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PROBLEM SOLVED

Installation and Operation Manual

Telco Sentinel
Bi-directional USB DTMF/ASCII transceiver with built-in hybrid

Manual update: 07/23/2013
Firmware Version 1.07 and above. If you need a firmware upgrade, contact Broadcast Tools®

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INTRODUCTION

Thank you for your purchase of a BROADCAST TOOLS® TELCO SENTINEL, bi-directional USB DTMF/ASCII transceiver with built-in hybrid (referred to as the TELCO SENTINEL throughout this manual). We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the BROADCAST TOOLS® TELCO SENTINEL.

SAFETY INFORMATION

Only qualified technical personnel should install the TELCO SENTINEL. Any attempt to install this device by a person who is not technically qualified could result in a hazardous condition to the installer or other personnel or damage to the TELCO SENTINEL or other equipment. Please ensure that proper safety precautions have been taken before installing this device. If you are unfamiliar with this type of equipment, please contact a properly qualified engineer to handle the installation and setup of the TELCO SENTINEL. Broadcast Tools, Inc., is unable to support NON-Broadcast Tools software, hardware or NON-Broadcast Tools computer/hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturers technical support department.

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

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Designed, Assembled and Supported in WA State, USA

Product Overview

The Telco Sentinel is a bi-directional DTMF/ASCII transceiver. It converts DTMF tones to ASCII and ASCII to DTMF tones when connected to a telephone line and provides incoming caller ID data. The unit is also equipped with an electronic hybrid providing send and caller audio on 3.5mm jacks, along with removable screw terminals. The Telco Sentinel interfaces with the PC via a USB Com port. Tones are transmitted at a selectable speed of 50ms, 100ms or 500ms tone/space. A post-transmit delay of 0.0 to 9.9 seconds can be added that will cause a delayed transmission of tones after the string is received on the USB port. The DTMF transmit buffer is 256 characters long. The Telco Sentinel can be configured to automatically answer after between 1 and 9 rings, or auto-answer may be disabled. Front panel send and caller telephone line audio trimmers are supplied, along with front panel LED's display; power, ring, hook and tone. The Telco Sentinel is USB bus powered.

Features/Benefits

- Bi-directional DTMF/ASCII transceiver
- Decodes caller ID data.
- Built-in electronic hybrid for caller/send audio.
- USB COM port interface for connection to PC.
- LED indicators for power, ring, hook, and tone detection.
- Fully RFI proofed.
- USB bus powered.
- Up to four Telco Sentinels may be rack mounted on one RA-1, 1-RU rack shelf.

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OVERVIEW
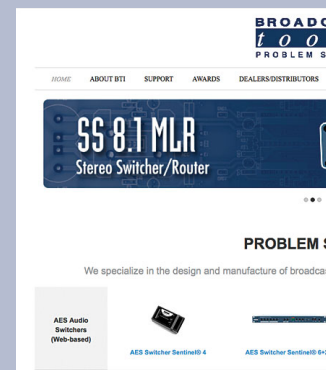
Inspection

Please examine your TELCO SENTINEL carefully for any damage that may have been sustained during shipping. If any damage is present, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package should contain the TELCO SENTINEL, a USB type A/B cable and a RJ11 phone cable. Manuals may be downloaded from our web site.

Installation

Surge Protection

The TELCO SENTINEL has built-in resistance to voltage changes; we recommend that you use a power surge protector or line conditioner on the incoming lines. Lightning strikes and/or other high voltage surges may damage your TELCO SENTINEL and connected equipment if it is not properly protected. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

LED indicators

- "PWR" LED: Indicates that the Telco Sentinel is powered up (green.)
- "HOOK" LED: Lit when line is seized (off hook) (yellow.)
- "RING" LED: Lit when ringing is detected on line (red.)
- "TONE" LED: Indicates valid DTMF tone decode (red.)

USB Port

This type B USB port powers the Telco Sentinel and is used to interface the Telco Sentinel to the computer via a virtual COM port. See the "USB Serial Setup" section of this manual for more information.

Telephone (Telco) Jack

RJ11 jack for connection to a phone line.

Caller/Send Audio

The Telco Sentinel's built-in electronic hybrid allows for audio to be recorded/monitored from the phone line (caller audio) as well as for audio to be sent to the phone line (send audio) by external audio interfaces.

Caller Level/Send Level

The front panel "Caller Level and "Send Level" adjustment trimmers may be used to adjust the caller output audio and send input audio levels to the desired loudness.

