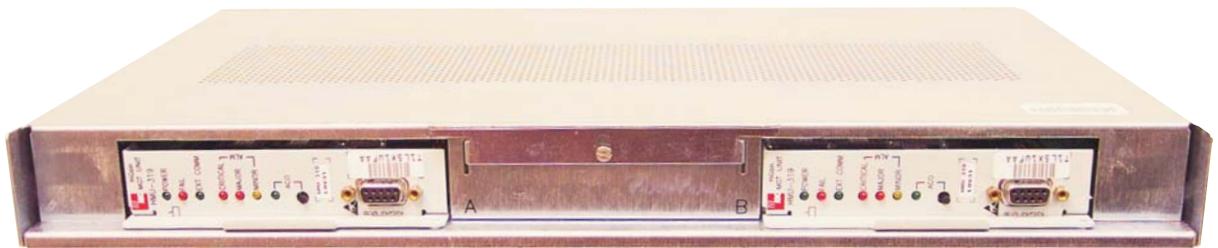


HRM-238 List 1 HiGain Retrofit Management Shelf User Manual



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Revision History

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1	May 9, 2003	Initial release
2	March 31, 2004	Updated Certificate and Warranty and Product Support Sections.
3	April 28, 2004	Misc technical updates
4	July 21, 2004	Misc technical updates/additions.

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July 21, 2004

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USING THIS MANUAL

The following conventions are used in this manual where applicable:

- Monospace type indicates screen text.
- Keys you press are indicated by small icons such as **Y** or **ENTER**. Key combinations to be pressed simultaneously are indicated with a plus sign as follows: **CTRL** + **ESC**.
- Items you select are in **bold**.

The following types of messages, identified by icons, may appear in text.



Notes provide information about special circumstances.



General cautions indicate the possibility of personal injury, product failure, or equipment damage if instructions are ignored or not completely followed.



An Electrostatic Discharge (ESD) caution indicates that a device or assembly is susceptible to damage from electrostatic discharge.



An electrical shock warning indicates the presence of a dangerous level of electrical power and the potential for serious personal injury or equipment damage.

For a list of abbreviations used in this document, refer to [“Appendix C - Abbreviations”](#) on page 15.

INSPECTING SHIPMENT

Upon receipt of the equipment:

- Unpack each container and inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC Telecommunications, Inc. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC as described in [“Appendix B - Product Support”](#) on page 14. If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

The HiGain® HRM-238 List 1 is a two-slot HiGain Retrofit Management (HRM) shelf. This shelf fits into either a 19- or 23-inch Central Office (CO) equipment rack. It accommodates up to two HiGain management units (HMU-319s). It is used in conjunction with 220-type, unmanaged 3190 type, and DDM+ type mechanic shelves to manage HiGain line units.

The HRM-238 shelf, with two management units installed, provides network management capabilities for a maximum of 56 HiGain line units (one 3190 or DDM+ or two 220 shelves). Each management unit in the HRM-238 shelf can manage up to 28 line units.

The HMU-319 management unit installs horizontally into the 4 3/4-inch slots labeled A or B on the HRM-238 shelf (Figure 1). Each management unit connects to the shelf backplane through a 96-pin DIN connector.

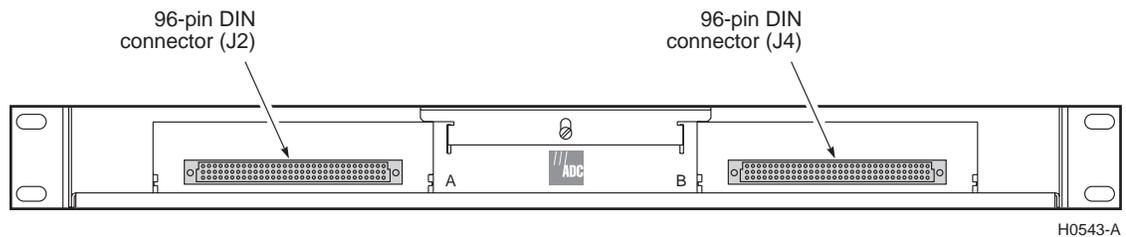


Figure 1. HRM-238 List 1 (front view)

