QUALSTAR ®

TLS Fibre Channel Option

Installation and Operation Manual

501440 Rev. J

Important Manual/Firmware Revision Information

This manual and the operating firmware for the Tape Library System (TLS) are revised periodically as the product is improved. This manual was revised to correspond with the firmware version indicated below. Do not use this manual with prior versions of the firmware. Check with Qualstar Technical Support about use of this manual with older or newer firmware.

Manual	Corresponding Firmware
Fibre Channel Installation and Operation Manual 501440 Rev. J, 16 March 2009	TLS Executive Firmware 700105 Version: 2.26

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Notices

Qualstar products are covered by one or more of the following patents: 6,271,982 and 6,560,061. Other patents pending.

Qualstar equipment is manufactured from new parts, or new and used parts. In some cases, Qualstar equipment may not be new and may have been previously installed. Regardless, Qualstar's warranty terms apply unless the equipment is specifically identified by Qualstar as "used" or "refurbished".

This equipment has been tested and found to comply with the limits for a Class A computing 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 instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception in which case the user, at his own expense, will be required to take whatever steps are necessary to correct the interference.

European Union Directive 89/336/EEC and Standard EN55022
(Electromagnetic Compatibility)

Warning
This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

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Table of Contents

1. Introduction

1.1 Who Should Read This Manual

This manual covers the TLS Fibre Channel Option (FCO) and is written for the installing technician and the user/operator.

For information about the operation of various libraries, SCSI interface, or other information outside the scope of this manual, please refer to the appropriate documents listed below.

Subject	Document	Qualstar Document Number
SCSI Command Information	TLS-4000 SCSI-2 Interface Manual	500523
	TLS-5000/6000/8000 SCSI-2 Interface Manual	501205
Installation and Operation	TLS-4000 Installation and Operation Manual	501370
	TLS-412xxx Installation and Operation Manual	501300
	TLS-5000/6000/8000 Installation and Operation Manual	501450
Service	TLS-4000 Technical Service Manual	501380
	TLS-412xxx Technical Service Manual	501290
	TLS-5000/6000/8000 Technical Service Manual	501090
Specifications	TLS-4000 Product Specification	500563
	TLS-412xxx Product Specification	500119
	TLS-5000 Product Specification	501561
	TLS-6000 Product Specification	501080
	TLS-8000 Product Specification	501498
Supported Tape Drives	Product Information Note	PIN-014
Approved Data Cartridges	Product Information Note	PIN-038
SCSI-2 Specifications	ANSI Document X3.131-1994	N/A
SCSI SPI-2 Specifications	ANSI Document X3.302-1998	N/A

Table 1-1   Applicable Documents

Although Qualstar has made every effort to insure the accuracy of the information contained in this manual, no guarantee is expressed or implied that the manual is error-free. Qualstar reserves the right to make changes at any time without prior notification.

The Qualstar TLS is a sophisticated, state-of-the-art computer peripheral. It should only be serviced by a competent service technician who is experienced with the operation and maintenance of tape libraries, and only after reading and understanding this manual and the Installation and Operation and Technical Service Manuals for the respective libraries.

1.2　Important Safety Information

All of the operating instructions and maintenance procedures in Qualstar manuals must be followed to prevent personal injury or damage to the equipment. In the interests of safety, there are two kinds of warnings used in Qualstar documents, as shown below.

DANGER

PERSONAL INJURY MAY RESULT IF YOU DO NOT FULLY COMPLY WITH THE HANDLING, OPERATING, OR SERVICE INSTRUCTIONS FOUND IN A DANGER PARAGRAPH.

GEFAHR

UNSACHGEMAESSE BENUTZUNG, BEDLENUNG ODER RAPARATUR AUFGRUND VON NICHTBEACHTUNG DER SICHERHEITSANWEISUNG KANN ZU VERIETZUNGEN FUEHREN.

CAUTION

EQUIPMENT DAMAGE OR LOSS OF DATA may result if you do not fully comply with the handling, operating, or service instructions found in a CAUTION paragraph.

In addition, useful information and tips may be found throughout the document in the following formats:

NOTE

SPECIAL ATTENTION to explanatory statements found in a NOTE paragraph will help you avoid mistakes and/or save time.

2.   Unpacking

When not delivered installed on a library, the Fibre Channel Option is shipped in a
specially designed carton. The shipping carton contains the following items:

A Fibre Channel Option
This Installation and Operation Manual

NOTE

*Before unpacking the unit, check the shipping container for damage, and report all shipping
damage to the carrier before opening the carton.*

1.   Open the carton and lift out the FCO assembly.

2.   Remove the packing material from the FCO assembly and put it back into the
     carton.

NOTE

*Be sure to save the shipping carton and packing material in case reshipment should ever be-
come necessary.*

3.   Product Description

3.1   General Description

The Fibre Channel Option (FCO) connects TLS-4000, 412xxx, 8000 and 88xxx libraries to Fibre Channel (FC).

There are three Fibre Channel Option configurations available for single and dual bay TLS libraries. Type C models incorporate a single channel Fibre Channel router, enclosed in an assembly, mounted to the back of the TLS library. Type B and ATTO™ models contain a dual channel Fibre Channel router and are designed to be rack mountable.

Fibre Channel Option Type C for TLS-84xx libraries are installed when they are shipped from the factory. All other models have the Fibre Channel Option shipped separately from the libraries and require installation in the field. They are attached to the rear of the TLS, taking the place of the rear service panel.

The installation and operation of the various library models is virtually identical. Models 412xxx and 88xxx are referred to as dual bay libraries because they contain dual drive bays. All other TLS models are single bay libraries. Differences among the models are noted where required.

FCO Type	Qualstar P/N	Transfer Rate	FC Channels	SCCI Buses	FC Interface Type	Q-Link Included
C	501420-02-0	2GB	Single	2	SFP-2GB	Yes
B	648-0003-0	2GB	Dual	6	GBIC-2GB	Yes
ATTO	648-0006-3	4GB	Dual	2	SFP-4GB	Yes

Table 3-1   FCO Descriptions

3.2   Models

Type C
Fibre Channel Options
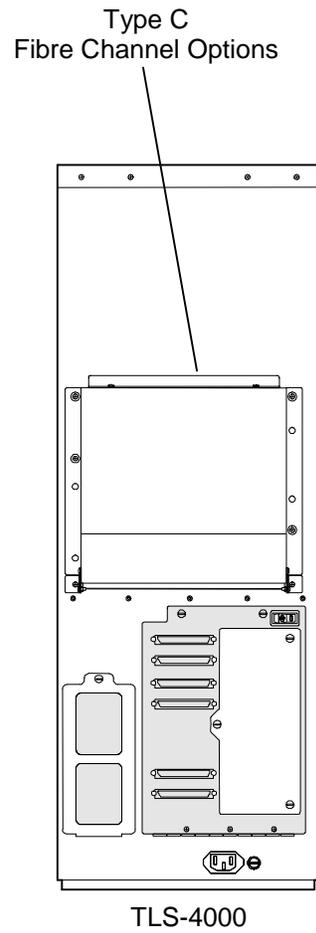
TLS-4000

Figure 3-1   Type C Fibre Channel Option Installed on a TLS-4000 Library
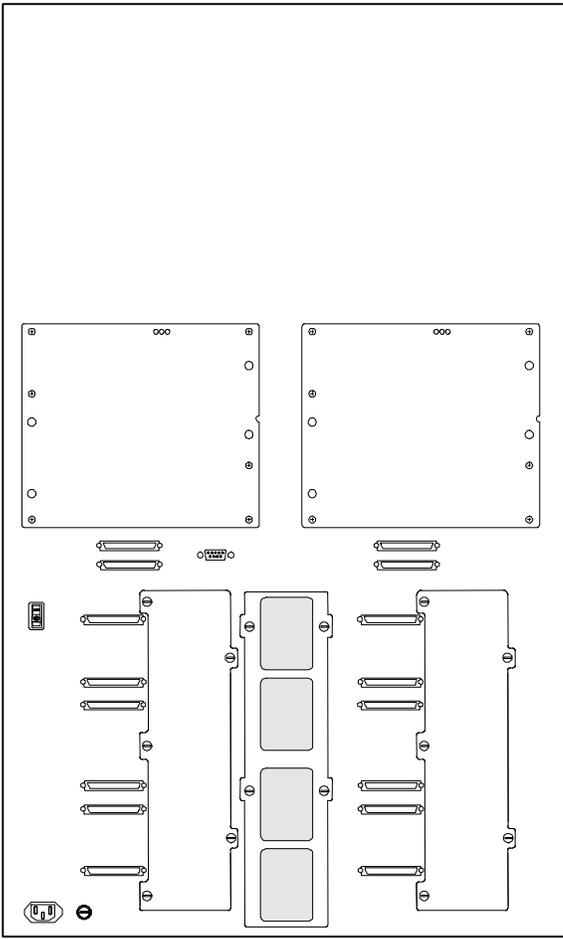
Type B Fibre Channel Options
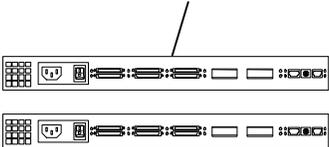
Figure 3-2   Type B Fibre Channel Option Installed next to a TLS-412xxx Library
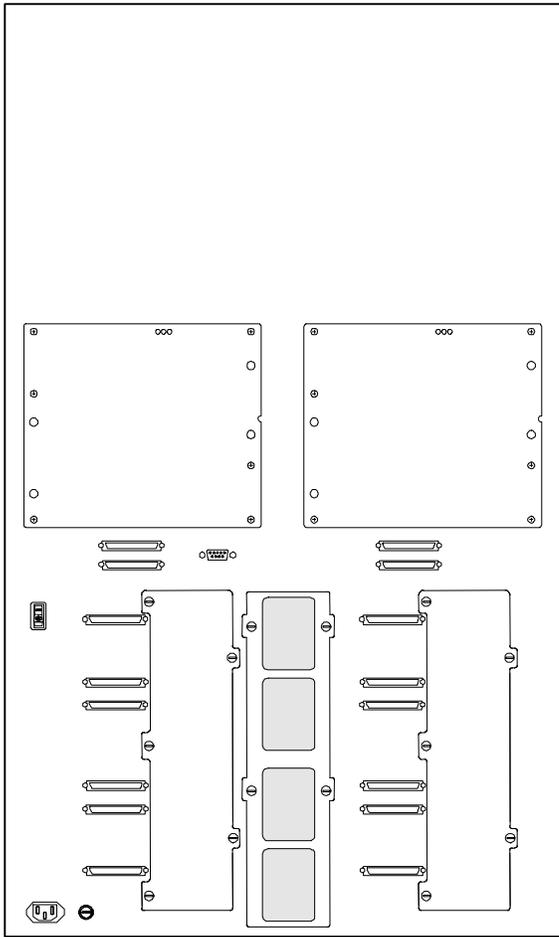
ATTO Fibre Channel Options
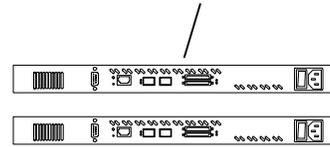
Figure 3-3   ATTO Fibre Channel Option Installed next to a TLS-412xxx Library

4.   FCO Type C Installation

4.1   Fibre Channel Option (FCO) Type C Installation Considerations

4.1.1   Operating Environment

A TLS with the Fibre Channel Option is designed to operate in an ambient environment from 41°F to 95°F (5°C to 35°C), 20% to 80% relative humidity, and at altitudes from -1000 to +10,000 feet. Moisture must not be allowed to condense inside the system.

4.1.2   Ventilation

When selecting a location for the TLS, be sure to provide sufficient space behind the unit to allow for cable connections. Also, be sure nothing will block the air intake at the inlet air filters or the top air vent slots.

4.2   FCO Type C Interconnect Cabling

The Fibre Channel Option for TLS-84xx libraries is installed when they are shipped from the factory. All other models have the Fibre Channel Option shipped separately from the libraries and require installation in the field. They are attached to the rear of the TLS, taking the place of the rear service panel. All the bridge/router interconnect cables are accessed at the rear of the unit.

Fibre Channel 0

Serial Jumper
Connectors

Q-Link 10BaseT

SCSI Channel 1

SCSI Channel 0

Reset Button

ACTIVITY CHANNEL 1 LED
(SCSI)

LINK LED
(Fibre Channel)

FAULT LED

+5V FCO LED

+5V EXEC LED

ACTIVITY CHANNEL 0 LED
(SCSI)

+12V LED

LINK LED
(Q-Link)

ACTIVITY LED
(Fibre Channel)

STATUS OK LED

ACTIVITY LED
(Q-Link)
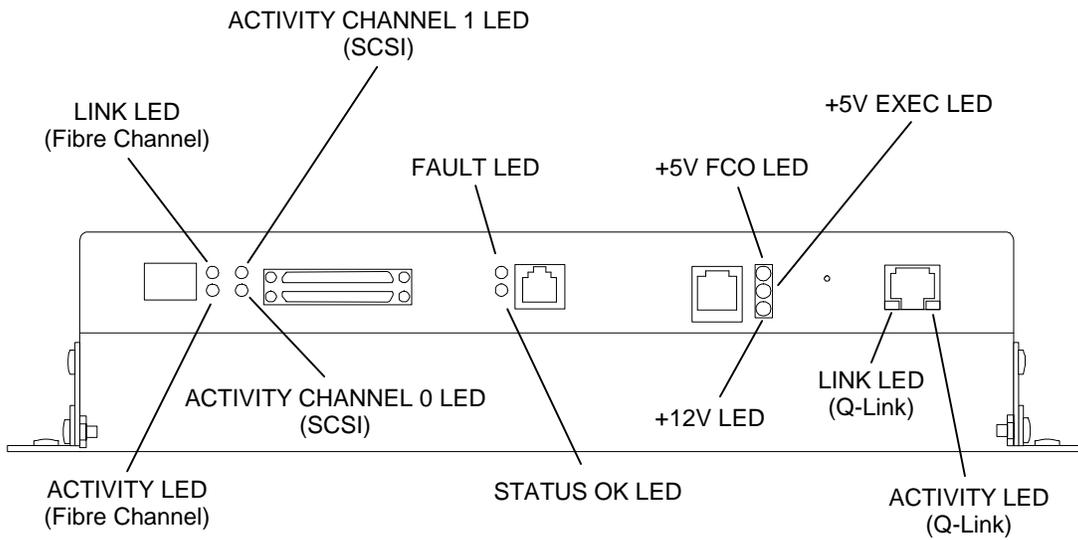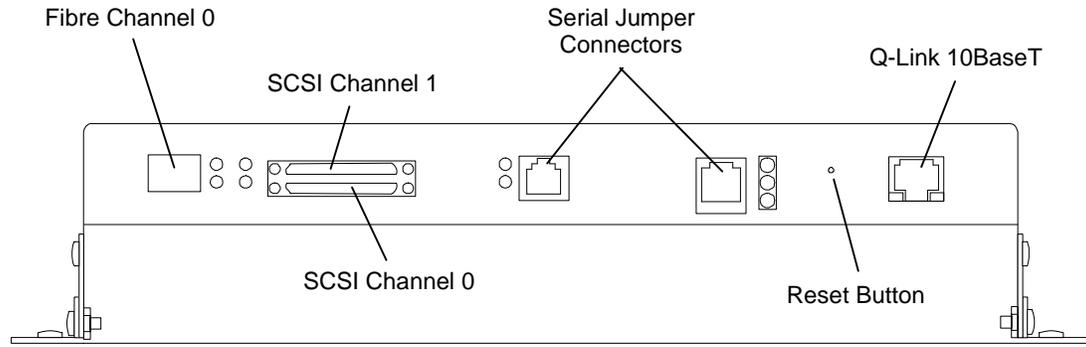
Figure 4-1   Bottom View of the Type C Fibre Channel Bridge/Router (FCO)

The following table briefly describes the components located on the bottom of the
FCO.

Component	Description
Fibre Channel 0	Small Form Factor Pluggable (SFP) transceiver socket. The receptacle is a 2 Gbit Fibre Channel SFP transceiver.
SCSI Channel 0 and 1	The SCSI Ultra 160 channels used to attach the TLS medium changer and tape drives.
Serial Jumper Connectors	The serial bridge cable provides a serial communication link between the FCO and the TLS library. This interface is used to configure the FCO.
Reset Button	The reset button is used to reset the Q-Link processor.
Q-Link 10 BaseT	The Q-Link Ethernet interface connection.
Activity LED (Fibre Channel)	On (green) when the Fibre Channel is active. Off when there is no Fibre Channel I/O activity.
Link LED (Fibre Channel)	On (green) when the Fibre Channel link is connected and established. Off when the Fibre Channel link is disconnected and/or not established.
Activity Channel 0 &1 LEDs (SCSI)	On (green) when SCSI bus is active or busy.
Fault LED	Solid on (red) when a fatal error condition is present. This indicator will be on during power-on diagnostics, and is extinguished after successful completion of the power-on sequence.
Status OK LED	Solid on (yellow) when the FCO is operational.
+5V FCO LED	Solid on (green) when the FCO +5volt power is present.
+5V EXEC LED	Solid on (green) when the Executive PCBA +5volt power is present.
+12V LED	Solid on (green) when the Executive PCBA +12volt power is present.
Link LED (Q-Link)	Solid on (green) when the 10BaseT link is connected.
Activity LED (Q-Link)	On (yellow) when then 10BaseT link is active or busy.

Table 4-1   Components Located on Bottom of FCO

4.3 Cabling for TLS-42xx (using AIT-3 or 5 Tape Drives), TLS-44xx and TLS-46120 (using AIT-3 Tape Drives)

Note that all TLS models are shipped from the factory without the SCSI interconnect cables or terminators installed. The following figures and tables represent the preferred cabling for a library with two to six tape drives.
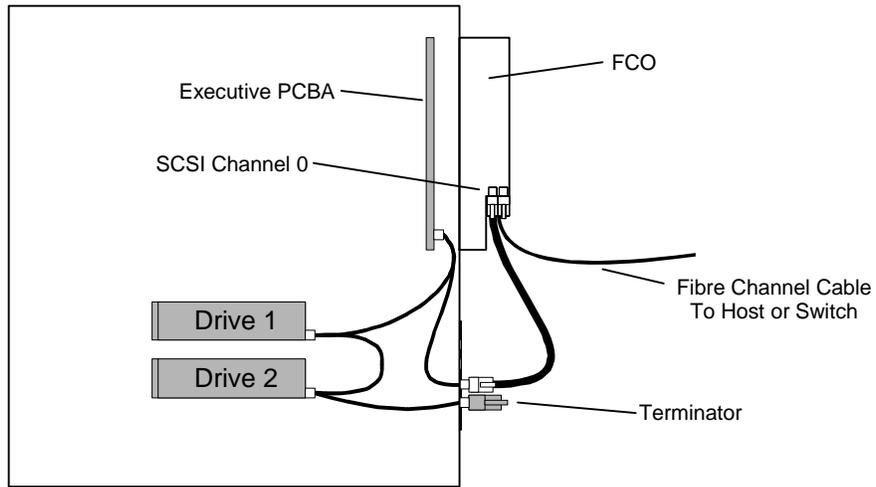
Figure 4-2   TLS-42xx Cabling Diagram

Connectors on Rear of FCO	Connectors on Rear of TLS-42xx
FCO: SCSI Channel 0	Medium Changer
	Tape Drive 1 (T1)
	Tape Drive 2 (T2)
FCO: SCSI Channel 1	None
FCO: Serial Jumper	

Table 4-2   Preferred TLS-42xx Fibre Channel Option Cable Connections
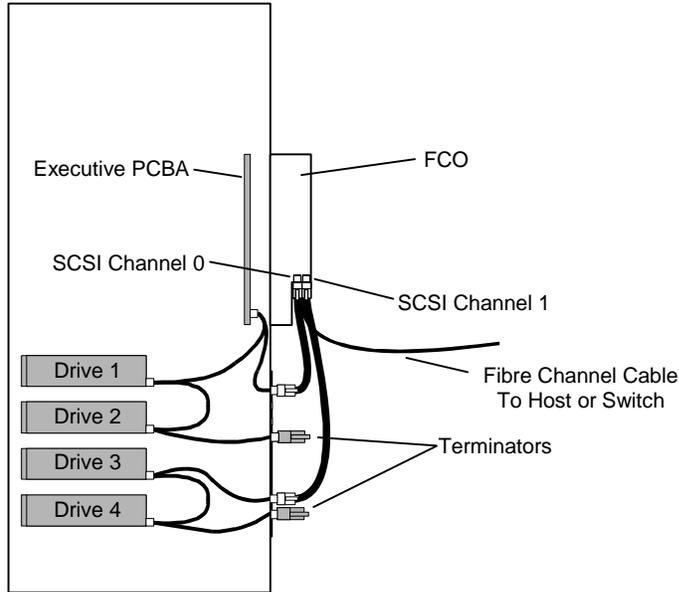
Figure 4-3 TLS-44xx Cabling Diagram using AIT-3 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-44xx
FCO: SCSI Channel 0	Medium Changer
	Tape Drive 1 (T1)
	Tape Drive 2 (T2)
FCO: SCSI Channel 1	Tape Drive 3 (T3)
	Tape Drive 4 (T4)
FCO: Serial Jumper	

Table 4-3 Preferred TLS-44xx Fibre Channel Option Cable Connections for AIT-3 Tape Drives

Executive PCBA

FCO

SCSI Channel 0

SCSI Channel 1

Fibre Channel Cable
To Host or Switch

Drive 1
Drive 2
Drive 3
Drive 4
Drive 5
Drive 6

Terminators
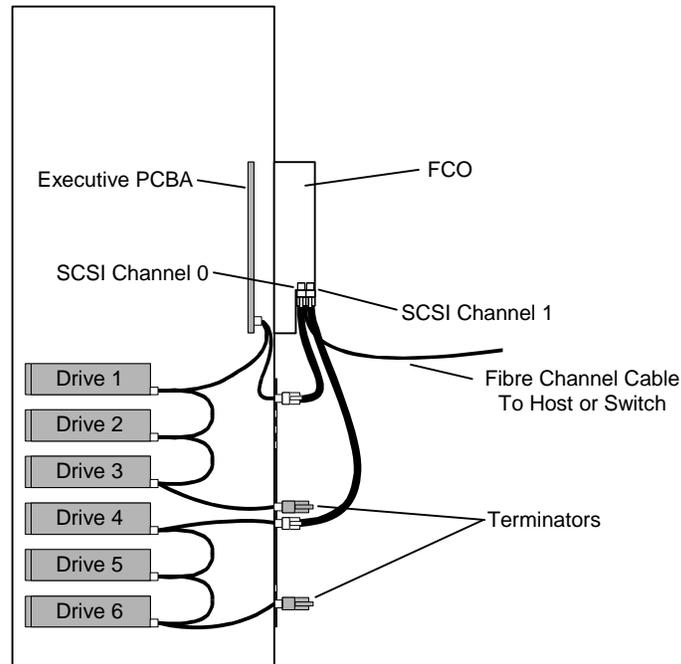
Figure 4-4   TLS-46xxx Cabling Diagram using AIT-3 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-46xxx
FCO: SCSI Channel 0	Medium Changer
	Tape Drive 1 (T1)
	Tape Drive 2 (T2)
	Tape Drive 3 (T3)
FCO: SCSI Channel 1	Tape Drive 4 (T4)
	Tape Drive 5 (T5)
	Tape Drive 6 (T6)
FCO: Serial Jumper	

Table 4-4   Preferred TLS-46xxx Fibre Channel Option Cable Connections for AIT-3 Tape Drives

4.4   Cabling for TLS-8000 and 88xxx Libraries

Prior to installing a Fibre Channel Option on TLS-8000 or 88xxx libraries the tape drive assemblies may need to be installed in the library and the drives will need to be cabled as shown in this section. Refer to the Installation section in the TLS-5000/6000/8000 Installation and Operation Manual (Qualstar document number 501450) for details about tape drive assembly preparation, enabling SCSI termination power and installation.

