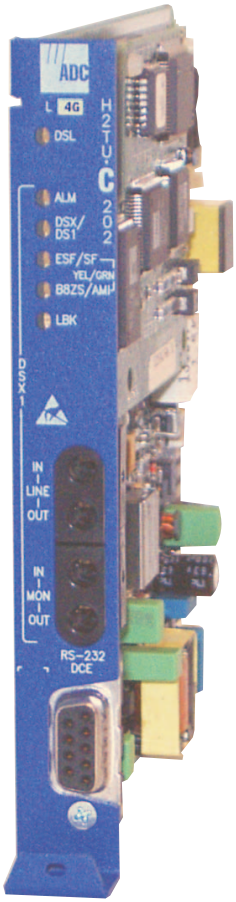
QUICK INSTALLATION



HIGAIN H2TU-C-202 LIST 4G LINE UNIT

THE H2TU-C-202 LIST 4G

The H2TU-C-202 List 4G 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-202 List 4G is designed to mount in 200 and 400 mechanics shelves.

FEATURES

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

Eight on-board configuration switches which lock out modification through the maintenance screens

HDSL2 transmission features:

- 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:

- Remote provisioning and PM data retrieval through TL1 FDL commands
- Loop attenuation and insertion loss reporting
- 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)

SPECIFICATIONS

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
CO Supply	-48 Vdc nominal (-42.5 Vdc to -56.5 Vdc)
Mounting	200 and 400 mechanics shelves
HDSL2 Line Rate	1.552 Mbps Overlapped Pulse Amplitude Modulation Transmission with Interlocking Spectra (OPTIS)
HDSL2 Output	+16.8 dBm ±0.5 dBm, 135Ω at CO side +16.5 dBm ±0.5 dBm, 135Ω at remote side
Maximum Insertion Loss	35 dB @ 196 kHz
Maximum Loop Attenuation	28 dB
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 266 feet of ABAM cable
DSX-1 Input Level	+1.5 dB to -7.5 dB DSX

1 INSTALLATION

The H2TU-C has certain options which are only configured by setting the DIP switches on the S2 switch block on the card (see illustration inside); other options can be configured after installation using the maintenance terminal Config menus. 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 PWRF 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 2 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.

3 PROVISIONING

Perform these basic provisioning tasks:

1. Connect a maintenance terminal to the craft port (see front-panel illustration inside) and log on. (If logging on through the management unit, the default password is **public**.) 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.

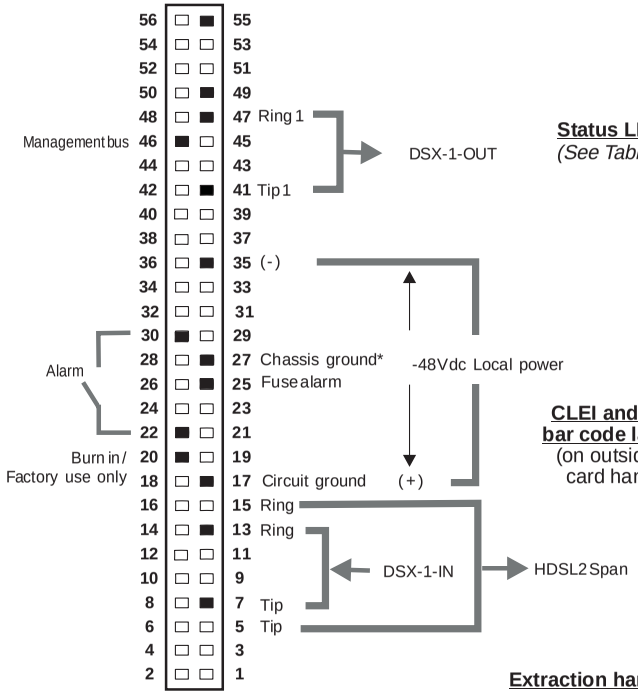
3. Select **Inventory**, then type the unit ID numbers.

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.

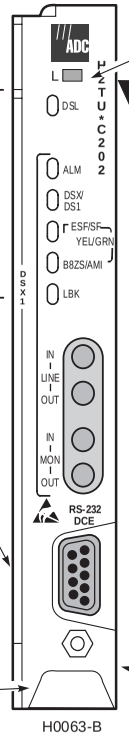
Continued

Card-Edge Connector



* Chassis ground may be connected to Earth ground per local practice.

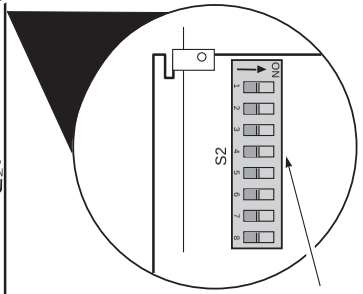
Front Panel



H0063-B

Status LEDs *(See Table 2)*

List number



DIP switch S2
(located on circuit board)

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

Extraction handle

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 T1 payloads.
LINE	Provides splitting jack access to (IN) from (OUT) the HDSL2 span at the DSX-1 interface.

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.

