Telco Systems
A BATM Company

T-Marc® 3208SH

Advanced Wireless Backhaul Demarcation

The T-Marc 3208SH service demarcation device is a temperature-hardened, Carrier Ethernet demarcation device to enable service providers and wireless operators to backhaul traffic from multiple 2G, 3G and 4G cell sites over Carrier Ethernet.

This device supports a wide variety of technologies including Ethernet, pseudowire and TDM emulation using Circuit Emulation Services (CES), MPLS, OAM tools and H-QoS. This combination of features, technologies and manageability allows service providers to extend the service intelligence to the customer edge offering and maintaining advanced SLAs, thus providing them competitive advantage.

The T-Marc provides access to advanced data services such as virtual private LAN services (VPLS), virtual private wire services (VPWS) and IP virtual private network (IP-VPN) services.

In addition, the T-Marc product line enables service providers to carry native TDM traffic transparently across the packet switched network (PSN), using various circuit emulation techniques. The TDM traffic is encapsulated in Ethernet or IP frames to emulate the functionality of a TDM circuit, ensuring that all original feature-set is preserved.

The T-Marc 3208SH enables traffic sorting, switching and aggregation, supports triple-play service and broadband accesss and aggregation, offers hub and spoke Layer 2 fiber aggregation capabilities, and creates a metro Ethernet extension for leased line replacement.

Enhanced Synchronization and Timing

The 3208SH provides a comprehensive set of synchronization options optimized for cellular operators looking to backhaul their data and voice traffic from the Node-B\BTS to their core network over Ethernet\MPLS transport.

The device supports Synchronous Ethernet (SyncE), IEEE 1588v2, external clock and phase source via BITS interfaces and clock distribution from one source to another for all source types. This flexibility allows any cellular operator to achieve a synchronization solution suitable for his own needs.

Flexible Control of Traffic and Services

A wide set of QoS and H-QoS features enable the service provider to have a granular control over the behavior of traffic and services in the network. Service multiplexing enables service providers to deliver multiple, isolated, services on a per-port and/or a per-flow basis. Provisioning, monitoring and troubleshooting of each individual service can be done without impacting other services.

The 3208SH supports industry-standards IEEE 802.1ag Connectivity Fault Management (CFM) and ITU-T Y.1731 allowing the service provider to monitor end-to-end services, identify connectivity and performance issues and isolate the problem from a remote location without track rolls.

In addition, the 3208SH delivers a comprehensive set of security features for authentication, connectivity and access control. This essential combination of QoS, security and multicast features allows the service provider to successfully deploy triple-play services.

Carrier-class Design

The 3208SH offers the carrier an ideal solution, incorporating high capacity in a compact size (only 1.5RU in height, 10" in depth). The 3208Sh supports 8 dual PHY Gigabit Ethernet interfaces, 4 dual-speed (100/1000) Ethernet plug-in (SFP) ports, Sync Clock and Phase Clock Coaxial interfaces and two expansion slots for add-on line cards. The 3208SH supports hot-swappable, redundant power supplies (either AC or DC) and hot-swappable fan-tray.

The 3208SH boasts a wide variety of resiliency protocols. It offers link-level mechanisms such as Resilient-link and LAG with LACP, network-wide mechanisms such as MSTP, G.8032 and FRR and service-level mechanisms such as G.8031.

The 3208SH is fully manageable via SNMP or CLI with either In-band (IB) or Out-of-Band (OOB) management tools. The CLI complies with the de-facto industry standard.

Telco Systems' EdgeGenie Service Management Platform simplifies management of the full lifecycle of network deployment from planning to managing, monitoring and maintaining Ethernet services.

- **Gigabit Ethernet, wire speed non-blocking Carrier Ethernet Service Demarcation Switch**
- **Purpose-built, highly available, temperature-hardened Carrier Ethernet equipment**
- **MEF, IEEE, ITU-T and IETF standards compliance for multi-vendor interoperability**
- **EdgeGenie Service Management for full lifecycle support of Ethernet Services**
- **Embedded BiNOX Operating System - learn once for all our platforms**
- **Circuit Emulation Services (CES) for delivery of traditional TDM or leased line services**
- **MPLS capabilities to provide access to H-VPLS and VPWS**
- **Hierarchical Quality-of-Service (HQoS) and service granularity support**
- **Extensive field-proven Operations, Administration and Maintenance (OAM) support**
- **Ideal for street cabinet installations**
  - Extended operating temperature: -40°C to 70°C (-40°F to 158°F)
  - Compact size (ETSI 300 compliant) 1.5RU height, 10" deep, 19" rack mountable

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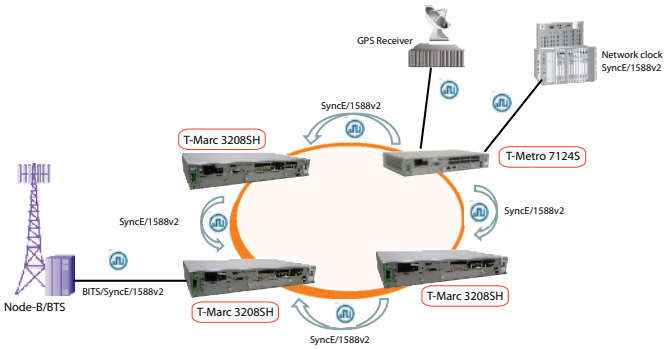

