

QUICK INSTALLATION



H2TU-C-319 LIST 1 AND LIST 1C LINE UNITS

THE H2TU-C-319 LIST 1 AND LIST 1C

The ADC® HiGain® HDSL2 product family is the industry's first practical implementation of High bit-rate Digital Subscriber Line 2 (HDSL2). When an H2TU-C-319 List 1 or List 1C line unit is used in conjunction with a HiGain remote unit (H2TU-R), the system provides 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 AWG or 9,000 feet of 26 AWG wire, including bridged taps.

FEATURES

-
- Front-panel status LED, craft port, and four-character status display (List 1 only) ^(a)
 - Ultra-low wander
 - Three-span range with two regenerators (36 kft, 24 AWG)
 - Grounded loop detection
 - Loss of Signal (LOS)/Alarm Indication Signal (AIS) payload alarm option
 - Payload or HiGain loopback source identification
 - Bit Error Rate (BER) alarm option
 - Bipolar Violation Transparency (BPVT) option
 - Flash download of firmware updates
 - HiGain maintenance screens for inventory, provisioning, troubleshooting, and performance monitoring
-

(a) The List 1C is an HMU-managed model that does not provide the standard front-panel provisioning features (RS-232 craft port, MOD and SEL buttons, and four-character display).

SPECIFICATIONS

Operating Temperature	-40 °F to +149 °F (-40 °C to +65 °C)
Operating Humidity	5% to 95% non-condensing
HDSL2 Span Voltage	0, -185 Vdc
Mounting	3192 high-density shelf
HDSL2 Line Rate	1.552 Mbps Overlapped Pulse Amplitude Modulation Transmission with Interlocking Spectra (OPTIS)
HDSL2 Output	+16.8 dBm ±0.5 dB, 135 Ω
Maximum Loop Attenuation	35 dB at 196 KHz, 135 Ω
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

To ensure proper installation, align the H2TU-C with the enclosure slot guides and slide the unit in. The unit should snap into place, indicating that the unit is properly seated.

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 next span device, it displays various alarm and status messages.

If the H2TU-C is able to communicate with the next span device, the following occurs:

- 1 The Status LED flashes red while acquiring each device in the system, and turns steady green when the entire system is operating without any alarms. (The T1 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 Any alarm conditions that exist after the system powers up are reported on the display. (The H2TU-C reports alarms if no T1 signal is applied.)

3 PROVISIONING

After installing the H2TU-C, perform these basic provisioning tasks by accessing the HiGain HDSL2 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. For List 1C, connect to the HMU craft port to access the logon screen.
- 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 **PairGain Options**. (List 1 configuration options can also be set from the front panel using the MODE and SEL buttons. See the “Front-panel Configuration Options” table inside.)
- 5 Once the H2TU-C is successfully installed and provisioned, access the Monitor, Performance or Event Log screens to clear these screens individually or select Master Clear from the Config menu to clear all screens to ensure useful data.

Continued



List 1 system option buttons (for manual setting of system parameters) *

- Use MODE and SEL to manually modify user options, initiate loopbacks, and display DSX-1 line parameters.
- Press the MODE button for 1 second and release. The front panel alternately displays the first system parameter and its current setting.
- Press SEL to step through all possible settings for the displayed parameter.
- Press MODE to update the parameter and advance to the next parameter.
- After scrolling through all the parameters, press SEL to confirm changes when prompted with a CONF NO message, or press MODE to cancel all changes.

DSX-1 test access jacks

Connect standard test equipment.

BRG	Provides non-intrusive bridging 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 (IN) and from (OUT) the HDSL2 span at the DSX-1 interface.

List 1 craft port provisioning *

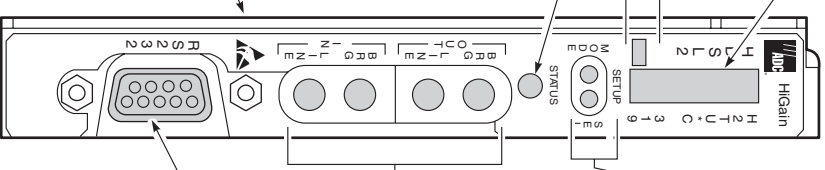
To access all system maintenance, provisioning and performance screens, connect a standard 9-pin terminal cable between the serial port on a PC and the H2TU-C craft port.

Maintenance Terminal Modem Settings

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

List 1 four-character display *
Displays status, provisioning, and alarm messages. See tables below for a list of message descriptions.

Green LED	Normal operation.
Red LED	Fuse alarm.
Flashing Red LED	HDSL2 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.



List number

Status LED

Card handle
(Configuration number and CLEI code label on outside of handle)

Card-edge connector

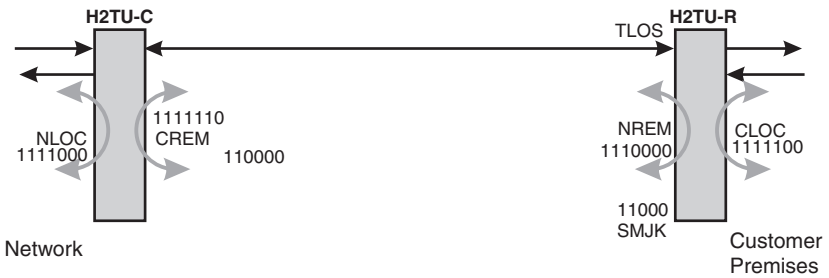
(IN) DSX-1 Tip	→ A	■	1	←	DSX-1 Ring (IN)
(OUT) DSX-1 Tip 1	← B	■	2	→	DSX-1 Ring 1 (OUT)
	C	□	3		
	D	□	4		
	E	□	5		GND
HDSL2 Span Tip	F	■	6		HDSL2 Span Ring
System alarm	H	■	7		Management bus
Frame ground	J	■	8		-48 V BAT
	K	□	9		
Factory use only	L	■	10		Fuse alarm*

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

* List 1C does not have a craft port, display, or MOD and SEL buttons. To provision the List 1C, access the maintenance terminal menus through the management unit.