FEATURES

Standard features include:

- 50-pin Amp-type connectors for connection between the management units in the HRM-238 shelf and previously unmanaged HiGain line units in 220, 3190, or DDM+ mechanics shelves.
- DB-25 connectors for connection to a computer, terminal, or modem
- British Naval Connector (BNC) for connection to a Local Area Network (LAN) or to a HMU-319 multi-shelf connection
- screw-type terminals for -48 Vdc power connection and grounding
- 23 wire-wrap pins to monitor alarm relay activity

OPERATIONAL CAPABILITIES

Application

With two HMU-319 management units installed, the HRM-238 shelf provides network management for up to 56 HiGain line units.

Recommended Network Setup for 220 Type Shelves

The configuration shown in [Figure 2](#) is the recommended setup for 220 type mechanics shelves. Position the HRM-238 shelf between the 220 type shelves, with up to two 220-type shelves above and two below. This limits the distance for the wire leads between the connectors for the management units and the line units they manage. [Figure 2](#) shows the HRM-238 shelf from the rear view with the A-side connectors on the right and the B-side connectors on the left. The leads from the HRM-238 shelf connector attach to the Network Management Agent (NMA) pins on the rear of the 220-type mechanics shelves for each line unit managed. The NMA pin on 220 type chassis is pin 46.

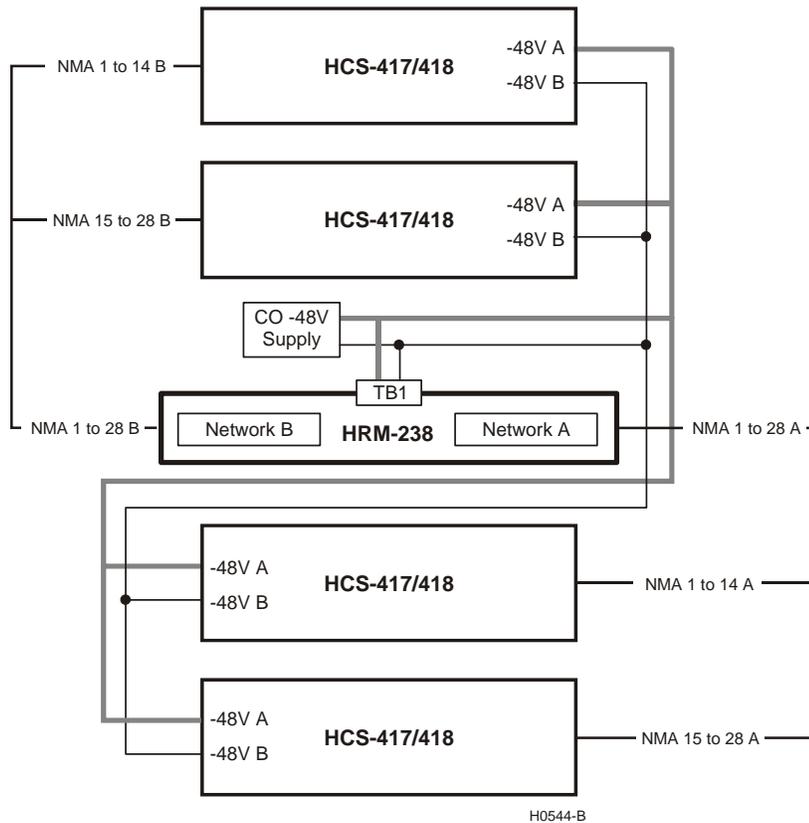


Figure 2. Recommended Network Setup for 220 Type Shelves

Recommended Network Setup for 3190 Type Shelves

The configuration shown in Figure 3 is the recommended setup for 3190 type mechanics shelves. Position the HRM-238 shelf below the 3190 type shelves. This limits the distance for the wire leads between the connectors for the management units and the line units they manage. Figure 3 shows the HRM-238 shelf from the rear view with the A-side connectors on the right and the B-side connectors on the left. The leads from the HRM-238 shelf connector attach to the Network Management Agent (NMA) pins on the rear of the 3190-type mechanics shelves for each line unit managed. The NMA pin on 3190 type chassis is pin 7.

