QUICK INSTALLATION

HIGAIN H4TU-C-231 LIST 5A LINE UNIT

THE H4TU-C-231 LIST 5A

The H4TU-C-231 List 5A line unit is the Central Office (CO) side of a T1 transmission system. The H4TU-C, when used with an H4TU-R remote unit, transmits a 1.544 Mbps payload a maximum distance of 12 kft. over two unconditioned copper pairs. The H4TU-C supports three powered spans to further expand reach.

The H4TU-C-231 List 5A is designed to mount in 220 mechanics shelves.

FEATURES

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

HDSL4 transmission features:

- Doubler (H4D) support for up to three spans
- Grounded loop and loop reversal detection
- Sources sealing current when connected to locally powered H4TU-R-402 remote unit
- Digital Data Service (DDS) latching loopbacks
- Fractional T1 maintenance

Maintenance screens: for inventory, provisioning, performance monitoring, and troubleshooting, including:

- Remote provisioning
- Loop attenuation and insertion loss reporting
- Power Back Off feature configures HDSL4 transmit power levels to reduce crosstalk
- Report menu for downloads of status and performance data

SPECIFICATIONS

Operating Temperature	-40°F to +149°F (-40°C to +65°C)
Operating Humidity	5% to 95% non-condensing
HDSL4 Span Voltage	0, -185 Vdc (Voltage is applied across Loop 1 and Loop 2.)
CO Supply	-48 Vdc nominal (-42.5 Vdc to -56.5 Vdc)
Mounting	220 mechanics shelves
HDSL4 Line Rate	784 kbps Overlapped Pulse Amplitude Modulation (OPAM) transmission per pair
HDSL4 Output	+14.1 dBm ±0.5 dBm, 135Ω
Maximum Insertion Loss	Span 1 = 47 dB at 196 kHz Span 2 and Span 3 = 43 dB at 196 kHz
Maximum Loop Attenuation	Span 1 = 31 dB; Span 2 and Span 3 = 29 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-pk}, pre-equalized for 0 to 655 feet of ABAM cable
DSX-1 Input Level	+1.5 dB to -7.5 dB DSX

1 INSTALLATION

Align the H4TU-C with the shelf card-slot guides and slide the unit in. When the H4TU-C is properly seated, the retaining latch snaps closed.

2 POWER-UP SEQUENCE

When the H4TU-C powers up, the DSL1 and DSL2 LEDs flash red once every second.

- If the H4TU-C is unable to communicate with the H4TU-R, the LEDs display solid red, indicating HBER, MARG, or PWRF alarms.

- If the H4TU-C is able to communicate with the H4TU-R, the LEDs display solid green, indicating that the HDSL4 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.

