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RM16M Universal Data Shelf

RM16M ACV
Universal Data Shelf

Installation and Operation

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Illustrations
RM16M ACV Universal Data Shelf

Illustrations (continued)

Figure

Tables
RM16M ACV Universal Data Shelf

Table

Chapter 1 Introduction

GENERAL

The UDS RM16M Universal Data Shelf™ is a multipurpose unit constructed of heavy gauge steel, plated for corrosion resistance, and meets all the requirements of EIA Standard EIA-310-C (Figure 1-1). The unit comes equipped with a removable power supply that plugs into a standard wall outlet. A variety of backplanes is available to satisfy different communications and DTE interfaces. The shelf can accept up to 16 standard modem, multiplexer, DDS, or auxiliary function plug-in cards.

Plug-In Cards

The plug-in printed circuit (pc) cards are accessible from the front through the hinged front panel. This allows cards to be installed or replaced from the front of the shelf without changes in wiring or cables.

Each pc card has Light Emitting Diode (LED) indicators that can be viewed through the transparent front panel to allow continuous monitoring of the operating conditions of the EIA-232 interface. With the front panel lowered, the modem controls are accessible on the front edge bracket of each modem card.

Some pc cards have a liquid crystal display (LCD) and front panel pushbuttons used to show status and select options.

The pc cards used in the RM16M shelf are the same pc cards installed in the individual standalone housings.

Power Module

The power supply module is a plug-in unit consisting of two transformers, two circuit breakers, and a power lamp. The power module converts 115 Vac input (230 Vac input is an option) to 30 and 10 Vac output for distribution to individual cards. The cards have rectifier assemblies, filters, and regulators for converting the 30 Vac to plus and minus 12 volts dc and the 10 Vac to +5 volts dc.

Backplane

The rear panel backplane contains connectors for interfacing to the Data Terminal Equipment (DTE) and to the telephone line. The DTE connector can be:

- 25-pin connector (standard)
- 50-pin mass termination connector (option)
- wire-wrap pins (option)

The telephone line connector can be:

- 8-pin modular jack (standard)
- 50-pin termination connector which serves eight modems (option)
- Wire-wrap pins (option - not available on the dial backup modem backplane)

A recessed power bus distributes stepped down voltages to the individual pc cards.

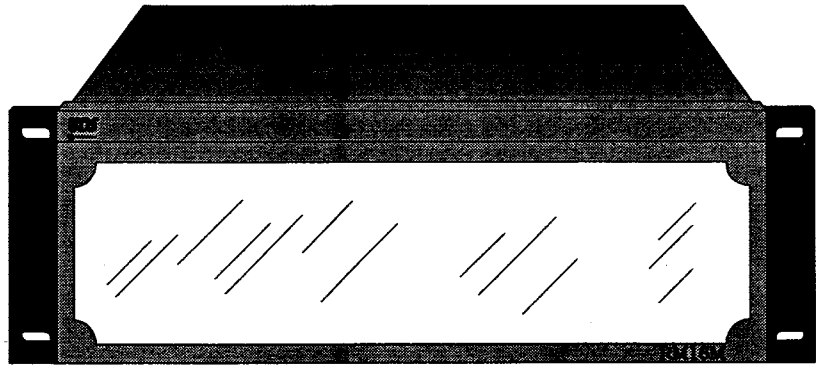


Figure 1-1
RM16M Universal Data Shelf

DESCRIPTION

The shelf is a self contained unit that holds 16 individual pc cards and a power supply module. The shelf is 7.0 inches high, 10.75 inches deep and mounts in a standard 19-inch rack (Figure 1-2).

The location and orientation of the plug-in power module and pc cards are shown in Figure 1-3. The front panel is hinged to allow removal of pc cards, enabling them to be installed or replaced from the front of the unit without disturbing the DTE and communications line connection at the rear of the unit. The power module is removed from the front but access to the rear of the shelf is necessary to loosen the power module hold down screw and unplug the power cord.

INTERFACE CONNECTORS

Interface connectors for the cards are located on the back of the rear panel. The DTE connectors are 25-pin receptacles and the Telco connectors are either 8-pin jacks, 50-pin mass termination receptacles, or wire-wrap pins.

Standard

Figure 1-4 is a shelf with standard modular jacks for the TELCO connectors and standard 25-pin connectors for the DTE.

Mass Termination

Figure 1-5 is a shelf with a 50-pin mass termination receptacles and wire-wrap pins for the TELCO connections. The EIA-232 connectors are standard 25-pin receptacles.

Segmented

Figure 1-6 is a segmented rear panel with 16 individual panels, one for each modem slot. The segments will vary according to the type of card in the shelf slot.

Dial Backup

Figures 1-7 and 1-8 are rear panels for shelves containing modems with dial backup capability. The TELCO connector is connected to the dial-up lines and the TELSET/LL connector is for leased lines. Wire-wrap pins are not available on this backplane.

To connect into the dial-up network, a 6-pin or 8-pin standard telephone cable is required for each modem. Standard jack arrangements must be provided by the telephone company.

LocalView

Figure 1-9 is a rear panel of the LocalView system. LocalView allows devices in the shelf to be controlled or interrogated through shared input/output devices.

The system consists of a controller which resides in slot 16 of the shelf and a modified backplane which utilizes unused pins on the power connector to pass data, address, and control information between controller and device cards. LocalView allows a single controller to address up to five shelves. With these

shelves fully populated, a total of 79 device cards can be addressed either from the LCD on the front of the controller or through an RS232 port on the rear of the controller. For detailed information concerning LocalView, refer to the LocalView controller card manual.

Jack Identification

The jacks are identified by the telephone company Universal Service Ordering Code (USOC) and must be specified when ordering standard jack arrangements from the company.

The various jack arrangements ensure that the signal level received at the telephone company central office does not exceed -12 dBm. The shelf has been registered with the FCC per the requirements of Part 68 of the FCC Rules for:

1. Programmable Mode - The local telephone company will install a resistor internal to the jack (USOC RJ45S or RJ41S).

2. Permissive Mode - The individual modem cards are preprogrammed for a maximum transmit level of -9 dBm (USOC RJ11C or RJ16X).

CARD TYPES

The shelf accepts various types of dial-up, leased line, and DDS modems as well as multiplexers, dial backup units, and automatic calling units. The different types of cards may be mixed within the enclosure in any manner desired. Each has been independently tested and meets Part 68, FCC rules and regulations.

