

QUICK INSTALLATION



H2TU-C-319 LIST 4E LINE UNIT

THE H2TU-C-319 LIST 4E

The H2TU-C-319 List 4E functions as the Central Office (CO) end of a repeaterless T1 transmission system when connected to a HiGain HDSL2 remote unit (H2TU-R). Setting new standards for interoperability and efficiency, HiGain HDSL2 modules transmit a 1.554 Mbps T1 payload on one unconditioned copper pair over the full Carrier Service Area (CSA) range.

FEATURES

-
- Front-panel status LED, craft port, and four-character status display
 - Maintenance screens for inventory, provisioning, troubleshooting, and performance monitoring
 - Loss of Signal/Alarm Indication Signal (LOS/AIS) payload alarm option
 - Grounded loop detection
 - Report menu option for downloading status and performance monitoring data to a file
 - Ultra-low wander
 - Payload (PL) or HiGain (HG) loopback source identification
 - Bipolar Violation Transparency (BPVT) option
 - Performance Report Messaging (SPRM and NPRM)
 - Bit Error Rate (BER) alarm option
 - Power Back Off Network (PBON) and Power Back Off Customer (PBOC) for configuring HDSL2 transmit power levels
 - Digital Data Service (DDS) latching loopback option
 - Supports the in-band 100 loopdown and 100000 loopup command when SmartJack loopback (LPBK) option is enabled
 - Sources sealing current when connected to an H2TU-R-402 List 5E or higher
 - Supports automatic protection switching (APS)^(a)
 - Metallic Test Access
-

(a) For more information about APS, see the PSC-606 Protection Switching Controller technical practice, document LTPH-TP-1006-xx.

SPECIFICATIONS

Operating Temperature	-40°F to +149°F (-40°C to +65°C)
Operating Humidity	5% to 95% non-condensing
HDSL2 Span Voltage	0, -180 ±5 Vdc
Mounting	3192 high-density shelf
HDSL2 Line Rate	1.552 Mbps Overlapped Pulse Amplitude Modulation Transmission with OPTIS
HDSL2 Output	+16.8 dBm ±0.5 dB, 135Ω (0-450 kHz) at CO side +16.5 dBm ±0.5 dB, 135Ω (0-350 kHz) at remote side
Maximum Loop Attenuation	35 dB at 196 kHz, 135Ω
DSX-1 Line Rate	1.544 Mbps ±200 bps
DSX-1 Line Format	Alternate Mark Inversion (AMI) or Bipolar with 8-zero Substitution (B8ZS)
DSX-1 Frame Format	Extended SuperFrame (ESF), SuperFrame (SF), or Unframed (UNFR)
DSX-1 Pulse Output	6 V ^{pk-pk} , pre-equalized for 0 to 655 feet of ABAM cable
DSX-1 Input Level	+1.5 to -7.5 dB DSX

1 INSTALLATION



When installing an H2TU-C, wear an antistatic wrist strap. Avoid touching components on the circuit board.

To ensure the proper installation of the unit to the enclosure, align the H2TU-C with the enclosure slot guides and slide the unit into the chassis until the unit is firmly seated in the backplane.

2 POWER-UP SEQUENCE

When the H2TU-C powers up, the four-character display illuminates and reports status messages.

If the H2TU-C is unable to communicate with the H2TU-R, it displays various alarm and status messages.

If the H2TU-C is able to communicate with the H2TU-R, the following occurs:

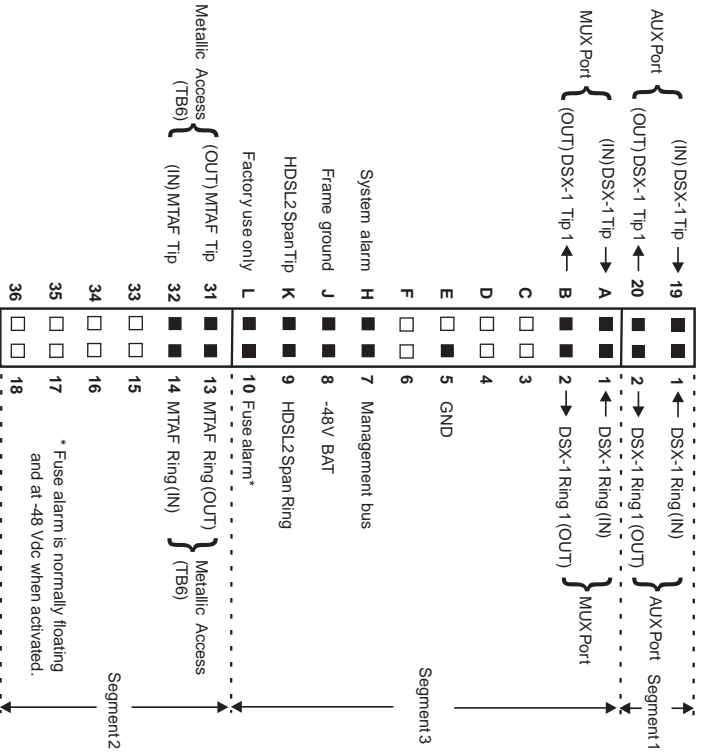
- 1 The Status LED flashes red while acquiring the H2TU-R and turns a steady green when the entire system is operating with no alarms. (The DS1 signal must be present.)
- 2 The four-character display reports margin (SNR) readings (should be ≥ 6 dB) and loop attenuation (should be <35 dB @196 KHz).
- 3 After the system powers up, alarm conditions that exist are reported on the display. (The H2TU-C reports alarms if no DS1 signal is applied.)

