

## Flex System FC5024D 4-port 16Gb FC Adapter

### Product Guide (withdrawn product)

The network architecture on the Flex System™ platform is designed to address network challenges, giving you a scalable way to integrate, optimize, and automate your data center. The Flex System FC5024D 4-port 16Gb FC Adapter is a quad-port mid-mezzanine card for the Flex System x222 Compute Node. It enables high-speed access for servers to an external storage area network (SAN). This adapter is based on the Brocade architecture, and offers end-to-end 16 Gb connectivity to SAN. It has enhanced features, such as N\_Port trunking and N\_Port ID Virtualization (NPIV), and boot-from-the-SAN with automatic LUN discovery and end-to-end Server Application Optimization (SAO). The following figure shows the Flex System FC5024D 4-port 16Gb FC Adapter.

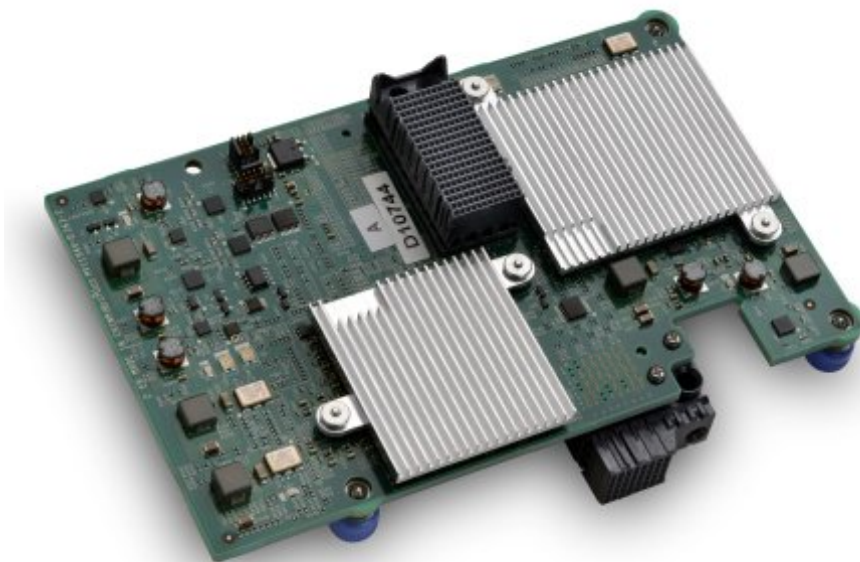


Figure 1. Flex System FC5024D 4-port 16Gb FC Adapter

### Did you know?

The FC5024D is designed to work best with the Flex System FC5022 16Gb SAN Scalable Switch, which deliver considerable value by simplifying the deployment of server and SAN resources, reducing infrastructure and operational costs, and maximizing server and SAN reliability, availability, and resiliency.

The Flex System x222 Compute Node is a high-density dual-server offering that is designed for virtualization, dense cloud deployments, and hosted clients. The x222 has two independent servers in one mechanical package, which allows up to 28 servers to be housed in a single 10U Flex System Enterprise Chassis. The FC5024D provides Fibre Channel connectivity to both servers in the x222, with two ports that are routed to each server.

## Part number information

The following table shows the part number to order this card.

Table 1. Part number and feature code for ordering

Description	Part number	Feature code
Flex System FC5024D 4-port 16Gb FC Adapter	95Y2379	A3HU

The part number includes the following items:

- One Flex System FC5024D 4-port 16Gb FC Adapter
- A documentation CD containing the adapter user's guide
- The *Important Notices* document

## Features

The Flex System FC5024D 4-port 16Gb FC Adapter has the following features:

- A 4-port adapter that is supported in the dual-server x222 Compute Node, where two ports of the adapter are routed to each of the servers
- Dual ASIC design
- Supports high-performance 16 Gbps Fibre Channel:
  - Use 16 Gbps bandwidth to eliminate internal oversubscription
  - Investment protection with the latest Fibre Channel technologies
  - Reduce the number of ISL external switch ports, optics, cables, and power
- RoHS-6 compliant adapter

