

Quantum ATL M1500 User's Guide Addendum — FC310 Router Option

Introduction	3
Fibre Channel Description	3
FC310 Router Operation.....	3
Key to Successful Configuration of the FC310 Option	4
Configuration.....	4
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FC310 Router Option Configuration	4
FC310 Configuration Procedure.....	4
Upgrading the FC310 Prism Firmware	7
<hr/>	
Commonly Used FC310 Services Software Commands for the ATL M1500 Library	11
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FC310 Services Software Commands	13
FC310 Service Software Operation	13
Command Syntax	14
List of Abbreviations.....	14
Command Listing.....	14

Introduction

The ATL M1500 tape library can contain up to two tape drives and up to 21 DLT/SDLT cartridges and 25 LTO cartridge. The ATL M1500 library is controlled by a host computer via a SCSI differential bus using the SCSI-2 medium changer command set. There is also a RS-232 diagnostic port interface.

The ATL M1500 Prism Architecture™ allows for easy conversion from the SCSI host interface to a Fibre Channel host interface by installing the FC310 Router option. This document is provided to end users of the ATL M1500 library to describe the FC310 Fibre Channel host interface option.

For a complete description of the ATL M1500 library operating procedures, see the *Quantum ATL M1500 User's Guide* (PN 6421000).

Fibre Channel Description

Fibre Channel is a serial data transfer architecture for use with computers and mass storage devices. Fibre Channel is rapidly emerging to challenge SCSI as the interface of choice for host-to-storage applications.

Fibre Channel advantages include:

- Connection distances with the FC310 option of up to 500 meters
- 1 GB/S data transfer rates
- Support for up to 126 devices on a loop
- Support for 24-bit addressing for over 16 million devices in point-to-point mode or fabric, when using a Fibre Channel switch or multiple Fibre Channel switches.
- Operating system independence
- Interconnect flexibility
- Fibre Channel fabric switches provide full direct connectivity between all ports on a network, which can increase the total throughput of all devices on a network.

FC310 Router Operation

Once the FC310 Router SCSI to Fibre Channel option is installed and tested, the library operates exactly as a ATL M1500 library with a SCSI host interface. User operation of the library via the graphical user interface (GUI) panel is unchanged.

Key to Successful Configuration of the FC310 Option

The FC310 Fibre Channel Option must be configured using the homebred FC310 Prism Router Services software. The key to successfully configuring the FC310 Option is to:

- Know exactly how the SCSI cabling in the library is configured including how many:
 - a SCSI buses are present in the library
 - b SCSI devices are connected to each bus
- Use the FC310 Prism Router Services software to create a Map file identifying which SCSI devices are electrically connected to which Fibre Channel ports on the FC310 board

Configuration

This document describes the ATL M1500 configuration procedure with two tape drives (maximum). To perform this configuration procedure, proceed to [FC310 Router Option Configuration on page 4](#).

FC310 Router Option Configuration

The FC310 Fibre Channel Option must be configured using the FC310 Prism Router Services software.

