MS7000 Switch

FTTH/FTTB access switch for up to 2.5Gbit/s downlink speed

Downlinks supports 1/2.5Gbit/s link speed

The MS7000 Ethernet switch is purpose built for FTTH/FTTB access to enable easy operation and deployment of services.

The MS7000 provides you with a feature set to support demanding business and residential services such as Internet, TV, wholesale capacity services and private networks at the same time as simplified and automated control of the network lets you reduce operational cost and save time when dealing with network issues.

The MS7000 series include models that support an extended temperature range, allowing deployment in outdoor enclosures such as street cabinets.

The MS7000 meet network operator needs for long deployment cycles and reliable network operation and it is purpose built with fiber networks in mind to support a wide variety of network architectures and service models.

BENEFITS

- **FTTH Customer and Service VLAN topology support with advanced QoS**
- **24 or 48 SFP-based 1G/2.5G downlink ports with four 10Gbit/s SFP+ uplinks**
- **Front-to-side airflow for optimal cooling**
- **Efficient distribution of TV including quality measurement**
- **Extended temperature range support -20 to +70°C**

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Product overview

The MS7000 is a Layer 2 access switch designed for FTTx access networks, network aggregation and traffic classification and prioritization to deliver the ultimate user experience.

The MS7000 is built with modern technology and includes support for pre-standard 2500BASE-X, allowing downlink ports to support more than 1Gbit/s link-speed with compatible customer premise equipment.

The MS7000 is filled with features to deliver voice, video and data services and to support your network team in daily troubleshooting and network operations.

The MS7000 can be used in a variety of network topologies such as

- Customer VLAN topology in combination with a Service Router/BNG with efficient multicast distribution and optional RADIUS based control of ingress traffic,
- Service VLAN topology where the MS7000 performs service enforcement and isolates end-users securly using MACF Forced Forwarding.
- TR-101 topologies with VLAN translation.
- PPPoE topologies with intermediate agent features for customer identification

The MS7000 can mix these features to support transitions from PPPoE to Service VLAN or Customer VLAN topologies. Security features such as IP strict clients can be used with both dynamic and statically assigned addresses to prevent spoofing of IP traffic.

Extendable through the ScriBOS script language, the MS7000 behavior can be easily adapted to fit into a variety of service provisioning solutions using e.g. DHCP or RADIUS to signal service parameters. Industry standard CLI and SNMP support allows easy management and control of MS7000 operation.

The MS7000 is available with either with 24 SFP (MS7024) or 48 SFP (MS7048) Ethernet downlink ports that operate at 1 or 2.5Gbti/s link-speed. In addition there are four 1/10Gbit/s SFP+ uplink ports.

The models are available as commerical or extended temperature range versions with AC or DC power options.

Benefits

Faster services and advanced traffic classification/forwarding

With up to 2.5 Gbit/s downlink speed, the MS7000 can deliver faster services. Using the onboard network processor (NPU) gives the MS7000 extensive traffic classification and service oriented bandwidth control and scheduling using advanced algorithms such as Weighted Fair Queuing (WFQ). Traffic in both ingress and egress direction can be handled through the NPU in order to overcome the traditional limitation of hardware queues and switch silicone rate-limiting. In ASIC-accelerated mode the MS7000 supports policing and shaping on port queue level.

Extended temperature range and front to side/rear-side cooling

The MS7000 series has a unique airflow solution with front-to-side airflow. This allows units to be installed in confined spaces, close to a rear wall or ETSI 300mm cabinets and still provide sufficient cooling of the front-panel SFPs.

The MS7000 extended temperature range versions adds additional fans blowing to the back, creating a front-to-side-back airflow. This enables the units to operate even in tough conditions with limited external cooling, supporting an ambient temperature range between -20 and +70°C. This makes the MS7000 suitable for street cabinets or other exposed installation enclosures.

Automated deployment

The MS7000 can be deployed into the network directly out of the box. There is no need for pre-configuration of the switch before installation. Using standard protocols the switch can have its firmware upgraded and complete system configuration downloaded when connected to the network.

