

BCM957508-N2100G

Dual-Port 100 Gb/s Ethernet PCI Express 4.0 x16 OCP 3.0 SFF Network Adapter

General Description

The Broadcom® BCM957508-N2100G is a dual-port 100 Gb/s PCI Express 4.0 x16 Network Adapter designed to the Open Compute Project (OCP) 3.0 Design Specification in small form factor with two QSFP56 network connectors. The adapter supports QSFP56/QSFP28/QSFP+ optical modules and copper direct-attach cables. The network adapter uses the Broadcom BCM57508 200GbE MAC controller with an integrated dual-channel 100GbE SFI transceiver.

Features

- Dual-port pluggable media interface, which is compatible with a QSFP56/QSFP28/QSFP+ optical transceiver or a copper direct-attach cable.
- Industry's most secure PCIe adapter solution leveraging Broadcom's BroadSAFE® technology
- Supports Ethernet 50G PAM-4, 25G NRZ, and 10G NRZ signaling.
- Multi-Host up to four hosts.
- Fully compliant with the SFF-8402 standard.
- x16 PCI Express 4.0 compliant.
- SR-IOV with up to 1k virtual functions (VFs).
- Function-Level Reset (FLR) support.
- TruFlow™ flow processing engine.
- Virtual Network Termination – VXLAN, NVGRE, Geneve, GRE encap/decap.
- vSwitch Acceleration.
- Tunnel-aware stateless offloads.
- DCB support – PFC, ETS, QCN, DCBx.
- RDMA over Converged Ethernet (RoCE)
- Network Controller Sideband Interface (NC-SI).
- SMBus 2.0.
- MCTP over SMBus.
- Jumbo frames up to 9 KB.
- Advanced congestion avoidance.
- Multiqueue, NetQueue, and VMQ.
- IPv4 and IPv6 offloads.
- TCP, UDP, and IP checksum offloads.
- Large send offload (LSO).
- Large receive offload (LRO).
- TCP segmentation offload (TSO).
- Receive-side scaling (RSS).
- Transmit-side scaling (TSS).
- VLAN insertion/removal.
- Interrupt coalescing.
- Network boot—PXE, UEFI.
- iSCSI boot.
- Wake-on-LAN (WOL).
- MSI and MSI-X.
- OCP 3.0 FRU support.
- Conforms to the OCP 3.0 Design Specification Version 1.0.

Applications

Dual-port 100-Gigabit Ethernet adapter for OCP systems.

Figure 1: BCM957508-N2100G OCP 3.0 SFF Network Adapter

NOTE: Figure 1 shows the pull-tab bracket installed by default. The surface markings of the component may not reflect the product upon receipt. Broadcom reserves the right to change any component on the printed circuit board with the same functionality.

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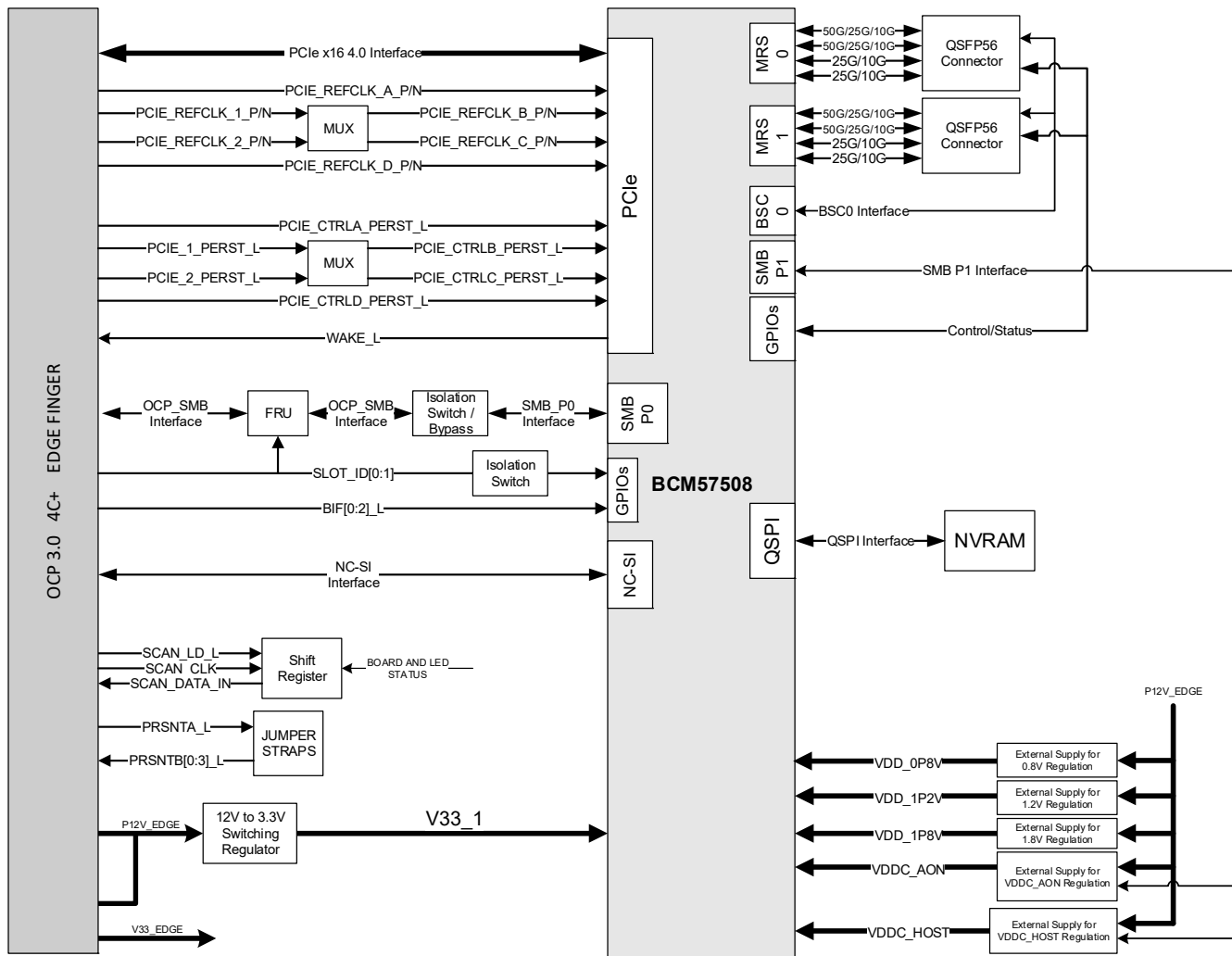
1 Functional Description

