ATTO Technology, Inc.

ATTO FibreBridge™

Installation and Operation Manual

ATTO FibreBridge 2390C/R/D

ATTO FibreBridge 2400C/R/D

1/2006

Document Control Number: PRMA-0362-000

Contents

1.0 ATTO FibreBridge provides storage options

The ATTO FibreBridge™ family of products provides Fibre Channel-to-SCSI bridges as embeddable boards, stand alone enclosures that can be fitted for rack mount integration, or desktop units.

Fibre Channel is a serial communications technology designed to transfer large amounts of data between a variety of hardware systems over long distances. It is a key technology for applications that require shared, high bandwidth access to storage.

Fibre Channel provides a logical point-to point serial channel for the transfer of data between a buffer at a source device and a buffer at a destination device. It moves buffer contents from one port to another, without regard to the format or meaning of the data, so different upper level protocols are able to run over Fibre Channel hardware.

All ATTO FibreBridge models can be used in a SAN (Storage Area Network) to connect a variety of Fibre Channel and SCSI devices. A SAN is a shared storage architecture connecting computers and storage devices for online data access. Each connected system can directly access any attached storage device.

The ATTO FibreBridge provides the interface between SCSI and Fibre Channel resources in SANs. Possible configurations depend upon your current hardware.

ATTO FibreBridge 2390C/R/D features, benefits

The ATTO FibreBridge 2390C/R/D is a 4-Gigabit Fibre Channel-to-SCSI bridge configured with a single 4-Gigabit Fibre Channel port and dual-stacked Ultra320 SCSI buses featuring VHDCI interfaces.

Designed to integrate industry-leading performance and SAN capabilities into advanced storage solutions, the FibreBridge 2390 uses a high performance architecture suited for tape automation OEMs who wish to integrate high performance LTO-3 and SDLT600 tape drives into 4-Gigabit Fibre Channel SANs, as well as disk OEMs looking to add 4-Gigabit Fibre Channel connectivity to their disk storage devices.

- One 4-Gigabit Fibre Channel port which auto negotiates to 1- and 2-Gigabit FC
- SFP FC connectors
- Support for direct connect to F-port fabric switches, full duplex FC data transfers and FC-AL, PLDA and public look login
- Two independent Ultra 320 SCSI buses
- Dual-stacked VHDCI SCSI connectors
- Backward compatible with all single-ended SCSI devices and all previous SCSI protocols
- Manual and auto SCSI device mapping
- ExpressNAV™ integrated management console for remote configuration, management and diagnostic capabilities
- Supports SCSI hard disk drives, tape drives and CD libraries

ATTO FibreBridge 2400C/R/D features, benefits

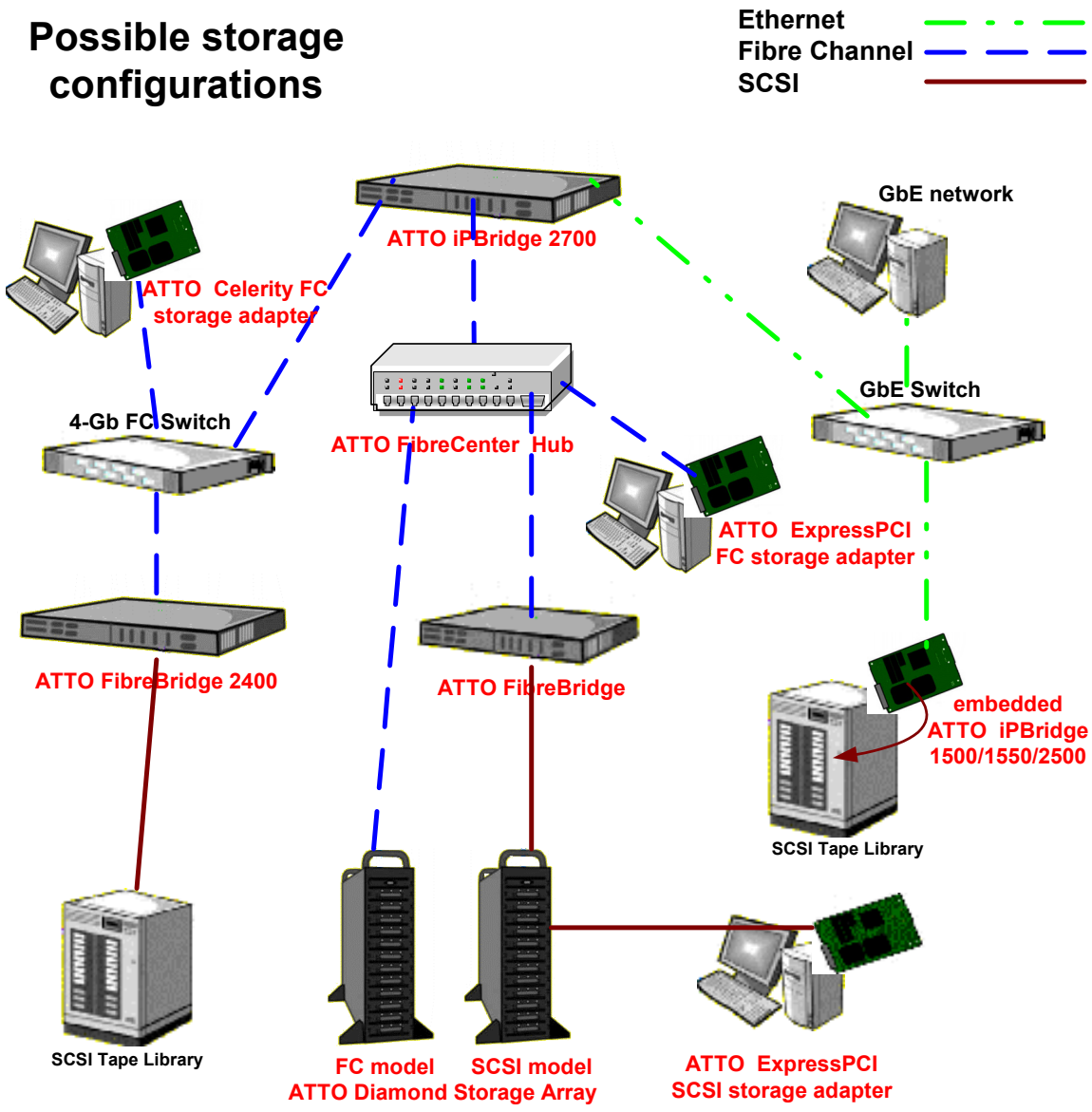
The ATTO FibreBridge 2400C/R/D is a 4-Gigabit Fibre Channel-to-SCSI bridge configured with dual independent 4-Gigabit Fibre Channel ports and dual-stacked Ultra320 SCSI buses featuring VHDCI interfaces.

Designed to integrate industry-leading performance and SAN capabilities into future generation storage solutions, the FibreBridge 2400 uses a high performance architecture suited for tape automation OEMs who wish to integrate high performance LTO-3 and SDLT600 tape drives into 4-Gigabit Fibre Channel SANs, as well as disk OEMs looking to add 4-Gigabit Fibre Channel connectivity to their disk storage devices.

- Two independent 4-Gigabit Fibre Channel ports which auto negotiate to 1- and 2-Gigabit FC
- SFP FC connectors

- Support for direct connect to F-port fabric switches, full duplex FC data transfers and FC-AL, PLDA and public look login
- Two independent Ultra 320 SCSI buses
- Dual-stacked VHDCI SCSI connectors
- Backward compatible with all single-ended SCSI devices and all previous SCSI protocols
- Manual and auto SCSI device mapping
- 440 MB/sec. maximum throughput
- ExpressNAV™ integrated management console for remote configuration, management and diagnostic capabilities
- Supports SCSI hard disk drives, tape drives and CD libraries

Exhibit 1.0-1 Possible storage configurations using ATTO iPBridge and FibreBridge models



1.1 ATTO FibreBridge 2390R/D

The ATTO FibreBridge 2390R/D is a 4-Gigabit Fibre Channel to SCSI bridge offering the ability to add 4-Gb Fibre Channel connectivity to Ultra 320 SCSI devices.

The FibreBridge 2390R/D is available in an industry-standard IU form factor for easy integration into racks. The advanced connectivity options make it suitable to support next-generation storage media such as LTO-3 and SDLT600.

Dimensions

Width: 17 inches

Length: 11 inches

Height: 1.7 inches (1U)

Weight: approximately 10 pounds

Cooling and airflow

Operating Temperature: 0-40° C external

Humidity: 10-90% non-condensing

Air enters from the front and is exhausted out the connector side by a blower inside the enclosure which provides 11 cubic feet per minute of airflow. Ambient air near the inlets should not exceed 40°C. The unit will automatically stop operation if the temperature goes beyond this threshold.

CAUTION

Do not block the enclosure's vents. The FibreBridge will shut down if overheating occurs.

Power

The power supply circuit is permanently mounted within the enclosure and is not hot swappable. It has one standard IEC320 power receptacle and switch.

The universal power supply provides power for the bridge board and cooling fan.

The power requirements of the ATTO FibreBridge 2390R plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

Input voltage: 110/230V AC, with operating input range of 90-132V AC or 175-264V AC, 47-63Hz, single phase. The AC input range selection is automatic with no manual or jumper switchover required.

Power draw: 2 amps at 110V, 1.6 amps @ 90V

Fibre Channel interface

The optical SFP 4-Gb Fibre Channel port auto-negotiates to 1-, 2- or 4-Gigabit devices, providing full support for direct connect for F-port fabric switches, Class 3 and intermix ANSI Fibre Channel specifications, PLDA, public loop login (NL-ports) and fabric connect (N-port) and full duplex transmissions.

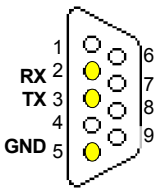
SCSI ports

The two SCSI ports connect storage devices into the Fibre Channel Storage Area Network (SAN). Each port is totally independent from the other.

The ports are Ultra 320 SCSI busses with VHDCI connector, downward compatible with all forms of single-ended SCSI and all previous SCSI protocols.

Serial port

The RS-232 serial port provides support for remote monitoring and management using a DB9 connector. The baud rate is programmable and preset at the factory to 115200 bps.



Ethernet port

The 10/100 Base T Ethernet port is accessible from the RJ45 connector. Local diagnostics are supported through an integrated web server (ATTO ExpressNAV), CLI, Telnet and FTP. Includes support for DHCP, Telnet, FTP, SNMP and ICMP.

LED indicators

The LED indicators can be viewed from the connector side and the front side of the FibreBridge 2390R/D. (See Exhibit 1.1)

LEDs on the connector side are:

A bicolor 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.

Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

SCSI ports: A green LED on each port indicates activity if is lit.

LEDs on the faceplate are:

A bicolor Ready/Fault LED is lighted green to indicate ready, lighted yellow to show a faulted condition, and off indicates not ready.

SCSI ports: A green LED on each port indicates activity if is lit.

Fibre Channel port: bicolor LED indicates FC speed. If it is off, speed is 1-Gb; if it is green, 2-Gb, and yellow indicates 4-Gb FC. A separate green LED indicates activity if it is lit, no activity if it is off.

Installation instructions

1 Physically place the FibreBridge on a desktop or into a rack.
   - **a.** To mount on a rack, install “L” brackets so that either the front or the connector side of the FibreBridge faces front. The mounting holes on the bracket fit a standard 19-inch rack using a centered 1.25-inch (31.7 mm) hole pattern.
   - **b.** Install the FibreBridge horizontally within the rack so it does not reduce the air flow.
   - **c.** Properly ground the FibreBridge to the rack equipment. The earth ground connection must be maintained.

Note

The power requirements of the ATTO FibreBridge plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

2 Connect a SCSI device to the FibreBridge. Connect the Fibre Channel port to your SAN.Connect the Ethernet cable from the Fibre Bridge to your computer. Refer to Cabling on page iii.

3 Connect the power connector.

4 Apply power.

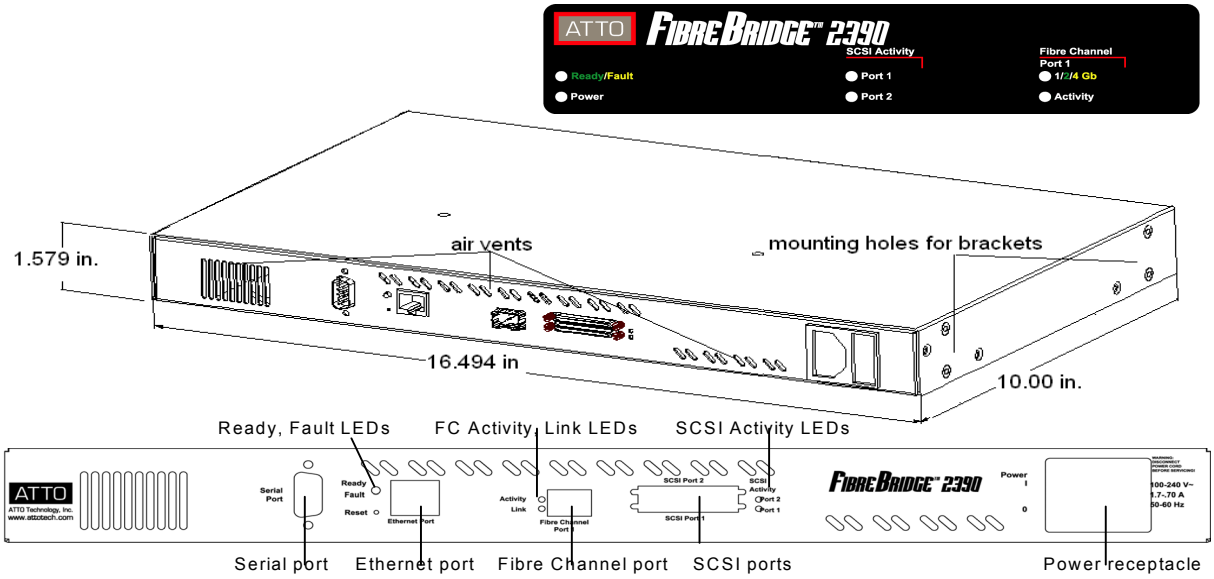
5 Access FibreBridge Services using the QuickNAV utility. Refer to Configuring the FibreBridge on page 14.

6 Go to the ExpressNAV **Restart** page and restart the FibreBridge.

7 Map your devices.Refer to Mapping devices on page 19.

8 Boot the computers on the SAN and check the configuration. Refer to Additional configurations on page 22.

Exhibit 1.1-1 Fibre Bridge 2390C/D dimensions with front panel and back panel details



1.2 ATTO FibreBridge 2390C

The ATTO FibreBridge 2390C is a 4-Gigabit Fibre Channel to SCSI bridge offering the ability to add 4-Gb Fibre Channel connectivity to Ultra 320 SCSI devices.

The FibreBridge 2390C is available in an industry-standard 4U cPCI card for easy integration into storage devices. The advanced connectivity options make it suitable to support next-generation storage media such as LTO-3 and SDLT600.

Board dimensions

Width: 6.1939 inches
Length: 6.299 inches
Height of tallest component: .545 inches

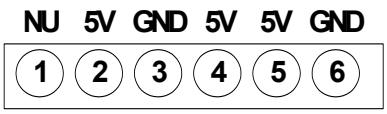
Cooling and airflow

Operating Temperature: 0-40° C
Humidity: 10-90% non-condensing

Power

The FibreBridge board may be powered from the cPCI backplane connector or a 6-pin connector.

6-pin connection pinouts



Input voltage: 5.0V
Power draw: 30 Watts
Battery-backed event log SRAM & Real-Time-Clock: A rechargeable Lithium ion battery cell will hold the memory in a 512KB SRAM for up to 30 days.

WARNING

Risk of explosion if the battery is removed and/or replaced by an incorrect type. Dispose of used batteries in accordance with your local environmental regulations.

If the FibreBridge becomes disconnected from power, recharging begins automatically when power is restored to the system. The battery is fully charged after 24 hours of continuous power application.

Fibre Channel port

The 4-Gigabit Fibre Channel port can connect the FibreBridge to either a Fabric or Arbitrated Loop.

- Full support for full duplex FC data transfers, FC-AL, PLDA and public loop login.
- Small Formfactor Pluggable (SFP) interface
- Auto negotiates with 1-, 2- and 4-Gb/sec. devices

SCSI ports

The two SCSI ports connect storage devices into the Fibre Channel Storage Area Network (SAN). Each port is totally independent from the other.

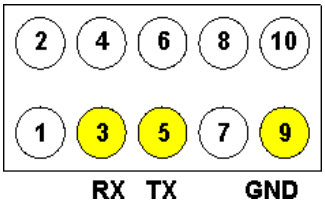
The ports are Ultra 320 SCSI busses with VHDCI connectors, downward compatible with all forms of single-ended SCSI and all previous SCSI protocols.

Ethernet port

The 10/100 Base T Ethernet port is accessible from the RJ45 connector. Local diagnostics are supported through an integrated web server, ATTO ExpressNAV, the preferred management tool. Includes support for DHCP, Telnet, FTP, SNMP and ICMP.

Serial management header

A serial 10-pin header provides support for an RS232 remote monitoring and management port through a Command Line Interface. The baud rate is programmable and preset at the factory to 115200 bps.



LED indicators

The on-board LED indicators show through the faceplate and follow left to right.

SCSI ports: a green LED indicates activity if it is lit, no activity if it is off.
Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

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.

A bicolor Ready/Fault LED lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.

