

Product Brief



Faster Flash

- Completes data warehousing transactions in 1/4 of the time¹
- Meet the massive bandwidth requirements of flash storage arrays with up to 32GFC throughput
- Maximize the performance of flash-based systems by prioritizing mission-critical traffic in congested networks with the exclusive ExpressLane™ feature

Dense Virtualization

- Near limitless scalability to support maximum VM density with 2X more on-chip resources & bandwidth
- Improved VDI experience with low-latency HBAs providing noticeable improvements during boot storms
- Simplified management & installation with OneCommand Manager plug-in for VMware vCenter server

Secure, Reliable Networking

- Enhanced security via the new secure firmware update feature which ensures the authenticity of HBA firmware.
- Industry Leader for Reliability—Emulex HBAs can provide up to 1,141 years of uninterrupted service!²

HPE StoreFabric Gen 6 (32GFC & 16GFC) Fibre Channel HBAs

**Faster Flash. Dense Virtualization. Secure Networking.
NVMe over FC Enabled**

SN1600E/SN1200E-Series for Gen 9/10 Servers

The explosive growth in enterprise flash storage and the deployment of servers with multi-core processors is driving the need for high performance storage networking to prevent application performance bottlenecks.

The server's Fibre Channel Host Bus Adapter (FC HBA) is a critical element of this storage network. The new HPE StoreFabric SN1600E and SN1200E Gen 6 HBAs from Emulex, deliver the ultimate in high bandwidth, low latency and high IOPs to meet any application performance requirement, from database online transaction processing or data warehousing to backup/restore and OpenStack Cinder block storage.

Delivering twice the performance of current 16GFC HBAs, the SN1600E Gen 6 32GFC HBA delivers better business outcomes across multiple industry verticals that rely on high performance, guaranteed reliability fibre channel block storage in their storage infrastructure.

Fibre Channel is the gold standard for network storage connectivity in enterprise and private/hybrid cloud deployments.

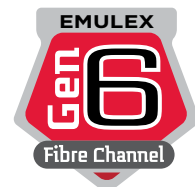
FC technology is a core connectivity option of HPE StorServ, MSA and StoreVirtual storage systems. In all instances, Fibre channel delivers:

- Guaranteed lossless data delivery
- Low latency and high scalability
- A proven enterprise storage networking solution

Unique to Fibre Channel technology is its deep ecosystem support making it ideal for large scale, easy-to-manage storage deployments. Users can count on a complete suite of management software, in-box drivers for mainstream server operating systems, and the performance reliability to support demanding service-level agreement (SLA) applications.

1. Demartek TPC-H testing performed with Emulex Gen 6 FC HBAs in a Microsoft SQL Server environment vs. the previous generations of HBAs

2. Based on published FIELD MTBF of 10 million hours for the Emulex family of FC HBAs.



Accelerate

The SN1200E and SN1600E HBA families feature industry-unique Emulex Dynamic Multi-core Architecture delivers unparalleled performance and more efficient port utilization than other HBAs by applying all ASIC resources to any port that needs it.

Compared to the previous generation, Emulex Gen 6 HBAs deliver 2x greater bandwidth—12,800MBps (2 ports 32G, full duplex), less than half the latency, and support an industry-leading 1.6 million IOPS on a single port, ensuring SLAs are met.

Emulex Gen 6 HBAs are an excellent choice for database applications. Recent TPC-H testing in a data warehousing environment demonstrated up to 71% faster completion times vs. the previous generations of HBAs.

To enable the highest Virtual Machine density, Gen 6 HBAs provide support for up to 1,024 Message Signaled Interrupts for processor affinity and on-board resources for concurrent exchanges and logins in a densely virtualized environment.

Protect

Secure Firmware

Emulex Gen 6 FC HBAs deliver enhanced security via the new secure firmware update feature which protects and ensures the authenticity of device firmware.

Data Reliability

Forward Error Correction (FEC) is a Gen 6 Fibre Channel standard feature that provides enhanced data reliability and performance by automatically detecting and recovering from bit errors. FEC is a

digital signal processing technique that introduces redundant data, called an error correcting code, prior to data transmission. FEC then provides the receiver with the ability to correct errors without a reverse channel to request the retransmission of data, which improves performance.

Data Integrity

T10 Protection Information (T10-PI) data integrity with high performance hardware offload provides data protection from the server to the storage array.

As one of the founders of the Data Integrity Initiative (DII), Emulex, along with Oracle and Seagate, was instrumental in defining the T10-PI standard, which, along with the Data Integrity Extensions (DIX) standard, delivers full end-to-end data integrity.

T10-PI provides protection against corruption in Oracle Unbreakable Linux environments.

Product Reliability

Emulex HBAs are renowned for reliability, ensuring maximum SAN uptime. Their “It Just Works” reputation is based on 17 million installed ports with proven industry-leading reliability of 10 million hours field Mean Time Between Failures (MTBF).

HPE Smart SAN Rapid Deployment

All Emulex Gen 6 HBAs are HPE Smart SAN compliant.

HPE Smart SAN for 3PAR is an industry-unique software technology makes Fibre Channel SAN deployments a breeze by collecting FC intelligence from the SAN to significantly automate

tedious SAN zoning. The major benefit for storage administrators is an 80% reduction configuration steps plus up to 90% reduction in SAN zoning time, from hours to minutes.

An end-to-end solution orchestrated and automated via the HPE 3PAR CLI, Smart SAN technology is supported (embedded in the firmware) in the Emulex HBAs.

