms operation without the option
installed,
                              or
Don't Care or Reject character used while in alphabetical
mode,
                                or
An ENTER AUTOMATIC command issued without an Auto-Name (.LI
command) loaded.
                                or
A variable length file command (.DSS, .SS, or .RE) with no
file.

10-BAD SIZE - In Edit Mode:

An attempt to Save a file with no data.

In Forms Mode:

The number of entries in the data file exceeds the number of
variable fields in the form. The wrong form was probably
loaded into the forms buffer,
                                or
The form is too big for the buffer.

11-USR TABL - Indicates the system detected an improper
command from the User Command Table. The User Command Table
must be corrected using the Configuration diskette.

12-MODEM - Indicates an improper condition has been detected
at the modem interface. One of the following conditions
exists:

Clear To Send was not asserted within 400 msc after Request
To Send was asserted,
                              or
Data Set Ready was not asserted when attempting to perform a
Send, Send Directory or Send Status command.

13-NO ROOM - Indicates a file being Edited or Saved from the
scratch pad is larger than the configured maximum file
length.
                              or
An attempt was made to exceed the capacity of the scratch
pad with an Edit, Insert, Replace or Append command.
                              or
When merging a file in the Forms Mode, the forms data field
is too small for the forms data.
                              or
An attempt was made to Edit a file on a diskette which was
not configured to have a scratch pad.
                              or
A Search/Replace operation results in a line length exceed-
ing the configured value.

14-OVERRUN - Input data in either the enter or receive mode
has exceeded the input rate or file capacity of the system
and data is lost.
                              or
The modem or terminal buffer has been filled beyond its
configured capacity.
                              or
An illegal buffer configuration exists.

15-ANSWER - Unused

2.1.17 Disk Power

Each unit is equipped with the Standby feature programmed to
power the disk drive(s) down between calls. The disk
drive(s) is (are) powered-up upon detection of RING and
powered- down at the conclusion of each call.

2.1.18 End-of-Data Condition

Upon sensing a file close condition (the operator has moved
the BINARY switch to the EXIT position), the drive writes an
ETX character to the end of file. The drive then goes to an
idle state.

2.1.19 Modem DTR Enable

The modem DTR signal is active when a User diskette is
inserted and the unit is in the Receive mode, or when the
modem baud rate switch is set to zero. The signal is
controlled under two pre-selected modes:

Standard Mode - DTR asserted as long as User diskette is
                inserted.

International Mode - DTR drops between calls

If the modem baud rate switch is in the 0 position, the
system will go into the idle mode and all PDE receive func-
tions will be disabled. The modem baud rate will default to
1200 baud and the DTR signal to the modem will be high at
all times. The modem baud rate can then be changed either
through the terminal or the modem port using the .BM command.

TABLE 2-3

Comm-Stor II/PDE INTERFACE UNIT CONFIGURATION REQUIREMENTS

NOTE: Refresh the Comm-Stor II/PDE Interface unit to Factory Standard Values (.R) before changing the required parameters.

Comm-Stor II/PDE INTERFACE UNIT PARAMETER NUMBER	REQUIRED VALUE OR OPTIONS	DESCRIPTION
15	\ (Backslash)	This parameter defines the character that will replace any character received with a parity error.
33	[^G]*	This parameter alerts the user that the modem is not connected properly.
37	Depends on parity of local terminal.	This parameter enables the Comm-Stor II/PDE Interface unit to communicate with the local terminal.
41	YES	This parameter indicates that a half duplex, 202 type modem is being used.
56	YES	This parameter enables the Comm-Stor II/PDE Interface unit to check for modem framing errors (a method for ensuring all data bits for each character are received).

---

*Some terminals, other than the DATASPEED† 40/2, may require parameter #33 to be a [NULL].

†DATASPEED is a registered trademark of ABI.

TABLE 2-3 (Cont)

Comm-Stor II/PDE INTERFACE UNIT PARAMETER NUMBER	REQUIRED VALUE OR OPTIONS	DESCRIPTION
58/59	odd parity 7 bits (If PDE terminal parity is different, set 58 and 59 to correspond with the PDE terminal.)	This parameter enables the Comm-Stor II/PDE Interface unit to communicate with the sending terminal.
62	Set to correspond with the printer parity. (If uncertain of printer parity, refer to manufacturer's documentation.)	This parameter enables the Comm-Stor II/PDE Interface unit to communicate with the printer.
138	This parameter requires a total of 20 characters. It provides options for receiving data (NOTE: ß = space).	This parameter defines the characteristics of data received from the remote PDE terminal, and how the Comm-Stor II/PDE Interface unit should respond to these characteristics.

For parameter 138:

Character Position	Selections (factory standard value listed first)
1	$
2	*
3	ß or R
4	ß or any of 0-6,9
5	ß or W
6	ßß or 00 or [nn]
7	ßß or 00 or [nn]
8	ß
9	ß or any of 1-9
10	
11	
12	
13	
14	
15	ß
16	
17	
18	
19	
20	

TABLE 2-3 (Cont)

Comm-Stor II/PDE INTERFACE UNIT PARAMETER NUMBER	REQUIRED VALUE OR OPTIONS	DESCRIPTION
	Character position 1: Factory Standard Value (FSV) = $	Character indicates start of call record in the file on diskette.
	Character position 2: FSV = *	Character indicates start of call status recorded on diskette once call is completed.
	Character position 3: FSV = ß Options: ß = save all calls R = reject bad calls	Character indicates user decision to record on diskette all calls (ß) or only those of status "G" (R).
	Character position 4: FSV = ß Options: ß = 2% error limit 0 = 0% error limit 1 = 1% error limit 2 = 2% error limit (default value) 3 = 4% error limit 4 = 6% error limit 5 = 8% error limit 6 = 10% error limit 9 = no error limit	Character indicates error limits for good calls (status "G"). Bad calls are those with an error percentage equal to or greater than the error limit.
	Character position 5: FSV = ß Options: ß = PDE Standard and PDE Block Protocol W = PDE Alphanumeric characters	Character indicates Receive Character Set. User response must correspond with the character set the terminal is transmitting.
	Character positions 6, 7: FSV = ßß Options: ßß = record ASCII and block to 128 ØØ = convert to EBCDIC and block to 128	Characters indicate IBM Blocking Factor (how data will be recorded on diskette).

TABLE 2-3 (Cont)

Comm-Stor II/PDE INTERFACE UNIT PARAMETER NUMBER	REQUIRED VALUE OR OPTIONS	DESCRIPTION
	[nn] = Convert to EBCDIC and block to twice number typed for "nn" (e.g. to convert to EBCDIC and block to 8Ø, enter 40).	
	Character position 8: FSV = ⌀ Options: ⌀ = raised I = dropped	Character indicates Modem Data Terminal Ready (DTR) mode select. Factory standard has DTR always raised, and is used in the U.S. Many foreign countries require that DTR be dropped (I) between international calls. It is raised by the RING signal.

	Character position 9: FSV = ⌀
	Options: ⌀ = 200 ms
	        (milliseconds)
	1 = 200 ms
	        (default value)
	2 = 400 ms
	3 = 600 ms
	4 = 800 ms
	5 = 1000 ms
	6 = 1200 ms
	7 = 1400 ms
	8 = 1600 ms
	9 = 1800 ms
		Character indicates Time Out for Call Disconnect. When the specified amount of time passes without data, the Comm-Stor II/PDE Interface unit assumes end of transmission. This time factor depends on the transmission set-up of the PDE terminal.

	Character position 10-20: FSV = 11 spaces (⌀⌀⌀⌀⌀⌀⌀⌀⌀⌀⌀) No options	Any other entries may cause unpredictable operations of the Comm-Stor II/PDE Interface unit.

TABLE 2-3 (Cont)

Comm-Stor II/PDE INTERFACE UNIT PARAMETER NUMBER	REQUIRED VALUE OR OPTIONS	DESCRIPTION
	Sample Configurations of Parameter 138	

Sample Configurations of Parameter 138

```
$   *   R   2   ƀ   40   ƀ   5   ƀ   ƀ   ƀ   ƀ   ƀ   ƀ   ƀ   ƀ   ƀ   ƀ   ƀ
                                      └────── eleven spaces ──────┘
                            └Time out for call disconnect = 1000 ms
                        └─ Modem DTR mode select = standard
                    └── IBM Blocking Factor = convert to EBCDIC (IBM)
                        and block to 80 characters per sector
            └── Receive character set = PDE Standard and PDE Block
                Protocol
        └── Error limit = 2%
    └── Save/reject bad calls = reject
  └── Character to indicate start of status
└── Character to indicate start of call
```

NOTE: Selecting values other than legal options for this parameter may cause unpredictable Comm-Stor II/PDE Interface unit operations. Verify the validity of your entries before final implementation.

| 140 | No options | The parameter provides a command table that is automatically executed by the Comm-Stor II/PDE Interface unit. |
| | .MM[Return] .CL[Return] .RƀTLX[Return] .CL2[Return] .R2ƀTLX[Return] .MX[Return] NOTE: ƀ = space bar [Return] = carriage return key | .MM - Instructs the Comm-Stor II/PDE Interface unit to print the call log status report. .CL - Instructs the Comm-Stor II/PDE Interface unit to cancel any existing files on diskette. .RbTLX - Instructs the Comm-Stor II/PDE Interface unit to receive data and store it under the file name of TLX. .CL2 - Instructs the unit to cancel existing files on drive 2 of a dual drive unit. |

TABLE 2-3 (Cont)

Comm-Stor II/PDE INTERFACE UNIT PARAMETER NUMBER	REQUIRED VALUE OR OPTIONS	DESCRIPTION
		.R2ʙTLX - Instructs the Comm-Stor II/PDE Interface unit to receive data on drive 2. .MX - Instructs the Comm-Stor II/PDE Interface unit to exit the Receive mode. These commands are executed in the order they appear.
141	Y	The parameter automatically activates the command table in parameter #140 when the Comm-Stor II/PDE Interface unit is turned on.
144	01	The parameter sets the modem port buffer size to 1K (1024) characters.

TABLE 2-4

Comm-Stor II/PDE INTERFACE CONFIGURATION PARAMETERS

NOTE: The Comm-Stor II/PDE Interface unit must be refreshed to Factory Standard
Values (.R) before changing the required parameters.

An asterisk (*) indicates those parameters, defined in Table 2-3, which may require
changing from Factory Standard Values for the Comm-Stor II/PDE Interface unit to
operate properly.

```
   1:   ASCII DATA? (YES)
   2:   SEND EOT AFTER EACH MODEM REQUEST? (NO)
   3:   END OF LINE CHARACTER ([CR])
   4:   SYSTEM TO ADD LINE FEED AFTER CARRIAGE RETURN? (YES)
   5:   LINE FEED CHARACTER ([LF])
   6:   CARRIAGE RETURN CHARACTER FOR SYSTEM MESSAGES ([CR])
   7:   LINE FEED CHARACTER FOR SYSTEM MESSAGES ([LF])
   8:   END OF TEXT CHARACTER ([ETX])
   9:   TRANSMIT "END OF TEXT" CHARACTER? (NO)
  10:   TRANSMIT "END OF TRANSMISSION" CHARACTER? (NO)
  11:   "END OF TRANSMISSION" CHARACTER ([^D])
  12:   "RESET" CHARACTER ([^T])
  13:   SPACE CHARACTER FOR SYSTEM MESSAGES ( )
  14:   FIRST CHARACTER OF ESCAPE SEQUENCE ([ESC])
* 15:   PARITY ERROR SYMBOL (\)
  16:   "STOP SEND/START SEND" OPTION (0)
  17:   "STOP SEND" CHARACTER (TO COMPUTER) ([^S])
  18:   "START SEND" CHARACTER (TO COMPUTER) ([^Q])
  19:   "HOLD" CHARACTER (FROM COMPUTER/TERMINAL) ([^S])
  20:   "RESUME" CHARACTER (FROM COMPUTER/TERMINAL) ([^Q])
  21:   OUTPUT NUMERICAL ERROR MESSAGES? (NO)
  22:   SEND ERROR MESSAGE TO MODEM? (NO)
  23:   SPECIAL OUTPUT CHARACTER #1 ([CR])
         PORTS (NONE)
         DELAY FACTOR/SUBSTITUTION (1)
  24:   SPECIAL OUTPUT CHARACTER #2 ([CR])
         PORTS (NONE)
         DELAY FACTOR/SUBSTITUTION (1)
  25:   SPECIAL OUTPUT CHARACTER #3 ([CR])
         PORTS (NONE)
         DELAY FACTOR/SUBSTITUTION (1)
  26:   SPECIAL OUTPUT CHARACTER #4 ([CR])
         PORTS (NONE)
         DELAY FACTOR/SUBSTITUTION (1)
  27:   "DELETE" CHARACTER ENTERED ([RUB])
  28:   "DELETE" CHARACTER ECHOED ([BS])
  29:   "LINE CANCEL" CHARACTER ([^X])
```

TABLE 2-4 (cont)

```
  30:   NUMBER OF LINES ON PAGE (23)
  31:   STOP DISPLAY AFTER EACH PAGE? (NO)
  32:   SUBSTITUTE TERMINAL PARITY ERRORS WITH ERROR SYMBOL? (YES)
* 33:   MODEM OFF-LINE ALERT CHARACTER ([^G])
  34:   INHIBIT ECHO TO TERMINAL? (NO)
  35:   IGNORE "NULL" CHARACTER FROM TERMINAL? (YES)
  36:   TERMINAL "NULL" CHARACTER ([NULL])
* 37:   NORMAL TERMINAL DATA
        PARITY - EVEN/ODD/NONE (NONE)
        NUMBER OF DATA BITS
        INCLUDING FIXED BITS (IF ANY) (8)
        EIGHTH DATA BIT (0)
  38:   BINARY TERMINAL DATA
        PARITY - EVEN/ODD/NONE (NONE)
        NUMBER OF DATA BITS
        INCLUDING FIXED BITS (IF ANY) (8)
  39:   TERMINAL INTERFACE CONTROL (11110)
        40/1 TERMINAL? (NO)
  40:   DOES TERMINAL PROVIDE "DATA TERM READY"?  (NO)
* 41:   HALF DUPLEX MODEM? (YES)
  42:   **FOR HDX ONLY** TURN AROUND LINE AFTER EVERY CHARACTER? (YES)
  43:   **FOR HDX ONLY** MODEM TURNAROUND CHARACTER ([CR])
  44:   **FOR HDX ONLY** SECONDARY (SUPERVISORY) CHANNEL AVAILABLE?  (NO)
  45:   **FOR HDX ONLY** "REQUEST TO SEND" TIMEOUT [MILLISECONDS] (200)
  46:   **FOR HDX ONLY** "SECONDARY CARRIER DROPPED" OPTION (0)
  47:   WAIT AFTER EOL FOR PROMPT OR AFTER ETX FOR ACK? (NO)
  48:   CHARACTER TO INITIATE WAIT PERIOD ([ETX])
  49:   WAIT FOR PROMPT BEFORE STARTING TRANSMISSION? (NO)
  50:   "PROMPT" OR "ACKNOWLEDGE" CHARACTER ([^F])
  51:   "RETRANSMIT FILE" CHARACTER ([^U])
  52:   IGNORE "NULL" CHARACTER FROM MODEM? (YES)
  53:   MODEM "NULL" CHARACTER ([NULL])
  54:   IS ATTACHED INSTRUCTION ECHOED? (NO)
  55:   SUBSTITUTE MODEM PARITY ERRORS WITH ERROR SYMBOL? (YES)
* 56:   CHECK FOR MODEM FRAMING ERRORS? (YES)
  57:   INACTIVITY TIMEOUT [SECONDS] (INACTIVE)
* 58:   NORMAL MODEM DATA
        PARITY - EVEN/ODD/NONE (ODD)
        NUMBER OF DATA BITS
        INCLUDING FIXED BITS (IF ANY) (7)
* 59:   BINARY MODEM DATA
        PARITY - EVEN/ODD/NONE (ODD)
        NUMBER OF DATA BITS
        INCLUDING FIXED BITS (IF ANY) (7)
  60:   DOES MODEM PROVIDE "DATA SET READY"? (YES)
```

