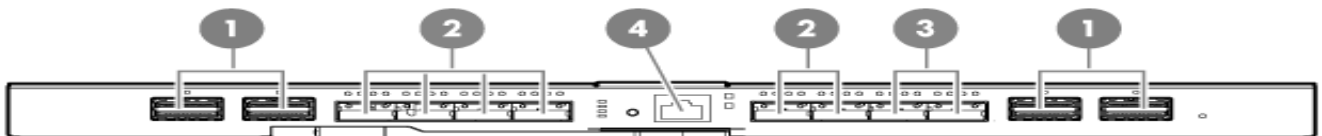## Overview

HPE Synergy 40GB F8 Switch Module

HPE Synergy 40GB F8 Switch Module is a key network switch element of HPE Synergy providing resilient fabric functionality. It provides network switching to data or storage networks. The Synergy 40Gb F8 Switch Module eliminates up to 95% of network sprawl at the compute module edge with one device that converges traffic from within Synergy 12000 Frames and directly connects to external networks. The Synergy 40Gb F8 Switch Module provides simultaneous support of Ethernet, FCoE, multihop FCoE, and native Fibre channel. Each redundant pair of Synergy 40Gb F8 Switch modules provides Ethernet downlink connections to dual-port 10Gb/20Gb Converged Network Adapters on each compute module. There are six QSFP+ uplink multi-function ports available for connection to upstream 40Gb Ethernet switches. These six multi-funtion ports can also be configured as 4x10Gb Ethernet or 4x8Gb Fibre Channel ports per QSFP+ connector. A QSFP+ 40Gb/4x10Gb/4x8Gb transceiver provides four uplinks per QSFP+ port for connection to upstream 4x10Gb Ethernet connections or 4x8Gb Fibre Channel connections to Fibre Channel networks. A maxium of 24 8Gb Fibre Channel ports per moudle are available. In addition to the six multi-use QSFP+ uplinks, there are two additional QSFP+ ports that can be used for stacking links bwetween Synergy 40Gb F8 Switches Modules or for additional Ethernet uplinks. Synergy 40Gb F8 Switch Modules reduce the number of components required compared to traditional and other converged network solutions by eliminating the need for separate Ethernet and Fibre Channel switches and cables. The Master/Satellite disaggregated architecture removes fixed traditional ratios of ports in a single frame and allows a high-speed, near zeto latency connecting of network resources directly to other frames via Interconnect Link Modules.

HPE Synergy is a single infrastructure of physical and virtual pools of compute, storage, and fabric resources, and a management interface that allows configuration of server resources in any configuration. The HPE Synergy 40Gb F8 Siwtch module is manged by industry standard management resources that allows network functions to managed by network administrators. As the fundation for the New Style of Business infrastructure, HPE Synergy eliminates hardware and operational complexity so IT organizations can precisely deliver infrastructure resources to applications faster and with greater flexibility

Figure 1 HPE Synergy 40GB F8 Switch Module Bezel

1.	Interconnect link ports	3.	40Gb QSFP+ Ethernet uplink/stacking ports
2.	40Gb QSFP+ multi-use uplink ports	4.	Console port

Models

HPE Synergy 40GB F8 Switch Module

Supported Products

Compatibility

HPE Synergy 40GB F8 Switch Module Module supports the following hardware.

HPE Servers	**HPE Synergy Compute Modules**
	• HPE Synergy 480 Gen9 Configure-to-order Compute Module
	• HPE Synergy 480 Gen9 Configure-to-order w/o Drive Bays Compute Module
	• HPE Synergy 660 Gen9 Configure-to-order SAS Compute Module
HPE Interconnect Link Modules	**HPE Interconnect Link Modules**
	• HPE Synergy 20G Interconnect Link Module
HPE Network Adapters	**Converged Network Adapter**:
	• HPE Synergy 3820C 10/20Gb Converged Network Adapter
	• HPE Synergy 2820C 10Gb Converged Network Adapter
	• HPE Synergy 3520C 10/20Gb Converged Network Adapter
	NOTE: Consult individual compute module TechSpecs for specific adapter support.

