

T-Marc 3348S/SH

10 Gigabit Ethernet/MPLS/IP Aggregation and Demarcation Device

The T-Marc 3348S/SH 10GE ETHERNET/MPLS/IP demarcation device offers an all-in-one solution that meets the increasing challenges of mobile operators, mobile backhaul wholesalers, and service providers to cost effectively connect base stations and controller sites running LTE and LTE Advanced. The T-Marc 3348S/SH also offers enterprises 10GE connectivity for heavy duty cloud applications. The device supports IEEE 802.1q, Q-in-Q, and MPLS transport technologies with no licensing fees, increasing network flexibility and future-proofing the network while reducing technological risks. The T-Marc 3348S/SH provides access to advanced data services such as virtual private wire services (VPWS), virtual private LAN services (VPLS) and hierarchical virtual private LAN services (HVPLS), simplifying the network and making it easier to manage, while gaining the added value that MPLS provides.

The T-Marc 3348S/SH is an advanced 10GE demarcation device, incorporating high capacity in a compact size (1RU by ½RU width), with 4 x 1GE/10GE SFP+ ports (two active ports and two ports which require license activation), 8 x dual-speed. (100Mbps/1GE) fiber ports and 4 x 10/100/1000Mbps copper ports, it offers one of the densest capacity demarcation devices in the industry. The T-Marc 3348S/SH supports redundant power supplies, including wide range DC power input, making it optimal for mobile cell site deployments.

Assuring SLAs using Enhanced Traffic Engineering

As the demand for bandwidth increases, but revenue streams stay flat, service providers want to differentiate their services and provide a proper quality of experience (QoE) for various application requirements. A wide set of QoS and HQoS features enable service providers to have granular control over the behavior of traffic and services in their networks, including WRED, multi-level queues, rate limiters and shapers. The T-Marc 3348S/SH supports multiple traffic engineering and dynamic signaling technologies, like LDP, BGP and RSVP-TE, so that providers are able to engineer data paths based on multiple attributes, while assuring that the requested paths can meet defined SLA requirements.

L3 Support

T-Marc 3348S/SH provides comprehensive solutions and services that best support IP (Internet Protocol) environment requirements– including Virtual Routing and Forwarding (VRF) support, IP static routing and dynamic routing protocols like OSPF and BGP. T-Marc 3348S/SH also supports Dynamic Host Configuration Protocol (DHCP) for dynamically distributing network configuration parameters, and Virtual Router Redundancy Protocol (VRRP).

Main Features

- 10GE aggregation and demarcation device
- 4x10GE + 12x1GE ports
- Carrier Ethernet, MPLS & IP transport technologies
- Layer 3 features support: HW-based L3 forwarding with VRF support using static route, OSPF, IS-IS and BGP routing protocols
- 52Gbps full-duplex (FD) platform
- Wire speed non-blocking switching capacity
- Supports a large number of services using HQoS
- Multiple resiliency mechanisms
- Extensive, field-proven service OAM

Advanced Hardware-based OAM over Carrier Ethernet & MPLS

By embedding a comprehensive set of OAM and SLA monitoring and testing tools in its hardware, the T-Marc 3348S/SH provides real-time accurate network measurements and service turn-up testing and verification, reducing truck rolls and shortening time for activation and management. The device supports a wide range of industry OAM standards, including link level IEEE 802.3ah EFM, 802.1ag Connectivity Fault Management (CFM) protocols and ITU-T Y.1731 loss and delay measurement, as well as Y.1731 SLM for E-LAN testing, and RFC2544 and Y.1564 and MEF46 Latching Loopback for service activation testing.