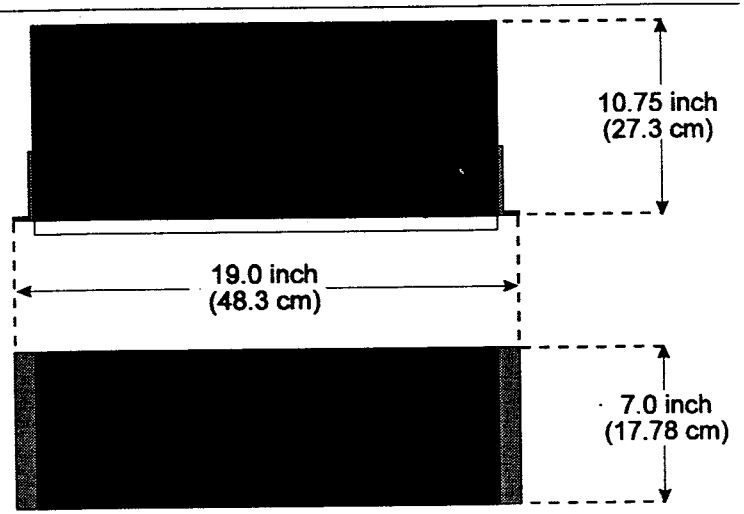


Figure 1-2
Mounting Dimensions

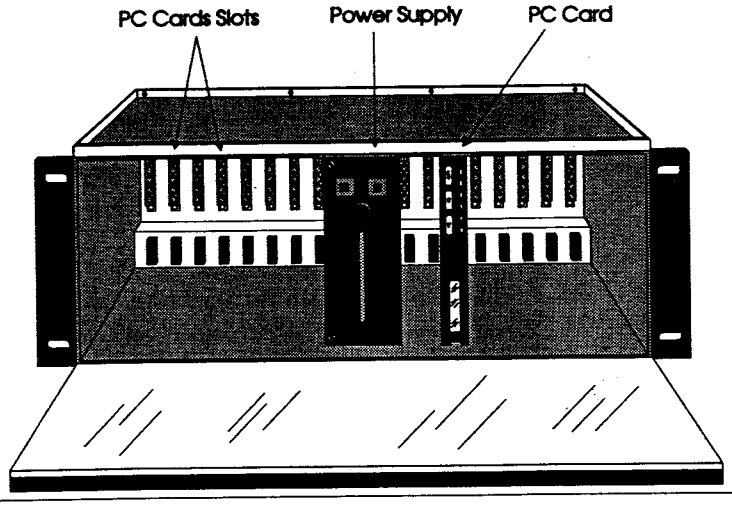


Figure 1-3
Front Panel Lowered

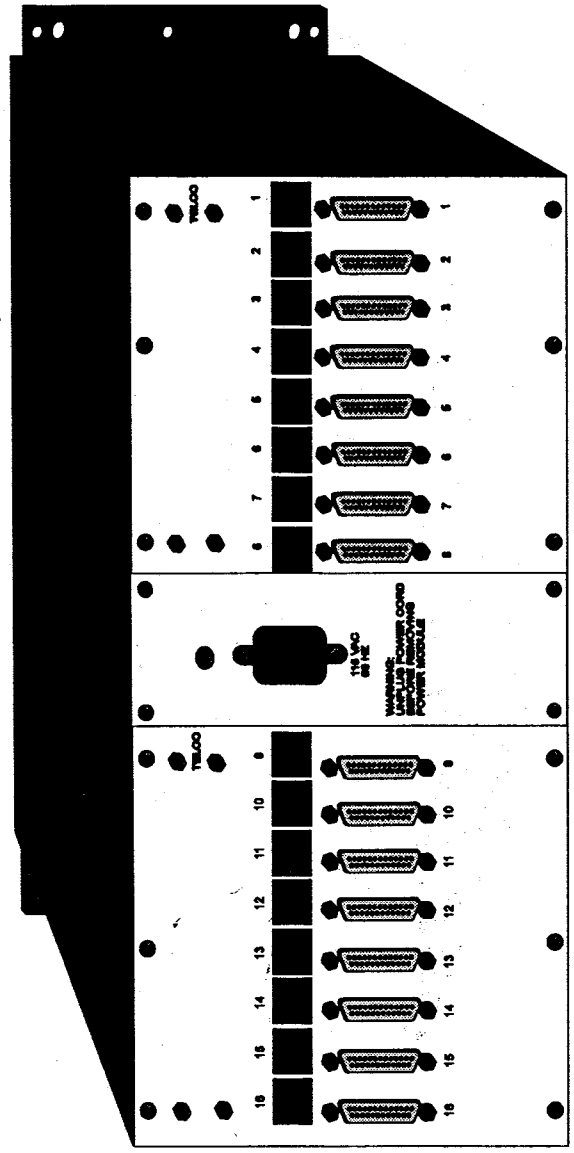


Figure 1-4
Rear Panel - 25-Pin DTE Connectors and Modular Jack Telco Connectors

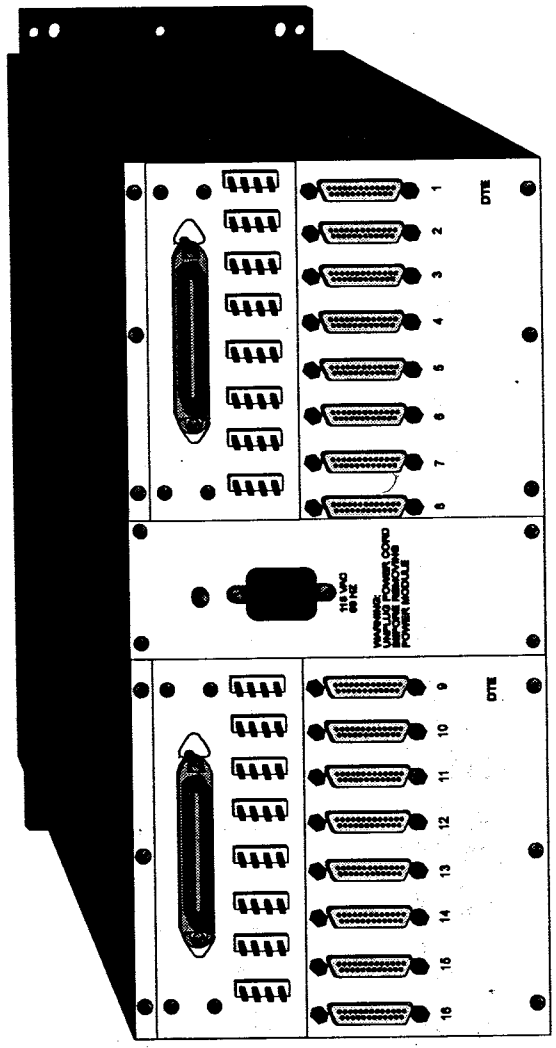


Figure 1-5
Rear Panel - 25-Pin DTE Connectors and 50-Pin Mass Termination Connectors

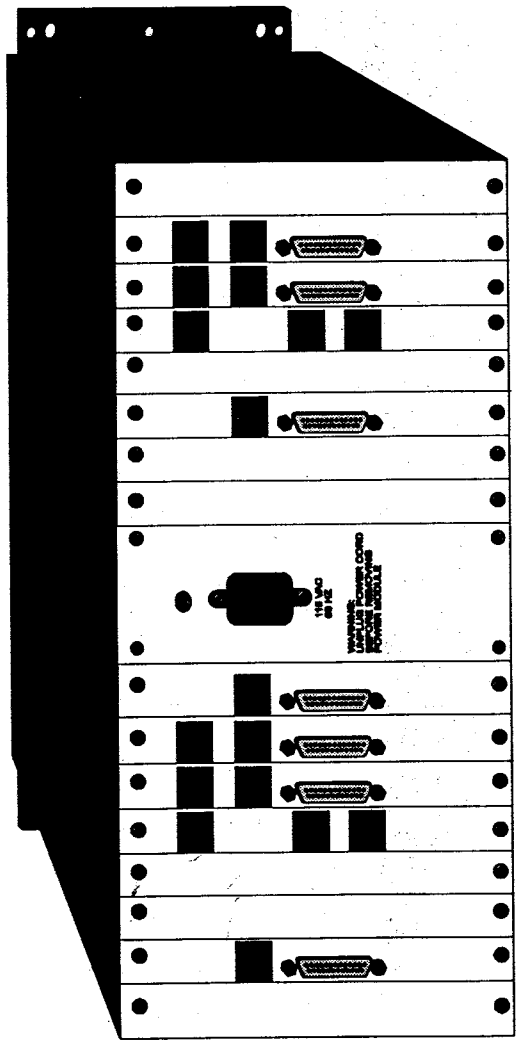


Figure 1-6
Segmented Rear Panels

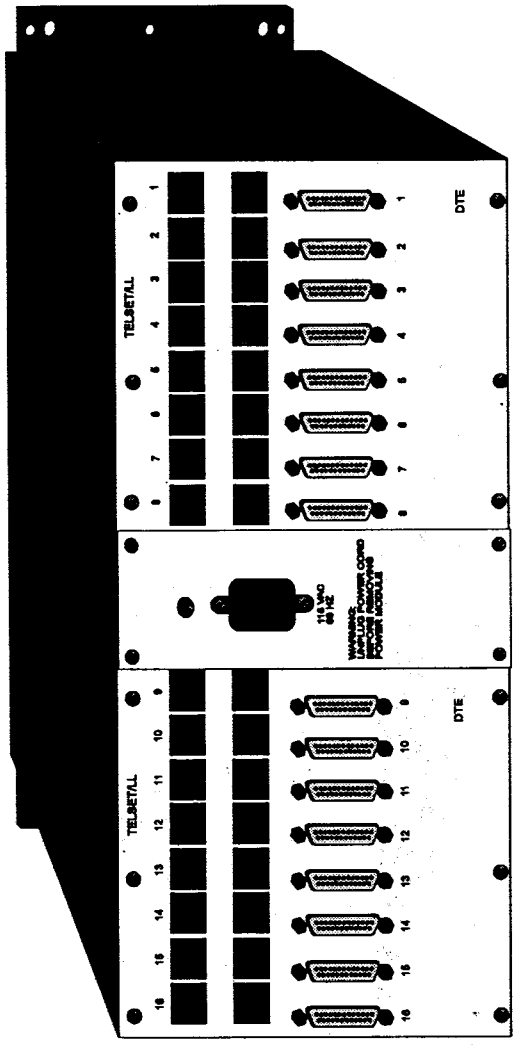


Figure 1-7
Dial Backup Rear Panel with Modular Jacks

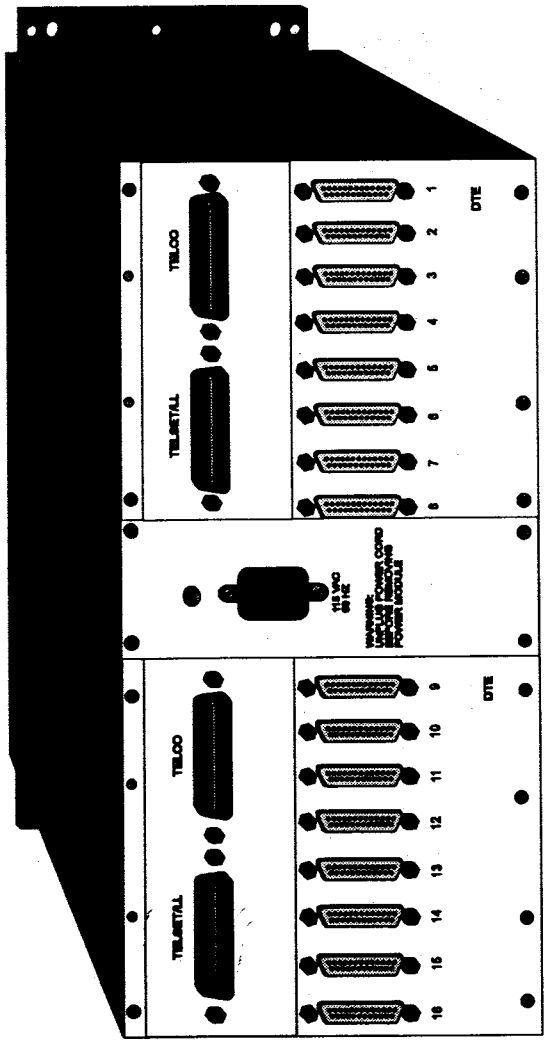


Figure 1-8
Dial Backup Rear Panel with Mass Termination

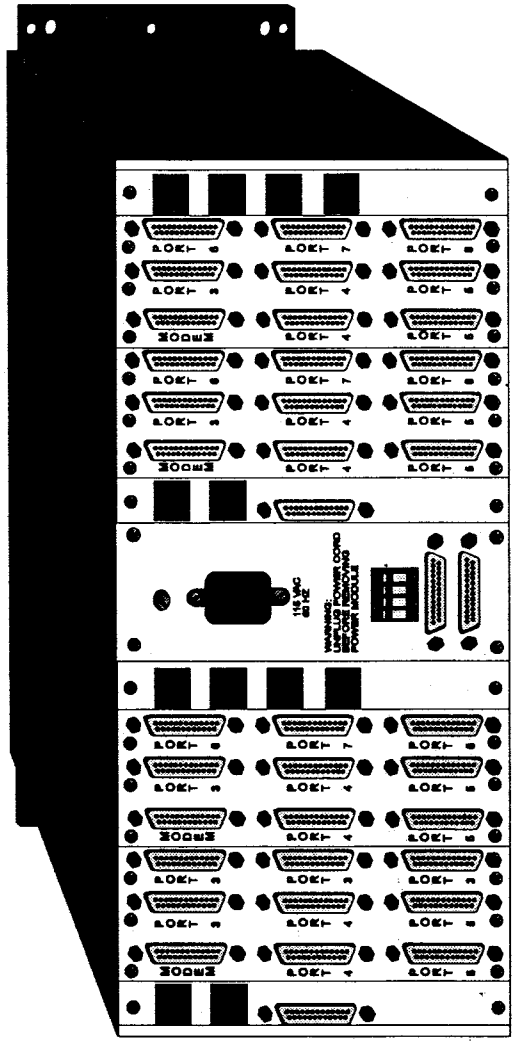


Figure 1-9
LocalView System Rear Panel

Chapter 2
Installation

GENERAL

This chapter provides the information required for the mechanical and electrical installation of the shelf.

