HiGain

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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Copyright Information

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ISO 9001
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Certificated Firm

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February 28, 2001

H2TU-C-202 LIST 3E LINE UNIT

THE H2TU-C-202 LIST 3E

The ADC HiGain® product family is the industries first practical implementation of High-bit-rate Digital Subscriber Line 2 (HDSL2). When an H2TU-C-202 line unit is used in conjunction with a Higain remote unit (H2TU-R), the system provides 1.552 Mps 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, four-character status display, and RS-232 port
- Ultra-low wander
- Supports the inband 100 loopdown and 100000 loopup commands when the SmartJack Loopback (LPBK) option is enabled
- Payload (PL) or HiGain (HG) loopback source identification
- Grounded loop detection
- Bipolar Violation Transparency (BPVT) options
- User-friendly management unit software interface
- Bit Error Rate (BER) alarm options
- HiGain maintenance screens for inventory, provisioning, troubleshooting, and performance monitoring
- Loss of Signal (LOS)/Alarm Indicator Signal (AIS) payload alarm option
- Report menu option for downloading status and performance monitoring data to a file

SPECIFICATIONS

Operating Temperature	-40 °F to +149 °F (-40 °C to +65 °C)
Operating Humidity	5% to 95% (non-condensing)
HDSL Span Voltage	-140 to ±112 Vdc
Mounting	ST5, 28-slot high-density shelf or equivalent
HDSL Line Code	784 kbps 2B1Q
HDSL Output	+13.5 dBm ±0.5 dB at 135 Ω
Maximum Provisioning Loss	35 dB at 196 kHz, 135 Ω
DS1 Line Rate	1.544 Mbps ±200 bps
DS1 Line Format	Alternate Mark Inversion (AMI), Bipolar with 8-Zero Substitution (B8ZS) or Zero Byte Time Slot Interchange (ZBTSI)
DS1 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-202, align the unit with the enclosure slot guides and slide it in until it touches the backplane card-edge connector.

2 POWER-UP SEQUENCE

When the H2TU-C-202 powers up, the four status LEDs illuminate and report status messages.

If the H2TU-C-202 is able to communicate with the H2TU-R, the following occurs:

1 The LOOP 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 DS1 signal must be present.)

2 If any alarm conditions exist after the system powers up, these are reported on the appropriate status LED (see the descriptions of the four status LEDs on the front-panel illustration inside).

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.

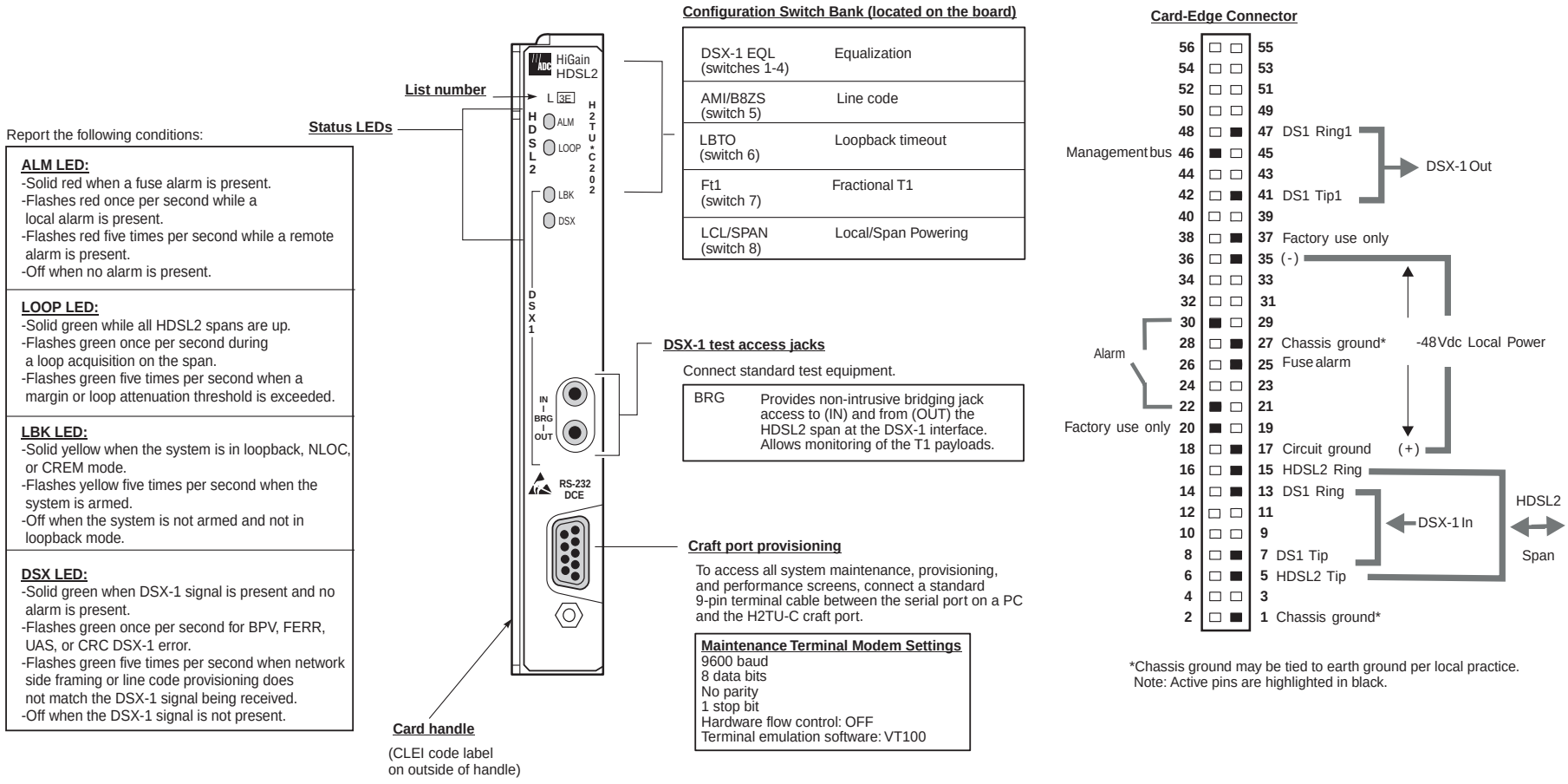
2 Select the Config menu, **Date and Time**, then type the date and time.

