

# How To set up the Kenwood TS-590S for Digital Data and Digital Voice Operation

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## Introduction

This HOWTO explains in detail how you can:

- use the Kenwood TS-590S USB, COM and ACC2 ports for digital operation
- set up the radio for digital data operation (for example PSK31, JT65 etc.)
- set up the radio for digital voice (DV) operation

The procedures described in this HOWTO have been specifically tested with Windows XP Home + SP3. The procedures for other versions of Windows should be similar.

## Hardware Requirements for Digital Operation

- Kenwood TS-590S transceiver
- PC
- One or more cables connecting the radio to the PC
- (Optional) a hardware interface (for example Signalink) with cable(s) to connect to the PC and radio

## Additional Hardware Requirements for Digital Voice Operation

- A (built-in) sound card for the microphone and loudspeaker/headphones (for example, SigmaTelAudio, SoundMAX, Realtek, AC97)
- Microphone and loudspeaker/headphones

## Software Requirements (see References for sources)

- Virtual COM port driver from Kenwood [1]
- Digital data software (for example, Fldigi) [3]
- Digital voice software (for example, FDM DV) [4]
- (Optional) QuickMix, to save Windows audio level settings [2]
- (Optional) USBDeview, to display USB port status [7]

**Background Reading**

- **Kenwood TS-590S Instruction Manual** [8]  
The manual that comes with the radio
- **TS-590S HOWTO: Digital QuickStart** [9]  
Basic instructions for setting up several well known digital packages, including Digipan, fldigi, MixW, MMTTY and others
- **HOWTO monitor TS-590S CAT Commands** [10]  
details of how to generate CAT commands and monitor CAT responses from the radio
- **TS-590S TechNote: SSB Audio Handling** [11]  
summarizes the many features built into the Kenwood TS-590S for handling SSB audio. Includes full details for setting the audio equalizers and cut-off filters, together with configuring TX keying (by VOX, PTT and external CAT commands).
- **TS-590S HOWTO: SSB Audio Setup** [12]  
Step-by-step guide to setting up really effective TX audio on the TS-590S. Includes background information on:
  - Factors that affect the audio
  - Menu A/ Menu B organization
  - TX equalizers
  - Low/High Cut filters
  - ALC and speech processing.

Includes large diagrams showing in detail the permissible levels for ALC and compression.

Detailed setup procedures for unprocessed and processed audio.

## TS-590S Digital Operation in a Nutshell

This section of the HOWTO summarizes the three principal areas of the TS-590S that are relevant in digital operation:

- Audio transmission
- VOX operation
- PTT operation

## Audio Transmission

There are three ways of inputting AFSK tones to the radio. See Figure 1.

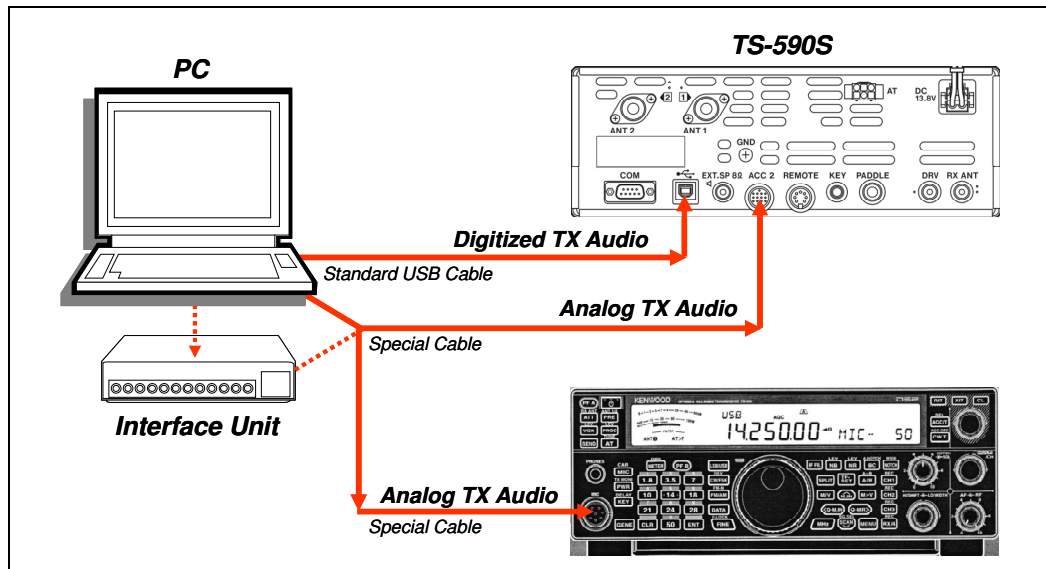


Figure 1: AFSK inputs to the TS-590S

1. Digitized Audio via the USB Cable: This is the simplest and most reliable way of transmitting AFSK. The analog audio tones generated by a communications program (such as fldigi) are converted to digital form by a device driver in the PC, then conveyed to the TS-590S through the USB cable. The radio then converts the digitized audio back to analog form, ready for modulating the RF signal.

There are two big advantages of using a USB cable:

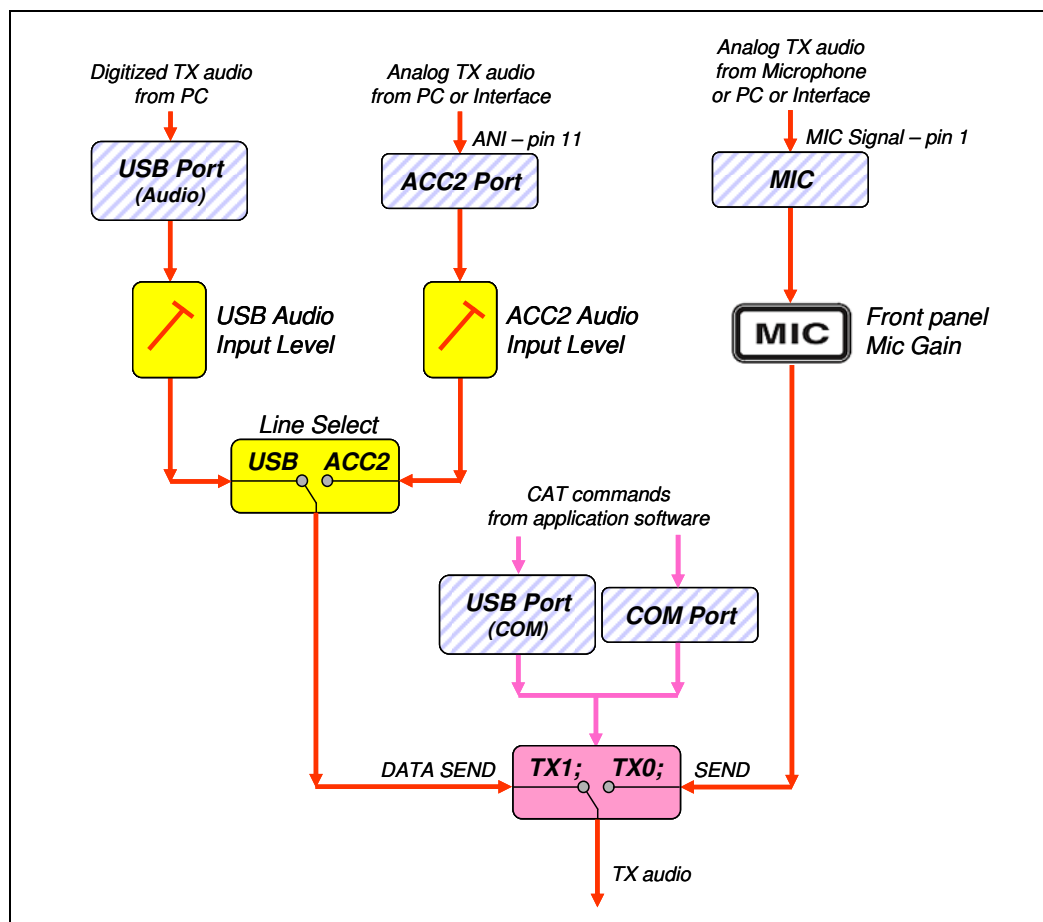
- Because the audio is carried in digitized form over the cable, the chances of hum pickup and problems with RFI are much reduced.
- The cable is a standard A/B USB cable, generally available at very low cost. The other methods of connecting audio to the radio require you to use special cables.

[Note: The USB cable carries two separate and completely independent full duplex channels: one for digitized TX/RX audio and the other for serial control data such as CAT commands/responses].

2. Analog Audio to the ACC2 Port: You may prefer to generate the audio tones in a separate interface unit (or you may wish to use the analog tones generated by the communications program in the PC) to modulate the RF signal. In this case you will need a special cable for the analog audio. This cable plugs into the ACC2 connector on the radio.
3. Analog Audio to the Mic Connector: You can connect the analog output from an interface unit (or PC) to the microphone input of the radio. Again, this will require a special cable.

## Audio Switching

Depending on which of the three methods you use to connect the AFSK audio to the TS-590S, you will need to set up the radio to select the correct input and the audio gain. See Figure 2.



**Figure 2: Audio input selection and gain setting.** The yellow boxes are menu controls. When transmitting audio through either the USB port or the ACC2 port, the digital program running on the PC will send a “TX1;” (Data Send) CAT command to the radio. This mutes the microphone input

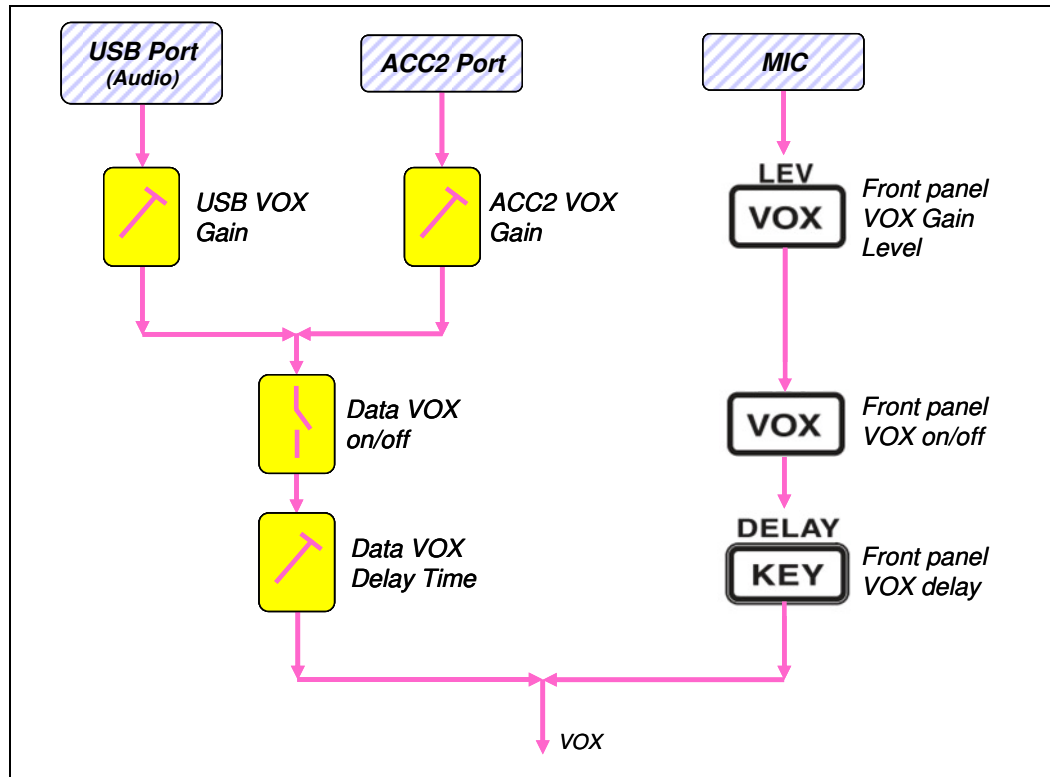
**Audio Input Selection:** If you use either the USB port or the ACC2 port, you will select the chosen input through the “Line Select” menu in the radio. In addition, you need to configure the communications program to issue the “Data Send” CAT command (“TX1;”) through either the USB port or the COM port – most programs will do this by default.

If you use the microphone input to the TS-590S for AFSK audio, you need to configure the communications program to issue the “Send” CAT command (“TX0;”) to the radio.

