

HiGain

USER MANUAL



HRE-420 Lists 1, 2, 3, and 4

HiGain Remote Indoor Enclosure

Product Catalog: 150-1115-01, 150-1115-02,
150-1115-03, 150-1115-04

CLEI: T1RHC904MA (List 1), T1RHC9A4MA
(List 2)



Revision History of This Manual

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Issue	Release Date	Revisions Made
2	June 14, 1996	Added List 4.
3	February, 27, 2002	ADC rebranding of document - no technical changes.
4	November 21, 2003	Updated Table 1, Power and Grounding section, HDSL Loop 1 and 2 section, and Product Support section.

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November 21, 2003

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USING THIS MANUAL

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.

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 13](#). If you must store the equipment for a prolonged period, store the equipment in its original container.

TABLE OF CONTENTS

Product Overview	1
Description And Features	1
Applications	2
Specifications	2
Operating Temperature and Humidity	2
Dimensions	2
Certification	3
UL Listing	3
CSA Certification	3
Installation	3
Installation Options and Wiring	4
Mounting	5
Power and Ground Wiring	5
List 1 and 2 DS1/HDSL Interface Wiring for HRU-412 Domestic Applications	6
HDSL Loop 1 and 2	6
DS1 HRU Connections to CI	6
List 1, 2, 3, and 4 HDSL Interface Wiring for EDU-451 and HDU-451 Doubler Applications	7
HDSL Loop 1 and 2 (IN)	7
HDSL Loop 1 and 2 Out Connections	7
List 3 G.703 120 Ohm Interface Wiring for ERU-412 International Applications	8
HDSL Loop 1 and 2 (IN) Connections	8
120 Ohm G.703 Connections to C1	8
List 3 G.703 75 Ohm Interface Wiring for ERU-412 International Applications	8
HDSL Loop 1 and 2 (In) Connections	8
G.703 75 Ohm ERU Connections to C1	8
List 4 DS1 Interface Wiring for HRU-412 Canadian Applications	8
Turn Up	12
Product Support	13
Limited Warranty	Inside Back Cover

LIST OF FIGURES

1. HRE-420 Enclosure (Front View)	1
2. HRE-420 Enclosures (Rear View)	4
3. HRE-420 Enclosure Cover and Wall Mounting Plate	5
4. HRE-420 List 1 and 2 Printed Circuit Board and TB1 Pin Assignments	6

5. HRE-420, List 1 and 2 Block Diagram.....	7
6. HRE-420, List 3 Printed Circuit Board and TB1 Pin Assignments.....	9
7. HRE-420, List 3 Block Diagram	9
8. HRE-420, List 4 Printed Circuit Board and TB1 Pin Assignments.....	10
9. HRE-420, List 4 Block Diagram	10
10. List 1, RJ-48C Pin Assignments	11
11. List 2, RJ-48X Pin Assignments.....	11
12. List 3 and List 4, DB-15 Pin Assignments	12
13. Wall Mounting Base	12

LIST OF TABLES

1. Compatible Remote Plugs	2
2. List of Materials.....	4

PRODUCT OVERVIEW

Description And Features

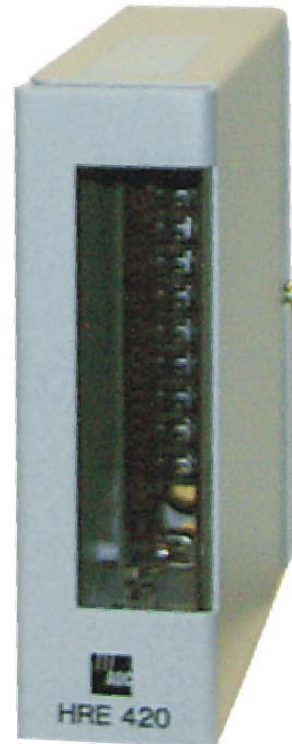


Figure 1. HRE-420 Enclosure (Front View)

ADC's HiGain Remote Indoor Enclosure model HRE-420 can accept either one single width, "400 or 200" mechanics type plugs (see Figure 1). The List 1 and 2 units have RJ-48C and RJ-48X DS1 interface connectors, respectively. Their main applications are in the RBOCs (Regional Bell Operating Companies) and the independent telephone companies in the United States. The List 3 unit has one DB15 and two BNC connectors that comply with the G.703, (120 ohm balanced and 75 ohm unbalanced), international ERU-412 applications respectively. The List 4 unit has one DB-15 and one RJ-48C connector which meet the DS1 Canadian interface requirements. The HRE-420 compatible remote plugs and their technical practices are shown in [Table 1 on page 2](#):

Table 1. Compatible Remote Plugs

Model	Document Catalog Number
HRU-402, List 1 & 3	150-1592-100-xx
HRU-402, List 1A	150-1592-111-xx
HRU-402, List 4	LTPH-TP-1024-xx
HRU-412, List 6	150-412-106-xx
HRU-412, List 7	150-412-107-xx
HRU-412, List 8	150-451-108-xx
HRU-412, List 9	150-412-109-xx
HRU-412, List 9B	150-412-192-xx
HLU-432, List 1	150-432-100-xx
HDU-451, List 1 & 2	150-451-100-xx
HDU-451, List 3	150-451-103-xx
HDU-451, List 4	150-451-104-xx
EDU-451, List 1	150-451-200-xx
EDU-451, List 2	150-451-202-xx
ERU-412, List 1 & 2	150-412-201-xx
HRU-512, List 1	150-512-100-xx
HRU-612, List 1	150-612-100-xx

