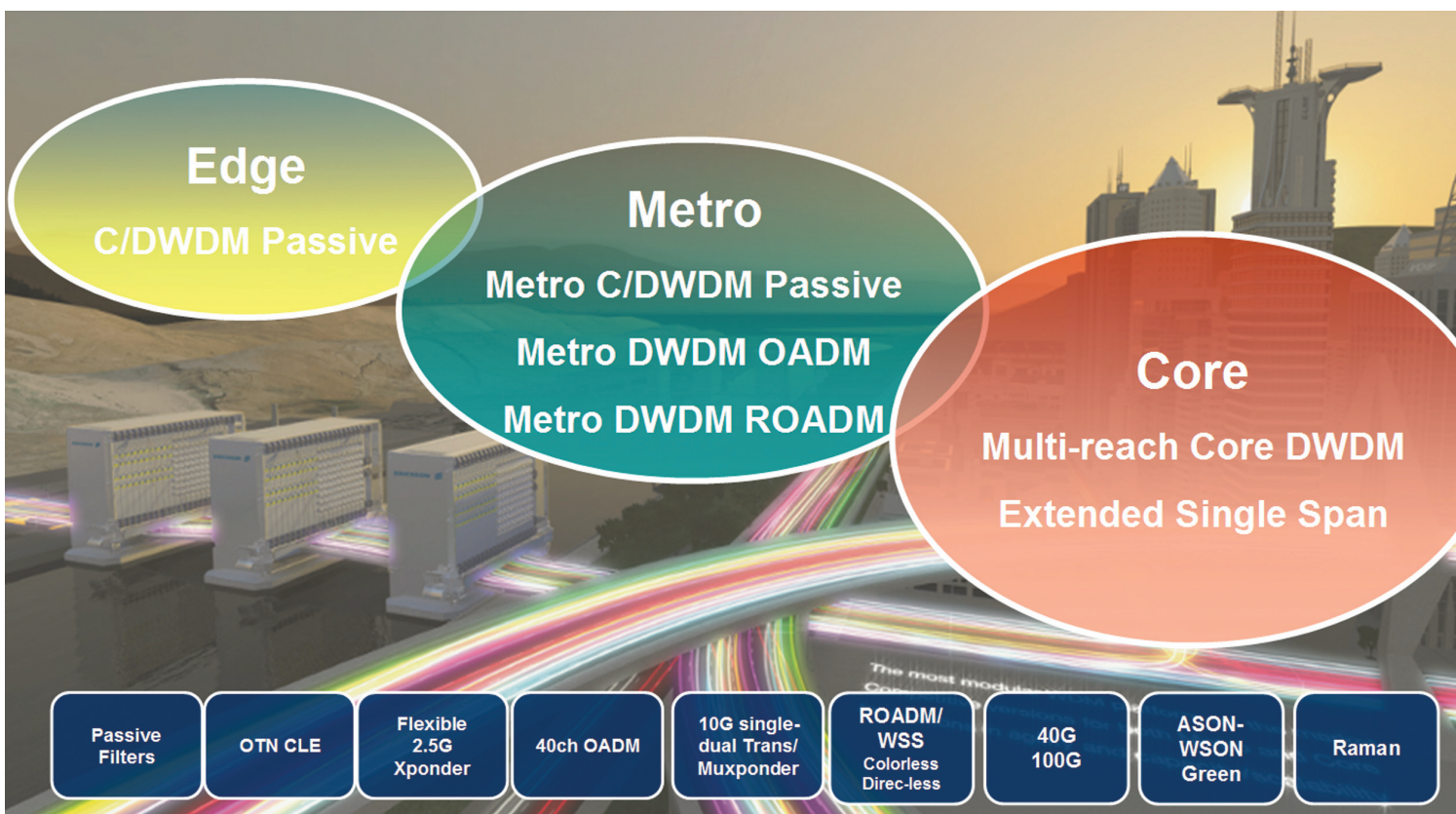


# MARCONI MHL 3000

OPTICAL DWDM SOLUTION



The Marconi MHL 3000 is a highly modular, multiple application platform with the flexibility suitable for network applications ranging from edge to metro and to core transport. It provides a cost optimized solution for C/DWDM, Metro DWDM OADM, Metro DWDM ROADM, Multi-Reach Core DWDM, and extended single span solutions.

# MARCONI MHL 3000

Protocol independent, the MHL 3000 provides the transport of SDH/SONET, Ethernet and SAN services. High bandwidth optimization via integrated transponders and muxponders meet the needs of services ranging from 2.5Gbit/s, to 10Gbit/s, 40Gbit/s and 100Gbit/s.

Operational complexity is kept to a minimum by the MHL 3000 “plug and play” architecture. This simplifies network planning, commissioning, maintenance and control, resulting in reduced network complexity and a lower cost of ownership (TCO).

