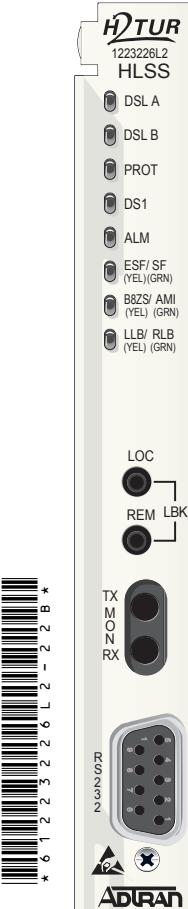


HDSL2
HLSS H2TU-R
P/N: 1223226L2
CLEI: T1L7YERA



CAUTION!
SUBJECT TO ELECTROSTATIC DAMAGE
OR DECREASE IN RELIABILITY.
HANDLING PRECAUTIONS REQUIRED.

LED STATUS

Label	Status	Description
DSL A	Green	DSL receiver is synchronized, no errors, and margin is ≥ 6 dB
DSL B	Red	DSL receiver out of sync, with errors, or margin < 3 dB
PROT *	Off Green Red	Unit is not configured for protection Unit is configured for protection Protection is enabled but unavailable due to circuit conditions
DS1	Green Red	DS1 signal is present and synchronized with no errors No DS1 signal or present but with errors
ALM	Off Red Yellow	No alarm condition detected Local alarm condition, loss of DS1 signal or DSL signal Remote alarm condition, loss of DSX input to H2TU-C
ESF/SF	Off Yellow Green	Unit is provisioned for unframed data Unit is provisioned for ESF data Unit is provisioned for SF data
B8ZS/AMI	Yellow Green	Unit is provisioned for B8ZS line code Unit is provisioned for AMI line code
LLB/RLB	Off Yellow Green	Unit is not in loopback Unit is in active loopback (toward network or customer) at the H2TU-R Unit is in active loopback toward the customer at the H2TU-C

* During initial training, the **PROT** LED may turn red until both loops are up and stable.

POWERING MODE

The HLSS H2TU-R will automatically receive span powering voltage from the H2TU-C at less than -140 VDC.

PUSHBUTTON LOOPBACK FUNCTIONS

LOC

This pushbutton is used to initiate a bidirectional loopback of the H2TU-R toward the network and customer.

REM

This pushbutton is used to initiate a bidirectional loopback at the H2TU-C toward the network and customer.

BANTAM JACKS

The front panel of the H2TU-R contains metallic bantam jacks for nonintrusive (monitoring) DS1 test access. This provides a nonintrusive tap to monitor characteristics of the DS1 signal.

- ♦ **TX:** Monitors the data stream being transmitted from the Customer
- ♦ **RX:** Monitors the data stream that would be received from the Customer

HLSS FEC PROTECTION SWITCHING

Forward Error Correction (FEC) Protection Switching requires that a Dual Port HLSS H2TU-C and Dual Port H2TU-R (P/N 1223226L2) be trained. The H2TU-C must be provisioned for Auto protection switching. If both loops are successfully trained and capable of carrying traffic, the **PROT** LED will be green indicating Error Correction and protection switching are active. If the H2TU-C experiences a problem along one HDSL2 span that interferes with passing data, the H2TU-C will switch the data to the other span (The **PROT** LED will be red). FEC adds information to the data transmission to allow errors to be corrected at the receiver, utilizing the bandwidth of the backup pair to transmit this error correction information. Switchover is near instantaneous.