Carrier Grade Resiliency

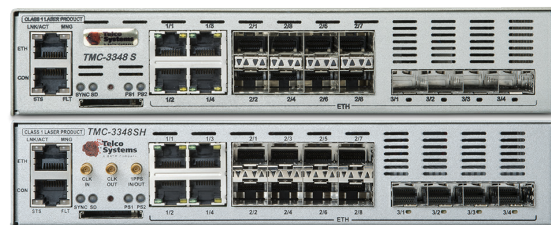
Telco Systems' T-Marc 3348S/SH provides carrier grade resiliency in physical design and by a variety of resiliency protocols. It is one of few 10GE devices that can provide a protected 10GE ring design (2x10GE east, 2x10GE west). With a high port count, the T-Marc 3348S/SH offers link-level protection mechanisms (Resilient link, LAG/MC-LAG, FRR, dual homing), network-wide mechanisms (xSTP, G.8032), and service-level mechanisms (G.8031).

Enhanced Synchronization and Timing

As part of the RAN evolution for LTE and LTE Advanced, backhaul networks require strict synchronization of both frequency and phase. T-Marc 3348S/SH provides Synchronous Ethernet (SyncE) optimized for the needs of mobile operators and mobile backhaul wholesale providers. T-Marc 3348SH offers additional BITs in/out clock interfaces and hardened temperature of -40°C to 65°C / -40°F to 149°F often needed for mobile backhaul applications.

SDN Support

T-Marc 3348S/SH provides full SDN support with comprehensive adoption of NETCONF, the network configuration protocol, and YANG, its data modeling language.



- SLA monitoring and assurance
- Time synchronization (SyncE)
- MEF, IEEE, ITU-T and IETF standards compliance for multi-vendor interoperability
- Integrated with EdgeGenie Service Management System – simplifying full lifecycle of network deployment
- BITs in/out interfaces support clock **
- Hardened temperature (-40°C to 65°C / -40°F to 149°F) **
- Small footprint, 1RU high, ½ shelf wide
- NEBS Level 1 compliant

Product Specifications

Hardware Characteristics	4 x 1000FX/10000BaseX SFP+ ports 8 x 100FX/1000BaseX SFP ports 4 x 10/100/1000BaseT RJ45 ports 1 x Console RJ45 port Non-blocking 52Gbps FD platform 19" rack and wall-mounting options
Services	MEF Services: E-LINE, E-LAN, E-TREE, and E-ACCESS L2 Services: IEEE 802.1Q bridging, IEEE 802.1ad Q-in-Q and TLS MPLS Services: VPWS, VPLS and HVPLS MPLS Signaling: RSVP-TE, BGP, LDP/T-LDP and Static MPLS IP Services: VRF-Lite, DHCP client/server, VRRP IP Routing: Static routing, OSPFv2, IS-IS and BGPv4
Timing	SyncE and clock BITS in/out interfaces**
Resiliency	Sub-50ms ITU-T G.8031, ITU-T G.8032, R-APS, STP/RSTP/MSTP, Sub-50ms Fast Ring, Sub-50ms FRR, HVPLS dual homing, secondary LSP, Resilient Link, LAG (static/IEEE 802.3ad LACP/Multi-Chassis), redundant AC/DC power supply
Quality of Service	Service classification per port/EVC/flow single/dual rate limiting, hierarchical rate limit per EVC. Hierarchical SP, DWRR and hybrid scheduling and shaping, with 8 queues per EVC / per port. CoS marking and mapping per EVC, flow control for congestion handling
Multicast Management	IGMP snooping v1/v2/v3, IGMP Proxy, Multicast VLAN registration (MVR)
OAM	IEEE 802.3ah EFM, Hardware-based IEEE 802.1ag CFM, OAM over VPLS, MPLS Ping
Testing & Monitoring	Hardware-based ITU-T Y.1564 and RFC 2544 test head, loopback and service performance analyzer, MEF46 Latching Loopback controller and responder, ITU-T Y.1731 PM, SM and SLM, Per-port/EVC/VLAN/COS, hardware-based MAC Swap loopbacks, TWAMP w/auto-testing
Management	Console, Telnet, SSHv2, RADIUS, TACACS+, SNMP v1/2/3, xFTP, NTP, DHCP client/server, Zero Touch Provisioning
Security	ACLs, RADIUS, SSHv2, SNMPv3, SFTP, port security, broadcast storm prevention, secured access, ARP protection
General Specifications	Dimensions: (H) 1RU 1.75" (W) 8.7" (D) 9.25" (44 mm x 221 mm x 235 mm) Weight: 2.42 lbs. (1.1 kg) Operating Temperature: T-Marc 3348S: 0°C to 50°C / 32°F to 122°F T-Marc 3348SH: -40°C to 65°C / -40°F to 149°F Humidity: 5% to 95% non-condensing Input power: 100-240 VAC, 50/60 Hz -24/48VDC to -72VDC
Regulatory and Environmental Compliance	Safety: NRTL certified: C-UL 60950, CSA 22.2 No. 950, EN/IEC 60950, TUV/GS (EN60950),CB, EN 60825-1/2 EMC: CE Mark: EN50081-1: EN55022 Class A, EN60555-2/3; North America: FCC 47 CFR Part 15 Class A; ICES-003 Issue 4 Class A (Canada); Japan: VCCI Class A; Australia/NZ: CISPR 22 Class A Immunity: EN50082-1, EN/IEC 61000-4-2/3/4/6/11 RoHS Compliant, NEBS Level 1 Compliant

