ATTO

ATTO Technology, Inc.

ATTO Celerity Fibre Channel Host Adapters Installation and Operation Manual

Celerity FC-44ES

4-Gb FC quad channel PCIe host adapter

Celerity FC-42ES

4-Gb FC dual channel PCIe host adapter

Celerity FC-41ES

4-Gb FC single channel PCIe host adapter

Celerity FC-41EL

4-Gb FC single channel host adapter

Celerity FC-42XS

4-Gb FC dual channel PCI-X host adapter

Celerity FC-41XS

4-Gb FC single channel PCI-X host adapter

Celerity FC-21PS

2-Gb FC single channel PCI-X host adapter

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Contents

1   ATTO provides Fibre Channel solutions

The ATTO Celerity Fibre Channel family of storage products provides connectivity, intelligence and scalability. Celerity FC host adapters simplify advanced storage networking needs such as switching, backup and data management. Specifically designed to enhance the functionality of third party fabric hardware and software, Celerity FC products are the industry-leading platform for storage connectivity.

Celerity FC-44ES Adapter

The Celerity FC-44ES uses PCI Express Interconnect and 4-Gigabit Fibre Channel to provide 4-Gb FC speeds of up to 800 MB/sec. per channel. The FC-44ES supports high-definition video, rich content databases and other high bandwidth environments.

The FC-44ES uses PCI Express, a serial, high-speed connection that supports aggregate throughput up to 4 GB/sec. (x8 PCIe) full-duplex. With software compatible with existing PCI and PCI-X products, the FC-44ES uses the same device drivers as other Celerity FC family products, simplifying installation and support.

Hardware specifications
- 4 independent Fibre Channel ports
- 4-Gigabit data transfer rates per channel
- 800 MB/sec. maximum full-duplex throughput per channel
- Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
- ANSI Fibre Channel: FC-PH, FC-AL, FC-FCP, FC-AL2, FC-PLDA, FC-FLA
- Flash ROM for easy field upgrades
- FC Class 3 support
- Local management and diagnostics
- Buffer credits: 8 @ 512 Bytes; 8 @ 2 Kilobytes

Advanced FC capabilities
- Supports SNIA HBA API
- On-demand automatic negotiation among 4-Gb, 2-Gb and 1-Gb Fibre Channel
- Supports target and initiator modes
- Supports Windows FDMI and WMI
- Supports exclusive ATTO Advanced Data Streaming (ADS) Technology

Host bus specifications
- x8 mechanical and x8 electrical PCI Express Interconnect
- Conforms to PCI Express Base Spec 1.0a

- Conforms to PCI Express CEM Spec 1.0a
- PCI Express to PCI/PCI-X Bridge spec 1.0

Environmental & physical specifications
- Conforms to PCI standard height, half length form-factor specifications
- Length: 6.525 inches
- Height: 3.81 inches
- Operating temperature: 0-45ºC (32-113ºF)
- Storage temperature: -40 to 70ºC (-40 to 158ºF)
- Relative humidity: 5 to 95% non-condensing
- 12V@ 2.1A (max.)
- 3.3V @ 3.0A (max.)
- 100 lf/m (minimum) airflow recommended
- RoHS compliant

External connectivity
- Easy-to-install full height connection plate
- External LEDs for on-line and speed status for each channel
- 4 pluggable optical LC SFP transceivers included

Software specifications
- Windows XP, 2000, Server 2003 and Vista
- Mac OS X (10.4.x, 10.5.x)
- Red Hat Linux (2.4 and 2.6 kernel)
- SUSE Linux (2.6 kernel)

Celerity FC-42ES Adapter

The Celerity FC-42ES is a dual-channel host adapter providing port density for Enterprise server and workstation applications. With 4-Gb FC speeds of up to 800 MB/sec. per channel, the FC-42ES supports the most demanding application requirements.

Additionally the FC-42ES takes advantage of the latest in host interconnect technology, PCI Express, a serial, high-speed connection that supports aggregate throughput up to 4 GB/sec. (x8 PCIe) full-duplex. The FC-42ES is software compatible with existing PCI and PCI-X products using the same device drivers as other Celerity FC family products, simplifying user installation and support. It is backward compatible with existing 2-Gb and 1-Gb Fibre Channel infrastructure, protecting existing technology.

Hardware specifications

- 2 independent Fibre Channel ports
- 4-Gigabit data transfer rates per channel
- 800 MB/sec. maximum full-duplex throughput per channel
- Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
- ANSI Fibre Channel: FC-PH, FC-AL, FC-AL2, FC-FCP, FC-PLDA, FC-FLA
- Flash ROM for easy field upgrades
- FC Class 3 support
- Local management and diagnostics
- Buffer credits: 8 @ 512 Bytes; 8 @ 2 Kilobytes

Advanced FC capabilities

- Supports SNIA HBA API
- On-demand automatic negotiation among 4-Gb, 2-Gb and 1-Gb Fibre Channel
- Supports target and initiator modes
- Supports Windows FDMI and WMI
- Supports exclusive ATTO Advanced Data Streaming (ADS) Technology

Host bus specifications

- x4 mechanical and x4 electrical PCI Express interconnect (RoHS compliant)
- Conforms to PCI Express Base Spec 1.0a
- Conforms to PCI Express CEM Spec 1.0a
- PCI Express to PCI/PCI-X Bridge spec 1.0

Environmental & physical specifications

- Operating temperature: 0-45ºC (32º-113ºF)
- Storage temperature: -40º to 70ºC (-40º to 158ºF)
- Relative humidity: 5 to 95% non-condensing
- 100 lf/m (minimum) airflow recommended
- Conforms to PCI half height, half length form-factor specifications
- 12V@ 04A (max.); 3.3V @ 1.5A (max.)
- Length: 5.6 inches
- Height: 2.712 inches
- RoHS compliant

External connectivity

- Easy-to-install full height connection plate
- External LEDs for on-line and speed status for each channel
- 2 pluggable optical LC SFP transceivers included

Software specifications

- Windows XP, 2000, Server 2003 and Vista
- Mac OS X (10.4.x, 10.5.x)
- Red Hat Linux (2.4 and 2.6 kernel)
- SUSE Linux (2.6 kernel)

2

Celerity FC-41ES Adapter

The Celerity FC-41ES is a single-channel host adapter providing support for the most demanding application requirements. With 4-Gb FC speeds of up to 800 MB/sec. per channel, the FC-41ES is a cost effective connectivity solution for environments requiring maximum throughput.

The FC-41ES also takes advantage of the latest in host interconnect technology: PCI Express, a serial, high-speed connection that supports aggregate throughput up to 2 GB/sec. (x4 PCIe) full-duplex. The FC-41ES is software compatible with existing PCI and PCI-X products using the same device drivers as other Celerity FC products, simplifying user installation and support. It is backward compatible with existing 2-Gb and 1-Gb Fibre Channel infrastructure, protecting existing technology investments.

Hardware specifications
* 1 Fibre Channel port
* 4-Gigabit FC data transfer rates
* 800 MB/sec. maximum full-duplex throughput
* Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
* ANSI Fibre Channel: FC-PH, FC-AL, FC-FCP, FC-AL2, FC-PLDA, FC-FLA
* Flash ROM for easy field upgrades
* FC Class 3 support
* Local management and diagnostics
* Buffer credits: 8 @ 512 Bytes; 8 @ 2 Kilobytes

Advanced FC capabilities
* Supports SNIA HBA API
* On-demand automatic negotiation among 4-Gb, 2-Gb and 1-Gb Fibre Channel
* Supports target and initiator modes
* Supports Windows FDMI and WMI
* Features exclusive Advanced Data Streaming (ADS) Technology

Host bus specifications
* x4 mechanical and x4 electrical PCI Express interconnect
* Supports PCI Express Base Spec 1.0a and CEM Spec 1.0a
* Supports PCI Express to PCI/PCI-X bridge spec 1.0

Environmental & physical specifications
* Conforms to PCIe low profile form factor specifications
* Length: 5.600 inches
* Height: 2.712 inches
* Operating temperature: 0-45ºC (32º-113ºF)
* Storage temperature: -40º to 70ºC (-40º to 158ºF)
* Relative humidity: 5 to 95% non-condensing
* 100 lf/m (minimum) airflow recommended
* Power: 12V@ 0.4A max; 3.3V@1.0A max.
* RoHS compliant

External connectivity
* Easy-to-install full height connection bracket
* External LEDs for on-line and speed status
* Pluggable optical LC SFP transceiver included

Software specifications
* Windows XP, 2000, Server 2003 and Vista
* Red Hat Linux (2.4 and 2.6 kernel)
* SUSE Linux (2.6 kernel)
* Mac OS X (10.4.x, 10.5.x)

Celerity FC-41EL Adapter

The Celerity FC-41EL is a single-channel host adapter. With 4-Gb FC speeds of up to 800 MB/sec., the FC-41EL supports the most demanding application requirements.