T200 DUAL PORT H2TU-R CARD EDGE PIN ASSIGNMENTS

Pin	Name	Description
1	CH GND	Chassis ground
5	DS1-T1	DS1 receive out tip (to customer)
7	LPA-T	Loop A tip (facility)
11	CH GND	Chassis ground
13	LPA-R	Loop A ring (facility)
15	DS1-R1	DS1 receive out ring (to customer)
27	CH GND	Chassis ground
41	LPB-T	Loop B tip
47	LPB-R	Loop B ring
49	DS1-R	DS1 transmit in ring (from customer)
55	DS1-T	DS1 transmit in tip (from customer)

HDSL2 LOOP SPECIFICATIONS FOR OPTIMUM OPERATION

- ♦ Cable pairs *must* be non-loaded
- ♦ No single Bridged Tap > 2 kft; Total Bridged Tap < 2.5 kft
- ♦ Maximum loop resistance is $750\ \Omega$
- ♦ Wideband Noise < 52 dBnF (as measured using an F filter) at 35 dB loss
- ♦ Attenuation (ATTEN on Detailed Status screen) ≤ 28 dB
- ♦ Signal margin of ≥ 6 dB with no fluctuation and equal on both loops
- ♦ Longitudinal Noise (Power Influence):
 - ♦ ≤ 80 dBnC acceptable
 - ♦ 80-90 dBnC marginal
 - ♦ >90 dBnC unacceptable

COMPLIANCE

WARNING: Up to -140 VDC may be present on telecommunications wiring.

CAUTION: The DSX-1 interface is intended for connection to intra-building wiring only. Ensure Chassis ground is properly connected.

Code	Input	Output
Power Code	F	C
Telecommunication Code (TC)	—	X
Installation Code (IC)	A	—



Dual-Port HLSS T200 HDSL2 Remote Unit

PRICING AND AVAILABILITY 800.827.0807
TECH SUPPORT 800.726.8663
RETURN FOR REPAIR 256.963.8722
www.adtran.com
61223226L2-22B

RS-232 DB-9 CONNECTOR

This connector is used to access performance monitoring data, perform loopbacks, and provision units via VT100 emulation software such as HyperTerminal – Private Edition and ProComm Plus.

There are two types of terminal emulation modes: Manual and Real-Time. Use **CTRL+T** to toggle between the two modes.

- ◆ Manual Emulation Mode: Press the space bar three times to manually update the screen. Print Screen and Log File commands are available in this mode.
- ◆ Real-Time Emulation Mode: The default mode. Print Screen and Log File commands are not available in this mode. Cursor placement and screen highlighting are enabled.

Provision terminal port as follows:

- ◆ Data Rate: 1.2 to 19.2 kbps
- ◆ Asynchronous Data Format: eight data bits, no parity (none), one stop bit

NOTE: When using a PC with terminal software, be sure to disable any power saving programs.

TROUBLESHOOTING HDSL2

ADTRAN HDSL2 equipment is equipped with troubleshooting-at-a-glance LEDs (identified on the reverse side of this document) that provide customers with a simple means of identifying the location of certain faults. Effective with the release of the newest generation of ADTRAN HDSL4 equipment, several new screens have also been added to the craft interface to simplify the trouble isolation process. These new screens and their associated benefits are described below.

Troubleshooting Screen

Available via the Main Menu (Option 12). Provides both current and 7-day historical view of performance. Errors and/or alarms detected at any of the monitored inputs (DSX-1, DS1, and HDSL) will be displayed in tabular format and highlighted in reverse video. This screen automatically escalates the error/alarm conditions using reverse video display. Faults detected and their associated meanings are as follows:

		DSX-1/DS1:
LOS	Loss of HDSL sync	LOS
MARG	Margin has exceeded the alarm threshold	Loss of signal (Red Alarm) at the DSX-1/DS1 receiver
ATTEN	Attenuation has exceeded the alarm threshold	CLK
ERR	Errors recorded at the HDSL receiver	RAI
Facility:		AIS
GROUND	Facility pair grounded	Alarm Indication Signal (Blue Alarm) detected at DSX-1/DS1 receiver
SHORT	Short circuit (or low impedance) between facility pairs	ERR
OPEN	Open circuit between facility pairs	Errors recorded at DSX-1/DS1 receiver

Troubleshooting Guidance Screens

Available via the Troubleshooting screen (Option 1). Provides guidance on the fault(s) detected; includes possible cause(s) and suggested actions.