Note that all TLS models are shipped from the factory without the SCSI interconnect cables or terminators installed.

The following figures and tables represent the preferred cabling for a library with two to eight tape drives.
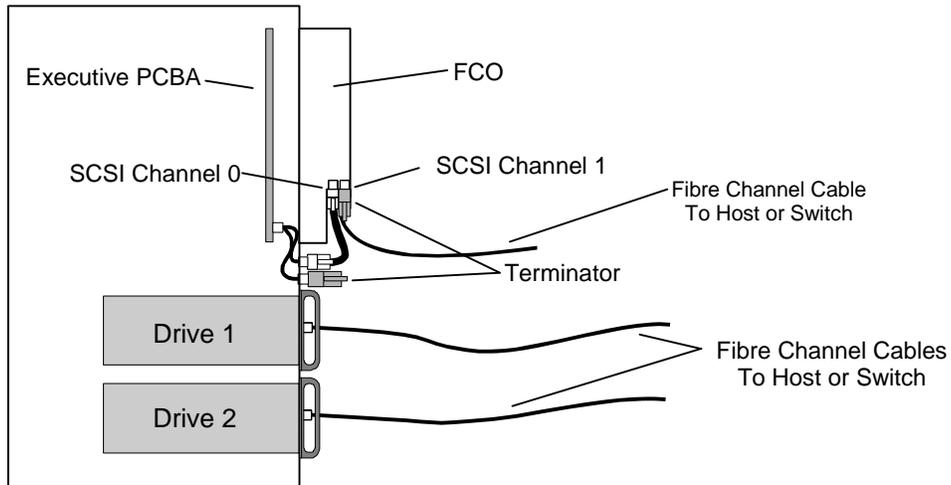
Figure 4-5   TLS-82xx Cabling Diagram

Connectors on Rear of FCO	**Connectors on Rear of TLS-82xx**
FCO: SCSI Channel 0	Medium Changer
FCO: SCSI Channel 1 (Terminator)	
FCO: Serial Jumper	

Table 4-5   Preferred TLS-82xx Fibre Channel Option Cable Connection

Executive PCBA

FCO

SCSI Channel 0

SCSI Channel 1

Terminator

Terminator

Fibre Channel Cable
To Host or Switch

Drive 1

Drive 2

Drive 3

Drive 4

Fibre Channel Cables
To Host or Switch
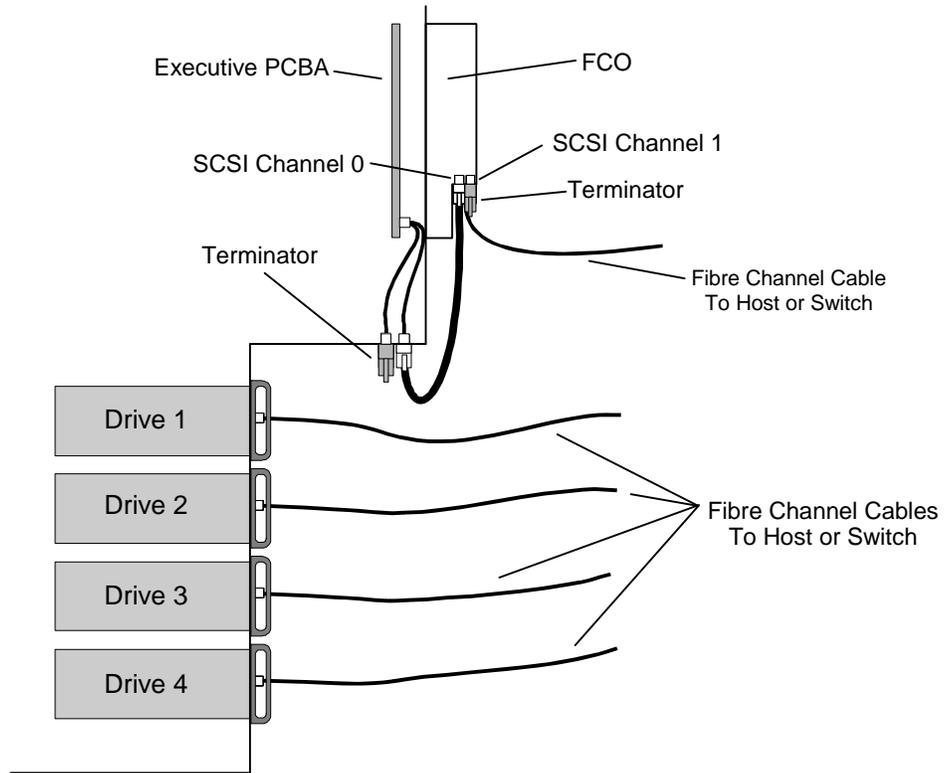
Figure 4-6   TLS-84xx Cabling Diagram

Connectors on Rear of FCO	Connectors on Rear of TLS-84xx
FCO: SCSI Channel 0	Medium Changer
FCO: SCSI Channel 1 (Terminator)	
FCO: Serial Jumper	

Table 4-6   Preferred TLS-84xx Fibre Channel Option Cable Connections
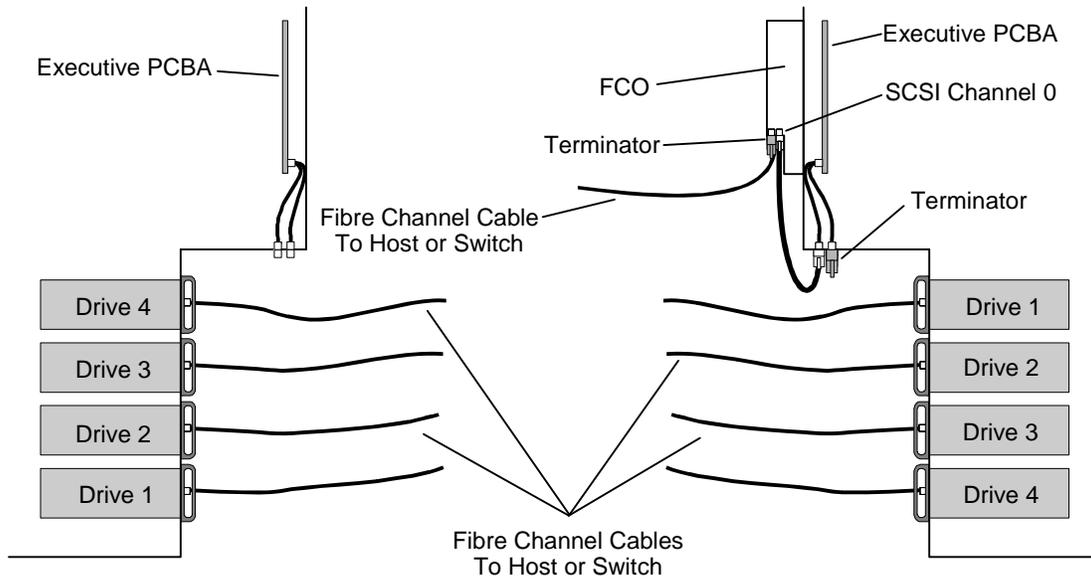
Figure 4-7   TLS-88xxx Cabling Diagram

Connectors on Rear of FCO	**Connectors on Rear of TLS-88xxx Library**
Left FCO: SCSI Channel 0 (Terminator)	Left Medium Changer
Left FCO: SCSI Channel 1	
Left FCO: Serial Jumper	
Right FCO: SCSI Channel 0	*Right Medium Changer* *Right Tape Drive 1 (RT1)* *Right Tape Drive 2 (RT2)*
Right FCO: SCSI Channel 1	
Right FCO: Serial Jumper	

Table 4-7   Preferred TLS-88xxx Fibre Channel Option Cable Connections

4.5   Installing a Fibre Channel Option

CAUTION

Be sure to turn the library's power off before installing or removing a Fibre Channel Option.

4.5.1   Installation

The following steps outline the actions necessary to install a Fibre Channel Option onto a library.

1.   Remove power from the TLS: first turn the power switch off and then remove the power cord.

2.   Using a Phillips screwdriver remove the six screws securing the service panel on the rear of the library – refer to Figure 4-8. Depending of the model of library, the service panel may not have ventilation slots. Care must be taken to not re-move the four screws securing the heatsink panels. Save the service panel for possible future use.

Phillips Screws (6)

Do not remove these screws

Do not remove these screws
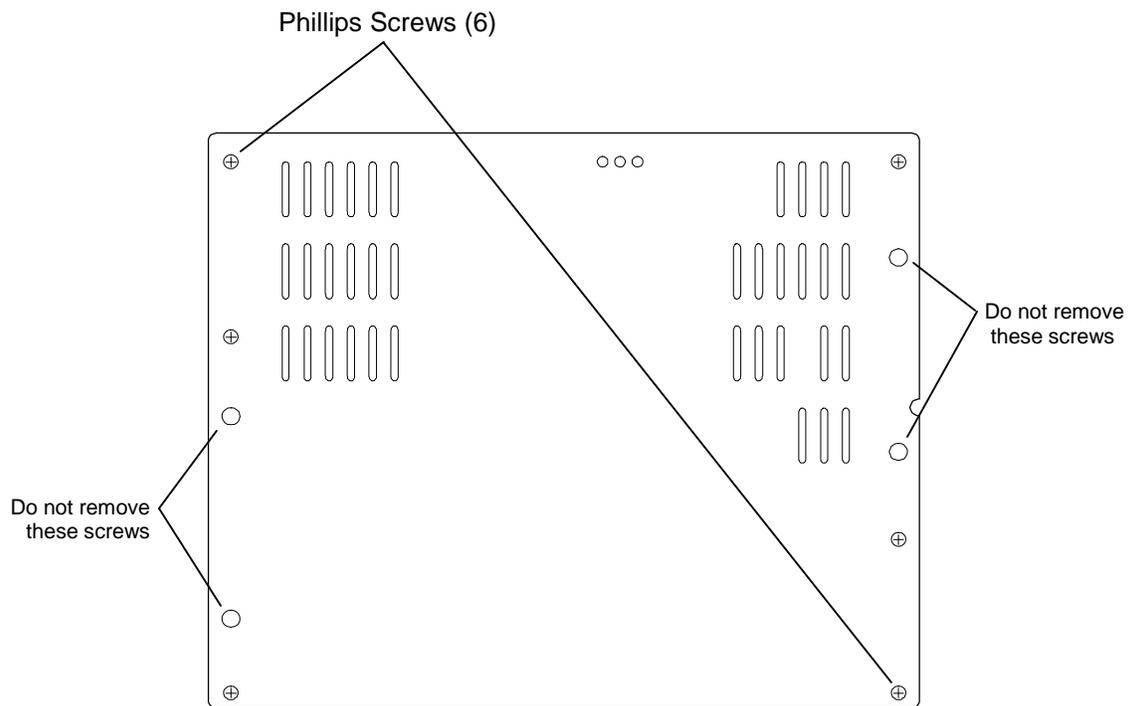
Figure 4-8   Service Panel

3.   Place the lower lip of the FCO inside the bottom edge of the service panel open-ing and tilt the FCO upwards, making sure that the heatsink panel screws align with the openings in the FCO. See Figure 4-9. The hinge surfaces should rest flat against the rear of the library.

4.   Using a Phillips screwdriver, secure the FCO to the rear of the library at the FCO's two top captive screws. See Figure 4-9.

5.   Using two of the screws that were removed with the service panel, attach the FCO's two hinges to the rear of the library. See Figure 4-9.
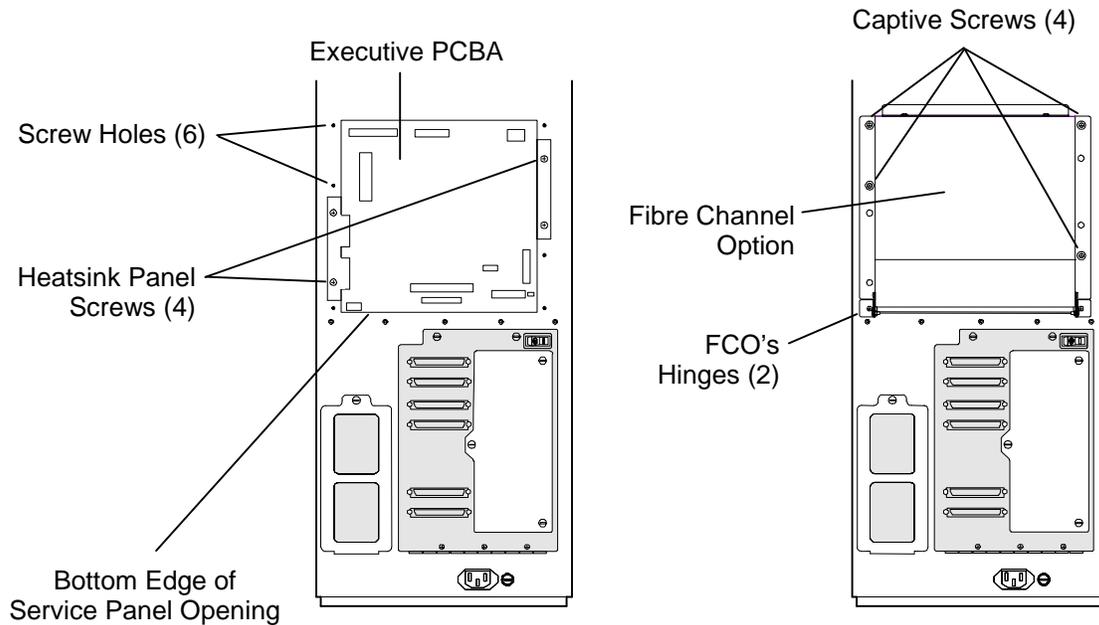
Figure 4-9   Rear View of TLS

6.   Loosen the two top captive screws on the FCO that were tightened in step number four. Carefully guide the FCO backwards as it pivots on the hinges and comes to its open position. See Figure 4-10.
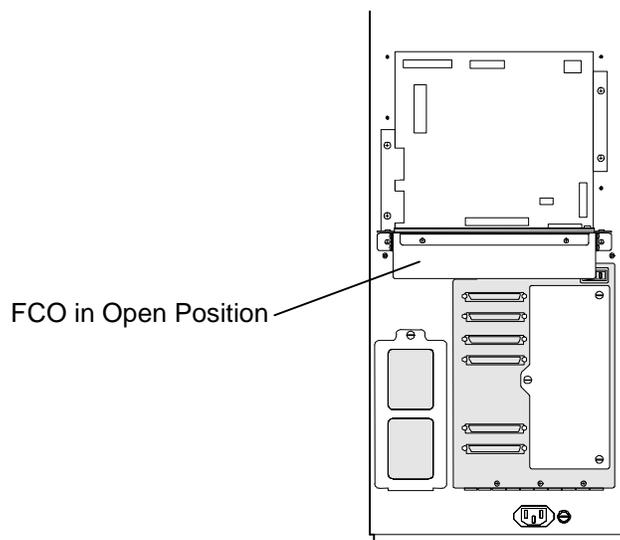
Figure 4-10   Fibre Channel Option in the Open Position

7.   Connect the AUXPWR cable to the AUXPWR connector on the Executive PCBA and to the PWRIN connector on the Fibre Channel Option. See Figure 4-11 and Figure 4-13.

Executive PCBA

AUXPWR Cable

SERIAL
Ribbon Cables

Fibre Channel Option
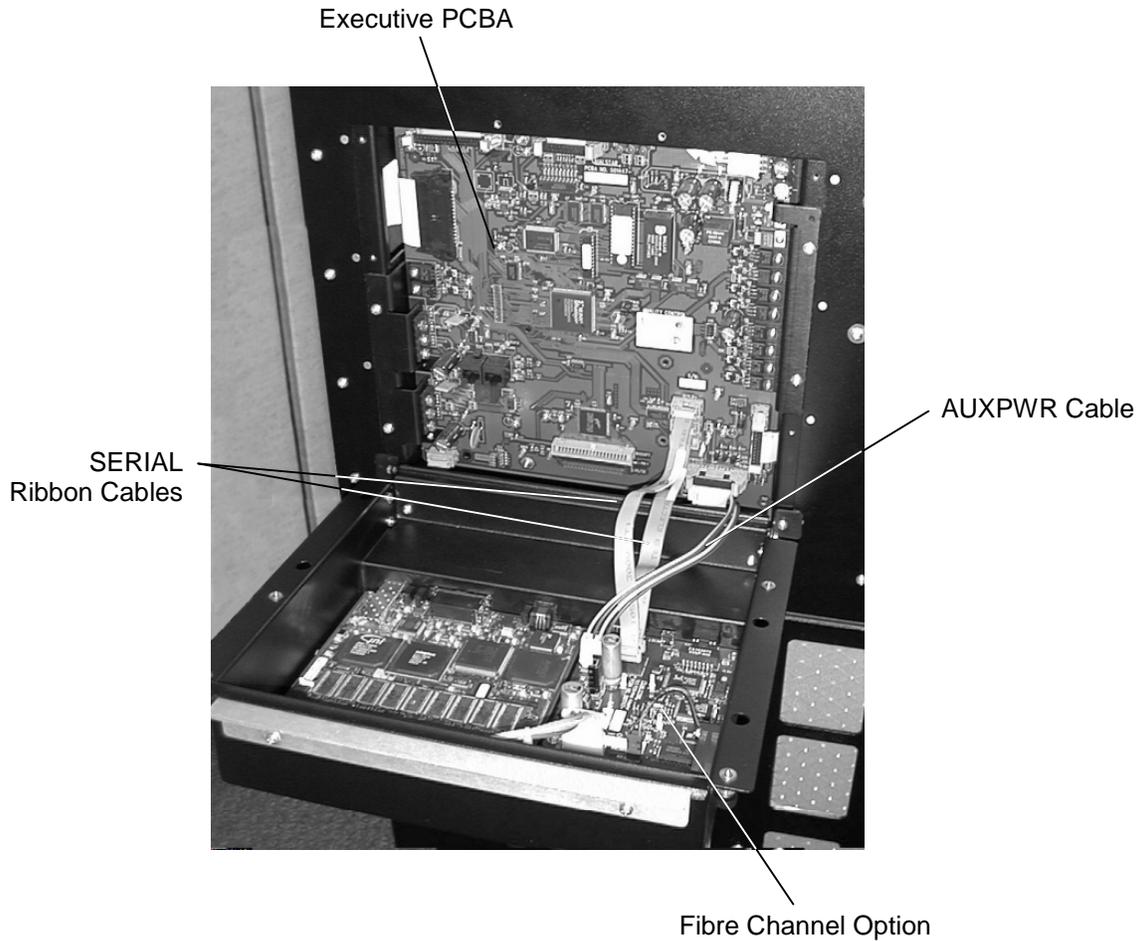
Figure 4-11   Executive PCBA and Fibre Channel Option (Executive IV PCBA Shown)

8.   The FCO's SERIAL ribbon cable will connect to differently named connectors on
the Executive PCBA depending on which version of Executive PCBA is installed
in the library. Executive III PCBA's will have part number 501387-printed on
them and Executive IV boards will have part number 501447- on them. Refer to
Figure 4-12 to determine which version of Executive PCBA the FCO is being
connected to.

