



## *Ancillary Equipment Shelf*

*994-T050 Rev. D Oct 2000*

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**WARNING:** This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the installation manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15, Subpart J of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of the 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.

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The FCC label can be found on the right side of the shelf assembly. The label includes the following information:

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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# Revision History

<b>Rev Level</b>	<b>Issue Date</b>	<b>Reason for Reissue</b>
A	October, 1996	First Release
B	January, 1997	Improved Installation Procedures
C	February, 2000	Logo Update; New Format, Error Correction
D	October, 2000	Logo Update

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# Section 1 Description

## 1.1 Purpose

The ancillary equipment shelf (PN 534-T008) is a card cage that serves as a mounting platform for various Westronic remote telemetry and communications products. The 3-vertical unit (5.25 inches) shelf mounts flush with the front of a standard 19-inch telecommunications rack (23-inch rack with optional adapters). Figure 1-1 shows the shelf, as viewed from the rear, and its dimensions.

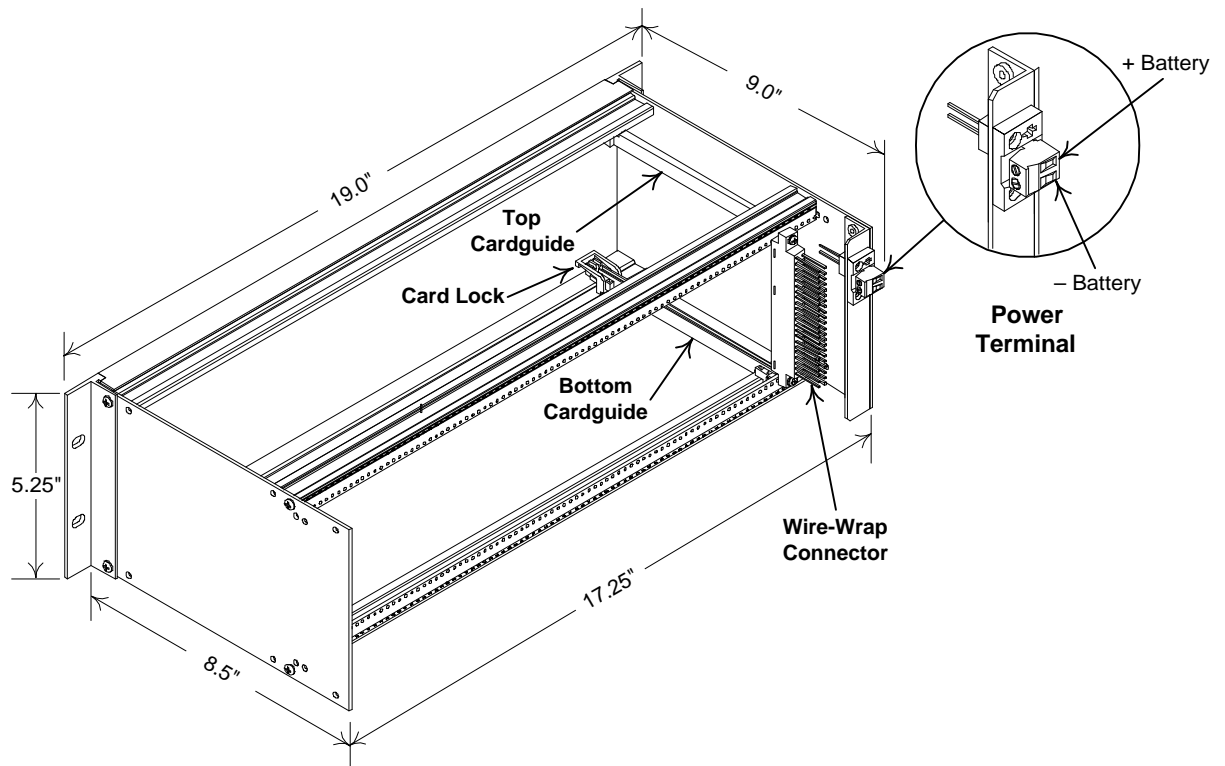


Figure 1-1 Plug-in Mounting Hardware

## 1.2 Installation

The ancillary equipment shelf bolts into an equipment rack without modification. You can mount ancillary equipment in the shelf before or after installation in the rack. Plug-in boards have all necessary hardware for mounting in the shelf.