The FC-41EL takes advantage of the latest in host interconnect technology, PCI Express, a serial, high-speed connection that supports aggregate throughout up to 2 GB/sec.full-duplex. The FC-41EL is software compatible with existing PCI and PCI-X products using the same device drivers as other Celerity FC family products, simplifying user installation and support. It is backward compatible with existing 2-Gb and 1-Gb FC infrastructures, protecting existing technology investments.

Hardware specifications
- 1 Fibre Channel port
- 4-Gigabit data transfer rate
- 800 MB/sec. maximum full-duplex throughput
- Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
- ANSI Fibre Channel: FC-PH, FC-FCP, FC-AL, FC-AL2, FC-PLDA, FC-FLA
- Flash ROM for easy field upgrades
- FC Class 3 support
- Local management and diagnostics
- Buffer credits: 4

Advanced FC capabilities
- Supports SNIA HBA API
- On-demand automatic negotiation between 4-Gb, 2-Gb and 1-Gb Fibre Channel
- Supports initiator and target modes
- Supports Windows® FDMI and WMI
- Supports exclusive ATTO Advanced Data Streaming (ADS™) technology

Host bus specifications
- x4 mechanical and x4 electrical PCIExpress interconnect
- Conforms to PCI Express Base Spec 1.0a
- Conforms to PCI Express CEM Spec 1.0a

Environmental & physical specifications
- Conforms to PCIe low profile form factor specifications
- Operating temperature: 0 to 45º C (32-113º F)
- Storage temperature: -40 to 70ºC (-40 to 158º F)
- Relative humidity: 10 to 90% non-condensing
- 100 lf/m (minimum) airflow recommended
- Conforms to PCI Express low-profile form-factor specification
- 12V @ 0.5A (max)
- Length: 5.600 inches
- Height: 2.712 inches
- RoHS compliant

External connectivity
- Easy-to-install full and low-profile connection plates
- External LEDs for on-line and speed status
- A pluggable optical LC SFP transceiver included

Software specifications
- Windows XP, 2000, Server 2003 and Vista
- Mac OS X (10.4.x, 10.5.x)

4
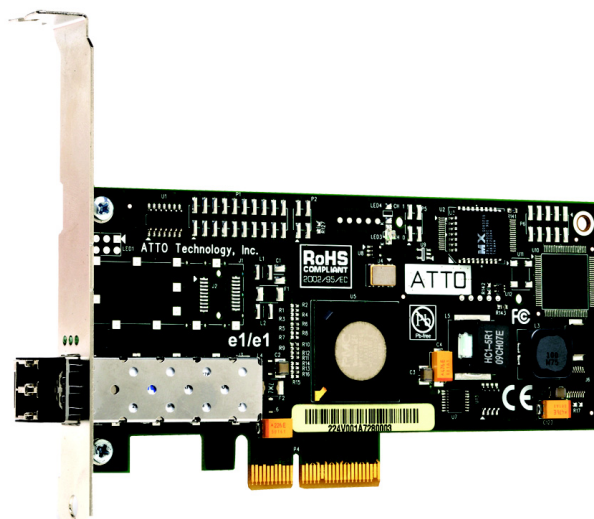
Celerity FC-42XS Adapter

The dual-channel Celerity FC-42XS host adapter provides the highest available throughput for Fibre Channel applications while protecting technology investments via backward compatibility with existing infrastructure.

With speeds of up to 800 MB/sec. per channel, the FC-42XS is capable of supporting the most intensive data applications.

To ensure a smooth transition path, the FC-42XS leverages the existing Celerity FC software hardware architecture, allowing ATTO to deliver industry-leading quality and stable software architecture.

Hardware specifications
- 2 independent Fibre Channel ports
- 4-Gigabit data transfer rates per channel
- 800 MB/sec. maximum full-duplex throughput per channel
- Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
- ANSI Fibre Channel: FC-PH, FC-FCP, FC-AL, FC-AL2, FC-PLDA, FC-FLA
- Flash ROM for easy field upgrades
- FC Class 3 support
- Local management and diagnostics
- Buffer credits: 8 @ 512 bytes; 8 @ 2 Kilobytes

Advanced FC capabilities
- Supports SNIA HBA API
- On-demand automatic negotiation among 4-Gb, 2-Gb and 1-Gb Fibre Channel
- Supports target and initiator modes
- Supports Windows FDMI and WMI
- Includes exclusive ATTO Advanced Data Streaming (ADS) Technology

PCI bus specifications
- 64-bit, 133 MHz PCI-X
- PCI-X 1.0a compliant
- PCI 2.2 compliant
- 3.3V PCI signaling only

Environmental & physical specifications
- Conforms to PCI low profile form factor standards
- Length: 6.600 inches
- Height: 2.536 inches
- Operating temperature: 0-45ºC (32º-113ºF)
- Storage temperature: -40º to 70ºC (-40º to 158ºF)
- Relative humidity: 5 to 95% non-condensing
- 3.3V@ 1.5A (max.)
- 100 lf/m (minimum) airflow recommended
- RoHS compliant

External connectivity
- Easy-to-install full height connection plate
- External LEDs for on-line and speed status for each channel
- 2 optical LC SFP transceivers included

Software specifications
- Windows XP, 2000, Server 2003 and Vista
- Red Hat Linux (2.4 and 2.6 kernel)
- SUSE Linux (2.6 kernel)
- Mac OS X (10.4x, 10.5x)

Celerity FC-41XS Adapter

The single-channel Celerity FC-41XS provides speeds of up to 800 MB/sec. using full 4-Gigabit Fibre Channel performance while being fully backward-compatible with existing 2-GB and 1-Gb Fibre Channel infrastructure, protecting existing technology investments. It is capable of supporting the most data-intense applications.

Hardware specifications
- 1 Fibre Channel port
- 4-Gigabit data transfer rates
- 800 MB/sec. maximum full-duplex throughput
- Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
- ANSI Fibre Channel: FC-PH, FC-FCP, FC-AL, FC-AL2, FC-PLDA, FC-FLA
- Flash ROM for easy field upgrades
- FC Class 3 support
- Local management and diagnostics
- Buffer credits: 8 @ 512 bytes; 8 @ 2 Kilobytes

Advanced FC capabilities
- Supports SNIA HBA API
- On-demand automatic negotiation among 4-Gb, 2-Gb and 1-Gb Fibre Channel
- Supports target and initiator modes
- Supports Windows FDMI and WMI
- Includes exclusive ATTO Advanced Data Streaming (ADS) Technology

PCI bus specifications
- 64-bit, 133 MHz PCI-X
- PCI-X 1.0a compliant
- PCI 2.2 compliant
- 3.3V PCI signaling only

Environmental & physical specifications
- Conforms to PCI low profile form factor standards
- Length: 6.600 inches
- Height: 2.536 inches
- Operating temperature: 0-45ºC (32º-113ºF)
- Storage temperature: -40º to 70ºC (-40º to 158ºF)
- Relative humidity: 5 to 95% non-condensing
- 3.3V@ 1.5A (max.)
- 100 lf/m (minimum) airflow recommended
- RoHS compliant

External connectivity
- Easy-to-install full height connection plate
- External LEDs for on-line and speed status
- Optical LC SFP transceiver included

Software specifications
- Windows XP, 2000, Server 2003 and Vista
- Red Hat Linux (2.4 and 2.6 kernel)
- SUSE Linux (2.6 kernel)
- Mac OS X (10.4.x, 10.5.x)

6

Celerity FC-21PS Adapter

The Celerity FC-21PS Fibre Channel host adapter provides a single 2-Gb Fibre Channel connection from host devices to the Storage Area Network (SAN) fabric.

