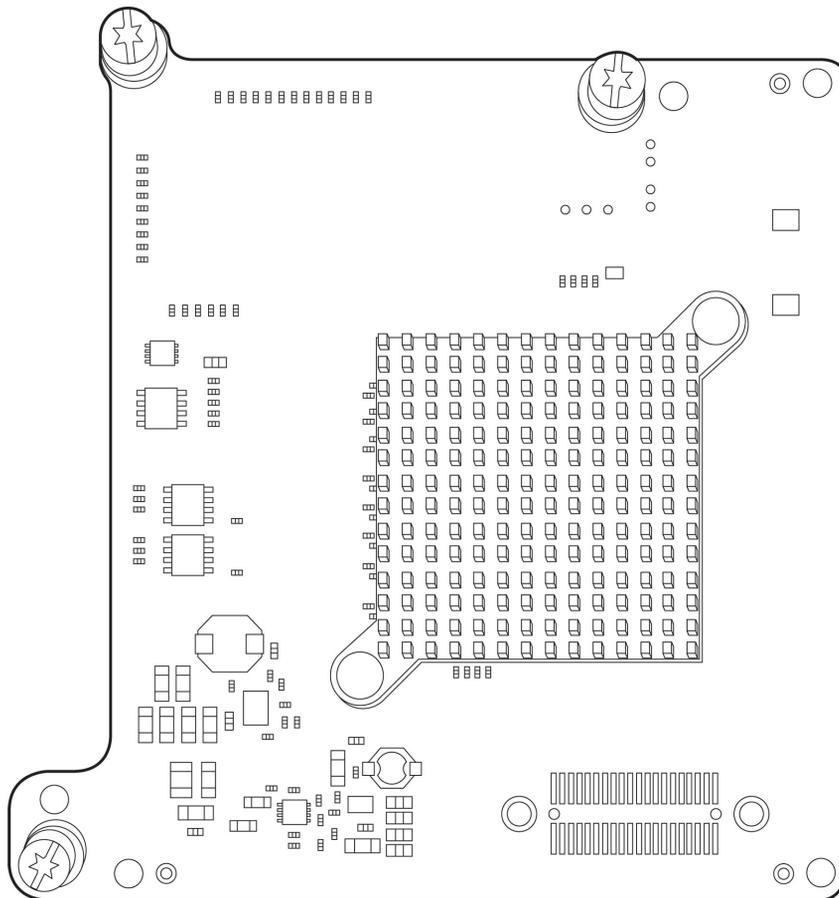


### Overview

The Emulex LPe1605-HP dual port Fibre Channel HBA provides reliable, high-performance connectivity at 8Gb/s and 16Gb/s. In addition to providing greater bandwidth, the HP LPe1605 also provides features such as data integrity, security and virtualization which are all complimentary to initiatives important to the enterprise data center. For greater system up time, the HP LPe1605 dual port design is the ideal Fibre Channel connectivity solution for applications that rely on high-availability for business continuity. The HP LPe1605 leverages several generations of Fibre Channel design to provide the greatest level of performance, scalability and manageability. Emulex's exclusive firmware architecture allows firmware to be upgraded without taking the server off-line or re-booting, and without the need to upgrade the driver. This provides hardware investment protection and ensures maximizes system uptime. As with all Emulex LightPulse Fibre Channel HBAs, the HP LPe1605 is managed with Emulex OneCommand™ Manager (OCM) HBA management application. OCM provides a secure, centralized administration console to discover, and manage Emulex Fibre Channel HBAs on local and remote hosts. Powerful diagnostic tools and flexible interface options (GUI, CLI and Browser) provide the greatest level of manageability. Fibre Channel is the de-facto standard for virtual server storage connectivity and Emulex HBAs are fully qualified for virtual server environments.

The HP BladeSystem c7000 Platinum Enclosure is required to permit 16Gb/s speed. Other HP BladeSystem c7000 Enclosures and HP BladeSystem c3000 Enclosures will have a maximum speed of 8Gb/s.