Applications

The HRE-420 enclosure consists of a wall mount section and a cover which slides over and is attached to the wall mount section. The wall mount section has a printed circuit board which connects the card edge connector to terminal block TB1, an RJ-48 (List 1 & 2), a DB-15 connector, and two BNC connectors (List 3) and an RJ-48C and DB-15 connector (List 4). The 10-position terminal block (TB1) provides access to all interface signal (HDSL and DS1) connections plus battery and ground. A rear panel punch-out labeled LEC (Local Exchange Carrier) provides cable access to TB1. The RJ-48 connector is configured as a non-shorting (looping) RJ-48C for List 1 and List 4, and a shorting (looping) RJ-48X for List 2.

The DB-15 connector and BNC connectors are provided in the List 3 unit only. The cover slides over the wall mounted section and is secured to it with a screw.



The HDU-451 and EDU-451 are not UL listed and their use in the HRE-420 will void the UL certification of the HRE-420.

SPECIFICATIONS

Operating Temperature and Humidity

-40° to +65° Celsius, 5% to 95% (non-condensing)

Dimensions

Height: 6.5 in. (16.51 cm)

Width: 2.0 in. (5.08 cm)

Depth: 9.5 in. (24.13 cm)

Weight 22 oz (623.7 g)

CERTIFICATION

UL Listing

The HRE-420 is a UL-listed component. Use normal caution when installing or modifying telephone lines. Dangerous voltages may be present. It is also considered imprudent to install telephone wiring during a lightning storm. Always disconnect all telephone lines and power connections before servicing or disassembling this equipment.

For performance and safety reasons, only power supplies listed for use with telephone equipment by a Nationally Recognized Testing Laboratory (NRTL) should be used with ADC equipment.



Use of the HDU-451 or EDU-451 doubler units in the HRE-420 will void UL certification.

CSA Certification

The HRE-420 has been tested and found to comply with CSA Standard C22.2 -950 with telecommunication features.

Installation

Refer to the installation section of the appropriate instruction manual for the unit you are installing for:

- Cabling information
- Proper connections
- Grounding information
- Line vs. local power

All wiring external to the product(s) should follow the provisions of the current edition of the National Electrical Code.



These units contain no user serviceable components. Only authorized ADC Service Personnel should service or repair these units. Use only with isolated Class 2 power source, rated 48 Vdc 3.0A maximum.

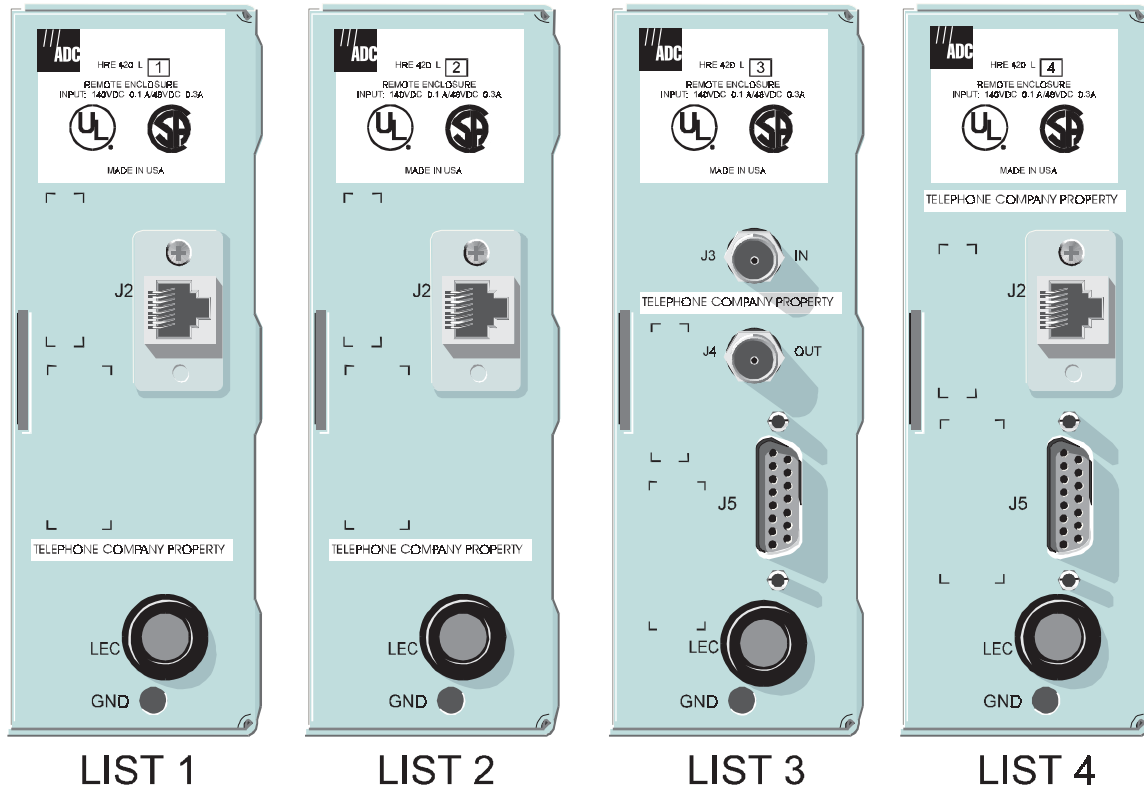


Figure 2. HRE-420 Enclosures (Rear View)

The ADC HRE-420 is a 1-slot wall mounted enclosure, which accepts one HiGain HRU-402 Remote Unit, one HiGain HRU-412 Remote Unit, or one HiGain HDU-451 Doubler Unit. The List 1 and 2 units are primarily intended for domestic use while the List 3 unit is used for International applications and the List 4 for Canadian applications.