FC310 Configuration Procedure

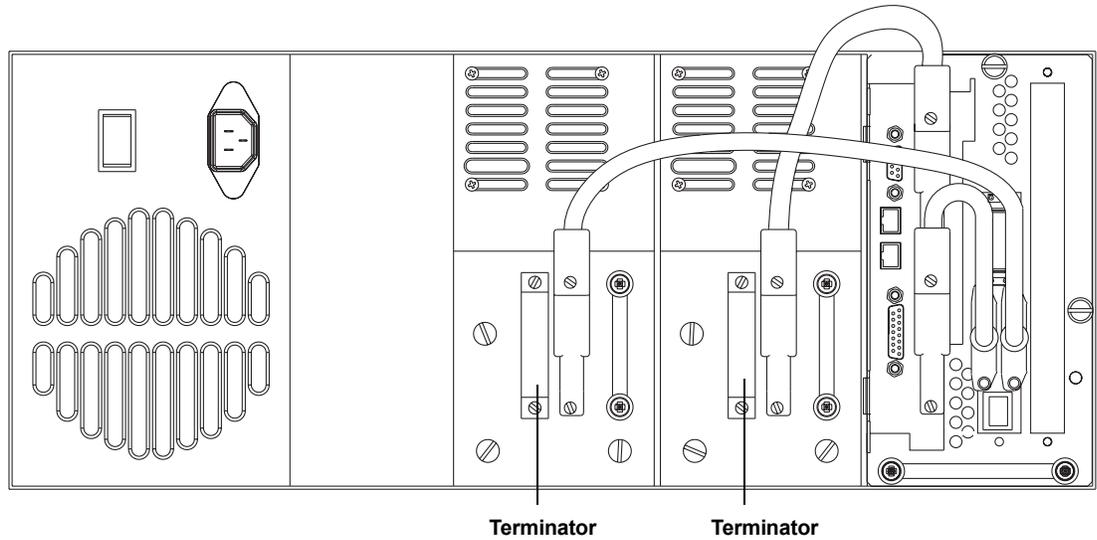
The ATL M1500 2-drive FC310 configuration procedure includes the following steps:

- [Confirm the Library's SCSI Cabling Configuration](#) on page 5
- [Connect a Service PC to the Library](#) on page 6
- [Start the FC310 Router Services Software on the Library](#) on page 7
- [Upgrading the FC310 Prism Firmware](#) on page 7
- [Scan the SCSI buses on the Library](#) on page 9

Confirm the Library's SCSI Cabling Configuration

- 1 Confirm the SCSI cabling is configured as shown in [figure 1](#).
- 2 If necessary, change the cabling to match [figure 1](#).

Figure 1 ATL M1500 2-Drive SCSI Cabling Configuration



Set the SCSI Device Addressing (IDs) for the Library

Set the SCSI IDs as shown in [table 1](#).

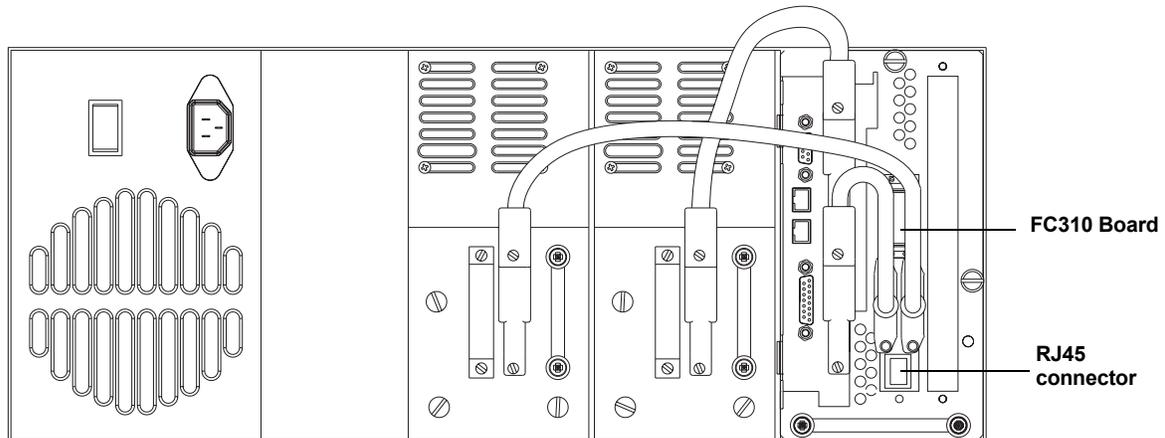
Table 1 SCSI ID Settings

Device	SCSI ID
Robotics Controller	0
Drive 0	1
Drive 1	2

Connect a Service PC to the Library

- 1 Locate the RJ45 connector at the bottom of the FC310 Router board in the ATL M1500 library as shown in [figure 2](#).