## 1.3 Power Connection

Power termination is in the left rear of the chassis. The top pin is for + Batt (Gnd) and the bottom pin is for – Batt (–48 Vdc). The unit comes with power leads from the power terminal ready for wire-wrap to the first installed wire-wrap connector. Pin 2 of all wire-wrap connectors is – Batt and Pin 6 is + Batt. Connect power by wiring the top power terminal lead (+ Batt) to Pin 6 of the first wire-wrap connector and the bottom power terminal lead (– Batt) to Pin 2 of the first wire-wrap connector. Apply power to additional plug-in units by daisy-chaining from Pins 2 and 6 of the previous wire-wrap connector.

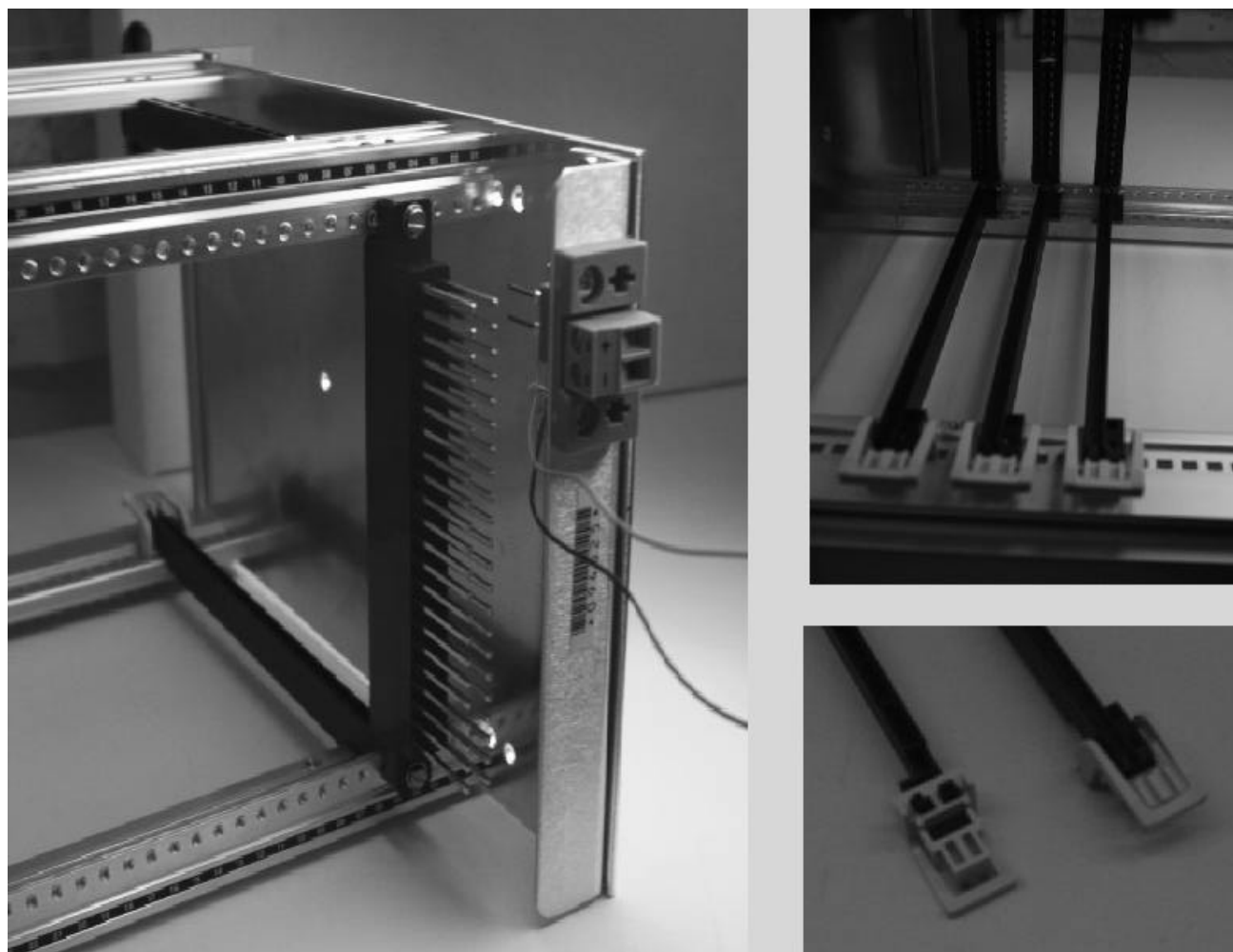
## 1.4 Plug-in Board Installation

Each plug-in card comes with all necessary hardware for mounting in the ancillary equipment rack. The mounting equipment consists of the following:

- Two card guides
- One wire-wrap connector (with mounting screws and lock washers)
- One card lock

The wire-wrap connector mounts to the shelf back with the two screws and lock washers. Each wire-wrap connector has a key to accept only one type of plug-in board (that is, a modem or a Universal Discrete Adapter – UDA). Card guides snap into the top and bottom of the shelf. The bottom guide has a locking mechanism that holds the installed board tightly in place. The following is a step-by-step procedure for installing the plug-in board mounting hardware. Refer to Figure 1-1 for the position of all hardware. Figure 1-2 shows details of the card lock and rear connector.





**Figure 1-2 Rear Connector (Left), Bottom Card Guides (Top Right), Card Lock (Bottom Right)**

**Procedure 1 Installing the Plug-in Card Mounting Hardware**

Step	Procedure
1.	Remove the card guides, card lock, connector, screws ,and lock washers from the plastic bags.
2.	Compare the actual hardware to Figure 1-1 to familiarize yourself with the general installation.
3.	Install the top card guide so that the slot faces down and aligns with the appropriate position number located on the rear of the shelf. When viewed from the front, the slot is to the left of the guide. To enable installation of the maximum number of plug-in units, center the first set of guides in shelf position #5 and install subsequent guides in every fourth position (that is, 5, 9, 13, 17, 21, and so on). Verify that the guide snaps tightly in place.

