USER MANUAL

H0333-A

HRE-425 List 1 Remote Enclosure
Product Catalog: 150-1114-01
CLEI: T1MFF504

ADC

Revision History of This Manual

Revision	Release Date	Revisions Made
01	July 20, 1998	Initial release
02	February 1, 1999	Changed fuse, mounting, and connector specifications
03	September 22, 1999	Added rack mounting instructions and edits to text
04	October 18, 2002	ADC rebrand

USING THIS MANUAL

The following conventions are used in this manual:

- `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**.

- Three types of messages, identified by icons, appear in text.

Notes contain information about special circumstances.

Cautions indicate the possibility of personal injury or equipment damage.

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

For a list of abbreviations used in this document, refer to "Abbreviations" on page 19.

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 DSL Systems, 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 DSL Systems, Inc. as described in "Product Support" on page 17. If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

The HiGain® Remote Enclosure HRE-425 List 1 houses HiGain line units, doubler units, and remote units (HLUs, HDUs, and HRUs, respectively). The HRE-425 List 1 can also accommodate a -48 Vdc power supply to power the slots, if required.

Access to the twelve slots is provided by wire-wrap card-edge connectors or by four 25-pair, type 57, backplane connectors. An optional RJ48 cable assembly provides access to the DS1 interface through a 12-port harmonic connector that attaches to either of the remote enclosure's two side panels or to the top or bottom panels. A variety of grommited cable access openings are located on the enclosure's top, bottom, sides, and rear covers.

FEATURES

The HRE-425 List 1 provides the following features:

- 12 slots for 12 plugs, or 11 plugs and a -48 Vdc local power supply in slot 12 only

- optional RJ48C or RJ48X modular jack assemblies for DS1 customer interface connections

- printed-circuit backplane provides wire-wrap or connectorized interface wiring options

- tamper-proof locking screw for security

- separate fuses for each slot

- wall, rack, or desktop mounting

- support for T1 (DS1) and E1 (G.703) applications.

Figure 1 shows a front view of the HRE-425.
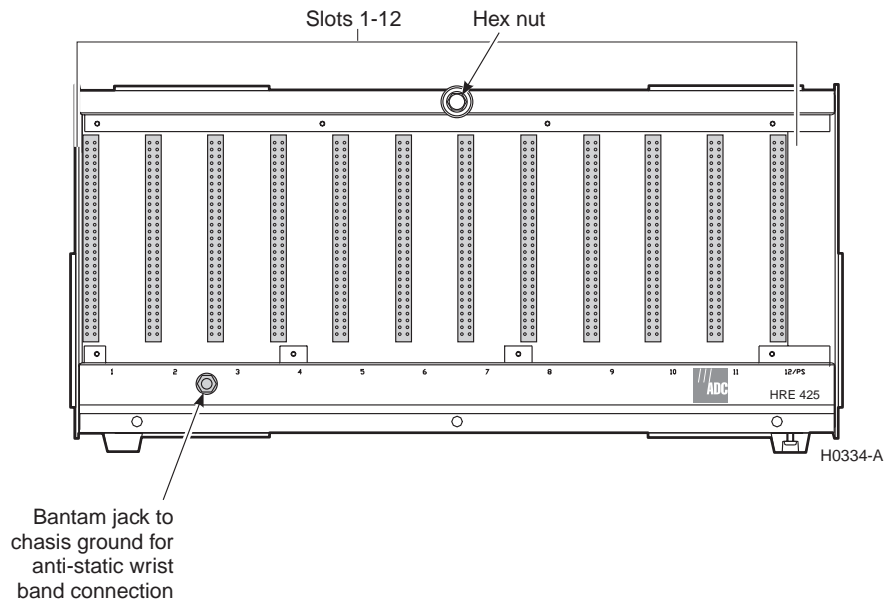
Figure 1. HRE-425 List 1 Remote Enclosure

APPLICATIONS

HiGain provides a quick and cost-effective way of delivering T1 High Capacity Digital Service (HCDS) to customers over metallic cable pairs. The primary application of the HRE-425 List 1 Remote Enclosure is to house the remote units of a HiGain repeaterless T1 transmission system.

> **Because the HRE-425 uses standard 400 mechanics slots, it can accommodate any plug with 400 mechanics, including the HDU-451 doubler and the HLU-431 line unit. It can also accommodate 200 mechanic plugs (half the width of 400 mechanics) used by the HiGain HRU-411 and HRU-402 remote units.**

INSTALLATION

This section provides information on installing and mounting the HRE-425 List 1.

INSTALLATION KIT

The installation kit contains the following items:

- four rack mounting screws
- four bracket attaching screws with locking nuts
- four plastic cable tie wraps
- one spare 0.5A fuse
- one 2A fuse for slot 12 (see "Fuse Alarm" on page 7.)
- two 19-inch or 23-inch rack mounting brackets
- circuit assignment card
- plastic circuit assignment card holder.

MOUNTING OPTIONS

The HRE-425 is suitable for mounting on a desk top, wall or equipment rack. Before setting up the equipment, select a location that provides appropriate security. The remote enclosure has four rubber feet for desktop installations and four mounting holes in the back cover for wall mounting.

