Ethernet Expansion Card (CIOv) for IBM BladeCenter

IBM BladeCenter at-a-glance guide

The Ethernet Expansion Card (CIOv) is an Ethernet expansion card with two 1 Gb Ethernet ports designed for BladeCenter servers with CIOv expansion slots. It is based on proven Broadcom 5709S ASIC technology and offers value added features like TCP Offload (TOE) and software-based iSCSI support for high performance.

This card is installed into the CIOv slot of the supported blade server. It provides connections to Ethernet-compatible modules located in bays 3 and 4 of supported BladeCenter chassis. The CIOv slot is a second generation PCI Express x8 slot. A maximum of one Ethernet Expansion Card (CIOv) is supported per single-wide blade server.

The Ethernet Expansion Card (CIOv) is shown in Figure 1.

Did you know?

Today’s virtualized servers require a larger number of network adapters. This adapter is a perfect fit for these environments because it can enable up to eight Ethernet ports per blade server.

The adapter is based on the PCI Express bus, which can be thought of as a high-speed serial replacement of the older technology. Its use offers many benefits including higher speeds and the ability to send and receive data at the same time.

When using the CIOv adapter, you can simultaneously use a CFFh adapter to enable more types of I/O to supported blade servers such as the HS22 when installed in the IBM BladeCenter H chassis. The innovative design of the CIOv adapter is designed to work with the CFFh adapter to support this combination workload.
Part number information

Table 1. Ordering part number and feature code

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Feature code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet Expansion Card (CIOv) for IBM BladeCenter</td>
<td>44W4475</td>
<td>1039</td>
</tr>
</tbody>
</table>

This part number includes the following items:

- One Ethernet Expansion Card (CIOv) for IBM BladeCenter
- The Documentation CD that contains *Ethernet Expansion Card (CIOv) for IBM BladeCenter Installation and User’s Guide*
- The IBM *Important Notices* document

Features

The expansion card has the following features:

- PCI Express host interface
- Broadcom BCM5709S communication module
- BladeCenter Open Fabric Manager (BOFM) support
- Connection to 1000BASE-X environments using BladeCenter Ethernet switches
- Full-duplex (FDX) capability, enabling simultaneous transmission and reception of data on the Ethernet local area network (LAN)
- Failover support
- Preboot Execution Environment (PXE) support
- Support for direct memory access (DMA)
- Wake on LAN support for both ports

Operating environment

The expansion card is supported in this environment:

- Temperature:
  - 10 to 35°C (50 to 95°F) at 0 to 914 m (0 to 3,000 ft)
  - 10 to 32°C (50 to 90°F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)
Supported servers and I/O modules

The Ethernet Expansion Card (CIOv) is supported in the IBM BladeCenter servers listed in Table 2.

Table 2. Supported servers

<table>
<thead>
<tr>
<th>Expansion card</th>
<th>Part number</th>
<th>HS12</th>
<th>HS21</th>
<th>HS21 XM</th>
<th>HS22</th>
<th>LS22</th>
<th>LS42</th>
<th>JS12</th>
<th>JS22</th>
<th>QS22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet Expansion Card (CIOv)</td>
<td>44W4475</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

See IBM ServerProven for the latest information on the expansion cards supported by each blade server type: http://ibm.com/servers/eserver/serverproven/compat/us/.

CIOv expansion cards are installed in the CIOv slot in supported servers such as the HS22, as shown in Figure 2.

Figure 2. Location of the CIOv slot in the IBM BladeCenter HS22

The Ethernet Expansion Card (CIOv) requires that a supported I/O module is installed in bay 3 and bay 4 of the chassis that the cards and servers are installed in. The supported I/O modules are:

- Any IBM, BNT or Cisco Ethernet Switch Module (standard form-factor switch module)
- Optical Pass-thru Module
- Copper Pass-thru Module
- Intelligent Copper Pass-thru Module
Popular configurations

This section shows two popular configurations using the Ethernet Expansion Card (CIOv).

Adding two extra Ethernet ports per blade server

Most often, the Ethernet Expansion Card (CIOv) is used to expand the number of Ethernet ports per blade to increase network bandwidth. This is shown in Figure 3.

Figure 3. The Ethernet Expansion Card (CIOv) provides two extra Ethernet ports per blade server

The components used in this configuration are listed in Table 3.

Table 3. Components used when connecting the Ethernet Expansion Card (CIOv) to external Ethernet network

<table>
<thead>
<tr>
<th>Diagram reference</th>
<th>Part number / Machine type</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Varies</td>
<td>IBM BladeCenter HS22 or other supported server</td>
<td>1 to 14</td>
</tr>
<tr>
<td>②</td>
<td>44W4475</td>
<td>Ethernet Expansion Card (CIOv)</td>
<td>1 per server</td>
</tr>
<tr>
<td>③</td>
<td>8677 or 8852*</td>
<td>IBM BladeCenter E, BladeCenter H, or BladeCenter S*</td>
<td>1</td>
</tr>
<tr>
<td>④</td>
<td>Varies</td>
<td>Any Ethernet-compatible switch module</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>

*Note: The expansion card can be installed in servers in the BladeCenter S (8886). However, by doing so you will lose the ability to connect to the BladeCenter S Disk Storage Modules (DSMs). The Ethernet expansion card will go in the place of the SAS expansion card needed to connect to the DSMs. Instead, use the 2/4 Port Ethernet Expansion Card (CFFh), part number 44W4479.

