

Total Access® 1500 E&M/TO Installation and Maintenance

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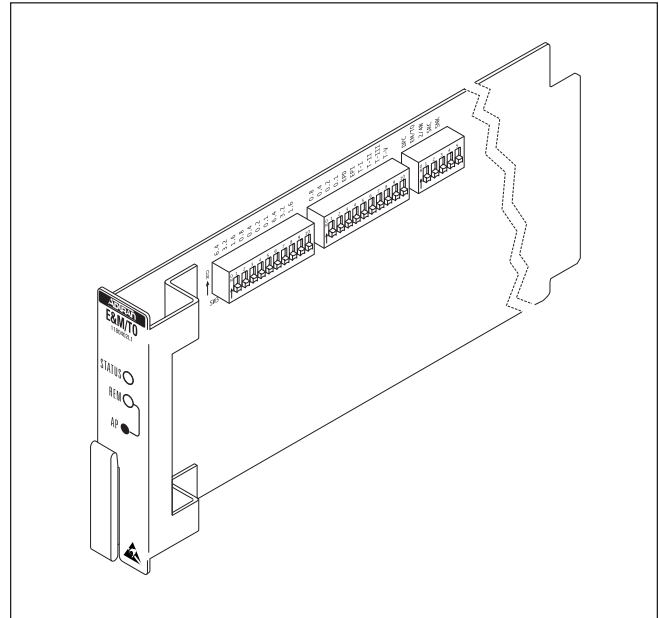


Figure 1. ADTRAN E&M/TO

1. GENERAL

This practice contains installation and maintenance information for the ADTRAN Ear and Mouth/ Transmit Only Dataport (E&M/TO), P/N 1180402L1. **Figure 1** is an illustration of the unit.

Revision History

This document has been revised to update the values for 2-wire and 4-wire TLP transmit and receive attenuation.

Features

Features of the E&M/TO, P/N 1180402L1, include the following:

- 600 ohms (4-wire) or 600 ohms + 2.15 μ F (2-wire) VF interface with DC isolation.
- Provisioning by onboard switches or craft interface.
- 2-wire mode: TLP transmit input range of 0.0 to -9.0 dBm. TLP receive output range of -9.0 to 0.0 dBm.

- 4-wire mode: Up to 12.0 dBm transmit and receive attenuation. TLP transmit input range of -3.5 to +8.5 dBm. TLP receive output range of -3.5 to +8.5 dBm.
- Compatible with Types I, II, III or V E&M signaling interfaces.
- Extended operating temperature range from -40°C to +65°C.
- Meets UL 1950, NEBS Level 3, FCC, and PUB43801 standards.

General Description

The E&M/TO is a Total Access 1500 channel unit. The E&M/TO provides an interface between a Total Access 1500 channel bank PCM interface and a VF transmission facility with E&M DC signaling supervision.

The unit is multifunctional and can be provisioned to operate in the following modes:

2-wire E&M	2-wire TO
4-wire E&M	4-wire TO

2. INSTALLATION



After unpacking the unit, inspect it for damage. If damage is discovered, file a claim with the carrier, then contact ADTRAN. Refer to *Warranty and Customer Service*.

The E&M/TO plugs directly into the ADTRAN Total Access 1500 channel bank. No special installation is needed.

Compliance Codes

The Total Access 1500 E&M/TO Access Module is intended to be installed in restricted access locations only (must be installed in Total Access 1500 only) and in equipment with a Type “B” or “E” installation code.

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, and (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.

Provisioning Options

All options on the E&M/TO are provisionable either manually, using internal slide switches, or electronically using the craft interface on the SCU.

Figure 2 displays slide switch, refer to Figure 1 for locations.

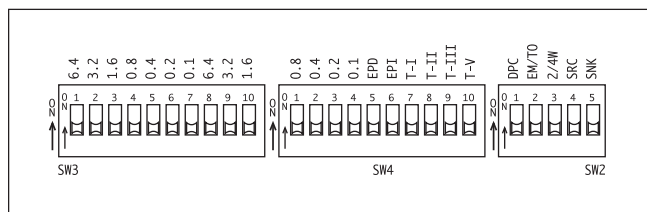


Figure 2. Configuration Switches

Manual Provisioning

Internal slide switch SW3 is used to provision the transmit and receive level attenuation settings.