Desktop Mounting

The remote enclosure includes four stand-off rubber feet for desktop mounting. When using the unit on a desktop, take care to prevent blocking the air flow from the bottom of the unit.

Wall Mounting

The backplate of the remote enclosure has four wall mounting holes to simplify wall-mounting. To mount the enclosure on a wall, remove the backplate and use it as a template for the mounting holes as follows:

1 Loosen the four rear-panel locking bolts and remove the backplate (Figure 2).
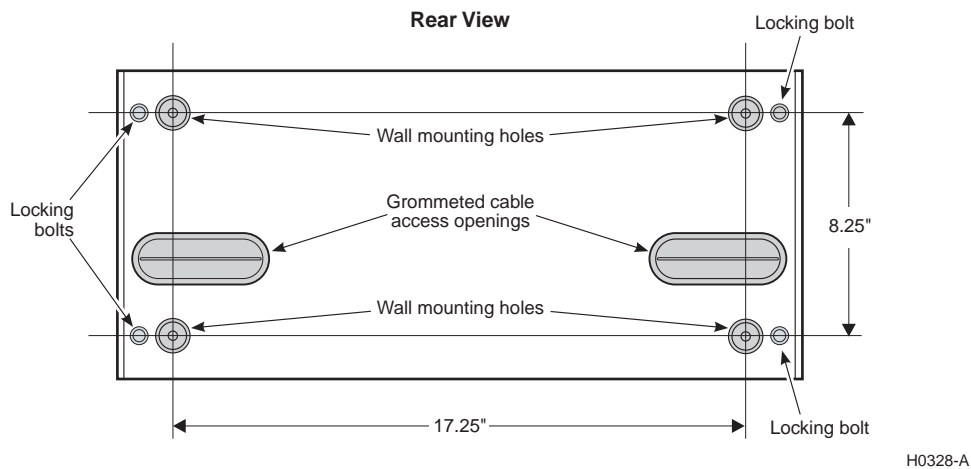
Figure 2.   HRE-425 List 1 Backplate

2 Using the backplate as a template, mark the wall locations for drilling the wall-mounting holes.

3 Drill pilot holes and attach the backplate to the backboard with the four No. 10 x $^3/_4$ inch PHS wood screws and washers supplied with the remote enclosure.

4 Use the four locking bolts loosened in Step 1 as hinge mounting bolts to reattach the backplate to the main chassis side panels. (See Figure 3 on page 5.)

> **When the main chassis is attached to the backplate, it can be rotated up or down by removing the two upper or lower mounting bolts and slightly loosening the two remaining mounting bolts to allow them to act as hinges. This provides access to the enclosure's backplane and other internal areas. See Figure 3 on page 5 for hinging details.**
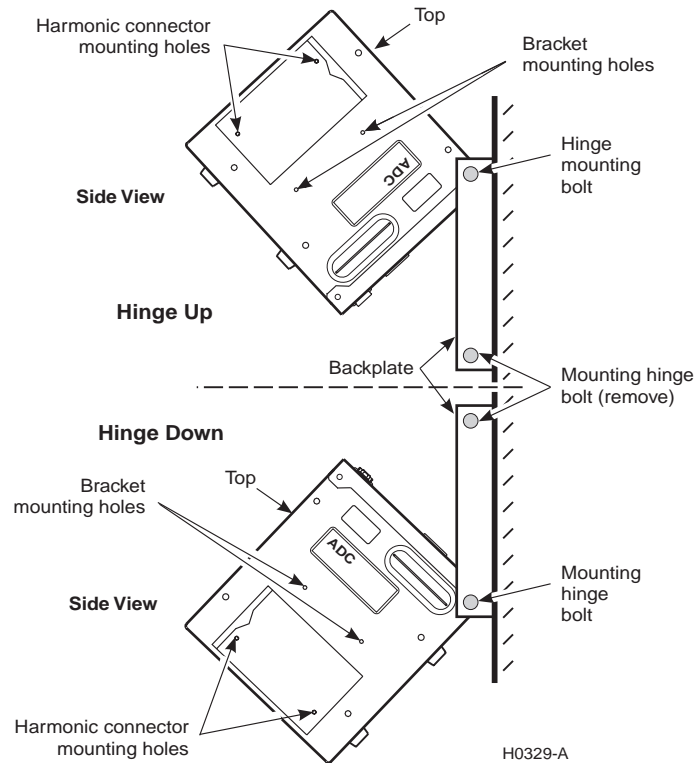
Figure 3. *Wall Mounting and Hinging View*

Rack Mounting

The HRE-425 can be mounted into a 19-inch or a 23-inch relay type rack with one of the two rack mounting brackets that are provided in the installation kit.

1   Orient the mounting brackets to the side panels consistent with the rack size (19 or 23-inch).

2   Attach the rack mounting brackets to the bracket mounting holes (see Figure 3) on each side panel with the four bracket attaching screws and locking nuts.

