T1/E1, Data/Voice & Ethernet Fiber Optic Multiplexer

TC8518B

Features

- **Up to 24 T1/E1 and 3 Ethernet ports over Fiber**
- **Fiber Optic Redundancy**
- **Hot Swappable and Redundant Power**
- **Multimode or Single Mode Optics**
- **Management via CLI, WebUI, SNMP**
- **Extreme operating temp (-40˚C to +80˚C) option**
- **Optional Expansion of up to 8 ports:**
  - T1/E1
  - FXS/FXO
  - 2-wire/4-wire Analog
  - RS-232/422/485 Serial
  - Dry Contact

Front with 16 Channels of T1 and 3 Channels of Ethernet Shown

Rear with Optional 8 Telephone FXO/FXS Channels Shown

Description

The TC8518 T1/E1, Data/Voice & Ethernet Fiber Optic Multiplexer multiplexes up to 24 channels of T1/E1 and 3 Ethernet ports on single mode (1310/1550nm) or multimode (850nm) fiber. It can also multiplex additional voice, analog and data channels via rear connector expansion card with up to eight of the following options:

- T1/E1
- Telephone: FXS or FXO
- Analog: 2-wire or 4-wire
- Serial: RS232/422/485
- Dry Contact

Each T1 or E1 channel is independent and transparent to the framing format and supports all applicable standards and line codes. The 3-port Ethernet switch supports 10/100 Mbps Full Duplex bandwidth, VLAN, and various other Ethernet features.

The TC8518 supports distances up to 100 km and offers a one fiber, bi-directional WDM option to maximize bandwidth. Setup, diagnostics, and management are accessed via Web, CLI and SNMP. Diagnostics include LED indicators, alarms, and loopbacks.

A 1U high “rack mount” chassis with power and fiber optic redundancy are standard. Fiber redundancy includes automatic switchover for maximum reliability. Standard power is 100-240VAC; power supplies are hot swappable. Optional power supplies include 12VDC, 24VDC, -48VDC, and 125VDC. A high temperature version (-20°C to +70°C) and extreme temperature version (-40°C to +80°C) are optional.

Applications

Typical applications include connecting T1/E1 signals from Cell Towers to Central Offices, multiplexing T1/E1 links between PBX’s, and adding Ethernet, Analog, Data or Telephone service to existing T1 or E1 fiber optic links.

Service Providers use the TC8518 as an efficient, cost effective method to provide their customers with Ethernet for data and T1/E1 for voice. Analog channels can be used for radio applications.

The one fiber, bi-directional optic option doubles existing fiber optic cable capacity.

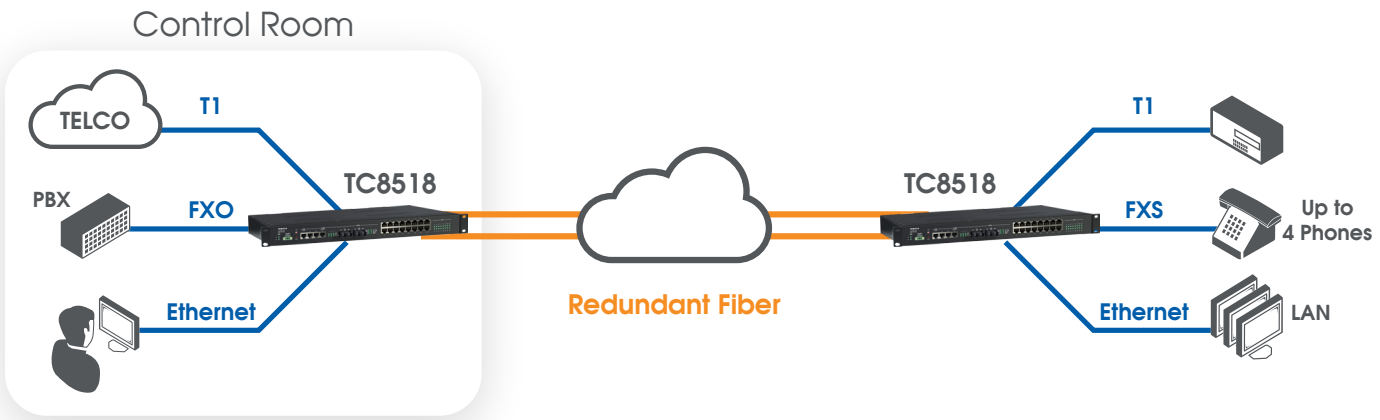
Feature	Description
Ethernet	
MAC Table	Up to 32K MAC addresses
Spanning Tree	• Spanning Tree Protocol (STP) IEEE 802.1D • Rapid Spanning Tree Protocol (RSTP) IEEE 802.1w/802.1D-2004 • Multiple Spanning Tree Protocol (MSTP) IEEE 802.1s/802.1Q-2005
Aggregation	Link Aggregation Control Protocol (LACP) IEEE 802.3ad
Virtual LAN (VLAN)	Support for up to 4094 IEEE 802.1Q VLANs simultaneously • Port-based VLAN • MAC-based VLAN • Protocol-based VLAN • Private VLAN
Voice VLAN	Voice traffic is automatically assigned to a voice-specific VLAN and treated with appropriate levels of QoS
Generic VLAN Registration Protocol (GVRP)	Dynamic VLAN for automatically propagating and configuring VLANs in a network
IGMP v1/v2/v3 Snooping	Provides IGMP (IPv4 multicast group) support on Layer 2 switches
MLD v1/v2 Snooping	Provides MLD (IPv6 multicast group) support on Layer 2 switches
Link Layer Discovery Protocol (LLDP)	IEEE 802.1AB standard for advertising their identity, capabilities, and neighbors of network devices
Quality of Service	
Hardware Priority Queue	8 QoS class queues per port
Scheduling	Strict priority and deficit weighted round-robin (DWRR)
Classification	• Port based; 802.1p Class of Service (CoS) • Port Tag Remarking • DSCP based; Differentiated Services (DiffServ) • DSCP translation and remarking
Rate Limiting	Ingress policing and egress shaping per port and per CoS
Carrier Ethernet Protocol and Features	
Ethernet CFM	IEEE 802.1ag standard that provides connectivity fault management
Service OAM	ITU-T Y.1731 Ethernet OAM standard for dividing a network into maintenance domains in the form of hierarchy levels
Provider Bridging	VLAN stacking (Q-in-Q) IEEE 802.1ad
Bandwidth Profile	Policing with leaky bucket (CIR/CBS & EIR/EBS) are supported per service
Ethernet Ring Protection Switching (ERPS)	ITU-T G.8032v2 provides sub-50 ms protection switching for Ethernet ring topologies
Precision Time Protocol (PTP)	IEEE 1588v2 protocol provides sub-microsecond range network timing and synchronization for Ethernet networks

