700A-L1 DATA SERVICE UNIT

DESCRIPTION, OPERATION, INSTALLATION, AND MAINTENANCE

PROCESSOR DATA MODULE

" DIMENSION® "   /SYSTEM 85

1. GENERAL

1.01 This section contains information on the description, operation, installation, and maintenance of the processor data module (PDM) 700A-L1 data service unit (DSU). The PDM is mounted either in a stand-alone mounting (Fig. 1) or in a multiple mounting.

1.02 Whenever this section is reissued, the reason for reissue will be contained in this paragraph.

1.03 The PDM serves as a data communication equipment (DCE) to transmit and receive serial customer data over a 4-wire digital communication protocol (DCP) line in the System 85. It provides an interconnection medium (without a voice terminal) between the system and customer-provided data terminal equipment (DTE) meeting Electronic Industries Association (EIA) standard RS-232-C.

1.04 The significant features of PDM are listed below:

- Available in selected standard data rates of up to 19.2 kb/s.

- Synchronous or asynchronous operation.
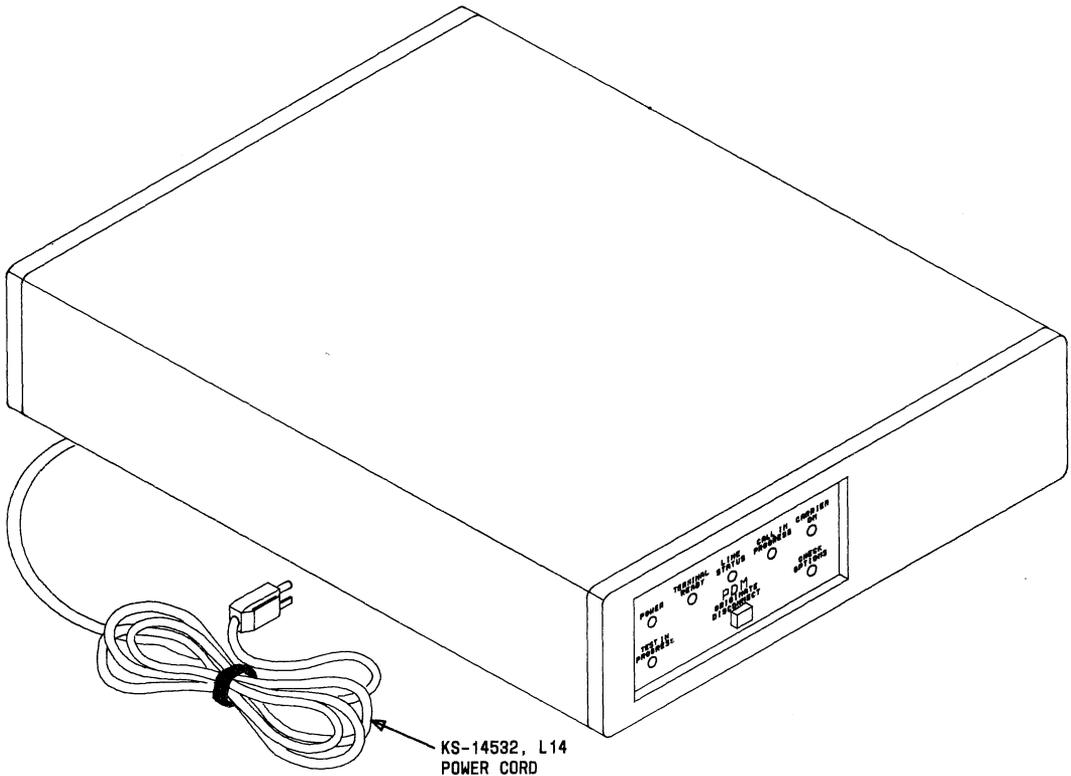
- Full- or half-duplex operation.

Fig. 1—Processor Data Module (PDM) in Stand-Alone Mounting

- Available in either stand-alone or multiple data mounting.

- Customer may control certain EIA RS-232-C interface leads from the customer option switches in the faceplate.

- Ten-bit American Standard Code for Information Interchange (ASCII) start-stop character dialing from the customer DTE.

- Compatible with the System 85 equipment.

- Light emitting diode (LED) indicators for monitoring data module status.

- Various customer options selectable from option switches in the faceplate.

- More than one speed option can be selected by the customer using option switches, allowing the operating speed to be selected during call setup handshaking.

- Automatic answer option.

1.05 The PDM operates in an ambient temperature range of +40 to +120°F and a relative humidity range of 5 to 95 percent, noncondensing.

1.06 The PDM may be switched by the System 85 to transmit or receive with another PDM or digital terminal data module (DTDM) or trunk data module.

2. PHYSICAL DESCRIPTION

A. PDM Circuit Pack (Module)

2.01 The PDM circuit pack (700A-L1) is composed of a printed circuit board with protective shields attached to a faceplate (Fig. 2). The circuit pack is mounted either in a 70A stand-alone mounting or in a 71A multiple mounting.

2.02 The dimensions of the circuit pack are 11.8 inches long, 7.67 inches wide, 1.9 inches high, and weighs approximately 2-1/2 pounds.

2.03 The faceplate of the PDM circuit pack is designed to allow easy reading of the display, switch and indicator designations regardless of PDM modules orientation, horizontally for stand-alone arrangements, and vertically for multiple arrangements. The faceplate labels are removable and are made of flexible plastic that contains switch and indicator designations on both sides, one side for mounting in stand-alone (horizontal) arrangements and the other for multiple (vertical) arrangements. Tabs on the labels fit into the openings in the faceplate frame. These labels can be flexed for removing from the faceplate, turned over and reinstalled in the faceplate frame for new orientation.

2.04 The faceplate on the PDM circuit pack contains ten LED indicators, two paddle switches, a pushbutton switch, and customer option switches. By reversing and rotating the faceplate labels, the labels can be arranged for either stand-alone or multiple mounting. The designations adjacent to the indicators identify the functions being monitored. The indicators (Fig. 2) and their function are as follows:

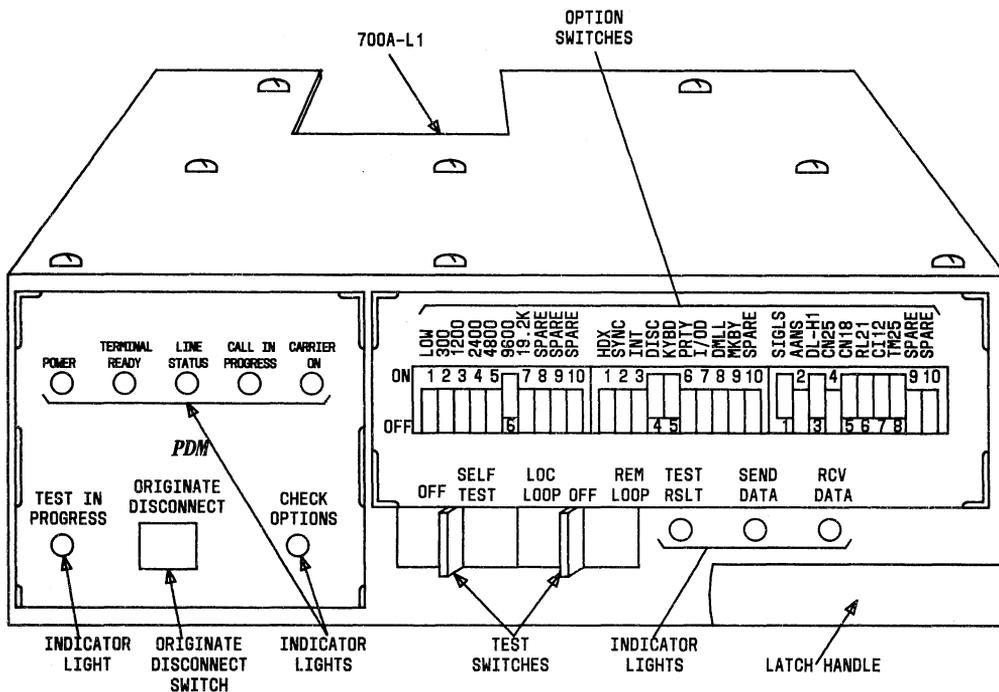(a) **POWER:** When **on** indicates power has been applied.