PCBA NO. 501387- = Executive III

PCBA NO. 501447- = Executive IV

SERLB

SERIAL

SERLA

SE/LVD

AUXPWR

LVD/SE

AUXPWR
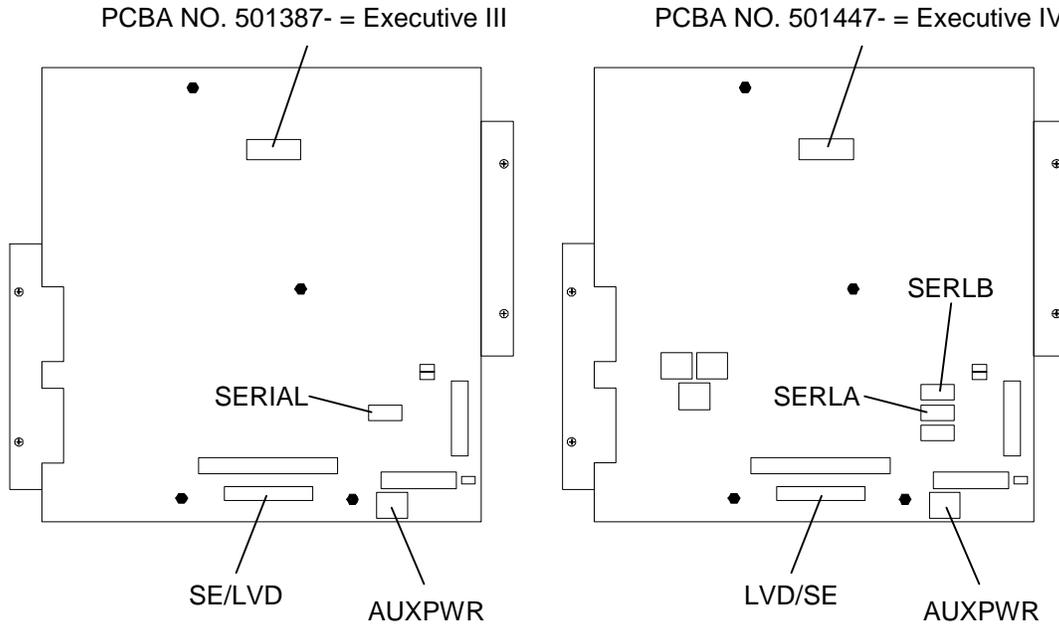
Figure 4-12   Executive PCBA Identification

9.   Make sure that the Red edge of the ribbon cable faces to the right side when the cable is installed. Connect the SERIAL ribbon cable to the SERIAL connector on Executive III PCBA's or to the SERLA connector on Executive IV PCBA's. Route the SERIAL cable under the AUXPWR cable as shown in Figure 4-11 and connect it to the FCO_A connector on the FCO (Figure 4-13).

10.   For those FCOs that also have Q-Link, connect the second SERIAL ribbon cable to the SERLB connector on the Executive IV PCBA. Route the second SERIAL cable under the AUXPWR cable as shown in Figure 4-11 and connect it to the Q_LINK connector on the FCO (Figure 4-13).
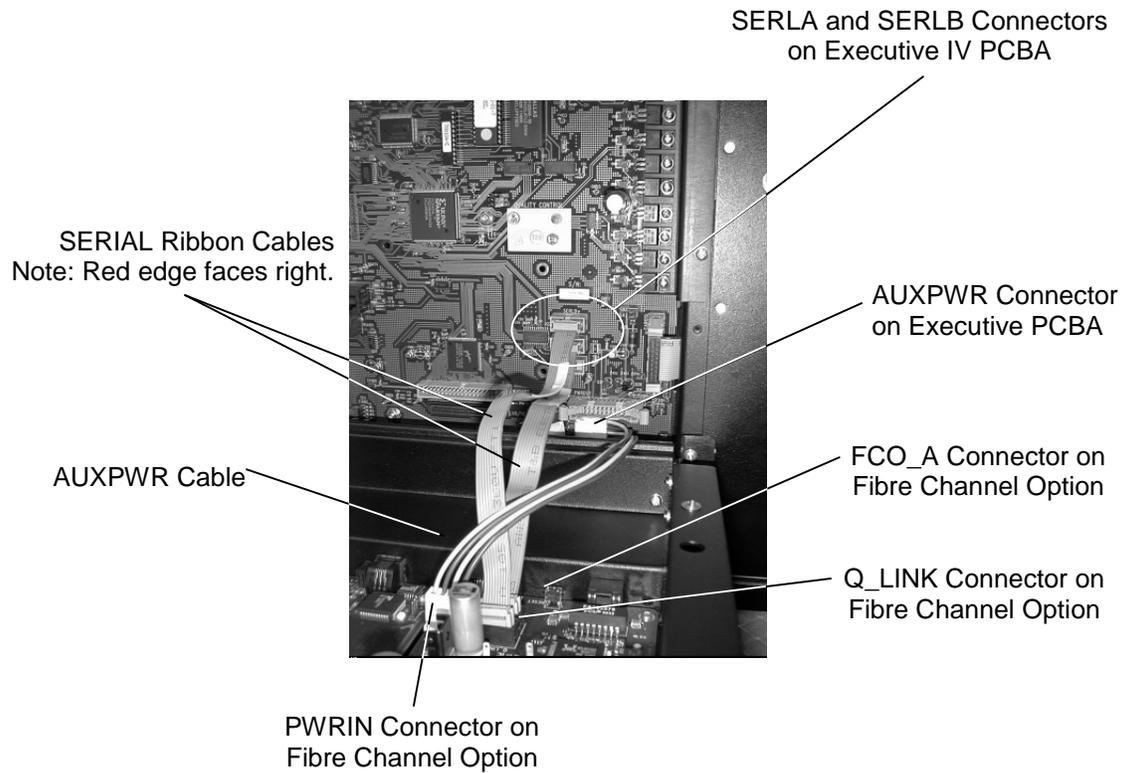
Figure 4-13 Detail of Connections (Executive IV PCBA Shown)

11. Carefully lift the FCO until it touches the rear of the TLS. Using a Phillips screwdriver, secure the Fibre Channel Option to the rear of the TLS by tightening all four of the captive screws. Refer to Figure 4-9 for captive screw locations.

12. Install the FCO serial communication bridge cable. The serial communication bridge cable is a short telephone type cable with a six-conductor RJ11 plug on each end. Insert each ended of the serial communication bridge cable (P/N-510149-01-6) into the RJ11 jacks on the FCO. See Figure 4-14.
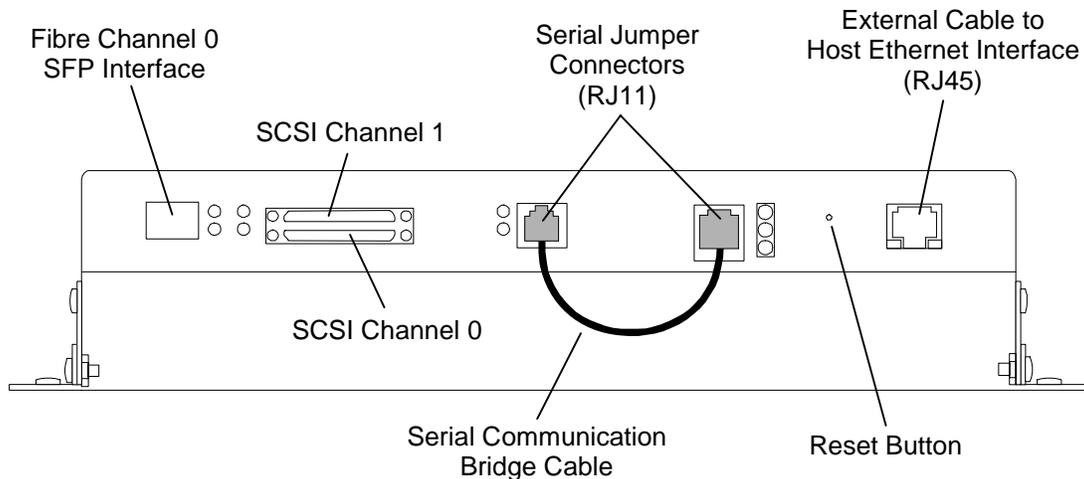
Figure 4-14   Install the FCO serial communications bridge cable (bottom view of the FCO)

13. Prepare to insert the appropriate SFP (Small Form Factor Pluggable) transceiver into the FCO. Note that the SFP adapter is keyed and the small circuit board connector is facing you when oriented correctly. See Figure 4-15. Locate the rectangular opening in the bottom of the Fibre Channel Option and insert the SFP transceiver connector end first. Then carefully guide the SFP transceiver into the FCO until it clicks into place. Refer to Figure 4-16.
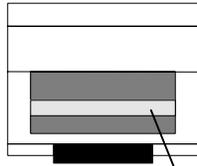
Small circuit board is facing you
when oriented correctly for insertion.

Figure 4-15   End View of Small Form Factor Pluggable Transceiver
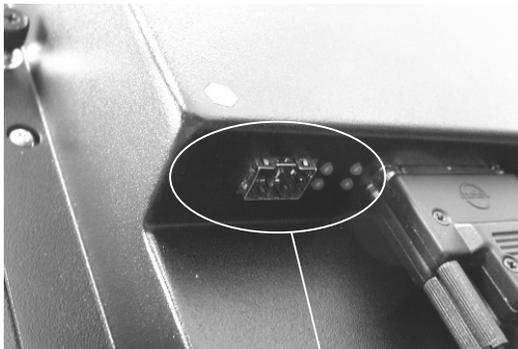
Rectangular opening in bottom
of Fibre Channel Option.
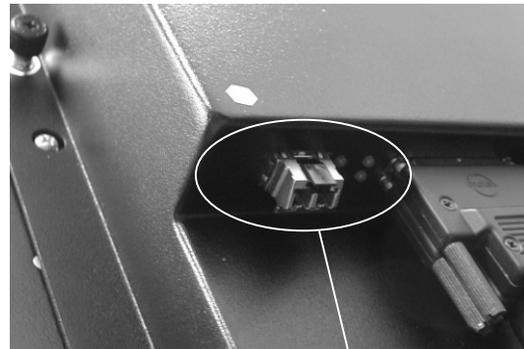
SFP adapter fully inserted
into Fibre Channel Option.

Figure 4-16   Inserting SFP Adapter into Fibre Channel Option

4.6   Initializing the Fibre Channel Option

After physically installing the Fibre Channel Option onto the library, disconnect (if connected) the Fibre Channel Option from the FC host or Hub to avoid affecting any operational systems.

NOTE

Refer to the applicable TLS Installation and Operation manual for instructions on using the TLS Library and its menus.

Apply power to the TLS library. During initialization, the library will reposition the cartridge handler and tape magazine carrousel. The tape drives and magazines will be scanned to inventory the contents of the library. The third line of the LCD displays the status of these operations.

If the Fibre Channel Option (FCO) is enabled and busy, it will also display status information on the third line of the LCD. If there is more than one message to be displayed, they will cycle at one-second intervals. Table 4-8 shows the possible messages that can appear while the FCO is initializing.

```
Qualstar•••••TLS-4000

FC: Please Wait
```

On single Fibre Channel Option installations, status messages are prefixed with "FC:". On dual installations, status messages for the left module are prefixed with "FCL:" and status messages for right module are prefixed with "FCR:". The right and left module's statue messages will alternate.

Status message	Status Condition
Please Wait	Waiting for Fibre Channel Option to complete restart initialization.
Reading Config	Reading the Fibre Channel Option configuration data.
Checking Config	Checking the Fibre Channel Option configuration.
Setting Config	Setting the Fibre Channel Option configuration.
Controller Reset	Resetting the Fibre Channel Option.

Table 4-8 Possible Fibre Channel Status Messages

If a serial communications error to the Fibre Channel Option is detected, the following warning will be displayed.

```
Fibre Channel
Communications
error detected
ENTER to continue
```

Note that on dual bay libraries with two Fibre Channel Options installed the left or right FCO will be specified in the message. Pressing the ENTER key will clear the message.

This warning message can be caused by an incorrectly installed serial cable. If the message reoccurs after checking the cables and clearing the message using the ENTER key several times, it may require power cycling the library, to reset the FCO. If this problem occurs, please contact the Technical Support department at Qualstar so that corrective action can be taken.

The initialization procedure can take up to several minutes. If the host system is started while FCO status messages are still present, the host may miss seeing the Fibre Channel devices because the system is still busy. The host should be instructed to scan for Fibre Channel devices after the FCO has been configured and line three is clear in the TLS Library's LCD display.

4.7   Configuring the Fibre Channel Loop ID

The Id Mode must be configured for either "Soft" or "Fixed" addressing. Using "Soft" addressing, the Fibre Channel Option connects to an arbitrated loop using the first available AL_PA, scanning from the highest valid address to the lowest. Using "Fixed" addressing, the user selects a specific arbitrated loop address (AL_PA) to connect with. If the selected address is not available, the Fibre Channel Option will connect with the first available address it finds. The use of "Soft" or "Fixed" addressing is based on the user's installation requirements.

Soft addressing can be configured when address conflicts are not likely. If the Fibre Channel Option is connected directly to the computer's HBA (Host Bus Adapter), the selection of a specific Loop Id is not usually required. For example, Emulex HBA drivers scan for an available address starting from the low Fibre Channel address range. The FCO begins scanning for an available address starting from the high Fibre Channel address range. This avoids address conflicts and the FCO Loop Id will be assigned the same value each time it is restarted.

Hard addressing should be configured if address conflicts can occur. This can happen if the FCO is connected to a Fibre Channel Hub. Since many HBA drivers map the Fibre Channel Loop Id to a SCSI Bus/Target address, this mandates that the Fibre Channel Loop Id be very stable, and cannot be allowed to change if the system is simply restarted. This might happen if soft addressing were used and the Fibre Channel Option found its previous address taken. Selecting a fixed address is a way to prevent the FCO Loop Id from changing if the system is restarted.

If the computer's HBA uses the World Wide Port Name (WWPN) convention instead of the Loop Id to map to a SCSI Bus/Target/Lun address, the value of the Loop Id is no longer important. The WWPN is always unique and consistent under all conditions. In the future, all addressing will likely use the WWPN.

```
C••••••Fibre•Channel
•Device
 Id Mode 0:     SOFT
 Loop Id 0:      nnn
 Topology 0:    LOOP
```

**Single Bay or one side
of a Dual Bay Library**

```
C••••••Fibre•Channel
•Device Left
•Device Right
 L Id Mode 0:    SOFT
 L Loop Id 0:     nnn
 L Topology 0:   LOOP
 R Id Mode 0:    SOFT
 R Loop Id 0:     nnn
 R Topology 0:   LOOP
```

**Dual Bay Library
with two FCO's**

The `Configuration\Fibre Channel` menu panel displays the SCSI device interface and configures the Fibre Channel Interface to host. The menu sets the Fibre Channel Option host topology. The "Topology" has two selections, LOOP and FABRIC. The LOOP selection configures the Fibre Channel Option for Arbitrated Loop (FC-AL) operation. The FABRIC selection configures the Fibre Channel Option for Switch Fabric (FC_SW) operation. If the mode is LOOP, the `Id Mode` and `Loop Id` entries are available.

The `Id Mode` menu item has two selections, `FIXED` or `SOFT`. If the mode is FIXED, the `Loop Id` entry is displayed. If the `Id Mode` is SOFT, the Loop ID is automatically assigned by the FCO.

During the Fibre Channel Arbitrated Loop (FC-AL) initialization process, a unique Arbitrated Loop Physical Address (AL_PA) value is assigned to each port on the loop. Not all of the 256 hex values are allowed as AL_PA values per FC-AL. The Loop Id value is used to represent the 126 addresses that the FCO can use. Table 7-1 shows how a Loop Id value maps to an AL_PA. If the Id Mode is "SOFT", the FCO will attempt to obtain an available Loop Id, in the following order: 0, 1, 2, etc.

4.8   Configuring the Fibre Channel SCSI Devices Interface

To establish the SCSI device configuration the Fibre Channel Option is commanded to "Rescan" its three SCSI device buses. The three SCSI device channels, starting with Channel 0, begin scanning for SCSI devices using ascending SCSI Target Ids. After all three channels have been scanned, the FCO builds a SCSI device table, that it uses to map SCSI Targets to the host as logical devices (LUNs).

```
C••••••Fibre•Channel
•Device
 Id Mode 0:     SOFT
 Loop Id 0:      nnn
 Topology 0:    LOOP
```

**Single Bay or one side
of a Dual Bay Library**

```
C••••••Fibre•Channel
•Device Left
•Device Right
 L Id Mode 0:    SOFT
 L Loop Id 0:     nnn
 L Topology 0:   LOOP
 R Id Mode 0:    SOFT
 R Loop Id 0:     nnn
 R Topology 0:   LOOP
```

**Dual Bay Library
with two FCO's**

For single bay libraries or dual bay libraries with only one Fibre Channel Option installed, press the ▲ (UP) or ▼ (DOWN) key to move the pointer to `Device`. Press the ENTER key to enter the `Configuration\Fibre Channel\Device` menu.

For dual bay libraries with two Fibre Channel Options installed, press the ▲ (UP) or ▼ (DOWN) key to move the pointer to either `Device Left` or `Device Right`. The left and right orientation is as viewed from the front of the library. Press the ENTER key to enter the `Configuration\Fibre Channel\Device (Left or Right)` menu.

The `Configuration\Fibre Channel\Device` menu panels display a list of SCSI devices attached to the Fibre Channel Option. C TLS library with a single Fibre Channel Option displays the title `CFC···········Device`. A dual-bay library with two Fibre Channel Options installed, displays the title `CFC······Device Left` or `CFC·····Device Right` to correspond to the Fibre Channel Option in the left and right side.

```
CFC•••••••••••Device          CFC••••••Device Left
  •0                          CFC•••••Device Right
  •1                            •0
  •2                            •1
  •3                            •2
  •4                            •3
  •5                            •4
  •6                            •5
  •7                            •6
  •8                            •7
  •9                            •8
  •10                           •9
  •11                           •10
  •12                           •11
  •13                           •12
  •14                           •13
  •15                           •14
  RESCAN                        •15
                                RESCAN
```

Single Bay or one side
of a Dual Bay Library

Dual Bay Library
with two FCO's

The Fibre Channel Option assembles a list of SCSI devices it detects on its three SCSI channels. This menu displays the SCSI devices that a Fibre Channel Option has detected. To initiate the scan operation, press the   (DOWN) key to move the pointer to RESCAN and press the ENTER key. The RESCAN item will disappear and return when the operation completes.

CAUTION

The RESCAN operation should be performed with the Library disconnected from the host. The Fibre Channel Option is restarted and SCSI device address maybe modified.

Press the EXIT key to return to the top LCD display and wait for the third line to clear of status messages.

5. FCO Type B Installation

5.1 Fibre Channel Option (FCO) Type B Installation Considerations

5.1.1 Operating Environment

A TLS with the Fibre Channel Option is designed to operate in an ambient environment from 41°F to 95°F (5°C to 35°C), 20% to 80% relative humidity, and at altitudes from -1000 to +10,000 feet. Moisture must not be allowed to condense inside the system.

5.1.2 Ventilation

When selecting a location for the TLS, be sure to provide sufficient space behind the unit to allow for cable connections. Also, be sure nothing will block the air intake at the inlet air filters or the top air vent slots. The Fibre Channel Option is designed to be rack mounted so be sure to allow sufficient space behind the unit to allow for cable connections and space around it for air flow.