INSTALLATION OPTIONS AND WIRING

The following material is included with each HRE-420.

Table 2. List of Materials

Description	Quantity
HRE-420 Technical Practice	1
#10 x $\frac{3}{8}$ pan head sheet metal screws	3
Ten 32 x $\frac{3}{8}$ button tamper-proof screw	1
Circuit assignment label	1
Drilling template	1

The tamper-proof screw can replace the factory provided blade “securing screw” shown in Figure 3. This screw requires an Allen key wrench, available on request, to install. It is intended to provide additional security if desired. The gummed Circuit Assignment Label is for circuit I.D.#. It can be attached to any convenient location on the enclosure. The RJ-48 jack comes with a small metal cover. This is provided to prevent access to the DS1 interface when the Customer Interface (CI) is external to the HRE-420. This makes the HRE-420, List 1 and 2, MPOE (Minimum Point Of Entry) compliant.

MOUNTING

Select a location for wall mounting the unit which will allow sufficient access to wiring connections on the right and indicators, test jacks, etc., on the left, see Figures 3 and 13. Lift the enclosure cover off the wall mounting plate and use it, or the drilling template provided, as a template for drilling or locating mounting holes. Attach the plate securely to the wall.

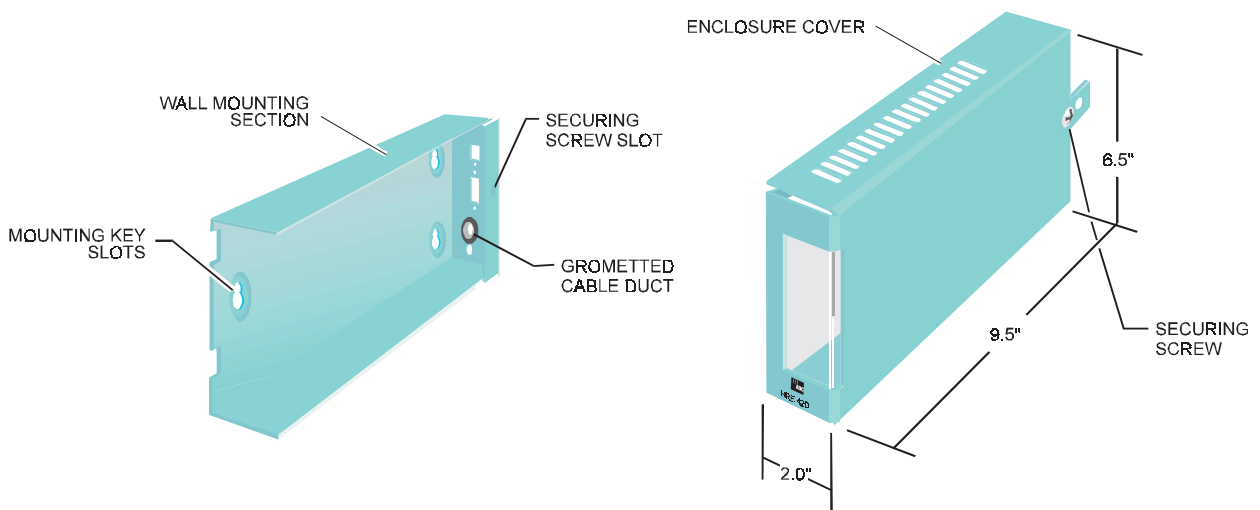


Figure 3. HRE-420 Enclosure Cover and Wall Mounting Plate

The HRE-420 cover is equipped with a securing screw for added security. Three holes are located on the mounting plate for securing the unit to a vertical surface.

POWER AND GROUND WIRING

Attach earth ground to the FRAME GND lug. If local power is required connect -48 V to TB1-2 and power return (CKT GRD) to TB1-1. See Figure 5 for List 1 and 2, Figure 7 for List 3, and Figure 9 for List 4 applications. The List 3 coils, L1 and L2 in Figures 6 and 7, are balanced longitudinal (simplex) suppression chokes located in the T and R of the 2 HDSL pairs. They prevent excessive common mode AC voltage impairments from entering the HRE-420 module where they could cause transmission errors.

LIST 1 AND 2 DS1/HDSL INTERFACE WIRING FOR HRU-412 DOMESTIC APPLICATIONS

HDSL Loop 1 and 2

The HDSL LOOP 1 and 2 are the two HDSL pairs coming to the HRE-420 from the field cable pairs, see Figures 4 and 5. Connect HDSL LOOP 1 (IN) to TB1-3 (T) and TB1-4 (R). Connect HDSL LOOP 2 (IN) to TB1-5 (T1) and TB1-6 (R1). Since the HDSL signals are bi-directional, they do not carry a "transmit" or "receive" designation. With reference to T1 terminology, however, Loop 1 is called the "receive pair" and Loop 2 the "transmit pair".