3 PROVISIONING

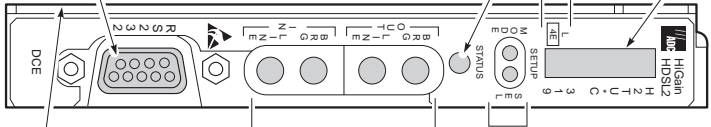
After installation, perform these basic provisioning tasks from the HiGain HDLSL2 logon screen. Refer to the onscreen Help menu for navigational aids.

- 1 Connect a maintenance terminal to the craft port (see front-panel illustration inside), then press **CTRL** + **R** to refresh the logon screen, if necessary.
- 2 Select the Config menu, **Date and Time**, then type the date and time.
- 3 Select the Inventory menu, then type in the unit ID numbers.
- 4 Change the settings of any system parameters, if necessary, by selecting the Config menu, **Standard Options** or **ADC Options**. (Configuration options can also be set from the front panel using the MODE and SEL buttons. See the “Front-Panel Read-Only Settings Using MODE” table inside.)

Card-edge connector



Front panel



Four-character display
 Displays status, provisioning, and alarm messages. See table below for a list of message descriptions.

List number

Status LED

Green LED	Normal operation.
Red LED	Fuse alarm.
Flashing Red LED	HDLSL2 acquisition or system alarm.
Yellow LED	A Customer Remote (CREM) loopback or a Network Local (NLOC) loopback is in effect.
Flashing Yellow LED	System is in Armed (ARM) mode.
Off	Line power is off.

Maintenance Terminal Modem Settings
 9600 baud
 8 data bits
 No parity
 1 stop bit
 Hardware flow control: OFF
 Terminal emulation software: VT100

System option pushbuttons

Use the MODE and SEL pushbuttons to review all system parameters, including user-configured settings, and to activate loopbacks.

To display system parameters: Press the MODE pushbutton for at least 3 seconds to place the front-panel display in Scroll mode. When it has finished scrolling through all the system parameters, the display returns to its normal mode.

To initiate a dual loopback: Press the SEL pushbutton for more than 3 seconds to activate both the NLOC and CREM loopbacks. If a loopback condition already exists, this will loop down all existing loopbacks. Press the LBK pushbutton again for more than 3 seconds to reactivate the dual loopback.

To initiate a manual loopback:

- 1 Press both the MODE and SEL pushbuttons for at least 5 seconds. The following message appears:
MAN LBK NLO?

- 2 Press the SEL pushbutton to activate the NLOC loopback or press MODE to advance to the next loopback selection.

DSX-1 test access jacks

Connect standard test equipment.

BRG	Provides non-intrusive bridging jack access to (IN) and from (OUT) the HDLSL2 span at the DSX-1 interface. Allows monitoring of the T1 payloads.
LINE	Provides splitting jack access to (IN) and from (OUT) the HDLSL2 span at the DSX-1 interface.

Card handle

(CLEI code and ECI bar code label on outside of handle)

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-C craft port.

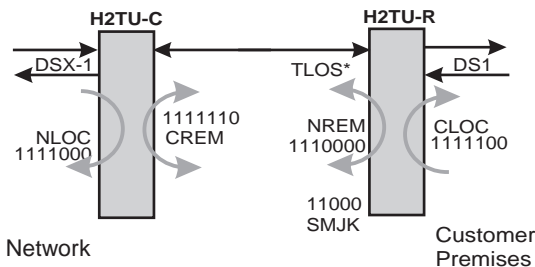
* Fuse alarm is normally floating and at -48 Vdc when activated.

PROVISIONING (CONTINUED)

- Once the H2TU-C is successfully installed and provisioned, access the Monitor or Performance menus to clear the Performance and Alarm History screens to ensure useful data.

4 LOOPBACK TESTING

Initiate loopback testing from the HiGain maintenance terminal screen or use the MODE and LBK pushbuttons. The inband codes below (except COLB and RULB) can also be sent by a test set.