Comm-Stor II/PDE INTERFACE UNIT

TABLE 2-4 (cont)

```
  61:   PRINTER PORT INSTALLED? (YES)
* 62:   PRINTER DATA
        PARITY - EVEN/ODD/NONE (NONE)
        NUMBER OF DATA BITS
        INCLUDING FIXED BITS (IF ANY) (8)
        EIGHTH DATA BIT (0)
  63:   PRINTER INTERFACE CONTROL (11110)
  64:   DOES PRINTER PROVIDE "DATA TERM READY"? (NO)
  65:   DOES PRINTER PROVIDE "SEC. REQUEST TO SEND"? (NO)
  66:   DOES PRINTER REQUIRE "LINE FEED" AFTER "CARRIAGE RETURN"? (YES)
  67:   CHARACTER TO SEPARATE COMMAND AND ARGUMENT ( )
  68:   CHARACTER TO SEPARATE FILE NAMES (/)
  69:   CHARACTER TO START "ENTER AUTOMATIC" INCREMENTING FIELD (<)
  70:   CHARACTER TO END "ENTER AUTOMATIC" INCREMENTING FIELD (>)
  71:   CHARACTER TO SEPARATE FILE NAME AND EXTENSION (+)
  72:   CHARACTER TO SEPARATE COMMAND AND ATTACHED INSTRUCTION (#)
  73:   DIRECTORY BOUNDARY SPECIFICATION CHARACTER (*)
  74:   "DON'T CARE" CHARACTER FOR EXTENSION (?)
  75:   *** UNUSED ***
  76:   USER RESPONSE TO "SURE?" MESSAGE (Y)
  77:   SYSTEM COMMAND CHARACTER - TERMINAL AND MODEM (.)
  78:   SYSTEM COMMAND CHARACTER - MODEM ONLY (,)
  79:   "SELECT DRIVE 1" CHARACTER (1)
  80:   "SELECT DRIVE 2" CHARACTER (2)
  81:   "BAUD MODEM" COMMAND (BM)
  82:   "BAUD PRINTER" COMMAND (BP)
  83:   "BAUD TERMINAL" COMMAND (BT)
  84:   "COPY" COMMAND (C)
  85:   "CANCEL" COMMAND (CN)
  86:   "DISPLAY" COMMAND (D)
  87:   "DISPLAY DIRECTORY" COMMAND (DD)
  88:   "DISPLAY STATUS" COMMAND (DS)
  89:   "ENTER" COMMAND (E)
  90:   "ENTER AUTOMATIC" COMMAND (EA)
  91:   "ECHO MODE" COMMAND (EM)
  92:   "ECHO EXIT" COMMAND (EX)
  93:   "INCLUDE MODE" COMMAND (IM)
  94:   "INCLUDE MODE EXIT" COMMAND (IX)
  95:   "LOAD EXTENSION" COMMAND (LE)
  96:   "LOAD INITIAL VALUE" COMMAND (LI)
  97:   "MONITOR MODE" COMMAND (MM)
  98:   "MONITOR MODE EXIT" COMMAND (MX)
  99:   "PRINT" COMMAND (P)
 100:   "PRINT DIRECTORY" COMMAND (PD)
 101:   "RECEIVE" COMMAND (R)
```

TABLE 2-4 (cont)

```
 102:  "RECEIVE AUTOMATIC" COMMAND (RA)
       "RENAME COMMAND" (RE)
 103:  "SEND" COMMAND (S)
 104:  "SEND DIRECTORY" COMMAND (SD)
 105:  "SEND STATUS" COMMAND (SS)
 106:  "SEQUENTIAL MODE" COMMAND (SM)
 107:  "ALPHA MODE" COMMAND (AM)
 108:  "STANDBY MODE" COMMAND (SB)
 109:  "WRITE-ENABLE" COMMAND (WE)
 110:  "WRITE-PROTECT" COMMAND (WP)
 111:  "EDIT OPTION INSTALLED? (NO)
 112:  EDITOR LINE NUMBER SEPARATOR (,)
 113:  EDITOR CHARACTER STRING DELIMITER (/)
 114:  EDIT COMMAND CHARACTER (;)
 115:  PREPARE TO "EDIT" COMMAND (ED)
 116:  "SAVE FILE" COMMAND (SV)
 117:  EDITOR "APPEND" COMMAND (A)
 118:  EDITOR "DELETE" COMMAND (D)
 119:  EDITOR "INSERT" COMMAND (I)
 120:  EDITOR "LINE COUNT" COMMAND (=)
 121:  EDITOR "CLEAR" COMMAND (Q)
 122:  EDITOR "LIST" COMMAND (L)
 123:  EDITOR "LIST-NUMBERED" COMMAND (N)
 124:  EDITOR "REPLACE" COMMAND (R)
 125:  EDITOR "SEARCH" COMMAND (S)
 126:  FORMS OPTION INSTALLED? (NO)
 127:  CHARACTER TO START FORMS VARIABLE FIELD ([)
 128:  CHARACTER TO END FORMS VARIABLE FIELD (])
 129:  "FORMS COMPLETE" COMMAND (FC)
 130:  "FORMS VARIABLE" COMMAND (FV)
 131:  "FORMS EXIT" COMMAND (FX)
 132:  FORMS MODE STRING SEARCH CHARACTER ([^Y])
 133:  FORMS MODE-UTILITY CHARACTER ([^L])
 134:  FORMS "LINE RE-ENTER" CHARACTER ([^Z])
 135:  FORMS MODE - FILL IN FROM DRIVE 1 ([^O])
 136:  FORMS MODE - FILL IN FROM DRIVE 2 ([^N])
 137:  FORMS "TAB" CHARACTER ([CR])
*138:  ANSWERBACK MESSAGE ($*R2ƀ40ƀ5ƀƀƀƀƀƀƀƀƀƀ)
 139:  CHARACTER TO INITIATE ANSWERBACK MESSAGE ([^E])
*140:  USER COMMAND TABLE (.MM[CR])
 .CL[CR]
 .R TLX[CR]
 .CL2[CR]
 .R2 TLX[CR]
 .MX[CR]
```

Comm-Stor II/PDE INTERFACE UNIT

TABLE 2-4 (cont)

```
 * 141:  SELF-START ON POWER-UP OR RESTART? (YES)
   142:  SEND ANSWER BACK MESSAGE AFTER INITIAL CONNECTION? (NO)
   143:  INHIBIT AUTO LINEFEED TO MODEM PORT? (NO)
 * 144:  TERMINAL/MODEM BUFFER SIZES (01)
   145:  LOWER DSR DURING STANDBY? (NO)
   146:  USE EIA LINES TO CLOSE FILES? (NO)
   147:  SELF-START ON AUTO-ANSWER? (NO)
   148:  INHIBIT MONITOR MODE ON SEND? (NO)
         ENABLE MONITOR MODE AT PRINTER? (NO)
   149:  RAISE RTS AFTER RECEIVING EOT? (NO)


 NOTE: Parameters 150 through 226 are not applicable to the Comm-Stor II/PDE
 Interface units.
```

Chapter 3

INSTALLATION PROCEDURES

3.1 GENERAL

In this chapter you will become familiar with the procedures required for installing a Comm-Stor II/PDE Interface unit.

3.2 UNPACKING AND INSPECTING THE EQUIPMENT

Refer to Figure 3-1 for packaging components. To avoid equipment damage, unpack the equipment as close as possible to the installation site. Proceed as follows:

a) With the box in an upright position, open the top flaps and fold them outward.

b) Grasp and remove the top mold.

c) Remove any accessories which may have been stored on top of the Comm-Stor II/PDE Interface unit.

d) Lift the unit out of the box. (Refer to Figure 3-1 for lifting points.)

Warning: Do not use the drive doors as the lifting point during unpacking; damage to the diskette drives may result.

DANGER: It is recommended that two people lift the unit to avoid the possibility of personal injury or equipment damage.

e) Inspect the remaining packaging material for any other accessories which may have been stored beneath the unit.

f) Compare the accessories and options with the packing slip to ensure the order is complete.

g) Dispose of the box according to local practices.

After removing the unit from its shipping container, visually inspect the unit for any shipping damage. If the unit was damaged during shipping, or the order is incomplete, contact your AIS/ABI Account Representative.

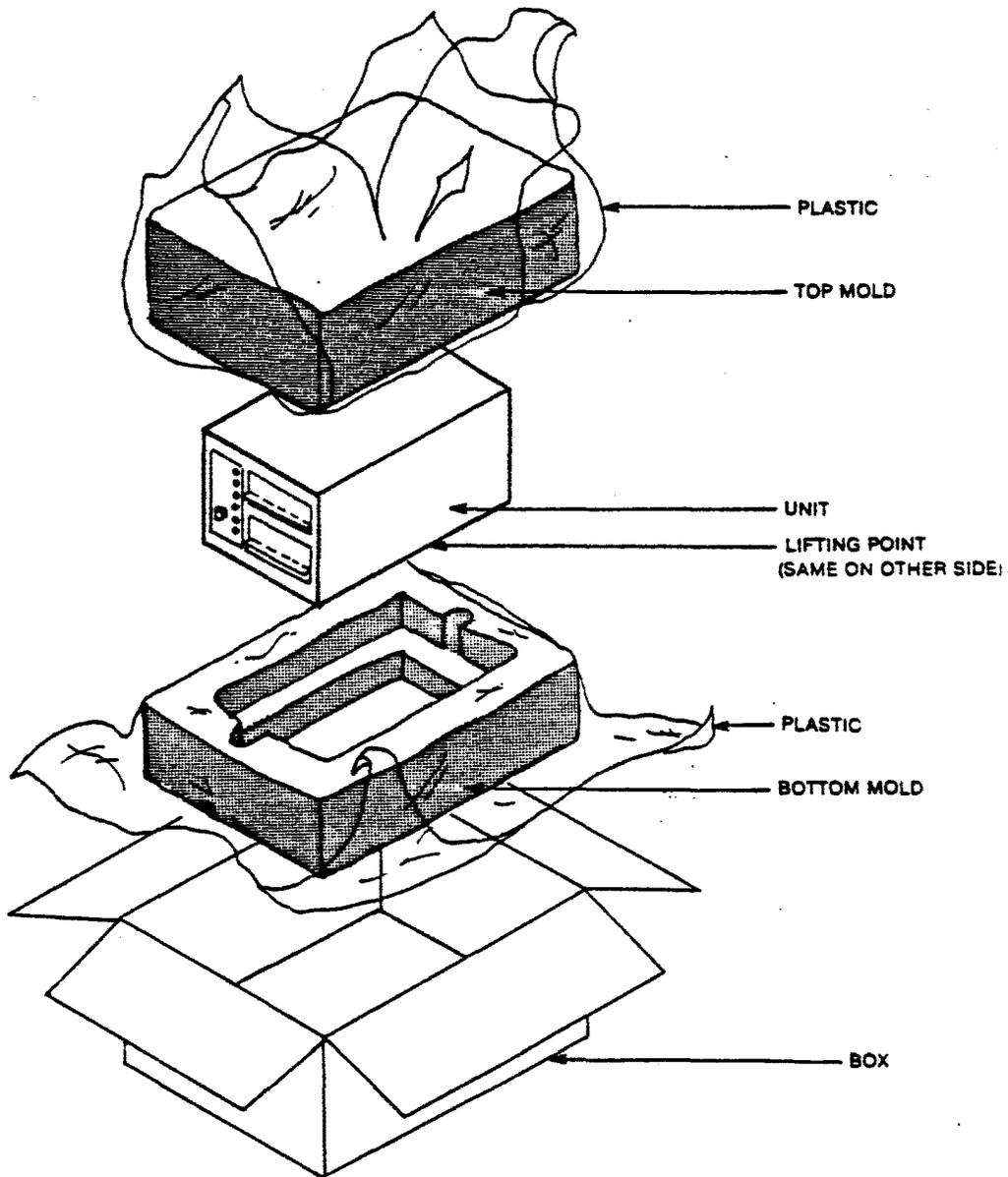**Comm-Stor II/PDE INTERFACE UNIT**

PLASTIC

TOP MOLD

UNIT

LIFTING POINT
(SAME ON OTHER SIDE)

PLASTIC

BOTTOM MOLD

BOX

Figure 3-1 Packaging Components

**Warning: It is not necessary to remove the cover to perform
any of the installation operations. Removing the cover and
improperly handling the integrated circuits or other compo-
nents may cause failures in these parts.**

3.3 ENVIRONMENTAL AND PLACEMENT REQUIREMENTS

3.3.1 Environmental

The Comm-Stor II/PDE Interface unit will operate satisfac-
torily at temperatures ranging from 40.25°F to 95.25°F
(4.25°C to 35.25°C). The allowable ambient humidity for the
Comm-Stor II/PDE Interface unit ranges from 20% to 80%
relative humidity, noncondensing.

3.3.2 Placement

Place the Comm-Stor II/PDE Interface unit in an upright
position on a table, desk top, or any hard, flat surface.
Be sure to allow at least six inches of clearance behind the
back panel for cooling purposes. Also ensure that the loca-
tion is free of magnetic fields. Units not meeting these
requirements are susceptable to reduced air flow, increased
dirt build-up in the air filters, and eventual component
failure and diskette damage.

3.4 TECHNICAL SPECIFICATIONS AND WEIGHTS AND DIMENSIONS

Power requirements of the Comm-Stor II/PDE Interface unit
are shown in Table 3-1. The standard unit requires 60 ± 1
Hz power. Table 3-2 shows weights and dimensions for the
Comm-Stor II/PDE Interface unit.