Figure 2 FC310 Mounted
in the ATL M1500



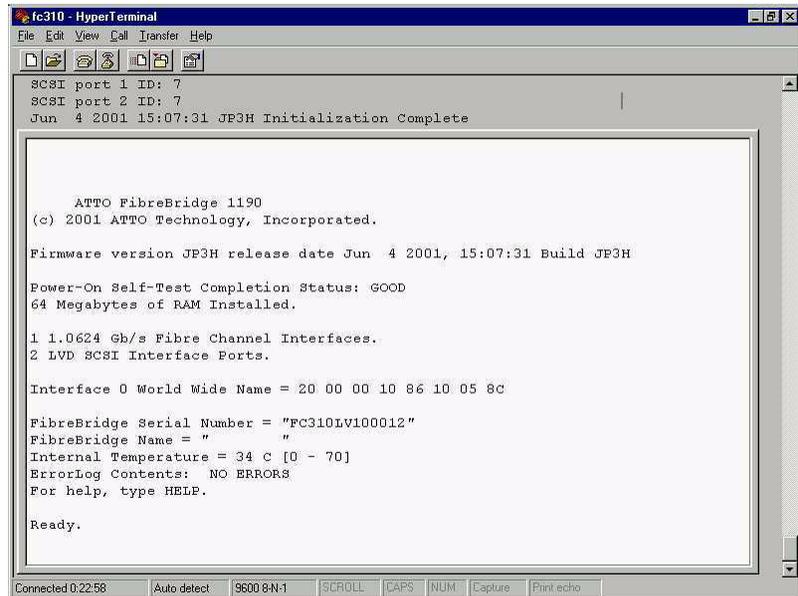
- 2 Connect a 9-pin serial cable (PN 6312122) to the RJ45 connector.
- 3 Connect the opposite end of the serial cable to the comm port on a service PC. For future reference, take note of which comm port you used on the service PC.
- 4 Turn on the PC.
- 5 Bring up a terminal emulation program on the PC such as HyperTerminal or ProComm.
- 6 Set the PC comm port operation as follows:
 - Baud rate: 9600
 - Data bits: 8
 - Stop bits: 1
 - Parity: none
 - Flow control: none
 - Properties/Setting/Function,...keys act as: Windows keys

Start the FC310 Router Services Software on the Library

- 1 Turn on the library or cycle the library power.
- 2 Upon power-up, the POST output scrolls past the PC screen, as shown in [figure 3](#), and the Prism Router Services software is immediately available.

Note: Check the version level on the POST output. Verify that the version is the most recent. If a newer version is available, download the newer version to the service. For more information, see [Upgrading the FC310 Prism Firmware](#) on page 7.