3   Attach the HRE-425 to the rack with the four mounting screws included.

BACKPLANE

The HRE-425 List 1 Backplane shown in Figure 4 can be connected in one of the following ways:

- trace connections to each of the 12 card-edge connectors (J1 through J12)

- terminal block connections to TB1

- 25-pair, multiple connectors (P1, P2, P3, and P4)
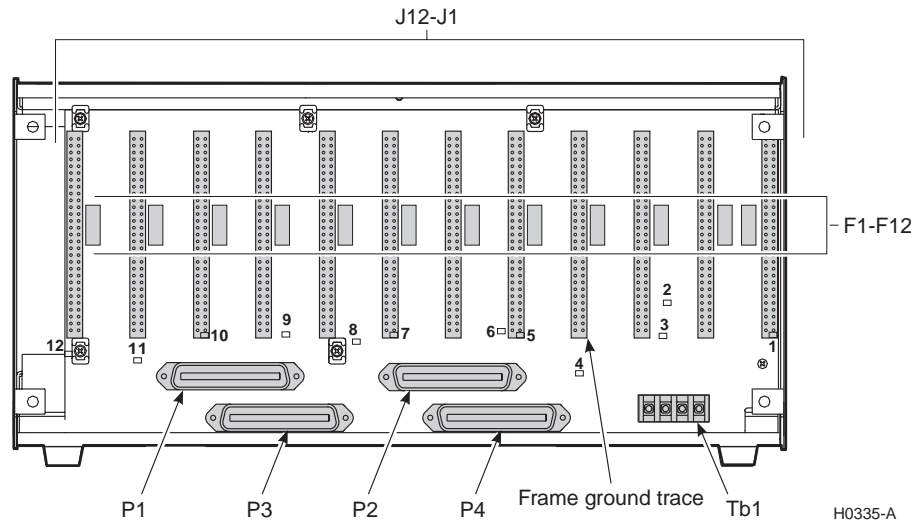
Figure 4.   HRE-425 List 1 Backplane

POWER AND GROUNDING

> **12 numbered, backplane printed circuit traces connect the HRE-425 frame ground to the chassis ground, pin 1, of every slot, which is the normal connection. The trace can be cut to disconnect the HRE-425 frame ground from pin 1 of any slot. This permits the HRE-425 to support plugs which use pin 1 for other purposes than frame ground. (These traces have no effect on pin 27, which always remains connected to frame ground of the shelf.) The area where the trace may be safely cut is identified by a small rectangle. See Figure 4. These locations are numbered with their corresponding slot number, either below or above the rectangle.**

ADC recommends that pin 4 of TB1, frame ground, be connected to earth ground according to the grounding recommendations found in Section 9 of Bellcore's GR-1089-DEC, 1996 (see Figure 6 on page 8). Failure to properly ground the enclosure could result in the following adverse situations:

- bit errors due to the inability of the ungrounded case to attenuate the noise inducing energy from stray EMI fields

- bit errors due to crosstalk from adjacent communication equipment

There is a shock hazard to craft personnel as a result of contact with a case that may have floated to an unsafe voltage. Properly ground the case to avoid shock hazard.

Damage to the HRU circuits may result if the discharge path to earth ground for its secondary surge voltage protection components is missing. Connect pin 4 of TB1 to earth ground to avoid HRU damage (see **Figure 6 on page 8**).

In unusual noise environments, it may be necessary to connect the HRUs circuit ground Pin 17 to frame ground Pin 1 of the card-edge connector to remove bit errors from the T1 payload (see **Figure 5**).
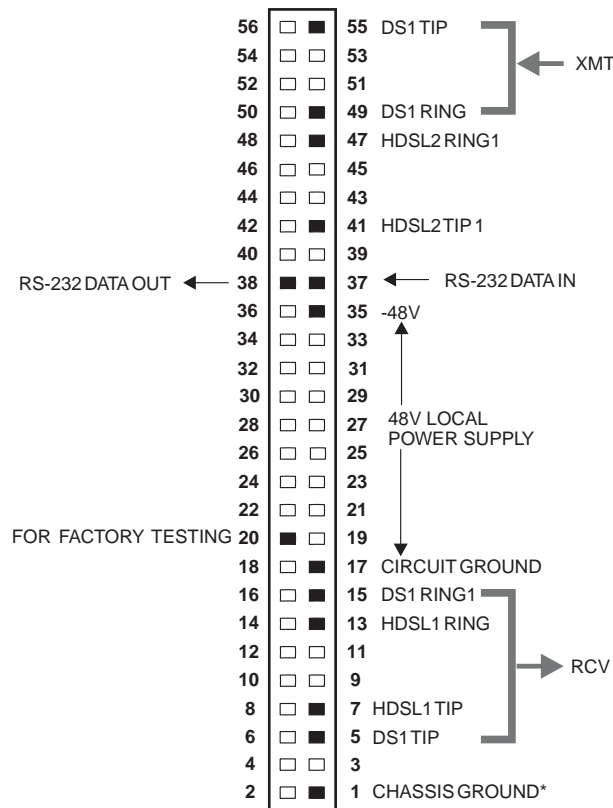
Note: Active pins are highlighted in black

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Figure 5.   HRU Pin Assignments

FUSE ALARM

Each of the 12 slots come equipped with a 0.5 Amp fuse between the 48 Vdc shelf supply and pin 35 as shown in Figure 6 on page 8. This accommodates the maximum power consumption requirements when using the HRE-425 to house HLU-431 line units.