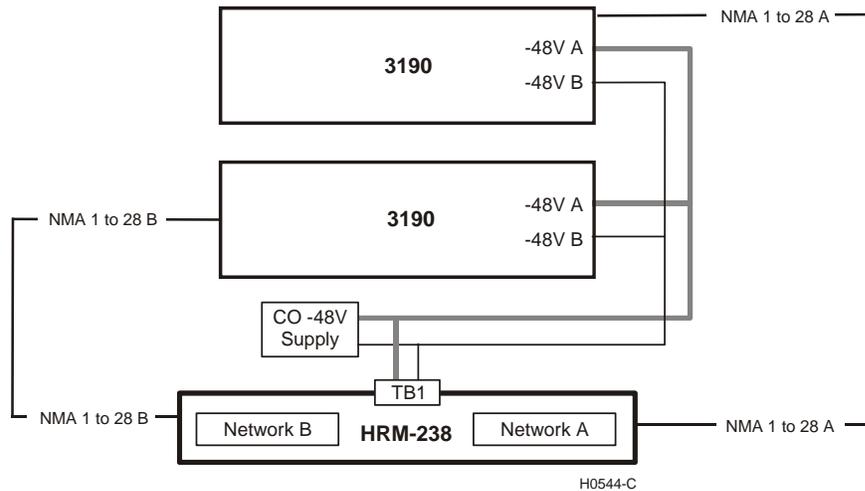


Figure 3. Recommended Network Setup for 3190 Type Shelves

Recommended Network Setup for DDM+ Type Shelves

The configuration shown in Figure 4 is the recommended setup for DDM+ type mechanics shelves. Position the HRM-238 shelf below the DDM+ type shelves. This limits the distance for the wire leads between the connectors for the management units and the line units they manage. Figure 4 shows the HRM-238 shelf from the rear view with the A-side connectors on the right and the B-side connectors on the left. The leads from the HRM-238 shelf connector attach to the Network Management Agent (NMA) pins on the rear of the DDM+ type mechanics shelves for each line unit managed. The NMA pin on DDM+ type chassis is pin 104.

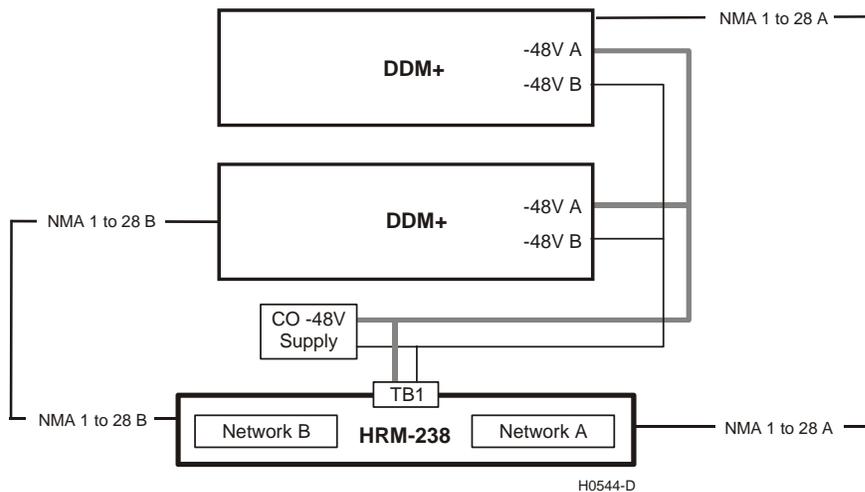


Figure 4. Recommended Network Setup for DDM+ Type Shelves

Management Cabling

Figure 5 shows the location for each connector on the HRM-238 shelf backplane. Table 1 lists the shelf connector types and management functions available to the HMU-319 management units through those connectors.