Installation instructions

1 Physically place the FibreBridge in your device.
2 Connect a SCSI device to the FibreBridge. Connect the Fibre Channel port to your SAN.Connect the Ethernet cable from the Fibre Bridge to your computer. Refer to Cabling on page iii.
3 Connect the power connector.
4 Apply power.
5 Access FibreBridge Services using the QuickNAV utility. Refer to Configuring the FibreBridge on page 14.
6 Go to the ExpressNAV **Restart** page and restart the FibreBridge.
7 Map your devices.Refer to Mapping devices on page 19.
8 Boot the computers on the SAN and check the configuration. Refer to Additional configurations on page 22.

Exhibit 1.2-1 FibreBridge 2390C bracket detail.

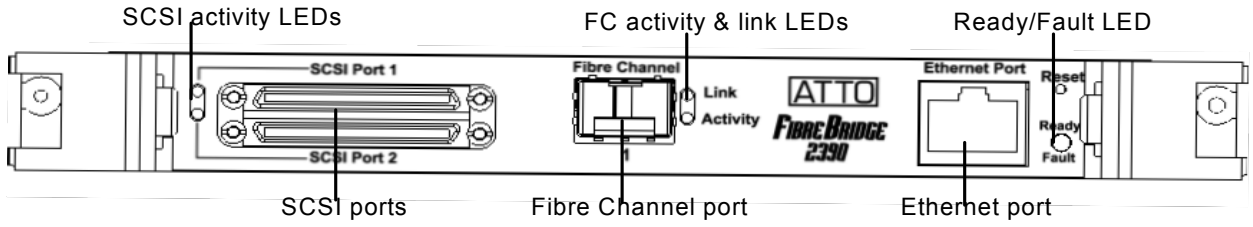
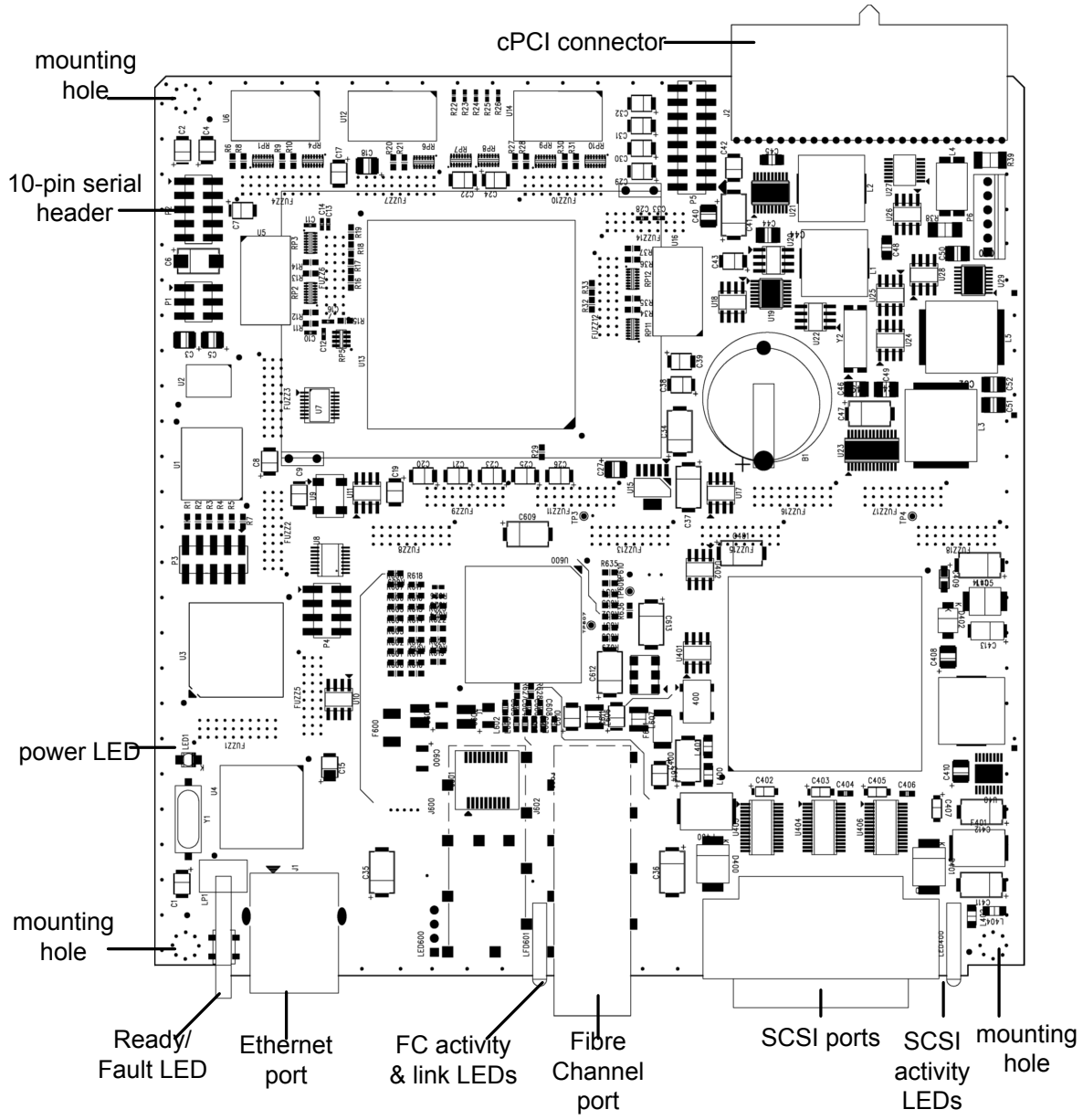


Exhibit 1.2-2 FibreBridge 2390 board layout



1.3 ATTO FibreBridge 2400R/D

The ATTO FibreBridge 2400R/D is a high performance bridge adding 4-Gb Fibre Channel connectivity to legacy SCSI storage devices.

The FibreBridge 2400R/D is available in an industry-standard 1U form factor for easy integration into racks. It supports next-generation media and, as a result, is equipped to handle the throughputs needed by advanced disk and tape technologies.

Dimensions

Width: 17 inches

Length: 11 inches

Height: 1.7 inches (1U)

Weight: approximately 10 pounds

Cooling and airflow

Operating Temperature: 0-40° C external

Humidity: 10-90% non-condensing

Air enters from the front and is exhausted out the connector side by a blower inside the enclosure which provides 11 cubic feet per minute of airflow. Ambient air near the inlets should not exceed 40°C. The unit will automatically stop operation if the temperature goes beyond this threshold.

CAUTION

Do not block the enclosure's vents. The FibreBridge will shut down if overheating occurs.

Power

The power supply circuit is permanently mounted within the enclosure and is not hot swappable. It has one standard IEC320 power receptacle and switch.

The universal power supply provides power for the bridge board and cooling fan.

The power requirements of the ATTO FibreBridge 2400R plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

Input voltage: 10/230V AC, with operating input range of 90-132V AC or 175-264V AC, 47-63Hz, single phase. The AC input range selection is automatic with no manual or jumper switchover required.

Power draw: 2 amps at 110V, 1.6 amps @ 90V

Fibre Channel port

The dual independent 4-Gigabit Fibre Channel ports can connect the FibreBridge to either a Fabric or Arbitrated Loop.

- Full support for full duplex FC data transfers, FC-AL, PLDA and public loop login.
- Small Formfactor Pluggable (SFP) interface
- Auto negotiates with 1-, 2- and 4-Gb/sec. devices

SCSI ports

The two SCSI ports connect storage devices into the Fibre Channel Storage Area Network (SAN). Each port is totally independent from the other.

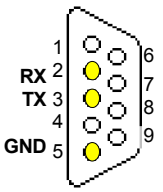
The ports are Ultra 320 SCSI busses with VHDCI connector, downward compatible with all forms of single-ended SCSI and all previous SCSI protocols.

Ethernet port

The 10/100 Base T Ethernet port is accessible from the RJ45 connector. Local diagnostics are supported through an integrated web server (ATTO ExpressNAV), CLI, Telnet and FTP. Includes support for DHCP, Telnet, FTP, SNMP and ICMP.

Serial port

The RS-232 serial port provides support for remote monitoring and management using a DB9 connector. The baud rate is programmable and preset at the factory to 115200 bps.



LED indicators

The LED indicators can be viewed from the connector side and the front side of the FibreBridge 2390R/D. (See Exhibit 1.3)

LEDs on the connector side are:

A bicolor 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.

Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

SCSI ports: A green LED on each port indicates activity if is lit.

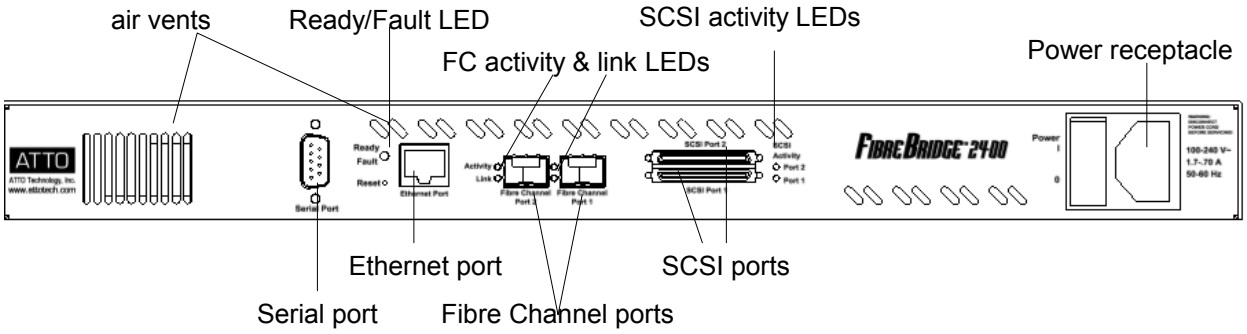
LEDs on the faceplate are:

A bicolor Ready/Fault LED is lighted green to indicate ready, lighted yellow to show a faulted condition, and off indicates not ready.

SCSI ports: A green LED on each port indicates activity if is lit.

Fibre Channel port: bicolor LED indicates FC speed. If it is off, speed is 1-Gb; if it is green, 2-Gb, and yellow indicates 4-Gb FC. A separate green LED indicates activity if it is lit, no activity if it is off.

Exhibit 1.3-1 Connectors, LEDs and power receptacle



Installation instructions

1 Physically place the FibreBridge on a desktop or into a rack.

   a. To mount on a rack, install “L” brackets so that either the front or the connector side of the FibreBridge faces front. The mounting holes on the bracket fit a standard 19-inch rack using a centered 1.25-inch (31.7 mm) hole pattern.

   b. Install the FibreBridge horizontally within the rack so it does not reduce the air flow.

Note

The power requirements of the ATTO FibreBridge plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

   c. Properly ground the FibreBridge to the rack equipment. The earth ground connection must be maintained.

2 Connect a SCSI device to the FibreBridge. Connect the Fibre Channel port to your SAN.Connect the Ethernet cable from the Fibre Bridge to your computer. Refer to Cabling on page iii.

3 Connect the power connector.

4 Apply power.

5 Access FibreBridge Services using the QuickNAV utility. Refer to Configuring the FibreBridge on page 14.

6 Go to the ExpressNAV **Restart** page and restart the FibreBridge.

7 Map your devices.Refer to Mapping devices on page 19.

8 Boot the computers on the SAN and check the configuration. Refer to Additional configurations on page 22.

1.4 ATTO FibreBridge 2400C

The ATTO FibreBridge 2400C is a high performance bridge adding 4-Gb Fibre Channel connectivity to legacy SCSI storage devices.

The FibreBridge 2400R/D is available in an industry-standard 1U cPCI card for easy integration into storage devices. It supports next-generation media and, as a result, is equipped to handle the throughputs needed by advanced disk and tape technologies.

Board dimensions

Width: 6.1939 inches
Length: 6.299 inches
Height of tallest component: .545 inches

Cooling and airflow

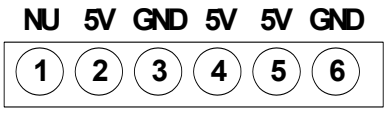
Operating Temperature: 0-40° C

Humidity: 10-90% non-condensing

Power

The FibreBridge board may be powered from the cPCI backplane connector or a 6-pin connector.

6-pin connection pinouts



Input voltage: 5.0V

Power draw: 30 Watts

Battery-backed event log SRAM & Real-Time-Clock: A rechargeable Lithium ion battery cell will hold the memory in a 512KB SRAM for up to 30 days.

WARNING

Risk of explosion if the battery is removed and/or replaced by an incorrect type. Dispose of used batteries in accordance with your local environmental regulations.

If the FibreBridge becomes disconnected from power, recharging begins automatically when power is restored to the system. The battery is fully charged after 24 hours of continuous power application.

Fibre Channel port

The dual independent 4-Gigabit Fibre Channel ports can connect the FibreBridge to either a Fabric or Arbitrated Loop.

- Full support for full duplex FC data transfers, FC-AL, PLDA and public loop login.
- Small Formfactor Pluggable (SFP) interface
- Auto negotiates with 1-, 2- and 4-Gb/sec. devices

SCSI ports

The two SCSI ports connect storage devices into the Fibre Channel Storage Area Network (SAN). Each port is totally independent from the other.

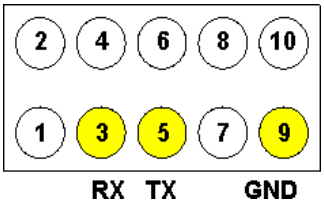
The ports are Ultra 320 SCSI busses with VHDCI connectors, downward compatible with all forms of single-ended SCSI and all previous SCSI protocols.

Ethernet port

The 10/100 Base T Ethernet port is accessible from the RJ45 connector. Local diagnostics are supported through an integrated web server, ATTO ExpressNAV, the preferred management tool. Includes support for DHCP, Telnet, FTP, SNMP and ICMP.

Serial management header

A serial 10-pin header provides support for an RS232 remote monitoring and management port through a Command Line Interface. The baud rate is programmable and preset at the factory to 115200 bps.



LED indicators

The on-board LED indicators show through the faceplate and follow left to right.

SCSI ports: a green LED indicates activity if it is lit, no activity if it is off.

Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

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.

A bicolor Ready/Fault LED lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.

Installation instructions

1. Physically place the FibreBridge in your device.
2. Connect a SCSI device to the FibreBridge. Connect the Fibre Channel port to your SAN.Connect the Ethernet cable from the Fibre Bridge to your computer. Refer to Cabling on page iii.
3. Connect the power connector.
4. Apply power.
5. Access FibreBridge Services using the QuickNAV utility. Refer to Configuring the FibreBridge on page 14.
6. Go to the ExpressNAV **Restart** page and restart the FibreBridge.
7. Map your devices.Refer to Mapping devices on page 19.
8. Boot the computers on the SAN and check the configuration. Refer to Additional configurations on page 22.