Fig. 2—Front View of PDM Circuit Pack

(b) **TERMINAL READY:** When **on** indicates the DTE is ready to receive or transmit data. Indicator is also **on** when PDM is in the idle mode and the REMOTE LOOP switch is operated.

(c) **LINE STATUS:** Indicates the on-hook or off-hook status of the PDM.

(d) **CALL IN PROGRESS:** Indicator comes **on** when an end-to-end call is established successfully.

(e) **CARRIER ON:** This indicator reflects the state of the EIA CF lead (received line signal detector). The indicator is **on** when the CF lead receives a space signal.

(f) **TEST IN PROGRESS:** When **on** indicates the module is performing a test or when the module is placed in remote loop by a remote data module or test initiated by System 85.

(g) **CHECK OPTIONS:** When **on** indicates a call cannot be set up because of incompatible options between modules.

(h) **TEST RESULTS:** This indicator is steadily **on** if the PDM module passed the SELF TEST. Flashes if the module failed the SELF TEST.

(i) **SEND DATA:** This indicator reflects the state of the EIA BA lead (transmitted data). Indicator is **on** when BA is in a spacing condition.

(j) **RECEIVE DATA:** This indicator reflects the state of the EIA BB lead (received data). Indicator is **on** when BB is in a spacing condition.

2.05 Three switches other than customer option switches are on the faceplate of the PDM module. These three switches are described below and customer option switches are described in Part 4.

(a) **ORIGINATE/DISCONNECT (ORIGINATE/DISCONNECT):** This momentary contact pushbutton switch is used to change the on-hook or off-hook state of the PDM provided EIA CD lead, data terminal ready is **on**, and the PDM module is not in self test, local loop, or System 85 maintenance mode.

(b) **SELF TEST (SELF TEST):** This switch is a 2-position paddle switch which during normal PDM operation will be in position marked OFF. In position marked SELF TEST, it puts PDM into a self-test mode. This switch is accessible on a stand-alone PDM by rotating the magnetically-latched front cover downward and on a multiple mounted PDM by rotating the mechanically-latched front cover downward.

(c) **LOC LOOP/REM LOOP (LOCAL LOOP/REMOTE LOOP):** This is a 3-position locking paddle switch which during normal operation will be in OFF position. In LOC LOOP (local loop) position, it enables an internal loopback of customer data prior to its digital communication protocol (DCP) link interface. In REM LOOP (remote loop) position, it causes customer data to be looped back from the remote module prior to its EIA interface.

2.06 A 25-pin female (RS-232-C) customer interface connector (Fig. 3) is provided at the rear of the circuit pack for connection to a customer provided equipment via an M25B cord. The connector pin numbers, the corresponding circuit mnemonics, and descriptions are given in Table A.

2.07 A modular jack DCP connector (Fig. 3) is provided at the rear of the circuit pack for connection to a LINE jack via a D8W-87 wire cord (customer provided). The connector pin numbers, circuit mnemonics, and descriptions are given in Table B.

2.08 The rear of the PDM circuit pack also contains a power connector and a screw option switch (Fig. 3) which permits connection of the circuit ground to the frame ground. When this screw is fully tightened, the frame ground and the signal ground will be connected. When this screw is loosened (not making contact), frame ground and signal grounds are isolated.

B. Stand-Alone Mounting

2.09 The PDM circuit pack can be mounted individually in a 70A stand-alone mounting (Fig. 4) which is 12.05 inches long, 8.69 inches wide, 2.75 inches high, and weighs approximately 7 pounds with circuit pack installed.

2.10 The 70A stand-alone mounting is equipped with power cord KS-14532, L14; covers on front and rear, cooling vents and two openings, one for EIA customer connector access and the other for DCP (modular jack) connector access (Fig. 5).
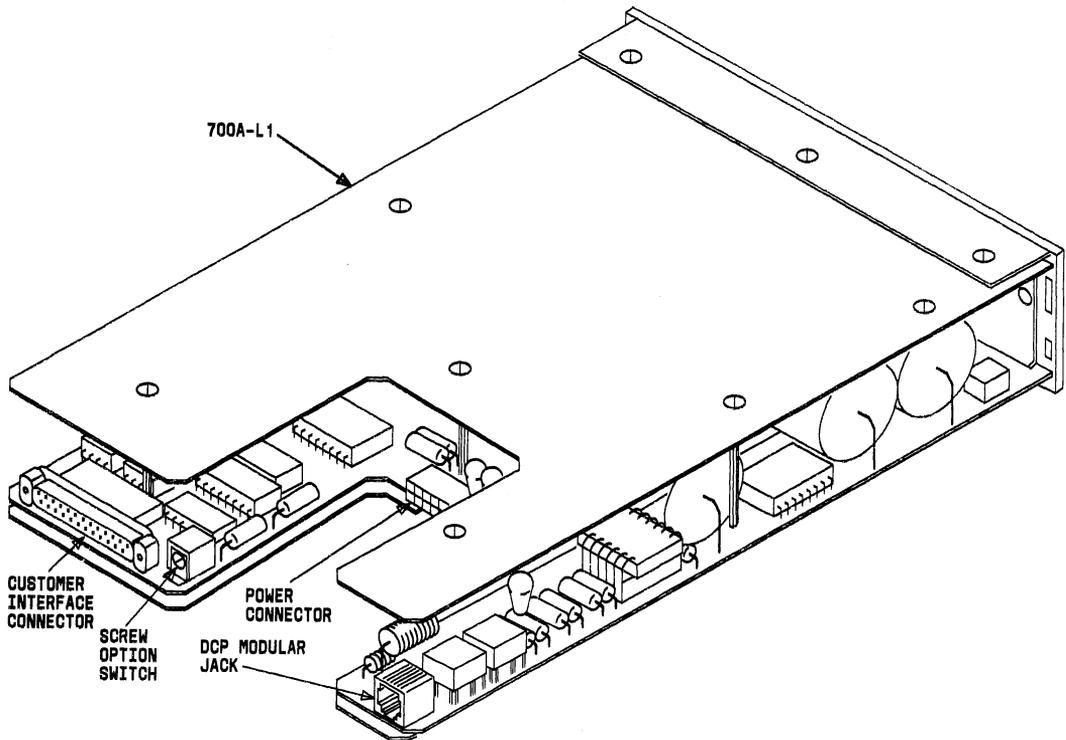
700A-L1

CUSTOMER
INTERFACE
CONNECTOR
SCREW
OPTION
SWITCH
POWER
CONNECTOR
DCP MODULAR
JACK

Fig. 3—Rear View of PDM Circuit Pack

2.11 The front cover can be opened by pulling the magnetically latched fron cover outward on the top edge and rotating downward. The rear cover can be removed by gently depressing on the top edge and rotating downward to lift off.

2.12 The inside of the front cover has a label describing the option designations relating to PDM or trunk data module. The white colored designations relate to both PDM and trunk data module except where blue Italic designations appear, it relates to trunk data module only.

2.13 Power for the 70A stand-alone mounting is obtained from a standard 117 Vac, 3-wire grounded outlet. The outlet should not be under control of a switch. The power cord KS-14532, L14 is connected to a low voltage ac transformer mounted in

the mounting. The transformer supplies low voltage alternating current to the circuit pack through a backplane and 963-type connector. The maximum power dissipation of a 70A stand-alone mounting is approximately 8 watts.

2.14 Two threaded holes are provided so that a 193A backboard can be attached, in case of wall mounting.

C. Multiple Mounting

2.15 The multiple mounting consists of a 71A mounting (Fig. 6) which holds up to eight PDM or trunk data modules (Fig. 7) in any order or mix. The 71A multiple mounting measures 19 or 23 inches wide, 8.7 inches high, 14.9 inches deep, and weighs 22 pounds without any modules installed and

TABLE A

EIA CUSTOMER INTERFACE CONNECTOR PIN ASSIGNMENTS

PIN NO.	CIRCUIT MNEMONIC	DESCRIPTION
2	BA	Transmitted Data
3	BB	Received Data
4	CA	Request-to-Send
5	CB	Clear-to-Send
6	CC	Data Set Ready
7	AB	Signal Ground (Common Return)
8	CF	Received Line Signal Detector
9	—	+P (Test Voltage)
10	—	-P (Test Voltage)
12	CI	Signal Rate Indicator Output
15	DB	Transmission Signal Element Timing
17	DD	Receiver Signal Element Timing
18	CN	Make Busy/Local Loopback
20	CD	Data Terminal Ready
21	RL	Remote Loopback
22	CE	Ring Indicator
23	CH	Data Signal Rate Selector
24	DA	Transmit Signal Element Timing
25	TM	Test Mode

40 pounds with eight modules installed. The maximum power dissipation of a fully loaded 71A multiple mounting is approximately 100 watts.