Connectors in the front

All connectors for network, administration and power are located in the front of the unit. In addition the MS7000 has a small form factor, only 24 cm deep. This simplifies installation and makes the MS7000 fit into narrow spaces in multi-dwelling unit environments as well as dense deployment in central office or wiring-closet sites. An additional 12V DC power input connector is located in the rear enables dual external power sources.

Customer and service VLAN topologies

The MS7000 can be used in a wide variety of network topologies and supports:

- Ethernet wholesale with C-VLAN and S-VLAN, supporting double-tagging for business services or open-access networks.
- Customer VLAN topologies with a central Service Router/BNG
- Service VLAN topologies using DHCP snooping for end-user and network security
- IP strict clients for anti-spoofing
- MAC Forced Forwarding prevents layer 2 interaction between clients in the VLAN, including ARP inspection for increased security

A major concern in BNG deployment topologies is how to protect the network from user upstream bandwidth attacks. The natural response is to use ingress rate-limiting on the access switch, but in BNG topologies this both increases the number of devices that need configuration and requires advanced rate-limiting functions to avoid a negative impact on traffic flows. The MS7000 can use RADIUS to automatically obtain configuration instructions for ingress shaping of traffic, thereby contributing to network protection and improved user experience.

Multicast VLAN support and ability to create channel packages allows optimal bandwidth utilization in the access at the same time as maximum control of TV distribution is obtained. MS7000 supports simultaneous forwarding of up to 4000 multicast groups.

The MS7000 supports full VLAN range, up to 4,096 vlans, including double-tagging, and 16,000 MAC addresses.

Support for dual stack services

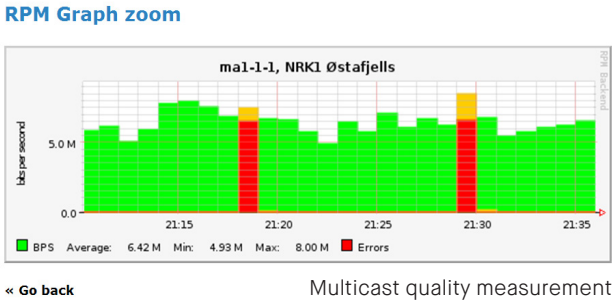
IPv6 deployment is now becoming mandatory in many networks. MS7000 also supports classification on IPv6 including policies for traffic management and QoS.

Quality inspection of TV

The MS7000 can also inspect multicast MPEG streams using the Realtime Protocol Monitoring (RPM) feature to measure the MPEG quality. The RPM feature supports MPEG over RTP as well as UDP and collects and analyzes metrics at RTP level, Transport Stream level and Packetized Elementary Stream level. The errors detected include:

- sequence-error per RTP multicast group
- jitter per RTP multicast group
- missing-sync-byte per TS multicast group
- misaligned per TS multicast group

This allows monitoring of both SD-TV and HD-TV streams.



Multicast quality measurement

Any detected errors can be logged, read using SNMP, or shown by the CLI. Each MS7000 that runs RPM becomes a probe, capable of monitoring up to 50 TV channels at the same time. Through static join of channels you can ensure continuous monitoring of key channels.

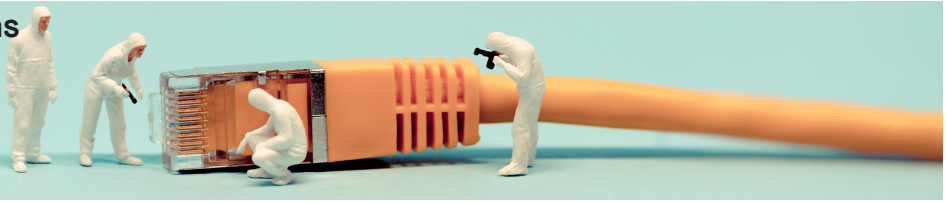
If an end user reports a problem with the TV service, the RPM data provides an immediate information if a problem is seen in the network, and if it affected the entire network or only a part of the network. The RPM help network engineers to pinpoint the location of the problem in seconds.

Environmental touch

The MS7000 series has been adapted to meet Swedish legislation to reduce certain hazardous materials commonly used in electronics. The MS7000 contains less bromide, phoshorous and chlorine compounds than comparable products which reduces the health risks associated with electronics.

