

MES7048

Data center switch

Description

The **MES7048** switch provide full Layer 2 and Layer 3 functionality allowing them to be used as aggregation switches as well as in data centers. Switch software is optimized to scale and improve data center performance.

The **MES7048** switch is high performance devices with 10GBASE-R and 40GBASE-SR4/LR4 / 100GBASE-SR4/LR4 interfaces that can be used as aggregation or transport switches in carrier networks and as Top-of-Rack or End-of-Row switches for data centers.



MES7048 overall view

- **Bandwidth – 2.15 Tbps**
- **Non-blocking architecture**
- **L3 switch**
- **Stacking up to 8 devices**
- **48 ports of 10G + 6 ports of 40G/100G**
- **MAC-table capacity – 288K**
- **Hot-swappable redundant power supplies**
- **Front-to-Back cooling**
- **Hot-swappable fans**

The device's ports support operation at rates of 1 Gbps (SFP), 10 Gbps (SFP+), 40 Gbps (QSFP+) and 100 Gbps (QSFP28).

The non-blocking architecture guarantees lossless packet forwarding at wire speed with minimum and predictable delays for all types of traffic. The front-to-back cooling provides effective cooldown in modern data centers.

The redundant and hot-swappable fans and AC/DC power supplies along with advanced hardware monitoring functions provide high reliability and uninterrupted services.

Technical features

MES7048	
<i>General parameters + Interfaces + Performance</i>	
Packet processor	Broadcom BCM56860 (Trident2+)
CPU	Intel Atom C2558
Interfaces	48x 10GBASE-R (SFP+)/1000BASE-X (SFP) + 6x 40GBASE-SR4/LR4 (QSFP+)/100GBASE-SR4/LR4 (QSFP28) + 1x 10/100/1000BASE-T (OOB)
USB	1 x USB 2.0
Console port	RS-232 (RJ-45)
Bandwidth	2.15 Tbps
Throughput for 64 bytes	1449 MPPS
Buffer memory	16 MB
RAM (DDR3)	4 GB
ROM (SATA SSD)	8 GB
MAC table	288K
VLAN table	4K
ECMP groups	16
Quality of Service (QoS)	7 queues per port
TCAM	16K Ingress, 1K Egress
L2 Multicast groups	2K
SQinQ rules	4K
VRRP routers	20
ARP table	6K
L3 interfaces	128
ECMP-groups	16
Loopback interfaces	64
Link Aggregation Groups (LAG)	64, 32 ports per LAG
Jumbo frames size	9416 bytes
IPv4 routes*	16K
IPv6 routes*	8K
<i>Physical and environmental features</i>	
Power supply	AC power: 220 V+-20%, 50 Hz DC power: -36...-72V <u>Power supply options:</u> one AC/DC power supply two AC/DC hot-swappable power sources
Max power consumption	180 W
Cooling	Front-to-Back, 4 fans
Operating temperature	from -0° to +45°C
Storage temperature	from -40° to +70°C
Operating humidity	80%
Dimensions (WxDxH), mm	440 x 447 x 44
Implementation	19", 1U
Weight	6.35 kg

* The number of routes can be increased up to 256K for IPv4 and 128K for IPv6



MES7048 front view

Features and capabilities

Interface features

- Head-of-line blocking (HOL) protection
- Back Pressure
- Auto MDI/MDIX
- Jumbo Frames
- Flow control (IEEE 802.3X)
- Protected ports
- Link aggregation groups (LAG)
- LACP
- Different LAG balancing algorithms

MAC table features

- MAC Multicast Support
- Static MAC filtering
- Port/VLAN MAC locking

VLAN features

- IEEE 802.1Q
- GVRP
- MAC/IP-based VLAN
- Different VLAN port operating modes
- Voice VLAN
- Independent VLAN learning
- Private VLAN
- Layer 2 Protocol Tunneling

