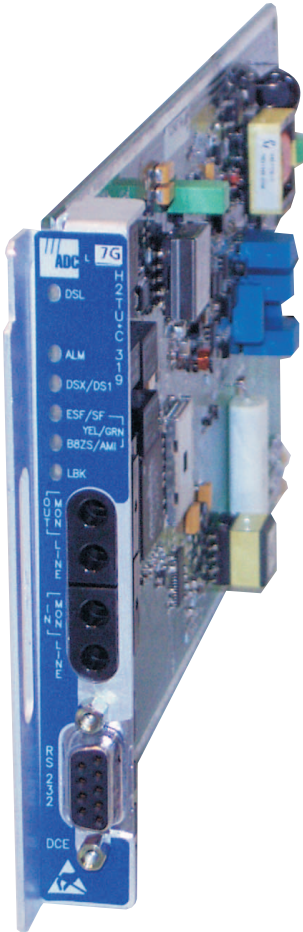


# QUICK INSTALLATION



## HIGAIN H2TU-C-319 LIST 7G LINE UNIT



---

# THE H2TU-C-319 LIST 7G

The H2TU-C-319 List 7G line unit is the Central Office (CO) side of a T1 transmission system. The H2TU-C, when used with an H2TU-R remote unit, transmits a 1.544 Mbps payload on one unconditioned copper pair over the full Carrier Service Area (CSA) range. The H2TU-C-319 List 7G is designed to mount in 3192 mechanics shelves.

## FEATURES

---

**Front-panel features:** craft port for maintenance screen access, six LEDs for system status reporting, and DSX-1 access jacks

**HDSL2 transmission features:**

- Automatic circuit retrain assures quality service
- Enhanced lightning protection
- Full-duplex transmission on one copper pair
- Grounded loop detection on HDSL2 span
- Sources sealing current
- Fractional T1 mode selection

**Maintenance screens** for inventory, provisioning, performance monitoring, and troubleshooting, including:

- Loop attenuation and insertion loss reporting

- Remote provisioning and PM data retrieval through TL1 FDL commands
  - Supports automatic protection switching (APS)
  - Power Back Off (PBON and PBOC) for configuring HDSL2 transmit power levels to reduce crosstalk
  - Report menu option for downloading status and performance data
  - Non-volatile storage of performance monitoring parameters
  - Customer disconnect indication alarms (AIS-CI and RAI-CI alarm patterns)
  - Performance Report Messaging (SPRM, NPRM, and S + N)
  - DS1 and HDSL2 Blockage Indicator History
- 

## SPECIFICATIONS

---

<b>Operating Temperature</b>	-40°F to +149°F (-40°C to +65°C)
<b>Operating Humidity</b>	5% to 95% non-condensing
<b>HDSL2 Span Voltage</b>	0 or -180 Vdc ±5 Vdc
<b>CO Supply</b>	-48 Vdc nominal (-42.5 Vdc to -56.5 Vdc)
<b>Mounting</b>	3192 mechanics shelves
<b>HDSL2 Line Rate</b>	1.552 Mbps Overlapped Pulse Amplitude Modulation Transmission with Interlocking Spectra (OPTIS)
<b>HDSL2 Output</b>	+16.8 dBm ±0.5 dBm, 135Ω at CO side +16.5 dBm ±0.5 dBm, 135Ω at remote side
<b>Maximum Insertion Loss</b>	35 dB @ 196 kHz
<b>Maximum Loop Attenuation</b>	28 dB
<b>DSX-1 Line Rate</b>	1.544 Mbps ±200 bps
<b>DSX-1 Line Format</b>	Alternate Mark Inversion (AMI) or Bipolar with 8-Zero Substitution (B8ZS)
<b>DSX-1 Frame Format</b>	Extended SuperFrame (ESF), SuperFrame (SF), Unframed (UNFR), or AUTO
<b>DSX-1 Pulse Output</b>	6 V <sup>pk-pk</sup> , pre-equalized for 0 to 655 feet of ABAM cable
<b>DSX-1 Input Level</b>	+1.5 dB to -7.5 dB DSX

---

---

# 1 INSTALLATION

Align the H2TU-C with the shelf card-slot guides and slide the unit in. Push on the H2TU-C front panel to snap the unit into place.

# 2 POWER-UP SEQUENCE

When the H2TU-C powers up, the DSL LED flashes red once every second.

