Total Access™ QFO-C
Installation and Maintenance

CONTENTS

FIGURES

TABLES

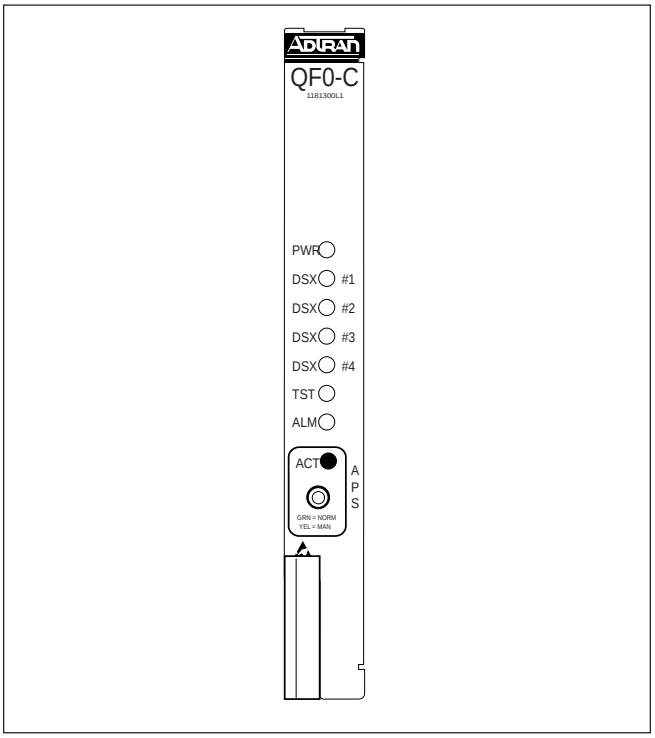

Figure 1. Total Access QFO-C

1. GENERAL

This practice is an installation and maintenance guide for the ADTRAN Total Access QFO-C, P/N 1181300L1, illustrated in **Figure 1**. See Table 5 for a description of QFO-C front panel indicators.

Revision History

This is the third issue of this practice. This issue includes the removal of the four-character display (FCD) five-minute time out feature.

Features

The Total Access QFO-C carries up to four asynchronous DS1 circuits over a single-mode fiber pair with an optical budget of 22 dB (minimum). The Total Access QFO-C has the following features:

- Installs in both the Total Access 3000 (23-inch) and the Total Access (19-inch) chassis.
- End-to-end transmission for one to four DS1 circuits
- Operating wavelength 1310 nm
- Single mode fiber operation
- Power budget of 25dB (typical)
- Launch power of -5dBm (typical)
- Receiver sensitivity of -35dBm (typical)
- DS1 receiver sensitivity of -9dBm
- Optical laser transmitter
- Configured for Central Office (CO) operation
- SC connectorized optics
- Performance monitoring
- Automatic AMI/B8ZS provisioning
- Can be equalized for 0 to 655 feet of ABAM cable

  Performance monitoring and manual loopback on each DS1
- Front panel LEDs indicate:

  PWR - Power is on or off, flashes during craft panel access

  DSX - Individual DSX alarm status is OK, errors or Loss of Signal

  TST - Card in loopback test mode

  ALM - Alarm present

  ACT - Online indication

2. INSTALLATION

CAUTION!

SUBJECT TO ELECTROSTATIC DAMAGE OR DECREASE IN RELIABILITY.

HANDLING PRECAUTIONS REQUIRED.

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

Compliance Codes

Table 1 shows the Compliance Codes. This product intended for use in Restricted Access Areas only, and is intented to be installed in a Type "B" or "E" enclosure.

Table 1. Compliance Codes

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

Wiring

The QFO-C can only be used in a DSX-1 fed system. If the QFO-C module is to be mixed in the same shelf with other line technologies such as T1 or HDSL, refer to the wiring for that specific card type (See Section 3, Application Guide, in the Total Access 3000 System Manual). The QFO-C will reach the network via Amphenol connectors Pair 5 through Pair 8, located on the backplane, which correspond to DSX-1 connectors A and B. See **Table 2**. **Table 3** includes the pin-outs for pairs 5 and 7, while **Table 4** includes the pin-outs for pairs 6 and 8.

Table 2. QFO-only Populated Total Access Chassis

From Total Access	To FDF	To DSX-1
AMP Connector Pair 5		DSX-1 IN B
AMP Connector Pair 6		DSX-1 OUT B
AMP Connector Pair 7		DSX-1 IN A
AMP Connector Pair 8		DSX-1 OUT A
*RX	RX (IN)	
*TX	TX (OUT)	
*Fiber connections are made to the QFO-C via the connector on its PCB.		

Table 3. Pin-out For Pair 5 and 7 on TA 3000

Binder Group Color	Wire Color	64-Pin AMP Pin	Total Access 3000 Slot	Tip/Ring (In)
NONE	WHT/BLU	33	1	T
	BLU/WHT	1		R
	WHT/ORG	34	2	T
	ORG/WHT	2		R
	WHT/GRN	35	3	T
	GRN/WHT	3		R
	WHT/BRN	36	4	T
	BRN/WHT	4		R
	WHT/SLT	37	5	T
	SLT/WHT	5		R
	REDBLU	38	6	T
	BLU/RED	6		R
	RED/ORG	39	7	T
	ORG/RED	7		R
	RED/GRN	40	8	T
	GRN/RED	8		R
	RED/BRN	41	9	T
	BRN/RED	9		R
	RED/SLT	42	10	T
	SLT/RED	10		R
	BLK/BLU	43	11	T
	BLU/BLK	11		R
	BLK/ORG	44	12	T
	ORG/BLK	12		R
	BLK/GRN	45	13	T
	GRN/BLK	13		R
	BLK/BRN	46	14	T
	BRN/BLK	14		R
	BLK/SLT	47	15	T
	SLT/BLK	15		R
	YEL/BLU	48	16	T
	BLU/YEL	16		R
	YEL/ORG	49	17	T
	ORG/YEL	17		R
	YEL/GRN	50	18	T
	GRN/YEL	18		R
	YEL/BRN	51	19	T
	BRN/YEL	19		R
	YEL/SLT	52	20	T
	SLT/YEL	20		R
	VOL/BLU	53	21	T
	BLU/VOL	21		R
	VOL/ORG	54	22	T
	ORG/VOL	22		R
	VOL/GRN	55	23	T
	GRN/VOL	23		R
	VOL/BRN	56	24	T
	BRN/VOL	24		R
	VOL/SLT	57	25	T
	SLT/VOL	25		R
BLUE	WHT/BLU	58	26	T
	BLU/WHT	26		R
	WHT/ORG	59	27	T
	ORG/WHT	27		R
	WHT/GRN	60	28	T
	GRN/WHT	28		R
	WHT/BRN	61		
	BRN/WHT	29		
	WHT/SLT	62		
	SLT/WHT	30		
	REDBLU	63		
	BLU/RED	31		
	RED/ORG	64		Shield
	ORG/RED	32		Ground

Table 4. Pin-out For Pair 6 and 8 on TA 3000

Binder Group Color	Wire Color	64-Pin AMP Pin	Total Access 3000 Slot	Tip/Ring (Out)
NONE	WHT/BLU	33	1	T
	BLU/WHT	1		R
	WHT/ORG	34	2	T
	ORG/WHT	2		R
	WHT/GRN	35	3	T
	GRN/WHT	3		R
	WHT/BRN	36	4	T
	BRN/WHT	4		R
	WHT/SLT	37	5	T
	SLT/WHT	5		R
	REDBLU	38	6	T
	BLU/RED	6		R
	RED/ORG	39	7	T
	ORG/RED	7		R
	RED/GRN	40	8	T
	GRN/RED	8		R
	RED/BRN	41	9	T
	BRN/RED	9		R
	RED/SLT	42	10	T
	SLT/RED	10		R
	BLK/BLU	43	11	T
	BLU/BLK	11		R
	BLK/ORG	44	12	T
	ORG/BLK	12		R
	BLK/GRN	45	13	T
	GRN/BLK	13		R
	BLK/BRN	46	14	T
	BRN/BLK	14		R
	BLK/SLT	47	15	T
	SLT/BLK	15		R
	YEL/BLU	48	16	T
	BLU/YEL	16		R
	YEL/ORG	49	17	T
	ORG/YEL	17		R
	YEL/GRN	50	18	T
	GRN/YEL	18		R
	YEL/BRN	51	19	T
	BRN/YEL	19		R
	YEL/SLT	52	20	T
	SLT/YEL	20		R
	VOL/BLU	53	21	T
	BLU/VOL	21		R
	VOL/ORG	54	22	T
	ORG/VOL	22		R
	VOL/GRN	55	23	T
	GRN/VOL	23		R
	VOL/BRN	56	24	T
	BRN/VOL	24		R
	VOL/SLT	57	25	T
	SLT/VOL	25		R
BLUE	WHT/BLU	58	26	T
	BLU/WHT	26		R
	WHT/ORG	59	27	T
	ORG/WHT	27		R
	WHT/GRN	60	28	T
	GRN/WHT	28		R
	WHT/BRN	61		
	BRN/WHT	29		
	WHT/SLT	62		
	SLT/WHT	30		
	REDBLU	63		
	BLU/RED	31		
	RED/ORG	64		Shield
	ORG/RED	32		Ground

If the system is configured with only QFO-Cs, all four DSX-1 connections are made. The connections are made via four Amphenol connectors to Pair 5 through Pair 8 on the backplane.

NOTE

Total Access 3000 uses 64-pin Amphenol cables. Total Access 3010 uses 50-pin Amphenol cable.

Table 5. Pin-out For Pair 5 and 7 on TA 3010

Binder Group Color	Wire Color	50-Pin AMP Pin	Total Access 3010 Slot	Tip/Ring (In)
NONE	WHT/BLU BLU/WHT	26 1	1	T R
	WHT/ORG ORG/WHT	27 2	2	T R
	WHT/GRN GRN/WHT	28 3	3	T R
	WHT/BRN BRN/WHT	29 4	4	T R
	WHT/SLT SLT/WHT	30 5	5	T R
	REDBLU BLU/RED	31 6	6	T R
	RED/ORG ORG/RED	32 7	7	T R
	RED/GRN GRN/RED	33 8	8	T R
	RED/BRN BRN/RED	34 9	9	T R
	RED/SLT SLT/RED	35 10	10	T R
	BLK/BLU BLU/BLK	36 11	11	T R
	BLK/ORG ORG/BLK	37 12	12	T R
	BLK/GRN GRN/BLK	38 13	13	T R
	BLK/BRN BRN/BLK	39 14	14	T R
	BLK/SLT SLT/BLK	40 15	15	T R
	YEL/BLU BLU/YEL	41 16	16	T R
	YEL/ORG ORG/YEL	42 17	17	T R
	YEL/GRN GRN/YEL	43 18	18	T R
	YEL/BRN BRN/YEL	44 19	19	T R
	YEL/SLT SLT/YEL	45 20	20	T R
	VOL/BLU BLU/VOL	46 21	21	T R
	VOL/ORG ORG/VOL	47 22	22	T R
	VOL/GRN GRN/VOL	48 23	23	(unassigned) (unassigned)
	VOL/BRN BRN/VOL	49 24	24	(Test) (Test)
	VOL/SLT SLT/VOL	50 25	25	GND

Note: Only Pairs 7 and 8 have the test pair (pins 24 and 49) on the 50-pin Amphenol.

Table 6. Pin-out For Pair 6 and 8 on TA 3010

Binder Group Color	Wire Color	50-Pin AMP Pin	Total Access 3010 Slot	Tip/Ring (Out)
NONE	WHT/BLU BLU/WHT	26 1	1	T R
	WHT/ORG ORG/WHT	27 2	2	T R
	WHT/GRN GRN/WHT	28 3	3	T R
	WHT/BRN BRN/WHT	29 4	4	T R
	WHT/SLT SLT/WHT	30 5	5	T R
	REDBLU BLU/RED	31 6	6	T R
	RED/ORG ORG/RED	32 7	7	T R
	RED/GRN GRN/RED	33 8	8	T R
	RED/BRN BRN/RED	34 9	9	T R
	RED/SLT SLT/RED	35 10	10	T R
	BLK/BLU BLU/BLK	36 11	11	T R
	BLK/ORG ORG/BLK	37 12	12	T R
	BLK/GRN GRN/BLK	38 13	13	T R
	BLK/BRN BRN/BLK	39 14	14	T R
	BLK/SLT SLT/BLK	40 15	15	T R
	YEL/BLU BLU/YEL	41 16	16	T R
	YEL/ORG ORG/YEL	42 17	17	T R
	YEL/GRN GRN/YEL	43 18	18	T R
	YEL/BRN BRN/YEL	44 19	19	T R
	YEL/SLT SLT/YEL	45 20	20	T R
	VOL/BLU BLU/VOL	46 21	21	T R
	VOL/ORG ORG/VOL	47 22	22	T R
	VOL/GRN GRN/VOL	48 23	23	(unassigned) (unassigned)
	VOL/BRN BRN/VOL	49 24	24	(Test) (Test)
	VOL/SLT SLT/VOL	50 25	25	(GND)

Note: Only Pairs 7 and 8 have the test pair (pins 24 and 49) on the 50-pin Amphenol.

