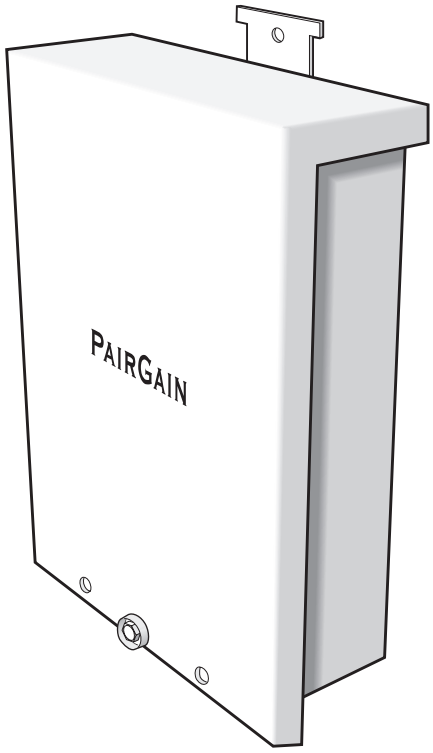
HiGain Remote Enclosure

Model	List Number	Part Number	CLEI Code
HRE-450	5	150-1121-05	T1RHCAS4RD



PairGain Technologies, Inc.
Engineering Services Technical Practice

Section 150-450-105-02

PairGain

Revision History of This Practice

Revision	Release Date	Revisions Made
02	November 4, 1998	CLEI Code update

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USING THIS TECHNICAL PRACTICE

Two types of messages, identified by icons, appear in the text.

Notes contain information about special circumstances.

Cautions indicate the possibility of equipment damage or the possibility of personal injury.

INSPECTING SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect it for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to PairGain. 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 PairGain as described in the Warranty. If you must store the equipment for a prolonged period, store the equipment in its original container.

TABLE OF CONTENTS

OVERVIEW

This technical practice describes the PairGain® HiGain® Remote Enclosure Model HRE-450 List 5. The HRE-450 is one component of the HiGain T1 transmission system, which transmits data at up to 1.544 Mbps on two unconditioned copper pairs over the full Carrier Service Area (CSA) range. A HiGain system consists of a line unit and a remote unit, and may include up to four doublers to extend the transmission distance.

This HRE-450 List 5 is a dual stub, weatherproof enclosure that houses either one single-slot HiGain Remote Unit (HRU) or one HiGain Doubler Unit (HDU). The HRE-450 is designed to be mounted outdoors on any suitable above-ground surface, such as a concrete wall or wood telephone pole. The HRE-450 cannot be pressurized, and therefore cannot be installed in an underground location.

FEATURES

- Compact design
- Easily mounted on a wall or pole using supplied screws
- Front cover opens easily, which enables quick inspection or service of enclosed unit
- Uses weather-sealing cable fittings that protect connections and provide strain relief
- Protects remote or line unit against adverse weather conditions and harmful contaminants
- Uses Quiet-Front Connector Modules (QFCMs) to provide electrical surge protection and corrosion-resistant wire

APPLICATIONS

The HRE-450 List 5 enclosure is primarily intended for housing a PairGain HRU-411 remote unit when used in Personal Access Communication Systems (PACS) application. A typical PACS circuit is shown in Figure 1 on page 2. The figure shows the wire connections from the stub. Stub 1 contains the two network HDSL pairs (White/Orange and White/Slate) that connect the HRU-411 to the upstream HiGain module (HLU or HDU). Stub 2 contains the two DS1 pairs (White/Blue and Red/Blue) and the power pair (White/Brown). The power pair connects the HRU-411 special 60 to 130 V, 8.5 W power supply to an external PACS remote 200 mW radio station such as the NEC radio port. Only the HLU-231 List 8x, HLU-319 List 5x and HLU-388 List 5x line units and the HDU-409 doubler can be used with the HRU-411 in PACS applications.