Table 1 displays the available options. SW4 also provides provisioning for signaling types I, II, III, and V and E-lead processing.

Table 1. Transmit and Receive Attenuation Options

Function	Selection/Setting		
Add Attenuation	Amount in dB	Transmit Activate Switch to "ON" position	Receive Activate Switch to "ON" Position
	0.1 dB	SW3-7	SW4-4
	0.2 dB	SW3-6	SW4-3
	0.4 dB	SW3-5	SW4-2
	0.8 dB	SW3-4	SW4-1
	1.6 dB	SW3-3	SW3-10
	3.2 dB	SW3-2	SW3-9
	6.4 dB	SW3-1	SW3-8

Note 1: Factory default settings for all switches is "OFF".

Note 2: Multiple switch activation causes a cumulative effect on the amount of attenuation added.

Note 3: The largest transmit and receive attenuation value in 2-wire mode is 9.0 dB for TX and RX.

Note 4: The largest transmit and receive attenuation value in 4-wire mode is 12.0 dB for TX and RX.

Internal slide switches SW2 and SW3 are also used to provision trunk processing mode and signaling, 2W/4W option, sealing current, and dial pulse correction. Available options are displayed in **Table 2** and described below.

Select TO (SW2-2) when no signaling, Transmission Only, is required. Select EM (SW2-2 is OFF) when E&M DC signaling supervision is required.

Select 2-wire or 4-wire using SW2-3. When 4-wire is selected (SW2-3 is ON), the T and R leads are used for the transmit pair, and the T1 and R1 leads are used for the receive pair. When selected for 2-wire operation, the T and R leads are used for both the receive and transmit pairs.

Select SRC (SW2-4) when source sealing current is desired.

Table 2. Switch Options

Function	Selection/Setting	
Mode and Signaling	4 wire 2 wire	SW2-2 (EM/TO) ON OFF*
2W/4W Operation	4 wire 2 wire	SW2-3 (2W/4W) ON OFF*
Sealing Current	Enabled Disabled	SW2-4 (SX) ON OFF*
Source/Sink (Sealing Current Options)	Enabled Disabled	SW2-5 (SRC/SNK) ON OFF*
Delayed Trunk Processing**	Enabled Disabled	SW4-5 (EPD) ON OFF*
Immediate Trunk Processing**	Enabled Disabled	SW4-6 (EPI) ON OFF*
*Factory default settings		
**EPI EPD Function		
OFF OFF NONE		
OFF ON Trunk Processing Delayed		
ON OFF Trunk Processing Immediate		
ON ON N/A		

Select SNK (SW2-5) when sink sealing current is desired. If both are selected, the unit defaults to NONE. Sealing current is only available when both 4-wire and TO modes are selected.

Select EPD option (SW4-5) for delayed trunk processing. When this option is selected, the E-lead appears on-hook when trunk processing begins. The E-lead then goes off-hook (appears busy) 2.5 seconds after trunk processing begins.

Select EPI option (SW4-6) for immediate trunk processing. This setting causes the E-lead to go off-hook immediately after trunk processing begins, and remains so until trunk processing is complete.

When EPI and EPD options are not selected, the E-lead is forced on-hook during trunk processing and remains so until trunk processing is complete. If both EPD and EPI are selected, unit defaults to NONE.

Select Type-I, Type-II, Type-III, or Type-V E&M signaling type by using SW4-7, SW4-8, SW4-9, SW4-10, respectively. If more than one signaling type is selected, the unit defaults to Type-I signaling.

Electronic Provisioning

The craft interfaces on the Total Access 1500 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 computer running a terminal emulation program to the front panel craft interface ADMIN port using a standard male-to-male RS-232 DB-9 cable. Craft port settings are as follows:

- 9600 Baud
- No parity
- 8 Data bits
- 1 Stop bit

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 questions.