The FC-21PS supports the leading operating systems, providing a single solution for all connectivity needs. As with all Celerity FC products, the FC-21PS is designed for high-quality data transmission, ensuring that critical information is delivered correctly the first time to reduce fabric traffic and improve overall fabric efficiency.

Hardware specifications

- 1 Fibre Channel port
- 400 MB/sec. throughput full-duplex
- Supports all FC topologies: direct fabric, arbitrated loop and point-to-point
- Flash ROM for easy field upgrades
- Simultaneous multi-protocol support
- ANSI Fibre Channel: FC-PH, FC-FCP, FC-AL, FC-AL2, FC-PLDA, FC-FLA, IETF-IPFC

Advanced FC capabilities

- Supports SNIA HBA API
- On-demand, automatic negotiation between 2-Gb and 1-Gb Fibre Channel
- Supports target and initiator modes
- Supports Windows FDMI and WMI
- Includes exclusive ATTO Advanced Data Streaming (ADS) Technology

PCI bus specifications

- 64-bit/32-bit, 66/33 MHz PCI compatible
- PCI 2.3 compliant
- 3.3V and 5V PCI signaling with universal connector

Environmental & physical specifications

- Conforms to PCI low profile form factor standards
- Length: 6.600 inches
- Height: 2.536 inches
- Operating temperature: 0-45ºC (32º-113ºF)
- Storage temperature: -40º to 70ºC (-40º to 158ºF)
- Relative humidity: 5 to 95% non-condensing
- 5V@ 1.5A (max.)
- 100 lf/m (minimum) airflow recommended

External connectivity

- Easy-to-install full height connection plate
- Integrated optical LC SFF fixed transceiver
- External LEDs for on-line and speed status

Software specifications

- Windows XP, 2000, Server 2003 and Vista
- Red Hat Linux (2.4 and 2.6 kernel)
- SUSE Linux (2.6 kernel)
- Mac OS X (10.4.x, 10.5.x)
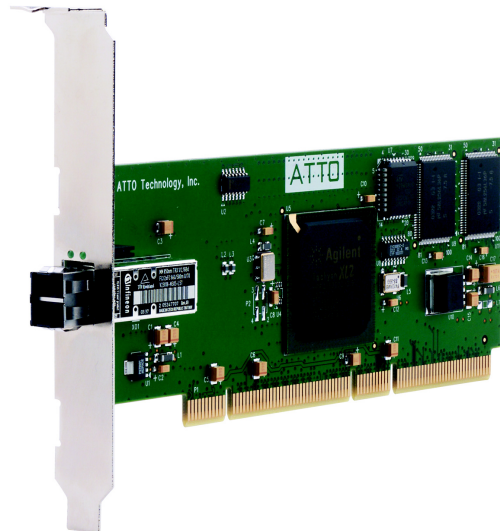
Celerity selection guide

Product Features	Celerity FC-44ES	Celerity FC-42ES	Celerity FC-41ES FC-41EL	Celerity FC-42XS	Celerity FC-41XS	Celerity FC-21PS
Fibre Channel Ports	4	2	1	2	1	1
FC protocol	4-Gb	4-Gb	4-Gb	4-Gb	4-Gb	2-Gb
Maximum Transfer Rate (half duplex)	1.6 GB/sec	800 MB/sec	400 MB/sec	800 MB/sec	400 MB/sec	200 MB/sec
Maximum Transfer Rate (full-duplex)	2 GB/sec	1 GB/sec (ES) 1.6 GB/sec (EN)	800 MB/sec	1 GB/sec[1]	800 MB/sec	400 MB/sec
Bus Type	PCIe	PCIe	PCIe	PCI-X	PCI-X	PCI-X
Bus Characteristics	8 lane	4 lane	4 lane[4]	64-bit 133 MHz[2]	64-bit 133 MHz[2]	64-bit 133 MHz[2]
Optical Interface	SFP LC	SFP LC	SFP LC	SFP LC	SFP LC	SFF LC
Maximum Cable Length	300m@2-Gb 150m@4-Gb	300m@2-Gb 150m@4-Gb	300m@2-Gb 150m@4-Gb	300m@2-Gb 150m@4-Gb	300m@2-Gb 150m@4-Gb	500m@1-Gb 300m@2-Gb
Low Profile form factor		•	•	•	•	•
ATTO Advanced Data Streaming (ADS) Technology	•	•	•	•	•	•
Software RAID support[3]	•	•	•	•	•	•
Developer's Kit (Target Mode & API)	•	•	ES only	•	•	•
Windows XP, 2000, Server 2003 and Vista support	•	•	•	•	•	•
Linux (Red Hat, SUSE) driver	•	•	ES only	•	•	•
Macintosh OS X driver	•	•	•	•	•	•
Novell Netware support	•	•	ES only	•	•	
Solaris support	•	•	ES only	•	•	
Free BSD	•	•	ES only	•	•	
RoHS compliant	•	•	•	•	•	

1 Performance ceiling is constrained by 133 MHz PCI-X bus transfer speed
2 Backward compatible to 32-bit and 33 MHz PCI; FC-21PS is 3.3V/5V Universal
3 ATTO ExpressStripe for OS X available; Express Power Center and other software RAID supported for Windows
4 FC-41EL 32-bit support only

2   Fibre Channel is a key technology for storage

Fibre Channel is a serial communications technology designed to transfer large amounts of data among 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.

Glossary

*Some terms used in the Fibre Channel industry are defined below. More information is available through the ATTO Technology website (*www.attotech.com*), the Fibre Channel Industry Association (*www.fibrechannel.com*), Cern (*www.cern.ch*), the Storage Area Networking Industry Association (*www.snia.org*), and the Fibre Channel Consortium (*www.iol.unh.edu/consortiums, *click on FC).*

Term	Definition
ANSI	American National Standards Institute
arbitrate	process of selecting one L_Port from a collection of ports which ask for use of the arbitrated loop at the same time
arbitrated loop	a loop topology (FC-AL) in which two or more ports are interconnected, but only two ports can communicate at one time; low-cost solution which may or may not use hubs and switches
auto negotiation	hardware senses and automatically responds depending on configuration
BER	Bit Error Rate: a measure of transmission accuracy; the ratio of bits received in error to bits sent
bit	smallest unit of data a computer can process: a single binary digit with a value of either 0 or 1
bus	a collection of unbroken signal lines used to transmit information from one part of a computer system to another; taps on the lines connect devices to the bus
byte	an ordered set of 8 bits
channel	a point-to-point link which transports data from one point to another
CPU	Central Processing Unit: the portion of the computer that actually performs computations
CRC	Cyclic Redundancy Check: an error-correcting code which calculates a numeric value for received and transmitted data; if no error has occurred during transmission, the CRC for both received and transmitted data should be the same
destination address	a value in the frame header of each frame which identifies the port in the node where the frame is being sent
device driver	a program that allows a microprocessor to direct the operation of a peripheral device
DMA	Direct Memory Access: a way to move data from a storage device directly to RAM without using the CPU's resources
DMA bus master	allows a peripheral to control the flow of data to and from system memory by block as opposed to allowing the processor to control the data by bytes (PIO or programmed I/O)