**Audio Gain:** There are three independent audio input gain controls in the radio. You set the audio level for the USB and ACC2 inputs through menus, and via the front panel MIC Gain control for audio input via the microphone socket.

### VOX Control

The simplest way to cause the radio to transmit digital signals is to use VOX. See Figure 3.



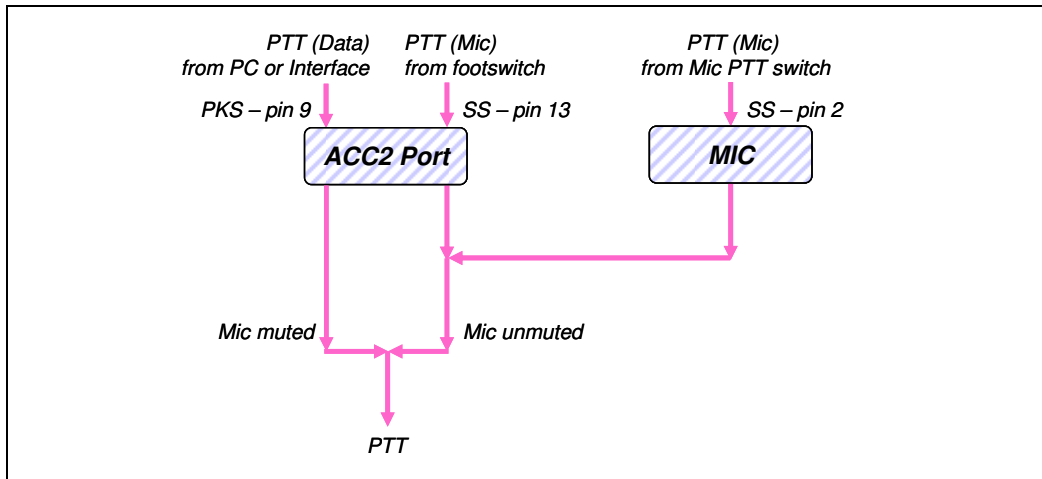
**Figure 3: VOX Control**

For audio input via the USB or ACC2 port, there are menu controls to adjust the VOX gain, to turn the data VOX on and off, and to adjust the VOX release delay time.

For audio input via the microphone socket, there are similar front panel controls.

## PTT Control

PTT is an alternative to VOX for switching the radio to transmit. See Figure 4.



**Figure 4: PTT Control**

There are two methods of activating PTT:

- **PTT (Data):** Grounding the PKS line (pin 9 on the ACC2 connector)
- **PTT (Mic):** Grounding the SS line (either pin 13 on the ACC2 connector or pin 2 on the microphone connector)

You should only use the PTT (Data) method, since this mutes the microphone on transmit. If you use the PTT (Mic) method, the microphone is not muted – the last thing you want is your data signal accompanied by coughs, sneezes, expletives and other sundry noises off when transmitting!

### The TS-590S USB, COM and ACC2 ports in detail

Figure 5 shows the various ways of connecting the PC and/or an interface unit to the TS-590S for digital operation.

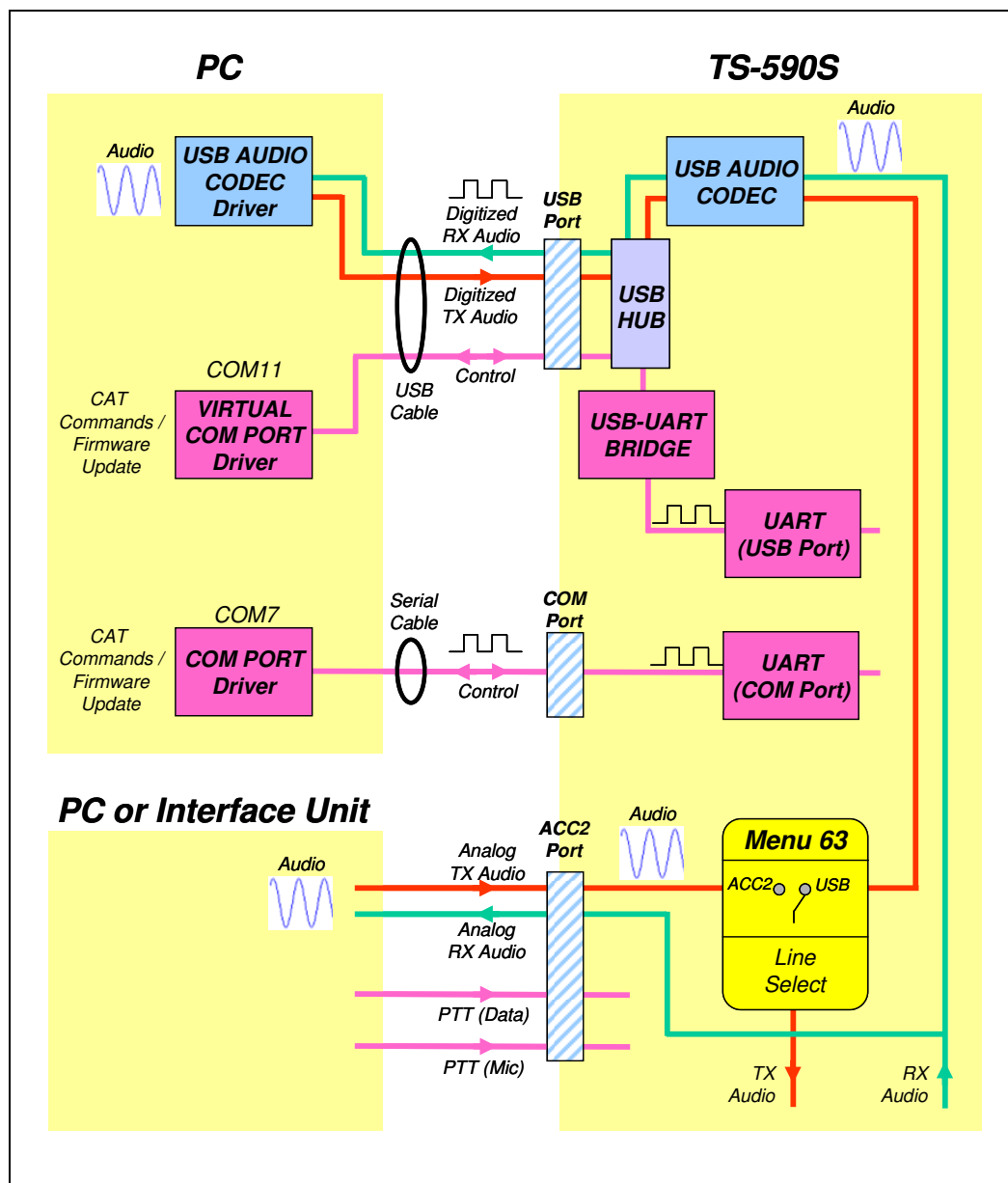


Figure 5: Connections to the USB, COM and ACC2 ports of the TS-590S for digital operation

In most circumstances only the USB port is needed for digital operation. This port carries both the transmit/receive audio and also (optionally) any CAT commands that are needed for transmit/receive switchover and other TS-590S control functions.

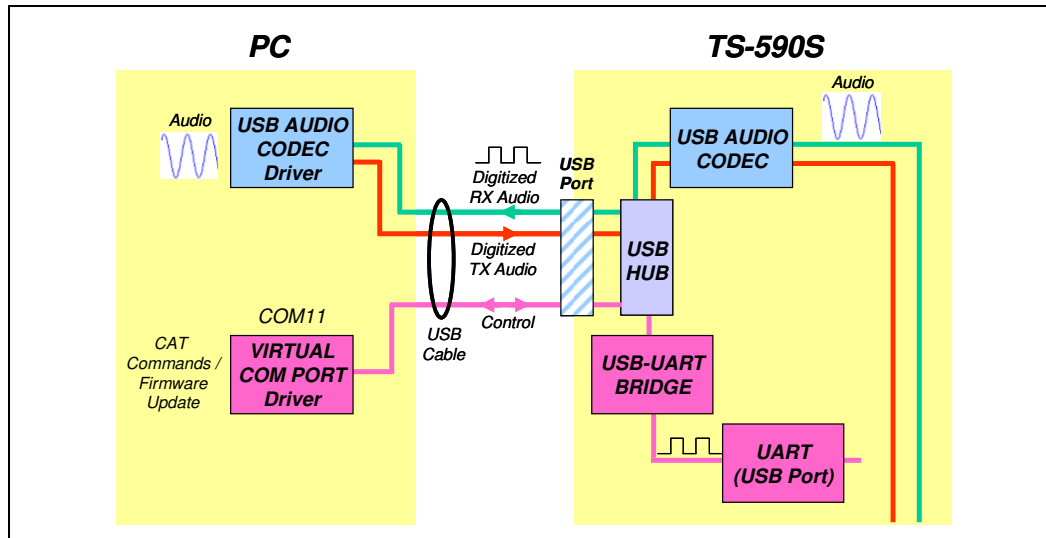
The COM port is an alternative port for CAT commands.

The ACC2 port allows the connection of an interface unit to carry transmit/receive audio and PTT control functions, and could be used instead of the USB port.

### Using the TS-590S USB Port

Figure 6 shows the use of a USB cable to connect the PC to the TS-590S. The cable carries two USB channels<sup>1</sup>:

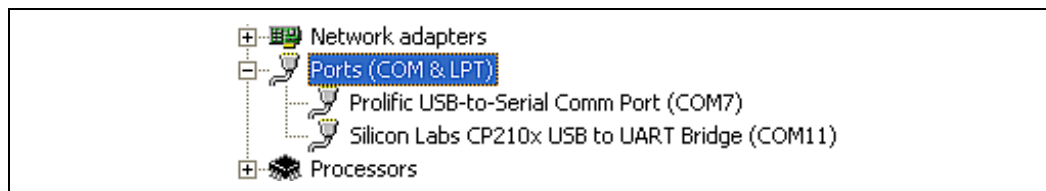
- A bidirectional digitized audio channel
- A bidirectional COM channel



**Figure 6: The USB Connection**

When you connect the PC to the TS-590S, Windows recognizes the presence of the USB Audio Codec in the radio, and automatically installs the USB Audio Codec driver. This channel alone is sufficient for simple digital communications. The transmit/receive audio is conveyed between the USB Audio Codec Driver in the PC and the USB Audio Codec in the radio, and transmit/receive control of the radio is achieved by VOX – when the radio senses TX audio, it switches to transmit.

For CAT control of the radio, you can use the virtual COM port. To do this, you need to download the Virtual COM Port Driver from Kenwood and install it on the PC. See [1] for full details on how to do this. Once installed, Windows will automatically allocate a COM port number to the port – COM11 in Figure 6 and Figure 7.



**Figure 7: The Windows Device Manager (Control Panel > System > Hardware > Device Manager) confirms that the virtual COM port driver is installed**

You can then use the port for CAT commands (or for firmware uploads to the radio). The Virtual COM Port Driver communicates with the UART in the radio via the USB-UART bridge.

<sup>1</sup> In actuality the data flow through the USB cable is multiplexed, but this level of detail is not required here.



### Left and Right Audio Channels – Transmit

Most digital packages, such as mixW, Digipan, V4 Chat etc., generate TX audio on both the Left audio channel and the Right audio channel. You simply set the Playback Device to the USB Audio Codec, and both channels are conveyed to the radio via the USB cable. See Figure 8.

