BROADCOM®

BCM957608-P2200GQF00

Dual-Port 200 Gb/s QSFP PCI Express 5.0 x16 Ethernet Network Interface Card

General Description

Based on Broadcom's scalable 400G Ethernet controller architecture, the BCM957608-P2200GQF00 2 x 200G PCIe NIC is designed to build large scale, feature-rich networking solutions in servers for AI/ML, cloud, high-performance computing, and storage applications.

The BCM957608-P2200GQF00 PCIe NIC builds upon the success of the widely deployed Broadcom architecture by combining a high-bandwidth Ethernet controller with a unique set of highly optimized hardware acceleration engines to enhance network performance and improve server efficiency.

The adapter supports fourth-generation, standards-based RDMA over Converged Ethernet (RoCE) with hardware-based congestion control. Broadcom's RoCE congestion control delivers the lowest latency in real-life scenarios and dramatically reduces the complexity of RoCE deployment at scale.

The BCM957608-P2200GQF00 adapter addresses the performance requirements of mega-scale data center networks with high throughput and advanced flow processing offloads. Features such as TruFlow™ increase virtual machine density by freeing up CPU cycles. The adapter supports technology-leading security enabling the industry's most secure server platform with secure boot and attestation anchored in Broadcom's silicon root of trust (RoT).

Features

Network Interface:
- 8 SerDes capable of 100/50G PAM4 and 25G NRZ
- QSFP112 support
- 1x 400GbE
- 2x 200/100/50/25GbE
- 400Gb/s total bandwidth
- Auto-negotiation with auto-detect
- IEEE-1588v2

Host Interface:
- 16 lanes of PCI Express 5.0
- Link rates: 32, 16, 8, 5, 2.5 GT/s
- Lane configuration: x16, x8, x4, x2, and x1
- MSI-X support

Platform Security:
- HW Secure Boot (RoT)
- Attestation (SPDM)
- OCP Secure Recovery
- Secure Wipe and Restore
- OCP Silver Security Badge (Cert Pending)

RoCEv2:
- Standards-based
- DCQCN
- Peer Memory Direct
- Smart Congestion Control and Advanced Telemetry
- Automated Configuration

Networking/Virtualizations and Accelerations:

- Multi-Queue, NetQueue, and VMQ
- Single Root I/O Virtualization
- VF isolation and protection
- VXLAN, GRE, NVGRE, Geneve, and IP-in-IP
- Tunnel-aware stateless offloads
- Edge Virtual Bridging (EVB)
- Stateless TCP offloads: IP/TCP/UDP checksum, LSO, LRO, GRO, TSS, RSS, aRFS, Interrupt coalescing
- kTLS hardware offload encryption/decryption support
- QUIC hardware offload encryption/decryption support

TruFlow Flow Processing:

- Flexible matching key
- NAT and NAPT
- Tunnel encap/decap
- Custom tunnel processing
- Connection tracking
- Flow aging
- Sampling and mirroring
- Rate-limiting and metering
- Flow-based statistics
- Network Traffic Hairpin

Manageability:

- Network Controller Sideband Interface (NC-SI)
- Management Component Transport Protocol (MCTP)
- MCTP over SMBus/I^2C
- MCTP over PCIe VDM
- NC-SI over MCTP
- Platform Level Data Model (PLDM): Base, Monitoring/ Control & FW update
- PLDM over MCTP
- I^2C support for device control and configuration

Network Boot:

- UEFI PXE boot
- UEFI L2 iSCSI boot
- UEFI support for x86

Design Specification:

Conforms to PCI-SIG CEM

Applications

- GPU server networking (scale-out and front-end)
- Artificial Intelligence (AI) and Machine Learning (ML)
- High-performance computing (HPC) Cloud and enterprise data center servers
- Network Function Virtualization
- NVMe storage disaggregation
- Storage servers