All the fuse alarm contacts are transmitted together on one bus and connected to the Fuse Alarm, pin 3 of TB1. If a fuse opens, the normally floating Fuse Alarm in pin 3 drives to -48 V.

> **When slot 12 is used for the 48 Vdc shelf supply, fuse F12 becomes the shelf fuse and must be replaced by the 2 Amp fuse included in the installation kit. If F12 opens in this application, the Fuse Alarm is left open and will not be driven to -48 V (as would be the case if an external power supply were lost).**
>
> **The internal supply in slot 12 is limited by 2 Amp fuse F12 in order to be compatible with the maximum current rating of typical, 400 mechanics shelf supplies. This 2 Amp capacity is sufficient when HRU remote units are used in the other 11 slots but not when HLU-431 line units are used. An external power supply rated at a minimum of 5 Amps is required to provide adequate power to a shelf full of HLU-431 line units operating under maximum load. See the HLU-431 technical practice for additional information (Refer to "Product Support" on page 17).**

Figure 6 shows the HRE-425's backplane wiring and bus connections.

> **The frame ground is available at both pins 1 and 27 of each slot.**
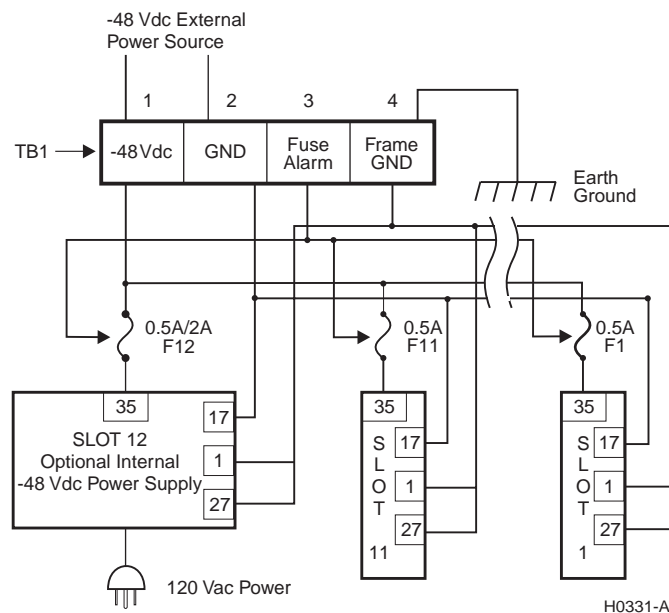
Figure 6. *HRE-425 List 1 Shelf Fusing, Backplane Wiring and Bus Connections*

SLOT-PIN ASSIGNMENTS

Slot-pin assignments for the HRU are shown in Figure 5 on page 7.   Slot-pin assignments for the various other HRE-425 compatible plugs (HDU-451 and EDU-451, HLU-431, and ERU-412) are shown in the following figures. Figure 7 shows the slot-pin assignments for the HDU-451 and EDU-451.

56	□ ■	55 HDSL L2 OUT TIP
54	□ □	53
52	□ □	51
50	□ ■	49 HDSL L2 OUT RWG
48	□ ■	47 HDSL2 IN RING
46	□ □	45
44	□ □	43
42	□ ■	41 HDSL2 IN TIP 1
40	□ □	39
RS-232 DATA OUT ← 38	■ ■	37 ← RS-232 DATA IN
36	□ □	35
34	□ □	33
32	□ □	31
30	□ □	29
28	□ □	27
26	□ □	25
24	□ □	23
22	□ □	21
FOR FACTORY TESTING 20	■ □	19
18	□ □	17
16	□ ■	15 DS1 RING1
14	□ ■	13 HDSL1 RING
12	□ □	11
10	□ □	9
8	□ ■	7 HDSL1 TIP
6	□ ■	5 DS1 TIP1
4	□ □	3
2	□ ■	1 CHASSIS GROUND

Note: Active pins are highlighted in black.

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Figure 7. *HDU-451 and EDU-451 Pin Assignments*

Figure 8 shows the slot-pin assignments for the HLU-431.
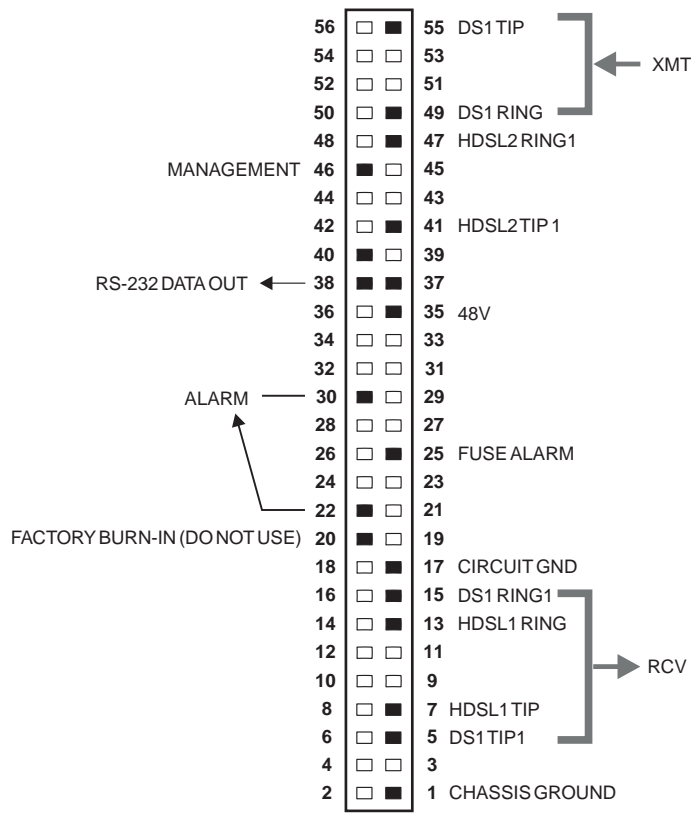
Note: Active pins are highlighted in black