**HP LPe1605 16Gb Fibre Channel HBA for BladeSystem c-Class**

### Overview

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### Models

HP LPe1605 16Gb Fibre Channel HBA for BladeSystem c-Class

718203-B21

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### Kit Contents

- HP LPe1605 16Gb FC HBA
- Quick install card
- Product warranty statement

### Standard Features

#### Key Features

- Comprehensive virtualization capabilities with support for N-Port ID Virtualization (NPIV) and Virtual Fabric
  - Support for up to 255 VPorts improves server consolidation capabilities and asset utilization
- Superior performance capable of sustaining up to 1.2 Million I/Os per second per channel
  - Delivers the performance needed for high transaction data base environments (ie: Oracle, SQL Server, etc)
- Host to Fabric FC-SP authentication
  - Provides advanced security protecting the SAN from potential threats such as WWN spoofing, compromised servers etc.
- BlockGuard™ ready (T10-DIF) - ensures end-to-end data integrity
- Common driver model allows a single driver to support all Emulex HBAs on a given OS
- Easy deployment of new firmware with minimal server reboots
- Efficient centralized administration of Emulex HBAs via powerful management tools
- 16 and 8 Gb/s Fibre Channel link speed support
- Full fabric support with automatic topology and auto-negotiation
- Message Signaled Interrupts eXtended (MSI-X) Support for Greater Host CPU Utilization
  - Streamlines interrupt routing to improve overall server efficiency
- Multi-Path support for redundant HBAs and paths
- Support FC-Tape devices
- Operating Systems and Virtualization Software Supported: Windows Server 2008, Windows Server 2012, Windows Server 2012 R2, VMware 5.0, RHEL 5, RHEL 6, SLES 11, Citrix, UEK, Solaris 10 x86

#### Features and Benefits

- **Cost-savvy**
  - Emulex installation and management tools automate installation and provide local and remote HBA configuration and management, therefore reducing cost of HBA installations across the enterprise
  - Emulex's automated installation facilities and extensive management capabilities speed HBA deployment and device management, while reducing administration costs and protecting IT investment.
  - Emulex HBAs feature a firmware upgradeable architecture for long-term investment protection, feature and performance upgrades and seamless backward compatibility.
- **Change-ready**
  - Fully compatible with Virtual Connect
  - Emulex's unique Service Level Interface (SLI) architecture allows complete independence between HBA hardware, firmware and drivers. That means no reboots during configuration changes and no need for OS specific firmware. A single driver model simplifies management and upgrades across multiple generations of HBAs.
  - Powerful automation capabilities facilitate remote driver parameter, firmware and boot code upgrades. Advanced diagnostic features such as HBA beaconing and HBA statistics help to 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.
- **Energy-thrifty**
  - Increasing the Fibre Channel link rate to 16Gb/s provides greater bandwidth as a percentage of power consumed
  - Enhanced virtualization capabilities (NPIV and Virtual Fabric improves server consolidation capabilities and asset utilization
  - Frame-level Multiplexing and out-of-order frame reassembly increases link efficiency and

### Standard Features

maximizes HBA performance.

- **Time-smart**

- A common driver model amongst all Emulex HBAs enables a customer to standardize on one driver version across their entire installed base - thus reducing the cost and complexity of managing all HBAs.
- Superior Quality and Reliability- Emulex HBAs deliver industry-leading reliability levels which minimizes downtime and increases productivity
- Emulex LightPulse HBA management capabilities enable secure, centralized discovery, monitoring, reporting, and administration of Emulex HBAs on local and remote hosts.
- With in-band and out-of-band management capabilities, Emulex provides data center administrators with the greatest level of management flexibility.

### Product Highlights

#### Superior Quality and Reliability

Emulex HBAs deliver industry-leading reliability levels by utilizing a field-proven, single-chip design that minimizes components. Emulex HBAs also use a combination of parity, CRC, ECC and other advanced error checking methods to verify the integrity of data blocks, which are passed from the host interface through the HBA.

#### The Most Efficient Installation and Management

Emulex management tools automate installation and provide local and remote HBA configuration and management. Emulex's unique Service Level Interface (SLI™) architecture allows complete independence of device drivers from HBA hardware and firmware. That means no reboots during most configuration changes and no need for OS specific firmware. A single driver model simplifies management across multiple generations of HBAs. In addition, Emulex HBAs have a firmware-based architecture that enables feature and performance upgrades without costly hardware changes, for long-term investment protection and seamless backward compatibility.

