Overview

HPE SN1600 Series 32Gb Fibre Channel Host Bus Adapter

Family Overview

A Fibre Channel Host Bus Adapter (HBA) is a server peripheral designed to be installed internally into a server and allow its server to externally transport data to a shared storage device like an HPE storage array. The Fibre Channel Host Bus Adapter is externally coupled to another Fibre Channel device using a special optical cable and optical connector. Several to dozens to hundreds of servers with HBAs are usually connected to a Fibre Channel switch or Fibre Channel director which controls the data traffic between the servers and the connected storage devices. The storage devices are designed to be shared with servers and applications to optimize performance and availability. These storage devices are split into fault-tolerant, primary storage arrays and secondary storage devices used for data protection. With a Fibre Channel HBA installed in every participating server connected to a Fibre Channel switch or Fibre Channel director and each switch or director attached to one or more storage devices, the resulting configuration is called a Storage Area Network or SAN based on the Fibre Channel (FCP) or FC-NVME protocol.

Compatibility and Investment Protection

All HPE SN1600 Series Host Bus Adapters support the Fibre Channel Protocol (FCP) and NVMe Protocol (FC-NVMe) at an industry-defined 32Gb/s - bandwidth. This generation of Host Bus Adapters is backwards compatible to 8Gb/s and 16Gb/s Fibre Channel devices. Additionally, all HPE SN1600 Series Host Bus Adapters are forward compatible to the HPE 64Gb/s Fibre Channel products. Fibre Channel HBAs and Fibre Channel switches offer connectivity to all HPE's primary and secondary storage devices including HPE Alletra, Primera, 3PAR, Nimble, XP8, MSA, StoreOnce, and other storage devices following the FCP and/or the FC-NVMe protocol. (Check HPE's Single Point of Configuration Knowledge (SPOCK) for complete compatibility).

The HPE SN1600 Host Bus Adapter family brings datacentre infrastructure components to a higher level of performance and efficiency with the ability to deliver twice the bandwidth performance of 16Gb HBAs, higher I/Os, and lower latency while maintaining compatibility. Other generations of Fibre Channel offer similar support as displayed in the table below:

Supported generations of Fibre Channel Host Bus Adapters and Fibre Channel Switches

	4Gb Switch[1]	8Gb Switch[1]	16Gb Switch	32Gb Switch	64Gb Switch
4Gb HBA[1]	Yes	Yes	Yes	No	No
8Gb HBA[1]	Yes	Yes	Yes	Yes	No
16Gb HBA	Yes	Yes	Yes	Yes	Yes
32Gb HBA	No	Yes	Yes	Yes	Yes
64Gb HBA	No	No	Yes	Yes	Yes

Notes:

- Always check HPE's Single Point of Configuration Knowledge (SPOCK) for complete compatibility.
- [1]Obsolete

The benefit of backward and forward compatibility design is to allow customers the flexibility to select an upgrade path of components based on time, budget, or functionality. A SN1600 HBA would be compatible with any combination of 8Gb, 16Gb, 32Gb, and 64Gb switches and storage devices in a SAN.

Overview

Connectivity

All Fibre Channel components are connected using special optical cables and special optical lasers called SFPs (Small Form Factor Pluggable). Each HPE Fibre Channel Host Bus Adapter port is shipped with a pre-installed, performance matching SFP. No additional SFPs are required for the HBA. Each optical cable requires an SFP installed on each end to insure data transport from one Fibre Channel device to another. This strict cable design is an industry standard and adopted to insure interoperability and quality data delivery. Two cabling standards exist – shortwave and longwave. Shortwave or (SW) is the most popular and allows for cable lengths up to 100m (about 328 feet) between servers, switches, and storage. For the shortwave standard, all cables and SFPs must match and use the shortwave design. The shortwave cabling standard uses a 50micron filament. The shortwave term is also interchangeable with the term "multi-mode" (mm). Longwave (LW) is standard offering providing longer cable distances ranging from 1km to 10km (about 6.21 mi) and longer. The Longwave standard has the same requirement that all components must be longwave to function. You cannot intermix shortwave and longwave cabling and SFPs. Longwave components are less popular and may require special ordering from HPE. The longwave term is also interchangeable with the term "single-mode" (sm). Cabling choices highlighted further into Quickspecs.

