Overview

Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy

The Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy represents a composable and integrated Fibre Channel interconnect module with Gen6 technology that simplifies integration of the HPE Synergy blade chassis into a Storage Area Network (SAN). It provides breakthrough application performance, operational stability and simplified manageability to meet the stringent business requirements with 32Gb FC technology for HPE's Composable Infrastructure. It is ideal for enterprises planning to deploy 32Gb FC to meet growing bandwidth demands of high-density virtualization/applications utilizing All-flash Storage arrays (AFA) and for customer looking to deploy scalable private cloud storage networks using HPE Synergy for workloads.

Brocade 32Gb FC Switch for HPE Synergy provides industry-leading performance with <900ns frame latency for fast switching, switching bandwidth up to 896 Gbps and a maximum throughput of 512 Gbps to enable demanding applications and high-density server virtualization. It provides scalability with 16 external optical ports (2 QSFP ports and 8 SFP+ ports) each supporting 32Gb, 16Gb and 8Gb FC speeds that customers can utilize on-demand paralleling their business growth. The QSFP ports support a break-out cable for connection to standard SFP+ ports. It provides simplified manageability utilizing the advanced Web Tools to simplify fabric set-up and on-going maintenance for SAN administrators. The Power Pack+ SAN management software option enables customers to manage data flow and maintain optimized application performance. With the HPE PowerPack+ software, the customers can also utilize IO Insight software for proactive and real-time monitoring of storage and application-level IO and VM Insight software to optimize VM workloads and ensure service-level objectives are met. Brocade 32Gb FC Switch Module for HPE Synergy is NVMe ready and provides next-generation storage connectivity to existing storage network. This will help customers transition applications and dynamically migrate to NVMe on demand continuing with the existing 16Gb and 32Gb SAN to run NVMe without code changes. Brocade 32Gb FC Switch Module for HPE Synergy also lowers TCO as it hot-plugs into the back of the HPE Synergy Frame. This frees-up rack space, enables shared power and cooling, and reduces cabling resulting in significant infrastructure savings.



Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy

At a Glance

Integrated SAN connectivity

Enables data center consolidation with HPE Synergy through a state-of-the-art zero-footprint design while lowering cost through shared power and cooling, fewer cables and less space resulting in reduced infrastructure complexity and lower operations costs.

32 Gb FC storage networking

Enables support of virtualized environments and other emerging technologies through high-speed technology that doubles the performance of the storage network. External facing ports auto-sense lower bandwidth components for flexibility and investment protection with existing FC ports (8, 16 or 32Gbps FC for external ports) as well as to the future FC products (64Gbps).

Overview

Quad Small Form-factor Pluggable (QSFP)
Up to two 4x32 Gbps QSFPs are supported, which can be used as additional 32 Gbps FC ports, 128 Gbps high speed FC ISL ports between switch modules, or as part of 128Gbps trunk port to a B-series Director.

Non-blocking architecture
Includes connection speed support for all ports to provide a high-performance system with switching bandwidth of up to 896 Gbps (28 ports x 32 Gbps).

ISL Trunking performance enhancements
Support for multiple trunks, with the maximum trunk size of up to eight SAN ports for up to 256Gbps balanced throughput per each trunk group. Trunking of the SAN-facing ports with external Brocade or HPE B-series switches provides a high-bandwidth solution while lowering costs through fewer SFPs and cables. You can trunk up to 8 external FC SFP+ ports or up to two QSFP ports. For maximum flexibility any number of consequent ports within adjacent QSFP ports can form a trunk.

Fabric Vision
Enables powerful built-in monitoring SAN management, and diagnostic tools to simplify administration, increase uptime and reduce costs. This results in significant insight and visibility across SANs with extensive analytics to keep your SAN optimized for best results. Available by default in the Power Pack+ model or as an upgrade option. It enables IO Insight and VM Insight Software.

Access Gateway mode
Employs N_Port ID Virtualization (NPIV), an ANSI T11 standard, to enable interoperability with other SAN fabrics and eliminate domain considerations while improving SAN scalability.

