

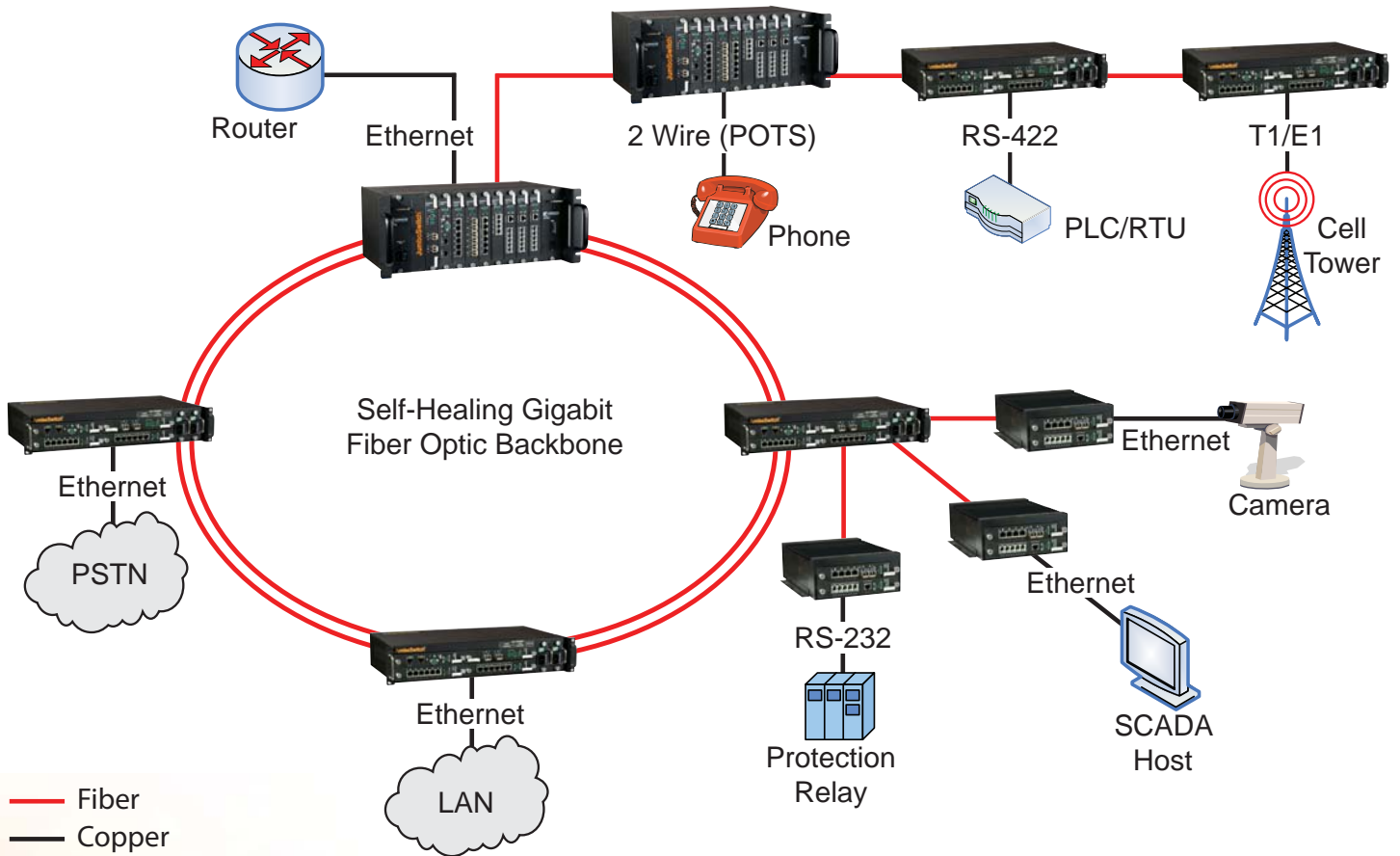
# JumboSwitch®

## Industrial Gigabit Ethernet Modular Switch



- Integrates Voice & Data Over Ethernet
- Provides Total IP Network Compatibility and Scalability
- Modernizes Legacy Systems
- Operates in Harsh Industrial Environments
- Advantages over SONET/SDH

# Overview



The industrial grade **JumboSwitch** product family puts your communication needs over an industrial grade fiber optic Gigabit Layer 2 or Layer 3 Ethernet backbone. Combining the flexibility and efficiency of Ethernet with the protection and reliability of fiber, the JumboSwitch is ideal for the most extreme environments and mission-critical projects.

The demand for more bandwidth is stretching the limit of last generation's technology, and the JumboSwitch answers the demands with a full Gigabit Full-Duplex pipe to meet all of your data, voice, and Ethernet requirements. No matter how complex your application is, the JumboSwitch can be your sophisticated yet graceful solution.

