

Overview

Moonshot-45Gc Switch Module

The HPE Moonshot-45Gc Switch Module is designed to provide high speed, low-latency connectivity while dramatically reducing cost and complexity of deploying solutions at scale. The 45Gc Switch Module, together with the HPE Moonshot-6SFP+ Uplink Module, provides 1GbE network connections to cartridges within the HPE Moonshot 1500 chassis and 10Gb connectivity external to the chassis. Up to two switch modules are supported in each chassis. IRF may be used to eliminate the cost of TOR switches and provide failover in the event of a switch or uplink failure.

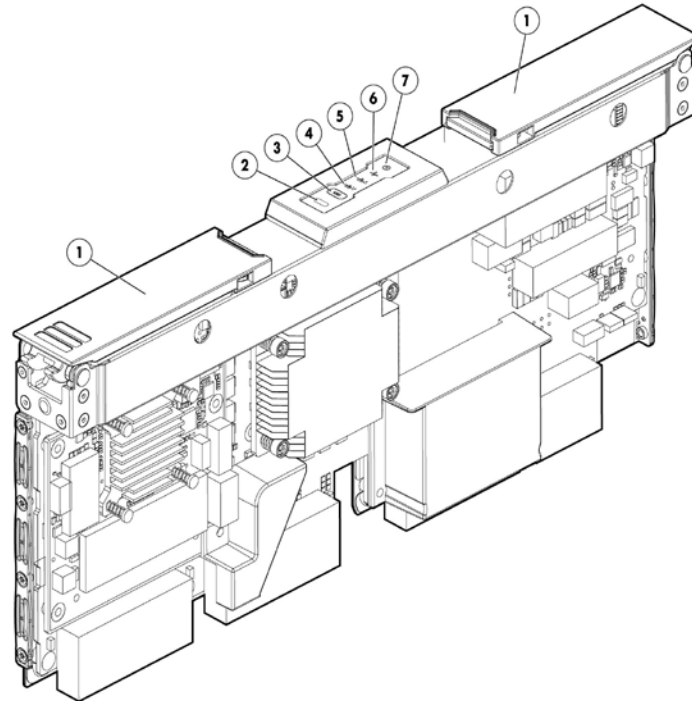


Figure 1 HPE Moonshot-45Gc Switch Module

- | | |
|-------------------------------|----------------------|
| 1. Release Latch | 6. Health Status LED |
| 2. Access Panel Sensor | 7. Power LED |
| 3. Unit ID (UID) LED / Button | |
| 4. Downlink Activity LED | |
| 5. Uplink Activity LED | |

Models

HPE Moonshot-45Gc Switch Module Kit

786617-B21

Standard Features

Performance

- 60Gb uplink bandwidth / 45Gb available server side bandwidth
- Non-blocking architecture
- Wire-speed switching and IPv4/IPv6 routing on all ports
- Combine up to 4 switches into a single virtual switch
- SFP+ ports support 6 x 1Gb
- Any uplink port can be used for IRF connections
- Cut-through switching
- Hardware-based wire-speed access control lists (ACLs)
- Data Center Bridging (DCBX)
- Support for VEPA (IEEE 802.1Qbg)

Management

- Remote configuration and management CLI
- Standards-based SNMP management via SNMPv1, v2c and v3
- Out of band management via iLO Chassis Manager
- HPE IMC (Intelligent Management Center)
- SDN with OpenFlow 1.3
- RJ45 console port
- sFlow
- Manager and operator privilege levels
- Command authorization via RADIUS
- Complete session logging for problem resolution
- LLDP Discovery protocol
- IPv6 management
- Multiple flash images
- Multiple configuration files
- Syslog
- Network Time Protocol (NTP)
- IEEE 1588v2 Precision Time Protocol (PTP)

Security

- IEEE 802.1X user authentication
- MAC-based authentication with RADIUS server
- Access Control Lists (ACLs)
- Secure FTP
- STP Root Guard
- DHCP Protection from unauthorized DHCP servers
- IP Source Guard
- Dynamic ARP protection to prevent eavesdropping
- Endpoint Admission Defense (EAD)
- RADIUS/TACACS+
- Secure management via SSHv2 and SNMPv3
- Unicast Reverse Path Forwarding (URPF)
- Monitor link and Smart link
- IPsec
- IKE (Internet Key Exchange)
- Disable password recovery

Level 2 Switching

- 128K MAC addresses
- 4094 VLANs
- IEEE 802.1ad QinQ VLANs
- Per VLAN Spanning Tree (PVST+)
- Private VLANs (PVLAN)

