BCM95719N1905C

Quad-Port 10/100/1000BASE-T Ethernet x4 PCI Express OCP 3.0 Small-Form-Factor Card

Overview

The Broadcom® BCM95719N1905C is a quad-port 10/100/1000 Mb/s x4 PCI Express (PCIe) Network Adapter Card designed to the Open Compute Project (OCP) 3.0 Design Specification 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) to deliver optimal network throughput, lower host processor utilization, and, as a result, improved overall system performance. The card is designed to meet the Open Compute Project (OCP) 3.0 Design Specification in small form factor.

Features

- The BCM95719N1905C network interface card is RoHS-compliant.
- Energy Efficient Ethernet-compliant with IEEE Std 802.3az-2010.
- Quad-port 10/100/1000BASE-T Ethernet NIC.
- 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.
    - 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 complies with ACPI requirements.
- Network Controller Sideband Interface (NC-SI) over RMII Based Transport (RBT) physical interface.
- FRU support.
- Statistics for SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (IEEE 802.3z, Clause 30).
- Comprehensive diagnostic and configuration software suite.
- Jumbo frame support with up to 9.6 KB[1] packet size.
- Conforms to the OCP 3.0 Design Specification Version 0.85.

Applications

PCI Express Gigabit Ethernet adapter for OCP systems.

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1. This is the capability of the silicon. The implementation of MTU size is OS-dependent. Contact your Broadcom FAE for additional information.

