

HPE Gen 7 (64GFC & 32GFC) Fibre Channel HBAs

SN1700E/SN1610E

Next-Gen HBAs for the Modern Data Center

The HPE SN1700E and SN1610E Gen 7 Fibre Channel (FC) Host Bus Adapters (HBAs) from Emulex® are designed for demanding mission-critical workloads and emerging applications. Applications continue to grow in size and scale and, to support them, enterprises are increasingly turning to new server technologies that contain hundreds of processor cores as well as high-performance storage solutions including low-latency NVMe, all-flash arrays (AFAs). NVMe can significantly increase the performance of storage area networks (SANs), making the selection of high-speed networking technology the critical element for achieving maximum system-wide performance. Fibre Channel is purpose-built for storage networks, meeting the requirements for high availability, scalability, predictable performance and low latency.

Compared to the previous generation, SN1700E and SN1610E HBAs offer up to 3x better latency, enhanced security, and operational efficiency for 64GFC and 32GFC SANs. SN1700E HBAs are available with single or dual 64GFC optics, with backward compatibility to 32GFC and 16GFC networks. SN1610E HBAs are available with single or dual 32GFC optics and provide backward compatibility to 16GFC and 8GFC networks.

Accelerate Workload Performance for NVMe Data Centers

- Accelerate workloads with up to 3x better latency than the previous generation
- Speed up applications, AFAs, and handle peak workload I/O spikes with up to 10M IOPS on 64GFC HBAs
- Get faster data transfer speed with the industry's first single- and dual-port PCIe 4.0 HBAs delivering 2x more bandwidth per lane

Easily Deploy, Manage, and Upgrade SANs

- Save time with no server reboots for firmware updates, queue depth changes, and optics replacements
- Meet SLAs with industry-leading HBA reliability—10M hours MTBF
- Enable full end-to-end implementation of Brocade Fabric Vision from the HBA to the switch

Performance

The Emulex Dynamic Multi-core Architecture delivers unparalleled performance and the most efficient port utilization with eight processing cores and 16 threads that dynamically apply ASIC resources to any port that requires them, ensuring SLAs are met. Compared to Gen 6, Emulex Gen 7 HBAs feature 3x better hardware latency and an industry-leading up to 10 million IOPS on 64GFC HBAs.

The fastpath design provides hardware acceleration for Emulex's Dynamic Multi-core architecture, reducing latency for each transaction by processing I/O requests in hardware, thereby operating significantly faster than software-based solutions. These performance advances enable Emulex Gen 7 HBAs to handle demanding workloads and I/O spikes experienced under peak workload conditions like no other Fibre Channel HBA in the industry.

SN1700E/SN1610E HBAs support NVMe over Fibre Channel (NVMe/FC), providing significantly lower latency versus traditional Fibre Channel SCSI Protocol (SCSI FCP). Recent testing by independent performance labs has shown that Emulex NVMe/FC can deliver up to 50% more IOPs and 30% lower latency than traditional SCSI FCP.* SN1700E/SN1610E HBAs also support NVMe/FC and SCSI FCP concurrently, providing investment protection and allowing data centers to transition to end-to-end NVMe over FC SANs at their own pace.

**Emulex labs/Demartek, 2018.*

Emulex®
GEN7
FIBRE CHANNEL

Fully Protect Data

- Thwart malicious firmware with a Silicon Root of Trust and digitally signed firmware
 - Complies with NIST 800-193 framework
 - Digital signature verification during firmware download and power-on
- Guarantee driver security with Broadcom digitally signed drivers
- Secure Boot guarantees UEFI boot code security with digitally signed boot code
- Data Integrity Field (T10 DIF) protects data from corruption

SN1700E/SN1610E port aggregation capability (also known as trunking) provides a method to aggregate physical ports together to form a single logical port. Aggregating physical ports to make a single high-bandwidth datapath increases the logical connection bandwidth for applications that need it, such as data warehousing and virtual machine migration.

Operational Efficiency

SN1700E/SN1610E HBAs offer enhanced reliability, availability and serviceability (RAS) including port isolation and port-based error isolation that enables users to easily detect, isolate, and recover from errors.