2.16 Power for the 71A multiple mounting is obtained from a 117 Vac, 3-wire grounded outlet via a single transformer which supplies low voltage alternating current to each of the modules. The outlet should not be under control of a switch. The power cord KS-14532, L20 is provided with the mounting, which connects to the twist-lock power connector on the rear of the multiple mounting.

2.17 The 71A multiple mounting is equipped with brackets on each side allowing it to be mounted in 19- or 23-inch relay racks or cabinets.

2.18 The rear of the 71A multiple mounting (Fig. 8) contains two connectors and a twist-lock power connector and are described below:

(a) *DCP-LINE CONNECTOR (50-pin female):* Provides connection to the System 85 using a B25A cord. The connector pin assignments and the lead designations are listed in Table C.

(b) *MODEM CONTROL CONNECTOR (50-pin female):* Not used at this time.

(c) *POWER CONNECTOR:* This is a twist-lock connector that accepts the power cord from the 117 Vac to supply power to the multiple mounting, which in turn through a single transformer supplies low voltage alternating current to each of the modules.

2.19 The front of the mounting is equipped with a panel that is hinged at the bottom and covers approximately the lower half of the module faceplates when raised. The panel must be lowered when installing and removing the modules and when

TABLE B

**DIGITAL COMMUNICATION
PROTOCOL (DCP) CONNECTOR ASSIGNMENS
FOR STAND-ALONE MOUNTING**

PIN. NO.	LEAD DESIGNATION	FUNCTION
1	DTL OUT 1	TRANSMIT
2	DTL OUT 2	TRANSMIT
3	DTL IN 1	RECEIVE
6	DTL IN 2	RECEIVE

gaining access to the test and customer option switches. A write-on plastic strip is provided across the top of the panel to note circuit numbers.

2.20 The inside of the panel has a label describing the option designations relating to PDM or trunk data module.

3. FUNCTIONAL DESCRIPTION

GENERAL

3.01 The PDM module simultaneously transmits and receives serial binary data over the 4-wire DCP link switched by the System 85.

3.02 The DCP transmission uses a 160 kb/s bipolar bit stream containing three channels. The PDM uses one of two 64 kb/s channels for data transmission. The other 64 kb/s channel is not used. The third channel is an 8 kb/s signaling link (S-channel) between the PDM and System 85. The remaining DCP bandwidth is used for frame synchronization.

3.03 The PDM data transmission speed is normally selected at the highest compatible speed available and is determined at the call setup time between the calling and the remote data module. With DL-HI option switch (on the faceplate of PDM) in the ON position and in ASCII mode, the highest compatible data rate between 300 bps and 19.2 kb/s and in local loopback mode selects between LOW and 19.2 kb/s.

3.04 In the asynchronous mode, the PDM features 10-bit start-stop communication in one of the six available data rates between 300 bps and 19.2 kb/s and a low rate based on sampling customer data at

19.2 kb/s. Synchronous output clocks are clamped OFF when operating asynchronously.

3.05 In the synchronous mode, PDM offers six optional data rates between 300 bps and 19.2 kb/s with no restrictions on the data transmission format or pattern.

3.06 The PDM communicates with another data module optioned similarly, synchronous or asynchronous, and optioned for same speed. The remote module if PDM or trunk data module may have several speed options selected, one of which must be common to both for successful communication.

TEST MODE

3.07 The PDM is provided with built-in test features which can be used during an installation or maintenance visit for isolating troubles. These tests make use of the test switches and status indicators on the PDM.

A. Self Test (SELF TEST)

3.08 *Caution: Operating the SELF TEST switch (without operating the REMOTE LOOPBACK switch) during a call will cause the call to be disconnected.* This self test (Fig. 9) checks the internal circuits of the PDM module and is activated by operating the SELF TEST switch from its normal OFF position to the SELF TEST position and continues until the switch is moved to the OFF position.

3.09 During the test, the TEST IN PROGRESS indicator will stay ON. The TEST RSLT (TEST RESULT) indicator will be steadily ON if the test is successful or will be flashing if the test failed.

3.10 If the PDM module passes the test, a known bit sequence is then looped through the internal data path and checked for error. Any bit error will cause the TEST RSLT indicator to flutter momentarily; but if the test passes, the indicator will be steadily ON.

3.11 The SELF TEST switch can be operated simultaneously with the REM LOOP (remote loopback) switch without losing a call; but if the SELF TEST switch is operated first without operating the REM LOOP switch, the call will be disconnected.
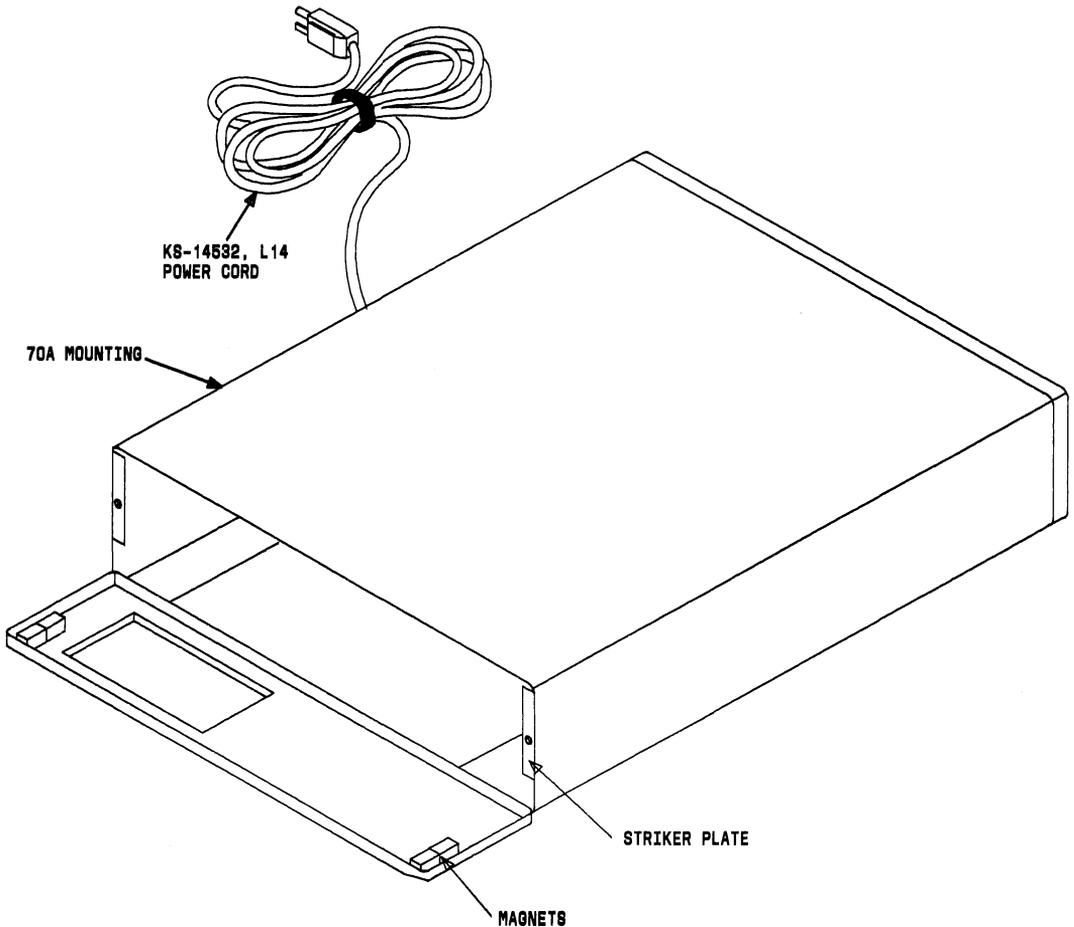
Fig. 4—70A Stand-Alone Mounting With Front Cover Open

B. Local Loop (LOC LOOP) Test

3.12 If a PDM module is placed in a local loopback mode while a call is in progress, the call will be discontinued.

3.13 The PDM module is placed in the local loopback mode by placing the LOC LOOP/REM LOOP switch in the LOC LOOP position. A DTE is required for this test which provides an internal loopback prior to DCP link interface. The EIA interface is active in this mode and the data transmitted by the terminal is looped back to the terminal. Check the data transmitted against the data displayed on the DTE. The test is passed if no error(s) are found. During the local loopback test (Fig. 10), the TEST IN PROGRESS indicator will be *on*. At the end of the test, place the LOC LOOP/REM LOOP switch in the OFF position. TEST IN PROGRESS indicator will turn OFF.

