

Emulex 16Gb FC Single-port and Dual-port HBAs for IBM System x

IBM Redbooks Product Guide

The Emulex 16Gb Fibre Channel (FC) host bus adapters (HBAs) for IBM® System x® are part of a family of high-performance FC HBA solutions. These HBAs deliver exceptional performance, enabling small and medium businesses to experience unsurpassed robustness and reliability for a wide spectrum of servers, storage, and SANs. These adapters provide an ideal solution for all System x servers requiring high-speed data transfer in disk connectivity for virtualized environments and data-backup, mission-critical applications.

The following figure shows the single-port adapter (SFP+ is not present).



Figure 2. Emulex 16Gb FC Single-port HBA (with 3U bracket attached; SFP+ is not present)

Did you know

The highly integrated multiprocessor design of the Emulex 16 Gb FC HBA minimizes onboard components and improves host performance and efficiency. Advanced error-checking features ensure the integrity of block data passing through the storage area network (SAN). The Emulex OneCommand Manager enterprise class management application features a multiprotocol and cross-platform architecture that provides centralized management of all Emulex HBAs. The unique OneCommand Manager plug-in for VMware vCenter enables HBAs to be managed directly within the VMware environment, simplifying management. Through rigorous testing by IBM through the IBM ServerProven® program, you can maintain a high degree of confidence that your System x server storage subsystem is compatible and functions reliably when using these 16 Gb HBA adapters.

Part number information

The following table shows the part number and feature codes for ordering the Emulex 16Gb FC HBAs.

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
Emulex 16Gb FC Single-port HBA for IBM System x	81Y1655	A2W5
Emulex 16Gb FC Dual-port HBA for IBM System x	81Y1662	A2W6

The part numbers for the Emulex 16Gb FC Single-port and Dual-port HBAs include the following items:

- An FC HBA adapter with one or two short-wave (SWL) 16 Gb (16/8/4 Gb support) SFP+ installed and 3U bracket attached
- Quick installation guide
- Documentation CD
- Low profile (2U) bracket
- Warranty Flyer
- IBM Important Notices Flyer

The following figure shows the dual-port adapter (SFP+ are not present).



Figure 2. Emulex 16Gb FC Dual-port HBA (with 3U bracket attached; SFP+ are not present)

Features

The Emulex 16Gb FC Single-port and Dual-port HBAs have the following features:

- Maximum performance with over 1 million input/output operations per second (IOPS) to support larger server virtualization deployments and scalable cloud initiatives, and performance to match new multicore processors, SSDs, and faster server host bus architectures.
- Frame-level multiplexing and out-of-order frame reassembly increases link efficiency and maximizes HBA performance.
- vScale performance and scalability: Multicore ASIC engine with eight cores supports 255 VFs, 1024 MSI-X, and 8192 logins/open exchanges for maximum VM density.
- 2x management functionality, which takes half the time to manage with OneCommand Manager.
- Unique OneCommand Manager plug-in for VMware vCenter for centralized management of adapters within a VMware environment.
- GreenState power efficiency reduces data center power consumption and associated operational expenses by delivering exceptional power to port ratios.
- End-to-end data protection with hardware parity, CRC, ECC, and other advanced error checking and correcting algorithms, which ensures that data is safe from corruption.
- BlockGuard data integrity offload ensures high performance and end-to-end data integrity.
- vEngine CPU offload lowers the processor burden on the host server, enabling support for more VMs.
- Rock-solid reliability and thermal characteristics, which are essential for mission-critical, cloud and virtualized applications.
- Support for Message Signaled Interrupts eXtended (MSI-X) improves host utilization and enhances application performance.
- Support for 16 Gb, 8 Gb, and 4 Gb FC devices.
- Comprehensive virtualization capabilities with support for N_Port ID Virtualization (NPIV) and Virtual Fabric.
- Host-to-fabric Fibre Channel Security Protocol (FC-SP) authentication.
- A common driver model allows a single driver to support all Emulex HBAs on a given OS.
- Reduces the number of cards, cables, and PCIe slots required.
- Exceptional performance per watt and price/performance ratios.
- Integrates seamlessly into existing SANs.
- Allows application of SAN best practices, tools, and processes with virtual server deployments.
- Ensures data availability and data integrity.
- Universal boot capability allows the appropriate boot environment to be automatically selected for any given hardware.
- Boot from SAN capability reduces the system management costs and increases uptime.
- Detailed and real-time event logging and tracing enables quick diagnosis of SAN problems.
- The beaconing feature flashes the HBA LEDs, simplifying their identification within server racks.
- The environmental monitoring feature helps optimize SAN availability.