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Figure 8. *HLU-431 Pin Assignments*

Figure 9 shows the slot-pin assignments for the ERU-412.

56	□ ■	55	TIP
54	□ □	53	
52	□ □	51	
50	□ ■	49	RING
48	□ ■	47	HDSL2 RING1
46	□ □	45	
44	□ □	43	
42	□ ■	41	HDSL2 TIP1
40	□ □	39	
38	□ □	37	
36	□ ■	35	
34	□ □	33	
32	□ □	31	
30	□ □	29	–
28	□ □	27	48V LOCAL
26	□ □	25	POWER SUPPLY
24	□ □	23	+
22	□ □	21	
20	□ □	19	
18	□ ■	17	CIRCUIT GROUND
16	□ ■	15	RING1
14	□ ■	13	HDSL1 RING
12	□ □	11	
10	□ □	9	
8	□ ■	7	HDSL1 TIP
6	□ ■	5	TIP1
4	□ □	3	
2	□ ■	1	CHASSIS GROUND*

120-OHM DB 15 G.703 ← XMT

120-OHM DB 15 G.703 → RCV

* CHASSIS GRND MAY BE TIED TO
EARTH GRND PER LOCAL PRACTICE

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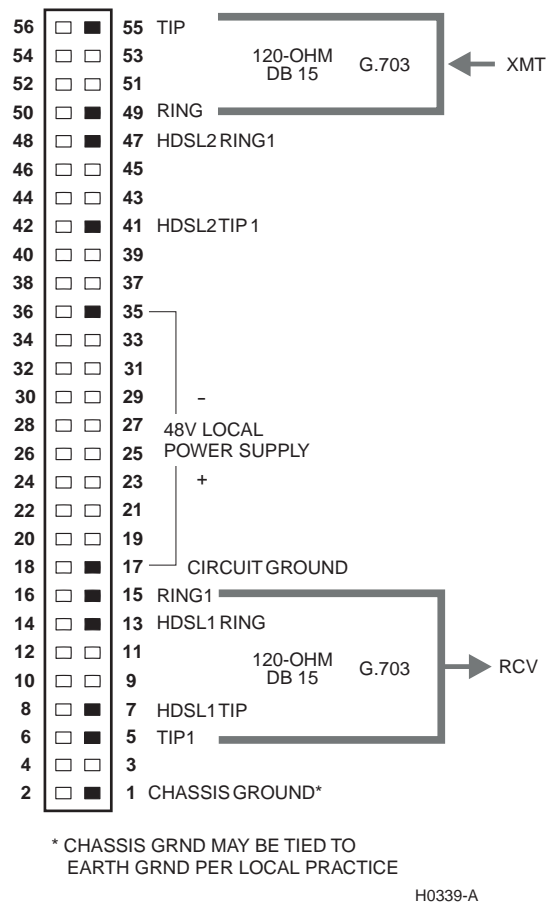
Figure 9.   ERU-412 Pin Assignments

Only the 120Ω, G.703 ERU should be used in the HRE-425. The 75Ω, G.703 ERU should not be used because its 75 Ω interface requires BNC connectors that are not available in the HRE-425.

Field Side HDSL Connections

Connect the HDSL field side ports to the wire-wrap pins of each connector (see above Figure 5, Figure 7, Figure 8, and Figure 9 for representations of slot-pin assignments).

You can also use these connections to access the two HDSL CO side Loop 1 IN and Loop 2 IN pairs for doubler applications.

The HDSL 1 designation refers to Loop 1 and HDSL 2 to Loop 2. If these leads are reversed, a CHREV message is displayed in the ALARMS display field when viewing the HiGain Status screen. This condition does not affect system operation, but should be corrected to avoid any confusion regarding the identities of the two HDSL loops.

> **The two HDSL facilities access cables that terminate on P3 and P4 provide the necessary XMT and RCV isolation required if the HRE-425 is used to provide access to standard T1 facilities, such as when T1 plugs, like SmartJack Network Interface Devices (NIDs), are used.**

The 25-pair backplane connections P3 and P4 are listed below in Table 1.

