

Total Access™ 750/850 QUAD FXS Access Module Installation and Maintenance

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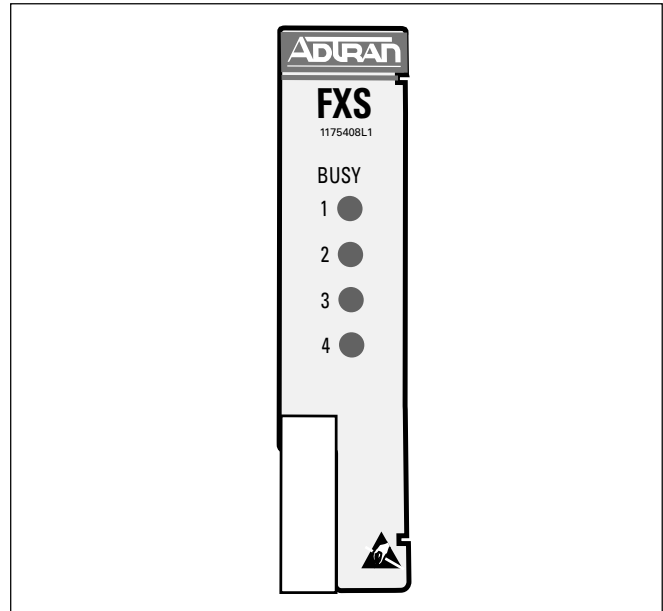


Figure 1. TA 750/850 Quad FXS

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN Total Access™ 750/850 (TA 750/850) Quad Foreign Exchange Station (FXS) Access Module. **Figure 1** is an illustration of the Quad FXS Module. The Quad FXS is designed specifically for the ADTRAN Total Access 750 and 850 chassis and is not used in any other product. The unit is multifunctional and can be provisioned to operate in any one of the following modes:

- 2-Wire Foreign Exchange Station (2FXS)
- Dial Pulse Originate (DPO)
- Tandem FXS Mode
- Private Line Automatic Ringdown (PLAR)

Revision History

This document has been revised to include Windows Hyperterminal and PASSWORD information.

Features

The features of the TA 750/850 Quad FXS, part number 1175408L1, include:

- Provides four individual analog voice interfaces.
- Automatic short loop provisioning feature.
- μ -law encoding and decoding.

- Supports ground start, loop start, and TR-08 signaling.
- Long loop capability – 1200 ohms (nominal) including telephone set (16 kfeet @ 24 AWG).
- Hot Swappable.
- V.90 Modem compliant.
- Supports CLASS™ features such as Caller ID.
- Transmit attenuation setting of 0 to -9 dB.
- Receive attenuation setting of 0 to -9 dB.
- Selectable 600 Ω , 900 Ω , 600 Ω +2.16 μ F, or 900 Ω +2.16 μ F 2-wire VF interface.
- Occupies a single slot in the TA 750 or TA 850 chassis.
- UL 1950 compliant.
- Extended temperature range of -40 to +65° C.
- Call Forward Disconnect
- Meets NEBS Level 3 requirements

General Description

The Quad FXS access module is used in the TA 750/850 platforms to provide analog voice extension. The Quad FXS resides in the TA chassis that is next or close to the customer's telephone and is usually located on the customer premises. The unit

can be used in conjunction with the TA 750/850 FXO (Foreign Exchange Office) access module, ADTRAN part number 1175407L1, which resides in the TA 750/850 that is located next to the Central Office Switch.

Figure 2 provides an illustration of a typical deployment using a TA 750 chassis with both FXO and FXS access modules. This arrangement is used where the TR-08 signaling format is not conveniently available at the CO switch. The TA 750 at the CO will combine a number of analog lines then multiplex them for T1 transmission to the TA 750 at the customer premises.

When using the TR-08 signaling option, the Quad FXS can communicate directly with the Central Office Switch without needing a Quad FXO. **Figure 3** provides an illustration of a typical TR-08 deployment.

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.

2. INSTALLATION



After unpacking the unit, inspect it for damage. If damage is noted, file a claim with the carrier, then contact ADTRAN Customer Service.

The Quad FXS inserts into any access card slot of the TA 750 or TA 850 chassis.

To install the Quad FXS, hold the unit by the faceplate while supporting the bottom side. Align the card edges to the guide grooves for the designated slot. Insert the card until the edge connector seats firmly into the backplane. Lock the unit in place by pushing in on the locking lever.

Telecommunications Codes

Table 1 shows the Configuration Codes for the Total Access 750/850 QUAD FXS Access Module. The Total Access 750/850 QUAD FXS Access Module is intended to be installed in restricted access locations and in the Total Access 750 /850 chassis only, and in equipment with a Type 'B' or 'E' installation code.