# Interface Cards

## Layer 2 Main and Management



Central Processor and Memory Board that provides system Management and Gigabit Layer 2 Up-Links of the JumobSwitch Platform.

- TC3840-1: Layer 2 Main Card
- TC3840-2: Layer 2 Management Card

### Data Rates

Ethernet.....10/100/1000Mbps, Layer 2  
Rate Control.....96K, 128K...1000Mbps

### SFP

Optical.....1000SX/LX  
Copper.....1000Base-T

### Features

#### Regulatory Approval

IEEE 802.1x, 802.1w, 802.1s, 802.3x, 802.1D,  
802.1p, 802.1Q, 802.3, 802.3u, 802.3z, 802.3ab,  
802.3ad, 802.3ah

#### Protocols

IGMP Snooping, GVRP, GMRP, TFTP, SNMP, RMON,  
HTTP, HTTPS, Telnet, SSH/SSL, Syslog, RARP, SN-  
MPv1/v2c/v3

#### MIB

MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE  
MIB, Bridge MIB, RSTP MIB, RMON, MIB Group 1,  
2, 3, 9

## Layer 3 Main and Management



Central Processor and Memory Board that provides system Management and Gigabit Layer 2/3 Up-Links of the JumobSwitch Platform.

- TC3840-1: Layer 2 Main Card
- TC3840-2: Layer 2 Management Card

### Data Rates

Ethernet.....10/100/1000Mbps, Layer 2/3  
Rate Control.....96K, 128K...1000Mbps

### SFP

Optical.....1000SX/LX  
Copper.....1000Base-T

### Features

#### Regulatory Approval

IEEE 802.1x, 802.1w, 802.1s, 802.3x, 802.1D,  
802.1p, 802.1Q, 802.3, 802.3u, 802.3z, 802.3ab,  
802.3ad, 802.3ah

#### Protocols

IGMP Snooping, GVRP, GMRP, TFTP, SNMP, RMON,  
HTTP, HTTPS, Telnet, SSH/SSL, Syslog, RARP, SN-  
MPv1/v2c/v3 IPv4/v6 Static Routing, RIP v1/v2, RIP  
v6, OSPF v2, OSPF v3, BGPv4, VRRP

#### MIB

MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE  
MIB, Bridge MIB, RSTP MIB, RMON, MIB Group 1,  
2, 3, 9

## Gigabit Ethernet



- TC3841: Copper Gigabit Ethernet Module
- TC3842-1: 6 Gigabit SFP
- TC3842-2: 3 Gigabit + 3 100FX SFP
- TC3842-3: 6 100FX SFP

### Data Rates

Ethernet.....10/100/1000Mbps  
Rate Control.....96K, 128K...1000Mbps

### Electrical

Ports.....6  
Connector.....RJ45F  
Interface.....10/100/1000Base-T

### SFP

Optical.....100FX, 1000SX/LX  
Copper.....1000Base-T

### Features

#### Regulatory Approval

IEEE 802.1x, 802.1w, 802.1s, 802.3x, 802.1D,  
802.1p, 802.1Q, 802.3, 802.3u, 802.3z, 802.3ab,  
802.3ad, 802.3ah

#### Protocols

IGMP Snooping, GVRP, GMRP, TFTP, SNMP, RMON,  
HTTP, HTTPS, Telnet, SSH/SSL, Syslog, RARP, SN-  
MPv1/v2c/v3

#### MIB

MIB-II, Ethernet-like MIB,  
P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP  
MIB, RMON, MIB Group 1, 2, 3, 9

## Serial Data Over I P



- TC3847-1: Serial Server
- TC3840-3: Turbo Serial Server

### Serial Communications

Data Rates.....50 bps to 115Kbps  
Interface.....RS232, RS422, RS485 (2/4-Wire)

Ports.....8  
Connector.....RJ11F

#### Protocols

ICMP, IP TCP, UDP, DHCP, Telnet, DNS, SNMP,  
HTTP, SMTP, ARP, SSH, SSL, PPPoE, DDNS, RIP

Parity..... None, Even, Odd, Space, Mark  
Data Bits.....5, 6, 7, 8

Stop Bits.....1, 1.5, 2  
Flow Control.....RTS/CTS, XON/XOFF

Console Port..... 1 x RS-232  
Security..... DES, 3DES, AES

Configuration..... Web/Serial/Telnet console

## T1/E1 over IP



- TC3845-1 T1/E1-over-IP
- TC3845-3 T3/E3-over-IP

### T1/E1

Data Rates.....1.544 Mbps; 2.048 Mbps  
Line Code.....AMI, B8ZS; AMI, HDB3

Regulatory Approval  
AT&T TR-62411, G.703, G.704, G.824, ANSI T1.403,  
G.703, G.704, G.706, G.732, G.823