Key Applications

- Mobile backhaul and mobile backhaul wholesale that requires more than 1GE uplinks
- Small cell mobile backhaul mini aggregator
- Pre-aggregation device with advance security separation
- SDN networks with NETCONF/YANG support
- Business services – MTU or high capacity site NID
- Private cloud demarcation gateway
- E-NNI for service providers' inter-connection & exchanges
- High resiliency networks
- OAM monitored networks for SLA assurance
- Advanced automatic traffic engineered (TE) networks

Ordering Information

Part Number	Description
TMC-3348S-2AC-x	Ethernet/MPLS/IP 10G Demarcation: 4 x 10/100/1000Base-T UNI/NNI, 8 x 100Base-FX/1000Base-X UNI/NNI, 4 x 1000Base-FX/10000Base-X (SFP+) UNI/NNI (Activation license required for ports 3 & 4 by LIC-3348-10G-2PORT), 1 x RJ-45 ASCII management console port; 1 x RJ-45 ASCII out of band management port; 2 x Internal AC power supplies; SyncE support.
TMC-3348S-2DC	Ethernet/MPLS/IP 10G Demarcation: 4 x 10/100/1000Base-T UNI/NNI, 8 x 100Base-FX/1000Base-X UNI/NNI, 4 x 1000Base-X/10000Base-X (SFP+) UNI/NNI (Activation license required for ports 3 & 4 by LIC-3348-10G-2PORT), 1 x RJ-45 ASCII management console port; 1 x RJ-45 ASCII out of band management port; Dual feed 24/DC power supplies; SyncE support.
TMC-3348SH-2DC	Ethernet/MPLS/IP 10G Demarcation: 4 x 10/100/1000Base-T UNI/NNI, 8 x 100Base-FX/1000Base-X UNI/NNI, 4 x 1000Base-X/10000Base-X (SFP+) UNI/NNI (Activation license required for ports 3 & 4 by LIC-3348-10G-2PORT), 1 x RJ-45 ASCII management console port; 1 x RJ-45 ASCII out of band management port; Dual feed 24/DC power supplies; SyncE support, with the addition of BITS in/out interfaces support clock and hardened temperature (-40°C to 65°C / -40°F to 149°F)
LIC-3348-10G-2PORT	Activation license for 2 x 1000/10000Base-FX/10000Base-X (SFP+) UNI/NNI

'x' specifies power supply and cord types: NA for North America, EUR: for Europe, UK: for United Kingdom

**Relevant for the TMC-3348SH only