Supported Configurations

HPE Synergy 12000 Frame - Rear View

Mezzanines

Port Mapping   Port mapping differs slightly between full height and half-height compute modules due to the support for additional Mezzanine cards on the full height version.

Supported Products

HPE 12000 Synergy Frame

Interconnect Module Configurations					Compute Module Network Adapters Used
[ICB 1]	Empty/Interconnect	->	Empty/Interconnect	[ICB 4]	Empty/Adapter
[ICB 2]	Empty	->	Empty	[ICB 5]	
[ICB 3]	Synergy 40GB F8 Switch	->	HPE 20Gb ICM	[ICB 6]	HPE Synergy 3820C 10/20 CNA

Interconnect Module Configurations					Compute Module Network Adapters Used
[ICB 1]	Empty/Interconnect	->	Empty/ Interconnect	[ICB 4]	Empty/Adapter
[ICB 2]	Empty	->	Empty	[ICB 5]	
[ICB 3]	Synergy 40GB F8 Switch	->	HPE 20Gb ICM	[ICB 6]	HPE Synergy 3820C 10/20 CNA

Standard Features

Product Features   **Performance**

- 12 x 20Gb Ethernet downlinks to compute module Converged Network Adapters
- Each 20Gb downlink supports one Ethernet and one FCoE connection to the adapter
- Each Converged Network adapter can be configured to transport Fiber Channel over Ethernet/CEE
- 6xQSFP+ external uplink ports configurable as 1x40Gb, 4x10Gb Ethernet ports connected to external LAN switches, or 4x8Gb Fibre Channel ports connected to Fibre Channel networks
- 2xQSFP+ external uplink ports configurable as uplinks or stacking ports
- Extended list of direct attach copper cable connections supported
- Low latency (1.0 μs Ethernet ports) throughput provides switch-like performance
- Line-rate, full-duplex 2.56 Tbps bridging fabric
- MTU up to 9216 Bytes - Jumbo Frames, Super Jumbo - 12K frames.
- VLAN Tagging, Pass-Thru and Link Aggregation supported on all uplinks
- Data Center Bridging (DCBX & CEE DCBx)
- s-channel support with CDCP, VLAN traffic over ECB ports - IEEE 802.1Qbg

Management

- Monitored by HPE OneView
- CLI support, SSH and Console, IPv4 and IPv6, for configuration and troubleshooting, integrated with security architecture and mulit level user administration
- Standards based SNMP management with SNMP v2, v3, both IPv4 and IPv6
- Syslog client, both IPv4 and IPv6
- RMON2
- Status and statistics reporting, system health, port status, through CLI and SNMP
- LLDP v1, v2 – 802.1AB
- Licensing support for native Fibre Channel through OneView
- Compute module-side NPIV removes storage management constraint of a single physical HBA on a compute module does not add to SAN switch domains or require traditional SAN management

Security

- Access control lists (ACL) – MAC based and IP based (IPv4, IPv6)
- Ethernet ARP – RFC 826

layer 2 Switching

- 288K MAC addresses
- 4094 VLANs
- IEEE 802.1Q VLAN support
- LAG and LACP over uplinks and stacking links on on sinlge module
- M-LAG on uplinks with two modules
- VLAN aware bridging, single VLAN and trunks on each physical port, native VLAN on uplinks
- Priority based switching - IEEE 802.1p
- ICMP – IPv4 and IPv6
- Private VLANs, BPDU Guard
- IGMP, IGMPv1, v2, v3 snooping
- Jumbo frame support
- Link Aggregation - IEEE 802.3ad
- Spanning Tree Protocol, MSTP, RSTP,

