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DUAL OCU DP
Option Module

1200230L1

DUAL OCU DP
Plug-on Board

1200231L1

USER MANUAL

61200230L1-1A
July 1998

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FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING *Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.*

WARNING *Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

CANADIAN EMISSIONS REQUIREMENTS

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil nuerique respecte les limites de bruits radioelectriques applicables aux appareils numeriques de Class A prescrites dans la norme sur le materiel brouilleur: "Appareils Numeriques," NMB-003 edictee par le ministre des Communications.

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Chapter 1 Introduction

DUAL OCU DP OVERVIEW

The Dual Office Channel Unit Dataport (Dual OCU DP) is one of the option modules available for use with the ADTRAN TSU 100/600 product line. The Dual 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 Dual 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 Dual 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.

Functional Description

The Dual OCU DP is designed to fit in the option slot of the TSU 100 and is subject to its operation and control. The Dual 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 Dual OCU DP module and are automatically installed when the Dual OCU DP is plugged into the unit.

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Features

- Operates using one DS0 for each port
- 2.4, 4.8, 9.6, 19.2, 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
- 45 dB 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)
- Zero code suppression
- Quality monitor/auto line disconnect
- Selectable hardware/software algorithms for Switched-56 operation
- Interface Connector; 8-pin modular

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.

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Dual OCU DP Option

Module Specifications

The following list contains the modular specifications for each port.

Loop Interface	4-wire (TX Pair and RX Pair)
Data Rate	2.4, 4.8, 9.6, 19.2, 56 kbps including secondary channel rates and 64 kbps (clear channel)
Signal Format	Bipolar, return-to-zero, 50% duty cycle
TX Output Amplitude	±1.5 V peak ±10% for rates 2.4, 4.8, 19.2, 54 and 64 kbps ±0.75 V peak ±10% for 9.6 kbps
TX/RX Source Impedance	135Ω ±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	Two DS0s (user configurable)
Tests	Power-on circuit test CSU loopback initiation - (sealing current reversal) OCU loopback (loopback-internal toward MUX)
Connector	8-pin modular

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Physical Description

The Dual OCU DP is an option module which plugs into the option slot in the rear of the TSU/TDU family of multiplexers. See Figure 1-1, below.

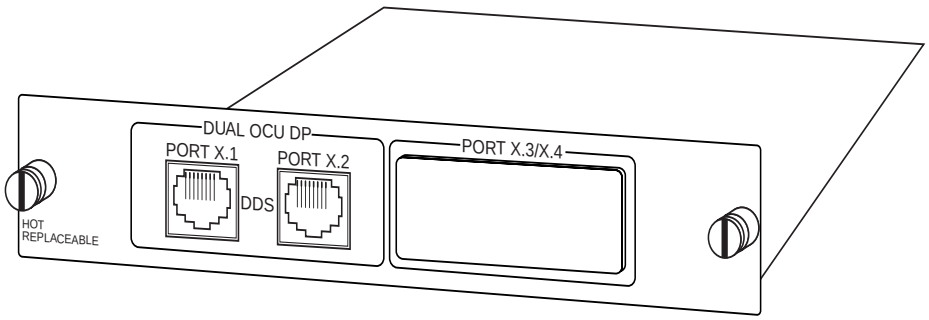

Figure 1-1. Dual OCU DP Option Module

The Dual 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 Dual OCU DP module. The PORT X.3/X.4 indication is linked to the port numbering philosophy of the TSU 100 product family. The X represents the slot number, and the .3 indicates the port number. For the TSU 100 application, there is only one option slot. Therefore, the port designation for the Dual OCU DP port will be 1.2/1.3. If added, the plug-on card port designation would be 1.3. These port numbers will appear in the front panel LCD menu displays.

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Chapter 2 Installation

UNPACK & INSPECT

Carefully inspect the Dual 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 Dual OCU DP Module back for repair or for verification of damage during shipment.

ADTRAN Shipments Include

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

Customer Provides

- Cable for connection to DSU/CSU

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Installing the Option Module

NOTE *The Dual OCU DP Option Module, PN1200.230L1, is hot replaceable and can be installed in the TSU product with the power On.*

Placement of the Option Module

For the proper placement of the Option Module using a TSU 100, complete the following steps. (See Figure 2-1.)

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

Power Connection

Each Dual OCU DP module derives power from the base TSU 100 unit.

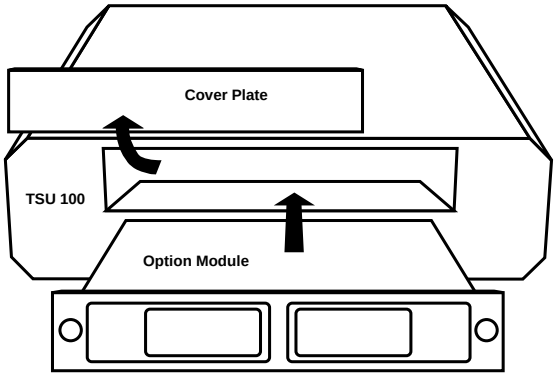

Figure 2-1. Installing Option Module

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Installing Plug-on Board

For the proper placement of the Plug-on Board, complete the following steps. (See Figure 2-2.)