Impedance.....100Ω; 75, 120Ω

### Features

Channels.....1-4  
G.823, G.824.....Recovered Clock Jitter and Wander

### Electrical

Ethernet.....1 Port, 10/100Mbps

## Voice over IP



- TC3848-1: 4 FXS + 1 FXO
- TC3848-2: 5 FXO

### Data Rates

Ethernet.....10/100Mbps

### Electrical

Connector.....RJ11F  
Interface.....10/100/1000Base-T

### Media Processing

Codec  
G.711 ALAW / G.711 ULAW, G.726-32, T.38 Fax,  
G.729 AB (Optional)

### Packetization

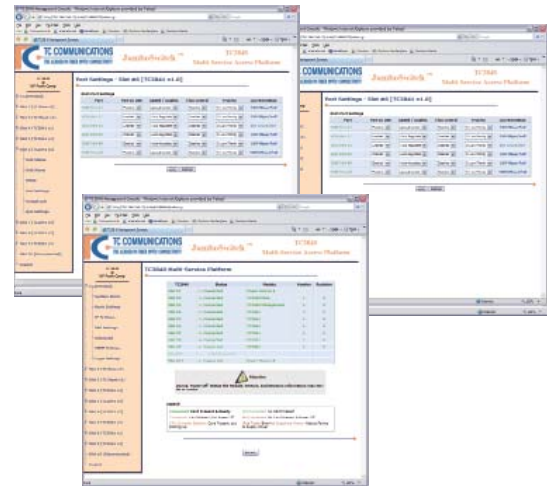
RTP/RTCP.....RFC 3350, 3351, 2198  
DTMF Relay.....RFC 2833

### Protocols

VoIP Signaling..SIP-RFC 3261, 3262, 3263, 3264, 2327

The **JumboSwitch** is a truly modern communications platform, yet its management, its web management is designed to emphasize usability. With no software installation necessary, you can configure and monitor every aspect of the JumboSwitch, down to the temperature and power consumption of each individual card.

### JumboSwitch Web Management



### Small Form-Factor Pluggable Transceiver (SFP)



**MULTIMODE**  
**100Base-FX** 1310nm, 2km  
**1000Base-SX** 850m, 550m, 1310nm, 2km

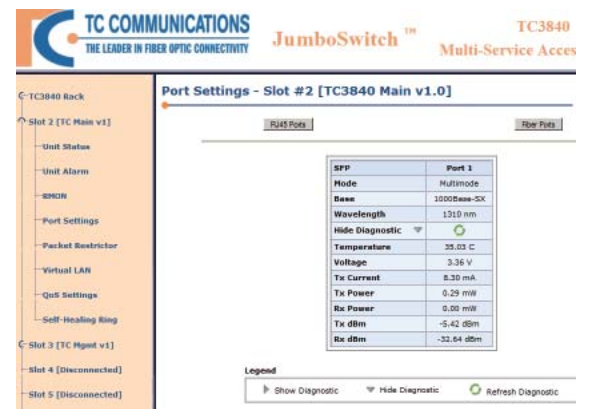


**SINGLE MODE**  
**100Base-FX** 1310nm, 20Km  
 1310nm, 40Km  
**1000Base-LX** 1310nm, 10Km  
 1310nm, 20Km  
 1310nm, 40Km  
 1550nm, 60Km  
 1550nm, 80Km

**ONE-FIBER BI-DIRECTIONAL**  
**1000Base-LX** 1310/1550nm, 40Km  
 1490/1550nm, 60Km

**COPPER**  
**1000Base-T**

### SFP DDM (Digital Diagnostic and Monitoring)



## Power Supplies

#### 4U AC POWER SUPPLY

**Voltage Range** 90-260 VAC  
**Power Rating** 200W  
**Power Management** Remote turn on/off, Power Cycle  
**EMI** CE, FCC, IEC 61850-3



JumboSwitch 4U Power Supply Modules

#### 4U DC POWER SUPPLY

**Voltage Range** 12VDC  
 24VDC  
 -48VDC  
 125VDC  
**Power Rating** 125W  
**Power Management** Remote turn on/off, Power Cycle  
**EMI** CE, FCC, IEC 61850-3

#### 2U AC POWER SUPPLY

**Voltage Range** 90-260 VAC  
**Power Rating** 60W  
**Power Management** None  
**EMI** CE, FCC, IEC 61850-3



JumboSwitch 2U Power Supply Modules

#### 2U DC POWER SUPPLY

**Voltage Range** 12VDC  
 24VDC  
 -48VDC  
 125VDC  
**Power Rating** 40W  
**Power Management** None  
**EMI** CE, FCC, IEC 61850-3

