BROADCOM® | **DELL**

Product Brief

Emulex® LPe31000/32000 16/32G Fibre Channel HBAs

Faster Flash. Better Virtualization. Lossless Networking.

Faster Flash

- Completes data warehousing transactions in 1/4 of the time[1]

- 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

- NVMe-ready capability delivers an additional 55% lower latency and supports NVMe over Fibre Channel and SCSI over Fibre Channel con-currently

Better 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

Lossless, Reliable Networking

- Near zero downtime— FC's lossless design ensures no dropped packets and maximum uptime

- Industry Leader for Reliability— Emulex HBAs can provide up to 1,141 years of uninterrupted service![2]

The Emulex LPe31000/LPe32000 16/32G Fibre Channel (FC) Host Bus Adapters (HBAs) by Broadcom are designed to address the demanding performance, reliability and management requirements of modern networked storage systems that utilize high performance and low latency solid state storage drives.

Fibre Channel is known as the gold standard for network storage connectivity in enterprise and cloud deployments. The latest Emulex LPe31000/LPe32000 FC HBAs offer higher performance, lower latency, enhanced diagnostics and manageability that benefit both 16GFC and 32GFC environments. Emulex LPe31000-series HBAs are available with single or dual 16GFC optics. The LPe32000- series HBAs are available with single or dual 32GFC optics.

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, software defined storage APIs and tools, and the strength to support high service level agreement (SLA) applications.

1 Demartek TPC-H testing performed with Emulex LPe31000/LPe32000 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 unique Emulex Dynamic Multi-core Architecture delivers unparalleled performance and more efficient port utilization than other HBAs with the ability to apply all ASIC resources to any port that needs it.

Compared to the previous generation, Emulex LPe31000/LPe32000 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 HBAs are an excellent choice for database applications with recent TPC-H testing in a data warehousing environment demonstrating up to 71% faster completion times vs. the previous generations of HBAs[1]. To enable the highest Virtual Machine density, LPe31000/LPe32000 HBAs provide support for up to 255 virtual functions, 1,024 Message Signaled Interrupts and expansive on-board context for exchanges and logins.

NVM Express (NVMe) is a relatively new protocol for solid-state storage devices built with non-volatile memory technologies. NVMe provides substantially lower latency for storage I/O operations and significantly higher IOPS per device. NVMe scales-up the number of devices it can address by adopting NVMe over Fabrics technology.

Emulex Gen 6 HBAs are NVMe over Fabrics-ready, providing an additional 55% lower latency for storage I/O operations versus SCSI. Gen 6 NVMe-ready HBAs support NVMe over Fabrics and SCSI concurrently, allowing datacenters to transition to all-flash storage at their own pace.

Emulex® LPe31000/32000 16/32Gb Fibre Channel HBAs

Protect

Deliver enhanced security via the new secure firmware update feature which protects and ensures the authenticity of device firmware.

Forward Error Correction (FEC) which provides enhanced data reliability and performance by automatically detecting and recovering from bit errors.

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

Enhanced silent data corruption protection provided by T10-PI with high-performance offload.

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).

Manage and Deploy

Dell Remote Access Controller (iDRAC™) with Lifecycle Controller systems management solution allows administrators to monitor, manage, update, troubleshoot and remediate Dell servers from any location – and without the use of agents. And regardless of OS or hypervisor presence or state.

Alternatively, the Emulex OneCommand Manager enterprise-class management application features a multiprotocol, cross-platform architecture that provides centralized management of all adapters provided by Emulex. 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.

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. Beaconing feature flashes the HBA LEDs, simplifying their identification within server racks.

Environmental monitoring feature helps optimize SAN availability.

The LPe31000/LPe32000-series HBAs support Brocade I/O Insight, which proactively and non-intrusively monitors device and application-level IO to gain insights into performance and availability, ensuring predictable performance and operational stability.

Additionally Emulex HBAs support the following Brocade features:

• Troubleshoot optics and cables before critical errors affect your system with Brocade ClearLink supported Switches and Emulex HBAs.

• Meet SLAs and QoS with ExpressLane application prioritization on hosts. ExpressLane is fully compatible with majority of switches offering QoS features.

• 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.

• 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.).

Added 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.

• Accelerates network access to SSDs with NVMe over Fibre Channel ready feature- supports the FC-NVMe T11 standard

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.

• Enhanced data protection provided by T10-PI with high-performance offload. T10-PI provides additional data protection in Oracle Unbreakable Linux environments.

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.

• Beaconing feature flashes the HBA LEDs, simplifying their identification within server racks.

• Environmental monitoring feature helps optimize SAN availability.

Standards

General Specifications

• The LPe31000/32000-series FC HBAs are powered by the 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

Industry Standards

• Current ANSI/IETF Standards: FC-PI-4; FC-PI-5; FC-PI-6; FC-FS-3; FC-LS-2; FCGS- 6; FC-DA; FC-DA-2; FCP-4; SPC-4; SBC-3; SSC-4

• Legacy ANSI/IETF 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

Architecture

Single-port LPe32000/ dual-port LPe32002

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

• Supports up to 2 FC ports at 32GFC max (dual-port model)

Single-port LPe31000/ dual-port LPe31002

• Supports 16GFC, 8GFC and 4GFC link speeds, automatically negotiated

• Supports up to 2 FC ports at 16GFC max (dual-port model)

Comprehensive OS and Hypervisor Support

• Microsoft Windows

• Red Hat Enterprise Linux

• SUSE Linux Enterprise Server

• VMware vSphere

Hardware Environments

• x86, x64 Dell PowerEdge servers

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

• Short, low profile PCIe card

• 167.64mm x 68.91mm (6.60" x 2.71")

• Full height and low profile bracket options available

Environmental Requirements

• Operating temperature: 0° to 55°C (32° to 131°F); 150 LFM required

• Storage temperature: -20° to 85°C (-4° to 185°F)

• Relative humidity: 5% to 95% non-condensing

• 23°C wet bulb

Agency and Safety Approvals

North America
• FCC/ICES Class A
• UL/CSA Recognized

Europe
• CE Mark
• EU RoHS compliant
• TUV Bauart Certified

Australia
• RCM

Japan
• VCCI Class A

Taiwan
• BSMI Class A

Korea
• MSIP (formerly KCC/MIC) Class A

China
• China RoHS Compliant

Ordering Information

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Dell 16GFC or 32GFC HBAs are available to order from Dell, using the following part numbers and model numbers:

Description	Factory Install Part Number	Customer Install Part Number
LPe31000-M6-D Single-port 16GFC Full-height, V2	540-BDHG	540-BDHN
LPe31000-M6-D Single port 16GFC Low-profile, V2	540-BDHS	540-BDHI
LPe31002-M6-D Dual-port 16GFC Full-height, V2	540-BDHP	540-BDHR
LPe31002-M6-D Dual-port 16GFC Low-profile, V2	540-BDGY	540-BDHH
LPe32000-M2-D Single-port 32GFC Full-height	403-BBLX	403-BBMG
LPe32000-M2-D Single-port 32GFC Low-profile	403-BBMC	403-BBLV
LPe32002-M2-D Dual-port 32GFC Full-height	403-BBLT	403-BBLY
LPe32002-M2-D Dual-port 32GFC Low-profile	403-BBLW	403-BBME

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For more product information: broadcom.com