This section provides the functional description of the BCM957508-N2100G Network Adapter.

1.1 Block Diagram

Figure 2 shows the main functional blocks on the BCM957508-N2100G Network Adapter.

Figure 2: BCM957508-N2100G Block Diagram



1.2 Host Interface Connector

The BCM957508-N2100G OCP network adapter 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.

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 | PRSENTB0# | PRSENTB1# | 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 BCM57508 Ethernet Controller

The BCM57508 Ethernet controller is configured as a dual-port 100 Gb/s interface to the line side and x16 PCI Express v4.0 interface to the system host.

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 BCM57508 complies with the PCI Express Base Specification Revision 4.0, and supports a 16-lane PCIe 4.0 interface via the host interface connector.

1.5 NC-SI Interface

The BCM57508 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 BCM57508.

1.6 SMBus Interface

The BCM57508 Ethernet Controller SMB0 interface supports serial communications between the BCM57508 and the system. The interface allows the Ethernet controller to act as a SMBus primary or a secondary device.

1.7 Non-Volatile RAM

The BCM57508 Ethernet controller requires a non-volatile serial flash memory (NVRAM) to store the device firmware, PCI configuration space settings (for example, device ID, vendor ID), MAC address, and so on. After power-up, the firmware is downloaded into the device memory and executed by the on-chip processor.

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.

1.9 Power Supplies

All power is derived from the network adapter host interface connector 12V and 3.3V supply which feeds the onboard regulators that provide the necessary power to the various components on the network adapter. The network adapter has six switching voltage regulators that power the adapter's VDDC_AON, VDDC_HOST, +0.8V, +1.2V, +1.8V, and +3.3V loads.