Table 1. *HDSL Connectors*

P3 (Doubler Loop 1 In/ HDSL Loop 1 In) [a]				
Slot Pin No.	**P3 Pin No**	**Card Slot**	**P3 Pin No.**	**Slot Pin No.**
	1	1	26	
	2	2	27	
13	3	3	28	7
	4	4	29	
HDSL 1	5	5	30	HDSL1
	6	6	31	
Loop 1 In	7	7	32	Loop 1 In
(Doubler)	8	8	33	(Doubler)
	9	9	34	
Ring	10	10	35	Tip
	11	11	36	
	12	12	37	
P4 (Doubler Loop 2 In/HDSL Loop 2 In)				
Slot Pin No.	**P4 Pin No**	**Card Slot**	**P4 Pin No.**	**Slot Pin No.**
	1	1	26	
	2	2	27	
47	3	3	28	41
	4	4	29	
HDSL 2	5	5	30	HDSL 2
	6	6	31	
Loop 2 In	7	7	32	Loop 2 In
(Doubler)	8	8	33	(Doubler)
	9	9	34	
Ring 1	10	10	35	Tip 1
	11	11	36	
	12	12	37	

(a) P3 Pins 13 through 25 and 38 through 50 are unused.

CPE DS1 (G.703) Connections

The DS1 (G.703) XMT and RCV interfaces can be made to the appropriate pins through wire-wrap connections for the card-edge connectors shown in Figure 5 on page 7 for HRU, Figure 7 on page 9 for HDU-451 and EDU-451, Figure 8 on page 10 for HLU-431, or Figure 9 on page 11 for ERU-412. Alternately, they can be connected to the two 50-pair connectors P1 and P2, as shown in Table 2.

Table 2.   *DS1/G.703/Doubler HDSL Connectors*

P1 (DS1/G.703/Doubler HDSL Loop 2 Out [a])				
Slot Pin No.	**P1 Pin No.**	**Card Slot**	**P1 Pin No.**	**Slot Pin No.**
	1	1	26	
	2	2	27	
49	3	3	28	55
	4	4	29	
(DS1, G.703) TX/IN	5	5	30	(DS1, G.703) TX/IN
	6	6	31	
Loop 2 Out	7	7	32	Loop 2 Out
(Doubler)	8	8	33	(Doubler
	9	9	34	
Ring	10	10	35	Tip
	11	11	36	
	12	12	37	
P2 (DS1/G.703/Doubler HDSL Loop 1 Out)				
Slot Pin No.	**P1 Pin No.**	**Card Slot**	**P1 Pin No.**	**Slot Pin No.**
	1	1	26	
	2	2	27	
15	3	3	28	5
	4	4	29	
(DS1, G.703) RX/OUT	5	5	30	(DS1, G.703) RX/OUT
	6	6	31	
Loop 1 Out	7	7	32	Loop 1 Out
(Doubler)	8	8	33	(Doubler)
	9	9	34	
Ring 1	10	10	35	Tip 1
	11	11	36	
	12	12	37	

(a) P1Pins 13 through 25 and 38 through 50 are unused.

You can purchase optional 12-port RJ48 harmonic cable assemblies for the CPE interface from ADC: (refer to "Product Support" on page 17).

- RJ48C (Part Number 150-2201-01), shown in Figure 10 on page 14
- RJ48X (Part Number 150-2201-02), shown in Figure 11 on page 15

You can attach these cable assemblies to the top, bottom, or either of the two side plates through the wall mounting holes located on all 4 of these plates. Figure 3 on page 5 shows the locations of these mounting holes on the side panel. Similar mounting holes are provided in the top and bottom plates (not shown).
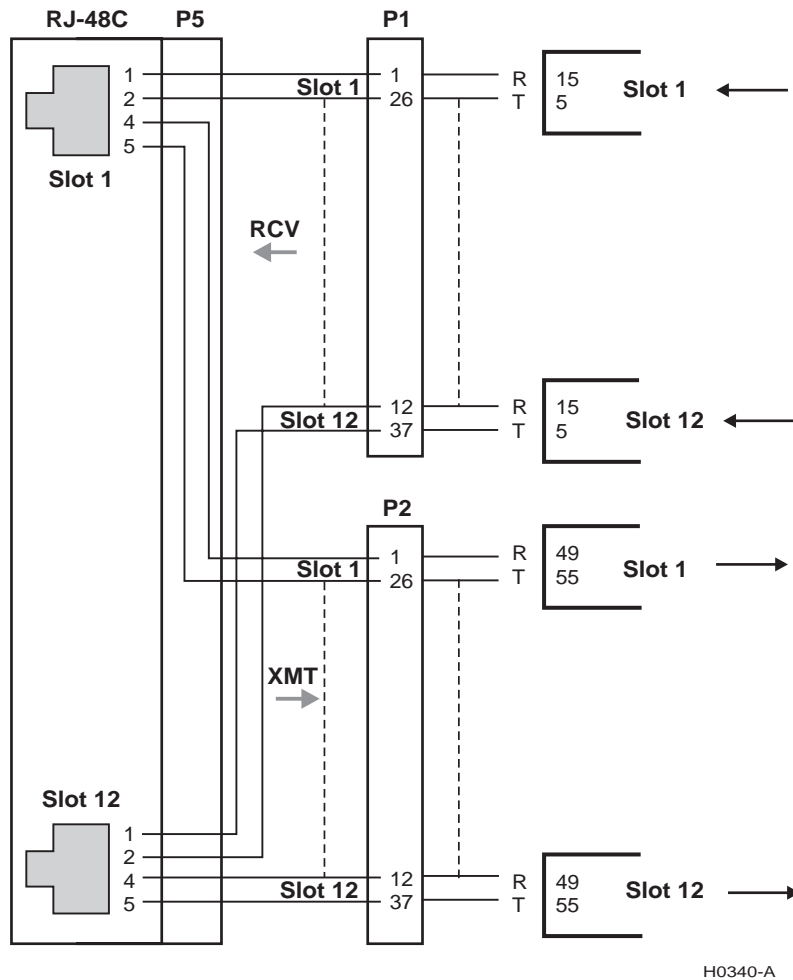