TABLE 3-1

POWER REQUIREMENTS

MODEL	VOLTAGE	CURRENT
Comm-Stor II Single-drive	115 VAC 230 VAC	2.5 amp 1.8 amp
Comm-Stor II Dual-drive	115 VAC 230 VAC	2.5 amp 1.8 amp

TABLE 3-2

WEIGHTS AND DIMENSIONS

MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
Comm-Stor II Single-drive	5.25 in. 13.34 cm.	13.75 in. 34.93 cm.	20 in. 50.80 cm.	35 lbs. 16 kg.
Comm-Stor II Dual-drive	9.6 in. 24.38 cm.	13.75 in. 34.93 cm.	20 in. 50.80 cm.	55 lbs. 25 kg.

3.5 INSTALLATION OUTLINE

The outline below should serve as a guide for installing Comm-Stor II/PDE Interface units.

a) Review the service order.

b) Unpack and inspect the equipment (section 3.2).

c) Check the environmental and placement requirements (section 3.3).

d) Connect the EIA cables (section 3.6).

e) Turn on the Comm-Stor II/PDE Interface unit (section 3.7).

f) Set the transmission rates (section 3.8).

g) Configure the system (section 3.9).

　　1) Modem

　　2) Terminal

　　3) Comm-Stor II/PDE Interface unit

　　4) Printer (optional)

h) Build a User diskette (section 3.10).

i) Generate a Refresh diskette (section 3.11).

j) Complete the installation.

1) Give documentation to the customer.

2) Clean up the site.

3) Complete the paperwork.

3.6 CABLE INSTALLATION

3.6.1 Options

A terminal, printer, and modem can be connected to the
Comm-Stor II/PDE Interface unit via connectors on the rear
panel of the unit (Figures 3-2 and 3-3). These connectors
conform to the Electronic Industries Association (EIA)
specification RS-232C.

3.6.2 Terminal Port

Connect the _male_ end of an EIA cable to the port labeled
TERM on the rear panel of the Comm-Stor II/PDE Interface
unit. Connect the other end of the cable to the terminal
you are using.

Place the terminal in the Full Duplex mode for all opera-
tions. The terminal must remain in this mode for both full
and half duplex modem connections.

3.6.3 Printer Port

Connect the _male_ end of an EIA cable to the port labeled
PRINTER on the rear panel of the Comm-Stor II/PDE Interface
unit. Connect the other end of the cable to the printer in
use.

If you install the printer port and the user decides not to
use it at this time, leave the port unterminated. However,
set the printer baud rate switch to position zero.

3.6.4 Modem Port

Connect the _female_ end of an EIA cable to the port labeled
MODEM. Connect the other end of the cable to the modem in
use.

Comm-Stor II/PDE INTERFACE UNIT

FAN FILTER   POWER SWITCH/ CIRCUIT BREAKER   PORTS   RESTART SWITCH
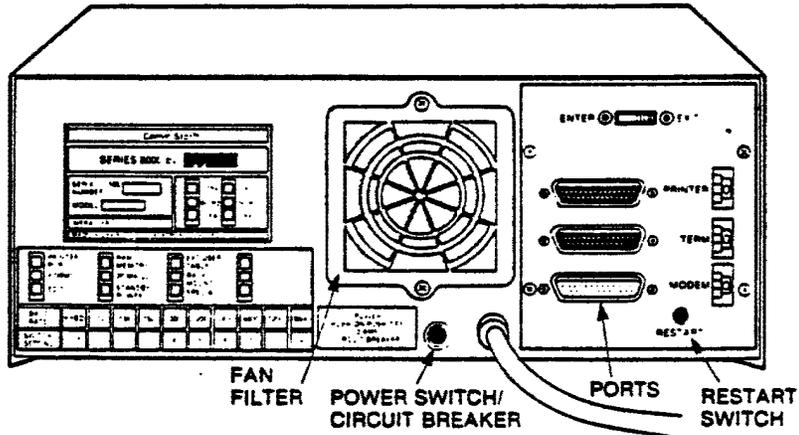
Figure 3-2 Rear Panel of Comm-Stor II Single-Drive Unit

CONFIGURATION PLATE

FAN FILTERS

PORTS

OPTIONS

BAUD RATE/ SWITCH SETTING TABLE

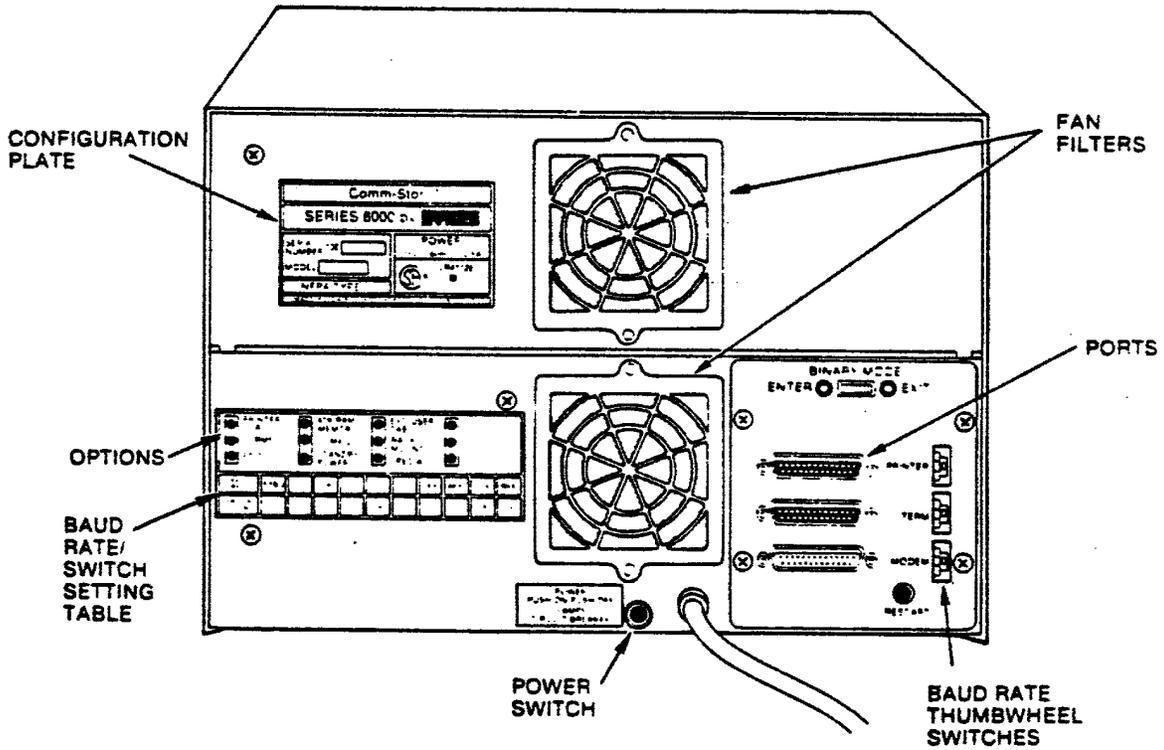POWER SWITCH

BAUD RATE THUMBWHEEL SWITCHES

Figure 3-3 .Rear Panel of Comm-Stor II Dual-Drive Unit

3.7 POWER ON

3.7.1 Front Panel Indicators

The front panel of the Comm-Stor II/PDE Interface unit has
several indicators to assist the user. Two of the indica-
tors, READY and BUSY, are duplicated in a dual drive unit to
provide information about each drive. When the power switch
is first turned on, all LEDs illuminate for a short time to
allow the user to perform a visual LED test. The function
of each indicator is described in the following paragraphs
(Figures 3-4 and 3-5).

RESTART: A switch/indicator, which when illuminated, shows
that the unit is turned on. It is also used to reset the
system when necessary. It should be noted that there is
also a RESTART switch on the rear panel of the unit. Both
switches function identically; however, the one on the rear
panel is non-illuminating.

READY: An LED indicator which indicates that a diskette has
been properly inserted into the drive and that the drive
door is closed. In a dual drive unit, READY 1 refers to the
LED for the top drive (drive 1), and READY 2 refers to the
LED for the bottom drive (drive 2). (The READY LED will go
off between calls and only the BUSY LED will remain lit.)

BUSY: An LED indicator which indicates that data is being
transferred to or from the diskette. Do not open the drive
door when the BUSY LED is on. Data could be lost. Wait
until the BUSY LED is off before removing the diskette. In a
dual drive unit, BUSY 1 refers to the LED on drive 1 and
BUSY 2 refers to the LED on drive 2.

When the BUSY LED is on by itself, the unit is waiting to
receive a call.

CARRIER: An indicator which shows the presence of a carrier
detect signal from the modem.

STATUS: This indicator performs the following functions:

a) It flickers to indicate data is being transferred
    through any port.

b) It remains lit for 20 seconds when a good transmission
    has been received by the Comm-Stor II/PDE Interface unit.

c) It blinks for 20 seconds (1/2 second intervals) if a bad
    transmission has been received by the Comm-Stor II/PDE
    Interface unit.
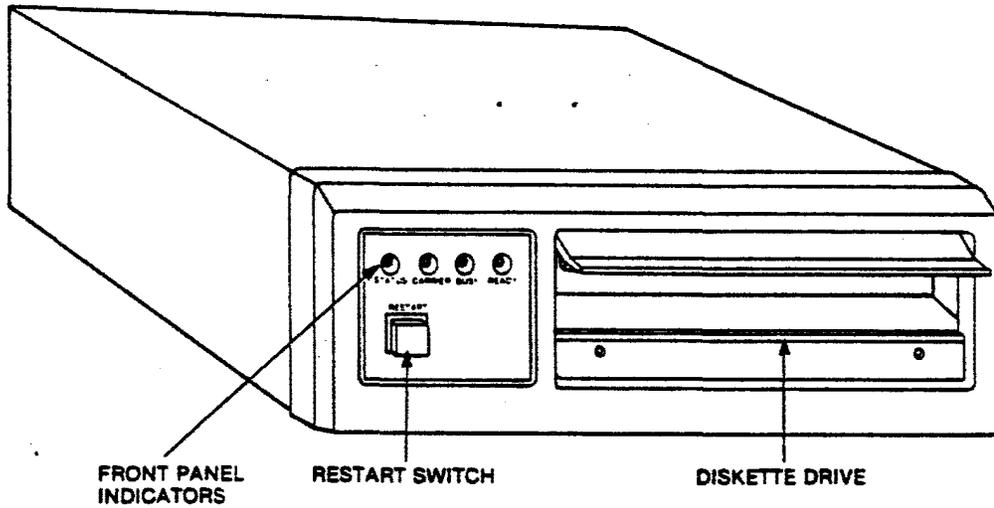
Comm-Stor II/PDE INTERFACE UNIT

Figure 3-4   Front View of the Comm-Stor II Single-Drive Unit
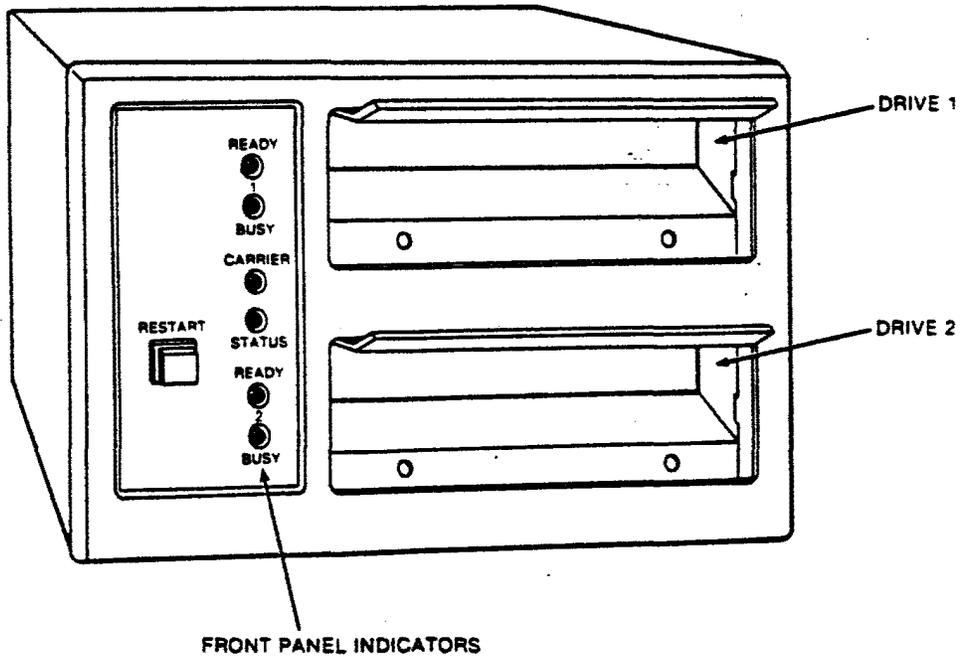

Figure 3-5   Front View of the Comm-Stor II Dual-Drive Unit

NOTE: If for any reason (e.g. the battery going dead) the contents of the configuration memory are altered or destroyed, the STATUS LED on the front panel will light when the unit is initially turned on. If this happens, insert the PDE Refresh diskette, and press the RESTART switch. If the STATUS LED remains lit after the unit is refreshed, replace the battery, Sykes part number 300D00001.

3.7.2 Power Connection

Voltage and frequency requirements are listed on the configuration plate attached to the rear panel of the Comm-Stor II/PDE Interface unit. The standard operating requirements are 115 V, 60 Hz at 2.5 amps (Table 3-1). Before connecting the Comm-Stor II/PDE Interface unit to a power source, check to be certain that both voltage and frequency agree with local power sources, and that the AC outlet is properly grounded.

The Comm-Stor II/PDE Interface units are shipped with a three-prong power plug commonly used to meet safety requirements. Do not attempt to defeat the purpose of this plug.

Connect the power plug on the rear panel of the Comm-Stor II/PDE Interface unit to a power source.

The power switch, located on the rear panel of the unit, turns the power on and off and acts as a circuit breaker.

The terminal, modem, and printer (if provided), must also be turned on. The order in which power is applied to these devices will not affect the performance of the Comm-Stor II/PDE Interface unit. Refer to the appropriate documentation on the devices for the proper instructions.

3.8 SETTING TRANSMISSION RATES

3.8.1 Setting Transmission Rates from the Baud Rate Switches

Transmission rates may be set from the baud rate switches on the rear panel of the Comm-Stor II/PDE Interface unit or from the terminal keyboard. Each port on the rear panel of the unit has a corresponding baud rate switch which sets the transmission rate for that port. The switches contain the numbers 0 through 9 which relate to a particular baud rate in accordance with the table on the rear panel of the unit (Figures 3-2 and 3-3). To set the baud rate, rotate the thumbwheel switch until the desired number appears.

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The RESTART switch must be pressed after changing any of the
baud rate switches to allow the unit to recognize the new
baud rate setting.

The thumbwheel switch on the modem port of the Comm-Stor
II/PDE Interface unit must be set to match the transmission
speed of the PDE terminal (normally 300 or 1200 baud).

The local terminal and modem do not require equal transmis-
sion rate settings.

