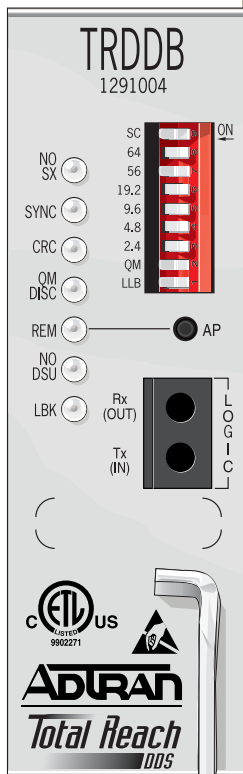


D4 TRDDB

CLEI: D4C4EEHB_ _



FRONT PANEL OPERATION & FEATURES

Status LEDs

NO SX	● On	No sealing current on local loop.
	* Flashing	Short circuit on 2-wire loop.
SYNC	● Green	Loop synchronized.
	● Red	Loop not synchronized.
CRC	● On	Errors on 2-wire loop.
QM DISC	● On	Quality Monitor Disconnect occurred.
REM	● On	Software option set in effect.
	* Flashing	Remote control link active.
	○ Off	Hardware option set in effect.
NO DSU	● On	Customer CSU/DSU not detected/installed.
LBK	● On	DSO, OCU, or CSU loopback exists.
	* Flashing	TRDDB in loopback towards customer.

NOTE: All LEDs OFF indicates loss of power or other malfunction.

Front Panel DIP Switch SW1

Dip switch SW1 options should be made prior to installing the TRDDB circuit card.

SW1-1 - Latching Loopback	On	Responds to DS0 latching loopback (LLBK) sequences. Translates OCU & CSU LLBK to TROCU-R
SW1-2 - Quality Monitor	On	TRDDB monitors incoming 2-wire loop and 4-wire customer interface for errors. Excessive errors cause a trouble code to be sent to the network: ASC (4-wire errors) or alternating MOS and ASC (2-wire errors)

SW1-3 - 2.4	On	Selects 2.4 kbps data rate
SW1-4 - 4.8	On	Selects 4.8 kbps data rate
SW1-5 - 9.6	On	Selects 9.6 kbps data rate
SW1-6 - 19.2	On	Selects 19.2 kbps data rate
SW1-7 - 56	On	Selects 56 kbps data rate
SW1-8 - 64	On	Selects 64 kbps data rate
SW1-9 - SC	On	Enables secondary channel

NOTE: At 64 kbps LLBK is automatically enabled. SW1-1 then controls LLBK protection: Off enables and On disables LLBK protection.

Front Panel AP Pushbutton SW2

Depressing the Alternate Provisioning pushbutton for five seconds will toggle between hardware and software option settings. The REM LED shows which set is in effect.

Front Panel Bantam Jacks

Logic level Bantam jacks provide access to the transmit and receive sides of the data stream for testing with a portable test set.

DEPLOYMENT GUIDELINES

- All loops must be non-loaded.
- Maximum Loop Loss measured at a Nyquist of 13.3 kHz is 50 dB AML or 47 dB EML (135 Ω termination).
- Maximum Loop Loss measured at a Nyquist of 28 kHz is 65 dB AML or 62 dB EML (135 Ω termination).
- Bridged tap length should not exceed 12 kft.
- Background noise level should not exceed 34 dBm.
- Impulse noise should not exceed -40 dBm (+50 dBm).

INSTALLATION & TURN UP

Installation assumes the TROCU-R is installed.

1. Wire 2-wire loop to T/R pair, pins 24 and 51 of the D4 backplane. Connect the DS0 input pair to the MA/MB pair, pins 46 and 48, and the DS0 output pair to the EA/EB pair, pins 45 and 19.
2. Select required/desired options on SW1.

3. Insert the TRDDB into its designated slot ensuring the edge connector seats firmly into the backplane.
4. After insertion the TRDDB will run a self-test and synchronization phase during which all LEDs undergo an On/Off sequence. Refer to Status LEDs for descriptions.
5. After synchronization, which may take up to 90 seconds, the following LED indication will show:
 - SYNC LED - Green
 - All other LEDs will be Off until network occurrences cause them to turn On.