Term	Definition
fabric	a Fibre Channel switch of two or more Fibre Channel switches interconnected to physically transmit data between any two N_Ports on the switch or switches
FC	Fibre Channel
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
frame	an indivisible unit for transfer of information in Fibre Channel
frame header	the first field in the frame containing the address and other control information about the frame
full-duplex	a communication protocol which allows transmission in both directions at the same time
half duplex	a communication protocol which allows transmission in both directions, but only one direction at a time
host	a processor, usually a CPU and memory, which communicates with devices over an interface
initiator device	a component which originates a command
L_port	a port in an arbitrated loop, either a NL_port or a FL_port
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: an identifier for a logical unit (0-7)
multi-mode fiber	an optical fiber which can carry several beams of light at once
N_port	a port attached to a node used with point to point or fabric configurations
NL_ port	a port attached to a node in Fibre Channel arbitrated loop or fabric loop configuration
originator	an initiating device; a component which originates a command
parity checking	a method which verifies the accuracy of data transmitted over the SCSI bus by adding one bit in the transfer to make the sum of all the bits either odd or even (for odd or even parity); an error message occurs if the sum is not correct
PCI	Peripheral Component Interconnect. Allows peripherals to be connected directly to computer memory, bypassing the slower ISA and EISA busses
point-to-point	a topology where two ports communicate
port	an access point in a device: see N_port, NL_port, etc.
port address	also port number; the address, assigned by the PCI bus, through which commands are sent to a host adapter board
port number	see port address
receiver	the ultimate destination of data transmission; a terminal device
scatter/gather	a device driver feature which allows the host adapter to modify a transfer data pointer so that a single host adapter can access many segments of memory, minimizing interrupts and transfer overhead
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.
single-mode fiber	an optical fiber with a small core which supports one wavelength (ray of light); the core radius is nearly equal to the wavelength of the source
topology	logical layout of the parts of a computer system or network and their interconnections
transceiver	a transmitter/receiver module
transfer rate	the rate at which bytes or bits are transferred, as in megabytes or gigabits per second

3   Installing and updating drivers

Before installing your Celerity adapter, you must configure your system to recognize and use it by installing drivers for your operating system.

Configure your system to recognize and use your Celerity adapter by

• installing drivers for your operating system
• updating the adapter firmware if necessary (refer to Updating hardware flash on page 22)

> ✓ **Note**
>
> *If you already have one or more Celerity adapters installed and you are installing additional adapter(s), you do not need to perform any of these procedures unless you are updating a previously installed driver.*

ATTO Celerity adapters ship with the latest firmware installed.

The Celerity FC Installation CD shipped with your adapter contains the latest driver.

The Installation CD automatically starts when inserted in the system CD-ROM drive. Navigate the easy-to-use HTML-based menu to find the driver that you want to install.

If the CD does not automatically start, open the CD and click on **autorun.bat**.

Specialized configurations

Some specialized applications may benefit from modification of adapter settings. The ATTO Utilities Installation and Operation Manual provides detailed information on using ATTO Technology configuration utilities found on the ATTO Utilities CD or downloaded from the ATTO website. For best performance, use the most recent device driver and flash version.

Verify the version based on your operating system.

Windows: Use the ATTO Configuration Tool from the ATTO Utilities CD, or download it from **www.attotech.com**, or view the adapter boot string during system boot or look in the **Device Manager**.

> **Note**
>
> *Windows NT is only supported with Celerity driver version 1.31 or earlier. If you are using Windows NT, contact your service representative.*

Mac OS X: Use the ATTO Configuration Tool on the ATTO Utilities CD, or download it from **www.attotech.com,** or use the Apple System Profiler.

Linux: Use the ATTO Configuration Tool on the ATTO Utilities CD, or download it from **www.attotech.com**, or to find the driver version, examine **/proc/scsi/celerityfc/X**, where **X** is the adapter's host number.

Windows 2000/XP/Server 2003/Vista

Five procedures are described below. Review each thoroughly to ensure that you are using the one that best fits your needs. If you have one or more Celerity FC adapters installed in your system and you are installing additional adapter(s), you do not need to perform any of

these procedures unless you are updating a previously installed driver.

The Celerity FC Installation Disk can be the Installation CD shipped with your adapter, a folder containing the latest downloaded and expanded driver, or a Celerity FC installation floppy disk.

11 ATTO Technology Inc. Celerity FC Host Adapters Installation and Operation Manual

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Upgrading an existing Celerity FC driver

1 Log on to Windows as the System Administrator.

2 Insert your Celerity FC Installation Disk and run **autorun.bat**

3 In **Windows Drivers**, select your operating system version.

4 Click on **Install Driver**.

Adding a Celerity FC adapter to an existing installation

![Note icon] Note

Complete this installation procedure before attaching any devices to the adapter.

1 Complete the steps in Updating hardware flash on page 22 to pre-install the driver.

2 Close Windows and turn off power to your PC when **Setup** prompts you to do so.

3 Install your new Celerity FC adapter into an available PCI expansion slot.
   a. If the Celerity FC adapter is replacing another adapter in the system, disconnect the FC cables from the adapter and remove the adapter from the system, or move the Celerity FC adapter to the PCI slot that the previous adapter occupied.
   b. Attach the appropriate FC cables to the Celerity FC adapter.

4 Close the computer chassis

5 Turn on the power and restart Windows.

6 During the boot process, Windows detects your Celerity FC adapter and the **Found New Hardware Wizard** is displayed.

   Follow the directions in the **Found New Hardware Wizard**, selecting the default settings for each adapter channel.

7 Insert the Celerity FC Installation disk when asked to do so.

8 When adapter installation is complete, the **Found New Hardware Wizard** displays an **ATTO Phantom Device** for each channel. Use the wizard default settings to complete the installation.

Creating a boot disk

![Note icon] Note

The procedure described below does not apply to Windows Server 2003 for Itanium systems because the Celerity FC driver does not support boot functionality on Itanium systems.

1 Start Windows text mode setup as found in the instructions provided with Windows.

2 Press **F6** when **Windows Setup**, displays. The setup program displays a prompt in the status window on the bottom left of the monitor. **Setup** continues to load files after you press **F6**.

3 A new window displays instructions to specify additional mass storage devices. Press **S** to install the ATTO Celerity as a storage device.

4 Insert the Celerity FC installation diskette in drive **A** and press **Enter**.

5 A screen displays a list of Celerity FC adapters. Select your adapter and press **Enter.**

6 Windows **Setup** loads the files from the floppy and then displays the screen described in Step 2. The ATTO Celerity FC device should now be listed as detected.

7 Repeat steps 2 to 6 for any other vendor-supplied driver installation disks.

8 After all other drivers have been processed, press **Enter** and proceed with the rest of the Windows installation procedure.

![Note icon] Note

When Windows begins copying files to your hard disk, a display prompts you to insert the Celerity FC installation disk and any other vendor-supplied disks you used during custom installation. This is normal. The first time you inserted the disks, Windows loads the drivers into memory; the second time you insert the disk(s), Windows copies the driver to your hard disk.

Creating a Celerity FC installation floppy

Note

You must have a floppy disk with the Celerity FC driver software to install a fresh copy of the Windows OS onto a disk attached to a Celerity FC adapter.

1   Insert the Installation CD into a CD-ROM. The installation starts automatically.

    If the Celerity FC installation does not start, navigate to the root of the CD and run **autorun.bat**

2   Select **Windows Drivers** from the items on the left side of the screen.

3   Select the appropriate CPU-based operating system from operating system choices.

4   Select **Create Miniport Driver Diskette** or **Create StorPort Driver Diskette** for the desired operating system.

5   Follow the instructions for creating the floppy disk.

Creating a floppy disk from a download

1   Download the latest driver software from the ATTO website, **www.attotech.com**.

2   The download is a self-extracting executable that expands the driver software package. Run the self-extracting executable and select a folder to place the expanded software package.

3   Navigate to the folder with the desired Celerity FC driver.

Note

The expanded software package contains a Miniport driver and may contain a StorPort driver. The Celerity FC Windows Miniport driver is in the base directory of the expanded software package. The Celerity FC Windows StorPort driver is in the StorPort subdirectory.

4   Run **makedisk.bat** and follow the instructions for creating the floppy disk.

Mac OS X driver installation, update

1   Extract the latest version of the device driver file to your desktop.

2   Double click the installer icon and follow the on screen prompts.

3   Reboot your system for the changes to take effect.

Linux driver installation, update

Note

You must have kernel header files for the appropriate kernel installed.

You must be logged in as **root**.

1   At the command prompt type **rmmod celerityfc**

2   Download the appropriate version of the device driver from the ATTO website.

3   At the command prompt, extract the file using the command **tar -xfz <filename.tgz>**

4   Enter the directory created in the above step and type **make install** to overwrite any previously-installed driver.