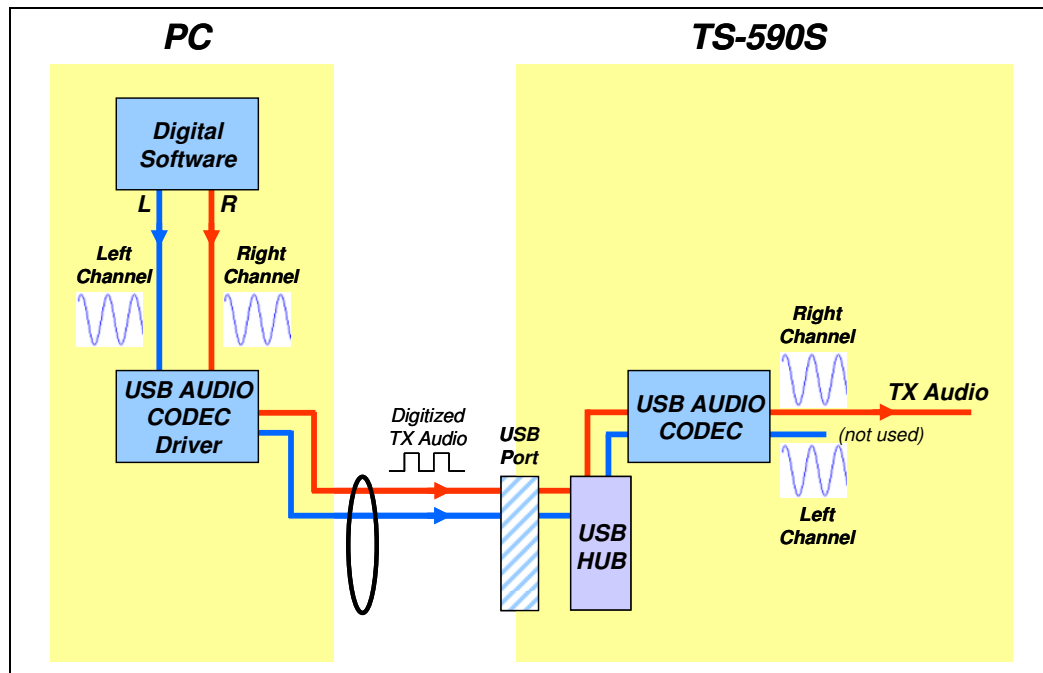


Figure 8: TX Audio Channels

**Note, however, that the radio only uses the Right channel for TX audio.** There is no connection to the Left channel output of the USB Audio Codec, so the Left channel audio from the digital package is ignored.

This can cause some head scratching with fldigi. By default, the Left/Right channel settings in fldigi are as in Figure 9.

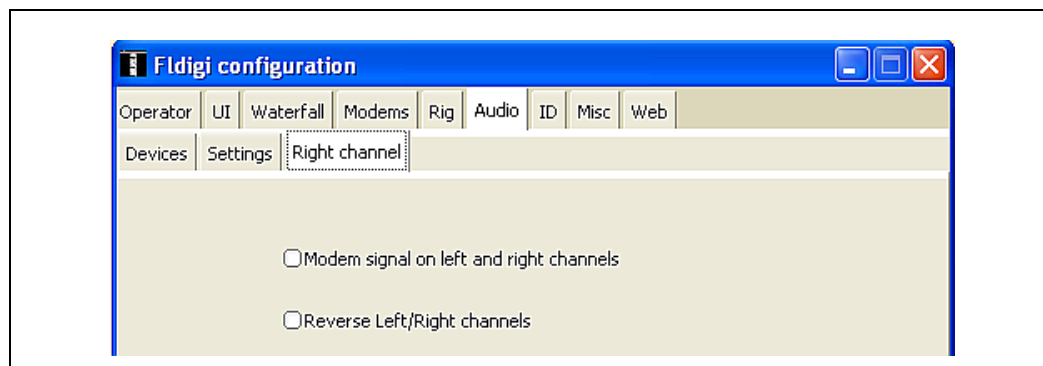
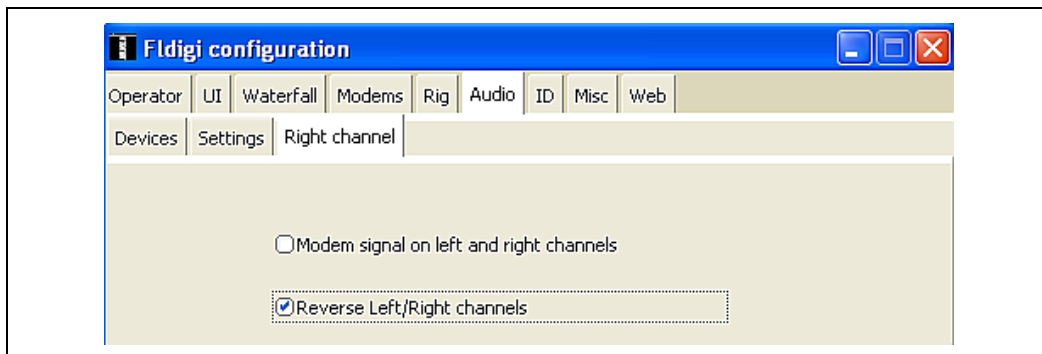


Figure 9: Default fldigi audio channels. No options are selected, which means that the Left audio channel is used for TX audio (and ignored by the TS-590S)

With these settings, fldigi uses the Left channel for TX audio, and there is no output on the Right channel. Because the radio ignores the Left channel, and because there is no audio on the Right channel, the radio does not transmit a digital signal.

To overcome this issue, you can select the Reverse option. See Figure 10. Fldigi will now output the audio on the Right channel, which the radio uses for transmission.

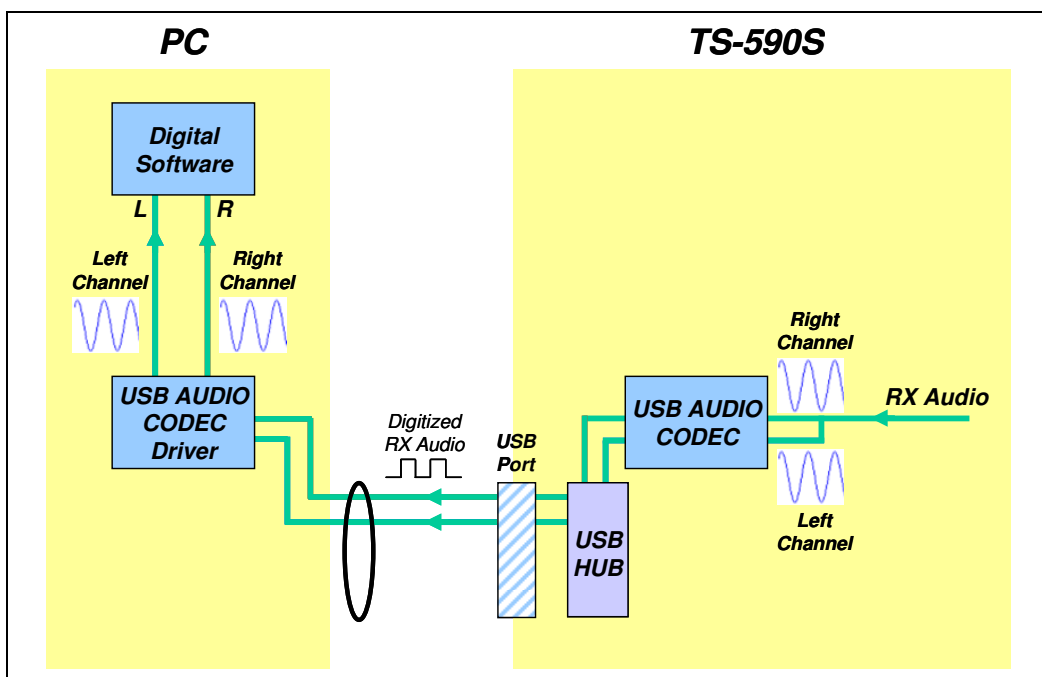


**Figure 10: Reversing the Left/Right channels means that the Right audio channel is used for TX audio, which the radio uses for transmission**

(Alternatively, you could select “Modem signal on left and right channels”, so that both channels reach the radio, but only the Right channel is used).

### Left and Right Audio Channels – Receive

When receiving audio via the USB connection, the RX audio in the radio is connected to both the Left and Right channel of the USB Audio Codec, so that the digital software receives the same audio on both channels. See Figure 11.



**Figure 11: RX audio in the radio is connected to both the Left and Right channel at the USB Audio Codec**

### Using the TS-590S COM Port

There may be situations where you wish to use the separate TS-590S COM port for CAT control and/or firmware upload. See Figure 12.

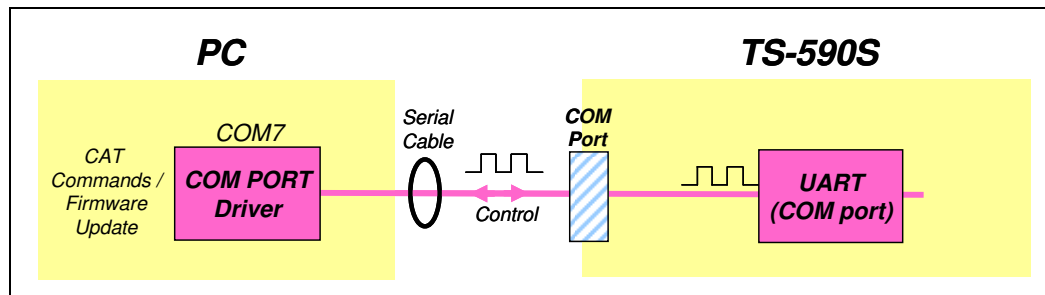


Figure 12: The TS-590S COM Port

The TS-590S COM port is a standard RS232-style serial port. If the PC has a regular COM port, all that is required is a straight-through RS232 serial cable to connect the two. However, most PCs nowadays do not have a serial port. In that case you will need to use a USB-to-serial adaptor to provide the serial connection. Either way, Windows will allocate a COM port number to the port – COM7 in Figure 7 and Figure 12.

### COM Port Baudrates

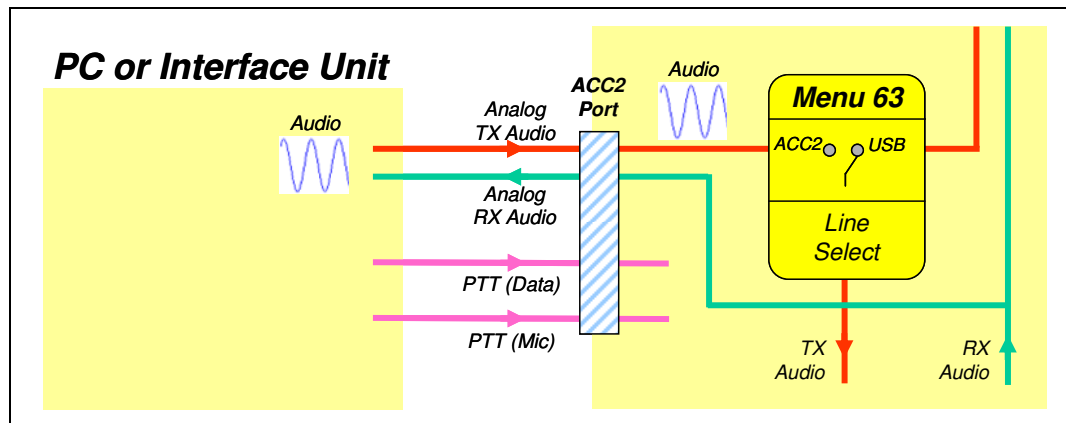
Before using the TS-590S USB port and/or the COM port, you need to set up the serial baudrate to match the baudrate of the ports on the PC. Do this using Menu 62 (for the USB port) or Menu 61 (for the COM port).

**IMPORTANT:** If you change the baudrate setting with either of these menus, you need to power-cycle the radio (turn the radio off and on again) for the change to take effect.

### Using the ACC2 Port

The beauty of using the TS-590S USB port and/or the COM port, as described above, is that no separate hardware interface is required between the PC and the radio.

If, however, you really want to use a hardware interface unit (such as Signalink), you can connect it to the TS-590S ACC2 port. See Figure 13.



**Figure 13: Connecting a Hardware Interface Unit to the TS-590S ACC2 Port**

In this case, the TX and RX audio connections are analog, and thus may be prone to hum pickup.

Note that the TS-590S can accept TX audio from **either** the ACC2 port **or** the USB port, but not both at the same time – Menu 63 selects which port to use for TX audio (see menu selection later).

RX audio is not switched between these ports – it is fed to both the ACC2 port and the USB port.

A further reminder: you should use the PTT (Data) connection for digital transmission, not the PTT (Mic) connection. This is because PTT (Data) mutes the microphone when transmitting, whereas PTT (Mic) does not.

### Setup for Digital Data Operation: The Big Picture

The block diagram in Figure 14 shows how the hardware and software fit together for digital data transmission and reception.

