



# **OCU DP OPTION MODULE**

**Part Number 1200068L1  
Part Number 1200068L1#HS**

# **OCU DP PLUG-ON BOARD**

**Part Number 1200083L1**

## **USER MANUAL**

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# OCU DP OPTION MODULE

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## 1. INTRODUCTION

### 1.1 OCU DP OVERVIEW

The Office Channel Unit Dataport (OCU DP) is one of the Option Modules available for use with the ADTRAN TSU 100. The OCU DP is an all-rate Office Channel Unit Dataport. It provides signal conversion from any of the rates on the customer loop side to a single DS0 time slot. The OCU DP should be selected for use with the connection of DDS or Switched 56 DSU/CSUs or other equipment which utilizes a DDS interface. The OCU DP provides an interface between the T1 Multiplexer and a DSU/CSU over a 4-wire loop, up to 18,000 feet in length of 26 AWG cable. This interface permits the combination of DDS lines into a single T1 stream.

### 1.2 FUNCTIONAL DESCRIPTION

The OCU DP is designed to fit in the option slot of the TSU 100 and is subject to its operation and control. The OCU DP is configured from the front panel of the TSU 100 or by an external personal computer (PC) program. The internal menus for its configuration are a part of the OCU DP module and are automatically installed when the OCU DP is plugged into the unit.

#### FEATURES

- Operates using one DS0
- 2.4, 4.8, 9.6, 19.2, 38.4, 56, 64 kbps dedicated rates
- Supports Switched 56 dial-up digital service
- Compatible with DDS secondary channel services at rates ranging from 75 to 2400 bps, depending on the primary channel rate
- 45dB range at all rates
- Transmit attenuation available for short loops
- OCU loopback toward TSU Network Interface (NI) (front panel, remote, inband)
- Sealing current reversal to initiate loopback at the CSU (front panel, remote, inband)

- PRT/LCL bidirectional loopback toward the TSU Network Interface (NI) and the DSU/CSU
- Zero code suppression
- Quality monitor/ auto line disconnect
- Latching Loopback enable/ disable
- Selectable hardware/ software algorithms for Switched-56 operation
- Interface Connector-RJ48C



*The 19.6 kbps feature is patented by INC, patent #4,862,480. The 45 dB range feature is patented by ADTRAN, patent #4,759,035. The quality monitor/ auto line disconnect feature is patented by ADTRAN, patent #5,450,441.*

**OCU DP OPTION  
MODULE SPECIFICATIONS**

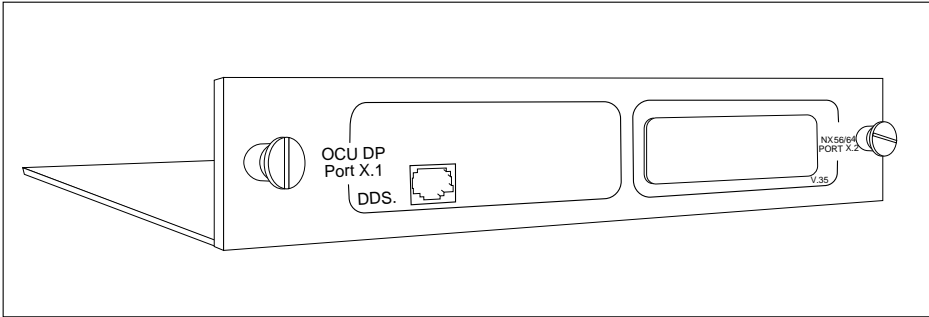
Loop Interface	4-wire (TX Pair and RX Pair)
Data Rate	2.4, 4.8, 9.6, 19.2, 38.4, 56 kbps including secondary channel rates and 64 kbps (clear channel)
Signal Format	Bipolar, return-to-zero, 50% duty cycle
TX Output Amplitude	$\pm 1.5\text{V}$ peak $\pm 10\%$ for rates 2.4, 4.8, 19.2, 38.4, 54 and 64 kbps $\pm 0.75\text{V}$ peak $\pm 10\%$ for 9.6 kbps
TX/RX Source Impedance	$135 \Omega \pm 20\%$
Dynamic Range	0 to 45 dB loops loss for all rates measured at a frequency of half the data rate
Sealing Current	4 to 20 mA DC with polarity reversal capability

Capacity	One DS0 (user configurable)
Tests	Power-on circuit test CSU loopback initiation - (sealing current reversal) OCU loopback (loopback-internal toward MUX) PRT/ LCL (bidirectional loopback)
Connector	RJ48C

## 1.3 PHYSICAL

### DESCRIPTION

The OCU DP, see **Figure 1**, is an option module which plugs into the option slot in the rear of the TSU 100.