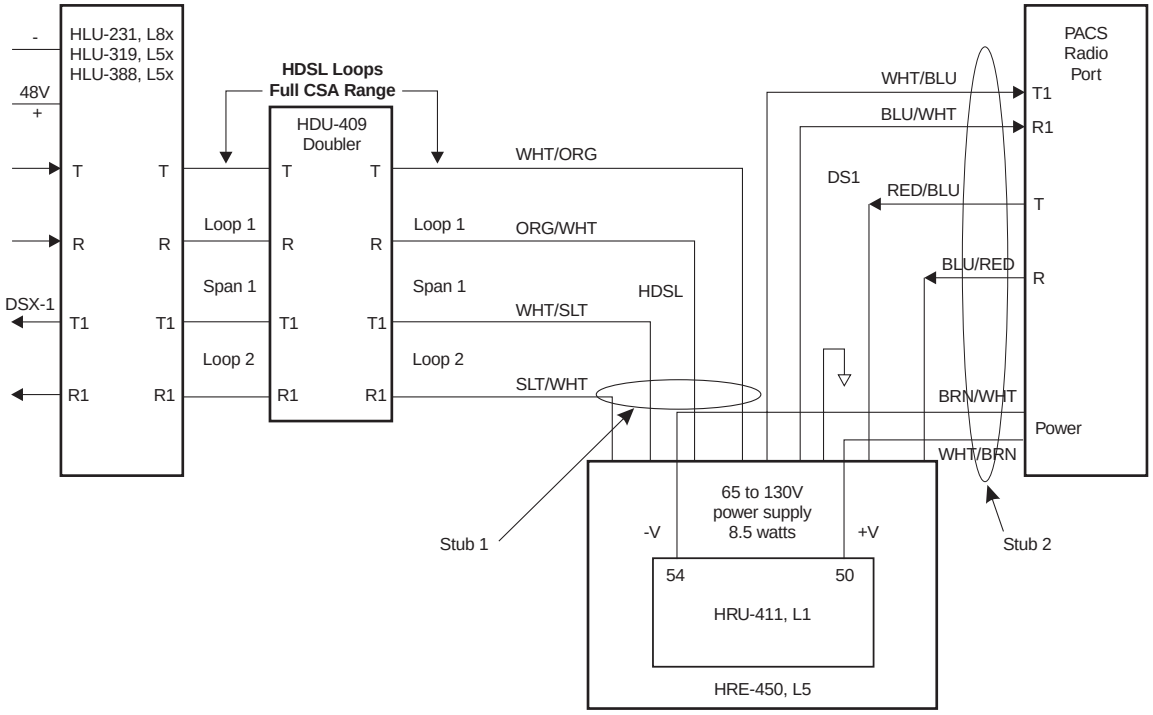

Figure 1. *HRU-411 PACS Application Interface*

DESCRIPTION

This section describes the components and compatibility of the HRE-450.

HRE-450 LIST 5 COMPONENTS

The HRE-450 is a weather-resistant, non-pressurized white-rectangular enclosure with a removable front lid. It can house one unit with either 400 or SLIM mechanics. SLIM mechanics plugs are half the width of the 400 mechanics. Figure 2 and Table 1 on page 4 identify the HRE-450 components.

