



ATTO Technology, Inc.

ATTO FibreCenter™ 3400
Secure Data Path Application
Installation and Operation Manual

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1 Fibre Channel is a key technology for storage

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.

The Fibre Channel architecture is structured as a hierarchical set of protocol layers. Defined within these layers are rules for signal interfaces, serial encoding and decoding, error control, frame format and communications protocols.

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. Storage devices could include RAID, tape backup, tape library, CD-ROM library or JBOD.

SANs maintain greater fault tolerance and load balancing by supporting server clustering and failover (the ability for one server to take over for another in the event of a failure).

The ATTO FibreCenter™ 3400 hub integrates industry-leading performance and Storage Area Network capabilities into mid-range applications.

Glossary

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

Term	Definition
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.
FC-AL	Fibre Channel Arbitrated Loop: A Fibre Channel network in which up to 126 nodes 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.
FL-port	A port in the Fibre Channel fabric where an NL_port may attach in an arbitrated loop.
hub	A device which provides a common connection to devices on a Fibre Channel Arbitrated Loop
initiator device	A component which originates a command

Term	Definition
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 Fibre Channel identifier of a device
N_port	A port that connects a node to a fabric or to another node as in a point-to-point configuration.
NL port	A port that connects a node in Fibre Channel arbitrated loop
POST	Power On Systems Test: a series of self-diagnostic tests stored in RAM which run when power is first applied to a component.
switch	A device which controls routing of data from one component to another.
topology	Logical layout of the parts of a computer system or network and their interconnections
warm boot	Startup without cycling the electric power. Operations include POST and refreshing all configuration settings. All software in Flash memory will be reloaded into RAM.

2 ATTO FibreCenter supports diverse SAN needs

The ATTO FibreCenter 3400 provides a 2-gigabit Fibre Channel rackmount hub configured with eight Fibre Channel ports and an Ethernet management port.

The ATTO FibreCenter 3400 integrates industry-leading performance and Storage Area Network capabilities into mid-range applications.

Available as a Fibre Channel rack system module, it provides dependable performance for high availability systems through hot swappable, dual power modular design.

Quick start instructions

The ATTO FibreCenter 3400R/D offers a variety of ways to connect into a SAN. The following is a quick start description:

- 1 Slide the hub module horizontally into the rack enclosure until you feel it make contact with the backplane connector.
- 2 Secure the hub module by tightening the two thumbscrews (hand tight).
- 3 Apply power to the rack enclosure. The FibreCenter is now active.
- 4 Connect to the management port via a standard RJ45 Ethernet cable.
- 5 Connect Fibre Channel devices to the ATTO FibreCenter using SFPs and standard cables manufactured for Fibre Channel use.
- 6 Connect a host computer to the FibreCenter 3400. The default IP address of the hub is 192.168.1.1. Unless your network is running under 192.168.1.X, you will need to use a crossover Ethernet cable to connect.
- 7 Change the IP address of the host computer to 192.168.1.X (where X does not equal 1).
- 8 Launch Hyperterminal.
- 9 From the menu bar at the top, select File - New Connection
- 10 Enter a name for the connection.
- 11 Select TCP/IP (Winsock) as the connection method.
- 12 Enter the IP address of the FibreCenter (default is 192.168.1.1)
- 13 Enter *zonedhub* when prompted for the login and your password when you are prompted.
- 14 You should now be connected. Type *help* for a list of commands. Enter the CLI commands required to set up your system if different from previously set configurations.

Exhibit 2-1 Single zone configuration (Zone 1), an eight-port hub configuration. Ports 2, 3, 4, 5, 6, 7 and 8 may access port 1, but only one at a time, under control of the Setup and Switch commands.

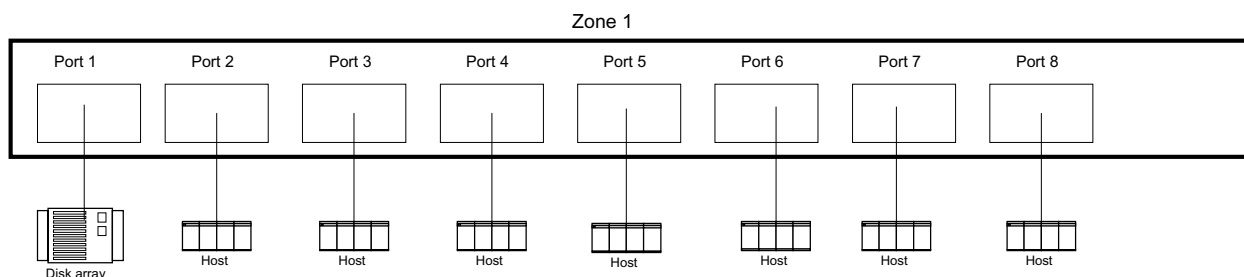
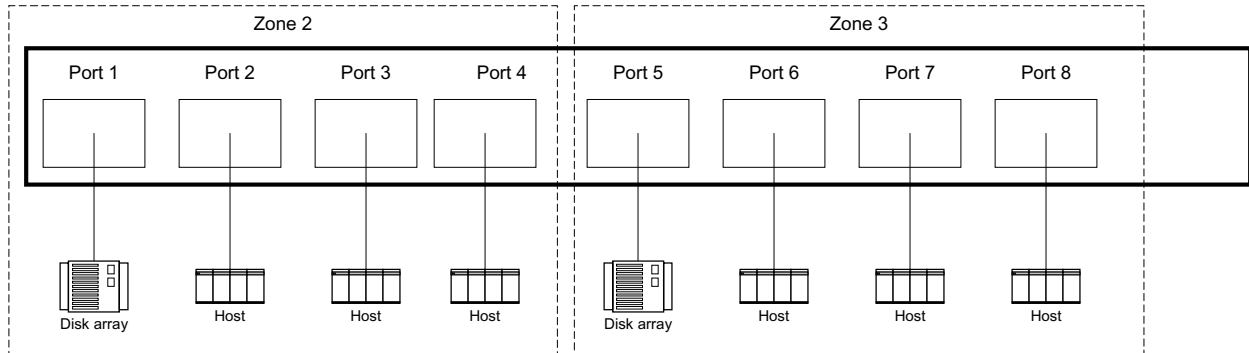