Figure 1: BCM957608-P2200GQF00 Network Interface Card
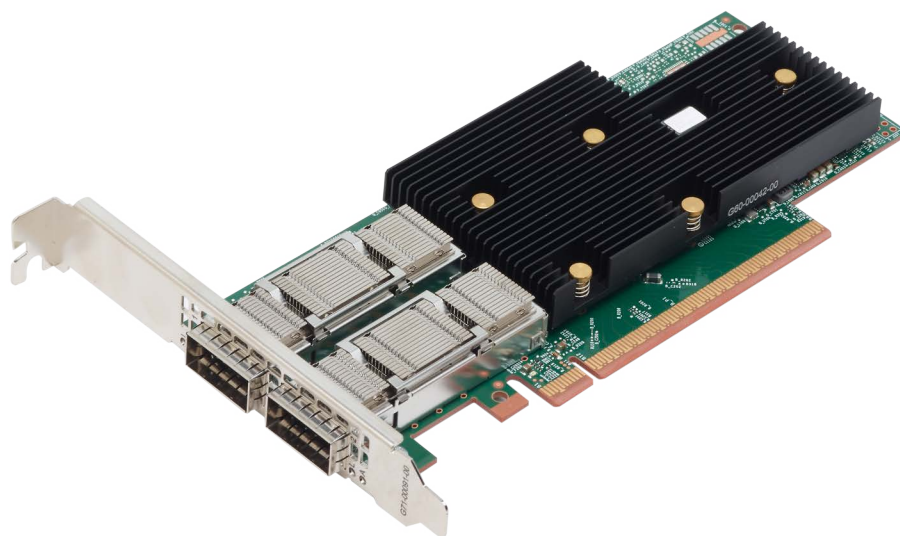
NOTE: The surface markings of the component may not reflect the product received. Broadcom reserves the right to change any component on the printed circuit board with the same functionality.
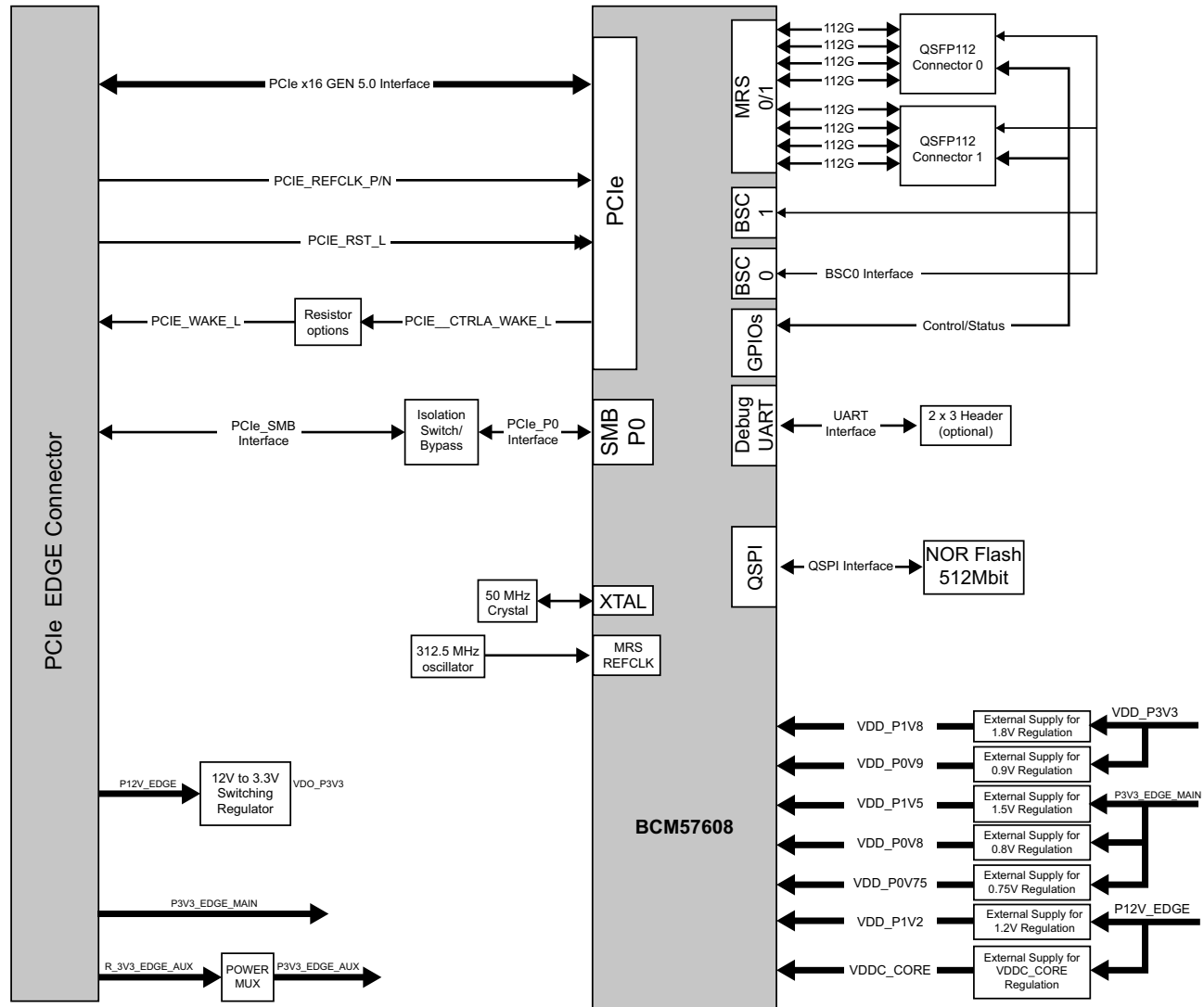
Table of Contents