DS1 HRU Connections to CI

The HRU's DS1 CPE interface ports may also be connected to either the RJ-48C, see Figure 10, or the RJ-48X jack (J2), see Figure 11, located on the rear panel of the HRE-420, or directly to TB1. If TB1 is used, connect the DS1 output from the CPE (XMT) to TB1-9 (T) and TB1-10 (R). Connect the DS1 input to the CPE (RCV) to TB1-7 (T1) and TB1-8 (R1). Note if TB1 is used for the CPE access when using the List 2 HRE-420, the shorted pins in the RJ-48X jack J2 must be opened. This is accomplished by inserting a dummy RJ-48 plug into J2.

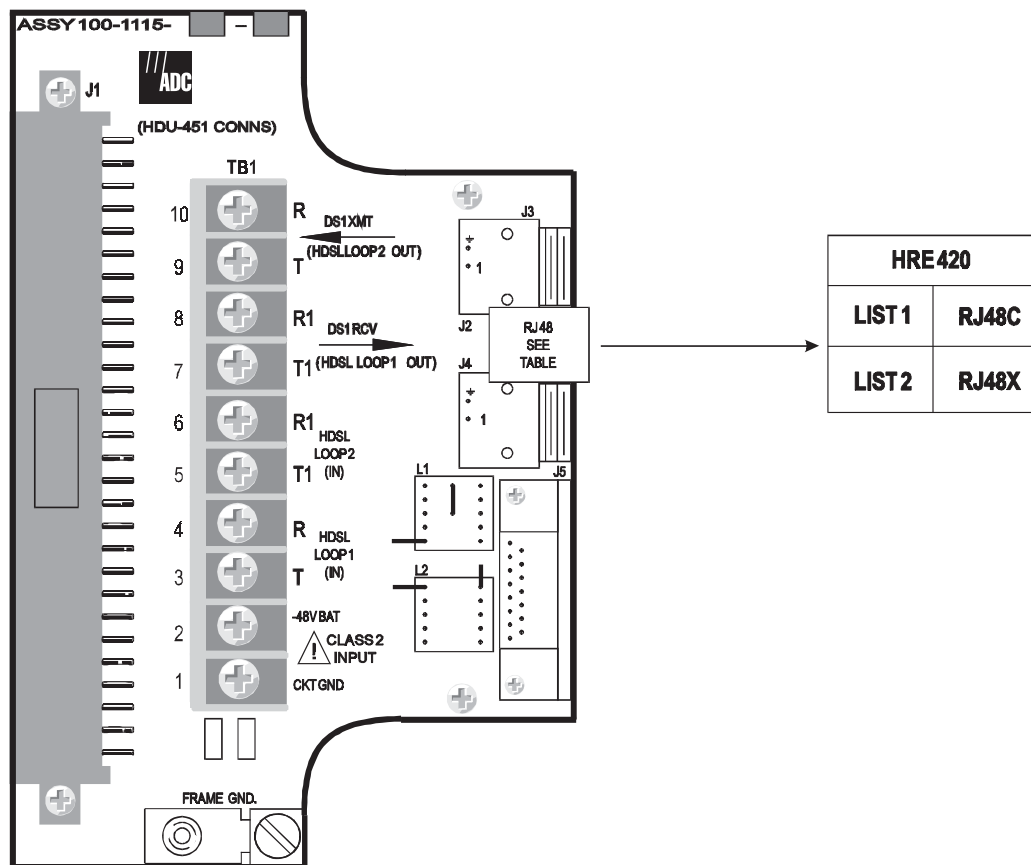


Figure 4. HRE-420 List 1 and 2 Printed Circuit Board and TB1 Pin Assignments

The diagram differentiates between the List 1 and List 2 units by the type of jack used. The List 1 unit uses an RJ48C while the List 2 unit uses an RJ48X.

LIST 1, 2, 3, AND 4 HDSL INTERFACE WIRING FOR EDU-451 AND HDU-451 DOUBLER APPLICATIONS

HDSL Loop 1 and 2 (IN)

The HDSL LOOP 1 and 2 (IN) ports connect the two HDSL pairs coming to the HRE-420/doubler installation from the field cable pairs connected to the line unit, see Figures 4 through 9. Connect HDSL LOOP 1 (IN) to TB1-3 (T) and TB1-4 (R). Connect HDSL LOOP 2 (IN) to TB1-5 (T1) and TB1-6 (R1). Since the HDSL signals are bi-directional, they do not carry a "transmit" or "receive" designation. With reference to T1 terminology, however, Loop 1 is called the "receive pair" and Loop 2 the "transmit pair".

HDSL Loop 1 and 2 Out Connections

The HDSL LOOP 1 and 2 OUT ports connect the two HDSL pairs coming from the HRE/doubler installation to the field cable pairs going towards the remote unit, see Figures 4 through 9. Note that the List 3 jumpers, JP1 and JP2, must be open for this application. Connect HDSL LOOP 1 OUT to TB1-7 (T1) and TB1-8 (R1). Connect HDSL LOOP 2 OUT to TB1-9 (T) and TB1-10 (R). The doubler connections for this application are shown in parenthesis in the block diagram, see Figure 5. This is done to highlight the fact that these same pins support different interfaces in other applications.