Exhibit 2-2 Dual-zone configuration (Zone 2 and Zone 3). Each zone is independent of the other, and so may be configured to run at different or the same speed: 1 Gigabit or 2 Gigabit. Ports 2, 3 and 4 may access port 1, but only one at a time, under control of the Command Line Interface Setup and Switch commands. Ports 6, 7 and 8 may access port 5, but only one at a time under control of the Setup and Switch commands.



3 ATTO FibreCenter 3400 characteristics

ATTO FibreCenter 3400 is a 2-Gigabit Fibre Channel hub configured with eight (8) Fibre Channel ports and an Ethernet management port. The FibreCenter 3400 is designed to integrate industry leading performance and Storage Area Network (SAN) capabilities into mid-range applications by providing a high-speed, central connection point for Fibre Channel connections.

The FibreCenter 3400 Fibre Channel rack system design provides maximum dependable performance for high availability systems through a hot-swappable, dual power module.

The FibreCenter 3400 module is housed in one module bay of a dual module, 1U high, industry standard rack enclosure complete with mounting brackets. Using two modules in a rack provides a maximum port density of 16 SFP ports and redundant power and cooling in a full width 1U rack.

The unit may be configured as one 8-port hub (Zone 1) or two 4-port hubs (Zones 2 and 3). When configured as Zones 2 and 3, the FibreCenter allows each 4-port zone to run at different speeds (1Gb or 2Gb). Configuration is managed through a 10BaseT Ethernet port.

Specifications

- *Eight 2-Gigabit Fibre Channel ports with Small Formfactor Pluggable (SFP) interface
- *400 MB/sec. maximum throughput in full duplex mode per zone
- *Auto negotiation between 2-Gigabit and 1-Gigabit modes
- *Port management interface for “on-the-fly” configuration
- *Ethernet configuration, management and monitoring
- *Modular design for maximum data reliability, availability and serviceability.

- *Support for Fibre Channel Class 2, Class 3 and Intermix specifications
- * Support for full-duplex data transfers
- * Full Fibre Channel support for FC-P2, PLDA and public loop login
- *32 MB of SDRAM memory for code execution and Ethernet packets.
- *4 MB of flash memory, field upgradable through Ethernet, for code and parameter storage.

Local and network management

- *Command Line Interface provides local and remote management and diagnostic support using Telnet over Ethernet
- *Field upgradeable firmware using FTP through the Ethernet port

Features

- *Digital retiming circuits eliminate jitter transfer to downstream devices.
- * Lockable port status
 - Disabled = Port is disconnected from FC network.
 - Enabled = Port is connected to FC network subject to automatic bypass criteria.
- *Automatic bypass may be disabled to allow link to always remain connected.
- * Link transmitter may be optionally disabled when port is disabled.
 - Reduced power consumption.
 - No external monitoring of FC activity.
- * All settings are persistent.

Exhibit 3-1 Front view of the FibreCenter 3400

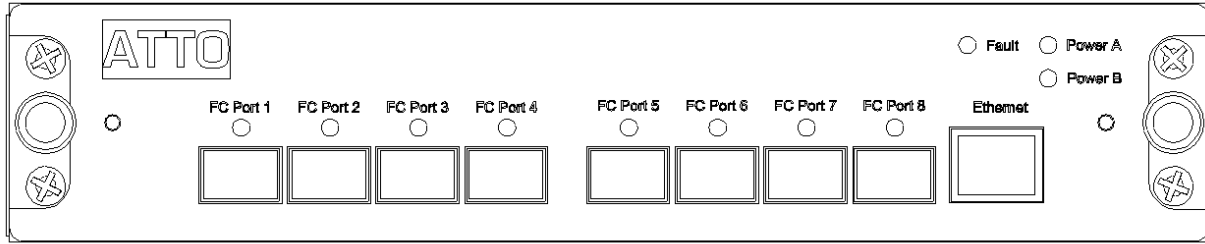
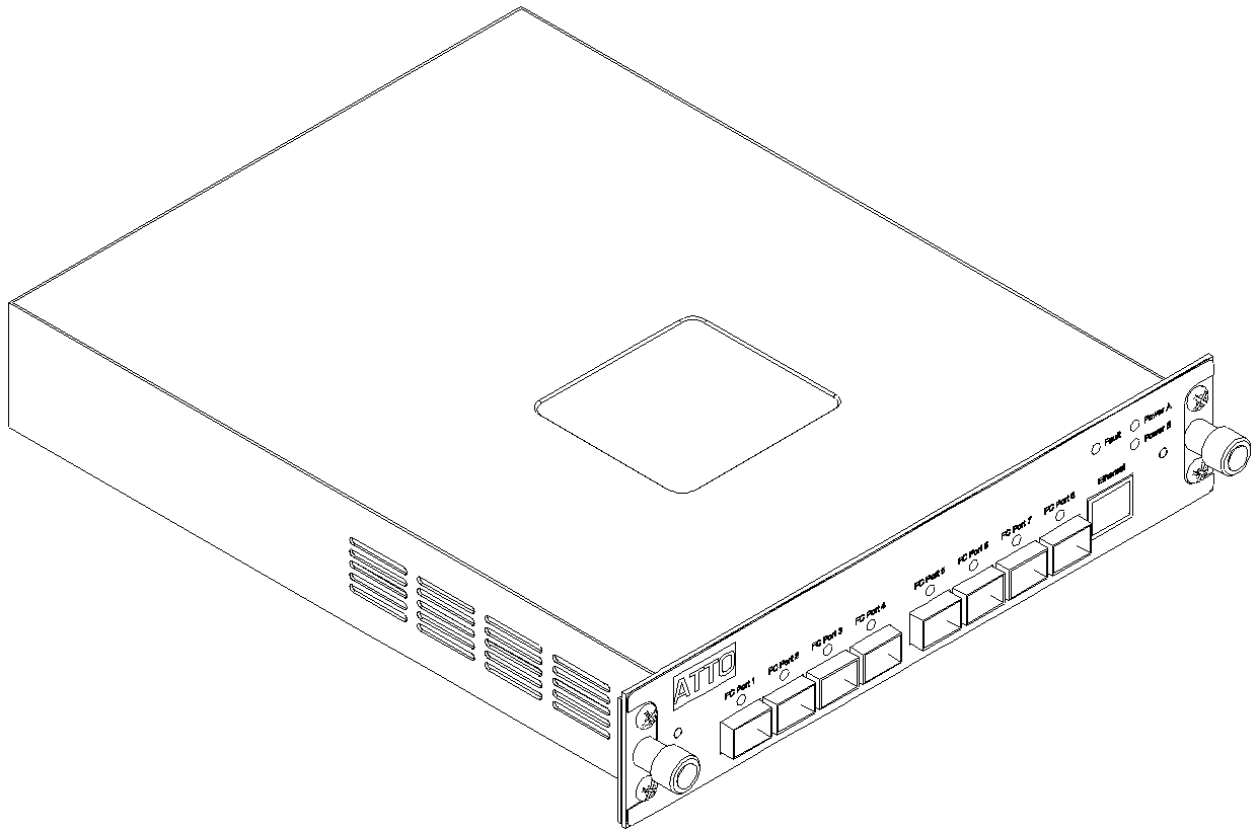