Standard Features

- Multicast VLAN Registration Protocol (MVRP)
- Jumbo frame support
- Port Aggregation
- Spanning Tree Protocol, MSTP, RSTP, STP Root Guard
- IP Multicast Snooping and data-driven IGMP
- Transparent Interconnect of Lots of Links (TRILL)
- Shortest Path Bridging (SPB)
- Multiple Label Switching (MPLS)
- Virtual Private LAN Service (VPLS)

Level 3 Routing

- IPv4 routing protocols - static routes, RIP, OSPF and BGP
- IPv6 routing protocols - static routes, RIPng, OSPFv3 and BGP+
- IPv6 tunneling
- IP Multicast - PIM-SSM, PIM-DM, PIM-SM, IGMP for IPv4 and IPv6
- Equal-Cost Multipath (ECMP)
- Policy-based routing
- DHCP and DHCPv6 client
- VRRP

Quality of Service (QoS)

- Advanced classifier-based QoS (with eight queues) - classifies traffic using multiple match criteria
- based on Layer 2, 3 and 4 information and applies QoS policies such as priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- Traffic policing - supports Committed Access Rate (CAR) and line rate
- Powerful QoS feature - creates traffic classes based on access control lists (ACL), IEEE 802.1p precedence, IP, DSCP or Type of Service (ToS) precedence; supports filter, redirect, mirror or remark; supports the following congestion actions: strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), and weighted random early discard (WRED)
- Storm restraint - allows limitation of broadcast, multicast, and unknown unicast traffic rate to cut down on unwanted broadcast traffic on the network

Resiliency and High Availability

- Intelligent Resilient Framework (IRF) - Creates virtual resilient switching fabrics, up to four Moonshot-45XGc switch modules acting as a single Layer 2/3 switch; Switches do not have to be co-located and can be part of a disaster recovery system; Servers or switches can be attached using standard LACP for automatic load balancing and high availability; Simplifies network operation by eliminating Spanning Tree, ECMP and VRRP; IRF supports up to four members in a group.
- Device Link Detection Protocol (DLDP) - Monitors Link connectivity and shuts down ports at both ends if unidirectional traffic is detected
- Virtual Router Redundancy Protocol (VRRP)

Monitoring and Diagnostics

- OAM (802.3ah) - Detects data link layer problems in the "last mile"; monitors link status between two devices
- CFD (802.1ag) - Connectivity Fault Detection (CFD) provides L2 link OAM mechanism used for link connectivity detection and fault location
- Mirroring - Port mirroring enables traffic on a port to be simultaneously sent to a network analyzer for monitoring; Flow-based mirroring

Compatibility

HPE Interconnect modules

NOTE: Up to two identical pairs of Switch and Uplink modules are supported in the Moonshot 1500 Chassis. Dual switch modules are required for network redundancy, regardless of cartridge configuration.

NOTE: Check Compatibility matrix below for supported switch and uplink modules

NOTE: For information HPE Moonshot Cartridges and Uplink Modules, please see the following:

Cartridge:

HPE ProLiant m300 Server Cartridge

<https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04111351>

HPE ProLiant m400 Server Cartridge

<https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04384048>

HPE ProLiant m710 Server Cartridge

<https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04384063>

Uplink

HPE Moonshot-6SFP+ Uplink Module

<https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111292c>

		CARTRIDGES							Uplink		
Switch	Speed	m300	m350	m400	M700	M710	M710p	M800	Moonshot 6SFP+ Uplink	Moonshot 16SFP+ Uplink	Moonshot 4QSFP+ Uplink
FASTPAST SWITCHES											
Moonshot 45G Switch	1Gb	X		X 1Gb speed only		X 1Gb speed only	X 1Gb speed only		X		
Moonshot 180G Switch	1Gb	X	X	X 1Gb speed only	X	X 1Gb speed only	X 1Gb speed only	X		X	X
COMWARE SWITCHES											
Moonshot 45Gc Switch	1Gb	X		X 1Gb speed only		X 1Gb speed only	X 1Gb speed only		X		
Moonshot 45XGc Switch	1Gb	X		X 1Gb speed only		X 1Gb speed only	X 1Gb speed only			X	X
	10 Gb			X		X	X			X	X

Service and Support

Service and Support Recommended HPE Care Pack Services for your HPE product (4 and 5 year Service offerings are also available)

HPE Technology Services

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 Care Pack Services

HPE Care Pack Services enable you to order the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement for the selected support.

Recommended HPE Care Pack Services for your HPE product

(4 and 5 year Service offerings are also available)

Optimized Care

Foundation Care 24x7, three-year Care Pack Service

HPE Foundation Care 24x7 connects you to Hewlett Packard Enterprise 24 hours a day, seven days a week for assistance on resolving issues. Hardware onsite response within four hours if needed; collaborative software included in this Care Pack service provides troubleshooting assistance on industry leading software running on your HPE server. Simplify your support experience and make Hewlett Packard Enterprise your first call for hardware or software questions.