Unbalanced Caller/Send Audio (3.5mm jacks)

Unbalanced audio connections can be made via the Caller and Send 3.5mm TRS jack connections. The TRS jacks are configured for dual mono output/input which means that mono audio is carried on the tip well as the ring and ground is provided on the sleeve of each connection.

Balanced Caller/Send Audio (Terminal Block)

Balanced audio connections can be made via the 5-position pluggable euro-style terminal block labeled "Audio." See below for a connector pin-out.

SEND −	SEND +	GND	CALLER −	CALLER +

NOTE: All connections and indicators are noted on the top cover label.

Jumper Settings

JP3: DTMF Tone detection jumper (Guard time)

The Telco Sentinel is equipped with a 4-position jumper, labeled "JP3" on its PCB. This is used to adjust how quickly DTMF tones are detected. The settings are as follows:

F = Fast, 50ms ON / 50ms OFF

M = Medium, 100ms ON / 100ms OFF

S = Slow, 150ms ON / 150ms OFF.

To detect multi-tone bursts, the jumper should be left in the default position F = Fast.

USB Serial Operation

To control the Telco Sentinel, you must connect it to the USB port of a PC running a serial terminal program such as HyperTerminal, or PuTTY. When you first plug the Telco Sentinel into your PC it should automatically install the correct FTDI USB Serial "Virtual COM port" drivers which will allow you to access the Telco Sentinel on a COM port. Set the terminal program to 9600,8,N,1, flow control to NONE. Character Echo should also be turned ON. **NOTE:** If the Telco Sentinel's FTDI USB Serial "Virtual COM port" drivers do not automatically install they may be downloaded here: http://www.ftdichip.com/Drivers/VCP.htm

Information Retrieval/Setup Commands

The (@) ampersat/at sign symbol is the beginning of string followed by the command/parameters. No carriage return or line feed is required. Commands are NOT case sensitive.

@Pnn – Sets the wait time between the receipt of an ASCII string and the generation of DTMF tones. When <nn> is the number of 100ms units that it will wait after receiving an ASCII string before sending DTMF. This is actually nn+100ms as there is an initial 100ms wait when receiving ASCII before any processing is done. This number can be 00-99.

> **Command example:**   @P01 will set the DTMF generation delay to 200ms
> **Response example:**   P=01<cr><lf>

@P? – Returns the current stored DTMF generation delay value: P=<nn>
> **Response example:**   P=01<cr><lf>

@Rn – Sets the number of rings before auto-answer. Where <n> is a number 0-9, 1-9 is the number of rings and 0 will disable auto-answer.
> **Command example:**   @R1 will set auto-answer to one ring.
> **Response example:**   R=1<cr><lf>

@R? – Returns the current ring value.
> **Response example:**   R=1<cr><lf>

@Sn – Sets the tone duration and tone spacing for generated DTMF tones.

Three spacing settings (<n>) are available 1, 2, or 3:

1=50ms tones with 50ms spacing.

2=100ms tones with 100ms spacing.

3=500ms tones with 500ms spacing.
> **Command example:**   @S1 will set tone duration and spacing to 50ms.
> **Response example:** S=1<cr><lf>

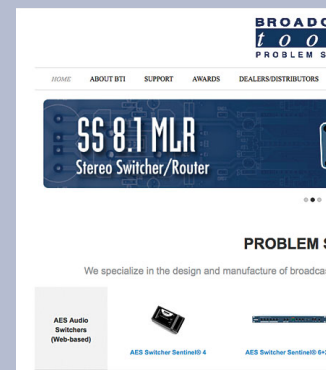**@S?** – Return the current tone duration and tone spacing value.
> **Response example:** S=1<cr><lf>

@U – Return unit model and firmware version :<product name> <version><cr><lf>
> **Response Example:** BTI TELCO SENTINEL v1.06<cr><lf>

INSTALLATION

Control Commands

@T – Takes phone line off-hook with loop current check. Will return @T when off hook and @H when the hang-up occurs.

      Response example (off-hook):   @T
      Response example (hang-up):   @H

@H – Will hang-up the phone line and return a @H.
      Response example: @H

@I – Takes phone line off-hook without loop current check. It will return a @I on the serial port when off-hook. This is useful for interfacing dry lines or for non-phone applications.
      Response example: @I

Caller ID data

The Telco Sentinel will output raw caller ID data to the USB Com port when it is present with an incoming call. All caller ID data is prefaced with the string: @CID followed by the raw Caller ID data.

NOTE: At least two rings must occur before pick-up for caller ID data to be transmitted and received.