#### Maximum SAN Performance

Emulex HBAs deliver maximum performance levels in real-world application environments, with superior full-duplex data throughput and I/Os per second. And Emulex's exclusive Dynamic Frame Multiplexing ensures consistently superior performance in mixed load environments such as disk and tape back-up applications.

#### The Fastest Diagnosis and Recovery

Comprehensive diagnostic functions, coupled with detailed event logging and tracing, provide for fast, efficient SAN troubleshooting.

#### The Broadest Enterprise Deployment

With the largest installed base of any Fibre Channel HBA supplier, Emulex is trusted by the world's largest, mission critical enterprises. Long-standing partnerships with leading storage vendors ensure unparalleled compatibility levels.

#### Software Features

A rich suite of management tools complements the LightPulse family of enterprise Fibre Channel HBAs. As a centralized management suite, HBAAnyware incorporates agent technology that provides discovery, reporting and management of local and remote HBAs with both in-band Fibre Channel and out-of-band IP support, enabling sophisticated management capabilities such as remote firmware upgrades and advanced diagnostics from a single console anywhere in the SAN.

All Emulex device drivers are fully compatible with previous generations of Emulex host bus adapters. A single driver binary supports all Emulex HBAs on a given host platform, streamlining the management of device drivers in environments with multiple generations and versions of HBAs, simplifying the upgrade process, and providing investment protection.

**NOTE:** For the latest Driver and Operating System options, please visit:

<http://h18004.www1.hp.com/products/blades/components/mezzanine/emulex/index.html>

### Compatibility

#### BladeSystem Compatibility

16Gb c-Class HBA Mezzanine (Mezz) Card Applications

**Supported HP ProLiant Server Blades** BL460c Gen8, BL465c Gen8, BL660c Gen8

**NOTE:** The HP LPe1605 16Gb FC HBA for HP BladeSystem c-Class must be deployed with the BladeSystem c-Class infrastructure and will only work with the BL c-Class Server Enclosures.

**NOTE:** The HP BladeSystem c7000 Platinum Enclosure is required to permit 16Gb/s speed. Other HP BladeSystem c7000 Enclosures and HP BladeSystem c3000 Enclosures will have a maximum speed of 8Gb/s.

**NOTE:** The HP LPe1605 16Gb FC HBA for HP BladeSystem c-Class is not compatible with 4Gb BladeSystem c-Class Fibre Channel interconnects.

**NOTE:** The HP LPe1605 16Gb FC HBA for HP BladeSystem c-Class is not compatible with HP ProLiant G7 and earlier server blades.

**NOTE:** This is a Type A mezzanine card, and can be configured in either Type A or Type B slots on HP ProLiant Gen8 Server Blades.

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#### Switch interoperability

**HP Storage and Third Party Switches**

- 16/8/4 Gb external Switches and Directors
- Compatible with external Fibre Channel switches including HP and third party vendors including Cisco and Brocade
- Compatible with 8Gb and 16Gb HP BladeSystem c-Class Fibre Channel switches and Virtual Connect Modules

For details on supported HP Fibre Channel SAN Switches, please consult the SAN Design Reference Guide at the following WEB address: <http://www.hp.com/go/san-documentation>

### Service and Support

#### Service and Support

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements.

**NOTE:** Server Options Limited Warranty includes 1 year Parts.

Care Pack services provide a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP Care Pack hardware and software services are available including:

- Installation and start up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 hours, 5 day to 24 hours, 7 days call window with options including 4-hour response or 6-hour Call To Repair
- Comprehensive range of software technical support for Microsoft, Linux, ProLiant Essentials and VMware-based IT solutions helping to deliver high level of application availability. Response times range from 30 mins for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution

HP has introduced a new building block approach which allows customers to purchase the right coverage at the right time whether purchasing an initial server blade plus enclosure or purchasing additional ProLiant server blades over time. HP will offer two sets of Care Pack services, one designed to support the server blade and one designed to support the enclosure.

HP Care Pack services for HP ProLiant Server Blades cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.

