Brocade Enterprise 20-port, 20-port, and 10-port 8Gb SAN Switch Modules

IBM Redbooks Product Guide

The Brocade Enterprise 20-port, 20-port, and 10-port 8 Gb SAN Switch Modules for IBM BladeCenter deliver embedded Fibre Channel switching with the industry's fastest Fibre Channel throughput performance (8 Gbps). The 20-port and 10-port switches provide basic FC switch functionality while the Enterprise 20-Port model is a fully enabled switch with a complete set of advanced SAN fabric service licensed features.

Figure 1 shows the Brocade 8Gb SAN Switch Module.

Figure 1. Brocade 8Gb SAN Switch Module for IBM BladeCenter

Did you know?

Brocade 8Gb SAN switches operate in full-fabric switch mode for native interoperability with IBM System Storage b-type SAN switches and Brocade Access Gateway mode for industry-standard interoperability with any fabric that supports N_Port ID Virtualization (NPIV) technology.

Part number information

Table 1 shows the part numbers to order these modules.

Table 1. Part numbers and feature codes for ordering

Description	Part number	Feature code
Brocade Enterprise 20-port 8Gb SAN Switch Module for IBM BladeCenter	42C1828	5764
Brocade 20-port 8Gb SAN Switch Module for IBM BladeCenter	44X1920	5481
Brocade 10-port 8Gb SAN Switch Module for IBM BladeCenter	44X1921	5483
Brocade 10-port Upgrade for IBM BladeCenter	32R1822	Not available
Brocade 8Gb SFP+ SW Optical Transceiver	44X1962	5084

The switch module part numbers include the following items:

- Brocade Enterprise 20-port, 20-port, or 10-port 8Gb SAN Switch Module for IBM BladeCenter
- Gasket for installation in a BladeCenter H Multi-switch Interconnect Module (MSIM)
- Documentation CD containing:
    - *Brocade 20-port and 10-port 8Gb SAN Switch Module for IBM BladeCenter Installation and User Guide*
    - End User License Agreement (EULA)
    - Safety Information
    - Brocade documentation
- The *IBM Important Notices* document

The switch does not ship with small form-factor pluggable plus (SFP+) modules, and they must be ordered separately. Table 1 lists the transceiver that is supported.

Switch comparison

Brocade 8Gb SAN Switch Modules for IBM BladeCenter support entry-level to enterprise SAN I/O requirements for next-generation data centers. Table 2 provides a feature comparison by model.

Table 2. Feature comparison by model

Feature	Enterprise 20-port switch	20-port switch	10-port switch
Number of active ports	20	20	10
10-POD license	Not needed	Not needed	Optional
Access Gateway	Included	Included	Included
Enhanced Group Management	Included	Included	Included
ISL Trunking	Included	Optional	Optional
Adaptive Networking	Included	Optional	Optional
Advanced Performance Monitoring	Included	Optional	Optional
Fabric Watch	Included	Optional	Optional
Extended Fabrics	Included	Optional	Optional
Server Application Optimization	Included	Not available	Not available

Features

Brocade and IBM are delivering innovative and powerful IT infrastructure for virtual data centers based on best-in-class, industry-standard computing and networking technology. Brocade 8Gb SAN Switch Modules for IBM BladeCenter support entry-level to enterprise SAN I/O requirements for next-generation data centers.

The Brocade switch modules include the following hardware features:

- Six external auto-sensing Fibre Channel ports (2 Gbps, 4 Gbps, or 8 Gbps for 8Gb SFP+ transceivers) that operate at a maximum speed of 8 Gbps

- 14 internal Fibre Channel ports that operate as F_ports (fabric ports) at 2 Gbps, 4 Gbps, or 8 Gbps, depending on FC expansion cards installed into blades

- 10-port model includes 10 Dynamic Ports-On-Demand (DPODs) that can be activated in any combination of internal and external ports

- High availability features including hot pluggable design, non-disruptive software upgrades, automatic path failover, and power-on self-test diagnostics and status reporting

- Aggregate Fibre Channel I/O bandwidth: 48 Gbps (6 external ports at 8 Gbps line rate)

- External ports that can operate as F_ports (fabric ports), FL_ports (fabric loop ports), or E_ports (expansion ports) when in full FC switch mode. When in Brocade Access Gateway mode the external ports operate as NPIV-enabled N_Ports.

