



Signalink™ USB

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Installation & Operation



- INTRODUCTION -

The Signalink USB combines the legendary performance of our SL-1+ with a state of the art built-in low-noise sound card. This innovative design offers many advantages over traditional sound card interfaces that must use the computer's sound card. These include optimal performance, greatly simplified installation and operation, and the ability to easily run multiple interfaces on one computer at the same time.

The Signalink USB supports ALL sound card Digital and voice modes. This includes "legacy" modes such as RTTY, SSTV and CW, as well as today's most popular modes like PSK31, MT-63 and EchoLink. Performance on all modes has been optimized by the use of special low-noise parts and careful design techniques, while convenient front panel controls let you adjust your Transmit Audio, Receive Audio and Transmit delay "on the fly".

The Signalink USB is designed and manufactured using only the highest quality components. Assembly is done using "state of the art" robotic production equipment. Strict testing of every unit, and our high level of quality control insures you of a premium quality product that will provide many years of dependable service. A great deal of effort has gone into the design and manufacture of the Signalink USB, and we think you'll agree that we have offered a level of innovation, quality, and value that cannot be beat!

- INSTALLATION OVERVIEW -

The Signalink USB is easy to install and operate. However, if it is not installed and operated correctly, you will not realize its best performance and in extreme cases you can damage your other equipment. Therefore, it is extremely

important that you take the time to read these installation instructions carefully to avoid any possible problems.

The Signalink USB will be installed in two steps. First you will install the jumper wires, and then you will connect the unit to your computer's USB jack. If after completing the installation you have any difficulty, please refer to the "Troubleshooting" section at the end of this manual. It covers most of the common problems that you might run into. Technical Support for the Signalink is also available if you need it. Please see the "Technical Support" section of this manual for more information.

- WHAT YOU WILL NEED -

The Signalink USB is supplied with everything needed to connect to your computer and radio. If the Signalink jumper settings for your radio are not available on our web site or CD, then you will need a multi-meter to verify your radio wiring. Some customers may find needle-nosed pliers to be helpful when installing the jumpers. You will need software for testing when the installation is complete. We have supplied some of the most popular programs for the most popular modes on our software CD. You can also download additional software from the main page of our website at www.tigertronics.com.

- OPENING THE SIGNALINK USB CASE -

To open the Signalink USB, we suggest that you open the **FRONT** of the unit while leaving the three knobs attached. This can be done by removing the four front Allen screws with the supplied Allen wrench, and **CAREFULLY** sliding the circuit board and front cover forward. **To avoid scratching the front panel or damaging the Signalink's front panel controls, we strongly suggest that you sit the circuit board on a book or other raised insulated surface when installing the jumper wires.** When you are ready to re-assemble the Signalink USB, **CAREFULLY** slide the circuit board back into the case and re-install the four Allen screws (note that the circuit board sits on the bottom most rail). If you have any difficulty re-installing the circuit board, you can remove the rear panel to make it easier.

- CONNECTING THE RADIO -

CAUTION – Before connecting the *Signalink* to your radio, read this entire section thoroughly. Both the *Signalink* and your radio can be damaged by improper installation. If you have already attached the *Signalink* to your computer, then you will need to unplug the USB cable BEFORE installing the jumper wires.

The *Signalink* USB attaches to the radio through an 8-pin RJ-45 connector located on the rear of the unit. A radio cable with the appropriate connector for your radio was supplied with the *Signalink* USB for this purpose. One end of this cable plugs into the *Signalink*'s "RADIO" connector, and the other end plugs into the radio's Mic, Data, or Accessory Port connector. This cable brings all of the required radio lines into the *Signalink* USB, so that each signal can be connected to the appropriate matching line inside the *Signalink*.

The *Signalink* USB uses the radio's Ground, PTT, Speaker and Mic lines. Because the location of these signals on the radio connector varies from radio to radio, we have provided a "Programming Socket" inside the *Signalink* (see JP-1 in Figure-4). The Programming Socket provides a convenient way to route the various signals to the correct pin on the radio connector. This is accomplished with "press-in" jumper wires so that no soldering is required.

Jumper settings for most common radios are provided on the *Signalink* CD and on our web site. Some of our radio cables also include the jumper settings with the cable. If jumper settings were supplied with your radio cable, then you can skip to the "Install Jumper Wires" section below, and install the jumpers as shown on that document. If you did not receive printed jumper settings with your cable, then please check the "Jumper Settings" section of the *Signalink* CD, or our web site. If you find the settings for your radio listed there (*please be certain that you are looking at the jumper settings for the correct radio model and cable!*), then skip to the "Install Jumpers Wires" section below and install the jumpers as shown. If we do not have the jumper settings for your radio available, then you will need to follow the "Detailed Jumper Installation Procedure" near the end of this manual, or contact Technical Support for assistance.

Install Jumper Wires

NOTE: The *Signalink* USB NEVER needs external power, so socket JP-1 does NOT have a "PWR" pin like earlier *Signalink* models. You can disregard the "PWR" jumper when installing the jumpers for the *Signalink* USB. All other jumpers should be installed as shown.

We have provided pre-stripped jumper wires with the *Signalink* USB. These wires are 24ga AWG and fit perfectly in the *Signalink*'s jumper socket. ***If you use any other wire to install the jumpers, then this wire MUST be 24ga AWG, or you will damage the Signalink's socket.*** Installation of the jumper wires can be done without any tools, but you may find it easier to do with needle-nosed

pliers. If you do use needle-nosed pliers, be sure to grip the wire close to the end that you are installing in the socket. When pushing the wires into the socket, be very careful not to bend them back and forth or they might break. The wires are quite durable and can be re-installed many times if you are careful, but if you break a wire off in the socket, there is no way to remove it. You will have to have a new socket installed! This should not be an issue if you are just a little bit careful.