**Figure 1. OCU DP Option Module**

The OCU DP rear panel includes a plastic plug over a cutout for additional connectors. This allows a "plug-on" card to be added to the OCU DP module. The PORT X.1 indication is linked to the port numbering philosophy of the TSU 100 product family. The X represents the slot number, and the .1 indicates the port number. For the TSU 100 application, there is only one option slot. Therefore the port designation for the OCU DP port will be 1.1. If added, the plug on card port designation would be 1.2. These port numbers will appear in the front panel LCD menu displays.



## 2. INSTALLATION

### 2.1 UNPACK & INSPECT

Carefully inspect the OCU DP module for any shipping damages. If damage is suspected, file a claim immediately with the carrier and then contact ADTRAN customer service. If possible, keep the original shipping container for use in shipping the OCU DP Module back for repair or for verification of damage during shipment.

#### ADTRAN SHIPMENTS INCLUDE

- The OCU DP Option Module
- The OCU DP Option Module User's Manual  
(To be inserted into main TSU 100 User's Manual)

#### CUSTOMER PROVIDES

- Cable for connection to DSU/CSU

### 2.2 INSTALLING THE OPTION MODULE

#### CAUTION

**Power to the TSU 100 should be OFF when installing the OCU DP Module, PN 1200.068L1.**



#### NOTE

*The OCU DP Option Module PN1200.068L1#HS, is hot replaceable and can be installed in the TSU 100 with the power On.*

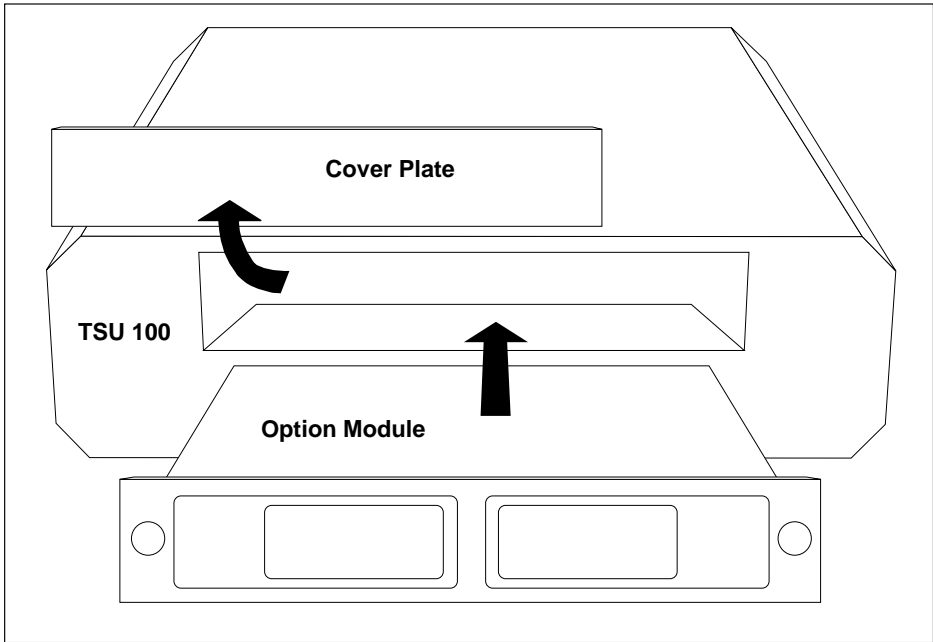
#### PLACEMENT OF THE OM

**Figure 2** is representative of the action required for proper placement of the Option Module.

- Remove the cover plate from the TSU 100 rear panel.
- Slide the option module into the rear panel until it is positioned firmly against the front of the TSU 100.
- Fasten the thumb-screws at both edges of the option module.

## POWER CONNECTION

Each OCU DP module derives power from the base TSU 100 unit. Power to the TSU 100 is supplied by a captive eight foot power cord.



**Figure 2. Installing Option Module**

## 2.3 WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within five years from the date of shipment if it does not meet its published specifications or fails while in service. For detailed warranty, repair and return information refer to the ADTRAN Equipment Warranty, Repair and Return Policy Procedure in the *TSU 100 User's Manual*.

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

For Service, RMA requests or more information, see the last page of this manual.

## 2.4 WIRING

The OCU DP offers one connector for a DDS interface.