Broad range of management tools and SMI-s conformance
Integrates with HPE OneView for monitoring and leverages HPE B-series SAN management and monitoring tools (PowerPack+, Fabric Vision). New REST API in addition to existing SMI-s API enables the use of industry standard interfaces to integrate management with other applications.

Utilizes advanced Web Tools to simplify fabric set-up and on-going maintenance for SAN administrators.

Switch Configuration-available in three base models
Available in 12-port, 20-port and 20-port Power Pack+ Full Fabric models. Choose the features and management options that make sense for your needs.

What's New

- Introducing HPE SANnav Management Software support for active manageability
- New 32 Gb/s Fibre Channel embedded high performance switch module for HPE Synergy Frame
- 12 downlink internal server ports, up to 8 uplink (SFP+) external ports and 2 uplink (QSFP) external ports

Standard Features

Advanced Fabric Services

- Hardware Enforced Zoning*
- Dynamic Path Selection*
- Web Tools
- Power Pack+ fabric services software bundle (optional)
  - Fabric Vision (Includes IO Insight and VM Insight Software)
  - ISL Trunking
  - Extended
  - Fabrics*

  Notes: *Not supported in Brocade Access Gateway mode.

Manageability

- Web Tools
- HPE Storage Operations Orchestration (optional)
- SMI API
- SNMP
- REST API
- PyFOS
- SAN automation with Ansible

Interoperability

Brocade Access Gateway mode enables the Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy to interoperate with other SAN fabrics running supported firmware. While in Access Gateway mode, the device must be connected to an NPIV-enabled edge switch or director. Supported edge environments are listed in the SAN Design Guide
https://support.hpe.com/hpsc/doc/public/display?docId=c00403562

Software Components, Standard

Access Gateway*

Brocade Access Gateway Mode enables seamless connectivity for the Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy to other supported SAN fabrics, enhances scalability and simplifies manageability. Utilizing N_Port ID Virtualization (NPIV) standards, Brocade Access Gateway eliminates switch/domain considerations.

Notes: *Brocade Access Gateway mode does not support switch-related features, including some features in the Power Pack+ bundle (e.g. Extended Fabric). Please refer to the Access Gateway Administrator's Guide for details.

Frame Filtering

A special B-Series ASIC-based capability that enables new applications and features. The switch has the ability to "view" the first 64-bytes of the Fibre Channel frame. At this time, Frame Filtering enables advanced capabilities such as Advanced Zoning,Frame level analytics and statistics.

Advanced Zoning

Zoning (Port and Worldwide Name), as well as Access Control, are enforced by hardware within the ASIC. Hardware enforcement enables the highest level of zoning enforcement without any impact to performance. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.

Web Tools

Enables organizations to monitor and manage single Fibre Channel switches and monitor small SAN fabrics. Tasks can be performed through a Java-capable Web browser from a standard laptop, desktop PC or workstation from any location within the enterprise.

Standard Features

Dynamic Path Selection
Improves performance by dynamically routing data traffic across multiple links and trunk groups.

Adaptive Networking Services
Adaptive Networking services optimize fabric behavior and ensure ample bandwidth for mission-critical applications. The tools currently include Quality of Service (QoS), Ingress Rate Limiting and Traffic Isolation. By assigning zones a high, medium, or low priority, QoS allocates bandwidth in the event of congestion to expedite high-priority traffic and keep all traffic flowing. Ingress Rate Limiting restricts data flow from less-critical hosts at preset bandwidths. Traffic Isolation assigns high-bandwidth data flows to specific ISLs.

Notes: Adaptive Networking Services are included by default in the switch firmware and do not require a separate license.