Figure 10. *DS1, G.703 RJ48C Harmonic Cable Interface Assembly (Part Number 150-2201-01)*
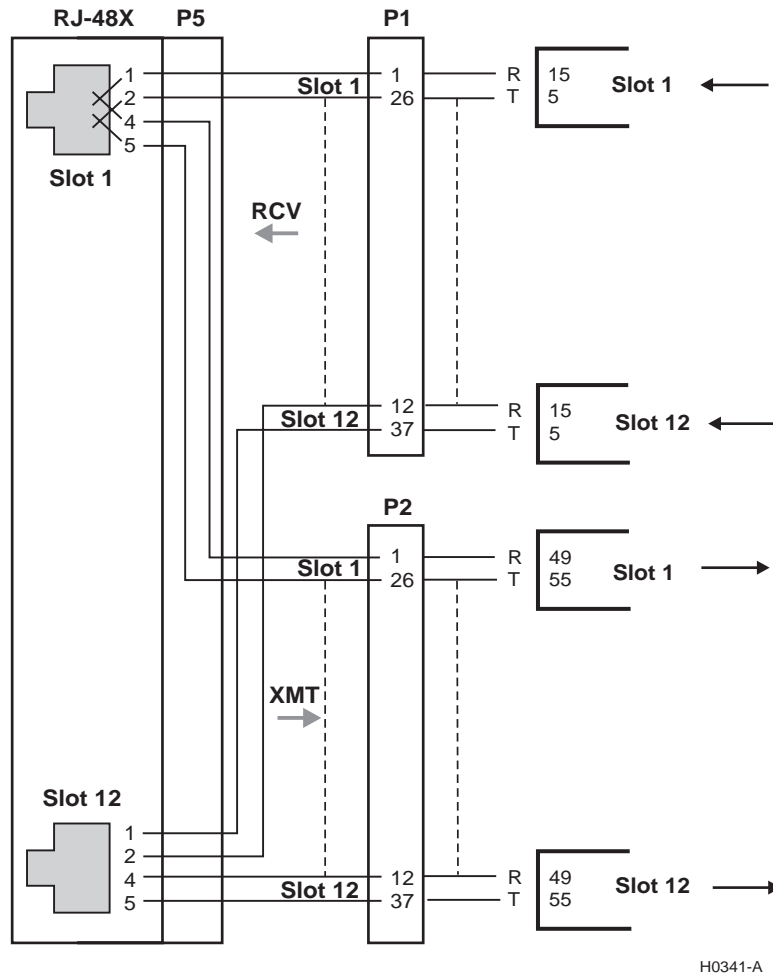
Figure 11. *DS1, G.703 RJ48X Harmonic Cable Interface Assembly (Part Number 150-2201-02)*

TURN-UP

> ⚠️ **Before handling the plug-in modules attach a wrist strap to the anti-static Bantam jack (shown in Figure 1 on page 1).**

Follow these steps to complete the turn-up procedure:

1 Open the front panel by loosening the Hex nut shown in Figure 1 on page 1, then gently lower the panel.

2 Insert the card in the assigned slots. Refer to the card's technical practice for the appropriate turn-up procedure.

SPECIFICATIONS

Mounting	Twelve type 400 or 200 mechanics plugs
Telco Facility	25-pair, type 57, male connector (P3), wire-wrap
	25-pair, type 57, male connector (P4), wire-wrap
CPE	DS1 (G.703) RCV (output toward CPE):
	25-pair, type 57, male connector (P1), or wire-wrap
	DS1 (G.703) XMT (input from CPE):
	25-pair, type 57, male connector (P2), or wire-wrap
	RJ48 Connector Option Cables:
	12-port, RJ48 C harmonic, connector cable assembly #150-2201-01
	12-port, RJ48 X harmonic, connector cable assembly #150-2201-02
In-shelf Power Supply Option	120 Vac to 48 Vdc @ 2 A. Westel 6060-03, Wescom 8548-13 or Troncom MPS-2500 (customer provided)
	or ADC HPS-448
Fusing	0.5 A protection per slot, factory-provided
Height	8.75 in. (23 cm.)
Width	17.4 in. (45 cm.)
Depth	11.5 in. (30 cm.)
Weight	22 lb. (9.9 kg.)

The power supply capacity and its fuse must conform to the power required by the plugs being used. Consult the appropriate practice for each plug's power requirements.