Connector Type (USOC)= RJ48C

PN= AMP # 555164-1

**Table A. Eight-Position Modular Jack Interface**

<b>PINOUT CONNECTORS FOR EIGHT-POSITION MODULAR JACK INTERFACE</b>		
<b>PIN</b>	<b>NAME</b>	<b>DESCRIPTION</b>
1	TIPRX	RECEIVE DATA FROM THE DSU
2	RING RX	RECEIVE DATA FROM THE DSU
3, 4, 5, 6	UNUSED	
7	TIPTX	SEND DATA TOWARDS THE DSU
8	RINGTX	SEND DATA TOWARDS THE DSU

## 2.5 POWER-UP TESTING AND INITIALIZATION

The OCU DP option module executes a self test during the power-up sequence, as described in the *TSU 100 User's Manual*. No initialization input is required. Automatically, upon power-up, any previously configured setting for the OCU DP is restored.

When the self testing is complete and the configuration is successfully restored, it will be indicated by the illumination of the green "OK" LED in the MODULE group on the front panel. (See the section *Front Panel Operation* in the *TSU 100 User's Manual*.) If the OCU DP module fails one or more of the self tests, a message is displayed on the front panel during power-up. (See **the section** *Power Up Testing and Initialization* in the *TSU 100 Manual*) Specific failures of the OCU DP module are shown in **the** appendix *OCU DP Failure Messages*. If any alarms are detected during operation, it will be indicated by the illumination of the red "ALARM" LED in the MODULE group on the front panel.

### 3. OPERATION

#### 3.1 OVERVIEW

The OCU DP module is controlled as part of the TSU 100 using the same methods as described in the user's manual.

#### 3.2 FRONT PANEL

##### INDICATORS/BUTTONS

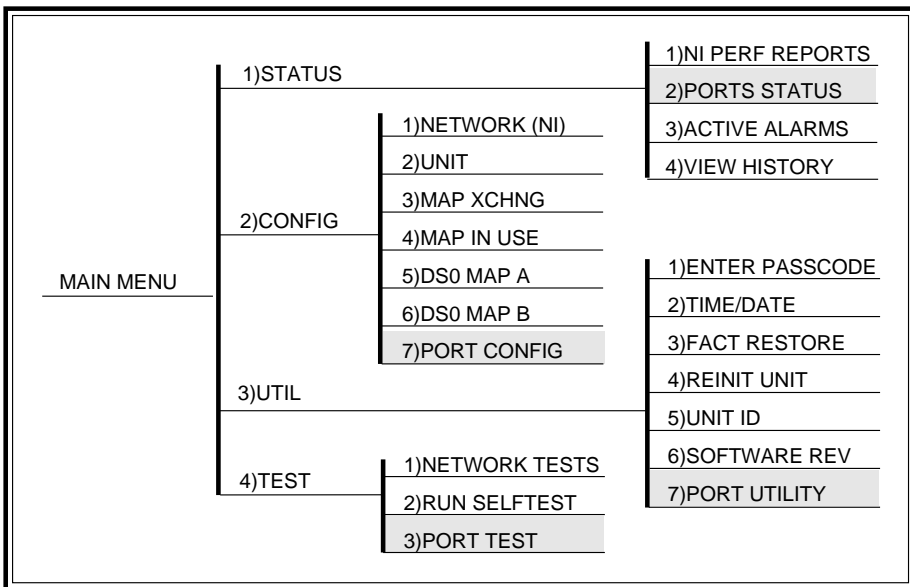
Please refer to the description of the TSU 100 front panel indicators and buttons in the user's manual.

#### 3.3 MENU STRUCTURE

The OCU DP menus appear as a subset of and operate the same as menus for the TSU 100. The menus are accessed by selecting 1.1 OCU DP under the PORT menu items.

**Figure 3** shows the TSU 100 Main Menu with the PORT selections shaded.

**The TSU 100 User's Manual's** appendix *TSU 100 Menu Tree* is a complete menu diagram.



**Figure 3. TSU 100 Main Menu**

## OCU DP MENUS ARE ALL SUBMENUS

The OCU DP menus are accessed from and operated the same as menus for the TSU 100. As can be noticed from the shaded menu items in **Figure 3**, the OCU DP items are submenu choices of the four main menus.

Each of the OCU DP sub menu items is discussed in the following paragraphs. All are accessed by the same method.

### *Operation*

With the cursor on one of the four main menu choices

Press: **ENTER** or the **number** key

Results: display of the first two submenu items with the cursor on the first item.