See Table 3 and Table 4 for Total Access 3000 pin-out information. See **Table 5** and **Table 6** for Total Access 3010 pin-out information.

For further details about QFO-C connections, see APP-301 and APP-306 in the Application Guide of the TA 3000 System Manual.

WARNING

Risk of electric shock. Voltages up to 140 Vdc (with reference to ground) may be present on telecommunications circuits.

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.
5. This equipment is intended to be used behind devices that provide primary lightning protection.
6. Never look into the end of the fiber cable.

For 1:1 Automatic Protection Switching (APS), two identical units are installed into adjacent slots. The Main unit plugs into any odd-numbered slot and its Auxiliary unit plugs into the next even-numbered slot to the right.

If no protection switching is provided, the Main unit plugs into any odd-numbered slot. The next higher even-numbered slot may contain a blank card or can be left empty. See **Figure 2**.

Installing the QFO-C

1. Set the right switch segment S2-2 to Working "on" or Protect "off" depending on where the QFO-C is to be located (even- or odd-numbered slot).
   - Odd-numbered slot - set to Working
   - Even-numbered slot - set to Protect

NOTE

The left switch segment S2-1 should be in the "off" position.

2. Plug the transmit and receive fiber cables into the fiber optic transceiver (U8) and route the cables as shown in **Figure 3**.

CAUTION

For proper operation, the ends of the fiber cables must remain clean. Do not touch the ends of the cables. When routing the cables, make sure the cables have no sharp bends.

3. Position the QFO-C into the selected shelf slot. While holding the fiber cables between the two cable guides on the top of the QFO-C front panel, lower the card retention lever and slide the unit into the shelf assembly.

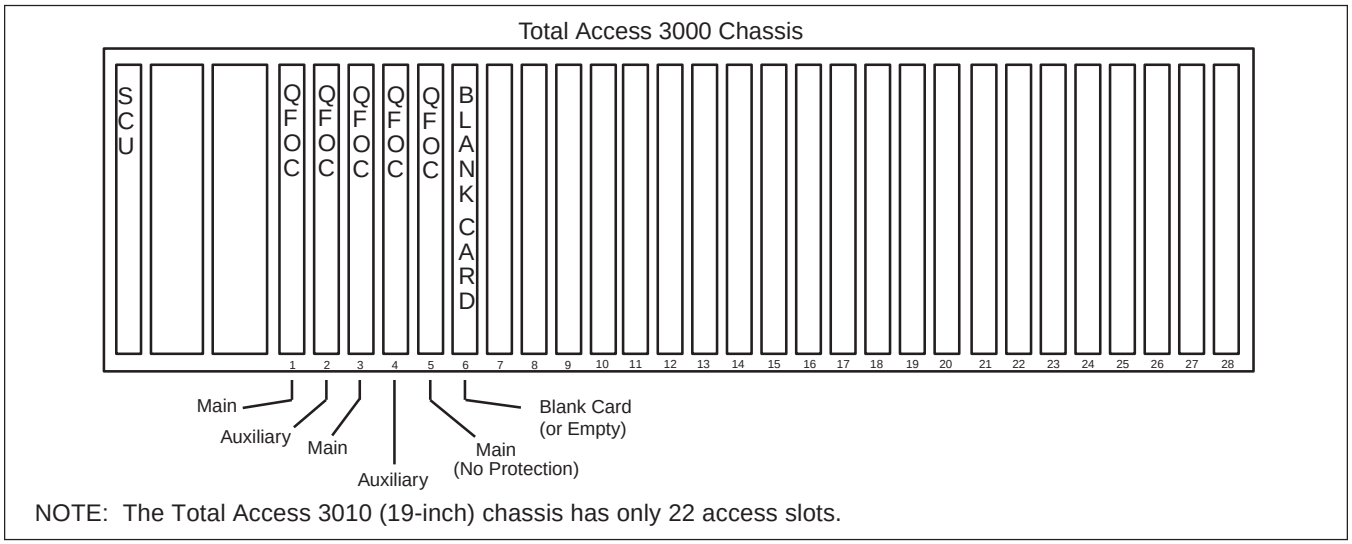

Figure 2. Total Access 3000 CO Chassis

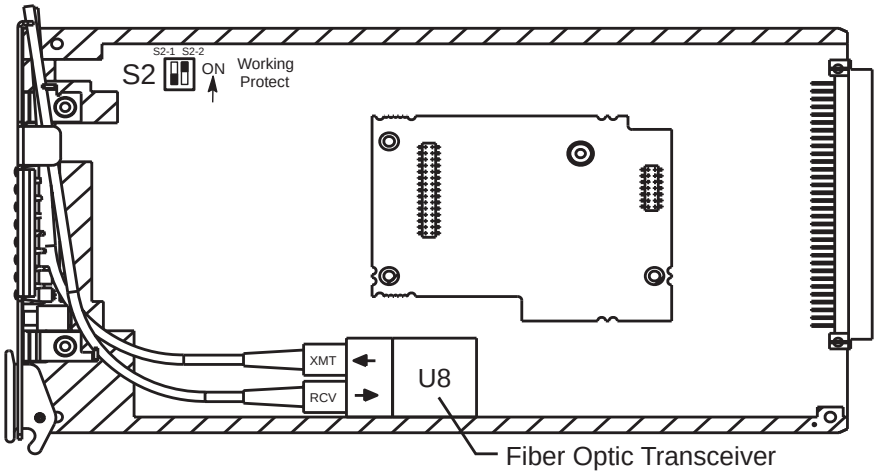

Figure 3. Fiber Optic Receiver Cabling

Release the card retention lever and carefully seat the card into the backplane connector by firmly pressing on the QFO-C front panel. Verify the fiber cables move freely between the cable guides and the shelf.

When installed and powered, the PWR LED (green) on the front panel lights steady.

Options

The QFO-C is software configurable through the System Controller Unit (SCU). A comprehensive guide to all options and configuration information is in the menu sections of this practice.

3. OPERATION

The QFO-C transports up to four T1 signals from the near (CO/CEV) end to the far Remote Terminal (RT) end via a single mode fiber pair (transmit/receive) that has an optical budget up to 22 dB. The functions of the card are set up through the Total Access SCU via a VT100 type terminal or via the FCD on the SCU front panel.

The DSX T1 signals are terminated in transformers reflecting a 100 ohm termination. The signal from a DSX channel is monitored for BPV errors and loss of signal. Signals up to -9 dBm may be recovered from the incoming DSX signal. The T1 signal may be manually looped back by a VT100 command. Up to four T1 signals are then multiplexed. The resulting signal is transmitted to the far end via the laser transmitter.

The received fiber signal is detected via the fiber receiver and de-multiplexed into four T1 signals. These signals are de-jittered and sent to the DSX by the T1 line drivers. The line driver circuits provide the appropriate pulse shape for line lengths ranging from 0 to 655 feet.

The Fiber transceiver provides a minimum launch power of -8 dBm (optical) and a minimum receive sensitivity of -30 dBm. This supports a minimum optical budget of 22 dB over a single mode 1310 nm fiber optic cable.

Connectors are single or duplex SC type. The receiver input level is -3 dBm maximum so the transmitter may be connected to the receiver without overdriving the receiver input. Optical coding is ANSI X3T9.5.

The Fiber transmitter is constantly monitored for “end of life.” If this condition is detected, a minor alarm is generated. In a protected system, service is switched to the auxiliary card and a minor alarm is generated.

The QFO-C has a single dip switch (S2), which must be set before installing the card in the Total Access chassis. If the card is used in a non-protected mode or is the main card in a protected mode, set S2-2 to Working “on” (towards the top to the card). If the card is used as the auxiliary fiber card in a protected operation mode, set S2-2 to “off” (toward the center of the card). The switch is set in the Working when received from the factory.

QFO-C Front Panel Indicators

The QFO-C front panel LEDs give status information about the card and are described in

Table 7. QFO-C Front Panel Indicators

Indicator	Color	Description
PWR (Power)	Solid Green Flashing Green Off	Power is on Card being accessed by the SCU via the SCU MODE/SELECT toggle switch Power is off
DSX 1 to 4 (Individual alarm status of each of 4 T1 circuits)	Solid Green Off Flashing Green and Orange	T1 is present with no errors T1 Loss of Signal from DSX or channel is disabled T1 Bipolar Violations from DSX
TST (Test)	Solid Orange Off	Card in loopback Normal indication (no loopback)
ALM (Combination of all 4 T1's alarm status)	Solid Red Off	Major/Minor alarm active No alarms present or alert/lower-level severity alarm active
ACT (Online indication)	Solid Green Off	Card is online Card is offline

Table 7.

QFO-C Card Provisioning

The card is provisioned through the craft port on the SCU or by the FCD. Detailed procedures for provisioning the QFO-C start on page 11 with the section labeled Fiber (QFO-C) Main Menu. The screenshots are accompanied by steps to assist in provisioning the unit. **Table 8** includes a list of the functions that may be provisioned in the QFO-C card.

Four-Character Display (FCD) Guidelines

This section provides guidelines for using the FCD menu interface for configuration, provisioning and system maintenance.

Menu Structure

The menu structure for a card is a multi-layered menu tree. Each menu level consists of menu elements, which may be either a main menu or a sub-menu item.

Sub-menus are menu elements that when selected descend down to the next menu level. Menu items consist of two types:

- Read-only – Elements that display information that may change based on the status of the unit, but are not changeable directly by the user, for example, "STAT OK."
- Read/write – Elements that display information, but the value may be altered by selecting the item, for example, "DSX EQ 134 FT." The user can select the item and change its value.

Navigating the Menu Structure

The three-position, return-to-center MODE/SELECT toggle switch on the SCU provides the FCD menu interface. The FCD displays strings four characters at a time. A string greater than four characters long is displayed as 4-character sub-strings for 1 second per sub-string. The string repeats when the end of the string is reached.

Four input values are available from the switch:

- MODE – press the switch in the MODE direction and release it within 1.5 seconds to toggle among selections on the current menu. The switch must be held for at least 24 milliseconds.
- SELECT – press the switch in the SELECT direction and release it within 1.5 seconds to select a menu item.
  The switch must be held for at least 24 milliseconds. If the SELECT switch is held for more than 1.5 seconds, the input is ignored.

Table 8. QFO-C Provisioning Options

Option	Description	Values	Default
Service State	Enables normal connection to the DSX or multiplexer interface	In Service	Out of Service-Unassigned
	Loops will train up but will not connect to the DSX or multiplexer interface	Out of Service - Unassigned	
	Supports active connections to the DSX or multiplexer interface; however, alarms cannot be generated	Out of Service - Maintenance	
DSX Equalization	Conditions the signal to provide a proper 0dB level output to the DSX	0 to 133' ABAM 134 to 266' ABAM 267 to 399' ABAM 400 to 533' ABAM 534 to 655' ABAM	0 to 133' ABAM
Loopback Timeout	Releases a code-activated loopback in the time selected after initial activation	Disabled 20 minutes 60 minutes 120 minutes	120 minutes
AIS to DSX (Loss of T1)	Generates AIS to network on LOS from facility for a specific port	Enabled, Disabled	Disabled
AIS to DSX (FLOS)	Generates AIS to network on all ports on Fiber LOS from facility	Enabled, Disabled	Disabled
ES Threshold (15-Min.)	Enters a specific ES 15-minute threshold that, when exceeded, will generate an alarm	30, 150	150
SES Threshold (15-Min.)	Enters a specific SES 15-minute threshold that, when exceeded, will generate an alarm	15, 75	75
UAS Threshold (15-Min.)	Enters a specific UAS 15-minute threshold that, when exceeded, will generate an alarm	15, 75	75
ES Threshold (24-Hour)	Enters a specific ES daily threshold that, when exceeded, will generate an alarm	2880, 14400	14400
SES Threshold (24-Hour)	Enters a specific SES daily threshold that, when exceeded, will generate an alarm	1440, 7200	7200
UAS Threshold (24-Hour)	Enters a specific UAS daily threshold that, when exceeded, will generate an alarm	1440, 7200	7200
Circuit ID (one for each port)	32-character alphanumeric character field		Null string

- ESCAPE – press the switch in the MODE direction and release it between 1.5 seconds and 3 seconds to ascend the menu tree.
- ROOT - press the switch in the MODE direction and release it after 3 seconds to return to the first element of the Level 1 card menu.

