Total Access 750/850/1500 OCU DP Access Module
Installation and Maintenance Practice

CONTENTS

FIGURES

TABLES

Figure 1.   OCU DP Front Panel

1.   GENERAL

This practice is an installation and maintenance guide for the ADTRAN® Total Access® 750/850/1500 Office Channel Unit Data Port (OCU DP) access module. **Figure 1** illustrates the OCU DP (P/N 1180005L1) front panel.

Revision History

This is the fourth issue of this practice. This release of the document includes a new CLEI code. This revision also reflects a general document update and changes to the Warranty information.

Description

The OCU DP provides the interface between a DS0 time slot of the T-carrier data stream and the 4-wire metallic to the customer premises. The OCU DP may interoperate over the carrier system with another OCU DP, DS0 DP, DS0 cross-connect system, or switch, and may be located in an end office, hub office, intermediate office, or remote digital terminal system.

Features

The OCU DP includes the following features:

- For use in Total Access 750, Total Access 850 or Total Access 1500 integrated access devices
- NEAR and FAR logic level bantam test access
- Non-intrusive monitoring of received data from NEAR or FAR direction
- Loop Quality Monitor and A/B signaling options
- Remotely provisionable and Performance Monitoring via Digital System-6

Compliance

Table 1 shows the compliance codes for the OCU DP. The OCU DP is NRTL listed to the applicable UL standards. The OCU DP is to be installed in a restricted access location and in a Type "B" or "E" enclosure only.

The Total Access 750/850/1500 Chassis frame ground terminal must be connected to an earth ground to ensure the front panel of the OCU DP is properly grounded via the backplane connector.

Table 1. Compliance Codes

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

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by ADTRAN could void the user's authority to operate this equipment.

2. INSTALLATION

C A U T I O N !
SUBJECT TO ELECTROSTATIC DAMAGE
OR DECREASE IN RELIABILITY.
HANDLING PRECAUTIONS REQUIRED.

After unpacking the Total Access 750/850/1500 OCU DP, inspect it for damage. If damage has occurred, file a claim with the carrier then contact ADTRAN Customer Service. Refer to the *Warranty and Customer Service* section for further information. If possible, keep the original shipping container for returning the OCU DP for repair or for verification of shipping damage.

Shipping Contents

The contents include the following items:

- Total Access 750/850/1500 OCU DP Access Module
- *Total Access 750/850/1500 OCU DP Access Module Job Aid* (P/N 61180005L1-22)

CAUTION

Electronic modules can be damaged by ESD. When handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

Instructions for Installing the Module

The OCU DP inserts into any Access Module slot (1 through 24) of the Total Access 1500 chassis. To install the OCU DP, perform the following steps:

NOTE

Hot insertion of the module is permissible.

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1. If present, remove the Access Module Blank (P/N 1175099L1) from the appropriate access module slot of the Total Access 750/850/1500 chassis.

WARNING

Dangerous voltage is exposed when the Access Module Blank is removed.

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2. Pull the ejector latch, located on the lower left-hand side of the OCU DP front panel, from its closed position.
3. Hold the OCU DP by the front panel while supporting the bottom edge of the module with the ejector latch opened to engage the chassis edge.
4. Align the module edges to fit in the lower and upper guide grooves for the access module slot.
5. Slide the module into the access module slot. Simultaneous thumb pressure at the top (above the **STATUS** LED) and at the bottom (to the right of the ejector latch) of the module will ensure that the

module is firmly positioned against the backplane of the chassis.

6. Secure the OCU DP in place by pushing in on the ejector latch.

The OCU DP becomes operational upon insertion into an active Total Access 750/850/1500 chassis and performs the power up self-tests. Once the power up self-test is complete, the **STATUS** LED will reflect the true state of the hardware.

Front Panel LEDs
The OCU DP provides front panel LEDs to display status information. See **Table 2** for a listing of the front panel LEDs and their indications.

Table 2. Front Panel LEDs

Label	Status	Description
STATUS	Green	Normal operating condition
	Yellow	OCU or Channel Loopback is active
	Red	No sealing current, no receive signal, or poor quality when Quality Monitor option is enabled
REM	Green	Unit has been remotely provisioned
	Green (Flashing)	DS-6 control link established

Time Slot Assignment
The Total Access 750/850/1500 platforms can have multiple time slots in the T1 data stream assigned to each physical slot in the channel bank. **Table 3** outlines the correlation between the T1 and the physical slot for the Total Access 750. The Total Access 1500 allows craft selectable time slots using the electronic provisioning interface.