Figure 1: BCM95719N1905C OCP 3.0 SFF Card
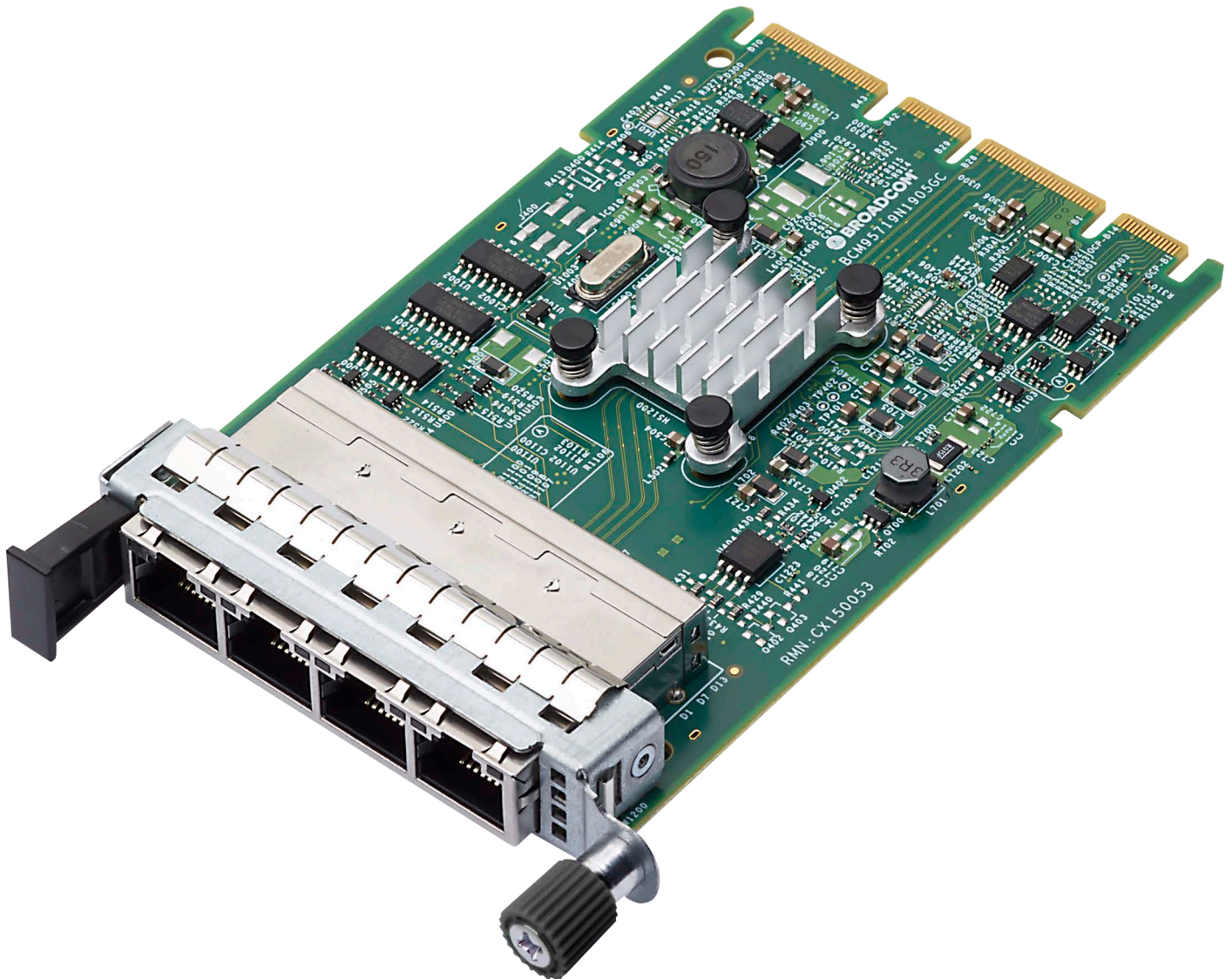
NOTE: Figure 1 does not show the faceplate installed. In general, a pull tab is installed by default. The surface markings of the component may not reflect the product you receive. Broadcom reserves the right to change any component on the printed circuit board with the same functionality.
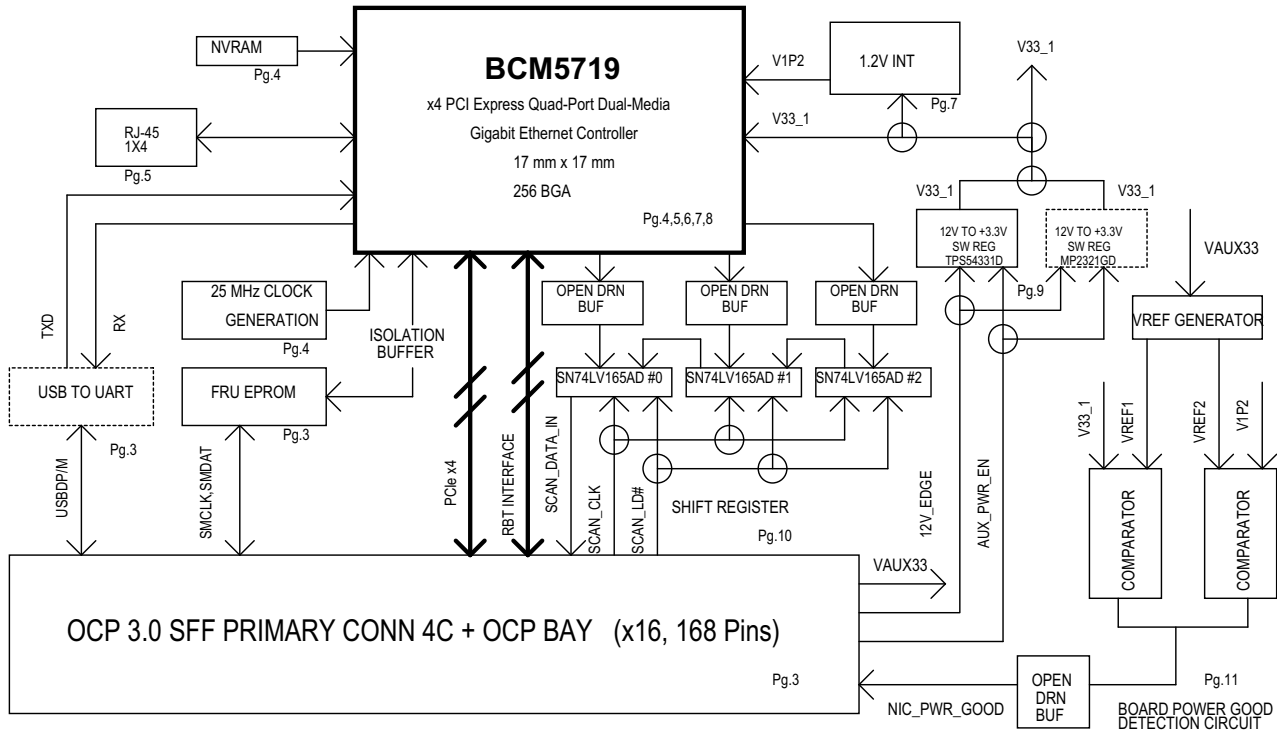
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1 Functional Description