Once you have all of the jumpers installed, please take a few minutes to look them over. You should have the "SPKR" jumper installed only if you have Speaker/RX audio available on the radio connector that you are using. If this signal isn't available (this is a possibility with Mic jacks), then this jumper should not be installed. Instead, you will need to connect the provided mono cable from the External Speaker or Headphone jack of your radio, to the SPKR jack on the rear panel of the *Signalink* USB. This will pass the radio's Speaker Audio signal into the *Signalink*. Once you are confident that the jumpers are installed correctly, you can put the *Signalink* USB circuit board back into the case (see "Opening The *Signalink* Case" at the beginning of this manual).

- AUXILIARY AUDIO OUTPUT -

The *Signalink* USB has an Auxiliary Audio jack ("Aux") on the rear panel that can be used to attach an external radio speaker, or headphones for monitoring receiver audio. This especially useful if your radio's built-in speaker has been cut-off by a speaker/headphone connection to the *Signalink*. Note that the Aux jack can only be used with a speaker/headphones if the *Signalink* USB is connected to high-level Speaker audio. If the *Signalink* USB is connected to your radio's Data or Accessory Port, then you will not be able to use this output for monitoring because virtually all of these ports have low-level outputs.

NOTE: Attaching or removing an external speaker while you are using the *Signalink* USB will change the loading on the radio's speaker circuit. This will probably cause a change in the level of audio going to the *Signalink* USB, and may require you to re-adjust the *Signalink*'s RX level control or the radio's Volume control to compensate.

- TRANSMIT AUDIO MONITOR OUTPUT -

The *Signalink* USB has a Transmit Audio Monitor jack ("Mon") on the rear panel that can be used with amplified speakers or high-impedance headphones to monitor the *Signalink*'s Transmit Audio signal. The output level of this jack varies with the computer's software volume controls, and provides a maximum level of approximately 400mv p-p into 1Kohm. This is sufficient to drive most amplified speakers and high-impedance headphones, but not un-amplified speakers.

NOTE: The Monitor output is NOT isolated from the computer, so it may be possible to hear low-level power

supply hum or noise generated by the computer or amplified speakers. This is normal and is NOT an indication that your Transmit Audio is noisy. The actual Transmit Audio signal going to the radio is FULLY ISOLATED from the computer and noise free.

- CONNECTING THE COMPUTER -

IMPORTANT: You should connect the Signalink USB to your computer only AFTER you have installed the jumper wires. If you are running Windows 98, you will need to have your Windows Installation CD available when you connect the Signalink USB to the computer.

The Signalink USB can be connected to any standard USB 1.1 or USB 2.0 jack on your computer. We have provided a standard USB cable for this purpose. Before attaching the USB cable, your computer should be turned ON, and Windows (or another supported Operating System) should be running. All communications programs and other software should be closed.

We suggest that you plug the computer-end of the USB cable into the computer first, as this will help drain any static electricity off of you, and minimize the chance of static damage to the Signalink. The computer end of the USB cable has a flat rectangular shaped “A” type plug and will fit into the USB jack only one way. If it doesn’t plug in, then you either have turned it the wrong way, or you are trying to plug it into a non-USB jack. The Signalink side of the cable can be plugged in after the connection to the computer has been made. This end of the cable has a USB “B” type connector installed and plugs into the Signalink’s rear panel “USB” jack. This connector is also “keyed” and will only fit one way.

When the USB connection between the Signalink and the computer is complete, Windows (or other supported Operating System) will automatically detect and install the required drivers. You should see several “New Hardware Found” messages as the drivers are installed. Your installation CD will not be needed unless you running Windows 98. If you are running Windows 98, then you MUST have your Installation CD available, or you will not be able to install the Signalink USB.

Once the Signalink USB drivers have been installed (this typically takes less than a minute), your computer will display a message indicating that “Your new hardware is installed and ready to use”. The Signalink USB is now ready for use, however we suggest that you take a few minutes to configure Windows and your communications program(s) to best use it. This is easy to do and is described below in the “Sound Card Selection” section.

NOTE: If you move the Signalink USB to a different USB port, Windows will detect this and re-install the Signalink USB drivers for the new port. Windows will do this one time for each different USB port that you use.

- SOUND CARD SELECTION -

Because the Signalink USB has its own built-in sound card, you will want to configure Windows to play its “System” sounds through your *computer’s* sound card instead of the Signalink USB. Your communications program can then be configured to use only the Signalink USB. This will eliminate any unwanted sounds from being transmitted accidentally, and allow your computer’s sound card and speakers to function as they normally would.

To configure Windows, follow the steps below. If you are using a different operating system, then please contact our Technical Support Staff for assistance (See the Technical Support section of this manual).

- Click the “Start” button and select “Control Panel”
- Double-click the “Sounds and Audio Devices” icon.
- A “Sounds and Audio Devices Properties” window will open. This window will look similar to the one shown below in Figure 1.

