

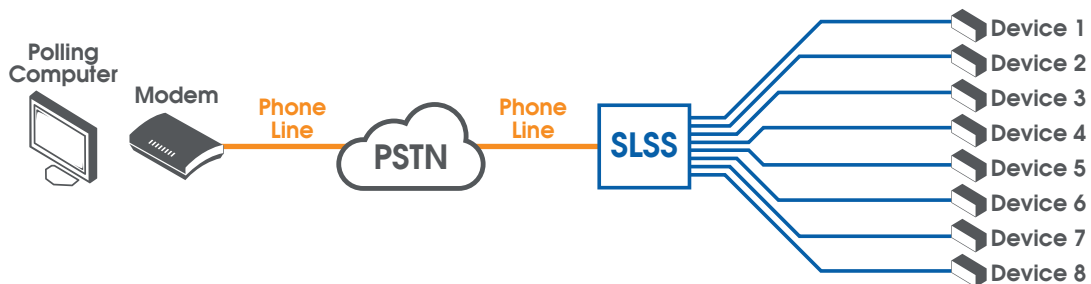
IEEE 1613 Compatible Substation Line Sharing Switch



Application Note

A common application for substation meter polling is the use of a substation line sharing switch (SLSS).

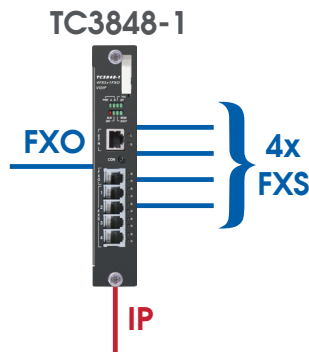
An SLSS allows the sharing of phone lines between multiple devices using over dialling to select each part. A typical example of this is as follows:



The SLSS allows the use of one phone line to select any of the devices by the polling computer, selecting them by over dialling an extension number assigned to the required device. This significantly reduces the number of dedicated phone lines required for the purpose of polling the remote devices. SLSS devices are typically designed with 8 ports. This application note describes a more flexible solution of 4-28 ports using a modern flexible design.

TC3848-1 4+1 Ch. VoIP+ with virtual PBX

The TC3848-1 has 1 FXO port coupled with 4 FXS ports



Used individually, the TC3848-1 has a virtual PBX to allow routing of the FXO port to one of the FXS ports.

The virtual PBX is fully configurable to allow the unit to be configured as a drop-in replacement for existing SLSS devices.

IEEE 1613 Compatible Substation Line Sharing Switch

For a single unit there are the following packaging options:



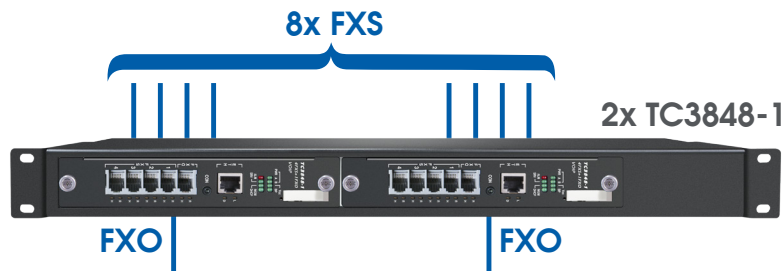
Standalone unit
Wall-mountable



1U
Rack mountable

Port Expansion

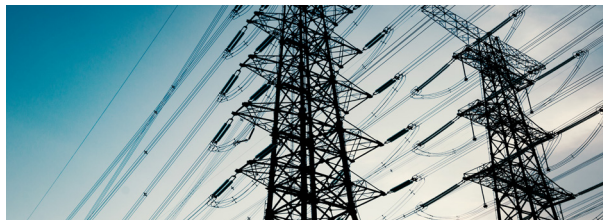
To expand the number of ports, simply add more TC3848-1 units.
For 8 ports, the configuration will look as follows:



In this configuration, the user can use one or both of the FXO ports as the virtual PBX allows either of the FXO ports to access any of the FXS ports.