Software Components, Optional

Power Pack+ Software Bundle
The Power Pack+ Software Bundle includes:

- Fabric Vision (Includes IO Insight and VM Insight Software)
- ISL Trunking
- Extended Fabrics*

Notes:

- *Not supported in Access Gateway mode (see the Access Gateway Administrator´s guide for full details).
- Adaptive Networking and Server Application Optimization features are included by default in the switch firmware and do not require a separate license

Fabric Vision
Fabric Vision offers innovative diagnostic, monitoring and management capabilities to help accelerate new application deployments, address SAN problems before they impact operations and reduce operational costs, it Includes:

- VM Insight: Seamlessly monitors end-to-end VM performance through standards-based VM tagging
- IO Insight: Automatically detect degraded storage IO performance with integrated device latency and IOPS monitoring
- Monitoring and Alerting Policy Suite:
  A policy-based monitoring tool with pre-built rules and automation that simplifies fabric-wide threshold configuration and monitoring. In addition, administrators can include IO Insight metrics in MAPS policies to understand IO profile as well as to be notified of storage IO performance degradation.
- Configuration and Operational Monitoring Policy Automation Services Suite(COMPASS):
  Simplifies deployment, safeguards consistency and increases operational efficiencies of larger environments with automated switch and fabric configuration services. Administrators can configure a template or adopt an existing configuration to seamlessly deploy a configuration across the fabric.
- ClearLink® Diagnostics:
  Ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. ClearLink Diagnostic
- Port (D_Port) is an advanced capability of Fibre Channel platforms.
- Flow Vision:
  A comprehensive tool that enables administrators to identify, monitor, and analyze specific application data flows without using taps to ensure optimized performance.
- Forward Error Correction (FEC):
  Enables recovery from bit errors in device connections and ISLs, enhancing transmission reliability and performance.

Standard Features

HPE SANnav Management Software

HPE SANnav Management Software is the next-generation SAN management application suite for HPE B-series SAN environments. It consists of SANnav Management Portal Software and SANnav Global View Software:

- SANnav Management Portal is a next-generation SAN management application with a simple browser-based user interface (UI) streamlining common workflows, such as configuration, zoning, deployment, troubleshooting, and reporting.
- SANnav Global View helps administrators visualize the health, performance and inventory of multiple SANnav Management Portal instances at data centers across the globe or a single multi-tenant data center using a simple, intelligent dashboard.

SANnav Management Portal and SANnav Global View not only transform SAN telemetry data into useful insights, such as health and performance scores, but also enable administrators to quickly associate real-time data with historical metrics and logs for in-depth analysis. This can help with spotting trends, establishing baselines, and identifying any behavioral changes over time.

HPE SANnav Management Software is available as a term-license for 1-year, 3-years and 5-years period as both – physical and electronic License-to-Use (LTU). It supports 8Gb, 16Gb and 32Gb FC Switches and Directors.

ISL Trunking

For high performance and seamless failover, this optional license logically groups up to eight E_ports (switch mode) or F_ports (Access Gateway mode) to provide a high bandwidth trunk between two HPE B-Series or Brocade switches. Each switch needs its own license. The fabric operating system views the trunk as a single, high bandwidth ISL resource (up to 256 Gbps when routing connections between 32 Gb/s capable switches). Connections are load-balanced across the individual links, which comprise the logical trunk group.

HPE Synergy Frame 12000 compatibility

Brocade 32Gb FC SAN Switch Module for HPE Synergy must be deployed within the HPE's Composable Infrastructure solution, and is compatible only with HPE Synergy Frames.

HPE FC HBA Mezzanines

16Gb and 32Gb HPE Fibre Channel Mezzanine cards for HPE Synergy are supported

- Please refer to the HPE FC Mezzanine HBA Product QuickSpecs for Compute Module support details. Support for the 32Gbps FC HBA Mezzanine with the Brocade 32Gb SAN Switch for HPE Synergy requires HPE FOS v8.2.0_gft or later

HPE Synergy Frame Frame

HPE Synergy Frame 12000

Switch interoperability

HPE B-Series Switches, Directors, and Routers

32Gbps Fibre Channel Switches and Directors

- SN8600B 32Gb Director Switch (Enterprise)
- SN6650B 32Gb Fibre Channel SAN Switch
- SN6600B 32Gb Fibre Channel Switch (Midmarket)
- SN3600B 32Gb Fibre Channel Switch (Entry)
- Brocade 32Gb Gb SAN Switch Module for HPE Synergy