## Procedure 1 Installing the Plug-in Card Mounting Hardware

Step	Procedure
4.	Determine the front and rear of the bottom card guide and align its slot directly on the appropriate position number. Position it in a mirror image of the top card guide. Snap the card lock onto the front of the bottom card guide and snap the card guide into place. Verify that the guide snaps tightly in place. See Figure 1-2.
5.	Feed the power wires out the rear of the shelf so that they do not interfere with the remaining steps.
6.	Use the two screws and lock washers to install the rear connector. Center the connector on the appropriate position on the shelf back with Pins 1 and 2 at the top and the wire-wrap pins to the rear.
7.	Verify that the slots of the rear connector and the top and bottom card guides are in alignment. If they do not align, remove the connector, reposition the card guides as needed, and reinstall the connector.
8.	A. If this is the first board installed in the shelf, make the following power connections: (a) Wire-wrap the + Batt (top) lead to Pin 6 on the rear connector. (b) Wire-wrap the – Batt (bottom) lead to Pin 2 on the rear connector. B. If this is not the first board (and also not a UDA extender – UDAX) installed in the shelf, make the following connections: (a) Wire-wrap a jumper between Pin 6 on the rear connector and Pin 6 on the rear connector of an adjoining plug-in. (b) Wire-wrap a jumper between Pin 2 on the rear connector and Pin 2 on the rear connector of an adjoining plug-in. C. If the plug-in is a UDAX, refer to <i>Installation</i> on Page 2-2.
9.	While pressing down on the card lock, slide the card top and bottom into the card guides. Carefully press the card-edge connector into the rear connector. Raise the lever on the card front to lock the card into place in the shelf.
10.	Refer to the appropriate plug-in section in this guide to position board jumpers and rear-connector wiring.