5.2 FCO Type B Interconnect Cabling

All the bridge/router interconnect and power cables are accessed at the rear of the unit.
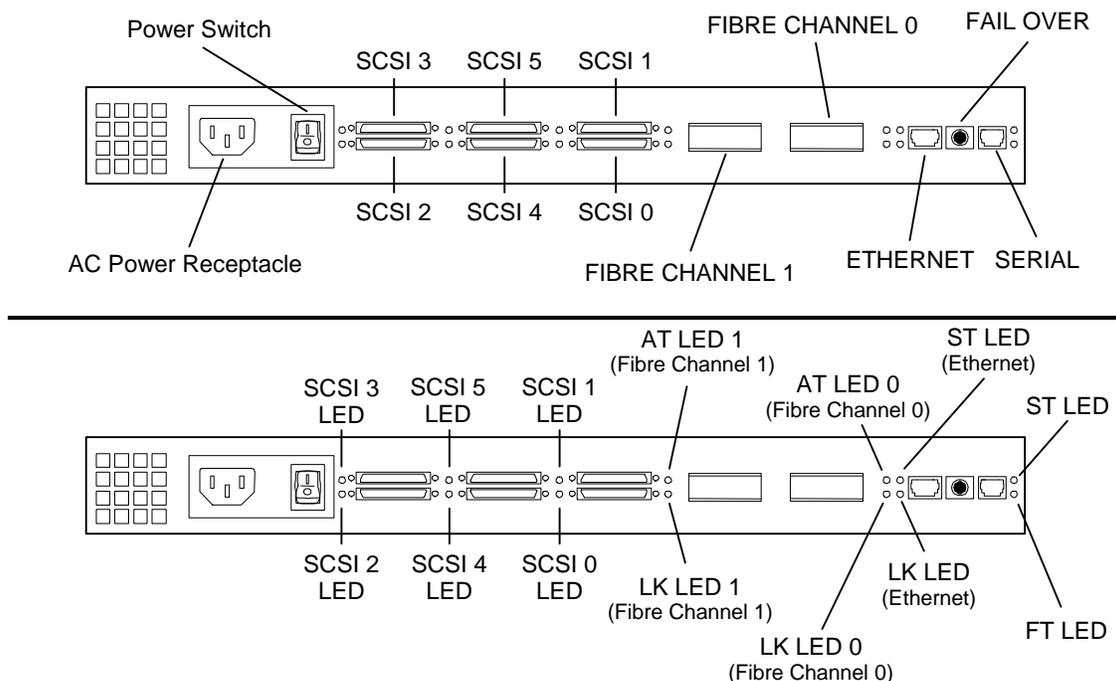
Figure 5-1   Rear View of the Type B Fibre Channel Bridge/Router (FCO)

The following table briefly describes the components located on the rear of the FCO.

Component	Description
SCSI Channel 0 through 5	The SCSI Ultra 160 channels used to attach the TLS medium changer and tape drives.
Fibre Channel 0 and 1	GBIC transceiver sockets. The receptacles are for 2 Gbit Fibre Channel GBIC transceivers.
Ethernet	The Ethernet management interface (not supported).
Fail Over	Not applicable.
Serial	The RS-232 communications port used by the TLS library for configuration and control of the Fibre Channel router.
SCSI LEDs 0 through 5	On (green) when the SCSI bus is active or busy.
AT LED 0 and 1 (Fibre Channel)	On (green) when the Fibre Channel is active. Off when there is no Fibre Channel I/O activity.
LK LED 0 and 1 (Fibre Channel)	On (green) when the Fibre Channel link is connected and established. Off when the Fibre Channel link is disconnected and/or not established.
ST LED (Ethernet)	On (green) when then 10BaseT link is active or busy.
LK LED (Ethernet)	Solid on (green) when the 10BaseT link is connected.
ST LED	Solid on (yellow) when the FCO is operational.
FT LED	Solid on (red) when a fatal error condition is present. This indicator will be on during power-on diagnostics, and is extinguished after successful completion of the power-on sequence.

Table 5-1 Components Located on Rear of the FCO

Note that all TLS-4000 models are shipped from the factory without the SCSI interconnect cables or termi-nators installed. The following tables and figures represent the preferred cabling for a library with two to 12 AIT tape drives.

5.3 Cabling for TLS-44xxx Libraries with AIT-5 Tape Drives
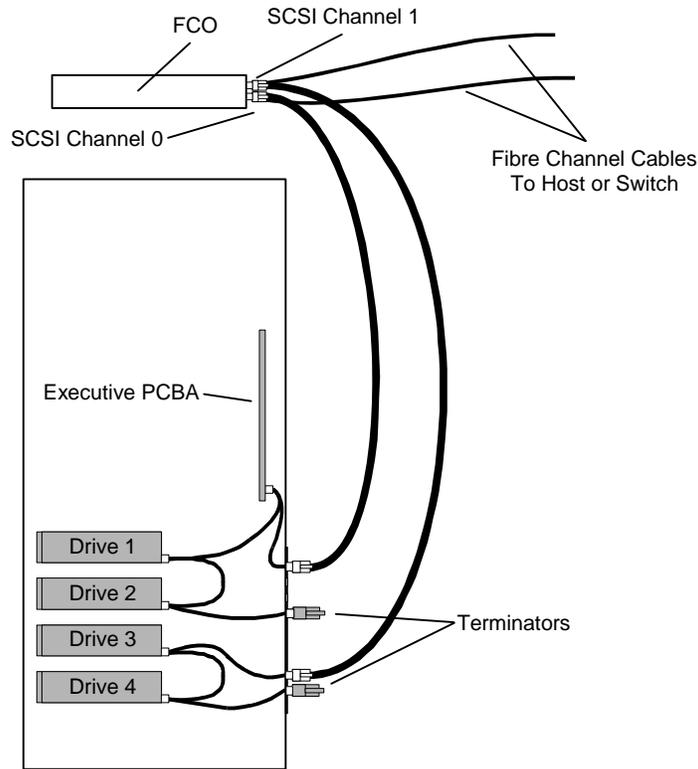
Figure 5-2   TLS-44xx Cabling Diagram using AIT-5 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-44xx
FCO: SCSI Channel 0	Medium Changer Tape Drive 1 (T1) Tape Drive 2 (T2)
FCO: SCSI Channel 1	Tape Drive 3 (T3) Tape Drive 4 (T4)
FCO: SCSI Channel 2 through 6	None
FCO: Serial Jumper	

Table 5-2   Preferred TLS-44xx Fibre Channel Option Cable Connections for AIT-5 Tape Drives

5.4   Cabling for TLS-46xxx Libraries with AIT-5 Tape Drives
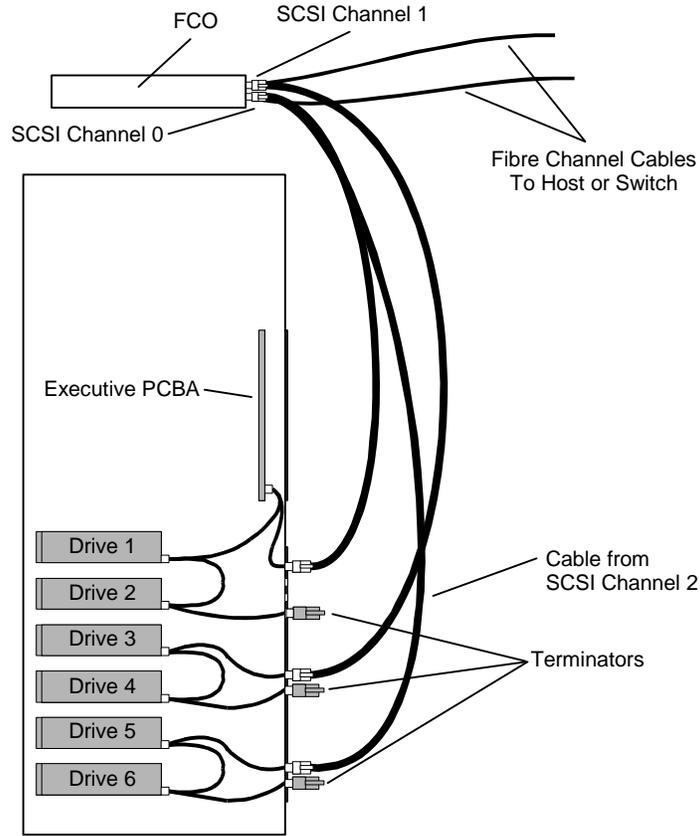
Figure 5-3   TLS-46xx Cabling Diagram using AIT-5 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-44xx
FCO: SCSI Channel 0	Medium Changer
	Tape Drive 1 (T1)
	Tape Drive 2 (T2)
FCO: SCSI Channel 1	Tape Drive 3 (T3)
	Tape Drive 4 (T4)
FCO: SCSI Channel 2	Tape Drive 5 (T5)
	Tape Drive 6 (T6)
FCO: SCSI Channel 3 through 6	None
FCO: Serial Jumper	

Table 5-3   Preferred TLS-46xx Fibre Channel Option Cable Connections for AIT-5 Tape Drives

5.5 Cabling for TLS-412xxx Libraries with AIT-3 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-412xxx
SCSI Channel 0	Left Medium Changer
	Left Tape Drive 1 (LT1)
	Left Tape Drive 2 (LT2)
SCSI Channel 1	Left Tape Drive 3 (LT3)
	Left Tape Drive 4 (LT4)
SCSI Channel 2	Left Tape Drive 5 (LT5)
	Left Tape Drive 6 (LT6)
SCSI Channel 3	Right Tape Drive 1 (RT1)
	Right Tape Drive 2 (RT2)
SCSI Channel 4	Right Tape Drive 3 (RT3)
	Right Tape Drive 4 (RT4)
SCSI Channel 5	Right Tape Drive 5 (RT5)
	Right Tape Drive 6 (RT6)
Serial	DB9 (Right Executive IV, SERL A)

Table 5-4   Preferred Fibre Channel Option Cable Connections for 12 AIT-3 Tape Drives

The following steps outline the actions necessary to connect the cables from the FCO to the TLS-412xxx with AIT-3 tape drives installed. Please see Figure 5-4 and Figure 5-5. If AIT-5 tape drives are installed see Sections 5.6 and 5.7.

1. Remove power from the TLS: first turn the power switch off and then remove the power cord.

2. Remove power from the FCO: first turn the power switch off and then remove the power cord.

3. Connect a SCSI Cable from the SCSI Channel 0 connector on the FCO to connector A on the left side on the TLS.

4. Connect the SCSI Bridge Cable (very short cable) from connector B to C.

5. Connect a SCSI Cable from the SCSI Channel 1 connector on the FCO to connector E.

6. Connect a SCSI Cable from the SCSI Channel 2 connector on the FCO to connector G.

7. Attach an LVD SCSI terminator at connectors D, F and H.

8. Connect a SCSI Cable from the SCSI Channel 3 connector on the FCO to connector I on the right side on the TLS.

9. Connect a SCSI Cable from the SCSI Channel 4 connector on the FCO to connector K.

10. Connect a SCSI Cable from the SCSI Channel 5 connector on the FCO to connector M.

11. Attach an LVD SCSI terminator at connectors J, L and N.

12. Connect the cable from the serial connector on the FCO to the DB9 connector O on the TLS.
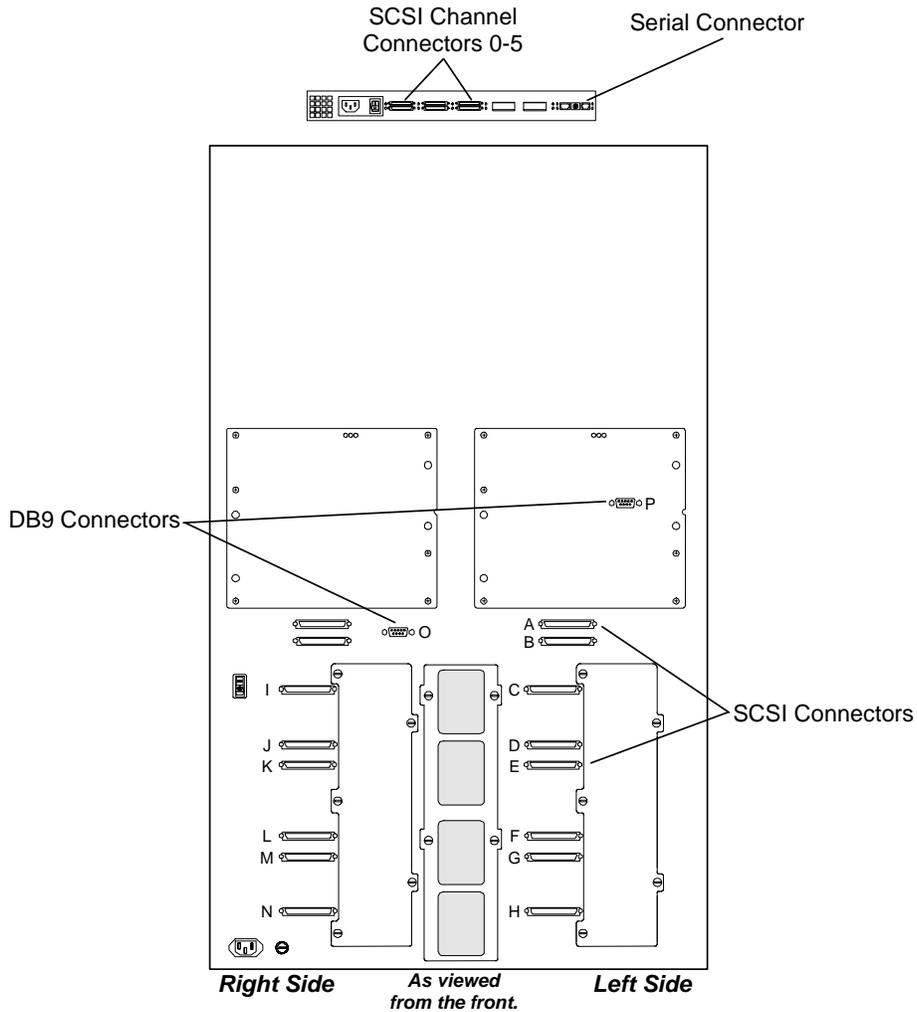
Figure 5-4   Connector Locations on the Rear of the TLS-412xxx
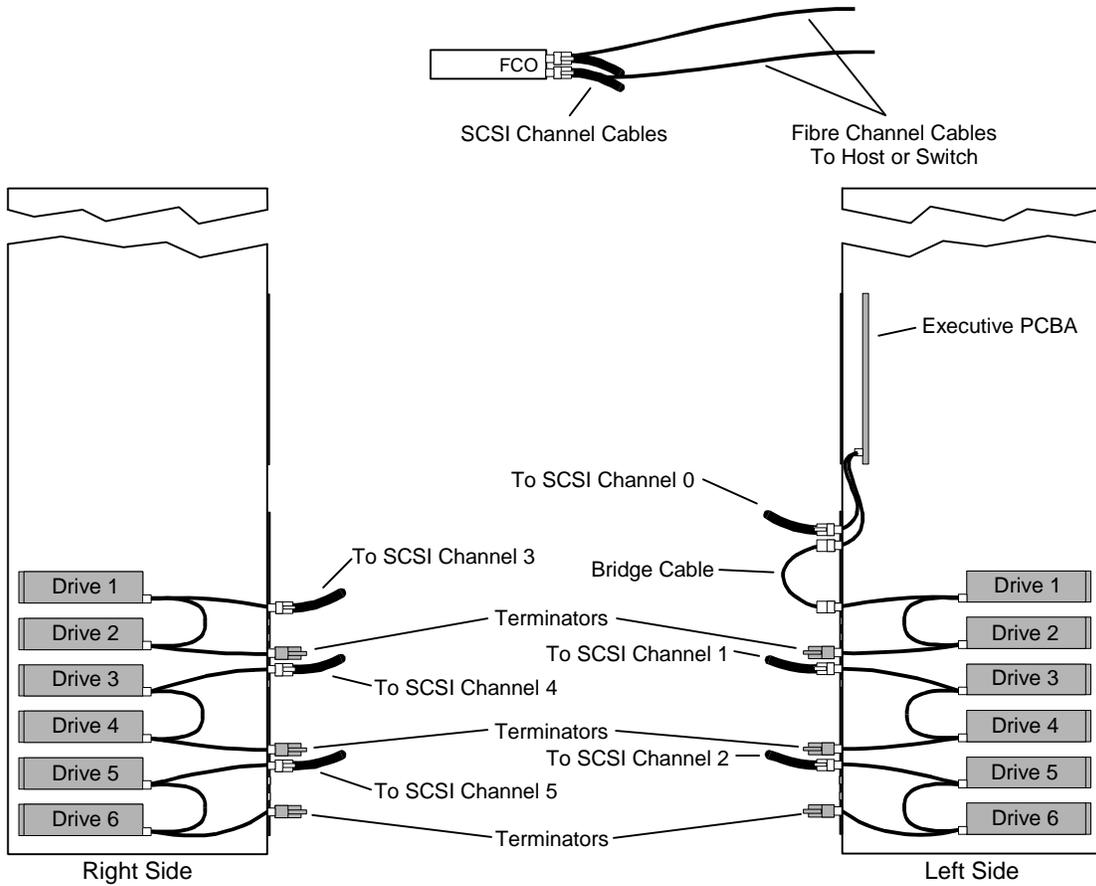
Figure 5-5   TLS-412xxx Cabling Diagram for 12 AIT-3 Tape Drives

5.6 Cabling for TLS-412xxx Libraries with up to six AIT-5 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-412xxx
SCSI Channel 0	Left Medium Changer
	Left Tape Drive 1 (LT1)
	Left Tape Drive 2 (LT2)
SCSI Channel 1	Left Tape Drive 3 (LT3)
	Left Tape Drive 4 (LT4)
SCSI Channel 2	Left Tape Drive 5 (LT5)
	Left Tape Drive 6 (LT6)
SCSI Channel 3 through 5	None
Serial	DB9 (Right Executive IV, SERL A)

Table 5-5 Preferred Fibre Channel Option Cable Connections for 6 AIT-5 Tape Drives

The following steps outline the actions necessary to connect the cables from the FCO to the TLS-412xxx with up to six AIT-5 tape drives installed. Please see Figure 5-4 and Figure 5-6. If more than six AIT-5 tape drives are installed see Section 5.7.

1. Remove power from the TLS: first turn the power switch off and then remove the power cord.

2. Remove power from the FCO: first turn the power switch off and then remove the power cord.

3. Connect a SCSI Cable from the SCSI Channel 0 connector on the FCO to connector A on the left side on the TLS.

4. Connect the SCSI Bridge Cable (very short cable) from connector B to C.

5. Connect a SCSI Cable from the SCSI Channel 1 connector on the FCO to connector E.

6. Connect a SCSI Cable from the SCSI Channel 2 connector on the FCO to connector G.

7. Attach an LVD SCSI terminator at connectors D, F and H.

8. Connect the cable from the serial connector on the FCO to the DB9 connector O on the TLS.

FCO
SCSI Channel Cables
Fibre Channel Cables
To Host or Switch

Executive PCBA

To SCSI Channel 0

Bridge Cable

Terminators
To SCSI Channel 1

Terminators
To SCSI Channel 2

Terminators

No Tape Drives
Installed

Drive 1

Drive 2

Drive 3

Drive 4

Drive 5

Drive 6

Right Side

Left Side

Figure 5-6   TLS-412xxx Cabling Diagram for up to 6 AIT-5 Tape Drives

5.7 Cabling for TLS-412xxx Libraries with up to twelve AIT-5 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-412xxx
FCO 1 SCSI Channel 0	Left Medium Changer
	Left Tape Drive 1 (LT1)
FCO 1 SCSI Channel 1	Left Tape Drive 2 (LT2)
FCO 1 SCSI Channel 2	Left Tape Drive 3 (LT3)
FCO 1 SCSI Channel 3	Left Tape Drive 4 (LT4)
FCO 1 SCSI Channel 4	Left Tape Drive 5 (LT5)
FCO 1 SCSI Channel 5	Left Tape Drive 6 (LT6)
FCO 1Serial	DB9 (Right Executive IV, SERL A)
FCO 2 SCSI Channel 0	Right Medium Changer
	Right Tape Drive 1 (RT1)
FCO 2 SCSI Channel 1	Right Tape Drive 2 (RT2)
FCO 2 SCSI Channel 2	Right Tape Drive 3 (RT3)
FCO 2 SCSI Channel 3	Right Tape Drive 4 (RT4)
FCO 2 SCSI Channel 4	Right Tape Drive 5 (RT5)
FCO 2 SCSI Channel 5	Right Tape Drive 6 (RT6)
FCO 2 Serial	DB9 (Left Executive IV, SERL A)

Table 5-6 Preferred Fibre Channel Option Cable Connections for 12 AIT-5 Tape Drives

The following steps outline the actions necessary to connect the cables from two separate Fibre Channel Options to the TLS-412xxx with up to twelve AIT-5 tape drives installed. Please see Figure 5-4 and Figure 5-7. If six or fewer AIT-5 tape drives are installed see Section 5.6.