Emulex HBAs fully support the Brocade Fabric Vision suite of features facilitating a solution from the switch to the server end-points that have Emulex HBAs installed. Supported features include ClearLink (D_port), Link Cable Beaconsing, Host Name Registration, Read Diagnostic Parameters, VMID, BB_Credit Recovery, Fabric-assigned Boot LUN, Fabric-assigned PWWN, FC Trace Route, FC Ping, Rest APIs, and more. Visit www.broadcom.com for additional information on supported Fabric Vision features.

SN1700E/SN1610E HBAs are easy to manage and save administrators time and operating costs with features such as no reboots for firmware updates, queue depth changes, or optics replacements. Hot plug (hot-swappable) optics enables optics to be removed and replaced without shutting down the system, allowing for uninterrupted service.

The Emulex HBA Manager application, formerly known as OneCommand Manager, provides centralized management of current and previous generations of Emulex FC HBAs. Emulex HBA troubleshooting is simplified with Emulex HBA Capture, an Emulex utility that gathers system, adapter, and device driver information. Data collected by HBA Capture is compressed into a single file and can be sent to Broadcom Technical Support for analysis when debugging system issues or for diagnostic purposes.

Security

One of the key initiatives for enterprises is that their infrastructure is safe from network attacks. Fibre Channel has field proven security in protecting the world's most sensitive data in banking, finance, healthcare, government, and military for over 20 years. Fibre Channel is protected from threats coming from IP networks because there is no direct connectivity for an attack from the IP network. This makes Fibre Channel a very strong link in the security chain.

SN1700E/SN1610E HBAs provide unmatched security with Silicon Root of Trust security embedded into the hardware itself. Firmware digital signatures are verified each time the system is booted as well as before installing any new firmware, providing a tamper proof solution.

Emulex's digitally signed drivers are integrated with all the major enterprise operating systems. Drivers are digitally signed and are verified to be authentic code written by Broadcom before they can be installed.

Standards

General Specifications

- HPE SN1700E/SN1610E FC HBAs are powered by the XE601 controller and utilize an eight-lane (x8) PCIe 4.0 bus on the single- and dual-port models, with backward compatibility to PCIe 3.0 supported. The architecture enables resources to be applied to any port that needs them, delivering up to 5M IOPS for 32GFC HBAs, and up to 10M IOPS for 64GFC HBAs.

Industry Standards

- Current ANSI/IETF Standards: FC-PI-7; FC-FS-5; FC-LS-3; FC-GS-7; FC-PI-5; FC-PI-6; FC-DA; FC-DA-2; FCP-4; SPC-4; SBC-3; SSC-4; FC-NVMe; FC-NVMe/AMI
- Legacy ANSI/IETF Standards: FC-PI-4; FC-FS-3; FC-FS-4; FC-LS-2; FC-GS-6; FC-PH; FC-PH-2; FC-PH-3; FC-PI; FC-PI-2; FC-PI-3; FC-FS; FC-GS-2/3/4/5; FCP-2/3; FC-HBA; FC-TAPE; FC-MI; SPC-3; SBC-2; SSC-2; SSC-3
- PCIe base spec 4.0
- PCIe card electromechanical spec 4.0
- Fibre Channel Class 3
- PHP hot plug-hot swap
- UEFI 2.5

HBA Port Virtualization

- NPIV, SR-IOV

Logins

- Supports 12,288 concurrent logins and active exchanges per port

Architecture

Single-port and dual-port SN1700E

- Supports 64GFC, 32GFC, and 16GFC link speeds, automatically negotiated

Single-port and dual-port SN1610E

- Supports 32GFC, 16GFC, and 8GFC link speeds, automatically negotiated

Comprehensive OS and Hypervisor Support

- Microsoft Windows
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware vSphere
- Oracle Linux; Oracle Linux with the Unbreakable Enterprise Kernel (UEK)
- Oracle Solaris
- Citrix

Hardware Environments

- Intel x64, Intel x86, and PowerPC

Throughput

- 32GFC: 6400MB/s full duplex line rate per port
- 64GFC: 12,800MB/s full duplex line rate per port