Exhibit 3-2 Module view of the FibreCenter 3400



4 Setting up the FC Rack System

The ATTO FC Rack System is a configurable 19-inch rack system with two bays designed to house the ATTO FibreCenter 3400. The 1U rackmount enclosure provides the flexibility to integrate the ATTO FibreCenter in pairs.

The following items are included with the ATTO FC Rack System:

- *Up to two (2) ATTO FibreCenter modules
- *One (1) or two (2) power modules.
- *One (1) or two (2) independent cooling fans
- *One (1) or two (2) AC shielded power cord(s).
- *Two (2) Rackmount "L" brackets and (4) screws for mounting the unit into the rack.

The main enclosure of the ATTO FC Rack System houses all the FibreCenter modules and power modules: two bays for FibreCenter and two bays for power modules.

Physical dimensions

Width: 17.4 inches (441.6 mm)

Depth: 17 inches (431.5 mm)

Height: 1.72 inches (43.7 mm)

Operating environment

Operating temperature: 0-40° Celsius

Humidity: 0-90% non-condensing

Mounting

You can install the ATTO FC Rack System with ATTO product modules facing the front or the back using the "L"-brackets and mounting holes provided on either end. The mounting holes on the "L"-bracket fit a standard 19-inch rack, using a centered 1.25-inch (31.7 mm) hole pattern.

Air flow and cooling

The FC Rack System cooling fans are contained within the power module. Each power module contains two 8-CFM fans and provides a total of 16 CFM of airflow. A system that has two power modules installed will have a total of 32 CFM of airflow. Air enters through the sides of the enclosure and is exhausted out the power

modules. Ambient air near the inlets should not exceed 40° C.

WARNING Do not block the vents on either side of the main enclosure. Blocking the vents may cause overheating and could damage the product.

Internal power distribution

The ATTO FC Rack System provides a redundant power scheme with two hot swappable power supply modules. Each power supply module feeds 12V to the backplane. From there the power is distributed to the FibreCenter 3400 modules and the fans.

A failure of one power supply will not affect the functionality of the modules or the cooling system since the second supply will continue to supply power to the backplane. In a redundant power supply installation, one supply can be removed and replaced without affecting the rest of the system in any way.

The product module will detect power supply failures, voltage regulation and failover.

NOTE: Power modules will load balance when two are present in the ATTO FC Rack System

The power module is a hot swappable unit that contains enough power to supply two ATTO product modules and four cooling fans. Each is designed to slide into the ATTO FC Rack System enclosure in either of the two bays on the end of the rack enclosure that is closer to the backplane and farther away from the cooling vents in the sides of the rack enclosure.

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

Output voltage: +12 Volts @ 5 Amps (60 watts) continuous, 5.8 amps (70 watts) peak.

Power draw: The maximum power draw is 2 Amps @ 110 Volts for the entire ATTO FC Rack System. When the ATTO FC Rack System has two power modules, the entire unit will draw 2 Amps @ 110 Volts.

LED indicator The green LED indicator on the power module will light when the module is correctly installed and the switch is turned on showing that power is being drawn from this module and is available on the backplane. The LED will not be illuminated if the power module is not turned on.

WARNING Do not plug the AC power cord in and turn on the power switch if the power module is not installed.

IEC Power Receptacle and Switch One standard IEC320 power receptacle and switch provides easy adaptability to different voltage standards throughout the world.

