

## T5C-XG™

Multilayer 10 Gigabit Ethernet Service Switch



The T5C-XG multilayer Ethernet switch offers the high performance, availability and form factor to make it ideal for broadband triple-play service aggregation and business Ethernet services.

The T5C-XG utilizes Telco Systems' Internetworking Operating System (BiNOS®) to provide the robust administration, management, QoS, and security performance requirements demanded by Carrier Ethernet networks.

T5C-XG's service multiplexing capability 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 T5C-XG offers the carrier an ideal solution, incorporating high capacity in a compact size (only 1.5RU in height, 10" in depth). T5C-XG supports 24 Gigabit Ethernet (SFP) ports, two 10Gigabit Ethernet XFP ports and an expansion slot that houses two 10Gigabit Ethernet ports on an expansion module. The T5C-XG supports hot-swappable, redundant power supplies (either AC or DC) and hot-swappable fan tray.

The T5C-XG 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 STP, RSTP, MSTP and Fast-Ring and end-to-end service level G.8031 Ethernet Linear Protection Switching (ELPS) that delivers a carrier grade OAM-based protection per service. G.8031 can perform a switchover from the primary service EVC to the backup service EVC based either on signal-fail (SF) or signal degrade (SD).

The T5C-XG provides a wide set of QoS features that enables the service provider to have a granular control over the behavior of traffic and services in the network. In addition, the T5C-XG 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.

The T5C-XG supports industry-standards OAM tools including IEEE 802.1ag Connectivity Fault Management (CFM) and IEEE 802.3ah Ethernet First Mile (EFM-OAM). The IEEE 802.1ag CFM protocol provides a set of tools allowing the service provider to monitor end-to-end services, identify connectivity issues and isolate the problem from a remote location without truck rolls. IEEE 802.3ah EFM allows the service provider to monitor the link between the customer equipment and the service provider network and use remote loopbacks and remote failure indication in order to identify a problem and pinpoint its exact location in the first mile.

Another key advantage of the T5C-XG is the **Service Mediator**, a distributed software solution that is embedded in the Company's T-Marc® demarcation devices and T5C-XG aggregation switches. BiNOS Service Mediator automates IP management to make the network more secure and scalable.

BiNOS Service Mediator consists of manager and agent components, which reside in the T5C-XG aggregation switch and T-Marc demarcation devices. The BiNOS Service Mediator manager 'listens' for agent requests from T-Marc devices at customer sites. Once discovered, the mediation manager updates BiNOSCenter NG management system with new devices. Since the management system operates and monitors on the point of aggregation rather than each individual end point, decreased messaging and information aggregation dramatically increase system performance and reduce utilization. The authentication protocol between the Service Mediator manager and client ensures a secure demarcation point.

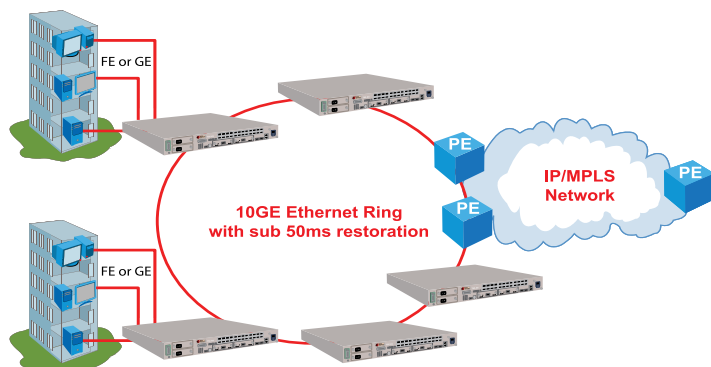
T5C-XG is fully manageable via SNMP or CLI with either In-band (IB) or Out-of-Band (OOB) management tools. The CLI complies with the de-facto industry standard.