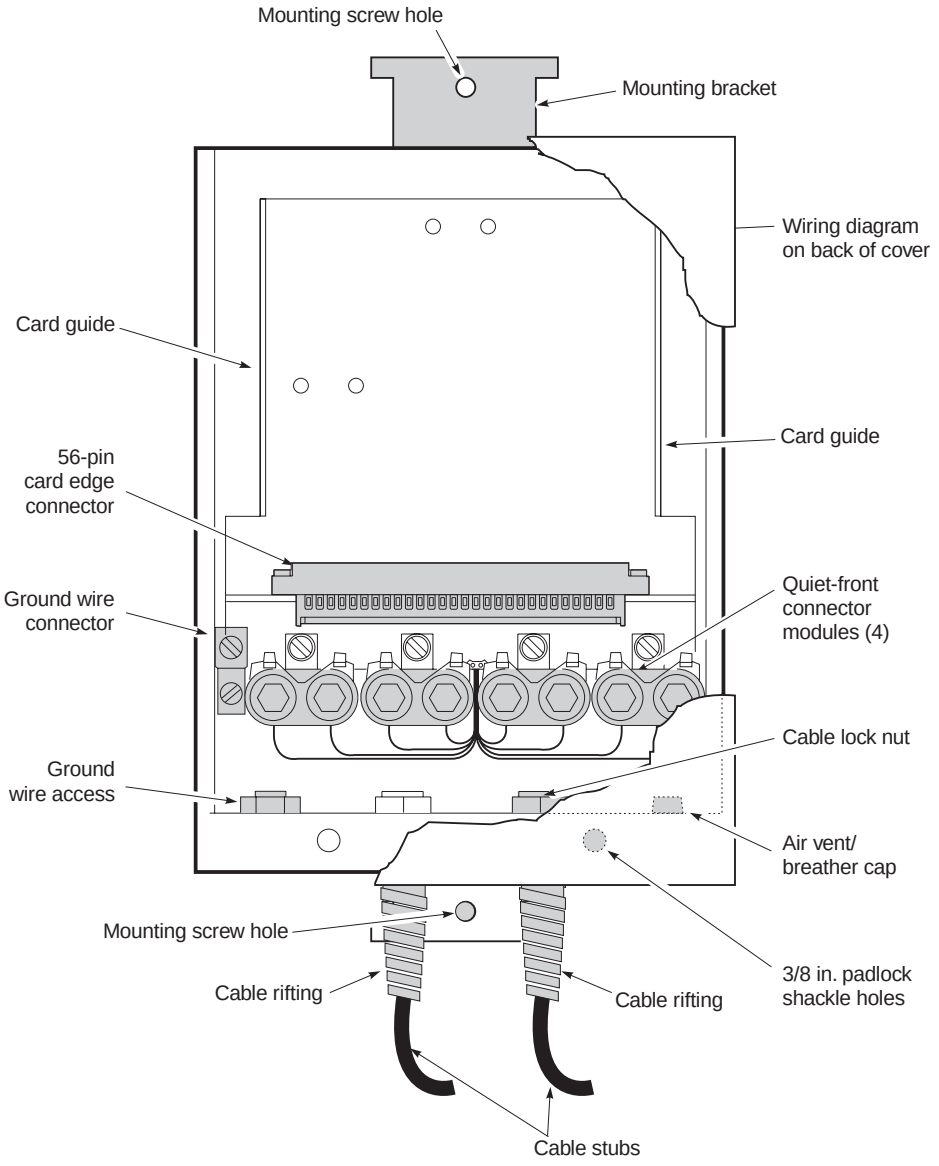

Figure 2. *HRE-450 Components*

Table 1. *HRE-450 Components*

Component	Function
Locking tab	Secures the unit to the connector.
Mounting screw guides	Indicate where to drill the mounting screw holes.
Mounting bracket	Secures the remote unit or doubler in the enclosure.
Wiring diagram label	Provides installation wiring diagram for both DS1 and HDSL interfaces.
56-pin card edge connector	Provides card edge connectivity for the installed remote or doubler unit.
Card guides	Guides and aligns card with card-edge connector during card insertion.
Quiet-Front Connector Modules	Primary surge protection to all four ports.
Ground wire connector	Used to attach the grounding wire.
Ground wire access	Access hole for insertion of ground wire lug.
Air vent/breather cap	Permits air circulation and keeps internal atmosphere free of harmful contaminants.
3/8 in. padlock shackle holes	Used to attach a padlock for security.
Cable stubs	Provide access for HDSL, DS1 and power wires.
Compression connector nuts	Creates a nearly air-tight fit to inhibit water and other contaminants.
Cable rifting	Protects excessive bending of stub at entrance point.

COMPATIBILITY

The HRE-450 is compatible with all PairGain HiGain HRU and ERU remote units and HDU-451 and EDU-451 units.

INSTALLATION

This section describes the tools and procedures for installing the HRE-450.

INSTALLATION KIT

The HRE-450 installation kit components are listed in Table 2. If any of the above items are missing, or the shipment is damaged, please contatct your PairGain sales representative.