Figure 3 POST Output Screen



```
fc310 - HyperTerminal
File Edit View Call Transfer Help
SCSI port 1 ID: 7
SCSI port 2 ID: 7
Jun  4 2001 15:07:31 JP3H Initialization Complete

  ATTO FibreBridge 1190
(c) 2001 ATTO Technology, Incorporated.
Firmware version JP3H release date Jun  4 2001, 15:07:31 Build JP3H
Power-On Self-Test Completion Status: GOOD
64 Megabytes of RAM Installed.

1 1.0624 Gb/s Fibre Channel Interfaces.
2 LVD SCSI Interface Ports.

Interface 0 World Wide Name = 20 00 00 10 86 10 05 8c
FibreBridge Serial Number = "FC310LV100012"
FibreBridge Name = "
Internal Temperature = 34 C [0 - 70]
ErrorLog Contents: NO ERRORS
For help, type HELP.

Ready.

Connected 0:22:58  Auto detect  9600 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

- 3 If the initial screen is not displayed, check the PC comm port settings, then power cycle the library.
- 4 Press <Enter> when POST completes and Ready displays. The PC is now in command line mode.

Upgrading the FC310 Prism Firmware

If a new version of FC310 firmware is available, use the following procedure to download the new firmware to the FC310 board:

- 1 Copy the new firmware file to a directory on the service PC.
- 2 Set the FC310 baud rate and the HyperTerminal baud rate to 115200 using the following steps. This speeds the firmware download process.

- a** At the Ready prompt type `set serialportbaudrate 115200`, then press <Enter>.
 - b** Type `saveconfiguration`, then press <Enter>. Wait for a new Ready prompt.
 - c** At the Ready prompt, type:
`firmwarerestart<Enter>`
 - d** From the HyperTerminal menu located at the top of the screen, select:
`Call/Disconnect`
 - e** From the HyperTerminal menu, select:
`File/Properties/Connect To tab/ Configure button`
 - f** Set the baud rate to 115200.
 - g** From the HyperTerminal menu at the top of the screen, select:
`Call/Connect`
- 3** At the Ready prompt, type:
`saveconfiguration`
- 4** Wait for the Ready prompt, then type:
`firmwarerestart`
- 5** Wait for the Ready prompt, then type:
`zmodem receive<Enter>`
- 6** From the HyperTerminal menu at the top of the screen, select:
`Transfer/Send File`
- 7** Browse to the location of the new firmware file.
`xxx.IMA`
- 8** In the Send File dialog box, select protocol:
`zmodem`
- 9** Click the **Send** button. The firmware download begins and takes approximately 3 to 4 minutes to complete. When the download is complete a new Ready prompt is displayed on the HyperTerminal screen.
- 10** At the Ready prompt, type:
`firmwarerestart<Enter>`
- 11** Confirm the new firmware revision is displayed in the HyperTerminal screen as the software comes to the Ready state.
Wait for the Ready prompt.
- 12** Reset the FC310 Router and the service PC back to 9600 baud:

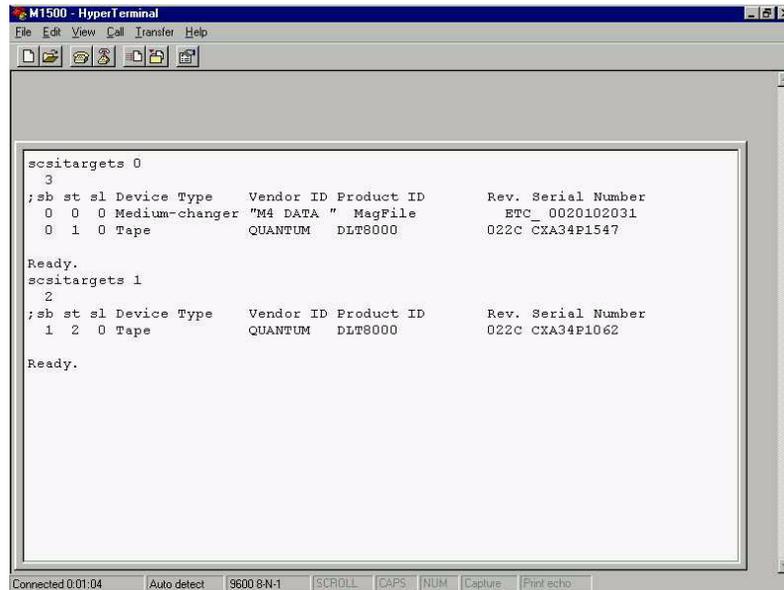
- a** At the Ready prompt, type `set serialportbaudrate 9600`, then press <Enter>.
- b** Type `saveconfiguration`, then press <Enter>. Wait for a new Ready prompt.
- c** From the HyperTerminal menu (located at the top of the screen), select Call/Disconnect.
- d** From the HyperTerminal menu select:
File/Properties/Connect To tab/Configure button.
- e** Set the baud rate to 9600.
- f** From the HyperTerminal menu select Call/Connect.

Scan the SCSI buses on the Library

Use the following procedure to confirm that the SCSI buses are cabled properly.

- 1** Connect the serial cable to the RJ45 connector of the FC310 Router board in the library.
- 2** Cycle power on the library to start the FC310 Router Services software.
- 3** At the Ready prompt:
 - a** Type `scsitargets 0`, then press <Enter>. This command scans and displays all SCSI devices found on SCSI bus 0—the robotics controller and drive 0.
 - b** Type `scsitargets 1`, then press <Enter>. The SCSI Bus Scan screen appears as shown in [figure 4](#). Scans bus 1—displays drive 1.

Figure 4 SCSI Targets
Screen