5   Start the driver by typing **modprobe celerityfc**

4   Hardware installation

You need a basic understanding of Fibre Channel before installing the Celerity FC host adapter. Please refer to [Fibre Channel is a key technology for storage](#) on page 9 for a list of related websites.

⚠ **CAUTION**

Back up your system data before changing or installing any hardware.

System requirements

The Celerity FC host adapter package contains the host adapter, the ATTO Utilities CD and a warranty and registration card. If any of these items are missing, contact your ATTO authorized sales representative.

To install and use the Celerity Fibre Channel host adapter you need

- A computer with an available PCI, PCI-X or PCI Express expansion slot
- The complete Celerity FC host adapter package

Fibre Channel address

Celerity FC adapters are configured with a unique address designated by the Institute of Electrical and Electronic Engineers. The WorldWide Port Name (WWN) and Node Name are the two components of the address assigned to Fibre Channel products. This address, stored in flash memory, allows the system to recognize the Celerity host adapter as a unique part of your configuration. The address is clearly marked on the back of the board for easy identification. Please keep a reference copy of the number in a safe place or write in the space provided on this page.

Celerity FC host adapter WWNs are assigned for each channel. The WWN listed on your host adapter is assigned to the first channel (0). Sequential WWNs apply for additional channels.

WWN 0   all adapters
WWN 1: 44ES, 42ES, 42XS
WWN 2   44ES
WWN 3   44ES

Installation

⚠ **CAUTION**

Celerity FC host adapters contain components that are sensitive to electrostatic discharge (ESD). ESD can cause damage to the Celerity FC host adapter. Please follow standard methods to avoid ESD.

1   Install the latest drivers. Refer to [Installing and updating drivers](#) on page 11.

2   Power down the computer and unplug the computer from all power sources.

3   Open the case.

4   Install the Celerity FC host adapter in any open PCI, PCI-X or PCI Express expansion slot. If you have questions about how to install an expansion card in your system, consult your computer's documentation.

Drawings of Celerity brackets begin on page 16 and drawings of boards begin on page 18.

📝 Note

The Celerity FC-41XS, and FC-42XS host adapters only fit in 3.3V slots.

The Celerity FC-42ES, FC-41ES and FC-41EL fit into x4, x8, or x16 mechanical PCI Express slots.

If you have trouble seating your adapter in a 32-bit PCI bus computer, check to make sure the connector can accommodate 64-bit host adapters.

5   Connect Fibre Channel devices by inserting a Fibre Channel cable from the devices to the connectors on the Celerity FC host adapter until you hear a click.

6   Close the case on the computer and power it up.
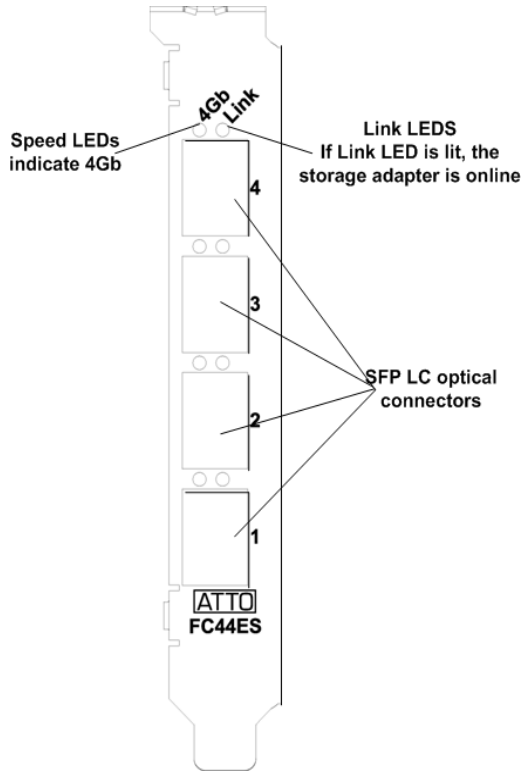
Bracket details

Exhibit 4-1   FC-44ES Adapter

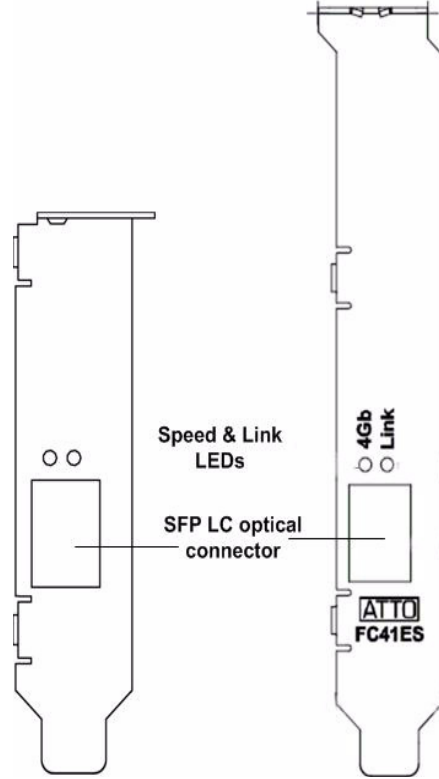*Exhibit 4-3   FC-41ES low profile, full height adapters*

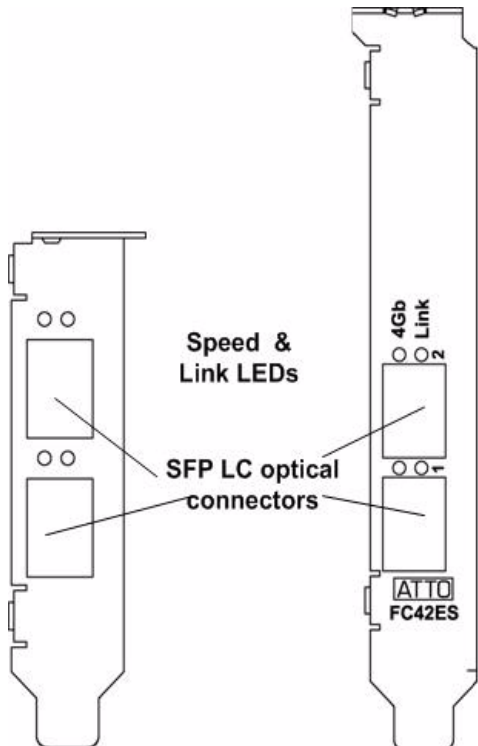*Exhibit 4-2   FC-42ES low profile, full height adapters*

Exhibit 4-4   FC-41EL low profile, full height adapters

16
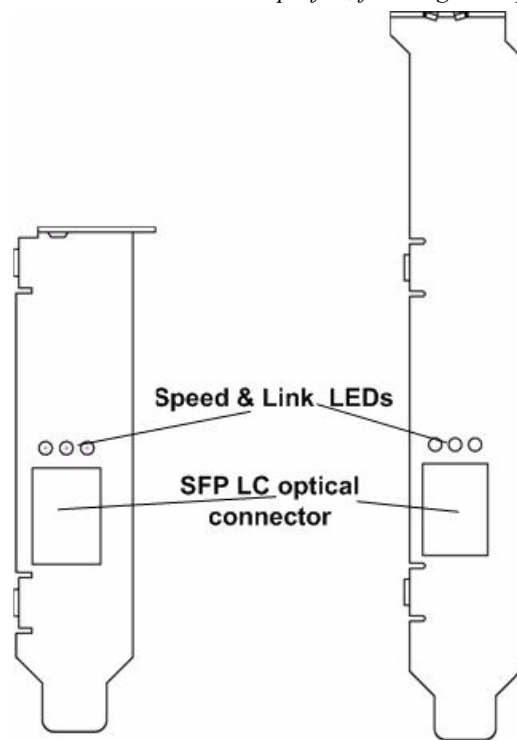
Exhibit 4-5   FC-42XS low profile, full height adapters   *Exhibit 4-7   FC-21PS Adapter*
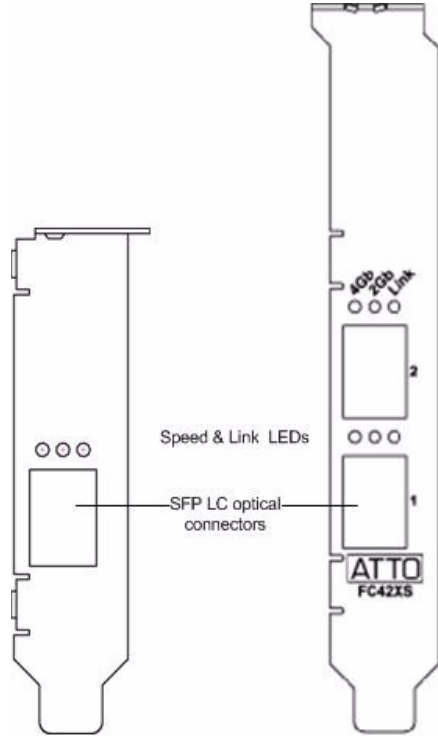
Speed & Link LEDs