Exhibit 1.4-1 FibreBridge 2400C bracket detail

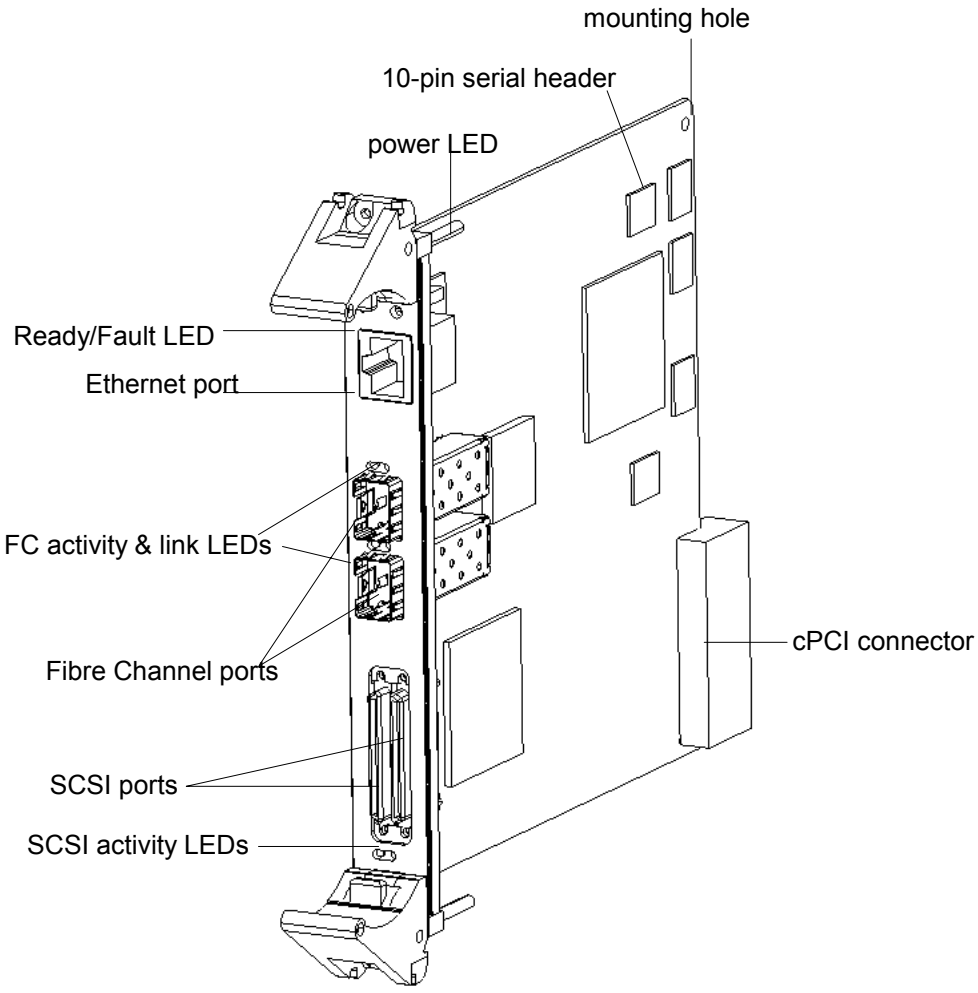
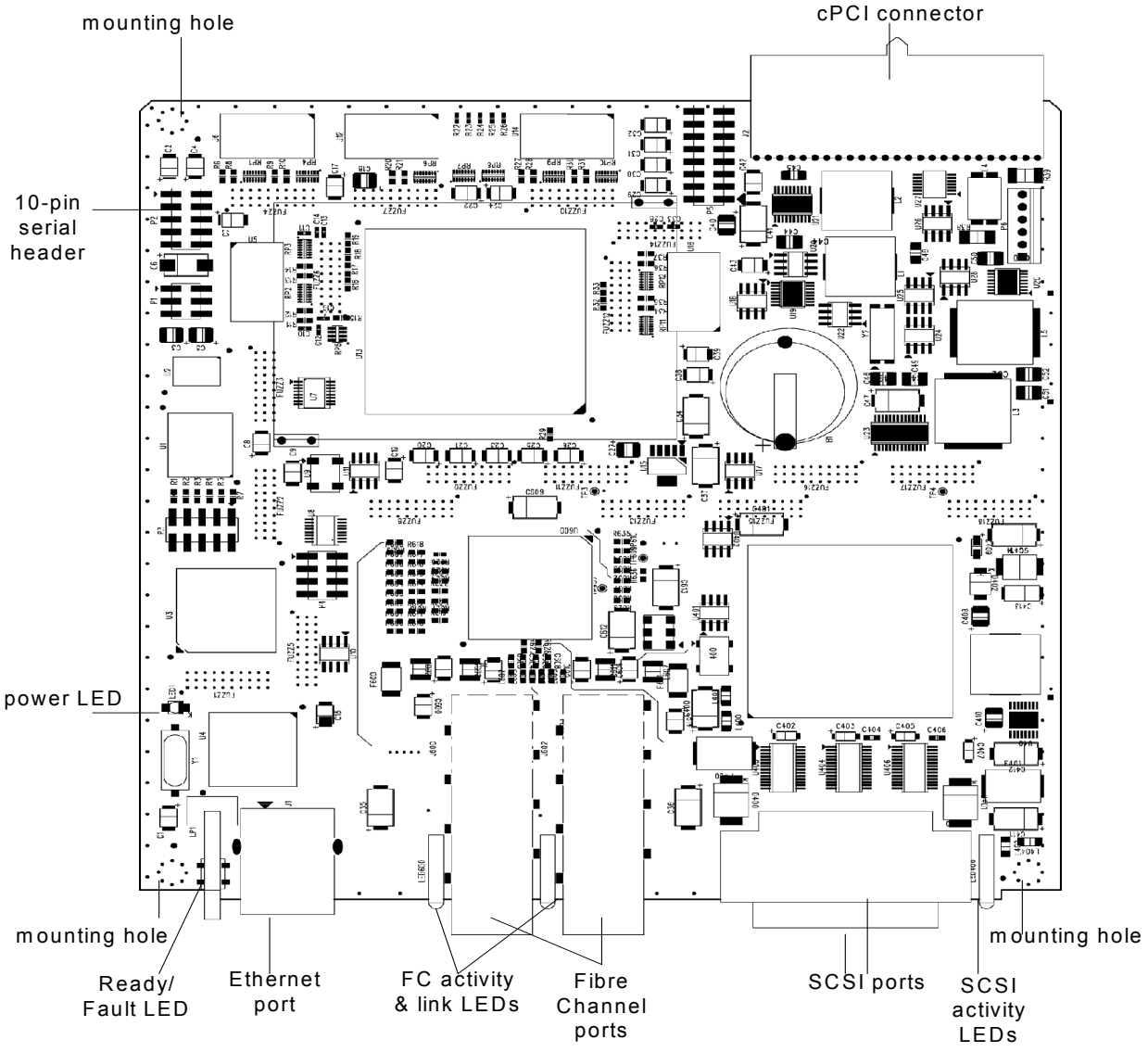


Exhibit 1.4-2 FibreBridge 2400C board layout



2.0 Configuring the FibreBridge

To configure the ATTO FibreBridge through FibreBridge Services, use ATTO ExpressNAV (a browser-based graphical user interface). Default values are appropriate for most configurations, but may be modified.

ATTO FibreBridge Services includes the means to display and modify various attributes of FibreBridge operation, as well as to update firmware. The best way to access FibreBridge Services for all models is to use ATTO ExpressNAV, a browser-based graphical interface. Refer to ATTO ExpressNAV interface on page 27.

Note

The recommended management tool for the FibreBridge is the ATTO ExpressNAV interface.

Other methods are also available depending on your operating system, what you want to accomplish, and the method you are using to access FibreBridge Services. Refer to Alternative interface options on page 31.

To use ATTO ExpressNAV you must know the IP address for the FibreBridge. Refer to Getting an IP Address on page 17.

After getting an IP address and entering ATTO ExpressNAV, you must map devices so that the FibreBridge can access the devices in your network. Refer to Mapping devices on page 19.

Additionally, it is best practice to change the default username and password. Refer to Additional configurations on page 22.

Several Fibre Channel hosts or initiators may initiate commands through the FibreBridge to SCSI devices. The basic mechanism to resolve possible conflicts among initiators is to use SCSI Reserve and Release commands. For details, refer to Handling multiple initiators on page 15.

2.0.1 Handling multiple initiators

Several Fibre Channel hosts or initiators may initiate commands through the FibreBridge to SCSI devices. The basic mechanism to resolve possible conflicts among initiators is to use SCSI Reserve *and* Release *commands.*

A Fibre Channel host may need exclusive access to a SCSI device. SCSI **Reserve** and **Release** commands allow logical units to be reserved or released under host control.

The FibreBridge intercepts any Reserve or Release command from a Fibre Channel host, performs initial processing and, if appropriate, relays the Reserve command to the SCSI device.

In a FibreBridge environment, the identity of the initiator (WWN) is not relayed to the SCSI device. A two-step process addresses initiator identity in the FibreBridge, and reserves the SCSI device on behalf of the FibreBridge.

Initiators on both the Fibre Channel (via the FibreBridge) and on the SCSI bus may initiate reserve and release commands to the SCSI devices.

The FibreBridge processing of reserve and release commands involves two tiers of verification. The first tier is within the FibreBridge; the second tier is within the SCSI device.

General verification procedure

1 The FibreBridge receives a SCSI Reserve command.

Tier 1

2 The FibreBridge determines, via its internal database, whether there are conflicting concurrent reservations from Fibre Channel hosts for the target SCSI device.
3 If there is a conflict, the FibreBridge returns a check condition with reservation conflict to the initiator.
4 If there is no conflict, the FibreBridge marks the SCSI device as reserved in its internal database.

Tier 2

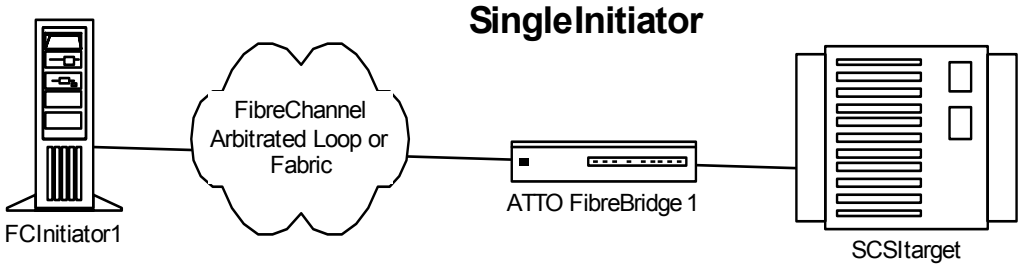
5 The FibreBridge relays the **Reserve** command to the SCSI device.
6 The SCSI device determines whether it is already reserved.
7 If the SCSI device is already reserved, it returns a **reservation conflict** to the FibreBridge. The FibreBridge removes its reserved indicator in its internal database, and returns **reservation conflict** to the initiator.
8 If the SCSI device was not previously reserved, the SCSI device is reserved and returns **success** to the FibreBridge. The FibreBridge then returns **success** to the initiator.

The FibreBridge does not implement extent reservation.

Single initiator

A single initiator presents no conflicts.

1 A single Fibre Channel initiator sends the **Reserve** command through the SAN to the FibreBridge
2 The FibreBridge determines that no reservation conflict exists at Tier 1.
3 The FibreBridge sends the **Reserve** command to the SCSI target.
4 The SCSI target is reserved until a **Release** command is sent by the Fibre Channel initiator.



Multiple Fibre Channel initiators

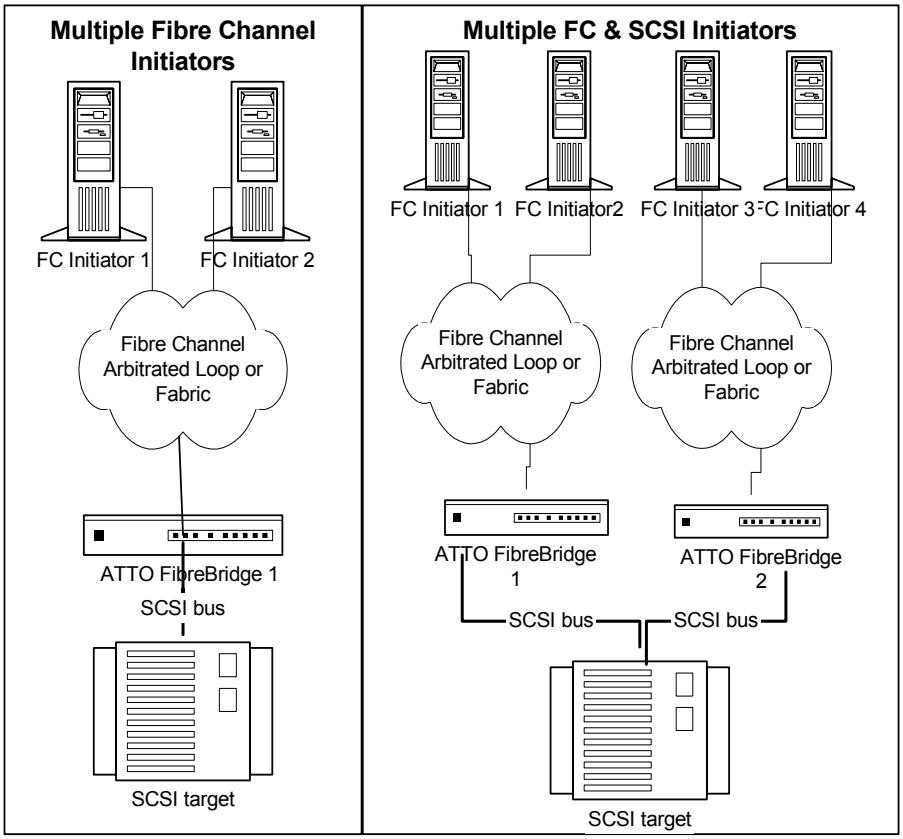
Multiple Fibre Channel initiators share a Fibre Channel connection on the SAN with a Fibre Bridge, and there are no other initiators on the SCSI bus.

1 Fibre Channel Initiator 1 sends the **Reserve** command through the SAN to the FibreBridge.
2 The FibreBridge determines that no reservation conflict exists at Tier 1.
3 The FibreBridge records the initiator ID (WWN) in its internal database.
4 The FibreBridge sends the **Reserve** command to the SCSI target.
5 The initiator is notified of reservation success: the SCSI target is reserved.
6 Fibre Channel Initiator 2 sends the **Reserve** command through the SAN to the FibreBridge.
7 The FibreBridge determines the SCSI device is already reserved.
8 The FibreBridge rejects Fibre Channel Initiator 2's command and returns **reservation conflict**.
9 The SCSI target remains reserved until a **Release** command is sent by Fibre Channel Initiator 1.
3 The FibreBridge records the initiator ID (WWN) in its internal database.
4 Fibre Bridge 1 sends the **Reserve** command to the SCSI target.
5 The initiator is notified of reservation success: the SCSI target is reserved.
6 Fibre Channel Initiator 3 sends the **Reserve** command through the SAN to FibreBridge 2.
7 FibreBridge 2 determines that no reservation conflict exists at Tier 1.
8 FibreBridge 2 records the initiator ID (WWN) in its internal database.
9 FibreBridge 2 sends the **Reserve** command to the same SCSI target.
10 The SCSI target is already reserved by FibreBridge 1 and rejects FibreBridge 2's reserve command.
11 SCSI Target returns **reservation conflict** to FibreBridge 2.
12 FibreBridge 2 removes its internal reserve indicator for the initiator.
13 FibreBridge 2 returns **reservation conflict** to Fibre Channel Initiator 3.
14 The SCSI target remains reserved by Fibre Channel Initiator 1.

Multiple FC & SCSI initiators

Several Fibre Channel initiators share a Fibre Channel connection on the SAN with a FibreBridge, and several initiators share the SCSI bus.

1 Fibre Channel Initiator 1 sends the **Reserve** command through the SAN to FibreBridge 1 for a SCSI target.
2 FibreBridge 1 determines that no reservation conflict exists at Tier 1.



2.1 Getting an IP Address

The easiest way to communicate with the ATTO FibreBridge is to use the browser-based interface, ATTO ExpressNAV. Your FibreBridge must be recognized by the network by finding or assigning it an IP address.

The FibreBridge 2390 and 2400 models are set by default to request an IP address from a DHCP server. The QuickNAV utility, available at www.attotech.com, finds your FibreBridge on your Ethernet network whether or not you have DHCP capability.

1 Work from the computer attached to the FibreBridge Ethernet port on the same broadcast domain.

Find and download the QuickNAV utility, **QuickNAV-windows.exe** available at www.attotech.com

2 Turn on the FibreBridge.
Wait for the Ready LED to light, up to three minutes, before proceeding.

3 Run the QuickNAV application.

a. Click **Next** on the QuickNAV **Wizard** page.

b. Select your FibreBridge serial number from the list of choices displayed.

c. Click **Next**.

- If you are using DHCP, note the IP Address assigned by the server.

_____

- If you are not using DHCP, configure the FibreBridge with the IP address and subnet mask given to you by your network administrator.

_____

_____

d. Click **Launch Browser**.

Your browser will point to the ExpressNAV splash screen.

4 Enter the username and password values.

Note

The default values are username "root" and password "Password". The username is case insensitive and the password is case sensitive.

CAUTION

It is best practice to change the default username and password after you have configured your FibreBridge. Refer to Change current username, password on page 22.

The FibreBridge **Status** page appears.

5 Go on to Mapping devices on page 19.

2.2 Mapping devices

After getting an IP address and entering ATTO ExpressNAV, you must map devices so that the FibreBridge can access the devices in your network.

The ATTO FibreBridge allows parallel SCSI devices to participate in a Fibre Channel arbitrated loop or on a fabric. Fibre Channel and parallel SCSI use different models to address devices. The FibreBridge translates between these addressing models.

Fibre Bridge mapping

On a Fibre Channel Arbitrated Loop, the FibreBridge appears at a single Arbitrated Loop Port Address (AL_PA). Each device on an arbitrated loop is assigned a unique AL_PA during loop initialization. The FibreBridge supports both modes of AL_PA assignment, commonly referred to as hard and soft addressing.

WWN: To identify each Fibre Channel device while addressing, each Fibre Channel device is assigned a unique World Wide Name (WWN). The 64-bit WWN has the following format:

Field Name	WWN Format		Company ID			Device ID		
Byte	0	1	2	3	4	5	6	7
Value	20	00	00	10	86	xx	xx	xx

Soft addressing allows the loop initialization master to assign the FibreBridge a unique AL_PA during the loop initialization process. The AL_PA assigned cannot be determined before loop initialization. For example, adding new devices to an arbitrated loop may change the AL_PA assigned to the FibreBridge.

Hard addressing allows a predetermined AL_PA to be assigned to the FibreBridge. The FibreBridge will try to acquire the desired hard AL_PA. If another device has already been assigned the specified AL_PA, the FibreBridge will acquire a currently unassigned AL_PA.

Note
The default mode is soft addressing.

SCSI device mapping

SCSI devices connected to the FibreBridge are viewed as Fibre Channel LUNs to the host computer. SCSI devices must be on the same addressing level as the SCSI portion of the FibreBridge. The FibreBridge SCSI ID must be set to a different SCSI ID from the other devices on the same bus.

Manual SCSI device route mapping

Manual mapping allows you to maximize the efficiency of your SCSI devices while allowing greater flexibility.

Using the CLI, you can ask the FibreBridge to find all the SCSI devices on its SCSI bus. With this information you then decide where you want to place these devices.

ATTO ExpressNAV makes manual mapping easy. For more information, refer to Mapping devices on page 19.

Note
ATTO ExpressNAV is the preferred management tooll for the ATTO FibreBridge.

In the chart below, the SCSI device on SCSI bus 1 at SCSI address of ID 1 LUN 0 is being mapped to Fibre Port 1 (on the FibreBridge) at Fibre Channel LUN 0.