1. Remove power from the TLS: first turn the power switch off and then remove the power cord.

2. Remove power from each FCO: first turn the power switch off and then remove the power cords.

3. Connect a SCSI Cable from the SCSI Channel 0 connector on FCO 1 to connector A on the left side on the TLS.

4. Connect the SCSI Bridge Cable (very short cable) from connector B to C.

5. Connect a SCSI Cable from the SCSI Channel 1 connector on FCO 1 to connector E.

6. Connect a SCSI Cable from the SCSI Channel 2 connector on FCO 1 to connector G.

7. Attach an LVD SCSI terminator at connectors D, F and H.

8. Connect the cable from the serial connector on FCO 1 to the DB9 connector O on the TLS.

9. Connect a SCSI Cable from the SCSI Channel 0 connector on FCO 2 to connector I.

10. Connect a SCSI Cable from the SCSI Channel 1 connector on FCO 2 to connector K.

11. Connect a SCSI Cable from the SCSI Channel 2 connector on FCO 2 to connector M.

12. Attach an LVD SCSI terminator at connectors J, L and N.

13. Connect the cable from the serial connector on FCO 2 to the DB9 connector P on the TLS.
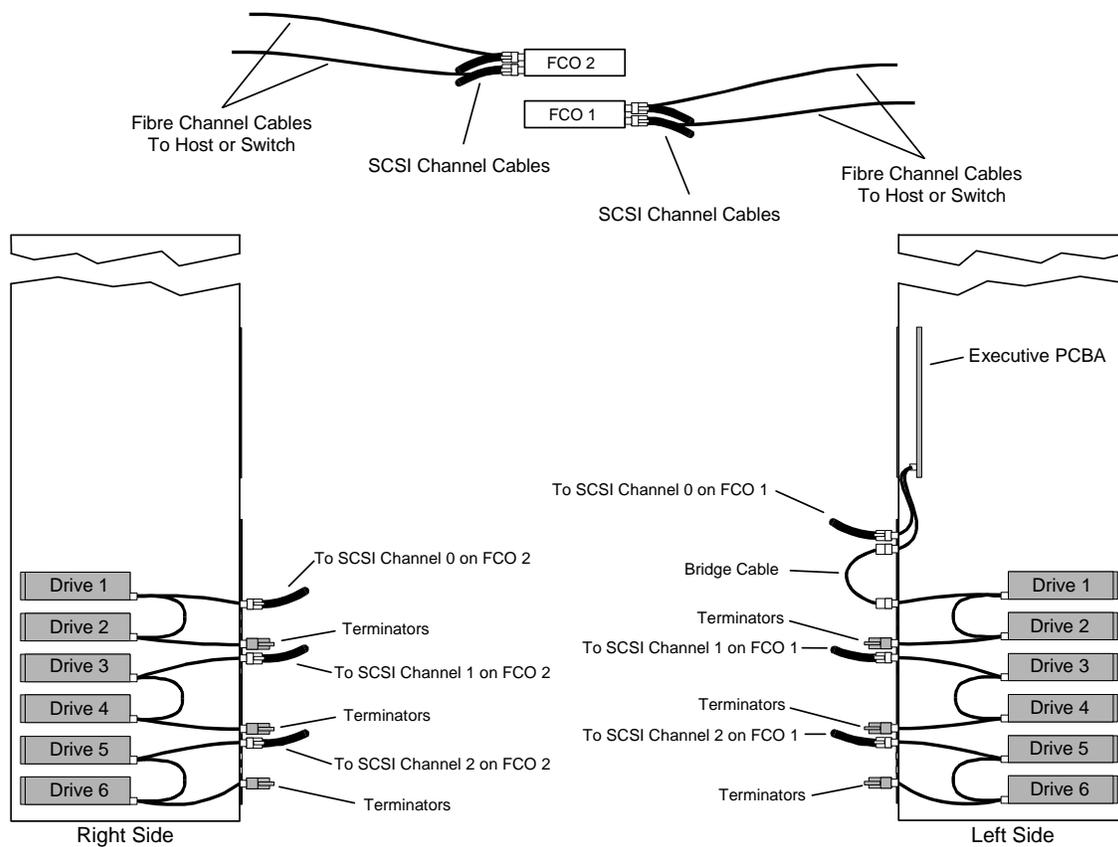
Figure 5-7   TLS-412xxx Cabling Diagram for up to 12 AIT-5 Tape Drives

5.8   Securing the Cables to the TLS

Two adhesive backed cable tie mounts and hook and loop style cable ties are provided to secure the interconnect cables to be secured to the rear of the TLS. Make sure to insert the cable ties into the tie mounts before attaching the mounts to the library. See Figure 5-8 for an example of the cables secured to the rear of the TLS.

Interconnect Cables

Hook and Loop Cable Ties
and Cable Mounts
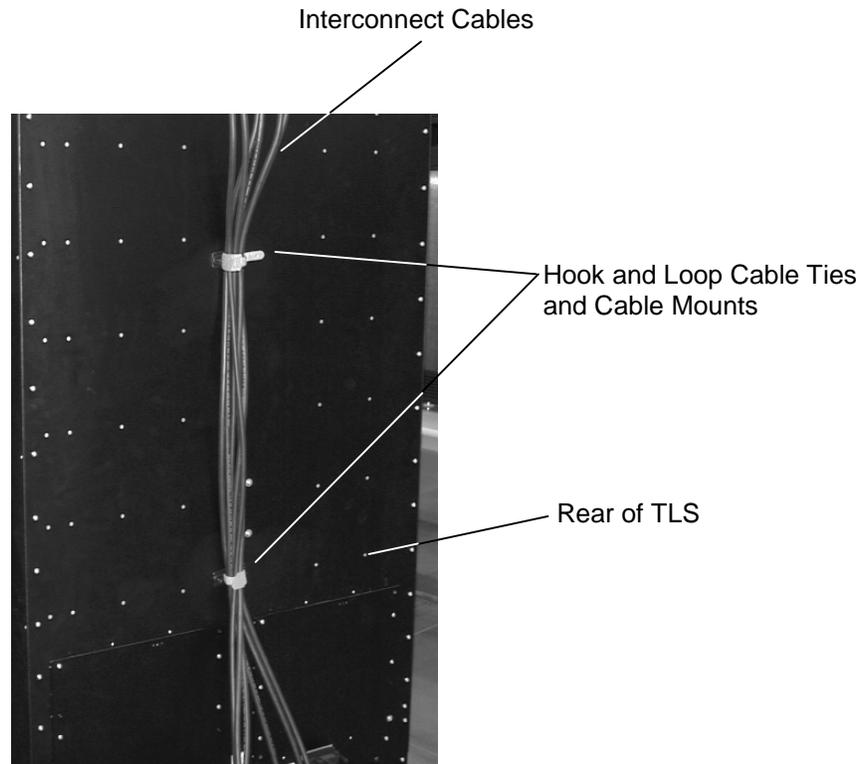
Rear of TLS

Figure 5-8   Example of Cables Secured to the Rear of the TLS

5.9   Initializing the Fibre Channel Option

After attaching all of the interconnect cables from the Fibre Channel Option to the library, disconnect (if connected) the Fibre Channel Option from the FC host or Hub to avoid affecting any operational systems.

NOTE

Refer to the applicable TLS Installation and Operation manual for instructions on using the TLS Library and its menus.

Attach the power cord to the FCO and then push the power switch to the on position. Apply power to the TLS library. During initialization, the library will reposition the

cartridge handler and tape magazine carrousel. The tape drives and magazines will be scanned to inventory the contents of the library. The third line of the LCD displays the status of these operations.

If the Fibre Channel Option (FCO) is enabled and busy, it will also display status information on the third line of the LCD. If there is more than one message to be displayed, they will cycle at one-second intervals. Table 4-8 shows the possible messages that can appear while the FCO is initializing.

```
Qualstar•••TLS-412180

FC: Please Wait
```

On single Fibre Channel Option installations, status messages are prefixed with "FC:".

Status message	Status Condition
Please Wait	Waiting for Fibre Channel Option to complete restart initialization.
Reading Config	Reading the Fibre Channel Option configuration data.
Checking Config	Checking the Fibre Channel Option configuration.
Setting Config	Setting the Fibre Channel Option configuration.
Controller Reset	Resetting the Fibre Channel Option.

Table 5-7 Possible Fibre Channel Status Messages

If a serial communications error to the Fibre Channel Option is detected, the following warning will be displayed.

```
Fibre Channel
Communications
error detected
ENTER to continue
```

Pressing the ENTER key will clear the message.

This warning message can be caused by an incorrectly installed serial cable. If the message reoccurs after checking the cables and clearing the message using the ENTER key several times, it may require power cycling the library, to reset the FCO. If this problem occurs, please contact the Technical Support department at Qualstar so that corrective action can be taken.

The initialization procedure can take up to several minutes. If the host system is started while FCO status messages are still present, the host may miss seeing the Fibre Channel devices because the system is still busy. The host should be instructed to scan for Fibre Channel devices after the FCO has been configured and line three is clear in the TLS Library's LCD display.

5.10   Configuring the Fibre Channel Loop ID

The Id Mode must be configured for either "Soft" or "Fixed" addressing. Using "Soft" addressing, the Fibre Channel Option connects to an arbitrated loop using the first available AL_PA, scanning from the highest valid address to the lowest. Using "Fixed" addressing, the user selects a specific arbitrated loop address (AL_PA) to connect with. If the selected address is not available, the Fibre Channel Option will connect with the first available address it finds. The use of "Soft" or "Fixed" addressing is based on the user's installation requirements.

Soft addressing can be configured when address conflicts are not likely. If the Fibre Channel Option is connected directly to the computer's HBA (Host Bus Adapter), the selection of a specific Loop Id is not usually required. For example, Emulex HBA drivers scan for an available address starting from the low Fibre Channel address range. The FCO begins scanning for an available address starting from the high Fibre Channel address range. This avoids address conflicts and the FCO Loop Id will be assigned the same value each time it is restarted.

Hard addressing should be configured if address conflicts can occur. This can happen if the FCO is connected to a Fibre Channel Hub. Since many HBA drivers map the Fibre Channel Loop Id to a SCSI Bus/Target address, this mandates that the Fibre Channel Loop Id be very stable, and cannot be allowed to change if the system is simply restarted. This might happen if soft addressing were used and the Fibre Channel Option found its previous address taken. Selecting a fixed address is a way to prevent the FCO Loop Id from changing if the system is restarted.

If the computer's HBA uses the World Wide Port Name (WWPN) convention instead of the Loop Id to map to a SCSI Bus/Target/Lun address, the value of the Loop Id is no longer important. The WWPN is always unique and consistent under all conditions. In the future, all addressing will likely use the WWPN.

```
C••••••Fibre•Channel
•Device
 Id Mode  0:     SOFT
 Loop Id  0:      nnn
 Topology 0:     LOOP
 Id Mode  1:     SOFT
 Loop Id  1:      nnn
 Topology 1:     LOOP
```

The `Configuration\Fibre Channel` menu panel displays the SCSI device interface and configures the Fibre Channel Interface to host. The menu sets the Fibre Channel Option host topology. The Fibre Channel option 648-0003-0 provides two FC host ports. These two ports provide a redundant connection to the router. Each is independently configured as port 0 and port 1.

The "Topology" has two selections, LOOP and FABRIC. The LOOP selection configures the Fibre Channel port for Arbitrated Loop (FC-AL) operation. The FABRIC selection configures the Fibre Channel port for Switch Fabric (FC_SW) operation. If the mode is LOOP, the `Id Mode` and `Loop Id` entries are available.

The `Id Mode` menu item has two selections, `FIXED` or `SOFT`. If the mode is FIXED, the `Loop Id` entry is displayed. If the `Id Mode` is SOFT, the Loop ID is automatically assigned by the FCO.

During the Fibre Channel Arbitrated Loop (FC-AL) initialization process, a unique Arbitrated Loop Physical Address (AL_PA) value is assigned to each port on the loop. Not all of the 256 hex values are allowed as AL_PA values per FC-AL. The Loop Id value is used to represent the 126 addresses that the FCO can use. Table 7-1 shows how a Loop Id value maps to an AL_PA. If the Id Mode is "SOFT", the FCO will attempt to obtain an available Loop Id, in the following order: 0, 1, 2, etc.

5.11 Configuring the Fibre Channel SCSI Devices Interface

To establish the SCSI device configuration the Fibre Channel Option is commanded to "Rescan" its six SCSI device buses. The six SCSI device channels, starting with Channel 0, begin scanning for SCSI devices using ascending SCSI Target Ids. After all six channels have been scanned, the FCO builds a SCSI device table, that it uses to map SCSI Targets to the host as logical devices (LUNs).

Press the (UP) or (DOWN) key to move the pointer to `Device`. Press the ENTER key to enter the `Configuration\Fibre Channel\Device` menu.

The `Configuration\Fibre Channel\Device` menu panels display a list of SCSI devices attached to the Fibre Channel Option. C TLS library with a single Fibre Channel Option displays the title `CFC···········Device`.

```
CFC···········Device
 •0
 •1
 •2
 •3
 •4
 •5
 •6
 •7
 •8
 •9
 •10
 •11
 •12
 •13
 •14
 •15
 RESCAN
```

The Fibre Channel Option assembles a list of SCSI devices it detects on its six SCSI channels. This menu displays the SCSI devices that a Fibre Channel Option has detected. To initiate the scan operation, press the (DOWN) key to move the pointer to `RESCAN` and press the ENTER key. The `RESCAN` item will disappear and return when the operation completes.

CAUTION

The RESCAN operation should be performed with the Library disconnected from the host. The Fibre Channel Option is restarted and SCSI device address maybe modified.

Press the EXIT key to return to the top LCD display and wait for the third line to clear of status messages.

6. ATTO FCO Installation

6.1 ATTO Fibre Channel Option (FCO) Installation Considerations

6.1.1 Operating Environment

A TLS with the Fibre Channel Option is designed to operate in an ambient environment from 41°F to 95°F (5°C to 35°C), 20% to 80% relative humidity, and at altitudes from -1000 to +10,000 feet. Moisture must not be allowed to condense inside the system.

6.1.2 Ventilation

When selecting a location for the TLS, be sure to provide sufficient space behind the unit to allow for cable connections. Also, be sure nothing will block the air intake at the inlet air filters or the top air vent slots. The Fibre Channel Option is designed to be rack mounted so be sure to allow sufficient space behind the unit to allow for cable connections and space around it for air flow.

6.2 ATTO FCO Interconnect Cabling

All the bridge/router interconnect and power cables are accessed at the rear of the unit.
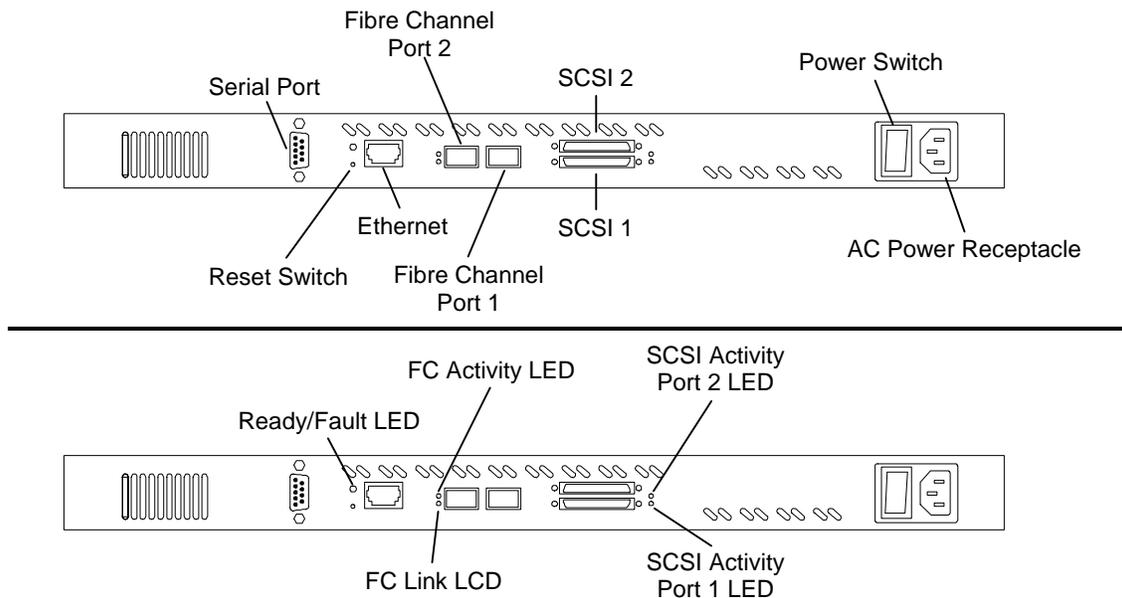
Figure 6-1   Rear View of the ATTO Fibre Channel Bridge/Router (FCO)

The following table briefly describes the components located on the rear of the FCO.

Component	Description
SCSI Channel 1 and 2	The SCSI Ultra 320 channels used to attach the TLS medium changer and tape drives.
Fibre Channel 1 and 2	Small Form Factor Pluggable (SFP) transceiver socket. The receptacle is a 4 Gbit Fibre Channel SFP transceiver.
Ethernet	The RJ-45 connector provides support for local and remote diagnostics, monitoring and management.
Serial	The RS-232 communications port provides support for remote monitoring and management.
Reset Switch	Reboots the FCO.
Ready/Fault LED	Lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.
Embedded in the Ethernet port connector	A lighted green LED shows a valid link; off indicates that no link is present. A separate blinking yellow LED indicates activity.
FC Activity LED	On (green) when the Fibre Channel is active. Off when there is no Fibre Channel I/O activity.
FC Link LCD	On (green) when the Fibre Channel link is connected and established. Off when the Fibre Channel link is disconnected and/or not established.
SCSI Activity LEDs 1 and 2	On (green) when the SCSI bus is active or busy.

Table 6-1   Components Located on Rear of the FCO

Note that the ATTO FCO is a stand-alone device that needs no special library configuration settings. Please refer to the enclosed CD for details about its set up and operation. The following diagrams represent examples of the preferred cabling when connecting the FCO to a library.

Note that all TLS-4000 models are shipped from the factory without the SCSI inter-connect cables or terminators installed. The following tables and figures represent the preferred cabling for a library with two to 12 AIT tape drives.