HP Care Pack services for the c7000 and c3000 Enclosure cover the enclosure, power supplies and fans. HP qualified rack options are covered by these services when installed within the same rack. HP Supported Ethernet devices covered include the Ethernet Pass-Through Module, Fibre Channel Pass-Through Module, Cisco Catalyst 3020 Blade Switch and GbE2c Ethernet Blade Switch.

**NOTE:** For more information regarding the Blade service portfolio visit our worldwide web site on the internet at: <http://h20219.www2.hp.com/services/cache/81725-0-0-225-121.html>

**NOTE:** For more information on HP Care Pack services, contact any of our worldwide sales offices or resellers or visit our worldwide Web site on the internet at: <http://www.hp.com/hps/carepack>

**NOTE:** For more complete information on HP Services offerings, customers and resellers, please visit us at: <http://www.hp.com/hps>

**NOTE:** Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

(1-1-1) Hardware Warranty - One-year on-site warranty, 8x5, next business day response, installation not included.

**NOTE:** The hardware warranty covers firmware and embedded non-saleable software. Saleable software carries its own warranty, please see below.

Software Warranty: HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.

**EXCLUSIVE REMEDY:** The entire liability of HP and its suppliers and your exclusive remedy for software

### Service and Support

that does not conform to this Limited Warranty shall be the repair or replacement of the defective media. This warranty and remedy are subject to your returning the defective media during the warranty period to HP in the country in which you obtained the software.

### Related Options

#### Service and Support Offerings (HP Care Pack Services)

**NOTE:** The HP Care Pack service part numbers below for ProLiant BL c-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.

#### Hardware Services On-site Service

HP 3year 4hour 13x5 c-Class Server Blade HW Support UE458E

HP 3year 4hour 24x7 c-Class Server Blade Hardware Support UE459E

HP 3year 6hour 24x7 Call to Repair c-Class Server Blade Hardware Support UE460E

#### Support Plus 24

HP 3year SupportPlus24 Microsoft c-ClassServer Blade Service UE473E

**NOTE:** HP Care Pack services for the c7000 and c3000 Enclosure cover the enclosure, power supplies and fans. HP qualified rack options are covered by these services when installed within the same rack. HP Supported Ethernet devices covered include the Ethernet Pass-Through Module, Fibre Channel Pass-Through Module, Cisco Catalyst 3020 Blade Switch and GbE2c Ethernet Blade Switch.

#### Hardware Services On-site Service

HP 3 year Next business day c7000 Enclosure Hardware Support UE477E

**NOTE:** Uplifts the Ethernet devices to the same level of warranty as the c-class enclosure

HP 3 year 4 hour 13x5 c7000 Enclosure Hardware Support UE478E

HP 3 year 4 hour 24x7 c7000 Enclosure Hardware Support UE479E

HP 3 year 6 hour 24x7 Call to Repair c7000 Enclosure Hardware Support UE480E

**NOTE:** The HP Care Pack service part numbers below covers the Brocade 4/12 SAN Switch and Brocade 4/12 SAN Switch 12-port Upgrade LTU.