NOTE

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

Password

Password protection is factory disabled. If password protection is enabled, then the SCU will display the log on screen, and a valid user ID and password are required to access the menus. The factory default password is PASSWORD, in upper case letters.

Figure 3 illustrates the E&M/TO menu tree.

Menu Navigation

To traverse through the menus, select the desired entry and press ENTER. To work backwards in the menu press the ESC (escape) key.

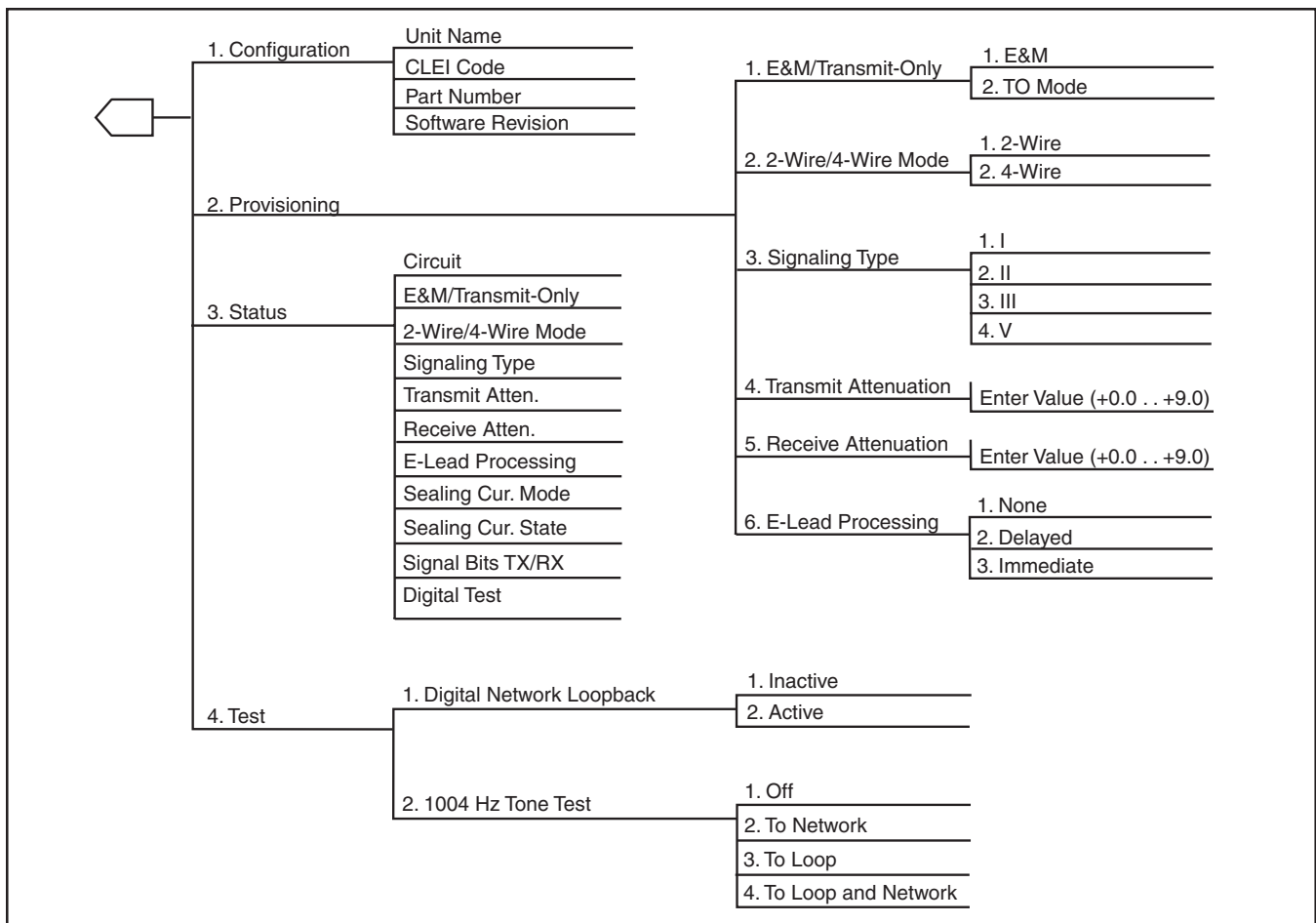


Figure 3. E&M/TO Menu Tree

Initial Turnup

To set the transmit and receive attenuation, first provision the unit for 2-wire or 4-wire mode.