Table 3. Total Access 750 Time Slot Assignments

Physical Slot	T1 Time Slot Assignment
1	1
2	5
3	9
4	13
5	17
6	21

Connections
All connections are made through the 50-pin male amphenol connector on the backplane of the Total Access 750/850/1500. See **Table 4** for Total Access 750/850 information. See **Table 5** on page 4 for Total Access 1500 information.
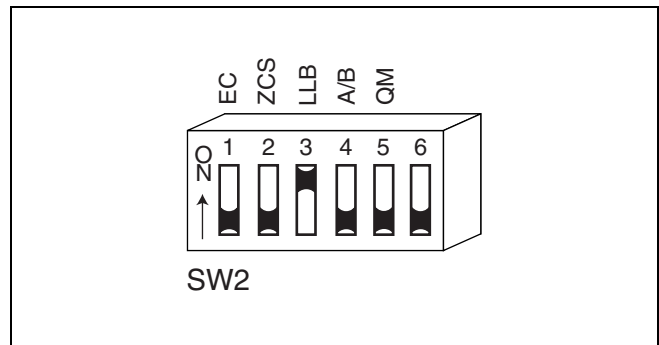
Table 4. OCU DP Pair Locator for Total Access 750/850

Physical Slot	T/R Receive	T1/R1 Transmit
1	26/1	27/2
2	30/5	31/6
3	34/9	35/10
4	38/13	39/14
5	42/17	43/18
6	46/21	47/22

Table 5. OCU DP Pair Locator for Total Access 1500

Physical Slot	T/R Receive	T1/R1 Transmit
1	26/1	26/1
2	27/2	27/2
3	28/3	28/3
4	29/4	29/4
5	30/5	30/5
6	31/6	31/6
7	32/7	32/7
8	33/8	33/8
9	34/9	34/9
10	35/10	35/10
11	36/11	36/11
12	37/12	37/12
13	38/13	38/13
14	39/14	39/14
15	40/15	40/15
16	41/16	41/16
17	42/17	42/17
18	43/18	43/18
19	44/19	44/19
20	45/20	45/20
21	46/21	46/21
22	47/22	47/22
23	48/23	48/23
24	49/24	49/24

Figure 2. SW2 Option Switch
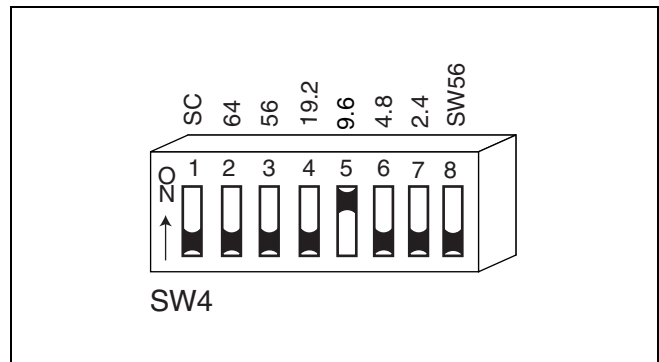
Figure 3. SW4 Option Switch

3. PROVISIONING

Provisioning of the OCU DP takes place prior to inserting the card into the channel bank. Options and data rates are selected with two DIP switches located on the circuit board (**SW2** and **SW4**). For option selections, see **Figure 2** and **Figure 3**.

Error Correction (EC SW2-1)

ON indicates the automatic enabling of the appropriate technique to ensure data integrity across the T-carrier system. OFF indicates error correction disabled.

NOTE

The **SW2-6** has no functionality.

Zero Code Suppression (ZC SW2-2)

ON ensures pulse density in the T-carrier data stream. ZCS is automatically disabled for 64 kbps Clear Channel circuits.

AB Signaling (SW2-4)

When AB Signaling is enabled, the Multi-Rate OCU DP determines the state of the A and B signaling bits required for Switched 56 operation from the signals present on the backplane of the channel bank. This method assumes that tandems and cross-connects between the OCU DP and the switch have maintained the signaling bit positions through two-state or four-state optioning. When AB Signaling is disabled, the OCU DP derives signaling bits from the incoming data of the DS0 time slot.