C. Remote Loop (REM LOOP) Test

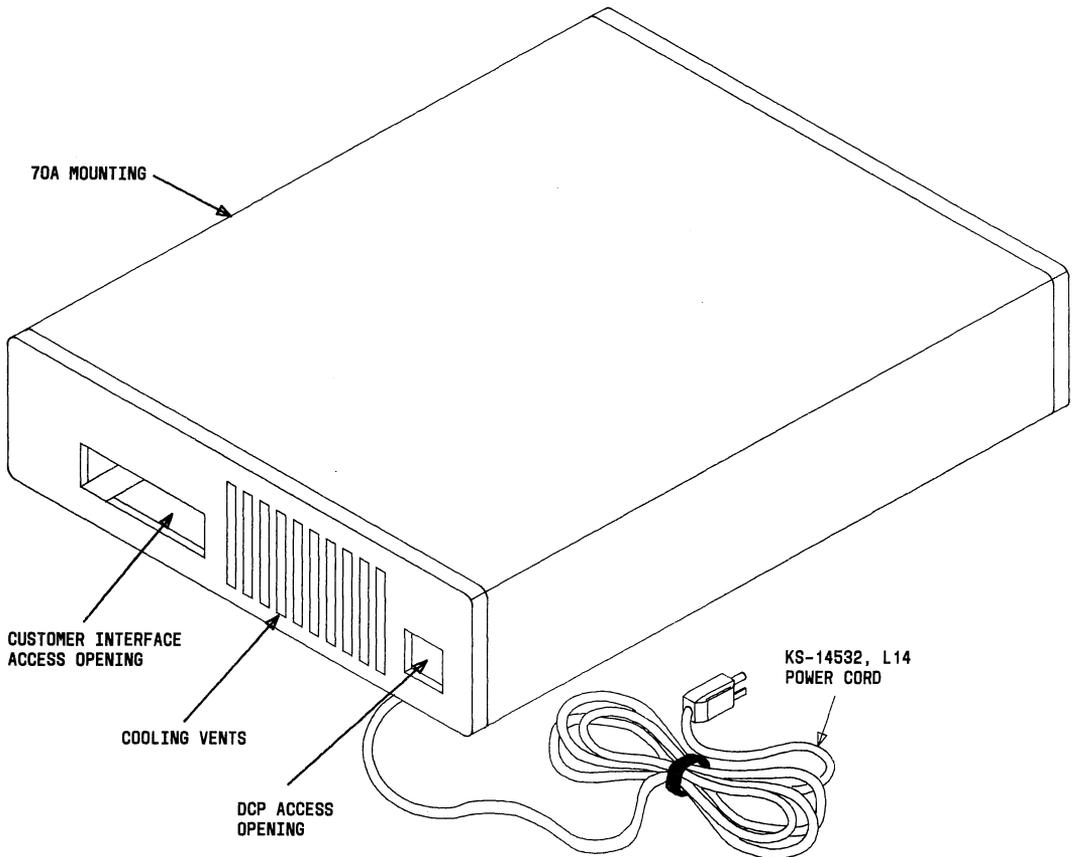**3.14** The remote loopback test (Fig. 11) is activated

Fig. 5—Rear View of 70A Stand-Alone Mounting

by placing the LOC LOOP/REM LOOP switch to the REM LOOP position during a call. Data transmitted by the local DTE will be looped back from the remote module prior to its EIA interface.

3.15 During the test, the TEST IN PROGRESS indicators on both the local and remote modules will be lighted and the remote module will be disabled for data transmission and reception. The remote module, if necessary, terminates the call by turning the CD interface lead (data terminal ready) OFF. Data transmission can be restored by placing the LOC LOOP/REM LOOP switch in the OFF posi-

tion. The call will be terminated if the switch is placed in the LOC LOOP position.

D. Remote Loopback/Self Test (REM LOOP/SELF TEST)

3.16 This test (Fig. 12) can be performed by moving the LOC LOOP/REM LOOP switch to the REM LOOP position after a call has been set up to put the remote module into remote loop. The SELF TEST switch is now moved to the SELF TEST position. The module will generate a known bit sequence and will transmit it to the remote module where the data will be looped back prior to the EIA interface of
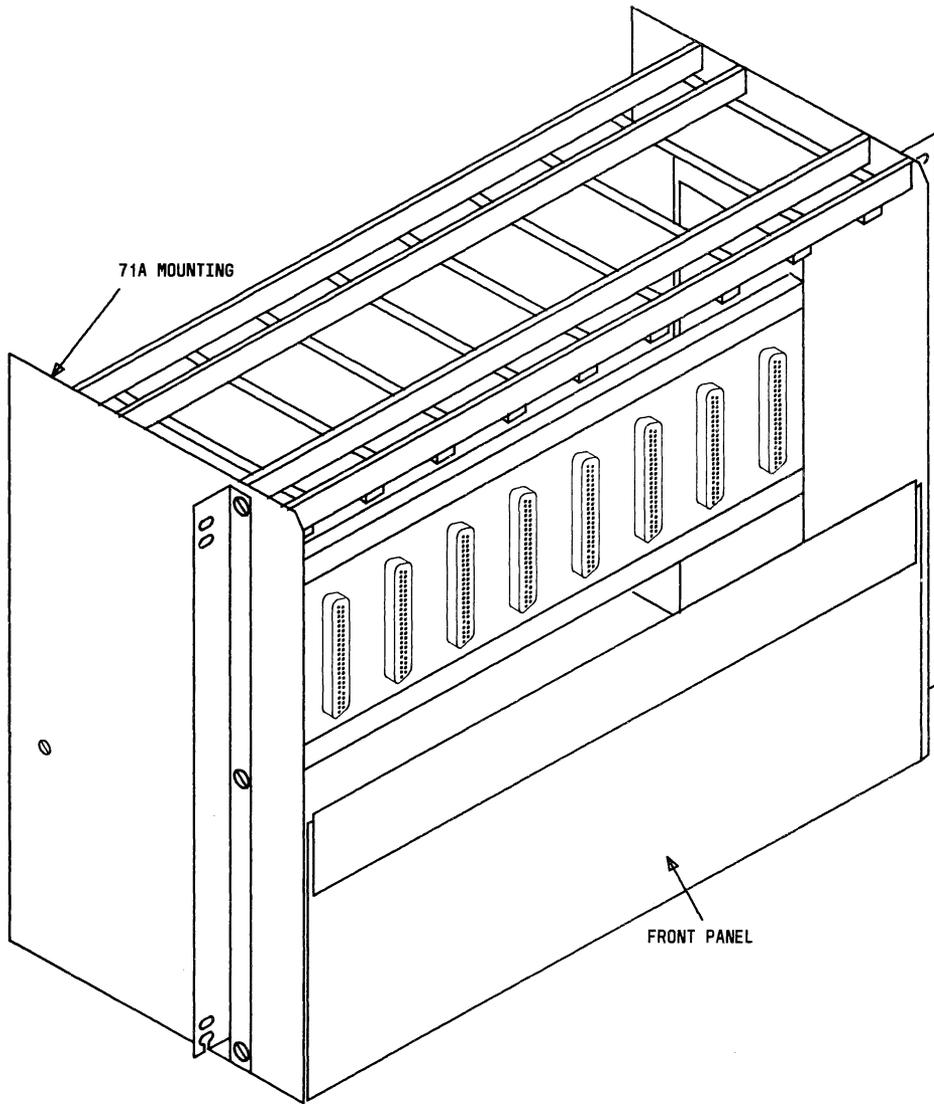
71A MOUNTING

FRONT PANEL

Fig. 6—Front View of 71A Multiple Mounting

TEST IN
PROGRESS   POWER
   O   O

PDM   TERMINAL
             READY
               O
ORIGINATE
DISCONNECT   LINE
             STATUS
   [ ]   O

             CALL IN
            PROGRESS
               O

CHECK   CARRIER
OPTIONS   ON
   O   O

71A MOUNTING

700A-L1

FRONT
PANEL
(OPEN)

*

* OPTION DESIGNATIONS
  FOR PDM OR TRUNK DATA
  MODULE ARE SHOWN HERE.