# Section 2 Multi-Volt Universal Discrete -in

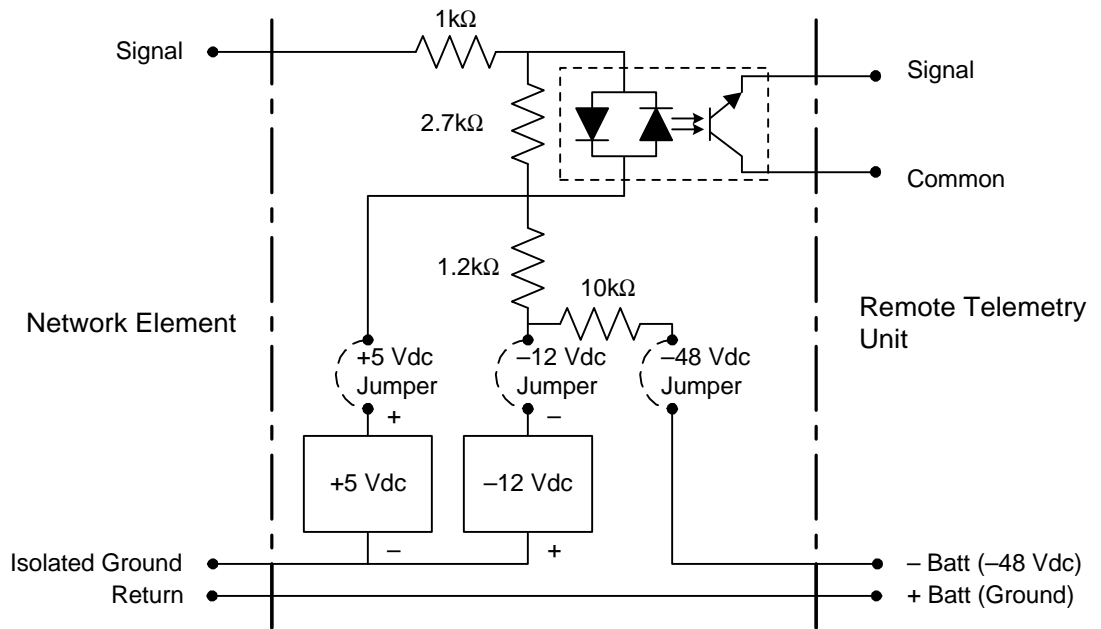
## 2.1 Purpose

The Universal Discrete Adapter (UDA) uses opto-isolation circuits to isolate

Typical RTUs are the Westronic C1000, WS2000, and WS3000. Because the inputs are isolated from the RTU, the Network Element (NE) or field wiring

-12 Vdc, and -48 Vdc inputs. Resistive networks match different element inputs to the RTU through isolation circuits.

typical input circuit.



2- Typical Discrete Input

## 2.2 Description

The Universal Discrete Adapter (UDA) comes in two varieties: the basic UDA (T111) and the UDA Extender (UDAX - PN 585)

operates like the UDA, but does not contain its own power supplies. Jumpers from an adjoining UDA supply the +5 Vdc and -12 Vdc power. If the UDAX is

-48 Vdc power. Each UDA can provide +5 Vdc and

adjoining UDAX. Provided with each UDAX is a power jumper cable. One to J2 on the front edge of the adjoining UDAX. Each UDA and UDAX can handle a maximum of 16 input points. An LED on correctly. Figure 2 2 shows the board layout.