```
M1500 - HyperTerminal
File Edit View Call Transfer Help

scsitargets 0
3
;sb st sl Device Type Vendor ID Product ID Rev. Serial Number
0 0 0 Medium-changer "M4 DATA " MagFile ETC_0020102031
0 1 0 Tape QUANTUM DLT8000 022C CXA34P1547

Ready.
scsitargets 1
2
;sb st sl Device Type Vendor ID Product ID Rev. Serial Number
1 2 0 Tape QUANTUM DLT8000 022C CXA34P1062

Ready.

Connected 0:01:04 /Auto detect 9600 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo
```

Create the FC310 Prism Map for the FC310 Router in the Library

A map file is required for the FC310 Router in the ATL M1500 library. It is used by the FC310 to identify the SCSI devices in the library electronically connected to the Fibre Channel port on the board.

To create the FC310 Prism Map, perform the following steps:

- 1 At the screen prompt, type `automap 0` and press <Enter>. The `automap` command executes.
- 2 When the ready prompt appears, type `saveconfiguration` and press <Enter>.
- 3 When the ready prompt appears, type `firmwarerestart` and press <Enter>.

Figure 5 Automap Screen

```
fc310 - HyperTerminal
File Edit View Call Transfer Help
[Icons]
Ready.
get ScsiPortSyncTransfer 0
Port 0 ScsiPortSyncTransfer = enabled
Ready.
help ScsiPortSyncTransfer
[set | get] ScsiPortSyncTransfer [PortNumber [enabled | disabled]]
If this option is enabled, the SCSI port will allow synchronous SCSI
transfers. Otherwise, only asynchronous transfers will occur.
Ready.
automap 0
Setting device offline: FC 0 Lun 0.
Setting device offline: FC 0 Lun 1.
Setting device offline: FC 0 Lun 2.
Scanning SCSI bus 0
Scanning SCSI bus 1
SCSI bus 1 scan complete.
SCSI bus 0 scan complete.
Ready. *
saveconfiguration
Ready.
firmwarerestart
Connected 0:21:03 | Auto detect | 9600 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo
```

Commonly Used FC310 Services Software Commands for the ATL M1500 Library

The FC310 Services Software resides on each FC310 Router board. This software configures the router for use in the Quantum ATL M1500 library through a Command Line Interface (CLI) that is compatible with any PC and a terminal emulation program (such as HyperTerminal or ProComm).

For more information on additional commands, syntax, and usage, see [FC310 Services Software Commands](#) on page 13.

Table 2 Commonly Used
 FC310 Services
 Commands

Command	Description	Default	Syntax
RouteDisplay	List the currently mapped Fibre Channel-to-SCSI routes.		routedisplay routedisplay [fp] routedisplay [online offline] routedisplay [fp [fl]] routedisplay [fp [online offline]]
SerialPortBaudRate	Set the baud rate for the FC310 serial port (2400, 9600, 19200, 38400, 57600, or 115200).	9600	set serialportbaudrate [rate] get serialportbaudrate
SerialPortEcho	Turn on or off the echoing of keyboard input.	off	set serialportecho [enabled disabled]
FirmwareRestart (Immediate)	Reboot the FC310 firmware.		firmwarerestart
Zmodem (Immediate)	Transfer a firmware image or NVRAM parameter file to or from the router using ZMODEM file transfer protocol.		zmodem [send [filename] receive]
Info (Immediate)	Displays version numbers and other product information for key components within the FC310.		info
Help (Immediate)	Displays a list of available commands. When the optional command name is present, detailed command-specific information is displayed.		help [command name]
SaveConfiguration (Immediate)	Save the new configuration. If a firmware restart is required to make the change, the user is prompted to confirm the restart. The user can override the confirmation request by indicating the override value on the command line.		saveconfiguration < restart norestart >

FC310 Services Software Commands

The FC310 Services Software is resident on each FC310 Router board, and is used to configure the router for use in the Quantum ATL M1500 library. The software uses a Command Line Interface (CLI) that is usable with any PC and a terminal emulation program such as HyperTerminal or ProComm.