<https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

Standard Care

Foundation Care NBD, three-year Care Pack Service

HPE Foundation Care Next Business Day connects you to Hewlett Packard Enterprise during business hours for assistance on resolving issues – features next business day hardware onsite response if needed and software call back within two hours. Collaborative software support is included and provides troubleshooting assistance on industry leading software running on your server. Simplify your support experience and make Hewlett Packard Enterprise your first call for hardware or software questions.

<https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

Related Services

HPE Moonshot Installation & Startup Service

HPE Installation and Startup Service for the Moonshot System provides for the installation of one system and its associated Moonshot servers and network switches, as well as operating system deployment and basic configuration of OS network parameters to establish network connectivity

HPE Datacenter Care service

HPE Datacenter Care helps you improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services “building blocks.” You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with Hewlett Packard Enterprise via a single point of accountability for Hewlett Packard Enterprise and others’ products. For more information, visit <http://www.hp.com/services/datacentercare>

HPE Self-Service Spares Service answers the question: What do you do when you need parts? We can set it up so that you get spare parts onsite through our automated self-service spares. You simply go to the part of your data center where the parts live, scan them out, scan in the broken one, and you're done. We maintain your inventory of good spares, so that what you need is ready to go when you need it. And we provide monthly service excellence reports illustrating onsite inventory performance.

Connect your devices to Unlock all of the benefits of your technology investment by connecting your products to Hewlett

Service and Support

HPE	Packard Enterprise. Achieve up to 77%¹ reduction in down time, near 100%² diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to Hewlett Packard Enterprise support.
Defective Media Retention (DMR) and Comprehensive Defective Material Retention	If your business deals with sensitive or legally protected data, you know that it's not a simple matter to return a defective hardware component, but keeping it conflicts with the terms and conditions of many standard warranty agreements. If you don't return the component, you'll be charged for the replacement part. HPE Foundation Care services are available with defective media retention of failed hard drives and comprehensive defective material retention of those other data-retentive components, such as memory, switches, processors and more. This may be purchased as an optional add-on to your HPE Foundation Care service purchase. This service is critical for customers who: • Need to control and secure their classified, proprietary and confidential data. • Are subject to current data privacy regulations. • Want a simpler, more cost-effective solution when choosing not to return a malfunctioning disk drive or other data retentive component. For more information on our data privacy services, see http://www.hp.com/services/dataprivacy
HPE Support Center	Hewlett Packard Enterprise provides several tools that make it simpler to get help from HPE: HPE Support Center is personalized online support portal with access to information, tools and experts to support Hewlett Packard Enterprise business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more: http://www.hp.com/go/hpsc The HPE Support Center Mobile App allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalize IT support anywhere, anytime. HPE Support Center are available at no additional cost with a Hewlett Packard Enterprise warranty, HPE Care Pack or Hewlett Packard Enterprise contractual support agreement. NOTE: HPE Support Center Mobile App is subject to local availability.
For more information	To learn more on HPE Moonshot System, please contact your Hewlett Packard Enterprise sales representative.

Technical Specifications

Product Specifications Hardware	Ports	Forty-five (45) 1Gb Ethernet downlink ports Six (6) 10 Gb Ethernet uplink ports One (1) serial console interface accessible through the uplink module One (1) internal serial interfaces to iLO Chassis Manager for use through the Virtual Serial Port (VSP)	
	Performance	Throughput	1.5 million pps (64-byte packets) per 1G port; 14.8 million pps per 10G port
		Switching Capacity	480 Gbps
	Memory	2 GB SDRAM; 128 MB flash; 9 MB packet buffer	
	Indicators / Switch	Module power, green/amber Module health, red/amber/green Module locator (UID), blue (LED & push button switch) Aggregated Uplink ports link/activity, green Aggregated Downlink ports link/activity, green	
	Physical Characteristics	Length	14.82 in (376 mm)
		Width	6.75 in (141 mm)
		Height	1.44 in (37 mm)
		Weight	1.707 kg (3.76 lbs)
	Environmental Ranges	Temperature Range	
		Operating	50° to 95° F (10° to 35° C)
		Non-operating	-22° to 140° F (-30° to 60° C)
	Power Consumption	Relative Humidity (non-condensing)	
		Operating	10% to 90%
		Non-operating	5% to 95%
		Altitude	
		Operating	10,000 ft. (3048 m)
		Non-operating	30,000 ft. (9144 m)
		Typical	60W
		Maximum	100W