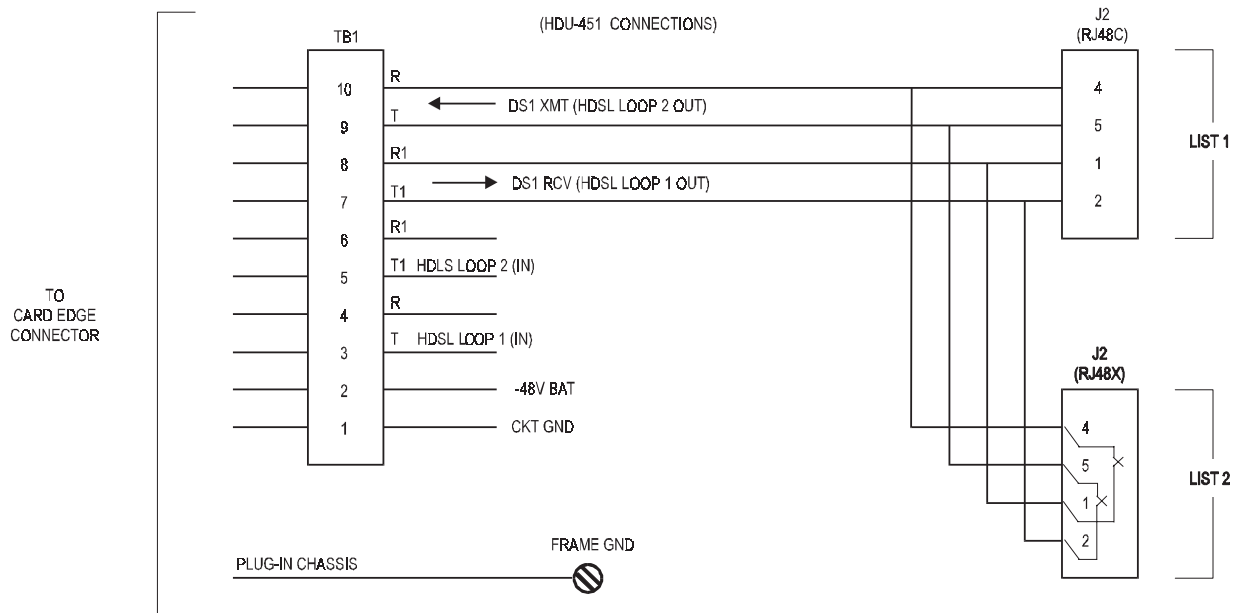


Figure 5. HRE-420, List 1 and 2 Block Diagram

LIST 3 G.703 120 OHM INTERFACE WIRING FOR ERU-412 INTERNATIONAL APPLICATIONS

HDSL Loop 1 and 2 (IN) Connections

The HDSL LOOP 1 and 2 (IN) ports connect the two HDSL pairs coming to the HRE-420/ERU installation from the field cable pairs connected to the line unit, see Figures 6 and 7.

Connect HDSL LOOP 1 (IN) to TB1-3 (T) and TB1-4 (R). Connect HDSL LOOP 2 (IN) to TB1-5 (T1) and TB1-6 (R1). Since the HDSL signals are bi-directional, they do not carry a "transmit" or "receive" designation.

120 Ohm G.703 Connections to C1

The G.703 120 ohm balance CPE interface ports connect to the DB-15 jack J5 located on the rear panel of the HRE-420, or directly to TB1, see Figure 12. If TB1 is used, connect the G.703 output from the CPE (XMT) to TB1-9 (T) and TB1-10 (R). Connect the G.703 input to the CPE (RCV) to TB1-7 (T1) and TB1-8 (R1). Note that jumper JP2 complies with the CCITT G.703 requirement to provide the option to connect the input's outside connector (case) to earth (frame ground). JP2 provides this option for the 120 ohm connector J5.

LIST 3 G.703 75 OHM INTERFACE WIRING FOR ERU-412 INTERNATIONAL APPLICATIONS

HDSL Loop 1 and 2 (In) Connections

The HDSL LOOP 1 and 2 (IN) ports connect the two HDSL pairs coming to the HRE-420/ERU installation from the field cable pairs connected to the line unit, see Figures 6 and 7. Connect HDSL LOOP 1 (IN) to TB1-3 (T) and TB1-4 (R). Connect HDSL LOOP 2 (IN) to TB1-5 (T1) and TB1-6 (R1). Since the HDSL signals are bi-directional, they do not carry a "transmit" or "receive" designation.

G.703 75 Ohm ERU Connections to C1

The G.703 75 ohm unbalanced CPE interface ports connect to the J3 and J4 BNC connectors located on the rear panel. Jumper JP1 complies with the CCITT G.703 requirement to provide the option to connect the ring lead (outer conductor) of the input port to earth (frame ground). JP1 provides this option for the 75 ohm connector J3.

LIST 4 DS1 INTERFACE WIRING FOR HRU-412 CANADIAN APPLICATIONS

The HRU's DS1 CPE interface ports may be connected to the DB-15 jack J5 on to the RJ-48C jacks located on the rear panel of the HRE-420, or directly to TB1, see Figures 8 and 9. If TB1 is used, connect the DS1 output from the CPE (XMT) to TB1-9 (T) and TB1-10 (R). Connect the DS1 input to the CPE (RCV) to TB1-7 (T1) and TB1-8 (R1).