Technical specifications

The Emulex 16Gb FC Single-port and Dual-port HBAs have the following specifications:

- Host interface: PCI Express Gen 2 x8
- Single-port or dual-port SFP+ based adapters
- Support for 16 Gb, 8 Gb and 4 Gb FC link speeds, which are automatically negotiated
- Data rate: 14.025 Gbps (1600 MBps), 8.5 Gbps (800 MBps), 4.25 Gbps (400 MBps), and 2.125 Gbps (200 MBps) autosensing (per port), with full duplex
- Performance: Over 500,000 IOPS per port (over 1,000,000 IOPS per dual-port adapter)
- Industry standards
 - Current ANSI/IETF standards: FC-PI-4, FC-PI-5, FC-FS-2 with amendment 1, FC-AL-2 with amendments 1 and 2, FC-LS-2, FC-GS-6, FC-DA, FC-SP-2, FCP-4, FC-MJS, FC-SB-4, FC-SP, SPC-4, SBC-3, SSC-3, and RFC4338
 - Legacy ANSI/IETF standards: FC-PH, FC-PH-2, FC-PH-3, FC-PI, FC-PI-2, FC-FS, FC-AL, FC-GS-2/3/4/5, FCP, FCP-2, FC-SB-2, FC-FLA, FC-HBA, FC-PLDA, FC-TAPE, FC-MI, SPC-3, SBC-2, SSC-2, and RFC2625
- Topology: Point-to-point and switched fabric
- Supported media: 16 Gbps Fibre Channel LC SFP+ short wave optical transceivers (850 nm), hot-pluggable
- Distance support:
 - 15 m at 16 Gbps on 62.5/125 μ m OM1 Multi-Mode Fiber (MMF).
 - 35 m at 16 Gbps on 50/125 μ m OM2 MMF.
 - 100 m at 16 Gbps on 50/125 μ m OM3 MMF.
 - 125 m at 16 Gbps on 50/125 μ m OM4 MMF.
- Management software:
 - Emulex AutoPilot Installer automates the HBA installation process and reduces time to deployment and administrative costs. Automated installation and configuration of driver and management tools simplifies deployment of multiple adapters within Windows environments. A single installation of driver and management application eliminates multiple reboots and ensures that each component is installed correctly and the HBA is ready to use.
 - The Emulex OneCommand Manager application enables centralized discovery, monitoring, reporting, and administration of Emulex HBAs and UCNAs on local and remote hosts. Powerful automation capabilities facilitate remote driver parameter, firmware, and boot code upgrades. In addition to the GUI interface, management functions can also be performed through a scriptable command-line interface (CLI) and a web browser.
 - Emulex management instrumentation complies to Open Management Standards, such as SMI-S and common HBA API support, which enables seamless upward integration into enterprise storage and server management solutions.

Supported servers

The Emulex 16Gb FC Single-port and Dual-port HBAs are supported on the IBM System x servers that are listed in the following table.

Table 2. Supported System x servers

Product description	x3100 M4 (2582)	x3200 M3 (7327, 7328)	x3250 M3 (4251, 4252)	x3250 M4 (2583)	x3400 M3 (7378, 7379)	x3500 M3 (7380)	x3500 M4 (7383)	x3550 M3 (7944)	x3550 M4 (7914)	x3620 M3 (7376)	x3630 M3 (7377)	x3650 M3 (7945)	x3650 M4 (7915)	x3690 X5 (7147)	x3755 M3 (7164)	x3850 X5 (7143)	dx360 M3 (6391)	dx360 M4 (7912)
Emulex 16Gb FC Single-port HBA	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	Y	N	Y	Y	Y	Y	N
Emulex 16Gb FC Dual-port HBA	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	Y	N	Y	Y	Y	Y	N

For the latest information about the System x servers that support each adapter, see the IBM ServerProven® website:

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

Supported operating systems

The Emulex 16Gb FC Single-port and Dual-port HBAs for IBM System x support the following operating systems:

- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Enterprise x86 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Standard x86 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2008, Web x86 Edition
- Microsoft Windows Server 2008 HPC Edition
- Windows Small Business Server 2008 Premium Edition
- Windows Small Business Server 2008 Standard Edition
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for x86
- SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1

- VMware ESXi 4.1
- VMware vSphere 5

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

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

Click **System x servers**, and then click **Shared storage adapters** to see the support matrix. Select the check mark associated with the System x server in question to see the operating system support details.

Physical specifications

The Emulex 16Gb FC Single-port and Dual-port HBAs have the following physical specifications.