Key features and benefits for MHL 3000 include:

- High modularity and easy configurability for ring and mesh topology adapts to any network application
- High scalability for core transport up to 3.2Tb/s capacity per line, 8Tb/s with 100Gb/s
- Transponders and sub-rate aggregation provide outstanding bandwidth utilization and service support for high-speed data, storage, video and voice services
- Full implementation of the Optical Transport Networking (OTN-G.709) with end-to-end monitoring
- Wide range of solutions for router-to-router applications with 40G solutions. e.g. 40G line transmission and 40G muxponders based on DPSK, RZ-DQPSK, and 40G inverse multiplexer for IP services
- Network flexibility with Wavelength Switch nodes for enhanced network connectivity and service provisioning
- Protection options with 1+1 OS-NCP with <50ms switching speed
- Simplified planning tools optimize bandwidth, network resources and optical parameters

- Dynamic network control and remote service provisioning, reducing TCO
- Intelligent ASON-WSO control Plane features for highest resiliency and lower TCO

## Applications

MHL 3000 is a flexible and versatile platform that delivers optimum network performance for linear, ring and mesh topology. The single platform addresses low channel count and short distance CWDM applications, as well as high DWDM channel counts and longer distances to accommodate increased traffic and higher bit rate services.

### Flexible network connectivity: Wavelength switches

MHL 3000 supports fully reconfigurable or fixed multi-direction optical add-drop nodes with 100% channel access. A Wavelength Switch simplifies network planning and reduces human intervention. The architecture enables capacity growth, bandwidth growth and flexibility.

### Removed electrical regeneration

Accommodating distances up to 4000km, the MHL 3000 eliminates the need for costly electrical regeneration. Optical bypass significantly improves network economics and reliability in standard long haul applications, simple rings or meshed topology.

### 40G connectivity

MHL 3000 enables router-router inter-connects at 40Gb/s on any 10G infrastructure. Fully integrated into the MHL 3000 shelf, the modulation format options of DPSK and RZ-DQPSK allow the delivery of high data rate services. Tunable optics simplifies spare handling, while the restoration mechanism provides cost-effective 40G services.

## Effective multi-service delivery

MHL 3000 facilitates the protocol independent transport of SDH/SONET, Ethernet and SAN services. Its modularity and flexibility make the MHL 3000 adaptable to the widest range of network services and performance requirements.

## Intelligent network

The ASON/WSO control plane adds network transport intelligence by providing a resilient network, in case of multiple faults, and bandwidth on demand for any service type. The Ericsson Optical Network Planner tool helps optimize resources.

## Key Advantages

### Optical Transport Network

MHL 3000 interfaces provide an embedded OTN frame structure to address the monitoring and supervision required for cost effective, end-to-end managed services. All the MHL 3000 interfaces are fully ITU-T G.709-compliant including the six levels of Tandem Connection Monitoring. The standard forward error correction (FEC) or enhanced FEC (EFEC), with performance monitoring, increases the quality of service.

### Festoon-type single span connections

MHL 3000 addresses repeater-free, single-span interconnections for festoon applications. The amplification solution, based on Raman, can easily cope with high span losses of 72dB.

### Agile Multi-service Transport Platform

Integrated and managed optical packet transport provides the bandwidth efficiency required for HDTV and IPTV services. This solution supports full multi-service flexibility from data packets to wavelengths and TDM aggregation.



MHL 3000 Optical Networks Application

### 2.5G interfaces

The MHL 3000 2.5G Xponder is a configurable multi-function card supporting a single or dual transponder with TDM or data aggregation. It offers full payload and overhead transparency for “carrier’s carrier” applications with standard G.709 frame and monitoring. This enables network planning and embedded monitoring facilities, while minimizing service costs.

### 10G interfaces

MHL 3000 offers a single and dual multi-rate transponder with pluggable client SFP/XFP optics and TDM and data muxponders. Tunable as well as pluggable, DWDM XFP optics improve spare management. The transport card provides a standard G.709 structure and OTU2 framing with FEC/EFEC to enhance optical performance.

### High network resiliency with protection and restoration options

MHL 3000 has a comprehensive optical protection suite to deliver maximum service availability at an optimum cost. Optical path restoration and route diversity increases the resiliency of Ericsson’s optical portfolio, even against double failures, for efficient and economical use of bandwidth. Green restoration with card sharing optimizes operator TCO.

### Management

Ericsson’s ServiceOn OSS solution manages the full Ericsson Broad-band Network product range, delivering end-to-end, best-in-class, service oriented management with seamless OSS integration.