Latching Loopback (LLB SW2-3)

When latching loopback is enabled the OCU DP will respond to the legacy latching loopback sequence as described in TR62310 and ANSI T1.417. At 64 kbps, the function of the **LLB** switch is altered. When 64 kbps is enabled, placing the **LLB** switch in the ON position will permit the channel unit to respond to the legacy latching loopback sequence as described in TR62310 and ANSI T1.417. At 64 kbps with the **LLB** switch in the OFF position the (channel unit) will initialize ADTRAN's Protected Loopback mode.

Quality Monitor (QM SW2-4)

ON monitors the 4-wire loop for errors. If excessive errors are detected, the OCU DP blocks customer data transmission and sends Abnormal Station Code to network. Customer data transmission is automatically restored when trouble condition clears.

Protected Loopback

ADTRAN's Protected Loopback supports the DDS latching loopback standard in T1E1.2/99-007R1. When enabled, the channel unit will respond to latching loopback when the idle code preamble is sent prior to the latching loopback sequence specified in TR62310 and ANSI T1.417. Protected Loopback prevents false latching loopback occurrences when the latching loopback sequence is embedded within the customer data payload.

Automated test equipment should support T1E1.2/99-007R1 to perform testing at 64 kbps when Protected Loopback is enabled. See **Table 6** for the latching loopback sequence requirement when Protected Loopback is enabled.

Rate Selection

Rate is selected with **SW4** by positioning the switch for the desired data rate toward the inscribed value. If more than one switch is ON the unit defaults to 56 kbps. See Figure 3 on page 4 for rate selections.

NOTE

Error Correction at rates of 56 and 64 kbps require two DS0 time slots for data and error-correcting parity bytes. If **SW56** is selected, Error Correction must remain OFF. If 64 kbps is selected, the secondary channel (**SC**) switch must not be selected.

Table 6. Protected Loopback Mode

Function	Byte Code	Number of Received Bytes
Exit data protocol	Idle - 11111110	Minimum of 35 idle bytes
Clear existing loopbacks	Transition in progress (TIP) *0111010	Minimum of 35 TIP bytes
Identify device to be looped	Loopback Select Code (LSC) *1010101 - OCU *0110001 - CSU *1000001 - NI *0000101 - DSO	Minimum of 35 LSC bytes
Prepare to loop: send MAP code after 30 bytes	Loopback Enabled (LBE) *1010110	Minimum of 100 LBE bytes
Activate loopback	Far-End Voice (FEV) *1011010	Minimum of 35 FEV bytes
Note: Minimum of 35 TIP bytes required to disable established latching loopback. * Don't care bit		

Alternate Provisioning

After installation, an alternate provisioning method is available via Digital System 6 using a portable test unit (TP 108/109 and TPI 105) or React 2001. The Alternate Provisioning (**AP**) pushbutton on the Total Access 750/850/1500 OCU DP front panel selects which provisioning is in effect; DIP switches or remote provisioning. When the pushbutton is pressed the green **REM** LED adjacent to the pushbutton provides the following status:

- Off - Remote provisioning not in effect, DIP switch provisioning active
- Flashing - Remote provisioning in progress
- On steady - Remote provisioning in effect, overrides DIP switch provisioning

Remote provisioning is normally a temporary provisioning or test process. The overrides stay in effect as long as the **REM** LED remains On. When temporary provisioning or testing is completed, pressing the **AP** pushbutton again will deactivate the temporary overrides, the **REM** LED goes Out, and DIP switch provisioning goes back into effect.

However, those options set remotely remain in memory and the **AP** pushbutton can toggle between the two option sets. Additional information on remote provisioning and diagnostics is provided in *Remote Provisioning And Diagnostics* on page 7.

