

# Modem-over-IP Gateway

## TC3848-3/4

- FXS (TC3848-3) or FXO (TC3848-4)
- Extends 2 or 4 Ch. 2-Wire Telephone/Dial-up Links
- 64 Kbps DS0 Channel (No Compression)
- Extremely Low Latency
- VLAN & QoS Support
- Temperature & Power Consumption Monitoring
- Extreme Temp (-40°C to +80°C) Optional
- Meets or Exceeds IEC 61850-3, IEEE 1613 & NEMA TS-2 Standards
- Member of JumboSwitch® Product Family



TC3848-3/4 (4 Ch. Shown) FXS or FXO over Ethernet Gateway

The TC3848-3/4 Modem-over-IP Gateway links or extends up to four channels of 2-wire telephone/dial-up across Layer 2/3 Ethernet/IP or MPLS networks. It is easy to configure, offers extremely low latency and supports point-to-point and point-to-multipoint topologies.

Available as a standalone product or JumboSwitch interface card, the TC3848-3/4 is specifically designed to extend dial-up devices like data modems, meters, fax machines and credit card machines over Ethernet/IP connections because VoIP is designed for voice and usually doesn't support dial-up connections.

The TC3848-3/4 provides Toll Quality sound and supports voice frequencies from 300Hz to 3.4KHz. It achieves minimal end-to-end processing delay (latency) by using high performance buffering and forwarding technology. Analog signals are transported on a 64Kbps channel without compression.

VLAN and QoS for packet prioritization ensure reliable communications. Other key features include Traffic Monitoring and Statistics, Network Time Server (NTP Server), Remote Firmware Upgrade and Temperature and Power Consumption Monitoring. Diagnostics include LED indicators.

The TC3848-3/4 is available in industrial hardened versions (-40°C to +80°C) and exceeds all pertinent industry and environmental standards including IEC 61850-3, IEEE 1613 & NEMA TS-2.

Setup, diagnostics, and management are accessed via Web, SNMP, Serial Console, and Telnet. The TC3848-3/4 fits any JumboSwitch chassis option including 2S Standalone chassis and 1U/2U/4U card cages. Power supply options are 12VDC, 24VDC, -48VDC, 125VDC (available on 1U/2U/4U card cages only) or 115/230VAC.

## Applications

The TC3848-3/4 MoIP Gateway is used to link analog telephones or legacy dial-up devices including data modems, fax machines, meters, ATM machines and Credit Card machines over Ethernet/IP or MPLS networks.

It can also be a critical connectivity product for completing migration from a legacy network to a fully integrated voice and data over Ethernet/IP network.

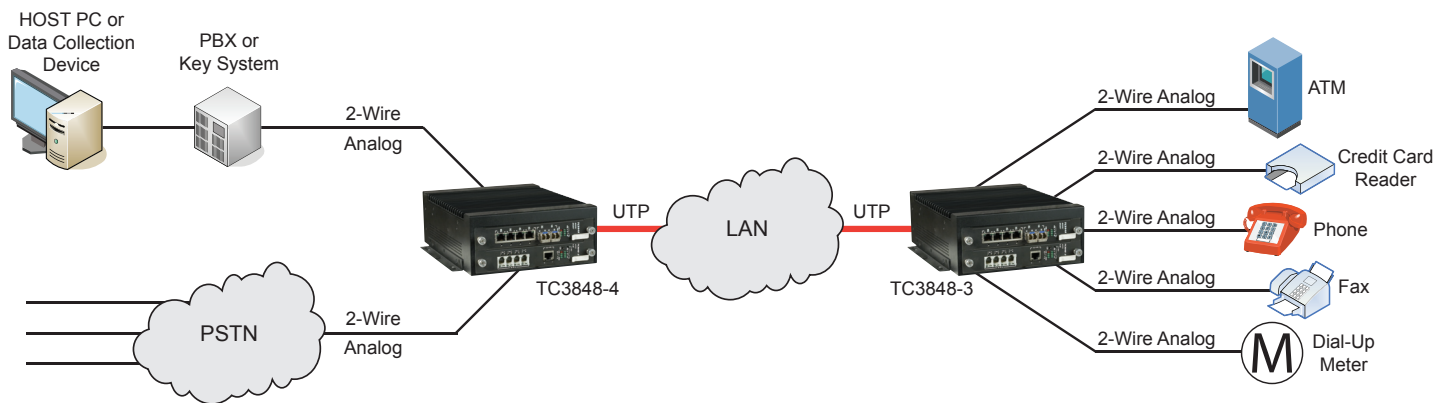
Typical applications include:

- Connecting a TC3848-3 FXS interface to a 2-wire analog phone station and a TC3848-4 FXO interface to PSTN for outside telephone service
- Connecting a TC3848-3 FXS interface to a dial-up meter in the field and a TC3848-4 to a PBX to enable a PC with a built-in dial-up modem to collect information and communicate with a central office.
- Connecting ATM or Credit Card Machines to a central processing center

## 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



Typical Application using the JumboSwitch TC3848-3/4 to extend analog phones or legacy dial-up devices over Ethernet/IP networks

### Electrical

FXS/FXO Interface  
 Impedance.....600Ω  
 Frequency band.....300 to 3400Hz  
 Connector.....RJ11  
 Ethernet Interface  
 Standards.....IEEE 802.3,  
 .....802.3u, 802.1p&Q  
 Connector.....RJ45  
 Console Interface  
 Connector.....2.5mm Audio Jack

### SLIC Characteristics

Maximum Ringer Load (REN).....3  
 Ringer Voltage..... 50Vrms  
 Distance.....4,000 feet (1.2192 km)

### Management

Web, SNMP, Serial Console,  
 and Telnet

### Regulatory Approval

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

### LEDs

Unit Status.....PWR (A, B), Alarm, BU  
 .....PL, Vcc, BP, MGM  
 Channel.....Ring, Hook  
 Ethernet.....Link, Duplex

### Power

Standard.....12VDC  
 Optional.....24VDC, -48VDC  
 .....or 125VDC (1U/ 2U/ 4U only)  
 .....90-260 VAC, 50/60Hz  
 Power Consumption.....<10W

### Operating Temperature

Standard 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.....(0.3 kg) 0.75 lbs

### Ordering Information

TC3848-3-2 .....2 Ch. FXS  
 TC3848-3-4 .....4 Ch. FXS  
 TC3848-4-2 .....2 Ch. FXO  
 TC3848-4-4 .....4 Ch. FXO



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