RECEIPT INSPECTION

After unpacking the equipment, check the contents against the packing list. Inspect the equipment carefully for damage that may have occurred in shipment. If there is damage or material shortage, contact the shipping agent and UDS for advice and assistance. UDS suggests that the shipping container and packing material be retained for future shipment.

SITE PREPARATION

The shelf should be installed within 7 feet of a grounded ac outlet capable of furnishing 115 or 230 Vac, as required, and no farther than 50 feet from the associated data terminal.

The installation area should be clean, well-lighted, and free from extremes of temperature, humidity, appreciable shock, and vibration. Allow adequate clearance at the front of the shelf for operating and maintenance accessibility. Ensure at least 4 inches at the rear of the shelf for interface cable clearance and flow of cooling air.

Side and top clearances for rack-mounted equipment are as dictated by the rack-cabinet provisions but should allow a free flow of cooling air. Mounting dimensions are shown in Figure 1-2.

INSTALLATION PROCEDURE

Service personnel should be familiar with the complete installation procedure before installing the shelf.

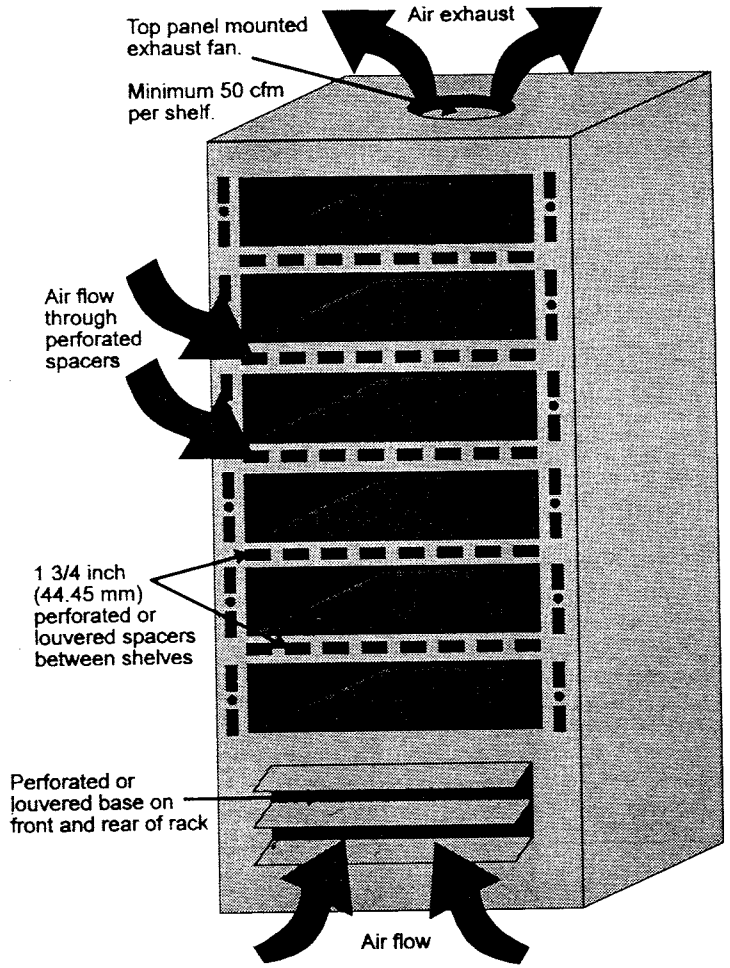
Tools/Equipment Required

No special tools or test equipment are required for installation.

MECHANICAL ASSEMBLY

The shelf mounts in standard 19-inch racks and requires 7 inches of vertical panel space. With a full complement of cards, the weight is approximately 50 pounds.

> **Caution** *To prevent damage to shelf components from overheating, clearances of at least 1 3/4 inch top and bottom should be maintained between mounted shelves. There should be adequate provision for circulation of cooling air and exhaust of warm air, such as air-intake louvers in the bottom panel of the rack-cabinet, and an adequate volume exhaust fan located in the top panel of the rack-cabinet (Figure 2-1).*



Note: This diagram is intended to show the location of the fan, grill, and perforated spacers. Cabinet size and number of shelves may vary according to customer requirements.

Figure 2-1
Shelf Cabinet

ELECTRICAL INSTALLATION

All shelf interface connections are located on the backplane.

Digital RS-232 Interface

The 16 EIA-232C or D digital input connectors are labeled and shown in Figure 2-2. These connectors are Cannon or Cinch 25-pin D series, as defined in EIA-232. The active pin connections are given in Tables 2-1 and 2-2. Note that some modems may not use all the functions listed.

The EIA-232 levels from the modem are as follows:

Received data mark: -5 to -15V
Received data space: +5 to +15V

Control signals OFF level: -5 to -15V
Control signals ON level: +5 to +15V

The expected levels on all inputs are:

Mark: -3 to -25V,
Space: +3 to +25V,

Controls OFF: -3 to -25V
Controls ON: +3 to +25V

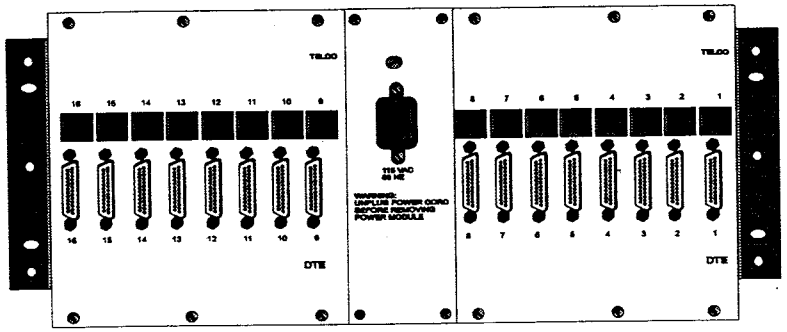


Figure 2-2
Interface Connections, Modular Jacks

Table 2-1
Digital Interface Signal Descriptions (232C)

Pin No.	EIA-232	CCITT	Signal Name	Description
1	AA	101	Protective Ground or Earth Ground	Chassis ground. Isolated from signal ground or common return (pin 7).
2	BA	103	Transmit Data	Serial digital data (to be modulated) from a data terminal or other digital data source.
3	BB	104	Received Data	Serial digital data at the output of the modem receiver. The data is accompanied by an internal data rate clock (pin 17) whose positive-going transitions occur on the data transition. (Synchronous modems only.)
4	CA	105	Request to Send	A positive level to the modem when data transmission is desired.
5	CB	106	Clear to Send	A positive level from the modem after receipt of Request to Send (pin 4) and when the modem is ready to transmit.
6	CC	107	Data Set Ready	A positive level from the modem when power is on and i is ready to operate.
7	AB	102	Signal Ground or Common Return	Common signal and dc power ground. Isolated from protective ground (pin 1).
8	CF	109	Received Line Signal Detector	A positive level from the modem indicating the presence of a receive signal (carrier detect).
9			+12 volts	+12 voltage reference
10			-12 volts	-12 voltage reference
11			Not used	
12	SCF		Sec. Rec'd Line Signal Detector	Carrier detect on a secondary channel.
13	SCB	142	Sec. Clear to Send	Clear to send on a secondary channel.