Workloads

The Fibre Channel and FC-NVMe protocols leverage a block-based design which is best used with data intensive workloads. Those workloads leverage database deployments like Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Financial Applications, Commercial Reservation Systems, Support Systems, Virtual Server warehouses, Media & Entertainment, Video Surveillance Systems, traditional backup and restore, and large multi-server workload configurations. Customers that have multiple workloads on multiple physical or virtual servers are ideal candidates for a Storage Area Network where the data can be stored on a consolidated storage array instead of each individual server. Each server running these workloads connected to a SAN would require an HBA installed and connected to the Fibre Channel switch.

Availability

Shared SAN Storage arrays are designed to be highly resilient because customers require high speed, cost-effective capacity to their servers that host their mission critical and business critical applications. Storage Arrays are commonly rated using a percentage of "uptime" in form of 99.9999% ("Four Nines", "Five Nines, "Six Nines"). Each "9" represents a projected hour of downtime per year. For example, a 99.99% ("four nines") array is assumed to have no more downtime than 52 minutes a year (and an uptime of approximately 8,759 hours out of 8,760 per year) whereas a 99.999% ("five nines") would be less than 6 minutes of downtime per year. Because storage is designed to be highly fault tolerant, SAN and Fibre Channel need to address high availability because of the "many servers to one storage" deployment in a data centre. SANs can be designed to support and complement high availability storage with a highly fault tolerant design building a redundant data path configuration. Redundant, dual path design is a 'Best Practices' design. A highly fault tolerant storage array would require a fault tolerance SAN infrastructure. Fibre Channel design will guarantee frame delivery (lossless) and deliver in-order. The dual path SAN design is to provide access to data at the array if a hardware failure occurs on the SAN. Should a SAN failure occur, the SAN reroutes data through the alternative data path. See the HPE **SAN Design Reference Guide** for more complete information. Internal and Partners Only)

Models

Dual Port

SN1610E	HPE SN1610E 32Gb 2-port Fibre Channel Host Bus Adapter	R2J63A
SN1610Q	HPE SN1610Q 32Gb 2-port Fibre Channel Host Bus Adapter	R2E09A
SN1600E	HPE SN1600E 32Gb Dual Port Fibre Channel Host Bus Adapter	Q0L12A
SN1600Q	HPE SN1600Q 32Gb Dual Port Fibre Channel Host Bus Adapter	P9M76A

Overview

Single Port

SN1610E	HPE SN1610E 32Gb 1-port Fibre Channel Host Bus Adapter	R2J62A
SN1610Q	HPE SN1610Q 32Gb 1-port Fibre Channel Host Bus Adapter	R2E08A
SN1600E	HPE SN1600E 32Gb Single Port Fibre Channel Host Bus Adapter	Q0L11A
SN1600Q	HPE SN1600E 32Gb Single Port Fibre Channel Host Bus Adapter	P9M75A

HPE Premier Flex Cables Product Overview

(Required to connect Fibre Channel Host Bus Adapters to other Fibre Channel devices)

HPE Premier Flex cables are optical cables designed for universal data centre deployments. These deployments include Fibre Channel and Ethernet designs. The cables, like the SFPs, are designated shortwave and longwave and must match the accompanying SFP as shortwave or longwave. There can be no intermixing of design. The Premier Flex cables appear thin based on the 50-micron internal filament, but the cables are designed for rugged datacentre deployment. The fiber optic cable routing can result in 90° bends when cables get caught in cabinet doors and kink. Data loss and transmission errors resulting from these common problems are difficult to troubleshoot, expensive, and increase downtime. HPE Premier Flex OM4 fiber optic cables solve these problems by providing up to 10 times better bend performance than existing fiber cables. These revolutionary cables use a bendable fiber optic technology that significantly improves bend performance over existing fiber cables. This bendability, combined with improvements in transmission clarity and bandwidth, allows HPE Premier Flex cables to transmit data over longer distances, at higher rates, with fewer transmission errors. The flexibility of these cables also enables simple, reliable installation, enhanced performance, and better signal integrity. Additionally, HPE Premier Flex OM4 Fiber Optic Cables are tested and qualified to provide maximum performance across HPE's entire Fibre Channel and Ethernet product families. The Fibre Channel feature, Link Cable Beaconing (LCB), can assist in locating port to port connections and their associated cable simplifying cable, connection, and port issues.

