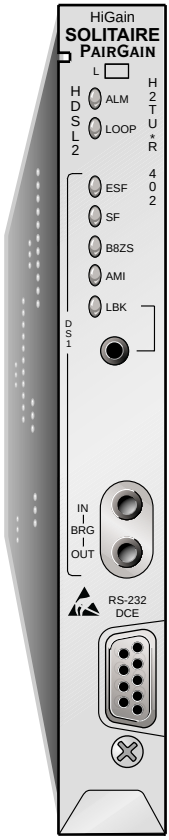
HiGain SOLITAIRE

Quick Installation Guide



H2TU-R-402
List 1 and List 1A
Remote Unit

PAIRGAIN

THE H2TU-R-402 LIST 1 AND LIST 1A

The PairGain® HiGain Solitaire™ product family is the industry's first practical implementation of High bit-rate Digital Subscriber Line 2 (HDSL2). The H2TU-R-402 List 1 or List 1A functions as the remote end of a repeaterless T1 transmission system. An H2TU-R connects to a HiGain HDSL2 Line Unit (H2TU-C), creating a HiGain system that provides 1.552 Mbps transmission on one unconditioned copper pair over the full Carrier Service Area (CSA) range. **The H2TU-R-402 List 1A is a line-powered unit. The List 1 supports local or line-powering.**

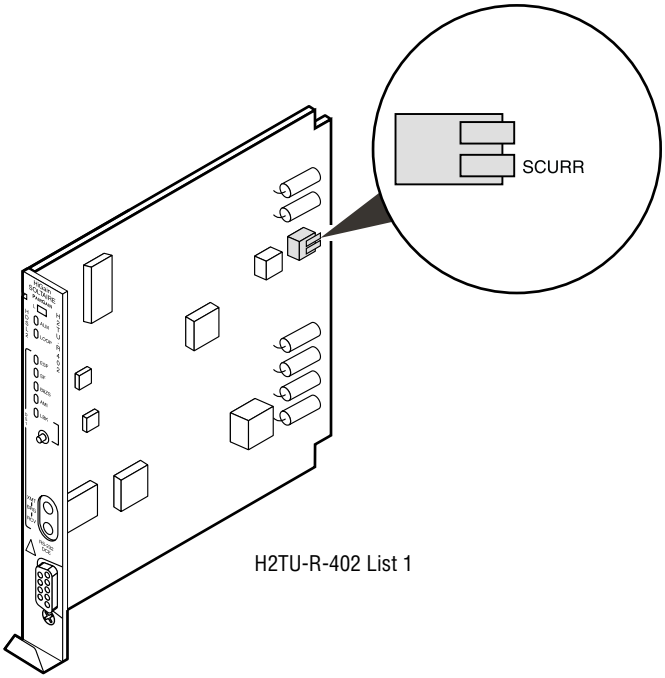
FEATURES

- Status Light Emitting Diodes (LEDs) for Digital Signal Level 1 (DS1) and HDSL2
- Craft port for maintenance terminal connection to access Solitaire HDSL2 provisioning screens
- DS1 transmit (IN) and receive (OUT) bridging jacks for testing
- Line powered
- Narrow 200 mechanics
- Support for up to three spans
- Lightning and power cross-protection on HDSL2 and DS1 interfaces
- 1.552 Mbps full-duplex Overlapped PAM Transmission with Interlocking Spectra (OPTIS) HDSL2 transmission on a single pair
- Generic and addressable repeater loopback activation codes
- Remote provisioning
- Ultra-low wander
- Flash download of firmware updates

SPECIFICATIONS

Operating Temperature	-40 °F to +149 °F (-40 °C to + 65 °C)
Operating Humidity	5% to 95% non-condensing
Power Consumption	6 Watts
Local Power Requirement (List 1 option)	-42.5 Vdc to -56.5 Vdc
Electrical Protection	Secondary surge and power cross protection on all DS1 and HDSL2 ports
Mounting	Any 400 or 200 mechanics shelf
HDSL2 Line Rate	1.552 Mbps OPTIS
HDSL2 Output	+16.5 dBm ±0.5 dBm, 135 Ω
DS1 Pulse Output	0 dB, -7.5 dB, -15 dB
Maximum Provisioning Loss	35 dB at 196 KHz, 135 Ω
DS1 Line Rate	1.544 Mbps ±200 bps
DS1 Line Format	AMI or B8ZS
DS1 Frame Format	ESF, SF or THRU (unframed)