FC310 Service Software Operation

The Command Line Interface provides access to the FC310 services through a set of ASCII-based command lines. Commands have four types of operation:

- *Immediate* – cause an immediate action; not preceded by a **get** or **set** operation.
- *Get* – returns the current value of a parameter or setting. This command may be abbreviated to “g”.
- *Set* – changes the value of a parameter or setting. This command may be abbreviated “s”, and does not take effect until a SaveConfiguration command is sent.
- *Usage* – if the form of an operation cannot be determined, it is assumed to be the “Usage” form and a brief help message is displayed.

The commands are not case sensitive.

Decimal numbers may be entered as raw numerical input, such as 123.

Octal numbers must be preceded by the number 0, for example 0713.

Hexadecimal numbers must be preceded by the C-style of 0x prefix, such as 9x1FA4.

Quoted strings are treated as a single parameter for any command which expects character input, regardless of space in the string.

Several non-immediate commands require a SaveConfiguration before their modified parameters take effect. When such a command is executed an asterisk appears next to the command line prompt.

Command Syntax

The following is a list of syntax used to describe command lines:

- [] indicates required entry
- < > indicates optional entry
- | indicates choose one entry

List of Abbreviations

The following is a list of abbreviations used to describe command lines:

- fpFibre Channel port number (0 - 2)
- flFibre Channel LUN (0 - 31)
- sbSCSI bus number (0 - 3)
- stSCSI target ID (1 - 15)
- sl SCSI LUN (0 - 7)

Command Listing

A list of the currently available FC310 Services Software commands is shown in [table 2](#).

Table 3 Most Common
 FC310 Services
 Commands

Command	Description	Default	Syntax
FcConnMode	Set the connection mode for the FC310 to arbitrated loop or point-to-point. Applies to all three Fibre Channel ports on each board.	loop	set fcconnmode [loop ptp] get fcconnmode
FcFairArb	Turn on or off the FC-AL arbitration fairness. Applies to all three Fibre Channel ports on each board.	enabled	set fcfairarb [enabled disabled] get fcfairarb
FcFrameLength	Specify the maximum number of payload bytes in a Fibre Channel frame. If the frame length is not specified, the current frame length is displayed.	2048 bytes	set fcframelength [512 1024 2048] get fcframelength

Command	Description	Default	Syntax
FcHard	Enable or disable Fibre Channel hard address assignment. Under soft addressing the FC310 loop address is assigned during loop initialization.	hard	set fchard [enabled disabled] get fchard
FcHardAddress	Set the value used as the FC-AL hard address.	port 0 = 3	set fchardaddress [fp [address]] get fchardaddress [fp]
FcSCSIBusyStatus	Specify the SCSI status value returned when the FC310 is unable to accept a SCSI command due to a temporary lack of internal resources.	BUSY	set fcscsibusystatus [busy qfull] get fcscsibusystatus
FibreBridgeName	Specify the 8-character name assigned to the FC310 router.		set fibrebridgename [name] get fibrebridgename
FibreBridgeTargetLUN	Specify the soft target LUN used by the FC310 when addressed by the host. This LUN is taken from NVRAM.		set fibrebridgetargetlun [0 - 31]
RouteChange (Immediate)	Map a Fibre Channel port and LUN to a SCSI bus, target, and LUN. Valid route change entries are: fp (0-2) fl (0-31) sb (0-3) st (0-15) sl (0-7).		routechange [fp] [fl] [sb] [st] [sl]
RouteOnline	Set the status of a route to online.		set routeonline [fp] [fl] get routeonline [fp] [fl]
RouteOffline	Set the status of a route to offline.		set routeoffline [fp] [fl] get routeoffline [fp] [fl]
RouteDisplay	List the currently mapped Fibre Channel-to-SCSI routes.		routedisplay routedisplay [fp] routedisplay [online offline] routedisplay [fp [fl]] routedisplay [fp [online offline]]

Command	Description	Default	Syntax
