HiGain

QUICK INSTALLATION

H2TU-R-402 LIST 5E REMOTE UNIT

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THE H2TU-R-402

The H2TU-R-402 remote unit is the customer premise side of a transmission system. The HiGain HDSL2 product family is fully compliant with the HDSL2 standard and ANSI T1/E1.4. Providing full-rate T1 access using just a single copper pair, HDSL2 is a cost-effective solution that offers an open architecture. The open architecture inherent in HDSL2 guarantees interoperability, allowing simple and economic accommodation of network growth.

HiGain HDSL2 products provide 1.552 Mbps transmission on one unconditioned copper pair over the full Carrier Service Area (CSA) range. The CSA includes loops up to 12,000 feet of 24 American Wire Gauge (AWG) wire or 9,000 feet of 26 AWG wire, including bridged taps.

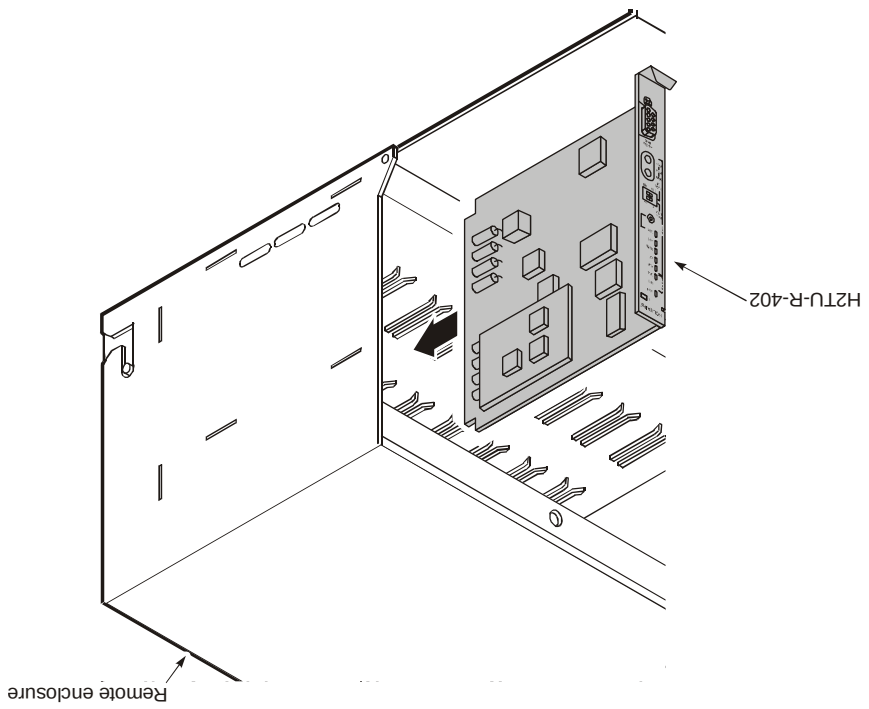
FEATURES

- Front panel status LEDs and craft port
- Ultra-low wander
- Line or locally powered with sealing current option
- Selectable DS1 pre-equalizer
- Full-duplex HDSL2 transmission on one pair at 1.552 Mbps
- Metallic loopback self-tests
- HiGain maintenance screens for remote provisioning, performance monitoring, inventory, and troubleshooting
- Performance report messaging (PRM) support
- Bit Error Rate (BER) alarm options
- Bipolar Violation Transparency BPVT) options
- Digital Data Service (DDS) latching loopback
- Enhanced loopback commands controlled by the LBK option
- Report menu option for downloading data to a file
- Sinks 10 mA of sealing current from the line unit for local power applications