- Fabric latency of 0.74 μsec ensures the fastest response and access time to data for critical applications and servers

- Supports full 8 Gbps operations at distances up to 129 km and up to 1036 km at 1 Gbps

Brocade switch modules include the following software features:

- Brocade Full Fabric mode: Enables high performance 8Gb fabric switching
- Brocade Access Gateway mode: Leverages NPIV to connect to any fabric without adding switch domains to reduce management complexity
- Dynamic Path Selection: Enables exchange-based load balancing across multiple Inter-Switch Links (ISLs) for superior performance
- Brocade Advanced Zoning: Segments a SAN into virtual private SANs to increase security and availability
- Brocade Enhanced Group Management: Enables centralized and simplified management of Brocade fabrics through IBM System Storage Data Center Fabric Manager (DCFM)

Brocade switch modules support the following fabric management (all management connections go through the management module):

- IBM System Storage DCFM: Centralizes and simplifies management of enterprise level SAN fabrics consisting of IBM System Storage b-type (using FOS) and Brocade fabrics m-type (using M-EOS) SAN products
- IBM System Storage DCFM Professional Plus: For customers managing single fabrics up to 1000 ports running Brocade Fabric OS (FOS) products
- Brocade Web Tools: Provides Web-based management interface designed to help simplify monitoring and configuration management
- Command-line interface (CLI) through the Telnet program
- Switch SNMP agent, which enables receipt of configuration values, traffic information, and FC failure data through SNMP and the Ethernet interface

The Enterprise 20-port model (42C1828) is a fully enabled switch with a complete set of licensed features that maximizes performance, ensures availability and simplifies management for the most demanding applications and expanding virtualization environments. The factory-installed licenses include:

- ISL Trunking: Consolidates ISLs into fault-tolerant and load balanced trunks with bandwidth of up to 48 Gbps for greater performance and simplified management
- Adaptive Networking: Ensures high priority connections obtain the bandwidth necessary for optimum performance
- Advanced Performance Monitoring: Provides end-to-end visibility into fabric performance to maximize performance tuning and the utilization of fabric resources
- Fabric Watch: Monitors and creates alerts based on the health of switch and fabric elements
- Extended Fabrics: Extends Fibre Channel SANs beyond traditional distance limitations for replication and backup
- Server Application Optimization: Allows Virtual Machine Quality of Service (QoS), authentication and monitoring from adapter through SAN

The following optional software features are available for the 10-port and 20-port modules. These features are factory installed on the Enterprise 20-port module (42C1828).

- 10-Port Port-on-Demand upgrade for 10-port model (32R1822)
- ISL Trunking (26K5607)
- Advanced Performance Monitoring (45W0508)
- Extended Fabrics (45W0505)
- Fabric Watch (45W0504)
- Adaptive Networking (45W0510)

Note: Server Application Optimization is not available for the 10-port and 20-port modules.

Supported BladeCenter chassis and expansion cards

Brocade 8Gb SAN Switch Modules are supported in the IBM BladeCenter chassis as listed in Table 3.

Table 3. IBM BladeCenter chassis that support the Brocade 8 Gb SAN Switch Modules

I/O module	Part number	BladeCenter S	BladeCenter E	BladeCenter H	BladeCenter T	BladeCenter HT	MSIM	MSIM-HT
Brocade Enterprise 20-port 8Gb SAN Switch Module	42C1828	N	Y	Y	N†	Y*	Y	N
Brocade 20-port 8Gb SAN Switch Module	44X1920	N	Y	Y	N†	Y*	Y	N
Brocade 10-port 8Gb SAN Switch Module	44X1921	N	Y	Y	N†	Y*	Y	N

† BladeCenter T can be supported on a case-by-case basis after testing the specific configuration. Contact your IBM representative.
* When the I/O module is installed in a BladeCenter HT unit, the internal ports operate up to 2 Gbps, and the external ports operate at speeds up to 8 Gbps.

The Brocade 8Gb SAN Switch Modules support the expansion cards listed in Table 4. Table 4 also lists the chassis bays in which the switch module must be installed when used with each expansion card.

The BladeCenter chassis have the following bays:

- BladeCenter S, E, and T have four standard I/O bays (1, 2, 3, and 4)
- BladeCenter H has four standard I/O bays (1, 2, 3, and 4), two bridge bays (5 and 6), and four high-speed bays (7, 8, 9, and 10)
- BladeCenter HT has four standard I/O bays (1, 2, 3, and 4) and four high-speed bays (7, 8, 9, and 10)

The Brocade 8Gb SAN Switch Modules fit in a standard I/O bay (bays 1-6) and, with the addition of the Multi-Switch Interconnect Module (MSIM) in the BladeCenter H, can also fit in a high-speed I/O bay (bays 7-10). The Brocade 8Gb SAN Switch Modules are not supported with MSIM-HT in high-speed bays of the BladeCenter HT chassis.