1 INSTALLATION



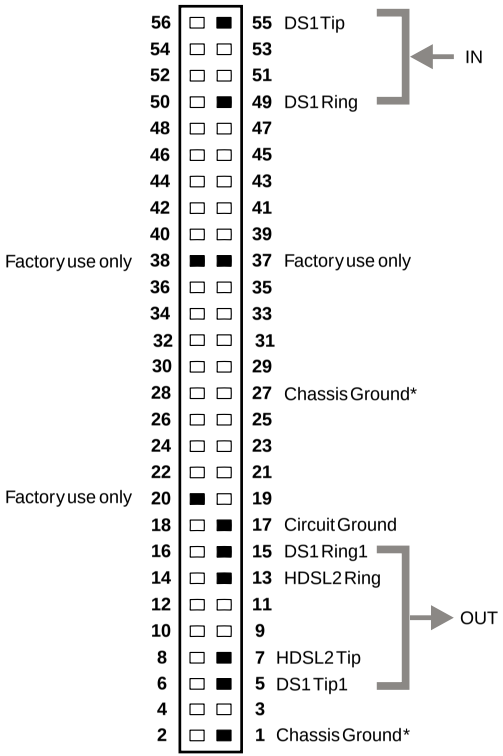
H2TU-R-402 List 1

1 If you are installing the List 1 model, check the configuration of the SCURR switch. The default configuration is disabled (up position). If your particular application requires simplex sealing current, place the SCURR switch in the down position.

2 Align the List 1 or List 1A remote unit with the enclosure slot guides, and push the unit in. The unit should snap into place, indicating that it is properly seated.

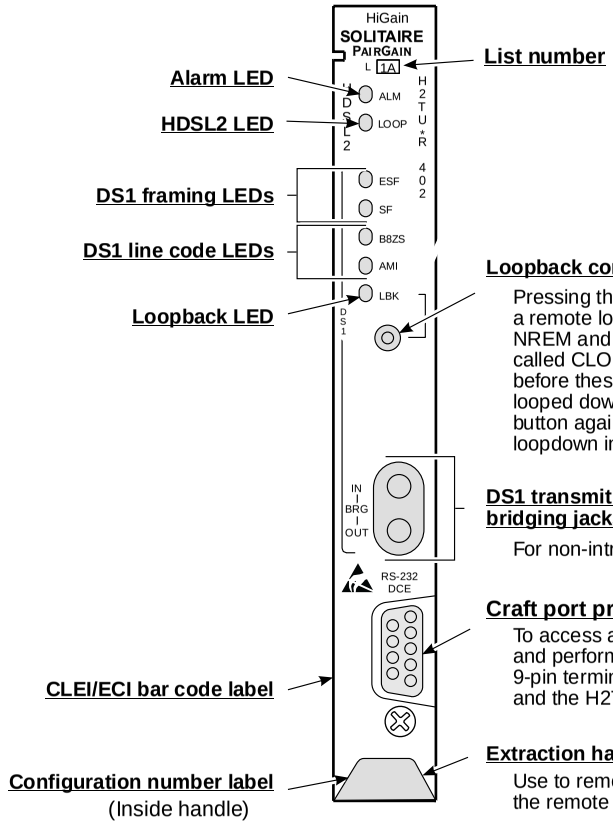
Continued

Card-edge connector



Active pins are highlighted in black.

* Chassis Ground may be tied to earth ground according to local practice.



Loopback control button

Pressing the button for 5 seconds activates a remote loopback toward the network called NREM and a local loopback toward the CPE called CLOC. Any existing loopback is terminated before these are activated. The unit can be looped down by either pressing the LPBK control button again for 5 seconds or by the standard loopdown inband commands.

DS1 transmit (IN) and receive (OUT) bridging jacks

For non-intrusive test access.

Craft port provisioning

To access all system maintenance, provisioning and performance screens, connect a standard 9-pin terminal cable between the serial port on a PC and the H2TU-R craft port.

Extraction handle

Use to remove the H2TU-R-402 from the remote enclosure.

Modem settings:
9600 baud
8 data bits
No parity
1 stop bit
Hardware flow control: OFF
Terminal emulation: VT-100