TEST
SWITCHES
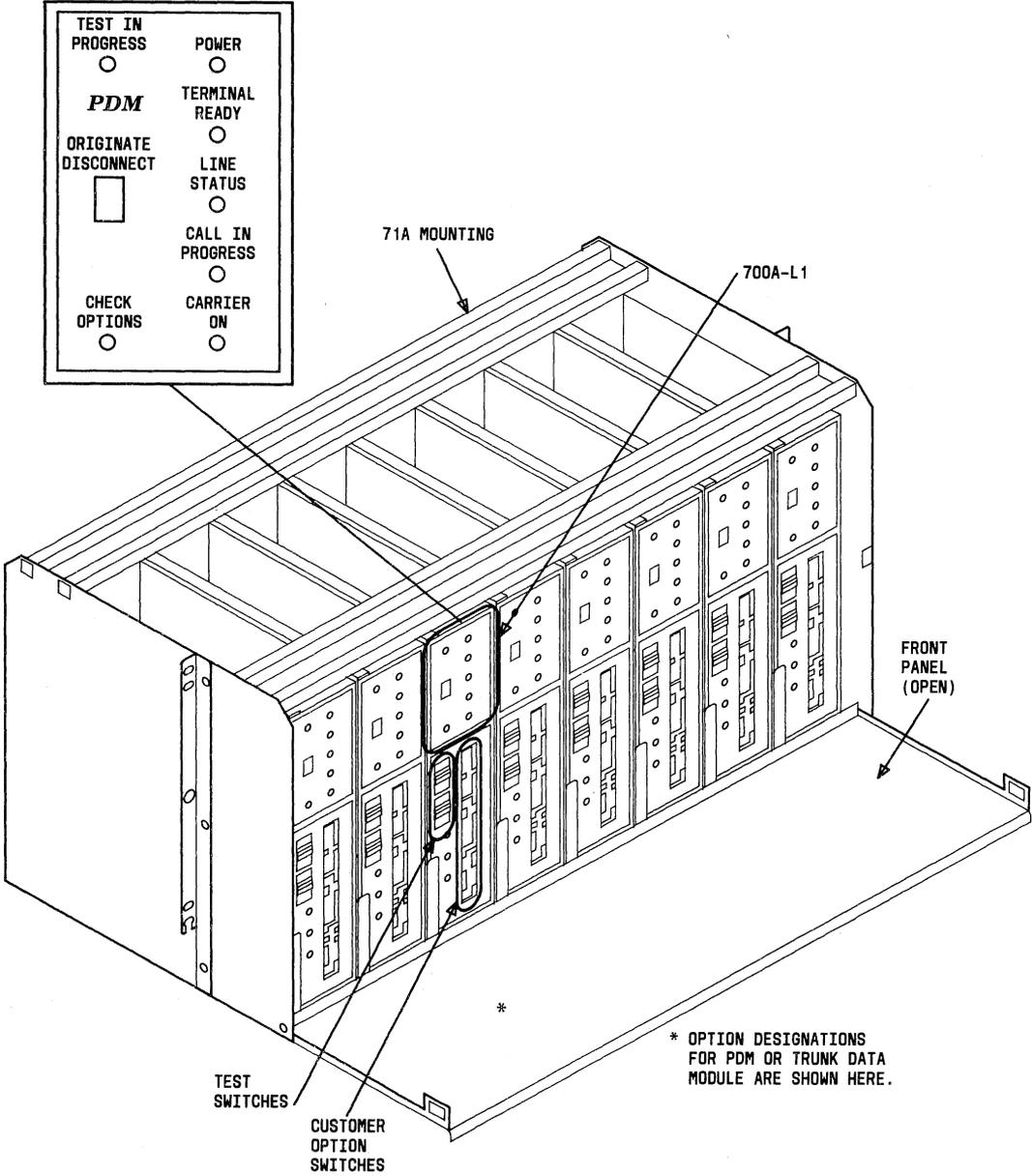
CUSTOMER
OPTION
SWITCHES
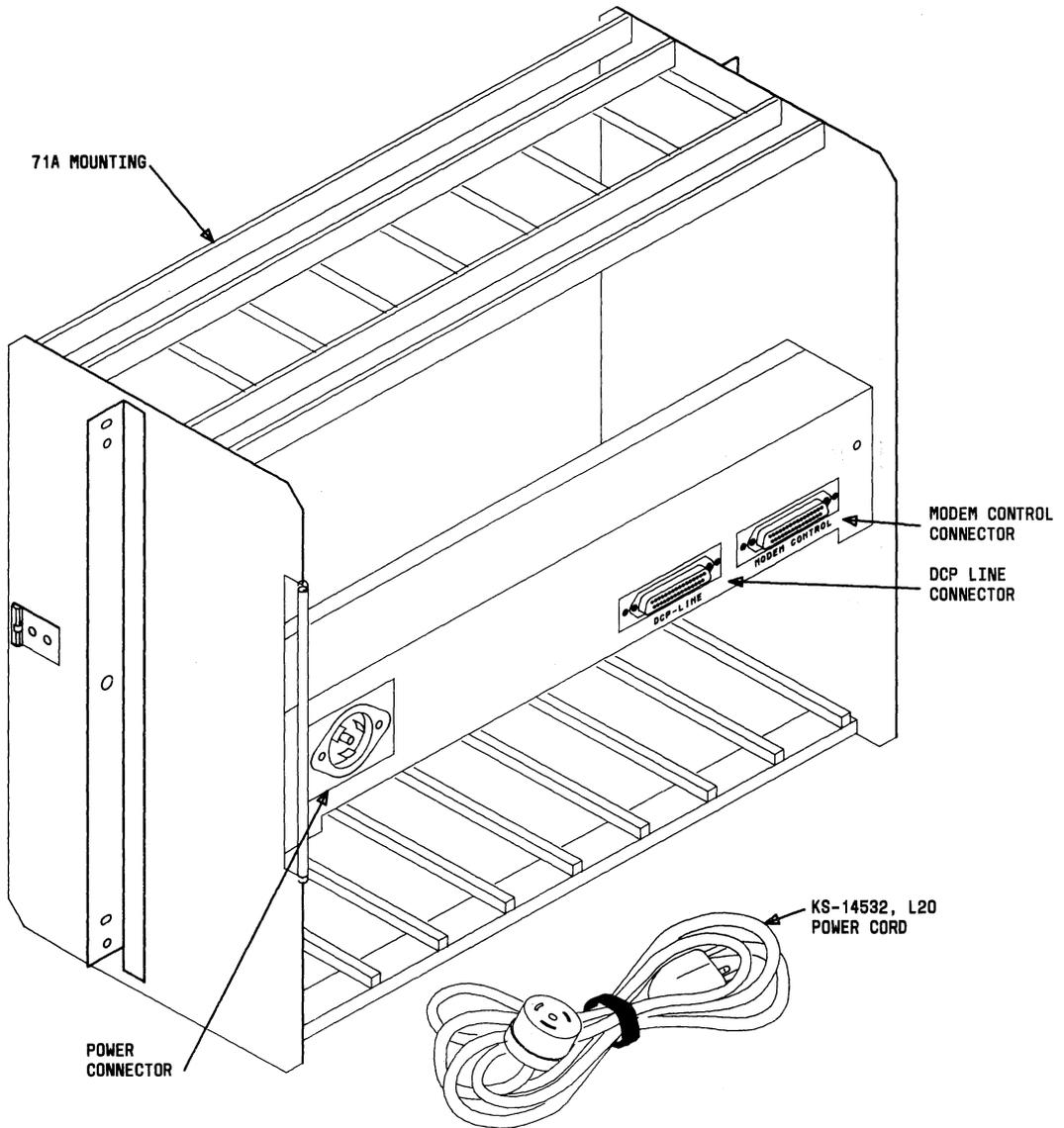
Fig. 7—71A Multiple Mounting With PDM Installed