1 Functional Description

This section provides the functional description of the network interface card.

1.1 Block Diagram

Figure 2 shows the main functional blocks on the network adapter.

Figure 2: BCM957608-P2200GQF00 Block Diagram

1.2 Host Interface Connector

The network interface card is a PCI Express 5.0 x16 add-in card with full-height bracket. The card edge connector complies with the PCI Express 5.0 x16 standard pinout for add-in cards. This card conforms to the HHHL form factor.

1.3 BCM57608 Ethernet Controller

The Ethernet controller is configured as a dual-port 200 Gb/s interface to the line side and x16 PCI Express v5.0 interface to the system host.

1.4 PCI Express Interface

PCIe is a serial interface standard for connecting high-speed components. The BCM57608 complies with the PCI Express Base Specification Revision 5.0, and supports a 16-lane PCIe 5.0 interface.

1.5 SMBus Interface

The Ethernet Controller SMB0 interface supports serial communications between BCM57608 and the system. The interface allows the Ethernet controller to act as a SMBus primary or secondary device.

1.6 NOR Flash

The Ethernet controller requires a SPI NOR Flash memory 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.

1.7 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.

1.8 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.

1.9 Network Connectors

The controller integrates two QSFP 112 connectors to support 50/100G PAM-4 or 25G NRZ signaling enabling up to 200 Gb/s per port.

1.10 LED Functions and Locations

The QSFP112 port supports two LEDs to indicate traffic activities and link speed. The LEDs are visible through the cutout on the bracket as shown in Figure 3.

Figure 3: Activity and Link LED Locations

Table 1: LED Functions
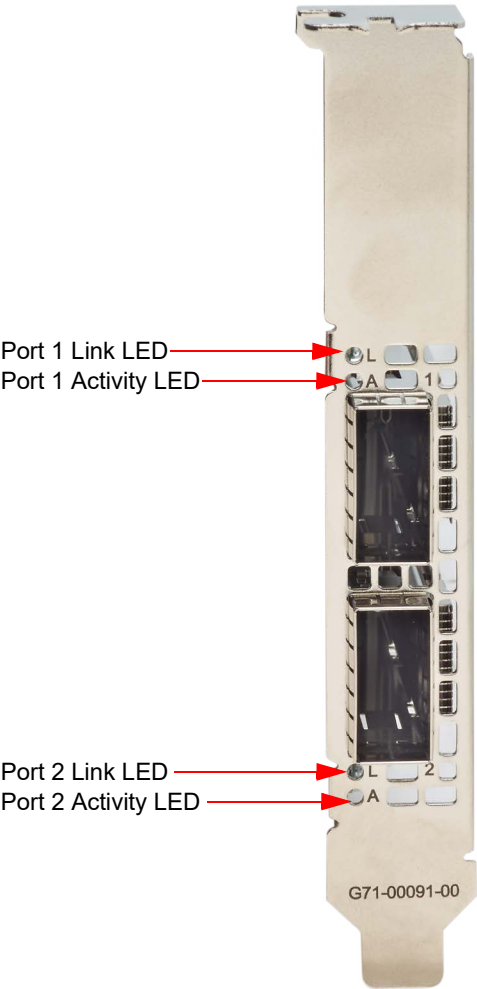
LED Type	Color/Behavior	Note
Activity	Off	No Activity
	Green (blinking)	Link up (traffic flowing)
Link	Off	No Link
	Green	Linked at 200 Gb/s or 400 Gb/s
	Amber	Linked at lower speed

1.11 PCIe Plug-N-Play Identification

Table 2 provides the PCIe PNP IDs for the adapter.

