SAS Expansion Card (CFFv) for BladeCenter
Product Guide (withdrawn product)

The SAS Expansion Card (CFFv) enables a Serial Attached SCSI (SAS) connection from the blade server to the SAS switches in the BladeCenter chassis and on to a SAS storage fabric. Built on proven 3 Gbps, full-duplex SAS technology, the SAS Expansion Card can connect to the IBM System Storage DS3200 from the BladeCenter E or H chassis and to multiple Disk Storage Modules (DSM) in the BladeCenter S. The LSI1064 SAS controller on the expansion card routes internally to the SAS switches that are installed in the BladeCenter chassis.

The SAS Expansion Card is installed into the CFFv slot of the supported blade server. It provides connections to SAS modules that are located in bay 3 and bay 4 of the supported BladeCenter chassis.
Figure 1 shows the SAS Expansion Card (CFFv).

Figure 1. SAS Expansion Card (CFFv) for BladeCenter

Did you know?

When using the SAS Expansion Card (CFFv) adapter, you can simultaneously use a CFFh adapter to enable more types of I/O when installed in the BladeCenter H or BladeCenter S chassis. The innovative design of the CFFv adapter works with the CFFh adapter to support this combination.

SAS is a point-to-point architecture in which all storage devices connect directly to a SAS port rather than sharing a common bus as traditional SCSI devices do. Point-to-point links increase data throughput and improve the ability to locate and fix disk failures. The SAS architecture solves the parallel SCSI problems of clock skew and signal degradation at higher signaling rates.

Part number information

Table 1 shows the part number to order this card.

Table 1: Part number and feature code for ordering

Description	Part number	Feature code
SAS Expansion Card (CFFv) for BladeCenter	39Y9190*	2979

* Withdrawn from marketing

The part number includes the following items:

- One SAS Expansion Card (CFFv) for BladeCenter
- Documentation package

Features

SAS Expansion Card (CFFv) has the following features and capabilities:

- CFFv form factor
- PCI-X bus adapter
- Uses LSI 1064 SAS Controller ASIC
- Supports two full-duplex SAS ports at 3 Gbps maximum per channel
- Supports RAID 0, 1, and 1E
- Provides blade with two 1X SAS ports for connecting to the SAS Connectivity Module

Operating environment

The expansion card is supported in the following environment:

- Temperature: 10° to 35°C (50° to 95°F)
- Relative humidity: 8% to 80%, noncondensing

Supported servers and I/O modules

The SAS Expansion Card (CFFv) is supported in the BladeCenter servers listed in Table 2.

Table 2. Supported servers

		HS12	HS21	HS21 XM	HS22	LS21	LS22	LS41	LS42	JS12	JS21	JS22	JS23/JS43	QS22	PN41
SAS Expansion Card (CFFv)	39Y9190	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N

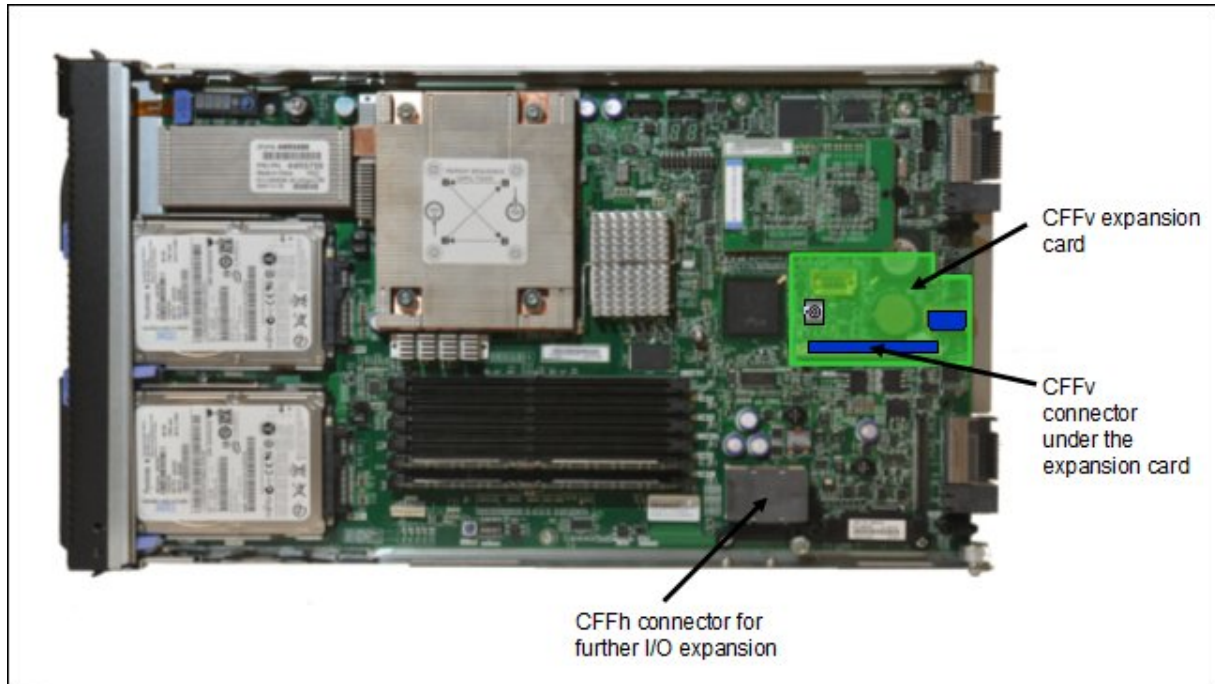Figure 2 shows where the CFFv card is installed in a BladeCenter server.