Each ASIC connects to one of the two servers in the x222 and acts as two independent 2-port adapters, with the following features and functions:

- Based on the Brocade Catapult2 ASIC
- Over 500,000 IOPS per port, which maximizes transaction performance and the density of VMs per compute node
- Achieves performance of 330,000 IOPS for email exchange and 205,000 IOPS for SQL database
- Boot from SAN allows the automation SAN Boot LUN discovery to simplify boot from SAN and reduce image management complexity
- Brocade Server Application Optimization (SAO) provides quality of service (QoS) levels that are assignable to VM applications
- Direct I/O enables native (direct) I/O performance by allowing VMs to bypass the hypervisor and communicate directly with the adapter
- Brocade Network Advisor simplifies and unifies the management of Brocade adapter, SAN, and LAN resources through a single pane-of-glass
- LUN Masking, an Initiator-based LUN masking for storage traffic isolation
- N\_Port Id Virtualization (NPIV) allows multiple host initiator N\_Ports to share a single physical N\_Port, dramatically reducing SAN hardware requirements
- Target Rate Limiting (TRL) throttles data traffic when accessing slower speed storage targets to avoid back pressure problems
- A unified driver across all Brocade-based Lenovo adapter products with automated version synchronization capability
- Forward Error Correction (FEC) provides a method to recover from errors that are caused on links during data transmission

- Buffer-to-Buffer (BB) Credit Recovery enables ports to recover lost BB credits
- FCP-IM I/O Profiling allows users to analyze traffic patterns and help fine-tune Fibre Channel adapter ports, fabrics, and targets for better performance.

## Supported compute nodes

The following table lists the Flex System compute nodes that support the FC5024D 4-port 16Gb FC Adapter.

Table 2. Supported compute nodes

Description	Part number	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532)	x440 (7917)	x440 (7167)	x280 / x480 / x880 X6 (7903)	x280 / x480 / x880 X6 (7196)
Flex System FC5024D 4-port 16Gb FC Adapter	95Y2379	N	Y	N	N	N	N	N	N	N	N

See ServerProven at the following web address for the latest information about the expansion cards that are supported by each blade server type:

<http://ibm.com/servers/eserver/serverproven/compat/us/>

The x222 supports one I/O adapter, which is shared between the two servers. The adapter is mounted in the lower server in the x222, as shown in the following figure. The adapter is shared between the two servers and is routed to the Fibre Channel switches that are installed in bays 3 and 4 of the chassis.