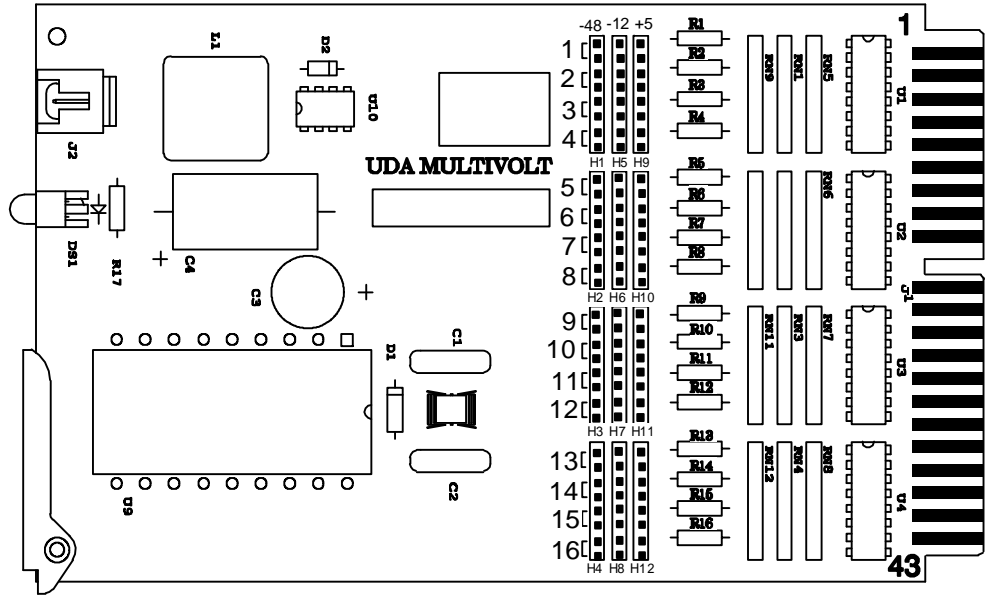


Figure 2-2 Universal Discrete Adapter Plug-in Board Layout

The 16 channels can be individually strapped for either +5 Vdc, -12Vdc, or -48Vdc. As shown in Figure 2-2, each channel has six jumper pins. Jumper the pins in the left column for -48 Vdc operation, the pins in the center column for -12 Vdc use, and the pins in the right column for +5 Vdc use. The UDA and UDAX come from the factory set for -48 Vdc operation.

## 2.3 Installation

Use the installation procedure given in *Plug-in Board Installation* on Page 1-2.

If you are installing a UDA plug-in card, you must jumper power from an adjoining plug-in card. Wire-wrap the jumpers between Pin 2 of the UDA and Pin 2 of the adjoining plug-in card and between Pin 6 of the UDA and Pin 6 of the adjoining plug-in card.

If you are installing a UDAX plug-in card, you do not need to connect power to the rear connector. However, you must install the UDAX next to a UDA. The UDAX derives its power from the adjoining UDA when you connect the included jumper between front panel connectors J2 on each card.

Figure 2-3 details pinouts for the UDA and UDAX board edge connectors. Pinouts for the circuit board edge connector and the wire-wrap backplane connector are identical.