6.3   Cabling for TLS-44xxx Libraries with AIT-5 Tape Drives
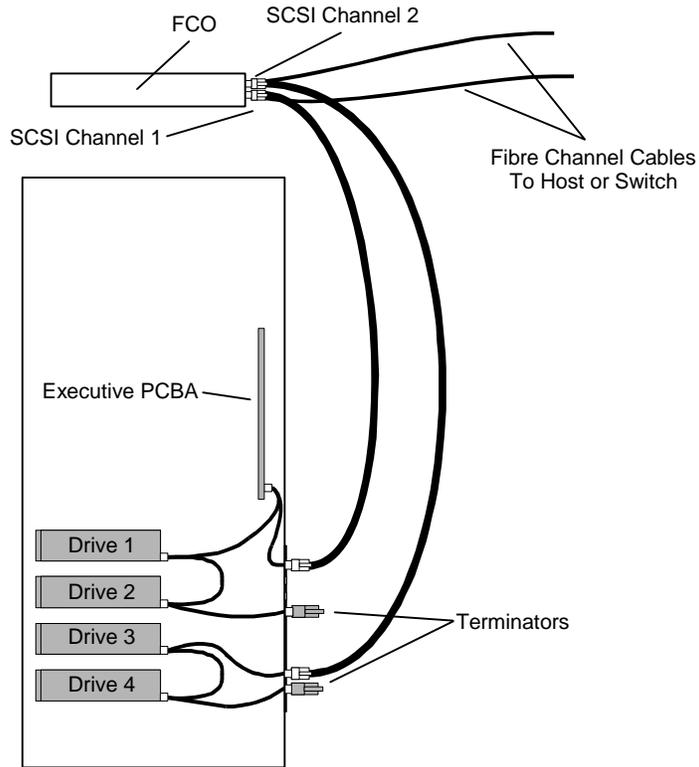
Figure 6-2   TLS-44xx Cabling Diagram using AIT-5 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-44xx
FCO: SCSI Channel 1	Medium Changer
	Tape Drive 1 (T1)
	Tape Drive 2 (T2)
FCO: SCSI Channel 2	Tape Drive 3 (T3)
	Tape Drive 4 (T4)

Table 6-2   Preferred TLS-44xx Fibre Channel Option Cable Connections for AIT-5 Tape Drives

6.4   Cabling for TLS-46xxx Libraries with AIT-5 Tape Drives
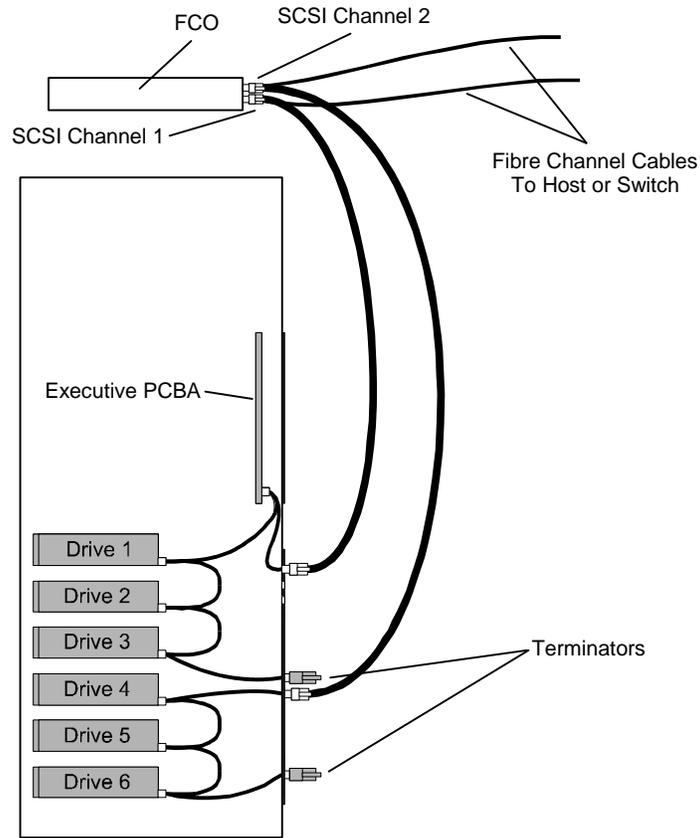
Figure 6-3   TLS-46xx Cabling Diagram using AIT-5 Tape Drives

Connectors on Rear of FCO	Connectors on Rear of TLS-44xx
FCO: SCSI Channel 1	Medium Changer
	Tape Drive 1 (T1)
	Tape Drive 2 (T2)
	Tape Drive 3 (T3)
FCO: SCSI Channel 2	Tape Drive 4 (T4)
	Tape Drive 5 (T5)
	Tape Drive 6 (T6)

Table 6-3   Preferred TLS-46xx Fibre Channel Option Cable Connections for AIT-5 Tape Drives

6.5 Cabling for TLS-412xxx Libraries with up to six AIT Tape Drives

If more than six AIT tape drives are installed see Section 6.6

Connectors on Rear of FCO	Connectors on Rear of TLS-412xxx
SCSI Channel 2	Left Medium Changer
	Left Tape Drive 1 (LT1)
	Left Tape Drive 2 (LT2)
	Left Tape Drive 3 (LT3)
SCSI Channel 1	Left Tape Drive 4 (LT4)
	Left Tape Drive 5 (LT5)
	Left Tape Drive 6 (LT6)

Table 6-4   Preferred Fibre Channel Option Cable Connections for up to 6 AIT Tape Drives
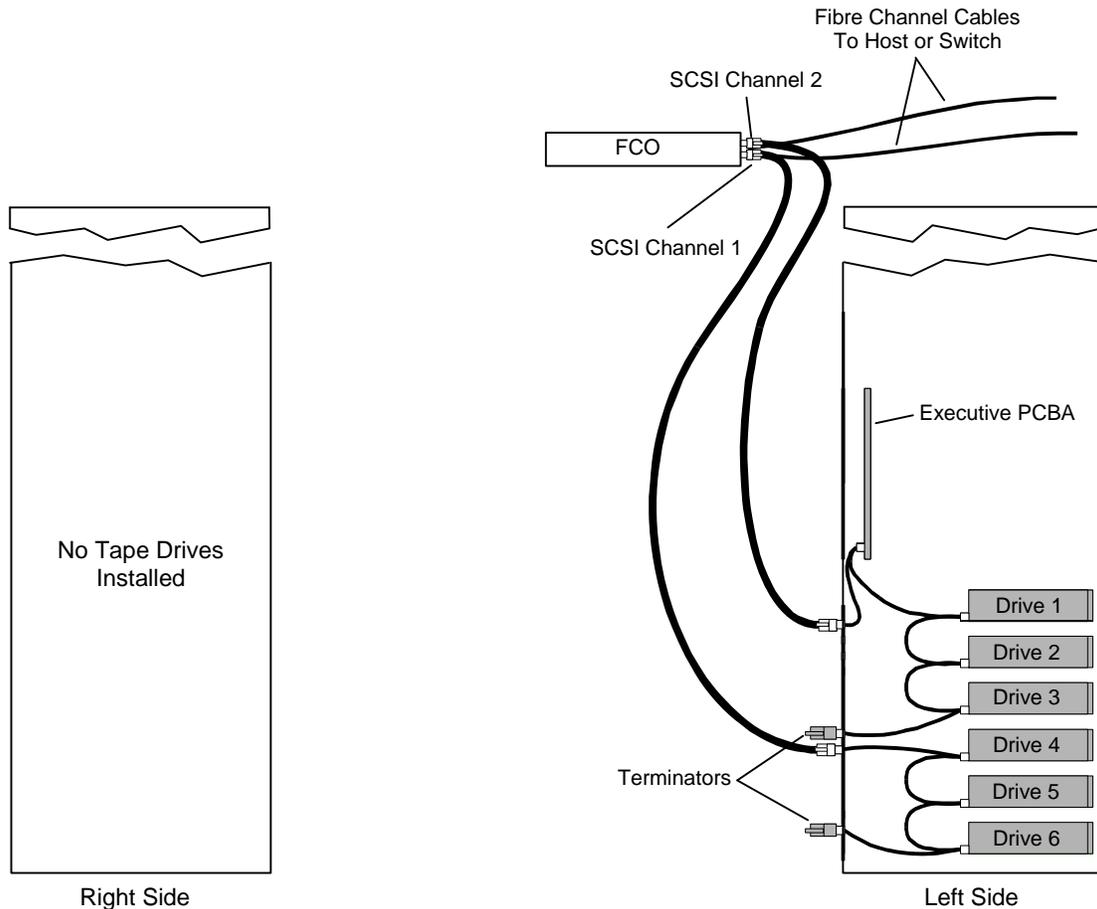
Figure 6-4   TLS-412xxx Cabling Diagram for up to 6 AIT Tape Drives

6.6 Cabling for TLS-412xxx Libraries with up to twelve AIT Tape Drives

Two separate Fibre Channel Options are necessary to connect the cables from a TLS-412xxx with seven up to twelve AIT tape drives installed. If six or fewer AIT tape drives are installed see Section 6.5.

Connectors on Rear of FCO	Connectors on Rear of TLS-412xxx
FCO 1 SCSI Channel 2	Left Medium Changer
	Left Tape Drive 1 (LT1)
	Left Tape Drive 2 (LT2)
	Left Tape Drive 3 (LT3)
FCO 1 SCSI Channel 1	Left Tape Drive 4 (LT4)
	Left Tape Drive 5 (LT5)
	Left Tape Drive 6 (LT6)
FCO 2 SCSI Channel 2	Right Tape Drive 1 (RT1)
	Right Tape Drive 2 (RT2)
	Right Tape Drive 3 (RT3)
FCO 2 SCSI Channel 1	Right Tape Drive 4 (RT4)
	Right Tape Drive 5 (RT5)
	Right Tape Drive 6 (RT6)

Table 6-5   Preferred Fibre Channel Option Cable Connections for 12 AIT Tape Drives

Figure 6-5   TLS-412xxx Cabling Diagram for up to 12 AIT Tape Drives

7. The Configuration Menu

Figure 7-1   The TLS Configuration Menu (Part 1)

```
·······Configuration
·Advanced
·Drive
·Q-Link
·Fibre Channel
SCSI ID:          dd
SCSI ID Left:    dd
SCSI ID Right:  dd
·Security
SET TO DEFAULTS
```

```
C··········Advanced
·Changer
·Control Panel
·Fibre Channel
·FC Left
·FC Right
·Library
·Log
·SCSI
·SCSI Left
·SCSI Right
·SCSI Inquiry
```

```
Configuration··Drive
·T1:          NONE
·T2:          NONE
·T3:          NONE
·T4:          NONE
·T5:          NONE
·T6:          NONE
·LT1:         NONE
·LT2:         NONE
·LT3:         NONE
·LT4:         NONE
·LT5:         NONE
·LT6:         NONE
·RT1:         NONE
·RT2:         NONE
·RT3:         NONE
·RT4:         NONE
·RT5:         NONE
·RT6:         NONE
```

LEGEND
```
l = location designator
d = decimal digit
x = hexadecimal digit
? = alphanumeric character
```

```
C·Advanced···Changer
Busy:           WAIT
·Door Lock
Door Open:     ABORT
Filter Days:   ddd
·Inventory
·I/O Port
LabelCheckChar:YES
·Mechanics
Power On Clear:YES
UsePrivateSlot:YES
```

```
C·Drive··········?T?
Mdl:          NONE
SN:???????????????
Enabled:       YES
Revision:     xxxx
SCSI Bus:  CHANGER
SCSI Id:        dd
WWN:      xxxxxxxx
          xxxxxxxx
Clean Loc.: llllll
Mode:       RANDOM
Eject:        HOST
Start:      MANUAL
Input First:llllll
Input Last: llllll
Input Slots:   ddd
OutputFirst:llllll
OutputLast: llllll
OutputSlots:   ddd
```

```
CA·Changer·Mechanics
Model:        NONE
BCR:          NONE
Carriage:        A
Door Lock:    NONE
FibreCh:         A
FC Left:      NONE
FC Right:     NONE
I/O Port:        A
Q-Link:          A
Shuttle:      NONE
```

```
CA·Changer··I/O Port
CALL Key:    1 MIN
Export:        YES
Extended:NOT READY
Import:        YES
Import Scan:   YES
Slot Access:  BOTH
```

```
CA·Changer·Inventory
Fixed Labels: SOME
Invalidate: SENTRY
Label Scan: ALWAYS
Mag. Labels: SOME
Seq. Labels: SOME
Source Drive:  NO
SourceI/O Port: NO
```

```
CA·Changer·Door Lock
Motion:         NO
Prevent:        NO
```

```
CA·····Control Panel
·Alarm
Backlight:       ON
Contrast:        dd
·Display
```

```
C······Fibre Channel
·Device
·Device Left
·Device Right
Id Mode  0:    SOFT
Loop Id  0:     nnn
Topology 0:    LOOP
Id Mode  1:    SOFT
Loop Id  1:     nnn
Topology 1:    LOOP
L Id Mode  0: SOFT
L Loop Id  0:  nnn
L Topology 0: LOOP
L Id Mode  1: SOFT
L Loop Id  1:  nnn
L Topology 1: LOOP
R Id Mode  0: SOFT
R Loop Id  0:  nnn
R Topology 0: LOOP
R Id Mode  1: SOFT
R Loop Id  1:  nnn
R Topology 1: LOOP
```

```
CACP·········Display
Dispaly:   CURRENT
Line 1:    DEFAULT
  1-10: ??????????
 11-20: ??????????
Line 2:    DEFAULT
  1-10: ??????????
 11-20: ??????????
Line 3:    DEFAULT
  1-10: ??????????
 11-20: ??????????
Line 4:    DEFAULT
  1-10: ??????????
 11-20: ??????????
COPY TO CURRENT
COPY TO SAVED
```

```
CACP···········Alarm
Door Open:    dddd
Handler Error:dddd
Inventory Vio:dddd
I/O Waiting:  dddd
Low Power:    dddd
```

```
CA·····Fibre·Channel
CA···········FC·Left
CA··········FC·Right
Alarm:            NO
Ch0 FC Speed: AUTO
Ch1 FC Speed: AUTO
Ch0 SCSI ID:    dd
Ch1 SCSI ID:    dd
Ch2 SCSI ID:    dd
Ch3 SCSI ID:    dd
Ch4 SCSI ID:    dd
Ch5 SCSI ID:    dd
Ch0 SCSI Speed:160
Ch1 SCSI Speed:160
Ch2 SCSI Speed:160
Ch3 SCSI Speed:160
Ch4 SCSI Speed:160
Ch5 SCSI Speed:160
CLEAR LOG
Router LUN:   SOFT
·Set Time
```

```
CFC··········Device
CFC·····Device·Left
CFC·····Device·Right
·0: ?????????????
·1: ?????????????
·2: ?????????????
·3: ?????????????
·4: ?????????????
·5: ?????????????
·6: ?????????????
·7: ?????????????
·8: ?????????????
·9: ?????????????
·10:?????????????
·11:?????????????
·12:?????????????
·13:?????????????
·14:?????????????
·15:?????????????
RESCAN
```

```
CAFC········Set Time
CAFCL·······Set Time
CAFCR·······Set Time
Date Day:        dd
Date Month:      dd
Date Year:     dddd
Time Hour:       dd
Time Minute:     dd
SET TIME
```

```
C·············Q-Link
Ip:000.000.000.000
Ma:000.000.000.000
Gw:000.000.000.000
Use DHCP:       OFF
MAC: xxxxxxxxxxxx
Date:   mm/dd/yyyy
Part Number:700xxx
Revision:    d.d.d
Checksum: xxxxxxxx
RESET
SET ADDRESSES
DEL ADMIN PASSKEY
```

```
C··········Security
Configuration: OFF
Inventory:     OFF
Master:        OFF
```

```
CFC Device·········??
CFC Device Left···??
CFC Device Right··???
SCSI Channel:     d
SCSI Id:         dd
SCSI Lun:         d
Manuf:????????????
Model:????????????
```

```
C·Advanced·······Log
 BDC:          OFF
 Clean:         ON
 Configuration: ON
 DriveBay:     OFF
 Executive:     ON
 FC Events:     ON
 FC Replies:    ON
 FC States:     ON
 I2c:          OFF
 Inventory:     ON
 Ioport:        ON
 RBT Actions:   ON
 RBT Client:    ON
 RBT Events:    ON
 RBT I/O Port:  ON
 RBT Machines:  ON
 RBT Operations: ON
 RBT States:    ON
 SCSI Commands:  ON
 SCSI Interrupt: ON
 SCSI Phases:   ON
 SCSI States:   ON
 Sequential:    ON
```

```
C·Advanced···Library
 ·a:       ENABLED
 ·b:      DISABLED
 ·c:      DISABLED
 ·d:      DISABLED
```

```
C·Advanced·LIbrary·?
 Enable:       ON
 Drive First:llllll
 Drive Last: llllll
 Drives:       dd
 Fixed First:llllll
 Fixed Last: llllll
 Fixeds:       dd
 Slot First: llllll
 Slot Last:  llllll
 Slots:       ddd
 VIOP First: llllll
 VIOP Last:  llllll
 VIOPs:       ddd
 DT Access: ??????
 DT Serial: 00 FILL
 ·ElementAddress
 Inq:      NATIVE
 Storage Order: MAG
 Volume Tag Pad:SPC
```

```
LEGEND
l = location designator
d = decimal digit
x = hexadecimal digit
? = alphanumeric character
```

```
C·Advanced······SCSI
C·Advanced·SCSI·Left
CA········SCSI·Right
 ·Library
 Disconnect:    ON
 Enable:        ON
 Interface: LVD/SE
 LUN:           0
 Parity:     ABORT
 Synchronous:  OFF
```

```
CAL·?·ElementAddress
 Display:    SAVED
 Data Transfr:ddddd
 Imp/Export:  ddddd
 Medium Trans:ddddd
 Storage:     ddddd
 COPY TO SAVED
```

```
CA·SCSI······Library
CAS·Left·····Library
CAS·Right····Library
 Initiator 0:     a
 Initiator 1:     a
 Initiator 2:     a
 Initiator 3:     a
 Initiator 4:     a
 Initiator 5:     a
 Initiator 6:     a
 Initiator 7:     a
 Initiator 8:     a
 Initiator 9:     a
 Initiator 10:    a
 Initiator 11:    a
 Initiator 12:    a
 Initiator 13:    a
 Initiator 14:    a
 Initiator 15:    a
```

```
CA······SCSI·Inquiry
 Set:        NATIVE
   xxxxxxxxxxxxxxx
         ????????
  ???????????????????
           ????
   xxxxxxxxxxxxxxx
   xxxxxxxxxxxxxxx
         xxxxxxxx
```

Figure 7-2   The TLS Configuration Menu (Part 2)

The Configuration menu is used to customize the operation of the TLS to meet the system requirements. The Configuration menu consists of several sub-menus, some affecting the unit's interaction with the SCSI system, and others affecting the unit's interaction with the user. Once the items in the Configuration menu have been customized, the Configuration menu should not have to be revisited, unless the configuration of the changer or the SCSI system (e.g. adding or removing tape drives) is changed.

The following sections explain the Fibre Channel menus in detail. An explanation of the remaining menu items are contained in the specific TLS models Technical Service Manual. Not all values or menu items appear at all times; some depend upon the model of library in use, other configuration parameters and incomplete prerequisite conditions.

NOTE

The menus in this chapter reflect revision 2.26 of the Executive PCBA EPROM software. If an earlier revision of the software is being used, some menu items may not appear in the menus.

Additionally, the menus in this chapter represent both single bay and dual bay libraries. Menu items that are specific to dual bay libraries contain the words "Left or Right" or the letters "L or R".

The Legends in Figure 7-1 and Figure 7-2 indicate the types of digits found in the value items of the Configuration menu's sub-menus. An explanation of each type is given below in Figure 7-3.

Legend	Explanation
d	**Decimal** digit (0-9):
	A Decimal value contains one or more decimal digits, indicating the present value of the item. Examples:
	Face value:
	This value indicates which carousel face is currently presented to the carriage. Face values range from 1 to 6.
	Element address (sometimes abbreviated **Elem**.):
	This value is the address used by the SCSI host to select a system element. Address values range from 0 to 65535.
l	**Location** digit:
	This value describes the physical location of a cartridge, tape drive, etc. Examples:
	A01, B10, 6B09, T1, 5F
x	**Hexadecimal** digit (0-9, A-F):
	A hexadecimal value contains one or more hexadecimal digits, indicating the present value of the item.
?	**Alphanumeric** character:
	An alphanumeric value contains one or more alphanumeric characters, indicating the present value of the item.

Figure 7-3   Legend of Configuration Menu's Digits

7.1   Configuration Menu

```
••••••••Configuration
 •Advanced
 •Drive
 •Q-Link
 •Fibre Channel
 SCSI ID:        dd
 SCSI ID Left:   dd
 SCSI ID Right:  dd
 •Security
SET TO DEFAULTS
```

This menu is the root configuration menu. It contains sub-menus and commands.

NOTE

Sub-menus for single bay libraries and dual side libraries with only one Fibre Channel Option in-stalled are displayed as being non-side specific.

Dual bay libraries that have Fibre Channel Options installed on both the left and right sides will display Left and Right sub-menu's.

7.2   Configuration\Advanced

```
C•••••••••••Advanced
 •Changer
 •Control Panel
 •Fibre Channel
 •FC Left
 •FC Right
 •Library
 •Log
 •SCSI
 •SCSI Left
 •SCSI Right
 •SCSI Inquiry
```

This Configuration\Advanced menu lists multiple sub-menus.

7.3   Configuration\Advanced\Changer\Mechanics Menu

```
CA•Changer•Mechanics
 Model:        4210
 BCR:          NONE
 Carriage         B
 Door Lock:    NONE
 FibreCh:         C
 FC Left:      NONE
 FC Right:     NONE
 I/O Port:        A
 Q-Link:          A
 Shuttle:      NONE
```

The `Configuration\Advanced\Changer\Mechanics` menu describes the hardware configuration of the TLS. The values in this menu are factory-set to reflect the unit's configuration at the time of shipping and are not changeable.

7.3.1   Fibre Channel

This value defines whether a Fibre Channel Option is currently installed on a single bay library.

`Fibre Channel` is a multiple-choice value with the options listed below:

NONE   No Fibre Channel Option

A   Fibre Channel hatch with one Fibre Channel (1Gb) and three SCSI (Ultra2)

B   Fibre Channel with two Fibre Channels (2Gb) and six SCSI (Ultra160)

C   Fibre Channel hatch with one Fibre Channel (2Gb) and two SCSI (Ultra160)

7.3.2   Fibre Channel Left

This value defines whether a Fibre Channel Option is currently installed on the left side of a dual bay library.

`Fibre Channel Left` is a multiple-choice value with the options listed below:

NONE   No Fibre Channel Option

A   Fibre Channel hatch with one Fibre Channel (1Gb) and three SCSI (Ultra2)

B   Fibre Channel with two Fibre Channels (2Gb) and six SCSI (Ultra160)

C   Fibre Channel hatch with one Fibre Channel (2Gb) and two SCSI (Ultra160)

7.3.3   Fibre Channel Right

This value defines whether a Fibre Channel Option is currently installed on the right side of a dual bay library.

`Fibre Channel Right` is a multiple-choice value with the options listed below:

NONE   No Fibre Channel Option

A   Fibre Channel hatch with one Fibre Channel (1Gb) and three SCSI (Ultra2)

B   Fibre Channel with two Fibre Channels (2Gb) and six SCSI (Ultra160)

C   Fibre Channel hatch with one Fibre Channel (2Gb) and two SCSI (Ultra160)

7.4   Configuration\Advanced\Fibre Channel (Left or Right) Menu

```
CA•••••Fibre•Channel
CA•••••••••••FC•Left
CA••••••••••FC•Right
 Alarm:          NO
 Ch0 FC Speed: AUTO
 Ch1 FC Speed: AUTO
 Ch0 SCSI ID:    dd
 Ch1 SCSI ID:    dd
 Ch2 SCSI ID:    dd
 Ch3 SCSI ID:    dd
 Ch4 SCSI ID:    dd
 Ch5 SCSI ID:    dd
 Ch0 SCSI Speed:160
 Ch1 SCSI Speed:160
 Ch2 SCSI Speed:160
 Ch3 SCSI Speed:160
 Ch4 SCSI Speed:160
 Ch5 SCSI Speed:160
 CLEAR LOG
 Router LUN:    SOFT
 •Set Time
```

This menu permits control of certain aspects of the Fiber Channel Options operation.