To enter the SCU, MUX, or LINE CARD (T1-OR, HTU-C or QFO-C) menu trees, activate the menu function by performing the following steps:

1. Push the toggle switch momentarily to the MODE position and release.
2. The SCU FCD will enter the login function. Each of the four digits of the password must be individually selected. To select a digit, move the toggle switch momentarily to the SELECT position. To change a digit, move the toggle switch momentarily to the MODE position. The default password is 0000 (four zeros).
3. At the shelf status "STAT" display, press and release the MODE/SELECT switch in the MODE direction to toggle among menu selections SCU, MUX (if equipped), and LINE CARD.
4. Press the MODE/SELECT switch in the SELECT direction to select the desired menu item.

4a. For the MUX selection, the FCD displays MUXA. Press and release the MODE/SELECT switch in the MODE direction to display MUXB (if equipped). Press the MODE/SELECT switch in the SELECT direction to enter the selected multiplexer menu tree.

4b. For the LINE CARD selection, the number of the first occupied line card slot displays (for example, 05). Press and release the MODE/SELECT switch in the MODE direction until the desired line card slot number displays. Press the MODE/SELECT switch in the SELECT direction to enter the selected line card menu tree.

Figure 4 shows the QFO-C FCD Menu Tree. The MODE command toggles among the selections on the current menu level. For example, if the FCD is displaying QFO-C "STAT MAJ ALRM" (**Figure 4,** Level 1) and the MODE command is issued, the "VIEW" menu displays. If the MODE command is issued again, the "PROV" menu displays, etc.

The SELECT command selects a menu element and descends the menu to the next level. For example, if the FCD is displaying QFO-C "ALRM PROV" (Figure 4, Level 1) and the SELECT command is issued, the "ES" sub-menu displays. If the SELECT command is issued again, the "15 MIN ERR THLD" sub-menu displays, etc. If a read/write element is selected, the display prompts the user to save the setting. The message "SAVE" flashes on the display followed by the message "NO." If the user wishes to go back to the original setting, press the MODE/SELECT switch to SELECT. If the user wishes to choose the new setting, press the MODE/SELECT switch to MODE. The message "YES" displays. Press the MODE/SELECT switch to SELECT to have the new setting take effect. After selecting the new setting, the display returns to flashing between the option name and the current setting for that option. The MODE switch can then be used to scroll through the remaining options.

The ESCAPE command ascends the menu tree. Issuing an ESCAPE command on any menu item ascends the menu one level and displays the first element on that level. For example, if the FCD is displaying QFO-C "20 MIN" on level 3 of Figure 4 and the ESCAPE command is issued, the "LB TOUT" menu displays. If the element is a read/write value, it maintains its original value.

The ROOT command ascends to the first element of the Level 1 card menu. If the ROOT command is issued from any non-level 1 location, the menu displayed is the first element of level 1. For the QFO-C Menu Tree (Figure 4), the FCD displays QFO-C "STAT" (first element of Level 1). If the ROOT command is issued from a level 1 location, the software interprets the ROOT command as an ESCAPE command and displays the SCU menus.

QFO-C Protection

A fully-protected system may be established by installing a second (Auxiliary) card to the right of the

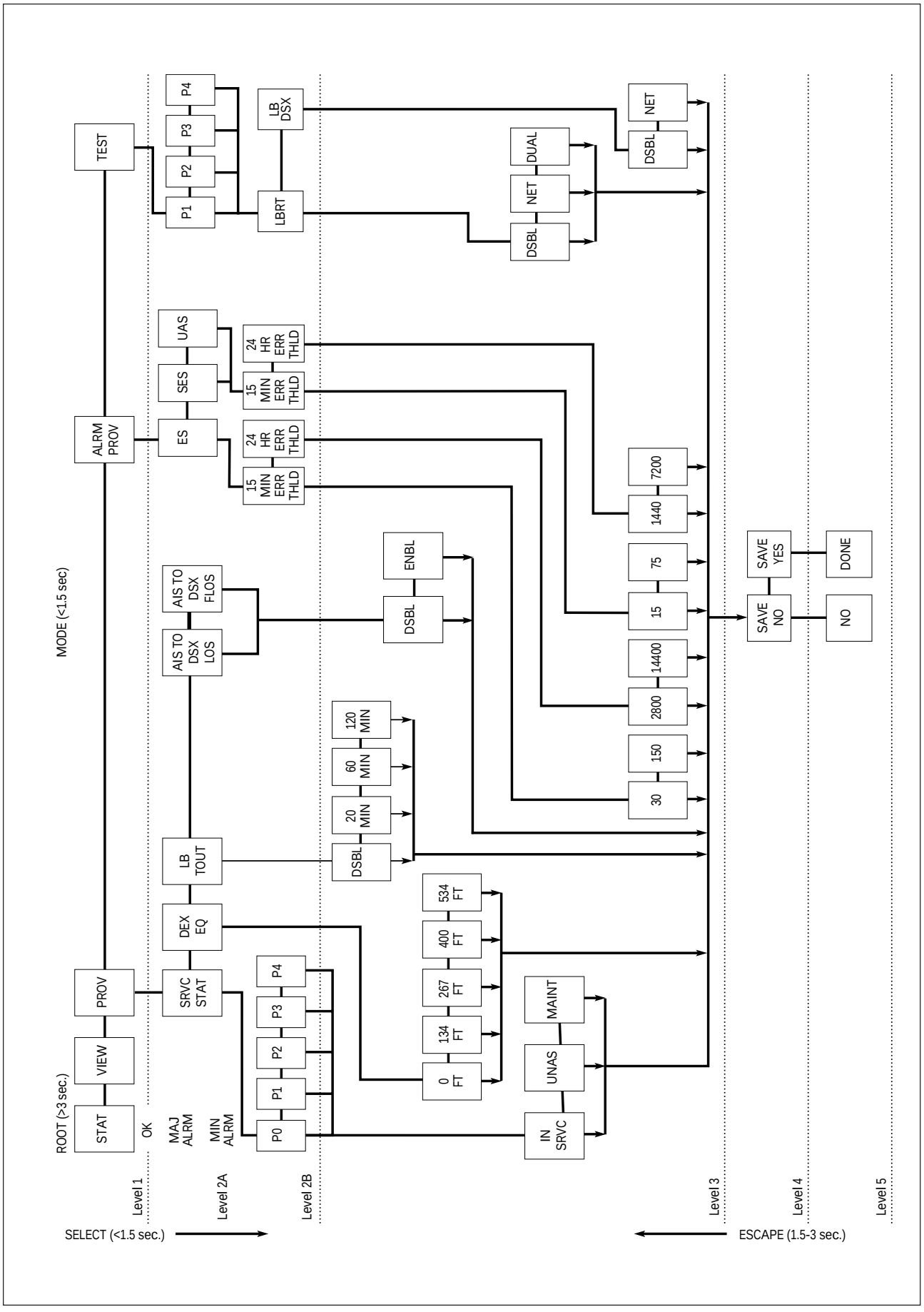

Figure 4. QFO-C FCD Menu Tree

Main card. The Main card is installed in an odd-numbered slot and the Auxiliary card must be installed in the even-numbered slot to the right of the Main card. The remote terminal (RT) must also have a Auxiliary card installed in the RT shelf. When installed, a Main/Auxiliary communication is established. Service is transferred from the Main to the Auxiliary card if a failure occurs in the Main card. The following conditions cause a switch:

- Fiber Loss signal (either fiber)
- Laser degrade signal
- Module power supply failure
- Manual switch via the APS switch or a VT100 command

After the faulty circuit has been restored or following a user-defined timeout, transmission reverts back to the Working card.

NOTE

A manual switch can be performed only from the Working card.

Fiber (QFO-C) Menu Screen

This subsection provides procedures for entering the fiber menu screens to provision and maintain the QFO-C and the QFO-R. The Fiber menu hierarchy (QFO-C Main Menu screen and its eight submenu screens) is shown in **Table 9**.

Table 9. QFO-C Menu Hierarchy

QFO-C Main Menu

Configuration
Provisioning
- Service State
  - Port 0/1/2/3/4
- All Provisioning
  - DSX Equalization
  - Loop Back Timeout
  - AIS to DSX (Loss of T1)
  - AIS to DSX (FLOS)
  - Restore Factory Defaults

Status
- Port 1/2/3/4
- All Ports

Alarms
- View Alarms
- Alarm Provisioning
  - ES Threshold (15-Min)
  - SES Threshold (15-Min)
  - UAS Threshold (15-Min)
  - ES Threshold (24-Hour)
  - SES Threshold (24-Hour)
  - UAS Threshold (24-Hour)

Test
- Port 1/2/3/4
  - Loopback RT
  - Loopback DSX

Performance Monitoring
- Port 1/2/3/4 (Near End)
- Port 1/2/3/4 (Far End)

Protection Switching
- ACT Activate

Circuit ID
- Port 1/2/3/4

Entering the Fiber Main Menu Screen

From the Total Access Main Screen Menu, type 4 and press Enter to select Access Modules. Type "1" and press Enter to select the Module Menus Screen. Choose the desired QFO-C slot number. The Fiber Main Menu Screen (**Figure 5**) will appear.

Viewing the QFO-C Configuration Screen

From the Fiber Main Menu screen, type "1" and press Enter to select Configuration. The Configuration screen (**Figure 6**) will appear.