Table 2: PCIe PNP IDs

Field	Value
Vendor ID	0x14E4
Device ID	0x1760
Sub-Vendor ID	0x14E4
Sub-Device ID	0x9120

2 Board Power and Environmental Specifications

The BCM957608-P2200GQF00 thermal solution is optimized for GPU scale out in Artificial Intelligence (AI) clusters. In each node, one or more BCM957608-P2200GQF00's are placed in front of the GPUs receiving airflow at 25°C to 35°C ambient.

Table 3 and Table 4 provide the adapter power consumption and airflow requirements for typical AI cluster use models.

Table 3: Adapter Power Consumption

Typical Power[a]	Passive DAC Cable	Optical Transceiver[b]
50% Ethernet traffic	12.7W	23.6W
100% Ethernet traffic	12.9W	23.8W

    a. Power consumption of adapter at 35°C ambient temperature; T_j=40°C; Nominal silicon process.

    b. Power consumption using two typical QSFP56 5W optical transceivers.

Table 4: Adapter Airflow Requirements

Ambient	Passive DAC Cable	Optical Transceivers[a]
25°C	200 LFM	200 LFM
35°C	250 LFM	250 LFM

    a. Airflow requirements using two typical commercial QSFP56 5W optical transceivers.

The adapter is capable of supporting up to a 12W optic per connector. Using higher power optics than used in data collected for Table 3 and Table 4 will require additional airflow and slot power considerations. Evaluate these requirements and adjust system parameters accordingly.

For uses in other system architectures, please contact your Broadcom sales representative for additional information.

Table 5: Operating and Storage Conditions

Condition	Specification
Storage Humidity	10-90% RH Non-condensing
Storage Temperature	–40 to 70°C
Operating Temperature	0 – 55°C

3 Package Weight

Table 6 shows the network package weight with the pull-tab bracket installed by default (excluding the optical module).

Table 6: Package Weight

| Parameter	Value	Unit
BCM957608-P2200GQF00 weight	150.5	gram

4 Physical Specifications

This section outlines the mechanical aspects of the network interface card as well as the environmental specifications.

4.1 Board Physical Dimensions

The board dimensions are shown in Figure 4. The dimensions are in millimeters with a tolerance of ±0.127 mm.