16Gb/s Fibre Channel Switches and Directors

- SN8000B 16Gb Director Switch (Enterprise)
- SN6500B 16Gb Fibre Channel SAN Switch
- SN6000B 16Gb Fibre Channel Switch (Midmarket)
- SN3000B 16G Fibre Channel Switch (Entry)
- Brocade 16 Gb SAN Switch for HPE c-Class BladeSystem
- Brocade 16Gb Fibre Channel SAN Switch Module for HPE Synergy

Standard Features

8 Gb Switches

- 8/24 SAN Switch
- 8/8 SAN Switch
- Brocade 8 Gb SAN Switch for HPE c-Class BladeSystem

Virtual Connect

- HPE Virtual Connect 8Gb 24-port Fibre Channel Module
- HPE Virtual Connect 8Gb 20-port Fibre Channel Module
- HPE Virtual Connect 16 Gb 24-port Fibre Channel Module
- HPE Virtual Connect 32 Gb 24-port Fibre Channel ModuleHPE Virtual Connect FlexFabric 10Gb/24-Port Module for c-Class BladeSystem
- HPE Virtual Connect FlexFabric-20/40 F8 Module for c-class Blade System
- HPE Virtual Connect SE 16Gb Fibre Channel Module for HPE Synergy
- HPE Virtual Connect SE 40GB F8 Module for HPE Synergy

Multi-Protocol Routers and Gateways

- HPE B-series SN8600B 32Gb SAN Extension Blade
- HPE Multi-protocol Extension Blade
- HPE B-series SN4000B FC SAN Extension Switch
- HPE 1606 SAN Extension Switch

Family Comparison

Features	Brocade 16Gb SAN Switch for HPE c-Class BladeSystem	Brocade 16Gb Fibre Channel SAN Switch Module for HPE Synergy	Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy
Targeted Environment	Enterprise, Datacenters, Workgroups, Departments	Enterprise, Datacenters, Workgroups, Departments	Enterprise, Datacenters, Workgroups, Departments
Port Bandwidth	16Gbps	16Gbps	32Gbps
Aggregate device bandwidth	448 Gbps (28 ports x 16 Gbps)	576 Gbps (36 ports x 16 Gbps)	896 Gbps (28 ports x 32 Gbps)
OS Support	Please Refer to SPOCK **https://www.hpe.com/storage/spock**		
Storage system Support	**3PAR StoreServ, Nimble, StoreVirtual 4000, P9000/XP7, P6000/EVA, P2000/MSA**		**3PAR StoreServ, Nimble, XP7, MSA 2050/1050**
FC Ports	12 external /16 internal	8 SFP+ external, 4 QSFP external /12 internal (24 maximum)	8 SFP+ external, 2 QSFP external /12 internal
SFP	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Included	Included	Included
Fabric Vision Software	Included with HPE PowerPack+ upgrade	Included with HPE PowerPack+ upgrade	Included with HPE PowerPack+ upgrade
Form factor	Embedded	Embedded	Embedded
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes, in BladeSystem Enclosure	Yes, in BladeSystem Enclosure	Yes, in Synergy Frame
Hot plug fans	Yes, in BladeSystem Enclosure	Yes, in BladeSystem Enclosure	Yes, in Synergy Frame

Service and Support

Warranty

Hardware Warranty - Three-year on-site warranty, normal business hours, next business day response, and installation not included.

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

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

Notes: The entire liability of Hewlett Packard Enterprise and its suppliers and your exclusive remedy for software 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 Hewlett Packard Enterprise in the country in which you obtained the software.

Services Included with Product Purchase

The Brocade 32Gb/20 Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy (Q2E57A) includes 3-years of Hewlett Packard Enterprise standard business hours, standard business days Software Support (includes software technical support and software product and documentation updates)..

The Brocade 32Gb Fibre Channel SAN Switch Module Power Pack+ LTU for HPE Synergy (Q2E60A, Q2E60AAE) includes 1-year of Hewlett Packard Enterprise standard business hours, standard business days Software Support (includes software technical support and software product and documentation updates).