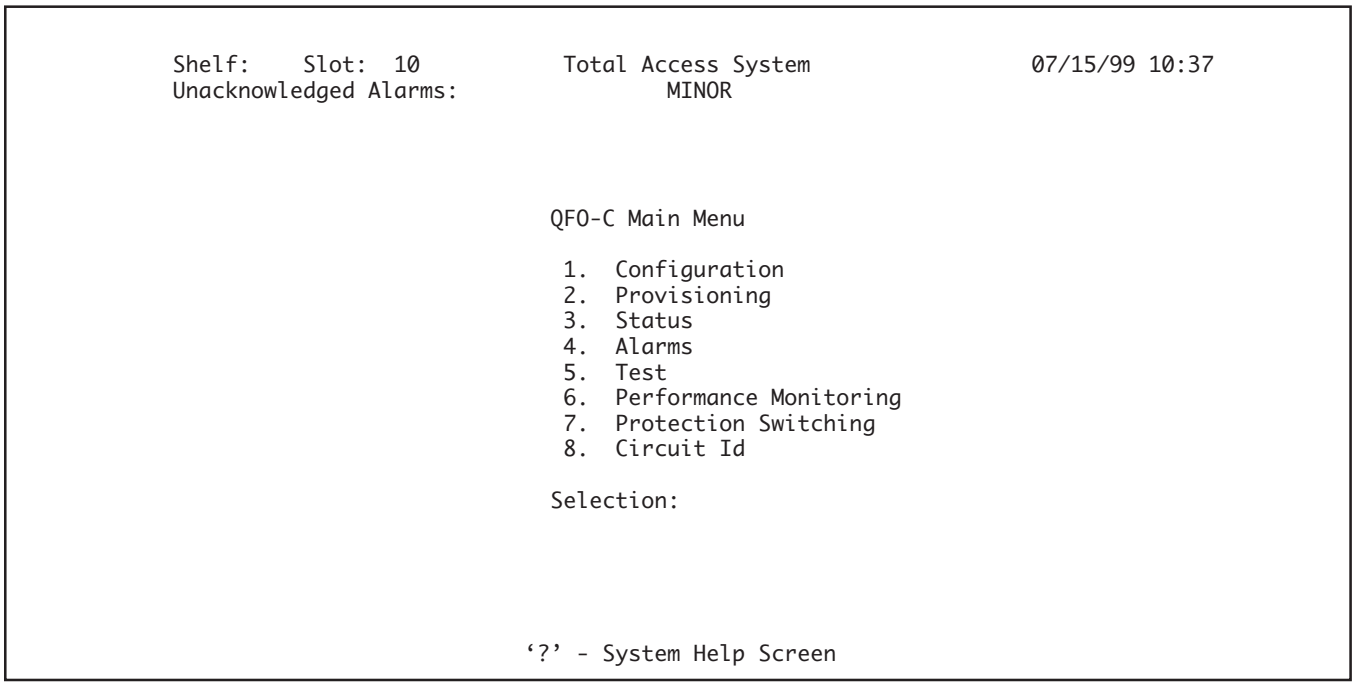

Figure 5. Fiber Main Menu Screen

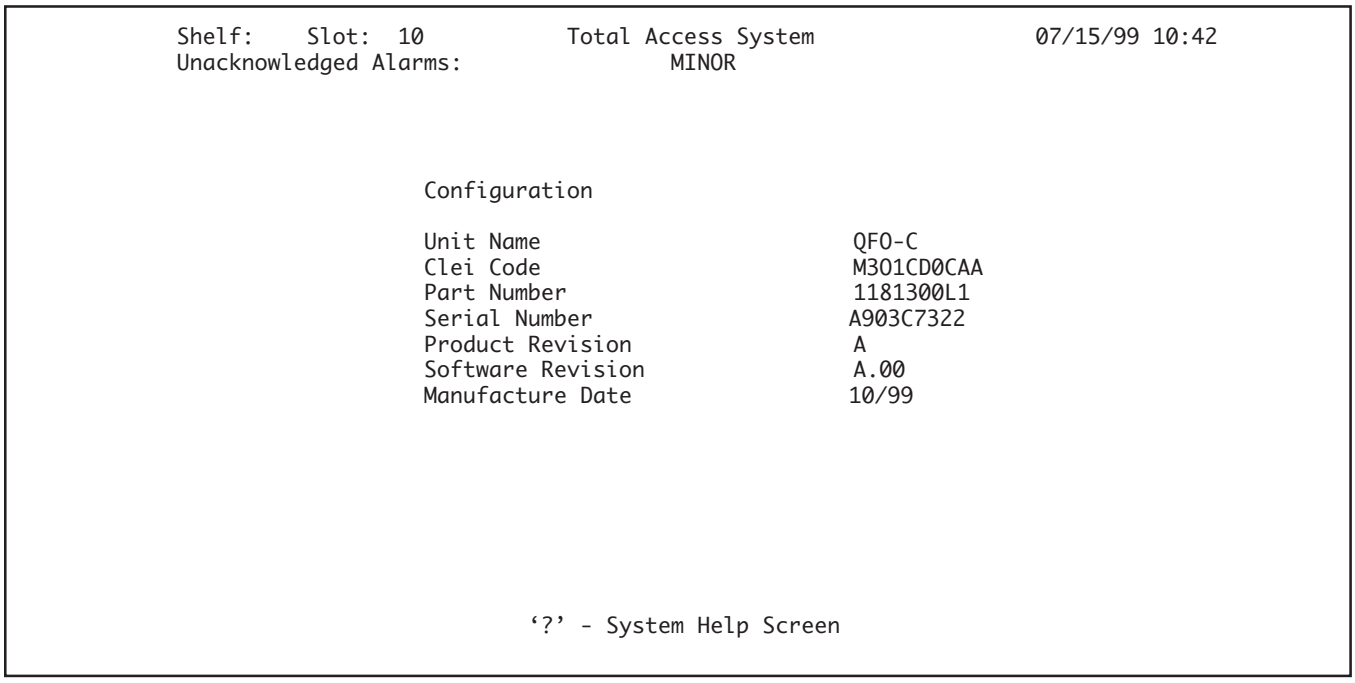

Figure 6. QFO-C Configuration Screen

Accessing the QFO-C Provisioning Screen

1. From the Fiber Main Menu Screen, type "2" and press Enter to select Provisioning. The Provisioning Screen (**Figure 7**) will appear.

2. Type "1" and press Enter for the Service State of the individual ports. The Service State Screen (**Figure 8**) will appear.

```
Shelf:    Slot:  10          Total Access System              07/15/99 10:42
Unacknowledged Alarms:               MINOR



                              Provisioning

                               1.  Service State
                               2.  All Provisioning

                              Selection:









                            '?' - System Help Screen
```

Figure 7. Provisioning Screen

```
Shelf:    Slot:  10          Total Access System              07/15/99 10:42
Unacknowledged Alarms:   None









                  Service State

                  1. Port 0              Out of Service - Unassigned
                  2. Port 1              Out of Service - Unassigned
                  3. Port 2              Out of Service - Unassigned
                  4. Port 3              Out of Service - Unassigned
                  5. Port 4              Out of Service - Unassigned


                  Selection:









                            '?' - System Help Screen
```

Figure 8. Service State Screen

NOTE

Port 0 is the QFO-C access module itself.

Changing the Port Service State

From the Service State Screen, type the desired port number and press Enter. The Port Service Status Screen (**Figure 9**) will appear.

Type the number corresponding to the desired service state. Press Enter.

From the Provisioning screen (Figure 7) type “2” and press Enter to select All Provisioning. The Provisioning of All Ports Screen (**Figure 10**) will appear.

```
Shelf:    Slot:  10          Total Access System              07/15/99 10:42
Unacknowledged Alarms:               MINOR




                        Port 1: Out of Service - Unassigned

                        1.  In Service
                        2.  Out of Service - Unassigned
                        3.  Out of Service - Maintenance

                        Selection:




                            '?' - System Help Screen
```

Figure 9. Port Service Status Screen

```
Shelf:    Slot:  10          Total Access System              07/15/99 10:45
Unacknowledged Alarms:               MINOR




                      Provisioning for All Ports

                      1.  DSX Equalization          0 to 133' ABAM
                      2.  Loopback Timeout          120 Min.
                      3.  AIS to DSX (Loss of T1)   Disabled
                      4.  AIS to DSX (FLOS)         Disabled
                      5.  Restore Factory Defaults

                      Selection:




                            '?' - System Help Screen
```

Figure 10. Provisioning of All Ports Screen

NOTE

Port 0 (all ports) "Out of Service" disables the entire module. Port 0 must be "In Service" for any Port 1 to 4 to be active.

Changing the DSX Equalization

1. From the Provisioning of All Ports screen, type "1" and press Enter to select DSX Equalization. The DSX Equalization Screen (**Figure 11**) will appear.

2. Type the number corresponding to the desired equalization value and press Enter.

Changing the Loopback Timeout Value

1. From the Provisioning of All Ports screen (Figure 10), type "2" and press Enter to select Loopback Timeout. The Loopback Timeout Screen (**Figure 12**) will appear.

2. Type the number corresponding to the desired loopback timeout value and press Enter.

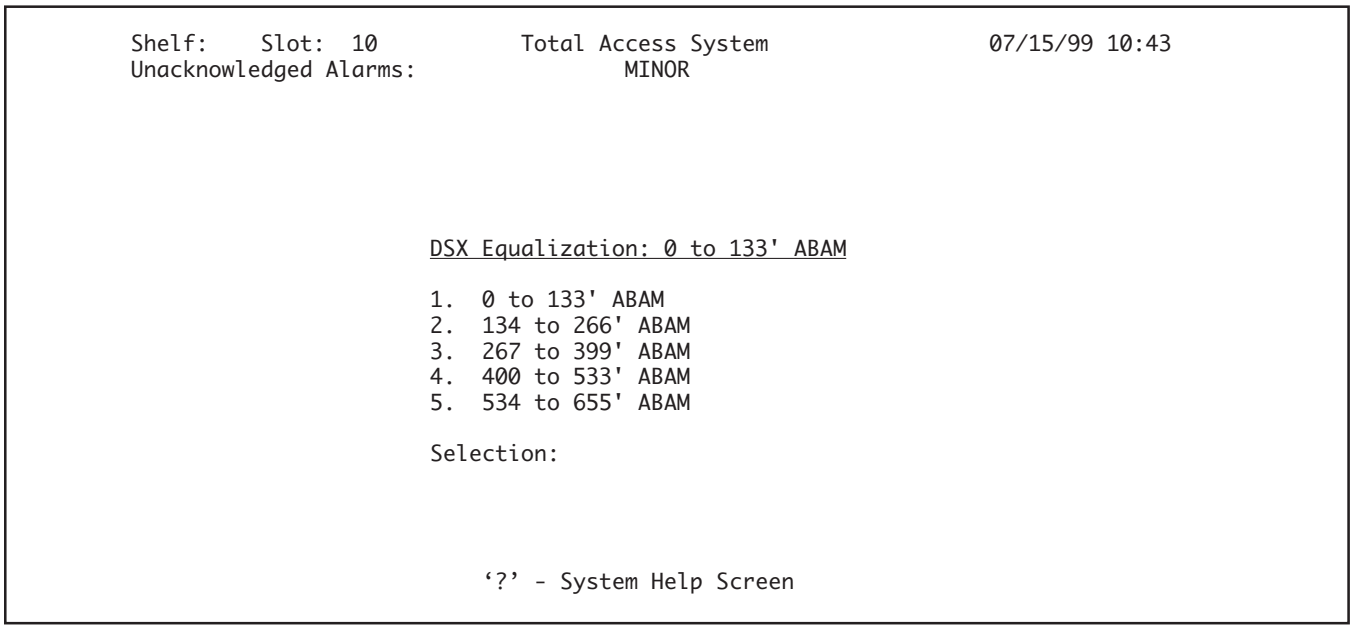

Figure 11. DSX Equalization Screen

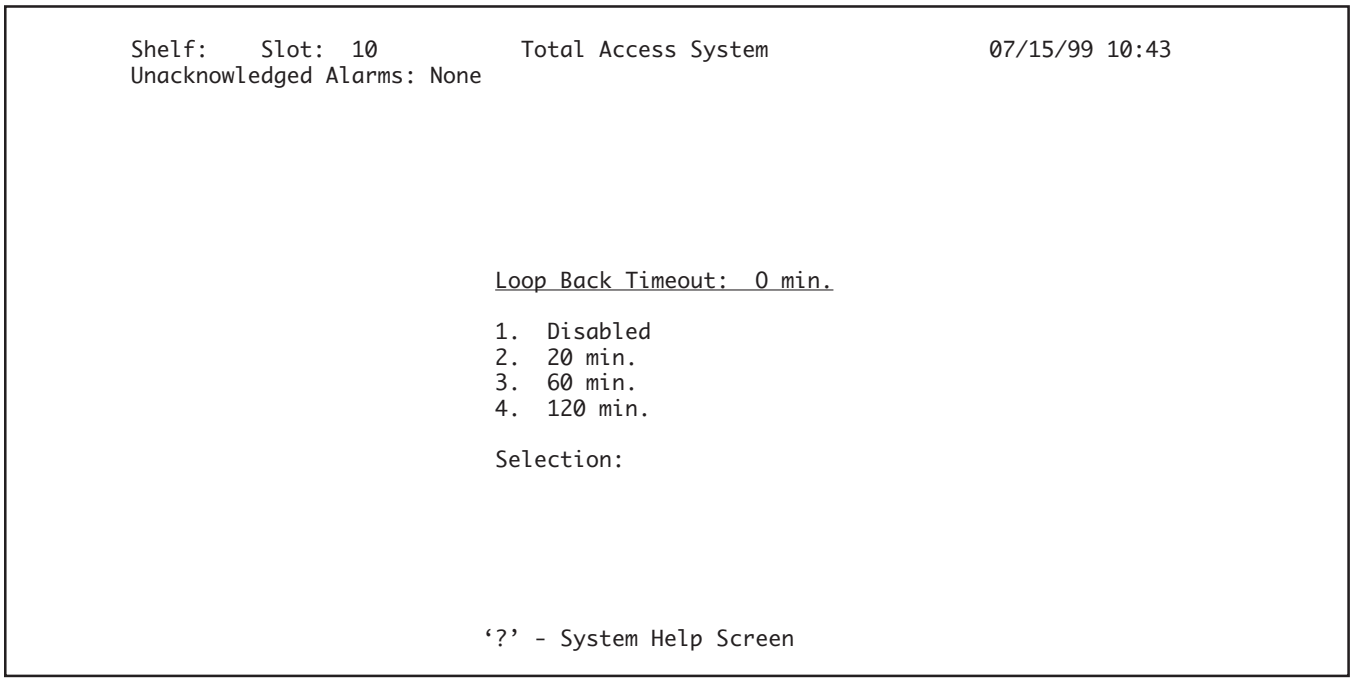

Figure 12. Loopback Timeout Screen

Enabling/Disabling AIS to DSX (Loss of T1)

1. From the Provisioning of All Ports Screen, type "3" and press Enter to select AIS to DSX (Loss of T1). The AIS to DSX (Loss of T1) Screen (**Figure 13**) will appear.

2. Type "1" and press Enter to select Disabled, or type "2" and press Enter to select Enabled.

Enabling/Disabling AIS to DSX (FLOS)

1. From the Provisioning of All FLOS screen, type "4" and press Enter to select AIS to DSX (FLOS). The AIS to DSX (FLOS) Screen (**Figure 14**) will appear.