This section provides the functional description of the BCM95719N1905C Network Adapter Card.

1.1 Block Diagram

Figure 2 shows the main functional blocks on the BCM95719N1905C Network Adapter Card.

Figure 2: BCM95719N1905C Block Diagram

1.2 Host Interface Connector

The BCM95719N1905C OCP network adapter card interfaces with the system baseboard via the gold fingers compliant with the SFF-TA-1002 specification. The PCIe bus, NC-SI bus, SMBus interface, various other sideband signals, and power are assigned to this connector. The connector pinout complies with the primary connector (4C+ OCP) as described in the OCP 3.0 Design Specification. Table 1 shows the signal pinout. Definitions of the signals at this connector are provided in the OCP 3.0 Design Specification (version 0.85).

Table 1: Primary Connector (4C+) Pinout

	Side B		Side A
OCP_B1	NIC_PWR_GOOD	PERST2#	OCP_A1
OCP_B2	MAIN_PWR_EN	PERST3#	OCP_A2
OCP_B3	LD#	WAKE#	OCP_A3
OCP_B4	DATA_IN	RBT_ARB_IN	OCP_A4
OCP_B5	DATA_OUT	RBT_ARB_OUT	OCP_A5
OCP_B6	CLK	SLOT_ID1	OCP_A6
OCP_B7	SLOT_ID0	RBT_TX_EN	OCP_A7
OCP_B8	RBT_RXD1	RBT_TXD1	OCP_A8
OCP_B9	RBT_RXD0	RBT_TXD0	OCP_A9
OCP_B10	GND	GND	OCP_A10
OCP_B11	REFCLKn2	REFCLKn3	OCP_A11
OCP_B12	REFCLKp2	REFCLKp3	OCP_A12
OCP_B13	GND	GND	OCP_A13
OCP_B14	RBT_CRS_DV	RBT_CLK_IN	OCP_A14
	Mechanical Key		
B1	+12V_EDGE	GND	A1
B2	+12V_EDGE	GND	A2
B3	+12V_EDGE	GND	A3
B4	+12V_EDGE	GND	A4
B5	+12V_EDGE	GND	A5
B6	+12V_EDGE	GND	A6
B7	BIF0#	SMCLK	A7
B8	BIF1#	SMDAT	A8
B9	BIF2#	SMRST#	A9
B10	PERST0#	PRSNTA#	A10
B11	+3.3V_EDGE	PERST1#	A11
B12	AUX_PWR_EN	PRSNTB2#	A12
B13	GND	GND	A13
B14	REFCLKn0	REFCLKn1	A14
B15	REFCLKp0	REFCLKp1	A15
B16	GND	GND	A16
B17	PETn0	PERn0	A17
B18	PETp0	PERp0	A18
B19	GND	GND	A19
B20	PETn1	PERn1	A20

Table 1: Primary Connector (4C+) Pinout (Continued)

