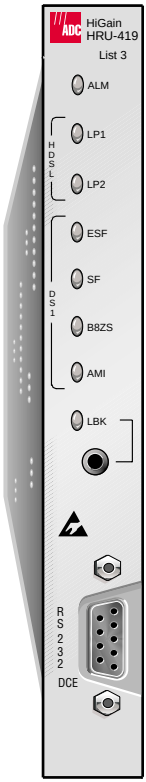
HIGAIN

Quick Installation Guide



HRU-419 List 3
Remote Unit

THE HRU-419 LIST 3

The HiGain® Remote Unit (HRU-419 List 3) functions as the remote end of a repeaterless T1 transmission system. The HRU-419 connects to a HiGain Line Unit (HLU) High-bit-rate Digital Subscriber Line (HDSL), creating a HiGain system that provides 1.544 Mbps transmission on two unconditioned copper pairs over the full Carrier Service Area (CSA) range. HiGain Doubler Units (HDUs) can also be used to extend the range. The HRU-419 supports local powering only.

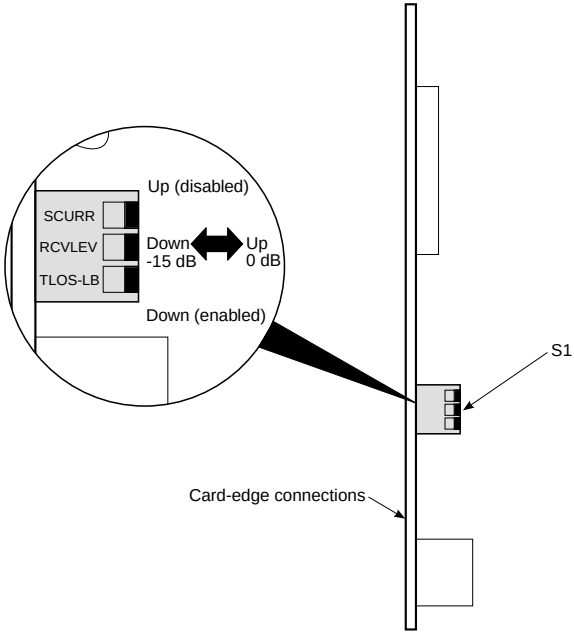
FEATURES

- 1.544 Mbps full-duplex transmission on two unconditioned copper pairs
- Status Light Emitting Diodes (LEDs) for Digital Signal Level 1 (DS1) and HDSL
- Craft port access for maintenance terminal connection
- 3192 mechanics
- Support for up to five spans
- HiGain maintenance screens for inventory, provisioning, troubleshooting, performance monitoring, and reporting
- Generic and addressable repeater loopback activation codes
- Lightning and power cross-protection on HDSL and DS1 interfaces
- Local powering only with sealing current option
- Ultra-low wander
- Fuse alarm circuit
- Remote provisioning

SPECIFICATIONS

Operating Temperature	-40 °F to + 149 °F (-40 °C to + 65 °C)
Operating Humidity	5% to 95% non-condensing
Power Consumption	3.1 Watts
Electrical Protection	Secondary surge and power cross-protection on all DS1 and HDSL ports
Mounting	3192 mechanics shelf
HDSL Line Code	784 kbps 2B1Q (each loop)
HDSL Output	+13.5 dBm ±0.5 dB, 135 Ω
DS1 Pulse Output	0 dB or -15 dB
Maximum Provisioning Loss	35 dB at 196 KHz, 135 Ω
DS1 Line Rate	1.544 Mbps ±200 bps
DS1 Line Format	Alternate Mark Inversion (AMI) or Bipolar with 8-Zero Substitution (B8ZS)
DS1 Frame Format	Extended Super Frame (ESF), Super Frame (SF), or Unframed (UNFR)

1 INSTALLATION



1 To set the simplex sealing current (SCURR), do one of the following:

- If the HRU-419 List 3 is to be used with an HDU-451 List 1, List 2, List 3, or List 3B doubler, disable the simplex sealing current by placing the SCURR switch in the up position. The sealing current circuit for the HRU-419 List 3 is not compatible with these doublers.
- If the HRU-419 List 3 is to be used with the following compatible doublers, enable the SCURR switch (down position) as desired.
  - HDU-404, HDU-407, HDU-409 (all lists)
  - HDU-437, HDU-439 List 1 or List 1B
  - HDU-451 List 4 or List 4B

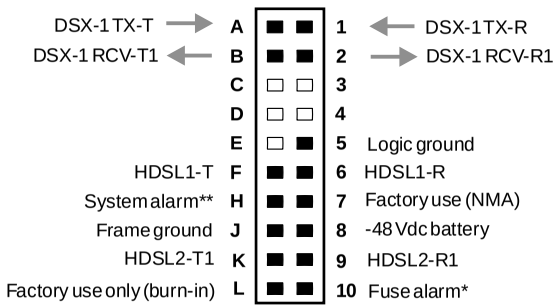
2 To enable the transmit loss of signal loopback (TLOS-LB), set the switch to the down position.

3 Set the Receive Level (RCVLEV) switch to the down (-15 dB) position or the up (0 dB) position as desired.

4 Slide the HRU-419 List 3 into the shelf slot guides. Push into the shelf unit until properly seated in the backplane card-edge connector.