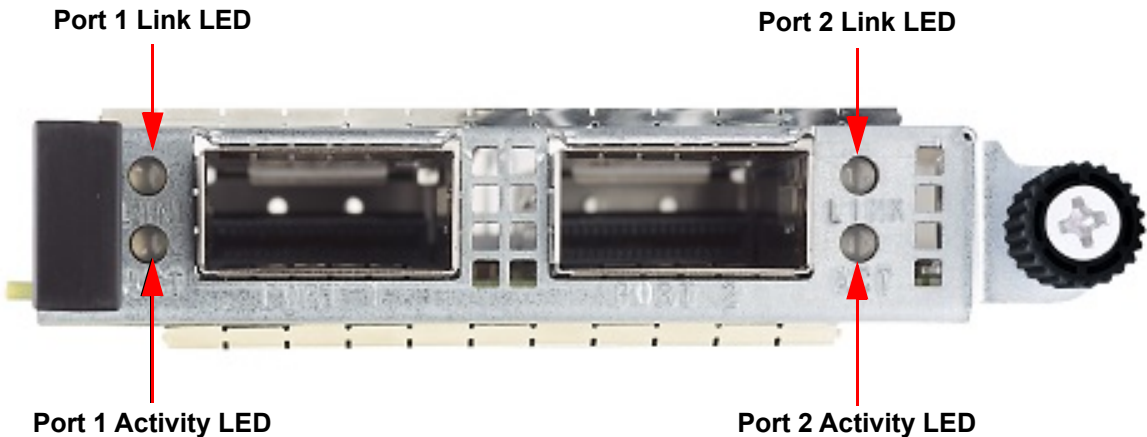
1.10 QSFP56 Connector

The BCM957508-N2100G integrates two QSFP56 connectors to support 50G PAM-4, 25G NRZ, or 10G NRZ signaling for 10050/40/25/10 Gb/s on each port. QSFP56 is backward compatible with QSFP28 and QSFP+ when appropriate cables and transceivers are used.

1.11 LED Functions and Locations

The QSFP56 port supports two LEDs to indicate traffic activities and link speed. 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



NOTE: [Figure 3](#) shows the pull-tab bracket installed by default. The surface markings of the component may not reflect the product upon receipt. Broadcom reserves the right to change any component on the printed circuit board with the same functionality.

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 100 Gb/s |
| | Amber | Linked at lower speed |

2 Regulatory and Safety Approvals

The BCM957508-N2100G network adapter meets the regulatory requirements of 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.

3 Board Power and Environmental Specifications

Table 3 provides the adapter power consumption.

Table 3: Adapter Power Consumption

| Adapter Power ^a | Passive DAC Cable | Optical Transceiver ^b |
|--------------------------------|-------------------|----------------------------------|
| Typical – 50% Ethernet traffic | 15.3W | 19.8W |
| Max – 100% Ethernet traffic | 16.4W | 21.0W |

a. Power consumption of adapter at 55°C ambient temperature.

b. Power consumption of adapter is measured using a Broadcom AFBR-89CDHZ power class 3 optical transceiver. The total adapter power adapter may vary with different optical transceivers.

Table 4: Adapter Environmental Specifications

| Airflow | Ambient Temperature | Passive DAC Cable | Optical Transceiver ^a |
|-----------------------|--|-------------------|----------------------------------|
| Cold Aisle | 45°C | Tier 7, 210 LFM | Tier 7, 240 LFM |
| Hot Aisle | 55°C | Tier 5, 245 LFM | Tier 8, 400 LFM |
| Storage Humidity | Relative Humidity Range (Non-condensing) maximum 90% at 35°C | | |
| Storage Temperature | –40°C to 70°C | | |
| Operating Temperature | 0°C to 55°C | | |

a. Airflow requirements are measured using a Broadcom AFBR-89CDHZ (power class 3, commercial temp [70°C]) optical transceiver. Check the airflow requirements of the selected optical transceivers to ensure adequate cooling to the optical transceivers.

4 Package Weight

Table 5 shows the BCM957508-N2100G package weight with the pull-tab bracket installed by default (excluding the optical module).

Table 5: Package Weight

| Parameter | Symbol | Value | Unit |
|-------------------------|--------|-------|------|
| BCM957508-N2100G weight | g | 110 | gram |

5 Physical Specifications

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

The BCM957508-N2100G supports all three faceplates, for example, pull tab, ejector latch, and internal lock. The pull tab is installed by default. For additional mechanical dimensions, see the OCP 3.0 Design Specification.

6 Ordering Information

Table 6: Ordering Information

| Part Number | Description |
|------------------|---|
| BCM957508-N2100G | Dual-Port 100 Gb/s Ethernet PCI Express 4.0 x16 OCP 3.0 Network Adapter, Halogen-Free |

Revision History

957508-N2100G-DS106; September 22, 2022

Updated:

- [Features](#) – Added 25G NRZ and 10G NRZ support.
- [QSFP56 Connector](#) – Added 25G NRZ and 10G NRZ support.

957508-N2100G-DS105; February 7, 2022

Updated:

- SMBus Interface – Updated description.
- Table 2, LED Functions – Changed Link to Activity.

957508-N2100G-DS104; August 20, 2021

Updated:

- Board Power and Environmental Specifications – Updated the entire section.

957508-N2100G-DS103; November 24, 2020

Updated:

- Board Airflow Requirement and Power Consumption – Updated the entire section.

957508-N2100G-DS102; January 3, 2020

Updated:

- Features – Updated OCP 3.0 Design Specification Version to 1.0
- Airflow Requirements – Updated airflow requirements.

957508-N2100G-DS101; October 24, 2019

Updated:

- Host Interface Connector – Updated version number.
- Board Power Consumption – Updated power consumption.

957508-N2100G-DS100; February 18, 2019

Initial release.

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