

Model 9004 TROCU DP Total Reach® All Rate DDS Dataport Installation and Maintenance

CONTENTS

1. GENERAL	1
2. OPTIONS	2
3. INSTALLATION	2
4. TESTING	3
5. DEPLOYMENT GUIDELINES	4
6. WARRANTY AND CUSTOMER SERVICE	5

FIGURES

Figure 1. TROCU DP	1
Figure 2. Total Reach DDS Circuit Diagram	2
Figure 3. Rate Selection (SW2)	2
Figure 4. Option Selection (SW1)	2
Figure 5. OCU Loopback at the TROCU DP	3
Figure 6. TROCU DP Bidirectional Loopback Pass-Thru Mode	4
Figure 7. TROCU DP Bidirectional Loopback Normal Mode	4

TABLES

Table 1. Preprovisioning	2
Table 2. LED Indicators	3
Table 3. Cable Type and Temperature Loss Data @ 13.3 kHz	4
Table 4. TRDDS Insertion Loss Measurements	5

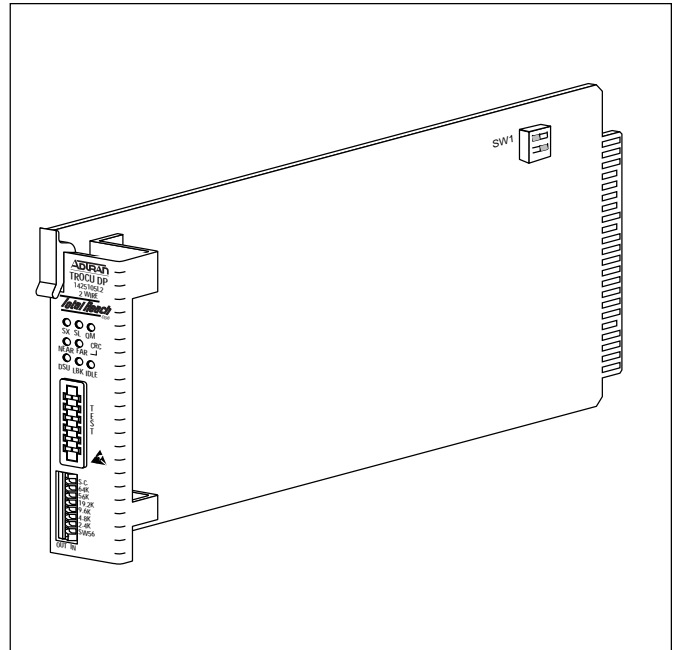


Figure 1. TROCU DP

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN 9004 Total Reach Office Channel Unit Dataport (TROCU DP). The 9004 TROCU DP is illustrated in Figure 1.

Document Revision History

Issue 2 of this document revises the Deployment Guidelines subsection.

Description

The 9004 TROCU DP is a functional replacement for the OCU DP, delivering data at rates up to 64 kbps using a single copper pair. Used in combination with the Total Reach Digital Data Service - Remote (TRDDS-R) termination unit, the 9004 TROCU DP can accommodate extended loop lengths, eliminating the need for DDS repeaters in most cases. The 9004 TROCU DP span powers the remote TRDDS-R

located at the customer premise. The TRDDS-R converts the two-wire signal to the traditional four-wire Alternate Mark Inversion (AMI) signal for presentation to the customer.

NOTE

The 9004 TROCU DP must be used with an appropriate TRDDS-R unit.

The ADTRAN 9004 TROCU DP occupies a single channel position in the Siemens® 9004-type channel bank and provides the interface between a DS0 timeslot of the T-carrier data stream and the two-wire metallic loop extending to the customer premise. The 9004 TROCU DP may interoperate over the carrier system with another TROCU DP, OCU DP, DS0 DP, DS0 cross connect system, or switch, and can be located in an end office, hub office, or intermediate office (Figure 2). The two-wire loop is connected using the Tip (pin 35) and the Ring (pin 36) on the 9004 backplane.