Configuration DIP switches *(Default settings are bold font.)*

SW	Settings	Description
1	SW2 SW1 OFF OFF = 0 ft. OFF ON = 0 to 133 ft. ON OFF = 134 to 266 ft. ON ON = 0 to 133 ft.	DSX-1 Equalization *
2		DSX-1 Equalization *
3	**FRM** / UNFR	DS1 Frame Formatting
4	**ESF** / SF	DS1 Frame Formatting **
5	**B8ZS** / AMI	DS1 Line Coding
6	**LBTO ENA** / LBTO DIS	Loopback Timeout (120 min.)
7	**T1 Mode** / FT1 Mode	T1 or Fractional T1 Mode
8	**SPAN PWR** / LCL PWR	Line power

** If both EQL switches are set, the lowest value is used.*

*** ESF and SF are valid only if FRM is set.*

Maintenance Terminal 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 menus. The inband codes shown below can be sent by a test set.

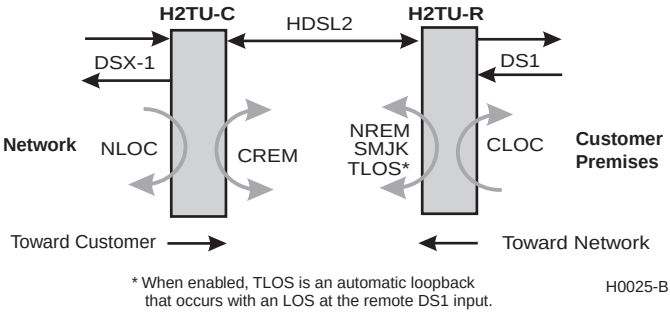


Table 1. *GNLB Loopback Commands*

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
DSL	
OFF	No power is applied to the H2TU-C.
Solid green	Normal operation: HDSL2 span is synchronized without error.
Solid red	HBER, MARG, or PWRF alarm is present at the H2TU-C.
Flashing red once every second	HDSL2 loop is attempting synchronization.
ALM	
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.
DSX/DS1	
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.
ESF/SF	
OFF	Unframed DSX-1 is present at the H2TU-C, unit set as unframed, 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.
B8ZS/AMI	
OFF	No DSX-1 signal is present at the H2TU-C.
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.
LBK	
OFF	H2TU-C is not in loopback.
Solid yellow	H2TU-C is in either NLOC or CREM (RLB).

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.

Table 3. *Maintenance Terminal Config Menu—Standard Options* [a] [b]

Standard Option	Function
Loopback Timeout (LBTO)	Sets automatic cancellation of all loopbacks to **120** min 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 **32 dB**.
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 **4 dB.**
DS1 Frame Formatting (FRMG)	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)	**B8ZS** = sets system for B8ZS line code. AMI = sets system for AMI line code.
H2TU-C Equalization (EQL)	Sets the DSX-1 equalizer to **OFF**, 0 to 133 ft., or 134 to 266 ft.
H2TU-R Line Buildout (RLBO)	Sets the DS1 receive level output toward the Customer Interface to 0 dB, **-7.5 dB**, or -15.0 dB.
Alarm Pattern (ALMP)	Enables an **AIS** or LOS output at the DS1 ports for LOSW or LOS DS1.
H2TU-R TLOS Loopback (TLOS)	Enables (ENA) or disables (**DIS**) 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 **AIS** or LOS towards CI for any network loopback.
Power Back Off Network (PBON)	The power output levels of the H2TU-C network unit toward the customer. Default (**DEF**) or enhanced (ENH).
Power Back Off Customer (PBOC)	The power output levels of the H2TU-R customer unit toward the network. Default (**DEF**) or enhanced (ENH).

(a) Default settings are in bold.
(b) Options that are configurable through the S2 DIP switch block on the H2TU-C card cannot be configured through the maintenance terminal screens. Configuration information is reported on the screens, but is "read only."

Table 4. *Maintenance Terminal Config Menu—ADC Options* [a] [b]

ADC Option	Function
Line Power Feed (PWRF)	Enables (**ON**) or disables (OFF) HDSL2 line power.
Remote Provisioning (RTPV)	Enables (**ENA)** or disables (DIS) remote provisioning.
Bipolar Violation Transparency (BPVT)	Enables (ENA) or disables (**DIS**) Bipolar Violation Transparency.
DS1 BER (DBER)	Enables (ENA) or disables (**DIS**) 24-hour DSX-1 BER alarm threshold.
HDSL2 BER Threshold (HBER)	Sets HDSL2 BER alarm threshold at **1E-6**, 1E-7 or NONE.
Special Loopback Mode (SPLB)	Configures system for generic (**GNLB**) or special inband loopback commands (A3LB).
SmartJack Loopback (LPBK)	Enables (**ENA)** or disables (DIS) SmartJack (SMJK) loopback commands.
Minor Alarm (ALM)	Enables (ENA**)** or disables (**DIS**) 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, **S + N** = H2TU-R generates both SPRMs and NPRMs whenever possible.
RAI to RAI-CI towards NET (RACI)	Enables (**ENA**) 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 (**ENA**) 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)	**OFF** = 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 T1 mode or fractional T1 mode.

(a) Default settings are in bold.
(b) Options that are configurable through the S2 DIP switch block on the H2TU-C card cannot be configured through the maintenance terminal screens. Configuration information is reported on the screens, but is "read only."

Copies of this publication or the user manual (LTPH-UM-1170-xx) can be downloaded from the ADC website at 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-1950/CSA C22.2 No. 950-95: Safety of Information Technology Equipment.

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Product Catalog: H2TU-C-202-L4G

CLEI: VACJDK5E

Document: LTPH-QI-1154-01

1236249

October 17, 2002