	Side B		Side A	
B21	PETp1	PERp1	A21	
B22	GND	GND	A22	
B23	PETn2	PERn2	A23	
B24	PETp2	PERp2	A24	
B25	GND	GND	A25	
B26	PETn3	PERn3	A26	
B27	PETp3	PERp3	A27	
B28	GND	GND	A28	
Mechanical Key				
B29	GND	GND	A29	
B30	PETn4	PERn4	A30	
B31	PETp4	PERp4	A31	
B32	GND	GND	A32	
B33	PETn5	PERn5	A33	
B34	PETp5	PERp5	A34	
B35	GND	GND	A35	
B36	PETn6	PERn6	A36	
B37	PETp6	PERp6	A37	
B38	GND	GND	A38	
B39	PETn7	PERn7	A39	
B40	PETp7	PERp7	A40	
B41	GND	GND	A41	
B42	PRSNTB0#	PRSNTB1#	A42	
Mechanical Key				
B43	GND	GND	A43	
B44	PETn8	PERn8	A44	
B45	PETp8	PERp8	A45	
B46	GND	GND	A46	
B47	PETn9	PERn9	A47	
B48	PETp9	PERp9	A48	
B49	GND	GND	A49	
B50	PETn10	PERn10	A50	
B51	PETp10	PERp10	A51	
B52	GND	GND	A52	
B53	PETn11	PERn11	A53	
B54	PETp11	PERp11	A54	
B55	GND	GND	A55	
B56	PETn12	PERn12	A56	
B57	PETp12	PERp12	A57	
B58	GND	GND	A58	
B59	PETn13	PERn13	A59	
B60	PETp13	PERp13	A60	

Table 1: Primary Connector (4C+) Pinout (Continued)

	Side B	Side A	
B61	GND	GND	A61
B62	PETn14	PERn14	A62
B63	PETp14	PERp14	A63
B64	GND	GND	A64
B65	PETn15	PERn15	A65
B66	PETp15	PERp15	A66
B67	GND	GND	A67
B68	RFU1, N/C	USB_DATn	A68
B69	RFU2, N/C	USB_DATp	A69
B70	PRSNTB3#	PWRBRK0#	A70

1.3 BCM5719 Ethernet Controller

The BCM5719 controller 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 controls the WOL power switching circuitry as well.

1.4 PCI Express Interface

PCIe is a high-bandwidth serial bus providing a low pin-count interface as an alternative to parallel PCI. It is part of the host interface connector. The BCM5719 complies with the PCI Express Base Specification Revision 2.0, and supports a 4-lane PCIe 2.0 interface via the host interface connector.

1.5 NC-SI over RBT Interface

The BCM5719 Ethernet controller supports the Network Controller Sideband Interface (NC-SI) Specification version 1.1.0. The NC-SI provides a standardized interface between the system baseboard management controller (BMC) and the integrated NC-SI module of the BCM5719.

1.6 SMBus Interface

The BCM5719 Ethernet Controller SMB0 interface supports serial communications between BCM5719 and the system. The interface allows the Ethernet controller to act as a SMBus primary or a secondary device.

1.7 Nonvolatile RAM

The BCM95719N1905C requires a non-volatile serial Flash memory (NVRAM) on the NIC, 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 into 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.

Upon power up, the device is configured to the correct NVRAM device based upon the external strapping on the NVRAM interface. The NVRAM strapping is set by the board manufacturer and cannot be changed.

1.8 Heat Sink

The passive heat sink is attached to the Ethernet controller using four spring-loaded push pins that are inserted into four mounting holes. To prevent damage to the BCM5719 Ethernet controller in the event of a missing heat sink, the network adapter card is not allowed to power up.

1.9 Power Supplies

All power is derived from the network adapter card host interface connector 12V and 3.3V supply which feeds the onboard regulators that provide the necessary power to the various components on the card. The network adapter card has three switching voltage regulators that power the card's various +1.2V and +3.3V loads.