Table 4. Expansion card support and Chassis I/O bay support

	Part number	Bay 1 (Standard)	Bay 2 (Standard)	Bay 3 (Standard)	Bay 4 (Standard)	Bay 5 (Bridge)	Bay 6 (Bridge)	Bay 7 (High-speed)	Bay 8 (High-speed)	Bay 9 (High-speed)	Bay 10 (High-speed)
8Gb expansion cards											
QLogic Ethernet and 8 Gb Fibre Channel Expansion Card (CFFh)	44X1940	N	N	N	N	N	N	N	Y	N	Y
QLogic 8Gb Fibre Channel Expansion Card (CIOv)	44X1945	N	N	Y	Y	N	N	N	N	N	N
Emulex 8Gb Fibre Channel Expansion Card (CIOv)	46M6140	N	N	Y	Y	N	N	N	N	N	N
4Gb expansion cards											
QLogic 4 Gb SFF FC Expansion Card	26R0890	N	N	Y	Y	N	N	N	N	N	N
QLogic 4 Gb Fibre Channel Expansion Card (CFFv)	41Y8527	N	N	Y	Y	N	N	N	N	N	N
Emulex 4 Gb Fibre Channel Exp. Card (CFFv)	43W6859	N	N	Y	Y	N	N	N	N	N	N
QLogic 4 Gb Fibre Channel Expansion Card (CIOv)	46M6065	N	N	Y	Y	N	N	N	N	N	N
QLogic Ethernet and 4 Gb Fibre Channel Expansion Card (CFFh)	39Y9306	N	N	N	N	N	N	N	Y	N	Y

Note: When the I/O module is installed in a BladeCenter HT unit, the internal ports operate up to 2 Gbps, and the external ports operate at speeds up to 8 Gbps.

Popular configurations

The Brocade 8Gb SAN Switch Modules can be used in various configurations.

Installation in standard switch bays

Figure 2 shows the Brocade 8Gb SAN Switch Modules that are installed in standard I/O bays in the BladeCenter chassis. The chassis is connected to the IBM System Storage DS3400. The servers in the chassis each have compatible CFFv or CIOv Fibre Channel expansion cards. The Redundant Array of Independent Disks (RAID) functionality is provided by the external storage system.
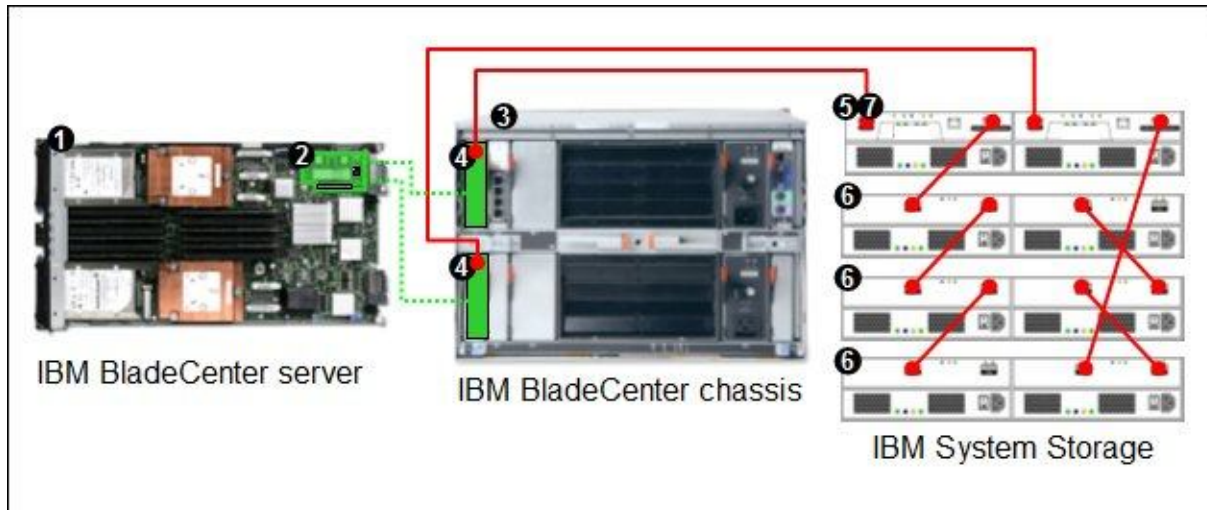
Figure 2. IBM BladeCenter connected to an external IBM System Storage DS3400 storage solution

Table 5 lists the parts that are used in this configuration.