2. Type "1" and press Enter to select Disabled, or type "2" and press Enter to select Enabled.

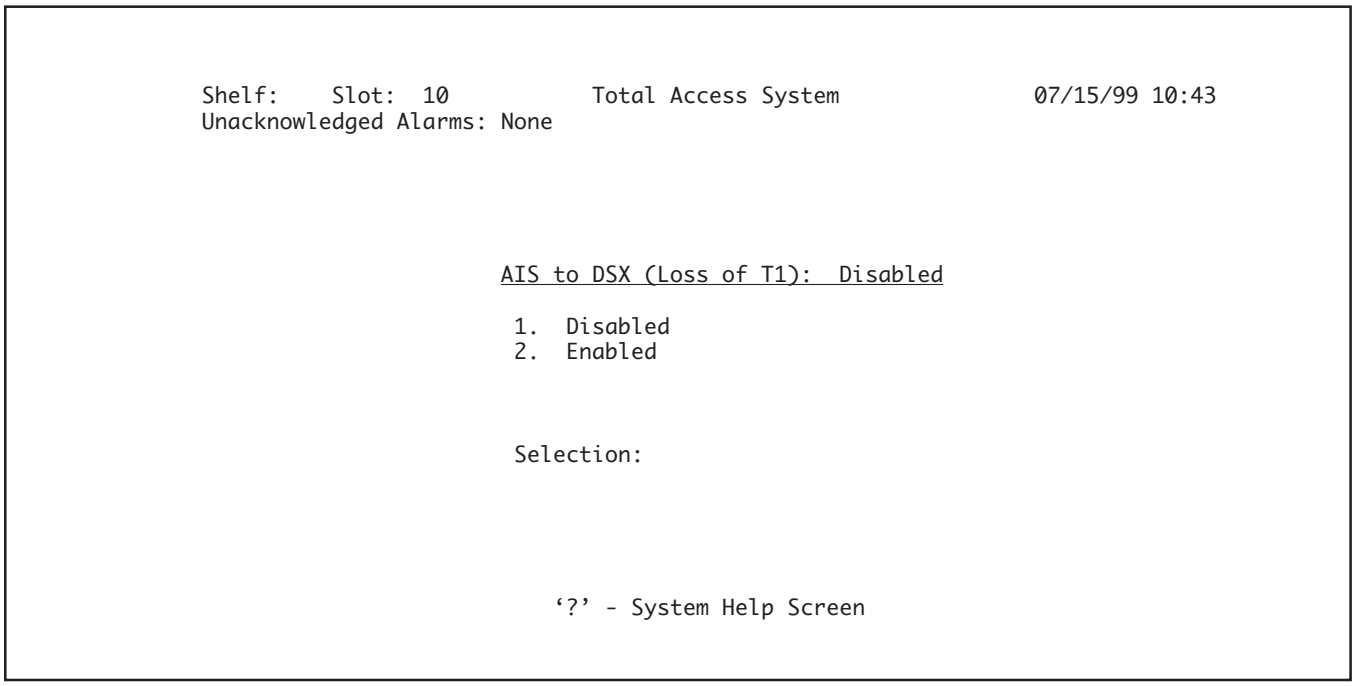

Figure 13. AIS to DSX (Loss of T1)

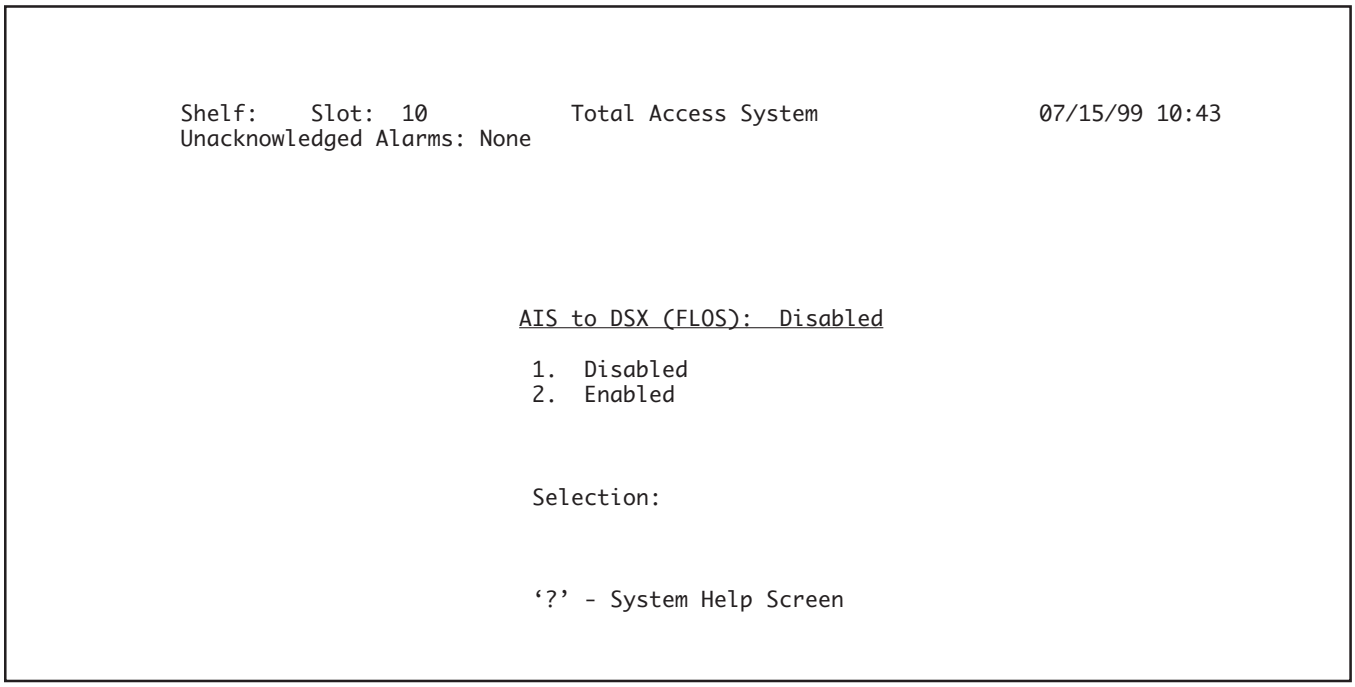

Figure 14. AIS to DSX (FLOS) Screen

Restore Factory Default Settings

1. From the Provisioning of All Ports Screen, type “5” and press Enter to select Restore Factory Defaults. The Restore Factory Defaults Screen (**Figure 15**) will appear.

2. Type “2” and press Enter to select Yes, and restore factory default settings.

Accessing the Status Screen

1. From the QFO-C Main Menu Screen, type “3” and press Enter to select Status. The Status screen (**Figure 16**) will appear.

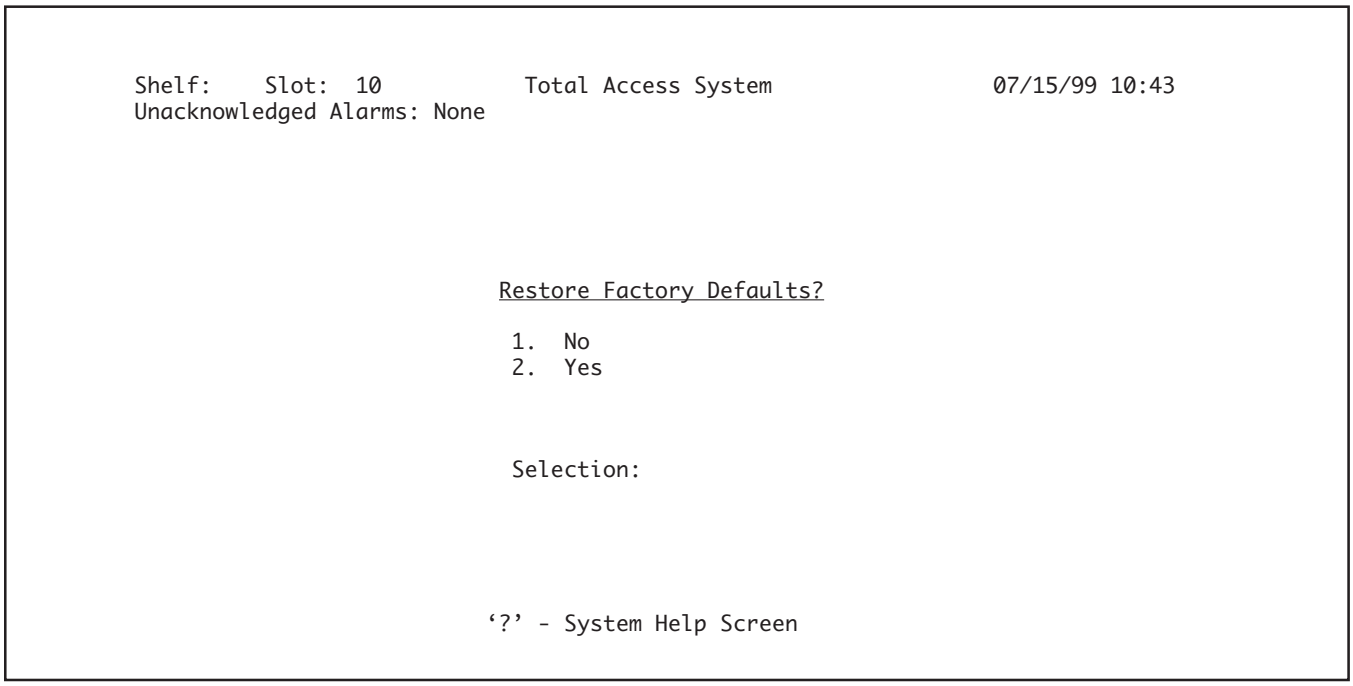

Figure 15. Restore Factory Defaults Screen

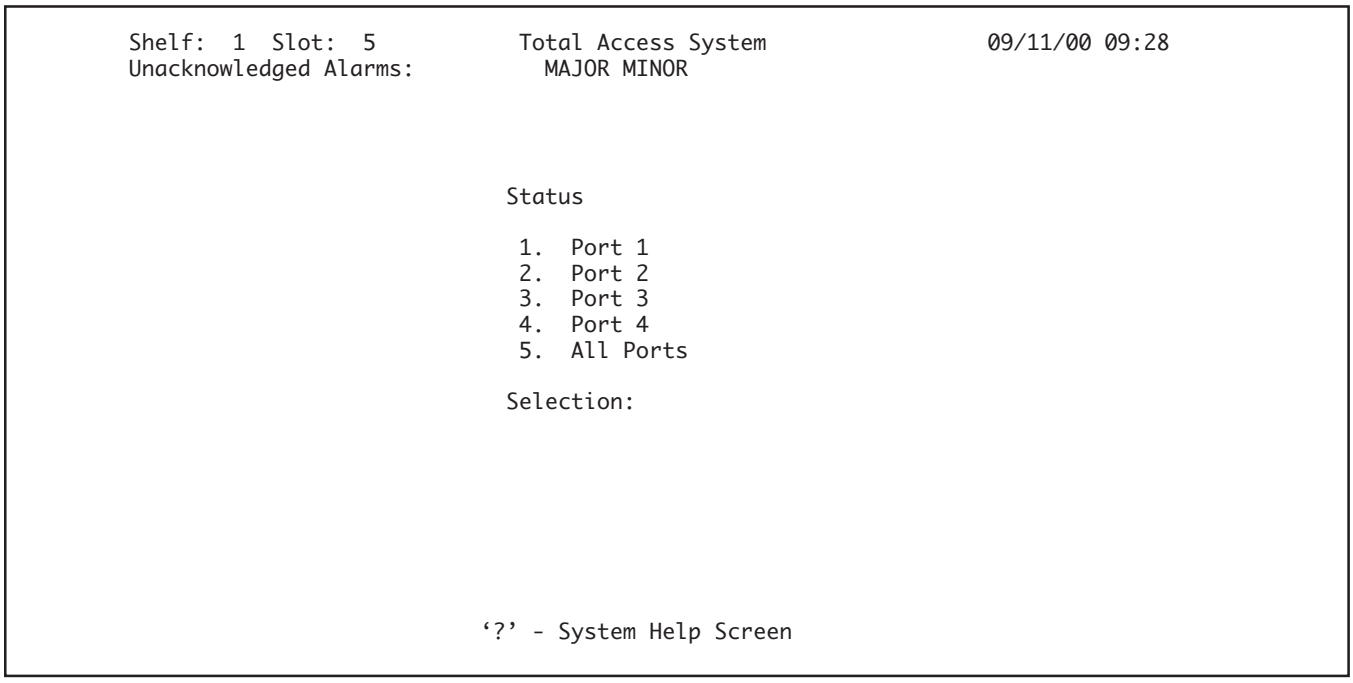

Figure 16. Status Screen

Viewing the Status of a Single Port

From the Status Screen, type the number of the desired single port and press Enter. The Port Status Screen (**Figure 17**) will appear.

Viewing the Status of All Ports

From the Status Screen, type "5" and press Enter to select All Ports. The Status of All Ports Screen (**Figure 18**) will appear.

```
Shelf: Slot:                Total Access System          02/18/98 02:24:18
Unacknowledged Alarms: None


                Port 1 Status
                                          Near End              Far End
                Port                      Disabled              Disabled
                Loss of Signal            No                    No
                Loop Back DSX             No                    N/A
                Loop Back RT (Network)    N/A                   Yes
                Loop Back RT (Customer)   N/A                   No
                Severely Errored          No                    No
                Errored                   No                    No
                Framing (Customer)        No                    No
                ESF Framing (Customer)    No                    No
                Unframed T1 (Customer)    No                    No



                                '?' - System Help Screen
```

Figure 17. Port Status Screen

```
Shelf:    Slot:  10          Total Access System                07/15/99 10:43
Unacknowledged Alarms: None


                Status of All Ports

                                          Near End      Far End
                Fiber Loss                No            No
                Laser Bias Alarm          No            No
                Adjacent Card             Present       N/A
                On Line                   No            No
                Switched Manually         No            No
                RT Auto Mode              No            No
                Port 1                    Disabled      Disabled
                Port 2                    Disabled      Disabled
                Port 3                    Disabled      Disabled
                Port 4                    Disabled      Disabled



                                '?' - System Help Screen
```

Figure 18. Status of All Ports Screen

Accessing the Alarms Screen

From the QFO-C Main Menu Screen, type “4“ and press Enter to select Alarms. The Alarms Screen (**Figure 19**) displays.