Fibre Port	FC LUN	SCSI BUS	SCSI ID	SCSI LUN
1	0	1	1	0
1	1	1	13	0
1	2	1	15	0
1	3	1	0	0
1	4	2	1	0
1	10	2	1	1
1	30	2	8	5
1	23	2	8	7

Note

Two SCSI devices cannot be mapped to the same FC port and FC LUN. If the same SCSI device is mapped to two different FC ports and/or FC LUNs, these FC port and FC LUNs will be taken offline automatically until the conflict is resolved.

You may also map SCSI devices manually by using the Command Line Interface RouteXXX family of commands.The RouteXXX and **AutoMap** commands provide the mechanism to map Fibre Channel Port/LUN to SCSI bus/target/LUN.

Manual mapping

Manual mapping allows you to maximize the efficiency of your SCSI devices while allowing greater flexibility using the CLI RouteXXX family of commands. You may modify the mapping as needed such as to make a device inaccessible or to replace a non-functioning mapped unit. Refer to Mapping commands on page 55 for details on the commands

AutoMap establishes a default mapping of Fibre ports and Fibre LUNs, and the RouteXxxxx commands manage the mapping, including display of current mapping and modification.

RouteDisplay displays the current mapping, in Fibre port, Fibre LUN order, showing the mapped SCSI bus/target/LUN, and the current status of the device. RouteDisplay may be used at any time.

It is not necessary to set all mapped devices online: SCSI commands sent to offline devices are rejected.

Logical Unit addressing

The FibreBridge 2390 and 2400 models may be configured to take advantage of Logical Unit Addressing using the Command Line ASCII-based interface.

In standard device mapping and formatting, target devices are only visible if you have mapped them specifically to Fibre Channel ports. However, if you enable Logical Unit Addressing, a scan is performed when power is applied to the system and a list is made of all devices. All target devices are visible to all Fibre Channel ports, with each port sharing a common Fibre Channel node name.

One advantage to this method is that you can enable port failover in the FibreBridge 2400. A designated Fibre Channel port is marked as **reserve** and becomes active only if the other port fails.

To enable Logical Unit Addressing, enter the Command Line Interface as described in Using the serial port on page 57 and, at the **Ready** prompt, type

```
set LogicalUnitAddressing enabled
```

To see the SCSI address mappings, type

```
RouteDisplay SCSI
```

You may designate a specific bus, target, LUN.

```
RouteDisplay SCSI <sb> <st> <sLUN>
```

Multiple Node addressing (FB2400 only)

By default, the FibreBridge presents a single Node name to a host for all Fibre Channel ports, providing host-side failover and load balancing.

The command **FCMultiNode,** when enabled, allows mapping of a different set of logical units to each FC port.

1 If not already connected, enter the ExpressNAV interface.
2 From the ExpressNAV main menu, click on the **Advanced** menu item on the left side of the screen.
3 Type **set FCMultiNode enabled** and click **Submit**.
4 To see the new configuration, type **RouteDisplay FC** and press **Enter**.
5 To keep this mapping, type **saveconfiguration** and click on **Submit**

Using ExpressNAV for mapping devices

Use the ExpressNAV interface to map devices automatically.

1 If not already connected, enter the ExpressNAV interface.
2 From the ExpressNAV main menu, click on the **Mapping** menu item on the left side of the screen.
3 Click **AutoMap**
All the CLI commands necessary to enable mapping and the command **saveconfiguration norestart** will be performed.

For greater flexibility, map devices manually.

1 From the ExpressNAV main menu, click on the **Mapping** menu item on the left side of the screen.
2 Select the devices from the box on the right hand side of the screen and drag to the appropriate LUN on the left.
3 Click **Submi**t. All the CLI commands necessary to enable mapping and the command **saveconfiguration norestart** will be performed.

Note

If you choose to use Logical Unit Addressing, you cannot use ExpressNAV. Use the Command Line Interface commands and refer to Using the serial port *on page 57.*

2.3 Additional configurations

Default values are appropriate for most configurations, but may be modified for your needs using ATTO ExpressNAV.

It is best practice to change the default username and password to a username and password significant to you.

Change current username, password

1 If you have not already, open an ExpressNAV session. For instructions, refer to Open an ExpressNAV session on page 27.

2 Click **Bridge**.

The **Bridge Configuration** page is displayed. The username that you are currently logged in with is displayed in the **Username** text box.

3 Enter appropriate information into the **Username**, **Current Password, Old Password**, **New Password**, and **Confirm Password** text boxes.

Note

The username is case insensitive and password is case sensitive.

4 Click **Submit**.

5 The username and password for all Telnet, FTP and ATTO ExpressNAV sessions is changed.

Enhance performance

SpeedWrite is a method to improve the performance of FCP WRITE commands to SCSI devices attached to the FibreBridge.

Using the CLI command **SpeedWrite**, you can specify the SCSI bus, target and LUN of a mapped device or specify [all] to set or get the state of all currently mapped SCSI devices.

SpeedWriteDefault specifies the state of **SpeedWrite** for any SCSI devices mapped manually or via an **AutoMap** operation. If enabled, any new SCSI device will use **SpeedWrite** performance enhancement by default.

Create a read only password or username

You may set a read only password or a read only username. Refer to General use commands on page 39.

1 If you have not already, open an ExpressNAV session. For instructions, refer to Open an ExpressNAV session on page 27.

2 Click **Bridge**.

The **Bridge Configuration** page is displayed. The username that you are currently logged in with is displayed in the **Username** text box.

3 Enter the Admin password in the first line of the boxed area.

4 Enter the desired information into the **Admin Username, New Admin Password, Confirm New Admin Password or New Read Only Password and Confirm New Read Only Password** text boxes.

The username is case insensitive and password is case sensitive.

5 Click **Submit**.

6 The username or password for all Telnet, FTP and ATTO ExpressNAV sessions are changed.

Enable port failover (FB2400 only)

The FibreBridge 2400 model may be configured to reserve a port to take over in case another port fails.

If you enable Logical Unit Addressing through the Command Line Interface (refer to Using the serial port on page 57), you can enable port failover in which a designated Fibre Channel port is marked as **reserve** and becomes active only if another port fails.

To enable port failover, enter the CLI and type **set FCPortFailover enabled**

To restore a bridge that has experienced a failover to its pre-failover state, type **FCPortRecover**

To return an active port back to its pre-failover state, type **FCPortRecover**

3.0 Advanced diagnostics and SNMP protocol

The Ethernet port provides Telnet- or SNMP-based monitoring and management.

The Ethernet port provides Telnet-based monitoring and management, including firmware update using FTP.

Remote system monitoring is also available using Simple Network Management Protocol (SNMP). An agent resides in the FibreBridge which takes information from the FibreBridge and translates it into a form compatible with SNMP. If certain conditions arise, the agent sends asynchronous notifications (traps) to a client.

To connect to the Ethernet port

1. Connect a cross-over cable (for a direct connection to a PC) or regular network cable from a network device to the Ethernet port.
2. Power on and boot up the host computer.
3. Attach a DB-9 null modem serial cable (the cable must be no longer than three meters) from the RS-232 port to a host computer and open a terminal emulator program on the host to set the Ethernet parameters.
4. Turn on the FibreBridge.
5. Upon successful power up and diagnostics, set the host computer with the appropriate settings.

   The host computer must have appropriate network settings to allow it to communicate with the FibreBridge. Please see your system administrator for more information.

To use Telnet

You may have to change the IP address from the default by first accessing the serial connection and changing it using the CLI.

You may change the IP address to a network specific value or, if the local network uses DHCP, you may enable automatic IP addressing **(set IPDHCP enabled)** using the CLI.

1. Open a Telnet session on the host computer.
   a. Default IP address: 10.0.0.1
   b. Port type: telnet
   c. Terminal type:vt100
2. If you make any changes to the network settings, use the **SaveConfiguration Restart** command.
3. Username/password: You will be prompted for a username and password, up to 32 characters each, case insensitive.

   You may change the telnet username and/or password after entering a CLI session using the commands

```
set Username [username]
set Password [password]
```

   Or you may change the telnet username and/or password using the **Configuration** page of the ExpressNAV interface.

   RestoreConfiguration default sets the telnet username and password to the default values.

4. In the CLI, see a list of available commands by typing **help** at the **Ready** prompt or refer to this manual's Index.
5. Using the ExpressNAV interface, configure the FibreBridge to your needs.

To use SNMP

Refer to Diagnostic commands on page 40 for complete information on these commands.

1. Enter the Command Line Interface through the serial port or Ethernet.
2. You may change the IP address to a network specific value or, if the local network uses DHCP, you may enable automatic IP addressing.
3. Set the number of trap client addresses by typing

```
set SNMPTrapAddress [1-6] [IPAddress]
[Level]
```

4. Type **set SNMPUpdates enabled**
5. Type **set SNMPTraps enabled**
6. Type **SaveConfiguration restart**
7. Install SNMP management software on each client you wish to receive traps (messages).

8 Call technical support (see Appendix F) to get the appropriate MIB file for your FibreBridge.

9 For each client, copy the MIB file to the directory containing the SNMP management software.

10 From within the SNMP management software, compile the file **attodmnd-mib.mib** according to the software's procedures.

11 Unload any default MIBs.

12 Load the MIB **ATTO***.

13 When requested, enter the FibreBridge's IP address as the **Remote SNMP Agent**.

14 The SNMP management software will contact the agent in the FibreBridge. The screen will reply with system information.

15 Status will be monitored and reported through the SNMP management software.

4.0 Updating firmware

The ATTO FibreBridge has several processors which control the flow of data. The firmware to control these processors can be upgraded in the field using the PUT *command from an FTP connection, or* ***ZModem*** *utility over an RS-232 serial connection. The preferred method is to use ATTO ExpressNAV.*

Note

The recommended management tool for updating firmware for the FibreBridge is the ATTO ExpressNAV interface. Use the Update Firmware page.

The FibreBridge firmware is distributed as a compressed **.zip** file and can be obtained from the ATTO Technology, Inc. web site at www.attotech.com.

Preliminary steps

1 The FibreBridge firmware is distributed as a compressed .zip file and can be obtained from the ATTO Technology, Inc. web site at www.attotech.com or from the CD which may be included with your Bridge.

2 Uncompress the **.zip** file into an image file (**.ima**). Note the filename.

CAUTION

Before beginning this procedure, ensure that all I/O to the FibreBridge has stopped.

During this procedure, *do not* interrupt the flash process.

***Do not* power down the host or the FibreBridge until the display returns the Ready prompt.**

Interrupting the flash process will make your FibreBridge inoperable and you will have to return it to ATTO Technology for repair.

1 Connect to ExpressNAV and click on the **Firmware** page.

2 Click **Browse** and locate the firmware you unzipped in the preliminary steps.

3 Click **Upload** and wait until a success message is displayed.

CAUTION

Do not interrupt the flash process. Do not power down the host or the FibreBridge until the display returns the *Ready* prompt.

Interrupting the flash process will make your FibreBridge inoperable and you will have to return it to ATTO Technology for repair.

4 Click the **Restart** link.

5 Click on **Restart**.

To use FTP over Ethernet to flash new firmware into the FibreBridge

1 Uncompress the.zip file obtained from the ATTO Technology Inc. website (www.attotech.com) into an image file (.IMA).

Note

*The **.zip** file can be uncompressed using any utility that supports the **zip** format.*

2 Establish an FTP link to the bridge that is to be flashed.

3 Use the **PUT** command to download the firmware. For example

```
PUT c:\bridge_firmware\FB3200100.IMA
```

4 Once the download is complete, cycle power on the FibreBridge to implement the new firmware.

To use the ZModem command over the RS-232 serial link to load new firmware

1 Uncompress the.zip file obtained from the ATTO Technology Inc. website (www.attotech.com) into an image file (**.IMA)**.

Note

*The **.zip** file can be uncompressed using any utility that supports the **zip** format.*

2 Load a Terminal Program such as Hyper Terminal.

3 Set the terminal and the FibreBridge for the highest possible baud rate for your terminal.

4 Turn on power to the FibreBridge.

5 Once the Ready prompt appears, type **ZMODEM RECEIVE.** The FibreBridge will display that it is preparing to receive a file from your terminal program.

6 On the terminal program, choose **Transfer Send File**

7 In the **Send File** box, enter the current FibreBridge **.ima** file or click the browse button to find it

8 Click **Send File**

9 The FibreBridge should acknowledge receiving the file and display a message not to interrupt power for 90 seconds.

CAUTION

Do not interrupt the flash process. Do not power down the host or the FibreBridge until the display returns the *Ready* prompt. Interrupting the flash process will make your FibreBridge inoperable and you will have to return it to ATTO Technology for repair.

10 Once the download is complete, cycle power on the FibreBridge to invoke the new firmware.

5.0 ATTO ExpressNAV interface

ExpressNAV is a web-based graphical user interface (GUI) that allows you to manage the FibreBridge by clicking choices and commands in traditional GUI fashion or by entering CLI commands directly as you would in a terminal emulation session.

Access ATTO ExpressNAV from any web browser that supports the latest standards for XHTML 1.0 and CSS1. To take full advantage of the ExpressNAV interface you should have Java script enabled through your browser.

To use the interface you must first have an IP address for the FibreBridge. Refer to Getting an IP Address on page 17.

Browser compatibility

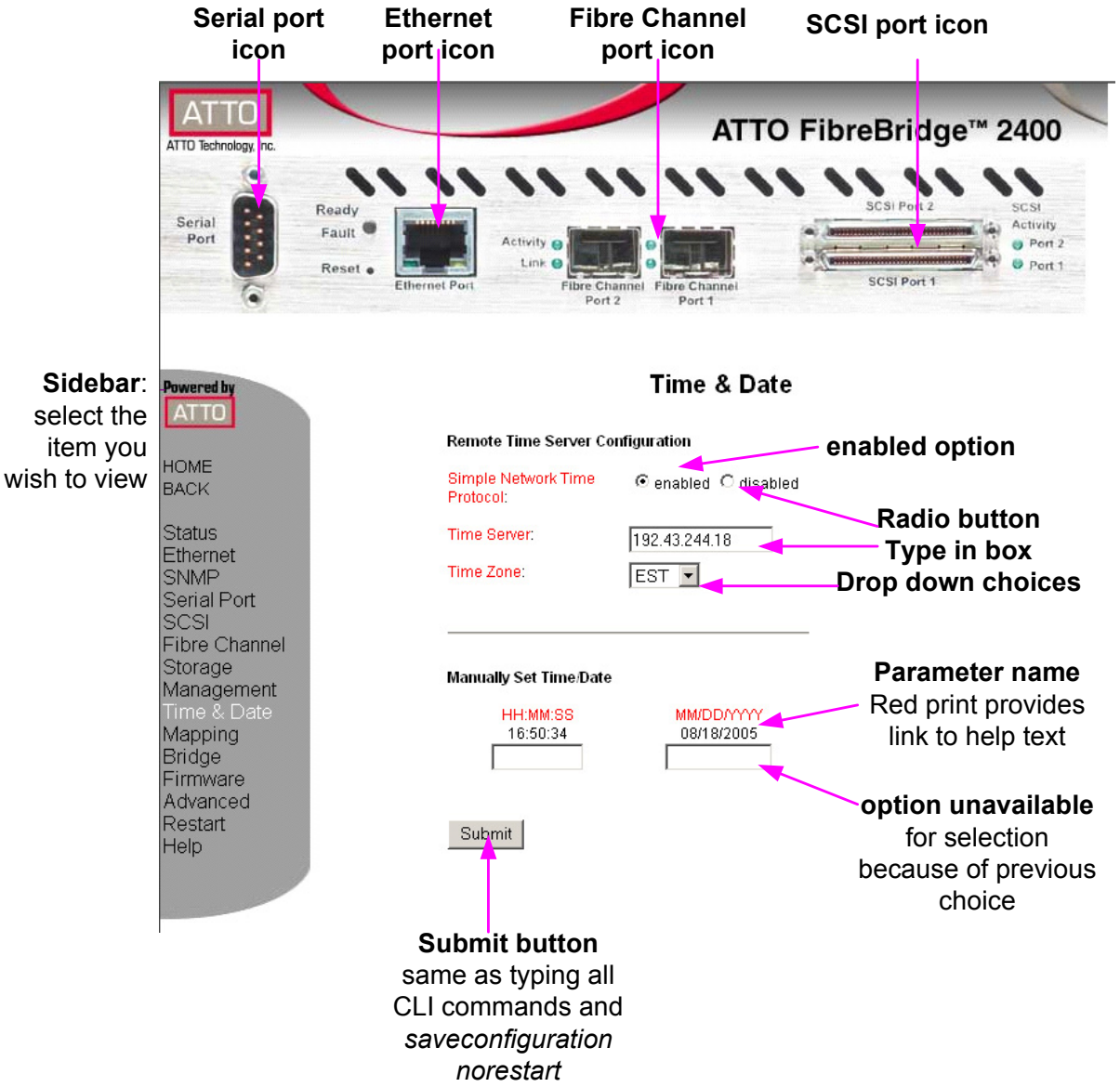
All pages are written in pure XHTML 1.0 and CSS1 to be compatible with the latest versions of Internet Explorer, Netscape, Mozilla (including K-Meleon, Camino, Mozilla Firefox, Epiphany and Galeon), and KHTML (including Konqueror and Safari).

Minimum requirement is for Internet Explorer 5.5 and Netscape 6.2.

