BCM5719-4P

Quad-Port Ethernet Server Adapter

General Description

The Broadcom® NetXtreme® BCM5719-4P is a quad-port 10/100/1000 Mb/s x4 PCI Express (PCIe) Ethernet Adapter that supports the IEEE 802.3ab standard over Category-5 twisted-pair cable. The card supports offload technologies including Large Send, TCP segmentation, TCP/UDP/IP checksum, and Receive Side Scaling (RSS) that deliver optimal network throughput, lower host processor utilization and, as a result, improve overall system performance. The card ships in a small form factor that is suitable for both low-profile and standard chassis server configurations.
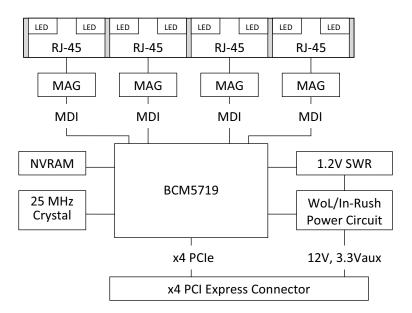
Features

- The BCM5719-4P Ethernet adapter is RoHS-compliant.
- Energy Efficient Ethernet-compliant with IEEE Std 802.3az-2010
- Quad-port Ethernet adapter
- x4 PCI Express v2.1 at 5 GT/s or 2.5 GT/s
- Hardware assist for IEEE 1588 and IEEE 802.1AS time synchronization implementations
- MSI and MSI-X capabilities — up to 17 MSI-X vectors
- I/O Virtualization support for VMWare NetQueue and Microsoft VMQ
- 17 receive queues and 16 transmit queues per port
- 17 MSI-X vectors supporting per queue interrupt to host
- Function Level Reset (FLR)
- ECC error detection and correction on internal SRAM
- Quad RJ-45 connectors with integrated link and activity LEDs
- RSS for multicore client processors
- TCP, UDP, and IP checksum offload
- Large Send Offload, TCP Segmentation Offload
- Wake-on-LAN (WOL) support that complies with ACPI requirements
- Statistics for SNMP MIB II and Ethernet-like MIB
- Comprehensive diagnostic and configuration software suite
- Jumbo frame support with up to 9.6 KB packet size
- Low-profile form factor: 2.7 in. x 5.2 in.

Applications

BCM5719-4P is compatible with x86 and x64 servers utilizing the PCIe v1.x and v2.x interfaces.

Figure 1: Functional Block Diagram

Table of Contents

Chapter 1: Introduction

1.1 Overview

The Broadcom BCM5719-4P is a quad-port 10/100/1000 Mb/s x4 PCI Express (PCIe) Specification v2.1 Ethernet server adapter that supports the IEEE 802.3ab standard over Category-5 twisted pair cable. The card supports offload technologies, including Large Send, TCP segmentation, and TCP/UDP/IP checksum, and Receive Side Scaling (RSS) that deliver optimal network throughput, lower host processor utilization and, as a result, improve system overall performance. The server adapter ships in a small form factor that is suitable for both low-profile and standard chassis configurations.

1.2 Features

The BCM5719-4P Ethernet server adapter supports the following features:

- Quad-port 10/100/1000BASE-T Ethernet server adapter
- x4 PCI Express v2.1 at 5 GT/s or 2.5 GT/s
- Hardware assist for IEEE 1588 and IEEE 802.1AS time synchronization implementations
- MSI and MSI-X capabilities — up to 17 MSI-X vectors
- I/O Virtualization support for VMWare NetQueue and Microsoft VMQ
  - 17 receive queues and 16 transmit queues per port
  - 17 MSI-X vectors supporting per queue interrupt to host
- Function Level Reset (FLR)
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- Wake-on-LAN (WOL) support that complies with ACPI requirements
- Statistics for SNMP MIB II and Ethernet-like MIB
- Comprehensive diagnostic and configuration software suite
- Jumbo frame support with up to 9.6 KB packet size
- Low-profile form factor: 2.7 in. x 5.2 in.
- RoHS-compliant (lead-free)

Chapter 2: Functional Overview

2.1 Functional Block Diagram

The functional block diagram (Figure 1) shows the high-level components that are used in the BCM5719-4P. Each component is described in the following sections.

2.2 PCI Express Host Interface

The BCM5719-4P complies with the *PCI Express Base Specification* (Revision 2.1)*.*

The card-edge connector follows the x4 PCI Express standard pinout for add-in cards outlined in Table 5-1, Section 5.1 of *PCI Express Card Electromechanical Specification* (Revision 2.0).

2.3 BCM5719-4P Ethernet Server Adapter

The BCM5719-4P Ethernet server adapter contains quad-port 10/100/1000BASE-T MACs with integrated PHYs whose Gigabit Media Dependent Interface (MDI) differential signals are connected to the quad-port RJ-45 connectors. The BCM5719-4P controls the WOL power switching circuitry as well.