- The yellow boxes represent the PC software
- The bright blue box represents the Windows audio mixer control
- The RX audio level into the PC is controlled within the TS-590S
- The TX audio output level from the PC is controlled by the Windows audio mixer
- The audio mixer and the capture/playback interfaces in the digital software are set to "USB Audio CODEC"

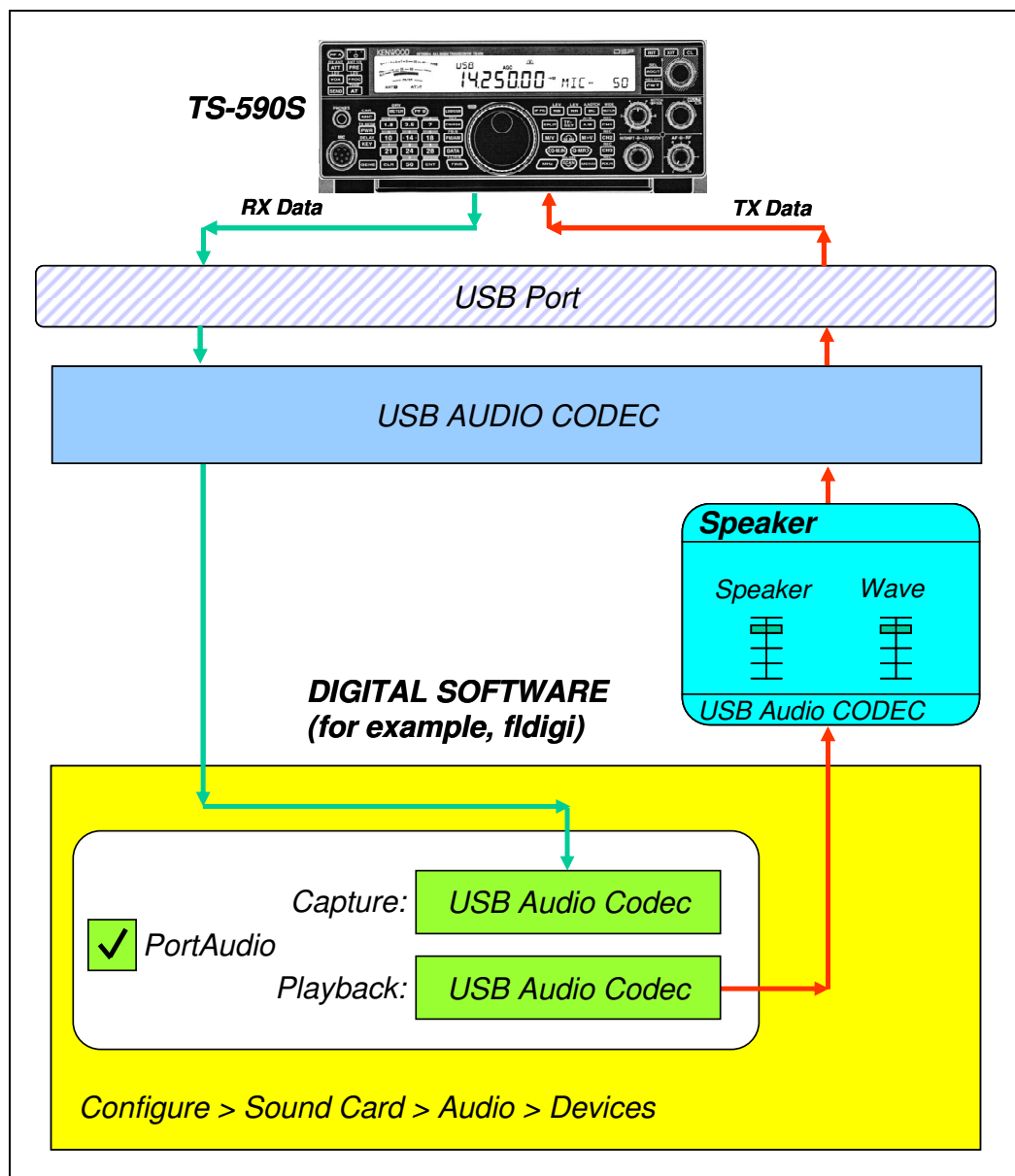
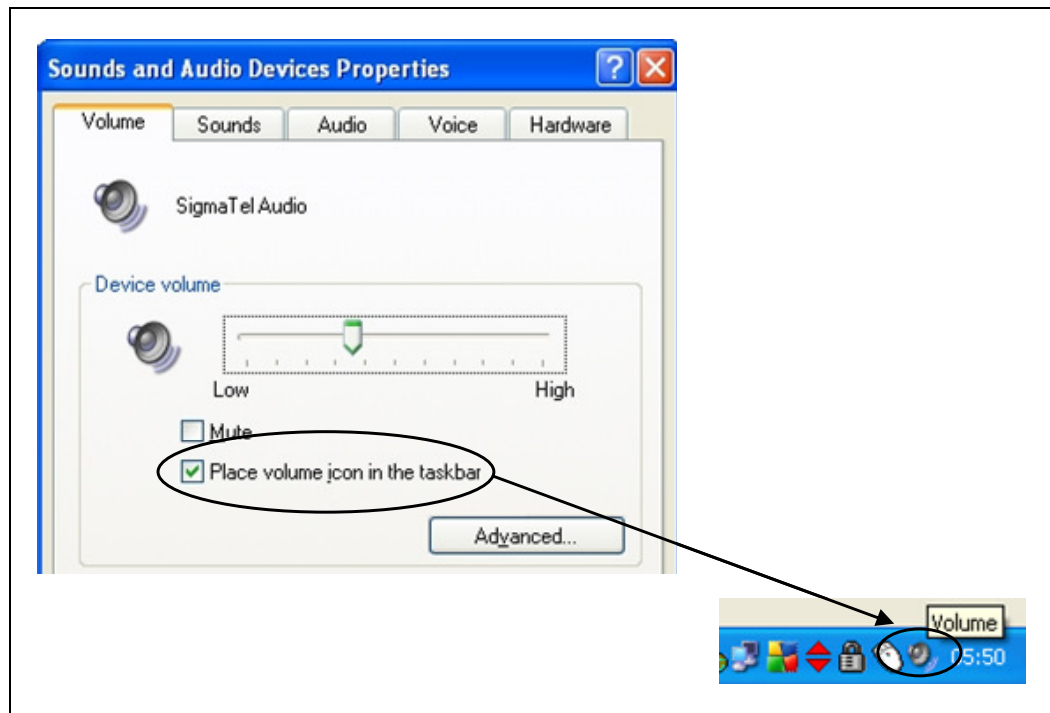


Figure 14: Transmit and receive data flow for digital operation

You may be wondering why only the Speaker audio control is configured in Windows (to control the TX audio level from the PC to the radio), where it would seem that a Recording control should also be necessary (to control the RX audio level from the radio to the PC). In fact, it turns out that the Windows XP audio mixer does not offer a separate Recording control for the USB Audio CODEC. This is why the RX audio level can only be controlled from within the TS-590S. The situation may be different for other versions of Windows.

### Configuring the Windows Audio Mixer

The first step in setting up the Windows audio mixer is to make sure the Volume (loudspeaker) icon is displayed on the Windows toolbar. If it is not visible, click on Control Panel > Sound effects and Audio Devices, then select Place volume icon in the taskbar. See Figure 15.



**Figure 15: Placing the Volume icon in the toolbar**

Next, double-click on the Volume icon in the toolbar. This will pop up the master volume control panel (Figure 16). Click on Options > Properties, then select the USB Audio CODEC as a Playback device. Finally, click on OK, and the control will appear on the screen as in Figure 16.

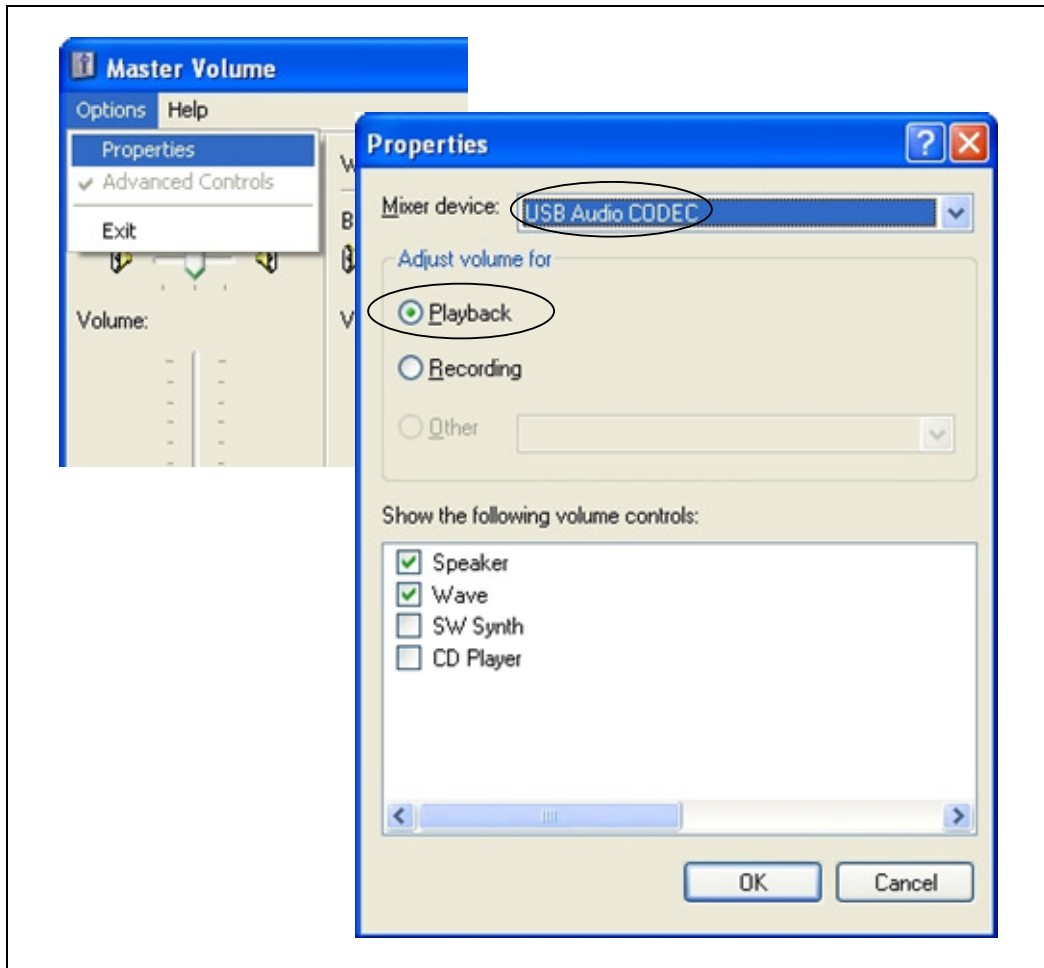


Figure 16: Selecting the USB Audio CODEC

### Setting up the TS-590S Menus for Data Operation, with VOX Control

Figure 17 shows the menus in the TS-590S that are involved in data operation via the USB and ACC2 ports, with VOX control. The Instruction Manual for the radio explains how to select these menus.