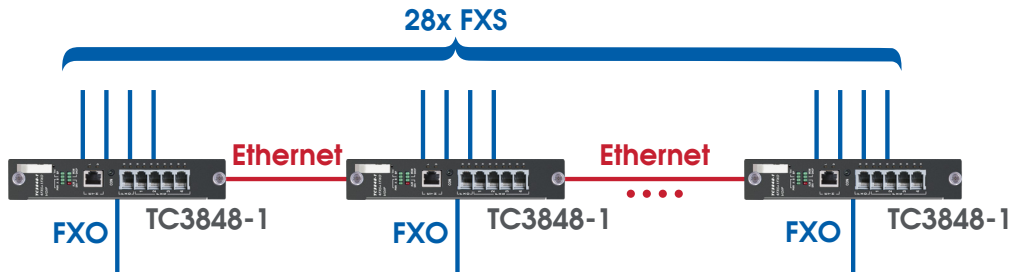


Mounting will be provided as a 1U rack containing the two TC3848-1.



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Because of the flexibility of the TC3848-1, users may use this to share a single line to 8 or more ports. Alternatively, the FXO ports can be corrected to multiple polling locations for ultimate flexibility. Users may continue to add TC3848-1 up to at least 28 FXS ports by connecting the units via the included Ethernet port. Therefore, a 28 port SLSS will look as follows:



Again, although there are 7 TC3848-1, they all share the same virtual PBX, so any FXO ports can access any of the FXS ports. Mounting is flexible, up to and including, a 4U rack shown below.



Features and specifications

- Optional Extended Temperature range
 - » -40°C to +80°C option
- Redundant power supplies
 - » All units have dual redundant power supplies
- AC and DC operation
 - » 110-240 VAC
 - » -48 VDC
 - » 12 VDC
 - » 125 VDC
 - » 24 VDC
- 5 year standard warranty
 - » May be extended to 10 year warranty

Appendix

Data Sheet

VoIP+™

A JumboSwitch Technology

- 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



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

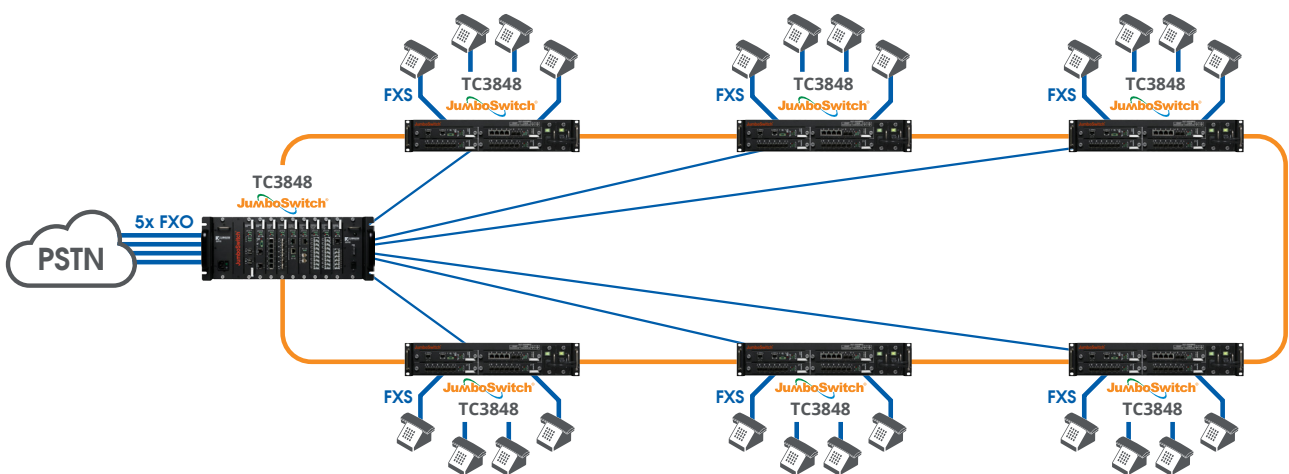
VoIP+ is ideal for creating phone solutions for private LANs in harsh environments. Seamlessly integrate reliable phone service and comprehensive call processing features without having to use PBXs.

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

Appendix

Introduction

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.