FCoE Connection Enablement

- NPIV (N_Port ID Virtualization) for server login

Standard Features

- DCB with QoS (priority and ETS) and Priority Flow Control (PFC)
- FCoE traffic cannot cross stacking links
- Up to 255 logins per physical port

FCoE Multihop, FIP Snooping

- FIP Snooping ANSI – FC-BB-5 (D.2, D.3, D.4)
- FCoE and and standard Ethernet traffic on the same uplink
- 1-1 VSAN to VLAN mapping
- Priority Flow Control (PFC) - IEEE 802.1Qbb
- Enhanced Transmission Selection (ETS) and DCB Exchange (DCBX) – IEEE 802.Qaz

Fibre Channel Direct Attach

- Connection to HPE 3PAR StoreServ via native FC Port

Options

- Optional HPE 10Gb SFP+ SR, LR, and LRM modules and 10Gb SFP+ Copper cables for use with QSFP+ to SFP+ adapter
- Optional HPE 40Gb QSFP+SR, SR 300M and LR modules, 40Gb SFP+ DAC and AOC cables, 40Gb DAC splitter cables and QSFP+ to SFP+ adapter
- Supports Converged Network adapters for HPE Synergy Compute Nodes (Supported functionality defined by each adapter)

Service and Support, HPE Care Pack and Warranty Information

Service and Support   HPE Technology Services offers you a rich portfolio of consulting and support services designed to add value to our core products and solutions. We have the know-how and experience to put technology to work for you. We work closely with you, as your strategic partner, leveraging our full services portfolio to make sure that everything works to help optimize your enterprise.

Choose from services aligned to our product offerings and lifecycle. From proactive onsite services to innovative support when your products are connected to Hewlett Packard Enterprise, you choose the precise level of attention and support your business demands.

HPE Technology Services for HPE Synergy

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to Hewlett Packard Enterprise to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time.

Protect your business beyond warranty with HPE Support Services

HPE support services offer complete care and support expertise with committed response choices that are designed to meet your IT and business needs.

HPE Foundation Care services offer scalable reactive support-packages for HPE Synergy and software. You choose the type and level of service that is most suitable for your IT and business needs.

HPE Proactive Care keeps your system stable and reliable helping to prevent problems and reduce outages through proactive service management and enhanced technical response.

Advise, transform, integrate, support, automate, and flex   **HPE Technology Services** helps you get the most out of what you have today and transition to HPE Synergy, a composable infrastructure, at your pace and from wherever you are on the journey.

Start with the HPE Transformation Workshop to ensure that your business and IT organizations collaborate, define the topline strategy for composable, software-defined, cloud-ready infrastructure and kick-start your projects confidently. This workshop clarifies your business requirements and the issues that IT and operations teams must resolve in order to meet these requirements. A detailed executive briefing or high-level report summarizes the strategies, high-level plan and functional requirements.

HPE Modernization and Migration Services helps you choose the right platform for the right workload at the right cost and evolve your IT infrastructure, processes and organization taking advantage of "on-hybrid infrastructure" innovations such as composable, converged, software-defined, technologies. Hewlett Packard Enterprise experts advise, transform, integrate and implement for platform refresh, datacenter consolidation virtualization, migration and automation projects.

HPE Flexible Capacity is a pay per use model for on premise infrastructure. This offers needed HPE Synergy capacity in the datacenter, plus a buffer of additional capacity. As HPE Synergy will be a dynamic environment, this provides enough room to grow your environment, but only pay for actual metered use. Technology transitions and refresh can be built in, infrastructure and services are billed monthly, enabling you to align costs to business use.

HPE Datacenter Care-Infrastructure Automation (DC-IA) is an extension to HPE Datacenter Care and delivers enterprise-grade support, advice, guidance and best practices for infrastructure automation. The service also includes Enterprise editions of automation tools including Enterprise Chef and selected others. The DC-IA Center of Excellence (CoE) is staffed with highly trained experts who have specific expertise on integrating Chef with HPE OneView.