Notes: "Fibre Channel" is the name for the data transfer protocol (FCP) and "Fiber Optic" is the name of the cabling standard using a glass filament as the transport. Shortwave (SW) and longwave (LW) components cannot be mixed on the same connection.

Models

Shortwave (Multi-mode) 50-micron LC/LC OM4 Fibre Optic Cables (length in meters)

Description	SKU
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 1m Cable	QK732A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 2m Cable	QK733A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 5m Cable	QK734A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 15m Cable	QK735A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 30m Cable	QK736A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 50m Cable	QK737A

Notes: Longwave (Single-mode) 9-micron LC/LC OM4 Fibre Optic Cables and Longwave (single-mode) SFPs special orders. Contact your HPE representative for details.

Standard Features

Key Features and Benefits

Performance

Up to two ports of 32Gb FC delivers 12,800MBps bandwidth across two 32GFC ports delivered in Fibre Channel frames. Frame delivery is lossless and in-order. Enhanced reliability and diagnostics are implemented to reduce retries and identify SAN congestion.

Each generation of Fibre Channel HBA uses a more powerful chipset increasing I/O performance, follows the industry standard for bandwidth, and offers lower latency. These HBA improvements generally improve workload performance like data-intensive deployments like databases.

PCIe 4.0

All HPE SN1600 Fibre Channel Host Bus Adapters are designed using PCIe 4.0 x 8 channels

Support for greater Server Virtualization

Higher bandwidth and ability to virtualize physical ports with QoS in the adapter, make these adapters ideal for high density server virtualization environments for increased scalability. Enables more applications and VMs to run on a single server and Fibre Channel port, resulting in reduced cabling and a higher return on IT investment.

Connectivity to HPE Servers and Storage

HPE's product strategy is to offer an HBA solution for any HPE compute platform – ProLiant, SuperDome, Synergy, and Alletra Storage Servers. Additionally, the HBA design follows the Fibre Channel (FCP) and FC-NVMe standards to interconnect Fibre Channel switches and directors to Fibre Channel and FC-NVMe connected storage arrays.
Each HPE supported operating system is tested and qualified. The complete configuration is meticulously documented in HPE Single Point of Connectivity Knowledge with firmware versions, drivers, and other pertinent information in a searchable online database for partners and customers. Additionally, the Operating System vendors will publish support for HPE hardware in their respective Hardware Compatibility Lists.

LUN Prioritization and QoS

HPE 32Gb FC HBAs support Class Specific Control (CS_CTL) which allows prioritization and bandwidth allocation at the LUN level. In addition, the SN1610Q and SN1610E adapters support Virtual Machine ID (VM-ID) which further enhances prioritization and monitoring to the virtual machine within the SAN, providing a VM-aware storage network.

FC-NVMe Data Protocol

HPE 32Gb Fibre Channel Host Bus Adapters are NVMe-enabled to support FC-NVM Express (NVMe). This protocol is designed to optimize data commands to storage devices that are storage memory designed like arrays using solid state disks (SSDs). The 32Gb HBAs can run both SCSI (FCP) protocol and FC-NVME protocol on either HBA port enabling a customer to run different protocol storage devices on the same SAN.

Active Health System

All HPE 32GFC adapters support HPE ProLiant Active Health System integration. This helps administrators accurately troubleshoot and resolves problems within the server faster.

