HiGain

QUICK INSTALLATION

H2TU-C-388 LIST 1D
LINE UNIT

H2TU-C-388 LIST 1D

The HiGain® product family is the industry's first practical implementation of High bit-rate Digital Subscriber Line 2 (HDSL2). When an H2TU-C-388 List 1D 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 and alarm LEDs, DSX-1 access jacks, and craft port
- 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
- HiGain maintenance screens for inventory, provisioning, troubleshooting, and performance monitoring
- Payload or HiGain loopback source identification
- Bit Error Rate (BER) alarm option
- Bipolar Violation Transparency (BPVT) option
- Flash download of firmware updates
- Performance Report Messaging (SPRM and NPRM)
- Digital Data Service (DDS) latching loopback option

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 $V^{pk\text{-}pk}$, pre-equalized for 0 to 655 feet of ABAM cable
DSX-1 Input Level	+1.5 to -7.5 dB DSX

1 INSTALLATION

To ensure proper installation of the H2TU-C, align the H2TU-C with the enclosure slot guides, and slide the unit in. Push down on the front panel to properly seat it.

Set the S1 switch bank to the desired configuration for line equalization. For information about line equalization, refer to the H2TU-C-388 List 1D technical practice, document number 152-388-114-xx.

2 POWER-UP SEQUENCE

When the H2TU-C powers up, the status and alarm LEDs illuminates and report status.

If the H2TU-C is unable to communicate with the next span device, it displays various alarm and status indicators on the front panel LEDs.

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

1 The Status LED flashes green while acquiring each device in the system, and turns a steady green when the entire system is operating without any alarms. (The T1 signal must be present.)

2 If any alarm conditions exist after the system powers up, these are reported on the status and alarm LEDs. (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.

2 Select the Config menu, **Date and Time**, and type the date and time.

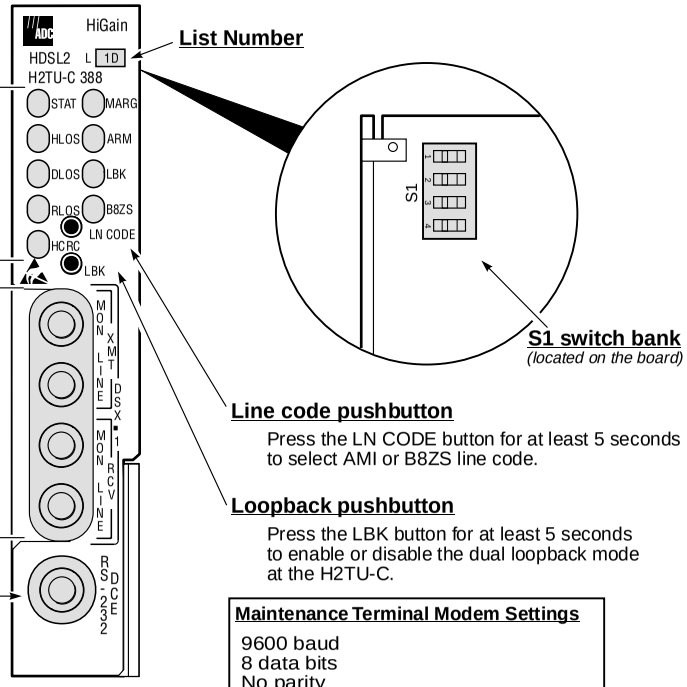
3 Select the Inventory menu and type in the unit ID numbers.

4 Change the settings of any system parameters, if necessary, by selecting the Config menu, **Standard Options** or **PairGain Options**.

5 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.

Continued

Front Panel



List Number

Status and alarm LEDs
(see table below)

DSX-1 access jacks

MON	Provides non-intrusive monitor jack access to (XMT) and from (RCV) the HDSL span at the DSX-1 interface. Allows the two T1 payloads to be monitored.
LINE	Provides splitting jack access to (XMT) and from (RCV) the HDSL span at the DSX-1 interface. Breaks the XMT and RCV paths to permit test signal insertion and retrieval.

S1 switch bank
(located on the board)

Line code pushbutton

Press the LN CODE button for at least 5 seconds to select AMI or B8ZS line code.

Loopback pushbutton

Press the LBK button for at least 5 seconds to enable or disable the dual loopback mode at the H2TU-C.

RS-232 craft port

The Bantam 210 jack provides bidirectional communication between the H2TU-C and a maintenance terminal for access to maintenance, provisioning, and performance screens. Use jack adapter 120-1035-01 to 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: VT100

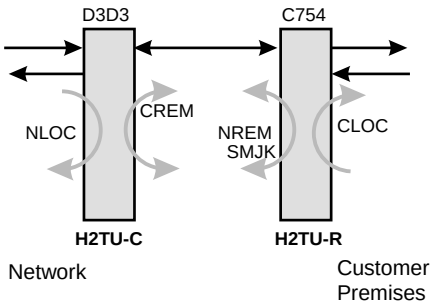
Card-edge Connector

	219	119	Frame ground	
Ground	218	118	Ground	
-48 Vdc	217	117	Fuse alarm*	
	216	116		
	215	115	Ring 1	DSX-1 OUT
	214	114	Tip 1	DSX-1 OUT
	213	113		
	212	112		
	211	111		
	210	110	Ring	DSX-1 IN
	209	109	Tip	DSX-1 IN
	208	108		
	207	107	Factory use only	
	206	106		
	205	105		
	204	104	Management bus	
	203	103		
	202	102	Ring	HDSL2 span
	201	101	Tip	HDSL2 span
	200	100		

* Fuse alarm is normally floating (0 to 80 V maximum) and at -48 Vdc (10 mA maximum) when activated.

