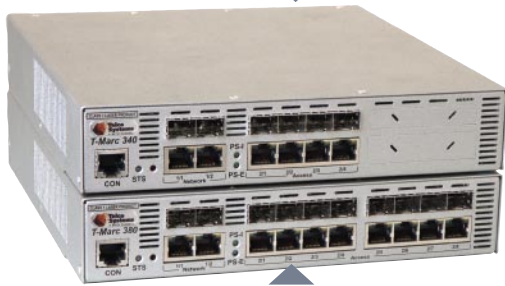# T-Marc® 300 Series

Ethernet Service Demarcation and Extension Solution

T-Marc 340: 6 (4+2) Multi-speed Combo Ethernet Ports

T-Marc 380: 10 (8+2) Multi-speed Combo Ethernet Ports

The T-Marc® Ethernet Service Demarcation and Extension product line from Telco Systems® provides intelligent and remotely managed, multi-port customer-located equipment (CLE) to deliver managed converged services (voice, video and data) over virtual Ethernet, MPLS/VPLS and IP networks. The T-Marc allows service providers to deliver multiple services on separate customer interfaces, including multiple services over a single customer interface. Because each service is isolated, providers can troubleshoot each individual service without impacting others.

Applications are prioritized over different traffic-engineered paths, multi-level Operations, Administration and Maintenance (OAM) is used to measure and ensure provisioned Service Level Agreements (SLA), and security controls are embedded to ensure protection against denial-of-service attacks.

Advanced Layer 2 Networking using Telco Systems' AccessEthernet™ allows total flexibility in deployment, provisioning, and delivery of Ethernet services. Physical and virtual networking capabilities provide automated address management and discovery, bandwidth profiles, advanced traffic classes, and complete control over how subscriber traffic is transported across a service provider's network.

Advanced Networking Features

The T-Marc 300 series offers a rich management toolset for multi-vendor interoperability in element, network and service management to reduce operational expenses (OPEX) and scale management to large access networks.

By augmenting existing IP/SNMP-based management frameworks with IEEE/ITU-T OAM protocols and MEF frameworks, the T-Marc family provides proactive health and status updates on network topology and application behavior.

Multi-level management provides unprecedented flexibility and scalability in the management of Ethernet services. Telco Systems' EdgeGenie Service Management Platform simplified management of the full life cycle of network deployment from planning to managing, monitoring and maintaining Ethernet services.

To reduce operational expenses and scale management to large access networks, existing standards-based SNMP management is coupled with a secure IP-based proxy management solution to provide proactive health and status information on individual links and connections.

Standards-based management enables service providers to use any off-the-shelf management system to manage a T-Marc device as an independent network element with its own IP address.

RFC 2544-based embedded test head and patent-pending Logical Services Loopback (LSL) provide end-to-end service level verification across multiple providers to support individual service level agreements.

Multi-layer OAM based on IEEE 802.3ah (link), IEEE 802.1ag (connectivity), ITU-T Y.1731 (fault and performance), IEEE 1588v2 PTP, and MEF OAM (services) provides unprecedented in-service monitoring, troubleshooting and fault isolation in multi-vendor networks.

Enhanced troubleshooting tools include optical power monitoring, quality of equipment monitoring, and quality of line monitoring to enable fast fault identification that minimizes the need for expensive truck rolls.

- **Managed multi-service integration demarcation for converged services (voice, video and data)**
- **AccessEthernet™ Networking for advanced MEF-compliant and emerging IEEE-based Services**
- **Application-aware Networking for Business-centric Services**
- **Policy-aware, Zero-touch Provisioning for drop-ship deployment**
- **EdgeGenie Service Management for full lifecycle management of Ethernet services**
- **Multi-link OAM for flexible in-service operation: IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731 and MEF SOAM**
- **Multi-layer control, monitoring, line testing and loopback for fail-safe operation**
- **Embedded RFC 2544-based Service Performance Analyzer for transparent service turn up and qualification**
- **Combo Ethernet Ports for deployment flexibility and reduced sparing**
- **Jumbo frame support (9216 bytes)**
- **Redundant uplinks for protected Services and Link Aggregation**
- **Redundant powering capability**
- **Purpose-built technology for optimized CAPEX and OPEX**
- **Certified to MEF 9 and MEF 14 for Ethernet Services at the UNI; IEEE, and ITU-T standards compliance for multi-vendor interoperability**

T-Marc® 300 Series

Ethernet Service Demarcation and Extension Solution

Per Service End-to-End Service Assurance
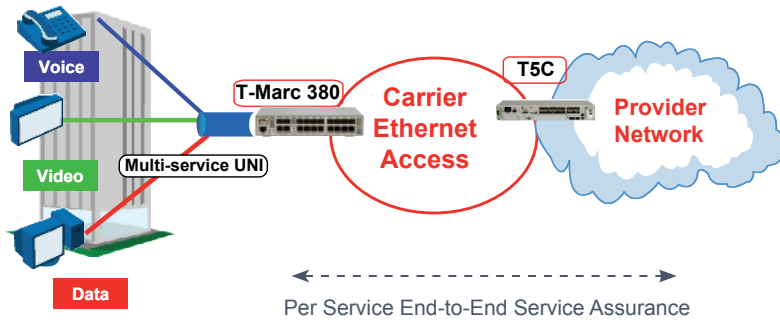
Key Applications