FcPortList (Immediate)	List the available Fibre Channel ports and their current status.		fcportlist
ScsiInitID	Specify the SCSI initiator ID to be used on the specified SCSI port.		set scsiinitid [sb [0-15]] get scsiinitid [sb]
ScsiPortResetOnStartup	Specify whether the SCSI port should be reset on power-up.	Reset each SCSI bus on startup	set scsiportresetonstartup [sb [enabled disabled]] get scsiportresetonstartup [sb]
ScsiPortSelTimeout	Show the time (msec) that the router waits for a response from a SCSI device on the selected port after a selection request.	256 msec	set scsiportseltimeout [sb [256 128 64 32 16 8 4 2 1]] get scsiportseltimeout [sb]
ScsiPortSyncTransfer	Specify whether synchronous SCSI transfers should be negotiated with devices on the specified SCSI port.	enabled	set scsiportsynctransfer [[sb [enabled disabled]] get scsiportsynctransfer [sb]
ScsiPortTaggedQueuing	Specify whether tagged command queuing is allowed on the SCSI port.	enabled	set scsiporttaggedqueuing [sb [enabled disabled]] get scsiporttaggedqueuing [sb]
ScsiPortUltra2	Specify whether the selected port supports Ultra2 (LVD) transfers.		set scsiportultra2 [sb [enabled disabled]] get scsiportultra2 [sb]
ScsiPortWideTransfer	Specify whether wide SCSI transfers should be negotiated.	enabled	set scsiportwidetransfer [sb [enabled disabled]]
ScsiTargets	List the SCSI devices that are on the referenced SCSI bus.		get scsitargets [sb]
ScsiPortList (Immediate)	List the available SCSI ports and their status.		scsiportlist
ScsiTermination	Set the internal termination of the referenced SCSI port.	enabled	set scsitermination [sb [enabled disabled]] get scsitermination [sb]
SerialPortBaudRate	Set the baud rate for the FC310 serial port (2400, 9600, 19200, 38400, 57600, or 115200).	9600	set serialportbaudrate [rate] get serialportbaudrate
SerialPortStopBits	Set the number of stop bits for the FC310 serial port (1 or 2).	1	set serialportstopbits [1 2] get serialportstopbits

Command	Description	Default	Syntax
SerialPortHandshake	Set the data handshaking method used for controlling the flow between the transmitter and receiver (hardware, software, or none).	none	set serialporthandshake [hard xon none] get serialporthandshake
SerialPortEcho	Turn on or off the echoing of keyboard input.	off	set serialportecho [enabled disabled]
FibreBridgeModel	Report the specific FC310 model information.		get fibrebridgemodel
SerialNumber	Report the FC310 board serial number.		get serialnumber
FirmwareRestart (Immediate)	Reboot the FC310 firmware.		firmwarerestart
ScsiPortReset (Immediate)	Reset the specified SCSI bus.		scsiportreset [sb]
Temperature	Report the unit temperature in degrees C.		get temperature
Zmodem (Immediate)	Transfer a firmware image or NVRAM parameter file to or from the router using ZMODEM file transfer protocol.		zmodem [send [filename] receive]
MaxEnclTempAlrm	Sets/displays the maximum enclosure temperature alarm of the unit in degrees C (5-40 degrees C).		set maxencltempalrm [5 - 40] get maxencltempalrm
MinEnclTempAlrm	Sets/displays the minimum enclosure temperature alarm of the unit in degrees C (5-40 degrees C).		set minencltempalrm [5 - 40] get minencltempalrm
IdentifyFibreBridge	Causes the "Fault" LED on the FC310 board to blink continuously until disabled.		set identifyfibrebridge [enabled disabled] Get identifyfibrebridge

Command	Description	Default	Syntax