*When enabled, TLOS is an automatic loopback that occurs with an LOS at the remote DS1 input.

GNLB Loopback Commands

Loopback	Inband Code	Description
NLOC	1111000	DSX-1 signal is looped back to the network at the H2TU-C.
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	DS1 signal from customer is looped back to the customer at the H2TU-C.
CLOC	1111100	DS1 signal from customer is looped back to the customer at the H2TU-R.
Loopdown	11100	Deactivates any of the above loopbacks.

Copies of this publication or the technical practice (LTPH-UM-1049-xx) can be downloaded from the ADC website at www.adc.com. To order a hard copy, please contact your sales representative.

Front-Panel Alarm Messages^(a)

Message	Description
PWR FEED SHRT ^(b)	A short between the Tip and Ring of the HDSL2 pair.
PWR FEED GND ^(b)	The HDSL2 loop is grounded.
PWR FEED OPEN ^(b)	A line-power open condition.
LOSW	The HDSL2 loop has lost synchronization. The span closest to the network has highest priority.
MTA	Indicates that the H2TU-C is in a metallic test access state.
LLOS	No signal is detected at the DSX-1 input to the H2TU-C.
RLOS	No signal is detected at the DS1 input to the H2TU-R.
LAIS ^(c)	Line Alarm Indication Signal.
RAIS ^(c)	Remote Alarm Indication Signal.
TRCI ^(c)	An RAI alarm (yellow LED) from the Customer Premises Equipment (CPE) with an error-free signal from the line unit or network.
RRAI ^(c)	An RAI alarm (yellow LED) from the CPE with errors from the line unit or network.
xxx-DBER ^(c)	A system DS1 Bit Error Rate (BER) alarm. (xxx denotes either TUC or TUR.)
PRMF ^(c)	H2TU-R Performance Report Messaging BER threshold exceeded at far end.
PRMN ^(c)	H2TU-R Performance Report Messaging BER threshold exceeded at near end.
xxx-HBER	A system HDSL2 Block Error Rate (BER) alarm. (xxx denotes either TUC or TUR.)
xxx-MAL	The margin on the HDSL2 loop has dropped below the threshold setting. (xxx denotes either TUC or TUR.)
xxx-LA	The attenuation on the HDSL2 loop has exceeded the maximum threshold value. (xxx denotes either TUC or TUR.)

- Front-panel alarm messages are listed in order of priority. ALRM displays prior to any alarm message. Pressing the SEL button initiates an Alarm Cutoff (ACO) message.
- Message displays repeatedly as long as the alarm condition exists and is not included in the priority order.
- Does not activate the alarm relay access pin H.



To comply with the intrabuilding wiring requirements of GR-1089 CORE, Section 4.5.9, the shields of the ABAM-type cables that connect the H2TU-C-319 List 4E DSX-1 output ports to the cross-connect panel must be grounded at both ends.

Front Panel Diagnostic Messages

Message	Description (normal operating messages in bold)
A=xx	The loop attenuation of the longest (maximum loss) span, measured in dB.
ACQ	The multiplexers of the H2TU-C and H2TU-R are trying to establish synchronization.
ARM	Armed to respond to Intelligent Repeater Loop (ILR) codes.
BAD RT?	The H2TU-C is not receiving a response from the H2TU-R.
FERR	A framing bit error occurred at H2TU-C DSX-1 input.
FLDL	Flash download of firmware updates. (Contact Customer Service for update procedures.)
HES	H2TU-C HDSL2 loop cyclical redundancy check (CRC) error.
LBPV	A local bipolar violation has been received at the DSX-1 input to the H2TU-C.
M=xx	Indicates the power of the received HDSL2 signal relative to noise (S/N with respect to 21.5 dB). Any value of 6 dB or greater is adequate for reliable system operation.
MNGD	The H2TU-C is under control of the H2TU-319 network management unit.
PWR FEED OFF	HDSL2 span power is turned off.
PWR FEED ON	Indicates that the HDSL2 span power is turned on and the loop is not grounded or shorted.
SIG	The transceivers of the H2TU-C and H2TU-R are trying to establish contact with each other on Span 1 of the HDSL2 loop.

