OptiSwitch® 300 - Optical Termination Unit
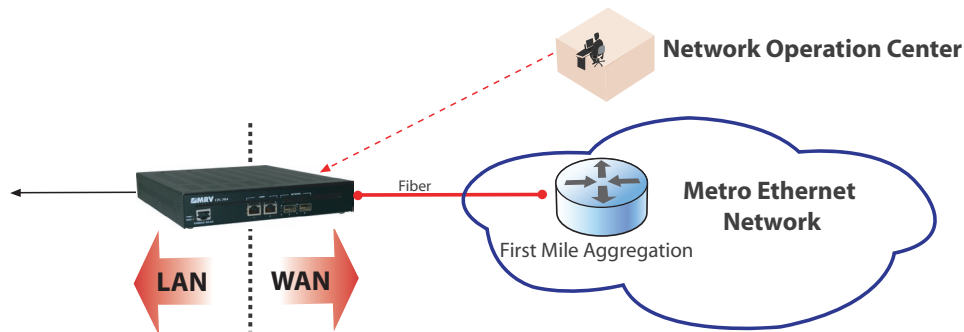
OS306-E

OS304-S

OS304

OS304-S-AC2

OS300

Product highlights

○ Local loop 100FX, 1000FX Fiber extension to businesses
  – NID/NTE Network Interface/Network Termination
  – Optical versatility for different rates & distances
○ Line extension Ethernet-centric service
  – Jumbo frames (9K), transparency
  – 50ms optical protection
○ Operation, Administration & Maintenance
  – Remote management, control & fault diagnostics

○ OS306 - EXT: to withstand extreme temperature
     from (-40 ˚C to 65 ˚C) (-40 ˚F to 149 ˚F)

Overview

The OptiSwitch 300 is a Fast Ethernet and Gigabit Ethernet small footprint Optical Termination Unit (OTU) that provides a simple and cost-effective solution for connecting optical fiber between the customer premises and a broadband service provider. The OS300 Ethernet optical termination unit offers the service provider the capability to extend the Metro Network Ethernet service over fully managed optical 1000FX (GE) or 100FX (FE) links. It allows the carrier to offer the simplest level of Ethernet services: a fully managed native Optical Ethernet demarcation channel, with controlled bandwidth, protected network and customer ports, VLAN aware and unaware modes and cable diagnostics features.

Network Operation Center

Fiber

Metro Ethernet Network

First Mile Aggregation

LAN   **WAN**

Features & Specifications
Physical ports
- OS304
  • 2 x 10/100/1000BaseT + 2 x SFPs (100FX/1000FX)
- OS304-S
  • 1 x 10/100/1000BaseT + 3 x SFPs (100FX/1000FX)
- OS306-E
  • 4 x 10/100/1000BaseT + 2 x SFPs (100FX/1000FX)
- Same SFP port can host 100FX & 1000FX pluggable optics
- Hot-swappable short/long haul, single strand (bidirectional) and WDM pluggable optics supported as per INF 8074i standard
- Auto-negotiation and force full-duplex modes
- Auto MDI/MDIX
- Network/User port identification
- EIA - 232 out-of-band console port
- Environmental sensor for temperature alarms

Advanced Ethernet Features
• Jumbo frames (9K) on user and network ports
• Non-blocking wire-speed Gigabit Ethernet on all ports
• Transparent cross-connect mode – port-based converter without MAC learning
• IEEE 802.1Q VLAN support
• VLAN Stacking (Q-in-Q) per user port for VLAN-aware transparent service
• Bandwidth control on per user/network ports
    - Policing from LAN and shaping to WAN
        • Fractional rates of 128Kbps
• Storm limit protection for Unicast/Multicast/Broadcast frames
• Port Security, including MAC DoS protection, ARP rate control and IEEE 802.1X
• CoS aware per DSCP and 802.1p headers
    - QoS mapping to 4 hardware priority queues per port
    - Low-latency Strict Priority and WRR scheduling
• Protection mechanism for Network & User FE or GE ports
    - 1+1 Link aggregation - 802.3ad
    - 1 : 1 LOS protection
• LIN - Link integrity
    - Link fault reflection from network to user ports

Protection mechanism can be set for both sides: customer/service and network

Link Protection 1:1 (Loss of Signal)

Customer's LAN — Active — Network — Standby

Link Aggregation 1+1 (802.3ad)