Not Connected	1 ■ ■ 2	- Battery (-48 Vdc)
Not Connected	3 ■ ■ 4	Not Connected
Isolated Ground	5 ■ ■ 6	+ Battery (Ground)
Isolated Ground	7 ■ ■ 8	+ Battery (Ground)
Isolated Ground	9 ■ ■ 10	+ Battery (Ground)
Isolated Ground	11 ■ ■ 12	+ Battery (Ground)
Isolated Status Input 1	13 ■ ■ 14	Status Point 1
Isolated Status Input 2	15 ■ ■ 16	Status Point 2
isolated Status Input 3	17 ■ ■ 18	Status Point 3
isolated Status Input 4	19 ■ ■ 20	Status Point 4
isolated Status Input 5	21 ■ ■ 22	Status Point 5
isolated Status Input 6	23 ■ ■ 24	Status Point 6
isolated Status Input 7	25 ■ ■ 26	Status Point 7
isolated Status Input 8	27 ■ ■ 28	Status Point 8
isolated Status Input 9	29 ■ ■ 30	Status Point 9
isolated Status Input 10	31 ■ ■ 32	Status Point 10
isolated Status Input 11	33 ■ ■ 34	Status Point 11
isolated Status Input 12	35 ■ ■ 36	Status Point 12
isolated Status Input 13	37 ■ ■ 38	Status Point 13
isolated Status Input 14	39 ■ ■ 40	Status Point 14
isolated Status Input 15	41 ■ ■ 42	Status Point 15
isolated Status Input 16	43 ■ ■ 44	Status Point 16

**Figure 2-3 UDA/UDAX Wire-Wrap Connector Pinouts** (Viewed From Wire-Wrap Side)

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# Section 3 V.22bis Modem Plug-in

## 3.1 Purpose

The V.22bis modem (PN 585-T115) routes RS-422 information at 1,200 or 2,400 bps from a remote site to a central collection point. The unique property of this modem is the capability to daisy-chain 4-wire inputs, resulting in a single serial output. The V.22bis modem, a stand-alone modem with no dial-up features, can be used with TABS, TBOS, and most asynchronous serial protocols. Figure 3-1 shows a typical data collection system that has three remote WS1000 sites reporting to a single central office WS3000 serial port.

