

T-Marc 3312SC/SCH

Ethernet/MPLS/IP and TDM CES Business services NID



Telco Systems' T-Marc 3312SC/SCH Ethernet/MPLS/IP and TDM CES Demarcation device offers an all-in-one solution that meets the increasing challenge of modern L2/L3 services as well as extending TDM circuits over packet networks. T-Marc 3312SC/SCH supports IEEE802.1q, Q-in-Q and MPLS transport technologies, providing high flexibility in network design and future proofing the network with no additional software licenses. It provides access to advanced data services such as virtual private wire services (VPWS), VPLS and HVPLS, and MPLS L3VPN simplifying the network and making it easier to manage, while gaining MPLS added value.

The T-Marc 3312SC/SCH offers one of the densest demarcation devices on the market, incorporating high capacity in a compact "shoe-box"

size (1RU by ½RU width), with 4 x 10/100/1000BaseTx, 8 x dual-speed (100M/1G) fiber ports and 8 x E1/T1 Circuit Emulation Service (CES) ports for 2G/3G and TDM circuits migration. The T-Marc 3312SC/SCH (48VDC) making it optimal for telecom environment deployments. T-Marc 3312SCH is the same product as the T-Marc 3312SC, with the addition of BITS in/out interfaces support clock and hardened temperature (-40°C to 65°C / -40°F to 149°F).

CIRCUIT EMULATION AND TIME SYNCHRONIZATION SUPPORT

The T-Marc 3312SC/SCH enables service providers to carry native TDM traffic transparently across packet-switched networks (PSN) using various circuit emulation techniques required when converging and migrating 2G and 3G to 4G and newer IP-based mobile technologies.

T-Marc 3312SC/SCH supports Synchronous Ethernet (SyncE), adaptive clocking and clock distribution from one source to another, enabling mobile operators to achieve a solution which can handle the current frequency synchronization requirements needed for 2G/3G deployments.

FLEXIBLE CONTROL OF TRAFFIC AND SERVICES

To allow providers to cope more efficiently with the increased demand for bandwidth and a more diverse range of services, the T-Marc 3312SC/SCH embeds sophisticated and flexible QoS and HQoS capabilities, such as hierarchical queuing, rate limiting and traffic shaping, advanced scheduling schemes, and intuitive service-oriented SLA configurations. This allows providers to benefit from the multiplexed nature of Carrier Ethernet, while assuring SLA requirements during traffic congestion.

As an MPLS demarcation device, the T-Marc 3312SC/SCH supports various traffic engineering technologies like LDP and RSVP-TE. These technologies allow providers to engineer data paths based on several attributes, while offering the highest level of protection and assuring that the requested paths can meet the defined SLA requirements. They also ensure fast switchover time to minimize

degradation or the interruption of services in case of failure, and provide high availability and sub-50ms resiliency using G.8032, FRR, and Fast Ring standards.

OAM SUPPORT

The T-Marc 3312SC/SCH supports a broad set of hardware-based OAM tools to help providers reduce their OPEX and to assure their customers they are meeting the agreed SLA. It supports IEEE 802.1ag Connectivity Fault Management (CFM) and

ITU-T Y.1731 allowing service providers to monitor services end-to-end, identify connectivity and performance issues and to isolate problems from a remote location without truck rolls. The device also supports IEEE 802.3ah EFM-OAM at the link-level, and complies with MEF requirements, definitions and monitoring. Using RFC 2544 based embedded test heads and Y.1564 EtherSAM, and MEF46 Latching Loopback the T-Marc 3312SC/SCH enables providers to test services remotely from a central office, thereby reducing costly truck rolls, saving OPEX, and improving service quality.

SDN SUPPORT

T-Marc 3312SC/SCH provides full SDN support with comprehensive adoption of NETCONF, the network configuration protocol, and YANG, its data modeling language.