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.
HPE Managed Services | HPE

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

Service and Support

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

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**

Service and Support

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

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

Service and Support

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**

Configuration Information

Step 1 – Base Configurations (Select one.)

Description	SKU
Brocade 32Gb/20 4SFP+ Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy	Q2E57A

- (1) 32Gbps SAN Switch
- 20 ports enabled for any combination (12 internal and 16 external)
- 4 32b SFP+
- Dual function mode - Native OS (default) or Access Gateway Mode
- Documentation and includes Power Pack+ Bundle and management tools (see software components, optional)

Step 2 – Additional Options

Select each type of required options with quantities specified.

Hardware

32Gbps QSFP / 32Gbps Optical Transceivers (SFP28)

HPE B-series 4x32Gb 1-pack Long Wave 2km QSFP Transceiver	Q2R31A
HPE B-series 4x32Gb QSFP28 Short Wave 100m 1-pack Secure Transceiver	R6B20A
Notes: QSFPs (4 lanes of 32Gb) support MPO/MPO Multi-mode as well as 4/LC breakout cables	
HPE B-series 32Gb SFP28 Short Wave 8-pack Secure Transceiver	R6W26A
HPE B-series 32Gb SFP28 Long Wave 10km 1-pack Secure Transceiver	R6B13A

16Gb/s QSFP 16Gb/s Optical Transceivers (SFP+)

HPE B-series 4x16 Short Wave QSFP Transceiver	K2Q87A
HPE B-series 16Gb SFP+ Short Wave Transceiver	QK724A
HPE B-series 16Gb SFP+ Short Wave 8-pack Secure Transceiver	R6W28A
HPE B-series 16Gb SFP+ Long Wave 10km 1-pack Secure Transceiver	R6B11A

Optical cables

PremierFlex OM4 LC/LC Multi-mode Cables

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

OM3 LC/LC Multi-mode Cables

HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

QSFP to 4xLC Breakout Cables

HPE Multi Fiber Push On to 4 x Lucent Connector 5m Cable	K2Q46A
HPE Multi Fiber Push On to 4 x Lucent Connector 15m Cable	K2Q47A
HPE Premier Flex MPO to 4xLC 30m Cbl	Q1H68A
HPE Premier Flex MPO to 4 x Lucent Connector 50m Cable	Q1H69A

Configuration Information

Description

OM4 MPO/MPO Multi-mode Cables

HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 1m Cable	Q1H63A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 2m Cable	Q1H64A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 5m Cable	Q1H65A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 10m Cable	QK729A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 15m Cable	Q1H66A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 30m Cable	Q1H67A
HPE Premier Flex MPO/MPO Multi-mode OM4 8 Fiber 50m Cable	QK731A
HPE Premier Flex MPO/MPO OM4 100m Cable	H6Z30A

Software

Power Pack+ Software Bundle

Brocade 32Gb Fibre Channel SAN Switch Module Power Pack+ E-LTU for HPE Synergy Q2E60AAE

Notes: Physical License – Q2E60A

(For upgrading Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy to Power Pack+). Includes bundled license for:

- Fabric Vision (Includes IO Insight and VM Insight Software)
- ISL Trunking
- Extended Fabrics

Brocade 32Gb Fibre Channel SAN Switch Module 8-port Upgrade E-LTU for HPE Synergy Q2E58AAE

Notes: Physical License – Q2E58A

Notes:

- The Brocade 32Gb FC Switch Module for HPE Synergy is capable of supporting 40 FC ports, up to 16 uplink FC ports and up to 24 downlink FC ports. However with Dual Port 32Gb FC Mezzanine cards, only a maximum of 12 downlinks are supported. This allows each Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy to support a maximum of 28 FC ports. The Brocade 32Gb Fibre Channel SAN Switch Module 8-port Upgrade LTU provides up to 8 additional usable ports. This LTU adds ports in increments of 8 up to a current total of 28 usable ports.
- For example, for the 32Gb/12 port base model you can add up to (QTY) 2 8-port upgrade LTUs or for the 32Gb/20-port models you can add (QTY) 1 8-port upgrade LTU totaling 28 ports.
- In order to obtain Extended Fabrics Software or ISL Trunking Software or Fabric Vision Software, a purchase of the Q2E60AAE Power Pack+ Software Bundle is required.