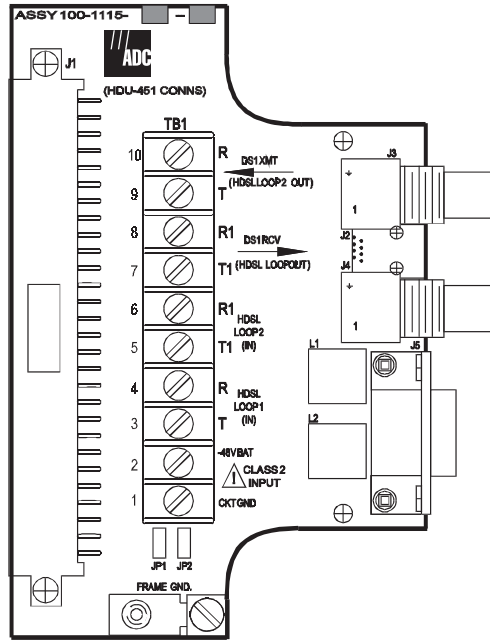


Figure 6. HRE-420, List 3 Printed Circuit Board and TB1 Pin Assignments

The diagram differentiates the List 3 unit by illustrating the two BNC connectors on the upper right hand side of the circuit board.

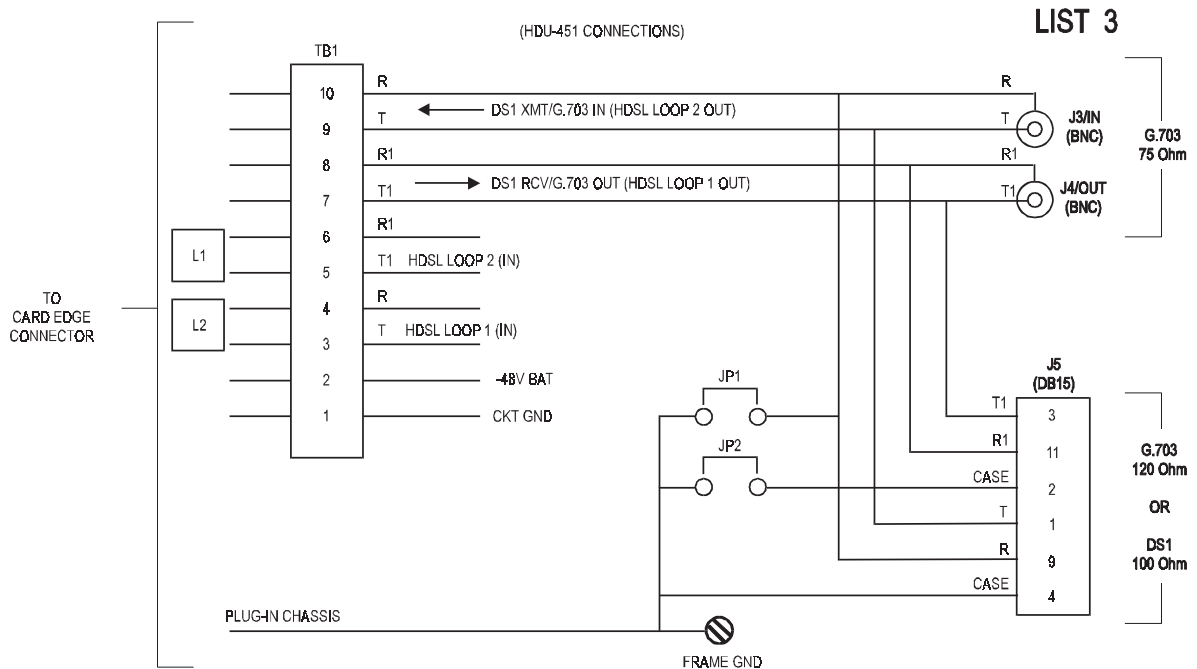


Figure 7. HRE-420, List 3 Block Diagram

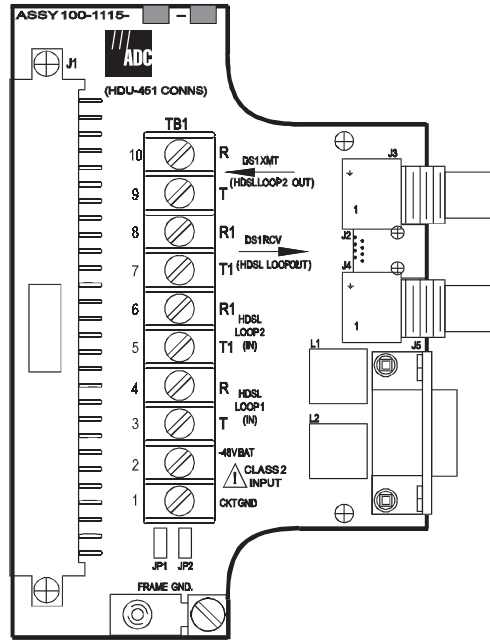


Figure 8. HRE-420, List 4 Printed Circuit Board and TB1 Pin Assignments

The List 4 unit supports the Canadian DS1 interface requirements.

