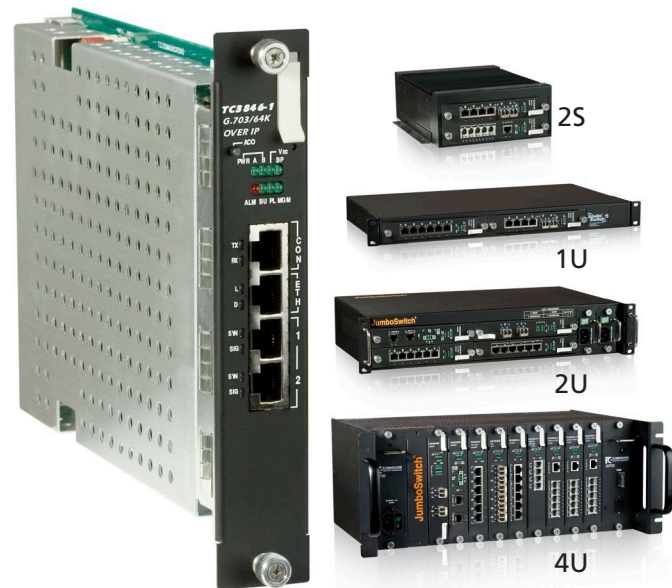


# G.703/64K-over-IP Gateway

## TC3846-1

- Extends G.703/64K Co-directional Interface over Ethernet
- Less Than 5 msec. Latency, One Way
- Point-to-Point & Point-to-MultiPoint Applications
- VLAN and QoS Support
- Manage Via Web, SNMP, Serial Console, Telnet
- Temperature & Power Consumption Monitoring
- Extreme Temp (-40°C to +80°C) Optional
- Meets or Exceeds IEC 61850-3, IEC 60834, IEEE1613 & NEMA TS-2 Standards
- Member of the JumboSwitch® Product Family



TC3846-1 with Various JumboSwitch Cages and Chassis

Featuring extremely low latency of less than 5 msec., one way, the TC3846-1 G.703/64K-over-IP Gateway extends 64Kbps G.703 co-directional circuits over Ethernet/IP networks. It is simple to configure and supports both point-to-point and point-to-multi point topologies.

Extremely low latency (minimal end-to-end processing delay) is achieved by using high-performance adaptive clock recovery, buffering and forwarding technology. To insure reliable communications, the TC3846-1 supports VLAN and QoS for packet prioritization.

Key features include Traffic Monitoring and Statistics, Network Time Server (NTP Server), Remote Firmware Upgrade and Temperature and Power Consumption Monitoring.

Setup, diagnostics, and management are accessed via Web, SNMP, Serial Console, and Telnet. Diagnostics include LED indicators and local and remote loopback to assist with troubleshooting and maintenance.

Each G.703/64K channel is independent and transparent to protocols and signaling used. Clear channel and octet aligned modes are supported.

The TC3846-1 interface card can fit into any available JumboSwitch housing option including 2S Standalone chassis and 1U/2U/4U card cages. Power supply options are 12VDC, 24VDC, -48VDC or 115/230VAC. Standard operating temperature is -20°C to +70°C and the extreme temperature version is -40°C to +80°C.