Installing a power module:

- 1 **Make sure the power switch on the rear of the power module is in the off position and the power cord is disconnected.**

Exhibit 4-1 Rack System power module

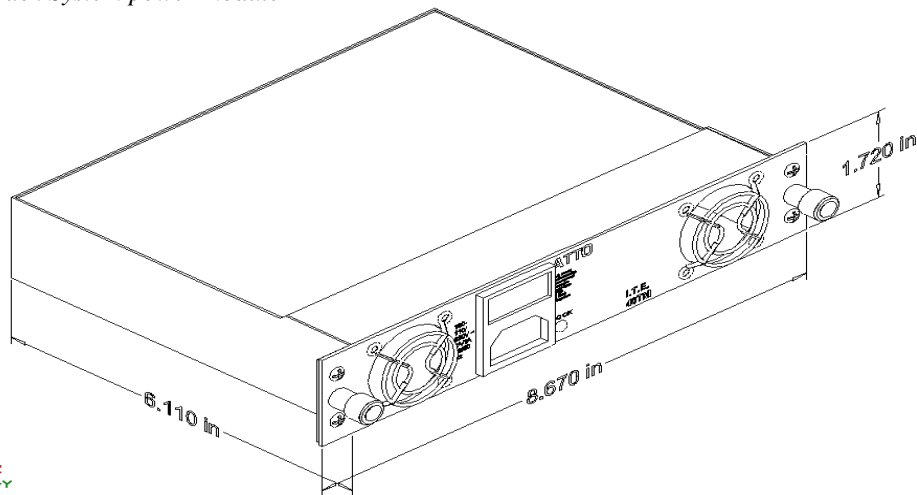
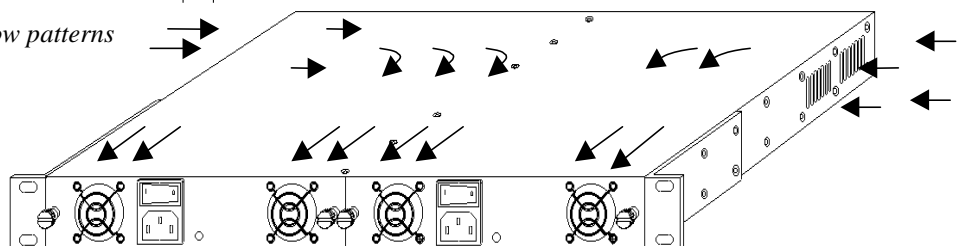


Exhibit 4-2 Cooling airflow patterns



- 2 **Slide the power module into the rack enclosure until you feel it make contact with the backplane connector. The face of the power module should be flush against the rack enclosure edges.**
- 3 **Secure the power module by tightening the two thumb screws (hand tight).**
- 4 **Connect the AC power cord to the power module and plug it into an appropriate receptacle.**
- 5 **Turn the power switch on the power module to the on position. Verify that the green LED is illuminated.**

Removing a power module:

- 1 **The power switch on the rear of the power module must be in the off position. Make sure the power LED is NOT illuminated.**
- 2 **Disconnect the power cord from the power module as well as the AC power source.**
- 3 **Loosen the two thumb screws on the face of the power module.**
- 4 **Carefully slide the power module out of the rack enclosure.**

5 Setting up the ATTO FibreCenter

The ATTO FibreCenter 3400 fits into a standard rack mount module enclosure. While configuration changes can be made “on the fly,” data transmission will be interrupted. To make changes without impacting data, make changes before activating data transmission.

Installing the FibreCenter

- 1 Slide the hub module horizontally into the rack enclosure until you feel it make contact with the backplane connector. The face of the hub module should be flush against the rack enclosure’s edge.
- 2 Secure the hub module by tightening the two thumbscrews (hand tight).
- 3 Apply power to the rack enclosure.
 - The ATTO FibreCenter takes about 40 seconds to begin operation after power-up or execution of the *Reset* command. All ports are disabled during this 40 seconds.
 - When the FibreCenter begins operation, it will use its default configuration or the last mapping designated by the *Setup* and *Switch* commands.
 - The power LEDs will illuminate immediately.
 - All FibreCenter port LEDs will blink one at a time, from left to right, then all will blink twice to indicate they are functional.
 - The FibreCenter is now active.
- 4 Connect to the management port via a standard RJ45 Ethernet cable. It may take up to 40 seconds for the hub to initiate the Ethernet connection.
- 5 Connect Fibre Channel devices to the ATTO FibreCenter using SFPs and standard cables manufactured for Fibre Channel use.
 - Cable limitations are listed in the chart on the next page.
 - The Online LED illuminates for each port with a connected cable if the connected device is powered up and online.
- 6 Connect a host computer to the FibreCenter. The default IP address of the hub is 192.168.1.1. Unless your network is running under 192.168.1.X, you will need to use a crossover Ethernet cable to connect.
- 7 Change the IP address of the host computer to 192.168.1.X (where X does not equal 1).
- 8 Launch Hyperterminal.
- 9 From the menu bar at the top, select File - New Connection
- 10 Enter a name for the connection.
- 11 Select TCP/IP (Winsock) as the connection method.
- 12 Enter the IP address of the FibreCenter.
- 13 Enter *zonedhub* when prompted for the login.
- 14 When prompted for a password, type in your password. Default is *zonedhub*.
- 15 You should now be connected. Type *help* for a list of commands. Enter the CLI commands required to set up your system if different from previously set configurations or defaults.

To change the password

- 1 To change the password you must be logged in as *root*.
- 2 The default password for *root* is *root* and should be changed as soon as possible.
- 3 If you are changing the *root* password, at the *bash#* prompt, type *passwd root*. If you are changing the *zonedhub* password, type *passwd zonedhub* at the *bash* prompt.
- 4 You will be prompted for a new password.
- 5 You will be prompted to retype the new password.

Change in password is effective immediately.

Connecting Fibre Channel ports

The Fibre Channel ports connect into an Arbitrated Loop.

When devices connected to the FibreCenter 3400 are powered up, each NL_Port must sign in with the other ports on the loop. Each port first attempts to find an FL_Port within the loop. When it does, it knows it is a part of a public loop connected to a fabric. If it does not, it knows it is a part of a private loop consisting of other NL_Ports only.