Table 2-1 Cont.
Digital Interface Signal Descriptions (232C)

Pin No.	EIA-232	CCITT	Signal Name	Description
14	SBA	141	Sec. Transmit Data	Transmitted data on a secondary channel.
15	DB		Transmit Clock (DCE)	A transit data clock output for use by an external data source. Positive clock transitions correspond to data transitions.
16	SSB		Sec. Rec'd Data	Received data on a secondary channel.
17	DD	115	Receive Clock	A receive data rate clock output for use by the external data sink. Positive clock transitions correspond to data transition.
18				Not used
19	SCA	140	Sec. Request to Send	Request to send on a secondary channel.
20	CD	108.2	Data Terminal Ready	This circuit is positive when the DTE is ready to originate or answer a call in dial up operation.
21	SQ	110	Signal Quality Indicator	Signals on this circuit are used to indicate the probability of an error in the received data. A positive level indicates good signal quality while a negative level indicates poor signal quality.
22	CE	125	Ring Indicator	In direct dial operation, this circuit is positive in response to an incoming ring signal.
23	CH	111	Data Rate Select	Supplies a data rate control to select primary or fallback data rate.
24	DA	113	External Transmit Clock	A serial data rate clock input from the data source. Positive clock transitions correspond to data transitions.
25				Not used

Table 2-2
Digital Interface Signal Descriptions (232D)

Pin No.	EIA-232D	CCITT	Signal Name	Description
1		101	Shield	No Connection
2	BA	103	Transmit Data	Serial digital data (to be modulated) from a data terminal or other digital data source. It must be accomplished by a transmit clock (pin 15) or by an external data rate clock (pin 24). Data transitions should occur on positive-going transitions at clock. (Synchronous modems only.)
3	BB	104	Received Data	Serial digital data at the output of the modem receiver. The data is accompanied by an internal data rate clock (pin 17) whose positive-going transitions occur on the data transition. (Synchronous modems only.)
4	CA	105	Request to Send	A positive level to the modem when data transmission is desired.
5	CB	106	Clear to Send	A positive level from the modem after receipt of Request to Send and when the modem is ready to transmit.
6	CC	107	Data Set Ready	A positive level from the modem when power is on and it is ready to operate. In dial-up operation, the modem must be off-hook to give a high DSR signal.
7	AB	102	Signal Ground or Common Return	Common signal and DC power ground.
8	CF	109	Received Line Signal Detector	A positive level from the modem indicating the presence of a receive signal (carrier detect).
9			+12 volts	+12 voltage reference
10			-12 volts	-12 voltage reference
11	CG	110	Signal Quality Indicator	Signals on this circuit are used to indicate the probability of an error in the receive data. A positive level indicates good signal quality while a negative level indicates poor signal quality.

Table 2-2 Cont.
Digital Interface Signal Descriptions (232D)

Pin No.	EIA-232D	CCITT	Signal Name	Description
12			Not used	
15		114	Transmit Clock (DCE)	A transmit data clock output for use by an external data source. Positive clock transitions correspond to data transitions
16			Not used	
17	DD	115	Receive Clock	A receive data rate clock output for use by the external data sink. Positive clock transitions correspond to data transition.
18		141	Local Loopback (loop 3) Control	A positive level will cause the modem to go into a local analog loop, when strap enabled.
20	CD	108.2	Data Terminal Ready	This circuit is positive when the DTE is ready to originate or answer a call in dial up operation. DTR must always be active (high) in 2-wire private line operation. Cycling DTR causes retraining.
21		140	Remote Digital Loopback	A positive level will cause a digital loopback at a remote modem when strap enabled.
22	CE	125	Ring Indicator	In direct dial operation, this circuit is positive in response to an incoming ring signal.
23	CH	111	Data Rate Select	Supplies a data rate control to select primary or fallback data rate.
24	DA	113	External Transmit Clock	A serial data rate clock input from the data source. Positive clock transitions correspond to data transitions.
25		142	Test Mode	Indicates when the modem is in a test mode.

Note: Tables 2-1 and 2-2 may vary depending on modem type. See manual pertaining to the particular pc card you are using.

Special Backplane

The special backplane for the digital interface is shown in Figure 2-3. Pin functions for the assembly are shown in Table 2-3. The special backplane is offered as an option and plugs into the existing EIA-232 25-pin connector. One special assembly serves two modems (plugs into two 25-pin EIA-232 connectors). The assembly consists of a 50-position miniature ribbon connector, two 25-pin male connectors and wire wrap pins for all connections on the 25-pin connectors.

Special Backplane Installation

When the digital interface backplane is required, installation is as follows:

- Determine which two EIA-232 connectors require the special backplane. Each backplane will convert two EIA-232 connectors to one 50-position connector or 50-wire wrap pins.
- Plug the two 25-pin male connectors into the two 25-pin receptacles.
- Insert the four screws (for J1 and J3 on the special backplane) and tighten.

P1 and P2 are 25-position terminal strips wtih 0.045" wire wrap pins.

J2 is a 50-position miniature jack, AMP P/N 552118-1 with bent bail assembly, P/N 552562-2

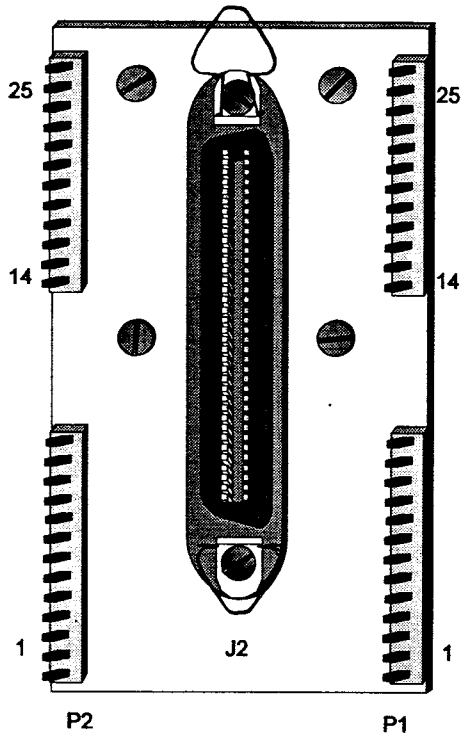


Figure 2-3
Digital Interface - Special Backplane

Table 2-3
Pin Functions of Digital Interface, Special Backplane

J2	J1	J3	Wire Wrap
1	1		P1 1
26	2		2
2	3		3
27	4		4
3	5		5
28	6		6
4	7		7
29	8		8
5	9		9
30	10		10
6	11		11
31	12		12
7	13		13
32	14		14
8	15		15
33	16		16
9	17		17
34	18		18
10	19		19
35	20		20
11	21		21
36	22		22
12	23		23
37	24		24
13	25		25
38		1	P2 1
14		2	2
39		3	3
15		4	4
40		5	5
16		6	6
41		7	7
17		8	8
42		9	9
18		10	10
43		11	11
19		12	12
44		13	13
20		14	14
45		15	15
21		16	16
46		17	17
22		18	18
47		19	19
23		20	20
48		21	21
24		22	22
49		23	23
25		24	24
50		25	25

TELEPHONE LINE INTERFACE

The shelf is FCC certified for connection to the dial-up Public Switched Telephone Network (PSTN).

Modular Jack Connectors

The standard rear panel contains sixteen 8-pin modular jacks to interface the modems to the telephone line. Each 8-pin jack has contacts that are used in various combinations depending on the type of service installed. Pin functions are described in Table 2-4.

Leased line modems have four contacts; namely a transmit pair and a receive pair.

Figures 2-4, 2-5 and 2-6 show typical telephone line cable configurations. Figures 2-7 and 2-8 show DDS cables.

Table 2-4
Modular Jack Pin Functions (Standard Modems)

Pin No.	Function	
1 2	R T	Xmit pair for DDS modems. Not used on other type modems.
3	R1/MI	Receive ring for leased line modems. Mode indicator for dial line modems.
4	R	Ring - dial or leased
5	T	Tip - dial or leased
6	T1/MIC	Receive tip for leased line modems. Mode indicator common for dial line modems.
7 8	PR PC	Programmable resistor connections for dial network modems.
7 8	T1 R1	Rec pair for DDS type modems.

