

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.



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

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

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

PCIe2 2-port 10 GbE BaseT 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

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

* 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

Characteristics	Cable, by length		
Length	1 m (3.28 ft)	3 m (9.84 ft)	5 m (16.4 ft)
Feature code	EN01	EN02	EN03
CCIN	EF01	EF02	EF03
Part number	46K6182	46K6183	46K6184

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

IBM Power System	Part numbers (CCINs) and feature codes					
	00E2719 (2CC3)				00E2718 (2CC4)	
	EN0S	EN0T	EN0U	EN0V	EN0W	EN0X
S812L (8247-21L)	No	Yes	No	Yes	No	No
S814 (8286-41A)	Yes	No	Yes	No	Yes	No
S822 (8284-22A)	No	Yes	No	Yes	No	Yes
S822L (8247-22L)	No	Yes	No	Yes	No	No
S824 (8286-42A)	Yes	No	Yes	No	Yes	No
S824L (8247-42L)	Yes	No	No	No	Yes	No
E870 (9119-MME)	Yes	Yes	Yes	Yes	Yes	Yes
E880 (9119-MHE)	Yes	Yes	Yes	Yes	Yes	Yes

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:

<http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/info/LinuxAlerts.html>

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

IBM i	Part numbers (CCINs) and feature codes					
	00E2719 (2CC3)				00E2718 (2CC4)	
	EN0S	EN0T	EN0U	EN0V	EN0W	EN0X
IBM i Version 7.2	Yes	No	Yes	No	Yes	No
IBM i Version 7.1 or later	Yes	Yes	Yes	Yes	Yes	Yes
Supported on Firmware level 8.1	No	No	Yes	Yes	No	No

Device drivers

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

Table 6. Device drivers

Device drivers	Part numbers (CCINs) and feature codes					
	00E2719 (2CC3)				00E2718 (2CC4)	
	EN0S	EN0T	EN0U	EN0V	EN0W	EN0X
AIX: devices.pciex.e4148a1614109304 for SFP+ optical ports and devices.pciex.e4148a1614109404 for RJ45 ports	Yes	Yes	Yes	Yes	No	No
AIX: devices.pciex.e4148e1614109204	No	No	No	No	Yes	Yes
Linux: bnx2x driver	Yes	Yes	Yes	Yes	Yes	Yes

To download the current version of the device driver or Power RAID adapter utilities (`iprutil.s`), 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.