Fig. 8—Rear View of 71A Multiple Mounting

TABLE C

**DIGITAL COMMUNICATION PROTOCOL LINE (DCP-LINE) CONNECTOR
ASSIGNMENTS FOR MULTIPLE MOUNTING**

| PIN NO. (J1)	LEAD DESIGNATIONS	PDM/TRUNK DATA MODULE LOCATION NO.	FUNCTIONS
27, 2	0D1, 0D2	1	TRANSMIT PAIR
28, 3	1D1, 1D2	1	RECEIVE PAIR
30, 5	0D1, 0D2	2	TRANSMIT PAIR
31, 6	1D1, 1D2	2	RECEIVE PAIR
33, 8	0D1, 0D2	3	TRANSMIT PAIR
34, 9	1D1, 1D2	3	RECEIVE PAIR
36, 11	0D1, 0D2	4	TRANSMIT PAIR
37, 12	1D1, 1D2	4	RECEIVE PAIR
39, 14	0D1, 0D2	5	TRANSMIT PAIR
40, 15	1D1, 1D2	5	RECEIVE PAIR
42, 17	0D1, 0D2	6	TRANSMIT PAIR
43, 18	1D1, 1D2	7	RECEIVE PAIR
45, 20	0D1, 0D2	7	TRANSMIT PAIR
46, 21	1D1, 1D2	7	RECEIVE PAIR
48, 23	0D1, 0D2	8	TRANSMIT PAIR
49, 24	1D1, 1D2	8	RECEIVE PAIR
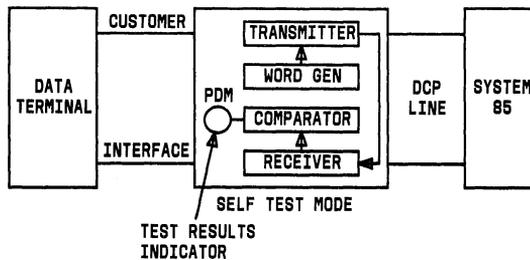
Fig. 9—Self-Test Diagram
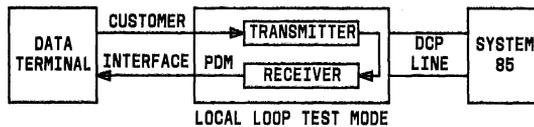
Fig. 10—Local Loop Test Diagram

REMOTE LOOP TEST MODE

Fig. 11—Remote Loop Test Diagram

REMOTE LOOP/SELF TEST MODE

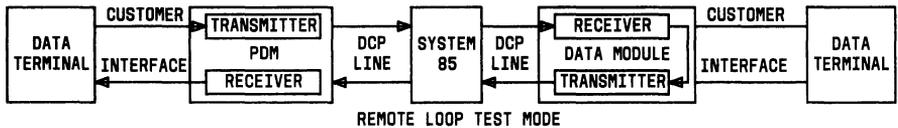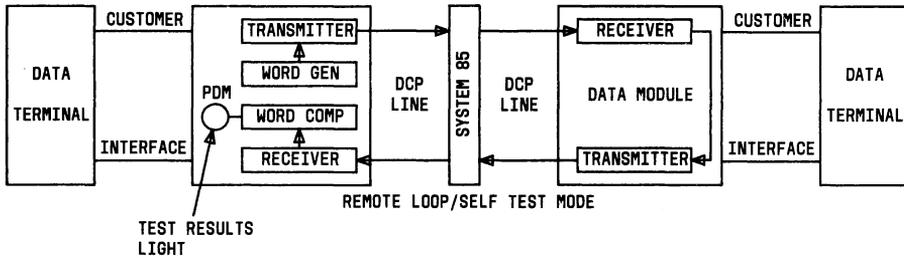TEST RESULTS LIGHT

Fig. 12—Remote Loop/Self-Test Diagram

the remote module. The local module, upon receiving the bit sequence, checks it with the transmitted bit sequence for error. The TEST RSLT (TEST RESULT) indicator flashes every time a bit error is detected and stays steadily ON if no bit error is detected.

3.17 During termination of the REMOTE LOOP/ SELF TEST, the SELF TEST switch is moved to the OFF position before the REM LOOP switch is palced in the OFF position. Placing the REM LOOP switch in the OFF position before the SELF TEST switch is placed in the OFF position, will terminate a call.

OPERATION

3.18 Calls can be originated from a PDM by using a computer port or using a voice terminal (telephone) or without a voice terminal but by using the keyboard dial of the DTE (ASCII dialing) feature. If the customer equipment supplies asynchronous formatted dialing information, keyboard dialing is performed with synchronous equipment capable of generating 10-bit start-stop ASCII characters which are clocked synchronously.

A. Call Origination

3.19 For call origination from a keyboard:

(1) Turn **on** the terminal power.

(2) The TERMINAL READY indicator should be **on.**

(3) Ensure that the KYBD (keyboard) switch on the faceplate of the PDM module is **on.**

(4) Make sure that the PDM options are compatible with the attached DTE and the remote module being called.

(5) Go off-hook by either:

   (a) Pressing the momentary contact ORIGI-NATE/DISCONNECT pushbutton switch

   (b) Sending a BREAK signal (ten or more space bits) to the EIA send data circuit (BA) lead from the keyboard BREAK key.

(6) The word DIAL: appears on the customer display screen on a line with a space following it and the LINE STATUS indicator comes **on.**

(7) Type the extension number desired and end with a carriage return using the keyboard terminal.

(8) The word RINGING appears on the customer display screen if the called data module is in

the on-hook state and when the ringback message is received from the System 85.

(9) The word ANSWERED is displayed on the customer display screen.

(10) During handshaking, the CARRIER ON indicator turns OFF.

(11) If the two modules are compatibly optioned, the handshaking is completed (approximately 50 ms) and the CALL IN PROGRESS and CARRIER ON indicators come **on** and data transmission may begin.

> **Note:** If the data modules are in synchronous mode, the CHECK OPTIONS and DISCONNECTED indicators are not displayed on the screen.

(12) If the two modules are not compatibly optioned (ie, sync-async, no common speed, etc), the CHECK OPTIONS message will be displayed on the customer display screen followed by DISCONNECTED; then the bell rings. At this point the LINE STATUS indicator turns OFF.

(13) If the distant data module is busy, the screen will display BUSY followed by DISCONNECTED, the bell rings, and the LINE STATUS indicator turns OFF.

(14) If during the call origination, a call termination is necessary, press the ORIGINATE/DISCONNECT switch or send a BREAK signal using the keyboard to the data module.

3.20 To originate a data call from a voice terminal:

(1) Turn on the DTE.

(2) Be sure that the TERMINAL READY light on the PDM is on.

(3) Be sure that the PDM is compatible with the module being called.

(4) Pick up the handset from the voice terminal and dial the extension number of the remote module. If the remote module is not busy, ringing tone will be heard on the handset.

(5) Listen for a distinctive tone after the ringing is heard in the handset. When this tone is heard, transfer the call to the PDM by pressing the DATA button on the voice terminal. The CALL IN PROGRESS and the CARRIER ON lights come on to indicate successful handshaking. Data transmission may begin at this time.

- If the remote module is busy, a busy tone will be heard.

- If the remote data module and PDM have incompatible options, the CHECK OPTIONS light will come on. The LINE STATUS light will go off.

3.21 To originate a data call by computer dialing : Computer system software can be created that will allow computer system emulation of keyboard dialing through a computer port. The key codes and call progress responses are identical to those detailed in the keyboard dialing section.

B. Call Answering

3.22 Incoming calls can be optioned to be answered either with AANS (automatic answer) or by KYBD (keyboard dialing) options.

3.23 With the AANS option and the TERMINAL READY indicator ON, the call will be answered automatically and handshaking starts. The CARRIER ON indicator will be OFF and after successful handshaking, the CARRIER ON and the CALL IN PROGRESS indicators will come ON and an INCOMING CALL-ANSWERED will be displayed on the customer's display screen.