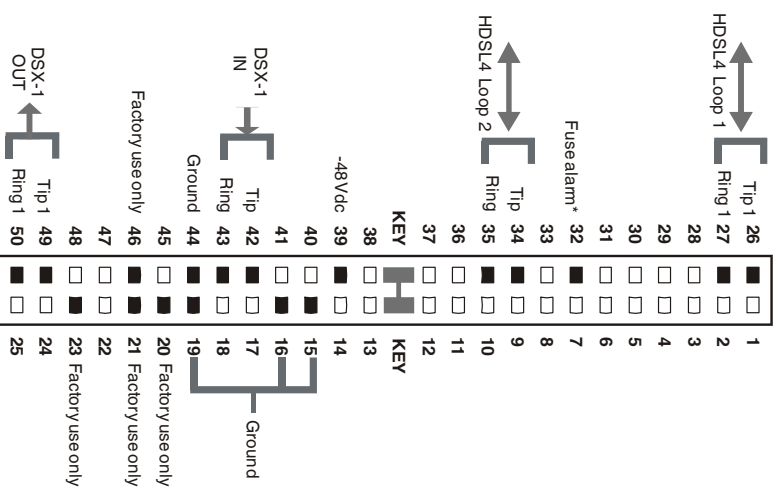# 3 PROVISIONING

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

3   Select the Inventory menu, 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 H4TU-C is successfully installed and provisioned, access the Performance or Event Log menus to clear the Performance, Alarm History, or Event Log screens, or use Master Clear in the Config menu.
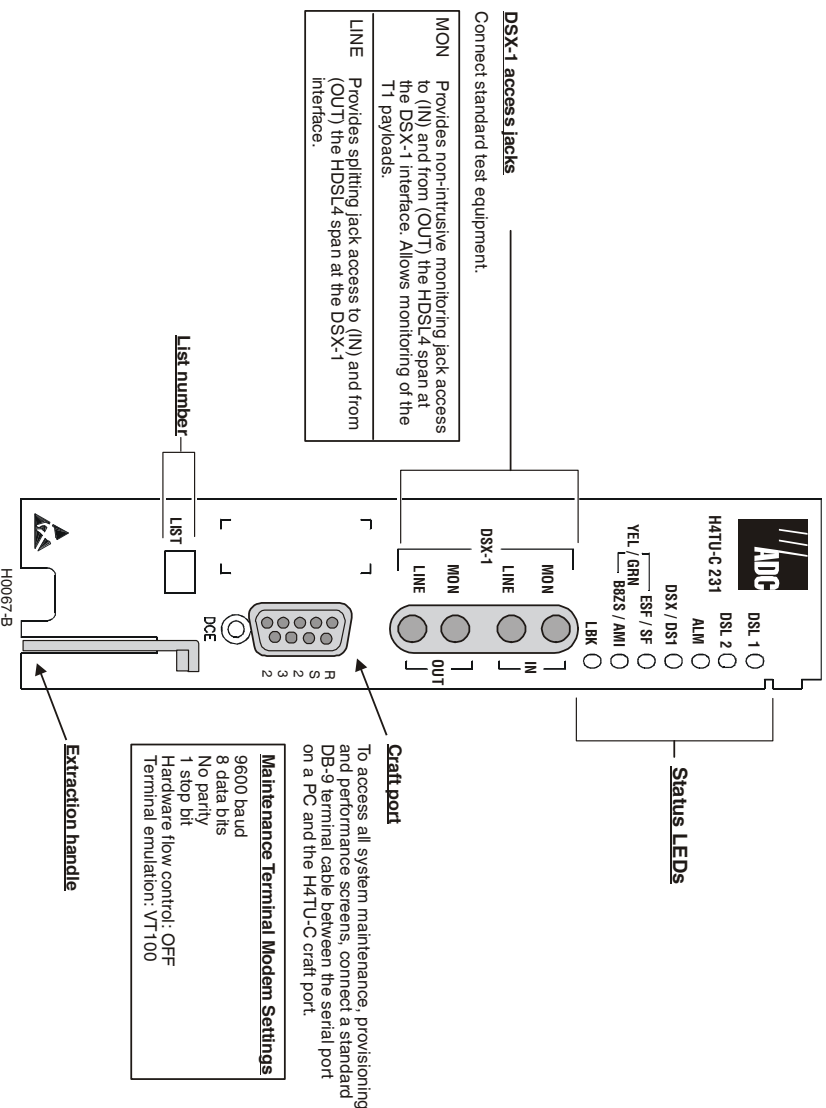
Card-Edge Connector

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

HDSL4 Loop 1 — Tip 1 26, Ring 1 27
DSX-1 IN — Ring 43, Tip 42
DSX-1 OUT — Tip 1 49, Ring 1 50
HDSL4 Loop 2 — Tip 35, Ring 34... Ring 36, Tip 37
Fuse alarm* 32
Factory use only 46, 45
Ground 44
-48Vdc 38
KEY
Ground 19

Pin numbers (left column): 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, KEY, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50

Pin numbers (right column): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, KEY, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

Factory use only 47, 48
Factory use only 20, 21
Ground

DSX-1 access jacks

Connect standard test equipment.

MON — Provides non-intrusive monitoring jack access to (IN) and from (OUT) the DSX-1 interface. Allows monitoring of the T1 payloads.

LINE — Provides splitting jack access to (IN) and from (OUT) the HDSL4 span at the DSX-1 interface.

Front Panel

ADC

H4TU-C 231

DSL 1
DSL 2
ALM
DSX / DS1
ESF / SF
YEL / GRN
BBZS / AMI
LBK

Status LEDs

DSX-1
MON
LINE
MON
LINE
IN
OUT

LBK

List number
LIST

DCE
R 9 5
S 4 3
2

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 H4TU-C craft port.

Maintenance Terminal Modem Settings

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

Extraction handle

H-0067-B

4 LOOPBACK TESTING

Initiate loopback testing from the maintenance menus. The inband codes shown below can be sent by a test set.

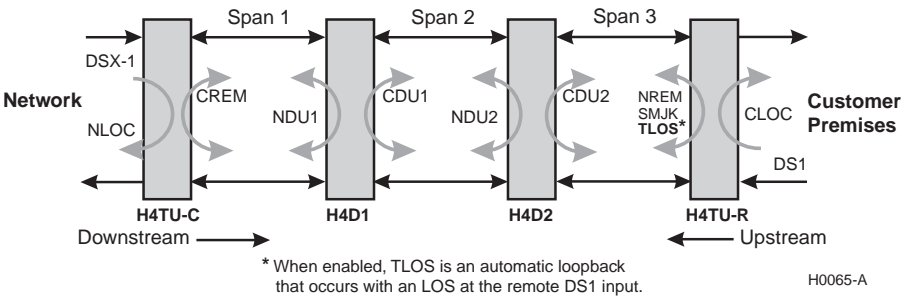* When enabled, TLOS is an automatic loopback that occurs with an LOS at the remote DS1 input.

H0065-A

Table 1. Loopback Commands

Loopback	Inband Code	Description
NLOC	1111000	DSX-1 signal is looped back to the network at the H4TU-C.
NREM	1110000	DSX-1 signal is looped back to the network at the H4TU-R.
NDU1	110000	Signal is looped back to the network at H4D1.
CDU1	111100	DS1 signal from customer is looped back to the customer at H4D1.
NDU2	111000	Signal is looped back to the network at H4D2.
CDU2	111110	DS1 signal from customer is looped back to the customer at H4D2.
CLOC	1111100	DS1 signal from customer is looped back to the customer at the H4TU-R.
CREM	1111110	DS1 signal from customer is looped back to the customer at the H4TU-C.
SMJK	11000	DSX-1 signal is looped back to the network at the H4TU-R SmartJack module.
Loopdown	11100	Deactivates any of the above loopbacks.