This configuration will also require cabling between the chassis and the storage server and between the storage server and expansion units. (The cable part numbers are not listed in Table 3.)

iSCSI SAN storage solution

In addition, this card can be used to connect to external iSCSI-based entry-level SAN, as shown in Figure 4.
The components used in this configuration are listed in Table 4.

Table 4. Components used when connecting the Ethernet Expansion Card (CIOv) to external iSCSI disk storage

<table>
<thead>
<tr>
<th>Diagram reference</th>
<th>Part number / Machine type</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Varies</td>
<td>IBM BladeCenter HS22 or other supported server</td>
<td>1 to 14</td>
</tr>
<tr>
<td>2</td>
<td>44W4475</td>
<td>Ethernet Expansion Card (CIOv)</td>
<td>1 per server</td>
</tr>
<tr>
<td>3</td>
<td>8677 or 8852*</td>
<td>IBM BladeCenter E, BladeCenter H, or BladeCenter S*</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Varies</td>
<td>Any Ethernet-compatible switch module</td>
<td>1 or 2</td>
</tr>
<tr>
<td>5</td>
<td>1726-31X or 1726-32X</td>
<td>IBM System Storage DS3300 (Single or Dual Controller)</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1727</td>
<td>Optional IBM System Storage EXP3000 (Single or Dual ESM)</td>
<td>1 to 3</td>
</tr>
<tr>
<td>7</td>
<td>39R6536</td>
<td>DS3000 Partition Expansion License</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: The expansion card can be installed in servers in the BladeCenter S (8886). However, by doing so you will lose the ability to connect to the BladeCenter S Disk Storage Modules (DSMs). The Ethernet expansion card will go in the place of the SAS expansion card needed to connected to the DSMs. Instead, use the 2/4 Port Ethernet Expansion Card (CFFh), part number 44W4479.

This configuration will also require cabling between the chassis and the storage server and between the storage server and expansion units. (The cable part numbers are not listed in Table 4.)

Take these considerations into account when planning external DS3300-based disk storage system attachments:

- DS3300 is supported for both data storage and boot from SAN when attached to the supported BladeCenter chassis.
- DS3300 Dual Controller version (1726-32X) and DS3300 Single Controller version (1726-31X) are both supported.
- Redundant paths from Ethernet switch modules to the same RAID controller unit installed in DS3300 are supported.
- Up to 48 hot swap 3.5" disk drives with a SAS or SATA interface are supported. Up to three EXP3000 expansion units are supported. The intermixing of SAS and SATA drives is supported. Note, however, that you cannot use both SAS and SATA drives in the same array.
- DS3300 can be attached to up to 28 blade servers (two chassis). A Partition Expansion Licenses are required to support more than four host server blades.
- RAID levels 0, 1, 10, 3, 5, and 6 are supported by the DS3300.
  - A maximum of 48 drives is supported in a single RAID 0, 1, and 10 array.
  - A maximum of 30 drives is supported in a single RAID array for other RAID levels (3, 5, and 6).
  - The logical volume size can be greater than 2 TB.
- Optional FlashCopy and VolumeCopy options are available.

**Supported operating systems**

The following operating systems support the expansion card:

- Microsoft Windows Server 2008, Web x64 and x86 Editions
- Microsoft Windows Server 2008, Standard x64 and x86 Editions
- Microsoft Windows Server 2008, Enterprise x64 and x86 Editions
- Microsoft Windows Server 2008, Datacenter x64 and x86 Editions
- Microsoft Windows Server 2003 and 2003 R2, Standard x64 and x86 Editions
- Microsoft Windows Server 2003 and 2003 R2, Enterprise x64 and x86 Editions
- Microsoft Windows Server 2003 and 2003 R2, Datacenter x64 and x86 Editions
- Red Hat Enterprise Linux 5 Server x86 and x64 Editions
- Red Hat Enterprise Linux 5 Server with Xen x86 and x64 Editions
- SUSE LINUX Enterprise Server 10 for x86 and AMD64/EM64T Editions
- SUSE LINUX Enterprise Server 10 with Xen for x86 and AMD64/EM64T Editions

See IBM ServerProven for the latest information on the specific versions and service packs supported: [http://ibm.com/servers/eserver/serverproven/compat/us/](http://ibm.com/servers/eserver/serverproven/compat/us/). Select the blade server and then select the expansion card to see the supported operating systems.

**Related publications**

For more information refer to these documents:

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