MAIN FEATURES

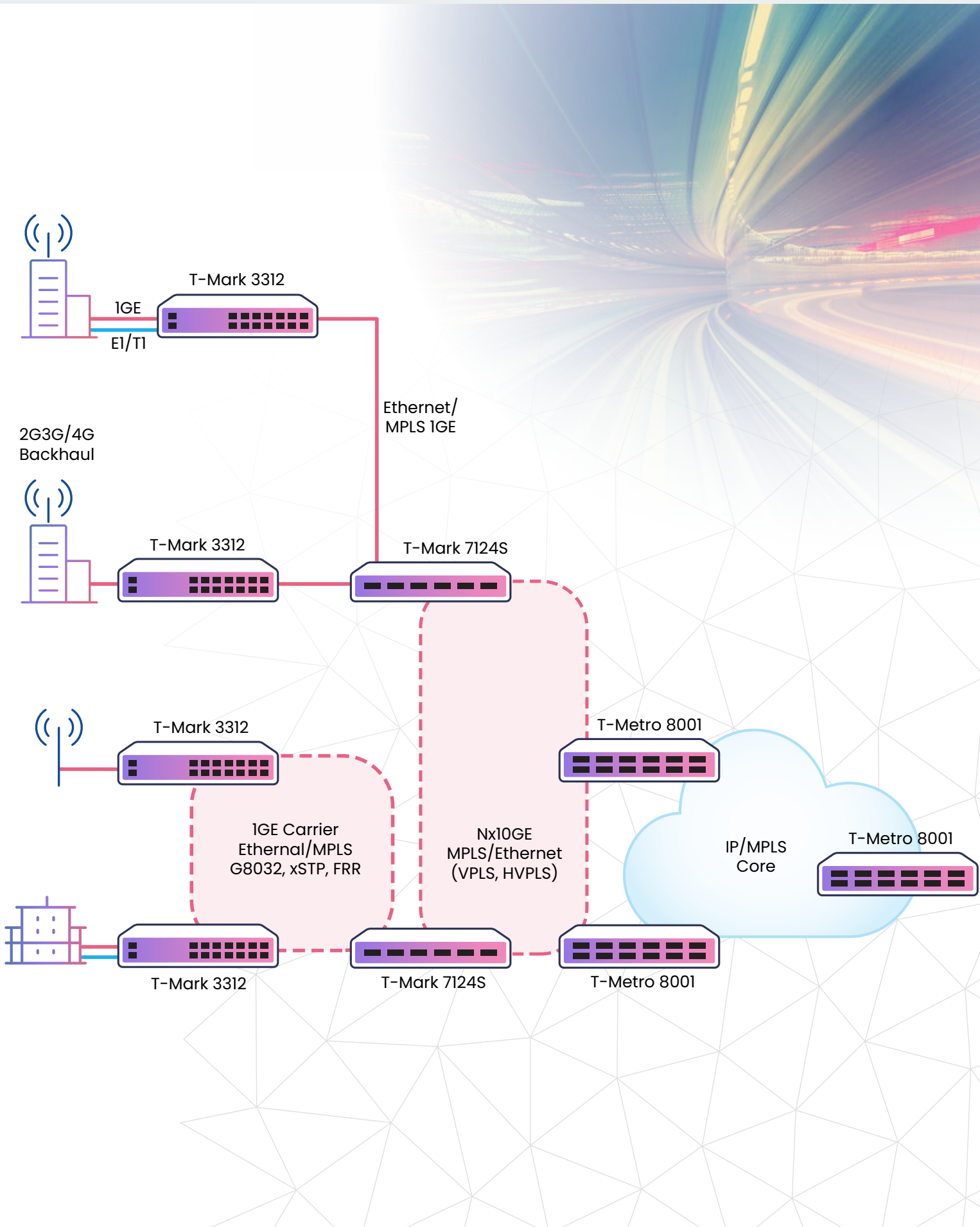
- Mobile backhaul 2G/3G/4G optimized demarcation device
- Premium Carrier Ethernet, MPLS & IP and I2/L3 VPN service demarcation device
- Wire speed, non-blocking switching
- Support for high amounts of service using Hierarchical QoS (HQoS)
- Multiple resiliency mechanisms
- Extensive, field-proven, OAM support
- Circuit Emulation Services (CES) for TDM over packet
- MEF, IEEE, ITU-T and IETF standards compliance
- Multi-vendor interoperable
- Integrated with EdgeGenie Service Management System – simplifying full lifecycle of network deployment
- BITS in/out interfaces support*
- Hardened temperature (-40°C to 65°C / -40°F to 149°F)*
- Small footprint, 1RU high, ½ shelf wide

ABOUT TELCO SYSTEMS

Telco Systems delivers a portfolio of Network Edge (Carrier Ethernet and MPLS) demarcation, aggregation, and uCPE solutions that enables service providers to create intelligent, service-assured, CE 2.0-compliant networks for mobile backhaul, business services, and cloud networking. Telco Systems end-to-end Ethernet, SDN/NFV-ready product portfolio delivers significant advantages to service providers, utilities, and city carriers competing in a rapidly evolving telecommunications market. Telco Systems is a wholly owned subsidiary of BATM Advanced Communications.