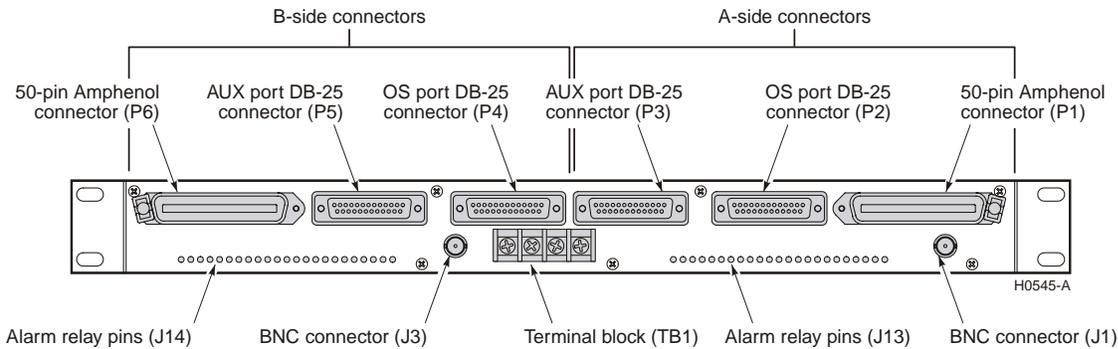


Figure 5. HRM-238 Shelf Backplane Connectors (back view)

Table 1. HRM-238 Connectors

Connector	Purpose	Type	Gender	No. of Pins
P1, P6	Provides connection from the HRM-238 shelf for the management units to each individual card that they manage.	Amphenol (CHAMP)	Male	50
P2, P3, P4, P5	Provides 4 connection points (two for each management unit) for a terminal, computer, or modem. There is one AUX port and one OS port connector for each management unit.	DB-25	Female	25
TB1	Provides separate -48 Vdc connection from the CO battery source to each management unit. Also provides battery common ground and a frame ground.	Terminal block	N/A	6
J13, J14	Provides connection for alarm relay contacts.	Wire-wrap pins	Male	23
J1, J3	Provides a 10BASE-2 connection to a LAN.	BNC	Female	1

INSTALLATION

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC Telecommunications, Inc. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC as described in “Appendix B - Product Support” on page 14. If you must store the equipment for a prolonged period, store the equipment in its original container.

INSTALLING THE HRM-238 SHELF

Install the HRM-238 in a CO equipment bay rack. If the CO rack is 19 inches wide, attach the short side of the mounting bracket to the HRM-238 shelf and use the long side of the mounting bracket to attach to the CO rack. If the CO rack is 23 inches wide, reverse the mounting bracket. Attach the long side of the mounting bracket to the HRM-238 shelf and use the short side of the mounting bracket to attach to the CO rack (Figure 6).

- 1 Position the HRM-238 shelf in the CO rack. (See “Operational Capabilities” on page 2, and Figure 2 on page 2, Figure 3 on page 3, or Figure 4 on page 3 for recommended placement.)
- 2 Align the HRM-238 shelf mounting brackets with the vertical mounting holes on the CO rack (Figure 6).
- 3 Install the mounting hardware and secure.

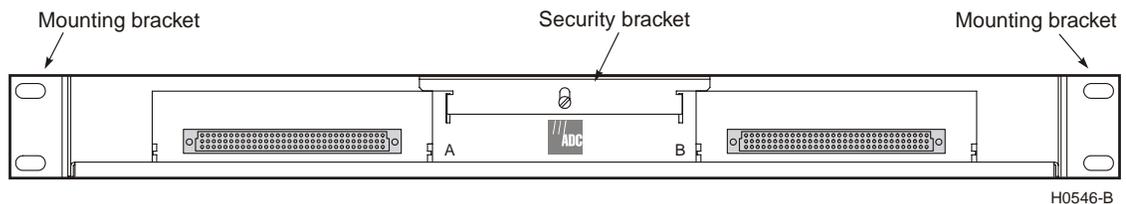


Figure 6. Shelf with Brackets Positioned for 19-inch Rack

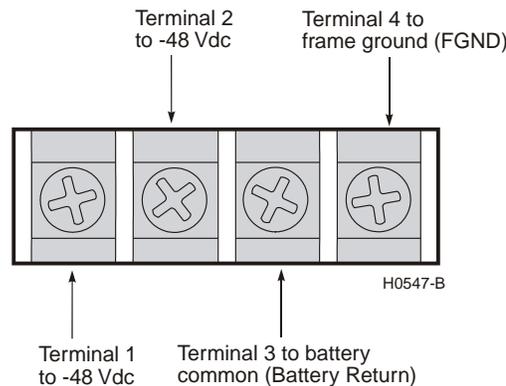
INSTALLING FRAME GROUND AND BATTERY POWER