SFP LC optical
connectors

4Gb
2Gb
Link

2

1

ATTO
FC42XS

2Gb
Link

If LED lit, indicates the
channel is using 2-Gb FC

If LED lit, the storage
adapter is online

SFF duplex LC
optical connector

ATTO
FC21PS
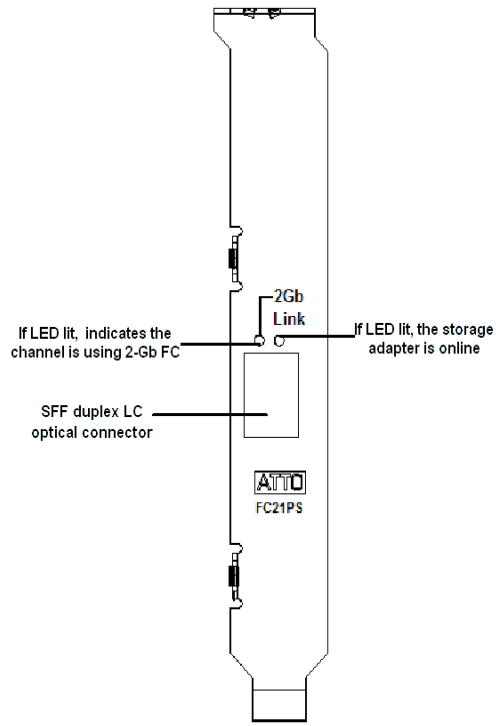
Exhibit 4-6   FC-41XS low profile, full height adapters

Speed &
Link LEDs

SFP LC
optical
connectors

4Gb
2Gb
Link

1

ATTO
FC41XS

17 ATTO Technology Inc. Celerity FC Host Adapters Installation and Operation Manual
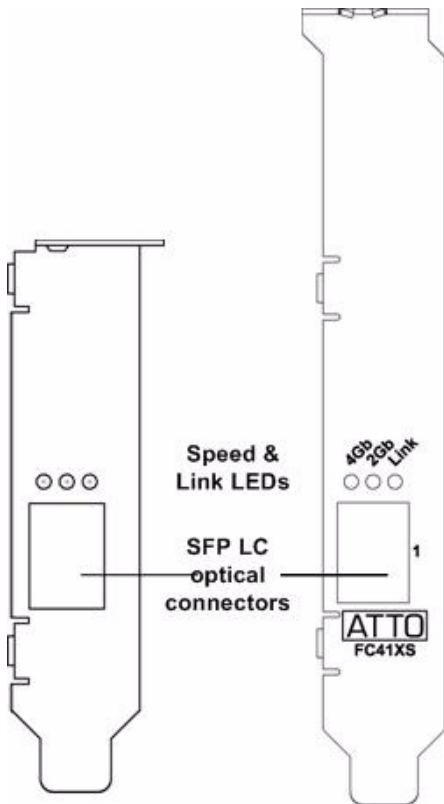
Adapter board details

Exhibit 4-8   FC-44ES
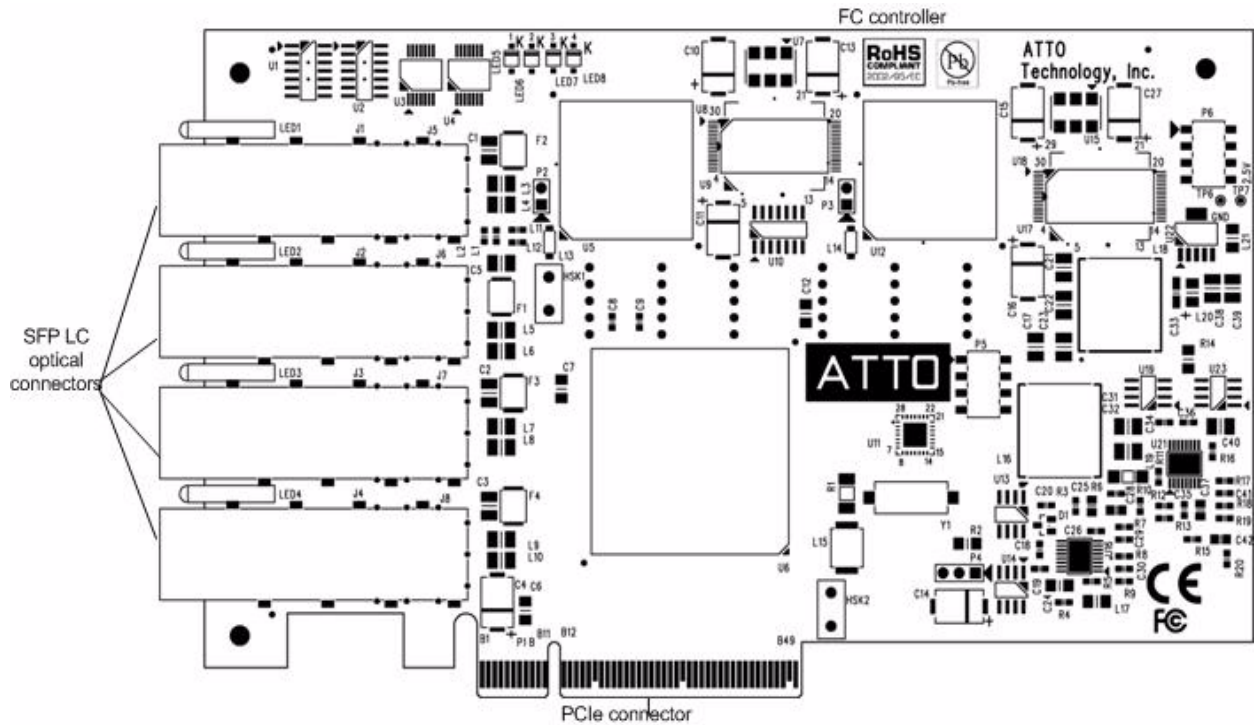
Exhibit 4-9   FC-42ES

Exhibit 4-10   FC-41ES

FC controller

SFP LC optical
connector

PCIe connector

Exhibit 4-11   FC-41EL

SFP LC
optical
connector

PCIe connector

19 ATTO Technology Inc. Celerity FC Host Adapters Installation and Operation Manual

Exhibit 4-12   FC-42XS

FC controller

SFP LC optical connectors

PCI-X connector

Exhibit 4-13   FC-41XS

FC controller

SFP LC optical connector

PCI-X connector

20

Exhibit 4-14   FC-21PS

SFF duplex LC optical connector   **FC controller**

PCI connector

21 ATTO Technology Inc. Celerity FC Host Adapters Installation and Operation Manual

5   Updating hardware flash

Your Celerity FC host adapter was flashed before shipment, but the flash memory may need to be updated as new versions become available or if the factory-installed version becomes corrupt. Visit the ATTO website, www.attotech.com, to download the latest drivers and flash bundle.