Standards Support

General Protocols

- IEEE 802.1D MAC
- IEEE 802.1ag Service Layer OAM
- Bridges 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 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.1X PAE
- IEEE 802.1AX / 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 1588 v2 Precision Time Protocol (PTP)
- RFC 768 UDP
- RFC 792 ICMP

Technical Specifications

- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 925 Multi-LAN Address Resolution
- RFC 951 BOOTP
- RFC 1058 RIPv1
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1519 CIDR
- RFC 1542 BOOTP Extensions
- RFC 2131 DHCP
- RFC 2453 RIPv2
- RFC 3768 VRRP
- RFC 4675 RADIUS VLAN & Priority
- 802.1r GARP Proprietary Attribute Registration Protocol (GPRP)

DCB

- 802.1Qaz DCBx
- 802.1Qaz ETS
- 802.1Qbb PFC

IP Multicast

- RFC 2934 Protocol Independent Multicast MIB for IPv4
- RFC 3376 IGMPv3 (host joins only)
- RFC 3618 Multicast Source Discovery Protocol (MSDP)
- RFC 4601 PIM Sparse Mode

IPv6

- RFC 4443 ICMPv6
- RFC 4541 IGMP & MLD Snooping Switch
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration

Layer 3

- Static routes
- RIP / RIPv1
- OSPF / OSPFv3
- BGP / BGP+
- IPv6 tunneling
- PIM-SM
- PIM-SSM
- PIM-DM
- IGMP
- ECMP
- Policy-based routing
- DHCP and DHCPv6 client

Technical Specifications

MIBs

- IEEE 8021ag CFM-MIB
- IEEE 8021Q CFM-MIBv2
- IEEE 8021AB LLDP-MIB
- IEEE 8021AB LLDP-EXT-DOT1-MIB
- IEEE 8021AB LLDP-EXT-DOT3-MIB
- ANSI/TAA 1057 LLDP-EXT-MED-MIB
- IEEE 8023 LAG-MIB
- RFC 1213 MIB
- RFC 1493 BRIDGE-MIB
- RFC 2096 IP-FORWARD-MIB
- RFC 2233 IF-MIB
- RFC 2273 SNMP-NOTIFICATION-MIB
- RFC 2571 SNMP-FRAMEWORK-MIB
- RFC 2572 SNMP-MPD-MIB
- RFC 2573 SNMP-TARGET-MIB
- RFC 2674 P-BRIDGE-MIB
- RFC 2674 Q-BRIDGE-MIB
- RFC 3414 SNMP-USER-BASED-SM-MIB
- RFC 3415 SNMP-VIEW-BASED-ACM-MIB
- RFC 3417 SNMPv2-TM-MIB
- RFC 3418 SNMPv2-MIB
- RFC 3826 SNMP-USM-AES-MIB
- RFC 4022 TCP-MIB
- RFC 4044 FC-MGMT-MIB
- RFC 4113 UDP-MIB
- RFC 4133 ENTITY-MIB
- RFC 4273 BGP4-MIB
- RFC 4747 T11-FC-VIRTUAL-FABRIC-MIB
- RFC 4750 OSPF-MIB
- RFC 4750 OSPF-TRAP-MIB
- RFC 4936 T11-FC-ZONE-SERVER-MIB
- SFLOW-MIB (V5)

Safety and Compliance Complies with UL 60950-1, CAN/CSA C22.2 No. 60950-1 and EN 60950-1. UL certified.

Safety Certifications CE Marking

RoHS 6/6 compliant

Emissions Classifications (EMC) Class A

Environment-friendly Products and Approach **End-of-life Management and Recycling** Hewlett Packard Enterprise 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.

Summary of Changes

ate	Version History	Action	Description of Change
26-Oct-2016	From version 1 to 2	Updated	Update Quick Specs for the Rebranding
28-Sept-2015	Version 1	Created	HPE Moonshot-45Gc Switch Module



Sign up for updates



© Copyright 2016 Hewlett Packard Enterprise Development LP. The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft and Windows NT are US registered trademarks of Microsoft Corporation. Intel, the Intel logo, Xeon and Xeon Inside are trademarks of Intel Corporation in the U.S. and other countries. Linux is a registered trademark of Linus Torvalds. SUSE is a registered trademark of Suse. Ubuntu and Canonical are registered trademarks of Canonical Ltd. Red Hat is a trademark of Red Hat, Inc. in the U.S. and other countries. VMware is a registered trademark of VMware, Inc. in the United States and/or other jurisdictions.

For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.

c04773032 - 15364 - Worldwide - V2 - 28-October-2016