2 VERIFICATION

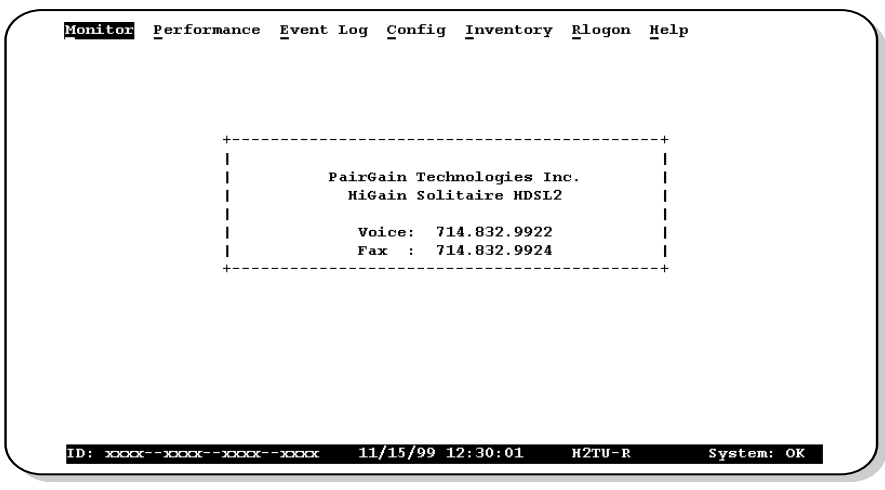
Once the H2TU-R-402 is installed, verify that it is operating properly by monitoring the Status LEDs on the front panel.

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 a 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 Cyclical 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, SF, B8ZS, and AMI 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 (LPBK) LED	Shows loopback states to and from the network and to and from the Customer Interface (CI).
Solid yellow	Indicates Network Remote Loopback (NREM).
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 log on using a maintenance terminal:

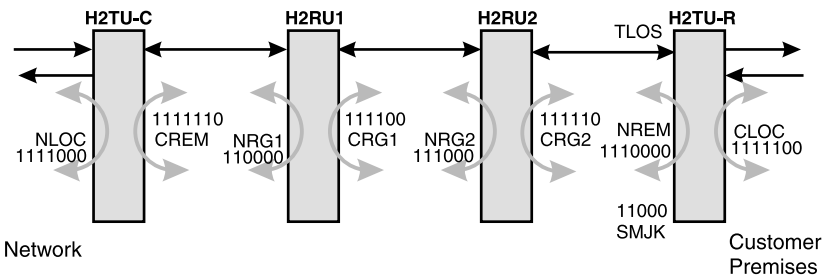
1. Connect a maintenance terminal to the H2TU-R-402 craft port (see Modem Settings in illustration above). The H2TU-R-402 Logon screen displays.
2. Press **CTRL** + **R** to refresh the Logon screen, if necessary.
3. Type the first letter of the desired menu. Use the **SPACEBAR** to cycle through menu selections, and press **ENTER** to change a setting or display a menu.

Type the first letter	To view:
Monitor	A graphical representation of circuit activity and devices.
Performance	Performance history statistics (current, 24-hour, 48-hour, 31-day). Also displays alarm status and count.
Event Log	Recent system events, their date and time of occurrence.
Config	Configuration options (standard, PairGain, date and time, factory defaults).
Inventory	Product information and circuit and unit identifications.
Rlogon	H2TU-C line unit screens.
Help	Glossary, screen navigation keys, PairGain contact information.

For more detailed information about the Solitaire HDSL2 screens, provisioning, flash download of firmware updates, and troubleshooting, download the appropriate H2TU-C line unit technical practice from the Customer Site portion of the PairGain Web page at *www.pairgain.com*. A password is required to access the Customer Site Web pages. If you do not have a password, contact your PairGain sales representative.

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.



GNLB Loopback Commands

Loopback	Inband Code	Description
NLOC	1111000	DSX-1 signal is looped back to the network at the H2TU-C.
NRG1 (a)	110000	DSX-1 signal is looped back to the network at H2RU1.
NRG2 (a)	111000	DSX-1 signal is looped back to the network at H2RU2.
NREM	1110000	DSX-1 signal is looped back to the network at the H2TU-R.
SMJK	11000	DSX-1 signal is looped back to the network at the H2TU-R SmartJack module.
CREM	1111110	Signal from customer is looped back to the customer at the H2TU-C.
CRG1 (a)	111100	Signal from customer is looped back to the customer at H2RU1.
CRG2 (a)	111110	Signal from customer is looped back to the customer at H2RU2.
CLOC	1111100	Signal from customer is looped back to the customer at the H2TU-R.
Loopdown	11100	Deactivates any of the above loopbacks.

(a) H2RU regenerators (doublers) are supported in firmware version 3.0 and higher.

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

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 at PairGain's option 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.

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

Modifications

Any changes or modifications made to this device that are not expressly approved by PairGain Technologies, 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

The H2TU-R-402 List 1 and List 1A have 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
- Binational standard, UL-1950/CSA-C22.2 No. 950-95: Safety of Information Technology Equipment

Trademark Information

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Certificated Firm

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