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**.

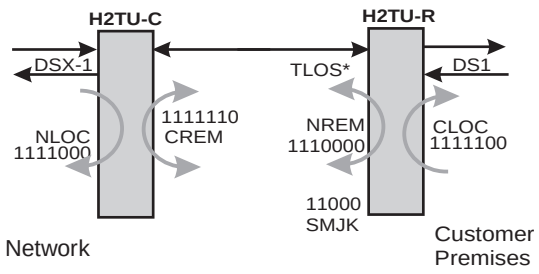
5 Once the H2TU-C-202 is successfully installed and provisioned, access the Monitor, Performance or Event Log menus to clear the Performance, Alarm History or Event Log screens, or use Master Clear in the Config menu.

Continued



4 Loopback Testing

Initiate loopback testing from the HiGain maintenance menus or use the MODE and SEL pushbuttons. 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.

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.

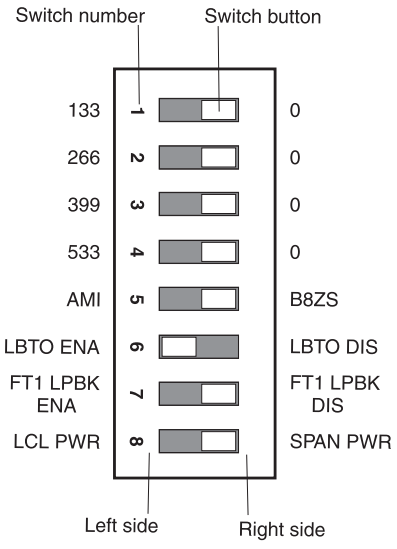
Configuration Options Using Maintenance Terminal

Option 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.
FT1	Enables (ENA) or disables (**DIS**) system response to DDS latching loopback commands for fractional T1 applications.
SPLB *xxxx*	Configures system for generic (**GNLB**) or special inband loopback commands (A2LB, A3LB, A4LB).
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 pins 22 and 30.
MARG	Determines the minimum allowable margin below which a system alarm can occur (**5 dB**) 0 dB to -15 dB.
DS1	DSX-1 line code = **B8ZS**, AMI.
CONV	H2TU-R frame format conversion = **OFF** (framing determined by the DS1 FRMG option), ACON (autodetection of framing and potential frame conversion at the H2TU-R), or FCON (autodetection of framing and forced frame format conversion at the H2TU-R).
FRMG	DS1 frame formatting = **AUTO** (auto framing mode) or UNFR (unframed mode).
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.
LATT	Loop Attenuation Threshold (0 - 40 dB). Default = **32** dB.
RTPV	Enables (**ENA**) or disables (DIS) remote provisioning.
PRM	OFF = no enhanced Performance Report Messaging; SPRM = Supplemental PRM; NPRM = Network PRM; **S + N** = SPRM + NPRM.
NAIS	If ALMP is set to AIS, NAIS 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.
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 towards the CI at the H2TU-R. CONV option must be set to FCON or ACON.
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.

5 Configuration

The H2TU-C-202 List 3E does not have a display or MODE and SEL pushbuttons. Set the switches on the on-board switch bank or access the maintenance terminal screens through the craft port to make configuration changes.

The H2TU-C-202 List 3E has a configuration switch bank containing eight switches (located on the printed circuit card). The switches are shown and described below in both the switch number and switch button figure and the Switch Descriptions table.



Switch Descriptions (default values in bold)

Leftmost Switch Position Options	Switch Number	Rightmost Switch Position Options
Sets the equalizer to 133 to 265 feet	1 (a)	**0**
Sets the equalizer to 266 to 398 feet	2 (a)	**0**
Sets the equalizer to 399 to 532 feet	3 (a)	**0**
Sets the equalizer to 533 to 655 feet	4 (a)	**0**
Selects the DSX-1 line code Alternate Mark Inversion (AMI)	5	Selects Bipolar with 8-Zero Substitution **(B8ZS)**
Enables the Loopback Timeout (LBTO) for **120 minutes**	6	Disables LBTO
Enables Fractional T1 (FT1) loopback capability	7	**Disables** FT1 loopback capability
Configures the system for **Line powering**	8	Configures the system for Span powering

(a) Only one of the DSX-1 line equalization switches (1 - 4) can be selected at a time. If more than one switch is enabled, the lowest value setting has priority.

For more detailed information about the HiGain HDSL2 screens, provisioning, and loopback testing, refer to the H2TU-C-202 List 3E technical practice, document number LTPH-TP-1005-xx. Contact Customer Service to obtain a copy of the practice.

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-202 DSX-1 output ports to the cross-connect panel must be grounded at both ends.