Table 5. Components used as shown in Figure 2

Diagram reference	Part number / Machine type	Description	Quantity
1	Varies	IBM BladeCenter HS22, HS21, or other supported server	1 to 14
2	Varies	Supported CIOv or CFFv expansion card (see Table 4)	1 per server
3	Varies	Supported BladeCenter chassis	1
4	44X1920	Brocade 20-port 8Gb SAN Switch Module for IBM BladeCenter	1 or 2
Not shown	44X1962	Brocade 8Gb SFP+ SW Optical Transceiver	Up to 12
5	1726-42X	IBM System Storage DS3400 (Dual Controller)	1
6	1727	**Optional** IBM System Storage EXP3000 (Single or Dual ESM)	1 to 3
Not shown	39R6536	DS3000 Partition Expansion License	1

This configuration also requires cabling between the chassis and the storage server and between the storage server and expansion units. (The cable part numbers are not listed in the table.)

Installation in BladeCenter H high-speed switch bays

Figure 3 shows the Brocade 8Gb SAN Switch Modules installed in MSIMs in the BladeCenter H chassis. The chassis is connected to the IBM System Storage DS3400. The servers in the chassis each have compatible CFFh Fibre Channel expansion cards. The RAID functionality is provided by the external storage system.
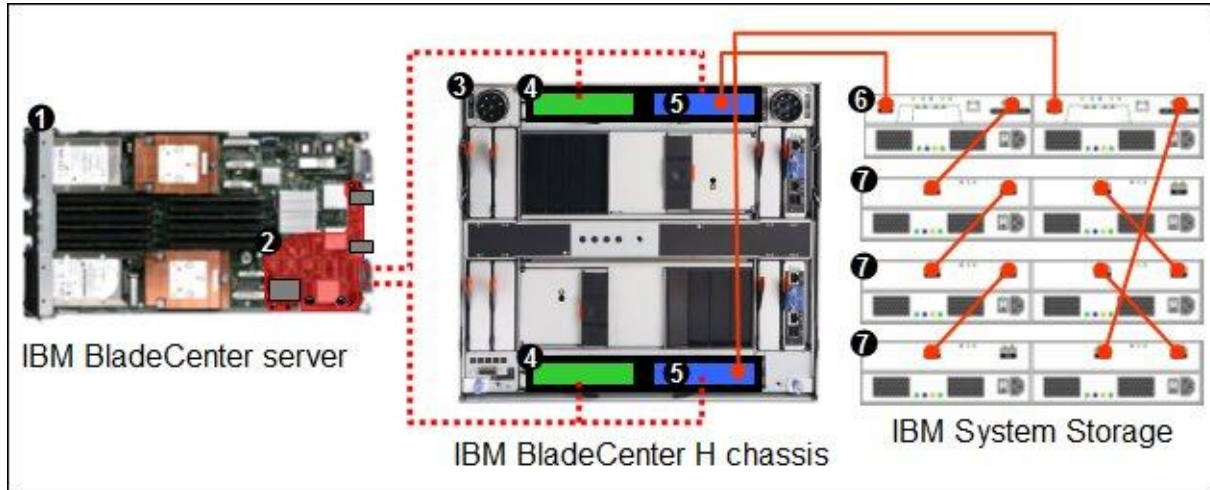

Figure 3. IBM BladeCenter H connected to an external IBM System Storage DS3400 storage solution

Table 6 lists the parts that are used in this configuration.

Table 6. Components used as shown in Figure 3

Diagram reference	Part number / machine type	Description	Quantity
❶	Varies	IBM BladeCenter HS22, HS21, or other supported server	1 to 14
❷	Varies	Supported CFFh expansion card (see Table 4)	1 per server
❸	8852	IBM BladeCenter H chassis	1
❹	39Y9314	Multi-switch Interconnect Module	1 or 2
❺	44X1920	Brocade 20-port 8Gb SAN Switch Module for IBM BladeCenter	1 or 2
Not shown	44X1962	Brocade 8Gb SFP+ SW Optical Transceiver	Up to 12
❻	1726-42X	IBM System Storage DS3400 (Dual Controller)	1
❼	1727	Optional: IBM System Storage EXP3000 (Single or Dual ESM)	1 to 3
Not shown	39R6536	DS3000 Partition Expansion License	1

This configuration also requires cabling between the chassis and the storage server and between the storage server and expansion units. (The cable part numbers are not listed in the table.)