3. OPTIONS

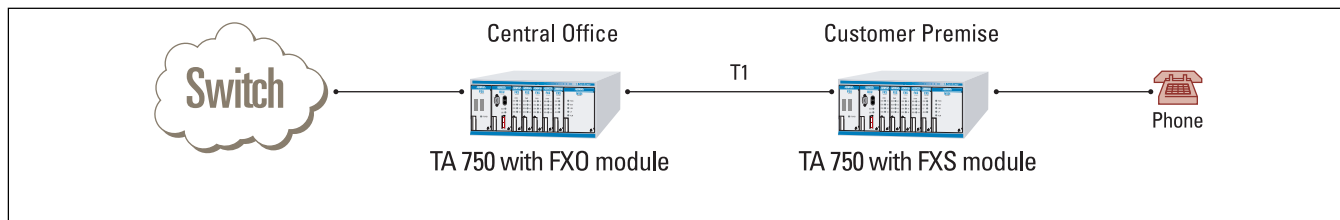


Figure 2. FXO to FXS Deployment

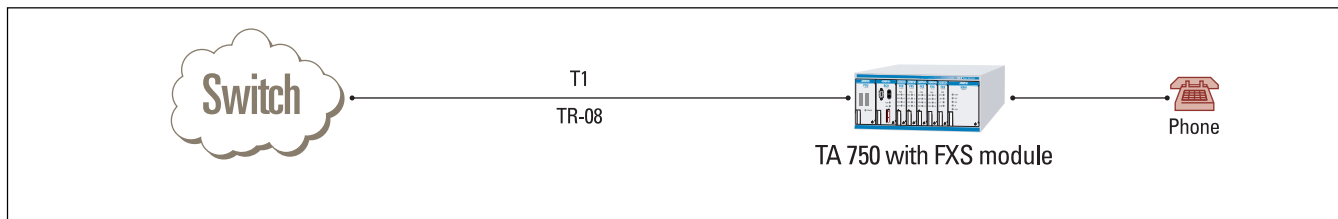


Figure 3. CO Switch to FXS Deployment

Table 1. Telecommunications Codes

Code	Input	Output
IC	F	C
TC	-	X
PC	A	-

There are no hardware options on the Quad FXS access module. The module has factory default settings for each of the four analog interfaces on the module. The DB-9 VT 100 craft interface on the TA 750 BCU or the TA 850 RCU is used if any other settings or provisioning options are desired. The factory default setting for the QUAD FXS interfaces are as follows:

- Loop start signaling.
- Automatic loop provisioning enabled.

Automatic Loop Provisioning

The Quad FXS incorporates a feature that automatically detects loop length and sets the termination impedance and gain for transmit and receive attenuation levels. This feature is enabled from the factory and can be disabled through the craft interface on the Bank Controller Unit (BCU).

For short loops, the termination impedance is set to 600 ohms + 2.16 uF and the gain is set to -6 dB for transmit and -3 dB for receive attenuation levels. For longer loops, the termination impedance is set to 900 ohms + 2.16 uF and the gain is set to -3 dB for transmit and receive attenuation levels.

Setting Attenuation With Known TLP

For applications where input and output Transmission Level Points are known, the transmit and receive attenuation levels can be calculated to ensure optimum VF characteristics. This is defined in AT&T® Publication 43801 which explains that the value of the digital signal at reference point TLP0 should be equal to 0 dBm0, or a digital milliwatt for optimum performance (proper volume heard through the telephone). Refer to **Figure 4** which displays the TLP reference points (input, output, TLP0) and attenuation parameters.

TRANSMIT ATTENUATION

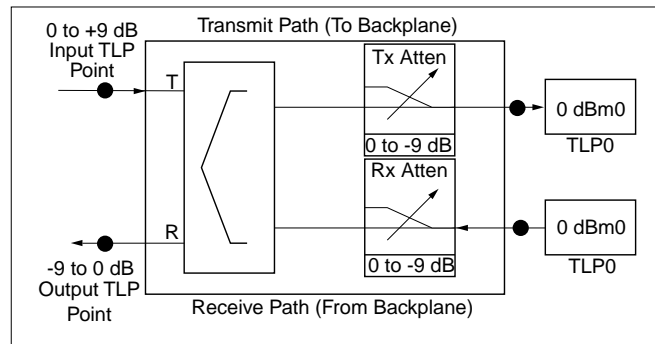


Figure 4. Circuit Path

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

$$\text{Tx Attenuation} = \text{Input TLP}$$

Example: if an input TLP of 3 dB is to produce a level of 0 dBm0 at TLP0, then the Transmit Attenuation should be set to 3.0 dB.