Step	Action
1	Hold the plug-on board above the option module.
2	Using a downward and right-to-left motion, slip the connector pane into the opening in the option module back panel.
3	Moving the plug-on board downward, secure the connection of the header pins at the front of the board.
4	Install two 4-40 screws through the rear mounting holes of the plug-on board into the mounting brackets on the rear panel.
5	Install two 4-40 screws through the front mounting holes of the plug-in card into two standoffs on the plug-on board.

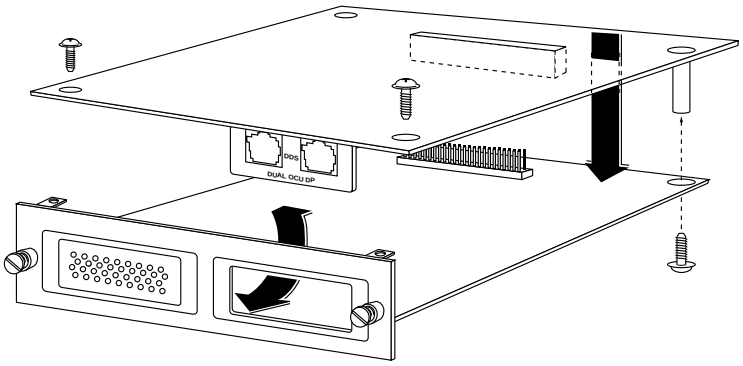

Figure 2-2. Installing Plug-on Board

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Wiring

The Dual OCU DP has two connectors for a DDS interface.

- Connector Type 8-pin, modular
- PN= AMP # 555164-1

Table 2- 1. Pinout for Eight-Position Modular Jack Interface

Pin	Name	Description
1	TIPRX	RECEIVE DATA FROM THE DSU
2	RING RX	RECEIVE DATA FROM THE DSU
3,4,5,6	UNUSED	
7	TIPTX	SEND DATA TOWARD THE DSU
8	RING TX	SEND DATA TOWARD THE DSU

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Power-Up Testing and Initialization

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

If the Dual 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 Multiplexer User Manual).

Specific failures of the Dual OCU DP module are shown in *Appendix A, Failure Messages* on page A-1. If any alarms are detected during operation, the red "ALARM" LED in the MODULE group will illuminate on the front panel.

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 Multiplexer User Manual.

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

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

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Chapter 3 Operation

OPERATION OVERVIEW

The OCU DP module is controlled as part of the TSU multiplexer using the same methods as described in the *TSU Multiplexer User Manual*.

Front Panel

Indicators/Buttons

Please refer to the description of the TSU multiplexer front panel indicators and buttons in the *TSU Multiplexer User Manual.*

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Menu Structure

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

Figure 3-1 shows the TSU multiplexer Main Menu with the PORT selections shaded.The TSU multiplexer User Manual's appendix *TSU Multiplexer Menu Tree* is a complete menu diagram.

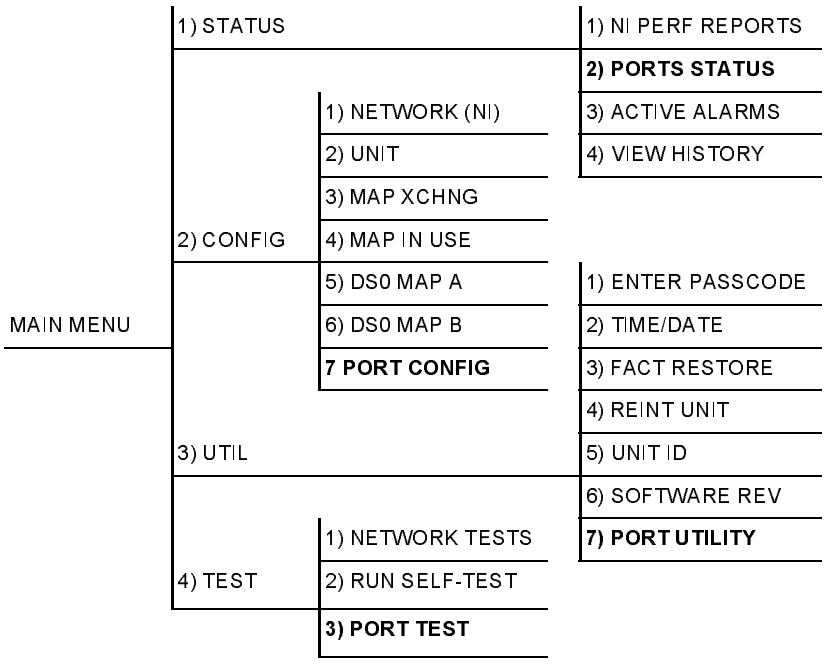

Figure 3-1. TSU 100 Main Menu Tree

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OCU DP Menus Are All Submenus

The OCU DP menus are accessed from and operated the same as menus for the TSU 100. As indicated by the bolded items in Figure 3-1 on page 3-2, the OCU DP items are submenu choices of the four main menus.