Viewing Alarms

From the Alarms screen, type “1” and press Enter to view alarms. The Alarms Reporting Screen (**Figgure 20**) appears.

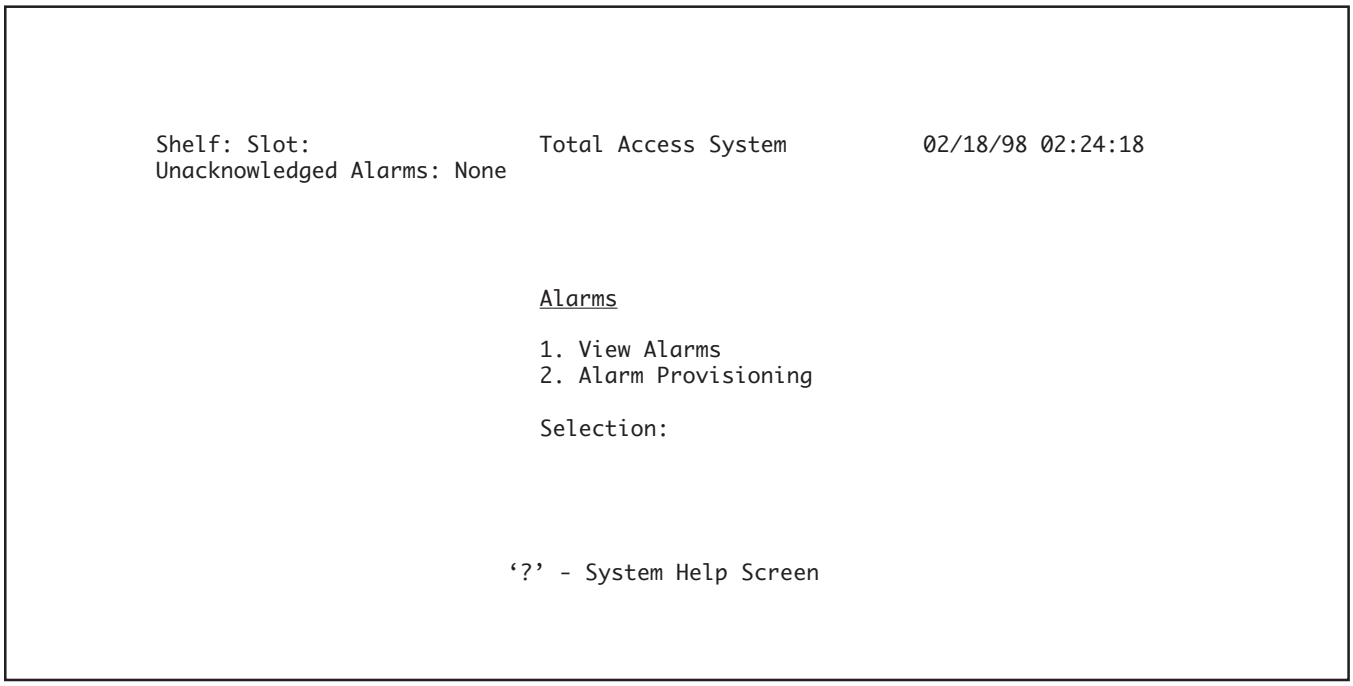

Figure 19. Alarms Screen

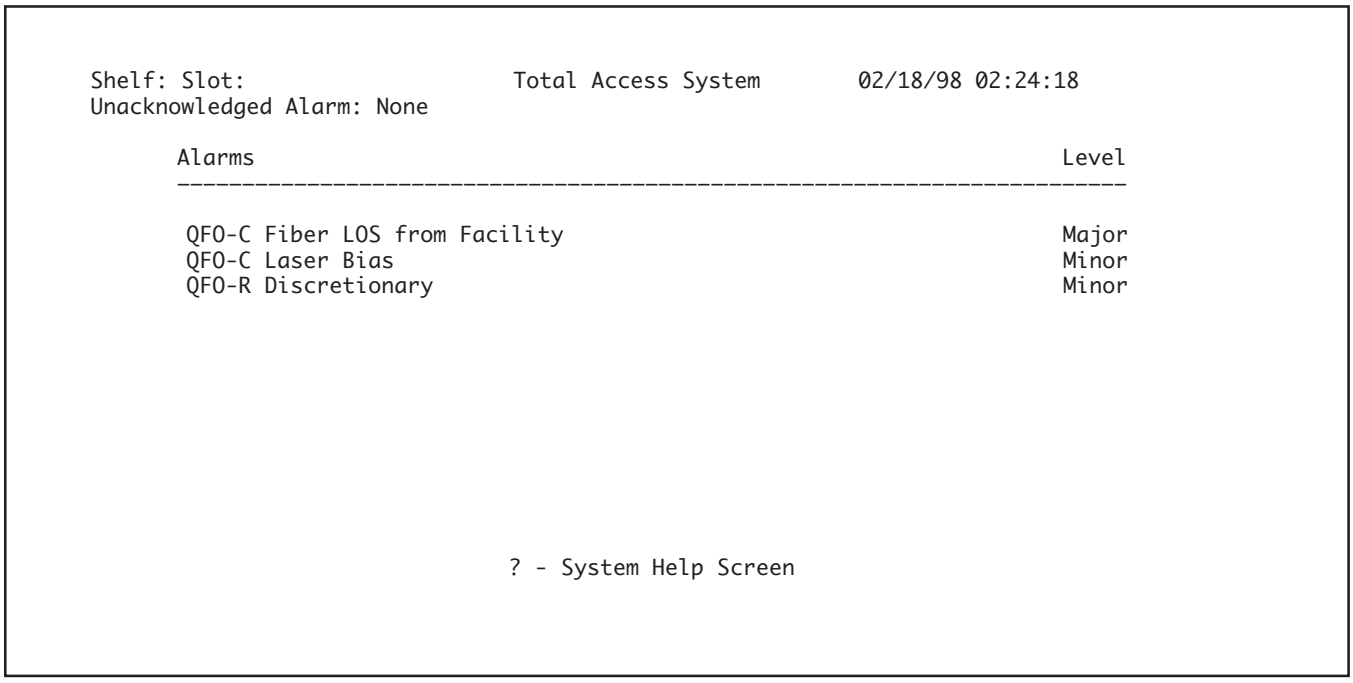

Figure 20. Alarm Reporting Screen

Changing Alarm Settings and Thresholds

1. From the QFO-C Main Menu screen, type “4” and press Enter to select Alarms. The Alarms Screen (Figure 19) will appear.

2. Type “2” and press Enter to select Alarm Provisioning. The Alarm Provisioning Screen (**Figure 21**) will appear.

Setting the ES Threshold (15-Min.)

1. From the Alarm Provisioning Screen, type “1” and press Enter to select ES Threshold (15-Min.). The ES Threshold Screen (**Figure 22**) will appear. Type the number of desired setting and press Enter.

```
Shelf: Slot:                    Total Access System       02/18/98 02:24:18
Unacknowledged Alarms: None

                          '?' - System Help Screen

                        Alarm Provisioning

                        1. ES Threshold (15 Min.)     30
                        2. SES Threshold (15 Min.)    15
                        3. UAS Threshold (15 Min.)    15
                        4. ES Threshold (24 Hours)    14400
                        5. SES Threshold (24 Hours)   7200
                        6. UAS Threshold (24 Hours)   7200


                        Selection:
```

Figure 21. Alarm Provisioning Screen

```
Shelf: Slot:                  Total Access System           02:24:18 02/18/98
Unacknowledged Alarm: None




                           ES Threshold (15 Min.):       30

                           1. 30
                           2. 150


                           Selection:




                              ? - System Help Screen
```

Figure 22. ES Threshold (15-Minute) Screen

Setting the SES Threshold (15-Min.)

1. From the Alarm Provisioning Screen, type “2” and press Enter to select SES Threshold (15-Minute). The SES Threshold Screen (**Figure 23**) will appear.

2. Type “1” and press Enter to select 15 or type “2” and press Enter to select 75.

Setting the UAS Threshold (15-Min.)

1. From the Alarm Provisioning Screen, type “3” and press Enter to select UAS Threshold (15-Minute). The UAS Threshold Screen (**Figure 24**) will appear. Type number of desired setting and press Enter.

```
SHELF: SLOT:                    TOTAL ACCESS SYSTEM          02:24:18 02/18/98
UNACKNOWLEDGED ALARMS: NONE




                          SES THRESHOLD (15 MIN.): 15

                           1. 15
                           2. 75


                           SELECTION:




                           '?' - System Help Screen
```

Figure 23. SES Threshold (15-Minute) Screen

```
Shelf: Slot:                    Total Access System          02/18/98 02:24:18
Unacknowledged Alarms: None




                         UAS Threshold (15 Min.): 15

                         1. 15
                         2. 75


                      Selection:




                           '?' - System Help Screen
```

Figure 24. UAS Threshold (15-Minute) Screen

Setting the ES Threshold (24-Hour)

From the Alarm Provisioning Screen, type “4” and press Enter to select ES Threshold (24-Hour). The ES Threshold Screen (**Figure 25**) will appear. Type the number of the desired setting and press Enter.

Setting the SES Threshold (24-Hour)

From the Alarm Provisioning Screen, type “5” and press Enter to select SES Threshold (24-Hour). The SES Threshold Screen (**Figure 26**) will appear. Type the number of the desired setting and press Enter.

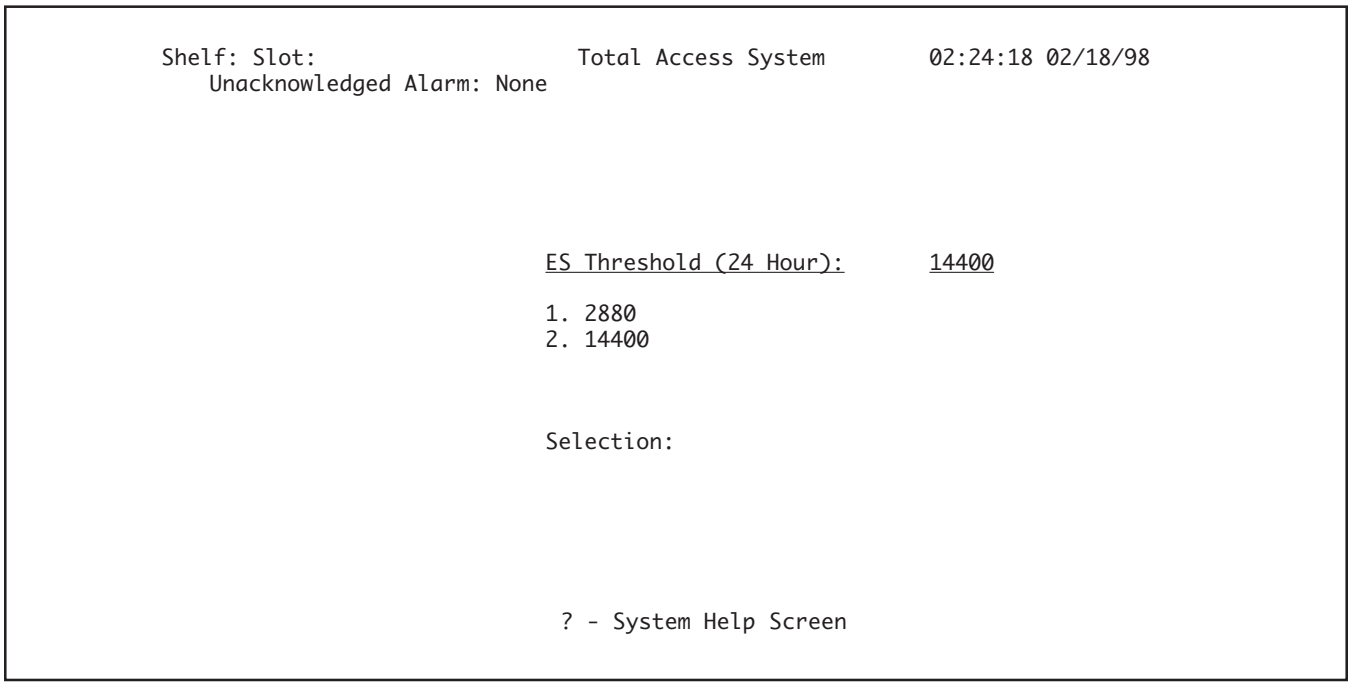

Figure 25. ES Threshold (24-Hour)

