PCIe2 2-Port 10GbE Base-T, PCIe2 4-Port (10GbE SFP+ & 1GbE RJ45) Adapter Families for IBM Power Systems

IBM Redbooks Product Guide

This IBM® Redbooks® Product Guide describes the PCIe2 2-Port 10GbE Base-T Adapter and PCIe2 4-Port (10GbE SFP+ & 1GbE RJ45) Adapter products. These are PCI Express Generation 2 (PCIe2) x8, short form-factor, low-profile capable, regular height network interface card (NIC) adapters. The 2-port adapters enable affordable 10-Gigabit Ethernet (10GbE) network performance with cost-effective RJ45 connections for distances up to 100 meters. The 4-port adapter enables affordable 10-Gigabit Ethernet (10GbE) network performance over SFP+ Multimode Fiber SR optical modules and also supports SFP+ Active Copper cables, depending on the Ethernet switch used. They are compatible with the installed base of GbE switching and cabling infrastructure commonly deployed today.

Figure 1. PCIe2 2-Port 10GbE Base-T Adapter

Did you know?

These network adapters offer an ideal solution for IBM Power System servers that require high-speed data transfer in LAN connectivity for mission-critical applications using existing, affordable cabling and switching IT infrastructure. The adapters provide support for 10Gb networking with CAT 6 copper cable connectivity with the two built-in RJ45 ports. The four-port adapter provides support for 10Gb SFP+ SR fiber or SFP+CU active Copper cable connectivity and 1Gb RJ45 CAT 5/5e cable connectivity.
Figure 2 shows the PCIe2 4-Port (10GbE SFP+ & 1GbE RJ45) Adapter.

![PCIe2 4-Port (10GbE SFP+ & 1GbE RJ45) Adapter](image)

Figure 2. PCIe2 4-Port (10GbE SFP+ & 1GbE RJ45) Adapter

**Part number information**

Table 1 contains the part numbers and feature codes for ordering these adapters.

Table 1. Ordering part numbers, CCINs, and feature codes

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>CCIN</th>
<th>Feature code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCIe2 2-port 10 GbE BaseT RJ45 Adapter</td>
<td>00E2718</td>
<td>2CC4</td>
<td>EN0W</td>
</tr>
<tr>
<td>PCIe2 LP 2-port 10 GbE BaseT RJ45 Adapter</td>
<td>00E2718</td>
<td>2CC4</td>
<td>EN0X</td>
</tr>
<tr>
<td>PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter</td>
<td>00E2719</td>
<td>2CC3</td>
<td>EN0S</td>
</tr>
<tr>
<td>PCIe2 LP 4-Port (10Gb+1GbE) SR+RJ45 Adapter</td>
<td>00E2719</td>
<td>2CC3</td>
<td>EN0T</td>
</tr>
<tr>
<td>PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter</td>
<td>00E2719</td>
<td>2CC3</td>
<td>EN0U</td>
</tr>
<tr>
<td>PCIe2 LP 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter</td>
<td>00E2719</td>
<td>2CC3</td>
<td>EN0V</td>
</tr>
</tbody>
</table>

PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapters and PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapters specifications (CCIN: 2CC3 FC: EN0S, EN0T, EN0U, and EN0V):

- Adapter field-replaceable unit (FRU) number: 00E2715 (complies with RoHS requirement)
- Low-profile tailstock part number: 00E2720
- Wrap plug FRU numbers:
  - 12R9314 (SFP+ SR wrap plug)
  - 74Y7010 (Twinax wrap plug)
  - 10N7405 (1 Gb unshielded twisted pair (UTP) wrap plug)
- I/O bus architecture: PCIe2 x8
PCle2 2-port 10 GbE Base-T RJ45 Adapters (CCIN: 2CC4 FC: EN0W EN0X) specifications:

- Adapter FRU number: 00E2714 (complies with RoHS requirement)
- Regular-height tailstock part number: 00E2862
- Low-profile tailstock part number: 00E2721
- Wrap plug FRU number: 10N7405 (RJ45 wrap plug)
- I/O bus architecture: PCIe2 x8

Cables: PCIe2 4-Port (10Gb+1GBE) SR+RJ45 Adapters

These adapters (CCIN: 2CC3 FC: EN0S and EN0T) use multimode fiber optic cables with shortwave lasers. Table 2 lists cable details.

Table 2. Supported distances for multimode fiber optic cables

<table>
<thead>
<tr>
<th>Cable type</th>
<th>OM1*</th>
<th>OM2**</th>
<th>OM3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>Multimode 62.5/125 micron fiber</td>
<td>Multimode 50/125 micron fiber</td>
<td>Multimode 50/125 micron fiber</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>200 MHz x km</td>
<td>500 MHz x km</td>
<td>2000 MHz x km</td>
</tr>
<tr>
<td>Supported distances</td>
<td>0.5 meters to 33 meters (1.64 feet to 108.26 feet)</td>
<td>0.5 meters to 82 meters (1.64 feet to 269.02 feet)</td>
<td>0.5 meters to 300 meters (1.64 feet to 984.25 feet)</td>
</tr>
</tbody>
</table>

* Because core sizes differ, OM1 cables can be connected only to other OM1 cables.
** For best results, OM2 cables must not be connected to OM3 or OM4 cables. However, if an OM2 cable is connected to an OM3 or OM4 cable, the OM2 cable characteristics apply to the entire length of the cables.