Atten/Margin History Screens

Available via the Troubleshooting screen (Option 3). Displays the minimum signal margin and maximum attenuation (worst case scenarios) for each HDSL receiver for the past 24 hours and the previous 7 days. Margin or attenuation values that exceed the thresholds will be displayed in reverse video. This screen helps to determine whether an outage might have been caused by either the attenuation and/or the margin falling outside the acceptable range.

FEATURES

This unit is equipped with TScan™. With this new release of TScan, the following features are available:

Splice Detection

This unit can detect anomalies in cable splices and provide an approximation of distance, in feet, to the suspect splice. Details are provided via the Troubleshooting screens available through the craft access port.

Fault Bridging

This feature minimizes downtime when an intermittent impairment (GFI, lightning, short, micro-interruption, bad splice, noise burst, etc.) briefly affects the HDSL loop by sustaining the circuit during the impairment until good signal returns, thereby preventing a retrain and maintaining communication.

LOOPBACK AND CONTROL CODES

NOTE: All codes must be sent for a minimum of 5 seconds in order for them to be detected and acted upon.

Function	Code (Hex/Binary)	Response
ARM (in-band) - also known as 2-in-5 pattern	11000 (binary)	If the pattern is sent from the network, the units arm, and the H2TU-R will loop up if NIU Loopback is enabled.
Disarm (in-band) - also known as 3-in-5 pattern	11100 (binary)	The H2TU-C is removed from the armed state. Any units in loopback when the 11100 pattern is received loop down. The LBK LEDs extinguish on all units.
H2TU-C Loop Up	D3D3 or 1101 0011 1101 0011	If armed, the H2TU-C loops back, 2 seconds of AIS (all ones) are transmitted, the looped data is sent for 5 seconds, and then a burst of 231 logic (bit) errors are injected. The burst of 231 logic errors continue every 20 seconds as long as the D3D3 pattern is detected. When the pattern is removed, the unit remains in loopback. If the pattern is reinstated, the injection of 231 logic errors resumes every 20 seconds.
Loop Down w/o Disarm	9393 or 1001 0011 1001 0011	When sent from the network, all units currently in loopback loop down. Armed units do not disarm. In order to function like a smartjack, the H2TU-R does not loop down from a network loopback in response to the 9393 pattern if NIU Loopback is enabled.
Loopback Query	D5D5 or 1101 0101 1101 0101	If the units are armed, and the H2TU-C or H2TU-R are in network loopback, logic errors are injected toward the network to indicate a loopback is present toward the network. The number of errors injected is determined by the unit that is in loopback. As long as the pattern continues to be sent, errors are injected again by the looped unit every 20 seconds as follows: H2TU-C 231 errors H2TU-R 20 errors
Loopback Time Out Override	D5D6 or 1101 0101 1101 0110	If the units are armed or a unit is currently in loopback when this pattern is sent from the network, the loopback time out is disabled. As long as the units remain armed, the time out remains disabled. When the units are disarmed, the loopback time out reverts to the previous loopback time out setting. If any element is in network loopback a bit error confirmation is sent by that unit as follows: H2TU-C 231 errors H2TU-R 20 errors
Span Power Disable	6767 or 0110 0111 0110 0111	If the units are armed and 6767 is sent from the network, the H2TU-C disables span power. If the pattern is sent from the network, the span power is disabled as long as 6767 pattern is detected. Once the pattern is no longer received, the H2TU-C reactivates span power, and all units retrain and return to the disarmed and unlooped state.
H2TU-R Loopback	C742 1100 0111 0100 0010	When set from the network, an H2TU-R network loopback is activated, and a 20-bit error confirmation is sent.

Warranty: ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service.

Warranty information can be found online at www.adtran.com/warranty.