Perform the following steps to install the -48 Vdc battery to the HRM-238 shelf and to connect battery common ground (LGND) and frame ground (FGND). The HRM-238 shelf terminal block TB1 has two connection points for supplying redundant battery capability. Connect a -48 Vdc battery source to Terminal 1 (-48V_A) to supply voltage to the HRM-238 shelf (Table 2 on page 6). Connect another -48 Vdc battery source to Terminal 2 (-48V_B) to supply redundant voltage to the HRM-238 shelf. See Table 2 on page 6 for TB1 terminal block information.

Table 2. Terminal Block (TB1)

Terminal	Description
1	-48V_A
2	-48V_B
3	BATTERY RETURN
4	FGND

- 1 Remove the fuse(s) in the equipment bay fuse panel for the circuit(s) where the HRM-238 shelf battery wire(s) will terminate.
- 2 Connect one end of the frame ground wire to Terminal 4 (FGND) on TB1 of the HRM-238 shelf and attach the other end of the frame ground wire to the CO ground wire termination point.
- 3 Connect the -48 Vdc CO battery to the HRM-238 shelf (Figure 7):
 - a Connect a wire to the HRM-238 shelf TB1 Terminal 1 (-48V_A) for Primary CO battery.
 - b Connect a wire to the HRM-238 shelf TB1 Terminal 2 (-48V_B) for Redundant CO battery.
 - c Connect the battery common wire to HRM-238 shelf TB1 Terminal 3 (BATTERY RETURN) of the HRM-238 shelf and attach the other end to CO battery ground source(s).
 - d Connect the wire(s) from the HRM-238 TB1 Terminal 1 and Terminal 2 to the CO -48 Vdc power termination point(s).

**Figure 7.** Connect -48 Vdc and Frame Grounds to TB1

INSTALLING COMMUNICATION WIRING

All wiring and connections for the HRM-238 shelf are on the back. [Figure 5 on page 4](#) shows the shelf backplane and connectors. Connect the NMA wiring from the HRM-238 shelf to each HiGain or Megabit Modem line unit that will be managed using the steps beginning on [page 7](#). Then, use the other connectors in “[Connect to a LAN or Interconnect Shelves](#)” on [page 9](#) and “[Connect to a Computer, Terminal, or Modem](#)” on [page 9](#) that are appropriate for your application.

Connect NMA Wiring

From the 50-pin Amphenol connector P1 and/or P6 (Figure 8), wire directly to the NMA pin 46 on the 220-type shelf backplane for each line unit being managed. Route wires from the P1 and P6 connectors to the NMA 220-type mechanics shelves as shown in Figure 2 on page 2. Refer to Table 3 for P1 and P6 NMA connector information.

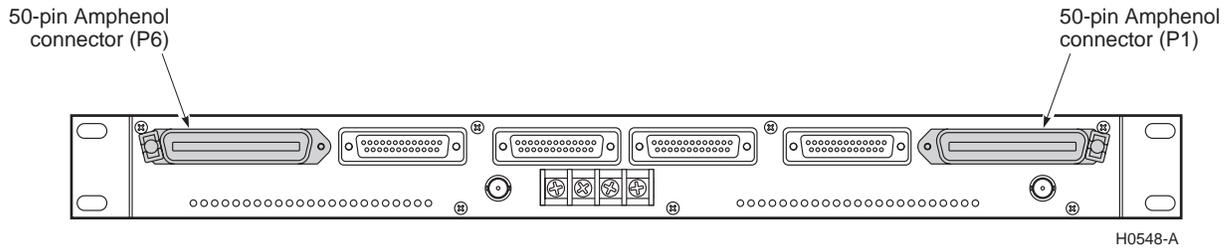


Figure 8. Connect NMA Wiring

- 1 Remove the plastic cover from the 50-pin Amphenol connector P1 and/or P6.
- 2 Install a 50-pin female plug into the connector. Separate the wires for each of the 50 pins.