Arbitrated loops can have up to 126 active NL_Ports but only one active FL_Port because the FL_Port is considered the master. You may not configure two switch ports (same switch or different switches) because that would create two FL_Ports.

The FibreCenter can connect direct to a fabric switch, but the switch port must be configured as an FL_Port (Loop Mode).

When connecting to a switch, make sure that only one port of the FibreCenter 3400, or multiple hubs daisy chained together, are connected to the switch.

You may not connect ports from multiple switches to the same loop FibreCenter 3400.

Cabling

Fibre Channel technology offers a variety of cabling options including standard copper, equalized copper, multimode fiber optic, and single mode fiber optic.

The FibreCenter 3400 uses a Small Formfactor Pluggable (SFP) Fibre Channel interface.

The type of cable to use varies depending upon the application, environment and distance. The following table illustrates the different cable options available.

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

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

Removing the FibreCenter

- 1 Disconnect all cables from the face of the hub module.**
- 2 Loosen the two thumbscrews on the face of the hub module.**
- 3 Carefully slide the hub module out of the rack**

6 Configuring the ATTO FibreCenter

The ATTO FibreCenter 3400 may be configured as one 8-port hub (Zone 1) or two 4-port hubs (Zone 2 and Zone 3). Each Fibre Channel bus in the two-zone configuration can run at different speeds (1Gb or 2Gb). The zones may be configured as either a one or two A-B style switch in a FC-AL loop. Configuration is managed through a 10/100 BaseT Ethernet port.

The software necessary to drive the FibreCenter 3400 consists of two segments: the switching logic and the command-processing logic.

The switching logic sets up hardware configurations. The command-processing logic allows you to change parameters on the FibreCenter 3400 and view responses and other information about the hub and its performance via a Telnet server program and command line interface commands (see Chapter 7.3)

The ATTO FibreCenter 3400 may be configured as one 8-port hub (Zone 1) or two 4-port hubs (Zone 2 and Zone 3) using the *Setup* and *Switch* CLI commands. Each Fibre Channel bus in the two-zone configuration can run at different speeds (1Gb or 2Gb). The zones may be configured as either a one or two A-B style switch in a FC-AL loop. A zone is defined by the following parameters:

- *A zone contains only adjacent ports.
- *Except for the *Get Switch* command return, Ports are labeled P1 through P8: all connections are assumed to be between port P1 and P2 | P3 | P4 | P5 | P6 | P7 | P8 in zone 1, between port P1 and P2 | P3 | P4 in zone 2 and between port P5 and P6 | P7 | P8 in zone 3. In the *Get Switch* command return, ports are labeled with letters.
- *Zone 2 and Zone 3 do not overlap.
- *Within a zone, all ports are disabled except the lowest-numbered port (counting from the left) and the single other port to which it is switched.

Data transfer when setting up zones

You must temporarily stop data transfer to the hub when you execute the *Setup* and *Switch* commands during setup of the ATTO FibreCenter.

Only the initiators can stop data transfer; the FibreCenter cannot stop data transfers.

- *If you are changing the FibreCenter 3400 from a single-zone configuration to a dual-zoned configuration, you must temporarily stop all data transfers from the host to the FibreCenter.
- *If you are changing zone 2 setup in a dual-zoned configuration, but not changing zone 3, you must temporarily stop all data transfers from the host in zone 2 but data transfer may continue in zone 3.
- *If you are changing from a dual-zoned configuration to a single-zoned configuration, you must temporarily stop all data from the host to the FibreCenter.

FibreCenter behavior on reset or power-up

The ATTO FibreCenter takes about 40 seconds to begin operation after power-up or execution of the *Reset* command. All ports are disabled during this 40 seconds. When the FibreCenter begins operation, it will use its default configuration or the last mapping designated by the *Setup* and *Switch* commands.

Zone 1

The FibreCenter 3400 may be configured into one zone in which all eight ports are available. Up to seven devices may access the eighth port, one at a time.

Zone 2 and Zone 3

The FibreCenter 3400 may be configured into two separate zones. In each zone, up to three devices may access the fourth port in that zone, one at a time. Devices in one zone may not access ports in the other zone.

FibreCenter 3400 Switching Patterns A-B switch model

Zone	Hub ports							
	P1	P2	P3	P4	P5	P6	P7	P8
1	✓	✓						
1	✓		✓					
1	✓			✓				
1	✓				✓			
1	✓					✓		
1	✓						✓	
1	✓							✓
2	✓	✓						
2	✓		✓					
2	✓			✓				
3					✓	✓		
3					✓		✓	
3					✓			✓

Invalid Switching Patterns

Zone	P1	P2	P3	P4	P5	P6	P7	P8	Reason:
any	✓	✓	✓						must be 1-1 map
2	✓							✓	P8 not in zone 2
3				✓	✓				P4 not in zone 3

Exhibit 6-1 Single zone configuration (Zone 1), an eight-port hub configuration. Ports 2, 3, 4, 5, 6, 7 and 8 may access port 1, but only one at a time, under control of the commands Setup and Switch.