Feature	Description
Security	
Secure Shell (SSH) Protocol	SSH secures Telnet traffic in or out of the switch, SSH v1 and v2 are supported
HTTPS	SSL encrypts the HTTP traffic, allowing secure access to the web based management GUI
Network Access Control	IEEE 802.1X defined: • Port based authentication • MAC based authentication • Single host mode • Multi host mode
AAA	Authentication, Authorization, and Accounting provides management security with a central RADIUS or TACACS+ server
RADIUS/TACACS+	Supports security through central RADIUS and TACACS+ servers
Port Security	Locks MAC Addresses to ports and limits the number of learned MAC addresses
DHCP Snooping	Provides security by filtering un-trusted DHCP messages, and by building and maintaining a dynamic IP address database
IP Source Guard	Prohibits IP packets with invalid IP addresses from accessing the network
ARP Inspection	Protects against Address Resolution Protocol (ARP) spoofing attacks
Access Control Lists (ACL)	Support for up to 256 entries for permitting or denying Ethernet packets based on multiple of parameters
Management	
Web GUI Interface	Built-in switch configuration utility for browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, maintenance, and monitoring.
SNMP	SNMP v1, v2c, and v3 with support for multiple traphosts
Remote Monitoring (RMON)	Supports RMON groups 1,2,3,9 (history, statistics, alarms, and events) for enhanced traffic management, monitoring and analysis
Network Time Protocol (NTP)	Protocol for providing clock synchronization. NTP Authentication is also supported.
IPv4 and IPv6 Support	Both IP version 4 and version 6 are supported
Firmware Upgrade	• Web browser upgrade (HTTP/HTTPS) • Upgrade through console port (TFTP) • TCView® to deploy the switch firmware
Dual Image	Dual image provides independent primary and secondary OS files for backup while upgrading
Diagnostics	Syslog, cable/link diagnostics, ping, chassis status

Environmental & EMC Compliance

The TC8518 meets all pertinent industry-specific standards for environmental, performance and security requirements including IEC 61850-3, IEEE 1613, NEMA TS-2 and NERC CIP. Furthermore, future JumboSwitch® family products will continue to be compliant with both existing and emerging industry standards and requirements, including developing Ethernet standards. Please refer to the charts below for specific standards compliance information.