4 LOOPBACK TESTING

Initiate loopback testing from the HiGain maintenance terminal screen or use the MODE and SEL buttons. The inband codes below can also be sent by a test set.



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	Signal from customer is looped back to the customer at the H2TU-C.
CLOC	1111100	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 user manual 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

Message	Description
System Alarm Messages ^(a)	
LOSW	The HDSL2 loop has lost sync.
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 ^(b)	Local AIS Signal.
RAIS ^(b)	Remote AIS Signal.
LRAI ^(b)	An RAI condition is detected at the remote and the signal from the line unit is error-free.
RRAI ^(b)	An RAI (yellow) alarm from the Customer Premises Equipment (CPE) with a failure from the network.
DBER ^(b)	A system DS1 Bit Error Rate (BER) alarm.
PRMF ^(b)	H2TU-R Performance Report Messaging BER threshold exceeded at far end.
PRMN ^(b)	H2TU-R Performance Report Messaging BER threshold exceeded at near end.
HBER	A system HDSL2 Block Error Rate (BER) alarm.
MAL	The margin on the HDSL2 loop has dropped below the threshold setting.
LA	The attenuation on the HDSL2 loop has exceeded the maximum threshold value.
Line-power Alarm Messages ^(c)	
PWR FEED SHRT	A short between the Tip and Ring of the HDSL2 pair.
PWR FEED GND	The HDSL2 loop is grounded.
PWR FEED OPEN	A line-power open condition.

(a) System 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.

(b) Does not activate the alarm relay access pin H.

(c) Line-power alarm messages display repeatedly as long as the alarm condition exists and are not included in the priority order of the system alarm messages.

Front-panel Diagnostic Messages

Display Code	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.
A n L	The multiplexers of the two devices on Span n are trying to establish synchronization with each other, where n is the number of the span.
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 HMU-319 network management unit.
PWR FEED OFF	HDSL2 span power is turned off.
PWR FEED ON	Indicates that the HDSL2 loop is not grounded or shorted.
SIG	The transceivers of the H2TU-C and H2TU-R (or the H2TU-C and first regenerator) are trying to establish contact with each other on Span 1 of the HDSL2 loop.
S n L	The transceivers of the two devices on Span n are trying to establish contact with each other, where n is the number of the span.

Front-panel Configuration Options Using MODE and SEL (List 1 Only)^(a)

Display Code	Description (default values in bold)
EQL	Sets the DSX-1 Equalizer to: 0 (0 to 133 ft.) , 133 (133 to 266 ft.), 266 (266 to 399 ft.), 399 (399 to 533 ft.), 533 (533 to 655 ft.).
RLBO	Sets the H2TU-R line buildout to 0 dB , -7.5 dB, or -15 dB.
LPBK	Enables (ENA) or disables (DIS) SmartJack loopback commands.
SPLB xxxx	Configures the system for generic (GNLB) or special inband loopback commands (A1LB, A2LB, A3LB, A4LB, A5LB).
PWRF	OFF = disables HDSL2 powering. ON = HDSL2 line voltage is -185 Vdc maximum.
HBER	1E-6 or 1E-7 = alarm activates when the HDSL2 BER alarm threshold exceeds 10 ⁻⁶ or 10 ⁻⁷ . NONE = prevents generation of a system alarm due to BER.
DBER	Enables (ENA) or disables (DIS) fixed 24-hour DSX-1 BER alarm threshold.
LBTO	Loopback timeout = NONE, 20, 60 , 120 minutes.
ALM	Enables (ENA) or Disables (DIS) alarm indications on Pin H.
DS1	DSX-1 line code = AUTO , B8ZS, AMI.
FRMG	DS1 frame formatting = AUTO (auto framing mode) or UNFR (unframed mode).
RDA	Enables (ENA) or disables (DIS) alarm indications due to remote DS1 LOS at the H2TU-R input.
ALMP	Enables system to output an alarm pattern: AIS or LOS.
BPVT	Enables (ENA) or disables (DIS) Bipolar Violation Transparency.
NLBP	Enables the H2TU-R to transmit either AIS or LOS towards the CI for any network loopback.
TL0S	Enables (ENA) or disables (DIS) a logic loopback at the H2TU-R when a LOS occurs at its DS1 input.
RTPV	Enables (ENA) or disables (DIS) remote provisioning.

(a) Front-panel configuration options display in the order listed.

Front-panel System Information Messages (Scroll Mode) (List 1 Only)^(a)

Code	Description	Code	Description
CODE xxxx	Line code setting (AMI, B8ZS).	LIST xx	Product list number.
FRM xxxx	Frame pattern received from the DSX-1 (SF, ESF, UNFR).	MARG xx	Margin threshold (0 to 15 dB). Default is 4.
LATT xx	Loop attenuation threshold (0 to 40 dB). Default is 35.	VER x.xx	Firmware version.

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



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

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

© 1999 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-L1L1C
CLEI: VACHDN0C, VACHKNZC
Document: 352-319-100-03, Issue 3



1213945
December 17, 1999