#### Hardware Services On-site Service

HP 3 year Next business day SAN Blade Switch Hardware Support UC007E

HP 3 year 4 hour 13x5 SAN Blade Switch Hardware Support UC008E

HP 3 year 4 hour 24x7 SAN Blade Switch Hardware Support UC009E

HP 3 year 6 hour 24x7 Call to Repair SAN Blade Switch Hardware Support UC023E

**NOTE:** The HP Care Pack service part numbers below covers the Brocade 4/24 SAN Switch.

#### Hardware Services On-site Service

HP 3 Years Next business day c-Class SAN Switch Hardware Support UE436E

HP 3 Years 4 hour 13x5 c-Class SAN Switch Hardware Support UE437E

HP 3 Years 4 Hour 24 hours UE438E

HP 3 Years 6 Hour 24x7 Call-To-Repair c-Class SAN Switch Hardware Support UE439E

HP Installation Storage Switches Service U5988E

**NOTE:** The HP Care Pack service part numbers below covers the Brocade 4/24 SAN Switch Power Pack.

#### Hardware Services On-site Service

#### Support Plus

HP 3 year Support Plus 4/24 SAN Switch Power Pack Service UE728E

#### Support Plus 24

### Related Options

HP 3 year Support Plus 24 4/24 Switch Power Pack Service	UE729E
<b>Installation &amp; Start-up Services</b>	
HP Enhanced Network Installation and Startup Service for HP BladeSystem	UE603E
<b>NOTE:</b> Provides for an integrated hardware and software implementation that includes remote service planning, onsite deployment of hardware and software, installation verification testing and customer orientation. Hardware deployment covers the installation of a single BladeSystem enclosure that include server blades (up to 16), Ethernet network interconnect, and power options. Software deployment covers the installation and configuration of HP Systems Insight Manager (SIM), HP Rapid Deployment Pack (RDP), and deploy up to two operating system editions of either Windows or Linux, using scripted operating system installation software.	
HP Install c-Class Server Blade Service	UE493E
HP Hardware Install c-Class Enclosure and Server Blade Service	UE494E
HP Installation and Startup for Insight Control Server Deployment - previously Rapid Deployment Pack	U5683E
<b>NOTE:</b> Provides installation on a Customer supplied server designated as a Deployment Server. Includes the deployment of a single server. This new server will be deployed using either one of the pre-configured scripts or an image. In addition, the service will provide for the capture and storage of the configuration of the newly deployed server and orientation on product usage. To be delivered during standard office ours, standard office days.	
HP Implementation HP Rapid Deployment Pack (Basic) Service	UA042E
<b>NOTE:</b> Service coverage: onsite installation of the Vulnerability and Patch Management (VPM) software on a customer designated server, configuration of the VPM software to acquire security patches, enabling the VPM software to scan up to five (5) systems, applying the security patches to the designated servers, generating a report from VPM that shows the vulnerability assessment results, and providing customer with an orientation to the software.	
HP Startup HP Systems Insight Manager Service	UA041E
HP Startup HP Systems Insight Manager Management Agents Service	UA040E
<b>Software Operating Environment Care Packs</b>	
HP 1year 9x5 3incidents Microsoft/Novell Operating Environment SW Technical Support	U8169E
HP 1 year 9x5 10 incident Red Hat High Performance Computing Software Technical Support	U3402E
HP 1year 9x5 3incidents SUSE SLES8 SW Technical Support	U9615E
HP 1year 9x5 3incidents ProLiant Essentials SW Technical Support	U8222E
HP 1year 24x7 3incidents ProLiant Essentials SW Technical Support	U8301E
HP 1year 9x5 10incidents ProLiant Essentials SW Technical Support	UE006E
HP 1year 24x7 10incidents ProLiant Essentials SW Technical Support	UE116E
HP 1year 9x5 25incidents ProLiant Essentials SW Technical Support	UE117E
HP 1year 24x7 25incidents ProLiant Essentials SW Technical Support	UE118E
HP 1year 9x5 50incidents ProLiant Essentials SW Technical Support	UE119E
HP 1year 24x7 50incidents ProLiant Essentials SW Technical Support	UE120E
HP 1year 9x5 ProLiant Essentials SW Technical Support	UE121E

### Related Options

HP 1year 24x7 ProLiant Essentials SW Technical Support	UE452E
HP 3y 9x5 ProLiant Esnt SW Tech Supp	UE453E
HP 3y 24x7 ProLiant Esnt SW Tech Supp	UE454E

### Technical Specifications

<b>System Unit</b>	<b>Dimensions (H x W)</b>	3.5 in x 3.9 in		
	<b>Media</b>	N/A (Always connects to BladeSystem interconnect module)		
	<b>Ports</b>	Two		
<b>System Inlet Temperature</b>	<b>Operating</b>		10° to 70°C (55° to 158°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).	
		<b>Non-operating</b>	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
	<b>Relative Humidity (non-condensing)</b>	<b>Operating</b>	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	
		<b>Non-operating</b>	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.	
<b>Altitude</b>	<b>Operating</b>	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).		
	<b>Non-operating</b>	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).		
	<b>Power Consumption</b>	Max	11.3 W	

**Environment-friendly Products and Approach**    **End-of-life Management and Recycling**    Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <http://www.hp.com/go/green>. To recycle your product, please go to: <http://www.hp.com/go/green> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

### Technical Specifications

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The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.