HiGain

QUICK INSTALLATION

H2TU-C-319 LIST 1A
LINE UNIT

THE H2TU-C-319 LIST 1A

The H2TU-C-319 List 1A line unit is the Central Office (CO) side of a T1 transmission system. When the H2TU-C is used in conjunction with a HiGain High-bit-rate Digital Subscriber Line 2 (HDSL2) 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
- Bipolar Violation Transparency (BPVT) option
- Bit Error Rate (BER) alarm option
- Grounded loop detection
- Maintenance screens for inventory, provisioning, troubleshooting, and performance monitoring
- Loss of Signal (LOS)/Alarm Indication Signal (AIS) payload alarm option
- DS1 and HDSL2 alarm histories
- Payload or HiGain loopback source identification
- Ultra-low wander

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 mechanics, 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 (0-450 kHz) at CO side +16.5 dBm ±0.5 dB, 135 Ω (0-350 kHz) at remote side
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 $V^{pk\text{-}pk}$, pre-equalized for 0 to 655 feet of ABAM cable
DSX-1 Input Level	+1.5 to -7.5 dB DSX

1 INSTALLATION

Align the H2TU-C-319 with the enclosure slot guides, then slide the unit in until it touches the backplane card-edge connector. Push the H2TU-C into the slot guides until properly seated in the card-edge connector.

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.)

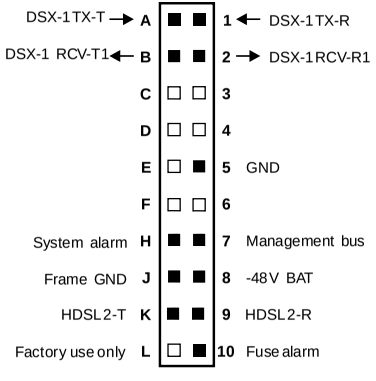
3 PROVISIONING

After installing the H2TU-C, perform these basic provisioning tasks by accessing the logon screen. Refer to the onscreen Help menu for navigational aids or use the SPACEBAR (to cycle through selections), ENTER (to activate the current setting, 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).

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 pushbuttons. See the "Front-Panel Configuration Options Using MODE and SEL" table inside.)
5. Once the H2TU-C is successfully installed and provisioned, access the Performance or Event Log menu to clear the Performance, Alarm History, or Event Log screens, or use Master Clear in the Config menu.

Continued

Card-edge connector



Four-character display

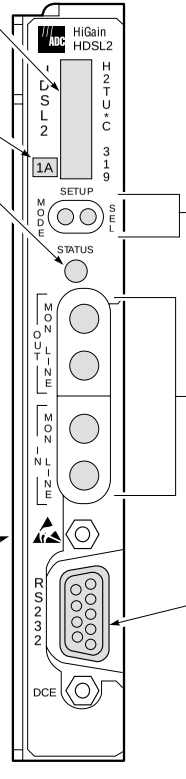
Displays status, provisioning, and alarm messages. See tables below for a list of message descriptions.

List number

Status LED

STATUS LEDs report the following conditions:

Green LED	Normal operation.
Red LED	Fuse alarm.
Flashing Red LED	HDSL2 acquisition or system alarm.
Yellow LED	A Customer Remote (CREM) or Network Local (NLOC) loopback is in effect.
Flashing Yellow LED	System is in Armed (ARM) mode.
Alternating green and red LED	Host alarm reporting is disabled.
Alternating yellow and red LED	System alarm and host alarm reporting is disabled.
Off	Line power is off.



Card handle

(ECI bar code label on outside of handle)

System option pushbuttons (for manual setting of system parameters)

Use MODE and SEL to manually modify user options, initiate loopbacks, and display DSX-1 line parameters.

1 Press the MODE pushbutton for 1 second and release. The front panel alternately displays the first system parameter and its current setting.

2 Press SEL to step through all possible settings for the displayed parameter.

3 Press MODE to update the parameter and advance to the next parameter.

4 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.

MON	Provides non-intrusive monitoring jack access to (IN) and from (OUT) the HDSL2 span at the DSX-1 interface. Allows monitoring of the DS1 payloads.
LINE	Provides splitting jack access to (IN) and from (OUT) the HDSL2 span at the DSX-1 interface.

Craft port provisioning

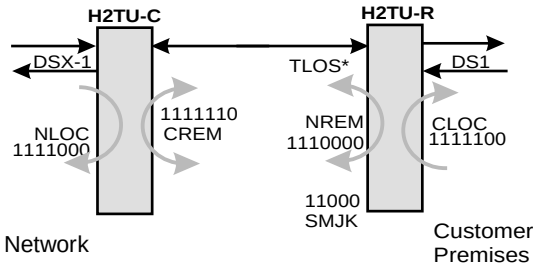
To access all system maintenance, provisioning and performance screens, connect a standard 9-pin terminal cable between the serial port on a PC and the H2TU-C craft port.

Modem settings:

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

4 LOOPBACK TESTING

Initiate loopback testing from the maintenance screen or use the MODE and SEL pushbuttons. The inband codes below 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.

For more information about the maintenance screens, refer to the H2TU-C-319 List 1A technical practice, document number 152-319-111-xx. Contact Customer Service to obtain a copy of the practice.

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.
SPN*n*-LOSW	The HDSL2 loop has lost synchronization. The span closest to the network has highest priority.
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 CPE with an error-free signal from the line unit or network.
RRAI [c]	An RAI alarm (yellow LED) from the Customer Premises Equipment (CPE) with errors from the line unit or network.
xxx-LOF	The DS1 input does not contain the ESF or SF frame pattern setting of the FRMG option. (*xxx* denotes either TUC or TUR.)
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.)

(a) 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.
(b) Message displays repeatedly as long as the alarm condition exists and is not included in the priority order.
(c) 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 1A DSX-1 output ports to the cross-connect panel must be grounded at both ends.

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-319 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 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 [(a)]

Display Code	Description (default values in bold)
EQL	Sets the DSX-1 Equalizer to: **0** (0 to 132 ft.), 133 (133 to 265 ft.), 266 (266 to 398 ft.), 399 (399 to 532 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 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), SF (SuperFrame), **ESF** (Extended SuperFrame), or UNFR (unframed mode).
RDA	Enables (ENA) or disables (**DIS**) alarm indications due to remote DS1 LOS at 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 CI for any network loopback.
TLOS	Enables (ENA) or disables (**DIS**) a logic loopback at the H2TU-R when an LOS occurs at its DS1 input.
RTPV	Enables (**ENA**) or disables (DIS) remote provisioning.
NAIS	If ALMP is set to AIS, this option specifies 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.
RACI	Enables (**ENA**) or disables (DIS) conversion of a DS1 SF-RAI signal received by the H2TU-R to an SF-RAI-CI signal towards the network.

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

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-231.
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 (0 to 40 dB). Default is 35.	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 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

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