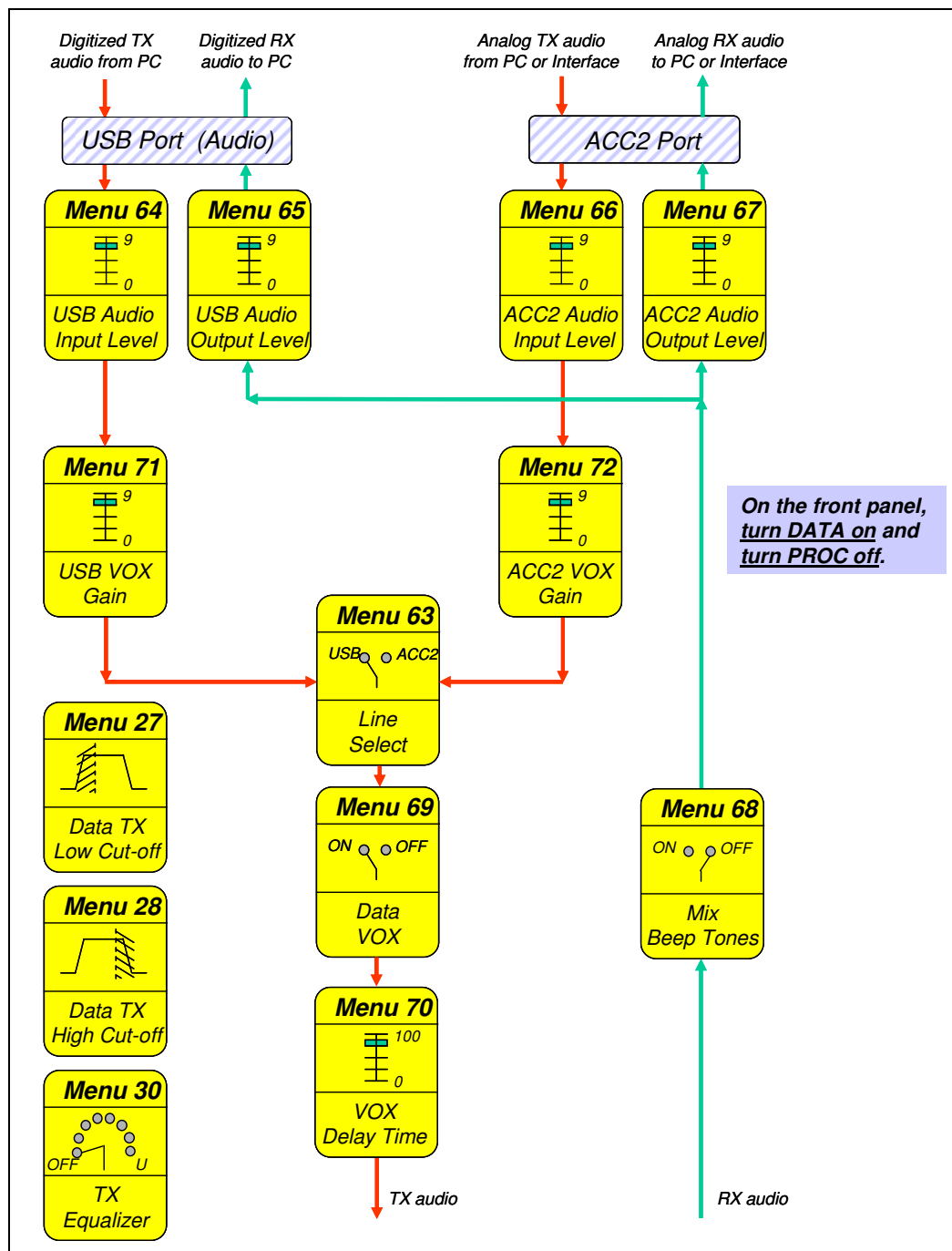


Figure 17: TS-590S menus for VOX operation. If using CAT commands for TX control instead of VOX, set Menu 69 to OFF



The table below shows suggested settings for data operation.

<b><u>FRONT PANEL SETTINGS</u></b>		
<b>1. Turn DATA on</b> <b>2. Turn PROC off</b>		
<b>Menu</b>	<b>Function</b>	<b>Setting</b>
27	Data TX Low Cut-Off	10 Hz
28	Data TX High Cut-Off	3000 Hz
30	TX Equalizer	OFF
63	Line Select	USB or ACC2
64	USB Audio Input Level	When Menu 63 = USB: Start at 1, increase as necessary (in conjunction with the Speaker audio control in the PC) for suitable TX audio level. <b>Note: The TX audio level must never exceed the point where ALC appears</b>
65	USB Audio Output Level	Start at 1, increase as necessary for suitable input level to the digital program running on the PC
66	ACC2 Audio Input Level	When Menu 63 = ACC2: Start at 1, increase as necessary (in conjunction with the Speaker audio control in the PC) for suitable TX audio level. <b>Note: The TX audio level must never exceed the point where ALC appears</b>
67	ACC2 Audio Output Level	Start at 1, increase as necessary for suitable input level to the digital program running on the PC
68	Mix Beep Tones	OFF
69	Data VOX	ON for VOX mode OFF if transmission is controlled by CAT commands
70	VOX Delay Time	Start at 50, adjust if necessary (unlikely)
71	USB VOX Gain	When Menu 63 = USB: Start at 5, adjust if necessary (unlikely)
72	ACC2 VOX Gain	When Menu 63 = ACC2: Start at 5, adjust if necessary (unlikely)

Some comments on these settings:

- Remember to check that the speech processor (PROC) control is turned OFF at the front panel during data operation, otherwise the data signal will be severely distorted.
- Similarly, remember to turn the TX Equalizer (Menu 30) OFF during data operation, to prevent undue distortion.
- Different digital programs running on the PC generate TX audio at different levels. To avoid having to change the Audio Input Level (Menu 64/66) for each program, it is probably easier to leave Menu 64/66 permanently set to 5, say, and adjust the output level in the PC as required by each program. The utility program QuickMix is very useful here, allowing you to save and retrieve individual levels for each program [2].

- It is imperative that the TX audio level never causes the ALC to come into operation. To minimise distortion of the transmitted signal, a simple technique is to:
  - gradually increase the TX audio level to the point where ALC just appears (one block on the ALC display on the front panel).
  - measure the transmitter output power at this point, using an external power meter.
  - reduce the TX audio level until the transmitter output power falls to about 75% of the previously measured power.

By adopting these precautions, it is easy to achieve PSK31 IMD levels of around  $-37\text{dB}$  (a very good figure).

### The Front Panel DATA Button

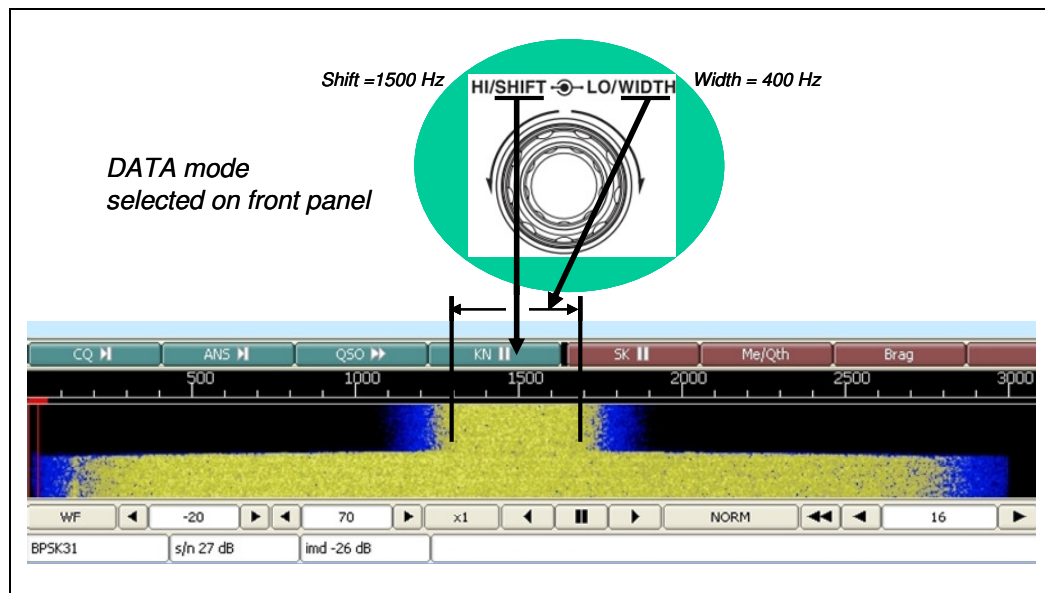
When you press the DATA button on the front panel to select LSB-DATA or USB-DATA mode, you can adjust the TX and RX audio filters specifically for data operation. These settings are independent of those you would normally use for SSB voice operation.

**TX Data Audio Filter:** Menus 27 and 28 let you select the lower and upper audio cut-off frequencies of the transmitted signal.

**RX Data Audio Filter:** When the TS-590S is set to DATA mode, the concentric HI/SHIFT and LO/WIDTH controls on the front panel let you set up a brick-wall audio DSP filter anywhere in the audio passband. See Figure 18.

- The HI/SHIFT control sets the center frequency of the filter.
- The LO/WIDTH control sets the width of the filter.

This gives an extremely flexible and effective method of removing unwanted signals.



**Figure 18: The RX audio DSP filter in operation (with Fldigi). The radio must be set to DATA mode for this filter to work**

### Setup for Digital Voice Operation: The Big Picture

The block diagram in Figure 19 shows how the hardware and software fit together for digital voice transmission and reception.

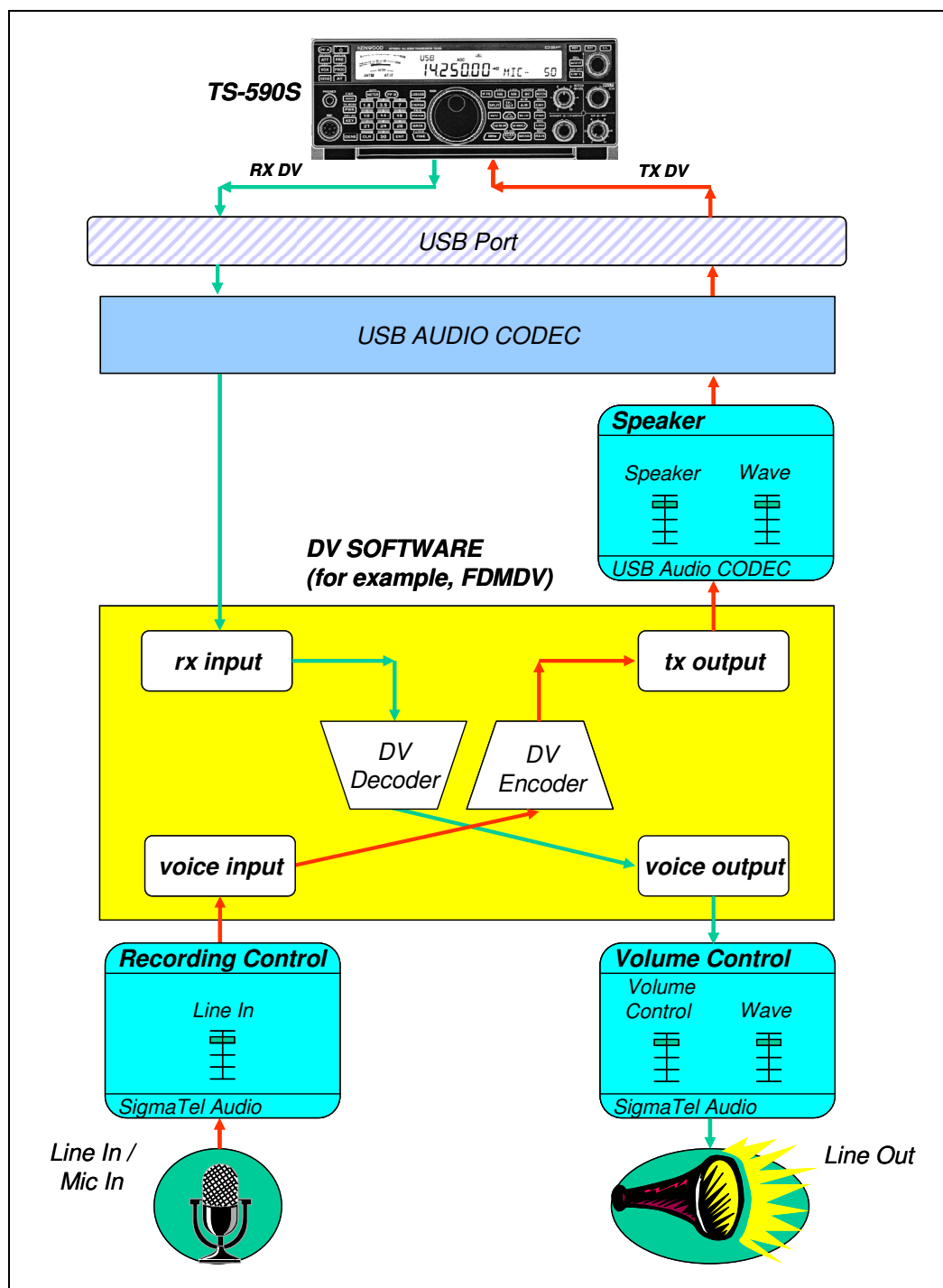


Figure 19: Transmit and receive data flow for digital voice operation

The top half of Figure 19, representing the connection between the PC and the radio, is exactly the same as for digital data operation.