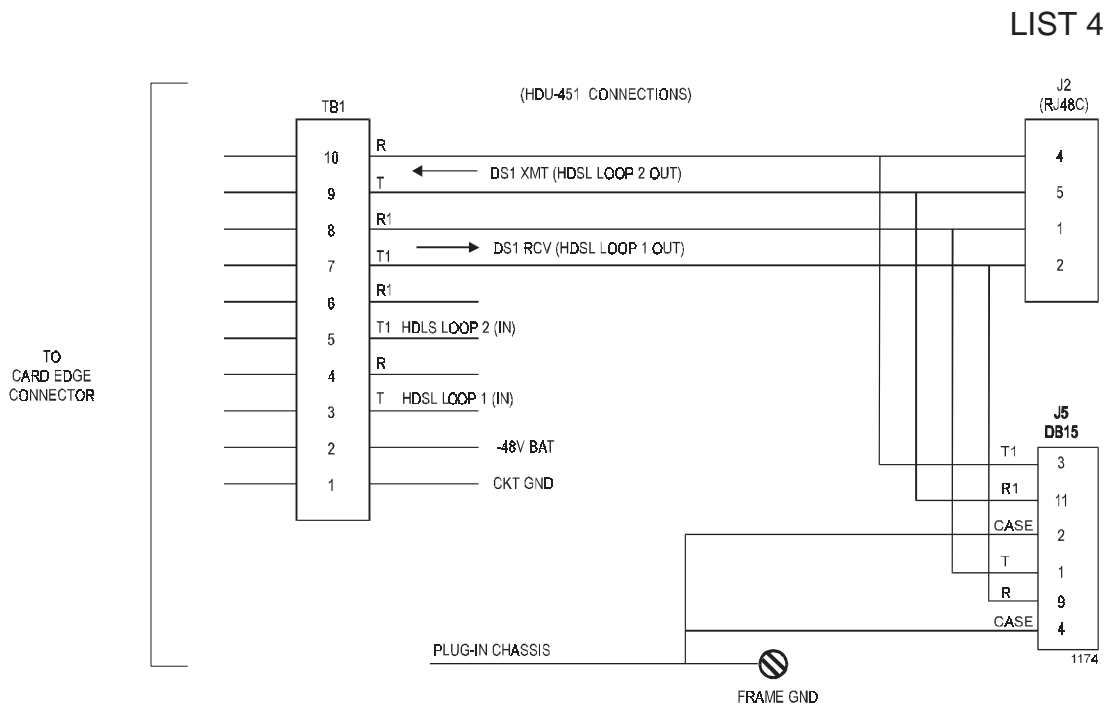


Figure 9. HRE-420, List 4 Block Diagram

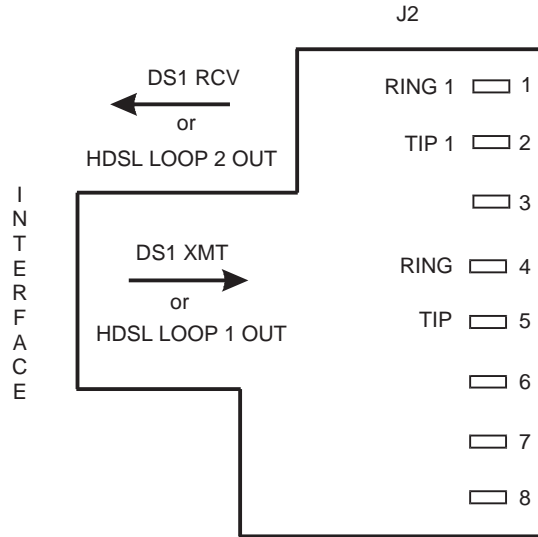


Figure 10. List 1, RJ-48C Pin Assignments

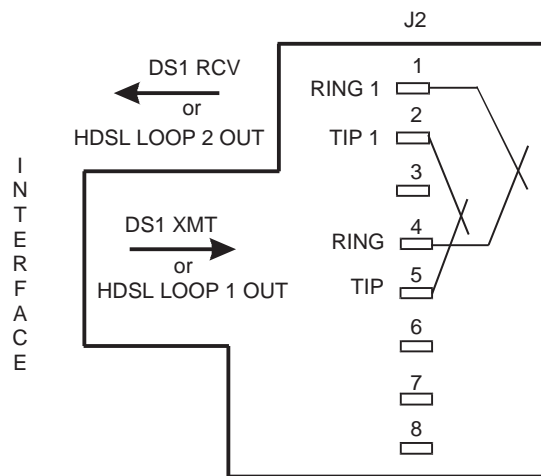
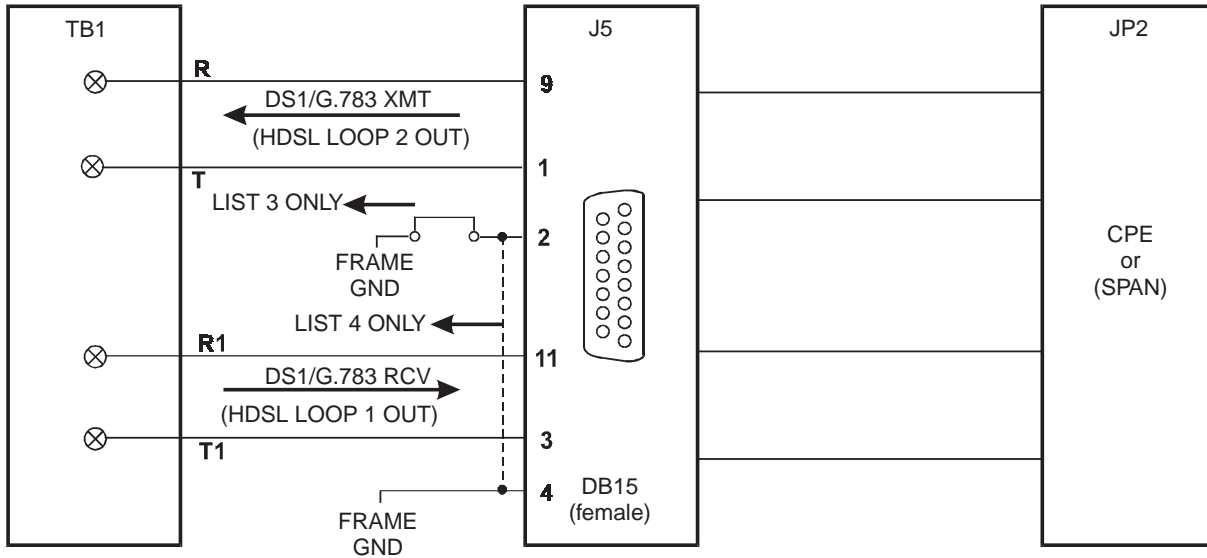


Figure 11. List 2, RJ-48X Pin Assignments



(Doubler Connections)

Figure 12. List 3 and List 4, DB-15 Pin Assignments

TURN UP

Slide the HRU, ERU, HDU, or EDU card along the two card guides and into the edge connector as shown in Figure 13. It should be seated firmly in the connector. Refer to the appropriate ADC user manuals listed in Paragraph 1.01 for complete turn-up instructions.

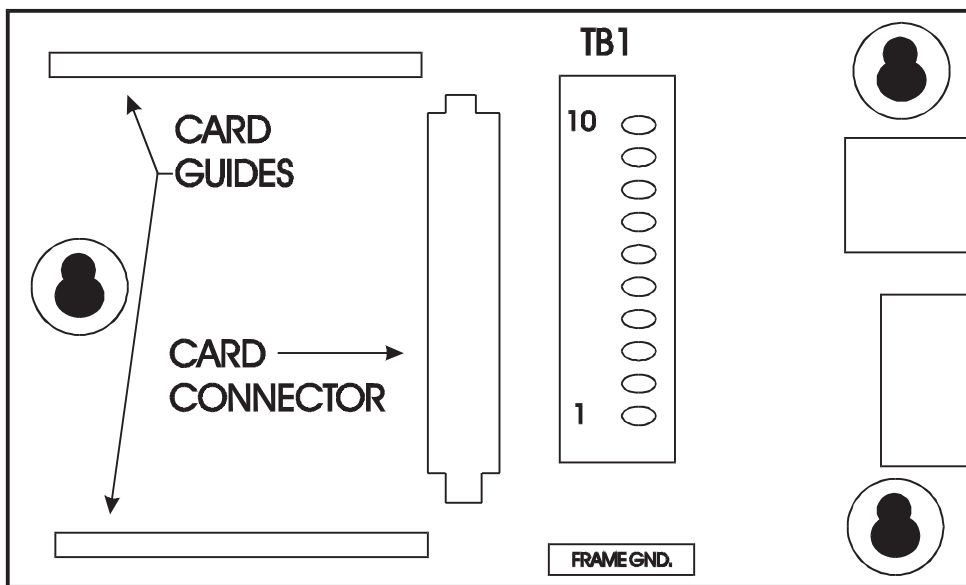


Figure 13. Wall Mounting Base

The wall mount plate has a printed circuit board which connects the card edge connector to terminal block TB1. The lug holes for this List 1/List 2 mounting base are typical for all HRE-420 enclosures.

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 (TAC).

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Online Technical Support	<ul style="list-style-type: none">• www.adc.com/Knowledge_Base/index.jsp
Online Technical Publications	<ul style="list-style-type: none">• www.adc.com/documentationlibrary/technicalpublications/
Product Return Department 800.366.3891 Email: rma@adc.com	<ul style="list-style-type: none">• ADC Return Material Authorization (RMA) number and instructions must be obtained before returning products.

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ADC Telecommunications, Incorporated (“ADC”) warrants that, for a period of thirty-six (36) 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 36-month warranty period per ADC's instructions and which product is confirmed by ADC not to comply with the foregoing warranty.

ADC warrants that, for a period of 90 days from the date of purchase, the software furnished with its products will operate substantially in accordance with the ADC published specifications and documentation for such software. ADC's entire liability for software that does not comply with the foregoing warranty and is reported to ADC during the 90-day warranty period is, at ADC's option, either (a) return of the price paid or (b) repair or replace of the software. ADC also warrants that, for a period of thirty (30) days from the date of purchase, the media on which software is stored will be free from material defects under normal use. ADC will replace defective media at no charge if it is returned to ADC during the 30-day warranty period along with proof of the date of shipment.

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.

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