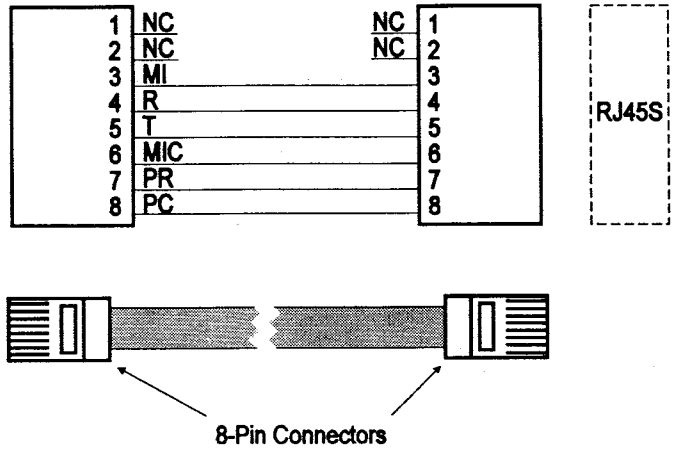


Figure 2-4
Programmable Cable 1020192

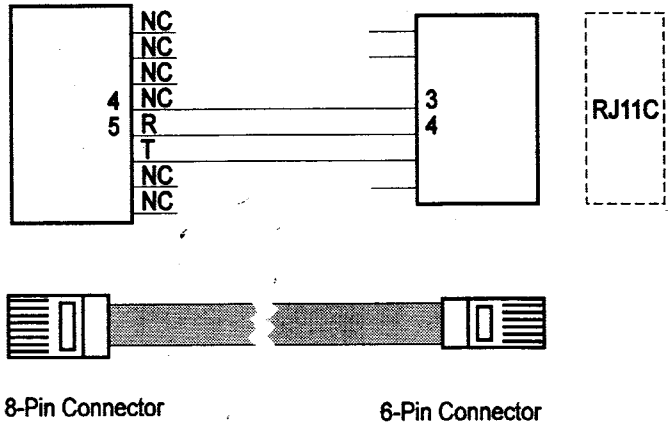


Figure 2-5
Permissive Cable 1020202

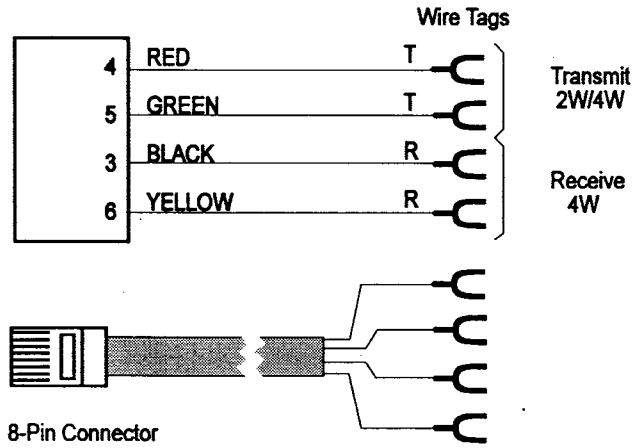


Figure 2-6
Leased Line Cable 1020636

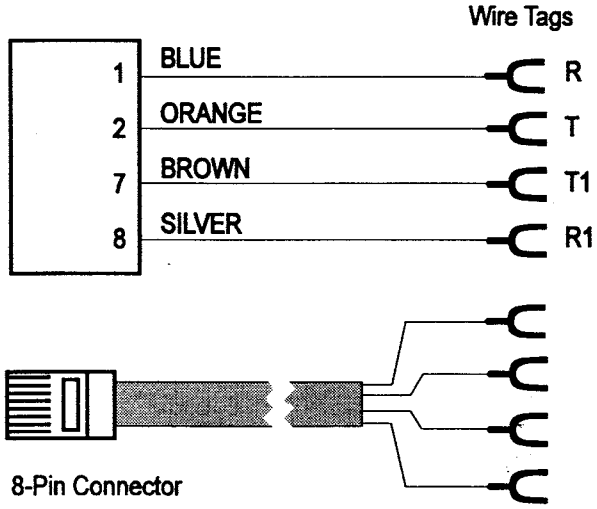


Figure 2-7
DDS Cable 1020569
Also used for dial backup type modems

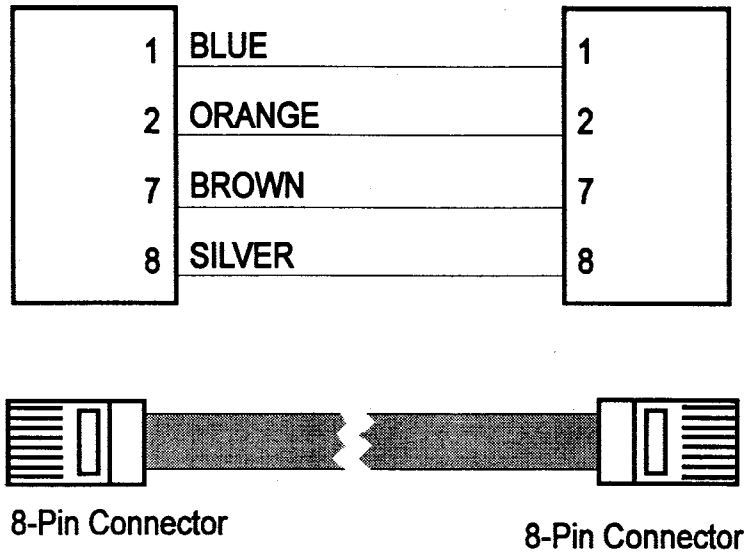


Figure 2-8
DDS Cable 1020575
Also used for dial backup type modems

Mass Termination Connector

As an option, a 50-pin mass termination connector may be specified for the TELCO connection. The adapter for conversion from modular connectors to mass termination also has wire-wrap pins for TELCO connection (Tables 2-5 and 2-6).

Table 2-5
Pin Functions for 50-Position Jack and Wire-Wrap Pins (Assembly 2962 and 0288)

J1	J2	P1	Pin Function	Resistor Designation	J1	J6	P5	Pin Function	Resistor Designation
1	4	1	R	R1	9	4	1	R	R5
26	5	2	T		34	5	2	T	
2	3	3	R1/MI		10	3	3	R1/MI	
27	6	4	T1/MIC		35	6	4	T1/MIC	
	J3	P2				J7	P6		
3	4	1	R	R2	11	4	1	R	R6
28	5	2	T		36	5	2	T	
4	3	3	R1/MI		12	3	3	R1/MI	
29	6	4	T1/MIC		37	6	4	T1/MIC	
	J4	P3				J8	P7		
5	4	1	R	R3	13	4	1	R	R7
30	5	2	T		38	5	2	T	
6	3	3	R1/MI		14	3	3	R1/MI	
31	6	4	T1/MIC		39	6	4	T1/MIC	
	J5	P4				J9	P8		
7	4	1	R	R4	15	4	1	R	R8
32	5	2	T		40	5	2	T	
8	3	3	R1/MI		16	3	3	R1/MI	
33	6	4	T1/MIC		41	6	4	T1/MIC	

CO compatible - Pins assigned in consecutive order for central office use.

J1 is a 50-position miniature jack, Amp. No. 552116-1 with bent bail assembly PN 552676-2.
J2 through J9 are 10-position connectors which interface to the modem boards.
P1 through P8 are 4-terminal wire-wrap connectors.
R1 through R8 (when used) are 1% resistors.

Not used for dial backup type modems.

Table 2-6
Pin Functions for 50-Position Jack and Wire-Wrap Pins

J1	J2	P1	Pin Function	J1	J6	P5	Pin Function
2	4	1	Line 1 Ring	14	4	1	Line 5 Ring
27	5	2	Line 1 Tip	39	5	2	Line 5 Tip
1	3	3	Receive Ring 1 or MI	13	3	3	Receive Ring 5 or MI
26	6	4	Receive Tip 1 or MIC	38	6	4	Receive Tip 5 or MIC
28	7		PR 1	40	7		PR 5
3	8		PC 1	15	8		PC 5
	J3	P2			J7	P6	
5	4	1	Line 2 Ring	17	4	1	Line 6 Ring
30	5	2	Line 2 Tip	42	5	2	Line 6 Tip
4	3	3	Receive Ring 2 or MI	16	3	3	Receive Ring 6 or MI
29	6	4	Receive Tip 2 or MIC	41	6	4	Receive Tip 6 or MIC
31	7		PR 2	43	7		PR 6
6	8		PC 2	18	8		PC 6
	J4	P3			J8	P7	
8	4	1	Line 3 Ring	20	4	1	Line 7 Ring
33	5	2	Line 3 Tip	45	5	2	Line 7 Tip
7	3	3	Receive Ring 3 or MI	19	3	3	Receive Ring 7 or MI
32	6	4	Receive Tip 3 or MIC	44	6	4	Receive Tip 7 or MIC
34	7		PR 3	46	7		PR 7
9	8		PC 3	21	8		PC 7
	J5	P4			J9	P8	
11	4	1	Line 4 Ring	23	4	1	Line 8 Ring
36	5	2	Line 4 Tip	48	5	2	Line 8 Tip
10	3	3	Receive Ring 4 or MI	22	3	3	Receive Ring 8 or MI
35	6	4	Receive Tip 4 or MIC	47	6	4	Receive Tip 8 or MIC
37	7		PR 4	49	7		PR 8
12	8		PC 4	24	8		PC 8

Pins assigned for RJ27X data jack compatibility
For dial or leased line modems (not used for dial backup type modems.)

Dial Backup Connections

Two special backplanes are available for use with dial backup modems. These backplanes provide either modular or mass termination jacks for both dial-up and leased line telephone line connections. See Figures 1-7 and 1-8.

Modems with dial backup capability have an option that allows them to switch to a dial-up line if the leased line fails. For this reason both the TELSET/LL and TELCO connections must be made. If the option will not be used, connect the modem to the appropriate service, either leased line or dial-up.

If standard modems (no dial backup capability) are installed they are limited to connection to the TELCO only.

Mass termination pin functions for the dial backup backplane are shown in Table 2-7. Modular jack pin functions are shown in Table 2-8. Wire wrap pins are not available.

Note: *TELCO jack pin functions are identical for both standard and dial backup modems.*

DTE connectors are the same as for standard modems.

Table 2-7
Dial Backup Mass Termination (50-Pin Receptacle) Pin Functions

Telco Connector		Telset/LL Connector		Telco Connector		Telset/LL Connector	
Pin	**Function**	**Pin**	**Function**	**Pin**	**Function**	**Pin**	**Function**
1	Ring 1	1	Xmit Ring 1	9	Ring 5	9	Xmit Ring 5
26	Tip 1	26	Xmit Tip 1	34	Tip 5	34	Xmit Tip 5
2	MI 1	2	Rec Ring 1	10	MI 5	10	Rec Ring 5
27	MIC 1	27	Rec Tip 1	35	MIC 5	35	Rec Tip 5
3	Ring 2	3	Xmit Ring 2	11	Ring 6	11	Ring 6
28	Tip 2	28	Xmit Tip 2	36	Tip 6	36	Tip 6
4	MI 2	4	Rec Ring 2	12	MI 6	12	MI 6
29	MIC 2	29	Rec Tip 2	37	MIC 6	37	MIC 6
5	Ring 3	5	Xmit Ring 3	13	Ring 7	13	Ring 7
30	Tip 3	30	Xmit Tip 3	38	Tip 7	38	Tip 7
6	MI 3	6	Rec Ring 3	14	MI 7	14	MI 7
31	MIC 3	31	Rec Tip 3	39	MIC 7	39	MIC 7
7	Ring 4	7	Xmit Ring 4	15	Ring 8	15	Xmit Ring 8
32	Tip4	32	Xmit Tip 4	40	Tip 8	40	Tip 8
8	MI 4	8	Rec Ring 4	16	MI 8	16	MI 8
33	MIC 4	33	Rec Tip 4	41	MIC 8	41	Rec Tip 8

Table 2-8
Dial Backup Modular Jack Pin Functions

Telco Jack			Telset/LL Jack	
Pin	**Function**		**Pin**	**Function**
1	R	Xmit pair for DDS modems. Not used on other type modems.	1	Xmit pair (Dial backup modems only)
2	T		2	
3	R1/ MI	Receive ring for leased line modems. Mode indicator for dial-up modems.	3	Not used
4	R	Ring - dial or leased	4	Not used
5	T	Tip - dial or leased	5	Not used
6	T1/ MIC	Receive tip for leased line modems. Mode indicator common for dial-up modems	6	Not used
7	PR	Programmable resistor connections for dial network modems.	7	Rec pair (Dial backup modems only)
8	PC		8	
7	T1	Rec pair for DDS type modems.		
8	R1			

POWER MODULE INSTALLATION/ REMOVAL

The power module consists of two transformers, two circuit breakers, power light, interface connector, and either a 115 or 230 Vac connector. The power supply modules should be installed or replaced by personnel familiar with the following procedure:

- Installation

  ☐ Lower hinged front panel.