In addition, the MS7000 supports Waystreams super low power SFPs that can reduce carbon emission and the electricity bill by 20-25% on average for FTTx equipment.

Technical Specifications



Physical

Model	MS7024/7024E	MS7048/7048E
Uplink ports	4 1000/10000base-X (SFP+)	4 1000/10000base-X (SFP+)
GE ports	24 1G/2.5G (SFP)	48 1G/2.5G (SFP)
Dimensions	43x441x240 mm (H x W x D)	43x441x240 mm (H x W x D)
Weight	4 kg	4 kg
Indicators	Interface LED indicator for link and speed, dual color Power LED indicator System LED indicator	
Acoustic	TBD	
Cooling	Redundant fan. The MS7000 has sufficient cooling capacity even with one fan failing. Commercial temp: Front-to-side airflow Extended temp: Front-to-side-back airflow	

Environmental

Operating temperature	Commercial temperature: 0 to 45°C Extended temperature: -20 to 70°C
Operating humidity	10% to 90%, non-condensing
Storage temperature	-40 to 70°C
Storage humidity	5% to 95%, non-condensing
Rack mounting	Standard 19" rack mountable
Heat dissipation	See power consumption

Power and Safety

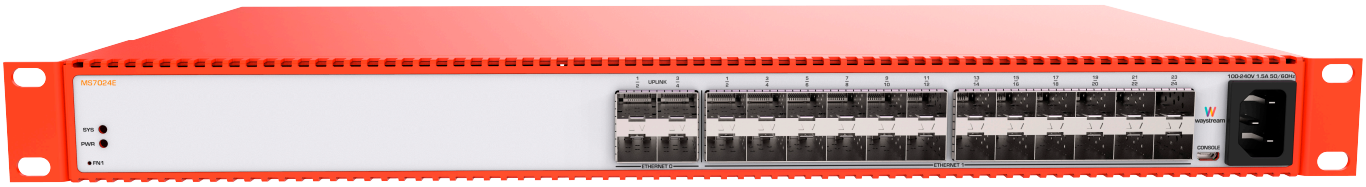
Power connector	One IEC 60320-1 C14, located on the front panel One 12VDC connector located on the back panel for external power supply
Power	Front-panel AC power input 100-240V, 50/60 Hz to internal PSU Rear-panel 12V DC power input to mainboard
Power consumption (typical)	MS 7024 AC/DC: 35 W, MS 7024E AC/DC: 41W MS 7048 AC/DC: 85 W, MS 7048E AC/DC: 87W
Safety	LVD (2014/35/EU) IEC/EN 60825-1, IEC/EN 60825-2 CE mark: EN 62368-1:2014+A11 CB scheme: IEC/EN 60950-1
EMC	CE EMC (2014/30/EU) Emission: EN55032:2015 Class B Immunity: EN61000-4-2:2009, EN61000-4-3:2006+A1:2008+A2:2010, EN61000-4-5:2014, EN61000-4-6:2014
RoHS, WEEE and REACH	RoHS 2017/2102/EU and 2015/863/EU, WEEE 2012/19/EU, SFS2016:1067, REACH

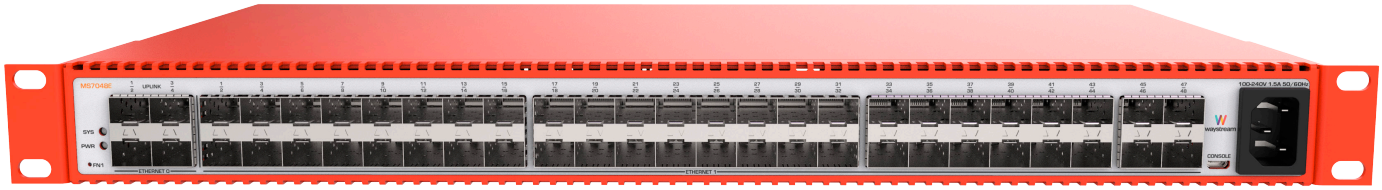
Performance	
Switch ASIC performance	Forwarding bandwidth: 160 Gbps, 240Mpps
NPU Performance	1200Mhz NPU with 4 cores, providing up to 10 Gbps throughput
MAC table	16000 MAC addresses
VLAN table	4094 VLANs
Multicast S,G entries	2048 L2 multicast, 4000 IP multicast groups
Jumbo Frames	Up to 9 Kbyte
Classification	Layer 2 packet classification with filtering Per service packets and bytes accounting Access-list entry hit logging and packet counting
Packet queuing	Weighted round robin (WRR) Weighted fair queuing (WFQ)
Policing ingress/egress	2000 policers with packet drop or recolor (64kbps-1000Mbit/s)
Shaping ingress/egress	4095 shapers with packet drop or recolor (64kpbs – 1000Mbit/s)