Open an ExpressNAV session

1. Obtain the IP address of the FibreBridge. Refer to Getting an IP Address on page 17.
2. Point your browser at the IP address of the FibreBridge.
3. The ExpressNAV interface home page is displayed. Click on **Enter**.
4. Enter the username and password.
   - The default username is **root**
   - The default password is **Password**
5. The **Status** page appears. Follow the links to find information or configure your FibreBridge. Each link takes you to a page such as the **Time & Date Configuration** page in Exhibit 5.0-1. Refer to ExpressNAV pages on page 29 for details on all ExpressNAV pages.

Exhibit 5.0-1 A typical ExpressNAV page.



5.1 ExpressNAV pages

Each page in the ATTO ExpressNAV interface provides information and/or configuration parameters based on a specific topics. The exact settings available depend on the model of FibreBridge you are using.

Screens in the ATTO ExpressNAV interface can be reached through the menu at the side of each page or through the image on each page's header which shows each port in the product faceplate.

Some screens and parameters are not available for all FibreBridge models. Use the following as a guide only.

Status

Displays FibreBridge information

- Vendor ID
- Product ID
- Firmware revision number
- Serial number
- Valid temperature range
- Current temperature
- Ethernet port IP addresses
- Ethernet port status
- World Wide identifiers: node name, port name
- Fibre Channel port status
- SCSI port status

Ethernet port configuration

Configures each port independently for the following parameters: use of DHCP, IP address, IP gateway, IP subnet mask and Ethernet speed.

See Ethernet configuration commands on page 53 for details.

SNMP

Controls the use of SNMP protocol and displays the trap recipient IP addresses.

For more information on SNMP, refer to Advanced diagnostics and SNMP protocol on page 23.

Serial port configuration

Configurable options are baud rate and echo. See Serial port configuration commands on page 51 for details.

SCSI configuration

Each SCSI port is configured separately. Displays include a list of attached devices for each bus. Configurable options are

- Port bus speed
- Synchronous transfer
- Wide transfer
- Initiator ID
- Bus reset on startup
- Bus termination
- Maximum LUNs per SCSI target
- Attached devices listed by bus number

Click on the individual bus for information on each SCSI device such as device type, vendor ID, Product ID and SCSI bus, target and LUN.

See SCSI configuration commands on page 47 for details.

Fibre Channel configuration

Configurable options included whether to use hard or soft addressing, how busy status is reported, the data rate, connection mode and hard address value. The node names and port names are displayed.

See Fibre Channel configuration commands on page 49 for details on each parameter.

Storage management

A list of attached SCSI devices and a list of attached Fibre Channel devices are displayed. Click on the individual bus or port for detailed information on each device.

You may also reset SCSI ports on this page or configure the following options: boot scan, boot Fibre delay, SpeedWrite default and virtual drive response.

See Fibre Channel configuration commands on page 49 and SCSI configuration commands on page 47 for details on each parameter.

Time & date configuration

Configures the real-time clock or access remote time server. Configurable options are

- Enable/disable Simple Network Time Protocol
- Time server
- Time zone
- manually set time
- manually set date

See Maintenance commands on page 45 for details.

Mapping

You may map drives using the ExpressNAV Mapping page. See Mapping devices on page 19 and Mapping commands on page 55 for details.

Bridge configuration

Configurable options are passwords, usernames, minimum and maximum operating temperature, operating temperature warning and identify Bridge. You may also restore defaults.

See Maintenance commands on page 45 for details.

Advanced CLI configuration

Allows you to input any CLI command available through the FibreBridge.

To use the Advanced Configuration page

1. Type in the CLI command
2. Click the **Submit** button: this is equivalent to typing in the CLI command into a TCP/IP or serial port CLI session.

   A text field beneath the box will list the most recent commands issued to the FibreBridge through this page.

   If you enter an incorrect parameter, the CLI help text will be displayed, showing the parameters available.
3. If your entry was correct, type **saveconfiguration**
4. Click the **Submit** button. Your changes will be implemented.

Restart firmware

Implements a firmware restart of the bridge and makes permanent any changes you have made since the last firmware restart.

CAUTION

Restarting the firmware may take a few minutes.

1. Click the **Restart** button.

   A box will tell you to wait until the counter gets to 0 and then the browser will refresh.
2. If the browser does not refresh after the counter gets to 0, click the link to refresh it manually.

Help

Gives help information about the command line interface commands and troubleshooting tips via links to pages with help text for each category of options and one link to the Troubleshooting Tips and FAQs page on the ATTO website, www.attotech.com.

Contact information for ATTO technical support is on the right. **Help** is always available by pressing any word shown in red on the screen.

6.0 Alternative interface options

Alternative methods to using the ATTO ExpressNAV interface may be used to manage the FibreBridge. ATTO ExpressNAV is the recommended interface.

Use the serial port or header

1 Connect a cable from FibreBridge RS-232 serial port or header to the serial (COM) port on a personal computer.

2 Turn on the FibreBridge.

3 Start a terminal emulation program on the personal computer, and use it to connect to the FibreBridge. For example, if you are using HyperTerminal on a computer running a Windows operating system,

   a. Type **FibreBridge** in the **New Connection** dialog box.
   b. Click **OK**.
   c. In the **Connect To** dialog box, for the **Connect using field** select the COM port number to which your serial cable is connected.
   d. Click **OK**.
   e. In the COM Properties dialog box select the following values:
      - Bits per second: 115200
      - Data Bits: 8
      - Parity: None
      - Stop Bits: 1
      - Flow Control: None
      - Terminal type: ASCII
      - Echo: on
   f. Click **OK.**

4 After you connect to the FibreBridge, start-up messages are displayed. These messages are only displayed at start-up. The last line in the start-up message sequence is **Ready**. See the example in Exhibit 6.0-1 on page 32.

Note

*In serial port sessions, there is no prompt on the line below the word **Ready**. Begin typing commands in the blank line where the cursor is resting. No username or password is required for serial port access.*

5 To verify that you have connected successfully, type **help** after the **Ready** prompt and press **Enter.**

- If a list of all available commands does not appear on the screen, review the steps in this section, check the cable, or contact service personnel until the problem is solved.

If you have difficulty using the serial port, verify that you have the correct settings and that your serial cable is less then two meters in length.

Use Telnet

Up to three Telnet sessions can be conducted simultaneously. A serial port session can use the CLI while Telnet sessions are open. Whichever session issues the first “set” CLI command can continue to issue set commands, while the other sessions can only issue “get” commands or display information. Once a connection is established, refer to CLI provides ASCII-based interface on page 33.

1 Connect to the FibreBridge from a computer on the same Ethernet network.

2 Start a Telnet session.

Note

There is more than one way to connect to the FibreBridge using a telnet program. Your telnet program may operate differently than in the following instructions.

3 At the telnet prompt, issue the **open** command where x.x.x.x is the IP address of the FibreBridge.

```
telnet > open x.x.x.x
```

4 If you have to specify a port type, enter the port type “telnet” and the terminal type “vt100”.

```
port type: telnet
terminal type: vt100
```

5 Enter the default values for the username, “root”, and the password, “Password”, if you did not set new values in Getting an IP Address on page 17.

Exhibit 6.0-1 Start up messages.

```
 ATTO FibreBridge 2400
(c) 2002 - 2005 ATTO Technology, Incorporated.

Firmware version 1.00 release date May 24 2005, 13:29:19 Build A75Q

127 Megabytes of RAM Installed.

2 4.25 Gb/s Fibre Channel Interface Port(s).
2 Ultra320 SCSI Interface Port(s).

Bridge World Wide Name = 20 00 00 10 86 20 00 95
Bridge Serial Number   = "FB2400100007"
Bridge Name            = "        "

Internal Temperature = 30 C [0 - 70]

For help, type HELP.
Active Configuration  = ATTO
Aug 19 2005 12:51:27 A79U Initialization Complete
STM41T0 RTC initialized
SCSI Interface 1 PCI Config Test Passed
SCSI Interface 1 Initialization  Passed
SCSI Interface 2 PCI Config Test Passed
SCSI Interface 2 Initialization  Passed
FC Interface 1 PCI Config Test Passed
FC Interface 1 Register Test   Passed
FC Interface 1 Reset Test      Passed
FC Interface 2 PCI Config Test Passed
FC Interface 2 Register Test   Passed
FC Interface 2 Reset Test      Passed

 Initializing Port MP1.............
FC Interface 1 Initialization  Passed
FC Interface 2 Initialization  Passed

Power-On Self-Test (POST) Completion Status: GOOD

Ready.
```

6.1 CLI provides ASCII-based interface

The command line interface (CLI) provides access to the ATTO FibreBridge Services through a set of ASCII commands. CLI commands may be entered while in CLI mode.

FibreBridge Services provide configuration and monitoring for the FibreBridge. The command line interface (CLI) is a set of ASCII-based commands which perform these tasks. CLI commands may be entered while in CLI mode.

- CLI commands are context sensitive and generally follow a standard format

```
[Get|Set] Command [Parameter1|Parameter2]
```

  followed by the **return** or **enter** key
- CLI commands are case insensitive: you may type all upper or all lower case or a mixture. Upper and lower case in this manual and the **help** screen are for clarification only.
- Commands generally have three types of operation: get, set and immediate.
- The get form returns the value of a parameter or setting and is an informational command.
- Responses to get commands are followed by **Ready**.
- The set form is an action that changes the value of a parameter or configuration setting. It may require a **SaveConfiguration** command and a restart of the system before it is implemented. The restart can be accomplished as part of the **SaveConfiguration** command or by using a separate **FirmwareRestart** command. A number of set commands may be issued before the **SaveConfiguration** command.
- Responses to **set** commands are either an error message or **Ready. *.** The asterisk indicates you must use a **SaveConfiguration** command to finalize the **set** command. **SaveConfiguration** will ask if you want to restart the system or not.
- Set commands which do not require a **SaveConfiguration** command, defined as immediate commands, are immediately executed.
- Responses to Immediate commands are either an error message or data results followed by **Ready**.

Exhibit 6.1-1 Symbols, typefaces and abbreviations used to indicate functions and elements of the command line interface used in this manual.

Command conventions

Symbol	Indicates
[ ]	Required entry
< >	Optional entry
|	pick one of
…	Ellipses, repetition of preceding item
\n	end of line
-	a range (6 – 9 = 6, 7, 8, 9)
Boldface words	must be typed as they appear
Italicized words	Arguments which must be replaced by whatever they represent
fl	Fibre Channel lun number (0 <= fl <= 31)
fp	Fibre Channel port number (0<= fp <= 2)
sb	SCSI bus number (0<= sb <= 3)
sl	SCSI lun ID (0 <= sl <= 7)
st	SCSI target ID (0 <= st <= 15)
mp1	Ethernet port used to manage the FibreBridge

CLI error messages

The following error messages may be returned by the Command line Interface

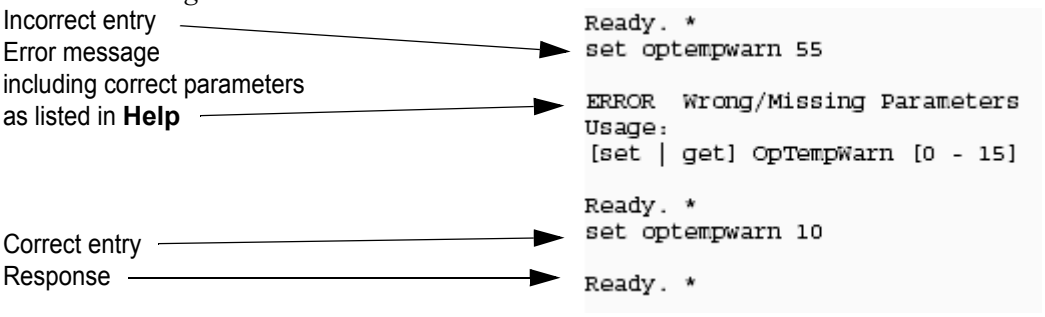
```
ERROR. Invalid Command. Type 'Help' for command list.

ERROR. Wrong/Missing Parameters

Usage: <usage string>

ERROR. Command Not Processed
```

Exhibit 6.1-1 If you enter a parameter for a CLI command incorrectly, the CLI help file will display with the error message:



6.1.1 CLI summary reference

A summary of the Command Line Interface commands, their defaults, and where you can find the specifics of the command. Commands which have no default values associated with them have a blank entry in that column of the table.

Command	Default	Example	pg
AutoLogSense	disabled	set autologsense enabled	40
AutoMap		automap	55
BootFibreDelay	0	set bootfibredelay 15	49
BootScan	disabled	set bootscan enabled	49
BootScanPorts (FB2400 only)	auto	set bootscanports all	49
BridgeModel		get bridgemodel	40
BridgeName	“ “	set bridgename Omega6	40
ClearEventLog		clearеventlog	40
ClearTraceLog		cleartracelog	40
Date		set date 03:03:03	45
DHCPFixedDelay	0	set dhcpfixeddelay 15	53
DisplayEventLog		displayeventlog	40
DisplayEventLogFilter	all enabled	set displayeventlogfilter all disabled	40
DisplayTraceLog		displaytracelog	40
DisplayTraceLogFilter	all enabled	set displaytracelogfilter all info enabled	40
DumpEventLog		dumpeventlog	40
DumpTraceLog		dumptracelog	41
EthernetSpeed	auto	set ethernetspeed 100	53
EventLog	enabled	set eventlog disabled	41
EventLogFilter	all enabled	set eventlogfilter gen info enabled	41
Exit		exit	53
FCConnMode	loop	set fcconnmode ptp	49
FCDataRate	auto	get fcdatarate	49
FCHard	disabled	set fchard disabled	49
FCHardAddress	fp1=3; fp2=4	set fchardaddress 1 122	49
FCMultiNode (FB2400 only)	enabled	set fcmultinode	49
FCPortErrors		set fcporterrors disabled	41
FCPortFailover (FB2400 only)	disabled	set fcportfailover enabled	50
FCPortList		fcportlist	41
FCPortRecover (FB2400 only)		fcportrecover	50
FCSCSIBusyStatus	busy	set fcscsibusystatus busy	50
FCWWName	fp1= 2000001086100000 fp2= 2100001086100000	get fcwwname 1	41
FirmwareRestart		firmwarerestart	45
Help		help driveinfo	39
IdentifyBridge	disabled	set identifyBridge enabled	41
Info		info	41
IPAddress	10.0.0.1	get ipaddress mp1	53
IPDHCP	enabled	set ipdhcp mp1 disabled	53

Command	Default	Example	pg
IPGateway	0.0.0.0	set ipgateway mp1 200.10.22.3	53
IPSubnetMask	255.255.0.0	get ipsubnetmask mp1	53
IsReserved		isreserved	45
LogicalUnitAddressing	disabled	set logicalunitaddressing enabled	55
MaxOpTemp	70	get maxoptemp	45
MinOpTemp	0	set minoptemp 10	45
OpTempWarn	5	set optempwarn 15	45
Password	Password	set password Alpha1	53
Performance		get performance 2	41
Ping		ping 192.42.155.155	53
ReadOnlyPassword	Password	get readonlypassword	54
ReadOnlyUsername	user	get readonlyusername	54
Reserve		reserve disabled	45
ResetFCPortErrors		resetfcporterrors 1	42
RestoreConfiguration		restoreconfiguration default	39
Route		route Alpha1 delete	55
RouteDisplay		routedisplay iscsi	56
SaveConfiguration		saveconfiguration restart	39
SCSIInitId	0x07	set scsiinitid 2 12	47
SCSIPortBusSpeed	ultra4	set scsiportbusspeed 2 ultra3	47
SCSIPortList		scsiportlist	42
SCSIPortReset		scsiportreset 1	45
SCSIPortResetOnStartup	enabled	set scsiportresetonstartup 1 disabled	47
SCSIPortSyncTransfer	enabled	set scsiportsynctransfer 2 disabled	47
SCSIPortTermination	enabled	set scsiporttermination 1 disabled	47
SCSIPortWideTransfer	enabled	set scsiportwidetransfer 2 disabled	47
SCSITargetLUNs	8	set scsitargetluns 1 64	48
SCSITargets		scsitargets 1	42
SerialNumber	FB2400L000000 FB2390L000000	get serialnumber	42
SerialPortBaudRate	115200	set serialportbaudrate 19200	51
SerialPortEcho	enabled	get seriallportecho	51
SNMPDumpMIB (FB2390 only)		snmpdumpmib	42
SNMPExtendedTraps (FB2390 only)	disabled	get snmpextendedtraps	42
SNMPTrapAddress	0.0.0.0 none	set snmptrapaddress 6 192.42.155.155 all	42
SNMPTraps	disabled	set snmptraps enabled	42
SNTP	enabled	get sntp	46
SNTPServer	192.43.244.18	set sntpserver 129.6.15.28	46
SpeedWrite		get speedwrite	46
SpeedWriteDefault	disabled	set speedwritedefault enabled	46
TailEventLog		taileventlog	42
Temperature		get temperature	42
Time	00:00:00	set time 03:32:30	46

Command	Default	Example	pg
TimeZone	EST	set timezone pst	46
TraceLog	disabled	set tracelog enabled	42
TraceLogFilter	all enabled	set tracelogfilter all all	42
Username	root	set username Barbara	54
VerboseMode	enabled	set verbosemode disabled	39
VirtualDriveResponse (FB2390 only)	disabled	set virtualdriveresponse enabled	48
Voltage		get voltage	43
WrapEventLog	enabled	set wrapeventlog disabled	43
WrapTraceLog	enabled	set wraptracelog disabled	43
Zmodem		zmodem receive	46

6.1.2 General use commands

These CLI commands are used in a variety of situations.