If the H2TU-C is unable to communicate with the H2TU-R, the DSL LED displays solid red, indicating HBER, MARG, or PWRP alarms.

If the H2TU-C is able to communicate with the H2TU-R, the DSL LED displays solid green, indicating that the HDSL2 spans are synchronized without error.

Verify the presence of a DS1 signal by confirming that the ALM LED is off (not lit). If the ALM LED displays red or yellow, a DS1 LOS condition exists. Refer to Table 1 to locate the problem.

Verify error-free DS1 transmission by confirming that the DS1, framing (ESF/SF), and line code (B8ZS/AMI) LEDs display solid colors. Refer to Table 2 to locate the problem if these LEDs are either flashing or display solid red. When the H2TU-C powers up, the four-character display illuminates and displays status messages.

•

# 3 PROVISIONING

Perform these basic provisioning tasks:

- 1 Connect a maintenance terminal to the craft port (see front-panel illustration inside) and log on. Press **CTRL** + **R** to refresh the logon screen, if necessary.

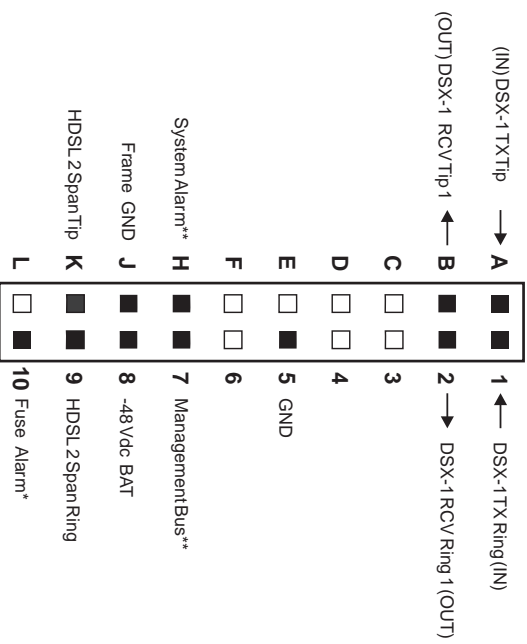
Refer to the onscreen Help menu for navigational aids or use the **SPACEBAR** (to cycle through selections), **ENTER** (to activate the current setting or choice, or to display a menu), **ESC** or **F11** (to return to the parent menu), or directional arrow keys (to navigate to a menu or item).

- 2 Select **Config, Date and Time**, then type the date and time.
- 3 Select **Inventory**, then type the unit ID numbers.
- 4 Change the settings of any system parameters, if necessary, by selecting **Config**, then **Standard Options** or **ADC Options** (see Table 3 and Table 4 inside). Once the H2TU-C is successfully installed and provisioned, access the Monitor, Performance, or Event Log menus to clear the Performance, Alarm History, or Event Log screens, or use Master Clear in the Config menu.

*Continued*



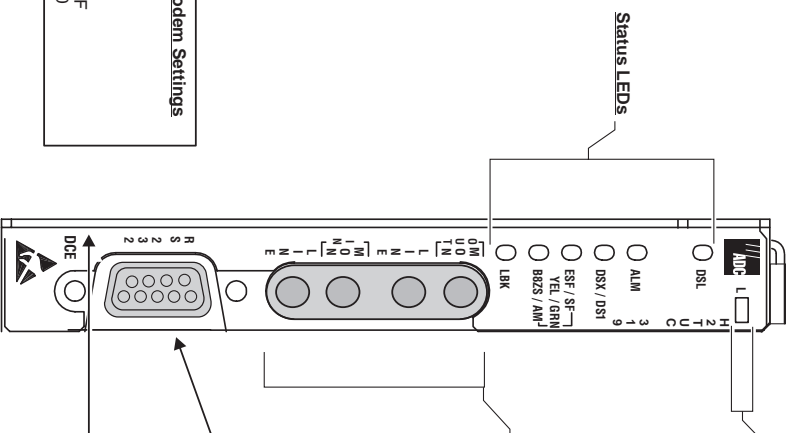
### Card-Edge Connector



\* Fuse Alarm  
 Normal = Floating (0 to -60 Vdc maximum)  
 Activated = -48 Vdc, 10 mA maximum

\*\* System Alarm and Management Bus (reserved)

### Front Panel



**Maintenance Terminal Modem Settings**

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

**MON**  
 Connect standard test equipment.  
 Provides non-intrusive monitoring jack access to (IN) and from (OUT) the HDSL2 span at the DSX-1 interface. Allows monitoring of the T1 payloads.