3.24 With the KYBD option and the TERMINAL READY indicator **on**, the INCOMING CALL—will be displayed on the customer display screen and the DTE bell will ring. The call may be answered either by pressing the momentary contact ORIGINATE/DISCONNECT switch on the PDM or by depressing the BREAK KEY on the DTE and the message INCOMING CALL—ANSWERED will be displayed on the terminal screen. If the KYBD option is disabled (KYBD switch in OFF position), no message will be sent to the customer terminal display.

3.25 If the two modules are not compatibly optioned, the CHECK OPTIONS message will be displayed on the screen followed by DISCONNECTED; then the bell rings.

C. Call Termination

3.26 If a call termination is necessary after a call has been established, any one of the following will terminate the call:

(a) Turning the EIA data terminal ready (CD) lead from *on* to *off*.

(b) Pressing the ORIGINATE/DISCONNECT switch.

(c) Sending a 2-second BREAK or SPACE signal from customer keyboard, if the DISC switch (LONG SPACE DISCONNECT) is in the ON position, and in asynchronous mode.

(d) Not receiving an EIA update control message (loss of signal) from the remote data module for 4.5 seconds, if the SIGLS switch is in the ON position.

(e) Receiving a System 85 message DISCONNECT.

(f) Receiving of a System 85 message DESTRUCTIVE RESET.

(g) Initiating a LOCAL LOOPBACK TEST by operating the LOC LOOP switch.

(h) Initiating a SELF TEST with the LOC LOOP/REM LOOP switch in the OFF position.

4. CUSTOMER OPTIONS

4.01 Options are installed or removed by means of ON/OFF switches and by a screw-switch on the rear of the circuit pack (signal ground to frame ground connection). The rear cover needs to be opened or the circuit pack has to be taken out of the mounting to operate this screw-switch. It should normally be in the closed position. The customer options are provided on the right side of the faceplate (Fig. 2) of the PDM behind the front cover and are installed by the sliding switches. The front cover in the case of stand-alone mounting is removed by pulling the magnetically latched, front cover outward on the top edge, and rotating downward. In the case of multiple mounting, the front panel has to be lowered to gain access to the option switches.

4.02 The customer options are described as follows:

(a) *SPEED:* Seven speed switches are provided to select data rates of LOW, 300, 1200, 2400, 4800, 9600, and 19.2 kb/s. To establish a call, the speed selection on both ends of the transmission must be the same or have at least one common speed. The switch corresponding to the speed selected should be in the ON position. Once a call is established, any change in the speed switches is ignored.

(b) *HDX:* This switch when in the ON position selects half-duplex and when in the OFF position selects full-duplex operation.

(c) *SYNC:* This switch when in the ON position selects synchronous and when in the OFF position selects asynchronous operation.

(d) *INT:* This switch when in the ON position selects internal timing and when in the OFF position selects external timing for synchronous mode.

(e) *DISC:* This switch in the ON position and in asynchronous mode permits 2 seconds of space (on the EIA BA lead) from customer equipment to terminate a call. This allows keyboard call termination over the EIA interface.

(f) *KYBD:* This switch when in the ON position enables and when in the OFF position disables ASCII (keyboard) dialing from customer terminal equipment.

(g) *PRTY:* This switch enables the choice of parity in the ASCII dialing mode (KYBD ON). This switch in combination with 1/OD switch (explained next) determines the parity used by the PDM for call progress and test messages sent to the DTE.

(h) *1/OD:* This switch in conjunction with PRTY switch enables the odd/even or 0/1 parity in ASCII dialing mode. Refer to Table D.

(i) *DMLL:* In the ON position, this switch turns on data set ready (CC lead) during local loop test mode.

(j) *MKBY:* In the ON position, this switch makes PDM look busy in self-test and local loop mode. In make-busy/local loop mode, the PDM will send an off-hook message to the System 85, preventing incoming calls.

(k) *SIGLS:* This switch in the ON position forces call termination on breakdown of end-to-end

control communications. If the PDM does not receive an EIA update control message for 4.5 seconds, the call will be disconnected.

(l) **AANS:** In the ON position, this switch enables the automatic answer feature, and when in the OFF position, disables the automatic answer feature.

(m) **DL-HI:** In the ON position and in ASCII dialing mode (not in data mode) sets the highest data speed between 300 bps and 19.2 kb/s and in LL mode in the highest data rate between low and 19.2 kb/s.

(n) **CN25 (Mutually Exclusive With TM25):** In the ON position connects EIA CN to pin 25. The PDM goes into a make-busy/local loopback input mode which puts the PDM into local loopback with an off-hook message to System 85 to prevent an incoming call.

(o) **CN18:** In the ON position connects EIA CN circuit to pin 18. The module goes into a local loopback mode with an off-hook message to System 85 to prevent an incoming call.

(p) **RL21:** In the ON position connects EIA remote loop circuit to pin 21 to activate a remote loop test mode from the EIA interface.

(q) **CI12:** In the ON position connects EIA CA circuit to pin 12. When two data speeds are selected, this lead will indicate to the attached DTE which data speed is being used. Refer to Table E for a detailed description of this switch.

(r) **TM25 (Mutually Exclusive With CN25):** In the ON position connects EIA TM circuit to pin 25. The module goes into a test mode.

5. INSTALLATION

5.01 The 700A DSU should be located near the customer-provided equipment (CPE) because the interface cord provided by the customer must not exceed 50 feet in length to reduce stray capacitance and conform to EIA standards. To minimize inductive interference to data signals on the telephone (data) line, the line should not be carried in the same cable run as the cable between the DSU and the CPE or lines connected to teletypewriter services.

5.02 The maximum cable distance from the System 85 to the PDM location is limited to 4000 feet

TABLE D

PARITY SELECTION USING PRTY AND 1/0D SWITCH

PARITY	PRTY OPTION SETTING	0 EV/1 0D OPTION SETTING
Even Parity	ON	OFF
Odd Parity	ON	ON
Zero Parity	OFF	OFF
One Parity	OFF	ON

when 26-gauge conventional, twisted pair station cabling wire is used. The maximum distance limitation may be increased to 5000 feet if 24-gauge conventional, twisted pair station cabling is used.

A. Stand-Alone Mounting

5.03 The components required for installation of the PDM in a stand-alone mounting are a PDM circuit pack, a 70A stand-alone mounting, an M25B cord, and a D8W-87 cord (Fig. 13).

5.04 Proceed as follows:

(a) Verify that the screw option switch (Fig. 3) on the circuit pack is closed.

(b) Open the magnetically latched, hinged front cover of the mounting by pulling outward on the top-edge and rotating downward.

(c) Align the circuit pack with the extruded rails on the stand-alone mounting and slide the circuit pack into the stand-alone mounting until the latch handle (Fig. 2) on the circuit pack is flush with the front edge of the mounting.

(d) If the rear cover has been removed, replace the rear cover by hooking the bottom tabs on the mounting; rotate forward and gently depress the top edge of the rear cover to engage the tabs on the top edge.

(e) Connect the customer interface M25B cord to the customer interface connector (Fig. 13) on the PDM circuit pack.

TABLE E

PDM SPEED SELECTION

DATA MODE				
	NUMBER OF SPEED SWITCHES CLOSED (INCLUDING LOW)			
FUNCTION	**0**	**1**	**2**	**MORE THAN 2**
CI (input)	on/off	on/off	on/off	on/off
CH (output)	off	off	*	off
Speed	LOW	per sw	†	Highest Compatible
KEYBOARD DIAL MODE				
	NUMBER OF SPEED SWITCHES CLOSED (EXCLUDING LOW)			
FUNCTION	**0**	**1**	**2**	**MORE THAN 2**
CI (input)	on/off	on/off	on/off	on/off
CH (output)	off	off	on/off	off
Speed	‡	per sw	Hi/Lo	Hi/Lo
IDLE MODE W/O KYBD or LOCAL LOOPBACK				
	NUMBER OF SPEED SWITCHES CLOSED (INCLUDING LOW)			
FUNCTION	**0**	**1**	**2**	**MORE THAN 2**
CI (input)	on/off	on/off	on/off	on/off
CH (output)	off	off	on/off	off
Speed	LOW	per sw	Hi/Lo	Hi/Lo

* CH will be ON if higher speed is selected during handshake and OFF if lower speed is selected.