Help

Displays a list of available commands. If command name is specified, displays detailed command-specific information.

Immediate: Help [command name]

RestoreConfiguration

Restores configuration to either the default configuration or the configuration last saved into non-volatile memory. The saved option will undo any changes made since the last save.

Immediate: RestoreConfiguration [Default | Saved]

SaveConfiguration

*Many commands require a **SaveConfiguration** command to be executed. This will be indicated by the return **Ready. ***. When you invoke a **SaveConfiguration** command, the current configuration is permanently saved in the FibreBridge and the new configuration becomes the active configuration. If a firmware restart is required to make the requested change permanent, you are asked to confirm the restart. You can override this request by indicating the override value on the command line. You may make several changes through commands before implementing the restart, but once you have restarted the FibreBridge, all the command changes created before the restart and save will be implemented. If you select the restart option, the FibreBridge will execute its complete start up cycle.*

Immediate: SaveConfiguration <Restart | NoRestart>

VerboseMode

Specifies the detail of feedback for the command line interface. Disabling this option removes parameter names from action commands and removes descriptions from information commands.

Default: enabled (returns have parameter information)
Set syntax: set VerboseMode [enabled | disabled]
Get syntax: get VerboseMode

6.1.3 Diagnostic commands

ATTO FibreBridge diagnostic commands help validate FibreBridge operation and diagnose/isolate FibreBridge faults. Event logging is a mechanism for on-site observation of internal FibreBridge behavior such as tracing SCSI commands received over the Fibre Channel from the host and return of data and status to the host.

AutoLogSense

Controls Automatic LOG SENSE functions.

Default: disabled
Set syntax: set AutoLogSense [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get AutoLogSense

BridgeModel

Reports model information about the FibreBridge.

Information only: get BridgeModel

BridgeName

Specifies the eight-character name assigned to the FibreBridge used to identify individual FibreBridge units. It is not the World Wide Name. The string is alphanumeric, eight characters long,.

Default: " "
Set syntax: set BridgeName [value]
Requires a SaveConfiguration command
Get syntax: get BridgeName

ClearEventLog

Clears the contents of the event log. No new entries will be recorded until ClearEventLog has completed.

Immediate: ClearEventLog

ClearTraceLog

Clears the contents of the trace log. No events will be recorded until the command has been completed.

Immediate: ClearTraceLog

DisplayEventLog

*Displays the most recent page of event log entries. Typing a +, - or = causes the next, previous or same page of event log entries to be displayed. No events will be recorded until the command has been completed. Type **q** to disable the command, begin new log entries, and return to CLI.*

Immediate: DisplayEventLog < + | - | = | q >

DisplayEventLogFilter

*Filters the display of data for specified subsystems and levels when in **DisplayEventLog** mode. The specific entries supported are platform dependent.*

Subsystem entries:	Log level entries:
ECC	INFO
ENET	WARN
GEN	CRIT
HTTP	FAIL
iSCSI	ALL
SCSI	
NDMP	
NVRAM	
PERF	
FC	
ALL	

Default: all all enabled
Set syntax: set DisplayEventLogFilter [subsystem] [level] [enabled | disabled]
Get syntax: get DisplayEventLogFilter [subsystem] [level]

DisplayTraceLog

*Displays the most recent page of trace log entries. Typing a **+, -** or = causes the next, previous or same page of trace log entries to be displayed. No events will be recorded until the command has been completed. Type **q** to disable the command, begin new log entries, and return to CLI.*

Immediate: DisplayTraceLog < + | - | = | q >

DisplayTraceLogFilter

*Filters the display of data in the trace log. when in **DisplayTraceLog** mode. To display all values, type **all all** as parameters.*

Default: all all enabled
Set syntax: set DisplayTraceLogFilter [FC | SCSI | ALL] [fp | sb | ALL] [ChkCond | ALL] [enabled | disabled]
Get syntax: get DisplayTraceLogFilter [FC | SCSI | ALL] [fp | sb | ALL] [ChkCond | ALL]

DumpEventLog

Dumps the contents of the entire event log to the current CLI session without impact on the log itself (the log is not cleared). No events will be recorded until the command has been completed.

Immediate: DumpEventLog

DumpTraceLog

Dumps the contents of the entire trace log to an RS-232 or Telnet session over Ethernet without impact on the log itself. (the log is not cleared). No events will be recorded until the command has been completed.

Immediate: DumpTraceLog

EventLog

Regulates event logging. When enabled, records various system events to the event log.

Default: enabled
Set syntax: set EventLog [enabled | disabled]
Get syntax: get EventLog

EventLogFilter

*Filters the display of data for specific subsystems when in **EventLog** mode. The specified entries supported are platform dependent. To display all values, type **all all** as parameters.*

Subsystem entries:	Log level entries:
ECC	INFO
ENET	WARN
GEN	CRIT
HTTP	FAIL
iSCSI	ALL
SCSI	
NDMP	
NVRAM	
PERF	
FC	
ALL	

Default: all all enabled
Set syntax: set EventLogFilter [subsystem] [level] [enabled | disabled]
Get syntax: get EventLogFilter [subsystem] [level]

FCPortList

Returns a list of available FC ports and their current status. Valid status values are OK and Failed.

Immediate: FCPortList

FCPortErrors

*Displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or **ResetFCPortErrors** command.*

Default:
Set syntax: set FCPortErrors [enabled | disabled]
Get syntax: get FCPortErrors

FCSCSIBusyStatus

Specifies the SCSI status value returned when the FibreBridge is unable to accept a SCSI command because of a temporary lack of resources. Choices are busy and qfull.

Default: busy
Set syntax: set FCSCSIBusyStatus [busy | qfull]
Requires a SaveConfiguration command
Get syntax: get FCSCSIBusyStatus

FCWWName

Reports the Word Wide Name (WWN) of the FC interface. Each FC port has an individual and unique WWN. The least significant 3 bytes of the WWN are used as the Ethernet MAC address. The lower nibble of the highest byte designates the port number.

Information only: get FCWWN [fp]

Help

Displays a list of available commands. If command name is specified, displays detailed command-specific information.

Immediate: Help [command name]

IdentifyBridge

Enabling this option causes the Ready LED on the front panel of the FibreBridge to blink until the parameter is disabled.

Set syntax: set IdentifyBridge [enabled | disabled]
Get syntax: get IdentifyBridge

Info

Displays version numbers and other production information for key components within the FibreBridge

Immediate: Info

Performance

Returns the performance data for the FC port you specify. Data includes the average rate (MB per sec.) and number of I/Os measured over the previous sampling period where a sampling period is approximately one second. Successful SCSI Read (08h, 28h) and Write (Oah, 2Ah) commands are considered I/Os.Reported performance may be affected by FC port and SCSI bus availability and saturation, SCSI device speeds and overall system use.

Information only: get Performance <fp>

Ping

Sends an ICMP echo request to the specified host.

Immediate: Ping [mp1] [xxx.xxx.xxx.xxx] <count <size>>

Reset FCPortErrors

*Resets all FC error counts for the specified port to zero. Refer to **FCPortErrors**.*

Immediate command: ResetFCPortErrors [fp]

SCSIPortList

*Returns a list of available SCSI ports and their current status. Valid status values are **OK** and **Failed.***

Immediate: SCSIPortList

SCSITargets

Returns a list of SCSI devices operational on the referenced SCSI port with SCSI target number, SCSI LUN number, device type, vendor ID, product ID, revision and serial number. Also for all models except the FibreBridge 2400, updates the status of any 'online' maps/routes to 'unavailable' if a device is not found or 'online' if a device is found.

Information only: SCSITargets [sb]

SerialNumber

Reports the FibreBridge serial number which is unique for each FibreBridge. The serial number tracks the board throughout its life and should not be changed for any reason. Set form requires operator privileges.

Information only: get SerialNumber

SNMPDumpMIB (FB2390 only)

Dumps the contents of the ATTO FibreBridge private SNMP MIB to the current CLI session. Consult your network administrator for further assistance with SNMP.

Immediate: SNMPDumpMIB

SNMPExtendedTraps (FB2390 only)

Controls Extended SNMP map functioning such as device transition and device error. Consult your network administrator for further assistance with SNMP.

Default: 0.0.0.0 none
Set syntax: set SNMPExtendedTraps [enabled | disabled]
Get syntax: get SNMPExtendedTraps

SNMPTrapAddress

Sets/displays the IP trap addresses and levels.Consult your network administrator for further assistance with SNMP.

Index: value between 1 and 6
IP Address: standard IP address
Trap Level: severity required for an event to trigger a trap:
None: no traps will be sent to the address
ALL: all triggering events will be sent
Informational: a trap will be issued to the given address
Warning: warning and critical events will be sent
Critical: only critical events will trigger a trap

Default: 0.0.0.0 none
Set syntax: set SNMPTrapAddress [Index] [IPAddress] [level]
Get syntax: get SNMPTrapAddress

SNMPTraps

Enables/disables SNMP trap functions.Consult your network administrator for further assistance with SNMP.

Default: disabled
Set syntax: set SNMPTraps [enabled | disabled]
Get syntax: get SNMPTraps

TailEventLog

Displays new events to the terminal during a serial or Telnet session. Press <ESC> to exit tail mode.

Immediate command: TailEventLog

Temperature

Returns the current internal temperature of the unit in degrees Celsius.

Information only: get Temperature

TraceLog

When enabled, records various system events to the trace log.

Default: disabled
Set syntax: set TraceLog [enabled | disabled]
Get syntax: get TraceLog

TraceLogFilter

*Filters the display of data for specific FibreBridge subsystems when in **TraceLog** mode.*

Default: disabled
Set syntax: set TraceLogFilter [FC | SCSI | ALL] [fp | sb | ALL] [ChkCond | ALL] [enabled | disabled]
Get syntax: get TraceLogFilter [FC | SCSI | ALL] [fp | sb | ALL] [ChkCond | ALL]

Voltage

Displays the voltage levels monitored by the FibreBridge 2350 and the FibreBridge 2400.

VDDA: +3.31 V
VDDB: +2.49 V
VDDC: +1.5V
VDDD: +1.35V
ALL: all monitored voltages

Information only: get Voltage <VCC | VDDA |VDDB |ALL>

WrapEventLog

When enabled, the FibreBridge will log up to 2,048 event entries before wrapping (overwriting the first entries). If disabled, the FibreBridge stops logging event entries when the buffer is full.

Default: enabled
Set syntax: set WrapEventLog [enabled | disabled]
Get syntax: get WrapEventLog

WrapTraceLog

When enabled, the FibreBridge will log up to 2,048 trace entries before wrapping (overwriting the first entries). If disabled, the FibreBridge stops logging trace entries when the buffer is full.

Default: enabled
Set syntax: set WrapTraceLog [enabled | disabled]
Get syntax: get WrapTraceLog

6.1.4 Maintenance commands

The CLI commands outlined in this chapter may be used to get information or perform functions which are used in a variety of situations with the ATTO FibreBridge.

Date

Sets/displays the date. The range is 01/01/2000 to 12/31/2099. For all models except the FibreBridge 2350, the date will be reset to the default after the FibreBridge is reset or power-cycled. The date is persistent in the FibreBridge 2350 because it has a battery backup.

Default: 01/01/2000
Set syntax: set Date [MM] / [DD] / [YYYY]
Requires a SaveConfiguration command
Get syntax: get Date

FCPortRecover (FB2400 only)

Attempts to restore a bridge that has experienced a failover to its pre-failover state.

Immediate: FCPortRecover

FirmwareRestart

Causes the FibreBridge to reboot, then re-initialize its firmware.Use the forced option to override any CLI reservation held by other sessions.

Immediate: FirmwareRestart <forced>

IsReserved

Displays the reservation status of the current FibreBridge session/interface.

Immediate command: IsReserved

MaxOpTemp

Sets/displays the maximum enclosure temperature alarm of the unit in degrees Celsius. If the temperature of the FibreBridge rises above the maximum MaxOpTemp, thermal control event handling occurs.Valid entries are between 55 and 70 degrees

Default: 70
Set syntax: set MaxOpTemp [55-70]
Requires a SaveConfiguration command
Get syntax: get MaxOpTemp

MinOpTemp

Sets/displays the minimum enclosure temperature alarm of the unit in degrees Celsius. If the temperature of the FibreBridge falls below the minimum MinOpTemp, thermal control event handling occurs.Valid entries are between 0 and 15 degrees

Default: 0
Set syntax: set MinOpTemp [0-15]
Requires a SaveConfiguration command
Get syntax: get MinOpTemp

OpTempWarn

Sets/displays the number of degrees in Celsius before a thermal control event handling occurs. Warnings will be made via system log entries. Valid entries are between 0 and 15 degrees

Default: 5
Set syntax: set OpTempWarn [0-15]
Requires a SaveConfiguration command
Get syntax: get OpTempWarn

Reserve

Prevents other CLI sessions from modifying the FibreBridge. When the FibreBridge services interface is reserved, set commands are unavailable but get commands are available. At least one service interface always has access to the FibreBridge at all times. This interface always reports ***RELEASED*** *status, since it may issue set commands. Reservation of the FibreBridge is implicit: if the configuration is changed by any user of CLI sessions, the FibreBridge becomes* ***RESERVED****. Executing a* ***SaveConfiguration*** *command,* ***RestoreConfiguration*** *or* ***FirmwareRestart forced*** *releases the FibreBridge so that other devices may modify it.*

Immediate: Reserve

RestoreConfiguration

Restores configuration to either the default configuration or the configuration last saved into non-volatile memory. The saved option will undo any changes made since the last save.

Immediate: RestoreConfiguration [Default | Saved]

SCSIPortReset

Resets the specified SCSI bus.

Immediate: SCSIPortReset [sb]

SCSITargetLUNs

Sets the maximum number of SCSI LUNS per target the FibreBridge will attempt to query during a SCSI bus scan.

Default: 8
Set syntax: set SCSITargetLUNs [sb] {8 | 64]
Requires a SaveConfiguration command
Get syntax: get SCSITargetLUNs

SNTP

Sets/gets the SNTP setting. When enabled, the FibreBridge will try, at reset and every 12 hours thereafter, to contact a specified SNTP time server to initialize/synchronize the time.

Default: enabled
Set syntax: set SNTP [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get SNTP

SNTPServer

Sets/gets the IP address of the SNTP time server. If the FibreBridge is unable to contact the specified SNTP timeserver within 30 seconds, the FibreBridge will try to contact the first auxiliary SNTP time server. If not successful, the FibreBridge will try to contact the second auxiliary server. If not successful, the FibreBridge will continue to keep time based on the most recent SNTP time server, physical RTC or manual initialization or synchronization

Auxiliary time servers included:
    129.6.15.28 (time-a.nist.gov)
    132.163.4.101 (time-a.timefreq.blrdoc.gov)
Default: 192.43.244.18 (time.nist.gov)
Set syntax: set SNTPServer xxx.xxx.xxx.xxx
Requires a SaveConfiguration command
Get syntax: get SNTPServer

SpeedWrite

SpeedWrite is a method to improve the performance of FCP WRITE commands to SCSI devices attached to the FibreBridge. You can specify the SCSI bus, target and LUN of a mapped device or specify "all" to set or get the state of all currently mapped SCSI devices.

Default: all disabled
Set syntax: set SpeedWrite [sb st sl | all] [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get SpeedWrite [sb st sl | all]

SpeedWriteDefault

Specifies the state of SpeedWrite for any SCSI devices mapped manually or via an AutoMap operation. If enabled, any new SCSI device will use SpeedWrite performance enhancement by default.

Default: disabled
Set syntax: set SpeedWriteDefault [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get SpeedWriteDefault

Time

Sets/displays the time in a 24-hour format. The default time is 00:00:00 and is accurate until the FibreBridge is reset or power-cycled when it returns to the default.

Default: 0:00:00
Set syntax: set Time [HH] : [MM] : [SS]
Requires a SaveConfiguration command
Get syntax: get Time

TimeZone

Sets/displays the time zone if SNTP is disabled. Setting may be EST, CST, MST PST or a numerical offset from GMT in the format +/- HH:MM. When SNTP is enabled, applies the time zone setting to the time retrieved from a specified SNTP time server to determine local time.

Default: EST
Set syntax: set TimeZone [EST | CST | MST | PST | [+ / - HH : MM]]
Requires a SaveConfiguration command
Get syntax: get TimeZone

Zmodem

Allows transfer of a firmware image to or from the FibreBridge using the ZMODEM file transfer protocol. Available only through the RS232 interface.

Immediate: Zmodem [Send filename | Receive]

CAUTION

After a firmware image is downloaded to the FibreBridge, the image is placed into flash memory. During this time (about 30 seconds), DO NOT remove power to the FibreBridge or the flash may become corrupted.

6.1.5 SCSI configuration commands

The SCSI ports are configured with default settings but may be customized to your specifications using the CLI commands in this section.

AutoLogSense
Controls Automatic LOG SENSE functionality.

Default: disabled
Set syntax: set AutoLogSense [enabled|disabled]
Requires a SaveConfiguration command
Get syntax: get AutoLogSense

FCSCSIBusyStatus
Specifies the SCSI status value returned when the FibreBridge is unable to accept a SCSI command because of a temporary lack of resources. Choices are busy and qfull.