Table 2. *Installation Kit*

Quantity	Description
1	HiGain Remote Enclosure (HRE) 500 Technical Practice, Section 150-450-100
2	three wood screws (#10 x 1.5 inch)
1	three anchor nuts (#10 x 1 inch)
2	three flat washers (#10 CPS/ZPS)
2	one cable tie (5.5 inch length, 0.15 inch width)

LOCATING THE NECESSARY TOOLS

To install the HRE-450, you need the following tools:

- blade screwdriver
- drill
- wood/metal or concrete drill bit, depending on installation surface
- hammer
- Type 216C (7/16 in.) wrench

INSTALLING THE HRE-450

Install the HRE-450 onto a concrete or wood surface, such as a wall or telephone pole, using the hardware provided in the Installation Kit. The HRE-450 must be installed above ground, in a location that provides access to wiring and grounding connections. To install the unit:

1 Using a 3/8 inch can wrench, or an adjustable wrench, loosen the cover screw on the HRE-450, then remove the cover.

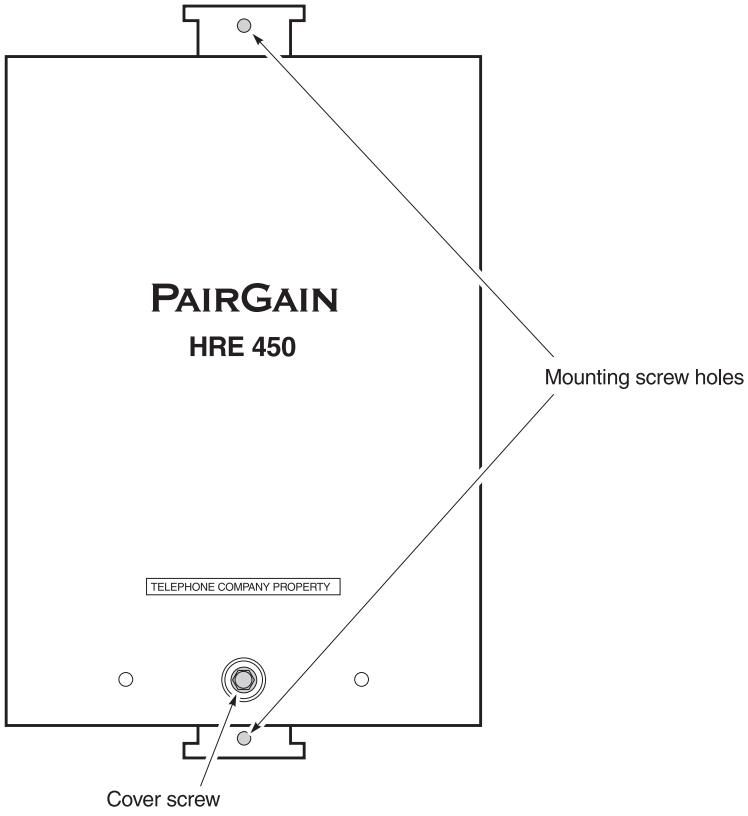

Figure 3. *Locating the HRE-450 Cover Screw*

2 The two compression connector nuts must be secure to seal the unit from water damage. If a fitting is not secure, tighten it using your fingers.

To locate the two compression connector nuts, see Figure 2 on page 3**.**

3 Place the HRE-450 in the selected installation location, then mark the mounting screw hole locations on the installation surface, using the mounting screw guides.

The HRE-450 must always be mounted vertically with the stubs pointing down. This prevents wind-driven rain and running water from entering the enclosure. Horizontal installations should never be used.

4 Do one of the following:

- If the installation location is wood, use a drill with a wood or metal drill bit to drill the mounting screw holes into the wooden surface.
- If the installation location is concrete, use a drill with a concrete drill bit that is slightly smaller than the diameter of the anchor nuts to drill the mounting screw holes into the concrete surface.

5 Insert the two anchor nuts into the mounting holes and tap the anchor nuts into place with a hammer.

6 While holding the HRE-450 in place, place a washer over one of the mounting-screw holes, then use a #2 screwdriver to screw one of the provided screws into the mounting hole.

7 While holding the HRE-450 in place, place a washer over the other mounting-screw hole then use a #2 screwdriver to screw one of the provided screws into the mounting hole.