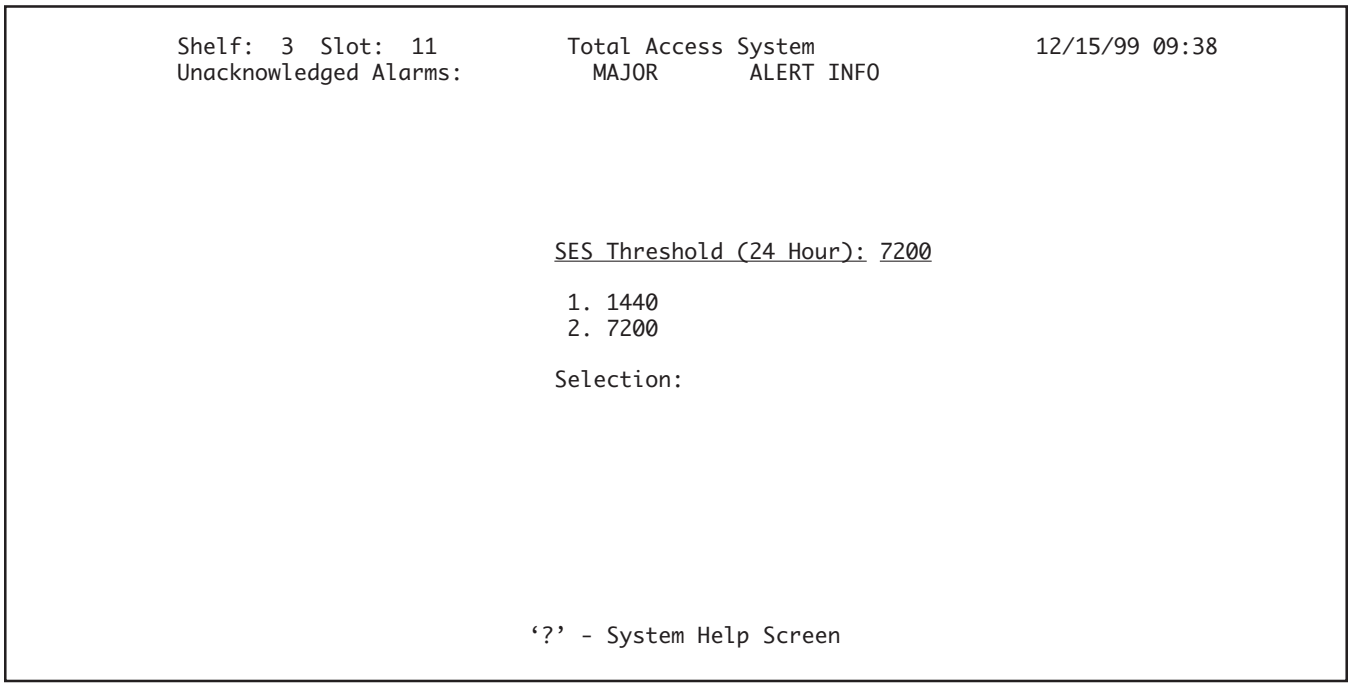

Figure 26. SES Threshold (24-Hour)

Setting the UAS Alarm Threshold (24-Hour)

From the Alarm Provisioning Screen, type “6” and press Enter to select UAS Alarm Threshold (24-Hour). The UAS Alarm Threshold Screen (**Figure 27**) will appear. Type the number of the desired setting and press Enter.

Setting Up Loopbacks for a Test

From the QFO-C Main Menu Screen, type “5” and press Enter to select Test. The Test Screen (**Figure 28**) will appear.

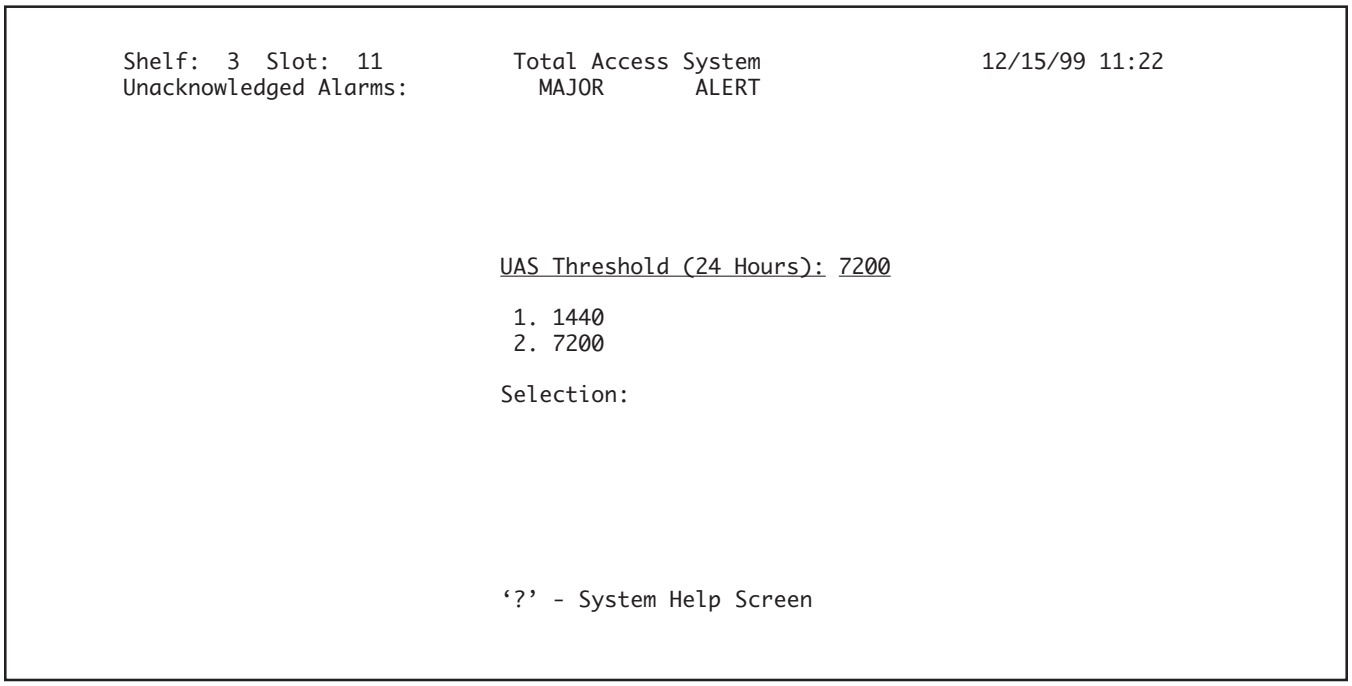

Figure 27. UAS Alarm Threshold (24-Hour)

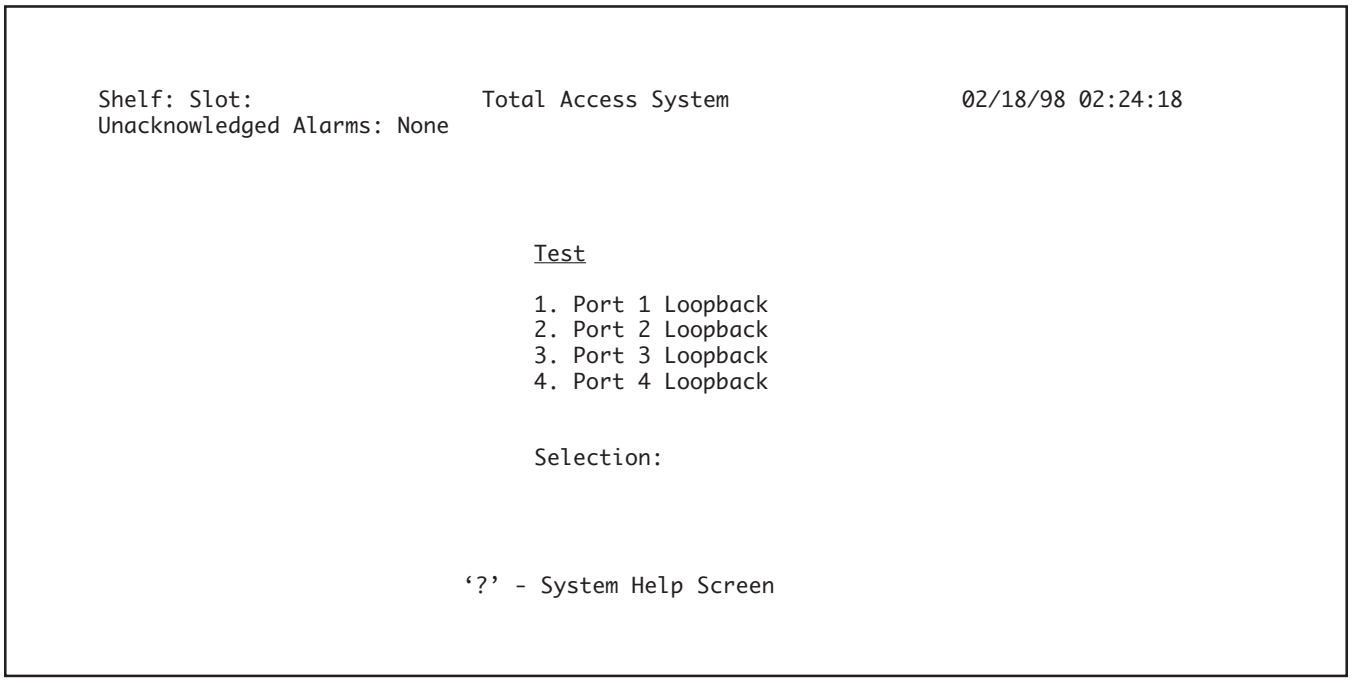

Figure 28. Test Screen

Performing Loopback Testing

1. From the Test Screen, type the number that corresponds to the desired port and press Enter. The Port Test Screen (**Figure 29**) displays.

2. Type "1" and press Enter for remote loopback testing. Type "2" and press Enter for network loopback testing. **Figure 30** displays the Loopback RT screen. Type the number of the desired remote test and press Enter.

