EMULEX®

CONNECTIVITY
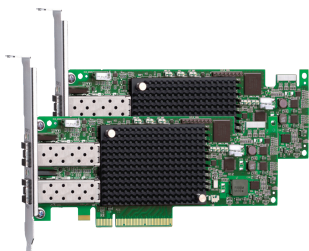
LightPulse®
LPe16000B/LPe16002B

16Gb Fibre Channel PCIe 3.0 Host Bus Adapter

SIMPLIFIED NETWORKING, MAXIMUM PERFORMANCE AND INCREASED BUSINESS AGILITY

The PCI Express (PCIe) 3.0 LPe16000B 16Gb Fibre Channel (16GFC) Host Bus Adapter (HBA) provides outstanding input/output operations per second (IOPS) performance—20% more than other 16GFC HBAs, plus lightning fast response times and 4x better IOPS performance per watt making it the clear choice for the toughest virtualized, cloud and mission critical deployments. With almost 1.2 million IOPS on a single port, it is ideally suited for FC connectivity to solid state disks (SSDs) and new multi-core processors. Its advanced management functionality can shave days off installing and managing adapters. The single-port LPe16000B and dual-port LPe16002B feature the Emulex bullet-proof driver-stack, backward compatibility to 4GFC and 8GFC HBAs and rock-solid reliability with a heritage that spans back to the first generation of Fibre Channel to today's 16GFC HBAs. Emulex is trusted by data centers the world-over, with more than 12 million HBA ports shipped and installed to date.

Proven Design, Architecture and Interface
The 16GFC HBA's highly integrated multi-core processor design improves host performance and efficiency. Advanced error-checking features ensure the integrity of block data as it traverses the storage area network (SAN). Emulex's firmware-based architecture enables feature and performance upgrades without costly hardware changes.

The unique 4th Generation Service Level Interface (SLI™) allows use of a common driver across all models of NEC branded HBAs provided by Emulex on a given operating system (OS) platform. Installation and management facilities are designed to minimize server reboots and further simplify deployment.

Powerful Management Software for Maximum Data Center Efficiency
The Emulex OneCommand® Manager enterprise-class management application features a multi-protocol, cross-platform architecture, that provides centralized management of all adapters provided by Emulex. This enables IT administrators to manage network connectivity with one tool for maximum efficiency. The NEC LPe16000B also features:

- **OneCommand® Manager plug-in for VMware vCenter Server**—enables comprehensive control of Fibre Channel HBAs and network (FCoE, iSCSI and TCP/IP NIC) connectivity solutions provided by Emulex from VMware's vCenter Server management console.

Key Benefits
- Maximum performance—up to 1.2 million IOPS on a single port to support larger server virtualization deployments and scalable cloud initiatives, as well as performance to match new multi-core processors, SSDs and faster PCIe 3.0 server host bus architectures
- Improves IT staff productivity through simplified deployment and management
- Reduces the number of cards, cables and PCIe slots required
- Exceptional performance per watt and price/performance ratios
- Integrates seamlessly into existing SANs
- Allows application of SAN best practices, tools and processes with virtual server deployments
- Assures data availability and data integrity

Key Features
- PCIe 3.0 bus
- vScale™ performance and scalability—multi-core ASIC engine with eight cores supports 255 virtual functions (VFs), 1024 Message Signaled Interrupts eXtended (MSI-X) and 8192 logins/open exchanges for maximum virtual machine (VM) density—up to 4x more than other adapters
- 2x management functionality, and takes half the time to manage with OneCommand® Manager
- GreenState™ power efficiency—reduces data center power consumption and associated OPEX by delivering up to 4x better IOPS performance/watt
- BlockGuard® data integrity offload— high performance T10 PI end-to-end data integrity protects against silent data corruption
- vEngine™ CPU offload—lowers CPU burden on host server, enabling support for more VMs
- Rock-solid reliability and thermal characteristics, essential for mission-critical, cloud and virtualized applications
- Support for MSI-X, improves host utilization and enhances application performance
- Support for 16GFC, 8GFC and 4GFC devices
- Comprehensive virtualization capabilities with support for N_Port ID Virtualization (NPIV) and Windows virtual HBAs
- Host-to-fabric Fibre Channel Security Protocol (FC-SP) authentication
- Common driver model, allows a single driver to support all Emulex HBAs on a given OS

OneCommand™

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SPECIFICATIONS

Standards

General Specifications

· The LPe16000B series is powered by the XE201 converged fabric controller and consists of an eight-lane (x8) PCIe 3.0 bus (backward compatibility to PCIe 2.0 supported)