SPECIFICATIONS

Operating Temperature	-40 °F to +149 °F (-40 °C to +65 °C)
Operating Humidity	5% to 95% (non-condensing)
Line or Local Power Consumption	5 Watts
Electrical Protection	Secondary surge and power cross-protection on all SD1 and HDSL2 ports
Mounting	Any 400 or 200 mechanics shelf
HDSL2 Line Rate	1.552 Mbps Overlapped Pulse Amplitude Modulated Transmisstion with Interlocking Spectra (OPTIS)
HDSL2 Output	+16.8 dBm ±0.5 dB at 135 Ω
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), Bipolar with 8-Zero Substitution (B8ZS) or Zero Byte Time Slot Interchange (ZBTSI)
DS1 Frame Format	Extended SuperFrame (ESF), SuperFrame (SF), or Unframed (UNFR)

1 INSTALLATION



Wear an antistatic wrist strap when installing the H2TU-R. Avoid touching components on the circuit board.

1 Align the H2TU-R with the enclosure slot guides and slide the unit in. Push the unit back until it touches the backplane card-edge connector.

2 Place your thumbs on the front panel and push the H2TU-R into the card-edge connector.

When local power is applied to this unit, it automatically provides a resistive termination at its HDSL2 port. This termination will sink 10 mA of sealing current when connected to a list 3E or higher line unit.

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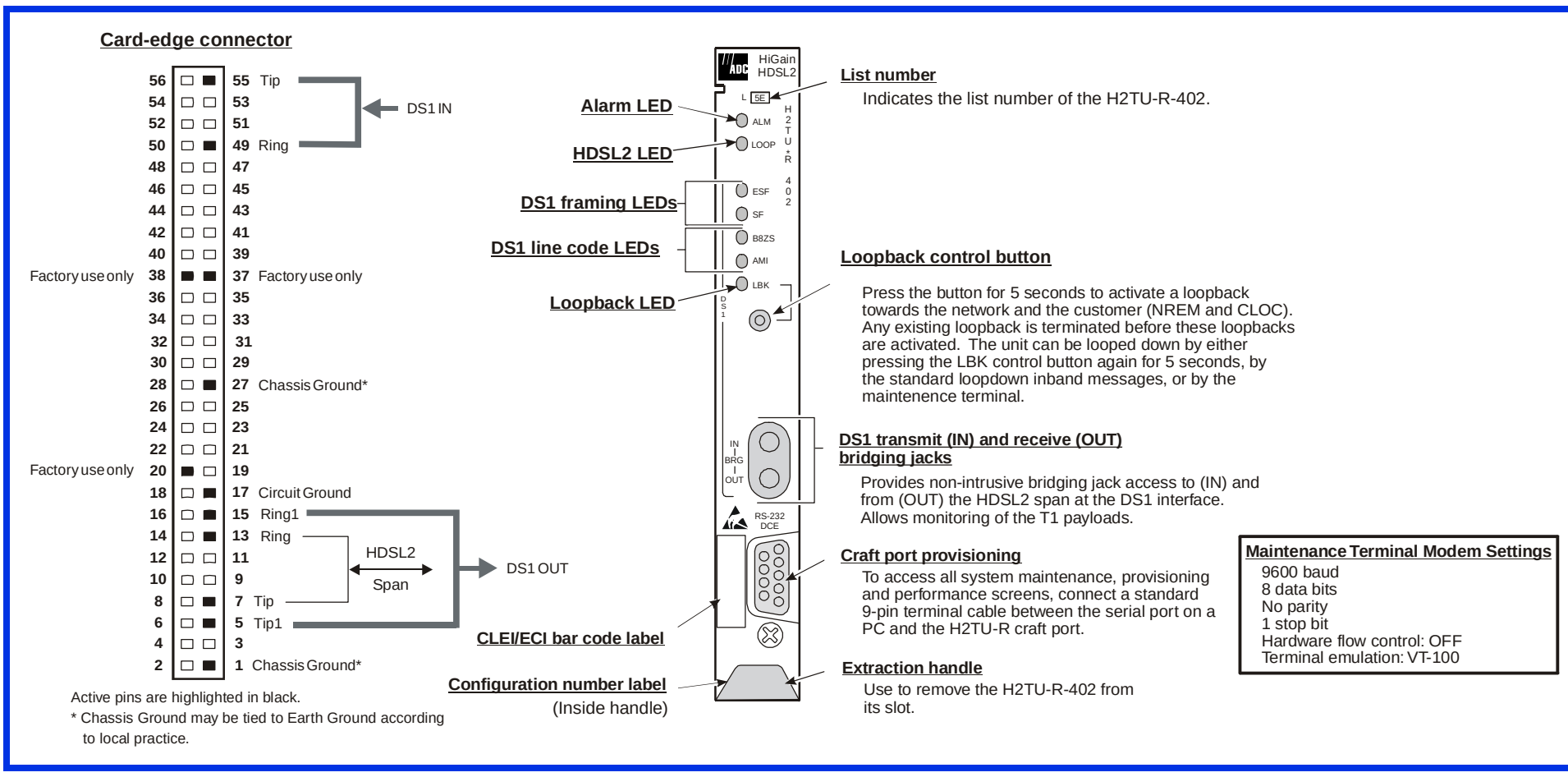