  ☐ Position the module in the guide strips and slide into housing.

  ☐ Close the front panel.

  ☐ Tighten holding screw on rear of housing.

  ☐ Connect ac power cord to ac plug on rear of power module.

  ☐ Plug power cord into 115 or 230 Vac outlet as required.

- Removal

  ☐ Unplug power cord from wall outlet.

  ☐ Disconnect ac power cord from power modules on rear of housing.

  ☐ Loosen holding screw on rear of housing.

  ☐ Lower hinged front panel.

  ☐ Grasp power module handle and slide out of housing.

Caution: Grasp handle with one hand while supporting bottom of module with other hand.

Power Module Connector

The power module generates two low voltage ac supplies which are bused to each modem slot in the housing.

Slots 1 through 8 are bused together and are supplied by one transformer in the power module and slots 9 through 16 are bused together and supplied by the other transformer in the module. The low voltage winding is used to generate + 5 Vdc on each modem card and the higher voltage winding is used to generate +12 Vdc and -12 Vdc on each modem card. The connector functions are:

Pin 1 Chassis Gnd

Pins 2 and 3 +5 volt winding

Pin 4 Common for plus and minus 12 volt winding

Pin 5 and 6 Plus and minus 12 volt winding

The bused ac voltage is fused on the motherboard as an option. The fuse ratings are 5 amps for the +5 volt winding and 1 amp for each of the 12 volt windings.

PC CARD INSTALLATION/ REMOVAL

The pc cards have edge connectors which insert into receptacles located on the backplane and power bus. The card is plugged in with the component side of the board facing to the left. The cards should be installed or replaced by personnel familiar with the following procedures:

- Removal

  ☐ Lower hinged front panel.

  ☐ The pc cards are removed by pulling on the card pullers and sliding the cards out through the front of the rack.

- Installation

The shelf is divided into two sections. Slots 1 through 8 are supplied by one power transformer in the power module and slots 9 through 16 are supplied by the other power transformer. When installing the modem cards, an attempt should be made to equalize the loads on the power module. For example, if the shelf has nine modem cards, five should be loaded in one half of shelf (slots 1 through 8) and four should be loaded into other half of shelf (slots 9 through 16).

☐ The pc cards are installed by sliding the cards into the card guides. Push the cards firmly into the connectors located in the rear of the unit.

☐ Close the hinged front panel.

STRAP OPTIONS/ USER OPTIONS

When the shelf mechanical and electrical installation procedures are completed, determine the configuration of each pc card in the data system and position the straps/switches as required. For user option instructions, refer to the manual which applies to the card in use.

Chapter 3 Operation

GENERAL

The shelf will accept leased line, dial-up, or DDS modems. The leased line modems operate on conditioned or unconditioned lines. The dial-up modems operate on the PSTN and have features which allow establishing dial-up circuits and data transfer. Some modems can operate on either leased or dial-up lines. The modems feature a standardized interface (EIA-232C or D) that provides for orderly calling, answering, and data modes. Many of the modems have automatic dialing and answering capabilities. Refer to the manual detailing the characteristics for the modem of interest.

TEST MODES

Each modem card has options that provide for modem testing. The test features of each modem are explained in the manual for the modem.

FRONT PANEL INDICATORS

Each modem has LEDs mounted on the front edge of the card which indicate the status of various EIA-232 interface functions. The LEDs are explained in the manual for that modem.

Some pc cards have a liquid crystal display (LCD) for observing modem status or selecting options using the three pushbuttons on the front panel. The LCD functions are explained in the manual for the modem.

SPECIAL ASSEMBLIES

The shelf may be configured with assemblies which enhance or modify the operation of the basic modems. The operation of the special assemblies is described in the appropriate manual. Some special assemblies are:

- 801 Automatic Call Unit (ACU) The 801 can be used with a PSTN modem to establish automatic data calls on the dial-up network. The shelf must be equipped with a segmented backplane.

- 720 Dual Dial Backup Unit (DDBU) The DDBU may be used to establish dial backup for leased line modems. A special segmented backplane is required for operation of the DDBU.

Chapter 4
Maintenance

PC CARDS

An inoperative pc card should be replaced. No attempt at field repair is recommended; contact Universal Data Systems Service for instructions on repairs and replacement.

The system power need not be turned off for simple pc card interchange. This allows normal operation of all other lines to continue. The procedure for card removal and installation is explained in Chapter 2.

POWER SUPPLY MODULE

The power module has two 115 or 230 Vac circuit breakers located on the module front panel. The left hand breaker protects the eight modem slots to the left of the power module (slots 1 through 8). The right hand breaker protects the eight modem slots to the right of the power module (slots 9 through 16).

The procedure for module removal and installation is explained in Chapter 2.

Fuses

Fuse protection for low voltages is available as an option. The fuses for the low voltage secondaries are located inside the shelf on the power bus (Figure 4-1). The power module must be removed to gain access to the fuses.

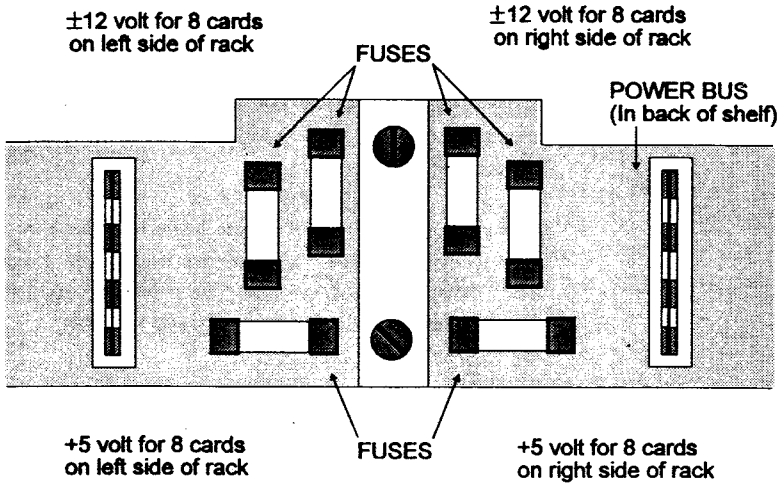


Figure 4-1
Backplane Showing Fuses
Fuses are optional and may not appear on all motherboards

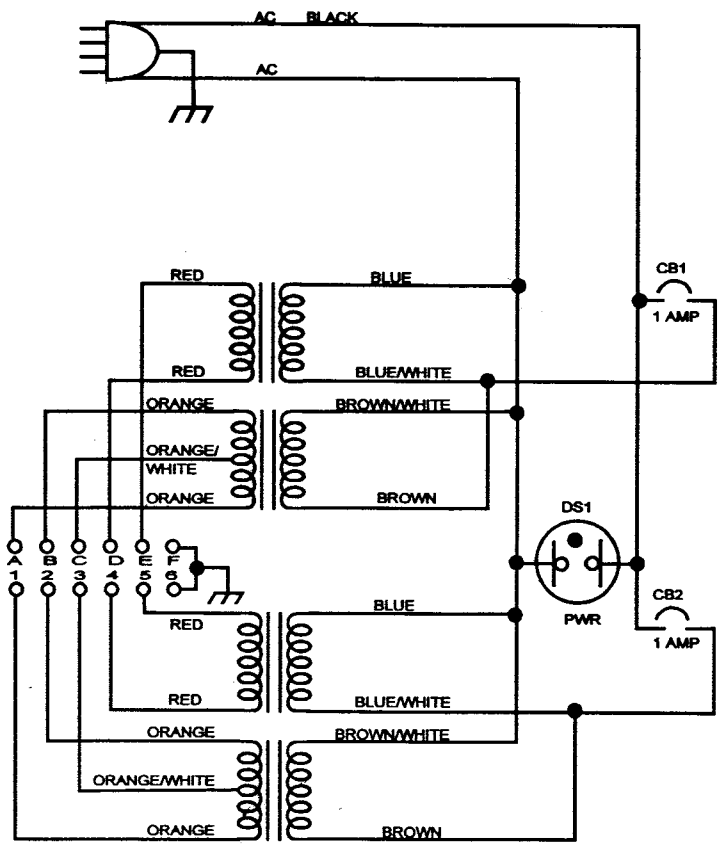


Figure 4-2
Schematic Power Module

Appendix A
Specifications

EIA Standard	Compliant with EIA Standard EIA-310-C
Dimensions	Width 19.0 inches
	Depth 10.75 inches
	Height 7.0 inches
	Weight 20 lbs shipped 50 lbs loaded
Power Requirements	Input voltage 115 Vac ±10%, 50/60 Hz or 230 Vac ±10%, 50/60 Hz
	Output voltage 30 ±10% Vac, 10 ±10% Vac, 50/60 Hz
	Wattage 150 watts
Environmental	Temperature 0° C to +50° C (+32° F to 122° F)

Appendix B
Mechanical Assembly

GENERAL

This appendix provides the front bracket LED assembly and the LCD standalone conversion information required to configure standalone units for the shelf mount.

FRONT BRACKET LED ASSEMBLY

The modem cards used in the RM16M DCV-R shelf are the same pc cards installed in standalone modem housings. When the modems are installed in the shelf, a bracket is placed on the front edge of the pc card. See Figure B-1. The bracket has a card puller and is labeled to indicate the LED and switch functions.

