

- 4 FXS + 1 FXO (TC3848-1); or 5 FXO (TC3848-2)
- Extreme Temp (-40°C to +80°C) Optional
- Audio Codes Standards  
G.711 ALAW/ULAW  
G.726-32  
T.38 Fax
- Internal Address Book
- Compatible with SIP
- Manage via Web, SNMP or Telnet
- Remote Firmware Upgrade
- Meets or Exceeds IEC 61850-3, IEEE 1613, & NEMA TS-2, Standards
- Member of the JumboSwitch® Product Family



TC3848-1/2 with Various JumboSwitch Cages and Chassis

**VoIP+**, TC3848-1/2 is a complete telephony solution that merges the simplicity of Ethernet with the call processing features of PABXs into one compact interface card. With no central hub required, the TC3848-1/2 utilizes cutting edge VoIP technology to become a self-contained phone system/product.

Designed to withstand the harshest environments, the TC3848-1/2 is the industry's first VoIP Virtual-PBX. It is the ideal solution to bring phone service into harsh environments where industrial grade equipment is a must. By simply connecting the TC3848-1/2 to your existing LAN, it is the easiest and most flexible way to connect the Telco world with the IP world.

The TC3848-1/2, like all JumboSwitch product family interface cards, meets or exceeds pertinent industry standards including IEC 61850-3, IEEE 1613 for networking devices and NEMA TS-2 for traffic control environments. Please refer to the chart on page 4 for details on specific tests.

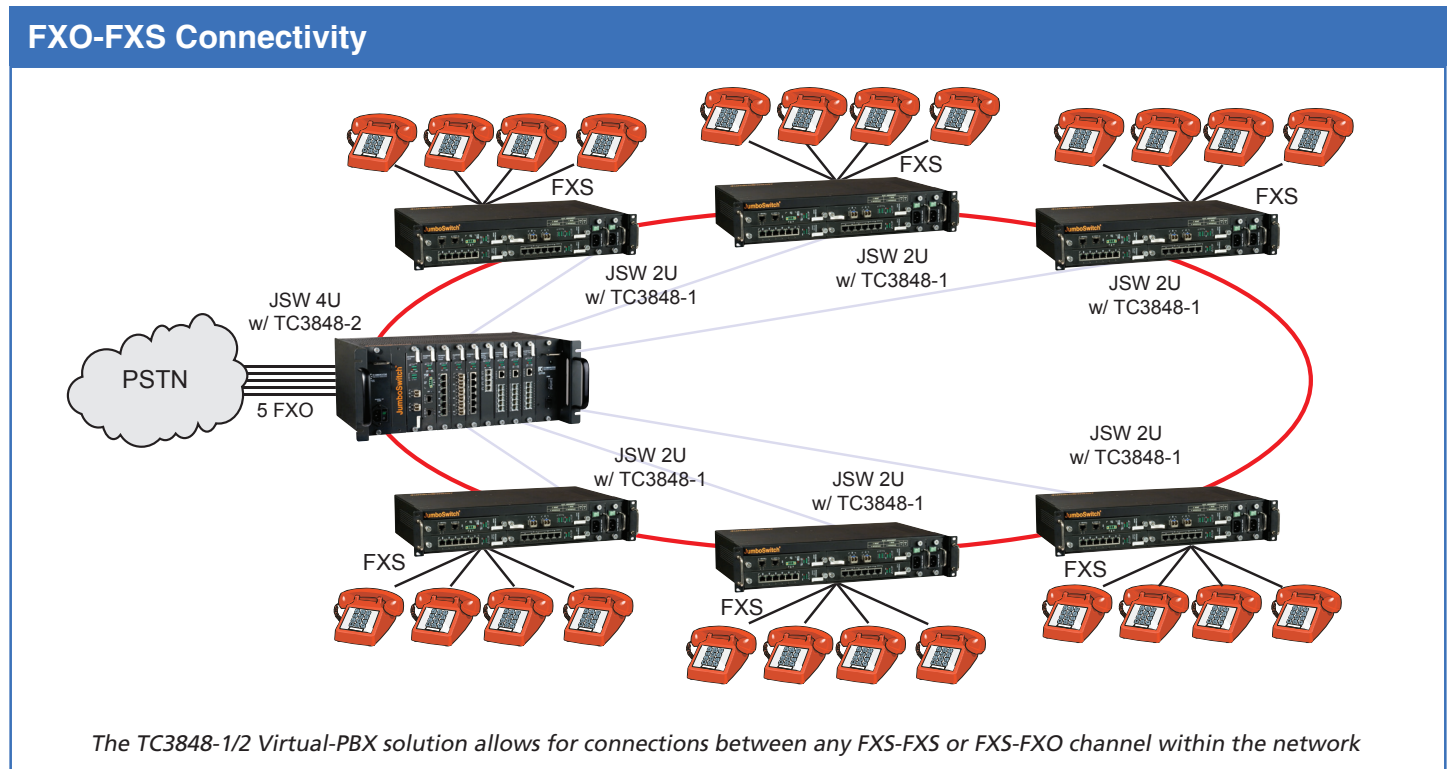
## Applications

**VoIP+** is ideal for creating phone solutions for private LANs in harsh environments. Seamlessly integrate reliable phone service and comprehensive call processing features without having to use PBXs.