For 220 type mechanics:

- 3 Wire wrap the corresponding NMA wire from the plug to the NMA pin 46 on the shelf for each line unit being managed. The wire leads from the Amphenol plug can be up to 20 feet maximum.

For 3190 type mechanics:

- 4 Wire wrap the corresponding NMA wire from the plug to the NMA pin 7 on the shelf for each line unit being managed. The wire leads from the Amphenol plug can be up to 20 feet maximum.

For DDM+ type mechanics:

- 5 Wire wrap or soldier (depending on chassis manufacturer) the corresponding NMA wire from the plug to the NMA pin 104 on the shelf for each line unit being managed. The wire leads from the Amphenol plug can be up to 20 feet maximum.

Table 3. P1 and P6 NMA Connectors

Pin	Description	Pin	Description
26	NMA_1	1	NMA_2
27	NMA_3	2	NMA_4
28	NMA_5	3	NMA_6
29	NMA_7	4	NMA_8
30	NMA_9	5	NMA_10
31	NMA_11	6	NMA_12
32	NMA_13	7	NMA_14
33	NMA_15	8	NMA_16
34	NMA_17	9	NMA_18
35	NMA_19	10	NMA_20
36	NMA_21	11	NMA_22
37	NMA_23	12	NMA_24
38	NMA_25	13	NMA_26
39	NMA_27	14	NMA_28
40	F_ALAM	15	ERR_ALM
41	LOS_ALM	16	GND
42	GND	17	GND
43	GND	18	GND
44	GND	19	GND
45	GND	20	GND
46	GND	21	GND
47	GND	22	GND
48	GND	23	GND
49	N/C	24	N/C
50	N/C	25	N/C

Connect to a LAN or Interconnect Shelves

Use the BNC connector (Figure 9) when required for access using a LAN or for interconnecting multiple shelves. Consult the appropriate user manual for the HMU-319 management unit and for the software used in the application. See Table 4 for information on BNC connector J1 and J3.

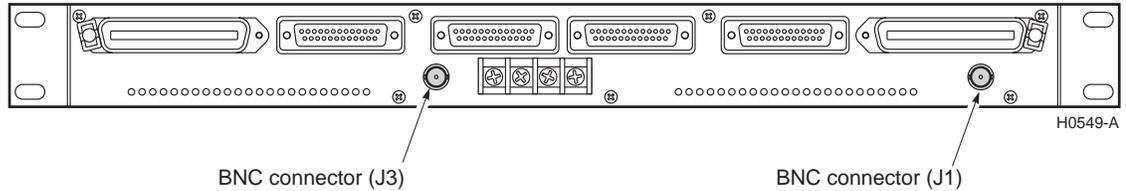


Figure 9. Using BNC Connector

Table 4. BNC Connector J1 and J3

Shield	LAN-, CDS
Center	LAN+

Connect to a Computer, Terminal, or Modem

The AUX and OS connectors (Figure 10) are DB-25, configured as Data Terminal Equipment (DTE). There is one AUX and one OS connector for each of the two management unit slots. Use these connectors for a direct connection (straight-through) with devices configured Data Communication Equipment (DCE) such as modems, X.25 Packet Assembler/Disassemblers (PADs), or LAN terminal servers.

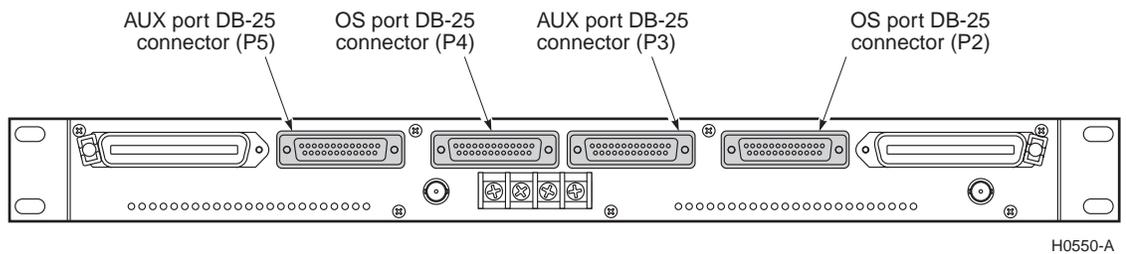


Figure 10. AUX or OS Connectors

Use a null modem connector for cross-over cabling when attaching a device that is not configured as DCE (such as terminals or computers running terminal emulation software) to these connectors. [Table 5](#) shows the pinouts for the two AUX ports (one port for each management unit). [Table 6](#) shows the pinouts for the two OS ports (one port for each management unit).