Default: busy
Set syntax: set FCSCSIBusyStatus [busy | qfull]
Requires a SaveConfiguration command
Get syntax: get FCSCSIBusyStatus

SCSIInitID
Specifies or reports the SCSI initiator ID on the specified SCSI port as found in NVRAM. All maps coinciding with the user-specified SCSIInitID will be destroyed after the command is issued.

Default: 7
Set syntax: set SCSIInitID [sb [0-15]]
Get syntax: get SCSIInitID

SCSIPortBusSpeed
Controls the transfer rate at which the FibreBridge will attempt to negotiate with its SCSI devices. Valid options are Fast SCSI, Ultra SCSI, Ultra 2 SCSI, Ultra 3 SCSI and Ultra 4 SCSI. Ultra2 and Ultra 3 are valid only if FibreBridge has LVD-capable SCSI ports.

Default: ultra4
Set syntax: set SCSIPortBusSpeed [Port Number [fast | ultra | ultra2 | ultra3 | ultra4]
Requires a SaveConfiguration command
Get syntax: get SCSIPortBusSpeed

SCSIPortList
Returns a list of available SCSI ports and their current status. Valid status values are OK and Failed

Get syntax: SCSIPortList

SCSIPortReset
Resets the specified SCSI bus.

Set syntax: SCSIPortReset [sb]

SCSIPortResetOnStartup
Specifies if the SCSI port should be reset on power-up.

Default: enabled
Set syntax: set SCSIPortResetOnStartup [sb [enabled | disabled]]
Requires a SaveConfiguration command
Get syntax: get SCSIPortResetOnStartup [sb]

SCSIPortSyncTransfer
Specifies whether synchronous SCSI transfers should be negotiated with devices on the specified SCSI port.

Default: enabled
Set syntax: set SCSIPortSyncTransfer [[sb [enabled | disabled]]
Requires a SaveConfiguration command
Get syntax: get SCSIPortSyncTransfer [sb]

SCSIPortTermination
Configures/reports the SCSI internal termination of the SCSI port identified on the FibreBridge.

Default: enabled
Set syntax: set SCSIPortTermination [sb] [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get SCSIPortTermination [sb]

SCSIPortWideTransfer
Specifies whether wide SCSI transfers should be negotiated. Enabled allows wide transfer negotiation

Default: enabled
Set syntax: set SCSIPortWideTransfer [sb [enabled | disabled]]
Requires a SaveConfiguration command
Get syntax: get SCSIPortWideTransfer

SCSITargetLUNs

Sets the maximum number of SCSI LUNs per target the FibreBridge will attempt to query during a SCSI bus scan.

Default: 8
Set syntax: set SCSITargetLUNs [sb] {8 | 64]
Requires a SaveConfiguration command
Get syntax: get SCSITargetLUNs

SCSITargets

Returns a list of SCSI devices operational on the referenced SCSI port with SCSI target number, SCSI LUN number, device type, vendor ID, product ID, revision and serial number. Also for all models except the FibreBridge 2400, updates the status of any 'online' maps/routes to 'unavailable' if a device is not found or 'online' if a device is found.

Information only: SCSITargets [sb]

SpeedWrite

When enabled, improves the performance of FCP WRITE commands to SCSI devices attached to the FibreBridge. Specify SCSI bus (sb), target (st), LUN (sl) of a mapped SCSI device or (all) for each currently mapped device

Set syntax: set SpeedWrite [sb st sl | all] [enabled | disabled]
Get syntax: get SpeedWrite [sb st sl | all]

SpeedWriteDefault

When enabled, SpeedWrite performance enhancement is set as the default for any subsequent SCSI devices mapped manually or via an AutoMap operation. If disabled, the FibreBridge will not attempt SpeedWrite performance enhancement to newly-mapped SCSI devices.

Set syntax: set SpeedWriteDefault [enabled | disabled]
Get syntax: get SpeedWriteDefault

VirtualDriveResponse (FB2390 only)

Virtual Drive Response allows the FibreBridge to provide proxy responses to SCSI INQUIRY and TEST UNIT READY commands if a SCSI device is in a timeout or busy. Host systems may then assign devices consistently despite the device's state during execution of the SCSI commands.

Default: disabled
Set syntax: set VirtualDriveResponse [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get VirtualDriveResponse

6.1.6 Fibre Channel configuration commands

The Fibre Channel ports are configured with default settings but may be customized using CLI.

BootFibreDelay
Initialization of the FC port is delayed by several seconds to allow a connected Fibre switch to fully initialize before enabling the FibreBridge FC ports.

Default: 0 (no delay)
Set syntax: set BootFibreDelay [0 | 15 | 30 | 45| 60 | 75]
Requires a SaveConfiguration command
Get syntax: get BootFibreDelay

BootScan
Provides dynamic mapping of SCSI devices to the Fibre port/LUN combination via a SCSI bus scan at boot time. All devices discovered during the bus scans will be assigned to a Fibre port, Fibre LUN combination until the next reset/power cycle. This dynamic mapping will replace the current, static mapping of the FibreBridge.

Default: disabled
Set syntax: set BootScan [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get BootScan

BootScanPorts (FB2400 only)
For legacy applications, selects/displays the ports to be used for a boot scan.

Default: auto
Set syntax: set BootScanPorts [fp | all | auto]
Requires a SaveConfiguration command
Get syntax: get BootScanPorts

FCConnMode
Controls/reports the connection mode the FibreBridge uses when communication across a FC network, either to an arbitrated loop (FC-AL) when you select loop *mode, or point-to-point when you choose* ptp. If you choose loop-ptp or ptp-loop, the FibreBridge will try to use the first parameter first, but will use the second if it cannot use the first.

Default: loop
Set syntax: set FCConnMode [loop | ptp | loop-ptp | ptp-loop]
Requires a SaveConfiguration command
Get syntax: get FCConnMode

FCDataRate
Specifies the rate the FibreBridge will use, 1 Gigabit/sec., 2 Gigabit/sec. 4 Gigabit/sec. or auto negotiate.

Default: auto
Set syntax: set FCDataRate [1Gb | 2Gb | 4Gb | auto]
Requires a SaveConfiguration command
Get syntax: get FCDataRate

FCHard
Used to enable or disable FC hard address assignment. Under soft addressing, the FibreBridge loop address is assigned during loop initialization. Use FCHardAddress (described below) if you enable hard addressing.

Default: disabled
Set syntax: set FCHard [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get FCHard

FCHardAddress
Sets/displays the value used as the FC-AL hard address. This hexadecimal value represents the address the FibreBridge will try to use if hard addressing is enabled. When an optional address is not present, the current value is displayed. The valid range of values is 0 through 125.

Default fp1=3; fp2=4
Set syntax: set FCHard Address [fp | [address]]
Requires a SaveConfiguration command
Get syntax: get FCHardAddress [fp]

FCMultiNode (FB2400 only)
When disabled, provides host-side failover and load balancing capabilities by presenting a single Node name to a host for all Fibre Channel ports. When enabled, allows mapping of a different set of logical units to each FC port.

Default: disabled
Set syntax: set FCMultiNode [enabled|disabled]
Requires a SaveConfiguration command
Get syntax: get FCMultiNode

FCPortErrors

Displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or ***ResetFCPortErrors*** *command.*

Set syntax: set FCPortErrors [enabled | disabled]
Get syntax: get FCPortErrors

FCPortFailover (FB2400 only)

Controls the current operating mode of FC ports on the bridge. When disabled, all FC ports are active. When enabled, a designated FC port is marked as reserved and becomes active only if a port fails. If a failure occurs, the failover port takes on the identity of the failed port. If enabled, all device maps on the designated failover port will be deleted.

Default: disabled
Set syntax: set FCPortFailover [enabled | disabled]
Get syntax: get FCPortFailover

FCPortList

Returns a list of available FC ports and their current status. Valid status values are ***OK*** *and* ***Failed*** *for all FibreBridge models, and* ***Reserved*** *for the FibreBridge 2400.*

Immediate: FCPortList

FCPortRecover (FB2400 only)

Attempts to restore a bridge that has experienced a failover to its pre-failover state.

Immediate: FCPortRecover

FCSCSIBusyStatus

Specifies the SCSI status value returned when the FibreBridge is unable to accept a SCSI command because of a temporary lack of resources. Choices are busy and queue full.

Default: busy
Set syntax: set FCSCSIBusyStatus [busy | qfull]
Requires a SaveConfiguration command
Get syntax: get FCSCSIBusyStatus

FCWWName

Reports the Word Wide Name (WWN) of the FC interface. Each FC port has an individual and unique WWN. The least significant 6 bits of the WWN are used as the Ethernet MAC address. Fabric and loop operations are unpredictable if duplicate WWNs are assigned.

Information only: get FCWWN [PortNumber]

Performance

Returns the performance data for the FC port you specify. Data includes the average rate (MB per sec.) and number of I/Os measured over the previous sampling period. A FC port which has been disabled or has failed will prompt an error message. Reported performance may be affected by FC port and SCSI bus availability and saturation, SCSI device speeds and overall system use.

Information only: get Performance [fp]

Reset FCPortErrors

Resets all FC error counts for the specified port to zero. Refer to ***FCMultiNode (FB2400 only)****.*

Immediate command: ResetFCPortErrors [fp]

6.1.7 Serial port configuration commands

The ATTO FibreBridge serial ports are configured with default settings but may be customized to your specifications using the CLI commands in this section.

SerialPortBaudRate

Configures/reports the baud rate for the FibreBridge RS-232 serial port. The number of data bits per character is fixed at 8 with no parity. Choices are 2400, 9600, 19200, 38400, 57600 and 115200

Default: 115200
Set syntax: set SerialPortBaudRate [2400 | 9600 |19200 |38400 | 57600 |115200]
Requires a SaveConfiguration command
Get syntax: get SerialPortBaudRate

SerialPortEcho

Enables/disables/reports the echoing of keyboard input. When enabled, all non-control character keyboard input is output to the display. Local ASCII terminal (or terminal emulator) echo settings should be set to disabled while using SerialPortEcho enabled

Default: enabled
Set syntax: set SerialPortEcho [enabled | disabled]
Requires a SaveConfiguration Restart command
Get syntax: get SerialPortEcho

6.1.8 Ethernet configuration commands

The Ethernet configuration commands configure the Ethernet and TCP/IP parameters.

DhcpFixedDelay

Selects/displays the delay, in seconds, between DHCP client request intervals, from between 0 seconds to 255 seconds. 0 time is typical.

Default: 0 (no delay)
Set syntax: set DhcpFixedDelay [0 - 255]
Get syntax: get DhcpFixedDelay

EthernetSpeed

Sets/displays the current speed of the Ethernet connection. Choices are 10, 100, and Auto.

Default: auto
Set syntax: set EthernetSpeed [mp1] [10 | 100 | Auto]
Requires a SaveConfiguration command
Get syntax: get EthernetSpeed [mp1]
If auto enabled, value in parentheses indicates current speed

Exit

Exits the current Ethernet telnet CLI session; it has no effect if used during a serial or in-band CLI session.

Immediate command: Exit

IPAddress

Sets/displays the current FibreBridge IP address.If IPDHCP is enabled (see below), get command reports current IP address assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP Address, whether or not a SaveConfiguration is performed.

Default IP Address: 10.0.0.1
Set syntax: set IPAddress [mp1] xxx.xxx.xxx.xxx
Get syntax: get IPAddress [mp1]

IPDHCP

Selecting DHCP allows the FibreBridge to request an IP address from the network. The network must have at least one DHCP server.

Default: enabled
Set syntax: set IPDHCP [mp1] [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get IPDHCP [mp1]

IPGateway

Sets/displays the current gateway. If IPDHCP is enabled (see above), get command reports current IP gateway assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP Gateway, whether or not a SaveConfiguration is performed. The IP gateway address will be rejected if the FibreBridge IP address is not in the same subnet as the gateway.

Default: 0.0.0.0
Set syntax: set IPGateway [mp1] xxx.xxx.xxx.xxx
Get syntax: get IPGateway [mp1]

IPSubnetMask

Sets/displays the current subnet mask. If IPDHCP is enabled (see above), get command reports current subnet mask assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP subnet mask whether or not a SaveConfiguration is performed.

Default: 255.255.0.0
Set syntax: set IPSubnetMask xxx.xxx.xxx.xxx
Get syntax: get IPSubnetMask

Password

*Specifies password for all non-serial sessions: Telnet, ftp and ExpressNAV user management console. You will be prompted for the current password, to enter the new password, and to confirm the new password. If local Echo is enabled, password will echo all * characters. In verbose mode only, CLI will request the password be re-entered. When the password is all 0s, Telnet and ftp do not validate the password and MD5 authentication is disabled. Passwords are case sensitive and can be 1-32 characters long with no spaces.*

Default: Password
Set syntax: set Password [xxx]
Requires a SaveConfiguration command

Ping

Sends an ICMP echo request to the specified host.

Immediate command: ping [mp1] [xxx.xxx.xxx.xxx] <count <size>>

ReadOnlyPassword

Specifies password for all non-serial sessions: Telnet, ftp and ExpressNAV user management console. An empty password can be configured by not specifying one.

Default: Password
Set syntax: set ReadOnlyPassword [xxx]
Requires a SaveConfiguration command

ReadOnlyUsername

Specifies username for all Telnet, ftp and ExpressNAV user management console sessions. Username is case insensitive, 1-32 characters, no spaces.

Default: User
Set syntax: set ReadOnlyUsername [username]
Requires a SaveConfiguration command
Get syntax: get ReadOnlyUsername

Username

Specifies username for all Telnet, ftp and ExpressNAV user management console sessions. Username is case insensitive, 1-32 characters, no spaces

Default: root
Set syntax: set Username [username]
Requires a SaveConfiguration command
Get syntax: get Username

6.1.9 Mapping commands

Access to SCSI devices is via Fibre Port and Fibre LUN addresses mapped to SCSI bus, target and LUNs. CLI commands are used to modify the mapping.

AutoMap

Programmatically maps all currently operational SCSI devices attached to the FibreBridge. Issue a SCSIPortList CLI command before issuing an AutoMap command to scan the bus for operational SCSI buses. Not available on if Logical Unit Addressing is enabled.

Immediate: AutoMap [fp]

FCConnMode

Controls/reports the connection mode the FibreBridge uses when communication across a FC network, either to an arbitrated loop (FC-AL) when you select loop *mode, or point-to-point when you choose* ptp. If you choose loop-ptp or ptp-loop, the FibreBridge will try to use the first parameter first, but will use the second if it cannot use the first.

Default: loop
Set syntax: set FCConnMode [loop | ptp | loop-ptp | ptp-loop]
Requires a SaveConfiguration command
Get syntax: get FCConnMode

FCHard

Used to enable or disable Fibre Channel hard address assignment. Under soft addressing, the FibreBridge loop address is assigned during loop initialization. Use ***FCHardAddress*** *(described below) if you enable hard addressing.*

Default: disabled
Set syntax: set FCHard [enabled | disabled]
Requires a SaveConfiguration command
Get syntax: get FCHard

FCHardAddress

Sets/displays the value used as the FC-AL hard address. This hexadecimal value represents the address the FibreBridge will try to use if hard addressing is enabled. When an optional address is not present, the current value is displayed. Choices are 0 through 125.

Default: fp1=3; fp2=4
Set syntax: set FCHardAddress [fp | [address]]
Requires a SaveConfiguration command
Get syntax: get FCHardAddress [fp]

FCMultiNode (FB2400 only)

When disabled, provides host-side failover and load balancing capabilities by presenting a single Node name to a host for all Fibre Channel ports. When enabled, allows mapping of a different set of logical units to each FC port.

Default: disabled
Set syntax: set FCMultiNode [enabled|disabled
Requires a SaveConfiguration command
Get syntax: get FCMultiNode

FCPortFailover (FB2400 only)

Controls the current operating mode of FC ports on the FibreBridge. When disabled, all FC ports are active. When enabled, a designated FC port is marked as reserved and becomes active only if a port fails. If a failure occurs, the failover port takes on the identity of the failed port. If enabled, all device maps on the designated failover port will be deleted.

Default: disabled
Set syntax: set FCPortFailover [enabled | disabled]
Get syntax: get FCPortFailover

FCPortRecover (FB2400 only)

Attempts to restore a bridge that has experienced a failover to its pre-failover state.

Immediate: FCPortRecover

LogicalUnitAddressing

Controls the current device mapping method on the bridge. When disabled, standard peripheral device mapping and formatting is used. Target devices are only made visible to the specific mapped Fibre Channel port. When enabled, static device mapping and formatting is achieved with a discovery bus scan at boot. All target devices are visible to all Fibre Channel ports, with each port sharing a common Fibre Channel Node Name.

Default: disabled
Set syntax: set LogicalUnitAddressing [enabled|disabled]
Get syntax: get LogicalUnitAddressing

Route

Assigns a Fibre Channel address to a target destination device. If you try to map a new SCSI BTL to the same FC LUN, the new BTL will overwrite the previous map. Using the delete identifier instead of SCSI will remove the map from its table. In verbose mode, overwriting an exiting

map requires secondary confirmation.Not available if Logical Unit Addressing has been enabled.

Immediate: Route FC [fp] [fl] [SCSI [sb st sl] Bridge | Delete]

RouteDisplay

Displays a list of Fibre Channel to SCSI address mappings on the FibreBridge. If Logical Unit Addressing has been enabled, RouteDisplay shows a list of SCSI to SCSI address mappings.