Figure 2. Location on the BladeCenter server planar where the CFFv card is installed (HS12)

See IBM ServerProven at the following 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 SAS Expansion Card includes an LSI 1064 SAS Controller. The following RAID levels are supported by the SAS Expansion Card:

- RAID-0 (Integrated Striping - IS)
- RAID-1 (Integrated Mirroring - IM)
- RAID-1E (Integrated Mirroring Enhanced - IME)

The maximum number of drives supported by an IM volume is two, plus one optional global hot spare. An IME volume supports up to ten HDDs, plus two optional hot spares. An IS volume supports up to ten HDDs. The IS volume does not support hot spare drives.

Mixing HDDs of different capacities in a single volume is supported. However, total volume size is aligned with the size of the smallest HDD. Excess space on larger HDDs is not used.

Supported combinations of volumes include:

- Two IM or IME volumes per blade server
- One IM or IME volume and IS volume per blade server
- Two IS volumes per blade server

Both SAS and SATA HDDs are supported, as is intermixing SAS/SATA drives. However, each volume must have hard disks of the same type, SAS or SATA.

The SAS Expansion Card (CFFv) requires that a supported I/O module is installed in bay 3 (and bay 4 depending on the configuration) of the chassis in which the cards and servers are installed. Table 3 lists the supported I/O modules.

Table 3. I/O modules supported with the SAS Expansion Card (CFFv)

I/O module	Part number	BladeCenter S	BladeCenter E	BladeCenter H	BladeCenter T	BladeCenter HT
SAS Connectivity Module	39Y9195	Y	Y	Y	Y	Y
SAS RAID Controller Module	43W3584	Y	N	N	N	N

Popular configurations

This section shows examples of how the SAS Expansion Card (CFFv) can be used in different configurations.

External DS3200 attachment

Figure 3 shows the supported topology for the SAS Expansion Card (CFFv) and an IBM System Storage DS3200 storage server connected to the BladeCenter E chassis. In this configuration, the RAID functionality is provided by the external DS3200 storage server.
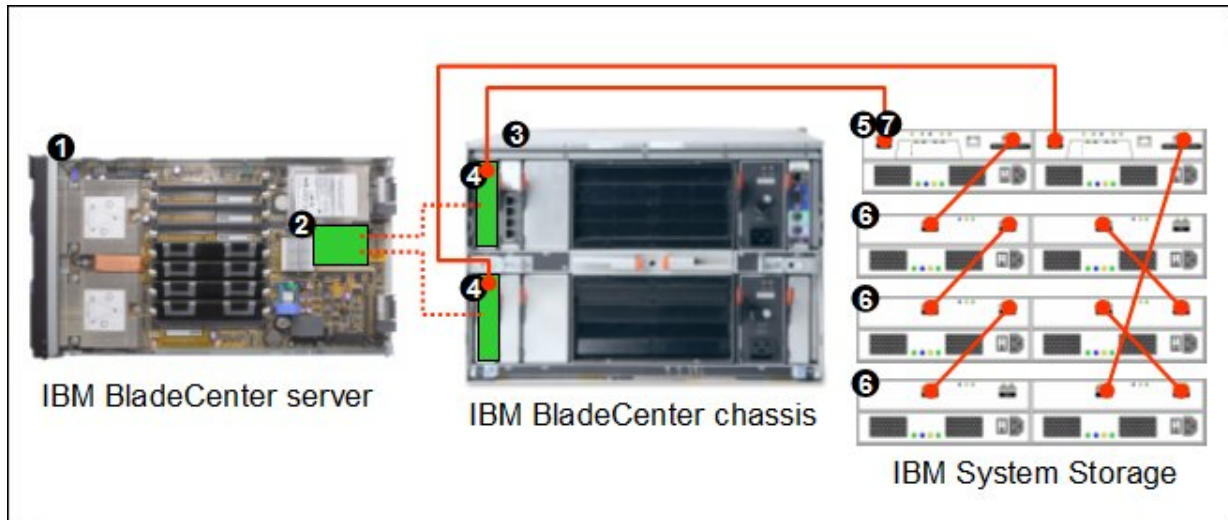

Figure 3. BladeCenter connected to an external IBM System Storage DS3200 storage solution

Table 4 lists the parts that are used in this configuration.