Industry Standards

· Current ANSI/IETF Standards: FC-PI-4; FC-PI-5; FC-FS-2 with amendment 1; FC-AL-2 with amendments 1 and 2; FC-LS-2; FC-GS-6; FC-DA; FC-SP-2; FCP-4; FC-MJS; FC-SB-4; FC-SP; SPC-4; SBC-3; SSC-3; RFC4338
· Legacy ANSI/IETF standards: FC-PH; FC-PH-2; FC-PH-3; FC-PI; FC-PI-2; FC-FS; FC-AL; FC-GS-2/3/4/5; FCP; FCP-2; FC-SB-2; FC-FLA; FC-HBA; FC-PLDA; FC-TAPE; FC-MI; SPC-3; SBC-2; SSC-2; RFC2625
· PCIe base spec 3.0
· PCIe card electromechanical spec 3.0
· Fibre Channel class 2 and 3
· PHP hot plug-hot swap

Architecture

· Single-port (LPe16000B) or dual-port (LPe16002B)
· Supports 16GFC, 8GFC and 4GFC link speeds, automatically negotiated
· Supports up to 2 FC ports at 16GFC max (dual-port model)
· Integrated data buffer and code space memory

Comprehensive OS & Hypervisor Support

· Windows Server
· Linux
· Solaris
· VMware vSphere
· Windows Hyper-V
· Additional support is available from OEMs and partners

Hardware Environments

· PowerPC, SPARC, x86, x64 and Intel Itanium 64-bit processor family

Optical

· Data rates: 14.025 Gb/s (1600Mb/s); 8.5 Gb/s (800Mb/s); 4.25 Gb/s (400 Mb/s) (auto-detected)
· Optics: Short wave lasers with LC type connector
· Cable: Operating at 16Gb
  - 15m at 16Gb on 62.5/125 μm OM1 MMF
  - 35m at 16Gb on 50/125 μm OM2 MMF
  - 100m at 16Gb on 50/125 μm OM3 MMF
  - 125m at 16Gb on 50/125 μm OM4 MMF

Physical Dimensions

· Short, low profile MD2 form factor card
· 167.64mm x 68.91mm (6.60" x 2.71")
· Standard bracket (low profile available)

Power and Environmental Requirements

Power supply 1.8V, 1.2V, 0.9V

· Volts: +3.3, +12
· Operating temperature: 0° to 55° C (32° to 131° F)
· Storage temperature: -40° to 70° C (-40° to 158° F)
· Relative humidity: 5% to 95% non-condensing
· 23° C wet bulb

Agency and Safety Approvals

· FCC Part 15, Subpart B, Class A (U.S.)
· ICES-003 Class A (Canada)
· VCCI Class A (Japan)
· CE Mark (EU), consisting of:
  - EN55022:2010
  - EN55024:2010
· C-Tick (Australia)
· AS/NZS CISPR22:2006 Class A
· CISPR 22:2005+A1 (International)
· KCC (formally MIC), Class A with latest RRL notices (Korea)
· BSMI Class A (Taiwan)
· UL 60950-1:2001 (cURus – U.S.)
· CSA 22.2 No 60950-1-03 (cURus - Canada)
· TUV Bauart certified to EN60950-1:2001
· CB Report and Certificate to IEC 60950-1:2001 (International)
· Dimethyl Fumarate (DMF) restrictions in packaging, ref. EU Decision 2010/251/EC:
  - EU RoHS Compliant (Directive 2002/95/EC)
· China RoHS Compliant

Ordering Information

The NEC LPe16000B-series is available from NEC. To order use the following part numbers:

· LPe16000B-M6-N
  - 1 Port 16GFC Short Wave Optical – LC SFP+
· LPe16002B-M6-N
  - 2 Ports 16GFC Short Wave Optical – LC SFP+

Added Features

Performance Features

· Doubling the maximum FC link rate from 8GFC to 16GFC and enhanced virtualization capabilities, help support IT "green" initiatives.
· Frame-level multiplexing and out-of-order frame reassembly 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 correcting algorithms ensure data is safe from corruption.
· Enhanced silent data corruption protection provided by T10 Protection Information (T10 PI) with high-performance offload.

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.

Management Features

· The Emulex OneCommand Manager application enables centralized discovery, monitoring, reporting, and administration of HBAs and UCNAs 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 beaconing 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) as well as a web browser.
· 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.

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