It is the first industrial grade VoIP Virtual PBX product in the industry.

\***VoIP+** is a function of JumboSwitch Family; A voice over IP product answers to higher standards, it's not just a gateway, but a complete PABX by itself.

The TC3848-1/2 features all essential PABX call processing features including 3-Way Conferencing, Call Forwarding, Music on Hold, Call Transfer, Call Waiting, Hot Line, Group Hunting, Volume Control, Mute, Caller ID and more. Compatible with analog phones, the TC3848-1/2 utilizes IEEE 802.1p/Q QoS prioritization to guarantee consistent, toll quality voice, regardless of network traffic. It is straight forward to setup, so it works with existing phone systems. No need to re-train your users.



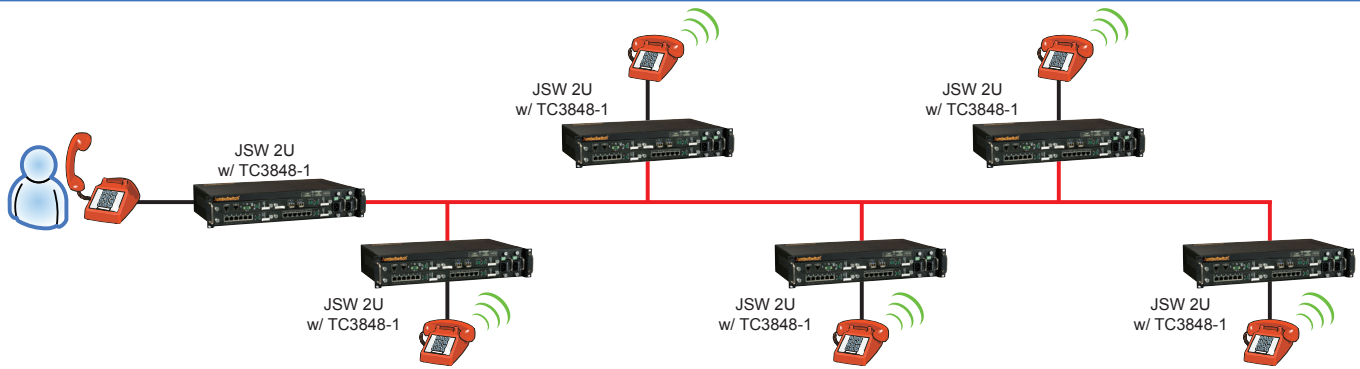
- Auto-Attendant - Transfer callers to the desired extension without the need of a receptionist
- Caller ID - 2 lines of identification displaying the name and number of the caller
- Hot Line - Create an instant phone connection by simply picking up your phone to ring a remote phone
- Group Hunting - Distribute phone calls to multiple locations anywhere within your VoIP network
- 3-Way Conferencing - 3 parties can connect at the same time in a conference call
- Call Processing - Comprehensive features to assist callers, such as Call Forwarding, Music on Hold, Transfer, Fax, etc.
- Temperature & Power Monitoring - Monitor the live temperature and power usage of each card to ensure operation

\* Phone connectors are RJ-11F, and the 10/100M Ethernet connector is RJ-45F. It is available with two temperature options: -20°C to 70°C or -40°C to 80°C. The TC3848-1/2 is a member of the JumboSwitch family, can fit into any available JumboSwitch housing options including 2S Standalone chassis and 1U/2U/4U card cages. Power redundancy is standard.