The bottom half of Figure 19 shows the additional hardware and software required for digital voice operation.

- The incoming RX data from the radio is decoded in the DV software, and output as audio to the loudspeaker or headphones. The audio level is controlled by the Volume Control Windows mixer.
- The outgoing audio from the microphone passes through the Recording Control Windows mixer, and is then encoded in the DV software. The encoded audio passes to the USB Audio CODEC, and thence to the radio.

The simplest way of connecting the microphone and loudspeaker/headphones to the DV software is via the (usually) built-in soundcard in the PC. [In the examples in this HOWTO, SigmaTelAudio is used].

### DV Soundcard Selection

The first step in setting up the software is to identify the ports that the DV program will use. For example, for FDM DV, click on Sound > Sound Card Selection (see Figure 20), then select the appropriate soundcards:

<i>Input/output</i>	<i>soundcard</i>
rx input	USB Audio CODEC
tx output	USB Audio CODEC
voice input	SigmaTelAudio
voice output	SigmaTelAudio

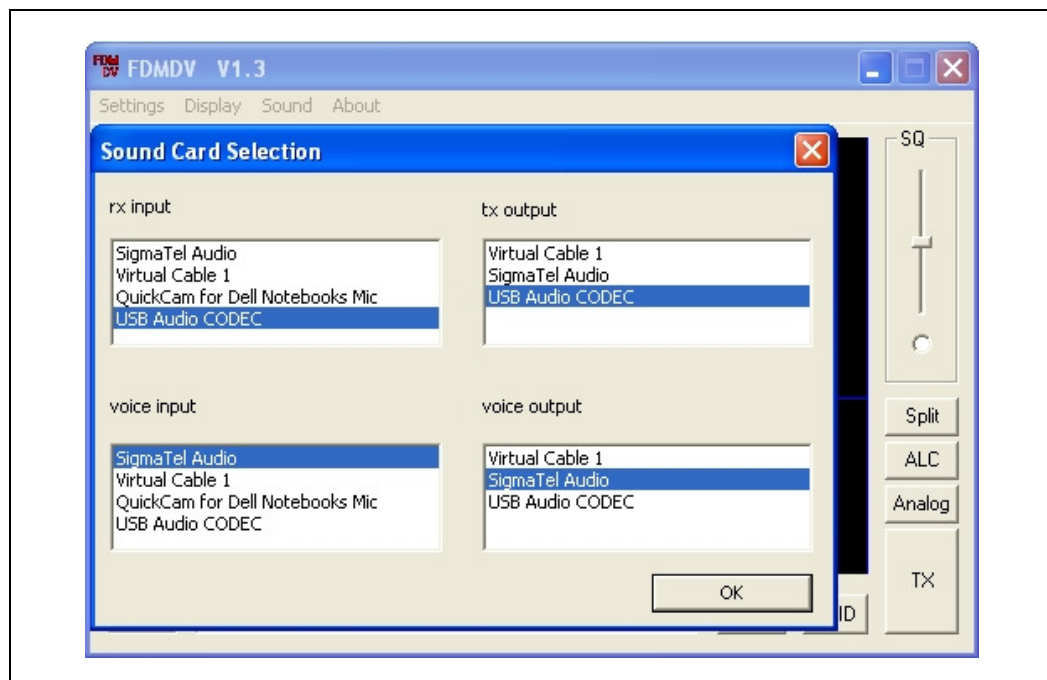
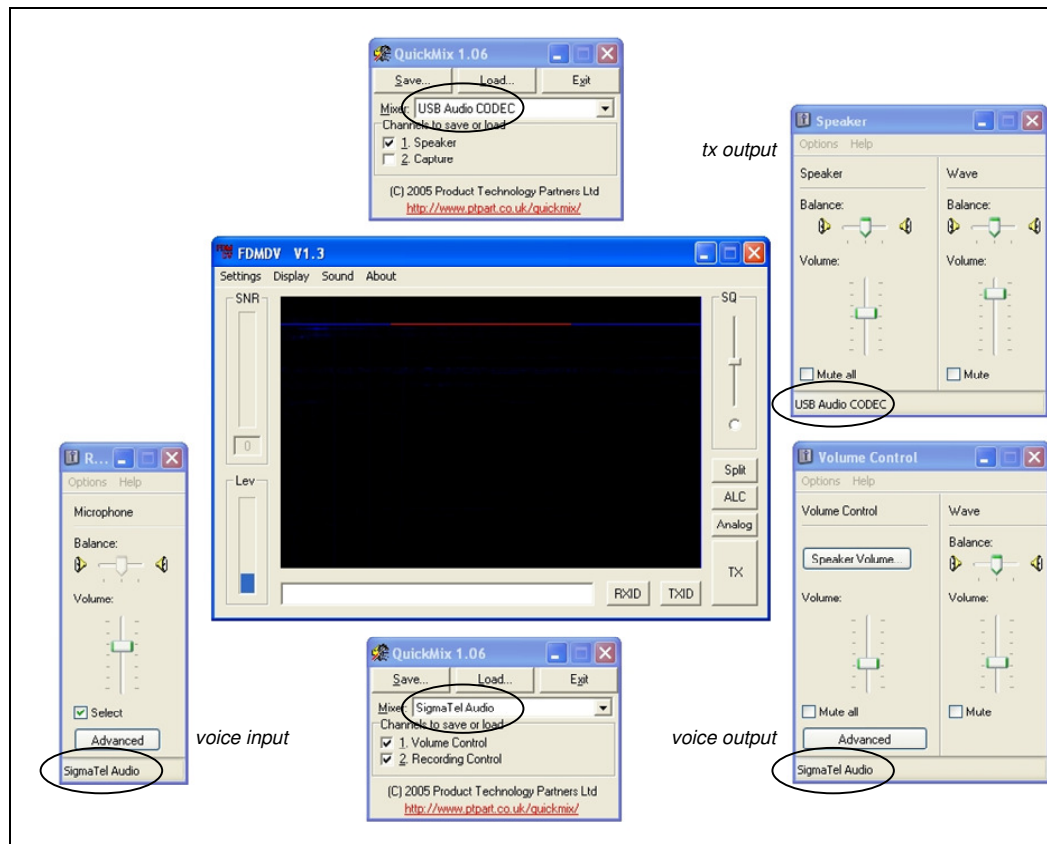


Figure 20: FDM DV soundcard selection

### Configuring the Windows Audio Mixers for Digital Voice

For DV you need to configure *three* separate Windows mixers, following the procedure described earlier for the USB Audio CODEC. See Figure 21. The mixers are:

- Speaker: USB Audio CODEC (for tx output)
- Recording Control: SigmaTelAudio (for voice input)
- Volume Control: SigmaTelAudio (for voice output)



**Figure 21: The three Windows mixers used with the DV program (FDMDV). It is convenient to position the mixers on the screen as shown when initially setting them up. When the correct audio levels have been set, they can be saved using QuickMix**

### Checking out DV operation: Step 1 – Audio input from the radio

To verify that the DV program is receiving audio from the radio, tune the radio into any strong signal and watch the DV receive display. If no signal spectrum appears there, gradually increase the USB Audio Output Level in the radio (Menu 65) until the spectrum appears.

Then adjust the DV program for minimum squelch, and check that loud squawking sound effects emerge from the loudspeaker/headphones. If necessary adjust the voice output Volume Control mixer for a comfortable sound level.

The system is now ready to receive DV signals.

**Checking out DV operation: Step 2 – Microphone input level**

Click on the TX button and speak into the microphone. Adjust the voice input Record Control mixer to the point where the voice level indicator on the DV program reaches about 90% of maximum.

The system is now ready to transmit DV signals.

**Checking out DV operation: Step 3 – Saving the mixer levels**

To avoid having to set the Windows mixer levels each time you start the DV program, it is a good idea to save the levels, using QuickMix. You will need to save two sets of levels: one set for the USB Audio CODEC, and the other set for the PC soundcard.

**Checking out DV operation: Step 4 – More detailed instructions**

The above description is necessarily brief, to explain the basic steps in setting up the PC and the radio for digital voice operation. For the finer points you will need to refer to the detailed documentation for the DV program(s) you plan to use. As a starting point, the FDMDV documentation by Mel Whitten, K0PFX, is very helpful [4].

**Making Contact on Digital Voice**

The recommended way of setting up a DV sked is to register with the K3UK Digital Sked page [5]. Then post a message saying what frequency and mode you are using, and with luck someone will call you!

## Appendix 1: Windows Sound Effects

Windows has an interesting habit of producing a collection of sound effects for all occasions. Usually this is not an issue, as long as the sound effects are confined to the PC. But if the sound effects find their way into the audio signal path to your radio, your transmitted digital data will be accompanied by a sundry collection of dings, clicks, squawks, alarms and other unwanted noises.

To confine the sound effects to the PC, the basic rule is simple: Windows always outputs the sound effects to the default sound playback device. Provided you do not select a default device that communicates with the radio, your on-air signals will not be corrupted with sound effects.

### Selecting the Default Sound Playback Device

Selecting the default sound playback device is straightforward.

Click on Control Panel > Sound effects and Audio Devices, then click on the Audio tab. See Figure A1-1.

Select the default device from the dropdown list, then click on the Apply button at the bottom of the window.

In Figure A1-1 the selected default device (SigmaTelAudio) is the built-in soundcard.

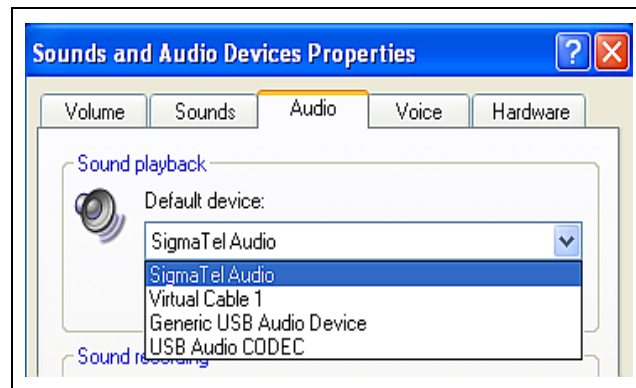


Figure A1-1: Select the default device from the drop-down list, then click on the Apply button

### TX Audio via the TS-590S USB Port

Figure A1-2 shows the usual way of configuring the audio when using the TS-590S USB port.