Operation

      When the appropriate number of rings are detected by the Telco Sentinel it will go off-hook and return @T.

      To generate DTMF tones from a character string simply send the data string to the Telco Sentinel's USB Com port at 9600,8,N,1,None. Up to 256 characters can be accepted in one string. 50ms after the last character of the string is received the Telco Sentinel will begin generating DTMF tones from the ASCII string. No carriage return is needed to terminate DTMF tone generation commands, only the above mentioned 50ms pause.

      For example to have a DTMF tone burst of 12345 sent, you would send the ASCII characters 12345 in one packet and 50ms after the 5 is received it will begin generating the DTMF tone burst.

The comma "," can be used to generate a one second pause within a tone burst and the semi-colon ";" can be used to generate a 100ms pause within a tone burst.

For example the ASCII string: 9,,15416872118 will dial 9, wait 2 seconds then dial 541 687 2118.

Any DTMF tones received on the phone line will automatically be decoded and immediately output over the USB Com port.

SPECIFICATIONS

Audio Inputs (Send):	Unbalanced 3.5mm jack, left and right mono. 11k impedance. Balanced mono terminal block input. 22k impedance.
Audio Outputs (Caller):	Unbalanced 3.5mm jack, left and right mono. 47 impedance Balanced mono terminal block output. 100 impedance.
USB Serial Port	USB Type B jack. FTDI Virtual Com Port chipset, 9600 baud, 8 data bits, no parity, 1 stop bit. Handshaking disabled.
Logic	Flash Microprocessor w/non-volatile memory
Power	USB bus powered.
Power Indicator	Green LED
Mechanical	6.10" x 3.75" x 1.60" (DWH)
Weight	1.5 pounds
Options	RA-1, 1-RU rack shelf. Up to four units may be accommodated.

WEBSITE:
Visit our web site for product updates and additional information.