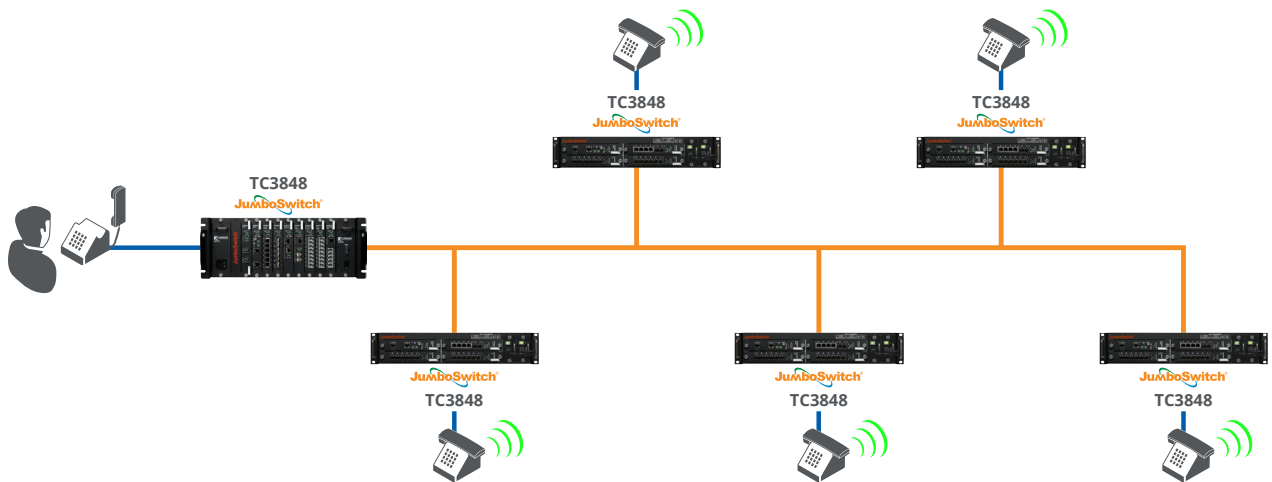


- Auto-Attendant - Transfer callers to the desired extension without the need of a receptionist
- Caller ID - 2 lines of identification displaying the name and number of the caller
- Hot Line - Create an instant phone connection by simply picking up your phone to ring a remote phone
- Group Hunting - 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

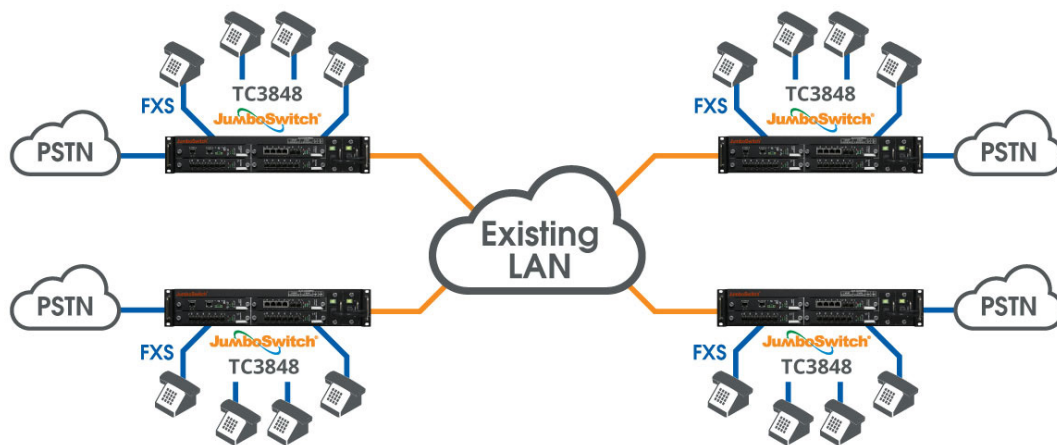
Appendix

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.



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!



Appendix

Audio Codec

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

Features

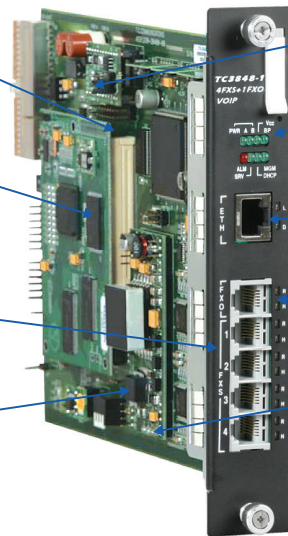
- 16 ms echo cancellation
- Password protection
- QoS prioritization

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

- Operation 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



Designed and made in
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Note: Information contained in this document is subject to change without prior notice.
LT231201 ver120123



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