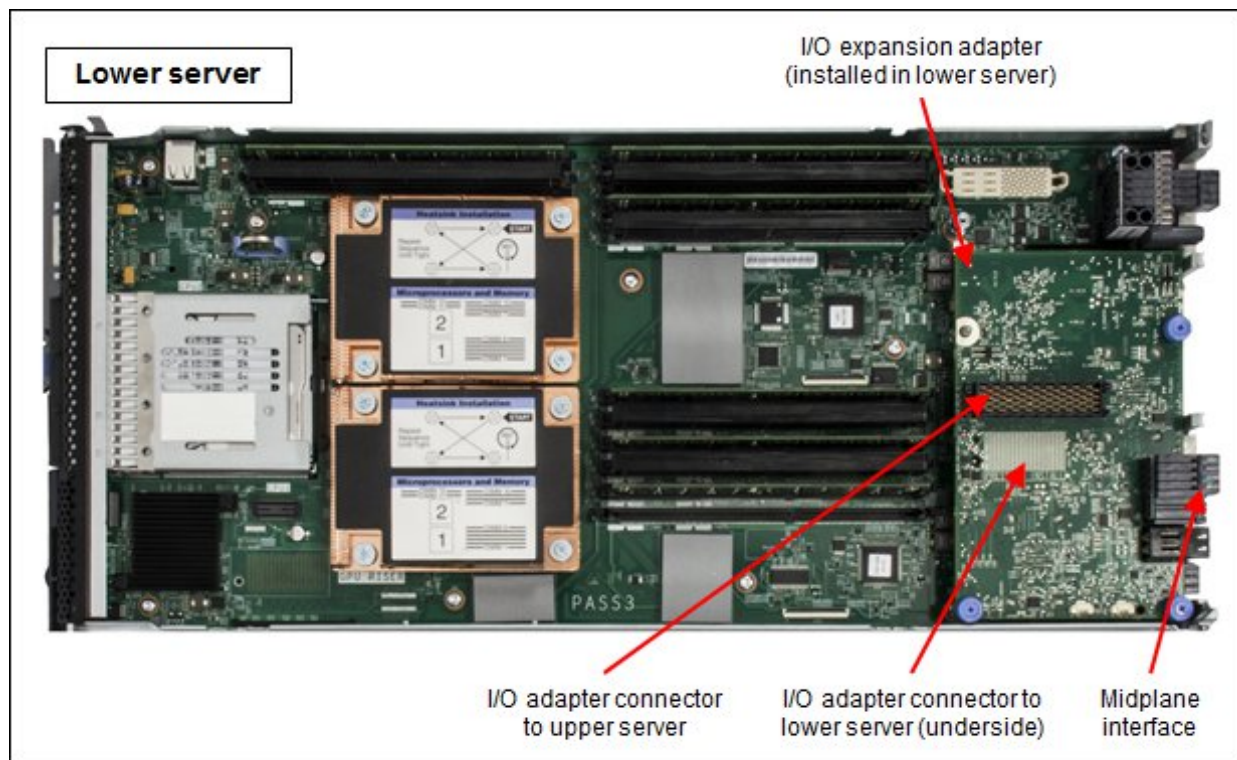


Figure 2. Location of the I/O adapter

For more information about the x222, see the Product Guide *Flex System x222 Compute Node*, found at <http://lenovopress.com/tips1036>

## Supported I/O modules

The FC5024D 4-port 16Gb FC Adapter supports the I/O modules that are listed in the following table. One or two compatible switches must be installed in the corresponding I/O bays in the chassis. Installing two switches means that all ports of the adapter are enabled.

Table 3. I/O modules that are supported by the FC5024D 4-port 16Gb FC Adapter

Description	Part number	Support the FC5024D adapter
Flex System FC3171 8Gb SAN Switch	69Y1930	No*
Flex System FC3171 8Gb SAN Pass-thru	69Y1934	No*
Flex System FC5022 16Gb SAN Scalable Switch (12-ports)	88Y6374	Yes
Flex System FC5022 24-port 16Gb SAN Scalable Switch	00Y3324	Yes
Flex System FC5022 24-port 16Gb ESB SAN Scalable Switch	90Y9356	Yes

\* The FC5024D 4-port 16Gb FC Adapter does not support these switches because they do not provide enough internal ports to connect to both servers in the x222 systems.

Switch port licenses for the FC5022 switches can be used for internal or external ports. Each x222 requires two internal switch ports. Additional ports might be needed depending on your configuration. See the Product Guide *Flex System FC5022 16Gb SAN Scalable Switches*, found at <http://lenovopress.com/tips0870>

A compatible switch module must be installed in to at least one of bays 3 and 4 in the chassis, as indicated in the following table. Installing switches in both bays 3 and 4 means that all ports of the adapter are enabled, which improves performance and network availability. For each ASIC, one port routes to the switch in bay 3 and one port routes to the switch in bay 4.

Table 4. Adapter to I/O bay correspondence

Server	FC5024D 4-port 16Gb FC Adapter	Corresponding I/O module bay in the chassis
Upper server	Port 1	Module bay 3
	Port 2	Module bay 4
Lower server	Port 1	Module bay 3
	Port 2	Module bay 4

The FC5024D adapter is installed in the single I/O expansion slot in the x222. The following figure shows how the FC5024D 4-port 16Gb FC Adapter is connected to Fibre Channel switches that are installed in the chassis. The figure also shows the four ports of the two Embedded 10 GbE Virtual Fabric Adapters that are routed to the Ethernet switches in bays 1 and 2.