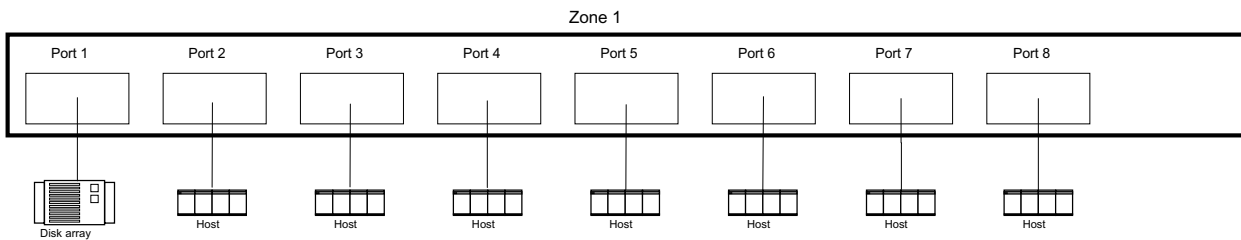
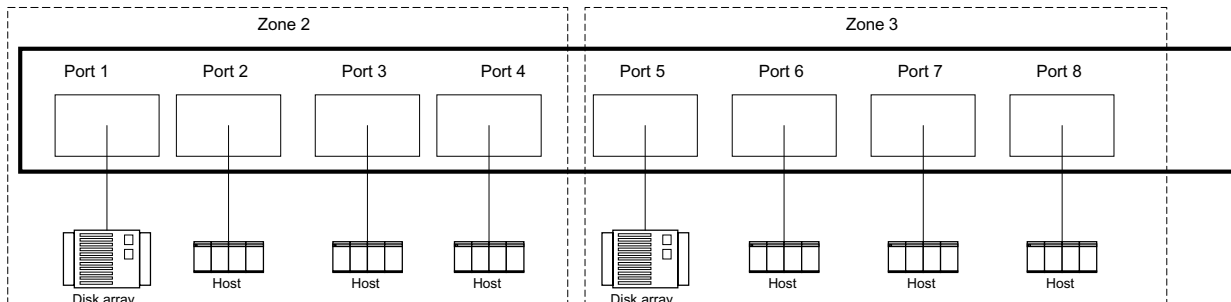


Exhibit 6-2 Dual-zone configuration (Zone 2 and Zone 3) as designated by the Setup and Switch commands. Each zone is independent of the other, and so may be configured to run at different or the same speeds: 1 Gigabit or 2 Gigabit. Ports 2, 3 and 4 may access port 1, but only one at a time. Ports 6, 7 and 8 may access port 5, but only one at a time.



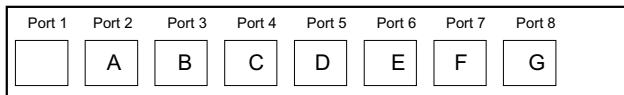
7 Command Line Interface use and guidance

You will be able to perform all configuration via the Telnet interface through the Ethernet port using Command Line Interface (CLI) commands.

To configure the ATTO FibreCenter you will access the Command Line Interface (CLI), a set of ASCII commands, through a Telnet session.

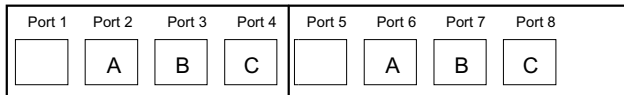
Except for the *Get Switch* command return, ports are labeled 1 through 8: all connections are assumed to be between port 1 and 2 | 3 | 4 | 5 | 6 | 7 | 8 in zone 1, between port 1 and 2 | 3 | 4 in zone 2 and between port 5 and 6 | 7 | 8 in zone 3. In the *Get Switch* command return, ports are labeled with letters.

Zone 1



Zone 2

Zone 3



CLI command conventions

- *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.
- *Responses to commands are specified in the *Results* field for each command, followed by the Telnet prompt \$.
- *Symbols, typefaces and abbreviations used to indicate functions and elements of the command line interface used in this manual include those found in Exhibit 7-3.
- *The settings resident in the FibreCenter 3400 will be preserved over a power-off, power-on cycle and restored automatically on power-on.

Exhibit 7-3 Command conventions. Do not type symbols when entering commands.

Symbol	Indicates
[]	Required entry
•	Space character (ASCII 32 decimal)
< >	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
<i>Italicized words</i>	Parameters which must be replaced by whatever they represent
RACK 000 or 000	required parameters
LL	Hub zone [01 02 03]
C	Channel or port number such as [2 3 4 5 6 7 8] in single-zone (Zone 1) configuration

Exhibit 7-4 A typical command/response sequence during a Telnet session.

Telnet session screen	Explanation
setup•000:0120	Prepares to connect port 1 to port 2 in zone 1
OK	Valid input, accepted
\$	Telnet prompt: ready for next command. Type the next command immediately after the prompt (\$ switch)
switch	Implements changes to the hardware configuration, connecting port 1 to port 2 in zone 1
OK	Connection complete
\$	Telnet prompt: ready for next command

7.1 Ethernet and Telnet configuration commands

Configure the ATTO FibreCenter 3400 using a Telnet session over the Ethernet port. The commands in this section configure or provide information about the Ethernet port and the Telnet session.

Default Router

Sets a new default router address for the Telnet server. Set the default router within the subnet as defined by the subnet mask and IP Address.

Limit: 0-255

Default: 0.0.0.0

Action: **set•RACK •000•Default•Router•[n.n.n.n]**

Information: **get•RACK •000•Default•Router**

reset•rack•000 or power cycle

Echo

Sets the Telnet command echo mode.

Limits: [on|off]

Action: **set•RACK •000•Echo•[on|off]**

Information: **get•RACK •000•Echo**

reset•rack•000 or power cycle

Factory Defaults

The Telnet parameters are set to their factory default values.

Action: **set•RACK •000•Factory•Defaults**

Information: none

reset•rack•000 or power cycle

Idle Timeout

Sets time period in seconds after which, if there is no action on the Telnet port, the Telnet session is shut down.

Default: 60 minutes

Action: **set•RACK •000•Idle•Timeout•[n]**

Information: **get•RACK •000•Idle•Timeout•[n]**

reset•rack•000 or power cycle

IP Address

Sets a new IP address which will be used after next reset.