TABLE 3-3

AVAILABLE BAUD RATES

Baud Rate	KYBD	110	134	150	300	1200	2400	4800	7200	9600
Switch Setting	0	1	2	3	4	5	6	7	8	9

3.9 CONFIGURATION PROCEDURES

NOTE: If Bell System modems, terminals, or printers are to
be connected to the Comm-Stor II/PDE Interface unit, recon-
figure the parameters of the Comm-Stor II/PDE Interface unit
as listed in Tables 3-4, 3-5, and 3-6 to their required
values.

For non-Bell devices, refer to the appropriate documentation.

3.9.1 Start-Up Procedures

The configuration process allows the Comm-Stor II/PDE Inter-
face unit to vary its characteristics (parameters) to meet
the requirements of the other devices in the system. The
Comm-Stor II/PDE Interface unit asks for the parameters
requiring change. Respond by indicating the parameters and
their values.

To use the configuration process, the Comm-Stor II/PDE
Interface unit must be set to communicate with the terminal
in use. To do this, the terminal must first be:

a) Connected to the TERM port of the Comm-Stor II/PDE
    Interface unit (section 3.6).

TABLE 3-4

DATA SET/TERMINAL/PRINTER INTERFACE PROCEDURES

DEVICE	INTERFACE PROCEDURE
202S Modem	a) Using an EIA cable, connect the <u>female</u> end to the Comm-Stor II/PDE Interface unit's modem port, the <u>male</u> end to the modem. b) Configure Parameter #41 (Half Duplex Modem): YES. c) Configure Parameters #42 and #43 (Line Turn-around characters). Check the remote terminal for the appropriate characters. d) Configure Parameter #45 (Request to Send Time-out): 200 ms. (factory standard value). e) Configure Parameter #46 (Secondary Carrier Dropped Option). Check the remote terminal or computer for the appropriate value. f) Set the modem for Soft Turnoff on RTS <u>NOTE</u>: This also provides recommended Received Data Squelch of 156 ms. g) If Reverse Channel option is installed on the modem, configure Parameter #44 [Secondary (Supervisory) Channel Available]: YES. h) Set the Comm-Stor II/PDE Interface unit's modem baud rate switch to position 5 (1200 bps), or 4 (300 bps) depending on PDE terminal configuration. i) Those parameters not specified should remain at factory standard values.
43 Teleprinter (43 KSR)	a) Using an EIA cable, connect the <u>female</u> end to the 43 Teleprinter, the <u>male</u> end to the Comm-Stor II/PDE Interface unit's terminal port.

Comm-Stor II/PDE INTERFACE UNIT

TABLE 3-4 (Cont)

DEVICE	INTERFACE PROCEDURE
	b) Set the Comm-Stor II/PDE Interface unit's terminal baud rate switch to: position 4 (300 bps) - for 300 baud operation position 1 (110 bps) - for 110 baud operation position 0 - permits baud rate selection from the terminal keyboard. c) Set the terminal for Full Duplex operation. d) Enable or disable Parity Detection. If Parity Detection is <u>enabled</u>, configure Parameter #37 to: Even Parity 7 Data Bits If Parity Detection is <u>disabled</u>, configure Parameter #37 to factory standard values: No Parity 8 Data Bits 8th Bit Deasserted e) Configure the parameters listed in Table 3-5 as indicated. f) Those parameters not specified above or in Table 3-5 should remain at factory standard values. 1) Configure Parameter #144 (Modem Buffer) to a size capable of handling the longest continuous transmission from the communications line, through the Comm-Stor II/PDE Interface unit, to the terminal. A minimum buffer memory of 4K RAM is required to support this operation. 2) Set the terminal for Full Duplex operation.

TABLE 3-4 (Cont)

DEVICE	INTERFACE PROCEDURE
DATASPEED 4420 Terminals	a) Using an EIA cable, connect the female end to the terminal, the male end to the Comm-Stor II/PDE Interface unit's terminal port. b) The following terminal options must be selected for compatible operation: Option 10a Line Ending Sequence = [CR][LF] Option 11b Receive After Send Option 40b Do Not Go Receive on Sending[CR] Option 41b Full Duplex Option 44a Enable EIA Interface Option 45b Disable Current Loop Interface Option 46a 103-Type Data Set Interface Option 47b Disable Printer Interface Option 49b Disable Interrupt Feature for KD Stations Option 50a Go Local and Hold Upon Printer's SSI Loss The following 4420 terminal options and Comm-Stor II/PDE Interface unit parameters must be set functionally equal.

DEVICE	OPTION/PARAMETER			
4420:	3	4	8	42
Comm-Stor II/PDE Interface unit	Set baud rate on the rear panel or keyboard	39	8	37, 38

All other terminal options may be left at the factory standard setting.

c) Configure the parameters listed in Table 3-7 as indicated.

Comm-Stor II/PDE INTERFACE UNIT

TABLE 3-4 (Cont)

DEVICE	INTERFACE PROCEDURE
	d) If a terminal and modem are used together, set the Comm-Stor II/PDE Interface unit's terminal baud rate switch equal to or greater than the modem baud rate.
	e) Place the terminal in the Send/Receive mode.
	f) Set the remaining Comm-Stor II/PDE Interface unit parameters as specified in Table 3-7. Those parameters not specified in previous steps, or in Table 3-7, should remain at factory standard values.
	a) Follow Steps a) through f) described for the DATASPEED 4420 terminal.
	b) Configure Parameter #39 (40/1 Terminal): YES.
	c) Set the remaining Comm-Stor II/PDE Interface unit parameters as specified in Table 3-7. Those parameters not specified in previous steps, or in Table 3-7, should remain at factory standard values.
DATASPEED 40/2 Printer	a) Follow Steps a) through f) for the DATASPEED 40/2 terminal.
	b) Configure Parameter #65 to (Y) YES with option 0.
	c) Set the remaining Comm-Stor II/PDE Interface unit parameters as specified in Table 3-7. Those parameters not specified in previous steps, or in Table 3-7, should remain at factory standard value.

TABLE 3-5

Comm-Stor II/PDE INTERFACE UNIT CONFIGURATION FOR 43 TELEPRINTERS

PARAMETER NUMBER	DESCRIPTION	REQUIRED VALUE
27	Delete Character Entered	BS
37*, 38*	Terminal Parity*	None, 8
58*, 59*	Modem Parity*	Odd, 7 bits

*It is recommended that this parameter be set at the value required by the peripheral devices in use.

TABLE 3-6

CONFIGURATION COMMANDS

.C[CR]	CONFIGURES ALL PARAMETERS
.D[CR]	DISPLAYS ALL PARAMETERS
.Cnnn[CR]	CONFIGURES PARAMETER nnn
.Dnnn[CR]	DISPLAYS PARAMETER nnn
.[CR]	CONFIGURES/DISPLAYS THE NEXT PARAMETER
..	CONFIGURES/DISPLAYS THE SAME PARAMETER
.B	BUILDS USER DISKETTES
.W	WRITES REFRESH DISKETTE
.R	STANDARD FACTORY REFRESH*
.[^T]	TERMINATES CURRENT OPERATION; RETURN TO PERIOD PROMPT†

*Standard Factory Refresh (.R) resets the Comm-Stor II/PDE Interface unit to factory standard configuration parameter values. For the Comm-Stor II/PDE Interface unit to receive data from the PDE terminal, the parameters listed in Table 2-4 must be changed.

†The character "^" represents the keyboard CONTROL key. To enter a CONTROL character, hold down the CONTROL key, and at the same time, press the other keyboard character.

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TABLE 3-7

Comm-Stor II/PDE INTERFACE UNIT CONFIGURATION FOR DATASPEED 40 PERIPHERALS

PARAMETER NUMBER	DESCRIPTION	REQUIRED VALUE
27	Delete character entered	BS
36	Terminal Null Character	LF
37*,38*	Terminal Parity*	Even, 7 bits
58*,59*	Modem Parity*	Odd, 7 bits
65	Does Printer Provide SRTS?	YES, 1
134	Line Re-enter Character	NULL
144	Buffer Sizes	/01/
145	Lower DSR during Standby	YES

b) Set to Full Duplex mode.

c) Set to On-line mode.

d) Set to the desired baud rate.

e) Turned on.

The Comm-Stor II/PDE Interface unit must then be set as follows:

a) The terminal port baud rate must be set to the same rate as the local terminal in use. To do this, set the terminal port baud rate switch to the proper position using the rear panel baud rate table.

b) If the printer port is present in the Comm-Stor II/PDE Interface unit, but a printer is not connected, the printer port baud rate switch must be set to 0 (zero).

---

*It is recommended that this parameter be set at the value required by the peripheral devices in use.

c) The modem baud rate switch must be set to match the local terminal's character length and parity convention as follows:

Position	Characteristics
0	7 bits and even parity
1	7 bits and odd parity
2	7 bits and no parity
3	8 bits and even parity
4	8 bits and odd parity
5	8 bits and no parity
6 or higher	invalid

NOTE 1: These characteristics apply to the above positions during the configuration process only.

NOTE 2: If positions 2 or 5 are selected, the Comm-Stor II/PDE Interface unit ignores the parity bit on incoming data from the local terminal and sets the parity bit to 0 for outgoing data to the local terminal. If position 6 or higher is selected, the front panel LEDs will flash randomly only after the configuration diskette has been inserted into drive 1 and RESTART has been pressed, indicating an error. Position 5 or lower must be selected.

d) The power switch must be turned on.

Place the Configuration diskette in drive 1, close the drive door, and press the RESTART switch. If either the terminal or modem baud rate switch is incorrectly set, meaningless characters may be displayed at the terminal. If this occurs, recheck the position of the baud rate switches and consult the appropriate documentation to determine what these settings should be. Additionally, it should be determined that the parity of the local and PDE terminals agree with the parity set in the Comm-Stor II/PDE Interface unit.

If the switches are correctly set and the terminal is functioning correctly, the Comm-Stor II/PDE Interface unit will send an identification message to the terminal:

COMM-STOR* CONFIGURATOR VER. ___
PLEASE TYPE FRAMING CHARACTER:

If this message is not obtained, a malfunction of the unit, the EIA cable, or the terminal is probable; or the local

---

*Comm-Stor is a registered trademark of Sykes Datatronics, Inc.
The blank will be filled by the Comm-Stor II/PDE Interface unit with the version level of the diskette in use.

terminal parity or the baud rate is not set to correspond to
those of the Comm-Stor II/PDE Interface unit. Check to be
sure that the terminal:

a) Is on-line.

b) Parity/word length is properly set.

c) Baud rates are properly set.

d) Is in Full Duplex mode.

e) Cable connections are correct and secure.

After the identification message and the request for the
framing character appear, the user enters a single char-
acter. This character is used before and after user
responses to configuration questions, and precisely defines
where the response begins and ends. Any character is
acceptable; however, the character which is chosen cannot be
part of any reply during the configuration process.

The customary selection at this point is the slash (/),
which means that no other system command may contain a
slash. For example: (.DD) may not be reconfigured to
(/DD). If the selected framing character conflicts with a
system command, press the RESTART switch to restart the
Configuration process and select another framing character.

3.9.2 Configuration Commands

When the framing character is entered, the unit sends a
period (.) prompt to the terminal. The user can now respond
by entering one of the commands in Table 3-6. Either upper
or lower case letters may be entered. The first five
commands require an End-of-Line character [EOL] (this may be
a carriage return, line feed, or new line control code)
before the command is sensed by the unit. The other
commands are sensed immediately after the key is struck at
the terminal. The underlined portion of each command indi-
cates entries made by the user; the leading period is a
prompt from the Comm-Stor II/PDE Interface unit.

3.10 BUILDING A PDE USER DISKETTE

Create User diskettes using the following procedure:

a) Place the Configuration diskette in the drive (drive 1
    of a dual drive unit). Close the drive door. Press the
    RESTART switch.

b) The Comm-Stor II/PDE Interface unit will send the iden-
tification message to the terminal:

COMM-STOR CONFIGURATOR VER.___
PLEASE TYPE FRAMING CHARACTER:

c) Enter the required character from the terminal.

d) The unit now displays a period (.) prompt. Type B to
begin the build process.

e) The unit will ask:

DUP OLD DISK?

f) If an existing User diskette was built correctly, type
"Y". This will allow the user to copy the format of the
existing diskette. Follow the Comm-Stor II/PDE Inter-
face unit instructions then proceed to Step h). Enter
an N (for no) from the terminal if a different format is
desired.

g) The unit will now ask a series of questions relating to
the format of the User diskette. Respond as indicated
by the underlined portion of text:

FIXED LENGTH FILES? N
MAXIMUM NUMBER OF FILE SLOTS PER DISKETTE? 1
NUMBER OF LINES ON SCRATCH PAD? 0
MAXIMUM NUMBER OF CHARACTERS PER LINE? 80
MAXIMUM NUMBER OF CHARACTERS PER FILE NAME? 3
MAXIMUM NUMBER OF CHARACTERS IN EXTENSION? 0

h) The unit will ask:

USE IBM SPARE TRACKS? N*

NOTE: Typing a response other than that specified above
may result in unpredictable operations of the Comm-Stor
II/PDE Interface unit.

i) The unit will now display:

DIRECTORY REQUIRES 1 TRACK; 1 FILE (ALL AVAILABLE SPACE)
AVERAGE FILE SIZE IS 1872 SECTORS

followed by:

BUILD DISK(S)? Y

---

*If an IBM 3740 Reader will never be used, a "Y" response may be specified, thus
giving approximately 5 percent more storage space on diskette.

___

Any other response will abort the build process.

j) The Comm-Stor II/PDE Interface unit is ready to build
    the User diskette. Follow the instructions displayed on
    the terminal.

If an error occurs in reading from or writing to the disk-
ette at any time during the configuration or diskette crea-
tion process, the unit will display the appropriate error
message and halt. Press the RESTART switch to start the
process again.

If errors persist, refer to Chapter 5 for Troubleshooting
Procedures.

3.11 CREATING A REFRESH DISKETTE

After all configuration parameters have been changed as
required, a Refresh diskette must be created. This diskette
will contain a copy of all parameter values. It is an
important part of normal operating procedures and must be
left with the customer.

Create a Refresh diskette using the following procedures.

a) Place the Configuration diskette in the drive (drive 1
    of a dual drive unit). Close the drive door. Press the
    RESTART switch.

b) The Comm-Stor II/PDE Interface unit will send the
    following message to the terminal:

    COMM-STOR CONFIGURATOR VER.___
    PLEASE TYPE FRAMING CHARACTER:

c) Enter the required character from the terminal.

d) The unit now displays a period (.) prompt. Type W to
    write a Refresh diskette.

e) The following appears on the terminal:

    LOAD SCRATCH DISK

    Open the drive door and remove the Configuration
    diskette (drive 1 of a dual drive unit).

f) The following appears:

    TYPE G

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> **Caution:** <u>Be sure the Configuration diskette has been</u> <u>removed before proceeding.</u>

Insert the blank diskette; close the drive 1 door, and type G.

g) When the process is completed, the following appears:

AGAIN?

Type Y to create another Refresh diskette. Remove the Refresh diskette just created, and return to Step f).