Immediate normal mode: RouteDisplay FC <fp> <fl>
Immediate LUA mode: RouteDisplay SCSI <sb> <st> <sl>

SCSIInitID

Specifies or reports the SCSI initiator ID on the specified SCSI port as found in NVRAM. All maps coinciding with the user-specified SCSIInitID must be set to offline *and will become invalid upon issuing this command. The set command always modifies NVRAM, whether you use a* ***SaveConfiguration*** *command or not.*

Default: 7
Set syntax: set SCSIInitID [sb [0-15]]
Get syntax: get SCSIInitID

SCSITargetLUNs

Sets the maximum number of SCSI LUNs per target the FibreBridge will attempt to query during a SCSI bus scan.

Default: 8
Set syntax: set SCSITargetLUNs [sb] {8 | 64]
Requires a SaveConfiguration command
Get syntax: get SCSITargetLUNs

SCSITargets

Returns a list of SCSI devices operational on the referenced SCSI port. Also, for all models except the FibreBridge 2400, updates the status of any online *maps/routes to* ***unavailable*** *if a device is not found or* ***online*** *if a device is found.*

Immediate: SCSITargets [sb]
Requires a SaveConfiguration command

Appendix A ATTO FibreBridge family

The ATTO bridge family of products provides GbE-to-SCSI or Fibre Channel-to-SCSI bridges available as Compact PCI (CPCI) boards, stand alone enclosures that can be fitted for rackmount integration, or desktop units, depending on the model and your needs.

The ATTO iPBridge and ATTO FibreBridge family of products share common configuration options and functions to provide the most versatile connectivity options available. Each product has been engineered to address specific customer needs. New capabilities are integrated into products throughout the family as much as possible, requiring only an upgrade of firmware to incorporate them into your SAN (Storage Area Network) or NAS (Network Attached Storage). Check the website, www.attotech.com, for the latest firmware updates.

ATTO iPBridge

Product features	2500C/R/D	2700C/R/D	1500E/D	1550E/D
Number of GigE ports	3	4	1	1
Number of SCSI ports	2	NA	1	1
SCSI interface	LVD/SE	NA	LVD	LVD
Number of FC ports	NA	2	NA	NA
FC interface	NA	SFP	NA	NA
Data transfers	NA	4 Gigabit	NA	NA
Ethernet interface	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet
Data transfer	Wire speed	Wire speed	37 MB/sec.	Wire speed
Configuration	cPCI board Desktop Rack	cPCI board Desktop Rack	Embedded Desktop	Embedded Desktop
Full duplex data transfers	yes	yes	yes	yes
Supports Class 2 transfers & direct fabric connect	NA	Class 3 only	NA	NA
Supports error recovery	yes	yes	yes	yes
Bridge management available • Serial • Ethernet • In-band	 yes yes yes	 yes yes yes	 yes yes yes	 yes yes yes
Diagnostics	Advanced	Advanced	Standard	Standard
ExpressNAV web management	yes	yes	yes	yes
iSCSI SANS	yes	yes	yes	yes
NDMP/NAS	yes	NA	NA	NA

ATTO FibreBridge

Product features	1180E/D	1290E	2300E/R/D	2350C	2390C/R/D	2400C/R/D
Number of FC ports	1	1	1	1	1	2
FC interface	DB9/SC	SFP	SFP	SFP	SFP	SFP
FC data rate	1-GB	2-Gb	2-Gb	2-Gb	4-Gb	4-Gb
Number of SCSI ports	1	2	2	2	2	2
SCSI interface	LVD/SE	LVD/SE	LVD/SE	LVD/SE	LVD/SE	LVD/SE VHDCI
Max. data transfer rate (MB/sec.)	72	160	185	195	280	440
Available configurations	Board (Embedded) Desktop	Board (Embedded)	Board (Embedded) Rackmount Desktop	cPCI Board (Embedded)	cPCI Board (Embedded) Desktop Rackmount	cPCI Board (Embedded) Desktop Rackmount
Full duplex data transfers	Yes	Yes	Yes	Yes	Yes	Yes
Supports						
• Class 2 transfers	Yes	Yes	Yes	Yes	No	No
• Class 3 transfers	Yes	Yes	Yes	Yes	Yes	Yes
• intermix transfers	No	Yes	Yes	Yes	No	No
• direct fabric connect	Yes	Yes	Yes	Yes	Yes	Yes
• error recovery	Yes	Yes	Yes	Yes	Yes	Yes
Bridge management available						
• Serial	Yes	Yes	Yes	Yes	Yes	Yes
• Ethernet	No	Yes	Yes	Yes	Yes	Yes
• In-band	Yes	Yes	Yes	Yes	Yes	Yes
Serverless backup	Yes	Yes	Yes	Yes	No	No
Virtual Device Architecture (VDA	No	No	No	No	Yes	Yes
Port failover	No	No	No	No	No	Yes
Diagnostics	Standard	Standard	Standard	Advanced	Advanced	Advanced
ExpressNAV web management	No	Yes	Yes	Yes	Yes	Yes

Appendix B Cabling

ATTO FibreBridge SCSI ports connect SCSI storage devices into the Fibre Channel Storage Area Network (SAN). Use an Ethernet connection to use the ATTO ExpressNAV interface.

Make sure all cables are anchored securely at both ends with the proper connectors.

SCSI port connections

The FibreBridge supports a wide variety of SCSI storage devices including stand-alone drives, removable drives, JBODs, tape, CD and DVD drives, changers, libraries and magneto optical drives.

Each SCSI port is totally independent from the other SCSI port. Each bus may support up to 15 devices and each SCSI bus auto-negotiates the appropriate sync rates with the connected devices. If slower devices are mixed with faster devices, the bus will communicate at the rate of the slowest device.

Connect slower devices to one SCSI port and faster devices to the other port.

Connect a SCSI connector from the SCSI device to a SCSI port on the FibreBridge.

Check the type of cable, cable length limit and number of devices recommended for each port. Keep cable lengths as short as possible to ensure the highest signal quality and performance. These cable lengths include the wiring inside the devices.

Device type	Cable limit
Ultra SCSI Single Ended (SE)	1.5 meters
Ultra SCSI High Voltage Differential (HVD)	25 meters
Ultra2 SCSI Low Voltage Differential (LVD)	12 meters
Ultra3 SCSI Low Voltage Differential (LVD)	12 meters
Ultra4 SCSI Low Voltage Differential (LVD)	12 meters

Fibre Channel connections

Fibre Channel technology offers a variety of cabling options. The type of cable required varies depending upon the application, environment and distance.

Cable length	Cable type	Cable size	FC connector
Up to 175 meters	multi mode fiber optic	62.5 micron	LC
Up to 500 meters	multimode fiber optic	50 micron	LC
Up to 13 meters	unequalized copper		HSSDC-2

Serial port connections

The ATTO FibreBridge supports remote service operations over the RS-232 serial port using standard terminal emulation software available with most systems.

Connect a DB-9 crossover serial cable (null modem) between the ATTO FibreBridge serial port and one of the computer's serial COM ports. A gender changer or DB-9 to DB-25 converter may be needed depending on the cables being used.

Ethernet connections

The 10/100 BaseT Ethernet port provides remote monitoring and management using the ATTO ExpressNAV interface.

When you connect an Ethernet cable between the FibreBridge and a 10/100Base-T connection, you may need a crossover cable connecting directly to a computer. The ATTO FibreBridge will auto detect the Ethernet speed by default.

Appendix C Glossary

Some terms used in the Fibre Channel industry are defined below. More information is available through the Fibre Channel Industry Association (www.fibrechannel.org), the Storage Area Networking Industry Association (www.snia.org) and the Fibre Channel Consortium (www.iol.unh.edu).

Term	Definition
fabric	A Fibre Channel switch or two or more Fibre Channel switches interconnected to physically transmit data between any two N_Ports on a switch or switches.
failover	The substitution of a working system for one which has failed.
FC-AL	Fibre Channel Arbitrated Loop: A Fibre Channel network in which up to 126 systems and devices are connected in a loop topology, with each transmitter connecting to the receiver of the device to its logical right. The Fibre Channel Arbitrated Loop protocol used for transmission is different from Fibre Channel switched and point to point protocols. Multiple FC-AL loops can be connected via a fabric switch to extend the network.
firmware	Software stored in read-only memory (ROM) or programmable ROM (PROM). Firmware is often responsible for the behavior of a system when it is first switched on.
F_port	A port in the Fibre Channel fabric where a N_port may attach
FL-port	A port in the Fibre Channel fabric where a NL_port may attach in an arbitrated loop
hot swapping	Components are removed and replaced while the unit is running, with power to either the component or a device connected to the unit. Not all components are hot swappable: please read installation and maintenance instructions carefully.
initiator device	A component which originates a command
JBOD	Just a Bunch Of Disks: a storage subsystem using multiple independent disk drives with or without RAID configuration.
LED	Light-emitting diode, a type of diode that emits light when current passes through it. Visible LEDs are used as indicator lights on all sorts of electronic devices.
LUN	Logical Unit Number: a SCSI or Fibre Channel identifier of a device
NL port	A port attached to a node in Fibre Channel arbitrated loop or fabric loop configurations
N_port	A port attached to a node used with point to point or fabric configurations
RAID	Originally Redundant Array of Inexpensive Disks, now Redundant Array of Independent Drives: a storage system spanning multiple disk drives.
SAN	Storage Area Network, a shared storage architecture connecting computers and storage devices for online data access. Each connected system can directly access any attached storage device.
SCSI	Small Computer Systems Interface: a processor-independent standard for system-level interface between a computer and intelligent devices including hard disks, floppy disks, CD-ROM, printers, scanners, etc.
topology	Logical layout of the parts of a computer system or network and their interconnections

Appendix D Standards and compliances

The equipment described in this manual generates and uses radio frequency energy. If this equipment is not used in strict accordance with the manufacturer's instruction, it can and may cause interference with radio and television reception. See the ATTO FibreBridge Technical Specification sheet for your particular model for a full list of certifications for that model.

FCC Standards: Radio and Television Interference

WARNING

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide a reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, try to correct the interference by one or more of the following measures:

- Move the receiving antenna.
- Relocate the bridge with respect to the receiver, or move the bridge away from the receiver.
- Plug the computer into a different outlet so the computer and receiver are on different branch circuits.
- If necessary, consult an ATTO authorized dealer, ATTO Technical Support Staff, or an experienced radio/television technician for additional suggestions.

The booklet *How to Identify and Resolve Radio/TV Interference Problems* prepared by the Federal Communications Commission is a helpful guide. It is available from the US Government printing office, Washington, DC 20402, Stock No. 004-000-00345-4.

Further results of FCC Testing

In certain instances, extraordinary variances in the AC power supplied to this unit will require the operating system's normal error recovery procedure to retry the current SCSI command. In this case, the unit can fully recover with no loss of data, and without user intervention. Note that other exceptional conditions in addition to variances in the AC power, such as improper cabling or unrecognized commands, may also trigger these normal error recovery procedures.

Canadian Standards

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Standards

Declaration of Conformity

This following statement applies to the ATTO FibreBridge.

This device has been tested in the basic operating configuration and found to be compliant with the following European Union standards:

Application of Council Directive: 89/336/EEC

Standard(s) to which conformity is declared: EN55022, EN50082-1, EN60950

This Declaration will only be valid when this product is used in conjunction with other CE approved devices and when the entire system is tested to the applicable CE standards and found to be compliant.

The ATTO FibreBridge 2400 complies with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Appendix E Fibre Channel accessories

The following Fibre Channel accessories are available through ATTO Technology. Contact an ATTO Technology authorized sales representative to order.

Embedded

FibreBridge 1180

FCBR-1180-ELC Fibre Channel to LVD Ultra2 SCSI Bridge Embedded Board with Copper DB9
FCBR-1180-ELS Fibre Channel to LVD Ultra2 SCSI Bridge Embedded Board with Optical SC

FibreBridge 1290

FCBR-1290-EL0 2-Gigabit Fibre Channel to LVD Ultra3 SCSI Bridge Embedded Board with SFP

FibreBridge 2300

FCBR-2300-EL0 2-Gigabit Fibre Channel to LVD Ultra3 SCSI Bridge Embedded Board with SFP

FibreBridge 2350

FCBR-2350-000 2-Gigabit Fibre Channel to LVD Ultra3 SCSI Bridge Embedded cPCI Board

FibreBridge 2390

FCBR-2390-C00 4-Gigabit Fibre Channel to LVD Ultra 320 SCSI Bridge Embedded cPCI Board

FibreBridge 2400

FCBR-2400-C00 4-Gigabit Fibre Channel to LVD Ultra 320 SCSI Bridge Embedded cPCI Board

Desktop/Rackmount

FibreBridge 1180

FCBR-1180-DLC Fibre Channel to LVD Ultra2 SCSI Bridge with Copper DB9

FibreBridge 2300

FCBR-2300-DLO 2-Gigabit Fibre Channel to LVD Ultra3 SCSI Bridge Desktop or Rackmount with SFP

FibreBridge 2390

FCBR-2390-D00 4-Gigabit Fibre Channel to LVD Ultra 320 SCSI Bridge Desktop or Rackmount

FibreBridge 2400

FCBR-2400-C00 4-Gigabit Fibre Channel to LVD Ultra 320 SCSI Bridge Desktop or Rackmount

MIAs

ADAP-MIAS-BLK MIA Adapter-Short Wave

GBICS

GBIC-DB90-000 GBIC DB9 Active Copper Interface
GBIC-HSDC-000 GBIC HSSDC Active Copper Interface
GBIC-SWFO-000 GBIC Short Wave Optical Duplex SC Interface
SFP2-0000-000 SFP 2-Gb FC Optical LC
SFP4-0000-000 SFP 4-Gb FC Optical LC

Cables/Copper

CBL-FCCU-003 DB9 Copper Fibre Channel Cable (Unequalized) – 3m.
CBL-FCCU-010 DB9 Copper Fibre Channel Cable (Unequalized) – 10m.
CBL-FCCE-020 DB9 Copper Fibre Channel Cable (Equalized) – 20m.

CBL-HSDB-003 HSSDC to DB9 Copper Fibre Channel Cable (Unequalized) – 3m.
CBL-HSDB-010 HSSDC to DB9 Copper Fibre Channel Cable (Unequalized) – 10m.

CBL-HSHS-003 HSSDC to HSSDC Copper Fibre Channel Cable (Unequalized) – 3m.
CBL-HSHS-010 HSSDC to HSSDC Copper Fibre Channel Cable (Unequalized) – 10m.

Cables/Optical

CBL-FCFI-005 5 Meter Cable-Duplex 50 Micron Multi-mode FC/Optical
CBL-FCFI-010 10 Meter Cable-Duplex 50 Micron Multi-mode FC/Optical
CBL-FCFI-030 30 Meter Cable- Duplex 50 Micron Multi-mode FC/Optical

Cables/FibreChain

CBL-FCFC-001 FibreChain 24” Cable Cables/SCSI

Cables/SCSI

CBL-FP68-C3 68-pin “P” / 50-pin Centronics – 1m
CBL-FP68-C6 68-pin “P” / 50-pin Centronics – 2m
CBL-FP68-C25 68-pin “P” / 50-pin Centronics – 8m
CBL-FP68-C79 68-pin “P” / 50-pin Centronics – 24m
CBL-F68E-00X 68-pin “P” / 68-pin fine pitch “P” – 1ft
CBL-U68E-681 68-pin “P” / 68-pin fine pitch “P” – 1m
CBL-F68E-686 68-pin “P” / 68-pin fine pitch “P” – 2m
CBL-F68E-003 68-pin “P” / 68-pin fine pitch “P” – 3m
CBL-F68E-010 68-pin “P” / 68-pin fine pitch “P” – 10m
CBL-F68E-025 68-pin “P” / 68-pin fine pitch “P” – 25m
CBL-F68E-68X 68-pin “P” / 68-pin fine pitch “P” – 16m.

CBL-V68E-4868-pin offset VHDCI to 68-pin VHDCI

Appendix F Warranty, contact information

Manufacturer limited warranty

Manufacturer warrants to the original purchaser of this product that it will be free from defects in material and workmanship as described in the ATTO Technology website, www.attotech.com. Manufacturer liability shall be limited to replacing or repairing, at its option, any defective product. There will be no charge for parts or labor should Manufacturer determine that this product is defective.

Products which have been subject to abuse, misuse, alteration, neglected, or have been serviced, repaired or installed by unauthorized personnel shall not be covered under this warranty provision. Damage resulting from incorrect connection or an inappropriate application of this product shall not be the responsibility of Manufacturer. Manufacturer's liability is limited to Manufacturer's product(s); damage to other equipment connected to Manufacturer's product(s) will be the customer's responsibility. This warranty is made in lieu of any other warranty, express or implied. Manufacturer disclaims any implied warranties of merchantability or fitness for a particular purpose. Manufacturer's responsibility to repair or replace a defective product is the sole and exclusive remedy provided to the customer for breech of this warranty. Manufacturer will not be liable for any indirect, special, incidental, or consequential damages irrespective of whether Manufacturer has advance notice of the possibility of such damages. No Manufacturer dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

Contact ATTO Technology, Inc.

Customer service, sales and technical support are available by phone Monday through Friday, 8 a.m. to 5 p.m EST., or by fax and web site 24-hours a day.

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155 CrossPoint Parkway
Amherst, New York 14068
(716) 691-1999 • voice
(716) 691-9353 • fax
http://www.attotech.com

ATTO Technology can also be reached via e-mail at the following addresses:

Sales Support: sls@attotech.com
Technical Support: techsupp@attotech.com