L2 Multicast features

- IGMP Snooping v1,2,3
- Port/host-based IGMP Snooping Fast Leave
- MLD Snooping v1,2
- MGMT Snooping SSM
- IGMP and MLD Snooping Querier
- MVR
- GMRP

L3 functions

- Static routing
- Inter VLAN routing
- Dynamic routing protocols RIP, OSPFv2, OSPFv3, BGP
- Address Resolution Protocol (ARP)
- Proxy ARP
- Policy-Based Routing
- VRF
- BFD
- VRRP
- ECMP Load Balancing
- UDP Relay/IP Helper
- ICMP Throttling
- Loopback interfaces
- IPv6 Host
- IPv6 DHCP Client (Statefull/Stateless)
- DHCPv6 Server
- IPv4 and IPv6
- ICMPv6 Throttling

Ring topology security functions

- STP (Spanning Tree Protocol, IEEE 802.1d)
- RSTP (Rapid Spanning Tree Protocol, IEEE 802.1w)
- MSTP (Multiple Spanning Tree Protocol, IEEE802.1s)
- PVSTP (Per VLAN Spanning Tree Protocol)
- PVRSTP (Per VLAN Rapid Spanning Tree Protocol)
- Spanning Tree Fast Link option
- STP Root Guard
- STP Loop Guard
- BPDU Filtering
- STP BPDU Guard
- Loopback Detection (LBD)

Security functions

- DHCP Snooping (IPv4 and IPv6)
- IP Source Guard (IPv4 and IPv6)
- Dynamic ARP Inspection
- IPv6 RA Guard (Stateless)
- MAC-based authentication, Port Security, Static MAC entries
- Port-based authentication IEEE802.1x
- Guest VLAN IEEE 802.1x
- MAC-based port authentication (dot1x)
- DoS attack prevention
- Traffic segmentation
- Protection against non-authorized DHCP servers
- DHCP clients filtering
- BPDU attack prevention
- NetBIOS/NetBEUI filtering

Access Control Lists (ACL)

- L2-L3-L4 ACL (Access Control List)
- Time-Based ACL
- IPv6 ACL
- ACL based on:
 - Source/destination MAC/IP/IPv6 address
 - Switch port
 - IEEE 802.1p
 - VLAN ID
 - Ethertype
 - TOS/DSCP/Preference
 - Protocol type
 - TCP/UDP source/destination port
- ACL actions:
 - Egress queueing
 - Flow-based redirecting and mirroring
 - ACL-based fixed rate limiting
 - Generation of trap log entries containing rule hit count

Quality of Service (QoS)

- QoS statistics for all ports
- Shaping, policing
- IEEE 802.1p Class of Service (CoS)
- Interface trust mode: IEEE 802.1p, IP DSCP
- IEEE 802.1p and IP DSCP-based traffic classification and mapping
- Storm control
- Interface bandwidth management
- Bandwidth management per queue
- Strict priority and weighted (WRR/WFQ) scheduling algorithms
- Tail Drop/Weighted Random Early Detection (WRED) queue depth management
- ACL-based CoS/DHCP mark assignment
- Automatic VoIP Class of Service (CoS) settings

Monitoring functions

- Interface statistics
- Port mirroring (SPAN)
- Remote port mirroring (RSPAN)
- Remote monitoring (RMON/SMON)
- sFlow
- IP SLA, Track for IP SLA
- Task- and traffic type-based CPU utilization monitoring
- RAM utilization monitoring
- Temperature monitoring
- LLDP (802.1ab) + LLDP MED
- Virtual Cable Testing (VCT)
- Optical transceiver diagnostics

METRO

- Ethernet OAM
- IEEE 802.1ag Connectivity Fault Management (CFM)
- Unidirectional Link Detection (UDLD)
- Layer-2 Protocol Tunneling (L2PT)
- 802.1ad Double VLAN tagging (according to TR-101)

Data Center Bridging (DCB)

- Quantized Congestion Notification (QCN)
- Enhanced Transmission Selection (ETS)
- Priority-Based Flow Control (PFC)
- Data Center Bridging Exchange Protocol (DCBX)
- MLAG(Virtual Port Channel)
- FIP Snooping
- Openflow v1.0/v1.3.4
- Cut-through switching