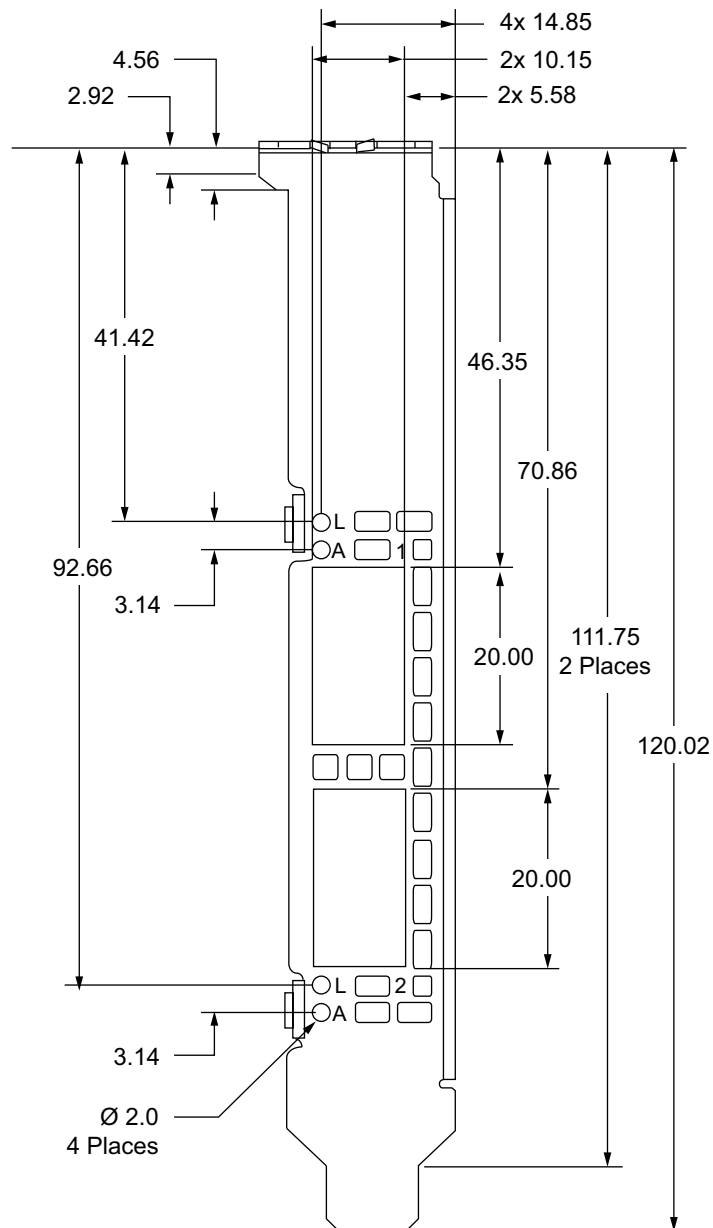**Figure 4: Board Physical Dimensions**
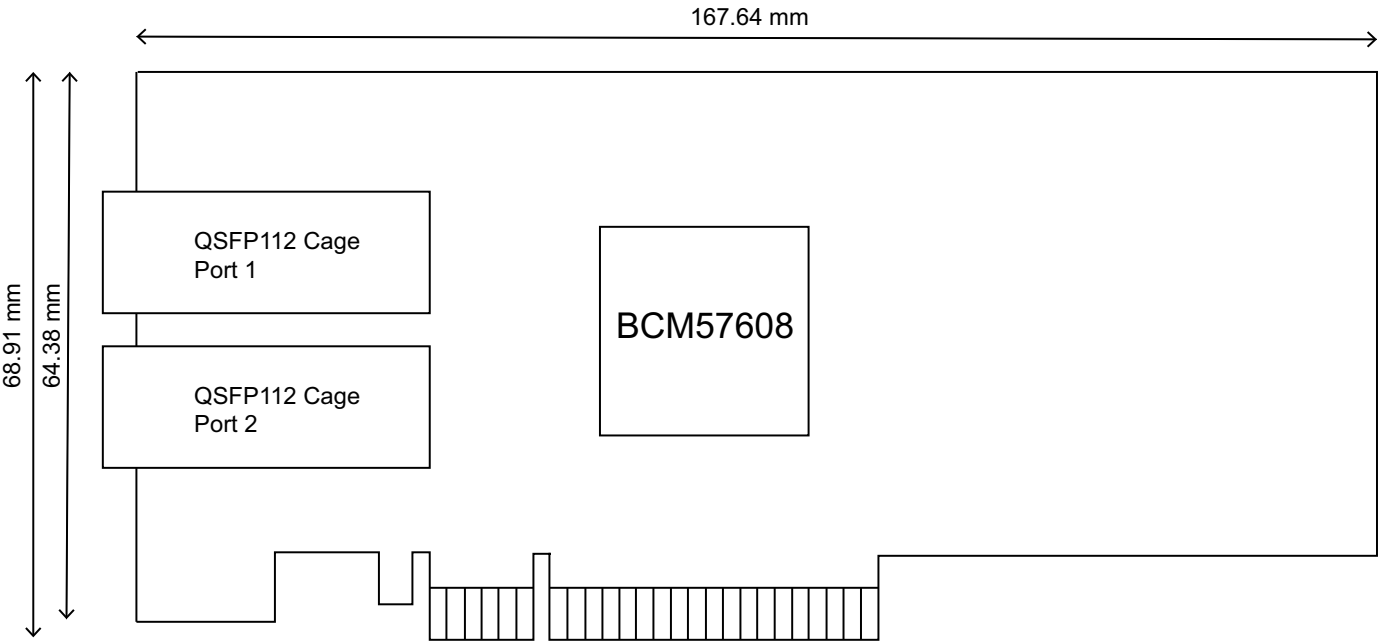
4.2 Bracket Outlines and Dimensions

The BCM957608-P2200GQF00 supports both standard and low-profile brackets.