WIRING THE HRE-450

The HRE-450 List 5 has two 20-foot air-filled stubs. Each stub is a 6-pair, 24 AWG plastic-insulated, single-jacketed, air core cable intended for aerial (above ground) applications. Conductors are insulated with solid high-density polyethylene. Standard color codes are used for pair identification with color compounds chosen for electrical balance and permanency. A non-hygroscopic core wrap protects the core and provides improved mechanical electrical characteristics. The cable core shield is a corrugated copolymer coated 8 mil aluminum tape. The outer jacket consists of a black, low-density polyethylene material that provides a flexible protective covering that withstands exposure to sunlight, atmospheric temperatures, ground chemicals and stresses expected in standard installations. The cable complies with the requirements of ANSI/ICEA S-85-625-1989 and REA PE-22. The outside diameter of the cable is 0.36 inches (9 mm).

Figure 4 shows the identity of the five ports to which each cable stub provides access. The CO ports are restricted to the CO HDSL cable pair connections that connect the HRE-450 to either a doubler or a line unit. The field pairs connect to the DS1 interfaces for remote unit applications.

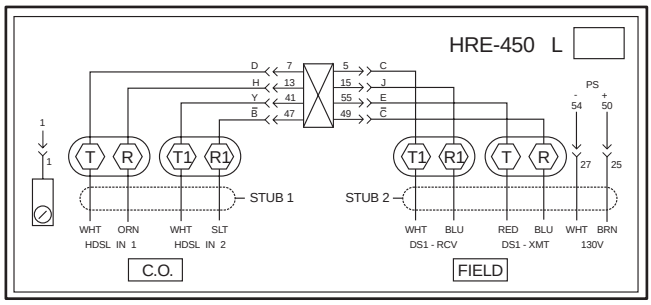

Figure 4. *HRE-450 Wiring Diagram*

The HRU-411 edge connector (inner set of pins) and the mating HRE-450 edge connector (outer set of pins) have different reference designations for the same pins.

Connect the HRE-450 to the signal cables and ground wire:

1 Loosen the compression connector nuts on the bottom of the HRE-450 using one of the following methods:

- Using your hand, turn the compression connector nuts counterclockwise.
- If the compression connector nuts are too tight to loosen by hand, use groove-joint pliers to hold each cable fitting center locknut, then use groove-joint pliers to turn each compression nut counterclockwise.