SPECIFICATIONS
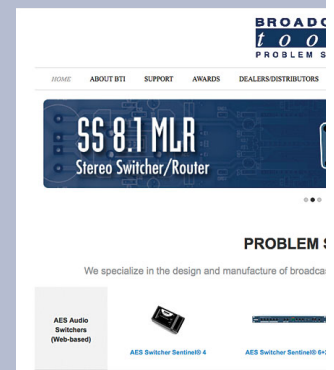
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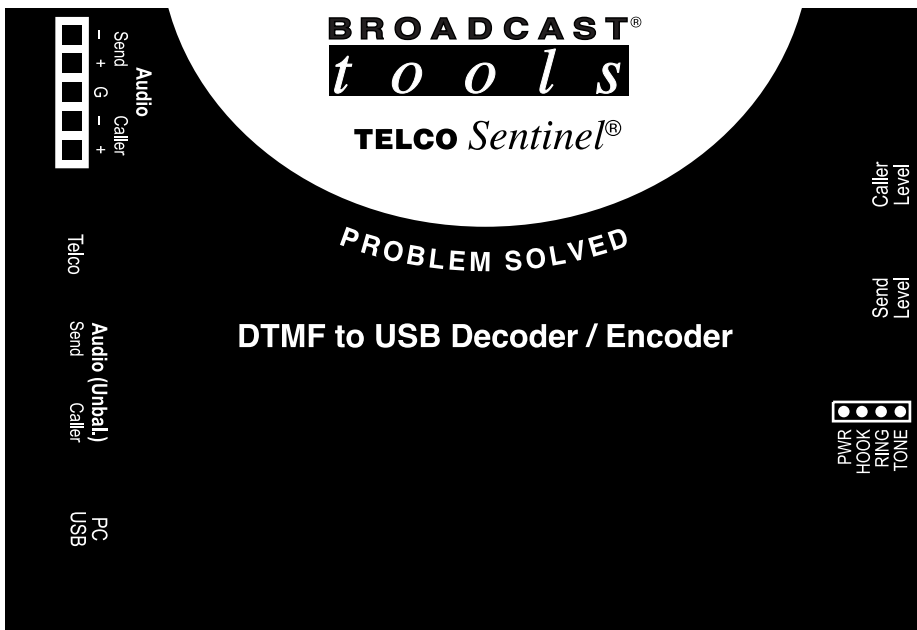
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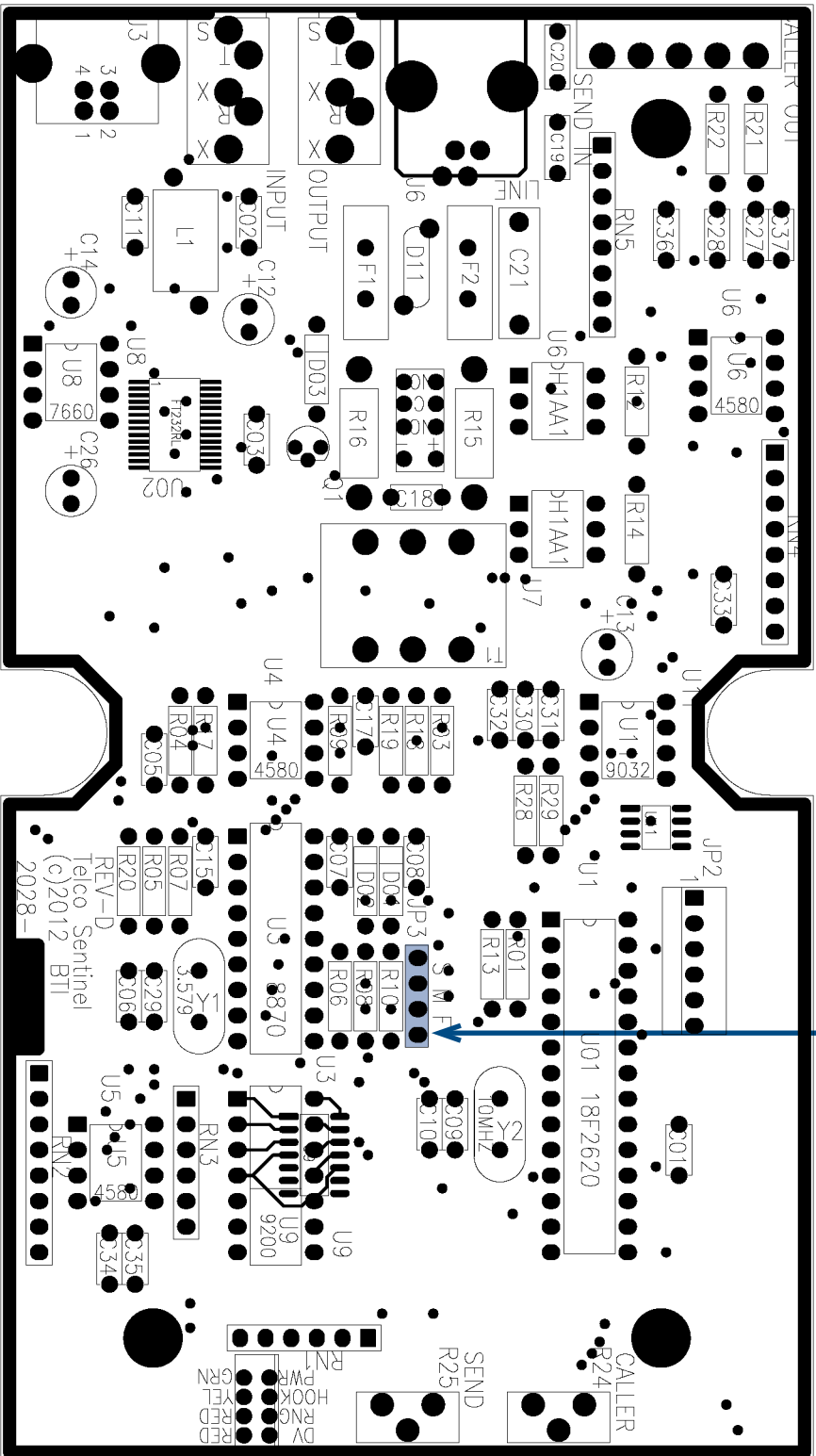
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TELCO *Sentinel*®

PROBLEM SOLVED

DTMF to USB Decoder / Encoder

Audio
Send   Caller
− + G − +

Telco

Audio (Unbal.)
Send   Caller

PC
USB

Caller
Level

Send
Level

PWR
HOOK
RING
TONE

Broadcast Tools® Telco Sentinel®

Jumper and Connection Layout

Detection Jumper

Fractional Schematic

Unbalanced
Consumer Level
Stereo Telco
Send Audio Input

Pro-Level
Balanced Telco
Send Audio Input

Pro-Level
Balanced Telco
Caller Audio Ouput

Front Panel Telco
Send Audio Trimmer

Front Panel Caller
Audio Trimmer

Unbalanced
Consumer Level
Stereo Telco Caller
Audio Output

CALLER OUT

LINE IN

INPUT

OUTPUT