Standard Features

HPE GreenLake for SAN Fabric Management

A management tool offered in the GreenLake portfolio designed to make SAN and SAN component management more intuitive and simpler. Component discovery via port paints a graphical, topographical connection for each device. A “pre-flight check” of component firmware identifies with component are below certified firmware levels (and will not function), which components are identified as supported but not at the latest firmware level and finally which components have firmware at the latest levels. All firmware checks are accomplished with integration with HPE certification database – SPOCK – Single Point of All Configuration Knowledge. This single feature can save hours of research and resolution. The HPE GreenLake for SAN Fabric Management enables saved templates for repetitive deployments and event logging of every SAN component.

Secure Firmware download

The SN1610Q and SN1610E deliver enhanced security via the new secure firmware update feature which protects and ensures the authenticity of device firmware. All SN1610 adapters offer non-disruptive firmware upgrades to reduce the number of server interruptions. Check SPOCK for supported firmware versions.

T10 Protection Information (T10-PI)

HPE 32GFC adapters support T10-PI for enhanced data integrity when connected to T10-PI enabled arrays. Cyclic Redundancy Check (CRC) and Error Correcting Code (ECC) are used to check Fibre Channel frames. T10-PI checks validates the data which is not necessarily checked during frame inspection.

Forward error correction (FEC)

FEC is enabled and improved at 32GFC as required by the FC Specification, automatically correcting transmission errors and improving network performance and resiliency.

Link cable beaconing (LCB)

LED beaconing “blinks” the Fibre Channel port lights where a physical fibre optic cable is connected. The light indicators on both ends of a physical link simplifies cable identification and management.

D-Port Diagnostics

Quickly run automated diagnostic tests in a single step, across multiple adapters, servers, and fabric components to assess connectivity. Optics and cable problems are identified and resolved.

Fabric Device Management Interface (FDMI)

FDMI enables the discovery of devices such as Fibre Channel host bus adapters (HBAs). Check connectivity to SAN devices and query the switch management server for in-depth details on connected devices.

Read Diagnostic Parameters (RDP)

Identify the source of network and media errors like cyclic redundancy check (CRC) and loss of sync (LOS) by remotely accessing diagnostic information from anywhere in the fabric.

Administrators can preconfigure WWN settings at the switch port allowing Fibre Channel adapter to acquire port WWN address from the 16Gb, 32Gb, or 64Gb fabric. This allows SAN administrator to configure SAN zoning without need for servers to be present.

Standard Features

Firmware Integrity Protection with Hardware Root of Trust

The HPE SN1610Q & SN1610E 32Gb FC HBAs incorporate hardware (RoT) that keeps malicious firmware from hijacking the adapter. The adapters RoT enables both integrity and authenticity during adapter firmware updates by both validating firmware embedded signatures with hardware embedded keys to ensure that only bona fide firmware executes, and protecting firmware updates that are applied over public networks.

Service and Support

Warranty

3-0-0 Three-year parts exchange warranty. Additional warranty protection can be purchased.

HPE Global Services provides a three-year, limited warranty, fully supported by a worldwide network of resellers and service providers and toll-free 24x7 hardware technical phone support for the duration of the warranty. In addition, available service offerings include a full range of HPE Services operational packaged hardware and software services.
Notes: Certain restrictions and exclusions apply. Consult the HPE Customer Support Center for details.

HPE Services

No matter where you are in your transformation journey, you can count on HPE Services to deliver the expertise you need when, where and how you need it. From planning to deployment, ongoing operations and beyond, our experts can help you realize your digital ambitions.
https://www.hpe.com/services

Consulting services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.
https://www.hpe.com/services/consulting

HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.
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Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.
https://www.hpe.com/services/operational

Recommended Services

HPE Tech Care Service

HPE Tech Care Service is the operational support service experience for HPE products. The service goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Tech Care Service delivers a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Tech Care Service is available in three response levels. Basic, which provides 9x5 business hour availability and a 2-hour response time. Essential which provides a 15-minute response time 24x7 for most enterprise level customers, and Critical which includes a 6-hour repair commitment where available and outage management response for severity 1 incidents.