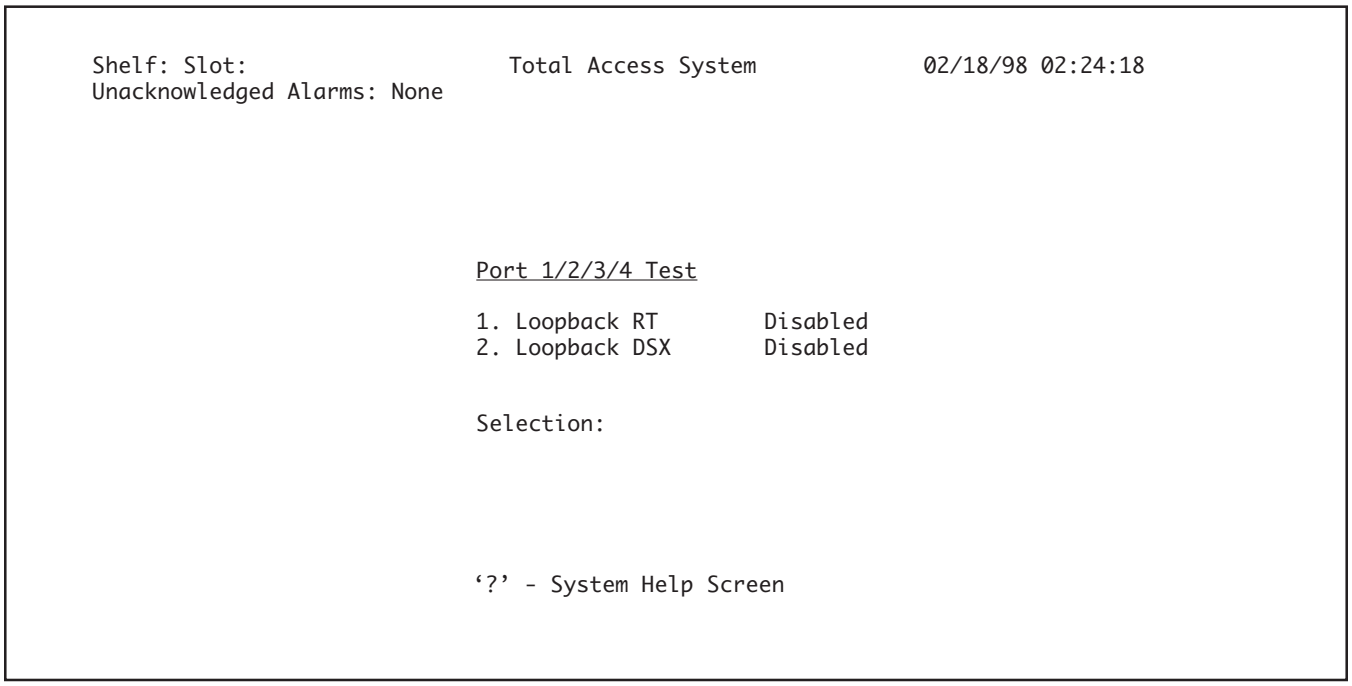

Figure 29. Port Test Screen

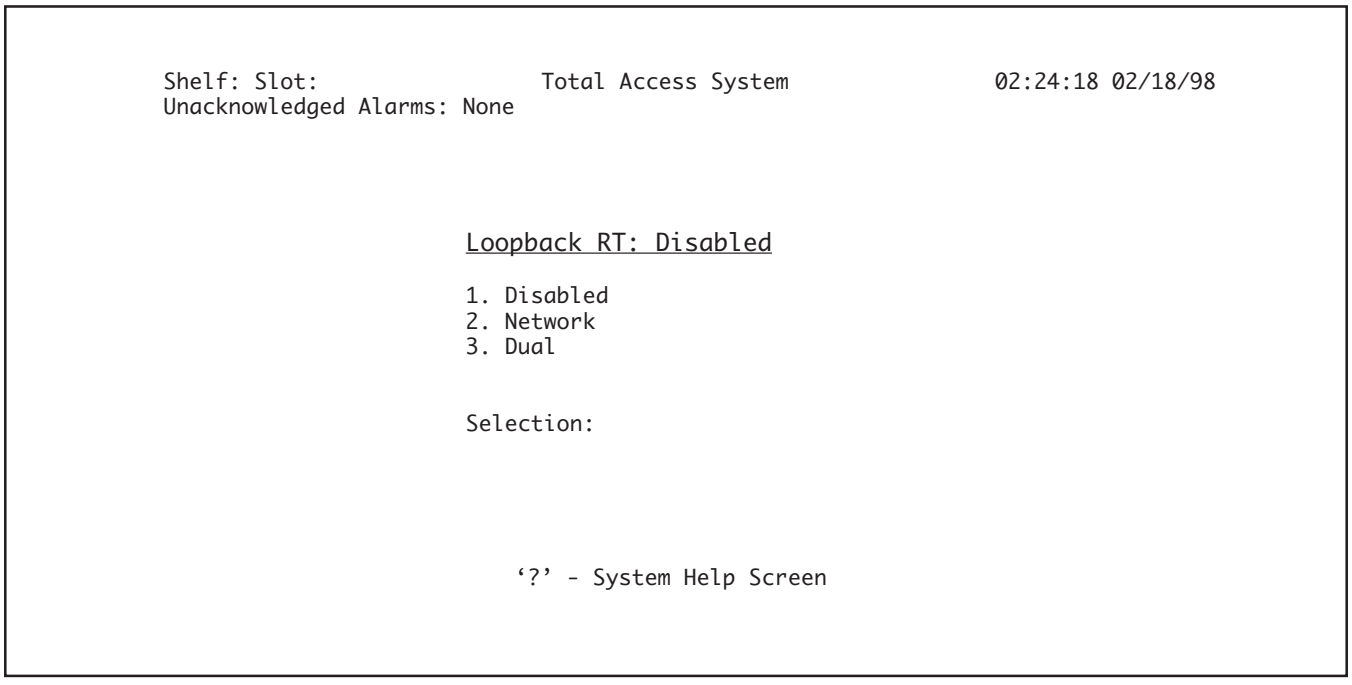

Figure 30. Loopback RT Screen

Figure 31 shows the Loopback DSX Screen. Type the number of the desired DSX test and press Enter.

Accessing the Performance Monitoring Screen

1. From the QFO-C Main Menu screen, type 6 and press Enter to select Performance Monitoring. The Performance Monitoring Screen (**Figure 32**) will appear.

```
SHELF: SLOT:                TOTAL ACCESS SYSTEM              02:24:18 02/18/98
UNACKNOWLEDGED ALARMS: NONE




                            Loopback DSX: Disabled

                            1. Disabled
                            2. Network


                            Selection:




                           '?' - System Help Screen
```

Figure 31. Loopback DSX Screen

```
Shelf: Slot:                Total Access System              02:24:18 02/18/98
Unacknowledged Alarms: None



                              Peformance Monitoring

                              1. Port 1 (Near End)
                              2. Port 2 (Near End)
                              3. Port 3 (Near End)
                              4. Port 4 (Near End)
                              5. Port 1 (Far End)
                              6. Port 2 (Far End)
                              7. Port 3 (Far End)
                              8. Port 4 (Far End)


                              Selection:



                           '?' - System Help Screen
```

Figure 32. Performance Monitoring Screen

Viewing Performance Monitoring Screens

Type the number corresponding to the port and type of Performance Monitoring data desired, Near or Far End and press Enter. The Port Performance Monitoring Screen (**Figure 33**) will display.

NOTE

Port 1, Near End, is shown in Figure 33 as an example. PM options 2 through 8 display the same.

Switching the QFO-C from On Line to Protect

From the QFO-C Main Menu Screen, type "7" and press Enter to select Protection Switching. The Protection Switching Screen for the Working card (**Figure 34**) will appear.

```
Shelf:  3  Slot:  11          Total Access System                12/15/99 11:22
Unacknowledged Alarms:          MAJOR       ALERT

                              Port 1 Performance (Near End)

                  15 Minute Registers                        24 Hour Registers
      ES--SES-UAS-----          ES--SES-UAS                  ES--SES-UAS
      0000   0000  0000    -16  0000   0000  0000           00006  0000  00000
  -1  0000   0000  0000    -17  0000   0000  0000      -1   00000  0000  20373
  -2  0000   0000  0000    -18  0000   0000  0000      -2   00007  0000  00000
  -3  0000   0000  0000    -19  0000   0000  0000      -3   00001  0000  00000
  -4  0001   0001  0000    -20  0000   0000  0000      -4   00000  0000  00000
  -5  0000   0000  0000    -21  0000   0000  0000      -5   00001  0000  00000
  -6  0000   0000  0000    -22  0000   0000  0000      -6   00003  0000  00000
  -7  0000   0000  0000    -23  0000   0000  0000      -7   65533  6553  46373
  -8  0000   0000  0000    -24  0000   0000  0000      -8   00003  0000  00000
  -9  0000   0000  0000    -25  0001   0001  0000
 -10  0000   0000  0000    -26  0000   0000  0000
 -11  0000   0000  0000    -27  0000   0000  0000
 -12  0000   0000  0000    -28  0001   0001  0000
 -13  0000   0000  0000    -29  0000   0000  0000
 -14  0001   0001  0000    -30  0000   0000  0000
 -15  0000   0000  0000    -31  0000   0000  0000
                Press 'N' for Next Page, 'P' for Previous Page
```

Figure 33. Port Performance Monitoring Screen

```
Shelf: Slot:                    Total Access System          02/18/98 02:24:18
Unacknowledged Alarms: None

                                  APS Switching

                                  1. ACT Activate


                                  Selection:



                                '?' - System Help Screen
```

Figure 34. Protection Switch Screen

2. Type “2” and press Enter to switch the Working QFO-C to protect (**Figure 35**).

Setting the Port Circuit ID

1. From the QFO-C Main Menu Screen, type “8” and press Enter to select Circuit ID. The Circuit ID S creen (**Figure 36**) will appear.

```
Shelf: Slot:                    Total Access System      02/18/98 02:24:18
Unacknowledged Alarms: None




                                ACT Activate

                                1. Do Not Switch
                                2. Switch


                                Selection:




                              ‘?’ - System Help Screen
```

Figure 35. Protection Switch Activate Screen

```
Shelf: Slot:                Total Access System              02/18/98 02:24:18
Unacknowledged Alarms: None




                               Circuit ID

                               1. Port 1
                               2. Port 2
                               3. Port 3
                               4. Port 4


                               Selection:



                            ‘?’ - System Help Screen
```

Figure 36. Circuit ID Screen

2. Type the number of the corresponding port whose Circuit ID is to be set or changed and press Enter. The Port Current Circuit ID Screen **(Figure 37)** will display.

3. Type the new Circuit ID and press Enter.

4. MAINTENANCE

The QFO-C requires no routine maintenance to operate properly.

ADTRAN cautions against performing major repairs in the field. Repair services are available if you return damaged units to ADTRAN. (Refer to the "Warranty and Customer Service" subsection of this Practice.)

Refer to **Table 10** for the QFO-C Multiplexer Module Specifications.

5. 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 Services (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

Presales Applications/Postsales 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

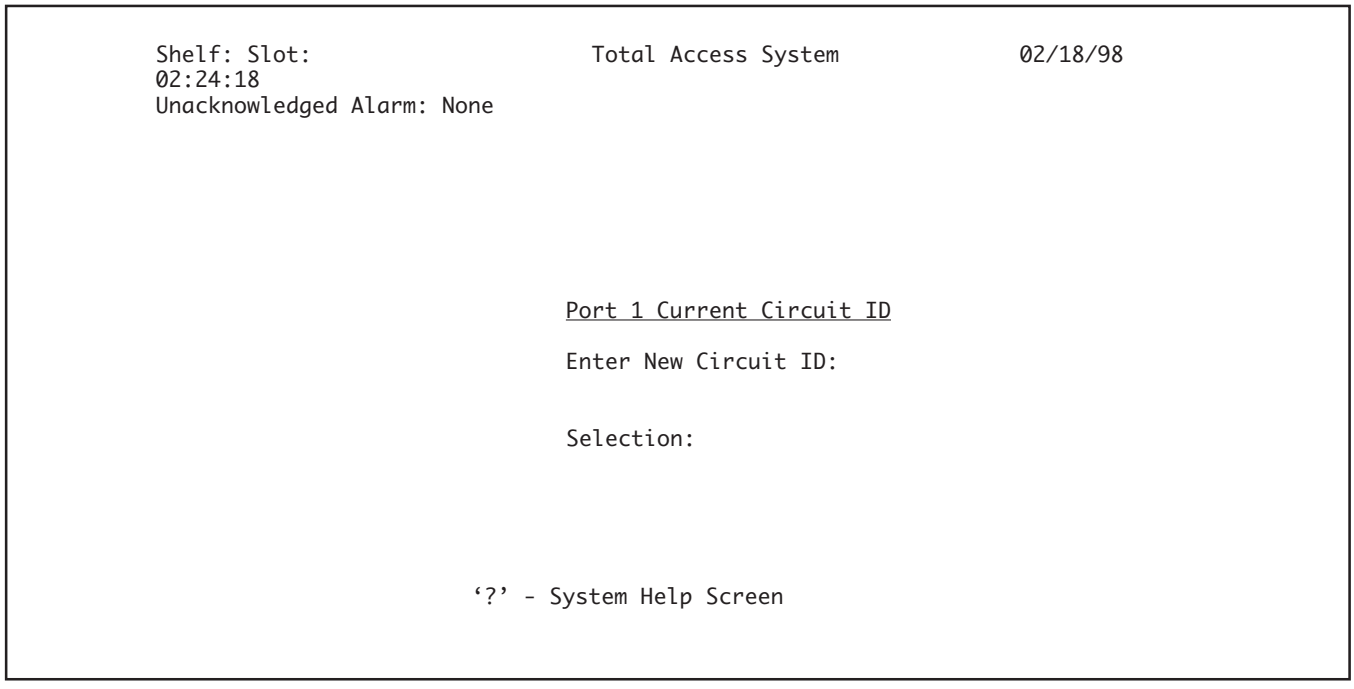

Figure 37. Port Current Circuit ID Screen

Table 10. QFO-C Specifications

DS1

Input Level ..... 0 to -9 dBm
Output Level ..... 0 dB with DSX buildout from 0 to 655 ft. in 133 ft. increments

Data Frequency Acceptance

1.544 Mb/sec. ±200 b/s
In/Out Impedance ..... 100 Ω
Output Jitter ..... < 0.08 UI (unit interval)
Max. Delay ..... Four data bits
Severe BPV Error Threshold ..... 10 -3

Optical Transport

ANSI X3T9.5 Fiber Distributed Data Interface

Optical Specifications

Cable Type ..... 9/125 mm single mode
Connector Type ..... SC (single or duplex)
Operating Wavelength ..... 1310 nm
Transmitter ..... Laser type
Output Launch Power ..... -8 dBm, minimum; -6 dBm, typical
Receiver Sensitivity ..... -30 dBm, minimum; -33 dBm, typical
Receiver Input Level ..... -3.0 dBm maximum
Minimum Optical Budget ..... 22 dBm
Typical Optical Budget ..... 25 dBm

Payload Specifications

Four independent DS1 (1.544) Circuits
Performance/Alarm Overhead (System Use Only)

Temperature Range

Operating ..... -40 to +65° C
Storage ..... -40 to 85° C

Humidity

0 to 95%, non-condensing

General Specifications

Supply Voltage ..... -42 to -56 Vdc
Maximum Power ..... 8 Watts @ -48 Vdc
Supply Current ..... 150mA at -48 Vdc, typical
Dimensions ..... 5.5” Height; .75” Width; 10” Depth
Weight ..... 10.6 oz. in an anti-static bag