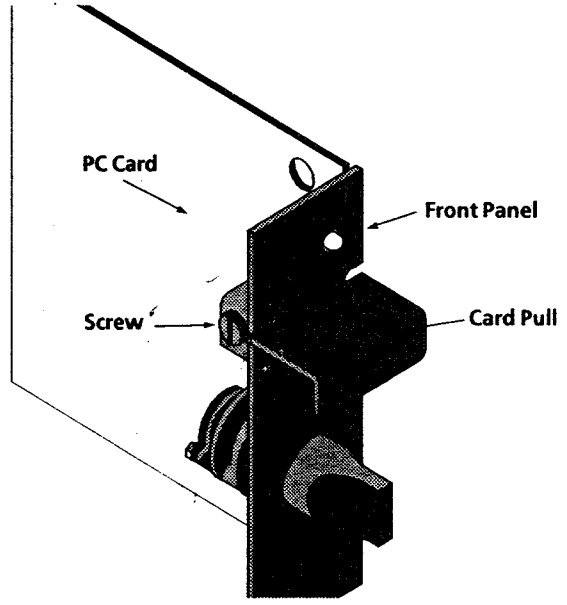


Figure B-1
Shelf Card Pull Position (Typical)

When the modem card is used in a standalone housing, the front bracket can be removed from the card or the card puller can be repositioned and the bracket can remain on the card. See Figure B-2.

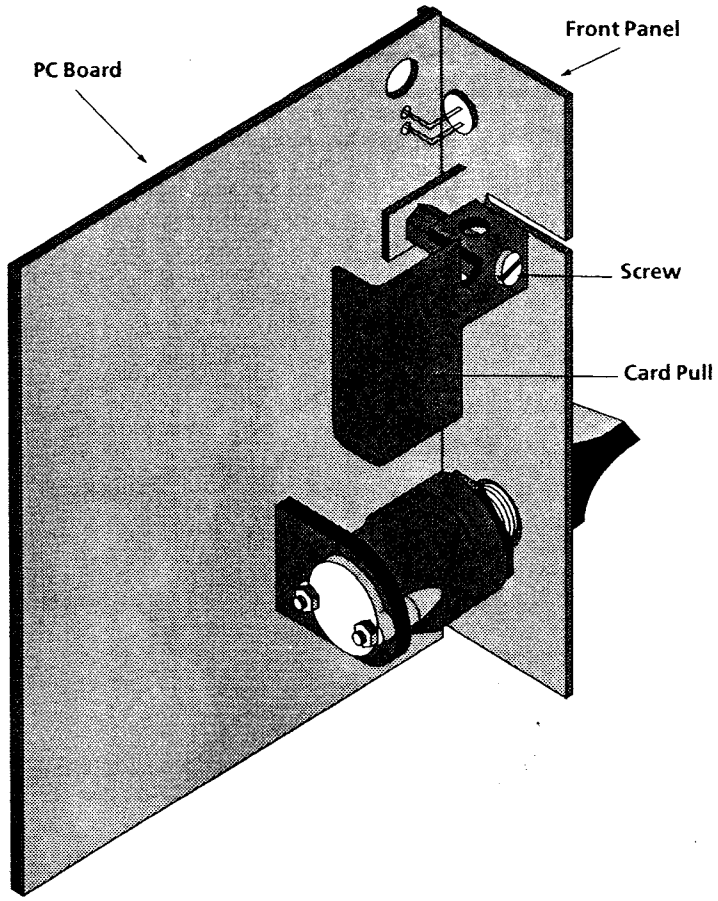


Figure B-2
Standalone Card Pull Position (Typical)

LCD STANDALONE CONVERSION

The following instructions explain how to convert a standalone LCD modem to a rack mount assembly.

> **WARNING**
> Disconnect all cables prior to cover removal. Do not leave the wall transformer plugged into the wall outlet when unplugged from the modem.

Cover Removal

Place the unit on its side on a flat surface. To disengage the lock tab insert a medium size flat screwdriver blade in one of the bottom rear latch slots. DO NOT PUSH the screwdriver but lightly pry the handle away from the unit as illustrated in Figure B-3. Assist removal by pushing the cover from the chassis with your fingers on the unit rear edges. Repeat this procedure with the remaining three latch slots.

To replace the cover align the lock clips, rear guide grooves, and front lock tabs. Press the cover in place until the lock clips engage the lock tabs.

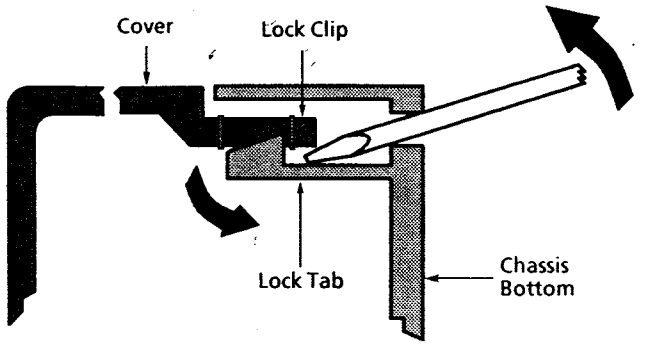


Figure B-3
Cover Removal

Once the cover is removed, disconnect the LCD connector cable from the pc board before removing the front panel.

> **NOTE**
> Because LCD connector styles vary, take note of the connectors configuration before removing.

Front Panel Removal

To detach the front panel use a flat edge screwdriver to release the two lock tabs. To release the lock tabs, insert the screwdriver between the front panel lock clip and chassis bottom lock tab, and twist the screwdriver until the clip releases (Figure B-4). Repeat this procedure for the other lock clip and then slide the front panel assembly forward until it is released from the chassis body.

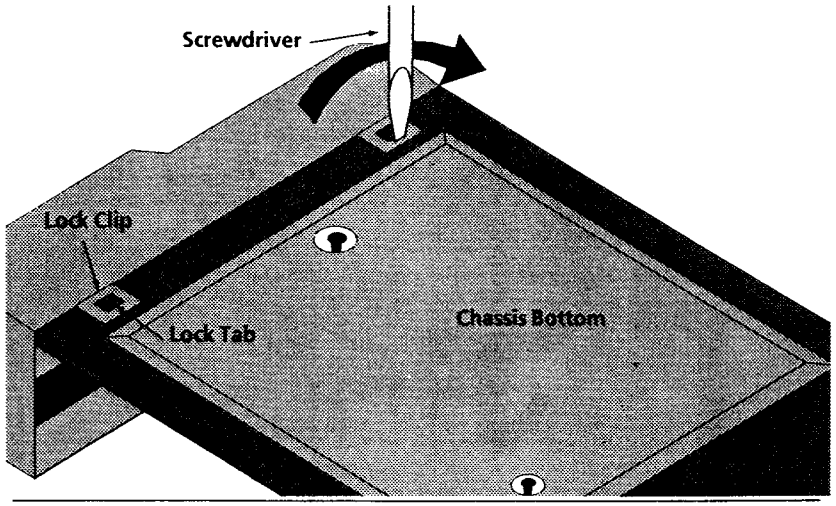


Figure B-4
Front Panel Cover Removal

Once the front panel assembly is removed, the pc board and LCD assembly can be removed.

LCD Assembly Removal

To remove the LCD panel assembly release the three lock tabs (Figure B-5) and pull the LCD assembly out from the front panel.

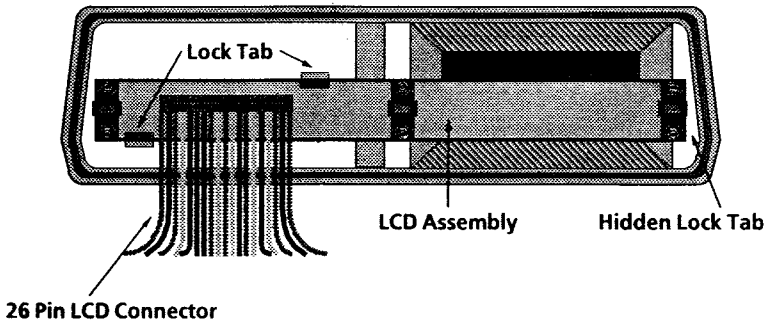


Figure B-5
Location of LCD Assembly Lock Tabs

Before removing the modem pc board, four lock tabs and a latch post must be released. Refer to Figure B-6 for the locations of the lock tabs and the latch post.

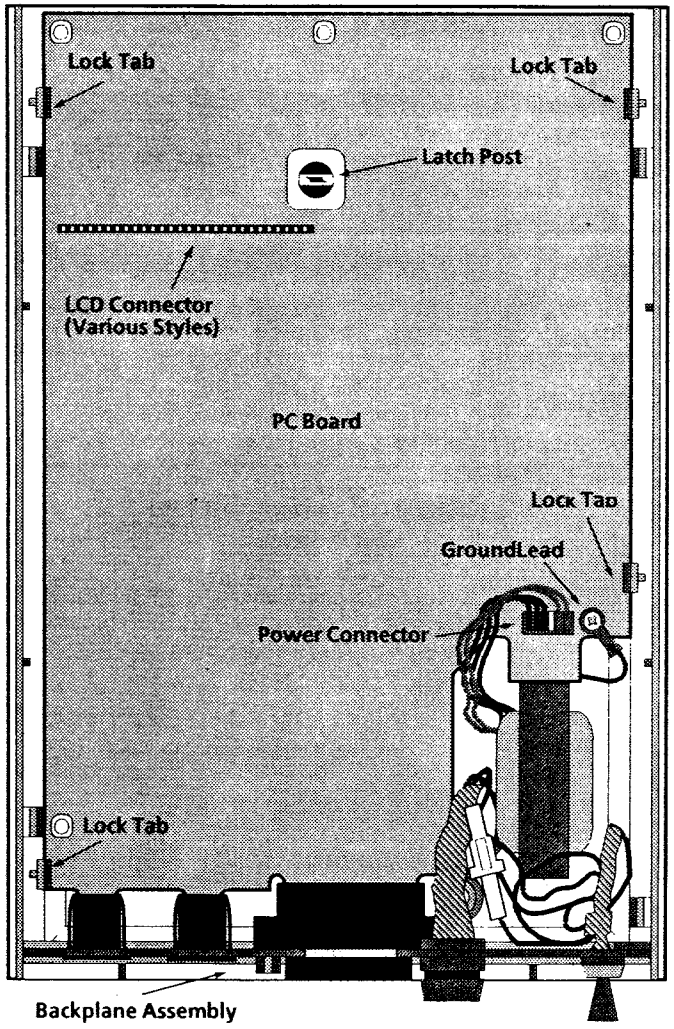


Figure B-6
Location of PC Board Lock Tabs and Latch Post

Releasing the Latch Post

To release the latch post, insert a flat edge screwdriver under the latch post pull tab and pry up (Figure B-7). The latch post can also be released from inside the modem by depressing the center on the latch post.