Stacking

- Redundant Management Unit support
- Single IP address management
- Automatic selection of management control unit
- Automatic firmware and configuration update throughout stack
- Hot-swap of stack units
- Offline configuration of stack units
- Stacking (up to 8 switches in a stack)

Management functions

- Configuration file download and upload via TFTP/SCP/FTP/SFTP and USB
- Software file download and upload via TFTP/SCP/FTP/SFTP and USB
- SNMP v1, v2, and v3
- Command Line Interface (CLI)
- SSH server
- Web interface
- NETCONF
- Syslog
- SNTP (Simple Network Time Protocol)
- Traceroute/Ping
- Authentication, Authorization and Accounting (AAA)
- Local authentication
- Command authorization
- RADIUS, TACACS+
- Management interface blocking
- SSL
- Macrocommands
- CLI command logging
- System log
- DHCP auto-provisioning
- Debugging commands
- CPU traffic limiting mechanism
- Command completion
- Context-sensitive help
- Password encryption
- Management access control lists

MIB/IETF

- IEEE 802.3 10BASE-T
- IEEE 802.3u 100BASE-T
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ac VLAN tagging
- IEEE 802.3ad Link aggregation
- IEEE 802.3ae 10GbE
- IEEE 802.3by Forward Error Correction (FEC) CL91
- IEEE 802.1ak Multiple Registration Protocol (MRP)
- IEEE 802.1as Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks
- IEEE 802.1s Multiple Spanning Tree compatibility
- IEEE 802.1w Rapid Spanning Tree compatibility
- IEEE 802.1D Spanning Tree Compatibility
- IEEE 802.1Q Virtual LANs with Port-based VLANs
- IEEE 802.1ad Double VLAN tagging (in accordance with TR-101)
- IEEE 802.1ag Connectivity Fault Management (CFM)
- IEEE 802.3ah Operations, Administration and Maintenance (OAM)
- IEEE 802.1Qat Multiple Stream Reservation Protocol (MSRP)
- IEEE 802.1Qav Forwarding and Queuing Enhancements for Time-Sensitive Streams
- IEEE 801.1Qbb Priority-based Flow Control
- IEEE 802.1Qau Virtual bridged local area networks amendment 13: congestion notification (Draft 2.4)
- IEEE 802.1Qaz Enhanced transmission election for bandwidth sharing between traffic classes (Draft 2.4)
- IEEE 802.1v Protocol-based VLANs