SANnav Software Licenses:

Notes: For users purchasing SANnav licenses for the first time, one of the following SKUs should be purchased. For users wanted to renew a SANnav license, a renewal license should be selected from the SANnav Renewal Software License in the next section.

HPE SANnav Management Portal Base 1yr E-LTU	R3P45AAE
HPE SANnav Management Portal Enterprise 1yr E-LTU	R3P46AAE
HPE SANnav Global View 1yr E-LTU	R3P47AAE
HPE SANnav Management Portal Base 3yr E-LTU	R3P48AAE
HPE SANnav Management Portal Enterprise 3yr E-LTU	R3P49AAE
HPE SANnav Global View 3yr E-LTU	R3P50AAE
HPE SANnav Management Portal Base 5yr E-LTU	R4P29AAE
HPE SANnav Management Portal Enterprise 5yr E-LTU	R4P30AAE
HPE SANnav Global View 5yr E-LTU	R4P31AAE

Configuration Information

Notes:

- The Base edition of HPE SANnav Management Portal does not support management of director class switches.
- HPE SANnav Management Software License-to-Use (LTU/E-LTU) includes maintenance and support for the duration of the license. At the end of the license period, customers have the option to renew the license, maintaining the same license key, by selecting from the SANnav Renewal Software License section below Software renewal via HPE Services is not allowed/supported.
- Trial Licenses: depending on the version of SANnav license, the trial period is different.
  - 90-day trial license available with all SANnav releases through v2.2.0
  - 30-day trial license available with SANnav v2.2.1 and v2.2.2
  - No trial license available with SANnav v2.3.0 or later

SANnav Renewal Software Licenses

Notes: For users who currently have a SANnav license and want to renew their software license, one of the following licenses should be selected. The SANnav license must align with the current type of software license i.e. in order to renew a Base license, the Base renewal licenses will need to be selected.

HPE SANnav Management Portal Base 1-year Renewal E-LTU	S1S52AAE
HPE SANnav Management Portal Enterprise 1-year Renewal E-LTU	S1S55AAE
HPE SANnav Global View 1-year Renewal E-LTU	S1S58AAE

Notes:

- The Base edition of HPE SANnav Management Portal does not support management of director class switches.
- HPE SANnav Management Software License-to-Use (LTU/E-LTU) includes maintenance and support for the duration of the license.
- Trial Licenses – depending on the version of SANnav license, the trial period is different.
  - 90-day trial license available with all SANnav releases through v2.2.0
  - 30-day trial license available with SANnav v2.2.1 and v2.2.2
  - No trial license available with SANnav v2.3.0 or later

Technical Specifications

Fibre Channel ports
12 Internal 16/32Gbps (downlink) ports; up to 16 External 8/16/32 Gbps auto-sensing (8x SFP+ and 2x QSFP+) (uplink) – universal (E, F, N, D) ports. For the 32Gb/20 Port SAN Switch model: up to 20 ports in any internal/external port combination enabled. Depending on SAN switch model selected, order the total number of Brocade 32Gb Fibre Channel SAN Switch Module 8-port Upgrade E-LTU or LTU for HPE Synergy to increase active FC port counts.

Device support and Scalability guidelines
https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-c04787660

Performance
32Gbps line speed, full duplex

Certified maximum
Certified maximum information available at
https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-c04787660

Switch core
Non-blocking

Fabric latency
<=900 nanoseconds through the use of cut-through frame routing at 32Gbps (includes FEC logic delay)

Maximum frame size
2112-byte payload

Classes of service
Class 2, Class 3, Class F (inter-switch frames)

Port types
D_Port (Diagnostic port), E_Port, F_Port; optional port type control Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port

Data traffic types
Fabric switches supporting unicast

Media types
Hot-pluggable, B-Series Branded Small Form Factor Pluggable (SFP), LC connector; Short-Wave Laser (SWL), Long-Wave Laser (LWL); Extended Long-Wave Laser (ELWL); distance depends on fiber-optic cable and port speed. Supports QSFP+ (32/16/8 Gbps) and/or SFP+ (32/16/8 Gbps) optical transceivers.