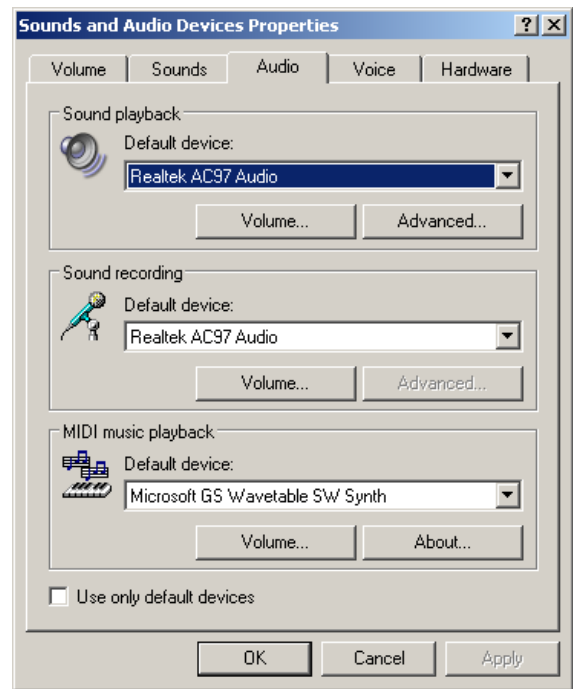


Figure 1 - Sound and Audio Devices Properties

- Click the “Audio” tab.
- Under “Sound Playback” and “Sound Recording”, select your computer’s soundcard as the “Default Device”. The exact name of your computer’s soundcard will vary, but unless you have more than one sound card installed, you will only see the computer’s sound card and the Signalink’s sound card listed (“USB Audio Codec”). Click the OK button and close the Control Panel.

- Your computer is now configured to send all system sounds to your computer's sound card and speakers (see the important note below).

NOTE: If your computer is used only for Amateur Radio Operation, then you might want to select the Signalink USB ("USB Audio Codec") as your default sound card. This will force all programs (communications and otherwise) to always use the Signalink USB. This can also be done if you are using an old sound card program that won't let you select the sound card that you want to use. If you do select the Signalink USB's built-in sound card as the default card, then we suggest that you disable all Windows system sounds.

- SETTING THE AUDIO LEVELS -

The Signalink USB's built-in sound card provides the same consistent audio levels no matter what computer you are using, so the software audio level setting procedure has been greatly simplified. Before you operate your Signalink USB on the air, you will need to adjust the PLAYBACK software volume controls, and the Signalink's TX and RX level controls. Note that the Signalink USB does NOT use software RECORDING controls ("waterfall drive", etc.), so you will not need to worry about adjusting those. Adjustment of the Receive Audio is done completely by the Signalink's RX level control.

While most levels are not too critical, incorrect adjustment of any of these levels can cause poor performance or unreliable operation. This procedure tells you how the levels should be set.

Preliminary Setup

- Before you can adjust the audio levels, the Signalink USB must be connected to the computer and radio. Both the Signalink USB and the radio should be powered ON and a communications program that you have selected should already be installed on your computer. Note that you will be using the communications program to generate the audio tones that are used to adjust the level controls, so CW programs should NOT be used unless they have a continuous "Tune" mode. A PSK-31 program like DigiPan is ideal for making these adjustments.
- Set the Signalink USB's TX level control to minimum (fully counter-clockwise), and the RX level control to 50%. The Delay ("DLY") control can be set to minimum for now.
- Start your communications program and verify that the sound card selected for both Transmit and Receive is "USB Audio Codec" (this is the sound card name used by the Signalink USB). Most programs allow you to select the sound card that you want to use in their "Configure" or "Setup" menu. Once selected, you should not need to select the Signalink USB again, as long as it is plugged in before starting the program.

Radio Setup

CAUTION – Be sure that your radio is connected to an antenna or dummy load before proceeding.

- If you already know how to configure your radio for digital operation, then you can skip to the "Transmit Audio Adjustment" section below.
- If the Signalink USB is connected to your radio's Mic jack, then set your radio to "USB" mode (note that you can change this later if the mode you want to run requires LSB).
- If the Signalink USB is connected to a Data or Accessory Port, then you will need to set your radio to the appropriate mode for this type of connection. USB will work on most radios, but you may need to select a special mode such as "Data", "User", or "D-USB". If you are not sure which mode to use, then consult your radio manual.
- Set the radio's Mic Gain control to 50%. Note that if the Signalink is connected to a Data or Accessory Port, this control may not have any effect on power output.
- Set your radio's "Forward Power" control to provide maximum power (this will be adjusted later to bring the power down to a suitable level). Note that the "Forward Power" control might be labeled "RF Power" or "Carrier Power" on your radio. Newer radios will have an "RF Power" menu setting instead of a knob.
- Your radio's Speech Processor / Compressor and VOX features should be turned OFF.

Transmit Audio Adjustment

- Open the Windows Volume Control Panel by clicking on the Start Button and selecting Programs (or "All Programs"), Accessories, Multimedia (or "Entertainment"), and then Volume Control.
- From the Options menu, select Properties to display the Properties page.
- In the "Mixer Device" drop-down menu, verify that "USB Audio CODEC" is selected. This is the name / identifier used by the Signalink USB's built-in sound card, so this MUST be selected.
- In the "Adjust Volume For" window, select Playback.
- In the "Show the Following Volume Controls" window, verify that the Speaker and Wave controls are checked. Other controls can also be checked but they will not be used.
- The Properties window should now look like the one shown below in Figure 2. Verify that it does and then click OK.