To learn more, visit Telco Systems at <http://www.telco.com>

TELCO SYSTEMS NETWORK MANAGEMENT SYSTEMS



PRODUCT SPECIFICATIONS

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|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hardware Characteristics | 8 x 100FX/1000BaseX SFP ports 4 x 10/100/1000BaseT RJ45 ports 8 x T1/E1 ports using TDM CES 1 x Console RJ45 port Non-blocking 13Gbps Full-Duplex platform 19" rack and wall-mounting options |
| Services | MEF Services: E-LINE, E-LAN, E-TREE, & E-ACCESS (MEF CE 2.0) 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 L3 Services: VRF, VRF-Lite, DHCP client/server, VRRP, L3 VPN IP Routing: Static routing, OSPF, IS-IS and BGP CES: SAToP, CESoPSN, CESoMPLS |
| Timing | SyncE, adaptive clocking, and BITS in/out interfaces* |
| Resiliency | Sub-50ms 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/MC-LAG), BFD, redundant AC/DC power supply |
| Quality of Service | Service classification per port/EVC/flow single/dual rate limiting, hierarchical rate limit per EVC. Hierarchical QoS. Support multi-level SP, WRR and hybrid frames scheduling, 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 Part Number Description SLM support, per-port/EVC/VLAN/COS, hardware-based MACSwap loopbacks, TWAMP w/auto-testing |
| Management | Console, Telnet, SSHv2, RADIUS, TACACS+, SNMP v1/2/3, xFTP, NTP, SD card, DHCP client/server, and Zero Touch Provisioning |
| Security | ACLs, RADIUS, SSHv2, SNMPv3, SFTP, port security, broadcast storm prevention, secured access, ARP protection |
| General Specifications | Dimensions (H x W x D): 1.75" (IRU) x 8.7" x 9.25" (44mm x 221mm x 235mm) Weight: 2.42 lbs (1.1 kg) Operating Temperature: 0°C to 50°C / 32°F to 122°F and -40°C to 65°C / -40°F to 149°F for the TMC-3312SCH Storage temperature: -25°C to 70°C / -13°F to 158°F Humidity: 5% to 95% non-condensing Input power: 100-240 VAC, 50/60 Hz / -24VDC to -72VDC |
| Regulatory 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 |
| Regulatory Compliance | NEBS Level 1 compliant North America and Canada EMI - FCC Part 15 Class B Safety - UL1950, cUL 60950 CSA 22.2 No. 950 International EMI - EN55022 Class B Immunity - EN50082-1 Safety - EN 60950, AS/NZS 60950-1:2003/A1:2006/ RoHS and REACH compliant |

KEY APPLICATIONS

- MEF CE 2.0 certified
- Business L2/L3 VPN combined with TDM circuits emulation
- Mobile backhaul – MPLS/Ethernet cell site gateway
- Quality of Service
- Converged multi mobile generation TDM & IP demarcation
- Business services – MTU or site NID combining TDM services
- SDN networks with NETCONF/YANG
- Multi-service multiplexing for different customers and services while ensuring service separation
- Scalable HQoS applications (Ethernet and MPLS)
- High resilience-based network
- OAM monitored network for SLA assurance

ORDERING INFORMATION

| Part Number | Part Number |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TMC-3312SC-2AC-x | NextGen Ethernet/MPLS/IP Mobile Backhaul Demarcation: 4 x 10/100/1000Base-T UNI/NNI, 8 x 100Base-FX/1000Base-X UNI/NNI, 8 x T1/E1 CES (RJ-45), 1 x RJ-45 ASCII management console port; 2 x internal AC power supplies; SyncE support. |
| TMC-3312SC-2DC | NextGen Ethernet/MPLS/IP Mobile Backhaul Demarcation: 4 x 10/100/1000Base-T UNI/NNI, 8 x 100Base-FX/1000Base-X UNI/NNI, 8 x T1/E1 CES (RJ-45), 1 x RJ-45 ASCII management console port; 2 x internal DC wide range (-24 VDC -72 VDC) power supplies; SyncE support. |
| TMC-3312SH-2DC | NextGen Ethernet/MPLS/IP Mobile Backhaul Demarcation: 4 x 10/100/1000Base-T UNI/NNI, 8 x 100Base-FX/1000Base-X UNI/NNI, 8 x T1/E1 CES (RJ-45), 1 x RJ-45 ASCII management console port; 2 x internal DC wide range (-24 VDC -72 VDC) 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) |

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

*Relevant for the TMC-3312SCH only