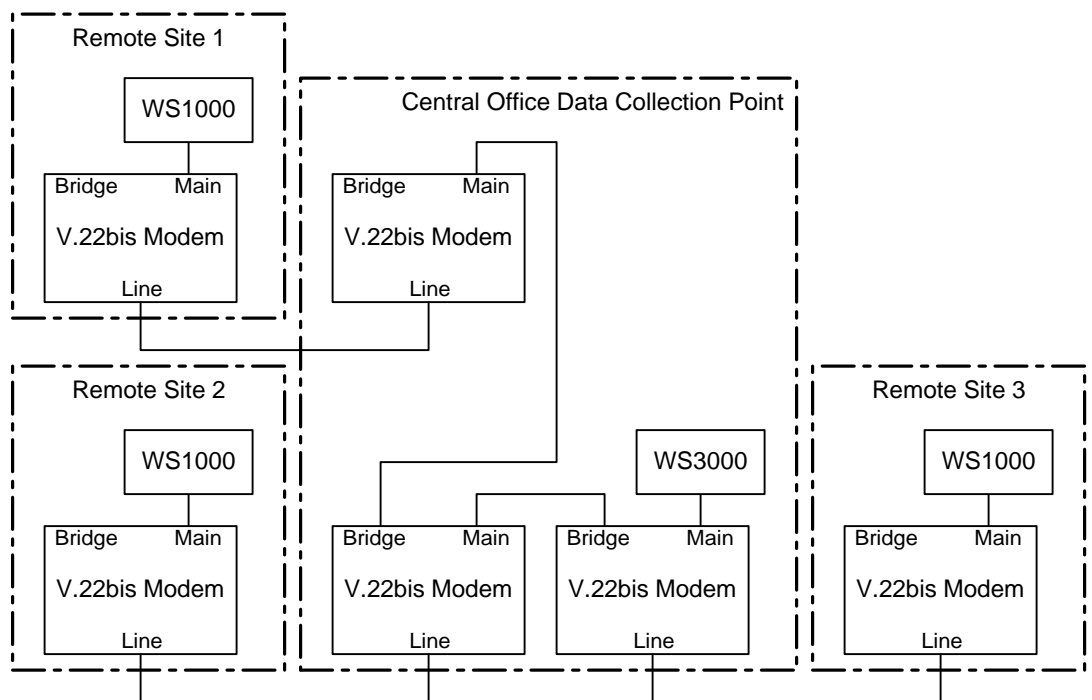


Figure 3-1 Typical System

## 3.2 Description

Each modem plug-in card, containing a single channel, receives power from the standard -48 Vdc supplied to the ancillary shelf. The modem establishes a link to the modem on the other end on powerup, thereafter providing continuous 1,200- or 2,400-bps full-duplex service. The modem communicates over a 4-wire analog circuit in which line-coupling transformers provide isolation. All interfaces provide transient voltage surge protection. Each modem contains dual RS-422 interfaces. At the host location, the main port connects to the host. Several modems can connect to a single host port by using the bridge port, as

shown in Figure 3-1. At the remote location, the main port connects to the network element; the bridge port is not used. Data rate, transmit attenuation, and receive gain boost are selectable through option jumpers (see *Strapping* on Page 3-2).

### 3.3 Operation

Usually the V.22bis modem operates over a dedicated four-wire analog interface. The modem does not have any dialup capabilities. After powerup, the host and remote modems automatically start up and connect without any operator intervention. Then, the modems send out an answer or originate tones and continuously “look” for the other modem. After establishing the modem link, the Carrier Detect (CD) LED lights. The RX LED indicates that the modem is receiving data across the modem link. The TX LED indicates that the modem is transmitting data across the modem link.

### 3.4 Installation

Use the installation procedure given in *Plug-in Board Installation* on Page 1-2.

You must wire-wrap power jumpers between Pin 2 of the modem and Pin 2 of an adjoining plug-in unit (–48 Vdc) and between Pin 6 of the modem and Pin 6 of the adjoining plug-in unit (Ground).

Figure 3-2 details pin-outs for the modem board edge connectors. Pinouts for the circuit board edge connector and the wire-wrap backplane connector are identical.

### 3.5 Strapping

Always remove the plug-in board to change jumper settings. See Figure 3-3.

- Z1 is ground and Z2 is for factory use only. **Do not** install jumpers on either Z1 or Z2.
- Z3 sets the data rate: installed for 1,200 bps or removed for 2,400 bps (default).
- Z4 installed sets “answer” mode and removed sets “originate” mode. One end of a two-modem link must be strapped for “answer” mode while the other should remain strapped for the default “originate” mode.
- Z5 installed sets the receive boost to +18 dB. The default setting is no boost (not installed).
- Z6 adjusts transmit attenuation in 1-dB increments from –6 dB to –21 dB. The default setting is –10 dB. The jumper settings are read only at powerup. Table 3-1 shows the transmit attenuation (Z6) strapping.



Not Connected	1 ■ ■ 2	- Battery (-48 Vdc)
Not Connected	3 ■ ■ 4	Not Connected
Not Connected	5 ■ ■ 6	+ Battery (Ground)
Not Connected	7 ■ ■ 8	Not Connected
Not Connected	9 ■ ■ 10	Not Connected
Not Connected	11 ■ ■ 12	Not Connected
Not Connected	13 ■ ■ 14	Not Connected
Main Tx+ (Out)	15 ■ ■ 16	Main Tx- (Out)
Not Connected	17 ■ ■ 18	Not Connected
Bridge Tx+ (Out)	19 ■ ■ 20	Bridge Tx- (Out)
Not Connected	21 ■ ■ 22	Not Connected
Main Rx+ (In)	23 ■ ■ 24	Main Rx- (In)
Not Connected	25 ■ ■ 26	Not Connected
Bridge Rx+ (In)	27 ■ ■ 28	Bridge Rx- (In)
Not Connected	29 ■ ■ 30	Not Connected
Not Connected	31 ■ ■ 32	Not Connected
Not Connected	33 ■ ■ 34	Not Connected
Not Connected	35 ■ ■ 36	Not Connected
Line TxD+ (Out)	37 ■ ■ 38	Line TxD- (Out)
Not Connected	39 ■ ■ 40	Not Connected
Line RxD+ (In)	41 ■ ■ 42	Line RxD- (In)
Not Connected	43 ■ ■ 44	Not Connected