Use: the **down scroll** key to place the cursor on the desired item

Press: **ENTER**

Results: display of the first two submenu choices.

## 2)PORTS STATUS, SUBMENU OF 1)STATUS

This menu item is used to display active status information about the OCU DP. There are three fields that report information. The display of an asterisk (\*) indicates an item is active.



Open - An asterisk will be present if the DDS loop is open or wired incorrectly.

IDLE - An asterisk will be present if the OCU is detecting Control Mode Idle (CMI) from the DDS loop.

ADIS - An asterisk will be present if the Quality Monitor Autodisconnect feature is enabled and the OCU has received enough improper violations to disconnect the DDS loop.

## 7)PORT CONFIG, SUBMENU OF 2)CONFIG

The 7)PORT CONFIG menu item is used for configuration of the OCU DP Passthru Option Module.

### *Operation*

With the cursor on main menu item 2)CONFIG

Press: **ENTER** or the **number 2** key

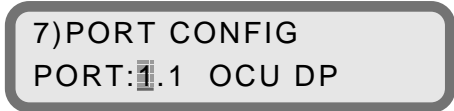
Results: display of the first two Configuration sub-menu items with the cursor on 1)NETWORK (NI)

Use: the **down scroll** key to place the cursor on 7)PORT CONFIG

Press: **ENTER**

Results: only the bottom line of the LCD changes display

Use: the **scroll** keys to identify 1.1 OCU DP



To select

Press: **ENTER**

Results: the first of eight submenu items

Continue with standard operating procedures.

**RATE** - Sets the data rate of the OCU DP.

Choices - 2.4, 4.8, 9.6, 19.2, 38.4, 56.0 DDS,  
56.0 SW, 64

**SEC CHAN** - Enables or disables the use of a secondary channel with all data rates excluding 64 kbps.

Choices - OFF or ON

**QUALMON** - Quality monitor function/ Auto Disable Function. Allows the OCU DP to monitor the data it receives from the DDS loop. If it detects violations in 7 out of 20 consecutive seconds, it ignores the data it receives and sends abnormal station code toward the NI. Normal operation will automatically be restored upon receipt of 30 consecutive error free seconds.



Choices - OFF or ON

ZCS - Zero Code Suppression may be used to prevent a channel of zeros when running 56K data rate with secondary channel ON. ZCS is not used for 64 kbps data rate.

Choices - OFF or ON

A/B SIGNAL - Selects either a software or hardware algorithm to be used for SW56 operation.

The OCU DP decodes signalling from the network and passes this to the loop as either CMI code or data mode. The default method of decoding signalling from the network is a software technique. If the C bit (bit 8) is 0 in any of the last seven data bytes, signalling is decoded as a 0 (on-hook). If bit 8 is a 1 in all of the last seven data bytes, signalling is decoded as a 1 (off-hook).

If the hardware (HW) option is enabled, signalling is decoded from the A and B bits in frames 6 and 12 of the T1 data.

Choices - SW or HW

LATCHING LBACK - Enables the OCU DP response to the latching OCU and Channel loopback commands and performance of the requested test configuration.

Choices - ENABLED or DISABLED

TX LEVEL - Sets the Transmit Signal out of the OCU DP to either Normal or Attenuated. For short line lengths it may be necessary to attenuate the transmit signal if the signal is large enough to saturate the DSU/CSU equipment being used.

Choices - NORMAL or REDUCED 10dB

### 3)FACT RESTORE, SUBMENU OF 3)UTIL

This menu item is used to restore the factory default setting for all OCU DP option module parameters.

#### *Operation*

Follow standard operating procedure to access the 3)UTIL menu items.

With the cursor on 3)FACT RESTORE

Press: the **ENTER** key

Results: the unit returns to the opening main menu with all factory preset defaults are restored.

### 7)PORT UTILITY, SUBMENU OF 3)UTIL

The 7)PORT UTILITY menu item is primarily used to access the display of the current software information for each port installed in the unit. This information is required when requesting assistance from ADTRAN customer service or when updates are needed.

#### *Operation*

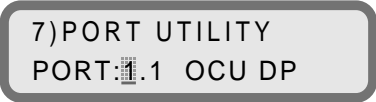
Follow standard operating procedure to access the 3)UTIL menu items.

With the cursor on 7)PORT UTILITY

Press: the **ENTER** key

Results: display of the first available port.