Layer2 and Forwarding	
IEEE standards	IEEE 802.3z – Gigabit Ethernet IEEE 802.3ae - 10Gbit/s over optical fibre IEEE 802.1p and 802.1Q with full VLAN range including Q-in-Q IEEE 802.1s Multiple Spanning-tree IEEE 802.1w Rapid spanning-tree IEEE 802.1x Port authentication with RADIUS VLAN/Service template assignment
Link aggregation	Up to 16 groups, 4 interfaces per group
Multicast	IGMPv2 snooping Static join of multicast groups

Other features	
System boot	BOOTP client for address assignment
Flow export	Netflow version 9
Security	IP spoofing protection Up to 10 Gbps bandwidth IP fragment inspection in NPU Restricted multicast access with IGMP join-filter UNI isolated ports MAC Forced Forwarding DHCPv4 snooping for anti-spoofing
Mirroring	Interface mirroring to local interface Interface mirroring over GRE to remote Wireshark or other packet capture tool
Programmable extension	ScriBOS script language for programmable extension

Management	
Command Line Interface	Industry standard CLI with debugging, configuration and management Telnet SSH
Serial interface	RS232 console serial port to access CLI
SNMP	SNMPv1, v2c and v3
PFDP	PacketFront Device protocol exchange system information with other iBOS devices and selected PFNP customer premise equipment
System boot	BOOTP client for address assignment
Time	NTP time synchronisation
Remote logging	Syslog
LLDP	Link Layer Discovery Protocol





Purchase your MS7000

To find out how you can join the growing number of networks using the MS7000, please contact your local parter or sales@waystream.com.

Article	Description
MS7024-AC	MS7024, 4 10GE (SFP+), 24 port 1G/2.5G SFP, commerical temperature, AC power, iBOS Standard
MS7048-AC	MS7048, 4 10GE (SFP+), 48 port 1G/2.5G SFP, commerical temperature, AC power, iBOS Standard
MS7024-DC*	MS7024, 4 10GE (SFP+), 24 port 1G/2.5G SFP, commerical temperature, DC power, iBOS Standard
MS7048-DC*	MS7048, 4 10GE (SFP+), 48 port 1G/2.5G SFP, commerical temperature, DC power, iBOS Standard
MS7024E-AC	MS7024, 4 10GE (SFP+), 24 port 1G/2.5G SFP, -20C to +70C ext. temperature, AC power, iBOS Standard
MS7048E-AC	MS7048, 4 10GE (SFP+), 48 port 1G/2.5G SFP, -20C to +70C ext. temperature, AC power, iBOS Standard
MS7024E-DC*	MS7024, 4 10GE (SFP+), 24 port 1G/2.5G SFP, -20C to +70C ext. temperature, DC power, iBOS Standard
MS7048E-DC*	MS7048, 4 10GE (SFP+), 48 port 1G/2.5G SFP, -20C to +70C ext. temperature, DC power, iBOS Standard
WAY-CONSOLE	Serial console cable (RJ-45 to DB9)
WAY-CONSOLE-MUSB	Serial console cable (Micro-USB to RJ-45 female)
PSU-12-180	Extrnal AC to DC power supply 12VDC, 15A, 180W

*) DC models to be general available winter 19/20.

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Communication everywhere

ABOUT WAYSTREAM

Waystream provides products fit for FTTH that are reliable, easy to operate and delivers great services. This means that the network can be built faster with better return on investment, more satisfied end-users and a robust solution. We provide switches, routers and related accessories that lets business and residential services be delivered over fiber.

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