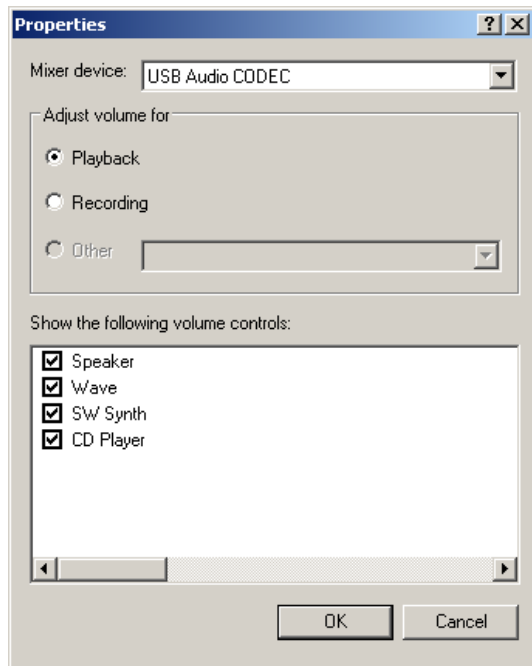


Figure 2 –Properties Window

- The volume control panel will now open. Set the “Speaker” control (far left control) to 100% max volume, and set the “Wave” control to 50%. Note that the Speaker and Wave controls should NOT be muted. All other controls can be. Your volume control panel should now look similar to the one shown below in Figure 3:

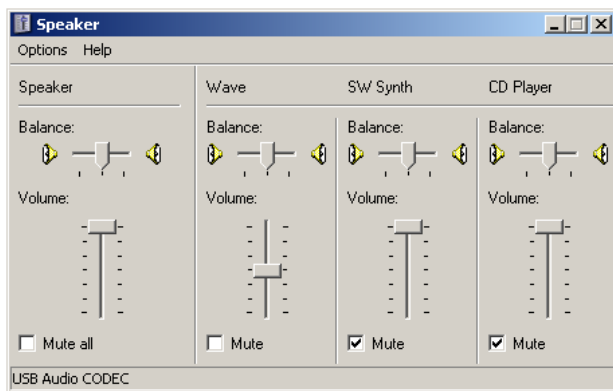


Figure 3 –Volume Control Panel

- The Signalink’s software volume controls are now set to provide an audio level that is suitable for most radios. If you determine that you need more audio (complete this procedure first!), then you can increase the “Wave” control. A special jumper can also be installed inside the Signalink USB to provide even more audio (see the “Special Jumpers” section of this manual)
- Select “TUNE” in your communications program. The Signalink’s PTT LED should now be ON, and your radio should be transmitting. If the PTT LED is not

ON, then you may have the wrong sound card selected in your communications program or the volume control panel. If you cannot get the PTT LED to turn ON, then see the Troubleshooting section at the end of this manual.

- You should now be able to adjust the Signalink USB’s “TX” level control for the desired Transmit power level (*see important note below*). If you cannot get adequate power, then see the notes on jumper JP3 under the “Special Jumpers” section of this manual. If the problem still persists, then please see the Troubleshooting section at the end of the manual.
- Be sure to turn your program’s “TUNE” function OFF when you are finished making adjustments!

IMPORTANT: We strongly suggest that you consult your radio manual to verify the manufacturers recommended maximum transmit level and duty cycle. Most digital modes are 100% duty cycle and cannot be run at full power without damaging your radio. Also, some modes (like PSK-31) typically only require 25 watts or less for reliable communication. You can actually “swamp” out other users if you use too much power.

Receive Audio Adjustment

- The Signalink USB does not use software “RECORDING” controls, so all adjustment of the Receive Audio level is done with the unit’s front-panel “RX” level control. A setting of 50% is usually about right for most installations, but you can adjust this control up or down as necessary.
- If you find that you have too much Receive Audio, or not enough, then you may need to adjust your radio’s Volume control (or fixed level “AF Output” control, if using a Data Port or Accessory Port). Jumper JP2 can also be installed inside the Signalink to increase the Receive Audio level (see the “Special Jumpers” section of this manual for details).
- If you cannot resolve the Receive problem, then please see the Troubleshooting section at the end of this manual.

- GENERAL RADIO SETTINGS -

Virtually all digital modes require that you TURN OFF any Speech Processing or Compression features in your radio. This is to insure RF linearity. You must also TURN OFF your VOX circuit when using the Signalink. As mentioned in the audio level setting procedure, you can usually use your radio’s USB mode for digital operation (LSB for some bands). However, if the Signalink USB is connected to a Data or Accessory Port, then you may need to select a special mode such as “Data”, “User”, “D-USB” or “D-LSB” (to name a few). If you are not sure which mode to use, then consult your radio manual.

- SIGNALINK CONTROLS AND INDICATORS -

Power Switch – This turns power OFF to the Signalink USB's Transmit and Receive circuits, but it does not power down the built-in sound card. The Signalink USB's sound card will power down with the computer automatically when the computer is shutdown, or put into "suspend" mode. When you are not using the Signalink, we suggest that you turn it OFF.

Power LED – This LED will be ON when the computer is powered up and the Signalink's "Power" switch is depressed. If the computer enters "suspend" mode and shuts off power to the USB port, then this LED will turn OFF even if the Signalink's Power switch is turned ON.

PTT LED – This LED is ON only when the Signalink USB is transmitting.

TX Control – This control adjusts the Transmit Audio level going to the radio, which directly affects the radio's RF power output level. Turn this control clockwise for more power, and counter-clockwise for less.

RX Control – This control adjusts the Receive Audio level (sometimes called "Waterfall Drive") going into the computer. Turn this control clockwise for more audio and counter-clockwise for less.