- IEEE 802.1p Ethernet priority with user provisioning and mapping
- IEEE 802.1X Port-based authentication and supplicant support
- IEEE 802.3x Flow control
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- ANSI/TIA-1057 LLDP-Media Endpoint Discovery (MED)
- IEEE 1588v2 Precision Time Protocol (PTP)
- RFC 768 UDP
- RFC 783 TFTP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 Ethernet ARP
- RFC 894 Transmissions of IP datagrams over Ethernet networks
- RFC 896 Congestion control in IP/TCP networks
- RFC 951 BootP
- RFC 1034 Domain names - concepts and facilities
- RFC 1035 Domain names - implementation and specification
- RFC 1321 Message digest algorithm
- RFC 1534 Interoperation between BootP and DHCP
- RFC 2021 Remote Network Monitoring Management Information base v2
- RFC 2030 Simple Network Time Protocol (SNTP) v4 for IPv4, IPv6, and OSI
- RFC 2131 DHCP Client/Server
- RFC 2132 DHCP options and BootP vendor extension
- RFC 2347 TFTP option extension
- RFC 2348 TFTP block size option
- RFC 2819 Remote Network Monitoring Management Information Base
- RFC 2865 RADIUS client
- RFC 2866 RADIUS accounting
- RFC 2868 RADIUS attributes for tunnel protocol support
- RFC 2869 RADIUS Extensions
- RFC 3162 RADIUS and IPv6
- RFC 3164 The BSD syslog protocol
- RFC 3580 IEEE 802.1X RADIUS usage guidelines
- RFC 4541 IGMP Snooping and MLD Snooping
- RFC 5171 Unidirectional Link Detection (UDLD) Protocol
- RFC 5176 Dynamic Authorization Server
- RFC 5424 The Syslog Protocol
- RFC 1027 Using ARP to implement transparent subnet gateways (Proxy ARP)
- RFC 1256 ICMP router discovery messages
- RFC 1765 OSPF database overflow
- RFC 1812 Requirements for IP version 4 routers
- RFC 1997 BGP Communities Attribute
- RFC 2082 RIP-2 MD5 authentication
- RFC 2131 DHCP relay
- RFC 2328 OSPFv2
- RFC 2370 OSPF Opaque LSA Option
- RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
- RFC 2453 RIP v2
- RFC 2545 BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
- RFC 2918 Route refresh capability for BGP-4
- RFC 3021 Using 31-Bit Prefixes on IPv4 Point-to-Point Links
- RFC 3046 DHCP/BootP relay
- RFC 3101 The OSPF "not so stubby area" (NSSA) option
- RFC 3137 OSPF stub router advertisement
- RFC 3623 Graceful OSPF restart
- RFC 3704 Unicast Reverse Path Forwarding (uRPF)
- RFC 3768 Virtual Router Redundancy Protocol (VRRP) version 2
- RFC 5187 OSPFv3 Graceful Restart
- RFC 5340 OSPF for IPv6
- RFC 5549 Advertising IPv4 Network Layer Reachability Information with an IPv6 Next Hop
- RFC 5798 Virtual Router Redundancy Protocol (VRRP) version 3
- RFC 5880 Bidirectional Forwarding Detection
- RFC 5881 BFD for IPv4 and IPv6 (Single Hop)
- RFC 6860 Hiding Transit-Only Networks in OSPF
- RFC 1981 Path MTU for IPv6
- RFC 2460 IPv6 Protocol Specification
- RFC 2464 IPv6 over Ethernet
- RFC 2711 IPv6 Router Alert
- RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
- RFC 3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
- RFC 3484 Default Address Selection for IPv6