Figure 3-2 Modem Backplane and Edge Connector Pinouts (Viewed From Wire-Wrap Side)

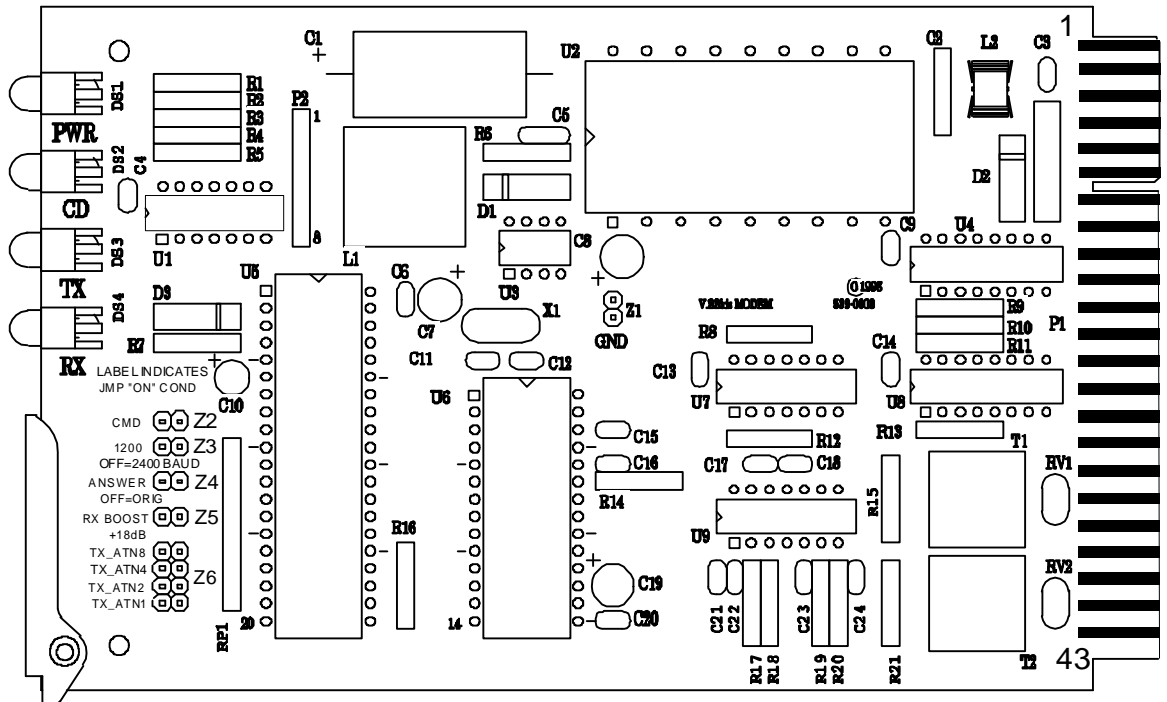


Figure 3-3 Modem Plug-in Board Layout

**Table 3-1 Modem Plug-in Board Transmit Attenuation Strapping**

Attenuation	Jumper Pins (X = Installed)			
	TX_ATN8	TX_ATN4	TX_ATN2	TX_ATN1
	1 – 2	3 – 4	5 – 6	7 – 8
-6 dB	-	-	-	-
-7 dB	-	-	-	X
-8 dB	-	-	X	-
-9 dB	-	-	X	X
-10 dB	-	X	-	-
-11 dB	-	X	-	X
-12 dB	-	X	X	-
-13 dB	-	X	X	X
-14 dB	X	-	-	-
-15 dB	X	-	-	X
-16 dB	X	-	X	-
-17 dB	X	-	X	X
-18 dB	X	X	-	-
-19 dB	X	X	-	X
-20 dB	X	X	X	-
-21 dB	X	X	X	X