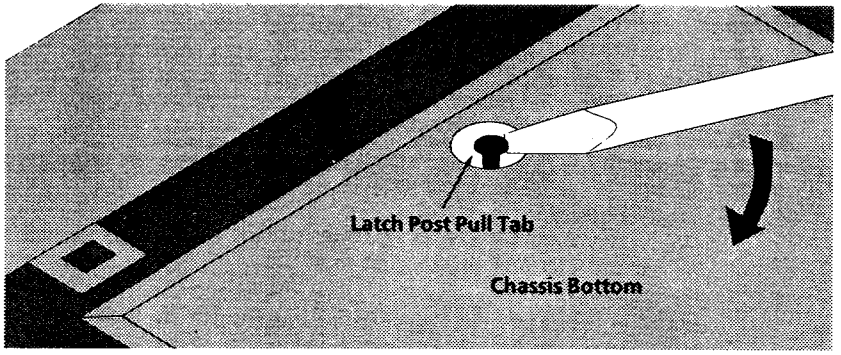


Figure B-7
Releasing the Latch Post

PC Board Removal

Before removing the the pc board, disconnect the power connector and ground lead from its terminal post.

Individually pry the lock tabs away from the pc board edge and lift the board above the retaining lip of the lock tabs. Ensure all cable connectors have been disconnected. Carefully slide the pc board away from the backplane assembly. This will disengage the multi pin edge connectors from the backplane jacks and receptacles. The pc board should now be entirely free.

> **NOTE**
> The TELCO, TELSET, and DTE connectors are attached to the backplane and do not need to be removed seperately.

Rack Mount Assembly

Retain the pc board, LCD assembly, and adapter kit for the rack mount assembly. Contact your distributor or sales representative for the specific rack mount adapter kit required for your application. The rack mount adapter kit contains the following:

- One bezel cover
- Three nuts
- Three short screws
- Three long screws
- Three lock washers
- One pull tab

There are three types of LCD assemblies found in stand alone modems:

Type A: contains slotted mounting brackets and a printed front panel.

This assembly requires the following:

- three short screws
- three nuts
- one pull tab

Type B: contains slotted mounting brackets and a non-printed front panel.

This assembly requires the following:

- three short screws
- three nuts
- one pull tab
- one bezel cover

Type C: contains solid mounting brackets and a printed front panel.

This assembly requires the following:

- three long screws
- three lock washers
- three nuts
- one pull tab

Type A Assembly

To assemble the Type A rack mount assembly attach the LCD assembly to the pc board with the three short screws and nuts. The nuts insert into slots in the mounting brackets and are fixed to prevent rotation.

Once the LCD assembly is attached, slide the pull tab into the LCD assembly. Finally, Connect the LCD connector to the pc board. Figure B-8 illustrates the Type A rack mount assembly.

Type B Assembly

To assemble the Type B rack mount assembly attach the LCD assembly to the pc board with the three short screws and nuts. The nuts insert into slots in the mounting brackets and are fixed to prevent rotation.

Once the LCD assembly is attached, firmly press the bezel cover over the LCD assembly. The bezel cover is held in place by two alignment posts on the back side. The bezel cover is notched on the right hand side, and the pull tab slides into the LCD assembly from the notched side. Finally, Connect the LCD connector to the pc board. Figure B-8 illustrates the Type B rack mount assembly.

Type C Assembly

To assemble the Type C rack mount assembly attach the LCD assembly to the pc board with the three long screws, lock washers and nuts. The nuts must be held to stop rotation.

Once the LCD assembly is attached, slide the pull tab into the LCD assembly. Finally, Connect the LCD connector to the pc board. Figure B-9 illustrates the Type C rack mount assembly.

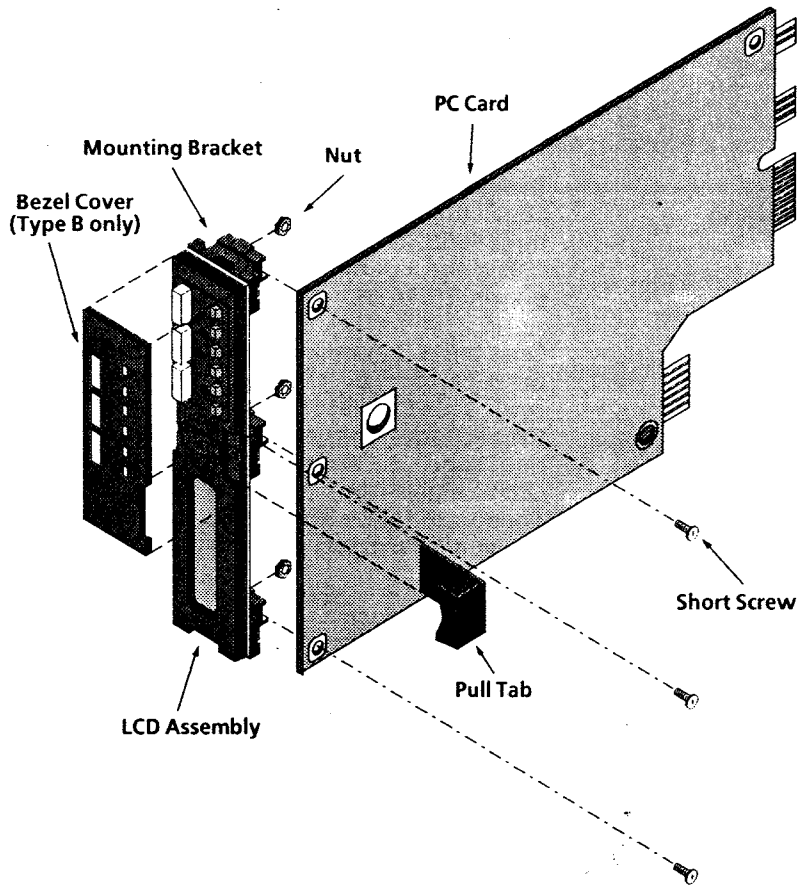


Figure B-8
Type A and B Rack Mount Card Assembly

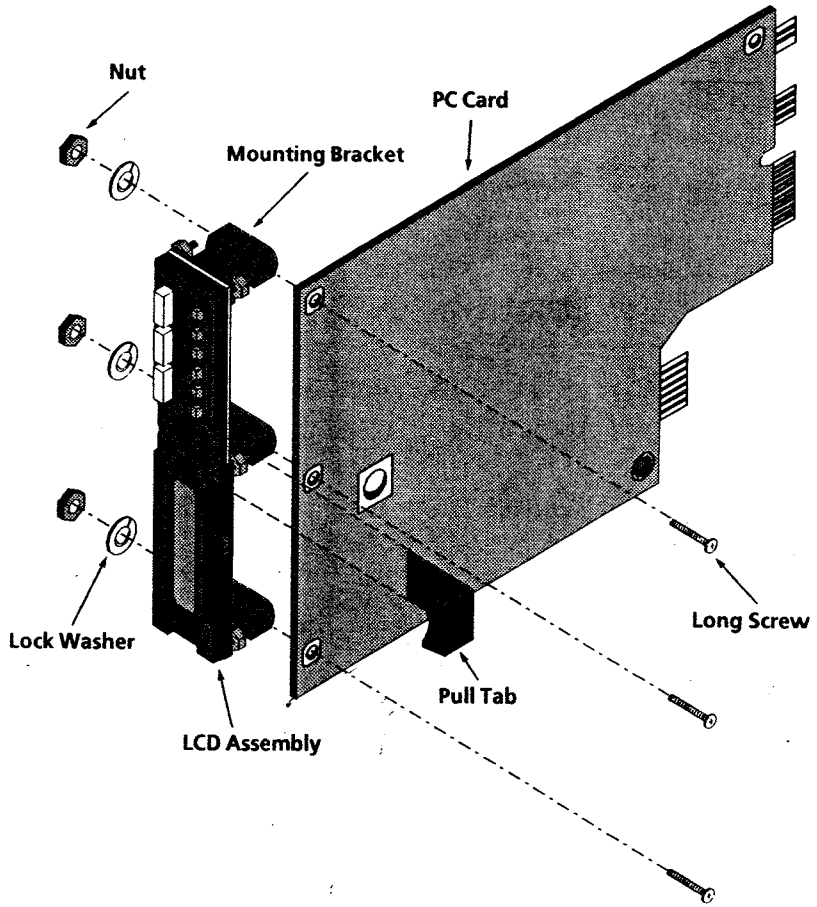


Figure B-9
Type C Rack Mount Card Assembly