HiGain

ADC HiGain
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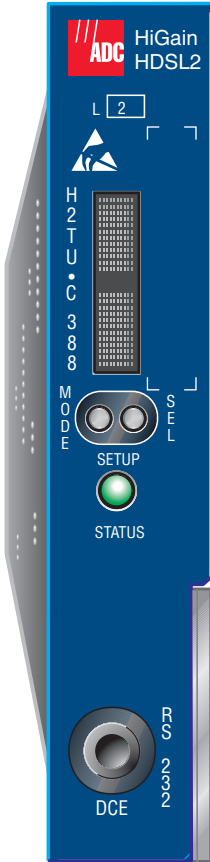T
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**H2TU-C-388 LIST 2
LINE UNIT**

ADC

THE H2TU-C-388 LIST 2

The H2TU-C-388 List 2 functions as the central office end (H2TU-C) 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 LIght Emitting Diode (LED), craft port, and four-character status display

- Maintenance screens for inventory, provisioning, troubleshooting, and performance monitoring

- Report menu option for downloading status and performance monitoring data to a file

- Grounded loop detection

- Loss of Signal/Alarm Indicator Signal (LOS/AIS) payload alarm option

- Ultra-low wander

- Payload (PL) or HiGain (HG) loopback source identification

- Power Back Off Network (PBON) and Power Back Off Customer (PBOC) for configuring HDSL2 transmit power levels

- Bipolar Violation Transparency (BPVT) options

- Bit Error Rate Tester (BERT)

- Sources sealing current when connected to an H2TU-R-402 List 1B (line and local powering), List 1C (line powering) or higher

SPECIFICATIONS

Voltage Source	-48 Vdc nominal (-42.5 to 56.5 Vdc)
Operating Temperature	-40°F to +149°F (-40°C to +65°C)
Operating Humidity	5% to 95% non-condensing
HDSL2 Span Voltage	0 or -180 Vdc ±5 Vdc
Mounting	Double Dual Module Plus (DDM+) high-density shelf
HDSL2 Output	+16.8 dBm ±0.5 dBm, 135 Ω at CO side +16.5 dBm ±0.5 dBm, 135 Ω at remote side
Maximum Loop Attenuation	35 dB at 196 kHz, 135Ω
DS1 Line Rate	1.544 Mbps ±200 bps
DS1 Line Format	Alternate Mark Inversion (AMI) or Bipolar with 8-Zero Substitution (B8ZS)
DS1 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 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.

2 POWER-UP SEQUENCE

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

If the H2TU-C is not communicating with the H2TU-R, it displays various alarm and status messages.

If the H2TU-C is communicating with the H2TU-R, the following occurs:

1 The Status LED flashes red while acquiring the H2TU-R and lights a steady green when the entire system is operating with no alarms. (The DS1 signal must be present.)

2 The four-character display reports signal-to-noise ratio (SNR) margin readings (should be ≥ 6 dB) and loop attenuation (should be <35 dB @196 KHz).

3 After the system powers up, alarm conditions exist and 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).
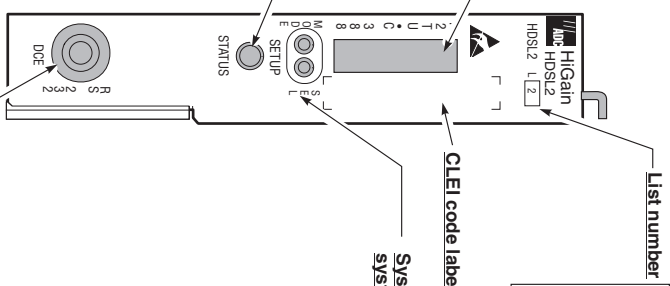
1 Connect a maintenance terminal to the craft port (see front-panel illustration inside), then press `CTRL` + `R` to refresh the logon screen, if necessary.

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

3 Select the Inventory screen, 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 Configuration Options Using MODE and SEL" table inside.)

5 Once the H2TU-C is successfully installed and provisioned, access the Monitor, Performance or Event Log menu to clear the Performance, Alarm History, or Event Log screens, or use Master Clear in the Config menu. This ensures collection of accurate and meaningful data thereafter.

Status LED

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.

Four-character display

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

CLEI code label

List number

Maintenance Terminal Modem Settings

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

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.

1. Press the MODE button 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.

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.

Card-edge Connector

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

DSX-1 OUT
DSX-1 IN
HDSL2 span

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

4 LOOPBACK TESTING

Initiate loopback testing from the maintenance menus or use the MODE and SEL pushbuttons. The in-band codes shown below can be sent by a test set.
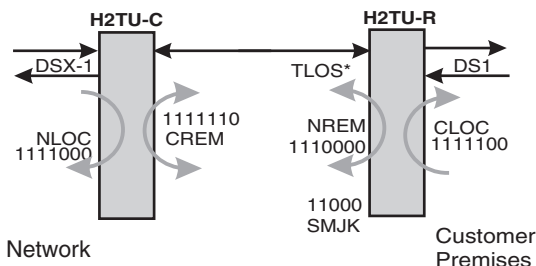
* When enabled, TLOS is an automatic loopback
that occurs with an LOS at the remote DS1 input.

GNLB Loopback Commands

Loopback	In-Band 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-TP-1115-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 (listed in priority order)
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.
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	Line Alarm Indication Signal.
RAIS	Remote Alarm Indication Signal.
LRAI	An RAI condition is detected at the remote and the signal from the line unit is error-free.
RRAI	An RAI alarm (yellow) from the Customer Premises Equipment (CPE) with errors from the line unit or network.
xxx-LOF	DS1 input does not contain ESF or SF frame pattern setting of the FRMG option. (xxx denotes either TUC or TUR.)
xxx-DBER	A system DS1 Bit Error Rate (BER) alarm. (*xxx* denotes either TUC or TUR.)
PRMF	H2TU-R Performance Report Messaging BER threshold exceeded at far end.
PRMN	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. $\rm ALRM$ displays prior to any alarm message. Pressing the SEL pushbutton 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.

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

Front Panel Diagnostic Messages (normal operating messages in bold)

Display Code	Description (normal operating messages in bold)
A=xx[a]	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[a]	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 the HDSL2 loop.

(a) Normal operating range.

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 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; 8 hours, 24 hours.
DS1	DSX-1 line code = **AUTO**, B8ZS, AMI.
FRMG	DS1 frame formatting = **AUTO** (auto framing mode), UNFR (unframed mode), SF (SuperFrame) and ESF (Extended SuperFrame).
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.
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.
PBON	Configures the power output levels of the H2TU-C network unit toward the customer to comply with Default (**DEF**) or Enhanced (ENH) templates.
PBOC	Configures the power output levels of the H2TU-C customer unit toward the network to comply with Default (**DEF**) or Enhanced (ENH) templates.

(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, 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.

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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ISO 9008/TL 9000

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