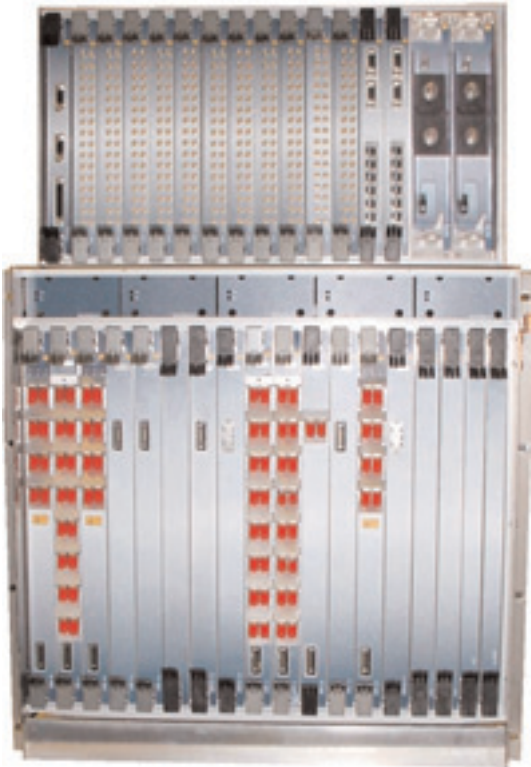# MSH64C

## High-capacity ADM/optical switch



MSH64C next-generation multi-service switch extends GMPLS and OTN to outer core and metro applications.

The MSH64C gives network operators greater network flexibility and responsiveness. It provides competitive advantage in core networks, metropolitan networks and on customer premises. And, despite its 80 Gbit/s capacity, two MSH64Cs can be accommodated in a single ETSI rack. Advanced features, such as OTN switching, data support and ASTN/ASON control plane architecture using GMPLS protocols, make the MSH64C the obvious choice for today's operators.

### Key benefits

- Highly compact design allows for two MSH64Cs per ETSI rack
- Dual-technology switch fabric supports SDH and OTN switching in a single fabric
- Simplified network planning and rapid service provisioning from fully non-blocking, 80 Gbit/s cross-connectivity
- Improves optical-layer efficiency through high transmission rate, grooming and consolidation
- Cost-effective integration of SDH and DWDM layers via Very Short Reach (VSR) and coloured interfaces
- Comprehensive service provision including:
  – STM-1/4/16/64
  – ODU-1/2
  – Gigabit Ethernet
  – ESCON/FiCon/Fiber Channel
  – 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

*Marconi*

ERICSSON ⋛

Ericsson - Compatible

## Integrated solution

The MSH64C 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

### Traditional ADM configurations

In an ADM configuration, the MSH64C can accommodate a single 4-fibre MS-SPRING ring or two 2-fibre MS-SPRING or SNCP rings and still support eight interface slots for add/drop traffic. The high-capacity switch allows full connectivity between rings when used in the dual-ring configuration.

### Metro Point of Presence

The MSH64C's service diversity and high capacity mean that a single chassis can provide a powerful metro point of presence to deliver SDH, Ethernet and wavelength services via OTN interfaces. The data NTE allows managed Ethernet services to be extended right into the customers' equipment rooms.

### Small Optical Switch

The 80 Gbit/s switch capacity is comparable to a traditional cross-connect, yet the compact size means the MSH64C can be deployed on smaller nodes, enabling network optimization to be performed further out in the network, leading to increased network capacity

### DWDM Gateway

The MSH64C's high interface capacity and full MS-SPRING support on all 2.5 and 10 Gbit/s interfaces allow up to eight STM-16/OTN-0.1 rings to be closed on a single chassis. The aggregated traffic can then be presented on grey or coloured DWDM 10 Gbit/s interfaces into a DWDM metro or core network.

## Features

### OTN switching

OTN switching extends the MSH64C's 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 MSH64C meets today's and future service requirements.

### Compact design

The MSH64C provides a space-saving, full-connectivity, non-blocking 80 Gbit/s cross-connect in a single 764 mm-high chassis. A single chassis can support 4 x STM-64, 32 x STM-16 ports or Gigabit Ethernet ports, 96 x STM-4, 192 x STM-1 ports or a combination of these configurations.

### Intelligent NEs

The MSH64C 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 managed by 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

MSH64C can be expanded via the MSH-ES, providing in-service electrical switch-fabric expansion up to 960 Gbit/s.