† If CI is ON when handshake starts the higher PDM optioned speed will be selected during handshake; otherwise, handshake will fail. If CI is OFF when handshake starts the lower PDM optioned speed will be selected; otherwise, handshake will fail.

‡ Keyboard dialing is not functional for LOW speeds.

(f) Connect the D8W-87 cord to the DCP modular jack connector (Fig. 13) on the PDM circuit pack.

(g) Connect the other end of the D8W-87 cord to the wall jack.

(h) Connect the loose end of the M25B cord to the data terminal.

(i) Connect the power cord of PDM (Fig. 13) to a 117 Vac outlet not controlled by a switch.

(j) Perform the SELF TEST by placing the SELF TEST switch on position marked SELF TEST. The TEST RESULT red indicator should be *on*.

(k) Press the ORIGINATE/DISCONNECT switch on the circuit pack. The LINE STATUS green indicator should go *on* and *off*, alternately each time the switch is pressed.

(l) Close the front cover. Rotate the cover upward until the magnetic latches engage.

(m) The installation is complete. If further tests are to be made, proceed as follows:

(1) Select the proper options using the option switches on the PDM to made it compatible with the data entry terminal and the remote module.

(2) When performing the LOCAL LOOP test, REMOTE LOOP test or REMOTE LOOP/SELF TEST, follow the procedures explained in Part 3, Test Mode.

B. Multiple Mounting

5.05 The components required for installation of the PDM in a multiple mounting are PDM circuit packs, a 71A multiple mounting, one M25B cord for each circuit pack, and one B25A cord.

5.06 Proceed as follows:

(a) Verify that the screw option switch (Fig. 3) on each circuit pack is closed.

(b) Open the mechanically latched, hinged front panel of the mounting.

(c) Align the circuit packs with the extruded rails on the mounting and slide the circuit pack into

the mounting until the latch on the circuit pack is flush with the front edge of the mounting.

(d) Connect the customer interface M25B cords to the customer interface connector on the PDM circuit packs.

(e) Connect the loose ends of the M25B cords to the data entry terminal.

(f) Connect the B25A cord to the DCP-LINE connector (Fig. 8) of multiple mounting per Table C.

(g) Connect the other end of B25A cord to the DCP line jack.

(h) Connect the power cord of the multiple mounting to the twist-lock connector on the multiple mounting.

(i) Connect the 3-prong connector of the power cord to a 117 Vac outlet, not controlled by a switch.

(j) Perform the SELF TEST by placing the SELF TEST switch on position marked SELF TEST. The TEST RESULT red indicator should be *on*.

(k) Press the ORIGINATE/DISCONNECT switch on the circuit pack. The LINE STATUS green indicator should go *on* and *off* alternately each time the switch is pressed.

(l) Close the front panel and rotate upward until the mechanical latches engage.

(m) The installation is complete. If further tests are to be made, proceed as follows:

(1) Select the proper options using the option switches on each PDM to make it compatible with the data entry terminal and the remote module.

(2) When performing the LOCAL LOOP test, REMOTE LOOP test or REMOTE LOOP/SELF TEST, follow the procedures explained in Part 3, Test Mode.

6. MAINTENANCE

6.01 All PDM circuit packs and mountings (stand-alone or multiple) when removed from service

KS-14532, L14
POWER CORD
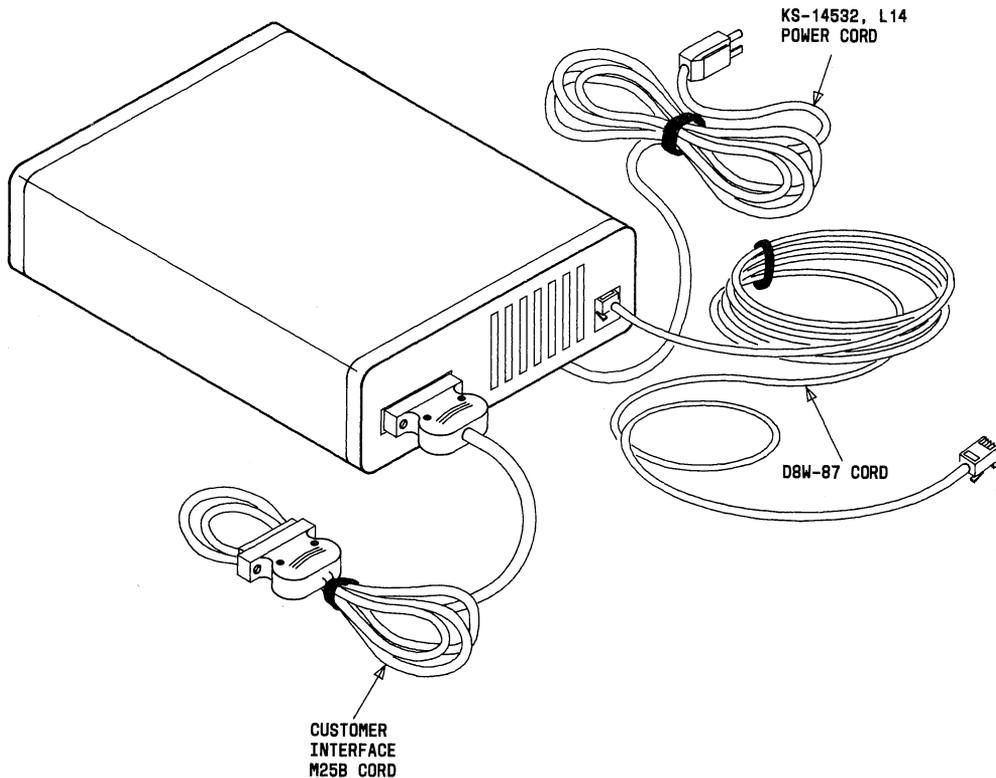
D8W-87 CORD

CUSTOMER
INTERFACE
M25B CORD

Fig. 13—70A Stand-Alone Mounting With Customer Interface Cord and D8W-87 Cord

for maintenance or end of location life should be returned to the service center in the following protective packaging carton kits:

- PDM Circuit Pack—Kit A

- Stand-Alone Mounting—Kit B

- Multiple Mounting—Kit C.

6.02 A tag describing the nature of the trouble should be completed and placed inside the carton before shipping.

6.03 The PDM does not require routine maintenance. Trouble isolated to a PDM circuit pack

(L1) should be replaced. The circuit pack and the mounting (L1/2) will not be changed unless the trouble cannot be corrected by changing the circuit pack. No attempt should be made to repair the data module in the field.

6.04 Maintenance capabilities of the PDM modules are provided by the System 85 and include System 85 surveillance, System 85 information display, and directed testing.

6.05 *SURVEILLANCE:* The System 85 routinely monitors the test results of the PDM modules self tests. The PDM does the self test every 5 minutes when in the idling condition except that the data message sequence part of the test is done

only once. No indication of this test is available to the customer. The System 85 also records any abnormal S-channel activity, call origination handshake failures, high current conditions on a DCP link, lack of PDM module response to periodic (6-second interval) S-channel messages, and loss of DCP communication synchronization.

6.06 *INFORMATION DISPLAY:* The System 85 can retrieve from the PDM module and display locally to a Maintenance Administration Access Panel (MAAP) terminal or remotely to a Remote Maintenance Administration and Traffic System (RMATS) to display the following information:

- Identifies data module type and firmware vintage

- Results of most recent periodic data module self test

- Present setting of customer option switches

- State of the customer EIA control interface leads.

6.07 *DIRECTED TESTING:* The PBX through its system maintenance interface could test the DCP link and the data PDM module. The test capabilities include:

- Nondestructive verification of the S-channel communication

- Destructive DCP loopback using the data module DCP link loopback feature to test I-channel data transmission

- Destructive SELF TEST of PDM.

7. REFERENCES

7.01 Additional information concerning the PDM and System 85 is contained in the following Bell System Practices:

SECTION	TITLE
555-100-104	System 85 Installation Manual
590-102-170	70A Data Mounting—Identification
590-102-171	71A Data Mounting—Identification
590-302-100	701A Data Service Unit—Description, Operation, Installation, and Maintenance—Digital Terminal Data Module—DIMENSION® AIS*/System 85
590-303-100	700B-L1 Data Service Unit—Description, Operation, Installation, and Maintenance—Trunk Data Module —DIMENSION® AIS*/ System 85