- RFC 3493 Basic Socket Interface for IPv6
- RFC 3513 Addressing Architecture for IPv6
- RFC 3542 Advanced Sockets API for IPv6
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 3633 IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6
- RFC 3736 Stateless DHCPv6
- RFC 4213 Basic Transition Mechanisms for IPv6
- RFC 4291 Addressing Architecture for IPv6
- RFC 4443 ICMPv6
- RFC 4861 Neighbor Discovery
- RFC 4862 Stateless Autoconfiguration
- RFC 6164 Using 127-bit IPv6 Prefixes on Inter-router Links
- RFC 6583 Operational Neighbor Discovery Problems
- RFC 854 Telnet
- RFC 855 Telnet Option Specifications
- RFC 1155 SMI v1
- RFC 1157 SNMP
- RFC 1212 Concise MIB definitions
- RFC 1867 HTML/2.0 forms with file upload extensions
- RFC 1901 Community-based SNMP v2
- RFC 1908 Coexistence between SNMP v1 and SNMP v2
- RFC 2068 HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03
- RFC 2271 SNMP Framework MIB
- RFC 2295 Transparent Content Negotiation
- RFC 2296 Remote Variant Selection; RSVP/1.0 State Management "Cookies"– draft-ietf-http-state-mgmt-05
- RFC 2576 Coexistence between SNMP v1, v2, and v3
- RFC 2578 SMI v2
- RFC 2579 Textual Conventions for SMI v2
- RFC 2580 Conformance statements for SMI v2
- RFC 2616 HTTP/1.1
- RFC 3410 Introduction and Applicability Statements for Internet Standard Management Framework
- RFC 3411 An Architecture for Describing SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for SNMP
- RFC 3413 SNMP v3 Applications
- RFC 3414 User-Based Security Model for SNMP v3
- RFC 3415 View-Based Access Control Model for SNMP
- RFC 3416 Version 2 of the Protocol Operations for SNMP
- RFC 3417 Transport Mappings for SNMP
- RFC 3418 Management Information Base for SNMP
- RFC 6020 A Data Modeling Language for NETCONF
- RFC 6022 YANG Module for NETCONF Monitoring
- RFC 6242 Using the NETCONF Protocol over Secure Shell (SSH)
- RFC 6415 Web Host Metadata
- RFC 6536 NETCONF Access Control Model
- RFC 7223 YANG Data Model for Interface Management
- RFC 7277 YANG Data Model for IP Management
- RFC 7317 YANG Data Model for System Management
- RFC 2246: The TLS Protocol, version 1.0
- RFC 2818: HTTP over TLS
- RFC 3268: AES Cipher Suites for Transport Layer Security SSH 1.5 and 2.0
- RFC 4251: SSH Protocol Architecture
- RFC 4252: SSH Authentication Protocol
- RFC 4253: SSH Transport Layer Protocol
- RFC 4254: SSH Connection Protocol
- RFC 4716: SECSH Public Key File Format– RFC 4419: Diffie-Hellman Group Exchange For The SSH Transport Layer Protocol – RFC 1858 Security Considerations for IP Fragment Filtering
- RFC 2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 headers
- RFC 2475 An architecture for differentiated services
- RFC 2597 Assured forwarding Per Hop Behavior (PHB) group
- RFC 2697 Single-Rate Policing
- RFC 3246 An expedited forwarding PHB
- RFC 3260 New terminology and clarifications for DiffServ
- RFC 1997 BGP Communities Attribute
- RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
- RFC 2545 BGP-4 multiprotocol extensions for IPv6 inter-domain routing
- RFC 2918 Route Refresh Capability for BGP-4
- RFC 4271 A Border Gateway Protocol 4 (BGP-4)
- RFC 4360 BGP Extended Communities Attribute
- RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
- RFC 4486 Subcodes for BGP Cease Notification Message
- RFC 4724 Graceful Restart
- RFC 4760 Multiprotocol Extensions for BGP-4
- RFC 5492 Capabilities Advertisement with BGP-4
- RFC 6793 BGP Support for Four-Octet Autonomous System (AS) Number Space
- RFC 7047 Open vSwitch Database Management Protocol
- ANSI/INCITS Fibre Channel backbone-5 (FC-BB-5) Rev 2.0.0 - FIP Snooping bridge
- OpenFlow Switch Specification, version 1.0.0 (Wire Protocol 0x01) and version 1.3.4

MES7048-AC back view



MES7048 side view



Ordering information

Part number	Description	Picture
MES7048-XX¹-XX²	Ethernet-switch MES7048 , 1 port of 10/100/1000BASE-T (OOB), 48 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), 6 ports of 40GBASE-SR4/LR4 (QSFP+) / 100GBASE-SR4/LR4 (QSFP28), 1 USB port, L3	
PM350-220/12	AC - Power supply module PM350-220/12, 220V AC, 350W	
PM350-48/12	DC - Power supply module PM350-48/12, 48V DC, 350W	
EMS-MES-Aggregation	EMS-MES-Aggregation - Option for managing and monitoring of network elements: 1 MES aggregation network element	

Note 1, 2:

The switch is equipped with defined power supply module and must be equipped at least with one power supply module

Ordering code

MES7048

- **XX** -

XX

1. Power supply module
AC
DC

2. Power supply module (redundant)
AC
DC

Examples of Orderig code

MES7048-AC

The switch MES7048 with one power supply module PM350-220/12

MES7048-DC

The switch MES7048 with one power supply module PM350-48/12

MES7048-AC-AC

The switch MES7048 with two power supply modules PM350-220/12

MES7048-AC-DC

The switch MES7048 with first power supply module PM350-220/12 and second power supply module PM350-48/12