Hardware flash memory may need to be updated as new versions become available or if the factory-installed version becomes corrupt.
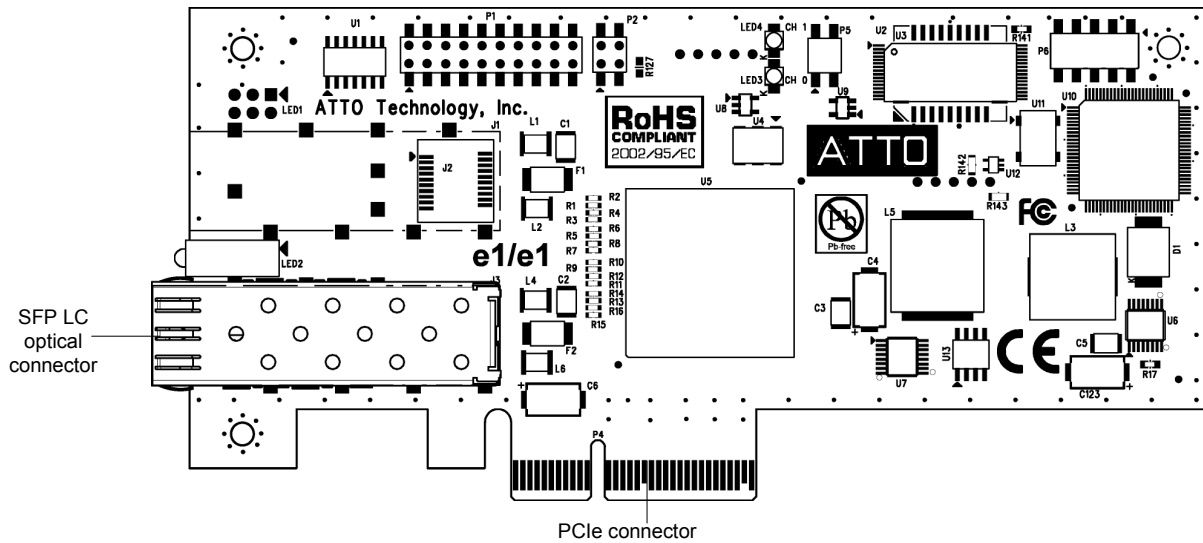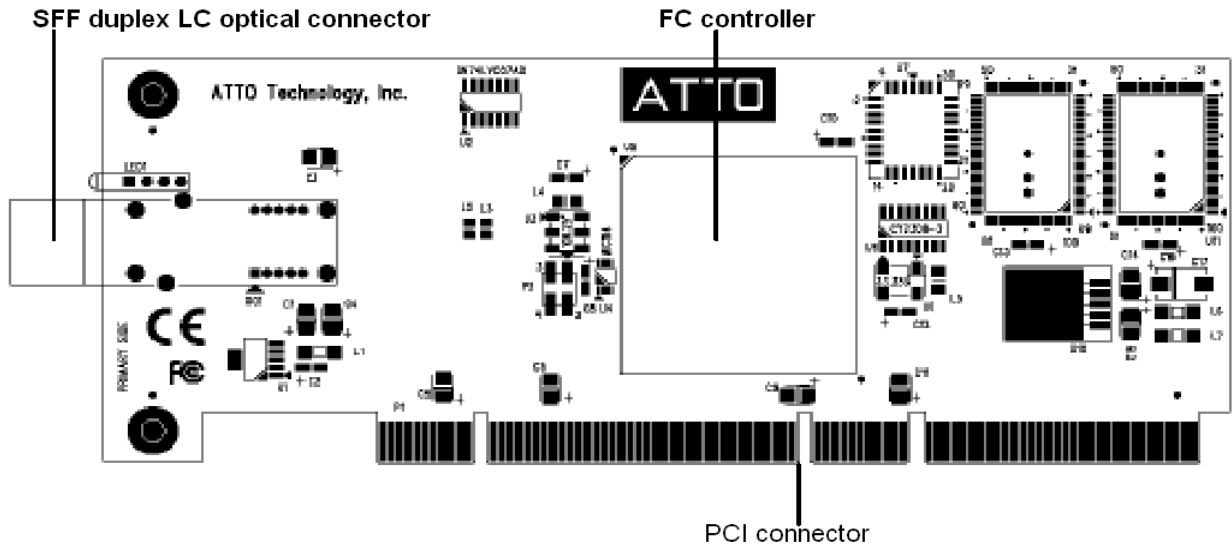
Updating flash in all operating systems

1   Download the most recent version of the **Configuration Tool** from the ATTO website.

   Refer to the ATTO Utilities Installation and Operation Manual for additional information on downloading and using the Configuration Tool.

2   Download the proper flash bundle (adapter specific) from the ATTO website.

3   Extract these files to your desktop.

4   Install the **Configuration Tool** on your system.

5   Launch the **Configuration Tool**.

6   In the **Device** window, select the adapter that needs to be updated.

7   In the **Flash** window, click on the **Browse** button to find the flash bundle that you previously downloaded to your desktop.

8   Click **Update** to update your flash ROM.

9   Reboot your system for the changes to take effect.

Updating flash on a PC

You may update hardware flash on a PC using BIOS utilities.

   Note

   BIOS utilities do not work on Itanium systems. Use the ATTO Configuration Tool to update flash on Itanium systems.

1   Download the latest driver software from the ATTO Technology website.

2   The download is a self-extracting executable that expands the driver software package. Run the self-extracting executable and select a folder in which to place the expanded software package.

   The expanded software package contains a Miniport driver and may contain a StorPort driver. The Celerity FC Windows Miniport driver is in the base directory of the expanded software package. The Celerity FC Windows StorPort driver is in the **StorPort** subdirectory.

3   Navigate to the folder with the desired Celerity FC driver.

4   Run **makedisk.bat** and follow the instructions for creating the floppy disk.

   Note

   The flash update must be loaded from a floppy because CD-ROM drivers are not loaded at this point in the system boot process.

5   Reboot the PC.

6   During the reboot, an ATTO Technology banner displays that the host adapter was detected.

7   Enter **Control-F** when prompted to begin the set-up utility within a few seconds after the banner appears.

   If you do not enter Control-F soon enough after the banner appears, repeat steps 5 and 6.

8   In the utility, select the **Upgrade Flash ROM** option.

9   Insert the disk into the drive slot.

10   Follow the on-screen instructions.

11   Remove the disk and reboot your system for the flash ROM changes to take effect

22

6 Troubleshooting

This chapter contains solutions for the most common problems you might encounter. If you need additional assistance, please refer to the ATTO Technology website, www.attotech.com, or contact an authorized ATTO Technology representative.

General suggestions

- Check each cable connection on every device.
- Verify all cables are in proper working condition. Loose or broken cables are often the cause of errors or problems.

- Check that Fibre Channel devices are plugged into an AC outlet and are turned on before you add power to your computer.

Mac OS X

> **Note**
>
> *The Celerity FC supports Mac OS X versions 10.3 and later.*

1   Open the ATTO **Configuration Tool** from the ATTO Utilities CD or download from the ATTO website. Refer to the ATTO Utilities Installation and Operation Manual for additional information.

2   If the adapter does not appear in the **Device Listing**, make sure it is properly seated in the PCI slot.
   a. Remove power from the PC.
   b. Remove the case.
   c. Check the PCI slot.
   d. Replace the case.
   e. Apply power.

> **Note**
>
> *If the Celerity adapter is properly seated and devices are still not accessible, contact an authorized ATTO representative.*

3   Verify the driver is loaded.
   a. Click on the adapter name in the **Device Listing** to view the **Basic Info** screen.
   b. If the **Driver Information** section indicates **Unknown: driver not loaded,** reinstall the driver. Refer to Installing and updating drivers on page 11.
   c. If reinstalling the driver does not fix the problem, contact an authorized ATTO representative.

4   Reset the NVRAM for all channels to defaults and reboot. If the problem persists, contact an authorized ATTO representative.

> **Note**
>
> *When calling ATTO Technical Support, please have a printout of the IOreg listing and output from the Apple System Profiler available.*

Windows 2000/XP/Server 2003/Vista

- If the card has been recently re-flashed, the new Windows driver must be installed. Follow the procedure in Installing and updating drivers on page 11.
- All of the external devices connected to the host adapter should be identified. If they do not appear in the **Device Manager**, the external devices or connection may not be working properly.
- For Intel-based PCs, check the computer CMOS setup and verify that the PCI slots are configured correctly.