Key Applications

- **Wireless backhaul (LTE, UMTS, GSM, Wi-Fi)**
- **Triple-play service and broadband access/ aggregation**
- **Hub & spoke Layer 2 fiber aggregation**
- **Multi-tenant, multi-service H-VPLS spoke (using MPLS or Q-in-Q)**
- **Cost-effective, Metro Ethernet access and aggregation**
- **Metro Ethernet extension and leased line replacement**

Specifications

Standards and Certifications

MEF 18: SAToP, CESoPSN
IEEE 802.1D; IEEE 802.1Q; IEEE 802.1P; IEEE 802.1ad
IEEE 802.1p Priority Queuing; IEEE 802.1u-2001
IEEE 802.3x PAUSE: flow control and back pressure
IEEE 802.1x; IEEE 802.3ad
IEEE 802.1d, IEEE 802.1w, IEEE 802.1s
IEEE 802.3; 802.3u; 802.3z; 802.3ab Ethernet
IEEE 802.3ah EFM-OAM
IEEE 802.1ag CFM
IEEE 1588v2 P-t-P timing
ITU-T G.8261/2,4 ITU-T G.781 Synchronous Ethernet
ITU-T Y.1731
ITU-T G.8031
ITU-T G.8032
ANSI*: ANSI T1.102, ANSI T1.105, ANSI T1.107, ANSI T1.403, ANSI T1.404, ANSI T1.231
Bellcore*: GR-253-CORE, GR-499-CORE, GR-1244-CORE,
ITU-T*: G.703, G.704, G.706, G.707, G.732, G.775, G.781, G.783, G.813, G.821, G.823, G.824, G.825, G.826, G.831

Interfaces

Flexible Ethernet combo-port interfaces
- Fiber SFPs (100M and 1000M)
- Dual-rate copper SFPs (100/1000M)
- Single-rate copper SFPs (1000M)
- Pluggable optics with comprehensive SFP diagnostics
- Sync Clock (2 x In, 1 x Out) Coaxial "1.0/2.3 R/A" interfaces
- Phase Clock (2 x In, 1 x Out) Coaxial "1.0/2.3 R/A" interfaces

Jumbo frames up to 9216 bytes
ASCII/RJ-45 management ports

Security Features

Secure management protocols
- SNMPv3, SSHv2

Wirespeed Access control lists: Layer-2/3/4 and policy-enabled Management VLAN
RADIUS and TACACS+ authentication
*Using add-on line-card and future SW update

Layer 2 Features

32k MAC addresses
802.1p, ToS, and DiffServ classification and remarking
Full range of IEEE 802.1Q based VLANs
Rate-limiting for bandwidth allocation
Transparent LAN Services
IGMP Snooping
Port mirroring

MPLS Features

H-VPLS spokes
Ethernet and TDM pseudowire emulation (PWE3) using Martini tunnels
Dual homing with active and guarded LSPs
LSR functionality including FRR
RSVP-TE and OSPF-TE

CES Features*

Structured agnostic traffic over packet (SAToP)
CES over packet switched networks (CESoPSN)
T1/E1 – Clear and Channelized (Nx64kbps, NxT1/E1)
T3/E3 – Clear and Channelized (Nx64kbps, NxT1/E1, NxT3/E3)

Traffic Management Features

QoS with ToS, and Differentiated Services
Hierarchical QoS (H-QoS)
Eight system-wide traffic classes with flexible hybrid scheduling.
Classification by:
- Ingress interface, or port
- Ingress/egress rate limiting and egress shaping
- Source and/or destination MAC address
- IEEE 802.1ad priority code points (PCP)
- IPv4 TOS/DSCP field
- 2 rate 3 color (CIR/EIR) rate limiting

Congestion avoidance:
- Tail drop
- Weighted Random Early Detection (WRED)

Protection Features

Resilient Link
Fast-Ring with sub 50ms switchover in fiber Ethernet rings
ITU-T G.8031 / ITU-T G.8032
Link aggregation groups, including LACP with MAC address-based distribution
STP/RSTP/MSTP

Management and OAM Features

Element management system
- EdgeGenie Service Management
- BiNOCenter™ NG

Multiple management access protocols and tools
- SNMPv1/v2c/v3; Telnet, SSHv2, TFTP, NTP
- DHCP (client)
- SYSLOG
- NETCONF/YANG

IEEE 802.3ah EFM-OAM; IEEE 802.1ag CFM; ITU-T Y.1731; RFC 2544
Embedded command line interface (CLI)
Direct IP-based management mode
RMON Group 1, 3, 4, and 10

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
RoHS Compliance

General Specifications

Dimensions (W x H x D):
483 mm (19") x 67 mm (2.625") x 253 mm (10")
Weight: 5.2 kg (11.5lb)
Operating Temperature: -40°C to 70°C (-40°F to 158°F)
Humidity: 5% to 95% non-condensing
Input power: 100-240 VAC, 50/60 Hz
-36VDC to -72VDC

Ordering Information

Part Number	Description
TMC-3208SH-AC-x*	T-Marc 3208SH Base System inc. Fan Tray, One (1) AC PSU, Blanking Plates (PSU & Module Slot), Accessory Pack, Console Management Cable and AC Power Cord
TMC-3208SH-DC	T-Marc 3208SH Base System inc. Fan Tray, One (1) DC PSU -48Volt with DC feed connector, Blanking Plates (PSU & Module Slot), Accessory Pack, Console Management Cable
LC-3208-8xT1\E1	Plug-in Line Card with 8 x T1\E1 RJ-45c CES interfaces (up to 2 line-card per T-Marc 3208SH system)

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

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