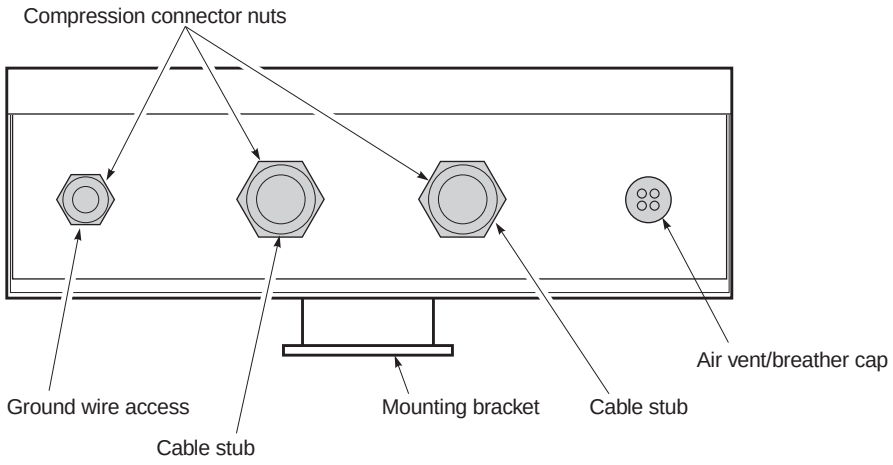

Figure 5. *Bottom View of the HRE-450*

2 Feed solid ground wire, up to #6 AWG, through the HRE-450 GND cable fitting.

3 Strip approximately 1/2 inch of insulation from the end of the ground wire.

4 Insert the stripped wire into the ground wire access, then tighten the ground wire connector.

5 Using your fingers, tighten the ground wire connector.

6 Remove the compression connector nut from the cable stub fitting.

7 Insert approximately 6 inches of interface telephone cable through the exposed cable stub fitting hub.

8 Slit the ends of the leads of each drop-wire pair and bend as shown in Figure 6.

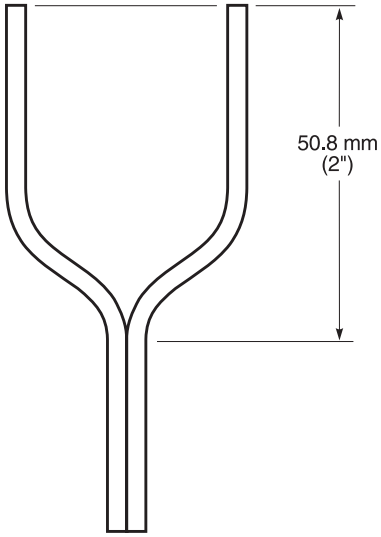

Figure 6. *Preparing the Wire Pair for Insertion into the Quiet-Front Connector Modules*

Do not strip the drop-wire pair insulation.

9 Use a Type 216C (7/16 inch) wrench to rotate each QFCM lug 1/4 turn counterclockwise to open the connectors.

Do not rotate the QFCM lug more than 1/4 turn or you will cut the wire.

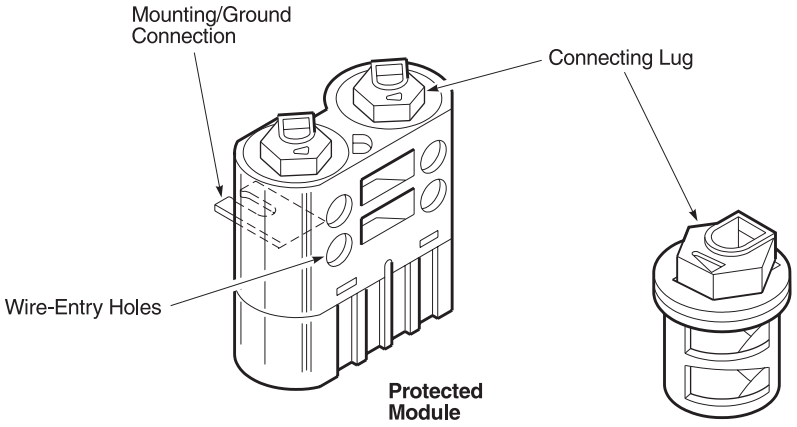

Figure 7. *Locating the QFCM Connecting Lug*

10 Insert the first pair's Tip and Ring wires into the Wire-Entry holes in the first QFCM, until the wires touch the ends of the transparent plastic caps.

11 While holding the Tip and Ring wires in place with your fingers, use a Type 216C (7/16 inch) wrench to rotate each QFCM lug 1/4 turn clockwise.

Do not rotate the QFCM lug more than 1/4 turn or you will cut the wire.

12 Using your fingers (do not use pliers or a wrench), tighten the cable rifting compression nut.

If necessary, use groove-joint pliers to hold each cable rifting center locknut while tightening each compression nut with your fingers.

13 Use cable ties to dress the wires that enter the enclosure box and connect to the QFCM terminals, per local practice.

14 Position and secure the ground wire along the installation surface and connect it to a nearby ground, per local practice.

INSTALLING A DOUBLER OR REMOTE UNIT

To install a doubler or remote unit in the HRE-450:

1 Slide the doubler or remote unit into the slot until firmly seated.

2 Connect the locking table to the unit to secure the unit to the enclosure.

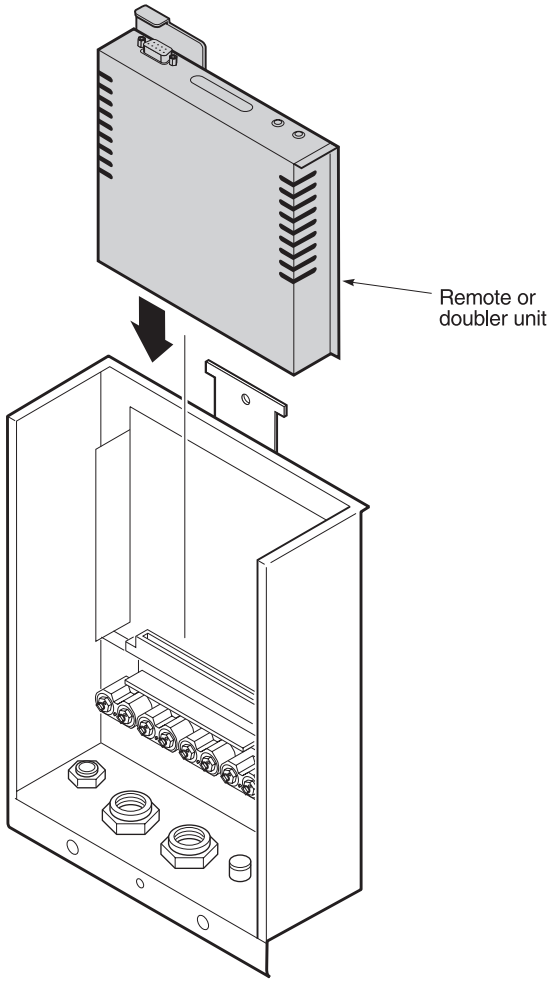

Figure 8. *Installing a Remote or Doubler Unit in an HRE-450*

3 Verify that the unit completes its initial power-on cycle and that both front-panel HDSL LEDs light green.

4 Install the HRE-450 cover and use a torque wrench to tighten the screw to approximately 6 to 8 inch/pounds (maximum) torque to secure.

APPENDIX A - SPECIFICATIONS

This appendix describes the HRE-450 technical specifications.

Physical

Material	Steel
Finish	Zinc plated
Mounting	Wood, wall or pole

Enclosure Box

Height	9.31 inch (23.65 cm)
Width	7.31 inch (18.57 cm)
Depth	2.31 inch (5.87 cm)

Enclosure Lid

Height	10.25 inch (26 cm)
Width	7.5 inch (19.1 cm)
Depth	2.69 inch (6.83 cm)

Quiet Front Connector Modules (QFCM)

Electrical Protection	Each QFCM module contains a 60 A, three-element, gas-tube surge protector with a 265-600 VDC breakdown voltage at breakdown rate of 2000 V/second
Specification compliance	PB 80 Heavy Duty, Bellcore TP-TS-1-000073, GTS 8376, UL 497

Environmental

Operating Temperature	- 40 C to + 65 C (40°F to 149°F)
Operating Humidity	5 to 95% non-condensing

APPENDIX B - PRODUCT SUPPORT

This section contains product support and warranty information.

TECHNICAL SUPPORT

PairGain Technical Assistance is available 24 hours a day, 7 days a week by contacting PairGain Customer Service Engineering group at:

Telephone: (800) 638-0031 or (714) 832-9922

Fax: (714) 832-9924

During normal business hours (8:00 AM to 5:00 PM, Pacific Time, Monday through Friday, excluding holidays), technical assistance calls are normally answered directly by a Customer Service Engineer. At other times, a request for technical assistance is handled by an on-duty Customer Service Engineer through a callback process. This process normally results in a callback within 30 minutes of initiating the request.

In addition, PairGain maintains a computer bulletin board system for obtaining current information on PairGain products, product troubleshooting tips and aids, accessing helpful utilities, and for posting requests or questions. This system is available 24 hours a day by calling (714) 730-2800. Transmission speeds up to 28.8 kbps are supported with a character format of 8-N-1.

WARRANTY

PairGain Technologies warrants this product to be free of defects and to be fully functional for a period of 60 months from the date of original shipment, given correct customer installation and regular maintenance. PairGain will repair or replace any unit without cost during this period if the unit is found to be defective for any reason other than abuse or incorrect use or installation.

Do not try to repair the unit. If it fails, replace it with another unit and return the faulty unit to PairGain for repair. Any modifications of the unit by anyone other than an authorized PairGain representative voids the warranty.

If a unit needs repair, call PairGain for a Return Material Authorization (RMA) number and return the defective unit, freight prepaid, along with a brief description of the problem, to:

PairGain Technologies, Inc.
14352 Franklin Avenue
Tustin, CA 92780
ATTN: Repair and Return Dept.
(800) 638-0031

PairGain continues to repair faulty modules beyond the warranty program at a nominal charge. Contact your PairGain sales representative for details and pricing.

Corporate Office

14402 Franklin Avenue
Tustin, CA 92780

Tel: (714) 832-9922
Fax: (714) 832-9924

For Technical Assistance:

(800) 638-0031

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