Electronic Provisioning

The craft interfaces on the Total Access 750 Bank Controller Unit (BCU), Total Access 850 Router Control Unit (RCU), or the Total Access 1500 System Controller Unit (SCU) are used to change default options and obtain access module status through menu screens. To access the menu screens, connect a VT100 terminal or a computer running a terminal emulation program to the front panel craft interface ADMIN port using a standard male-to-female RS-232 DB-9 cable. Craft port settings are as follows:

- 9600 Baud
- No parity
- 8 Data bits
- 1 Stop bits
- No Flow Control

Windows HyperTerminal

Windows HyperTerminal can be used as a VT100 terminal emulation program. Open HyperTerminal by selecting Programs/Accessories/HyperTerminal. Refer to the Help section of HyperTerminal for additional information.

NOTE

To ensure proper display background, select VT100 terminal emulation under Settings.

Password and User Name

Password protection is a function of the SCU and is factory disabled. If password authentication is enabled, then the SCU will display the Logon screen. A valid User Name and Password are required to access the menus. The default User Name is "user", and the default Password is "password". The User Name and Password are not case sensitive.

Menu Navigation

To traverse through the menus, select the desired entry and press ENTER. To work backward in the menu press the ESC (escape) key. **Figure 4** illustrates the OCU DP menu tree.
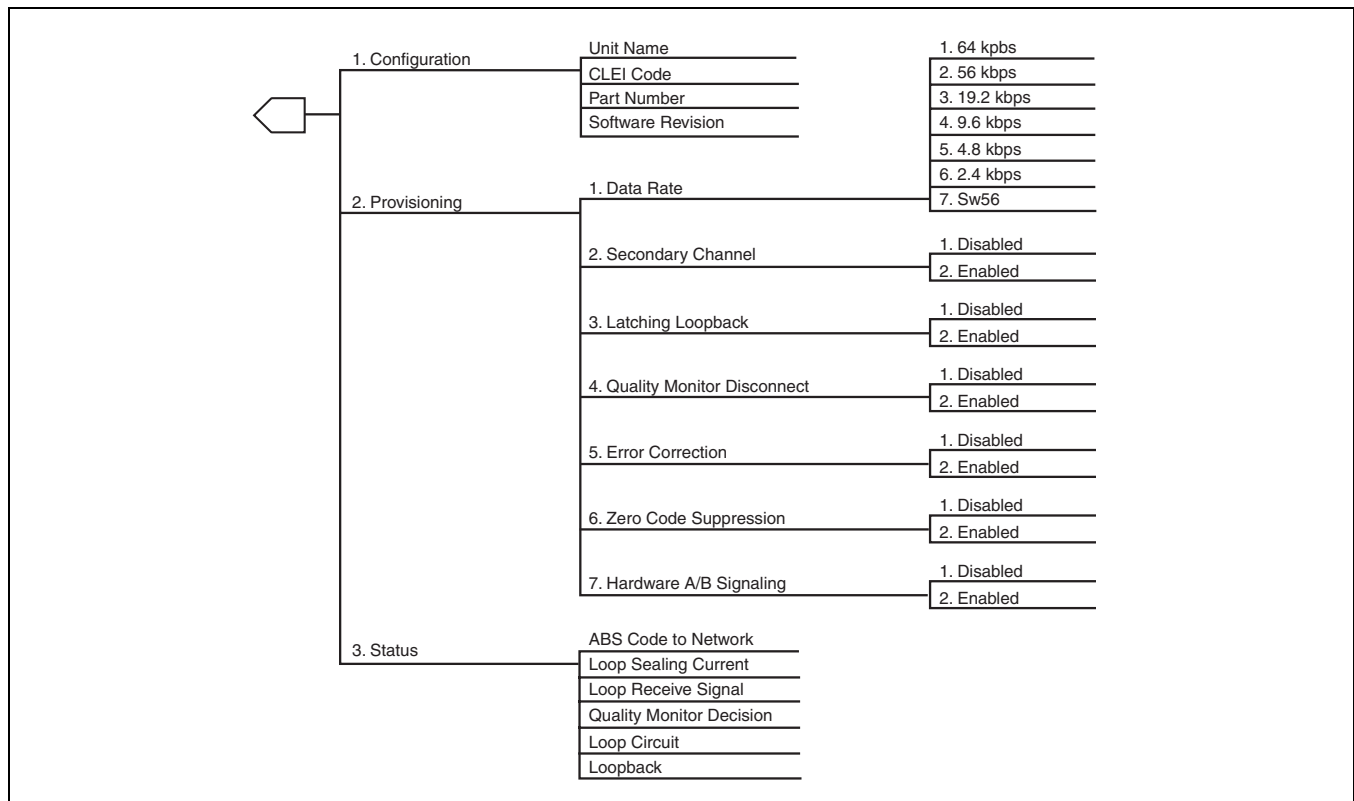
Figure 4. OCU DP Menu Tree