	Test	Industrial Standards	TC8518 Series Type Test and Levels	
			Power Supply Unit (PSU)	RJ-45 & Signal
Temperature/Humidity	Low Temperature Use	IEC 61850-3, IEEE 1613, NEMA TS-2	IEC 60068-2-1; Ae; -40°C; 16 hour	
	Low Temperature Storage	IEC 61850-3, IEEE 1613, NEMA TS-2		
	High Temperature Use	IEC 61850-3, IEEE 1613, NEMA TS-2	IEC 60068-2-2; Be; +80°C; 16 hour	
	High Temperature Storage	IEC 61850-3, IEEE 1613, NEMA TS-2	IEC 60068-2-2; Bd; +85°C; 16 hour	
	Damp Heat	IEC 61850-3, IEEE 1613, NEMA TS-2	IEC 60068-2-30; Db; +55°C; 95%; 96 hours	
Mechanical	Vibration	IEC 61850-3, IEEE 1613, NEMA TS-2	IEC 60068-2-6; Fc; 3 - 150 Hz; 7.5 mm; 2 g; 10 sweeps per axis	
	Shock	IEC 61850-3, IEEE 1613, NEMA TS-2	IEC 60068-2-27; Ea; 30g; 11ms	
	Free Fall	IEC 61850-3, IEEE 1613	25 cm	
ElectroMagnetic Compatibility	Electrostatic Discharge Immunity	IEC 61850-3, IEEE 1613 (C37.90.3)	IEC 61000-4-2; 8kV contact; 15 kV air	
	Radiated RF Immunity	IEC 61850-3, IEEE 1613 (C37.90.2)	IEC 61000-4-3; 80 MHz - 1000 MHz; 35 V/m (Peak); AM 80% at 1 kHz	
	EFT/Burst Immunity	IEC 61850-3, IEEE 1613 (C37.90.1)	IEC 61000-4-4; 4 kV CM; TM	IEC 61000-4-4; 4 kV CM; TM
	Surge Immunity	IEC 61850-3, IEEE 1613	IEC 61000-4-5; 4 kV LG; 2 kV LL	IEC 61000-4-5; 4 kV LG; 2 kV LL
	Conducted RF immunity	IEC 61850-3, IEEE 1613	IEC 61000-4-6; 150 kHz - 80 MHz; 10 V; AM 80% 1 kHz	IEC 61000-4-6; 150 kHz - 80 MHz; 10 V; AM 80% 1 kHz
	Magnetic Field Immunity	IEC 61850-3, IEEE 1613	IEC 61000-4-8; 50 Hz; 100 A/m cont.; 1000 A/m 1 second	
	Damped Oscillatory Magnetic Field Immunity	IEEE 1613	IEC 61000-4-10; 100 kHz; 30 A/m	
	Damped Oscillatory Magnetic Field Immunity	IEEE 1613	IEC 61000-4-10; 1 MHz; 30 A/m	
Power Supply Unit (PSU) Variations & Emissions	AC Voltage Dips	IEC 61850-3	IEC 61000-4-11; 30% & 100%, 0.5s	NA
	DC Voltage Dips	IEC 61850-3	IEC 61000-4-29; 40% & 70%, 0.1s	NA
	Ripple on DC Power Supply	IEC 61850-3	IEC 61000-4-17; 10% Un	NA
	Conducted PF CM Voltage	IEC 61850-3, IEEE 1613	IEC 61000-4-16; 50 Hz; 30 V cont.; 300 V 1s	IEC 61000-4-16; 50 Hz; 30 V cont.; 300 V 1s
	Conducted Emission	IEC 61850-3	CE/FCC/CISPR32 class A	CE/FCC/CISPR32 class A
	Radiated Emission	IEC 61850-3	CE/FCC/CISPR32 class A	
Dielectric	Dielectric 50 Hz Test	IEEE 1613	IEC 60255-5; 2 kV	IEC 60255-5; 0.5 kV
	Impulse Voltage Test	IEEE 1613	IEC60255-5; 5 kV	IEC 60255-5; 5 kV



Typical Application Using the TC8518B T1/E1, Data/Voice & Ethernet Fiber Optic Multiplexer's.

Data Rates

T1 ..... 1.544 Mbps
E1 ..... 2.048 Mbps
Ethernet..... 10/100 Mbps
Async RS-232/422/485 .....Up to 115K
Console 9.6K
Audio ..... 300 Hz to 3.4 Khz

Channel Capacity

T1 ..... 4, 8, 16, 24
E1 ..... 4, 8, 16, 24
Ethernet..... 3
2-Wire/4-Wire Analog.....4 or 8
RS-232/422/485 .....4 or 8
Telephone (FXS or FXO).....4 or 8
Dry Contact .....4 or 8

Optical*

Wavelength
Multimode.....850nm
Single Mode 1310/1550nm
Connector .....ST/SC

Electrical

Interface ... T1, E1 (G.703), IEEE 802.3
Connectors
T1 (100Ω) RJ48
E1 (120Ω) RJ48
E1 (75Ω) ..... BNC**
Ethernet.....RJ45
Console Port RJ45

Visual Indicators

System LEDs.....PWR (A, B), ALARM
T1/E1 ..... Line Status
Optical .....SYNC, RSYNC, OPT-A/B,
..... USE-B, S1, S2, INT CLK
Ethernet..... FULL/COL, 100M,
.....LINK/ACT

Diagnostic Functions

Local and Remote Loopack for T1/E1
Loopback for Optical

Power

Standard.....100-240VAC 50/60Hz
Optional .....12VDC, 24VDC, -48VDC,
..... 125VDC
Power Consumption .....<30W

Operating Temperature

Operating..... -10°C to 50°C
High Temp (opt.)..... -20°C to 70°C
Extreme Temp (opt. ..... -40°C to 80°C

Storage

Temperature..... -40°C to 90°C
Humidity.....95% non-condensing

Physical

Height..... (4.22 cm) 1.66"
Width..... (48.26 cm) 19"
Depth..... (30.5 cm) 12"
Weight..... (2.54kg) 5.6 lbs

*Contact factory for detailed specifications

** Using RJ48-to-BNC adapter

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TAA Compliant

TC Communications Quality Management System is certified as being in conformity with ISO 9001:2015 by Intertek

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FC CE

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