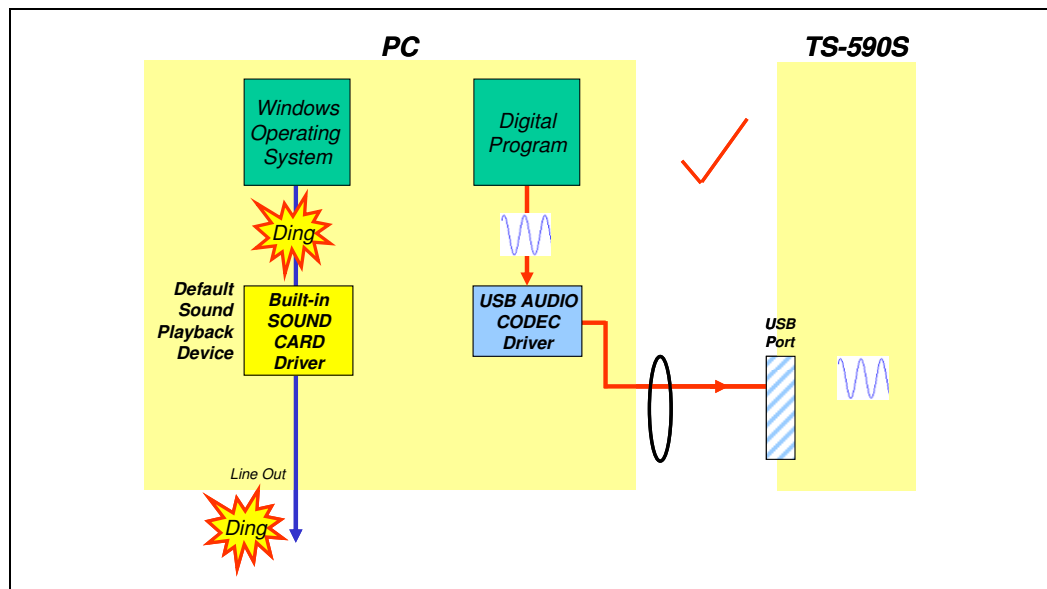
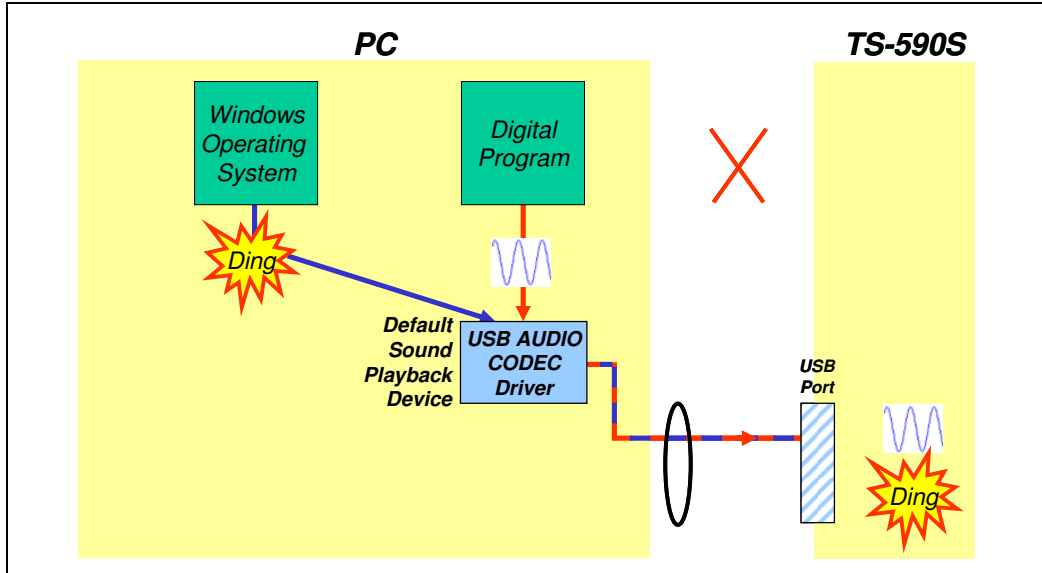


Figure A1-2: The CORRECT way to set up the default sound playback device when using the USB port for transmitting audio

Windows sound effects are output to the built-in sound card, where they can do no harm, and the audio data path passes through the USB audio codec driver to the USB port.

Figure A1-3 shows the *wrong* way to set up the audio. Here the default sound playback device has been incorrectly set to the USB audio codec. In this scenario the sound effects will intermingle with the audio data stream and will be transmitted on-air.



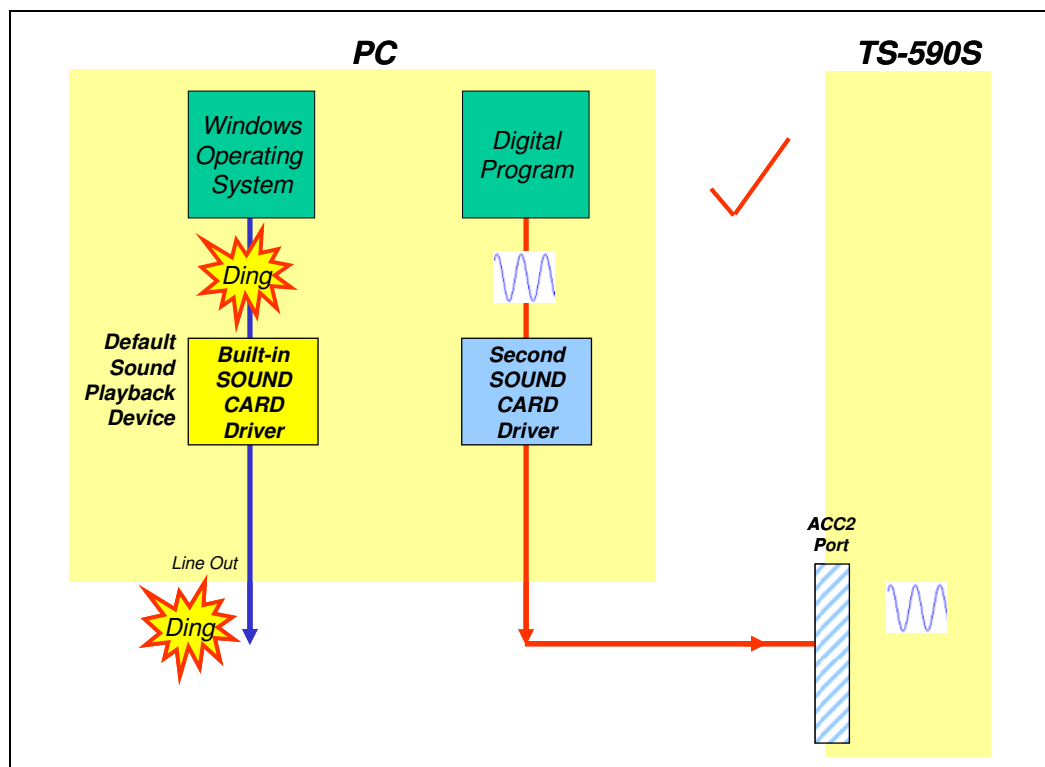
**Figure A1-3: The WRONG way to set up the default sound playback device when using the USB port for transmitting audio. Windows sound effects are directed to the USB Codec, and from there through the USB port to the radio**



### TX Audio via the TS-590S ACC2 Port

Transmitting audio data through the analog input pin of the ACC2 port is not quite as simple as using the USB port. Two approaches are suggested here.

1. Using a second sound card: See Figure A1-4. Windows sound effects are directed to the built-in sound card as before, and the audio data for transmission is directed to a second soundcard plugged into the PC. In this case you will need to configure the digital program's TX and RX channels to use the driver that is applicable for the second soundcard.



**Figure A1-4: A possible CORRECT way to set up the default sound playback device when using the ACC2 port on the TS-590S. Windows sound effects are directed to the built-in soundcard, and the TX audio passes through a separate soundcard**

Figure A1-5 shows a typical USB soundcard costing less than \$5 that you could use as a second soundcard.

However, to ensure high quality TX and RX signals, it is probably worth spending a little more.



**Figure A1-5: A low cost USB soundcard**

2. Using a dummy default audio device: If you want to use the built-in sound card for the TX audio, you can install a virtual audio device driver for the Windows sound effects. See Figure A1-6.

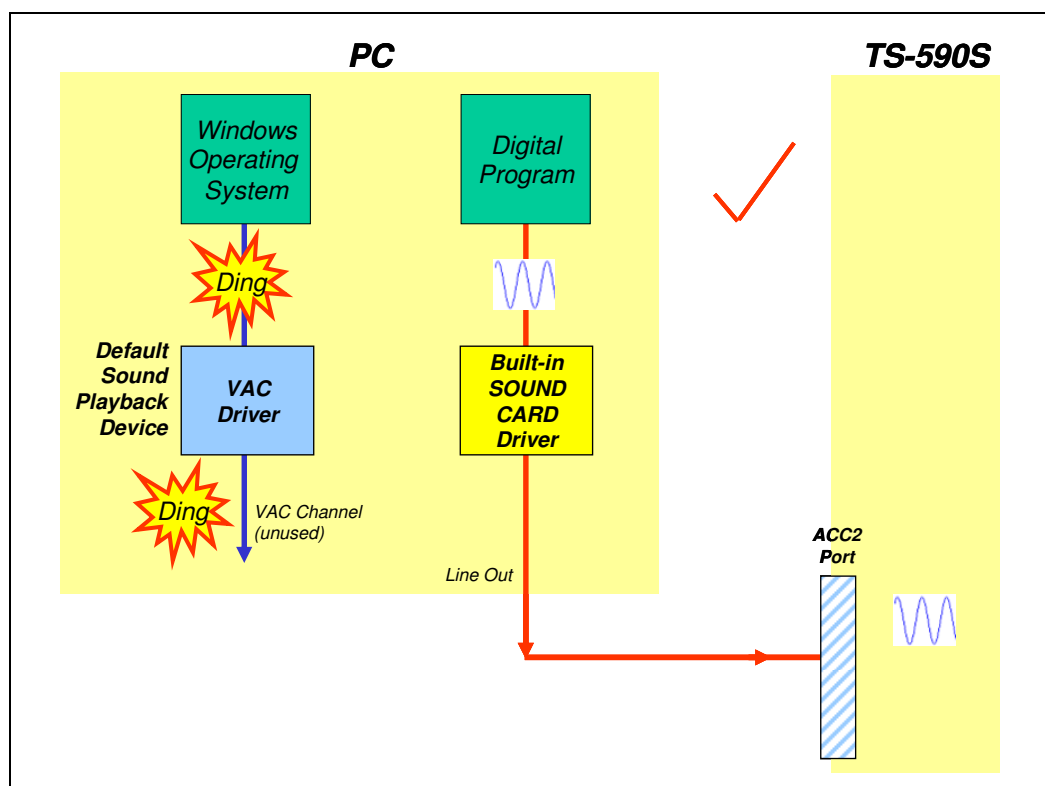


Figure A1-6: Using a VAC virtual sound card driver for Windows sound effects

An example of a suitable virtual soundcard driver is Virtual Audio Cable (VAC) [6], in which you can set up a virtual cable as the default audio device. See Figure A1-7.

Windows sound effects disappear down the VAC virtual “pipe”, and the TX audio is available at the Line Out socket on the PC.

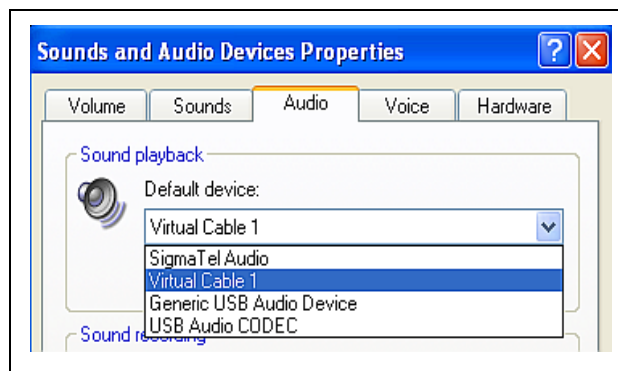
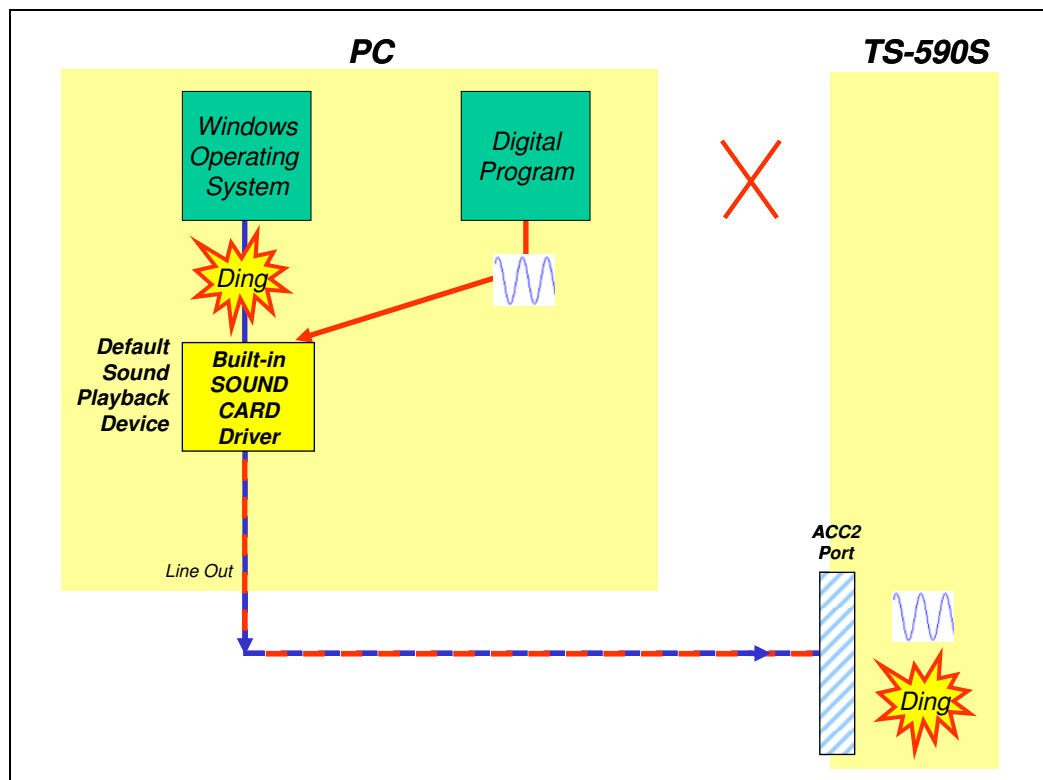


Figure A1-7: Selecting the virtual audio device (Virtual Cable 1) as the default sound playback device

**How not to Transmit Audio via the TS-590S ACC2 Port**

Finally, Figure A1-8 shows how not to configure the audio when transmitting via the TS-590S ACC2 port. Here the Windows sound effects and the digital program share the built-in soundcard which has been configured as the default sound playback device. Predictably, the sound effects will be heard on data transmissions.