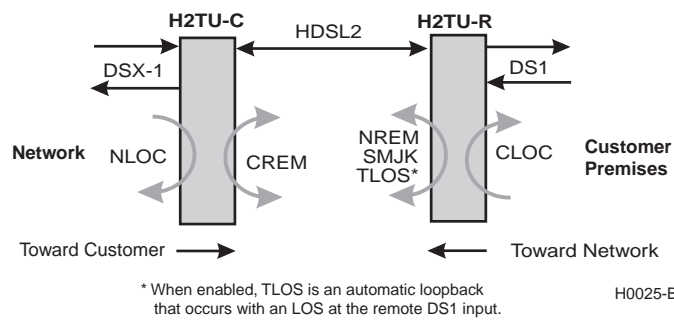
**LINE**  
 Provides splitting jack access to or from the customer or the network multiplexer based on the DS-1 test jack setting in the Config menu. Refer to the user manual for more information.

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

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

# 4 LOOPBACK TESTING

Initiate loopback testing from the maintenance menus. The inband codes shown below can be sent by a test set.



**Table 1. 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.
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.
SMJK	11000	DSX-1 signal is looped back to the network at the H2TU-R SmartJack module.
Loopdown	11100	Deactivates any of the above loopbacks.

**Table 2. LED Status and Functions**

LED and Status	Function
<b>DSL</b>	
OFF	No power is applied to the H2TU-C.
Solid green	Normal operation: HDSL2 span is synchronized without error.
Solid red	HBER, MARG, or PWRP alarm is present at the H2TU-C.
Flashing red once every second	HDSL2 loop is attempting synchronization.
<b>ALM</b>	
OFF	Normal operation: the DSX-1 signal is present at both the H2TU-R and H2TU-C.
Solid yellow	RLOS is present at the H2TU-R.
Solid red	LLOS is present at the H2TU-C.
<b>DSX/DS1</b>	
Solid green	Normal operation: the DSX-1 signal is error free.
Solid red	LLOS, BPV, frame error, or CRC is present at the H2TU-C.
<b>ESF/SF</b>	
OFF	Framing is set to UNFR, unframed DSX-1 is present at the H2TU-C, or no DSX-1 is detected at the H2TU-C.
Solid yellow	ESF frame formatting is present at the H2TU-C.
Flashing yellow once every second	ESF frame formatting and frame error/CRC are present at the H2TU-C.
Solid green	SF frame formatting is present at the H2TU-C.
Flashing green once every second	SF frame formatting and frame error are present at the H2TU-C.
<b>B8ZS/AMI</b>	
Solid yellow	B8ZS is provisioned at the H2TU-C.
Flashing yellow once every second	B8ZS and excess zeros string are present at the H2TU-C.
Solid green	AMI is provisioned at the H2TU-C.
Flashing green once every second	AMI and BPV are present at the H2TU-C.
<b>LBK</b>	
OFF	H2TU-C is not in loopback.
Solid yellow	H2TU-C is in either NLOC or CREM (RLB).