https://www.hpe.com/services/techcare

Service and Support

HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

https://www.hpe.com/services/completecare

Other related services from HPE Services

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- Lifecycle Install and Startup Services: Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system.
- HPE Firmware Update Analysis Service: Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment.
- HPE Firmware Update Implementation Service: Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment.
- Implementation assistance services: Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and onsite technical forums.
- HPE Service Credits: Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices.

https://www.hpe.com/services/lifecycle

- For a list of the most frequently purchased services using service credits, see the **HPE Service Credits Menu**

HPE SAN Deployment Service

Hewlett Packard Enterprise delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components.

Learn more: **https://www.hpe.com/psnow/doc/5981-8527enw?jumpid=in_lit-psnow-red**

HPE Installation Service

Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

Learn more: **https://h20195.www2.hpe.com/v2/Getdocument.aspx?docname=5981-9356enw**

HPE Education Services

Training and certification designed for IT and business professionals across all industries. Broad catalogue of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.

https://www.hpe.com/services/training

Service and Support

Defective Media Retention

An option available with HPE-Complete Care Service and HPE Tech Care Service and applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

Consult your HPE Sales Representative or Authorized Channel Partner of choice for any additional questions and services options.

Parts and Materials

HPE will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

How to purchase services

Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find services at **https://ssc.hpe.com/portal/site/ssc/**

AI Powered and Digitally Enabled Support Experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience.

Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with seamless transition when needed to a live support agent.

https://support.hpe.com/hpesc/public/home/signin

Consume IT on your terms

HPE GreenLake edge-to-cloud platform brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake edge-to-cloud platform accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

To learn more about HPE Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE" **https://www.hpe.com/us/en/contact-hpe.html**

For more information: **http://www.hpe.com/services**

Technical Specifications

Family Information

	R2E08A	R2E09A	R2J62A	R2J63A
	SN1610Q - 1P	**SN1610Q - 2P**	**SN1610E - 1P**	**SN1610E – 2P**
Generation	7			
Number of channels	Single	Dual	Single	Dual
Port Speed	32GFC	32GFC	32GFC	32GFC
OS Supported	**Notes:** Always refer to the HPE Single Point of Connectivity Knowledge for HPE Storage Products at: **http://www.hpe.com/storage/spock** for specific product support information and specific OS versions supported.			
Microsoft Windows Server & HyperV	2022 x64 Edition 2019 x64 Edition			
Red Hat Enterprise Linux	9.x x64 Release 8.x x64 Release 7.x x64 Release			
VMware ESX/ESXi	8.x x64 7.x x64			
SUSE Linux	15.x x64 12.x x64			
Servers Supported	Select HPE ProLiant, Alletra, and SuperDome servers. **Notes:** Refer to server Quick Specs for details regarding supported options.			
Array Platforms Supported	Refer to **http://www.hpe.com/storage/spock** for specific product support information.			
What's Included in the Box?	32 Gbps HBA with standard bracket, one 32 Gbps SFP+ transceiver, low-profile bracket, documentation	32 Gbps HBA with standard bracket, two 32 Gbps SFP+ transceiver, low-profile bracket, documentation	32 Gbps HBA with standard bracket, one 32 Gbps SFP+ transceiver, low-profile bracket, documentation	32 Gbps HBA with standard bracket, two 32 Gbps SFP+ transceiver, low-profile bracket, documentation
Environmental Operating Temperature	32° F to 131° F 0° C to 55° C		32° F to 131° F 0° C to 55° C	
Environmental Storage Temperature	-4° F to 158° F (-20° C to 70° C)		-4° F to 185° F (-20° C to 85° C)	
Environmental Relative Humidity Operating	10% to 90% RH at 40° C (non-condensing)		5% to 95% (non-condensing)	
Product Dimensions (W x D x H)	6.6 x 0.49 x 2.73 in (167.64 x 12.44 x 69.34mm)		6.6 x 0.43 x 2.71 in (167.64 x 10.92 x 68.83mm)	
Media	Shortwave Optic (SFP+) (pre-installed)		Shortwave Optic (SFP+) (pre-installed)	
Connector	Fiber Optic cable with LC type connector		Fiber optic cable with LC type connector	
PCIe Connections	PCIe 4.0 x8		PCIe 4.0 x8	
Auto-negotiation	32/16/8 Gbps		32/16/8 Gbps	