Remote Provisioning And Diagnostics

Control Protocol
Remote access to provisioning and status information is accomplished using ADTRAN Digital System 6 Message protocol, defined in *Control and Diagnostic Procedures Practice, Section 6032991-6*. Digital System 6 is supported by the TPI 108/109 and 105 portable test sets and is supported by Hekimian React remote test system. The TR DDS network elements comply with *ANSI T1.107-1995*, *Digital Hierarchy Format Specifications Annex G* which allows remote provisioning, querying, and performance monitoring via in-band control of network elements.

NOTE

The REACT 2001 GUI software release 1.900 supports ANSI T1.107-1995.

Remote access is accomplished using a defined set of in-band DS0 byte sequences similar to the latching loopback sequence. Commands issued through the test system are recognized by the individual channel unit, which responds with the appropriate byte sequences. These in-band commands may be used to verify options via dialogs with REACT 2001 and TPI 108/109 test sets. Unit CLEI, serial number, provisioning, and performance information can be retrieved remotely using the Digital System 6 protocol.

Provisioning and Status
All configuration options can be remotely viewed or provisioned. The front panel **REM** LED flashes during control link establishment and remains ON after the channel unit has been remotely provisioned.

If the channel unit has been remotely provisioned, the operator can alternate between remote configuration and manual switch settings by pressing the momentary **AP** pushbutton located on the front panel. If the channel unit is removed from the system, the previous provisioning is retained by the Total Access 750/850/1500 shelf common equipment.

The **REM** indicator remains ON when the channel unit is operating based on Remote Provisioning, and is OFF when operating on manual switches. If the channel unit has never been remotely provisioned, the **AP** switch has no effect and the **REM** indicator remains OFF.

4. TESTING
The OCU DP is equipped with logic level bantam test access jacks that permit testing in both directions using a portable test set. Latching and alternating OCU and CSU loopback sequences are supported. Alternating loopbacks do not operate when the 64 kbps data rate is selected. Choose NEAR to test toward the 4-wire customer loop direction; choose FAR to test toward the T-carrier.

In the FAR direction, an OCU loopback sequence will loop the unit directly across the carrier system. In the NEAR direction, an OCU loopback sequence will loop the unit directly connected to the portable test set.

NOTE

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

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5. MAINTENANCE
The Total Access 750/850/1500 OCU DP does not require routine maintenance for normal operation.

ADTRAN does not recommend that repairs be attempted in the field. Repair services may be obtained by returning the defective unit to ADTRAN. Refer to the *Warranty and Customer Service* section for further information.

6. SPECIFICATIONS
Specifications for the Total Access 750/850/1500 OCU DP are detailed in **Table 7**.

7. WARRANTY AND CUSTOMER SERVICE
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.

Refer to the following subsections for sales, support, Customer and Product Service (CAPS) requests, or further information.

ADTRAN Sales
Pricing/Availability:
800-827-0807

ADTRAN Technical Support

Pre-Sales Applications/Post-Sales Technical
Assistance:

800-726-8663

Standard hours: Monday - Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade:
(256) 963-8722

Repair and Return Address

Contact CAPS prior to returning equipment to
ADTRAN.

ADTRAN, Inc.
CAPS Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

Table 7. OCU DP Specifications

Specification	Description
Power	
Current Draw:	0.028 A maximum @ –48 VDC
Environmental	
Operating Temperature: Storage Temperature:	–40°C to +65°C –40°C to +70°C
Relative Humidity:	95 percent maximum @ 50°C, noncondensing
Maximum Heat Dissipation:	1.00 watts
Physical	
Dimensions:	Height: 3.125 inches Width: 0.62 inches Depth: 10.1 inches
Weight:	0.5 pounds
Compliance	
Regulatory Agency Requirements:	UL 60950 NEBS Level 3 FCC 47CFR Part 15, Class A
Part Number	
Total Access 750/850/1500 OCU DP Access Module:	1180005L1