Cables: PCIe2 4-Port (10Gb+1GBE) Copper SFP+RJ45 Adapters

These adapters (CCIN: 2CC3 FC: EN0U and EN0V) use 10 Gb copper twinax Ethernet cables listed in Table 3.

Table 3. Feature code and part number for varying lengths of the cable

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cable, by length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>1 m (3.28 ft)</td>
</tr>
<tr>
<td>Feature code</td>
<td>EN01</td>
</tr>
<tr>
<td>CCIN</td>
<td>EF01</td>
</tr>
<tr>
<td>Part number</td>
<td>46K6182</td>
</tr>
</tbody>
</table>

Cables: PCIe2 2-Port 10 GbE GBaseT Adapters

These adapters (CCIN: 2CC4 FC:EN0W and EN0X) use the (4-pair) CAT 6A cables.
Features and specifications

The adapters provide the following features:

- Are PCIe2 NIC network convergence adapters.
- Can be used as the host local area network (LAN) adapter.
- Support interrupt moderation to deliver increased performance while significantly reducing processor utilization.
- Support dual port operation in any PCIe3 or PCIe2 slot.
- Support auto-negotiation, full-duplex only.
- Support multiple media-access control (MAC) per interface.
- Support integrated media-access control (MAC) and physical layer (PHY).
- Provide message signal interrupts (MSI), MSI-X, and support of legacy pin interrupts.
- Support jumbo frames up to 9.6 KB.
- Support gigabit Ether Channel (GEC) with the existing software.
- Support TCP checksum offload transmission control protocol (TCP), user datagram protocol (UDP), TCP segmentation Offload (TSO) for IPv4 and IPv6.
- Support TCP segmentation or large send offload.
- Support EEPROM-SPI and single EEPROM.
- Comply with the following protocols:
  - IEEE 802.3ae in the 10 GbE ports
  - IEEE 802.3ab in the 1 GbE ports
  - Ether II and IEEE 802.3 for encapsulated frames
  - IEEE 802.1p for setting up priority levels in tagged VLAN frames
  - IEEE 802.1Q for VLAN tagging
  - IEEE 802.3x for flow control
  - IEEE 802.3ad for load-balancing and failover
  - IEEE 802.3ad and 802.3 for link aggregation
Supported servers

Table 4 identifies the IBM Power System servers that are supported by these adapters.

Table 4. Servers supported by the adapters

<table>
<thead>
<tr>
<th>IBM Power System</th>
<th>Part numbers (CCINs) and feature codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>00E2719 (2CC3)</td>
</tr>
<tr>
<td></td>
<td>EN0S</td>
</tr>
<tr>
<td>S812L (8247-21L)</td>
<td>No</td>
</tr>
<tr>
<td>S814 (8286-41A)</td>
<td>Yes</td>
</tr>
<tr>
<td>S822 (8284-22A)</td>
<td>No</td>
</tr>
<tr>
<td>S822L (8247-22L)</td>
<td>No</td>
</tr>
<tr>
<td>S824 (8286-42A)</td>
<td>Yes</td>
</tr>
<tr>
<td>S824L (8247-42L)</td>
<td>Yes</td>
</tr>
<tr>
<td>E870 (9119-MME)</td>
<td>Yes</td>
</tr>
<tr>
<td>E880 (9119-MHE)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Supported operating systems and device drivers

The adapters support the following IBM AIX®, Linux, and IBM i operating systems and device drivers:

**AIX** (all adapter feature codes support these AIX versions):
- AIX 7.1, Technology Level 3, Service Pack 2, or later
- AIX 7.1, Technology Level 2, Service Pack 2, or later
- AIX 7.1, Technology Level 1, Service Pack 3, or later
- AIX 6.1, Technology Level 9, Service Pack 2, or later
- AIX 6.1, Technology Level 8, Service Pack 3, or later
- AIX 6.1, Technology Level 7, Service Pack 2, or later

**Linux** (all adapters feature codes support these versions of Linux):
- Red Hat Enterprise Linux Version 6.5 or later; current maintenance updates are available from Red Hat.
- SUSE Linux Enterprise Server 11, Service Pack 3, or later; current maintenance updates are available from SUSE.