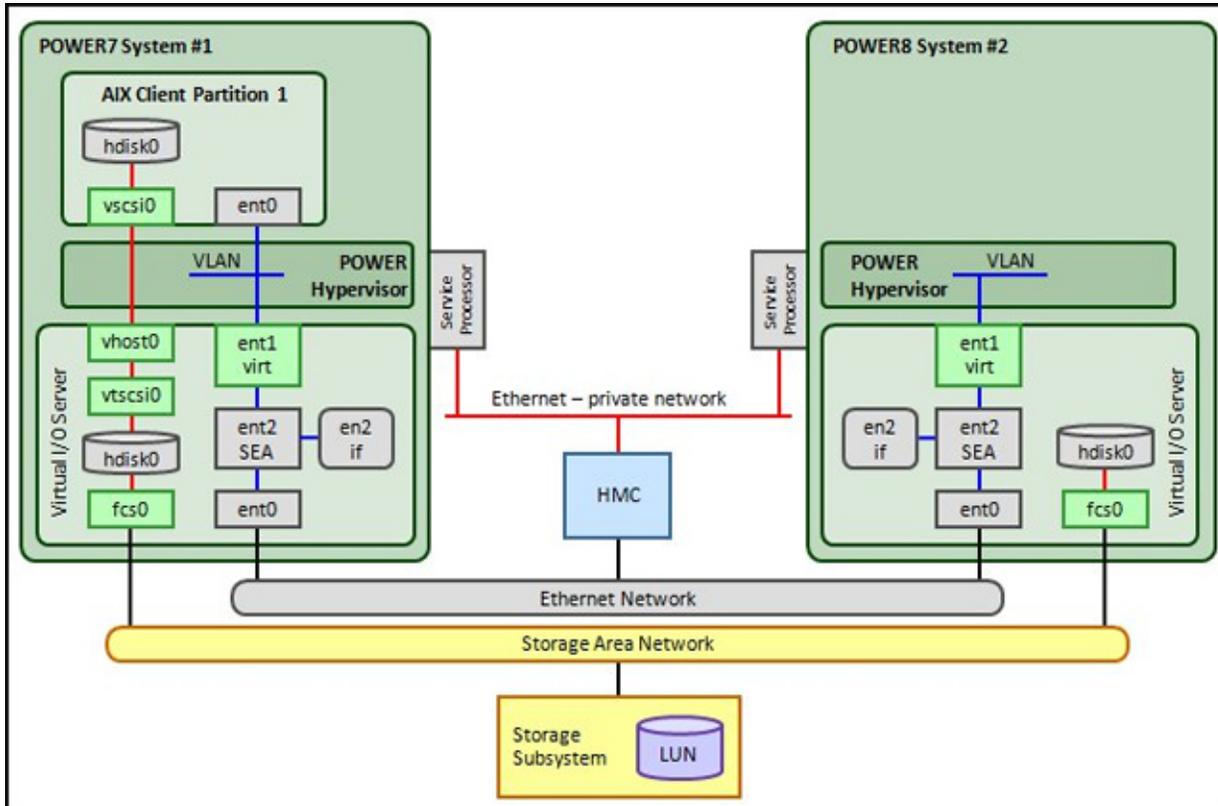


Figure 3. Power Systems using Ethernet

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

Dimension	Part numbers (CCINs)	
	00E2719 (2CC3)	00E2718 (2CC4)
Width	0.7"	0.7"
Length	6.6"	6.6"
Height	2.731"	2.731"
Height with bracket	4.725"	4.725"
Weight	450 g (0.99 lb.)	450 g (0.99 lb.)

Operating environment

The adapters are supported in the following environment:

- Temperature:
 - o Operating: 0° to 55°C (32° to 131 °F) at 0 - 914 m (0 - 3000 ft)
 - o 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

Classification	Part numbers (CCINs)			
	00E2719 (2CC3)		00E2718 (2CC4)	
	Class	Date	Class	Date
FCC Rules, Part 15	B	01/13/13	A	08/09/13
Industry Canada, ICES-003	B	01/13/13	A	08/09/13
EN55022 (emissions portion of the CE Mark)	B	03/11/13	A	08/19/13
EN55024 (immunity portion of the CE Mark)	N/A	03/11/13	N/A	08/19/13
CISPR22	-		-	
Australia/New Zealand (C-Tick Mark)	B	01/13/13	A	08/19/13
Japan VCCI	B	01/25/13	A	08/19/13
Taiwan BSMI	B	01/30/13	A	10/18/13
Korea	B	02/20/13	A	09/10/13

Related information

See these resources for more information about the adapters:

- *IBM Power Systems S812L and S822L Technical Overview and Introduction*, REDP-5098
<http://www.redbooks.ibm.com/abstracts/redp5098.html?Open>
- *IBM Power Systems S814 and S824 Technical Overview and Introduction*, REDP-5097
<http://www.redbooks.ibm.com/abstracts/redp5097.html?Open>
- *IBM Power System S824L Technical Overview and Introduction*, REDP-5139
<http://www.redbooks.ibm.com/redpieces/abstracts/redp5139.html?Open>
- *IBM Power Systems E870 and E880 Technical Overview and Introduction*, REDP-5137
<http://www.redbooks.ibm.com/redpieces/abstracts/redp5137.html?Open>
- *IBM Power System S822 Technical Overview and Introduction*, REDP-5102
<http://www.redbooks.ibm.com/abstracts/redp5102.html?Open>
- IBM Systems
<http://www-03.ibm.com/systems/infrastructure/us/en/it-infrastructure/mobile-app.html>
- Power Systems Technical Guide
<http://www-03.ibm.com/systems/power/hardware/reports/factsfeatures.html>
- IBM PartnerWorld® - Techline
<http://www-304.ibm.com/partnerworld/wps/servlet/ContentHandler/LLIE-6LLS4T>
- IBM PartnerWorld - IBM Techline Repository
https://www-304.ibm.com/partnerworld/wps/servlet/ContentHandler/stg_com_sys-techline-repository

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service. IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you. This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk. IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you. Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

© Copyright International Business Machines Corporation 2014-2015. All rights reserved.

Note to U.S. Government Users Restricted Rights -- Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

This document was created or updated on January 20, 2015.

Send us your comments in one of the following ways:

- Use the online **Contact us** review form found at:
ibm.com/redbooks
- Send your comments in an e-mail to:
redbooks@us.ibm.com
- Mail your comments to:
IBM Corporation, International Technical Support Organization
Dept. HYTD Mail Station P099
2455 South Road
Poughkeepsie, NY 12601-5400 U.S.A.

This document is available online at <http://www.ibm.com/redbooks/abstracts/tips1225.html> .

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are marked on their first occurrence in this information with the appropriate symbol (® or ™), indicating US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at <http://www.ibm.com/legal/copytrade.shtml>

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

AIX®
IBM®
PartnerWorld®
Power Systems™
Redbooks®
Redbooks (logo)®

The following terms are trademarks of other companies:

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.