

MSH2K

320Gbit/s SDH/OTN Optical Core Switch

The MSH2K packs a 320Gbit/s dual-technology (SDH/OTN), non-blocking cross-connect into a single subrack.

The MSH2K is ideal for optimizing existing networks and as the foundation for new networks. Its high-capacity, multi-capability switch and integrated DWDM translate directly into reduced

network costs through traffic optimization and rapid service provisioning. Investment is protected through advanced features such as in-service expansion, OTN switching, data support and ASTN/ASON control plane architecture using GMPLS protocols, making the MSH2K the obvious choice for today's operators.



Key benefits

- Improves optical layer efficiency through grooming and consolidation
- Dual-technology switch fabric supports SDH and OTN switching in a single fabric
- Fully integrated tuneable DWDM interfaces eliminate the need for transponders
- Simplified network planning and rapid service provisioning from fully non-blocking cross-connectivity
- GMPLS-enabled distributed, network-aware control plane to support fast network restoration and client-driven routing
- Saves real-estate costs with ultra-compact design
- Investment protected with in-service upgrade to 960 Gbit/s and beyond
- Comprehensive service provision including:
 - STM-1/4/16/64
 - ODU-1/2
 - Gigabit Ethernet
- High-bandwidth ATM and Ethernet enabled by concatenation
- Simultaneous support for SDH protection schemes and GMPLS-based fast network restoration
- Carrier-class availability and reliability

Integrated solution

MSH2K delivers tight integration with the DWDM layer through tuneable DWDM interfaces complete with power control. This allows direct interworking to our DWDM systems without the need for additional policing units or transponder racks. G.709 digital wrapper support ensures that end-to-end wavelength management is retained even when wavelengths are switched and groomed.

Applications

The compact design, scalability and high functionality of the MSH2K make it ideal for a wide range of applications within broadband, high-capacity networks.



Meshed networks

The combination of compact size, powerful cross-connectivity and GMPLS make MSH2K ideal for high-efficiency, high-resilience meshed network architectures. The MSH2K's ability to support SDH protection schemes and ASTN/ASON-based fast restoration mean networks can evolve from ring to mesh architectures without the cost associated with overlay networks.

Head-end ring closure

The ability to close up to 64 x 2.5 Gbit/s rings with the choice of either MS-SPRING or SNCP protection schemes makes the MSH2K the ideal switch to replace multiple discreet head-end ADMs, delivering massive savings in terms of hardware and node housing costs.

Powerful gateway solutions

The MSH2K is optimized to provide sub-lambda switching for traffic consolidation through integrated DWDM optics or VSR interfaces to minimize DWDM interconnect costs. ASTN/ASON functionality can be utilized to add advanced

network functionality to existing point-to-point DWDM systems.

Scaleable switching

MSH2K grows with your requirements: from a compact SDH switch to a fully integrated optical transport node. Growth options include:

- Electrical switch fabric expansion to 960Gbit/s (2880Gbit/s planned)
- Integrated multi-haul core DWDM transport system
- Fully optical switch plane for lambda bypass and wavelength restoration (future option).

Features

OTN switching

OTN switching extends the MSH2Ks application beyond SDH switching by adding standards-based transparency. OTN switching enables consolidation and grooming of entire SDH streams or other non-SDH services, ensuring the MSH2K meets today's and future service requirements.

Compact design

The MSH2K provides a space-saving full-connectivity, non-blocking 320 Gbit/s cross-connect in a compact 300 x 600 mm subrack. This high-density single subrack can support 32 x STM-64 ports, 128 x STM-16 or Gigabit Ethernet ports, 256 x STM-4 ports, 512 x STM-1 ports or a combination of these configurations.

Intelligent NEs- ASTN/ASON and GMPLS

The MSH2K incorporates an ASTN/ASON-based distributed dynamic control-plane employing GMPLS protocols to facilitate element-driven fast network restoration and routing. Network resilience and disaster recovery times are significantly improved by network resource auto-discovery. This mechanism ensures that optimal use is made of any connectivity available without complex operator involvement. The degree of control given to the elements is under the full control of the central NMS to ensure the traffic engineering requirements of individual carriers are met.

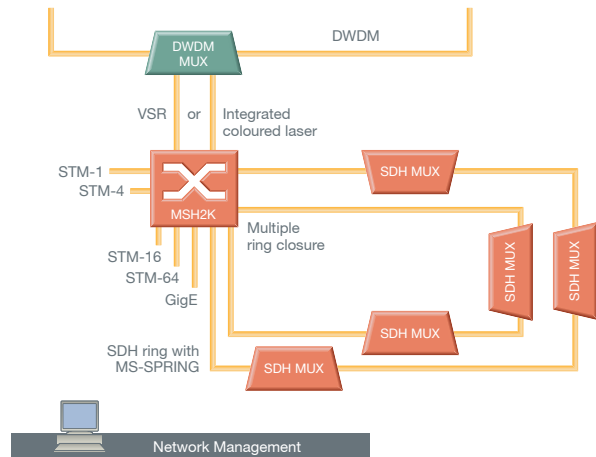
Cost-effective DWDM interworking

Integrated G.709 coloured optics dramatically reduce interconnect costs through the elimination of transponders in DWDM systems. In addition, low-cost VSR interfaces are available to minimize

interconnect costs where existing transponder-based solutions are already in place.