Versatile network deployment
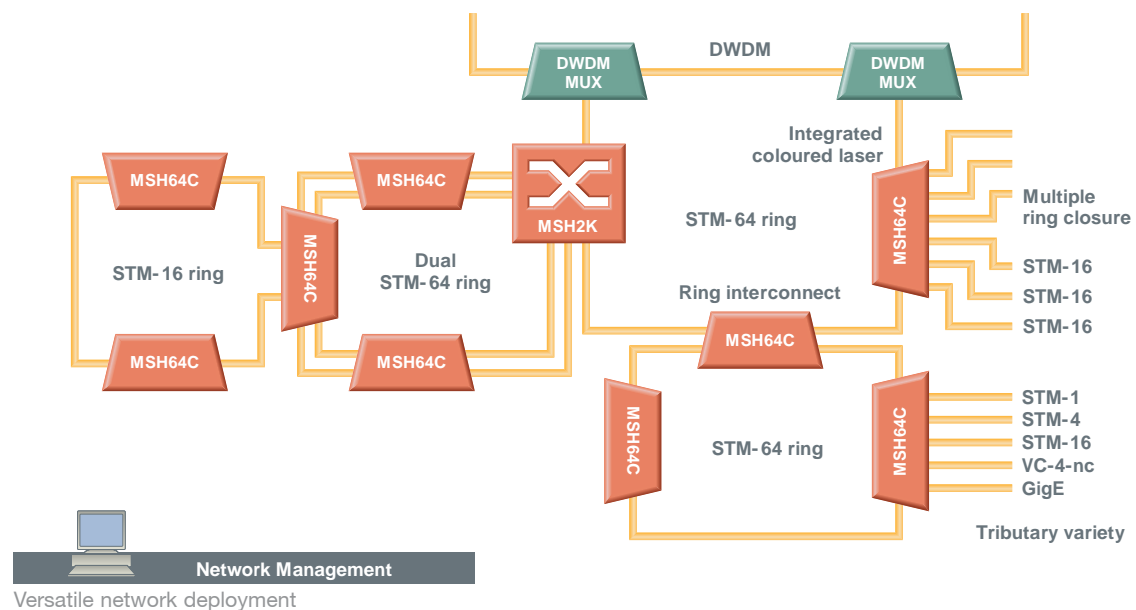
**G.709 digital wrapper**

MSH64C 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 data support**

Data services are mapped via Generic Framing Protocol (GFP) into VC-4s. LCAS allows VC-4s to be added and removed to adjust bandwidth to the service requirements.

The MSH64C provides flexible interfaces to support Fast/Gigabit and 10Gigabit Ethernet, ESCON, FiCon and Fiber Channel via pluging in optical modules.

The data capability is further enhanced by the optional Ethernet aggregation plug-in that provides a 20 Gbit/s, Layer 2, Ethernet switch, allowing data services to be aggregated prior to being mapped into VC-4s.

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 80 km). The MSH64C supports an optional 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 MSH64C provides an extensive range of equipment and traffic protection options including:

- Fully redundant switch matrix
- Fully redundant ASTN/ASON control-plane
- Multiplex Section Protection 1 + 1 and 1:N
- Sub-Network Connection Protection
- Multiple 2-fibre and 4-fibre MS-SPRING
- ASTN/ASON-based fast mesh network restoration

**Management**

The MSH64C is managed by 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 modern network architecture, in conjunction with NEM, 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** | 80 Gbit/s, dual-technology, SDH/OTN, full-connectivity, fully non-blocking switch fabric<br>VC-4, VC-4-4c, VC-4-16c and VC-4-64C SDH cross-connections<br>ODU-1 and ODU-2 OTN cross-connections<br>Layer 2 Ethernet aggregation plug-in (20Gbit/s, VLAN/MPLS-based routing) |

**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 | 2 port and 4 port, S16.1, L16.1, L16.2/L16.3 |
| STM-64 optical | I64.1r, I64.2r, S64.2, L64.2b, L64.2c |
| Coloured interfaces | STM-64 (50 GHz spacing) |
| Gigabit Ethernet | 4 port, 1000BaseSX, 1000BaseLH or 1000BaseZX (IEEE 802.3z) |
| | 8-port flexible Fast/Gigabit/10 Gigabit Ethernet, ESCON, FiCon, Fiber Channels interface |

| | |
|---|---|
| **Optical connectors** | LC and SC type |
| **Element manager interface** | Proprietary Q interface between a gateway network element and the element manager, improving bandwidth utilization.<br>Qecc Protocol to ITU-T Recommendation G.784 for use of DCCs. |
| **Local terminal interface** | ITU-F interface V24 to IBM-compatible PC |

**Synchronisation**

| | |
|---|---|
| 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 764 mm (high) |
| **Environment** | The equipment will operate to ETS 300 019 Class 3.2<br>Radiated susceptibility to EN 50082-2 (10 V/m)<br>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<br>Optical safety to EN 60825- 1& 2, ITU-T G.664/G.958<br>Electrical safety to EN 60950 |

### About Ericsson, Marconi and MSH64C

*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.*