Connectors and LEDs

The front panel of the Brocade 8Gb SAN Switch Module contains the following components, as shown in Figure 4:

- Information LEDs that display the status of the I/O module and its network connections.
- Six external Fibre Channel ports to connect Fibre Channel devices and switches. These ports are labeled 0, 15, 16, 17, 18, and 19 (from top to bottom) on the I/O module.
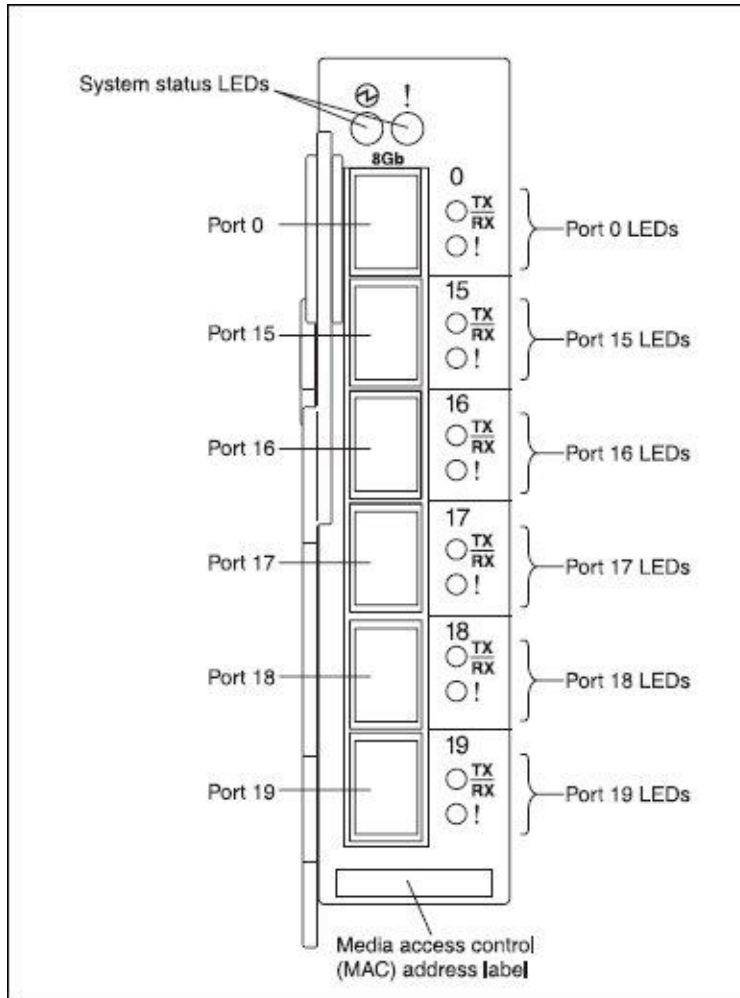

Figure 4. Front panel of the Brocade 8Gb SAN Switch Module

Table 7 lists the LEDs on the front panel and their meanings.

Table 7. LEDs on the front panel

LED name	LED description
System Status (OK)	This green LED is at the top left of the I/O module on the front panel and indicates that the module is working properly.
System Status (!) (I/O module fault)	This amber LED is at the top right of the I/O module on the front panel. This LED indicates that the I/O module has a fault. If the I/O module fails the POST, this fault LED is lit.
External port status (TX/RX)	There are six green external port activity (TX/RX) LEDs. When one of these LEDs flashes, it indicates that data is being received or transmitted (that is, activity is occurring) on that port. The flash frequency is proportional to the amount of traffic on that port.
External port diagnostics (!)	There are six amber external port fault (!) LEDs. When an external port fault LED is lit, it indicates that the external port has failed the internal, external, or online port diagnostics tests.

Operating environment

The environment has the following temperature and altitude requirements:

- Operating:
    - 10 - 52 °C (50 - 125 °F) at an altitude of 0 to 914 m (0 to 3,000 ft)
    - 10 - 49 °C (50 - 20 °F) at an altitude of 0 to 3,000 m (0 to 10,000 ft)
- Non-operating:
    - - 40 - 65 °C (-40 - 149 °F) at an altitude of 0 to 12,000 m (0 to 39,370 ft)

The environment has the following humidity level requirements:

- Operating: 8% to 80%, noncondensing
- Non-operating: 5% to 80%, noncondensing

Related publications

For more information, see the following links:

- *Brocade 20-port and 10-port 8Gb SAN Switch Module for IBM BladeCenter Installation and User Guide*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5082884

- Supplemental Instructions: Installing a Brocade 8Gb SAN Switch Module for IBM BladeCenter with a multi-switch interconnect module (MSIM)
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5081558

- IBM US Announcement Letter
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-592

- *IBM BladeCenter Interoperability Guide*
  http://www.redbooks.ibm.com/big

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  http://www.redbooks.ibm.com/abstracts/sg247523.html

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