Customer's LAN — Network

Link integrity

Customer's LAN — Network

LIN - Fault reflection
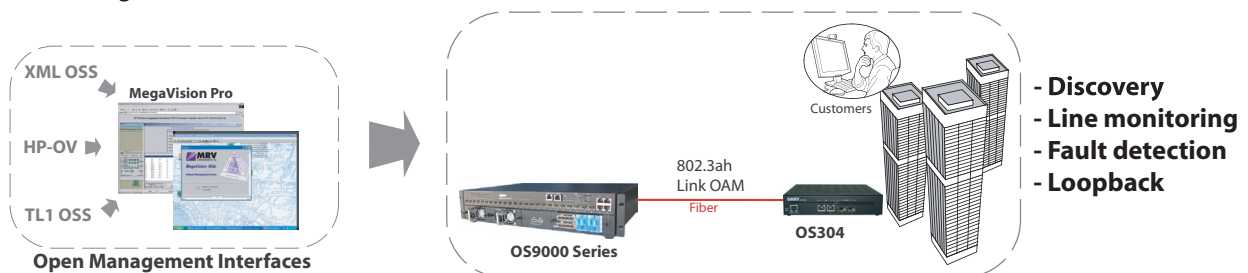
Device Management
• Out-of-band CLI
    - Optional CLI disable-mode & in-band control via network
• IP-less managed - link OAM via 802.3ah EFM
    - Simplifies deployment and management
    - Maintains visivility into customer's & provider's networks
        • EFM 802.3ah OAM configuration & auto-discovery
        • Link continuity from CO to demarcation
        • GigE & FE service interfaces

XML OSS — MegaVision Pro
HP-OV
TL1 OSS
Open Management Interfaces

OS9000 Series — 802.3ah Link OAM — Fiber — OS304

Customers

- **Discovery**
- **Line monitoring**
- **Fault detection**
- **Loopback**

• Telnet or web-based
• SNMPv1,v2
• DHCP client for automated IP assignment
• Management VLAN – secure and invisible to the customer
• Management ACL for trusted connections – trusted IP or subnet
• Configuration load/save via TFTP

Fault Management & Monitoring on Network/User ports
• RMON – 4 groups: History, statistics, alarms & events
  - Complete set of raw alarms and traffic collection reports on port-basis
• Ping for connectivity verification
• Copper Cable diagnostics (copper TDR) on RJ45 User ports
  - Isolates location of copper cable faults
• Optical level monitoring on SFP network ports
  - Comply with SFF-8472 for Rx / Tx optical level monitoring and other parameters
• Last gasp to enables alarm indication of power loss
• Link fault reflection to enable of fault propagation from Network /User port
• Port near & far loopback to enable port analysis on crossing transmission from NOC

Optical Termination Service
The OS300 enables a clear optical termination point between the customer's and the service provider's networks, facilitating remote optical Ethernet services.
The OS300 incorporates 10/100/1000BaseT RJ45 user ports, and SFP network ports that can host 100FX and 1000FX SFP pluggable transceivers, and connect Fast Ethernet and Gigabit Ethernet optical services via the same device.

Optical SFP interfaces
FE and GE SFP interfaces provide unmatched deployment flexibility to enable versatile optical extensions from short to long haul single mode, single fiber (Bidirectional), or CWDM/DWDM connections – simply by means of a specific SFP.

Traffic Management
Customer's service can be connected at the physical interface rates, or can be provisioned remotely from the Network Operations Center (NOC) with configurable granular rates (128Kbps) of up to 1000Mbps. Incremental scalable bandwidth is achieved by performing traffic policing on ingress and shaping on the WAN optical interface and offers predictable network traffic into the provider's broadband network.

VLAN/VMAN Services
Provider's Ethernet services can be differentiated and logically separated by means of the VLAN technology. OS300 offers VLAN stacking (Q-in-Q) that allows transparent LAN services by mapping the customer's VLAN traffic into the provider's service VLAN. This functionality provides layer 2 transparencies and eliminates the need for VLAN configurations coordination between the provider and the customer.

Differentiated Services
The OS300 used as a demarcation point for customer traffic that can inspect various traffic flows and respect the marked traffic that can be queued to corresponding service level. This can be used to differentiate between packets that need fast and low delay processing, and between lower priority packets that can suffer longer delay in treatment (usually non real-time applications).

Remote Management & Fault Diagnostic
Network monitoring is an essential tool for debugging network occurrences. The OS300 offers remote network monitoring and statistics collection of Layer 2 Ethernet frames and RMON 4 groups of network performance counters. The OS300 supplies full remote access to the demarcation point in order to remotely check the condition of a device, performs software upgrades and adds new features to minimize OPEX (operational expenses). This capability offers visibility into the customer premises to eliminate technician visits to customer's sites.