2 VERIFICATION

Once the H2TU-R-402 is installed, verify that it is operating properly by monitoring the Status LEDs on the front panel.

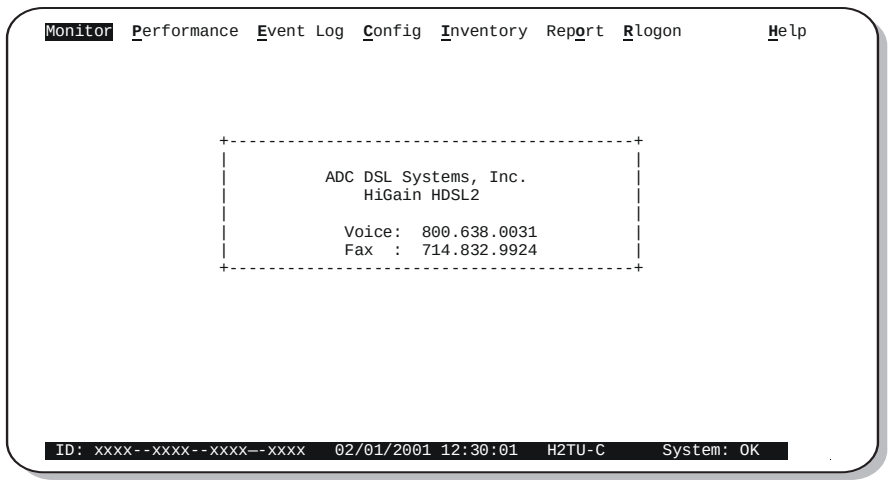
Status LED Descriptions

LED Status	Indicates
Alarm (ALM) LED	Shows alarm states for remote and local Loss of Signal (LOS).
Solid red	Indicates a Loss of Signal (LOS) condition at the T1 input of the H2TU-R-402.
Blinking	Indicates an LOS condition at the T1 input of the H2TU-C line unit.
HDSL2 LED	Displays HDSL2 Loop condition.
Solid green	Indicates HDSL2 loop is in sync.
Blinking once per second	Indicates the HDSL2 loop is trying to acquire sync.
Blinking 4 times per second	Indicates a margin alarm condition on the HDSL2 loop.
Blinking 10 times per second	Indicates a Cyclic Redundancy Check (CRC) error on the HDSL2 loop.
OFF	Indicates no activity on the HDSL2 loop.
DS1 Framing (FRM) LEDs (ESF and SF)	Indicates 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 occurs.
SF LED = Solid green	Indicates Super Frame (SF). The LED blinks once per second when a frame error occurs.
OFF	Indicates unframed or no signal.
DS1 Code LEDs (B8ZS and AMI)	Indicates DS1 code options. If DS1 signals are not detected, the ESF, SF, B8ZS, and AMI LEDs will not light.
B8ZS LED = Solid green	Indicates that the DS1 line code option is set to Bipolar with 8-Zero Substitution (B8ZS). 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 Alternate Mark Inversion (AMI). 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 (NREM) loopback, SmartJack (SMJK) loopback, or Transmit Loss of Signal (TLOS) loopback.
Blinking once per second	Indicates Customer Local Loopback (CLOC) loopback state.
Blinking 4 times per second	Indicates the H2TU-R is in an Armed state.