Type N if no further Refresh diskettes are needed. The following appears:

RESTART, HIT KEY

Open the drive 1 door and remove the Refresh diskette. Label it "PDE Refresh Diskette," with today's date.

h) The unit is now ready for normal operations.

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Chapter 4

UNIT MAINTENANCE

4.1 GENERAL

The Comm-Stor II/PDE Interface unit will operate efficiently under normal operating conditions. This chapter explains these conditions and the two levels of maintenance required for the unit to operate with the least amount of malfunctions.

Danger and Warnings

DANGER: Turn off all power and signal sources before removing or replacing any module or component.

Warning 1: To avoid possible internal damage to circuitry, wear a static discharge strap connected to ground to allow static dischage before handling circuit boards or components as much as possible.

Warning 2: Put the replaced board in a static bag immediately after removal from unit. Never handle the board outside the bag without being properly grounded.

Warning 3: Handle all diskettes with care:

Never touch the exposed diskette surface. Handle the diskette only near the label.

Do not write on the diskette cover; write only on the label. If possible, write on the label with a felt tip pen before placing the label on the diskette. Do not use pencils or ball point pens.

Do not attempt to clean a dirty or dusty diskette; such a diskette should be discarded.

Keep the diskette away from potentially magnetic materials (paper clips, etc.) or magnetic sources (unshielded power supplies, CRT monitors, etc.).

Do not bend the diskette.

Do not expose the diskette to extreme temperatures of heat or cold.

Keep the diskette in its protective cover when not in use.

Store diskettes vertically in boxes when not in use.

4.2 TOOLS AND SUPPLIES

The following tools and supplies may be required to perform
the routine maintenance procedures discussed in this chapter.

TOOLS

Screwdriver, Phillips 1/4", 4" blade, 2 point size
Screwdriver, Slotted 1/8", 2" blade
Volt-ohm meter KS8455
Volt-ohm multi-meter KS14510
Nut driver, 1/4"
Nut driver, 11/32"
Screwdriver, Phillips 1/8", 2" blade, 0 point size
Screwdriver, Slotted 1/4", 4" blade
Penlight
Static Ground Strap (Simco Neutrostat, 3M Velostat, or
equivalent)
Static Bag (Simco Neutrostat, 3M Velostat, or equivalent)

SUPPLIES

Head Cleaner Solution (Miller Stephenson-MS200 or Isopropyl
Alcohol)
Soft wiping cloth (Lint-Free)
Fan Filter Spray (Super Filter Coat #418, Research Products
Corp.)
Soft Bristled Brush

4.3 LEVEL 1 MAINTENANCE

The Comm-Stor II/PDE Interface unit will operate for at
least one year, but not longer than two years, without
preventive maintenance. This allows the user to schedule
maintenance procedures at a time when the unit can be turned
off without an appreciable loss of data. Table 4-1 provides
a routine maintenance schedule. All items listed in Table
4-1 are checked during the following maintenance procedures.

**Warning: Do not use sharp objects, harsh cleaning agents,
or any cleaning solution containing Freon as these might
damage plastic surfaces.**

TABLE 4-1

ROUTINE MAINTENANCE SCHEDULE

COMPONENT	FREQUENCY
Configuration Memory (CMOS) Battery	1 - 2 years
Diskette Drive	1 - 2 years
Power Supply	1 - 2 years
Fan Filter	Monthly

4.3.1 General Inspection

Check for and correct any defects in the general appearance of the Comm-Stor II/PDE Interface unit. Make sure:

- all connectors are seated properly and securely,

- there are no pinched or crimped wires or cables,

- drive doors open and close properly,

- all lamps and LEDs are functional,

- all hardware is secure, and

- top cover is secure.

4.3.2 General Cleaning

Perform the following to clean exterior surfaces:

a) Wash with a mild detergent solution.

b) Rinse with a damp cloth.

c) Dry with a soft cloth.

Use a soft bristled brush to dislodge debris inside the unit. Vacuum the interior of the unit if possible.

_____

4.3.3 Fan Filter Assemblies

Figure 4-1 shows the parts associated with a single fan
filter assembly. The assembly consists of:

- a replacement fan filter, which is a green square of
  fibers,

- an outer filter housing, and

- two knurled (grooved) head screws.

Compare the filter housings on your unit with those shown in
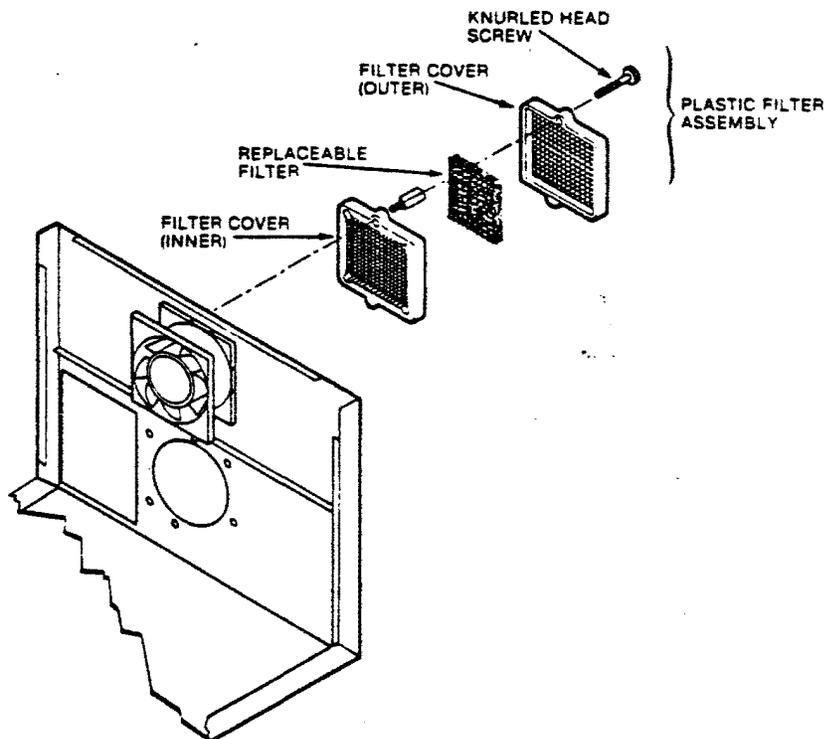Figure 4-1.

Figure 4-1   Fan Filter Assembly

If your filters are metallic and are held in place by regular screws, then the unit has not yet been upgraded with the latest filter assemblies. In this case an AIS/ABI Service Representative must be called to clean the filters now installed.

4.3.4 Fan Filter Replacement

The Comm-Stor II/PDE Interface unit is cooled by two air intake fans located on the rear panel.

Because the fans draw in outside air, they are covered by filters that trap dust and other foreign matter. If the unit is in a typical office environment, you must remove the filters and replace them with new ones on a monthly basis. More frequent replacement of the filters is required if the air is unusually dirty or dusty.

You can safely replace the filters without tools while the unit is operating.

a)   Without disconnecting or tugging on any wires or cables at the rear of the unit, position the unit so that you can get to the fan filter assemblies.

     Caution: Since the system is on-line, do not bump the RESTART switches or the power switch. Also, do not lift the unit by grasping the drive doors.

b)   Compare the fan filter assemblies on the unit to those shown in Figure 4-1.

     If they are the same, proceed to Step c). If they are different, you cannot replace the filters. Call for service.

c)   Using your thumb and forefinger, loosen and remove the two knurled head screws securing one of the outer filter housings. Put the screws and the outer filter housing aside.

d)   Remove and discard the green filter.

     NOTE: It is recommended that you do not try to clean and re-use filters. The unit will operate more efficiently with new filters.

e)   Place the matted (grid-like) side of the new filter against the inner housing of the fan filter assembly.

---

f) While holding the new filter in place, cover it with the outer filter housing. (Be sure to line up the screw holes.)

g) While holding the outer filter housing in place, insert and hand tighten each of the two screws.

h) Repeat Steps b) through g) to replace the other filter.

i) Reposition the unit. Be sure it has at least four inches (10 cm) of rear clearance to allow for proper air circulation.

4.3.5 Battery Maintenance

Replace the battery located on the base card assembly.

4.4 LEVEL 2 MAINTENANCE

4.4.1 Drive Maintenance

Under normal operating conditions, preventive maintenance is required at the intervals described in Table 4-1. If the unit is operating in severely dirty environments, it may require more frequent checks to assure reliable performance.

Table 4-2 provides recommended inspection and maintenance procedures. During visual inspection of the drive, look for corrosion of parts, dirt, wear, mechanical binding, and loose connections. Cleanliness is essential to ensure that the diskettes, read/write heads, and stepper motor shaft remain free of contamination.

4.4.2 Read/Write Head Maintenance

a) Disconnect the AC power cord and all peripheral devices from the Comm-Stor II/PDE Interface unit. During the following steps, removal of the top cover, front panel, and diskette drive may be required.

b) Use a bright directional light during the following steps. Observe the following precautions:

- Do not smoke while inspecting or cleaning the read/write head.

- Do not touch the face of the head.

- Do not leave residue or lint on the head. Trapped residual particles can cause irreversible damage to the head and may scratch the diskette.

TABLE 4-2

INSPECTION AND MAINTENANCE FOR DISKETTE DRIVES

UNIT	LOOK FOR:	ACTION
Read/Write Head (Single) Read/Write Heads (Double)	oxide build up and scratches	Clean. (See section 4.4.2.)
Stepper Motor	nicks, burrs and dirt	Remove dust, and excess lubricant. Replace if necessary. (See section 4.4.3.)
Carriage Assembly	loose bearings and binding to the stepper motor shaft	If the carriage binds on the stepper shaft, remove the carriage and clean the bearings. (See section 4.4.4.)
Drive Motor Belt	frayed or weakened areas	Replace every 3 - 5 years. (See section 4.4.5.)
Drive Frame	loose screws, connectors, etc.	Correct any loose connections. Vacuum any dust from the main frame. (See section 4.4.6.)
Read/Write Head	- - - -	If an incompatibility problem occurs, check the head using the FD Alignment Package option (#1009A0521). (See section 4.4.2.)
Head Load Pad	excessive wear	Replace if necessary.

Comm-Stor II/PDE INTERFACE UNIT

_____

- Keep all magnetic tools away from the head and stepper motor shaft.

c) Locate the read/write head.

    1) Inspect the read/write head for red-brown oxide deposits. The load arm above the head may be raised to aid inspection, but do not lift more than 1/2 inch. Failure to follow this procedure may cause irreversible damage to the load arm and/or the read/write head.

    2) Clean the head only if required.

    3) Using a clean lint-free cloth, lightly drybuff the face of the head. Be sure all deposits are removed.

    4) If oxide deposits cannot be removed by drybuffing, dampen, do not soak, a clean lint-free cloth or swab with high quality head cleaner or isopropyl alcohol. Carefully wipe the head face to remove oxide deposits. Using a dry cloth, lightly drybuff the head again.

- If oxide deposits still remain, replace the entire drive assembly.

- Inspect the read/write head for scratches which may cause damage to diskettes or interfere with transfer of diskette data. Replace the entire drive assembly if the head is badly scratched.

4.4.3 Stepper Motor Maintenance

a) Inspect the stepper motor shaft for nicks or burrs which may impede smooth carriage movement. Replace the entire assembly if it is damaged.

b) Manually rotate the stepper motor shaft. Rotation of the shaft should be smooth and easy. Using a clean lint-free cloth, remove any dirt or grease from the shaft. The groove can be cleaned by inserting the cloth into the groove and rotating the stepper motor shaft. Replace the entire assembly if it cannot be cleaned properly.

Caution: Do not apply any lubricant or chemical cleaner to the motor shaft! Lubricant will cause accumulation of dirt, while chemical cleaners may damage the carriage assembly's nylon bearings.

4.4.4 Carriage Assembly Maintenance

> Inspect the carriage assembly for loose bearings, or bear-
> ings contaminated by dirt or other foreign particles. In
> extreme cases, it may be necessary to remove the carriage
> assembly to clean the bearings.

4.4.5 Drive Motor Belt Maintenance

> Inspect the belt for frayed or weakened areas. Check to see
> if the belt surface is worn. This may cause the belt to
> slip on the pulley. Replace the belt if necessary.

4.4.6 Drive Frame Maintenance

> a) Check to ensure that all connectors and screws are
>   tightly fastened. All adjustable devices are sealed
>   with a sealant and should be resealed if adjustments are
>   made.
>
> b) Clean the frame to remove all dirt and dust deposits.
>
> NOTE: Since you want to be sure the unit is not over-
> heated due to clogged fan filters, make a note to replace
> them each month. Also, be sure you have enough replacements
> on hand. Order the filter kit (Part No. 1009A0612) whenever
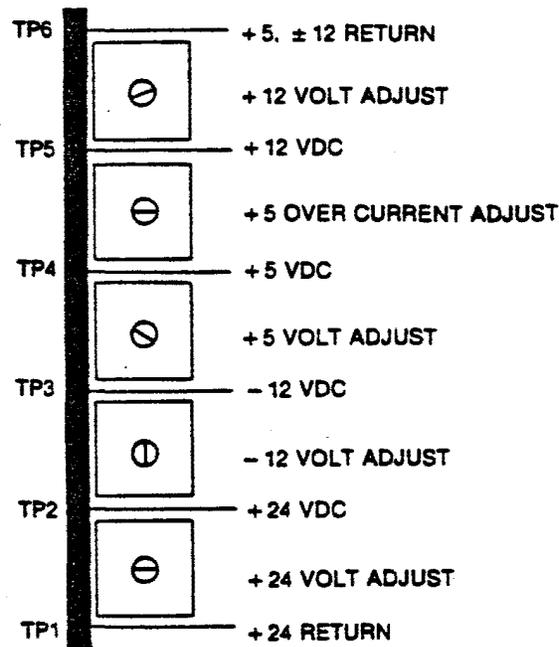> you are out of back-up filters.

4.4.7 Power Supply Maintenance

> Under normal conditions, adjustments to the power supply are
> not necessary. However, during maintenance procedures each
> supply voltage should be checked and readjusted if neces-
> sary. Also, if the supply is replaced or repaired, adjust-
> ment may be necessary as described below.
>
> a) Remove the top cover. Turn the unit on. The voltages
>   should be checked with all boards inserted and only
>   after the system has reached normal operating tempera-
>   ture. Refer to Figure 4-2 for the voltage adjustments.
>
> b) Using a digital voltmeter, connect the ground lead to
>   TP1 and check the following test points on the power
>   supply control board. If necessary, readjust the
>   voltage by turning the appropriate potentiometer.
>   Reseal the potentiometer when adjustment is finished.
>
> Caution: Take extreme care not to short the test points to
> the power supply frame.