## Applications

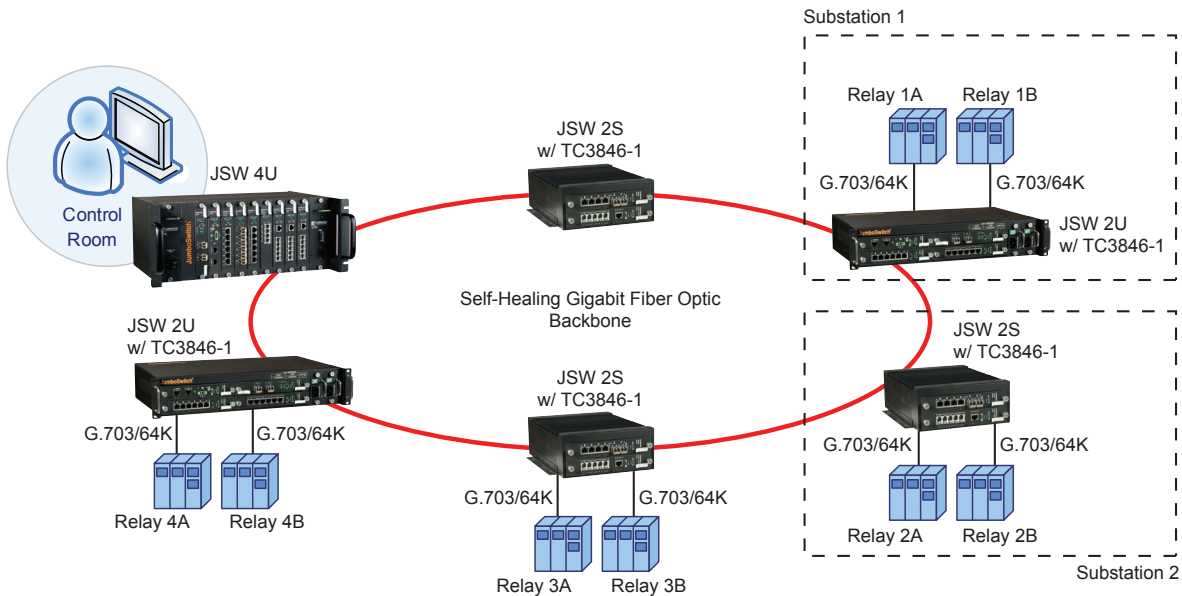
Typical applications include extending G.703 circuits across IP networks.

For example, the TC3846-1 is used to extend Teleprotection relays with a G.703/64K interface over existing Layer 2 / Layer 3 Networks.

## Environmental & EMI Compliance

The JumboSwitch product family meets all pertinent industry-specific standards for environmental, performance and security requirements including IEC 61850-3, IEC 60834, 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



Typical Teleprotection Application Using TC3846-1 to Extend G.703/64K (Co-Directional) over Ethernet Network

**Data Rates**

G.703 .....64Kbps  
 Ethernet .....10/100 Mbps Full Duplex  
 Console .....9.6K

**Connection Capacity**

G.703/64K .....2 Channels  
 Ethernet .....1 Port

**Electrical**

**G.703/64k Interface**

LineCode.....AMI  
 Standards.....G.703, G.823  
 Connector.....RJ48F  
 Impedance.....120 Ohm

**Ethernet Interface**

Standards .....IEEE 802.3,  
 .....802.3u, 802.1p&Q  
 Connector.....RJ45F  
 Console Port.....RJ45F

**System**

Bit Error Rate .....1 in 10<sup>10</sup> or Better

**Standard Compliance**

CE, FCC Part 15, CISPR (EN55022)  
 CLASS A, IEC 61850-3, IEEE 1613,  
 NEMA TS-2, IEC 60834

**Diagnostic Functions**

Local and Remote Loopback for  
 G.703/64K and Ethernet

**LEDs**

Unit Status.....PWR (A, B), Alarm, BU,  
 .....PL, Vcc, BP, MGM  
 G.703/64K.....Status  
 Ethernet.....Link/Act

**Power**

Standard.....12VDC  
 Optional.....24, -48 VDC  
 .....90-260 VAC, 50/60Hz  
 Power Consumption.....<10W

**Operating Temperature**

High Temp .....-20°C to 70°C  
 Extreme Temp .....-40°C to 80°C

**Storage**

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

**Physical (rack mount card)**

Height.....(3.15 cm) 1.24"  
 Width.....(17.78 cm) 7.0"  
 Depth.....(22.86 cm) 9.0"  
 Weight.....(0.3kg) 0.75lbs



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



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