Technical Specifications

	P9M75A	P9M76A	Q0L11A	Q0L12A
	SN1600Q - 1P	**SN1600Q - 2P**	**SN1600E - 1P**	**SN1600E – 2P**
Generation	6			
Number of channels	Single	Dual	Single	Dual
Port Speed	32GFC	32GFC	32GFC	32GFC
OS Supported	**Notes:** Always refer to the HPE Single Point of Connectivity Knowledge for HPE Storage Products at: **http://www.hpe.com/storage/spock** for specific product support information and specific OS versions supported.			
Microsoft Windows Server & HyperV	2022 x64 Edition 2019 x64 Edition			
Red Hat Enterprise Linux	9.x x64 Release 8.x x64 Release 7.x x64 Release			
VMware ESX/ESXi	8.x x64 7.x x64			
SUSE Linux	15.x x64 12.x x64			
Servers Supported	Select HPE ProLiant, Alletra, and SuperDome servers. **Notes:** Refer to server Quick Specs for details regarding supported options.			
Array Platforms Supported	Refer to **http://www.hpe.com/storage/spock** for specific product support information.			
What's Included in the Box?	32 Gbps HBA with standard bracket, one 32 Gbps SFP+ transceiver, low-profile bracket, documentation	32 Gbps HBA with standard bracket, two 32 Gbps SFP+ transceiver, low-profile bracket, documentation	32 Gbps HBA with standard bracket, one 32 Gbps SFP+ transceiver, low-profile bracket, documentation	32 Gbps HBA with standard bracket, two 32 Gbps SFP+ transceiver, low-profile bracket, documentation
Environmental Operating Temperature	32° F to 131° F 0° C to 55° C		32° F to 131° F 0° C to 55° C	
Environmental Storage Temperature	-4° F to 158° F (-20° C to 70° C)		-4° F to 185° F (-20° C to 85° C)	
Environmental Relative Humidity Operating	10% to 90% RH at 40° C (non-condensing)		5% to 95% (non-condensing)	
Product Dimensions (W x D x H)	6.6 x 0.49 x 2.73 in (167.64 x 12.44 x 69.34mm)		6.6 x 0.43 x 2.71 in (167.64 x 10.92 x 68.83mm)	
Media	Shortwave Optic (SFP+) (pre-installed)		Shortwave Optic (SFP+) (pre-installed)	
Connector	Fiber Optic cable with LC type connector		Fiber optic cable with LC type connector	
PCIe Connections	PCIe 4.0 x8		PCIe 4.0 x8	
Auto-negotiation	32/16/8 Gbps		32/16/8 Gbps	

Technical Specifications

HPE Premier Flex LC/LC multi-mode OM4 2 Fiber Cable - Family Information

Fiber optic multimode OM4 50/125um duplex cable assembly with LC/LC duplex connectors Available in 1m to 50m cable lengths

Physical	**Core diameter:**	**50um ±3um**
	Cladding diameter:	125um ±2um
	Bandwidth:	4700 MHz-km @ 850nm (laser)
	Jacket color:	Blue
	Jacket material:	OFNR (optical fiber nonconductive riser) LSZH (low smoke zero halogen) thermoplastic
Bend/Loss (approx.)	35.7mm (2 turns)	<0.05 decibels (db)
	15mm (2 turns)	<0.1 decibels (db)
	7.5mm (2 turns)	<0.2 decibels (db)
Reach	10GbE	380m
(max no bends)	16GFC	125m
	32GFC, 25GbE	100m
	64GFC	100m

Notes: "LC" represents "Little Connector" or "Lucent Connector"