Comm-Stor II/PDE INTERFACE UNIT


```
TP6 ──────────────── +5, ±12 RETURN
        ⊖           + 12 VOLT ADJUST
TP5 ──────────────── + 12 VDC
        ⊖           +5 OVER CURRENT ADJUST
TP4 ──────────────── +5 VDC
        ⊘           +5 VOLT ADJUST
TP3 ──────────────── - 12 VDC
        ⏀           - 12 VOLT ADJUST
TP2 ──────────────── + 24 VDC
        ⊖           + 24 VOLT ADJUST
TP1 ──────────────── + 24 RETURN
```

Figure 4-2   Power Supply Voltage Adjustments

- TP2: +23 V to +25 V

If TP2 is not set as indicated, adjust the +24 V poten-
tiometer. If the adjustment cannot be made, check for
an overload condition. Replace the supply if necessary.

- TP3: -11 V to -13 V

If TP3 is not set as indicated, adjust the -12 V poten-
tiometer. If the adjustment cannot be made, check for an
overload condition. Replace the supply if necessary.

- TP4: +5.1 V to +5.2 V

If TP4 is not set as indicated, adjust the +5 V poten-
tiometer. If the adjustment cannot be made, check for
an overload condition. Replace the supply if necessary.

- TP5: +11 V to +13 V

If TP5 is not set as indicated, adjust the +12 V poten-
tiometer. If the adjustment cannot be made, check for
an overload condition. Replace the supply if necessary.

Comm-Stor II/PDE INTERFACE UNIT

_____

●   +5 V Current Limit Potentiometer

This is set at the factory to allow the power supply to
deliver 8 amps of current at +5 V before shutting down
the voltage regulator. It should not be adjusted in the
field as a resistive load bank is required to set it
properly.

4.4.8 Operational Checkout

After servicing the Comm-Stor II/PDE Interface unit, perform
the diagnostics as discussed in Chapter 5.

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Chapter 5

UNIT TEST AND TROUBLESHOOTING

5.1 GENERAL

An operational checkout should be performed after installa-
tion or on trouble calls. It may be a brief checkout to
make sure the unit is operable, or a complete checkout to
exercise all features and options. Perform a complete
series of diagnostic tests after any extensive repair.

NOTE: Off-line test procedures do not check the interface
or receive capabilities. Conduct a complete test of receive
capabilities with the unit properly interfaced to the oper-
ating system.

If an indicated response is not obtained in any test proce-
dure, repeat the test to make sure the procedure has been
performed correctly. If the results are still unsatis-
factory, replace the indicated module.

The terms baud and baud rate as used throughout this chapter
refer to data transmission and are considered equivalent to
"bits per second."

Danger and Warnings

DANGER: Turn off the unit and remove all EIA cables from
the rear panel ports of the Comm-Stor II/PDE Interface unit
before removing or replacing any module or component.

Warning 1: To avoid possible internal damage to circuitry,
wear a static discharge strap (TP346392) connected to ground
to allow static discharge before handling circuit boards or
components for removal or replacement. Avoid touching
circuit lands or components as much as possible.

Warning 2: Put the replaced board in an anti-static bag
immediately after removal from unit. Never handle the board
outside the bag without being properly grounded.

Warning 3: Handle all diskettes with care:

    Never touch the exposed diskette surface. Handle the
    diskette only near the label.

    Do not write on the diskette cover; write only on the
    label. If possible, write on the label before placing
    it on the diskette.

Comm-Stor II/PDE_INTERFACE UNIT

Do not attempt to clean a dirty or dusty diskette; such
a diskette should be discarded.

Keep the diskette away from potentially magnetic
materials (e.g. paper clips, etc.) or magnetic sources
(e.g. unshielded power supplies, CRT monitors, etc.).

Do not bend the diskette.

Do not expose the diskette to extreme temperatures of
heat or cold.

Keep the diskette in its protective cover when not in
use.

Store diskettes vertically in boxes when not in use.

5.2 PRELIMINARY CHECK

Before turning on any equipment, check to be sure the unit
is connected to a properly grounded AC outlet. Also check
the seating of all circuit boards and cable connectors.

If there are operational difficulties with a Comm-Stor
II/PDE Interface unit, peripheral devices such as the
terminal, modem, and printer should be checked, depending on
the area of difficulty.

Also, check the Comm-Stor II/PDE Interface unit's variable
configuration data. All configuration parameters should be
checked and changed as required. (section 3.9)

If difficulties are encountered with data transfers on and
off of diskette, use other diskettes and check diskette
handling procedures.

5.3 DIAGNOSTIC DESCRIPTION

5.3.1 User Diagnostic Kit

The User Diagnostic kit (Part #1030A5191) consists of a
Diagnostic diskette and a three-port EIA test plug (Figure
5-1).

The Diagnostic diskette contains a prerecorded set of proce-
dures for testing the Comm-Stor II/PDE Interface unit. Each
test is automatically loaded from the diskette into the
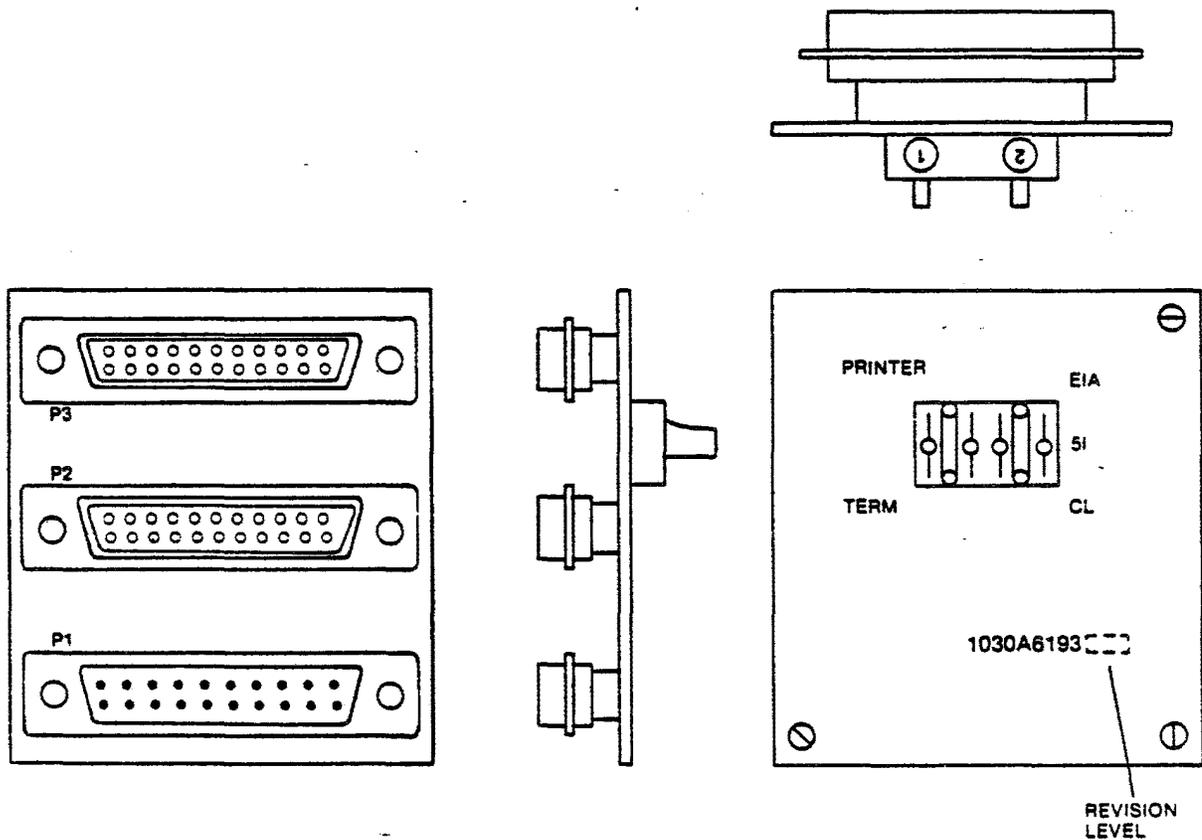memory of the Comm-Stor II/PDE Interface unit upon request.

Figure 5-1 Diagnostic Test Plug

The test plug has two switches, numbered 1 and 2, for
simulating peripheral cabling.

The Diagnostic diskette and the test plug are used together
to fully verify the Comm-Stor II/PDE Interface unit.

5.3.2 User Diagnostic Tests

The Diagnostic diskette contains the following tests:

a) LED/Switch Test

b) Hardware Features Check

c) Internal Tests: Memory/Diskette/Timer/Baud Rate

d) Terminal and Modem Port Tests

e) Printer Port Test

f) Configuration Memory Test

g) Diskette Test

The results of tests a through g are displayed on the front panel LEDs. These tests can be operated independently of the terminal.

5.4 BASIC TROUBLESHOOTING PROCEDURE

Begin by loading the Diagnostic diskette as described in section 5.5.

Because of the complicated interconnection circuitry, it is recommended that a spare set of modules be used to swap/ verify the operation of questionable areas as described in the Diagnostic procedure.

If the unit is completely inoperative, or will not load and execute the Diagnostic procedure, refer to Table 5-1, Checklist #1.

If the unit passes all tests in the Diagnostic procedure, but other difficulties are still experienced, refer to Table 5-2, Checklist #2.

5.5 DIAGNOSTIC PROCEDURES

This part describes the procedure for running each of the Comm-Stor II/PDE Interface unit Diagnostic tests and provides a general explanation of the test results. If an error occurs at any time during a test, swap/verify the defective module.

If a Comm-Stor II/PDE Interface unit malfunction prevents reading of the Diagnostic diskette, the READY LED blinks.

After the Diagnostic diskette is loaded, the STATUS LED blinks if one of the following conditions exists:

a) The binary switch is set to the EXIT position and the modem baud rate switch is set to position 0, or

b) The incorrect Diagnostic diskette has been inserted for the system being tested.

The tests are selected by setting the modem baud rate switch on the rear panel of the unit (Figures 3-1 and 3-2). These tests are listed in Table 5-3. Perform the diagnostic tests in the order they are presented in this chapter.

TABLE 5-1

CHECKLIST #1

SYMPTOM	INTERPRETATION	REMEDY
Unit is completely inoperative.	Cooling fan is not spinning; drive motor is not spinning; no illumination of the power switch; no front panel LED illumination.	Note: The voltmeter used in the following procedures must contain the following ranges: 0-50 VDC 0-115 VAC a) Reset the circuit breaker by pressing the power switch/circuit breaker switch located on the rear panel. b) Check the power outlet for 115 VAC. c) Unplug the unit from the power source. Remove the top cover. Check the power harness connectors to make sure they are mated together properly and there are no loose wires. d) Check the AC power connections at the power switch/circuit breaker, and the harnessing. e) With the unit unplugged, check the continuity of the power switch/circuit breaker, and the harnessing.

Comm-Stor II/PDE INTERFACE UNIT

TABLE 5-1 (Cont)

SYMPTOM	INTERPRETATION	REMEDY
No power indication	No illumination of the power switch. No illumination of LEDs when the unit is turned on or restarted.	a) Check the DC power supply voltages at the base card edge connectors (Figure 5-2): +5.1 - +5.2 VDC @ pin 6 +23 - +25 VDC @ pin 8 +11 - +13 VDC @ pin 100 -11 - -13 VDC @ pin 98 Ground @ pins 2 and 66 If one or more of the DC voltages are not present at the base card edge connector, refer to section 4.4.7 for power supply adjustment procedure. b) If one or more of the power supply voltages are low, the power supply may be defective or a defective component on one of the circuit boards could be loading down a particular voltage. Swap/verify the power supply. Swap/verify the circuit boards one at a time.
LEDs do not illuminate when the system is restarted.	No head load solenoid activity when the system is restarted with the diskette inserted.	a) Check the DC voltages (refer to Step b), above) at the base card edge connector. b) Check the battery voltage for 4.0 VDC minimum. c) Check all battery connections.

TABLE 5-1 (Cont)

SYMPTOM	INTERPRETATION	REMEDY
		d) Check the front panel LED harness connection on the Communications Ports board. e) If all the DC voltages appear to be normal, use the following sequences. 1) Turn the unit off; remove the Diskette Interface board, and turn the unit on. If the LEDs light, the problem is in the Diskette Interface board or in the diskette drive assembly. Swap/verify these assemblies one at a time. 2) Turn the unit off, remove the Printer board if installed, and turn the unit on. If the LEDs light, the problem is in the printer option board. 3) Turn the unit off; swap/verify the MP/RAM board. 4) Turn the unit off; swap/verify the ROM IIA board. 5) Turn the unit off; swap/verify the base card.

Comm-Stor II/PDE INTERFACE UNIT

TABLE 5-1 (Cont)

SYMPTOM	INTERPRETATION	REMEDY
LEDs light for one second and go off, but the User Diagnostic program does not load off the diskette.	Bad Diagnostic diskette	a) Check the Diagnostic diskette on another system. If problem persists, use another Diagnostic diskette. b) Check for drive motor rotation. If the motor does not rotate, swap/verify the drive motor assembly.
	Faulty drive ribbon wire cables.	c) Swap/verify the drive ribbon wire cables.
	Faulty diskette drive assembly.	d) Swap the diskette drive assembly and restart the test.
	Faulty Diskette Interface board.	e) Swap/verify the Diskette Interface board. f) Swap/verify the remaining circuit boards one at a time.
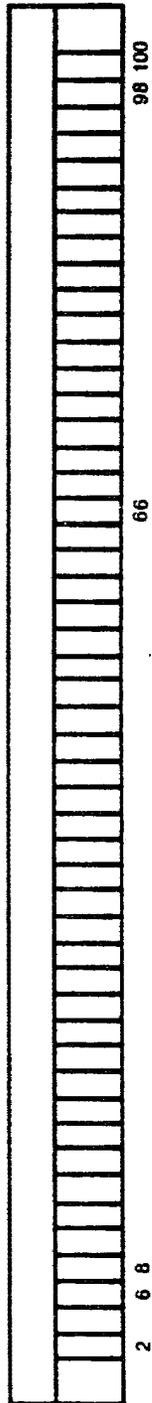
Figure 5-2   Base Board Pin Locations for Voltage Measurement

TABLE 5-2

CHECKLIST #2

SYMPTOM	INTERPRETATION	REMEDY
The system will not respond to certain keyboard commands.	Invalid configuration parameters or faulty MP/RAM board.	a) Using a Configuration disk-ette, display all param-eters and check for valid configuration responses. Change invalid parameters if necessary and recheck. This can be done by refreshing the unit. If over the course of time the Config-uration parameters change, check the battery voltage; if correct, replace the MP/RAM board.
	Faulty ROM IIA board.	b) Swap/verify the ROM IIA board.
Unit will not respond with "carriage return," "line feed," or "asterisk" when restarted.	Terminal baud rate switch rate is not set to the same transmission rate as the terminal.	a) Change the baud rate.
	Parity of the terminal and of the unit are not set to the same value.	b) Change the parity value of the unit to match the terminal parity value.
	System was not refreshed after MP/RAM board re-moval/replacement.	c) Restore the unit to its normal operating config-uration.
	Invalid configuration parameters.	d) Check the configuration parameters.