Dimensions and weight (approximate):

- Height: 69 mm (2.7 in.)
- Width: 168 mm (6.6 in.)
- Depth: 25 mm (1.0 in.)
- Weight: 113 g (0.25 lb)

Shipping dimensions and weight (approximate):

- Height: 48 mm (1.9 in.)
- Width: 217 mm (8.5 in.)
- Depth: 140 mm (5.5 in.)
- Weight: 450 g (1.0 lb)

Operating environment

The adapters are supported in the following environment:

- Temperature:
 - Operating: 0 - 55 °C (32 - 131 °F)
 - Storage: -40 - 70 °C (-40 - 158 °F)
- Relative humidity:
 - 5 - 95% (relative, non-condensing)

Warranty

One-year limited warranty. When installed in a System x server, these cards assume the system's base warranty and any IBM ServicePac® upgrade.

Agency approvals

The adapter conforms to the following standards:

- EN55022
- EN55024
- EN60950 / CE
- EN 61000-3-2
- EN 61000-3-3
- IEC 950 CB Scheme
- FCC Part 15 Class A
- UL 1950
- CSA C22.2 950-95
- VCCI
- NZ AS3548 / C-tick
- RRL for MIC (KCC)
- BSMI
- UL 94-V

Popular configurations

This section illustrates how the Emulex 16Gb FC Single-port and Dual-port HBAs can be used in configurations. For a list of IBM-supported configurations that include Emulex 16Gb HBAs, fabric switches, and storage targets, see IBM System Storage® Interoperation Center at the following address: <http://ibm.com/systems/support/storage/ssic>

Figure 3 shows the Emulex 16Gb FC Single-port HBAs installed in a supported server. The servers are connected to the IBM System Storage DS3500 through IBM System Storage SAN48B-5 switches.

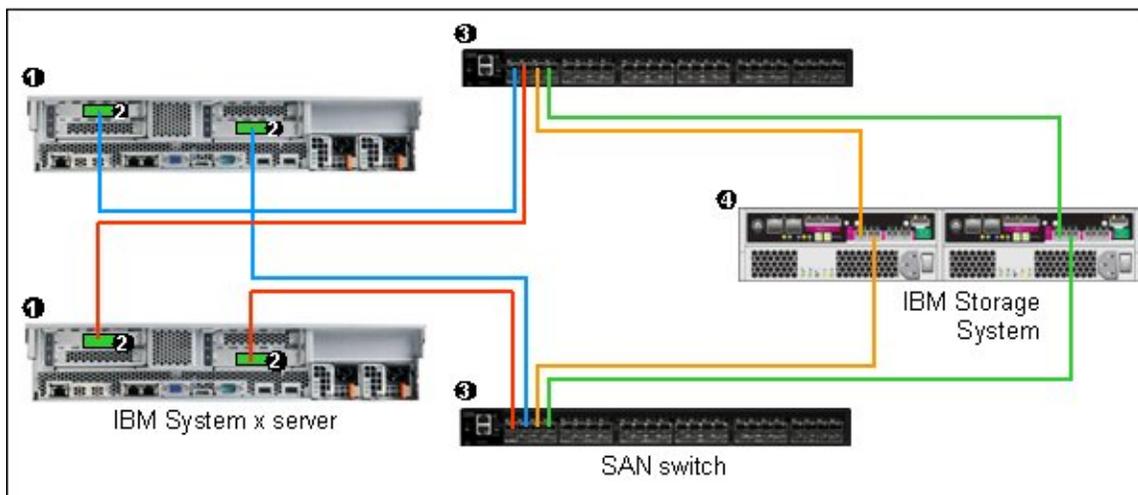


Figure 3. x3650 M3 server with Emulex 16 Gb FC adapters connected to an external IBM System Storage DS3500 through SAN switches

The parts used are listed in Table 3.

Table 3. Components used when connecting Emulex 16Gb FC Single-port HBAs to the external disk storage (as shown in Figure 3)

Diagram reference	Part number/machine type	Description	Quantity
1	Varies	x3650 M3 or other supported server	1
2	81Y1655	Emulex 16Gb FC Single-port HBA	2 per server
3	2498F48	IBM System Storage SAN48B-5	2
4	1746A4D	IBM System Storage DS3524 Express Dual Controller Storage System	1

This configuration also requires cabling between the servers and the SAN switches and between the SAN switches and the storage system. (The cable part numbers are not listed in Table 3.)

Related publications

For more information, refer to these documents:

- IBM US Announcement Letter for the Emulex 16Gb FC Single-port and Dual-port HBAs:
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS112-073>
- *Emulex 16Gb FC Single-port and Dual-port HBAs Installation and User Guide*.
www.ibm.com/systems/support
- *IBM System x Configuration and Options Guide*:
<http://www.ibm.com/support/docview.wss?uid=psg1SCOD-3ZVQ5W>

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