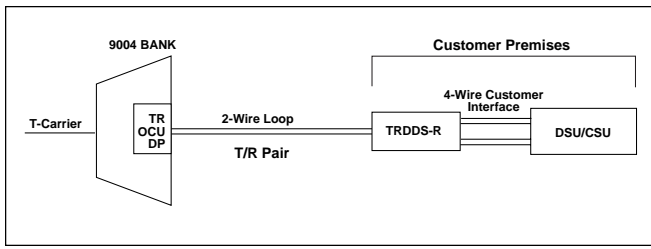


Figure 2. Total Reach DDS Circuit Diagram

Features

- Two-wire deployment.
- Repeaterless operation.
- Bridged tap tolerant.
- Span power for remote TRDDS-R termination unit.
- Utilization in all Siemens 9004-type channel banks.
- Loop Quality Monitor and A/B signaling options.
- Near and far logic level test access.

2. OPTIONS

Select the desired rate using faceplate DIP switch SW2 (Figure 3) and network options using circuit board DIP switch SW1 (Figure 4). The 9004 TROCU DP must be withdrawn from the shelf to position SW1.

Figure 3. Rate Selection (SW2)

Figure 4. Option Selection (SW1)

Quality Monitor

When Quality Monitor (SW1-1) is ON, the unit monitors the incoming two-wire loop and four-wire customer interface data for errors. If excessive errors are detected, the unit blocks customer data transmission and sends Abnormal Station Code to the network. Customer data transmission is automatically restored when the trouble condition is cleared. The Quality Monitor feature is recommended for use on multipoint circuits.

A/B Signaling

When A/B Signaling (SW1-2) is OFF, the unit derives signaling from the incoming data stream. When A/B Signaling is ON, the unit determines the state of the A and B signaling bits using signals present on the backplane of the channel bank. This method assumes that proper signaling has been maintained throughout network tandems and cross-connect systems.

NOTE

A/B Signaling option is only applicable when SW56 is selected, otherwise the option is a “don’t care.”

Preprovisioning

In lieu of additional option switches, the 9004 TROCU DP has been preprovisioned with feature settings as shown in Table 1.

NOTE

Only one rate should be selected. Rate is selected on faceplate switch SW2 by pushing one or two switches to the right toward the inscribed rates. If either SW56 or 64 is selected, the SC switch must not be selected.

Table 1. Preprovisioning

Feature	Setting
Latching Loopback	ON
Zero Code Suppression	ON (Unless 56 kbps, SC, and 64 kbps = OFF)
Error Correction	OFF

3. INSTALLATION



The ADTRAN 9004 TROCU DP plugs directly into a Siemens 9004-type channel bank. No special wiring is required. The two-wire loop utilizes the Tip (pin 35) and the Ring (pin 36) on the 9004 backplane.

Span powering is accomplished using -130 V, measured from Tip to Ring. Voltage measured from Tip to GND should indicate approximately -130 V, voltage from Ring to GND should indicate approximately 0 V.

When inserted into a powered-up backplane the 9004 TROCU DP initiates a 30 to 90 second synchronization sequence with the TRDDS-R. Once synchronized the SL indicator LED will turn Off. If synchronization cannot be achieved, check the T/R pair for open- or short-circuit conditions or load coils. Refer to Table 2 for synchronization LED indication and other LED descriptions.

Table 2. LED Indicators

Indicator	Description
SX	ON: Indicates that there is no sealing current detected between the TROCU DP and the TRDDS-R unit.
SL	ON: Indicates that there is no sync between the TROCU DP and the remote TRDDS-R; check for continuity, load coils, and other abnormal line conditions.
QM	ON: Indicates that the Quality Monitor Disconnect has occurred.
NEAR CRC	ON: Indicates that there are errors on the incoming data stream; check for the abnormal line conditions closer to the TROCU DP.
FAR CRC	ON: Indicates that there are errors occurring towards the remote TRDDS-R; check for the abnormal line conditions closer to the TRDDS-R.
DSU	ON: Indicates the absence of the customer DSU/CSU as determined by the TRDDS-R.
LBK	ON: Indicates the OCU or CSU loopback activation.
IDLE	ON: Indicates the presence of the Control Mode Idle toward the network.