3 LOGGING ON TO THE MAIN MENU

The H2TU-R-402 supports local and remote logon through a maintenance terminal (VT-100 or a PC running VT-100 terminal emulation software) connected to the craft port on the H2TU-R-402 front panel.

The H2TU-R-402 accesses menus and screens that are replications of those viewed at the H2TU-C. You can also view system settings and inventory, initiate loopbacks, monitor performance, and configure the circuit.



To connect to a maintenance terminal:

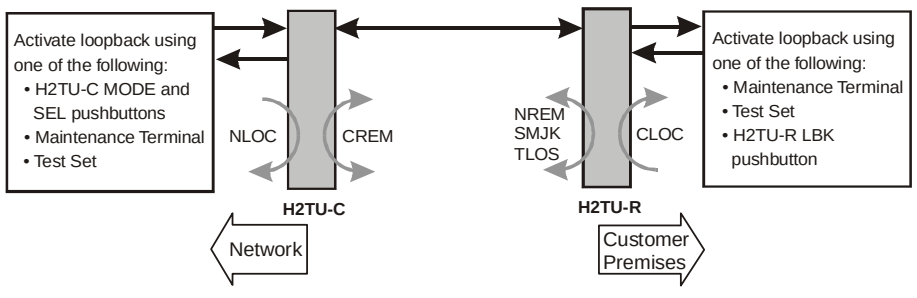
1. Connect a standard 9-pin serial cable to the RS-232 craft port on the H2TU-R-402 List 5E front panel.
2. Connect the other end of the cable to the serial port on the maintenance terminal.
3. Start a terminal emulation program such as Procomm (emulating a VT100 terminal).
4. Configure the maintenance terminal to the following comunications settings:
   - 9600 baud
   - No parity
   - 8 data bits
   - 1 stop bit
   - Hardware flow control to OFF
5. If necessary, press CTRL + R to refresh to HiGain HDSL2 logon screen.

Type the first letter	To view:
Monitor	Monitors loopbacks and alarms, and provides a graphical representation of circuit activity, including ES, UAS, SES, and line code.
Performance	Performance and alarm histories for current, 25-hour, 48-hour, or 31-day periods for either the DS1 or HDSL2 interface.
Event Log	Identifies the 100 most recent system events and reports the date and time of occurrence.
Config	Standard configuration options, ADC options, date and time setting, and a reset option.
Inventory	Product information about the various devices that are in the system and lists circuit and device identifications.
Rlogon	Remote log on can be performed from the H2TU-R or H2TU-C. To log off the remote unit, press **R**. "**R**logout" changes to "**R**logon."
Help	Glossary, a list of navigational keys, and ADC contact information.

Initial provisioning of the HiGain HDSL2 system is performed at the H2TU-C line unit. For more information about the HiGain screens, provisioning, and troubleshooting, contact Customer Service to obtain a copy of the applicable technical practice.

4 LOOPBACK TESTING

Initiate loopback testing from the maintenance terminal menus or by using inband codes. The inband codes shown below can be sent by a test set. For more information, refer to the technical practice for the H2TU-C line unit.



A3LB Loopback Commands

Name	Description	Binary Code [a] (Hexadecimal Equivalent)
NLOC	H2TU-C loopup from NI	1111-1111-0001-1110 (FF1E)
CREM	H2TU-C loopup from CI	0011-1111-0001-1110 (3F1E)
NREM	H2TU-R-402 loopup from NI	1111-1111-0000-0010 (FF02)
CLOC	H2TU-R402 loopup from CI	0011-1111-0000-0010 (3F02)

(a) The leftmost bit arrives first in all sequences. The detection algorithm functions reliably with a random 10^{-3} Bit Error Ratio (BER) on the facility.