DLY Control – This control adjusts the Transmit "Hang Time" for the Signalink USB's Auto-PTT™ circuit. With the control set to minimum (fully counter-clockwise), the radio will remain keyed for approximately 15 milliseconds after Transmit Audio has stopped. This setting is suitable for modes that require fast turn-around times like Packet. It is also the best position for many other digital modes like PSK-31 and MT63. A longer delay of up to 4 seconds can be selected by turning the control clock-wise. A delay of approximately two seconds is adequate for most Voice modes such as EchoLink. For slow AFSK CW, you will probably want to set the Hang Time delay to between 500 ms and 1 second.

- SPECIAL JUMPERS -

The Signalink has three jumpers that can be installed to provide higher Transmit and Receive Audio levels, and increase the unit's PTT sensitivity. These jumpers are described below and their location is shown in Figure 4.

JP2 – This jumper can be installed to increase the Receive Audio signal going into the Signalink USB's built-in sound card.

JP3 – This jumper can be installed to increase the Signalink USB's Transmit Audio Signal. With this jumper installed, the Signalink USB can provide up to 2Vp-p into 600 ohms. This should be more than adequate to drive any radio to full power. Note that this is NOT needed for most radios.

JP4 – This jumper can be installed to increase the sensitivity of the Signalink USB's Auto-PTT™ circuit approximately two times. This is not necessary for Data modes, but does offer increased performance for voice applications.

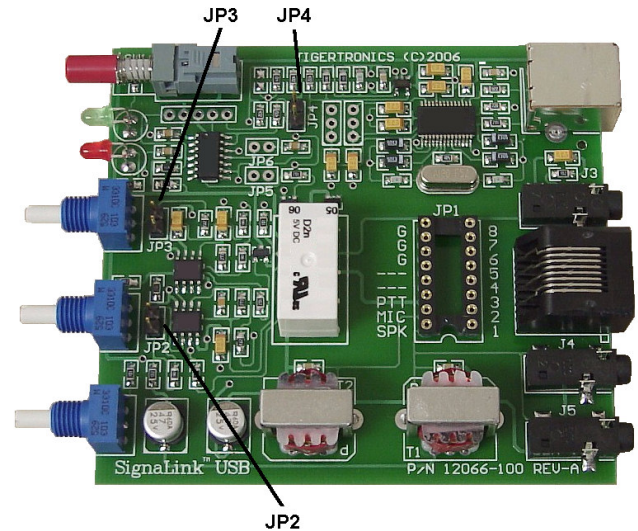


Figure 4 – Location of jumpers JP2, JP3 and JP4.

- VISIT US ON THE INTERNET -

If you have Internet access, please visit our web site at:

<http://www.tigertronics.com>

Our site contains the latest news about Tigertronics' products, support information, and other information of interest to all Hams and SWLs. This is also the best source for downloadable programs that work with our products. We also have all of our distribution software and documentation available for download as well. The site is updated often, so stop in on a regular basis and get the latest news and updates.

- YOUR COMMENTS WELCOME -

We have made every effort to make the Signalink USB the best product possible. We welcome any comments or suggestions that you would like to make. Please drop us a note to let us know about your experiences, tips you would like to share with other users, or how we might do a better job for you.

- LIMITED WARRANTY -

Tigertronics warrants the Signalink USB to be free of defects in material and workmanship for a period of 90 days from the date of shipment. Tigertronics will repair or replace, at its option, any parts found to be defective during the warranty period. This warranty does not include any unit that has been subject to misuse, neglect, improper installation or operation. This warranty is in lieu of all

others, express or implied, and no person or representative is authorized to assume for Tigertronics any other liability in connection with the sale or use of this product. Tigertronics will not be responsible for any expense or loss of revenue or property incurred by the user due to operation or malfunction of this equipment. Tigertronics reserves the right to make any changes including but not limited to the circuit, components or firmware, or to incorporate new features, at any time, without obligation.

- RETURN POLICY -

A Return Material Authorization Number (RMA#) must be obtained before any product will be accepted for return or repair. Items received without an RMA# clearly marked on the OUTSIDE of the package WILL BE REFUSED. Items being returned must be sent prepaid. Returned items should have a note attached showing the RMA#, customer name, return address, phone number, and action requested. Units being returned for warranty repair must be accompanied by a copy of the original sales invoice showing the date of purchase.

Customers wishing to return a product for REFUND, for ANY REASON, must receive an RMA# within 15 days from the shipping date shown on the original sales invoice. Customers returning products for refund will be charged a Restocking Fee equal to 20% of the purchase price, to cover the cost of re-testing and re-stocking. Products that have been damaged or modified in any way may not be returned. Contact our Technical Support department for the RMA#.

- TECHNICAL SUPPORT -

***BEFORE YOU CALL** – The vast majority of technical issues can be resolved with the information that is available in this manual and on the Tigertronics web site. If you thoroughly investigate these resources, you will probably never need to call. Please take some time to read through this manual, and then check the online support resources to be sure that you have the most current software and documentation available. Thank you.*

If you encounter a problem that you cannot resolve with the Signalink (not software), please contact our Technical Support Staff at (541) 862-2639. **They are available every Monday, Wednesday, and Friday, from 1:00 PM to 5:00 PM Pacific Time.** Be sure to have your equipment available for testing when you call. Please DO NOT mail, email, or fax your technical inquiries. We realize that calling is a little more expensive, but more can be accomplished in a few minutes on the phone than can be done in hours of writing!

- FCC STATEMENT -

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide

reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.