TABLE 5-2 (Cont)

SYMPTOM	INTERPRETATION	REMEDY
Error 2	Probable worn or damaged diskette.	a) Check the unit with other diskettes. b) Check the diskette drive assembly head-to-track alignment. Refer to section 4.3, Operator Maintenance.
Error 3	Probable worn or damaged diskette. Diskette drive is out of alignment. Faulty Diskette Interface board.	a) Check the system with other diskettes. b) Check the head-to-track alignment of the system which is reading the diskette. c) Swap/verify the Diskette Interface board of the system which wrote on the diskette as well as the system reading the diskette.
Error 0	Caused by a User diskette with a bad directory. Faulty ROM IIA board. Faulty MP/RAM board. Faulty Diskette Interface board. Faulty Communications Ports board.	a) Copy the diskette, using the copy (.C) command. b) Swap/verify the ROM IIA board. c) Swap/verify the MP/RAM board. d) Swap/verify the Diskette Interface board. e) Swap/verify the Communications Ports board.

Comm-Stor II/PDE INTERFACE UNIT

TABLE 5-2 (Cont)

SYMPTOM	INTERPRETATION	REMEDY
Erroneous data transfer between the unit and the terminal, modem, or printer.	Incorrect baud rate.	a) Check for proper baud rate adjustment of the unit and the peripheral device.
	Incorrect parity.	b) Check for proper parity adjustment of the unit and terminal.
	Faulty Communications Ports board.	c) Swap/verify the Communications Ports board for terminal or modem data transfer problems.
	Faulty Printer board.	d) Swap/verify the Communications Ports board for terminal or modem port data transfer problems.
	Faulty MP/RAM board.	e) Swap/verify the MP/RAM board if erroneous data transfer exists through all I/O ports.

TABLE 5-3

TEST SELECTIONS

MODEM SWITCH SETTING	TEST
1	LED/Switch Test
2	Internal Tests
3	Terminal and Modem Port Tests
5	Printer Port Test
7	Hardware Features Check
8	Configuration Memory Test
9	Diskette Test

5.5.1 Start-Up Procedures

Perform the following procedure to return the Comm-Stor
II/PDE Interface unit to factory standard configuration.

NOTE: This procedure must be performed prior to executing
any diagnostic test as the values stored in configuration
memory may change as a result of each test. This procedure,
however, does not need to be performed between each test if
the tests are performed sequentially.

a)   With the unit turned on, open both drive doors and
     remove any diskettes from the drives.

b)   Turn off the unit and remove all cables from the rear
     panel. Connect a terminal to the TERM port of the
     Comm-Stor II/PDE Interface unit.

c)   Turn on the unit. Insert the Configuration diskette
     into drive 1 and press the RESTART switch.

d)   The unit asks for a framing character. The standard
     response is a slash (/). Enter a response (section
     3.9).

e)   A period (.) prompt displays. Enter R to return the
     unit to factory standard.

f)   The unit sends the following question to the terminal:

     —SURE?

g)   Enter Y to the —SURE? prompt.

h)   Remove the Configuration diskette from drive 1 when the
READY 1 LED is the only LED lit.

The Diagnostic diskette may contain errors recorded from
previous testing. Erase these errors from the diskette
prior to running any diagnostic test. To erase these errors:

a)   Place the binary switch on the rear panel of the unit
to the EXIT position.

b)   Set the modem baud rate switch to position 0.

c)   Insert the Diagnostic diskette into drive 1. Close the
drive door and press the RESTART switch.

d)   When the STATUS LED begins blinking, remove the Diag-
nostic diskette from drive 1.

Set the following switches to the described positions unless
specified in a given test procedure.

a)   Set the binary switch to the EXIT position.

b)   Set the terminal baud rate switch to position 0.

c)   Set the modem baud rate switch to position 0.

d)   Set the printer baud rate switch to position 0.

NOTE: The following test procedures fully verify the
unit. Do not connect the terminal, printer, or modem.

5.5.2 LED/Switch Test

The LED/Switch test checks each LED and baud rate switch for
any malfunctions. To test:

a)   Be sure the Comm-Stor II/PDE Interface unit has been
set to standard factory configuration (Table 3-2).

b)   Insert the Diagnostic diskette into drive 1 and close
the drive door.

c)   Set the modem baud rate switch to position 1 to select
this test (Table 5-3).

d)   Press the RESTART switch. The LED test starts immedi-
ately.

e) LED Test: The front panel LEDs react immediately as
    follows:

    Requirement 1: All the LEDs are lit (approximately
    one second).

    Requirement 2: The READY 1 and BUSY 1 LEDs are lit
    (approximately one second).

    Requirement 3: The LEDs flicker randomly (approxi-
    mately 15 seconds) then blink off.

    Requirement 4: Walking lights: each LED is lit inde-
    pendently and sequentially (approximately one second
    each).

    Requirement 5: The READY 1 LED lights again.

f) If the proper LED patterns do not display, refer to
    Table 5-4, Failure Interpretation, for the LED test.

g) Switch Tests: The switch test values are represented
    by the LED display.

    Requirement 1: Set all baud rate switches to posi-
    tion 0. None of the LEDs should be lit.

    Requirement 2: Move the binary switch to the ENTER
    position; the STATUS LED should be lit. Move the
    binary switch to the EXIT position; the STATUS LED
    should not be lit. If the proper LED pattern does not
    display, refer to Table 5-4, Failure Interpretation,
    for the Binary switch test.

    Requirement 3: Move the printer baud rate switch
    through its settings of 0 through 9. (The modem and
    terminal baud rate switches must be set to position 0.)
    Each baud rate setting should generate a corresponding
    LED display. Examine the LEDs at each setting and
    compare the values displayed with the values listed in
    Table 5-5. Return the printer baud rate switch to
    position 0 and follow the same procedure for the
    terminal and modem baud rate switches.

h) If the proper LED pattern does not display, refer to
    Table 5-4, Failure Interpretation, for the baud rate
    switch tests.

i) Remove the Diagnostic diskette from drive 1, if no
    other tests are to be performed.

Comm-Stor II/PDE INTERFACE UNIT

TABLE 5-4

FAILURE INTERPRETATION

TEST FAILURE	PROBABLE CAUSE
LED Test	Swap/verify the Communications Ports board (1030A5162). If the LED still fails, replace the defective LED.
Baud Rate Switch	Swap/verify the MP/RAM board (1060A5171).
Binary Switch	Swap/verify I/O Panel (1030A6291). If the switch still fails, replace the Communications Ports board (1030A5162).

TABLE 5-5

LED DISPLAY

BAUD RATE SWITCH SETTING	STATUS	CARRIER	BUSY(1)	READY(1)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON

5.5.3 Hardware Features Check Test

The Hardware Features check indicates the hardware that is
installed in the unit and allows the remaining tests to
check that hardware.

NOTE: If performing the tests in sequence, proceed
directly to Step c).

To test:

a) Be sure the Comm-Stor II/PDE Interface unit has been
    set to standard factory configuration (Table 3-2).

b) Insert a Diagnostic diskette into drive 1 and close the
    drive door.

c) Set the modem baud rate switch to position 7 to select
    this test (Table 5-3).

d) Press the RESTART switch.

e) The unit immediately performs the visual LED test.
    After completing this test, a series of LEDs will
    light. Ignore this pattern.

f) Open and close the drive 1 door.

    Requirement: All LEDs blink in unison.

g) The installed hardware features are indicated by a
    series of LED ON/OFF patterns which will be located in
    Table 5-6 through 5-9. These LED patterns are gen-
    erated each time the drive door is opened and closed.
    A different hardware feature is represented each time
    this procedure is .performed.

    For example, if the _third_ pattern is:

    STS   CAR   BSY(1)   RDY(1)
    (OFF)   (ON)   (OFF)   (OFF)

    this would indicate that the unit has two drives and
    the Standby mode installed (Table 5-7).

    NOTE 1: If an installed feature is not indicated by
    this check, the associated component(s) either malfunc-
    tioned or is(are) not properly installed.· Replace a
    faulty component. _If a feature is not detected by this_
    check, it is not tested in any of the Diagnostics tests.

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TABLE 5-6

RAM SIZE

LED PATTERN #1				LED PATTERN #2				MEMORY SIZE
STS	CAR	BSY (1)	RDY (1)	STS	CAR	BSY (1)	RDY (1)	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OK
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	4K†
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	8K
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	12K
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	14K
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	16K
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	20K
OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	24K
OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	28K
OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	32K
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	36K
OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	40K

*An error in RAM is indicated.
†Standard PDE product.

TABLE 5-7

NUMBER OF DRIVES/STANDBY MODE

LED PATTERN #3				NUMBER OF DRIVES/ STANDBY MODE
STS	CAR	BSY (1)	RDY (1)	
OFF	OFF	OFF	OFF	---
OFF	OFF	OFF	ON	1 Drive/No Standby Mode
OFF	OFF	ON	OFF	2 Drives/No Standby Mode
OFF	OFF	ON	ON	1 Drive/Standby Mode
OFF	ON	OFF	OFF	2 Drives/Standby Mode

NOTE 2: The RAM size (Table 5-6) is indicated by the
first or the second LED pattern. Therefore, one of
these patterns shows none of the LEDs lit.

For example, if a unit contains 4K of RAM, the first
pattern is:

STS	CAR	BSY(1)	RDY(1)
(OFF)	(OFF)	(OFF)	(OFF)

The second pattern is:

STS	CAR	BSY(1)	RDY(1)
(OFF)	(OFF)	(ON)	(OFF)

h) To obtain the first two patterns, open and close the
    drive 1 door. Record the first pattern. Open and close
    the drive 1 door again. Record the second pattern.
    Locate the combination of these two patterns in Table
    5-6. This pattern determines the RAM size. Patterns
    not listed indicate a hardware failure.

TABLE 5-8

EDITOR/FORMS OPTIONS

LED PATTERN #4				
STS	CAR	BSY (1)	RDY (1)	EDITOR/FORMS OPTIONS
OFF	OFF	OFF	OFF	Standard PDE Value
OFF	OFF	OFF	ON	No Forms/No Editor
OFF	OFF	ON	OFF	No Forms/Editor
OFF	OFF	ON	ON	Forms/No Editor
OFF	ON	OFF	OFF	Forms/Editor
OFF	ON	OFF	ON	No Forms/Extended Editor
OFF	ON	ON	OFF	Extended Forms/No Editor
OFF	ON	ON	ON	Extended Forms/Editor
ON	OFF	OFF	OFF	Forms/Extended Editor
ON	OFF	OFF	ON	Extended Forms/Extended Editor

i) Open and close the drive 1 door again to obtain the
   third LED ON/OFF pattern. This pattern determines the
   number of drives and whether Standby mode is installed.
   Locate this pattern in Table 5-7 and record the feature.

j) Open and close the drive 1 door to obtain the fourth LED
   ON/OFF pattern. This pattern determines whether the
   Editor and the Forms options are installed. Locate this
   pattern in Table 5-8 and record the feature.

TABLE 5-9

PRINTER PORT/EXTENDED USER COMMAND TABLE

LED PATTERN #5				
STS	CAR	BSY (1)	RDY (1)	PRINTER PORT/EXTENDED USER COMMAND TABLE
OFF	OFF	OFF	OFF	--
OFF	OFF	OFF	ON	No Printer Port/No Extended User Command Table
OFF	OFF	ON	OFF	Printer Port/No Extended User Command Table
OFF	OFF	ON	ON	No Printer Port/Extended User Command Table
OFF	ON	OFF	OFF	Printer Port/Extended User Command Table

NOTE: Neither the Forms nor the Editor option should
be indicated for PDE Comm-Stor II/PDE Interface units.

k) Open and close the drive 1 door to obtain the fifth LED
ON/OFF pattern. This pattern determines whether or not
the printer port and the Extended User Command Table are
installed. Locate the pattern in Table 5-8 and record
the feature.

l) Open and close the drive door to end the test. All the
LEDs blink in unison.

5.5.4 Internal Tests: Memory/Diskette/Timer/Baud Rate

The Internal tests check all the hardware of the unit for
any problems.

NOTE: If performing the tests in sequence, proceed
directly to Step c.

Comm-Stor II/PDE INTERFACE UNIT

To test:

a) Be sure the unit has been set to standard factory con-
   figuration (Table 3-2).

b) Insert the Diagnostic diskette into drive 1 and close
   the drive door.

c) Set the modem baud rate switch to position 2 to select
   this test (Table 5-3).

d) Press the RESTART switch.

e) The unit immediately performs the visual LED Test. After
   completing this test, a series of LEDs light. Ignore
   this pattern.

f) Open and close the drive 1 door. The unit executes the
   Internal tests. The tests run about ten minutes. Time
   length varies according to the memory size.

NOTE: Dual drive systems only: Upon completion of the
Diskette portion of the Internal tests for drive 1, the
READY 1 and BUSY 1 LEDs blink in unison. Remove the Diag-
nostic diskette from drive 1; insert it into drive 2 and
close the drive door. Drive 2 tests run approximately three
minutes.

   Requirement: When the tests are completed, all the
   LEDs blink in unison.

g) Open and close the drive 1 door (or the drive 2 door in
   a dual drive unit).

   Requirement 1: If at any time the LEDs blink in
   unison, go to Step h).

   Requirement 2: If a series of LEDs is lit, refer to
   Table 5-10 for RAM faults. If no LEDs are lit, go to
   Requirement 3.

   Requirement 3: Open and close the drive door again.
   If a series of LEDs is lit, refer to Table 5-11 for Con-
   figuration Memory faults. If no LEDs are lit, go to
   Requirement 4.

   Requirement 4: Open and close the drive door again.
   If a series of LEDs is lit, refer to Table 5-12 for ROM
   faults. If no LEDs are lit, go to Requirement 5.

TABLE 5-10

RAM FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The main memory is faulty. Random and unpredictable operating faults may occur.	Swap/verify the MP/RAM board (1030A5171).
CARRIER or STATUS	The expanded memory is faulty.	Swap/verify the Expanded RAM board (1030A5013 or 1030A5014).

TABLE 5-11

MP/RAM MEMORY FAULTS

LED	INTERPRETATION	REMEDY
READY 1	The main memory is faulty. Random and unpredictable operating faults may occur.	Swap/verify the MP/RAM board (1030A5171).
BUSY 1	The Extended User Command Table is faulty.	Swap/verify the MP/RAM board (1030A5171).

Requirement 5: Open and close the drive door again. If a series of LEDs is lit, refer to Table 5-13 for Drive 1 faults. If no LEDs are lit, go to Requirement 6.

Requirement 6: Open and close the drive door again. If a series of LEDs is lit, refer to Table 5-14 for Drive 2 faults. If no LEDs are lit, go to Requirement 7.

Requirement 7: Open and close the drive door to end the test. All LEDs blink in unison.

h) If no further fault conditions exist, the test ends with all LEDs blinking in unison. Those fault tables by-passed by the diagnostic procedure contain no reportable results.