Table 4. Components used when connecting the SAS Expansion Card (CFFv) to external disk storage

Diagram reference	Part number / machine type	Description	Quantity
1	Varies	Supported BladeCenter server (See Table 2)	1 to 14
2	39Y9190	SAS Expansion Card (CFFv) for BladeCenter	1 per server
3	8677	BladeCenter E	1
4	39Y9195	BladeCenter SAS Connectivity Module	2
5	1726-22X	IBM System Storage DS3200 (Dual Controller)	1
6	1727	Optional: IBM System Storage EXP3000 (Dual ESM)	1 to 3
7	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.)

BladeCenter S integrated storage: Basic RAID functionality

The configuration shown in Figure 4 connects the SAS Expansion Card (CFFv) to the integrated BladeCenter S storage using the IBM SAS Connectivity Modules in the BladeCenter S chassis. In this configuration, the RAID functionality is provided by the SAS Expansion Card.
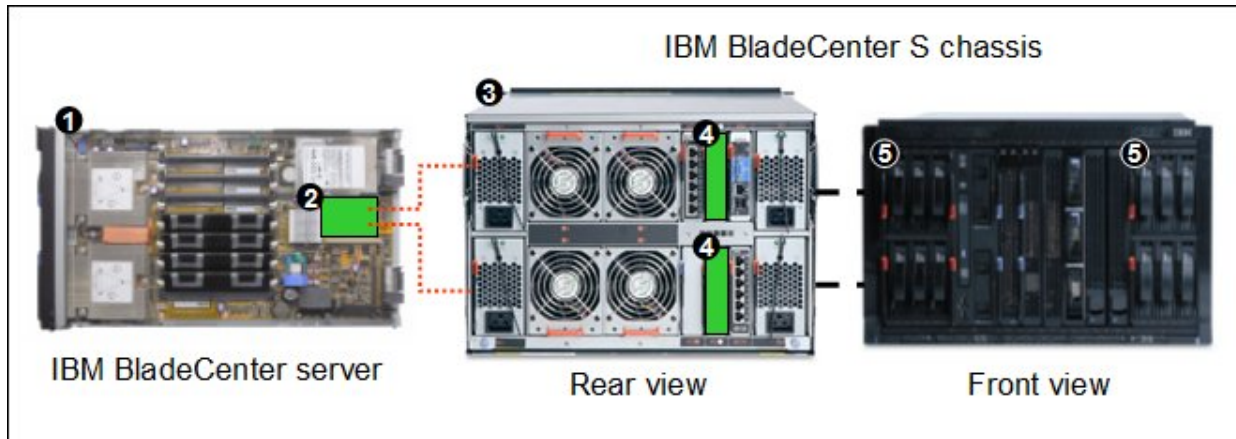

Figure 4. BladeCenter S with basic RAID functionality

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

Table 5. Components used when connecting the SAS Expansion Card (CFFv) to the integrated BladeCenter S storage

Diagram reference	Part number / machine type	Description	Quantity
❶	Varies	Supported BladeCenter server (see Table 2)	1 to 6
❷	39Y9190	SAS Expansion Card (CFFv) for BladeCenter	1 per server
❸	8886	BladeCenter S	1
❹	39Y9195	BladeCenter SAS Connectivity Module	1 or 2
❺	43W3581	BladeCenter S 6-DSM	1 or 2

BladeCenter S integrated storage: Advanced RAID functionality with shared storage