- GENERAL SPECIFICATIONS -

Freq Response:	100hz to 10Khz. Upper Frequency limit is Intentionally limited by a Low Pass Filter.
Sampling Size/Rate:	16 Bit, All standard rates are supported up to 48Khz.
Computer OS:	Windows 98SE/ME/2000/XP MAC OS 9.1 or later MAC OS X 10.00 or later
Radio In/Out Z:	600 Ohm (nom). TX/RX Levels are fully adjustable for compatibility with Hi-Z and Low-Z radio connections.
Auto-PTT™ Delay:	Adjustable "Hang Time" 30 ms to >3 seconds
PTT Circuit:	Relay, 90V 3AMP (max)
Radio Connector:	TX/RX Audio,PTT,GND - RJ-45 RX Audio/Spkr - 3.5mm Mono
Computer Connector:	USB 1.1/2.0 Compatible Standard USB "A" type Conn.
Other Connectors:	Aux. Speaker - 3.5mm Mono
Case:	Extruded Aluminum - 6061T4
Dimensions:	1.6" x 3.2" x 3.6"
Operating Temp:	-30C to +60C

Detailed Jumper Installation Procedure

If you do not find the jumper settings for your radio listed on the Signalink CD or our web site, then follow this step-by-step guide to install the jumpers for your radio.

Signal Lines - Every installation requires connecting the Signalink to at least three pins on the radio's Mic, Data, or Accessory connector. On the Mic connector these are "Mic Input", "PTT", and "Ground". On the Data or Accessory Port, these same basic signals are used, but they are usually labeled differently. The table in Figure 1 shows the common Mic signals and their Data / Accessory port equivalents. Please refer to this table if you are installing the Signalink USB on your radio's Data or Accessory port.

<u>Mic Signal</u>	<u>Data/Accessory Port Signal</u>
PTT (Push-To-Talk) Mic / Mic Input	Standby, PKS, or Packet Standby TX Data, Data Input, PKD, or Mod In
AF Out / Speaker	RX Data, Data Out, RXD, or RX Audio
PTT GND Mic GND	PTT Ground, Chassis Ground Signal GND, Mic GND

Figure 1 - Data / Accessory Port Signal Names

Note that many radios actually have multiple ground connections (Mic Ground, PTT Ground, etc.). The Programming Socket has multiple ground (G) connections for this reason. On many radios the Mic, Data, and Accessory connectors also provide access to Speaker Audio. If Speaker Audio (or the equivalent Data / Accessory Port signal) is not available from the connector on your radio, then you will need to install the provided mono cable from the External Speaker or Headphone jack on your radio, to the SPKR jack on the rear panel of the Signalink USB. If this signal is available on the connector, then you will connect it later in this section.

Before proceeding with jumper installation you should verify in your radio manual that the radio PTT requirements do not exceed the specifications of the Signalink keying circuit. Verify that the PTT is "Grounded" to make the radio transmit and the PTT signal does not exceed 3 Amps at 90V. This should be within the ratings of all modern radios but could be a problem on some older rigs. If your radio exceeds these specifications or requires some other keying arrangement, then you will need to key the radio using a low voltage/low current relay. Please feel free to contact Technical Support if you need assistance with this.

Connectors With More Than Eight Pins - The jumper installation procedure in this manual is for use with radio connectors that have 8 pins or less. If you are installing the Signalink on a 13-pin Accessory port (currently the only radio connector with more than eight pins), then you will either be using a fully assembled cable that we have provided, or you will be attaching your own 13-pin connector to our un-terminated cable. In either case, jumper

settings and/or special instructions for installing the connector and jumpers were included with the radio cable. Please follow those instructions instead of the procedures in this manual.

Identifying Jumper Locations - Identifying the jumper locations for your radio is a two-step process. First we will identify the pin-out for the radio connector, and then we will verify that it is correct. The verification process is very important since incorrect wiring could damage your equipment. The final steps will be to draw a wiring diagram using Figure-2 and actually install the jumpers.

- **Lookup Pin-out** - In your radio Operators Manual, find the page that identifies the pin-out of the Mic, Data, or Accessory connector that you are going to use. Using the manual, identify the pin numbers assigned to the following signals, and record them below. Note that the signals found on radio Data and Accessory ports will likely be labeled differently from those shown. Please refer to the table in Figure 1 for the equivalent Data / Accessory Port signals.

- _____ PTT
- _____ Mic Input
- _____ Speaker Audio**
- _____ Mic Ground**
- _____ PTT Ground**
- _____ Chassis Ground**

** Note that some radios only have one ground pin.
** Speaker Audio is not always available.

- **Verify Pin-out** - This step is **Extremely Important** since not all manufacturers use the same numbering convention for their connectors. This is especially true of radios using RJ-45 mic connectors. This brief verification process could ward off a **major disaster** when you turn on the power! This procedure verifies that the pin numbers, which you just identified in the Operators Manual, do in fact match the numbers identified on the Programming Socket. The easiest way to do this is to use a multimeter to verify some of the more important lines. Before you start, you will need to make sure that the radio power is OFF, that there are NO JUMPERS are installed in JP-1, and that the supplied cable is connected between the Signalink and the radio.

Note that you should not find the lines "scrambled". They will either be in the correct order or they will be completely reversed (pin 1=8, 2=7, 3=6, etc). First check the Ground pin (or pins) recorded earlier. You can do this by checking for continuity between the radio chassis and the pins numbered on the Programming Socket (JP-1). JP-1 is a very convenient place to probe since it is wired 1:1 to every pin on the radio connector.