HPE Fiber Optical Transceiver (XCVR) - Family Information

All HPE Host Bus Adapters (HBAs) are shipped with the appropriate number of Small Form Factor Pluggable (SFP) transceivers (XCVR). Dual Port HBAs (2P) are shipped with two SFP transceivers. Single Ports HBAs (1P) are shipped with a single SFP. The SPF transceivers (XCVR) match the bandwidth of the HBA. For example, the SN1610Q - HPE SN1610Q 32Gb 2-port Fibre Channel Host Bus Adapter would ship with two (dual port) 32Gb/s SPFs pre-loaded in the adapter. No ordering of SFPs is needed on the HBA. All SFP Transceivers are multi-mode or shortwave (SW). For longwave (LW) or single-mode fiber connections an alternative SFP (LW) and longwave (LW) or single-mode cable must be ordered. Shortwave (SW) and longwave (LW) components cannot be mixed on the same connection.

SFPs may be required for Fibre Channel Switches and Directors. Check the Quickspecs of those products for SFP requirements – some HPE Fibre Channel Switches have SFPs pre-installed, and some Fibre Channel Switches and Directors do not have SKUs pre-installed and must be ordered separately.

Description	**Connector**	**Temp (C)**		**Wavelength**	**Speed**	**Wattage (w)**	
(not orderable for HBAs)	**Type**	**Low**	**High**	**(nm)**	**(Gb/s)**	**Avg.**	**Max**
HPE 64Gb SFP56 SW 100m 1pk XCVR	LC	0	70	850	57.8	1.7	2
HPE 32Gb SFP28 SW 1-pack Com Temp XCVR	LC	0	70	850	28.05	1	1.5
HPE 32Gb SFP28 SW E Temp 1-pack PT XCVR	LC	0	85	850	28.05	1	1.5
HPE 32GB SFP28 LW 10km 1-PACK XCVR	LC	0	70	1310	28.05	1.5	2
HPE 16Gb SW Extended Temp SFP+ Transceiver	LC	0	85	850	14.025	1	1.5
HPE 16Gb SW C Temp (0-70 C) SFP+ Transceiver	LC	0	70	850	14.025	1	1.5
HPE 16Gb SFP+ SW E Temp 1-pack PT XCVR	LC	0	85	850	14.025	1	1.5

Summary of Changes

Date	Version History	Action	Description of Change
13-Nov-2023	Version 17	Changed	HPE Services Rebranding
05-Sep-2023	Version 16	Changed	Overview, Standard Features and Technical Specifications sections were updated.
10-Jan-2022	Version 15	Changed	Standard Features section was updated
07-Sep-2021	Version 14	Changed	Removed some of the deprecated features
04-May-2021	Version 13	Changed	Added FC-NVMe OS support
03-Aug-2020	Version 12	Changed	Added SN1610E details
15-Jun-2020	Version 11	Changed	Overview and Technical Specifications sections were updated.
02-Dec-2019	Version 10	Changed	Standard Features section was updated.
21-Oct-2019	Version 9	Changed	Standard Features section was updated.
07-Oct-2019	Version 8	Changed	SN1610Q adapters
07-Jan-2019	Version 7	Changed	Feature information edited with latest information Overview and Service and Support sections were updated
18-Dec-2017	Version 6	Changed	Overview section was revised.
07-Aug-2017	Version 5	Changed	Added Gen10 server support
08-May-2017	Version 4	Changed	Changes made throughout the document
24-Feb-2017	Version 3	Changed	Feature and table of specifications are cleaned up with latest information
28-Nov-2016	Version 2	Changed	32Gb SN1600E Single Port and Dual Port adapters added
26-Sep-2016	Version 1	New	New QuickSpecs

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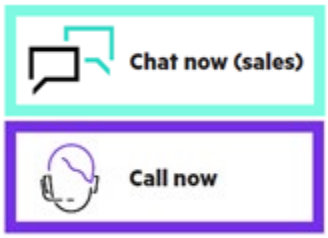

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