TS-590S HOWTO: Digital QuickStart

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Introduction

This HOWTO serves as a beginners' cookbook for running some of the well-known digital packages with the Kenwood TS-590S. To keep things simple, a common approach has been adopted throughout:

- Audio tones are conveyed between the PC and the TS-590S via the USB port.[1]
- Two TX keying methods are described for most packages:
  - VOX TX Keying
  - CAT Command TX Keying

This approach requires only a single USB cable connecting the radio to the PC. No other cables or hardware interfaces are required.

This HOWTO is confined to the basics of persuading the selected packages to communicate with the TS-590S. Nothing more. Some of the packages offer alternative ways of TX keying control – discovering those is left as an exercise for the reader!

Software and Hardware Configuration

Configuration details for each of the packages are covered in two or three pages. The first page for each package contains a table showing the following settings:

- Audio device section (USB Codec device)
- Audio Output Level Control
- Audio input level control
- PTT port configuration (for CAT control)
- TS-590S front panel and menu settings

The second and subsequent pages for each package contain screenshots showing the relevant configuration settings.

All of the configuration settings apply to a Windows XP environment, but should be similar under other members of the Windows family.

The information described in this HOWTO is intentionally cryptic, but hopefully self explanatory.

[1] With some JT65-related modes the TS-590S USB port may not be suitable for audio transport, as the time delays introduced by the USB link may be unacceptably long. In this case it will be necessary to use the ACC2 port instead – see the TS-590S Digital HOWTO [1] and the TS-590S SSB Audio Handling TechNote [2].

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Some General Comments

- Getting digital software to work properly with *any* radio is not a five-minute "Plug n' Play" exercise.
- You need to spend a lot of time reading the documentation that comes with the software.
- You need to spend a lot of time adjusting the transmit and receive audio levels to prevent signal overload.
- When making transmit adjustments, you need to run low power into a dummy load.
- You need to transmit with the speech processor switched off.

Digital Software Installation

Some digital software packages give you the option of deciding where to install them, with the default folder being C:\Program Files. If you are running Windows Vista or Windows 7, it is highly recommended that you do *not* install in C:\Program Files – this is because the operating system places restrictions on user actions in this folder that may prevent correct operation of the software.[2]

Instead, it is much cleaner all round to create a special folder for digital software packages (for example, C:\Digital Programs), then install individual packages in folders below it. See Figure 1.

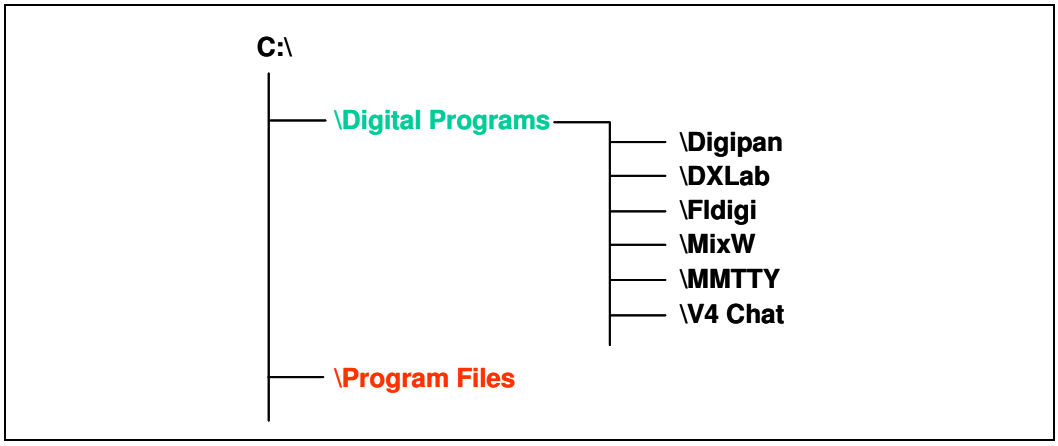

Figure 1: Create a special folder for digital programs, then create a separate folder for each package below it.

[2] A known issue with Fldigi, for example.

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TX Keying

VOX TX Keying: The simplest method. See Figure 2.

- The USB cable transfers the TX and RX data between the PC and the TS-590S.
- In the radio, Data VOX (Menu 69) is switched ON.
- In the PC, the codec driver is automatically installed by Windows when the codec inside the radio is first detected – there is no need to install any other drivers in the PC.
- No serial COM connection is required. This leaves both the USB virtual COM port and the serial COM port free for other purposes.
- VOX keying is simple, but slow (compared against CAT command keying).