7.4.1   Alarm

An audible alarm on the Fibre Channel Option interface is sounded if a warning or error event is reported by the Fibre Channel Option.

YES   If the `Alarm` value is set to `YES`, the audible alarm is enabled.

NO   If the `Alarm` value is set to `NO`, the audible alarm is disabled.

7.4.2 Ch0 / Ch1 FC Speed (Fibre Channel Type B and C)

This value is a selection AUTO, 1Gb or 2Gb, that corresponds to the FC link speed. If AUTO, the link will attempt to negotiate the highest possible speed of 2Gb. If the Selection is 1Gb, the link will only negotiate the lower 1Gb speed. If the selection is 2Gb, the link will only negotiate the higher 2Gb speed. The number of entries will depend on the Fibre Channel Option selected.

The default is AUTO.

7.4.3 Ch0..Ch5 SCSI ID (Fibre Channel Type B and C)

This value is a number from 0 to 15 that corresponds to the SCSI Channel (0..5) initiator id. The number of entries will depend on the Fibre Channel Option selected.

The default SCSI Id is 7.

7.4.4 Ch0..Ch5 SCSI Speed (Fibre Channel Type B and C)

This value is a selection 160, 80, or 40, that corresponds to the highest negotiated SCSI bus speed of the FC SCSI Channel 0..5 Initiator. The number of entries will depend on the Fibre Channel Option selected.

The default is SCSI Speed 160.

7.4.5 CLEAR LOG

Invoking this command will clear the Fibre Channel Option internal event log.

7.4.6 Router LUN

The Fibre Channel Option interface is assigned a SCSI address Lun, for configuration and management features. This menu options selects the method used to assign the router Lun address.

NONE	The Router Lun is disabled. No address is assigned.
SOFT	The Router Lun is assigned the next address after the last physical SCSI device.
0-15	Assigns the Router Lun an address value of 0 to 15.
	The default value is 0.

NOTE

For Windows NT/2000 users: Type B Fibre Channel option's require the Router Lun to be set to 0 for libraries with 7 or more drives.

7.5   Configuration\Advanced\Fibre Channel (Left or Right)\Set Time Menu

```
CAFC••••••••Set Time
CAFCL•••••••Set Time
CAFCR•••••••Set Time
 Date Day:        dd
 Date Month:      dd
 Date Year:      dddd
 Time Hour:       dd
 Time Minute:     dd
 SET TIME
```

The Configuration\Advanced\Fibre Channel (Left or Right) \Set Time menu is used to set the Fibre Channel Option's real time clock. The date and time values that are displayed are not current. They reflect the values obtained from the last Fibre Channel power-on or configuration update.

The Fibre Channel Option uses the real time clock to timestamp log events. Note that the time is not critical to normal operations.

7.5.1   Date Day

This value is a number from 1 to 31.

7.5.2   Date Month

This value is a number from 1 to 12.

7.5.3   Date Year

This value is a number from 1970 to dddd.

7.5.4   Time Hour

This value is a number from 0 to 23.

7.5.5   Time Minute

This value is a number from 0 to 59.

7.5.6   SET TIME

Invoking this command will set the Fibre Channel Option's real time clock to the date/time values that are displayed.

7.6　Configuration\Fibre Channel Menu

```
C••••••Fibre•Channel
 •Device
 •Device Left
 •Device Right
Id Mode  0:     SOFT
Loop Id  0:      nnn
Topology 0:     LOOP
Id Mode  1:     SOFT
Loop Id  1:      nnn
Topology 1:     LOOP
L Id Mode  0:   SOFT
L Loop Id  0:    nnn
L Topology 0:   LOOP
L Id Mode  1:   SOFT
L Loop Id  1:    nnn
L Topology 1:   LOOP
R Id Mode  0:   SOFT
R Loop Id  0:    nnn
R Topology 0:   LOOP
R Id Mode  1:   SOFT
R Loop Id  1:    nnn
R Topology 1:   LOOP
```

The `Configuration\Fibre Channel` menu is used to configure the Fibre Channel Option to the host.

7.6.1　Id Mode (Left or Right)

This value represents the Id Mode, which must be configured for either "Soft" or "Fixed" addressing. Using "Soft" addressing, the Fibre Channel Option connects to an arbitrated loop using the first available AL_PA, scanning from the highest valid address to the lowest. Using "Fixed" addressing, the user selects a specific arbitrated loop address (AL_PA) to connect with. If the selected address is not available, the Fibre Channel Option will connect with the first available address it finds

FIXED	The "Loop Id" entry is displayed.
SOFT	The Loop Id is automatically assigned by the Fibre Channel loop insertion protocol.

7.6.2　Loop Id (Left or Right)

During the Fibre Channel Arbitrated Loop (FC-AL) initialization process, a unique Arbitrated Loop Physical Address (AL_PA) value is assigned to each port on the loop. Not all of the 256 hex values are allowed as AL_PA values per FC-AL. The Loop Id value is used to represent the 126 addresses that the Fibre Channel Option can use.

Table 7-1 shows how a Loop Id value maps to an AL_PA. If "SOFT" is requested for the "Loop Id", the Fibre Channel Option will attempt to obtain an available Loop Id, in the following order: 0, 1, 2, etc.

7.6.3 Topology 0 / Topology 1 (Left or Right)

This value sets the Fibre Channel Option host topology. The "Topology" has two selections, LOOP and FABRIC. The LOOP selection configures the Fibre Channel Option for Arbitrated Loop (FC-AL) operation. The FABRIC selection configures the Fibre Channel Option for Switch Fabric (FC_SW) operation. If the mode is LOOP, the `Id Mode` and `Loop Id` entries are available.

LOOP   The LOOP value configures the Fibre Channel Option for Arbitrated LOOP (FC-AL) operation.

FABRIC   The FABRIC value configures the Fibre Channel Option for Switch Fabric (FC_SW) operation.

Loop Id	AL_PA	Loop Id	AL_PA	Loop Id	AL_PA	Loop Id	AL_PA
(decimal)	(hex)	(decimal)	(hex)	(decimal)	(hex)	(decimal)	(hex)
0	EF	32	B2	64	72	96	3A
1	E8	33	B1	65	71	97	39
2	E4	34	AE	66	6E	98	36
3	E2	35	AD	67	6D	99	35
4	E1	36	AC	68	6C	100	34
5	E0	37	AB	69	6B	101	33
6	DC	38	AA	70	6A	102	32
7	DA	39	A9	71	69	103	31
8	D9	40	A7	72	67	104	2E
9	D6	41	A6	73	66	105	2D
10	D5	42	A5	74	65	106	2C
11	D4	43	A3	75	63	107	2B
12	D3	44	9F	76	5C	108	2A
13	D2	45	9E	77	5A	109	29
14	D1	46	9D	78	59	110	27
15	CE	47	9B	79	56	111	26
16	CD	48	98	80	55	112	25
17	CC	49	97	81	54	113	23
18	CB	50	90	82	53	114	1F
19	CA	51	8F	83	52	115	1E
20	C9	52	88	84	51	116	1D
21	C7	53	84	85	4E	117	1B
22	C6	54	82	86	4D	118	18
23	C5	55	81	87	4C	119	17
24	C3	56	80	88	4B	120	10
25	BC	57	7C	89	4A	121	0F
26	BA	58	7A	90	49	122	08
27	B9	59	79	91	47	123	04
28	B6	60	76	92	46	124	02
29	B5	61	75	93	45	125	01
30	B4	62	74	94	43		
31	B3	63	73	95	3C		

Table 7-1   Arbitrated Loop Physical Addresses

7.7   Configuration\Fibre Channel\Device (Left or Right) Menu

```
CFC•••••••••••Device
CFC••••••Device Left
CFC•••••Device Right
 •0: ??????????????
 •1: ??????????????
 •2: ??????????????
 •3: ??????????????
 •4: ??????????????
 •5: ??????????????
 •6: ??????????????
 •7: ??????????????
 •8: ??????????????
 •9: ??????????????
 •10:??????????????
 •11:??????????????
 •12:??????????????
 •13:??????????????
 •14:??????????????
 •15:??????????????
 RESCAN
```

The `Configuration\Fibre Channel\Device (Left or Right)` menu displays a listing of the SCSI devices attached to the Fibre Channel Option. This menu presents a list of the first 16 LUN assignments.

7.7.1   RESCAN

Invoking this command will cause the Fibre Channel Option to rescan the buses for SCSI devices. Note, the RESCAN command will disrupt host communication, so a warning message will be displayed. When the warning message appears, press the ENTER key to continue the RESCAN operation.

CAUTION

The RESCAN operation should be performed with the Library disconnected from the host. The Fibre Channel Option is restarted and SCSI device address maybe modified.

7.8 Configuration\Fibre Channel\Device (Left or Right) Menu

```
CFC Device••••••••??
CFC Device Left•••??
CFC Device Right••??
 SCSI Channel:    d
 SCSI Id:        dd
 SCSI Lun:        d
 Manuf:????????????
 Model:????????????
```

The `Configuration\Fibre Channel\Device (Left or Right)` menu displays information that the Fibre Channel Option has obtained from attached SCSI devices.

7.8.1 SCSI Channel

This value is the Fibre Channel Option SCSI channel (0-2) that the device is connected to.

7.8.2 SCSI ID

This value is the SCSI Id of the device.

7.8.3 SCSI Lun
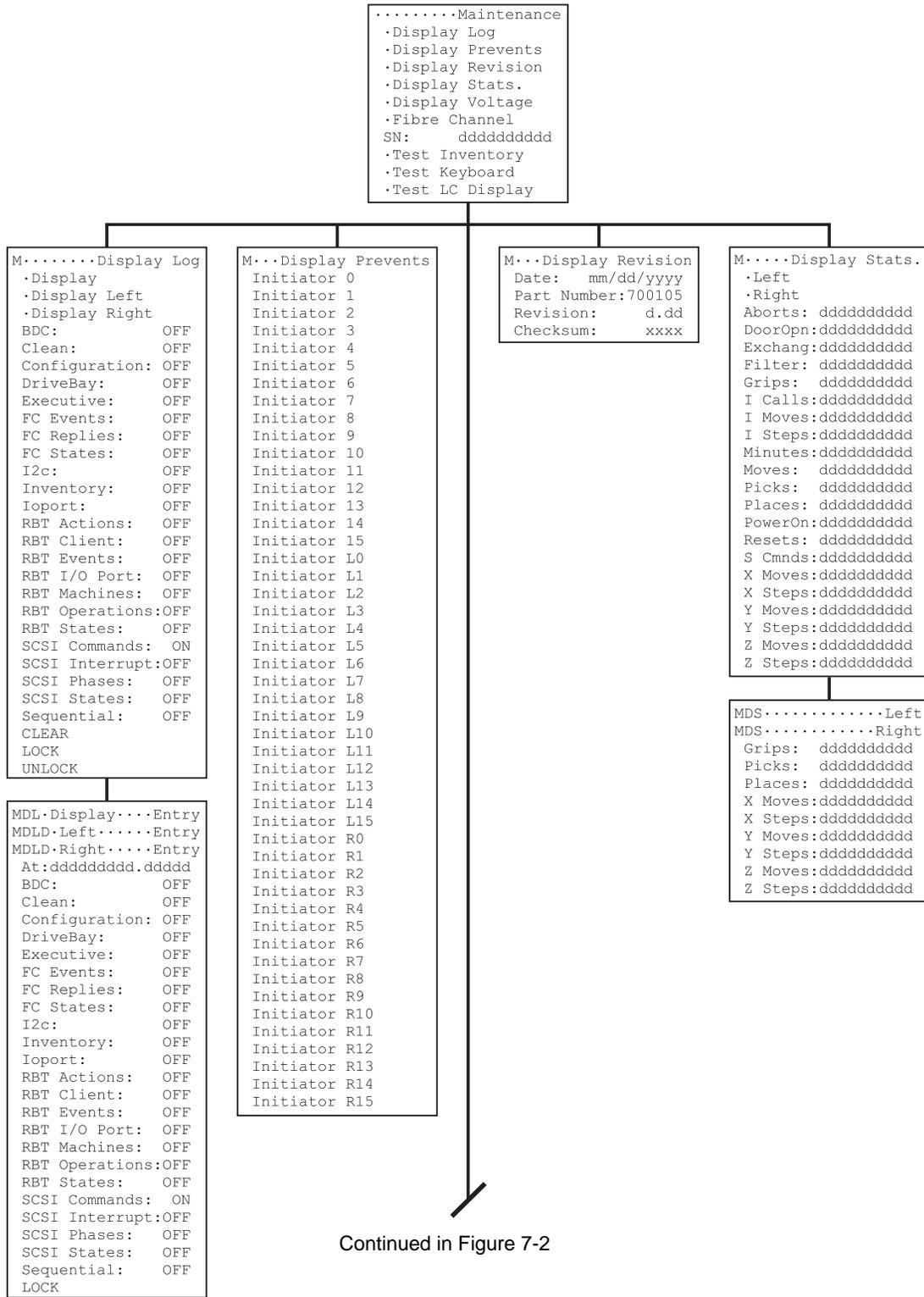
This value is the is the SCSI Lun of the device.

7.8.4 Manuf

This value is the SCSI device manufacturer's string.

7.8.5 Model

This value is the SCSI device model string.

8.   Maintenance Menu

```
·········Maintenance
·Display Log
·Display Prevents
·Display Revision
·Display Stats.
·Display Voltage
·Fibre Channel
SN:      dddddddddd
·Test Inventory
·Test Keyboard
·Test LC Display
```

```
M·········Display Log
 ·Display
 ·Display Left
 ·Display Right
 BDC:          OFF
 Clean:        OFF
 Configuration: OFF
 DriveBay:     OFF
 Executive:    OFF
 FC Events:    OFF
 FC Replies:   OFF
 FC States:    OFF
 I2c:          OFF
 Inventory:    OFF
 Ioport:       OFF
 RBT Actions:  OFF
 RBT Client:   OFF
 RBT Events:   OFF
 RBT I/O Port: OFF
 RBT Machines: OFF
 RBT Operations:OFF
 RBT States:   OFF
 SCSI Commands:  ON
 SCSI Interrupt:OFF
 SCSI Phases:  OFF
 SCSI States:  OFF
 Sequential:   OFF
 CLEAR
 LOCK
 UNLOCK
```

```
M···Display Prevents
 Initiator 0
 Initiator 1
 Initiator 2
 Initiator 3
 Initiator 4
 Initiator 5
 Initiator 6
 Initiator 7
 Initiator 8
 Initiator 9
 Initiator 10
 Initiator 11
 Initiator 12
 Initiator 13
 Initiator 14
 Initiator 15
 Initiator L0
 Initiator L1
 Initiator L2
 Initiator L3
 Initiator L4
 Initiator L5
 Initiator L6
 Initiator L7
 Initiator L8
 Initiator L9
 Initiator L10
 Initiator L11
 Initiator L12
 Initiator L13
 Initiator L14
 Initiator L15
 Initiator R0
 Initiator R1
 Initiator R2
 Initiator R3
 Initiator R4
 Initiator R5
 Initiator R6
 Initiator R7
 Initiator R8
 Initiator R9
 Initiator R10
 Initiator R11
 Initiator R12
 Initiator R13
 Initiator R14
 Initiator R15
```

```
M···Display Revision
 Date:   mm/dd/yyyy
 Part Number:700105
 Revision:     d.dd
 Checksum:     xxxx
```

```
M·····Display Stats.
 ·Left
 ·Right
 Aborts: dddddddddd
 DoorOpn:dddddddddd
 Exchang:dddddddddd
 Filter: dddddddddd
 Grips:  dddddddddd
 I Calls:dddddddddd
 I Moves:dddddddddd
 I Steps:dddddddddd
 Minutes:dddddddddd
 Moves:  dddddddddd
 Picks:  dddddddddd
 Places: dddddddddd
 PowerOn:dddddddddd
 Resets: dddddddddd
 S Cmnds:dddddddddd
 X Moves:dddddddddd
 X Steps:dddddddddd
 Y Moves:dddddddddd
 Y Steps:dddddddddd
 Z Moves:dddddddddd
 Z Steps:dddddddddd
```

```
MDS············Left
MDS···········Right
 Grips:  dddddddddd
 Picks:  dddddddddd
 Places: dddddddddd
 X Moves:dddddddddd
 X Steps:dddddddddd
 Y Moves:dddddddddd
 Y Steps:dddddddddd
 Z Moves:dddddddddd
 Z Steps:dddddddddd
```

```
MDL·Display····Entry
MDLD·Left······Entry
MDLD·Right·····Entry
 At:dddddddddd.ddddd
 BDC:          OFF
 Clean:        OFF
 Configuration: OFF
 DriveBay:     OFF
 Executive:    OFF
 FC Events:    OFF
 FC Replies:   OFF
 FC States:    OFF
 I2c:          OFF
 Inventory:    OFF
 Ioport:       OFF
 RBT Actions:  OFF
 RBT Client:   OFF
 RBT Events:   OFF
 RBT I/O Port: OFF
 RBT Machines: OFF
 RBT Operations:OFF
 RBT States:   OFF
 SCSI Commands:  ON
 SCSI Interrupt:OFF
 SCSI Phases:  OFF
 SCSI States:  OFF
 Sequential:   OFF
 LOCK
```

Figure 8-1   The TLS Maintenance Menu (Part 1)

The Maintenance menu is used to display detailed information about the TLS and its operating history, and to test the functionality of the liquid crystal display and menu control keys. The Maintenance menu is available to the system user and is considered safe. The user cannot break anything by using, or misusing, this menu. Diagrams showing the entire structure of the Maintenance menu system are shown in Figure 8-1 and Figure 8-2.

The following sections explain the Fibre Channel menus in detail. An explanation of the remaining menu items are contained in the specific TLS models Technical Service Manual. Not all values or menu items appear at all times; some depend upon the model of library in use, other configuration parameters and incomplete prerequisite conditions.

Figure 8-2   The TLS Maintenance Menu (Part 2)

NOTE

The menus in this chapter reflect revision 2.26 of the Executive PCBA EPROM software. If an earlier revision of the software is being used, some menu items may not appear in the menus.

Additionally, the menus in this chapter represent both single bay and dual bay libraries. Menu items that are specific to dual bay libraries contain the words "Left or Right" or the letters "L or R".

8.1   Maintenance Menu

```
........Maintenance
 .Display Log
 .Display Prevents
 .Display Revision
 .Display Stats.
 .Display Voltage
 .Fibre Channel
 SN:     dddddddddd
 .Test Inventory
 .Test Keyboard
 .Test LC Display
```

The Maintenance menu contains multiple Display items. Display items look like the sub-menus found in the Configuration and Operation menus, but they generally do not contain editable values or executable functions. We prefer to call the Display items status screens, because they display the present status of various TLS elements.

NOTE

Sub-menus for single bay libraries and dual side libraries with only one Fibre Channel Option installed are displayed as being non-side specific.

Dual bay libraries that have Fibre Channel Options installed on both the left and right sides will display Left and Right sub-menu's.

8.2   Maintenance\Fibre Channel Menu

```
M......Fibre Channel
 .Info
 .Info Left
 .Info Right
 .Log
 .Log Left
 .Log Right
```

The Fibre Channel menu is partitioned into status screens, Info and Log. The Info screen displays version and environmental information from the Fibre Channel Option. The Log screen accesses and displays the Fibre Channel Option's internal event log.

8.3   Maintenance\Fibre Channel\Info (Left or Right) Status Screen

```
MFC.............Info
MFC........Info Left
MFC.......Info Right
 Backplane Id:  ddd
 Base Lvl:  xxxxxxx
 Board Rev:       a
 CPLD Rev:       dd
 Memory (MB):  dddd
 Daughtr Bd Id: ddd
 FW Rev:       aaaa
 Loader Rev:  aaaaa
 Prod. Id.:  aaaaaa
 S/N:        aaaaaa
 +2.5V:         ddd
 +3.3V:         ddd
 +5V:           ddd
 +12V:         dddd
 Air Temp (C): +ddd
 CPU Temp (C): +ddd
 UPDATE
```

The Fibre Channel Info status screen displays the Fibre Channel Option's configuration and environmental information. The displayed information was obtained at power-on, from the last configuration change, or from the last UPDATE request.

8.3.1   Backplane Id

This value identifies the type of backplane. The value of 001 should be displayed for type B Fibre Channel Options. Type C FCOs will display the value of 007.