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TABLE 5-12

ROM/TIMER/BAUD RATE FAULTS

LED	INTERPRETATION	REMEDY
READY 1	The main memory is faulty. Random and unpredictable operating faults may occur.	Swap/verify the ROM IIA board (1030A6486).
BUSY 1	A timer fault has occurred.	Swap/verify the Diskette Interface board (1030A6054).
CARRIER	A baud rate generator is faulty.	Swap/verify the Communications Ports board (1030A5162).

TABLE 5-13

DRIVE 1 FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	Diskette drive 1 cannot read properly.	Swap/verify the diskette drive assembly (1030A3251). If drive 1 still fails, replace the Diskette Interface board (1030A6054) and cable. Continued failure of drive 1 indicates a bad Diagnostic diskette.
CARRIER or STATUS	Diskette drive 1 cannot write properly.	(same as above)

TABLE 5-14

DRIVE 2 FAULTS

LED	INTERPRETATION	REMEDY
READY 2 or BUSY 2	Diskette drive 2 cannot read properly.	Swap/verify the diskette drive assembly (1030A3251). If drive 2 still fails, replace the Drive Interface board (1030A6054) and cable. Continued failure of drive 2 indicates a bad Diagnostic diskette.
CARRIER or STATUS	Diskette drive 2 cannot write properly.	(same as above)

i) Remove the Diagnostic diskette from the drive if no other tests are to be performed.

5.5.5 Terminal and Modem Port Tests

NOTE: Always begin this test at Step a).

These tests check the terminal and modem port lines and their respective UARTs. To test:

a) Open both drive doors and remove any diskettes from the drive. Turn off the Comm-Stor II/PDE Interface unit.

b) Mount the diagnostic test plug on the rear panel. Set switch 1 up (the EIA position) and switch 2 down (the TERM position).

c) Turn on the unit.

d) Refer to section 3.9, Start-up procedures, and return the Comm-Stor II/PDE Interface unit to standard factory configuration.

e) Insert the Diagnostic diskette into drive 1 and close the drive door.

f) Set the rear panel switches as follows:

1) Modem port baud rate switch to 3 to select this test
   (Table 5-3).

2) Printer port baud rate switch to 0.

3) Terminal port baud rate switch to 0.

4) Binary switch to EXIT.

g) Press the RESTART switch. The diagnostic immediately
   performs the visual LED test. After completing this
   test, a series of LEDs illuminate; ignore this LED
   pattern.

NOTE: If you wish to test only the modem port, follow
Step h). If you wish to test only the terminal port, follow
Step i). To test both ports follow Steps h) through i).

h) To test the modem port:

1) Set the terminal port baud rate switch to the set-
   ting that corresponds to the rate of the terminal in
   use (Table 5-15).

2) Open and close the drive 1 door. The diagnostic
   executes the modem port test.

3) The test runs about three minutes.

Requirement: When the test is completed, all LEDs will
blink in unison.

4) Open and close the drive 1 door.

Requirement 1: If at any time the LEDs blink in
unison, go to 5).

Requirement 2: If a series of LEDs is lit, Step i)
must be performed when Step h) is completed, as terminal
port error may exist. If no LEDs are lit, go to
Requirement 3.

Requirement 3: Open and close the drive door again.
If a series of LEDs is lit, Step i) must be performed
when Step h) is completed, as terminal port error may
exist. If no LEDs are lit, go to Requirement 4.

TABLE 5-15

BAUD RATE SPECIFICATIONS

DESIRED BAUD RATE	TERM SWITCH SETTING
110	1
134	2
150	3
300	4
1200	5
2400	6
4800	7
7200	8
9600	9

Requirement 4: Open and close the drive door again.
If a series of LEDs is lit, refer to Table 5-18 for the
Modem Receive/Transmit Faults. If no LEDs are lit, go
to Requirement 5.

Requirement 5: Open and close the drive door again.
If a series of LEDs is lit, refer to Table 5-19 for the
Modem EIA Control Line Faults. If no LEDs are lit, go
to Requirement 6.

Requirement 6: Open and close the drive door to end
the test. All LEDs blink in unison.

5) If no further faults exist, the test ends with all
   LEDs blinking in unison.

6) Remove the test plug from the rear panel and the Diagnostic diskette from the drive, if no other tests are to be performed.

i) To test the <u>terminal port</u>:

1) Set the <u>terminal port</u> baud rate switch to the setting that corresponds to the rate of the terminal in use (Table 5-15).

2) Open and close the drive 1 door. The diagnostic executes the terminal port test.

3) The tests run about three minutes.

<u>Requirement</u>: When the tests are completed, all LEDs blink in unison.

4) Open and close the drive 1 door.

<u>Requirement 1</u>: If at any time the LEDs blink in unison, go to 5).

<u>Requirement 2</u>: If a series of LEDs is lit, refer to Table 5-16 for the Terminal Receive/Transmit Faults. If <u>no</u> LEDs are lit, go to Requirement 3.

<u>Requirement 3</u>: Open and close the drive door again. If a series of LEDs is lit, refer to Table 5-17 for the Terminal EIA Control Line Faults. If <u>no</u> LEDs are lit, go to Requirement 4.

<u>Requirement 4</u>: Open and close the drive door again. If a series of LEDs is lit, Step h) must be performed (if not previously done) when Step i) is completed, as a modem port error may exist. If <u>no</u> LEDs are lit, go to Requirement 5.

<u>Requirement 5</u>: Open and close the drive door again. If a series of LEDs is lit, Step h) must be performed (if not previously done) when Step i) is completed, as a modem port error may exist. If <u>no</u> LEDs are lit, go to Requirement 6.

<u>Requirement 6</u>: Open and close the drive door to end the test. All LEDs blink in unison.

5) If no further faults exist, the test ends with all LEDs blinking in unison.

TABLE 5-16

TERMINAL RECEIVE/TRANSMIT FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The terminal port cannot receive and/or transmit characters properly.	Swap/verify the Communications Ports board (1030A5162).
CARRIER	One or more of the following faults may occur: (a) The terminal port may not respond to a break (i.e., long space) from the terminal. (b) The terminal port cannot send a break to the terminal. (c) A terminal parity error indication may be falsely given.	Swap/verify the Communications Ports board (1030A5162).
STATUS	The STATUS LED is not used during this test.	_____

TABLE 5-17

TERMINAL EIA CONTROL LINE FAULTS

LED	INTERPRETATION	REMEDY
ANY LED	The terminal port is faulty.	Swap/verify the Communications Ports board (1030A5162).

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TABLE 5-18

MODEM RECEIVE/TRANSMIT FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The modem port cannot receive and/or transmit characters properly.	Swap/verify the Communications Ports board (1030A5162).
CARRIER	One or more of the following faults may occur: (a) The modem port may not respond to a break (i.e., long space) from the modem. (b) The modem port cannot send a break to the modem. (c) A modem parity error indication may be falsely given.	Swap/verify the Communications Ports board (1030A5162).
STATUS	Under certain conditions, transmission from the modem to the terminal may be faulty.	Swap/verify the Communications Ports board (1030A5162).

TABLE 5-19

MODEM EIA CONTROL LINE FAULTS

LED	INTERPRETATION	REMEDY
ANY LED	The modem port is faulty.	Swap/verify the Communications Ports board (1030A5162).

6) Remove the test plug from the rear of the unit if no other tests will be performed.

7) Remove the Diagnostic Diskette from the drive.

5.5.6 Printer Port Test (if the option is installed)

The Printer Port test checks the printer port lines and the UART.

NOTE: If performing the tests in sequence, proceed directly to Step c).

To test:

a) Be sure the unit has been set to the factory standard configuration (Table 3-2).

b) Turn the unit off. Mount the test plug on the rear panel of the unit.

c) With the unit off, set switch 1 up (EIA) and switch 2 up (PRINTER) on the diagnostic test plug.

d) Turn the unit on.

e) Insert the Diagnostic diskette into drive 1 and close the drive door.

f) Set the modem baud rate switch to position 5 to select this test (Table 5-3).

g) Press the RESTART switch.

h) The unit immediately performs the visual LED test. After completing this test, a series of LEDs lights. Ignore this pattern.

i) Refer to Table 5-15 and set the terminal baud rate switch on the rear panel of the unit.

j) Open and close the drive 1 door to start the test.

Requirement: The test runs about <u>three</u> minutes. When completed, all LEDs blink in unison.

k) Open and close the drive 1 door to obtain the test results as displayed by the LEDs.

Requirement 1: If at any time the LEDs blink in unison, go to 1).

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TABLE 5-20

PRINTER RECEIVE/TRANSMIT FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The printer port cannot transmit characters properly.	Swap/verify the Printer Port board (1030A5012 or 1030A5014).
CARRIER	The printer port may not be able to send a break (i.e., long space) to the printer.	Swap/verify the Printer Port board (1030A5012 or 1030A5014).
STATUS	The STATUS LED is not used.	————

TABLE 5-21

PRINTER EIA CONTROL LINE FAULTS

LED	INTERPRETATION	REMEDY
ANY LED	The printer port is faulty.	Swap/verify the Printer Port board (1030A5012 or 1030A5014).

Requirement 2: If a series of LEDs is lit, refer to Table 5-20 for the Printer Receive/Transmit faults. If no LEDs are lit, go to Requirement 3.

Requirement 3: Open and close the drive door again. If a series of LEDs is lit, refer to Table 5-21 for the Printer EIA Control Line faults. If no LEDs are lit, go to Requirement 4.

Requirement 4: Open and close the drive door again. If a series of LEDs is lit, refer to Table 5-18 for the Modem Receive/Transmit faults. If no LEDs are lit, go to Requirement 5.

Requirement 5: Open and close the drive door again.
If a series of LEDs is lit, refer to Table 5-19 for the
Modem EIA Control Line faults. If no LEDs are lit, go
to Requirement 6.

Requirement 6: Open and close the drive door to end
the test. All LEDs blink in unison.

1) If no further faults exist, the test ends with all LEDs
    blinking in unison. Those tables bypassed by the diag-
    nostic procedures contain no reportable results.

m) Remove the test plug from the unit if no other tests
    will be performed.

n) Remove the Diagnostic diskette from the drive.

5.5.7 Configuration Memory Test

The Configuration Memory test checks the main configuration
memory, the Extended User Command Table memory, and the
battery.

NOTE: If the tests are performed in sequence, proceed
directly to Step f).

To test:

a) Be sure the unit has been set to the standard factory
    Configuration (Table 3-2).

b) Turn the unit off.

c) Remove the test plug or any port cables from the rear
    panel.

d) Turn the unit on.

e) Insert the Diagnostic diskette into drive 1 and close
    the drive door.

f) Set the modem baud rate switch to position 8 to select
    this test (Table 5-3).

g) Press the RESTART switch.

h) The unit immediately performs the visual LED test.
    After completing this test, a series of LEDs will
    light. Ignore this pattern.

i) Open and close the drive 1 door to start the test.

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Requirement: When the BUSY 1 LED remains lit, turn
the unit off. Wait about one minute.

j) Turn the unit on.

Requirement: · The LED test is again automatically
performed.

k) Open and close the drive 1 door.

Requirement 1: If the BUSY 1 or the CARRIER LED begins
blinking, refer to Table 5-22 for the Configuration
memory faults.

Requirement 2: If the BUSY 1 LED remains lit, no
faults exist. Turn the unit off. Wait about one minute.

l) Turn the unit on.

Requirement: The LED test is again automatically
performed.

m) Open and close the drive 1 door.

Requirement 1: If the BUSY 1 LED or the CARRIER LED
begins blinking, refer to Table 5-22 for the Configura-
tion Memory faults.

Requirement 2: If all LEDs blink in unison, the test
is finished and no further faults exist.

NOTE 1: Wait at least one minute where required.
However, if the suspected Configuration memory fault is
time related, more or less time may be required between
steps.

NOTE 2: If the problem is thought to be heat related,
the user may press the RESTART switch between steps
rather than turn the unit off.

n) Remove the Diagnostic diskette from the drive, if no
other tests will be performed.

5.5.8 Diskette Test (Read Only)

The Diskette test checks a diskette to determine if data can
be read. This test need only be run if a diskette is sus-
pected to contain errors.

NOTE 1: The user should first verify the unit's operation
by running the Internal tests.

TABLE 5-22

CONFIGURATION MEMORY FAULTS

BLINKING LED	INTERPRETATION	REMEDY
BUSY 1	The battery or the main configuration memory is faulty.	Swap/verify the battery (3000D0001). If the problem persists, replace the MP/RAM board (1030A5171).
CARRIER	The battery or the Extended User Command Table memory is faulty.	(same as above)

NOTE 2: If the tests are performed in sequence, proceed directly to Step f).

To test:

a) Be sure the unit has been set to the standard factory configuration (Table 3-2).

b) Turn the unit off.

c) Remove the test plug or the port cables from the rear panel of the unit.

d) Turn the unit on.

e) Insert the Diagnostic diskette into drive 1; close the drive door.

f) Set the modem baud rate switch to position 9.

g) Press the RESTART switch.

h) The unit immediately performs the visual LED test. After completing this test, a series of LEDs will light. Ignore this pattern.

i) Open and close the drive 1 door.

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Requirement 1: The READY 1 and BUSY 1 LEDs begin blinking. Remove the Diagnostic diskette and insert the diskette to be tested into drive 1.

Requirement 2: The READY 1 and BUSY 1 LEDs stop blinking but remain lit during the test. The test runs about two minutes.

Requirement 3: If no errors occur, the READY 1 and BUSY 1 LEDs start blinking again (READY 2 and BUSY 2 blink on a dual drive unit). Another diskette may be inserted into the drive (drive 2 on a dual drive unit) and tested.

NOTE: In dual drive units additional diskettes are tested by alternating between drives 1 and 2.

Requirement: If an error occurs, the CARRIER LED begins blinking. Remove the faulty diskette from the drive and discard it. If a failure occurs, the test needs to be restarted. To test additional diskettes, proceed as described in Requirement 3.

NOTE: The user can attempt to copy a faulty diskette to save valuable data.

This completes the diagnostic test procedures. Remove the Diagnostic diskette, and restore the system to its normal operating configuration. Be sure all interface connections have been properly made.

INDEX

I. General

    This attachment provides the Price Element Code (PEC) for the Option
    Kit to convert a Comm-Stor 8120A or 8220A to a Comm-Stor II*/PDE
    Interface Unit. A Comm-Stor II/PDE Interface Unit cannot be ordered.

II. PEC Arrangement

		Description	
PEC	Sykes Part No.	Item	Part No.
36012	1009A0592	PROM-LOC.K1	1030A8512
		PROM-LOC.J3	1030A8513
		PROM-LOC.J2	1030A8514
		PROM-LOC.J1	1030A8515
		PROM-LOC.H3	1030A8516
		3740 Convert Diskette	1030A4559
		Standard Refresh Diskette	1030A4558

III. Availability

    The option kit may be ordered under American Bell Contract No.
    AB 111A from Sykes Datatronics Corporation 159 East Main St.
    Rochester, N.Y. 14604. General availability is July 4, 1983.

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