Limit: 0-255

Default: 192.168.1.1

Action: **set•RACK •000•IP•address•[n.n.n.n]**

Information: **get•RACK •000• IP•Address**

reset•rack•000 or power cycle

Security Traps

Sets the Telnet security level

Default: 3

Action: **set•Security•Traps•[n]**

Information: **get•RACK •000•Security•Traps**

reset•rack•000 or power cycle

Subnet Mask

Sets a new subnet mask which will be used after next reset.

Limit: 0-255

Default: 255.255.255.0

Action: **set•RACK •000•Subnet•Mask•[n.n.n.n]**

Information: **get•RACK •000•Subnet•Mask**

reset•rack•000 or power cycle

Telnet

Ends the current Telnet session and opens another

Action: **Telnet**

Information: none

Telnet Status

Returns the Telnet status. The format will be determined in the future.

7.2 Diagnostic commands

The commands in this section only provide information about the ATTO FibreCenter 3400. Access this information using these command line interface commands in a Telnet session over the Ethernet port.

Status

Displays the status of the power supplies and the cooling fans.

Limits:

PP = power supply status; OK = operating, NG=inoperable, NI = missing

FF = cooling fan status: OK = operating

K = L

Action: none

Information: **get•Status•000**

Return syntax: Status•000•PS1:PP•FAN1:FF•PS2:

PP•FAN2:FF•KEY:K

Return example:

Status•000•PS1:OK•FAN1:OK•PS2:OK•FAN2:OK•KEY:L

Telnet Status

Returns the Telnet status.

Limits: Status may be narrowed to [1] Telnet session information [2] TCP statistics or [3] Telnet auditing information

Action: none

Information: **get•RACK •000•Telnet•Status• [1|2|3]**

Version

Displays the firmware version of the rack. The FibreCenter 3400 has two processors. Returns reflect status of the ARM firmware and the Xilinx firmware.

Limits: n = ARM firmware version; x = Xilinx firmware version

Action: none

Information: **get•RACK •000•Version**

Return: n.nn-xxx

7.3 Configuration commands

Configure the ATTO FibreCenter 3400 using a Telnet session over the Ethernet port. The commands in this section configure or provide information about the ATTO FibreCenter 3400. Flush, Setup and Switch commands are all closely related.

Flush

Undoes all previous Setup commands since the most recent Flush or Switch command

Actions: **Flush•000**

Information: **none**

Rate

Sets (fixes) the data rate for each zone in the FibreCenter 3400. The rate will ordinarily be set through auto negotiation but this command has the power to fix the rate at either 1Gb or 2Gb, regardless of auto negotiation. When the get rate command returns 0, the 0 is a placeholder for a zone and does not mean autonegotiate.

Limits: [0|1|2] for auto negotiate, 1Gb or 2 Gb in zones 01, 02 or 03.

Actions: **set•RACK•000•Rate•[0|1|2]•[0|1|2]•[0|1|2]**

Information: **get•RACK•000•Rate**

Example: set•RACK•000•Rate••1•2

Return: **RACK•000•Rate •1•0•0** (1Gb in zone 01)

(sets zone 02 in 1 Gb, zone 03 as 2 Gb)

Reset

Performs a “warm boot” including POST and refreshes all configuration settings. All software in Flash memory is reloaded into RAM.

Actions: **Reset •RACK•000**

Information: **none**

Setup

Prepares the FibreCenter 3400 for the requested configuration and saves all configuration information internally without making hardware changes. Hardware changes require a Switch command.

Syntax: **setup•000:[LL][C]0**

Actions: **Setup•000:01 [2|3|4|5|6|7|8]0**

Information: **none**

Setup•000:02 [2|3|4]0

Setup•000:03 [6|7|8]0

See Exhibit 7.3-1 for examples of returns

Switch

Commits all previous Setup commands since the most recent Flush or Switch command. The Switch command first turns off all ports within the configured zone, waits for the amount time designed in Switch Delay command (default is 20000 microseconds), then implements the Setup command. The get switch command returns the ports as alphabetic characters because the hub is acting as an A-B switch.

Actions: **Switch•000**

Information: **get•Switch•000**

See Exhibit 7.3-1 for examples of returns

Switch Delay

Determines the amount of time before the Switch command takes effect in microseconds (μ sec).

Limits: 0 to 2000000 μ sec (0-2 seconds)

Default: 20000 μ sec

Actions: **set Switch•delay [0-2000000]**

Information: **get•Switch•Delay**

Zone 1

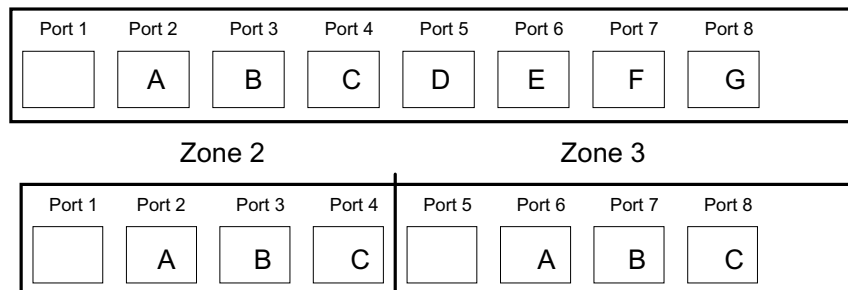


Exhibit 7.3-1 Command line interface setup commands and get switch returns for Zones 1, 2 and 3

