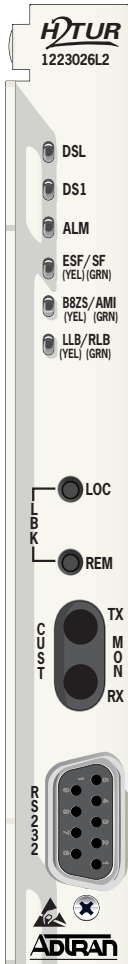


HDSL2 T200 H2TU-R

P/N 1223026L2
CLEI: T1L8MOKC_



LED STATUS

Label	Status	Description
DSL	● Green	Good signal margin on the loop (> 2 dB margin above 10 ⁻⁷ BER)
	● Red	Poor signal margin on the loop (≥ 10 ⁻⁷ BER)
	⊛ Flashing	Error detected at H2TU-C or H2TU-R (the color of this LED will match the color representing the signal margin of the loop)
DS1	● Green	Customer-side DS1 signal is present and synchronized
	● Red	Customer-side DS1 signal not detected from customer or is of a format not matching the HDSL2 circuit provisioning
ALM	○ Off	No alarm condition detected
	● Red	Local alarm condition (H2TU-R) detected
	● Yellow	Remote alarm condition (H2TU-C) detected
ESF/SF	○ Off	Unit is Provisioned for Unframed operation
	● Green	Unit is Provisioned for DS1 SF framing mode
	● Yellow	Unit is Provisioned for DS1 ESF framing mode
B8ZS/AMI	● Green	Unit is Provisioned for AMI coding
	● Yellow	Unit is Provisioned for B8ZS coding
LLB/RLB	○ Off	Unit is not in loopback or armed state
	● Green	Active remote bidirectional loopback at the H2TU-C
	● Yellow	Unit is in bidirectional loopback at the H2TU-R

PUSHBUTTON LOOPBACK FUNCTIONS

- ◆ **LOC** - Initiates a bidirectional loopback of the H2TU-R toward the network and customer
- ◆ **REM** - Initiates a bidirectional loopback at the H2TU-C toward the network and customer

DS1 BRIDGING (BANTAM) JACKS

If the DS1 test set is optioned for MONITOR, the monitor jacks provide a nonintrusive tap onto the signal line.

- ◆ **TX** - Monitors the data stream being received from the customer equipment
- ◆ **RX** - Monitors the data stream being transmitted to the customer equipment

POWERING MODES

This T200 H2TU-R is span powered only. If a locally powered H2TU-R is required, order P/N 1223024L2.

CARD EDGE PINOUTS

Pin	Designation	Description
1	CH GND	Chassis ground
5	DS1-T1	DS1 receive out tip (to customer interface)
7	H1-T	HDSL2 Loop tip (facility)
11	CH GND	Chassis ground
12	GND	Ground for protection switching
13	H1-R	HDSL2 Loop ring (facility)
15	DS1-R1	DS1 receive out ring (to customer interface)
20	VCC	+5 VDC for protection switching
27	CH GND	Chassis ground
40	PROT-1	Control line for protection switching
49	DS1-R	DS1 transmit in ring (from customer interface)
55	DS1-T	DS1 transmit in tip (from customer interface)

RS-232 DB-9 CONNECTOR

Used to access performance monitoring data, perform loopbacks, and provision units via VT100 emulation applications, such as HyperTerminal - Private Edition.

- ◆ There are two types of terminal emulation 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.

Use CTRL+T to toggle between the two terminal emulation modes.

- ◆ Provision terminal port for VT100 as follows:

- ◆ **Data Rate**: 1.2 to 19.2 kbps
- ◆ **Asynchronous Data Format**: Eight data bits, no parity (none), one stop bit
- ◆ When using a PC with terminal software, disable any power saving programs.

COMPLIANCE

WARNING: Up to -200 VDC may be present on telecommunications wiring.

This product is intended to be installed in Restricted Access Areas only and in equipment with a Type "B" or "E" enclosure.

This product meets all requirements of Bellcore GR-1089-CORE (Class A2) and ANSI T1.418-2002, and is NRTL listed to the applicable UL standards.

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

TROUBLESHOOTING HDSL2

This ADTRAN HDSL2 unit 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. Additionally, screens available via the craft interface simplify the trouble isolation process. These screens and their associated benefits are described below.

Troubleshooting Screen

Available via the Main Menu (Option 12) - provides ADTRAN contact information and access to the Troubleshooting Guidance and General Information screens.