8.3.2   Base Lvl

This value identifies the base-level revision.

8.3.3   Board Rev

This value identifies the board level revision.

8.3.4   CPLD Rev

This value identifies the CPLD revision.

8.3.5   Memory (MB)

This value specifies the amount of memory.

8.3.6   Daughtr Bd Id

This value identifies the type of daughter board.

8.3.7   FW Rev

This value identifies the firmware revision.

8.3.8   Loader Rev

This value identifies the loader revision.

8.3.9   Prod. Id.

This value identifies the product model name.

8.3.10   S/N

This value identifies the board serial number.

8.3.11   +2.5V (Type C FCO only)

This value displays the +2.5V voltage.

8.3.12   +3.3V

This value displays the +3.3V voltage.

8.3.13   +5V

This value displays the +5V voltage.

8.3.14   +12V (Type B and C FCOs only)

This value displays the +12V voltage.

8.3.15 Air Temp

This value displays the board's temperature in degrees Celsius.

8.3.16 CPU Temp (Type B and C FCOs only)

This value displays the CPU's temperature in degrees Celsius.

8.3.17 UPDATE

This menu item is visible when communications to the Fibre Channel Option is in an idle state. Invoking this command will cause the Fibre Channel Option to update the configuration and environmental information.

It takes approximately 35 seconds to obtain new information after the UPDATE command has been invoked.

8.4 Maintenance\Fibre Channel\ Log (Left or Right) Status Screen

```
MFC..............Log
MFC........Log Left
MFC........Log Right
```

The Fibre Channel Log status screen displays the Fibre Channel Option's internal event log. The information is provided to assist in troubleshooting problems and is not required for normal library operation. The event log is saved in non-volatile memory and is not lost when the library power is removed.

The first line in the status screen indicates the Fibre Channel Option selected. The second line contains the event sequence number and a timestamp. Lines three and four contain event text description. If the second line ends with an up arrow, newer events are available for viewing. If the last line ends with a down arrow, older events are available for viewing. These older or newer events can be viewed by using the (UP) and (DOWN) keys to scroll the display. Since the event data is stored in the Fibre Channel Option, a small time delay occurs after each request to retrieve the information for display.
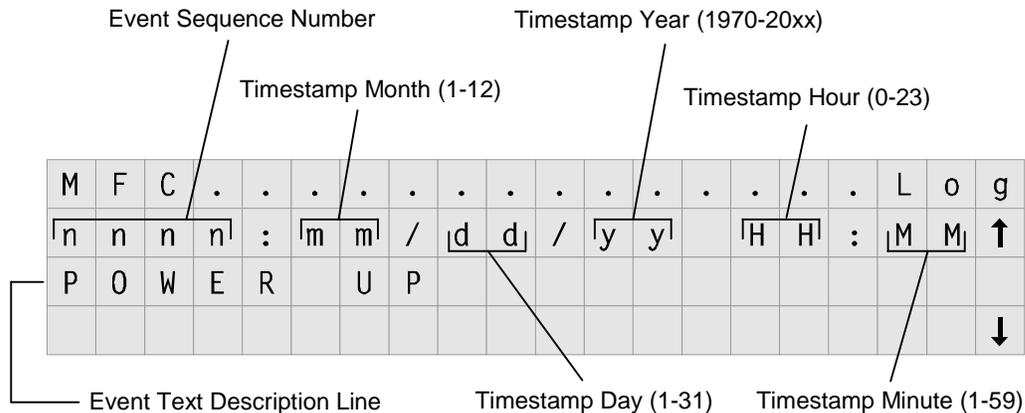

Figure 8-3 Log Status Screen Sample

Event text description	Event Code Program Label
"CNTRL_REBOOT_CMPL"	CONTROLLER_REBOOT_COMPLETE
"DIAGNOSTIC_FAILURE"	DIAGNOSTIC_FAILURE
"POWER_FAILURE"	POWER_FAILURE
"RESCAN_BUS_COMPLETE"	RESCAN_BUS_COMPLETE
"UPDATE_FIRMWARE_CMPL"	UPDATE_FIRMWARE_COMPLETE
"BATTERY_FAILURE"	BATTERY_FAILURE
"UNIT_MAPPING"	UNIT_MAPPING
"SET_CNTRL_PARAMS"	SET_CONTROLLER_PARAMS
"SET_CNTRL_TIMEDATE"	SET_CONTROLLER_TIMEDATE
"RESTORE_CNTRL_DFLT"	RESTORE_CONTROLLER_DEFAULT
"UTILITY_ABORT"	UTILITY_ABORT
"EVENT_LOG_CLEAR"	EVENT_LOG_CLEAR
"AD_WARNING"	AD_WARNING
"AD_FAILURE"	AD_FAILURE
"CONFIG_HAS_CHANGED"	CONFIGURATION_HAS_CHANGED
"AD_OK"	AD_OK
"SDRAM_CORR_ECC_ERR"	SDRAM_CORR_ECC_ERR
"SDRAM_UNCORR_ECC_ERR"	SDRAM_UNCORR_ECC_ERR
"POWER_UP"	POWER_UP
"HOST_TERMIN_WARNING"	HOST_TERMINATION_WARNING
"BATTERY_CHARGE_CMPL"	BATTERY_CHARGE_COMPLETE
"TRANSPRT_MODE_CHANGE"	TRANSPORT_MODE_CHANGE
"BATTERY_HW_FAIL_INFO"	BATTERY_HW_FAILURE_INFO
"SHUTDOWN_CNTRL"	SHUTDOWN_CONTROLLER
"ENCLOSURE_FAILURE"	ENCLOSURE_FAILURE
"BATTERY_TEMP_WARNING"	BAT-TERY_TEMPERATURE_WARNING
"CONFIG_DEFAULTS"	CONFIGURATION_DEFAULTS
"MODEL_SPECIFIC"	MODEL_SPECIFIC

Table 8-1   Event Text Descriptions

9.   Repacking

This chapter explains how to properly repack type C and type B Fibre Channel Options for shipping.

The following items were packed in the original shipping carton:

Fibre Channel Option
This Installation and Operation Manual

9.1   Repacking the Fibre Channel Option

With the exception of Fibre Channel Options that are shipped from the factory installed on libraries, the FCO was originally shipped in a specially-designed carton. When shipping the FCO, use the original shipping carton and packing materials. If the original shipping carton and packing materials are not available, order new shipping materials by calling Qualstar Technical Support.

9.2   Preparation for Packing Type C Fibre Channel Options

CAUTION

Be sure to turn the library's power off before installing or removing a Fibre Channel Option.

Prepare the FCO for packing as follows:

1. Remove power from the TLS: first turn the power switch off and then remove the power cord.

2. If the FCO is connected the FC host or Hub, disconnect it.

3. Carefully remove the SFP (Small Form Factor Pluggable) adapter from the FCO. They are located in the bottom of the FCO. See Figure 9-1. Store the SFP adapter in a safe location.
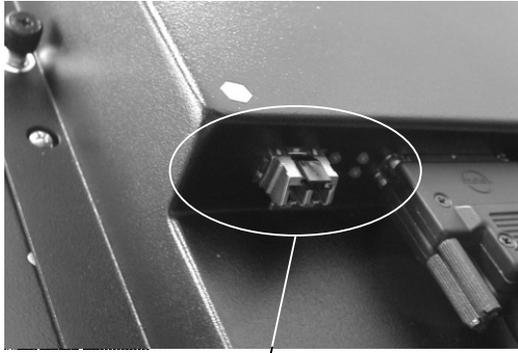
SFP adapter fully inserted into
a type C Fibre Channel Option.

Figure 9-1   Remove the SFP Adapter from the Fibre Channel Option

4.   Using a Phillips screwdriver, loosen the four captive screws on the FCO (see
     Figure 9-2) and carefully guide the FCO backwards as it pivots on the hinges
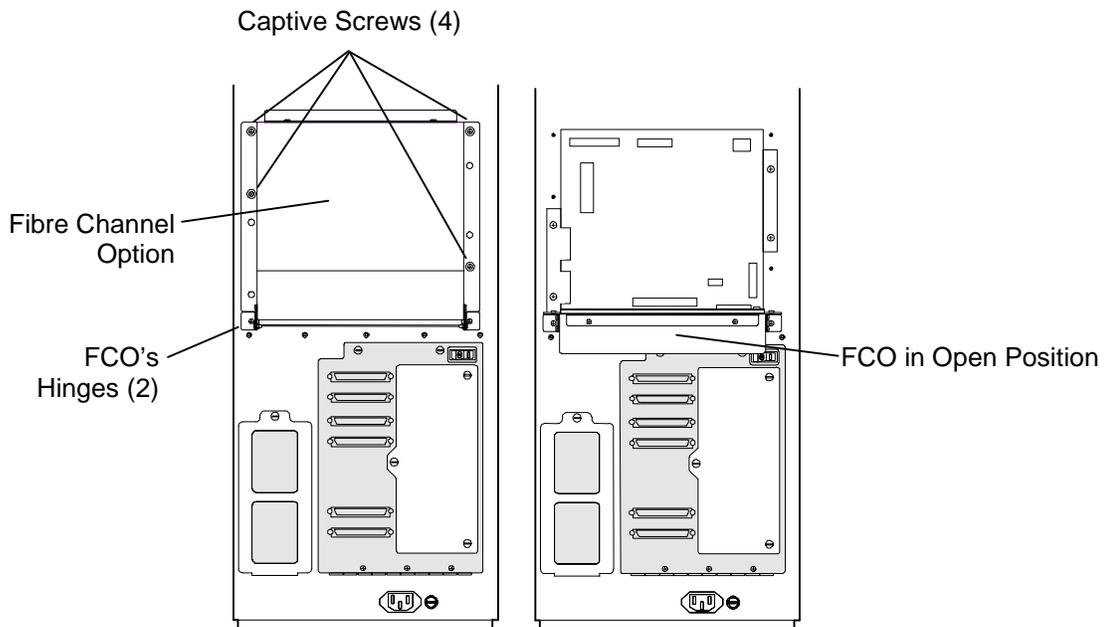   and comes to its open position. See Figure 9-2.

Captive Screws (4)

Fibre Channel
Option

FCO's
Hinges (2)

FCO in Open Position

Figure 9-2   Fibre Channel Option in Closed and Open Positions

CAUTION

SCSI Bus ribbon cables are fragile and can be damaged by pulling on the cable instead of the pull-tab provided at each connector.

5. Carefully disconnect the AUXPWR cable from the PWRIN connector on the Fibre Channel Option. See Figure 9-3.
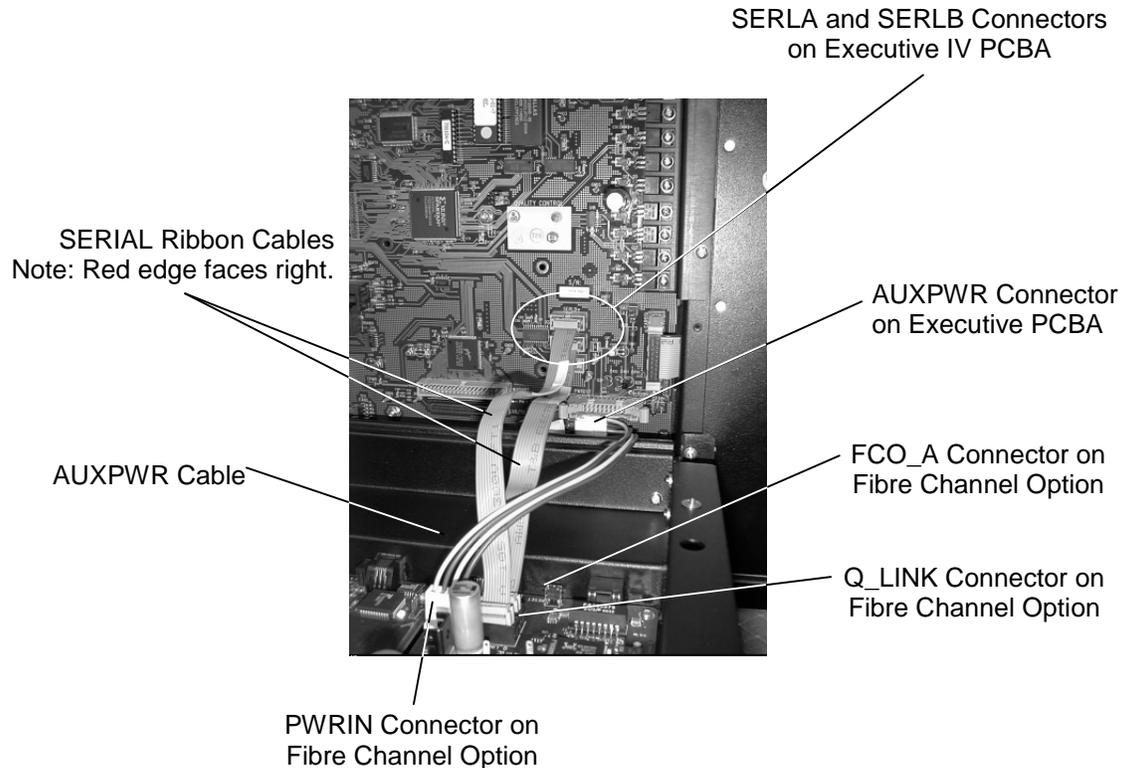

Figure 9-3   Detail of Connections in a Type C FCO

6. Carefully disconnect the SERIAL ribbon cable from the FCO_A connector on the Fibre Channel Option. For those FCOs that also have Q-Link, carefully disconnect the SERIAL ribbon cable from the Q_Link connector on the FCO. See Figure 9-3.

7. Slowly lift the FCO until it touches the rear of the TLS. Using a Phillips screwdriver, secure the Fibre Channel Option to the rear of the TLS by tightening the two top captive screws. See Figure 9-4.
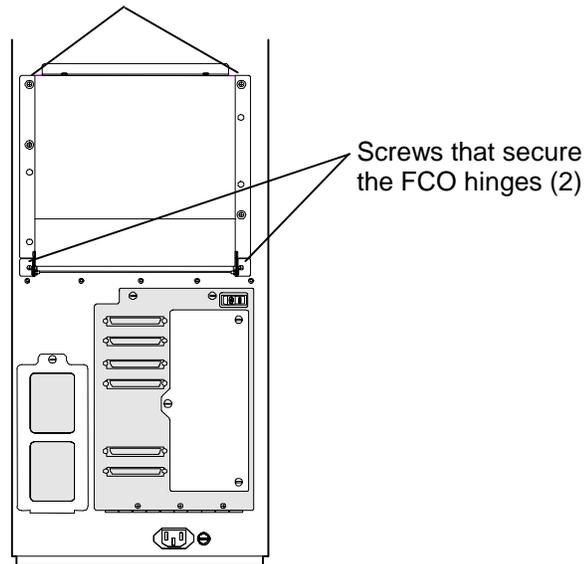
Top 2 Captive Screws in the FCO

Screws that secure
the FCO hinges (2)

Figure 9-4   Screw Locations in a Type C FCO

8. Remove the two screws from the hinges on the FCO. Save the screws for future use.

9. While supporting the FCO with one hand, loosen the two captive screws at the top of the FCO.

10. Carefully remove the FCO unit from the rear of the library.

9.3   Preparation for Packing Type B Fibre Channel Options

CAUTION

Be sure to turn the library's power off before installing or removing a Fibre Channel Option.
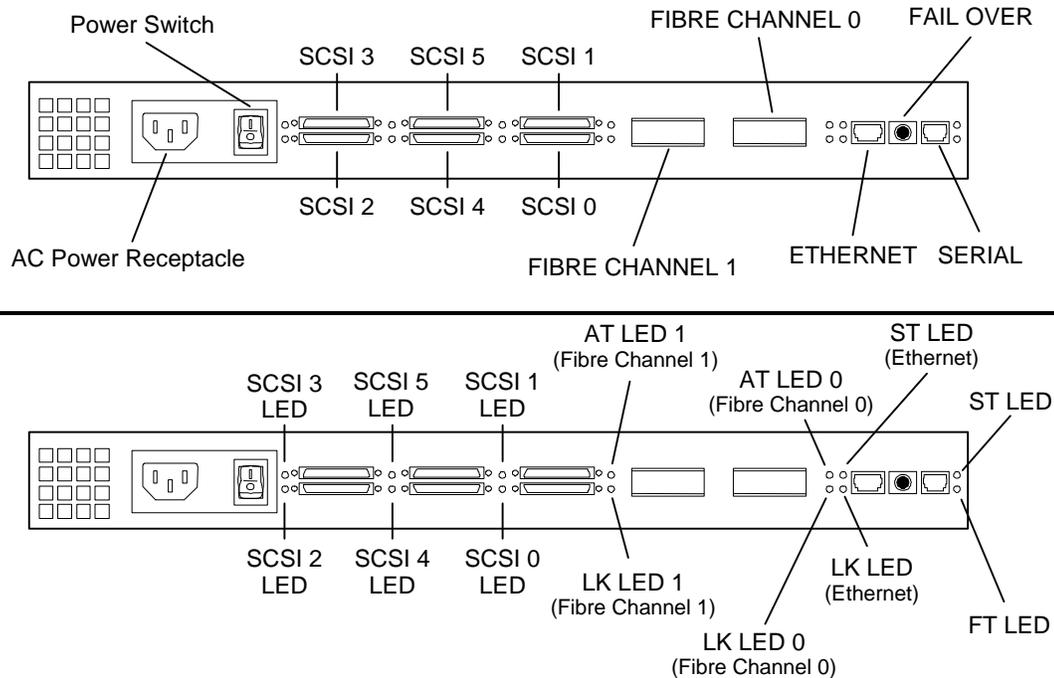
Figure 9-5   Rear View of the Type B Fibre Channel Bridge/Router (FCO)

1. Remove power from the FCO: first turn the power switch off and then remove the power cord.

2. Remove power from the TLS: first turn the power switch off and then remove the power cord.

3. If the FCO is connected the FC host or Hub, disconnect it.

4. Disconnect any SCSI cables (SCSI 0 through SCSI 5) from the rear of the FCO.

5. Disconnect the cable from the serial connector on the FCO.

6. If the FCO is mounted in a rack, cabinet or other location detach it and it will be ready for packing.

9.4   Preparation for Packing ATTO Fibre Channel Options

CAUTION

Be sure to turn the library's power off before installing or removing a Fibre Channel Option.
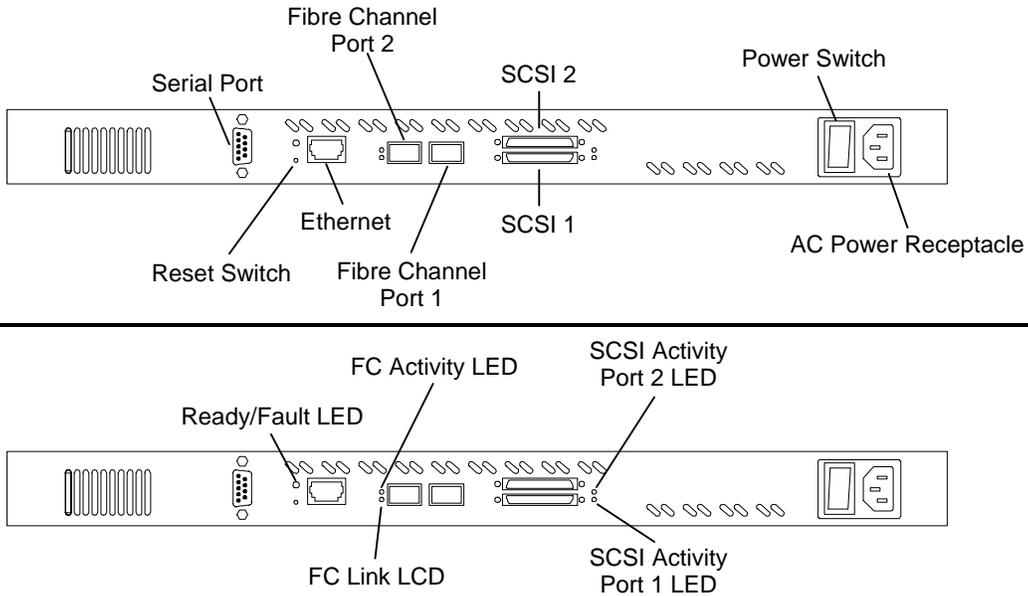
Figure 9-6   Rear View of the ATTO Fibre Channel Bridge/Router (FCO)

1. Remove power from the FCO: first turn the power switch off and then remove the power cord.

2. Remove power from the TLS: first turn the power switch off and then remove the power cord.

3. If the FCO is connected the FC host or Hub, disconnect it.

4. Disconnect any SCSI cables (SCSI 1 and SCSI 2) from the rear of the FCO.

5. Disconnect the cable from the serial port or Ethernet connectors on the FCO, if connected.

6. If the FCO is mounted in a rack, cabinet or other location detach it and it will be ready for packing.

9.5   Packing the Fibre Channel Option

1. Using the packing material that came with the FCO, place the FCO into the shipping carton and seal with shipping tape.