4.2.1 Standard-Profile Bracket Outline and Dimensions

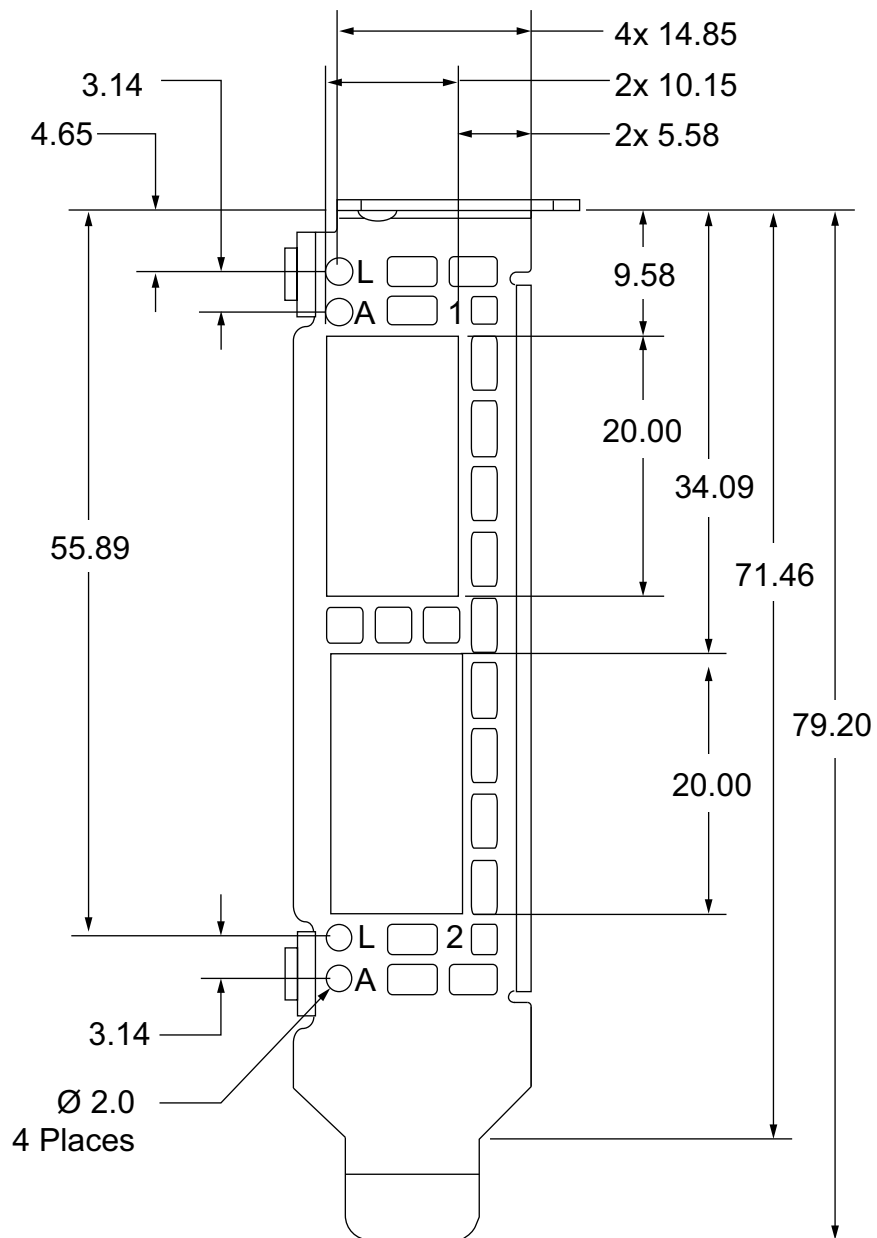Standard-profile bracket outline and physical dimensions are shown in Figure 5.

Figure 5: Standard-Profile Bracket Outline and Dimensions (in millimeters)

4.2.2 Low-Profile Bracket Outline and Dimensions

The low-profile bracket outline and physical dimensions are shown in Figure 6.