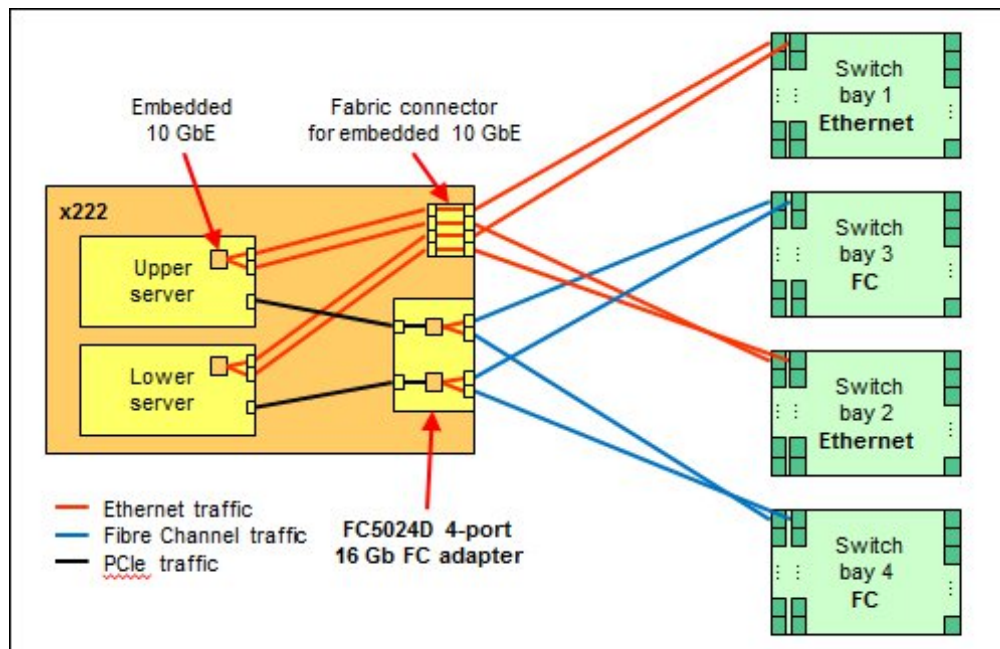


Figure 3. Logical layout of the x222 interconnects - Ethernet and Fibre Channel

## Supported operating systems

The FC5024D 4-port 16Gb FC Adapter supports the following 64-bit operating systems:

- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- Red Hat Enterprise Linux 7
- SUSE LINUX Enterprise Server 11 for x86
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

For the latest information about the specific versions and service packs that are supported, see the ServerProven® website:

<http://ibm.com/servers/eserver/serverproven/compat/us/>

## Regulatory compliance

The adapter conforms to the following standards:

- United States FCC 47 CFR Part 15, Subpart B, ANSI C63.4 (2003), Class A
- United States UL 60950-1, Second Edition
- IEC/EN 60950-1, Second Edition
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1-03
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- IEC 60950-1(CB Certificate and CB Test Report)
- Taiwan BSMI CNS13438, Class A
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A

## Physical specifications

The dimensions and weight of the adapter are as follows:

- Width: 158 mm (6.2 in.)
- Depth: 108 mm (4.2 in.)
- Weight: 230 g (0.5 lb)

Shipping dimensions and weight (approximate):

- Height: 97 mm (3.8 in.)
- Width: 165 mm (6.5 in.)
- Depth: 215 mm (8.5 in.)
- Weight: 430 g (0.95 lb)

## Popular configurations

The FC5024D 4-port 16Gb FC Adapter can be used in various configurations. The following figure shows the I/O installed in an I/O adapter slot of the x222, which in turn is installed in the chassis. The chassis is connected to an IBM V7000. The RAID functionality is provided by the external storage system.