**Figure A1-8: The WRONG way to use the Line Out output from the PC when sending TX data to the ACC2 port. Both the Windows sound effects and the digital program share the built-in sound card, thus the sound effects will appear on data transmissions**

## Appendix 2: Windows USB Devices

When using the TS-590S for digital data and digital voice modes, the correct functioning of the USB port is essential for carrying the TX/RX audio between the PC and the radio, and possibly also for use by CAT commands. Fortunately there is little to go wrong with the USB port. This appendix describes the USBDevview utility for monitoring USB device status, and includes hints on preventing the USB connection from powering down.

### Checking USB Devices with USBDevview

Through the Control Panel, Windows provides a lot of detailed information on the USB devices, but this information is spread over many subfolders and dialog boxes. USBDevview [7] is a much more convenient tool for displaying USB status. It provides no less than 28 separate pieces of information about each USB device connected to the PC, all displayed together in one (very long) line. See Figure A2-1 for a sample of part of USBDevview's display.

[Hint: when viewing the USBDevview display, select "Options" and uncheck the option "Display Disconnected Devices". Otherwise you will see many lines of old information related to devices that were connected to the system in the past].

The figure consists of three screenshots of the USBDevview utility, showing different views of USB device information. The first screenshot shows a list of devices with columns for Device Name, Description, Device Type, Connected, Safe To Unplug, Disabled, USB Hub, Drive Letter, Serial Number, Created Date, and Last Plug/Unplug Date. The second screenshot shows a list of devices with columns for VendorID, ProductID, Firmware Revision, USB Class, USB SubClass, USB Protocol, Hub / Port, Computer Name, Vendor Name, Product Name, and ParentID Prefix. The third screenshot shows a list of devices with columns for d Prefix, Service Name, Service Description, Driver Filename, Device..., Device Mfg, Power, U..., Driver Description, Driver Version, and Instance ID.

Device Name	Description	Device Type	Connected	Safe To Unplug	Disabled	USB Hub	Drive Letter	Serial Nu...	Created Date	Last Plug/Unplug Date
CP2102 USB to UART Bridge Controller	Silicon Labs CP210x USB to UART Bridge	Vendor Specific	Yes	Yes	No	No	COM11	0550000...	20/01/2011 21:54:02	14/06/2012 06:30:55
USB Serial Converter	USB Serial Converter	Vendor Specific	Yes	No	No	No			21/11/2010 21:40:39	14/06/2012 06:07:26
USB Audio CODEC	USB Composite Device	Unknown	Yes	Yes	No	No			16/07/2011 19:49:32	14/06/2012 06:30:55
USB Device	Logitech USB Camera (Dell Notebooks)	Unknown	Yes	Yes	No	No		22660891	11/07/2009 20:32:52	14/06/2012 06:07:28
USB Optical Mouse	USB Human Interface Device	HID (Human Interface Device)	Yes	Yes	No	No			11/07/2009 20:30:45	14/06/2012 06:07:27
USB-Serial Controller	Prolific USB-to-Serial Comm Port	Vendor Specific	Yes	Yes	No	No	COM7		29/04/2010 19:27:24	14/06/2012 06:07:27

VendorID	ProductID	Firmware Revis...	USB Class	USB SubClass	USB Protocol	Hub / Port	Computer Name	Vendor Name	Product Name	ParentID Prefix
10c4	ea60	1.00	ff	00	00			Cygnal Integrated Products, Inc.	CP210x UART Bridge / myAVR mySmartUSB light	
0403	6001	6.00	ff	ff	ff	Hub 0, Port 1		Future Technology Devices Int...	FT232 USB-Serial (UART) IC	
08bb	29b3	1.00	00	00	00	Hub 3, Port 1		Texas Instruments Japan	PCM2903B Audio CODEC	782e82365b80
046d	08c6	80.05	00	00	00			Logitech, Inc.	QuickCam for DELL Notebooks	686d6e47f81
093a	2510	1.00	03	01	02	Hub 0, Port 2		Pixart Imaging, Inc.	Optical Mouse	683704140380
067b	2303	3.00	ff	00	00	Hub 2, Port 2		Prolific Technology, Inc.	PL2303 Serial Port	

d Prefix	Service Name	Service Description	Driver Filename	Device...	Device Mfg	Power	U...	Driver Description	Driver Version	Instance ID
	silabser	Silicon Labs CP210x USB to UART Bridge Driver	silabser.sys	Ports	Silicon Laboratories	0 mA		Silicon Labs CP210x USB to UART Bridge	6.1.0.0	USB\vid_10c4&pid_ea60\05500000
	FTDIUSB	USB Serial Converter Driver	ftdibus.sys	USB	FTDI	400 mA	2.00	USB Serial Converter	2.6.0.0	USB\vid_0403&pid_6001\58fc7ab
365b80	usbccgp	Microsoft USB Generic Parent Driver	usbccgp.sys	USB	(Standard USB Host Controller)	20 mA	2.00	USB Composite Device	5.1.2600.0	USB\vid_08bb&pid_29b3\6816afcd
47f81	usbccgp	Microsoft USB Generic Parent Driver	usbccgp.sys	USB	Logitech	500 mA	2.00	Logitech USB Camera (Dell Notebooks)	10.5.1.1124	USB\vid_046d&pid_08c6\22660891
140380	HidUsb	Microsoft HID Class Driver	hidusb.sys	HIDClass	(Standard system devices)	100 mA	1.10	USB Human Interface Device	5.1.2600.2180	USB\vid_093a&pid_2510\58fc7ab
	Ser2pl	Prolific Serial port driver	ser2pl.sys	Ports	Prolific	100 mA	1.10	Prolific USB-to-Serial Comm Port	2.0.0.18	USB\vid_067b&pid_2303\5834f1b

**Figure A2-1: A sample USBDevview display – the display is very wide, so it is shown here in three parts**

In this picture the first line confirms that the USB-to-UART Bridge controller is operational. It is connected to COM11, and is using version 6.1.1.0 of the Virtual COM Port Driver (silabser.sys).

The third line shows that the USB audio codec is operational, and is using version 5.1.2600.0 of the USB Audio Codec Driver (usbccgp.sys).

The last line shows the Prolific USB-to-serial converter connected via COM7 to the TS-590S COM port.

[The remaining lines show the status of other USB devices not related to the TS-590S].

Provided that the USBDeview display is similar to Figure A2-1, all should be well with the TS-590S USB port.

### USB Power Management

Some people have commented that while USB connections appear to work most of the time, they sometimes appear to “go to sleep”. This is possibly because of a USB power saving function in Windows.

To prevent this happening:

1. Go to Control Panel > System > Hardware > Device Manager.
2. Select Universal Serial Bus Controllers.
3. For each USB Root Hub entry:
  - a. Click on the Power Management tab.
  - b. Uncheck the option Allow the computer to turn off this device to save power.

## References

<i>Resource</i>	<i>URL</i>
[1] Virtual COM port driver	<a href="http://www.kenwood.com/i/products/info/amateur/vcp_e.html">http://www.kenwood.com/i/products/info/amateur/vcp_e.html</a>
[2] QuickMix software	<a href="http://www.ptpart.co.uk/assets/unsupported/quickmixin.zip">http://www.ptpart.co.uk/assets/unsupported/quickmixin.zip</a>
[3] Fldigi software	<a href="http://www.w1hkj.com/download.html">http://www.w1hkj.com/download.html</a>
[4] FDM DV software and user documentation	<a href="http://n1su.com/fdmdv/">http://n1su.com/fdmdv/</a>
[5] K3UK DigitalRadio Sked page	<a href="http://www.obriensweb.com/sked/index.php?page=digital">http://www.obriensweb.com/sked/index.php?page=digital</a>
[6] Virtual Audio Cable (VAC)	<a href="http://software.muzychenko.net/eng/vac.htm">http://software.muzychenko.net/eng/vac.htm</a>
[7] USBDeview	<a href="http://www.nirsoft.net/utils/usb_devices_view.html">http://www.nirsoft.net/utils/usb_devices_view.html</a>
[8] Kenwood TS-590S Instruction Manual	Go to the TS-590S Resources Page: <a href="http://homepage.ntlworld.com/wadei/ts-590s.htm">http://homepage.ntlworld.com/wadei/ts-590s.htm</a> Click on the " <b>KENWOOD TS-590S DOCUMENTATION</b> " button. Select item # 2 from the list.
[9] TS-590S HOWTO: Digital QuickStart	Go to the TS-590S Resources Page: <a href="http://homepage.ntlworld.com/wadei/ts-590s.htm">http://homepage.ntlworld.com/wadei/ts-590s.htm</a> Click on the " <b>HOWTOs</b> " button. Select item # 10 from the list.
[10] HOWTO monitor TS-590S CAT Commands	Go to the TS-590S Resources Page: <a href="http://homepage.ntlworld.com/wadei/ts-590s.htm">http://homepage.ntlworld.com/wadei/ts-590s.htm</a> Click on the " <b>HOWTOs</b> " button. Select item # 3 from the list.
[11] TS-590S TechNote: SSB Audio Handling	Go to the TS-590S Resources Page: <a href="http://homepage.ntlworld.com/wadei/ts-590s.htm">http://homepage.ntlworld.com/wadei/ts-590s.htm</a> Click on the " <b>TECHNOTES</b> " button. Select item # 2 from the list.
[12] TS-590S HOWTO: SSB Audio Setup	Go to the TS-590S Resources Page: <a href="http://homepage.ntlworld.com/wadei/ts-590s.htm">http://homepage.ntlworld.com/wadei/ts-590s.htm</a> Click on the " <b>HOWTOs</b> " button. Select item # 20 from the list.
TS-590S Resources Page	<a href="http://homepage.ntlworld.com/wadei/ts-590s.htm">http://homepage.ntlworld.com/wadei/ts-590s.htm</a>
Digital radio group	<a href="http://groups.yahoo.com/group/digitalradio/">http://groups.yahoo.com/group/digitalradio/</a>
Digital voice group	<a href="http://groups.google.com/group/digitalvoice">http://groups.google.com/group/digitalvoice</a>

**Document Version History**

<b>Version</b>	<b>Date</b>	<b>History</b>
1.0	7 February 2011	First version
1.1	6 October 2011	Added detailed coverage of the USB, COM and ACC2 ports Added section on setting USB/COM baudrates Extended Menu Settings diagram to include ACC2 settings
1.2	7 October 2011	Corrected the diagrams showing Menu 63 (Line Select). This menu only switches the <u>TX</u> audio. It does not switch the <u>RX</u> audio
1.3	28 December 2011	Added section on Left/Right audio channels
1.4	20 February 2012	Added Nutshell section: introduction to AFSK, VOX and PTT Added note that the front-panel DATA button is only relevant for receive, not transmit
1.5	5 March 2012	Added Appendix 1 and Appendix 2
1.6	14 March 2012	Added further information on the function of the front panel DATA button Added a section on USB Power Management in Appendix 2
1.7	23 March 2012	Changed the link to QuickMix Reference [2]
1.8	2 December 2012	Minor revision. Clarified COM port operation Added new USBDeview screenshot Added cross references to other TS-590S HOWTOs and TechNotes