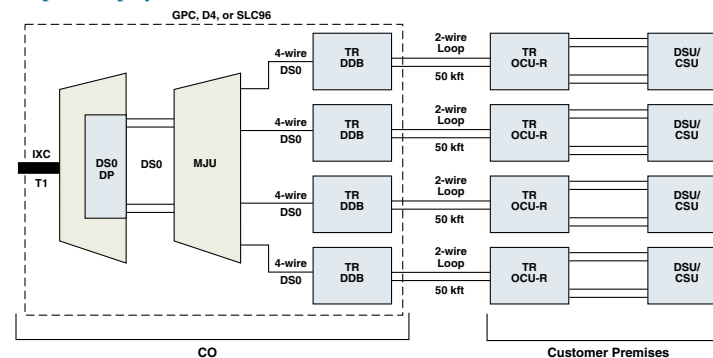
If LEDs in step 5 are as noted, proceed with loop testing per specifications.

If LEDs in step 5 are in any other configuration, refer to TROUBLESHOOTING GUIDE.

Hardware vs Software Provisioning

When SW1 is used for option selection those options take effect when the card is first inserted in the channel bank. Subsequent software provisioning can override hardware options. Depressing the AP pushbutton will toggle between the hardware and software option set. Option changes to either set can be made when the set is active or inactive.

Typical Multipoint Deployment



CONTROL PORT OPERATION

The TRDDB can be remotely controlled via the craft interface on the TROCU-R. The terminal interface operates at baud rates from 1.2 to 19.2 kbps, asynchronous, 8 data bits, no parity, and one stop bit.

Terminal sessions provide access to screen menus for the following:

- Provisioning
- Testing
- Performance Monitoring

Upon terminal connection, depress the space bar three times to access screens. Directions on the screens guide craft personnel through the various menus.

Remote Provisioning and Diagnostics

The TRDDB responds to or supports the following:

- ADTRAN Digital System 6 Message Protocol.
- TPI 108/109 and 105 portable test sets.
- Hekimian React 2001 Release 1.900.
- ANSI Standard T1.107-1995 "Digital Hierarchy Format Specifications Annex G".

TROUBLESHOOTING GUIDE

No Power at the TROCU-R

- Ensure TRDDB is supplying necessary voltage to power the TROCU-R. Measure T/R voltage at the frame (Tip to Ground = -130 Vdc or less depending on voltmeter impedance, Tip to Ring = -125 to -130 Vdc, ring to ground = 0). The Total Reach DDS system is not polarity sensitive.
- If no voltage is measured at the TRDDB, replace the unit.
- Remove the TROCU-R from the housing. Measure T/R voltage at the T200 mounting. Tip to Ring = -125 to -130 Vdc.
- If voltage is not present at the TROCU-R, check continuity of cable pair.
- If voltage is measured at the TROCU-R, replace the unit.



- The TROCU-R does not invoke a measurable short between tip and ring, thus cable resistance measurements must be made with a manually applied short.

Power, but No Synchronization

- Check cable for load coils.
- Note signal meter reading on TROCU-R during power up and synchronization process. Refer to “Signal Loss Indication” on TROCU-R job aid for definitions. Loop loss may be too great for synchronization to occur.
- Ensure loop length is within allowable deployment guidelines.
- Relocate the TROCU-R to splice points sequentially closer to the Total Reach DDB to isolate suspect cable sections.

Excessive Errors On Loop

- Ensure background noise does not exceed 34 dBm.
- Ensure impulse noise is not greater than -40 dBm (+50 dBm). *NOTE: Measure noise with 50 kbit filter.*
- Compare resistances of individual conductors. If these are different, high-resistance or intermittent opens may be indicated. A TDR is commonly required to find such faults.
- Relocate the TROCU-R to splice points sequentially closer to the Total Reach DDB to isolate suspect cable sections.

Trouble Codes

The TRDDDB transmits an alternating MOS 9Ah/ASC 9Eh trouble code towards the network under the following fault conditions:

- 2-wire DSL loss of signal.
- Loss of synchronization.
- Open loop.
- Quality Monitor disconnect.