Troubleshooting Guidance Screens

Available via the Troubleshooting screen (Option 1) - detects and displays errors and/or alarms at any of the monitored inputs (DSX1, DS1 and HDSL). Guidance on the fault(s) detected includes possible cause(s) and suggested actions, including those shown below:

DSX-1/DS1:

- LOS Loss of signal (Red Alarm) at the DSX-1/DS1 receiver
- CLK T1 receive clock is out of range
- RAI Remote Alarm Indication (Yellow Alarm) detected at DSX-1/DS1 receiver
- AIS Alarm Indication Signal (Blue Alarm) detected at DSX-1/DS1 receiver
- ERR Errors recorded at DSX-1/DS1 receiver

Facility:

- GROUND Ground Fault Interrupt on span voltage (facility pair grounded)
- SHORT Short circuit (or low impedance) between facility pairs
- OPEN Open circuit between facility pairs

DSL:

- LOS Loss of HDSL sync
- MARG Margin has exceeded the alarm threshold
- ATTEN Attenuation has exceeded the alarm threshold
- ERR Errors recorded at the HDSL receiver
- HIST Performance History of the DSL units

General Information Screen

Available via the Troubleshooting screen (Option 2) - a reference page which displays the minimum acceptable signal margin, maximum attenuation, and other deployment parameters for this HDSL2 circuit. A sample display of this screen is shown below:

HDSL2 Loop Guidelines for optimum operation

-
- Non-loaded cable pair
- Single bridge tap < 2 kft
- Total bridge taps < 2.5 kft
- Bridge tap within 1000 ft of transceiver may affect performance
- Impulse noise < 50 dBrnF (F filter)
- Wideband noise < 31 dBrnF (F filter)
- Power influence ≤ 80 dBrnC
- Longitudinal Balance ≥ 60 dB (If using Wideband test at 196 Khz ≥ 40dB)
- Foreign DC Voltage (t-r, t-g, r-g) < 3 VDC
- Loop Resistance ≤ 775 ohms
- Margin ≥ 6 dB
- Attenuation ≤ 28 dB

Along with the Troubleshooting screens, the Detailed Status screen and Performance History screen, available via the craft access terminal, provide both real-time and historical view of this circuit.

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 at www.adtran.com/warranty.

FEATURES

TScan

This module is equipped to function with Central Office units (H2TU-C) having the TScan™ feature. TScan allows for remote retrieval of circuit diagnostics and performs advanced fault location. For more information about TScan refer to the Installation and Maintenance practice.

Bad Splice Detection

The Runtime TScan splice detection feature is an ADTRAN proprietary non-intrusive method for detection of anomalies (poor splice connections) in the copper plant.

Data transmission transceivers, especially echo-cancelled technologies, such as HDSL2 (or HDSL4) are subject to degraded performance in the presence of deteriorating splice connections. This deterioration is often undetected by normal testing methods. Often, these splices present no problem for the data transmission equipment until the point at which oxidation within the splice itself causes a rapid impedance change. Such a change in impedance may cause errors, signal margin fluctuation, and/or a retrain of the DSL transceivers. To address the difficulty in identifying deteriorating splice connections, ADTRAN has developed the splice detection feature, which non-intrusively monitors the cable pair during runtime for the presence of deterioration.

The screen below, accessed from the troubleshooting screen, shows a suspect splice 250 feet from the H2TU-C.

```

Circuit ID:                                06/06/04 09:29:45
                                           Press ESC to return to previous menu

* Note: Chronic Circuit Results are only valid after all other circuit *
* qualification tests have been performed and failed to show a trouble !! *

Splice Detector Version 1 Result Definitions:
-----
NTF - No Trouble Found yet.
LOS - Unit not in sync.
Number - Distance from Reference point (in ft.) of suspect splice.

Reference Point   Splice Detection Results   Version Number   Result Shown for date
-----
H2TUC             250                               01               MM/DD/YY
H2TUR             NTF                               --               -----
                                                         06/06/04

(B) Back
    
```

Fault Bridging

Fault Bridging is a feature that minimizes downtime due to an intermittent impairment (GFI, short, micro-interruption, bad splice, noise burst, etc.) that appears on the cable pair.

The bridging feature allows the DSL transceivers to maintain synchronization during such an interruption, thus avoiding a 25 to 30 second retrain. Depending on the type of impairment, interruptions as long in duration as 200 ms can be bridged.

Fast Retrain

Fast Retrain is an ADTRAN proprietary feature that minimizes downtime due to an intermittent impairment (bad splice, noise burst, etc.) which due to its duration cannot be bridged.

When such impairments occur after HDSL synchronization has been achieved, the fast retrain feature will be invoked to restore service within 5 to 7 seconds. This short retrain time allows for reduced downtime compared to the traditional 25 to 30 second retrain duration.

NOTE: *Fast-Retrain capable units must be installed on both ends of the HDSL2 circuit for this feature to function properly. Also, if there is a failure, for any reason, of a Fast Retrain attempt then the traditional (25-30 second) retrain will be initiated.*