1.10 LED Functions and Locations

The BCM95719N1905C NIC supports four RJ-45 connectors. There are two LEDs integrated on each RJ-45 connector. The LEDs are visible as shown in Figure 3. Its locations and form factors conform to the OCP 3.0 Design Specification.
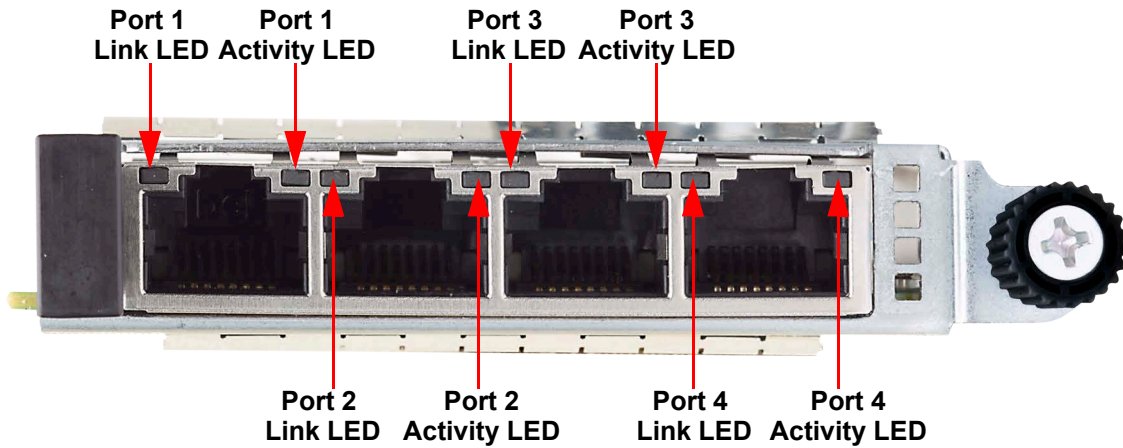
Figure 3: Activity and Link LED Locations

Table 2: LED Functions

LED Type	Color/Behavior	Note
Activity	Off	No Activity
	Green (blinking)	Link up (traffic flowing)
Link	Off	No Link
	Green	Linked at 1000 Mb/s
	Amber	Linked at 10/100 Mb/s

2 Regulatory and Safety Approvals

The BCM95719N1905C Network Adapter Card meets the regulatory requirements of the OCP 3.0 Design Specification. For additional information on required compliance including environmental, EMC, Product Safety, and immunity (ESD), reference the OCP 3.0 Design Specification.

2.1 Board Power Consumption

Table 3 shows the total power consumption required on the 12V and 3.3V edge connector pins for the BCM95719N1905C.

Table 3: Board Power Consumption

Condition	Total Power (W)
No Link (idle)	1.63
10BASE-T	2.68
100BASE-T	2.85
1000BASE-T	4.69
Low-Power Mode (10BASE-T)	0.88
Low-Power Mode (100BASE-T)	0.94

3 Airflow Requirements

The maximum junction temperature (Tj) for the BCM5719 is 110°C. The system designer should deploy methods to monitor the BCM5719 Tj and provide sufficient airflow for keeping Tj below 110°C. According to the thermal analysis, 150 LFM is required for the BCM95719N1905C to operate at 55°C ambient temperature (Ta).

4 Package Weight

Table 4 shows the BCM95719N1905C package weight (excluding faceplate, optical module, and so on).

Table 4: Package Weight

Parameter	Symbol	Value	Unit
BCM95719N1905C weight	g	80	gram

5 Physical Specifications

The physical board dimensions are compliant with the OCP 3.0 Design Specification, Small Form Factor (SFF) card, and faceplate. See the mechanical dimensions in the OCP 3.0 Design Specification for additional information.

The BCM95719N1905C supports all three faceplates, for example, pull tab, ejector latch, and internal lock. The pull tab is installed by default for BCM95719N1905C, and the internal lock is installed for BCM95719N1905CI. For additional mechanical dimensions, see the OCP 3.0 Design Specification.

6 Ordering Information

Table 5: Ordering Information

Part Number	Description
BCM95719N1905C	Quad-port Gigabit Ethernet x4 PCI Express OCP 3.0 Small-Form-Factor Card, Pull Tab Faceplate
BCM95719N1905CI	Quad-port Gigabit Ethernet x4 PCI Express OCP 3.0 Small-Form-Factor Card, Internal Lock Faceplate

Revision History

95719N1905C-DS102; October 18, 2023

Updated:

- Features – Added footnote on MTU size.

95719N1905C-DS101; March 2, 2022

Updated:

- SMBus Interface – Updated description.
- Table 2, LED Functions – Changed No Link to No Activity.

95719N1905C-DS100; February 5, 2019

Initial Release.