2.4 RJ-45 Connector and LED Functions

The BCM5719-4P supports four RJ-45 connectors. There are two LEDs integrated on each RJ-45 connector. The LEDs are described as follows:

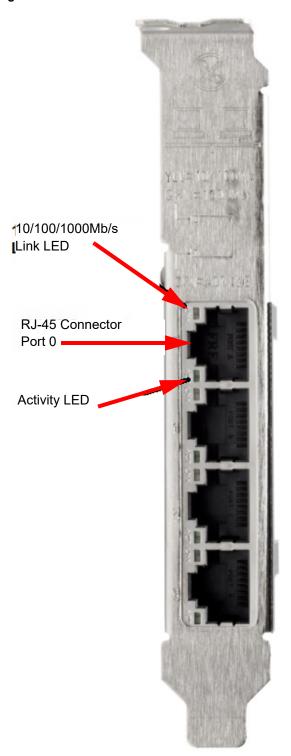The Link LEDs are located at the upper left corner of the connector.
- Yellow = 10/100 Mb/s
- Green = 1000 Mb/s

The Activity LED is located at the lower left corner of the connector
- Green = blinks when there is activity on the wires

Figure 2 shows the locations of the LEDs and the RJ-45 connector.

Figure 2: LEDs and RJ-45 Connector

10/100/1000Mb/s
Link LED

RJ-45 Connector
Port 0

Activity LED

2.5 Non-Volatile RAM

The BCM5719-4P requires a non-volatile serial flash memory (NVRAM) on the adapter, which is used to store boot code and PCI configuration information such as Device ID and Vendor ID as well as various firmware components. The boot code is downloaded in the device memory and executed by an internal processor. User mode software running on the host system can be used to upgrade the boot code contents in the NVRAM.

2.6 Regulatory and Safety

The following sections detail the Regulatory, Safety, Electromagnetic Compatibility (EMC), and Electrostatic Discharge (ESD) standard compliance for the BCM5719-4P Network Interface Card.

2.6.1 Regulatory

Table 1: Regulatory Approvals

Item	Applicable Standard	Approval (A)/Certificate (C)
CE/European Union	EN 62368-1:2014	CB report and certificate
UL/USA	IEC 62368-1 (ed. 2)	CB report and certificate

2.6.2 Safety

Table 2: Safety Approvals

Country	Certification Type/Standard	Compliance
International	CB Scheme ICES 003 – Digital Device UL 1977 (connector safety) UL 796 (PCB wiring safety) UL 94 (flammability of parts)	Yes

2.6.3 Electromagnetic Compatibility (EMC)

Table 3: Electromagnetic Compatibility

Standard/Country	Certification Type	Compliance
CE/EU	EN 55032:2012/AC:2013 Class A EN 55024:2010 EN 61000-3-2:2014 EN 61000-3-3:2013	CE report and CE DoC
FCC/USA	CFR47 Part 15 Subpart B Class A	FCC/IC DoC and EMC report referencing FCC and IC standards
IC/Canada	ICES-003 Class A	FCC/IC DoC and report referencing FCC and IC standards
ACA/Australia, New Zealand	AS/NZS CISPR 22:2009 +A1:2010	ACA certificate
BSM/Taiwan	CNS 13438 (2006) Class A	BSMI certificate
BSMI/Taiwan	CNS 15663	BSMI certificate/RoHS table
MSIP/S. Korea	RRL KN22 Class A KN24	Korea certificate MSIP mark

Table 3: Electromagnetic Compatibility (Continued)

Standard/Country	Certification Type	Compliance
VCCI/Japan	VCCI V-3 (2015-04)	Copy of VCCI online certificate

2.6.4 Electrostatic Discharge (ESD) Compliance

Table 4: ESD Compliance Summary

Standard	Certification Type	Compliance
EN 55024:2010 (EN 61000-4-2)	Air/Direct discharge	Yes

2.6.5 FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

2.7 DC Power Specification

Table 5 shows the total power consumption required from the 12V and 3.3Vaux PCIe card-edge connector pins.

Table 5: Board Power Consumption

Condition	3.3Vaux (A)	12V (A)	Total Power (W)
No Link (idle)	0	0.160.16	1.94
10BASE-T	0	0.270.27	3.25
100BASE-T	0	0.280.28	3.37
1000BASE-T	0	0.480.48	5.78
Low-Power Mode (10BASE-T)	0.16	0	0.88
Low-Power Mode (100BASE-T)	0.17	0	0.94

2.8 Environmental Specifications

Table 6: Environmental Specifications

Parameter	Condition
Operating Temperature	0°C to 55°C
Airflow Requirement (LFM)	0
Storage Temperature	–40°C to +65°C
Storage and Operating Humidity	5% to 95% non-condensing
Vibration and Shock	IEC 68, FCC Part 68.302, NSTA, 1A
Electrostatic/Electromagnetic Susceptibility	EN 61000-4-2, EN 55024

Chapter 3: Ordering Information

Table 7: Ordering Information

Part Number	Description
BCM95719A1904AC	Quad-port Gigabit Ethernet x4 PCI Express Adapter; RoHS-compliant

Appendix A: Acronyms and Abbreviations

For a more complete list of acronyms and other terms used in Broadcom documents, go to:
http://www.broadcom.com/press/glossary.php.

Table 8: Acronyms and Abbreviations

Term	Description
FLR	Function Level Reset
MIB	Management Information Base
MSI	Message Signaled Interrupt
NVRAM	Nonvolatile RAM
RSS	Receive Side Scaling
SRAM	Static RAM
WOL	Wake-on-LAN

Revision History

5719-4P-DS102; February 8, 2022

Updated:

- Chapter 3, Ordering Information - Updated ordering information.

5719-4P-DS102; October 21, 2021

Updated:

- FCC Statement

5719-4P-DS101; January 4, 2018

Updated:

- Regulatory and Safety

5719-4P-DS100-R; February 12, 2015

Initial release.

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