Continued

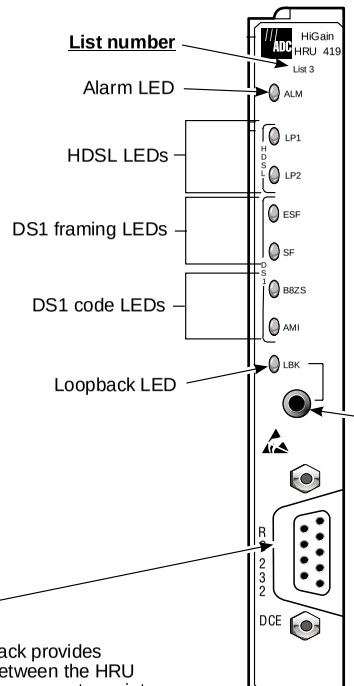
Card-Edge Connector



* Fuse alarm is normally floating (0 to -60 Vdc maximum) and at -48 Vdc (10 mA maximum) when activated.

* * System alarm is normally floating (+5 to -60 Vdc maximum) and at +5 Vdc (10 mA maximum) when activated.

Front Panel



Loopback control button

Pressing the button for 5 seconds activates a remote loopback towards the network, called a Network Remote Loopback (NREM). Any existing loopback is terminated before NREM is activated. The unit can be looped down by either pressing the LBK control button again for 5 seconds, by the standard loopdown inband messages, or by the craft port.

RS-232 craft port

The RS-232 DB-9 connector jack provides bidirectional communication between the HRU and a maintenance terminal for access to maintenance, provisioning, and performance screens.
Use a standard RS-232 DB-9 terminal cable to connect between the serial port on a PC and the HRU craft port.

Modem settings:
1200-9600 baud
8 data bits
No parity
1 stop bit
Hardware flow control: none
Terminal emulation: VT100

2 VERIFICATION

Once the HRU-419 is installed, verify that it is operating properly by monitoring the Status LEDs on the front panel.

Status LED Descriptions

LED Status	Indicates
Alarm (ALM) LED	Shows alarm states for remote and local Loss of Signal (LOS).
Solid red	Indicates an LOS condition at the HRU-419 DS1 input or a fuse alarm.
Blinking	Indicates an LOS condition at the HLU DSX-1 input.
HDSL LEDs	Displays HDSL Loop 1 and Loop 2 conditions.
Solid green	Indicates HDSL Loop 1 and Loop 2 are in sync.
Blinking once per second	Indicates the HDSL loop is trying to acquire sync.
Blinking 4 times per second	Indicates a margin alarm condition at the HRU on the last span.
Blinking 10 times per second	Indicates a Cyclical Redundancy Check (CRC) error on the HDSL loop.
OFF	Indicates no activity on the HDSL loop.
DS1 Framing LEDs (ESF and SF)	Indications for framing patterns. If DS1 signals are not detected, the ESF and SF, LEDs will not light.
ESF LED = Solid green	Indicates Extended Super Frame (ESF). The LED blinks once per second when a frame error is indicated.
SF LED = Solid green	Indicates Super Frame (SF). The LED blinks once per second when a frame error is indicated.
OFF	Indicates unframed or no signal.
DS1 Code LEDs (B8ZS and AMI)	Indications for DS1 code options. If DS1 signals are not detected, the B8ZS and AMI LEDs will not light.
B8ZS LED = Solid green	Indicates that the DS1 line code option is set to B8ZS or the option is set to AUTO and an B8ZS line code is being received at the HRU DS1 input. The LED blinks once per second when a string of excessive zeros is detected.
AMI LED = Solid green	Indicates that the user DS1 line code option is set to AMI or the option is set to AUTO and an AMI line code is being received at the HRU DS1 input. This LED blinks once per second when a Bipolar Violation (BPV) is detected.
Loopback (LBK) LED	Shows loopback states to and from the network and to and from the Customer Interface (CI).
Solid yellow	Indicates Network Remote Loopback (NREM), SmartJack (SMJK), or Transmit Loss of Signal (TLOS).
Blinking once per second	Indicates Customer Local Loopback (CLOC) loopback state.
Blinking 4 times per second	Indicates the HRU is in an Armed state.

3 LOGGING ON TO THE MAIN MENU

The HRU-419 supports remote login through a maintenance terminal (ASCII terminal or a PC running terminal emulation software) connected to the craft port on the HRU-419 front panel. Remote login creates menus and screens for the HRU-419 that are identical to those viewed at the HLU. Once logged on, you can access the Remote Terminal Main Menu screens to view system settings, initiate loopbacks, and provision the circuit if remote provisioning is enabled from the HLU.

To log on and access the Remote Terminal Main Menu screens using a maintenance terminal:

1. Press the **SPACEBAR** several times to display the Remote Login screen.
2. Press the **ENTER** key to view the HiGain Maintenance Terminal Screen. The Remote Terminal Main Menu items are replications of the line unit screens. Depending on the HiGain Line Unit (HLU) attached to the HRU-419, remote provisioning may be available. Refer to the applicable HLU technical practice for details.

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FCC Certification

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 this product to be free of defects and to be fully functional for a period of sixty (60) months from the date of original shipment, given correct customer installation and regular maintenance. ADC will repair or replace at ADC's option any unit without cost during this 60-month 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 ADC for repair. Any modifications of the unit by anyone other than an authorized ADC representative voids the warranty.

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

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

Modifications

Any changes or modifications made to this device that are not expressly approved by ADC DSL Systems, 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:

- Binational standard, UL-1950/CSA-C22.2 No. 950-95: Safety of Information Technology Equipment

Trademark Information

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