4. TESTING

Testing for the 9004 TROCU DP is accomplished using the same test procedures for four-wire OCU and OCU DP units. Table 3 describes cable loss for the TRDDS Nyquist frequency of 13.3 kHz.

The 9004 TROCU DP is equipped with logic level MAC Test Access that permits testing in both directions using a portable test set. Choose NEAR to test towards the customer loop. Choose FAR to test towards the T-carrier.

In the Far direction, an OCU loopback sequence will loop the unit directly across the T-carrier system. In the Near direction, an OCU loopback sequence will loop the unit connected directly to the portable test set.

Latching and alternating OCU and Channel Service Unit (CSU) loopback sequences are supported. Alternating loopbacks do not operate when the 64 kbps data rate is selected.

NOTE

If 64 kbps is selected, the unit will only respond to latching loopback sequences. Alternating sequences are not valid at this rate.

TROCU DP Bidirectional Loopback Support

The TROCU DP will execute a bidirectional loopback when performing an OCU loopback at the TROCU DP as shown in Figure 5. If the TRDDS-R detects a bidirectional loopback during power-up synchronization, the TRDDS-R allows data to pass on the four-wire interface by entering pass-thru mode. This allows a standard portable DDS test set, connected to the four-wire customer interface of the TRDDS-R, to verify the integrity of the two-wire loop by transmitting a test pattern and examining the returning data for synchronization and errors. The TROCU DP LBK LED will illuminate solid during an OCU loopback.

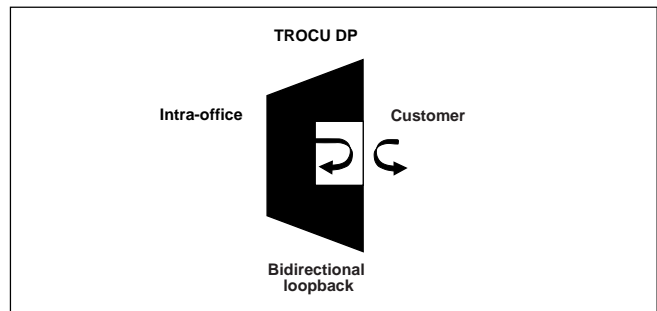


Figure 5. OCU Loopback at the TROCU DP

Refer to Figure 6 for an illustration of the bidirectional loopback pass-thru mode. If the TROCU DP bidirectional loopback is invoked after the TRDDS-R achieves synchronization, the TRDDS-R will not pass or receive data from the CPE or DDS test set. This is consistent with current DDS testing methods and is referred to as the TROCU DP bidirectional loopback normal mode.

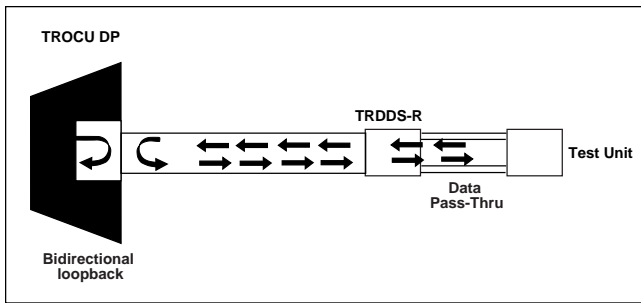


Figure 6. TROCU DP Bidirectional Loopback Pass-Thru Mode

For testing purposes, the installer may choose to initiate the TRDDS-R to pass-thru mode. Once the bidirectional loopback is executed in normal mode, unseat and reseal the TRDDS-R and allow the unit to train-up. Once trained, the TRDDS-R will revert to pass-thru mode for further testing. Refer to **Figure 7** for TRDDS operation during bidirectional loopback in normal mode.