Evolution options

MSH2K can be expanded via the MLS or MSH-ES, providing in-service electrical switch-fabric expansion up to 960 Gbit/s. In addition to the electrical switch expansion, there is a choice of fully integrated Managed Optical Patch Panel or passive optical wavelength switch plane. The integrated optical plane can also incorporate conventional or ultra-long-haul, 160-channel, DWDM optics, filters and amplifiers to eliminate the need for additional DWDM hardware. The integrated architecture dramatically reduces the cost of optical transport by allowing passive, transponderless optical bypass. Wavelengths are only passed into the electrical plane for add/drop or wavelength translation.



MSH2K delivers benefits to ring and meshed networks

G.709 digital wrapper

MSH2K digital wrapper functionality provides enhanced end-to-end traffic management and performance monitoring of the optical channel, verifying the integrity of the client traffic. The digital wrapper also includes out-of-band FEC to extend span distance, and is fully compatible with our DWDM family.

True scalability

The MSH2K provides the flexibility demanded by operators. The fully scalable architecture ensures the MSH2K is cost-effective from small metro applications through to large core switching nodes. Scalability beyond 320Gbit/s is supported by an in-service upgrade to the MSH-ES (960Gbit/s in first release).

Data support

Gigabit Ethernet frames are mapped (using GFP) into either a single VC-4 or a VC-4-nv concatenated payload, giving efficient transparent transport of IP services over SDH. LCAS allows VC-4 to be added or removed to adjust bandwidth to meet customer requirements. Packet over SDH (PoS) IP traffic and ATM traffic are supported on standard interfaces through VC-4 concatenation.

Efficient managed Ethernet delivery

All data interfaces can support a low-cost data NTE. This provides managed Ethernet delivery right into the customers' premises (up to 80km).

The MSH2K supports an additional Layer 2 Ethernet switch for aggregating IP traffic to optimize core capacity utilization.

High-density tributaries

High-density tributaries deliver maximum revenue generation, from minimum space occupancy.

Protection

The MSH2K provides an extensive range of equipment and traffic protection options including:

- Fully redundant switch matrix
- Redundant controllers
- Multiplex Section Protection 1 + 1 and 1:N
- Sub-Network Connection Protection
- Multiple 2-fibre and 4-fibre MS-SPRING
- Fully redundant ASTN/ASON control plane.

Management

The MSH2K is managed by the widely deployed NEM-EM/NM (empowered by ServiceOn) solution that provides end-to-end integrated network management, offering network-wide performance monitoring and rapid fault identification. The MSH2K-based modern network architecture, in conjunction with NEM-EM/NM, facilitates true 'point and click' path provisioning minimizing site visits.

Technical Data

General	This equipment is designed to meet the appropriate sections of ITU-T Recommendations G.691, G.707, G.709, G.782, G.783, G.784, G.823, G.825, G.826, G.957 and G.958.
Switch	320G, dual-technology, SDH/OTN, full-connectivity, fully non-blocking switch fabric VC-4, VC-4-4c, VC-4-16c and VC-4-64C SDH cross-connections ODU-1 and ODU-2 OTN cross-connections Layer 2 Ethernet aggregation plug-in
Interfaces	
STM-1 electrical	16 port
STM-1 optical	16 port, S1.1, L1.1, L1.2/L1.3
STM-4 optical	8 port, S4.1, L4.1, L4.2/L4.3
STM-16 optical	4 port, S16.1, L16.1, L16.2/L16.3
STM-64 optical	I62.1R, I64.2R, S64.2, L64.2b, L64.2cSTM-64
Optical DWDM	16 channel tuneable G.709 (50 GHz spacing)
OTM-1 Optical	Intra-office, Short Reach, Long Reach
OTM-2 Optical DWDM	16 Channel Tuneable G.709, G.789
Gigabit Ethernet	4 port, 1000BaseSX, 1000BaseLH or 1000BaseZX (IEEE 802.3z) Gigabit Ethernet interfaces support in-band, remotely managed data NTE for managed delivery of Ethernet services
Element manager interface	Proprietary Q interface between a gateway network element and the element manager, improving bandwidth utilization. Qecc Protocol to ITU-T Recommendation G.784 for use of DCCs.
Local terminal interface	ITU-F interface V24 to IBM-compatible PC
Synchronization	
Inputs	2048 kHz timing signal to G.703 Section 13, 2 Mbit/s HDB3 to G.703/G.704.
Outputs	2048 kHz to G.703 Section 13, 2 Mbit/s to G.703/G.704
Supply voltage	-48V to -60V DC nominal
Mechanical arrangement	Subrack housed in ETSI 300 119 rack
Dimensions	280 mm (deep), 535 mm (wide) and 1700 mm (high)
Environment	The equipment will operate to ETS 300 019 Class 3.2 Radiated susceptibility to EN 50082-2 (10 V/m) Conducted, radiated and electrostatic discharge, susceptibility and conducted and radiated emissions to the worst-case limits of EN 300 386-2 for high-priority traffic Optical safety to EN 60825- 1& 2, ITU-T G.664/G.958 Electrical safety to EN 60950

About Ericsson, Marconi and MSH2K

Ericsson and Marconi have had a close relationship since 1995. As well as incorporating Marconi network elements into Ericsson's end-to-end optical networking portfolio, the two companies are co-operating in the development of high-quality, cost-effective, standardized solutions flexible enough to handle any specific customer requirements.