**MHL 3000 40G MUX-PONDER SOLUTION IS A HIGHLY MODULAR, MULTIPLE APPLICATION PLATFORM**

## TECHNICAL SPECIFICATIONS MHL 3000

### APPLICATIONS

Edge, Metro and Core

### TOPOLOGY

Point-to-point, linear, ring, hubbed, meshed

### CAPACITY

3.2 Tb per line, 28.8 Tb per node

### FIBER TYPES

G.652, G.653, G.654 and G.655

### TRANSMISSION FORMAT

NRZ, RZ, NRZ-DPSK, RZ-DQPSK

### NETWORK APPLICATIONS

- Network size: up to 1000km regional and 4000km backbone
- Multispan applications (examples): 29 spans at 20 dB @10G, 27 spans at 21 dB @2.5G, 15 span x 20dB @ 40G
- Typically: 25 nodes per ring

### OPTICAL AMPLIFIER MODULES

- Output power from +16 to 20.5dBm
- Gain: up to 29 with 10dB gain range
- Dynamics: 1-80channels
- Embedded optical levelling and control
- Raman amplifier: Counter- and co-propagating for Core applications

### OPTICAL ADD-DROP

Multi-direction flexible and fixed OADM’s

- ROADM and WSS up to 9 nodal degrees
- Colorless and directionless option
- 100% add-drop capacity
- C and DWDM filters
- Add-drop filter granularity: 1/2/4 channels
- In service upgrade — band filter

# TECHNICAL SPECIFICATIONS

## MHL 3000

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### TRIBUTARY CARDS

- 2.5G Xponder: 2xSTM16/OC-48, 4xGbE/1G FC/2G FC, 4xSTM-1/4, 2x4G FC and 4xAny
  - 10G Multirate transponders (10GbE WAN/LAN, STM-64/OC-192)
  - 2x10G multirate transponders (2xSTM-64/OC-192/10G WAN/Lan Phy)
  - 10 Gbit/s TDM Muxponder (4xSTM-16/OC-48/ODU-1)
  - 10 Gbit/s Data Muxponder (8xGbE/FC)
  - 40 Gbit/s transponder (STM-256/OC-768/ODU-3/40GbE)
  - 40G inverse multiplexer (4x10G)
  - 40G Muxponder (4xSTM-64/OC-192/ODU-2/10GbE WAN/Lan Phy/OTU-2/OTU-2e)
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### OPTICAL CONNECTORS

Standard optical connector: SC; High-density card connectors: LC

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### PLUGGABLE OPTICS

Grey, C/DWDM SFP/XFP

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### TUNABILITY FULL C BAND

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### PERFORMANCE MONITORING

- Standard G.709
  - Embedded analogue monitoring
  - Optical performance monitoring (G.697)
  - Gigabit Ethernet performance monitoring
  - Historical registers (15 minutes and 24 hours)
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### SERVICES

SDH/SONET/CBR:

- STM1/OC-3/CBR-155 Mbit/s
- STM-4/OC-12/CBR-622 Mbit/s
- STM-16/OC-48/CBR-2.5 Gbit/s
- STM-64/OC-192/CBR-10 Gbit/s
- STM-256/OC-768/CBR-40 Gbit/s

### SERVICES (CONT'D)

Ethernet:

- Gigabit Ethernet
- 10G Gigabit Ethernet WAN/LAN-Phy

Video:

- 270 Mbit/s

Storage:

- Ficon, Fiber Channel: 1G/2G/4G/10G
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### MANAGEMENT

- Management protocols: Q Ethernet; OSI or IP-based DCN
  - Element Manager: ITU-T 3010
  - Q.Protocol: ITU-T G.733, Q.811 and Q.812
  - Qecc Protocol: ITU-T G.784
  - TL1 interface
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### MECHANICAL SPECIFICATIONS

#### SUBRACK TYPE DIMENSIONS (W x D x H mm)

- Compact subrack 220 x 280 x 450
  - Single-row 495 x 280 x 510
  - Dual-row 495 x 280 x 930
  - CLE 440 x 220 x 44
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### RACK

ETS 300 119-3, ANSI 19"/23"

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### SUPPLY VOLTAGE

-48 VDC to -60 VDC nominal

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### STANDARDS CONFORMANCE

- Optical Safety: IEC 60825, Hazard Level 1M; CDRH Laser Notice No.50
  - Electrical Safety: IEC and UL 60950
  - Climatic ETSI 300-019-1-3: Class 3.1e/3.2
  - Transport: ETSI 300-019-1-2: Class 2.3
  - Storage: ETSI 300-019-1-1: Class 1.2
  - NEBS Level 3:GR 63, GR 109
  - Acoustic noise: ETSI 300-753
  - Electromagnetic Compatibility: ETSI 300-753, FCC Part 15
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### CERTIFICATION

IBM GDPS and Server Time Protocol (STP) application