Advanced
Short-wave, long-wave, and extended long wave laser transceivers are supported

Fabric services
Simple Name Server, Registered State Change Notification (RSCN). Includes Advanced WebTools and Advanced Zoning. Optional advanced fabric services include: Fabric Vision, ISL Trunking, and Extended Fabrics.

Options
SFP media, port upgradeable licensing, advanced management software licensing

Technical Specifications

Supported software

Telnet, SSH, SNMP (FE MIB, FC Management MIB), HPE Storage Operations Manager, Advanced WebTools, Advanced Zoning, HPE SANnav Management Software, SmartSAN, and Anisible Automation

Management access

Web Tools, SMI-s provider, REST API, SNMP, Telnet, and SSH

Diagnostics

Cable diagnostic (D_Port), including electrical/optical loopback, link traffic/latency/distance

Power consumption

Typical 50W, maximum is 70W (with all ports running at maximum speed)

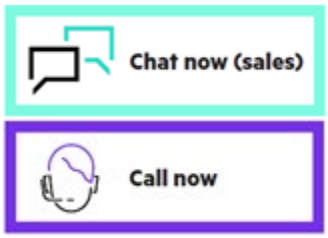
Dimensions	**Depth**	1.08 in. (2.75 cm.)	
	Height	11.05 in. (28.07 cm.)	
	Width	16.92 in. (42.97 cm.)	
	Weight	Approx. 7.0 lb. (3.18 kg.) - without media	
Environment	**System Inlet Temperature**	**Operating**	Inlet air temperature up to 43°C (109.4°F) at sea level with an altitude derating of 1.0°C per every 1000 feet of elevation above sea level to a maximum operating altitude. For example, the maximum inlet air-temperature requirement at 5000 ft. above sea level is 38ºC.
		Non-operating	-40°C to 70°C (-40° to 158°F). Maximum rate of change is 20°C/Hr (36°F/Hr).
	Relative Humidity	**Operating**	5 to 95% relative humidity, 38.7°C maximum wet bulb temperature, and Non-condensing.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	**Operating**	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).
		Non-operating	9144 m (30,000 ft.). Maximum allowable altitude change rate is 457 m/min (1500 ft. /min).
Vibration	**Operating**	1 G, 10-500 Hz, 60 minutes per axis	
	Non-operating	2 G, 10-500 Hz, 30 minutes	
Shock	**Operating**	Half-sine-wave shock, 40 G, 2 ms duration, in each direction of three mutually perpendicular axes.	
	Non-operating	Half-sine-wave shock, 140 G, 2 ms duration, in each direction of three mutually perpendicular axes; and square-wave shock up to 80 G, 180 inches/s velocity change, in each direction of three mutually perpendicular axes.	

Summary of Changes

Date	Version History	Action	Description of Change
13-Nov-2023	Version 9	Changed	HPE Services Rebranding
24-Jul-2023	Version 8	Changed	Standard Features and Configuration Information sections were updated. Removed Network Orchestrator
04-Oct-2021	Version 7	Changed	Service and Support section was updated Obso SKU was removed
02-Aug-2021	Version 6	Changed	Service and Support, and Configuration Information sections were updated.
07-June-2021	Version 5	Changed	Added 16Gb and 32GB SW and LW transceivers
10-Aug-2020	Version 4	Changed	Overview, Standard Features and Configuration Information sections were updated.
03-Feb-2020	Version 3	Changed	Standard Features, Service and Support, and Configuration Information sections were updated.
07-Oct-2019	Version 2	Changed	Overview, Standard Features, Service and Support, Configuration Information, and Technical Specifications sections were updated.
02-Apr-2019	Version 1	New	New QuickSpecs

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