- Copper and Fiber Ethernet-based Demarcation between Service Provider and Enterprise Networks
- Copper and Fiber Ethernet-based Service Extension between Service Provider and Enterprise Networks
- Enterprise/SMB/Home Business: Multi-tenant Unit (MTU), and Multi-dwelling Units (MDU)
- Industrial Parks, FTTx
- Inter-Provider Demarcation
- High-performance Private-LAN and Private-Line
- Ethernet VPN and Transparent LAN Service (TLS)

Specifications

Standards and Certifications
- MEF 9: EPL, EVPL, ELAN
- MEF 14: EPL
- IEEE 802.1D; IEEE 802.1Q; IEEE 802.1P
- 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 802.3; 802.3u; 802.3z Ethernet
- IEEE 802.3ah OAM ; IEEE 802.1ag CFM; ITU-T Y.1731
- IEEE 802.1ab Link Layer Discovery Protocol (LLDP)
- IEEE 1588v2 Precision Time Protocol (PTP)
- ITU-T G.8031 (ELPS)
- NEBS Level 3 compliant

Interfaces
Flexible Ethernet combo-port interfaces
- Dual-speed (100M and 1000M) fiber interfaces
- Pluggable optics, including CWDM
- Tri-speed (10/100/1000M) copper interfaces

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

Traffic Management Features
Eight system-wide traffic classes with flexible hybrid scheduling. Classification by:
- Ingress interface, or port
- Source and/or destination MAC address
- IEEE 802.1ad priority code points (PCP)
- IPv4 TOS/DSCP field
- IPv6 Type of Service (ToS)

Hierarchical QoS

Layer 2 Features

Layer-2 performance
- T-Marc 340: up to 8.9286 Mpps
- T-Marc 380: up to 14.881 Mpps

IEEE 802.1D, 802.1Q, 802.1ad Bridging
- Transparent LAN Service (TLS): Q-in-Q-based
- 4095 system-wide VLAN space
- 16K MAC address forwarding table
- Port-based VLANs and Super VLANs

Layer Two Control Protocol (L2CP) Tunneling
   Tunneling including xSTP & PVST+
Per-port, per-service, flexible MAC-based loopbacks
Response Time Reporter (RTR)

MEF networking features
Ethernet Service Definition, Phase 2
- E-Line (EPL and EVPL) and E-LAN (ELAN) services
- Flexible CE traffic bundling options: one, some, few, all
- Service multiplexing: 127 services per device
- Point-to-point topologies
- Per-UNI, per-EVC and per-COS dual-rate, three-color marker ingress bandwidth profiles (policing) with 1 Mbps rates increments and programmable burst capability

UNI Type 1, 2 and MEF SOAM

Protection Features
Resilient Link
Link aggregation groups, including LACP with MAC and IP address-based distribution
Sub-50mS convergence via augmented RSTP
STP, RSTP & MSTP network-wide resiliency
End-to-end service level protection using Ethernet Linear Protection Switching (ELPS) ITU-T G.8031

Security Features

Secure management protocols (SNMPv3, SSHv2)
Access control lists: L2, L3 and policy-enabled
Denial of service prevention
Management VLANs
RADIUS, TACACS+ and IEEE 802.1X authentication

Management and OAM Features
Element management systems
- NetBeacon ESP
- EdgeGenie Service Management
- BiNOSCenter NG / Proxy-based management

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

Embedded command line interface (CLI)
Direct IP-based management mode
RFC-2544-based embedded service performance analyzer
Connectivity fault management, performance and services management
- IEEE 802.1ag/ ITU-T Y.1731-based throughput measurement, frame loss ratio, delay and delay variation
- IEEE 1588v2 PTP for one-way delay and delay variation measurements

RMON Group 1, 3, 4, and 10

Regulatory Compliance
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/
A2:2008/A3:2008

Physical Specifications
Dimensions:	(H) 1RU 1.75" (44 mm)
	(W) 8.7" (221mm)
	(D) 9.25" (235 mm)
Weight:	2.42 lbs (1.1 kg)
Installation:	Wall/Desk/Rack Mount
Power:	100/240V AC Input +
	Load Sharing 12V DC Input
	-48V DC Input +
	Load Sharing 12V DC Input
Operating temp.:	0°C to 50°C (32°F to 122°F)
Relative humidity:	10% to 90% non-condensing

Short term extended temperature:
   -20º C to 60º C (-4˚F to 140˚F)

Ordering Information

Note: 'z' specifies power supply and cord types: NA for North America, EUR for Europe, UK: for United Kingdom, DC for DC, AC for no power cord

Part Number	Description
TMC-340-z	Managed Ethernet Service Demarcation and Extension system: 2 x 10/100/1000Base-T or 100Base-FX/1000Base-X combo SFP* network ports 4 x 10/100/1000Base-T or 100Base-FX/1000Base-X combo SFP* access/user ports 1 x RJ-45 ASCII management console port; Internal power supply; AccessEthernet and service assurance; Optional external redundant power supply
TMC-340-2DC	Same as TMC-340 but with dual feed, internal DC power supply; no optional external power supply
TMC-380-z	Same as the TMC-340 but with 8 access/user ports
TMC-380-2DC	Same as TMC-380 but with dual feed, internal DC power supply; no optional external power supply
* SFPs not included. Call for options.	