Front-Panel Read-Only Settings Using MODE^(a)

Message	Description (default selections in bold)
VER x.xx	Software version number of the H2TU-C-319.
LIST xx	List number of the H2TU-C-319.
FRM xxxx	Frame pattern received from the DSX-1 (SF, ESF, UNFR).
CODE xxxx	Line code (AMI or B8ZS).
LATT xx	Loop Attenuation threshold setting (38).
MARG xx	Margin threshold setting (4).
EQL	Indicates DSX-1 Equalizer setting: 0 (0 to 132 ft.), 133 (133 to 265 ft.), 266 (266 to 398 ft.), 399 (399 to 532 ft.), or 533 (533 to 655 ft.).
RLBO	Indicates H2TU-R line buildout setting: 0 dB, -7.5 dB , or -15 dB.
LPBK	SmartJack loopback commands enabled (ENA) or disabled (DIS).
SPLB xxxx	System configured for generic (GNLB) or special inband loopback commands (A1LB, A2LB, A3LB, A4LB, A5LB).
PWRF	HDSL2 line power disabled (OFF) or -180 Vdc (ON).
HBER	1E-6 or 1E-7 = indicates HDSL2 BER alarm threshold setting. NONE = no generation of a system alarm due to BER.
DBER	24-hour DSX-1 BER alarm threshold enabled (ENA) or disabled (DIS).
LBTO	Loopback timeout = NONE, 20, 60 , 120 minutes, 8-hour, 24-hour.
DS1	DSX-1 line code = Bipolar with 8-Zero Substitution (B8ZS), Alternate Mark Inversion (AMI).
CONV	H2TU-R frame format conversion = OFF (framing determined by the DS1 FRMG option), ACON (autodetection of framing and potential frame conversion at the H2TU-R), or FCON (autodetection of framing and forced frame format conversion at the H2TU-R).
FRMG	DS1 frame formatting = AUTO (auto framing mode) or UNFR (unframed mode).
RDA	Alarm indications due to remote DS1 LOS at H2TU-R input are enabled (ENA) or disabled (DIS).
ALMP	Alarm pattern = Alarm Indication Signal (AIS) or Loss of Signal (LOS).
BPVT	Bipolar Violation Transparency (BPVT) enabled (ENA) or disabled (DIS).
NLBP	H2TU-R transmits either AIS or LOS towards CI for any network loopback.
TLOS	Logic loopback at the H2TU-R is either enabled (ENA) or disabled (DIS) when an LOS occurs at its DS1 input.
PRM	Performance Report Messaging = OFF (no enhanced Performance Report Messaging), SPRM (Supplemental PRM), NPRM (Network PRM), AUTO (H2TU-R generates both SPRMs and NPRMs whenever possible).
NAIS	If ALMP is set to AIS, indicates which pattern is sent to the network when a remote LOS or AIS occurs. CI = AIS-CI sent to the network; AIS = AIS sent to the network.
ROVR	Conversion of an ESF DS1 payload from the network with an embedded RAI pattern to an SF-RAI pattern toward the CI at the H2TU-R is enabled (ENA) or disabled (DIS). CONV option must be set to FCON or ACON.
RACI	Conversion of a DS1 SF-RAI signal (yellow alarm) received by the H2TU-R to an SF-RAI-CI signal toward the network is enabled (ENA) or disabled (DIS).
PBOC	Indicates the power output levels of the H2TU-R customer unit toward the network. Default (DEF) or enhanced (ENH).
PBON	Indicates the power output levels of the H2TU-C network unit toward the customer. Default (DEF) or enhanced (ENH).

(a) Front-panel codes scroll in the order listed. The configured selections follow each code.

Front-Panel System Information Messages (Scroll Mode)^(a)

Code	Description	Code	Description
CODE xxxx	Line code setting (AMI or B8ZS).	LIST xx	List number of the H2TU-C.
FRM xxxx	Frame pattern received from the DSX-1 (SF, ESF, or UNFR).	MARG xx	Margin threshold (0 to 15 dB). Default is 5 .
LATT xx	Loop attenuation threshold setting (0 to 40 dB). Default is 32 .	VER x.xx	Software version number.

(a) To scroll through system information messages, press the MODE button for 3 or more seconds.

FCC Class A Compliance

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

Product warranty is determined by your service agreement. Contact your sales representative or Customer Service for details.

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 safety standards:

- GR 63-CORE - Network Equipment-Building System (NEBS) Requirements
- 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

ADC is a registered trademark of ADC Telecommunications, Inc. HiGain is a registered trademark of ADC DSL Systems, Inc. Other product names mentioned in this installation guide are used for identification purposes only and may be trademarks or registered trademarks of their respective companies.

Copyright Information

© 2002 ADC DSL Systems, Inc. All rights reserved. Information contained in this document is company private to ADC DSL Systems, Inc., and shall not be modified, used, copied, reproduced or disclosed in whole or in part without the written consent of ADC.

ADC DSL Systems, Inc.

14402 Franklin Avenue
Tustin, CA 92780-7013
Tel: 714.832.9922
Fax: 714.832.9924

Technical Assistance

Tel: 800.638.0031
Tel: 714.730.3222
Fax: 714.730.2400



Product Catalog: H2TU-C-319-L4E
CLEI: VACHYVYG
Document: LTPH-QI-1078-02, Issue 2



1213495
January 9, 2002