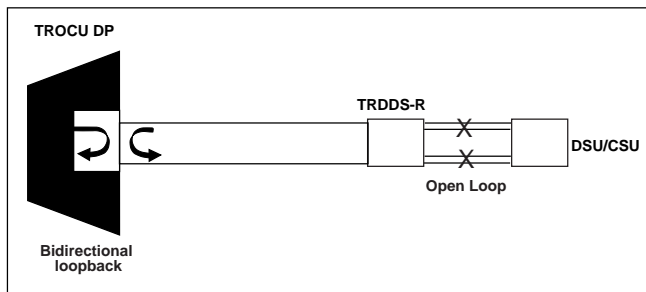


Figure 7. TROCU DP Bidirectional Loopback Normal Mode

5. DEPLOYMENT GUIDELINES

The 9004 TROCU DP and TRDDS-R use technology designed to eliminate the need for repeaters and concerns about impairments caused by typical noise and bridged taps. Refer to Table 3 and 4, for different loss calculations based on wire gauge, type, temperature, and length at standard frequencies. Listed below are the loop design guidelines for TRDDS:

- All loops must be nonloaded.
- Actual Measured Loss (AML) should not exceed 50 dB at 13.3 kHz (135 Ω termination), the Nyquist frequency of TRDDS.

NOTE

The 50 dB AML limit includes 6 dB of signal margin to account for potential near-end cross talk (NEXT) from other digital services that may be provisioned in the same binder group.

- Loop length should not exceed 50 kft.
- Bridged tap length should not exceed 12 kft.
- Background noise level should not exceed 34 dBrn.
- Impulse noise should not exceed -40 dBm, (+50 dBrn).

Table 3. Cable Type and Temperature Loss Data @ 13.3 kHz

Plastic Cable	dB Loss/kft	Paper Cable	dB Loss/kft
19 Gauge PIC (0F)	0.5302	19 Gauge PULP (0F)	0.5616
19 Gauge PIC (70F)	0.6083	19 Gauge PULP (70F)	0.6415
19 Gauge PIC (120F)	0.6610	19 Gauge PULP (120F)	0.6955
22 Gauge PIC (0F)	0.912	22 Gauge PULP (0F)	0.9454
22 Gauge PIC (70F)	1.0258	22 Gauge PULP (70F)	1.0606
22 Gauge PIC (120F)	1.1015	22 Gauge PULP (120F)	1.1370
24 Gauge PIC (0F)	1.2571	24 Gauge PULP (0F)	1.2900
24 Gauge PIC (70F)	1.3982	24 Gauge PULP (70F)	1.4324
24 Gauge PIC (120F)	1.4917	24 Gauge PULP (120F)	1.5268
26 Gauge PIC (0F)	1.6823	26 Gauge PULP (0F)	1.6751
26 Gauge PIC (70F)	1.8568	26 Gauge PULP (70F)	1.8469
26 Gauge PIC (120F)	1.9718	26 Gauge PULP (120F)	1.9608

NOTE

Measure noise with 50 kbit weighting characteristic approximating a filter with a passband of 40 Hz to 30 kHz. Background noise level or impulse noise level is referenced from 56/64 kbps data rate in TR62310.

Table 4. TRDDS Insertion Loss Measurements

TRDDS 13.3 kHz compared to 28 kHz for traditional DDS service		
Line Configuration	@ 13.3 kHz	@ 28 kHz
27 kft 26 AWG	50.12 dB	65.35 dB
36.25 kft 24 AWG	50.00 dB	62.50 dB
50 kft 22 AWG	50.24 dB	59.33 dB
18 kft 22 AWG +10 kft 24 AWG +10 kft 26 AWG	50.60 dB	62.90 dB

6. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten years from the date of shipment if it does not meet its published specifications or fails while in service (see: *ADTRAN Carrier Networks Equipment Warranty, Repair, and Return Policy and Procedure*, document: 60000087-10A).

Contact Customer And Product Service (CAPS) prior to returning equipment to ADTRAN.

For service, CAPS requests, or further information, contact one of the following numbers:

ADTRAN Technical Support

(800) 726-8663

Standard hours: Monday-Friday, 7 a.m.-7 p.m. CST

Emergency hours: 7 days/week, 24 hours/day

ADTRAN Sales

(800) 827-0807

ADTRAN Repair/CAPS

(256) 963-8722

Repair and Return Address

ADTRAN, Inc.

CAPS Department

901 Explorer Boulevard

Huntsville, Alabama 35806-2807