- Procedures vary greatly: refer to the manual supplied with your system or call the computer supplier for configuration assistance.
- Windows 2000/XP/Server 2003/Vista are Plug-n-Play operating systems: be sure your computer's BIOS is set accordingly.
- If these do not solve the problem, re-flash the host adapter and re-install the Windows 2000/XP/Server 2003/Vista driver. See Installing and updating drivers on page 11.

If the devices connected to the Celerity FC host adapter are not accessible

1   Right-click **My Computer**.
2   Select **Properties**.
3   Select the **Hardware** tab.
4   Select **Device Manager**.

•   If the Celerity FC host adapter does not appear under the SCSI and RAID controllers, remove power from the PC, open the case, and check that the Celerity FC adapter is properly seated in the PCI slot. Replace the case and apply power.

•   If the adapter has been identified but there is an exclamation point (!) on the listing, right click on the listing and select **Uninstall**.

5   Reload the driver (see Installing and updating drivers on page 11).

6   Reboot the system and repeat the installation process.

7   If problems persist, contact your authorized ATTO Technology representative.

Linux

1   Verify the **celerityfc driver** is loaded with the **lsmod** command. If **lsmod** does not show the driver, refer to the installation instructions to install and load the driver in Installing and updating drivers on page 11.

2   Check the system log with the command **dmesg**. The celerityfc driver creates status messages during initialization. Make sure that all installed cards are properly detected and initialized.

3   Examine the contents of the file(s) **/proc/scsi/celerityfc/X**, where X is the adapter's host number. This file contains details such as link status, connection speed and discovered devices.

Note
*Advanced users only. Modify the **driver makefile** to enable debugging information. Upon loading, the **celerityfc driver** displays detailed debugging information which may help troubleshoot the problem.*

Appendix A   Standards and compliances

The equipment described in this manual generates and uses radio frequency energy. The Technical Specification sheet for a particular Celerity FC host adapter lists certifications for that model.

FCC standards: radio and television interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna
• Increase the separation between the equipment and receiver
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
• Consult the dealer or an experienced radio/TV technician for help

Canadian standards

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

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

European standards

Declaration of Conformity

This following statement applies to the Celerity FC host adapter.

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: EN55024:2002; EN55022:2002 CLASS B

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.

Some ATTO Celerity cards comply with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS). Contact your ATTO representative regarding RoHS compliant products.

The following apply to the Celerity FC-42XS host adapter only:

MIC

ATO-CTFC-42XS

N14322

Appendix B   Accessories

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

Optical Cables
    CBL-FCFI-05x5 m. cable– Duplex 50 Micron Multi-mode FC/Optical
    CBL-LCSC-0033 m. 50/125 optical cable (LC to SC)
    CBL-LCSC-01010 m. 50/125 optical cable (LC to SC)

A variety of iSCSI, Fibre Channel, SAS and SCSI products are also available from ATTO Technology. Please contact your ATTO sales representative for product descriptions and part number information.

Fibre Channel and iSCSI solutions
    ATTO FibreBridge^{TM}Fibre Channel-to-SCSI bridge
    ATTO iPBridge   iSCSI to SCSI, iSCSI to Fibre Channel bridges

SCSI solutions
    ATTO ExpressPCI Family of SCSI Host Adapters (see Appendix C)

SAS/SATA Solutions
    ATTO ExpressSAS family of SAS Adapters (see Appendix D)

Software
    ATTO Utilities   Configuration and management software
    ATTO ExpressStripe Mac OS X RAID and benchmark software
    ATTO Express Power CenterWindows-based striping utility

Appendix C   SCSI adapter selection guide

Product Features	Ultra 320 SCSI			
	UL5D	UL5D LP	UL4D	UL4S
Max. transfer rate (MB/sec.)	640	640	640	320
Low Voltage Differential	•	•	•	•
Single-ended SCSI	•	•	•	•
Number of SCSI Channels	2/2	0/2	2/2	1/1
Number of SCSI IDs supported	30	30	30	30
Low profile		•		
Large file transfers	•	•	•	•
Cable distances (m)	12.5	12.5	12.5	12.5
32-bit PCI compatible			•	•
64-bit PCI compatible			•	•
33 MHZ PCI			•	•
133 MHZ PCI-X			•	•
66 MHz PCI			•	•
x4 PCI Express	•	•		
Windows 2000/XP, Server 2003/Vista support	•	•	•	•
Linux support	•	•	•	•
Mac OS X support	•	•	•	•
Novell Netware support	•	•	•	•
RoHS compliant	•	•	•	•

Appendix D   SAS adapter selection guide

Product Features	ATTO ExpressSAS RAID Adapters	
	R348	**R380**
Max.transfer rate[1] (full duplex)	4 GB/sec.	4 GB/sec.
x8 PCI Express	●	●
Number of ports	8	8
Port configuration external/internal	4/8 user selectable 4/4 or 0/8	8/0
Connector type	1 mini SAS (x4) SFF-8088 external 2 mini SAS (x4) SFF-8087 internal	2 mini SAS (x4) SFF-8088 external
Number of devices supported	64 SAS/SATA targets 128 virtual devices	64 SAS/SATA targets 128 virtual devices
1.5 Gb SATA support	●	●
3 Gb SATA II support	●	●
3 Gb SAS support	●	●
Cable distances	up to 8m	up to 8m
Integrated RAID	0, 1, 4, 5, 6^2, 10, 50, 60^2, JBOD, DVRAID	0, 1, 4, 5, 6^2, 10, 50, 60^2, JBOD, DVRAID
RAID Management Utility	●	●
Global Hot Spares	●	●
Event notification	E-mail, pop-up, log file	E-mail, pop-up, log file
Memory (ECC)	258 MB standard 512 upgradeable (OEM)	258 MB standard 512 upgradeable (OEM)
Advanced Data Streaming™	●	●
Battery backup	optional	optional
32-bit support	●	●
64-bit support	●	●
Windows 2000/CP, Server 2003/Vista support	●	●
Linux (Red Hat, SUSE) support	●	●
Mac OS X support	●	●
RoHS compliant	●	●
Low profile	●	●

[1] Performance ceiling constrained by PCIe bus transfer speed
[2] Future support

Appendix E   Safety, warranty, contacts

All ATTO host adapter products have been tested to meet applicable safety standards when operated in proper electrical and thermal environments.

Safety

Please review the specifications for your specific host adapter before installing and operating it in any computer system to ensure compatibility.

Installation

Before installing an ATTO host adapter product into your computer system, unplug the computer from its electrical power source and allow adequate time for electrical discharge and the internal components to cool down before removing the computer system cover. This will decrease the risk of personal injury from electrical shock or touching the hot surface of an electrical component.

Once an ATTO host adapter is installed in a computer system, the computer cover must be reinstalled properly before turning the computer system back on.

Operation

ATTO host adapters require adequate cooling to function properly. If you have any questions as to the airflow provided by your computer system, please refer to your computer system manual or contact your computer system manufacturer.

To facilitate proper air circulation, ATTO host adapters should never be operated in a computer system without the cover installed or with an inoperable fan as this may cause safety or thermal problems which could damage the ATTO host adapter and void the warranty.

ATTO Technology, Inc. limited warranty

ATTO Technology, Inc. warrants to the original purchaser of this product that it is free from defects in material and workmanship as described in the ATTO Technology website, **www.attotech.com**.

ATTO Technology, Inc. liability shall be limited to replacing or repairing, at its option, any defective product. There is no charge for parts or labor should ATTO Technology, Inc. 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 ATTO Technology, Inc. Liability is limited to ATTO Technology, Inc.product(s); damage to other equipment connected to ATTO Technology, Inc.product(s) is the customer's responsibility.

This warranty is made in lieu of any other warranty, express or implied. ATTO Technology, Inc. disclaims any implied warranties of merchantability or fitness for a particular purpose.

ATTO Technology, Inc. responsibility to repair or replace a defective product is the sole and exclusive remedy provided to the customer for breech of this warranty. ATTO Technology, Inc. is not liable for any indirect, special, incidental, or consequential damages irrespective of whether ATTO Technology, Inc. has advance notice of the possibility of such damages.

No ATTO Technology, Inc. dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

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http://emailbydomain.com

Auto manuals search

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TV manuals search

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