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 extension 73000
(USA and Canada)
952.917.3000
Fax: 952.917.3237

- Quotation Proposals
- Ordering and Delivery
- General Product Information

Systems Integration
800.366.3891, extension 73000
(USA and Canada)
952.917.3000

- 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
800.638.0031
714.730.3222
Fax: 714.730.2400
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/technical support

Online Technical Publications

- www.adc.com/documentation library/technical publications

Product Return Department
800.366.3891 ext. 73748 or
952.917.3748
Fax: 952.917.3237
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.

BAR CODE AND CONFIGURATION NUMBER INFORMATION

Figure 12 shows the location of the bar code and configuration number labels. Table 3 provides a brief description of what the labels represent.
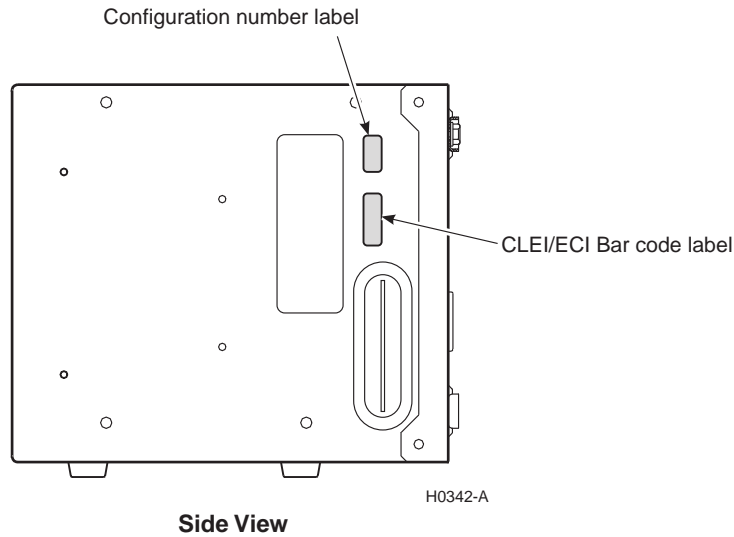

Side View

Figure 12. *HRE-425 List 1 Bar Code and Configuration Number Label Locations*

Table 3. *HRE-425 List 1 Bar Code and Configuration Number Label Descriptions*

Item	Description
CLEI/ECI Bar code label	Contains human-readable Common Language Equipment Identifier (CLEI) code number and Equipment Catalog Item (ECI) bar code number.
Configuration number label	This label contains the configuration or revision number, the part number, the date the warranty begins, and the bar code serial number.

ABBREVIATIONS

CLEI	Common Language Equipment Identifier
CO	Central Office
CPE	Customer Premises Equipment
DS1	Digital Signal, level 1
ECI	Equipment Catalog Item
HCDS	High Capacity Digital Service
HDSL	High-bit-rate Digital Subscriber Line
HDU	HiGain Doubler Unit
HLU	HiGain Line Unit
HRE	HiGain Remote Enclosure
HRU	HiGain Remote Unit
NID	Network Interface Device
RMA	Return Material Authorization
RCV	Receive
XMT	Transmit

CERTIFICATION AND WARRANTY

FCC CLASS A COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment 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 expense.

LIMITED WARRANTY

ADC DSL Systems, Incorporated ("ADC") warrants that, for a period of sixty (60) months from the date of shipment, the hardware portion of its products will be free of material defects and faulty workmanship under normal use. ADC's obligation, under this warranty, is limited to replacing or repairing, at ADC's option, any such hardware product which is returned during the 60-month warranty period per ADC's instructions and which product is confirmed by ADC not to comply with the foregoing warranty.

The transportation charges for shipment of returned products to ADC will be prepaid by the Buyer. ADC will pay transportation charges for shipment of replacement products to Buyer, unless no trouble is found (NTF), in which case the Buyer will pay transportation charges.

ADC may use reconditioned parts for such repair or replacement. This warranty *does not* apply to any product which has been repaired, worked upon, or altered by persons not authorized by ADC or in ADC's sole judgment has subjected to misuse, accident, fire or other casualty, or operation beyond its design range.

Repaired products have a 90-day warranty, or until the end of the original warranty period—whichever period is greater.

ADC DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ITS PRODUCTS AND ANY ACCOMPANYING WRITTEN MATERIALS. FURTHER, ADC DOES NOT WARRANT THAT SOFTWARE WILL BE FREE FROM BUGS OR THAT ITS USE WILL BE UNINTERRUPTED OR REGARDING THE USE, OR THE RESULTS OF THE USE, OF THE SOFTWARE IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY OR OTHERWISE.

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.

STANDARDS COMPLIANCE

This equipment has been tested and verified to comply with the applicable sections of the following standards.

- GR 63-CORE - Network Equipment-Building System (NEBS) Requirements: Physical Protection
- GR 1089-CORE - Electromagnetic Compatibility and Electrical Safety
- UL-1459 - Underwriters Laboratories

> **The HRE-425 List 1 has not been tested for compliance with UL-1459 when it is used to house HiGain doublers such as the HDU-451 and HDU-404.**

For technical assistance, refer to

ADC DSL Systems, Inc.

14402 Franklin Avenue
Tustin, CA 92780-7013

Tel: 714.832.9922
Fax: 714.832.9924

Technical Assistance

Tel: 800.638.0031
Tel: 714.730.3222
Fax: 714.730.2400