RECEIVE ATTENUATION

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

$$\text{Rx Attenuation} = \text{Output TLP}$$

Example: if 0 dBm0 at TLP0 is required to produce an output TLP level of -3 dB, then the Receive Attenuation should be set to 3.0 dB.

Electronic Provisioning

The craft interfaces on the TA 750 BCU and the TA 850 RCU are used to change default options and obtain access module status through menu screens. To access the menu screens, connect a VT 100 terminal or computer running a terminal emulation program to the faceplate 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 VT 100 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 VT 100 terminal emulation under SETTINGS.

PASSWORD

Upon Hyperterminal can be used as a VT 100 terminal emulation program. To enable the password, select Back Controller (1) /Password control (8) /Enable Password (2). The factory default is PASSWORD in all capital letters. The password can be changed to a user-selected password if desired.

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.

Signaling States

The Quad FXS signaling states are provisioned through the BCU/RCU craft interface. The following signaling states are supported:

- Loop Start
- Ground Start
- TR 08 Signal Party
- TR008 Universal Voice Grade
- Tandem
- DP0

4. OPERATION

The Quad FXS goes operational upon insertion into an active TA 750/850 chassis. Initialization with the network is indicated by the faceplate LEDs. Refer to Section 5, Testing for initialization procedures.

LED Status

After the initialization sequence, status of the analog service for each customer loop is shown by four (green) faceplate LEDs. Indication is as follows:

- | | | |
|------------|---|-----------------------|
| Off | - | On Hook |
| Flashing | - | Ringing |
| On | - | Off Hook (Busy) |
| Sequencing | - | Time Slot Unavailable |

NOTE

If the unit is inserted into a bank which has its timeslots allocated to the module assigned to the DSX-1 or Nx56/64 port, the LEDs will sequence, indicating a problem. The timeslots must be freed up before the unit will become operational.

Time Slot Assignment

The TA 750/850 platforms can have multiple time slots in the T1 data stream assigned to each physical slot in the channel bank. Table 2 outlines the correlation between the T1 and physical slot for the TA 750.

NOTE

Once inserted, the Quad FXS access module utilizes all four DS0 time slots allocated to the physical slot. DS0s can not be reassigned to other ports (i.e., DSX-1 port, V.35 port).

Table 2. TA 750 Time Slot Assignments

Physical Slot	T1 Time Slot Assigned
1	1 - 4
2	5 - 8
3	9 - 12
4	13 - 16
5	17 - 20
6	21 - 24

Connections

A single 50-pin male amphenol connector on the rear of the TA 750/850 chassis provides the interconnect wiring for the four analog circuits on each access module. Figure 5 details the pinout of the connector.