Copper Cable Diagnostics
Because the L1/L2 aspects of Ethernet are closely coupled together, it is often not possible with today's Ethernet equipment to isolate at which layer a problem has occurred. This results in truck rolls to swap out equipment, cables, or interfaces, in an attempt to fix the problem without really knowing what/where it is. This dramatically increases operation costs and decreases the value proposition of Ethernet to service providers. The OS300 incorporates copper TDR that can identify problems with CAT5 copper cables on a customer's site such as opens, shorts and wrong impedance.

Optical Performance Level Monitoring Digital Diagnostics
The OS300 supports the SFP Digital Diagnostics standard (as per SFF-8472). A powerful OPM tool, it provides access to a number of real-time SFP operating parameters such as optical TX/RX power, voltage and temperature, as well as component information such as vendor code, serial number and wavelength. The information provided by Digital Diagnostics, together with alarm and warning thresholds, enables a network administrator to identify potential problems in optical transmission and take preemptive action before any service outage actually occurs.

Technical Specifications

Standard compliance	UL-1950; FCC part 15 Class B; CE-89/336/EEC,73/23/EEC; RoHS directive
Environment	Operating Temp: OS304 models: 0˚C to 45˚C (32˚C to 113˚F) / 306-E model: 0˚C to 65˚C (32˚C to 149˚F) OS306-EXT module: -40˚C to 65˚C (-40˚F to 149˚F) Storage Temp: -25˚C to 70˚C (-13˚F to 158˚F)
Operating humidity range	10 to 95%
Diagnostic LEDs	Power, Ports: Link, activity
Mounting (ETS300-119)	19 " or 23" racks (1RU) and wall mount - ETSI EN300-019 class 3.1
Rack efficiency	Two units can be placed in a side-to-side mode
MTBF	OS304 ,304-S ,OS306-E : 220,000 HRS @ 25˚C/77F OS304-S/AC-2: 585,866 HRS @ 25˚C/77F
Performance	Non-blocking wire-speed on all ports
Power Specifications	Power AC: Auto-range 90-240 AC Line frequencies 50-60Hz Power DC: -36VDC - 72VDC Power Consumption: OS304 / OS304-S 8W max ; OS304-S/AC-2 14W max
Physical dimensions WxDxH	OS304 / OS304-S / 306-E / 306-EXT 214x240x43.65mm 8.45x 9.45x1.72 inch	OS304 -S/AC-2 316.6x240x43.65mm 8.45x 9.45x1.72 inch
Weight	0.80 kg (1.76 lb)	1.6 kg (4.28 lb)
Heat dissipation (Max.)	OS304 / OS304-S / OS306-E 27 BTU/hr ; OS304-S/AC-2 47 BTU/hr

Order Info

OS-300	
OS304	Optical termination unit - 2 RJ45 10/100/1000Base-T LAN and 2 100/1000FX WAN SFP ports, AC (90-240VAC) power supply
OS304/DC	Optical termination unit - 2 RJ45 10/100/1000Base-T LAN and 2 100/1000FX WAN SFP ports, DC (-48VDC) power supply
OS304-S	Optical termination unit - 1 RJ45 10/100/1000Base-T LAN and 3 100/1000FX WAN SFP ports, AC (90-240VAC) power supply
OS304-S/DC	Optical termination unit - 1 RJ45 10/100/1000Base-T LAN and 3 100/1000FX WAN SFP ports, DC (-48VDC) power supply0
OS304 -S/AC-2	Optical termination unit - 1 RJ45 10/100/1000Base-T LAN and 3 100/1000FX WAN SFP ports, Dual redundant AC (90-240VAC) power supply
OS306 -E	4 RJ45 10/100/1000Base-T LAN and 2 100/1000FX WAN SFP ports, with high temperature support (0 ˚C to 65 ˚C)
OS306 -E/DC	4 RJ45 10/100/1000Base-T LAN and 2 100/1000FX WAN SFP ports, with high temperature support (0 ˚C to 65 ˚C) (32 ˚F to 149 ˚F), 48VDC power supply
OS306 -EXT	4 RJ45 10/100/1000Base-T LAN and 2 100/1000FX WAN SFP ports, with extreme temperature support (-40 ˚C to 65 ˚C) (-40 ˚F to 149 ˚F)
Accessories	
EM304-BR-1	19" mounting brackets for a Telco rack
EM304-BR-2	23" mounting brackets for a Telco rack
EM304-BR-3	19" mounting brackets for a Telco rack - fits OS304-S with 2 AC power supplies
EM304-BR-4	23" mounting brackets for a Telco rack - fits OS304-S with 2 AC power supplies
EM304-WBR	Wall mounting bracket for OS300
EM-10-BR	Vertical rack mount frame (6U) - to fit up to 10 OS300 or OS900 units

For ordering codes of FE and GE SFP pluggable optics, please refer to MRV's website: www.mrv.com