Deploy and integrate   **HPE Synergy First Frame Installation and Startup -** Provides for hardware installation (HPE Synergy compute modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Fibre Channel Modules, Frame Link Modules, and HPE Synergy D3940 Storage Modules) and software startup for the first frame of your HPE Synergy deployment. Additional frames can be added using the HPE Synergy Additional Frame Installation and Startup Service.

Service and Support, HP Care Pack and Warranty Information

	HPE Synergy Additional Frame Installation and Startup Service - Add additional frames to your HPE Synergy First Frame Startup service or expand your existing HPE Synergy Infrastructure.
Optimized Support	Choose the right support to maximize uptime, free up your resources, and achieve improved value—as you get the most out of the existing IT assets while accelerating time-to-revenue. **HPE Proactive Care Advanced - 24x7 coverage, three year Support Service** Builds and incorporates on Proactive Care and also gives customers personalized technical and operational advice from an assigned, local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help optimize business critical IT, and Critical Incident Management to help so the business is not affected if there is a system or device outage. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues. **http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA5-3259ENW.pdf**
Standard Support	**HPE Proactive Care with 24x7 coverage, three year Support Service** Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center specialists for start to finish case management plus proactive reports and recommendations for firmware and software management and best practice advice. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues. **http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf**
HPE Education	Training your IT staff is critical to help drive the value of HPE Synergy with increased efficiencies and better business outcomes. Training is key to the transformation and management of HPE Synergy.
Parts and Materials	Hewlett Packard Enterprise 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. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.
Warranty	HPE Synergy 40Gb F8 Switch Module Limited Warranty includes 3 year Parts, 3 year Labor, 3-year on-site support. Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html
Service Coverage	The HPE Synergy 40Gb F8 Switch Module includes 3 years 9x5 Next Business Day hardware support. If you have requirements for longer durations of service, quicker response times or more comprehensive services, HPE Care Pack services for the HPE Synergy 40Gb F8 Switch Module are available to uplift or extend your coverage
For more information	Additional Support Services can be found at HPE Support Services Central **http://ssc.hpe.com**

Related Options

Interconnect Link Module Cables	HPE Synergy Interconnect Link 3m Active Optical Cable
	HPE Synergy Interconnect Link 10m Active Optical Cable

QSFP+ uplink ports options	HPE Synergy 40GbE/4x10GbE/4x8Gb FC QSFP+ Transceiver
	HPE BladeSystem c-Class 40Gb QSFP+ MPO SR4 100m Transceiver
	HPE BladeSystem c-Class 40Gb QSFP+ LC LR4 Transceiver
	HPE BladeSystem c-Class 40Gb QSFP+ MPO SR4 300m Transceiver
	HPE MPO to 4 xLC 5m Cable
	HPE MPO to 4x LC 15m Cable
	HPE Premier Flex MPO/MPO Multi-mode OM4 8 Fiber 10m Cable
	HPE Premier Flex MPO/MPO Multi-mode OM4 8 Fiber 50m Cable
	HPE Premier Flex MPO/MPO OM4 100m (12ft) Cable
	HPE BladeSystem c-Class 40G QSFP+ to QSFP+ 15m Active Optical Cable
	HPE BladeSystem c-Class 40G QSFP+ to QSFP+ 5m Direct Attach Copper Cable
	HPE BladeSystem c-Class 40G QSFP+ to 4x10G SFP+ 15m Active Optical Cable
	HPE BladeSystem c-Class 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable

QSFP+ to SFP+ Options	HPE BladeSystem c-Class QSFP+ to SFP+ Adapter
	HPE BladeSystem c-Class 10Gb SFP+ SR Transceiver
	HPE BladeSystem c-Class 10Gb SFP+ LR Transceiver
	HPE 10GBase-T SFP+ Transceiver
	HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable
	HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable

Technical Specifications

Shipping Dimensions	**Length**	19.45 in (494 mm)
	Width	15.55 in (395 mm)
	Height	5.75 in (145 mm)
Shipping Weight		Approximately 5.4Kg (12.0 Lbs)
Product Specifications Hardware	**Performance**	Line-rate, full-duplex 2.56 Tbps bridging fabric
		Non-blocking architecture
		Maximum transmission unit (MTU) of up to 9216 bytes (jumbo frames)
	Connectors and Cabling	12 x 20Gb downlinks through the midplane 6 x 40Gb SR4, LR4 fiber, DAC, AOC and Splitter uplink 4x120Gb Interconnect Link ports Console port
	Indicators	Interconnect link cable port LED QSFP+ port LED Next button Reset pin-hole Health LED Ethernet mode LED PID mode LED Link/Activity mode LED
	Weight	4.22Kg (9.3 Lbs)
	Latency	1.0 μs on Ethernet only port
	Scalability	Does not contribute to the total switch limit.
	Buffer Credits	16 buffer credits per port, ASIC embedded memory

Environmental Ranges	**Temperature Range**	
	Specification	10°C to 40°C (50°F to 104°F)*
	Temperature Range	
	Operating	10°C to 40°C (50°F to 104°F)
	Shipping	Shipping -40°C to 70°C (-40°F to 158°F)
	Storage	-30°C to 60°C (-22°F to 140°F)
	Maximum wet bulb temperature	38.7°C (101.66°F)
	Relative Humidity (noncondensing)	
	Operating	5% to 95%
	Shipping	5% to 95%

NOTE: All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

NOTE: Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

Power Specification	12V @ 20A (240 W max)	

Management and	**Standards**	**General protocols**

Technical Specifications

Standards Support		IEEE 802.1D MAC Bridges
		IEEE 802.1 AB LLDP
		IEEE 802.1p Priority
		IEEE 802.1Q VLANs
		IEEE 802.1Qbg Virtual Edge Bridging
		IEEE 802.1s (MSTP)
		IEEE 802.1v VLAN classification by Protocol and Port
		IEEE 802.3ad Link Aggregation Control Protocol (LACP)
		IEEE 802.3ae 10 Gigabit Ethernet
		RFC 2521, RFC 1191, RFC 1788, RFC 792 ICMP IPv4 and IPv6
		RFC 826 ARP
		RFC 1812 Static Routing
		RFC 1350 TFTP Protocol (revision 2)
		RFC 2131, RFC 2132 DHCP IPv4
		RFC 3736 Stateless DHCP Client for IPv6
		RFC 1212, 1213, 1215, 2089, 2578, 3411, 3412, 3413, 3414, 3417(partial), 3584, 3526, SNMP v2, v3 , IPv4 and IPv6
		RFC 4250, 4251, 4252, 4253, 4254, 4256, SSH IPv4 and IPv6
		RFC 4502 RMON2
		RFC 3164 Syslog client
		FCoE
		802.1Qaz DCBx
		INCITS FC-BB-5 Rev 2.00 (on all downlinks)
		802.1Qaz ETS
		802.1Qbb PFC
		FIP Snooping
		Fibre Channel Forwarder (FCF)
		NPV mode
Safety and Compliance	**Safety Certifications**	UL/CUL Recognition to UL/CSA 60950-1
		TUV to EN 60950-1
		CB report and certificate to IEC 60950-1 with all country deviations
		CE Marking
Electromagnetic Emissions Certifications FCC Part 15 Class A	FCC Part 15 Class A	
	EN 55022 Class A (CISPR22 Class A)	
	VCCI Class A	
	CE Marking	
Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett Packard Enterprise Enetrpise offers end-of-life Hewlett Packard Enterprise 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 Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard Enterprise 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 Enterprise web site at: **http://www.hp.com/go/green**. These instructions may be used by

Technical Specifications

recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
1-Dec-2015	Version 1	Created	New QuickSpecs

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