Optical

- Data rates: 64GFC (28.9 GBaud PAM4), 32GFC (28.05 Gbaud NRZ), 16GFC (14.025 Gbaud NRZ), 8GFC (8.5 Gbaud NRZ), automatically detected (8GFC supported on SN1610E HBAs only)
- Optics: Short-wave lasers with LC-type connector
- Cable:
 - 0.5m to 70m at 32GFC on 50/125 μ m OM3 MMF
 - 0.5m to 100m at 32GFC on 50/125 μ m OM4 MMF
 - 0.5m to 100m at 32GFC on 50/125 μ m OM5 MMF
 - 10 km at 32GFC/16GFC on 9/125 μ m singlemode fiber when Emulex approved longwave transceivers are used

Physical Dimensions

- Short, low profile PCIe card
- 167.64 mm x 68.91 mm (6.60 in. x 2.71 in.)
- Standard bracket (low-profile bracket ships in box)

Environmental Requirements

- Operating temperature: 0°C to 55°C (32°F to 131°F); 150 LFM (275 LFM for LPe35004-M2 model) required
- Storage temperature: -20°C to 85°C (-4°F to 185°F)
- Relative humidity: 5% to 95% non-condensing

Agency and Safety Approvals

North America

- FCC/ICES Class A
- UL/CSA Recognized

Europe

- CE Mark
- EU RoHS compliant
- EU Low Voltage Directive

Australia

- RCM Class A

Japan

- VCCI Class A

Korea

- KCC Class A

China

- China RoHS Compliant

Taiwan

- BSMI Class A

Ordering Information

- The HPE SN1700E and SN1610E are available from HPE and resellers using the following part numbers:

R7N77A

- 1-Port 64GFC Short Wave Optical LC SFP+

R7N78A

- 2-Port 64GFC Short Wave Optical LC SFP+

R2J62A

- 1-Port 32GFC Short Wave Optical LC SFP+

R2J63A

- 2-Port 32GFC Short Wave Optical LC SFP+

Additional Features

Performance Features

- Doubling the maximum FC link rate from 16GFC to 32GFC and support for NVMe over Fibre Channel helps support data center modernization initiatives.
- Frame-level multiplexing increases link efficiency and maximizes HBA performance.
- Accelerates network access to SSDs with NVMe over Fibre Channel — supports the FC-NVMe INCITS T11 standard.
- N-Port ID Virtualization(NPIV) increases network scalability by enabling a single FC adapter port to provide multiple virtual ports.

Data Protection Features

- End-to-end data protection using hardware parity, CRC, ECC, and other advanced error checking and correction algorithms ensures data is safe from corruption.
- Enhanced data protection provided by T10 PI with high-performance offload. T10 PI provides additional data protection in environments such as Oracle Unbreakable Linux.

Deployment and Management Features

- Universal boot capability allows the appropriate boot environment to be automatically selected for any given

hardware.

- Boot from SAN capability reduces system management costs and increases uptime.
- Detailed, real-time event logging and tracing enables quick diagnosis of SAN problems.
- Beaconsing feature flashes the HBA LEDs, simplifying their identification within server racks.
- Environmental monitoring feature helps optimize SAN availability.

Management Features

- The Emulex HBA Manager application¹ enables centralized discovery, monitoring, reporting, and administration of HBAs provided by Emulex on local and remote hosts. Powerful automation capabilities facilitate remote driver parameter, firmware and boot code upgrades.
- Advanced diagnostic features, such as adapter port beaconsing and adapter statistics, help optimize management and network performance, while the environmental monitoring feature helps to maintain optimum host-to-fabric connections. In addition to the GUI interface, management functions can also be performed via a scriptable Command Line Interface (CLI).
- Troubleshoot optics and cables before critical errors affect your system with

Brocade ClearLink supported Switches and Emulex HBAs.

- Emulex HBA Manager supports role-based management to facilitate administration of adapters throughout the data center without compromising security. Management privileges can be assigned based on LDAP and AD group memberships.
- Emulex's management instrumentation complies to open management standards, such as SMI-S and common HBA API support, which enables seamless upward integration into enterprise storage and server management solutions.

¹: The OneCommand[®] Manager application has been renamed the Emulex HBA Manager application.

EMULEX[®]
Fibre Channel HBAs