**Table 3. Maintenance Terminal Config Menu—Standard Options<sup>(a)</sup>**

Standard Option	Function
Loopback Timeout (LBTO)	Sets automatic cancellation of all loopbacks to NONE, 20 min, 60 min, or <b>120 min</b> after activation.
Loop Attenuation Threshold (LATT)	Determines the maximum loop attenuation (0 to 40 dB) before an alarm is declared. Zero disables the alarm. Default setting is <b>32 dB</b> .
Margin Threshold (MARG)	Determines the minimum allowable margin (0 to 15 dB) below which a system alarm can occur. Zero disables the alarm. Default setting is <b>4 dB</b> .
DS1 Frame Formatting (FRMG)	<b>AUTO</b> = system searches DS1 transmission for SF or ESF frame pattern. SF = sets system for SF frame formatting. ESF = sets system for ESF frame formatting. UNFR = system functions as a transparent bit pipe.
DS1 Line Coding (DS1)	<b>B8ZS</b> = sets system for B8ZS line code. AMI = sets system for AMI line code.
H2TU-C Equalization (EQL)	Sets the DSX-1 equalizer to: <b>0</b> (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.).
H2TU-R Line Buildout (RLBO)	Sets the DS1 receive level output toward the Customer Interface to 0 dB, <b>-7.5 dB</b> , or -15.0 dB.
Alarm Pattern (ALMP)	Enables an <b>AIS</b> or LOS output at the DS1 ports for LOSW or LOS DS1.
H2TU-R TLOS Loopback (TLOS)	Enables (ENA) or disables ( <b>DIS</b> ) a TLOS loopback at H2TU-R for LOS at its DS1 input (if enabled at the H2TU-R).
Network Loopback Pattern (NLBP)	Enables the H2TU-R to transmit an <b>AIS</b> or LOS towards CI for any network loopback.
Power Back Off Network (PBOC)	The power output levels of the H2TU-C network unit toward the customer. Default ( <b>DEF</b> ) or enhanced (ENH).
Power Back Off Customer (PBOC)	The power output levels of the H2TU-R customer unit toward the network. Default ( <b>DEF</b> ) or enhanced (ENH).

(a) Default settings are in bold.

**Table 4. Maintenance Terminal Config Menu—ADC Options<sup>(a)</sup>**

ADC Option	Function
Line Power Feed (PWRP)	Enables ( <b>ON</b> ) or disables (OFF) HDSL2 line power.
Remote Provisioning (RTPV)	Enables ( <b>ENA</b> ) or disables (DIS) remote provisioning.
Bipolar Violation Transparency (BPVT)	Enables (ENA) or disables ( <b>DIS</b> ) Bipolar Violation Transparency.
DS1 BER (DBER)	Enables (ENA) or disables ( <b>DIS</b> ) 24-hour DSX-1 BER alarm threshold.
HDSL2 BER Threshold (HBER)	Sets HDSL2 BER alarm threshold at <b>1E-6</b> , 1E-7 or NONE.
Special Loopback Mode (SPLB)	Configures system for generic ( <b>GNLB</b> ) or special inband loopback commands (A3LB).
SmartJack Loopback (LPBK)	Enables ( <b>ENA</b> ) or disables (DIS) SmartJack (SMJK) loopback commands.
Minor Alarm (ALM)	Enables (ENA) or disables ( <b>DIS</b> ) the generation of an alarm output when a system alarm occurs.
Network AIS Pattern (NAIS)	If ALMP is set to AIS, determines 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.
Performance Report Messaging (PRM)	OFF = no enhanced Performance Report Messaging, SPRM = Supplemental PRM, NPRM = Network PRM, <b>S + N</b> = H2TU-R generates both SPRMs and NPRMs whenever possible.
RAI to RAI-CI towards NET (RACI)	Enables ( <b>ENA</b> ) or disables (DIS) conversion of a DS1 RAI signal (yellow alarm) received by the H2TU-R to an RAI-CI signal toward the network.
ESF-RAI to SF-RAI Overwrite (ROVR)	Enables ( <b>ENA</b> ) or disables (DIS) 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. CONV option must be set to FCON or ACON.
H2TU-R DS1 Frame Conversion (CONV)	<b>OFF</b> = framing determined by the DS1 FRMG option, ACON = autodetection of framing and potential frame conversion at the H2TU-R, FCON = autodetection of framing and forced frame format conversion at the H2TU-R.
Fractional T1 Mode (FT1)	Enables (ENA) or disables ( <b>DIS</b> ) fractional T1 mode.

(a) Default settings are in bold.



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 line unit DSX-1 output ports to the cross-connect panel must be grounded at both ends.



Copies of this publication or the user manual (LTPH-UM-1205-xx) can be downloaded from the ADC website at [www.adc.com](http://www.adc.com). To order a hard copy, please contact your sales representative.

## 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-60950/CSA C22.2 No. 60950-00 Third Edition: 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

© 2003 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

Product Catalog: H2TU-C-319-L7G  
CLEI: VACKED0A  
Document: LTPH-QI-1209-01

## Technical Assistance

Tel: 800.366.3891 x73223  
Tel: 952.917.3223  
Fax: 952.917.3244  
Email: [wsd.support@adc.com](mailto:wsd.support@adc.com)



1255259  
March 26, 2003