Table 5. *AUX P3 and P5 Connectors*

Pin	Description	I/O	Pin	Description	I/O
1	N/C		14	N/C	
2	AUX_TX	O	15	N/C	
3	AUX_RX	I	16	N/C	
4	N/C		17	N/C	
5	N/C		18	N/C	
6	AUX_DSR-	I	19	N/C	
7	LGND	I	20	AUX_DTR-	O
8	N/C		21	N/C	
9	N/C		22	N/C	
10	N/C		23	N/C	
11	N/C		24	N/C	
12	N/C		25	N/C	
13	N/C				

Table 6. *OS Port P2 and P4*

Pin	Description	I/O	Pin	Description	I/O
1	N/C		14	N/C	
2	OS_TX	O	15	OS_TCLK	I
3	OS_RX	I	16	N/C	
4	OS_RTS-	O	17	OS_RCLK	I
5	OS_CTS-	I	18	N/C	
6	OS_DSR-	I	19	N/C	
7	LGND	I	20	OS_DTR-	O
8	N/C		21	N/C	
9	N/C		22	N/C	
10	N/C		23	N/C	
11	N/C		24	OS_TCLK	I
12	N/C		25	N/C	
13	N/C				



For further details about connecting to the AUX or OS connectors, consult the appropriate user manual for the management unit and applicable software.

IDENTIFYING ALARMS

Alarm relay contacts for each management unit are on J13 and J14 (Figure 11). Install wiring between these pins and an alarm monitoring device per local practice. Table 7 describes the alarm J13 and J14 pinouts.

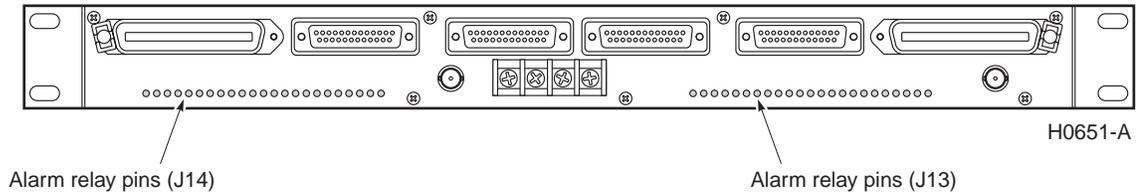


Figure 11. Alarm Relay Wire-Wrap Pins

Table 7. Alarm J13 and J14 Pinouts

Pin	Description	Pin	Description
1	CRIT_AUD_NC_A	13	MIN_AUD_NC_A
2	CRIT_AUD_COM_A	14	MIN_AUD_COM_A
3	CRIT_AUD_NO_A	15	MIN_AUD_NO_A
4	CRIT_VIS_NC_A	16	MIN_VIS_NC_A
5	CRIT_VIS_COM_A	17	MIN_VIS_COM_A
6	CRIT_VIS_NO_A	18	MIN_VIS_NO_A
7	MAJ_AUD_NC_A	19	SYS_ID_NC_A
8	MAJ_AUD_COM_A	20	SYS_ID_COM_A
9	MAJ_AUD_NO_A	21	SYS_ID_NO_A
10	MAJ_VIS_NC_A	22	EXT_ACO_A
11	MAJ_VIS_COM_A	23	LGND
12	MAJ_VIS_NO_A		

TURNING UP THE SYSTEM

Perform the following procedures prior to installing the management unit(s) into the shelf.

Insert Fuse

Insert an appropriately sized fuse(s) into the equipment bay fuse panel for the circuit(s) where the HRM-238 shelf battery wire(s) were terminated. Refer to the appropriate management unit user manual for power consumption, power dissipation, and current drain.