For support and important notices, see the Linux on IBM web page:

**IBM i** (Table 5 lists IBM I versions that are applicable to the adapter feature codes).
Table 5. IBM i version applicable to adapter feature codes

<table>
<thead>
<tr>
<th>IBM i</th>
<th>Part numbers (CCINs) and feature codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>00E2719 (2CC3)</td>
</tr>
<tr>
<td></td>
<td>00E2718 (2CC4)</td>
</tr>
<tr>
<td></td>
<td>EN0S</td>
</tr>
<tr>
<td>IBM i Version 7.2</td>
<td>Yes</td>
</tr>
<tr>
<td>IBM i Version 7.1 or later</td>
<td>Yes</td>
</tr>
<tr>
<td>Supported on Firmware level 8.1</td>
<td>No</td>
</tr>
</tbody>
</table>

Device drivers

Table 6 lists the device drivers that are needed for the adapters.

Table 6. Device drivers

<table>
<thead>
<tr>
<th>Device drivers</th>
<th>Part numbers (CCINs) and feature codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>00E2719 (2CC3)</td>
</tr>
<tr>
<td></td>
<td>00E2718 (2CC4)</td>
</tr>
<tr>
<td></td>
<td>EN0S</td>
</tr>
<tr>
<td>AIX: devices.pciex.e4148a1614109304 for SFP+ optical ports and devices.pciex.e4148a1614109404 for RJ45 ports</td>
<td>Yes</td>
</tr>
<tr>
<td>AIX: devices.pciex.e4148e1614109204</td>
<td>No</td>
</tr>
<tr>
<td>Linux: bnx2x driver</td>
<td>Yes</td>
</tr>
</tbody>
</table>

To download the current version of the device driver or Power RAID adapter utilities (iprutils), go to the IBM Service and productivity tools website: http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html
Popular configuration

Figure 3 shows a common configuration using these adapters with two IBM Power Systems® that are connected via an Ethernet network.

Warranty

When these adapters are installed in a supported IBM server, they assume your system's base warranty.
Physical specification

Table 7 lists the physical specifications for these adapters.

Table 7. Physical specifications

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Part numbers (CCINs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>00E2719 (2CC3)</td>
</tr>
<tr>
<td>Width</td>
<td>0.7&quot;</td>
</tr>
<tr>
<td>Length</td>
<td>6.6&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>2.731&quot;</td>
</tr>
<tr>
<td>Height with bracket</td>
<td>4.725&quot;</td>
</tr>
<tr>
<td>Weight</td>
<td>450 g (0.99 lb.)</td>
</tr>
</tbody>
</table>

Operating environment

The adapters are supported in the following environment:

- Temperature:
  - Operating: 0° to 55°C (32° to 131 °F) at 0 - 914 m (0 - 3000 ft)
  - Storage: -40° to 65°C (-40° to 149°F) at 0 - 914 m (0 - 3000 ft)
- Relative humidity: 5% - 95% (non-condensing)
Agency approvals

The adapters are compliant with European Union Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

Table 8 lists FCC Classifications that are available for these adapters. Date format is mm/dd/yy.

Table 8: FCC Classifications

<table>
<thead>
<tr>
<th>Classification</th>
<th>Class</th>
<th>Date</th>
<th>Class</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCC Rules, Part 15</td>
<td>B</td>
<td>01/13/13</td>
<td>A</td>
<td>08/09/13</td>
</tr>
<tr>
<td>Industry Canada, ICES-003</td>
<td>B</td>
<td>01/13/13</td>
<td>A</td>
<td>08/09/13</td>
</tr>
<tr>
<td>EN55022 (emissions portion of the CE Mark)</td>
<td>B</td>
<td>03/11/13</td>
<td>A</td>
<td>08/19/13</td>
</tr>
<tr>
<td>EN55024 (immunity portion of the CE Mark)</td>
<td>N/A</td>
<td>03/11/13</td>
<td>N/A</td>
<td>08/19/13</td>
</tr>
<tr>
<td>CISPR22</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Australia/New Zealand (C-Tick Mark)</td>
<td>B</td>
<td>01/13/13</td>
<td>A</td>
<td>08/19/13</td>
</tr>
<tr>
<td>Japan VCCI</td>
<td>B</td>
<td>01/25/13</td>
<td>A</td>
<td>08/19/13</td>
</tr>
<tr>
<td>Taiwan BSMI</td>
<td>B</td>
<td>01/30/13</td>
<td>A</td>
<td>10/18/13</td>
</tr>
<tr>
<td>Korea</td>
<td>B</td>
<td>02/20/13</td>
<td>A</td>
<td>09/10/13</td>
</tr>
</tbody>
</table>
Related information

See these resources for more information about the adapters:

- **IBM Power Systems S812L and S822L Technical Overview and Introduction**, REDP-5098
- **IBM Power Systems S814 and S824 Technical Overview and Introduction**, REDP-5097
- **IBM Power System S824L Technical Overview and Introduction**, REDP-5139
- **IBM Power Systems E870 and E880 Technical Overview and Introduction**, REDP-5137
- **IBM Power System S822 Technical Overview and Introduction**, REDP-5102
- IBM Systems
- Power Systems Technical Guide
  [http://www-03.ibm.com/systems/power/hardware/reports/factsfeatures.html](http://www-03.ibm.com/systems/power/hardware/reports/factsfeatures.html)
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