Key characteristics of HPE Smart SAN for 3PAR include:

- Centralized and automated target driven peer zoning (TDPZ) simplifies the zoning process
- Intelligence gathering, by the 3PAR array, from all elements in the SAN (HBAs, switches and array) for an orchestrated solution
- Easy troubleshooting from a single point in the fabric

Investment Protection - NVMe over Fibre Channel Enabled

Non Volatile Memory Express (NVMe) is an exciting new storage protocol technology to accelerate flash storage performance. NVMe over Fibre Channel, when available as an industry standards based solution, will further reduce latencies in a Fibre Channel storage network. NVMe over Fibre Channel will interoperate with existing 16G/32G FC switch infrastructure.

All Emulex SN1200E and SN1600E series FC HBAs are NVMe over Fibre Channel enabled, and when standards are finalized, a firmware and driver update will enable these HBAs to be NVMe over Fibre Channel compliant.

Management and Control

The flagship OneCommand® Manager enterprise-class management application features a multiprotocol, cross-platform architecture that provides centralized management of all current and previous generations of Emulex FC HBAs. This enables IT administrators to manage network connectivity with one tool for maximum efficiency.

Emulex HBA troubleshooting is simplified with OneCapture, an Emulex device driver utility that gathers system, adapter, device driver, and applications information. Data collected by OneCapture is compressed into a single file and can be sent to Broadcom Technical Support for analysis when debugging system issues or for diagnostic purposes.

Additionally Emulex HBAs support the following Brocade features:

- ClearLink (D_Port)- automated end-to-end signal integrity checks help identify any cabling, optics or port issues in minutes versus hours.
- Link Cable Beaconing- locates a connection on either the Brocade switch port or the Emulex HBA port by making the LED port blink for easy end-to-end identification.
- Host Name Registration- eliminates the need to manually associate worldwide port names with servers, with automated capture of information from Emulex HBA ports.
- VM ID - VM Insight (VMID) feature that enables monitoring capabilities down to individual VM level and provides deeper integration of virtualized infrastructure with SAN storage fabric.

- Read Diagnostic Parameters- Brocade switches and Emulex HBA ports will self-report diagnostic information, including port speed, link errors, and SFP information (temperature, Tx and Rx power, etc.).

ExpressLane I/O Write Prioritization

Emulex ExpressLane enables special priority queuing Write operations to selected LUNs (ExpressLane LUNs).

ExpressLane LUN performance is superior to that of regular LUNs. Mixed storage environments can use ExpressLane to alleviate congestion, reduce latency, and improve throughput, ensuring that key applications receive highest priority.

Specifications

Standards

General Specifications

- The SN1600E/SN1200E series FC HBAs are powered by the multi-core XE501 controller and utilizes an eight-lane (x8) PCIe 3.0 bus (backward compatibility to PCIe 2.0 supported)—the architecture enables all resources to be applied to any port that needs it, delivering up to 1.6M IOPS on a single-port or in aggregate, across both ports.

Industry Standards

- Current ANSI/IEEE Standards: FC-PI-4; FC-PI-5; FC-PI-6; FC-FS-3; FC-LS-2; FC-GS-6; FC-DA; FC-DA-2; FCP-4; SPC-4; SBC-3; SSC-4
- Legacy ANSI/IEEE standards: 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 3.0
- PCIe card electromechanical spec 3.0
- Fibre Channel Class 3
- PHP hot plug-hot swap

Logins and Exchanges

- Support for 4,096 concurrent logins and 4,096 active exchanges

Ordering Numbers

Single-port SN1600E (Part#: QOL11A)

Dual-port SN1600E (Part#: QOL12A)

- Supports 32GFC, 16GFC and 8GFC link speeds, automatically negotiated
- Includes SFP+ optical transceivers

Single-port SN1200E (Part#: QOL13A),

Dual-port SN1200E (Part#: QOL14A)

- Supports 16GFC, 8GFC and 4GFC link speeds, automatically negotiated
- Includes SFP+ optical transceivers

Comprehensive OS and Hypervisor Support

- Microsoft Windows Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware vSphere (ESXi)

Hardware Environments

- Intel x86, x64

Optical

- Data rates: 28.05 Gb/s (32GFC); 14.025 Gb/s (16GFC); 8.5 Gb/s (8GFC); 4.25 Gb/s (4GFC) automatically negotiated
- Optics: Short wave lasers with LC type connector
- Cable: Operating at 32Gb
 - 20m at 32Gb on 50/125 µm OM2 MMF
 - 70m at 32Gb on 50/125 µm OM3 MMF
 - 100m at 32Gb on 50/125 µm OM4 MMF

Physical Dimensions

- 165.1 x 17.5 x 68.9 mm (6.6 x 0.69 x 2.71 in)
- Standard bracket (low profile bracket ships in box)

Environmental Requirements

- Operating temperature: 0° to 55°C (32° to 131°F)
- Storage temperature: -20° to 85°C (-4° to 185°F)
- Relative humidity: 10% to 90% at 40° non-condensing

Agency and Safety Approvals

North America

- FCC/ICES Class A
- UL/CSA Recognized

Europe

- CE Mark Class A
- EU RoHS compliant
- TUV Bauart Certified

Australia

- RCM

Japan

- VCCI Class A

Taiwan

- BSMI Class A

Korea

- MSIP (formerly KCC/MIC)

China

- China RoHS Compliant

Added Features

Performance Features

- Doubling the maximum FC link rate from 16GFC to 32GFC and enhanced virtualization capabilities, help support IT “green” initiatives.
- Frame-level multiplexing increases link efficiency and maximizes HBA performance.

Data Protection Features

- End-to-end data protection with hardware parity, CRC, ECC and other advanced error checking and correction algorithms ensure data is safe from corruption.

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.

Management Features

- 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.