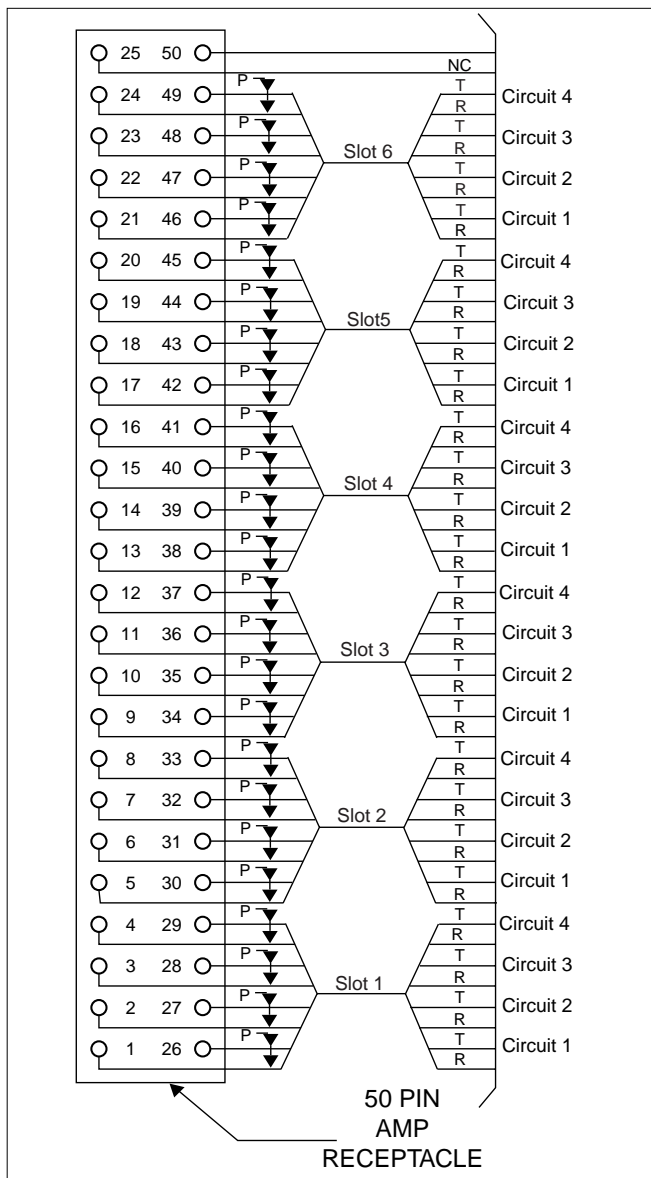


Figure 5. Connector Pin Assignments

5. TESTING

Self Test

A self test is performed on the Quad FXS when it is inserted into an active TA 750 or TA 850 chassis. The test verifies proper operation of critical circuits. If the test is successful all four LEDs turn On in a predefined sequence, the unit is placed in service, and the LEDs then return to normal operation showing current status of the FXS.

Initiated Tests

Other tests conducted on the Quad FXS are initiated via the screen menus and VT 100 terminal.

DIGITAL LOOPBACK TEST

The Digital Loopback Test is used to loopback DS0 data coming from the network for each individual channel. Received data is latched in on the appropriate receive time slot on the receive bus. This data is then placed on the transmit bus in the unit's transmit time slot.

NETWORK ON-HOOK / OFF-HOOK TEST

The Network On-hook / Off-hook test is used to test signaling sent to the network by the unit. When On-hook Test is selected, On-hook signaling is sent to the network. When Off-hook Test is selected, Off-hook signaling is sent to the Network. The customer loop is forced On-hook while this test is active.

CUSTOMER RING TEST

The Customer Ringing Test will activate the unit's ring relay in a 2-on / 4-off ring cadence, providing ringing to the customer loop.

1000 Hz DRS TONE GENERATION TEST

The 1000 Hz DRS (Digital Reference Signal) Tone Generation Test is used to send DRS signal on the receive path to the loop. The loop receive level that should be received is determined by the following equation:

$$\text{Receive Level} = 0 \text{ dB} - \text{Attenuation}$$

6. SPECIFICATIONS

Refer to **Table 3** for TA 750/850 Quad FXS specifications.

7. MAINTENANCE

The TA 750/850 Quad FXS requires no routine maintenance for normal operation.

ADTRAN does not recommend that repairs be performed in the field. Repair services are obtained by returning the defective unit to ADTRAN Customer Service.

Table 3. Specifications

Quad FXS Electrical	
Power:	6 Watts (off hook).
Loop Current:	23 mAmp nominal 20 mAmp minimum
Loop Resistance:	1200 ohms nominal/ 1650 ohms maximum* (900 ohms/1350 ohms - line, 300 ohms - phone)
Terminating Impedance:	900 ohms + 2.16 μ F, 600 ohms + 2.16 μ F, 900 ohms, and 600 ohms.
Return Loss:	900 ohms + 2.16 μ F, ERL >28 dB, SRL >20 dB.
Trans Hybrid Loss:	900 ohms + 2.16 μ F, ERL >28 dB, SRL >20 dB.
Longitudinal Balance:	200, 500, and 1000 Hz: >58 dB min., > 63 dB ave. 3000 Hz: >53 dB min., >58 dB ave.
Frequency Response:	300 to 3400 Hz: -0.5 and 1.0 dB.
Idle Channel Noise:	<20 dBBrnC.
Signal-to-Distortion Ratio:	0 to -30 dBm0: >33 dB -30 to -40 dBm0: >27 dB -40 to -45 dBm0: >22 dB.
Physical	
Dimensions:	3 1/4" H x 10" D
Weight:	1 lb.
Environment	
Operating Temperature:	-40° to 65° C
Storage Temperature:	-40° to 70° C
Relative Humidity:	Up to 95% non-condensing
*Measured with -48 VDC input, 20 mA loop current	

8. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within 10 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 Part Number
1175408L1

ADTRAN Sales
Pricing and availability
(888) 4-ADTRAN

ADTRAN Technical Support
Presales Applications / Post-sale Technical Assistance
(800) 726-8663

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

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

ADTRAN Repair/CAPS
Return for repair / upgrade
(256) 963-8722

Repair and Return Address:
ADTRAN, Inc.
CAPS
901 Explorer Boulevard
Huntsville, Alabama 35806-2807