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

- 10 Gigabit Ethernet, wire-speed, non-blocking, Carrier Ethernet service switch
- Purpose-built, highly available Carrier Ethernet equipment
- MEF, IEEE, ITU-T and IETF standards compliance for multi-vendor interoperability
- Ethernet service management supported through EdgeGenie Service Management Platform
- Embedded BiNOS® Operating System - learn once for all our platforms
- Enhanced Quality-of-service (QoS) and service granularity support
- MEF 9 and 14 certified
- Extensive Operations, Administration and Maintenance (OAM) support
- Sub-50ms switchover in Ethernet rings using Telco Systems' Fast-Ring technology
- Ideal for street cabinet installations
  - Extended operating temperature -20°C to 65°C (-4°F to 149°F)
  - Compact size (ETSI 300 compliant) - 1.5RU height, 10" deep, 19" rack mountable

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## Key Applications

- Triple-Play Service and Broadband Aggregation
- Hub & Spoke Layer 2 Fiber Aggregation
- Layer 2 VPN Service
- Cost-effective, Metro Ethernet Access and Aggregation Rings
- High Speed Access
- Data center consolidation

## Specifications

### Standards and Certifications

- 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 Ethernet
- IEEE 802.3ah OAM ; IEEE 802.1ag CFM
- IEEE 802.1ab Link Layer Discovery Protocol (LLDP)
- ITU-T G.8031

### Interfaces

#### Flexible Ethernet combo-port interfaces

- Fiber SFPs (100M and 1000M)
- Dual-rate copper SFPs (100/1000M)
- Single-rate copper SFPs (1000M)

#### Jumbo frames up to 9216 bytes

Laser-level monitoring according to SFF-8472 specification (requires compliant SFP/XFP)

#### ASCII/RJ-45 management ports

### 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
- VLAN redirection
- IGMP Snooping

### Layer 3 Features

- Static routing
- RIP
- OSPF
- IS-IS
- VRRP
- PIM-SM, PIM-DM
- Proxy ARP & dynamic ARP inspection
- DHCP server & relay

### Traffic Management Features

QoS with ToS, and Differentiated Services  
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
  - Stabilized Random Early Detection (SRED)

### Security Features

#### Secure management protocols

- SNMPv3, SSHv2

#### Wirespeed Access control lists: Layer-2/3/4 and policy-enabled

#### Management VLAN

- RADIUS and TACACS+ authentication
- DHCP snooping (option 82)

### Protection Features

- Ethernet Linear Protection Switching (ELPS)
- Resilient Link
- Link aggregation groups, including LACP with MAC address-based distribution
- Sub-50ms convergence via augmented RSTP
- STP/RSTP/MSTP

### Management and OAM Features

#### Element management system

- BiNOSCenter® NG
- EdgeGenie Service Management
- Multiple management access protocols and tools
- SNMPv1/v2c/v3; Telnet, SSHv2, TFTP, NTP
- DHCP (client)
- SYSLOG

#### 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

## Ordering Information

Part Number	Description
T5C-XG-AC-x*	Base System inc. Fan Tray, 1 AC PSU, Blanking Plates (PSU & Module Slot), Accessory Pack, Console Management Cable and AC Power Cord
T5C-XG-DC	Base System inc. Fan Tray, 1 DC PSU -48Volt with DC feed connector, Blanking Plates (PSU & Module Slot), Accessory Pack, Console Management Cable
T5C-XG-2x10G	Plug-in Module with 2 10G XFP Ports (1 per T5C-XG system)
T5C-XG-ACPS-x	AC PSU
T5C-XG-DCPS	DC PSU -48Volt with DC feed connector
T5C-XG-FAN	Fan Tray

SFP/XFPs not included. Call for options.

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

## 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)

**Ext. Operating Temperature:** -20°C to 65°C (-4°F to 149°F)

**Humidity:** 5% to 95% non-condensing

**Input power:** 100-240 VAC, 50/60 Hz  
-36VDC to -72VDC



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