Table 2. LED Status and Functions

LED and Status	Function
DSL1	
Solid green	Loop 1 of the HDSL4 span connected to H4TU-C has synchronized without error.
Flashing red once every second	Loop 1 of the HDSL4 span connected to H4TU-C is in acquisition.
Solid red	Loop 1 of the HDSL4 span connected to H4TU-C has detected HBER, MARG alarm, or any PWRF alarms.
DSL2	
Solid green	Loop 2 of the HDSL4 span connected to H4TU-C has synchronized without error.
Flashing red once every second	Loop 2 of the HDSL4 span connected to H4TU-C is in acquisition.
Solid red	Loop 2 of the HDSL4 span connected to H4TU-C has detected HBER, MARG alarm, or any PWRF alarms.
DSX/DS1	
Solid green	DSX-1 signal at the H4TU-C is error-free.
Solid red	LLOS, BPV, frame error, or CRC is detected at H4TU-C. (LED updates once every second when error occurs.)
ALM	
OFF	DS1 signal is present at both the H4TU-R and H4TU-C.
Solid yellow	RLOS is present at the H4TU-R.
Solid red	LLOS is present at the H4TU-C.
ESF/SF	
OFF	Unframed DSX-1 is present at the H4TU-C or no DSX-1 is detected at the H4TU-C.
Solid yellow	ESF frame formatting is present at the H4TU-C.
Flashing yellow once every second	ESF frame formatting and frame error/CRC are present at the H4TU-C.
Solid green	SF frame formatting is present at the H4TU-C.
Flashing green once every second	SF frame formatting and frame error are present at the H4TU-C.
B8ZS/AMI	
OFF	No DSX-1 signal is present at the H4TU-C.
Solid yellow	B8ZS is provisioned at the H4TU-C.
Flashing yellow once every second	B8ZS and excess zeros string are present at the H4TU-C.
Solid green	AMI is provisioned at the H4TU-C.
Flashing green once every second	AMI and BPV are present at the H4TU-C.
LBK	
OFF	H4TU-C is not ARMed or in loopback.
Solid yellow	H4TU-C is in either NLOC or CREM (RLB).
Flashing yellow once every second	System is ARMed.

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

Standard Option	Function
Loopback Timeout (LBTO)	Sets automatic cancellation of all loopbacks to NONE, 20 min, 60 min, **120** min, 8 hr, or 24 hr after activation.
Loop Attenuation Threshold (LATT)	Determines the maximum loop attenuation (0 to 50 dB) before an alarm is declared. Zero disables the alarm. Default setting is **42 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)	AUTO = system searches DS1 transmission for SF or ESF frame pattern. 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.
H4TU-C Equalization (EQL)	Sets the DSX-1 equalizer to: **EXT** (external), 0 (0 to 132 ft.), 133 (133 to 265 ft.), 266 (266 to 398 ft.), 399 (399 to 532 ft.), or 533 (533 to 655 ft.).
H4TU-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.
H4TU-R TLOS Loopback (TLOS)	Enables (ENA) or disables (**DIS**) a TLOS loopback at H4TU-R for LOS at its DS1 input (if enabled at the H4TU-R).
Network Loopback Pattern (NLBP)	Enables the H4TU-R to transmit an **AIS** or LOS towards CI for any network loopback.
Power Back Off Network (PBON)	The power output levels of the H4TU-C network unit toward the customer. Default (**DEF**) or enhanced (ENH).
Power Back Off Customer (PBOC)	The power output levels of the H4TU-R customer unit toward the network. Default (**DEF**) or enhanced (ENH).

(a) Default settings are in bold.

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

ADC Option	Function
Line Power Feed (PWRF)	Enables (**ON**) or disables (OFF) HDSL4 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.
HDSL4 BER Threshold (HBER)	Sets HDSL4 BER alarm threshold at 1E-6, 1E-7 or disables **(DIS)**.
SmartJack Loopback (LPBK)	Enables (**ENA)** or disables (DIS) SmartJack (SMJK) loopback commands.
Remote Disconnect Alarm (RDA)	Enables (ENA) a remote DS1 LOS condition at the input to the H4TU-R to generate an LOS alarm. AIS or LOS (depending on ALMP) is sent towards the network. Prevents or disables (**DIS**) a remote DS1 LOS condition at the input to the H4TU-R from causing an LOS alarm. The front-panel Status LED still flashes red and the ALRM RLOS message is displayed, but the alarm relay contacts do not close and LOS is sent towards the network from the H4TU-C instead of AIS.

(a) Default settings are in bold.

Copies of this publication or the user manual (LTPH-UM-1253-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-60950/CSA C22.2 No. 60950-00: Safety of Information Technology Equipment.

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