The TROCU-R transmits an ASC 9Eh trouble code towards the network from the customer premise for similar 4-wire customer interface fault conditions. (Example: mismatched Total Reach and CSU/DSU data rates.)

INSERTION LOSS MEASUREMENTS

Total Reach Design Limits at Traditional 4-wire Frequencies

The table below is for comparison only. The Total Reach DDS system operates at 13.3 kHz for all customer data rates.

Customer Rate	4-Wire Qualifying Frequency (kHz)	DDS Loss Limit (dB)
2.4	1.2	21
2.4/SC	1.6	23
4.8	2.4	26
4.8/SC	3.2	29
9.6	4.8	33.5
9.6/SC	6.4	37
19.2	9.6	44
19.2/SC	12.8	50
56	28.0	59
56/SC & 64	36.0	61

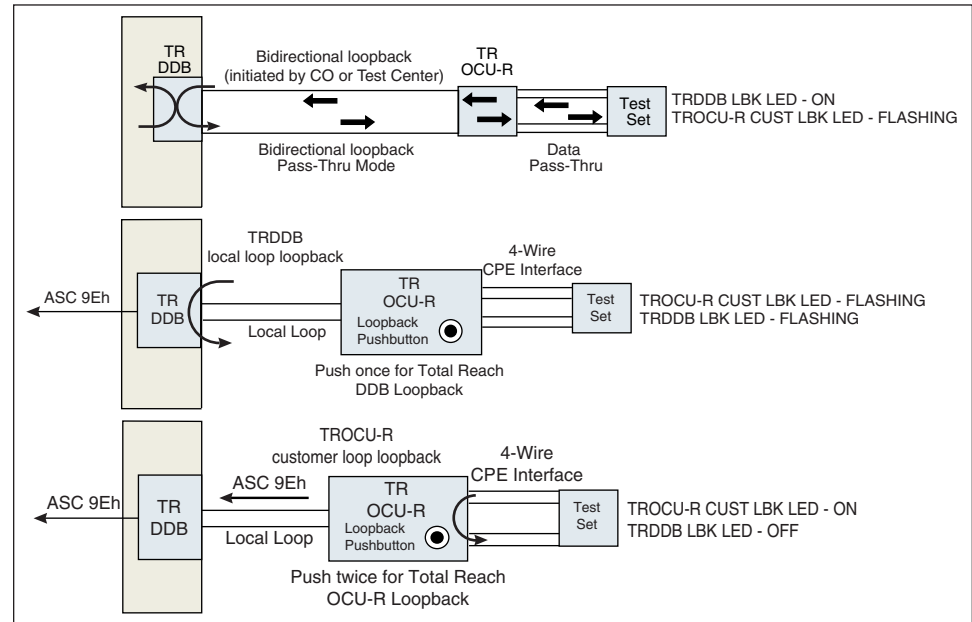
TESTING

The TRDDDB supports the following loopbacks and applications:

- DS0 latching bidirectional loopback from DS0 test set or remote test center.
- Remote end initiated loopbacks from TROCU-R.
- Supports 2-wire loop tests from remote end when DDS-DP is in bidirectional loopback.
- All existing Total Reach system loopbacks release in response to 35 DDS loop down TIP bytes, by pressing the LBK button on the TROCU-R, or via a terminal through the DB-9 on the TR OCU-R. Refer to loopback diagrams for all LBK pushbutton activated tests.

LBK & Pushbutton Tests

Successful loopback tests will show the following LED indication:



Compliance

CAUTION: This product is intended for installation in a restricted access location in a Type B or E enclosure only.

Normal operation – Loop current will not exceed 22 mA @ -130 Vdc with a maximum power requirement of 100 mA from -48 Vdc.

CODE	INPUT	OUTPUT
Power Code (PC)	F	C
Telcommunication Code (TC)	-	X
Installation Code (IC)	A	-

WARRANTY

Warranty for Carrier Networks products manufactured by ADTRAN and supplied under Buyer's order for use in the U.S. is ten (10) years. For a complete copy of ADTRAN's U.S. Carrier Networks Equipment Warranty statement, call (877) 457-5007, Document #414.