4 LOOPBACK TESTING

Initiate loopback testing from the HiGain Monitor screen. The inband codes below can also be sent by a test set.



HiGain HDSL2 Maintenance Screens

For information about the HiGain HDSL2 maintenance screens, refer to the H2TU-C-388 List 1D technical practice, document number 152-388-114-xx. Copies of this publication or the technical practice can be downloaded from the ADC website at *www.adc.com*. To order a hard copy, please contact your sales representative.

Table 1. *Status and Alarm LEDs*

LED Modes	Description
STAT LED (Bi-color red/green)	
OFF	Line power is off.
Solid Green	Normal operation.
Solid Red	Fuse alarm.
Flashing green	HDSL2 loop acquisition on any span (once per second).
HLOS (Red)	
OFF	Normal operation. HDSL2 spans is synchronized.
Solid Red	HDSL2 loss of synchronization.
DLOS (Red)	
OFF	DSX-1 signal present at H2TU-C.
Solid Red	Loss of DSX-1 signal into the H2TU-C.
RLOS (Red)	
OFF	DS1 signal present at H2TU-R.
Solid Red	Loss of DS1 signal into the H2TU-R.
HCRC (Bi-color red/green)	
OFF	HDSL2 span is not synchronized.
Solid Green	HDSL2 span is synchronized without HBER alarm.
Solid Red	HDSL2 span has crossed the 10^{-7} HBER alarm threshold.
MARG (Bi-color red/green)	
OFF	HDSL2 span is not synchronized.
Solid Green	HDSL2 spans is synchronized without MARG alarm.
Solid Red	HDSL2 span has crossed the MARG alarm threshold.
ARM (Yellow)	
OFF	System is not armed.
Solid Yellow	System is in armed state.
LBK (Yellow)	
OFF	No H2TU-C loopback.
Solid Yellow	H2TU-C is in NLOC or CREM loopback.
B8ZS (Green)	
OFF	System is configured for AMI line code.
Solid Green	System is configured for B8ZS line code.

Table 2. *H2TU-C-388 List 1D Standard Config Screen Options*

System Settings Screen Options	Screen Display Code	Selection	Description
Loopback Timeout	LBTO	NONE	Disables automatic time-out cancellation of all loopbacks.
		20	Sets automatic cancellation of all loopbacks to 20 minutes after initiation.
		60	Sets automatic cancellation of all loopbacks to 60 minutes after initiation.
		120	Sets automatic cancellation of all loopbacks to 120 minutes after initiation.
Loop Attenuation Threshold	LATT	0 through 40 dB	Determines the maximum loop attenuation before an alarm is declared. Zero disables the alarm. The loop attenuation threshold can only be set through the Solitaire HDSL2 maintenance screens.
		35 dB	Default value.
Margin Threshold	MARG	0 to 15 dB	Determines the minimum allowable margin below which a system alarm can occur. Zero disables the alarm. The Margin (Alarm) Threshold can only be set through the HiGain Solitaire HDSL2 maintenance screens.
		4 dB	Default value.
HDSL2 BER Threshold	HBER	1E-7	System alarm relay contact closes and the Status LED flashes red when BER exceeds 10^{-7}.
		1E-9	System alarm relay contact closes and the Status LED flashes red when the Block Error Rate exceeds 10^{-9}. (Block Error Rate is based on the definition of Bit Error Rate.)
		NONE	Prevents generation of a system alarm due to BER.
DS1 Line Coding	DS1	**B8ZS**	Places both the H2TU-C and H2TU-R into their B8ZS modes.
		AMI	Places both the H2TU-C and H2TU-R into their AMI modes.
H2TU-C Equalization	EQL	**0**	Sets the Equalizer to DSX-1 for 0 to 132 feet.
		133	Sets the Equalizer to DSX-1 for 133 to 265 feet.
		266	Sets the Equalizer to DSX-1 for 266 to 398 feet.
		399	Sets the Equalizer to DSX-1 for 399 to 532 feet.
		533	Sets the Equalizer to DSX-1 for 533 to 655 feet.
H2TU-R Line Buildout	RLBO	**0 dB**	Sets the DS1 receive level output toward the Customer Interface (CI). H2TU-R Line Buildout can only be set through the Solitaire HDSL2 maintenance screens.
		-7.5 dB	Sets the DS1 receive level output toward the CI to -7.5 dB.
		-15.0 dB	Sets the DS1 receive level output toward the CI to -15.0 dB.
Alarm Pattern	ALMP	**AIS**	Enables the HiGain Solitaire system to output an AIS payload at its T1 ports for LOSW and T1 LOS.
		LOS	Enables the HiGain Solitaire system to output an LOS condition at its T1 ports for LOSW and T1 LOS.
H2TU-R TLOS Loopback	TLOS	ENA	Enables a logic loopback at the H2TU-R when an LOS occurs at its DS1 input, if enabled at the H2TU-R.
		DIS	Disables Transmit Loss of Signal (TLOS) logic loopback.
Network Loopback Pattern	NLBP	**AIS**	Enables the H2TU-R to transmit an AIS towards CI for any network loopback.
		LOS	Enables the H2TU-R to transmit an LOS towards CI for any network loopback.

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-388 List 1D 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

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