#### 2S AC POWER SUPPLY

**Voltage Range** 115VAC (via External AC Power Adapter)  
 230VAC (via External AC Power Adapter)  
 240VAC (via External AC Power Adapter)  
**Power Rating** 20-30Watt  
**Power Management** Remote turn on/off  
**EMI** CE, FCC, IEC61850-3

#### 2S DC POWER SUPPLY

**Voltage Range** 12VDC (Standard)  
 24VDC  
 -48VDC  
**Power Rating** 20-30Watt  
**Power Management** Remote turn on/off  
**EMI** CE, FCC, IEC 61850-3

#### 1U AC POWER SUPPLY (Built In)

**Voltage Range** 90-260 VAC  
**Power Rating** 60W  
**Power Management** None  
**EMI** CE, IEC 61850-3

#### 1U DC POWER SUPPLY (Built In)

**Voltage Range** 12VDC  
 24VDC  
 -48VDC  
 125VDC  
**Power Rating** 40W  
**Power Management** None  
**EMI** CE, FCC, IEC 61850-3

#### AC PLUG OPTIONS



## Environmental & EMI Compliance

The JumboSwitch product family 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.

	Tests	Industrial Standards	TC Communications - JumboSwitch 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	
ElectroMagnetic Compatibility	Electrostatic Discharge Immunity	IEEE 1613	IEC 61000-4-2; 8kV contact; 15 kV air	
	Radiated RF Immunity	IEC 61850-3, IEEE 1613	IEC 61000-4-3; 80 MHz - 1000 MHz; 20 V/m; AM 80% 1 kHz	
	EFT/Burst Immunity	IEC 61850-3, IEEE 1613	IEC 61000-4-4; 4 kV CM	IEC 61000-4-4; 4 kV CM
	Surge Immunity	IEC 61850-3	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	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	IEC 61000-4-8; 50 Hz; 100 A/m cont.; 1000 A/m 1 s	
	Damped Oscillatory Magnetic Field Immunity	IEC 61850-3	IEC 61000-4-10; 100 kHz; 30 A/m	
	Damped Oscillatory Magnetic Field Immunity	IEC 61850-3	IEC 61000-4-10; 1 MHz; 30 A/m	
Power Supply Unit (PSU) Variations	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
	Damped Oscillatory Wave	IEC 61850-3	IEC 61000-4-12; 2.5 kV CM, 1.0 kV DM @1MHz	IEC 61000-4-12; 2.5 kV CM, 1.0 kV DM @ 1MHz
	Conducted PF CM Voltage	IEC 61850-3	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/CISPR22 class A	CE/FCC/CISPR22 class A
	Conducted emission	IEC 61850-3	CE/FCC/CISPR22 class A	CE/FCC/CISPR22 class A
	Radiated emission	IEC 61850-3	CE/FCC/CISPR22 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

# Cages & Chassis



**JumboSwitch 4U**  
Main + Management  
7 Interface Module Slots

**PHYSICAL**

Height 7.0" (17.8 cm)  
Width 19" (48.3 cm)  
Depth 11.75" (29.9 cm)



**JumboSwitch 2U**  
Main + Management  
2 Interface Module Slots

**PHYSICAL**

Height 3.5" (8.9 cm)  
Width 19" (48.3 cm)  
Depth 10.5" (26.7 cm)



**JumboSwitch 2S**  
Main/Management Combo  
1 Interface Module Slot

**PHYSICAL**

Height 3.33" (8.5 cm)  
Width 7.5" (19.1 cm)  
Depth 9.89" (25.1 cm)



**JumboSwitch 1U**  
Main/Management Combo  
1 Interface Module Slot

**PHYSICAL**

Height 1.72" (4.4 cm)  
Width 19" (48.3 cm)  
Depth 9.5" (24.1 cm)

## TC Communications, Inc



Since its inception in 1992, TC Communications has focused in designing and manufacturing the most versatile and reliable fiber optic communication products possible to meet the rigorous requirement of industrial, military, government and commercial customers all over the world.

TC Communications has earned its reputation as the most reliable and trustworthy fiber optic communication equipment manufacturer in the industry, with over 10,000 installed sites around the world, and several thousands of happy customers.



**ISO 9001**  
QMI-SAI Global  
#1045959

TC Communications, Inc.  
17881 Cartwright Road  
Irvine, CA 92614 U.S.A.  
Factory Tel: (949) 852-1972  
Fax: (949) 852-1948

Sales Office  
U.S.A. Domestic International:  
(800) 569-4736 (949) 852-1973

Web Site: [www.tccomm.com](http://www.tccomm.com)  
E-mail: [sales@tccomm.com](mailto:sales@tccomm.com)

Note - Information contained in this data sheet is subject to change without prior notice.



[www.JumboSwitch.com](http://www.JumboSwitch.com)



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