You will be checking against the numbers you recorded earlier from the Operators Manual. Note that if your radio has a separate mic ground it may have a slight resistance to chassis ground. Any other ground pin should test very close to zero ohms. If you do not get the expected continuity in this test, try checking against the numbers in the reverse order (1=8, 2=7, 3=6, etc). It would probably be very helpful to make a new table using the reversed number sequence to avoid mistakes! This step should establish whether or not the radio connector is “reverse ordered” and allow you to correct the numbers on your table.

Once you are confident about the ground lines you can move on to other pins. If your radio had Accessory Power you should be able to turn ON the radio and use your multimeter (volts scale) to test for power on the appropriate pin of JP-1. The Signalink USB does NOT use power from the radio, but this line can still be used for verification purposes.

You can test the PTT pin as follows: First check the pin with your multimeter (volts). You should see a voltage on the PTT pin (5-12v) when the radio is ON. You should be able to key the radio by grounding the PTT line. For the sake of safety, you should ground the PTT pin through a small value resistor (100-1000 ohms) in case it’s not the pin you think it is! Be sure your radio power is set to LOW and an antenna or dummy load is connected for this test, as the radio will go into “transmit” with the line grounded.

If the Speaker signal is available on the connector you are using, then you can try attaching a speaker or headphone to the appropriate pin on JP-1 to see if you can hear audio. Note that you will NOT be able to hear anything if the speaker source is a low level output (usually the case on Data and Accessory ports). There is no easy way to test the mic line but there will be little doubt about it if the other lines are correct. The main thing you are looking for here is to determine whether or not the connector numbers are reversed on your radio. If you have any unresolved errors, then you should double check your numbering in the Operators Manual again.

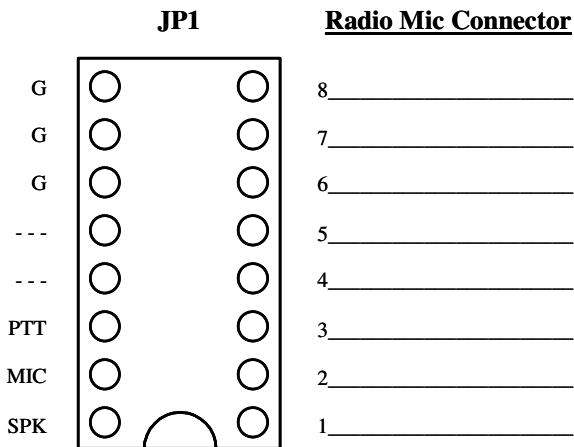


Figure 2 – Jumper Wiring Diagram

- **Draw Jumper Wires** - Once you have verified your pin-out and are comfortable with the results, you are ready to label the lines in Figure-2 and draw in the jumper wires. To do this, you simply need to draw a line between the pins on the left of JP-1 (G, PTT, Mic & SPKR) and their appropriate match on the right side of the diagram. For example, draw a line between the “G” pin on the left of JP-1 and the line that you labeled “Ground”. The “PTT” pin should be connected to the pin that you labeled “PTT” and so on. If you are installing the Signalink on a Data or Accessory port, then refer to Figure 1 for the correct signal names. An example of the microphone Jumper Wiring Diagram for a Kenwood TS-450 is shown in Figure 3.

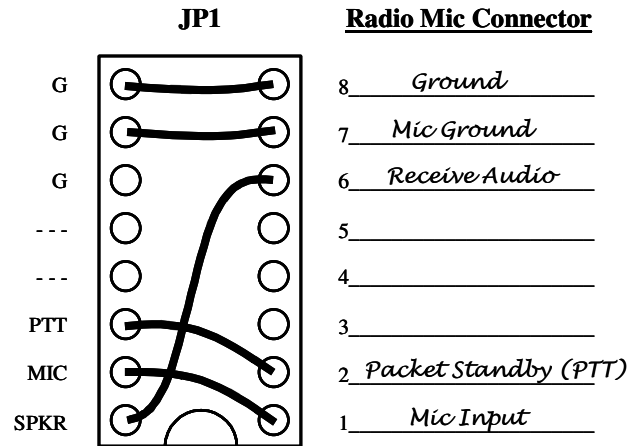


Figure 3 – Example Jumper Wire Diagram for TS-450 Mic

VERY IMPORTANT NOTE! – You are about to install the jumper wires. The wires **must be 24ga AWG** or you will damage the socket! It would be best to use the wires that we provided for this purpose to avoid damage.

Install Jumper Wires – Now that you know where the jumper wires go, all you need to do is install them! Installation of the jumper wires can be done without any tools, but you may find it easier to do with needle-nosed pliers. If you do use needle-nosed pliers, be sure to grip the wire close to the end that you are installing in the socket. When pushing the wires into the socket, be very careful not to bend them back and forth or they might break. If you break a wire off in the socket, there is no way to remove it. You will have to have a new socket installed! This should not be an issue if you are just a little bit careful.

Once you have all of the jumpers installed, please take a few minutes to look them over. You should have the “SPKR” jumper installed only if you have Speaker/RX audio available on the radio connector that you are using. If this signal isn’t available (a possibility with Mic jacks), then this jumper should not be installed. Instead, you will need to install the provided mono cable from the External Speaker or Headphone jack of your

radio, to the SPKR jack on the rear panel of the Signalink USB. This will pass the radio's Speaker Audio signal into the Signalink so that the unit can receive. Once you are confident that the jumpers are installed correctly, you can put the Signalink USB circuit board back into the case.