The configuration shown in Figure 5 connects the SAS Expansion Card (CFFv) installed in each blade server to the integrated BladeCenter S storage by using two BladeCenter S SAS RAID Controller Modules in the BladeCenter S chassis. In this configuration, the RAID functionality is provided by the RAID Controller Modules in the BladeCenter chassis (and not by the RAID controller on the SAS Expansion Card).
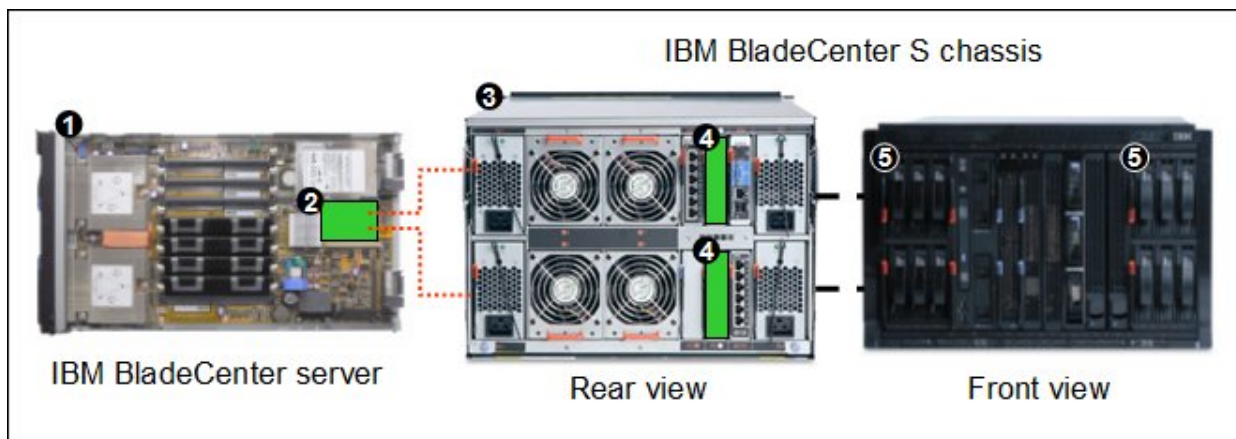

Figure 5. BladeCenter S with advanced RAID functionality

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

Table 6. Components used when connecting the SAS Expansion Card (CFFv) to the integrated BladeCenter S storage with support for shared storage

Diagram reference	Part number / machine type	Description	Quantity
❶	Varies	Supported BladeCenter server (see Table 2)	1 to 6
❷	39Y9190	SAS Expansion Card (CFFv) for BladeCenter	1 per server
❸	8886	BladeCenter S	1
❹	43W3584	BladeCenter S SAS RAID Controller Module	2 required
❺	43W3581	BladeCenter S 6-DSM	1 or 2

Supported operating systems

The SAS Connectivity Card (CFFv) supports the following operating systems:

- IBM AIX 5L for POWER Version 5.3
- IBM AIX Version 6.1
- IBM i operating system 6.1
- Microsoft Windows Essential Business Server 2008 Premium Edition
- Microsoft Windows Essential Business Server 2008 Standard Edition
- Microsoft Windows Server 2003, Web Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise x64 Edition
- Microsoft Windows Server 2003/2003 R2, Standard Edition
- Microsoft Windows Server 2003/2003 R2, Standard x64 Edition
- Microsoft Windows Server 2008 HPC Edition
- 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 Small Business Server 2003/2003 R2 Premium Edition
- Microsoft Windows Small Business Server 2003/2003 R2 Standard Edition
- Microsoft Windows Small Business Server 2008 Premium Edition
- Microsoft Windows Small Business Server 2008 Standard Edition
- Red Hat Enterprise Linux 4 AS for AMD64/EM64T
- Red Hat Enterprise Linux 4 AS for iSeries and pSeries
- Red Hat Enterprise Linux 4 AS for x86
- Red Hat Enterprise Linux 4 ES for AMD64/EM64T
- Red Hat Enterprise Linux 4 ES for x86
- Red Hat Enterprise Linux 4 WS/HPC for AMD64/EM64T
- Red Hat Enterprise Linux 4 WS/HPC for x86
- Red Hat Enterprise Linux 5 for System i and System p

- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Solaris 10 Operating System
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for IBM POWER
- 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
- SUSE LINUX Enterprise Server 9 for AMD64/EM64T
- SUSE LINUX Enterprise Server 9 for IBM POWER
- SUSE LINUX Enterprise Server 9 for x86
- VMware ESX 3.5
- VMware ESXi 3.5

Not all servers support these operating systems. See IBM ServerProven at the following address for the latest information about the specific versions and service packs that are supported by each BladeCenter server. Select the blade server and then select the expansion card to see the supported operating systems.

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

Related publications

For more information, see the following documents:

- SAS Expansion Card (CFFv) Installation and User's Guide
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5072377
- IBM US Announcement Letter for the SAS Expansion Card (CFFv)
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS107-575
- BladeCenter Interoperability Guide
  http://lenovopress.com/bcig
- *BladeCenter Products and Technology*, SG24-7523
  http://lenovopress.com/sg247523

Related product families

Product families related to this document are the following:

- Blade Storage Adapters

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This document, TIPS0709, was created or updated on September 29, 2009.

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