## Features

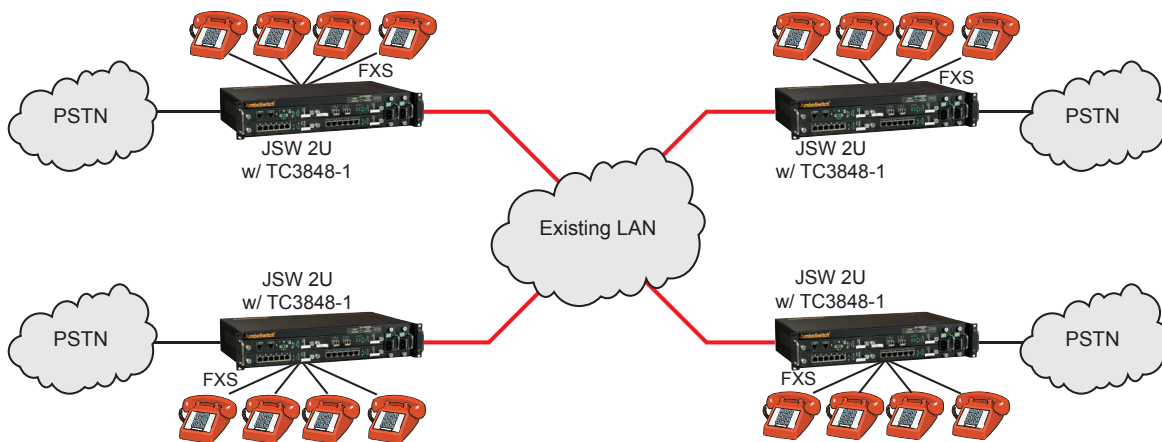
Management is simple and comprehensive. Accessible via a web browser, Telnet, or SNMP. Password protection prevents unauthorized phone service use. Diagnostic LEDs include power, Ethernet status, as well as Ring and Hook status.

### Hot-Line



The TC3848-1/2 has a built-in address book that allows it to operate as a fully functioning and independent telephony system for up to 100 phone numbers, without the need of an additional SIP server or Call Manager. It also supports SIP protocols with an external SIP server. With its straightforward FXS and FXO port connectivity, it is possible to gracefully extend PSTN service from a single node to several remote locations. This eliminates the need for excessive PSTN lines and even the PBX itself!

### Stand Alone VoIP in Existing LAN



## 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

**Audio Codec**

- G.711 ALAW/ULAW
- G.726-32
- T.38

**Features**

- 16 ms Echo Cancellation
- Password Protection
- QoS Prioritization

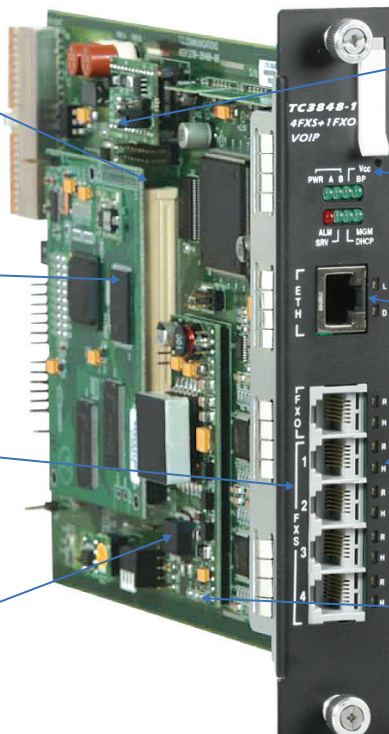
**VoIP Card Options**

- 4 FXS + 1 FXO
- 5 FXO

**Call Processing**

Virtual PBX Built-In

- Auto Attendant
- 3-Way Conferencing
- Group Hunting



**User-Friendly**

Simple to Manage Using Any Web Browser

**Visual Diagnostics**

LED Diagnostics

- Power
- Management

**Ethernet**

10/100M Auto-Negotiation

**Phone / Line Status**

- Ring
- Hook

**Industrial Hardened**

- Operating Temperature -20°C to 70°C
- 40°C to 80°C (Optional)
- Optional Conformal Coating
- Meets or Exceeds IEC 61850-3, IEEE 1613, NEMA TS-2

**Interfaces**

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

**Media Processing**

Voice Codec.....	G.711 ALAW
.....	G.711 ULAW
.....	G.726-32, T.38 Fax
.....	G.729 Optional
Silence Suppression.....	VAD, CNG
Adaptive Jitter Buffer.....	300 msec

**Packetization**

RTP/RTCP.....	RFC 3350, 3551, 2198
DTMF Relay.....	RFC 2833

**Protocols**

VoIP Signaling Protocols	
SIP - RFC 3261, 3262, 3263, 3264, 2327	
Ethernet Protocols	
HTTP, IPv4, TCP, UDP, ICMP, ARP, DNS, IEEE 802.1p/Q, QoS, IEEE 803/3u/3x	

**SLIC Characteristics**

Maximum Ringer Load (REN) .....	5
Short/Long Haul	
Ringer Voltage .....	65Vrms
Distance .....	18,000 feet

**Regulatory Approval**

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

**LEDs**

System Status .....	PWR A, PWR B
.....	SRV, Vcc, ALM, DHCP, BP, MGM
Phone.....	Ring, Hook
Ethernet.....	Link, Duplex

**Power**

Standard.....	12VDC
Optional.....	24, -48VDC
.....	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.....	(0.3 kg) 0.75 lbs



SAI GLOBAL  
ISO 9001  
Quality

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



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