<p>DispEvent</p> <p>Set the switches which control the filtering performed when displaying events. Switches have the following meanings and settings:</p> <p>(subsystem) switch: mask that controls which subsystem events are displayed. The mask is a byte value with the following bit patterns corresponding to the currently supported subsystems:</p> <p>0x01 FCP Processor /i960 Interaction 0x02 SCSI Processor/i960 Interaction 0x04 Ethernet (Future) 0x20 NVRAM & Flash</p> <p>To display the events from several different subsystems, use a mask value equal to the logical OR of the corresponding subsystem values. To display events from all subsystems enter the value 3Fh for the mask.</p> <p>(event_level) switch: mask that controls what reporting level events are displayed. The mask is a byte value with the following bit patterns corresponding to the currently supported reporting levels:</p> <p>0x01 Info; general information 0x02 Warning; unexpected situation/condition 0x04 Critical; operation limited/curtailed 0x08 Failure; hard failure 0x10 Other; otherwise not categorized 0x20 Debug; tracking events</p> <p>To display events from several different reporting levels, use a mask value equal to the logical OR of the corresponding reporting levels. To display events for all reporting levels enter the value 3Fh for the mask.</p> <p>(status) switch: has the following two values which correspond to the status of the events to be displayed:</p> <p>all All events, regardless of their status values are displayed. ngood Only events with a status other than good are displayed.</p>	<p>3Fh</p> <p>3Fh</p> <p>all</p>	<p>3Fh</p> <p>3Fh</p> <p>all</p>	<p>set dispevent [subsystem] [event_level] [status] get dispevent</p>

Command	Description	Default	Syntax
LogEvent	<p>Sets the switches which control the filtering performed when logging events. The switches have the following meanings and settings:</p> <p>(enabled disabled) switch: controls whether or not events logging is enabled or disabled.</p> <p>(subsystem) switch: same as switch for DispEvent in previous section</p> <p>(event_level) switch: same as switch for DispEvent in previous section</p> <p>(status) switch: same as switch for DispEvent in previous section</p>	<p>disabled</p> <p>3Fh</p> <p>3Fh</p> <p>all</p>	<p>set logevent [enabled disabled] [[subsystem] [event_level] [status]]</p> <p>get logevent</p>
ClearEvent (Immediate)	Clears the contents of the event log.		clearevent
DisplayEvent (Immediate)	Displays the current contents of the event log. The log is filtered by the current switch settings as described in the DispEvent section. If the optional all is selected, the display filtering is temporarily suspended and all logged events are displayed.		displayevent < all >
Info (Immediate)	Displays version numbers and other product information for key components within the FC310.		info
Help (Immediate)	Displays a list of available commands. When the optional command name is present, detailed command-specific information is displayed.		help [command name]
RestoreConfiguration (Immediate)	Restore to factory default configuration or the last saved configuration. The new configuration must be saved to take effect.		restoreconfiguration [default saved]

Command	Description	Default	Syntax
SaveConfiguration (Immediate)	Save the new configuration. If a firmware restart is required to make the change, the user is prompted to confirm the restart. The user can override the confirmation request by indicating the override value on the command line.		saveconfiguration < restart norestart >
Reserve (Immediate)	<p>Reservation of the FC310 is implicit; once the configuration image is changed by any user of services (Serial/Ethernet/Etc.) the FC310 becomes RESERVED. Performing a SaveConfiguration, RestoreConfiguration or FcRestart RELEASES the FC310 so that other devices may access it.</p> <p>When the FC310 services interface is reserved, set commands are unavailable, but get commands are available. Note that at least one service interface always has access to the FC310 at all times. This interface always reports a RELEASED status, since it may issue set commands.</p>		reserve
VerboseMode	Sets the Command Line Interface to display extended information about a parameter when the help command is given. When verbose mode is enabled, parameter values are generally preceded by labels in responses to the get commands. Only the parameter value is output when verbose mode is disabled.		set verbose [enabled disabled] get verbose