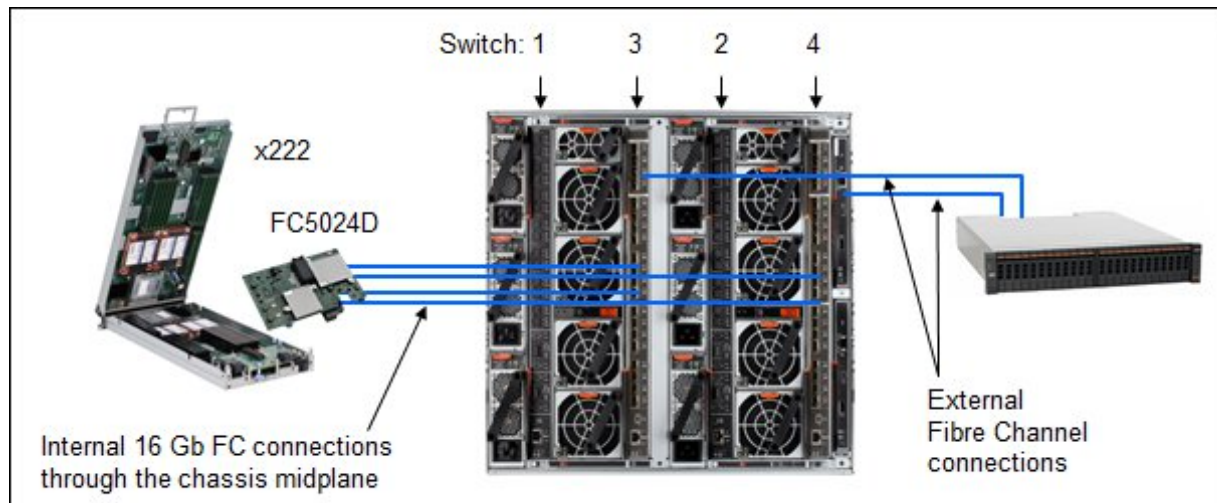


Figure 4. Example configuration

The following table lists the parts that are used in the configuration. We have 14x Flex System x222 Compute Nodes installed in the chassis.

With 14 x222 compute nodes installed, a total of 28 internal ports are required for each of the two switches installed, which means that Upgrade 2 (88Y6386) is required for the switch. For the 24-port switches, Upgrade 2 will enable a total of 48 port licences; for the 12-port switch, Upgrade 2 will enable a total of 36 port licenses. 28 port licenses must be used to enable internal ports and the remaining port licences can be used to enable external ports.

Table 5. Components in the example configuration

Part number or machine type	Description	Quantity
7916	Flex System x222 Compute Node	14
95Y2379	FC5024D 4-port 16Gb FC Adapter	14 (1 per server)
8721	Flex System Enterprise Chassis	1
00Y3324	Flex System FC5022 24-port 16Gb SAN Scalable Switch	2
88Y6386	Flex System FC5022 16Gb SAN Scalable Switch (Upgrade 2)*	2
88Y6393	Brocade 16Gb SFP+ Optical Transceiver	1 per external FC connection to the V7000
39M5698	1m LC-LC Fibre Channel Cable	1 per external FC connection to the V7000
2076-124	IBM V7000	1

\* Switch Upgrade 2 adds 24 ports. The extra ports are required for the FC5022 24-port 16Gb SAN Scalable Switch when 14 x222 compute nodes are installed

This configuration also requires additional V7000 features, such as drives and software licenses. These are not listed in the table.

## Related publications

For more information, see the following resources:

- Product Guides for Flex System servers, switches and options  
<http://lenovopress.com/flexsystem>
- *Flex System x222 Compute Node* Product Guide  
<http://lenovopress.com/tips1036>
- *Flex System Products and Technology by Lenovo*, SG24-8255  
<http://lenovopress.com/sg248255>
- *Flex System Interoperability Guide*  
<http://lenovopress.com/fsig>

## Related product families

Product families related to this document are the following:

- [Blade Storage Adapters](#)

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