Figure 6: Low-Profile Bracket Outline and Dimensions (in millimeters)

5 Marks, Certifications, Compliance, and Safety Characteristics

The design and implementation of the adapter minimizes electromagnetic emissions susceptibility to radio frequency energy, and the effects of electrostatic discharge. The following adapter model shows the marks and certifications included in Table 7.

Table 7: Marks and Certifications

Adapter Part Number	Model Number
BCM957608-P2200GQF00	CX150158

5.1 Regulatory and Safety

Table 8: Regulatory and Safety Approvals

Item	Applicable Standard	Approval (A)/Certificate (C)
CE/European Union	EN IEC 62368-1:2020 +A11:2020	CB report and certificate
UL/USA	IEC 62368-1 (ed. 2)	CB report and certificate

Table 9: Safety Approvals

Country	Certification Type/Standard	Compliance
International	CB Scheme UL 1977 (connector safety) UL 796 (PCB wiring safety) UL 94 (flammability of parts) CSA C22.2 No. 62368-1-19, 3rd Ed	Yes

All network interface controller adapters meet or exceed the requirements of UL flammability rating 94 V0. Each bare board is also marked with the supplier name or trademark, type, and UL flammability rating. For the boards installed in a PCIe bus slot, all voltages are lower than the SELV 42.4V limit.

5.2 Electromagnetic Compatibility (EMC)

Table 10: Electromagnetic Compatibility

Standard/Country	Certification Type	Compliance
CE/EU	EN 55032:2015 +AC:2016, Class A EN 55024:2010 +A1:2015 EN 55035 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 SDoC and EMC report referencing FCC standards
IC/Canada	ICES-003 Class A	Report referencing IC standards.
ACA/Australia, New Zealand	AS/NZS CISPR 32:2015, Class A	ACA certificate
BSM/Taiwan	CNS 15936:2016	BSMI certificate
BSMI/Taiwan	CNS 15663	BSMI certificate/RoHS table
KC/S.Korea	KN32 Class A KN35	Korea certificate KC mark R-R-BCM-CX150158

Table 10: Electromagnetic Compatibility (Continued)

Standard/Country	Certification Type	Compliance
VCCI/Japan	VCCI-CISP 32:2016	Copy of VCCI online certificate

5.3 Electrostatic Discharge (ESD) Compliance

Table 11: ESD Compliance Summary

Standard	Certification Type	Compliance
EN55035 (EN 61000-4-2)	Air/Direct discharge	Yes

5.4 VCCI – Japan

この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。   VCCI－A

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures. VCCI—A.

5.5 FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

5.5.1 Information to User

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

6 Ordering Information

Table 12: Ordering Information

Part Number	Description
BCM957608-P2200GQF00	Dual-Port 200 Gb/s QSFP112 112 PCI Express 5.0 x16 Ethernet Network Interface Card, Halogen Free

Revision History

957608-P2200GQF00-DS107; March 6, 2025

Updated:

■ Updated feature list.

957608-P2200GQF00-DS106; January 9, 2025

Updated:

■ Board Power and Environmental Specifications

957608-P2200GQF00-DS105; September 23, 2024

Updated:

■ General Description – Updated entire description.
■ Applications – Updated entire description.
■ Figure 1, BCM957608-P2200GQF00 Network Interface Card – Replaced photo.
■ Figure 3, Activity and Link LED Locations – Replaced photo.

957608-P2200GQF00-DS104; May 20, 2024

Updated:

■ Table 8, Adapter Power Consumption – Updated

957608-P2200GQF00-DS103; April 30, 2024

Updated:

■ Board Power and Environmental Specifications

Added:

■ PCIe Plug-N-Play Identification

957608-P2200GQF00-DS102; December 18, 2023

Updated:

■ Board Power and Environmental Specifications – Updated tables.

957608-P2200GQF00-DS101; December 6, 2023

Updated:

■ Table 9, Package Weight — Updated weight
■ Marks, Certifications, Compliance, and Safety Characteristics — Updated section
■ Physical Specifications — Added figures of standard and low-profile brackets

957608-P2200GQF00-DS100; September 14, 2023

Initial release.

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