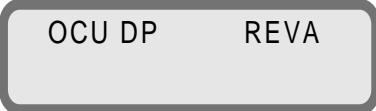
Use: the **up** and **down scroll** keys to identify 1.1 OCU DP



To select

Press: **ENTER**

Results: display of the option card name and the software version installed.



Press: the **CANCEL** key to exit or to select another port.

## 2)RUN SELF TEST, SUBMENU OF 4)TEST

This menu item is used to execute both the TSU 100's internal test and the OCU DP's internal test. This is the same test as is executed upon power-up. The results of the self test are displayed on the LCD. For additional information on Self test, consult the chapter *Operation* in the *TSU 100 User's Manual*.

Follow standard operating procedure to access the 4)TEST menu items.

With the cursor on 2)RUN SELFTEST

Press: the **ENTER** key

Results: a changing display in the LCD showing the test result.

## 3)PORT TEST, SUBMENU OF 4)TEST

This menu item is used to activate tests of the selected data ports. Selecting the OCU DP displays two Loopback tests available for this option module.

### *Operation*

Follow standard operating procedure to access the 4)TEST menu items.

With the cursor on 3)PORT TEST

Press: the **ENTER** key

Results: display of the first available port.

Use: the **up** and **down scroll** keys to select 1.1 OCU DP



3)PORT TEST  
PORT: 1.1 OCU DP

To select

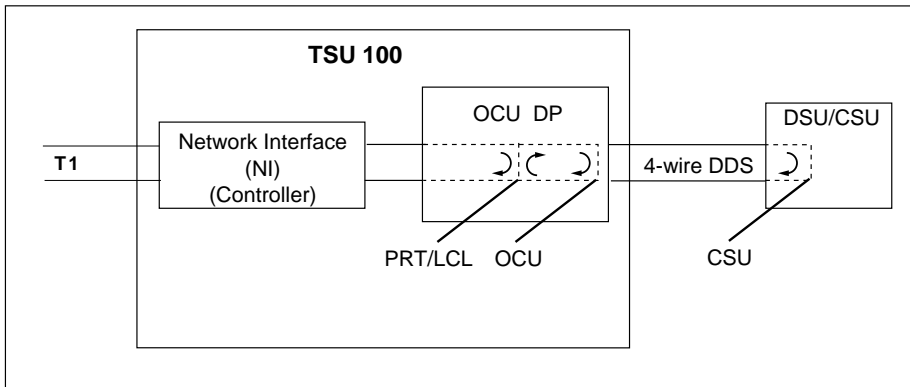
Press: **ENTER**

**LOOPBACK** - This item activates the loopback function on the OCU DP module.

On the OCU DP, the CSU loopback initiates a sealing current reversal. Upon detecting this rever-

sal, the DDS CSU (connected to the OCU DP over a 4-wire loop) should loop data back toward the NI.

The OCU loopback loops the data mapped to the OCU DP back toward the network interface of the controller. Using the loopback in conjunction with an external BERT driving the Network Interface, will exercise the entire data path from the Network Interface (NI) through the OCU DP option module and back out the NI. See **Figure 4, Diagram of Loopbacks**.



**Figure 4. Diagram of Loopbacks**

The PRT/LCL bidirectional loopback loops the data mapped to the OCU DP back to the network interface of the controller. It also loops data from the DSU/CSU back to the DSU/CSU. If the DSU/CSU is capable of sending a test pattern, it can be used with this loopback to verify integrity of the 4-wire DDS loop.

To deactivate the Loopback, OFF must be selected under the 1.1 OCU DP submenu.



## APPENDIX I

### OCU DP FAILURE MESSAGES

#### FAILURE MESSAGES AT POWER-UP

The following messages indicate a probable part failure on the OCU DP Module.

- EPROM** - EPROM ERROR
- SRAM** - StaticRAMERROR

#### OCU DP ALARM MESSAGES

The following message indicates an alarm condition on the OCU DP Module.

- OPEN LOOP** - not able to detect sealing current flowing. DSU/CSU not connected or incorrect wiring.



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## **Product Support Information**

### **Presales Inquiries and Applications Support**

Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering (800) 615-1176  
Sales (800) 827-0807

### **Post-Sale Support**

Please contact your local distributor first. If your local distributor cannot help, please contact ADTRAN Technical Support and have the unit serial number available.

Technical Support (800) 726-8663

### **Repair and Return**

If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Return Material Authorization (RMA) department to issue an RMA number. For information regarding equipment currently in house or possible fees associated with repair, contact RMA directly at the following number:

RMA Department (205) 971-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

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

RMA # \_\_\_\_\_