Verify Cabling

Verify the following:

- 1 Verify a minimum of -42 Vdc and a maximum of -56 Vdc between the following:
 - a -48 Vdc battery screw Terminal 1 and the battery common Terminal 3 (BATTERY RETURN)
 - b -48 Vdc battery screw Terminal 2 (when used) and the battery common Terminal 3 (BATTERY RETURN)
- 2 Visually verify that all connections are securely terminated.

Secure Cabling

Tie the cable connectors to the back of the HRM-238 shelf using the tie wraps and mounting screws.

INSTALLING THE MANAGEMENT UNIT(S)

- 1 Install the management unit(s) into the HRM-238 shelf per procedures in the appropriate HMU-319 user manual.
- 2 Loosen the security bracket screw, push down the security bracket, and re-tighten the screw ([Figure 6 on page 5](#)).

APPENDIX A - SPECIFICATIONS

Power

Maximum power	10.0 Watts
CO Supply	-48 Vdc nominal (-42.5 Vdc to -56.5 Vdc)
Fuse Size	0.5A

Physical

Material	Steel
Finish	Zinc plated
Capacity	2 management modules (HMU-319 or MMU-319)
Mounting	19- or 23-inch rack

Dimensions

Height	1.75 in. (4.39 cm)
Width	17 in. (43.18 cm), without mounting brackets 18.37 in. (46.65 cm), mounting brackets set for 19-inch rack 22.37 in. (56.82 cm), mounting brackets set for 23-inch rack
Depth (including the wire-wrap terminals)	12 in. (30.48 cm)
Weight	2.5 lb. (1.13 kg)

Operational Environment

Temperature	-40°C to +65°C
Humidity	5 to 95% (non-condensing)
Altitude	200 ft below sea level to 13,000 ft above sea level (-60m below sea level to 4,000m above sea level)

Storage Environment

Temperature	-40°C to +70°C
Humidity	5 to 95% (non-condensing)

APPENDIX B - PRODUCT SUPPORT

ADC Customer Service Group provides expert pre-sales and post-sales support and training for all its products. Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center.

Sales Assistance

800.366.3891

- Quotation Proposals
- Ordering and Delivery
- General Product Information

Systems Integration

800.366.3891

- Complete Solutions (from concept to installation)
- Network Design and Integration Testing
- System Turn-Up and Testing
- Network Monitoring (upstream or downstream)
- Power Monitoring and Remote Surveillance
- Service/Maintenance Agreements
- Systems Operation

ADC Technical Assistance Center

800.366.3891

Email: wsd_support@adc.com

- Technical Information
- System/Network Configuration
- Product Specification and Application
- Training (product-specific)
- Installation and Operation Assistance
- Troubleshooting and Repair/Field Assistance

Online Technical Support

- www.adc.com/Knowledge_Base/index.jsp

Online Technical Publications

- www.adc.com/documentationlibrary/technicalpublications

Product Return Department

800.366.3891

Email: repair.return@adc.com

- ADC Return Material Authorization (RMA) number and instructions must be obtained before returning products.

All telephone numbers with an 800 prefix are toll-free in the USA and Canada.

APPENDIX C - ABBREVIATIONS

B

BNC: Bayonet-Locking Connector

C

CO: Central Office

D

DCE: Data Communication Equipment

DTE: Data Terminal Equipment

H

HCS: HiGain Card Shelf

HMU: HiGain Management Unit

HRM: HiGain Retrofit Management

L

LAN: Local Area Network

N

NMA: Network Management Agent

P

PADs: Packet Assembler/Disassemblers

CERTIFICATION AND WARRANTY

FCC COMPLIANCE

This equipment does not have any clocking source, and is deemed to be a passive device per FCC guidelines. When used in conjunction with any clocking devices, this combined system may radiate radio frequency energy that can cause harmful interference to radio communications. Operation of such a system in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own.

LIMITED WARRANTY

Product warranty is determined by your service agreement. Refer to the ADC Warranty/Software Handbook for additional information or contact your sales representative or Customer Service for details.

MODIFICATIONS

Any changes or modifications made to this device that are not expressly approved by ADC Telecommunications, Inc. voids the user's warranty.

All wiring external to the products should follow the provisions of the current edition of the National Electrical Code.

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