FibreCenter 3400 Switching Patterns
A-B switch model

Zone	Hub ports								Setup command	Get Switch return
	P1	P2 A	P3 B	P4 C	P5 D	P6 E	P7 F	P8 G		
									creates configuration; implement with <i>switch</i>	after <i>setup</i> & <i>switch</i> commands
1	✓	✓							setup • 000 : 0120	switch • 000 •• A •
1	✓		✓						setup • 000 : 0130	switch • 000 •• B •
1	✓			✓					setup • 000 : 0140	switch • 000 •• C •
1	✓				✓				setup • 000 : 0150	switch • 000 •• D •
1	✓					✓			setup • 000 : 0160	switch • 000 •• E •
1	✓						✓		setup • 000 : 0170	switch • 000 •• F •
1	✓							✓	setup • 000 : 0180	switch • 000 •• G •
Zone		A	B	C		A	B	C		
2	✓	✓							setup • 000 : 0220	switch • 000 •••••• A •
2	✓		✓						setup • 000 : 0230	switch • 000 •••••• B •
2	✓			✓					setup • 000 : 0240	switch • 000 •••••• C •
3					✓	✓			setup • 000 : 0360	switch • 000 •••••••• A •
3					✓		✓		setup • 000 : 0370	switch • 000 •••••••• B •
3					✓			✓	setup • 000 : 0380	switch • 000 ••••~••••• C •

8 Updating firmware

The Linux Kernel and the Flash File System may be updated by accessing the FibreCenter 3400 through an Ethernet network.

Linux Kernel Update

- 1 **Attach the FibreCenter 3400 to an Ethernet network.**
- 2 **Configure the FibreCenter for Ethernet access.**
- 3 **Start up a Telnet session on the host to the IP address of the FibreCenter 3400 and login as root.**
- 4 **At the `bash#` prompt, after entering your password, type `flash_erase /dev/mtdchar1` and hit Enter.**
- 5 **Wait for the process to complete. Once completed, the FibreCenter 3400 system is ready to accept a new Linux kernel.**
- 6 **On the host, name the new kernel file `mtdchar0` if this is not its name already.**
- 7 **FTP the file `mtdchar0` from the host to `/dev/` on the FibreCenter 3400.**
- 8 **When the FTP process is complete, cycle the power on the FibreCenter 3400 and login**

in the usual manner OR at the `bash#` prompt, type `reboot` and hit Enter.

Flash File System (FFS) Update

- 1 **Attach the FibreCenter 3400 to an Ethernet network.**
- 2 **Configure the FibreCenter for Ethernet access.**
- 3 **Close all previous open sessions (zonedhub or root logins).**
- 4 **FTP the new application files from the host to `/mnt/flash/` in the FibreCenter 3400.**
- 5 **When the FTP process is complete, login as root.**
- 6 **Type the following at the `bash#` prompt**

```
cd /mnt/flash
chmod +x zonedhub sleep setmac xloader
chmod +s zonedhub
chmod 666 *.xml
```
- 7 **Type `reboot` and hit Enter at the `bash#` prompt.**

9 Troubleshooting

The fault LED indicates that a signal is being received, but the signal contains enough faults to make the port fail and go into bypass mode.

Port LEDs on the ATTO FibreCenter are generally lighted if the port is enabled through the *Setup* CLI command and an active device is connected to the port. However, if you want to test your configurations without having active devices attached to the ports, enter the command *Switch-*

Forcemode while in the command line interface. If the FibreCenter is not in force mode, however, the port LEDs will behave as illustrated in the table below.

LED	If LED is illuminated	If LED is not illuminated
OnLine	Port is on-line and functioning properly	No cable connected Cable connected, but no device or host connected to cable Cable connected between hub and connected device or host, but the device is powered off
Fault	See information below	ATTO FibreCenter port is operating properly
Power A	ATTO FibreCenter is receiving power through power supply A	Power supply A is not installed or turned on A power supply is active, but the FibreCenter is not receiving power through power supply A
Power B	ATTO FibreCenter is receiving power through power supply B	Power supply B is not installed or turned on A power supply is active, but the FibreCenter is not receiving power through power supply B
Fault LED	Condition	
ON	Port has been taken off-line, because it is not receiving proper signals due to the following: <ul style="list-style-type: none"> → Port is receiving bad / discontinuous signals → Bad cables → Device connected to the port is powered on, but failed → Cable may be too long / signal has deteriorated → SFP fault – an internal fault within the SFP connected to the port requires replacement. 	

Index: Command Line Interface

A summary of the Command Line Interface commands, their defaults, an example of how they might be used, 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	Page
Default Router	0.0.0.0	set•RACK •000•Default•Router•0.1.0.1	15
Echo	on	set•RACK •000•echo•off	15
Factory Defaults		set•RACK •000•factory•defaults	15
Flush		flush•000	17
Idle Timeout	60 minutes	set•RACK •000•idle•timeout•30	15
IP Address	192.168.1.1	set•RACK •000•ip•address• 10.0.0.1	15
Rate		set•RACK •000•rate•1•1•2	17
Reset		reset•rack•000	17
Security Traps	3	set•RACK •000•security•traps•2	15
Setup		setup•000:0120	17
Status		get•status•000	16
Subnet Mask	255.255.255.0	set•RACK •000•subnet•mask• 255.255.0.0	15
Switch		get•switch•000	17
Switch Delay	20000 µsec.	set•switch•delay•20005	17
Telnet		Telnet	15
Telnet Status		get•RACK •000•Telnet•status	15
Version		get•RACK •000•version	16

Appendix A Standards and compliances

The ATTO Technology FibreCenter 3400 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 Technical Specification sheet for a full list of certifications.



UL 1950 3rd Edition



FCC Standards: Radio and Television Interference

WARNING The ATTO FibreCenter 3400 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 A 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 FibreCenter 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 FibreCenter 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 FibreCenter 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 available from the US Government printing office, Washington, DC.



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 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

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

Appendix B Contact ATTO Technology, Inc.

Customer service, sales information and technical support are available by phone Monday through Friday, Eastern Standard Time 8:00 a.m. to 8:00 p.m., or by fax and web site 24-hours a day.

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

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Technical Support: techsupp@attotech.com