Transmit Attenuation

Determine the input TLP level. Then use the following formula to calculate the amount of transmit attenuation to add to the circuit.

$$\text{Transmit Attenuation} = \text{Input TLP level} + \text{Transmit Circuit Gain}$$

where Transmit Circuit Gain =
 0.0 dB (2-wire)
 3.5 dB (4-wire)

For example, if the unit is in 2-wire mode and the input TLP is +3, then to achieve a 0dBm0 TLP0 Transmit Attenuation is:

$$+3 \text{ dBm} + 0 \text{ dB} = 3 \text{ dB}$$

If the unit is in 4-wire mode and the input TLP is -3 dB, then to achieve a 0 dBm0 TLP0 the Transmit

Attenuation is:

$$-3 \text{ dBm} + 3.5 \text{ dB} = 0.5 \text{ dB}$$

Receive Attenuation

Determine the desired output TLP level. Then use the following formula to calculate the amount of receive attenuation to add to the circuit.

$$\text{Receive Attenuation} = \text{Receive Circuit Gain} - \text{Output TLP level}$$

where Receive Circuit Gain =
 0.0 dB (2-wire)
 8.5 dB (4-wire)

For example, if the unit is in 2-wire mode, the TLP reference level is 0 dBm0, and the desired output TLP is -3.0 dB, then the Receive Attenuation is:

$$-(-3 \text{ dB}) = 3 \text{ dB}$$

For example, if the unit is in 4-wire mode, and the desired output TLP is -3 dB, then the Receive Attenuation is:

$$8.5 \text{ dB} - (-3 \text{ dB}) = 11.5 \text{ dB}$$

3. TESTING

Digital Network Loopback Test

The Digital Loopback Test is used to loopback data coming from the network.

1004 Hz DRS Tone Generation Test

The 1004 Hz DRS Tone Generation test is used to send the DRS signal to the loop, the network, or both.

LED Status

The status of the Analog service is shown by the two Front Panel LEDs. See **Table 3** for LED indications.

Table 3. Front Panel LEDs

Indicator	Color	Description
STATUS	Green	Busy
	Yellow	Test
	Off	Idle
	Red	Unit failure
REM	Green	Unit remotely provisioned
	Off	Unit locally provisioned

4. MAINTENANCE

The ADTRAN E&M/TO PM requires no routine maintenance to operate properly.

ADTRAN recommends that repairs on the unit not be performed in the field. Repair services may be obtained by returning damaged units to ADTRAN refer to *Warranty and Customer Service*.

5. SPECIFICATIONS

See **Table 4** for the Total Access 1500 E&M/TO Specifications.

Table 4. Total Access 1500 E&M/TO Specifications

Electrical	
Input Impedance:	600 + 2.15 μ F
Return Loss:	ERL > 28 dB, SRL > 20 dB
Trans Hybrid Loss:	ERL > 34 dB
Longitudinal Balance:	> 58 dB 200 to 1000 Hz; > 53 dB 3000 Hz
Frequency Response:	\pm 0.25 dB, 300 to 3000 Hz
Idle Channel Noise:	< 23 dBmC0
Physical	
Dimensions:	3.125 in. H x 0.62 in. W x 10.1 in. D
Weight:	< 1 lb.
Environment	
Operating Temperature:	-40°C to 65°C
Storage Temperature:	-40°C to 70°C
Relative Humidity:	Up to 95% noncondensing

6. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten (10) years from the date of shipment if it does not meet its published specifications or fails while in service. Refer to ADTRAN *U.S. and Canada Carrier Networks Equipment Warranty*, document 60000087-10.

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 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

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