Troubleshooting

If you do not find your problem listed here, or if you are unable to resolve the problem, then please refer to the Technical Support section of this manual for instructions on contacting our Technical Support Staff.

Radio doesn't transmit AND the Signalink USB's PTT LED is OFF - Check the following:

- Verify that the Signalink USB's PWR LED is ON. If it is not, then check your USB cable connection to the computer and the Signalink.
- Verify that your communications program is configured to use the Signalink USB's built-in sound card. The program should have "USB Audio CODEC" selected as the sound card for both Transmit and Receive.
- Verify that the PLAYBACK volume controls for the Signalink USB are set according to the "Setting The Audio Levels" procedure. If they are too low, then the Signalink USB will NOT transmit.

Radio doesn't transmit even though the Signalink's PTT LED is ON - If the Signalink USB's PTT LED turns ON but the radio doesn't switch to transmit, then you have most likely jumpered the PTT signal incorrectly on JP-1 (go back and double-check ALL jumpers). If the Signalink is attached to your radio's Data or Accessory Port, then another possible cause is that your radio isn't configured properly to use that port. Consult your radio manual and verify that your radio is in the correct Mode (Digital USB, etc.).

Radio transmits but there is no power output, or it is too low – The Signalink USB can provide more than enough Transmit Audio to drive any radio to full power. If you have set the TX level control to maximum and still cannot get enough power, then check the following:

- If you are using a CAT interface to control your radio, then you need to disable "PTT by CAT Control" (or similar option) in your communications software, so that the Signalink can key the radio. This is necessary because some radio's will only look for Transmit Audio on the Mic jack if the radio is switched into Transmit by the CAT interface. Note that this is a design issue with the radio and has absolutely nothing to do with the Signalink.
- Verify that your radio's "Forward Power" (sometimes called "RF Power" or "Carrier Power") control is set to maximum.
- If the Signalink is attached to your radio's Mic jack, then try turning up your radio's Mic Gain control.

- Adjust the Windows "Wave" PLAYBACK volume control higher.
- See the "Special Jumpers" section of this manual and install JP3. This will dramatically increase the Signalink's Transmit Audio level. Note that this is NOT needed for most radios, so you really need to be sure that everything else is correct before doing this.
- If the Signalink is attached to a Kenwood 13-pin Accessory Port, then you may have set the PTT jumper incorrectly. Double-check the document that was supplied with your radio cable to see if your radio requires a standard PTT jumper or the diode module to be installed.

Transmit signal is "wide" or distorted – This is generally the result of over-driving your radio. Verify that your radio's speech processor/compressor is turned OFF. Your radio's "Forward Power" control (sometimes called "RF Power" or "Carrier Power") should be set to maximum. If you have lowered this control to decrease your transmit power, then you more than likely have not set the audio levels correctly, and are overdriving your radio. Follow the "Setting The Audio Levels" procedure to correct this problem. If the above mentioned radio controls are set correctly, then try turning the radio's Mic, Data or Accy Port gain and see if that improves the quality of your signal (Data/Accy Port gain is usually a radio menu setting). If this has no effect, then you may have the software PlayBack volume controls, or the Signalink USB's TX level control set to high. See the "Setting The Audio Levels" procedure to correct this.

The Signalink's TX control is near minimum but the Radio's transmit power is too high – This is most likely because the radio's Mic, Data or Accy Port gain control is set too high. If the Signalink is attached to the Mic jack, then try turning the radio's Mic Gain control down (this may also affect Data/Accy Ports on some radios). If the Signalink is attached to a Data or Accy Port, then your radio should have a menu setting or trimmer to adjust the gain. Note that some radios call the Data or Accy Port gain control "Packet Input Level" or "Packet Gain". Contact Tech Support if you are unable to resolve this problem.

I can't seem to receive - There are several possible causes for this problem:

- **Signalink USB's RX level control or radio level control set too low** – Verify that the Signalinks RX level control is turned up (clockwise). If you are using Speaker Audio from the radio (not a fixed level signal from a Data/Accy Port), then verify that your radio volume is turned up. If your communications program doesn't show any signs of Receive Audio (no waterfall display, etc.), then please review the "Connecting The

Radio” and "Setting The Audio Levels" sections of this manual.

- **Computer too slow or incompatible with software. Software not configured properly** - Check the documentation for the program that you are using and verify that your computer meets the minimum requirements. Verify that the program is configured correctly (the Signalink USB's "USB Audio CODEC" should be selected as the sound card). If all else fails, try using a different program.

Why Can't I Receive Some Stations - No matter how good your antenna and radio are, there will always be some stations that you cannot copy (even with strong signals!). While the reason for this may be because of operator error (wrong mode or baud rate, off frequency, etc.), radio wave propagation problems can often prevent you from receiving. Some modes are more susceptible to this than others. For example, even though PSK31 usually works very well with weak signals, sometimes even strong PSK31 signals cannot be copied at all because of multipath and Doppler Shift propagation problems. Other modes like HF Packet and RTTY do not work well with weak signals and are susceptible to multipath and Doppler Shift.

Windows "System Sounds" cause the Signalink to transmit – This will NOT happen if you configure Windows to use your computer's sound card as the default sound card. See the "Connecting The Computer" section of this manual to resolve this problem.

Adjusting the Windows Volume Control Panel has no effect – If this happens, then you are almost certainly adjusting the volume controls for the wrong sound card. Please go back to the "Setting The Audio Levels" procedure and pay careful attention to Figure 2, where "USB Audio Codec" is selected as the mixer device.