Each of the OCU DP submenu items is described in the following sections. All are accessed by the same method.

Operation

With the cursor on one of the four main menu choices, do the following:

Step	Action	Results
1	Press **ENTER** or the **number key.**	The first two submenu items display with the cursor on the first item.
2	Use the down scroll key to place the cursor on the desired item.	
3	Press **ENTER.**	The first two submenu choices display.

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X)PORT 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.

Field	Explanation
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.

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X)PORT CONFIG, Submenu of 2)CONFIG

The X)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:

Step	Action	Result
1	Press **ENTER** or the **number 2** key.	The first two Configuration submenu items with the cursor on 1)NETWORK (NI) display.
2	Use the down scroll key to place the cursor on X)PORT CONFIG.	Only the bottom line of the LCD changes display.
3	Press **ENTER**.	
4	Use the scroll keys to identify 1.1 OCU DP.	7)PORT CONFIG PORT:1.1 OCU DP
5	Press **ENTER**.	The first of eight submenu items appear.
6	Continue with standard operating procedures.	

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Configuration Menu

Menu Item	Description
RATE	Sets the data rate of the OCU DP. Choices: 2.4, 4.8, 9.6, 19.2, 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
QUAL MON	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
A/B SIGNL	Selects either a software or hardware algorithm to be used for SW56 operation. Choices: SW or HW
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.
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

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

Step	Action	Result
1	Place the cursor on 3)FACT RESTORE.	
2	Press **ENTER**.	The unit returns to the opening main menu with all factory preset defaults are restored.

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X)PORT UTILITY Submenu of 3)UTIL

The X)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.

Step	Action	Result
1	Place the cursor on X) PORT UTILITY.	
2	Press **ENTER**.	The first available port displays.
3	Use the up and down scroll keys to identify 1.1 OCU DP.	X)PORT UTILITY PORT:1.1 OCU DP
4	To select, press **ENTER**.	The option card name and the software version installed display. OCU DP REVA
5	Press **CANCEL** to exit the program or to select another port.	

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x)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 Operation chapter in the TSU 100 User's Manual.

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

Step	Action	Result
1	Place the cursor on x)RUN SELFTEST.	
2	Press **ENTER**.	The LCD changes and shows the test result.

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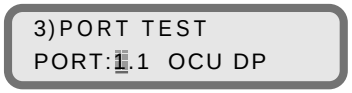
3)PORT Test Submenu of 4)TEST

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.

Step	Action	Result
1	Place the cursor on 3)PORT TEST.	
2	Press **ENTER**.	The first available port displays.
3	Use the up and down scroll keys to select 1.1 OCU the DP.	
4	To select, press **ENTER**.	

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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 reversal, 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 3-2.

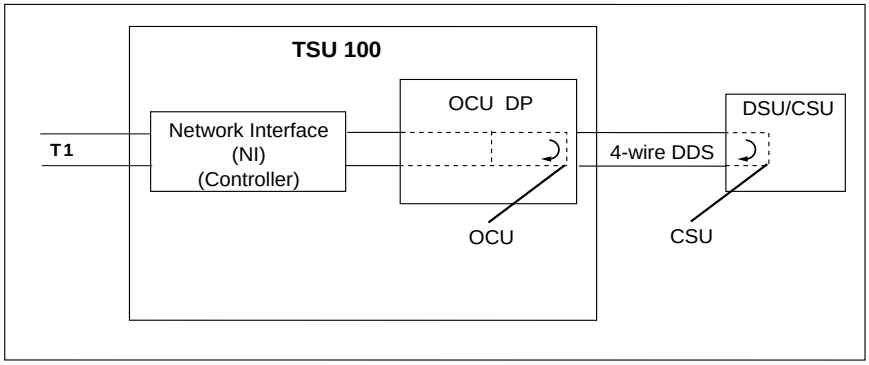

Figure 3-2. Diagram of Loopbacks

To deactivate the loopback, go to the port test submenu and select **OFF**.

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Appendix A Failure Messages

FAILURE MESSAGES AT POWER-UP

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

EPROM	-	EPROM ERROR
SRAM	-	Static RAM ERROR

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	(888) 4ADTRAN

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

CaPS Department	(256) 963-8722

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

ADTRAN, Inc.
CaPS Department
6767 Old Madison Pike
Progress Center
Building #6, Suite 690
Huntsville, AL 35807

RMA # _____

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