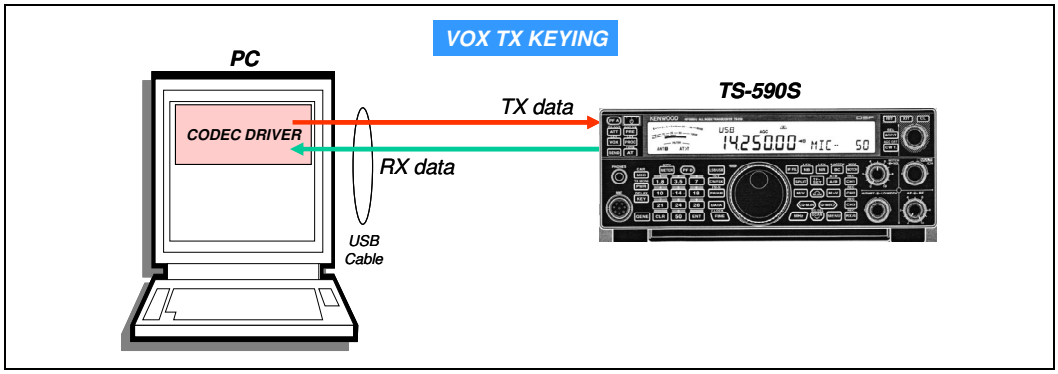

Figure 2: VOX TX Keying

CAT Command TX Keying: The method to use for faster TX/RX switching[3]. See Figure 3.

- The USB cable transfers the TX and RX data plus the CAT Control commands between the PC and the TS-590S.
- In the radio, Data VOX (Menu 69) is switched OFF. TX keying is achieved with the "TX1;" CAT command that originates in the digital package.
- In the PC, the codec driver is automatically installed by Windows when the codec inside the radio is first detected.
- In the PC, it will be necessary to install the UART Bridge driver (which Kenwood calls the "Virtual COM Port Driver") from [3], for the CAT commands, if the operating system has not already installed it.
- This leaves the serial COM port free for other purposes.

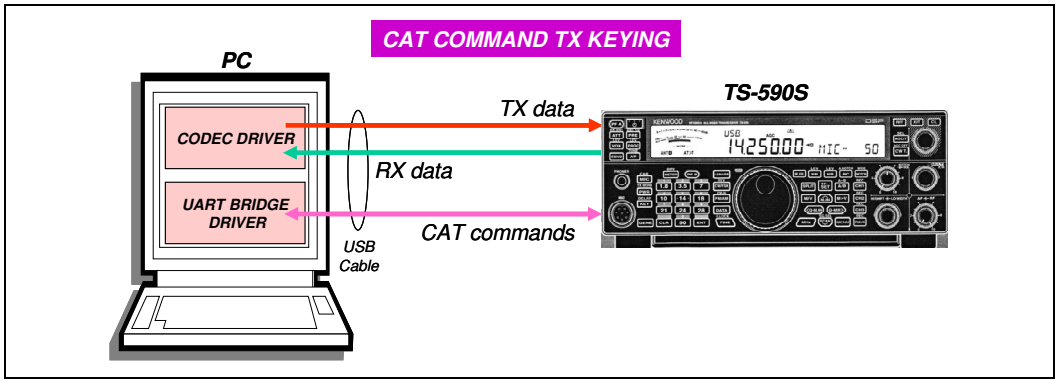

Figure 3: CAT Command TX Keying

[3] Necessary for ARQ modes such as V4.

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Device Names

The screenshots in this HOWTO show actual detected device names, which may differ slightly from PC to PC, depending on the operating system and device drivers installed.

The configuration table for each package shows the USB COM port as **COM*n***. This corresponds to **COM11** in the screenshots.

What Next?

Once basic communication is achieved between the digital package and the TS-590S, you then have to read the package documentation in detail to see how to drive it.

More background information is contained in the TS-590S Digital HOWTO [1] and in the TS-590S SSB Audio Handling TechNote [2].

Which Mode?

The packages described in this HOWTO are capable of transmitting and receiving many different digital modes, and the beginner often finds it very confusing – which mode to use? This summary by Scott Traurig, WU2O, provides a succinct starting point.

The following are arguably the most popular modes and probably represent 99% of the data traffic on the amateur HF bands. They are popular for a reason; that is, they are widely considered the best modes for the listed "purpose":

- Want to see how far you can get on very few watts in an automated fashion that requires very little effort? Use **WSPR** (you need an internet connection to see how you are doing as stations report reception on a website).
- Want to have very tiny, pro forma "QSOs"" on very few watts or in extremely poor conditions in a semi-automated fashion with very little effort? Use **JT65**.
- Want to have a QSO in extremely poor conditions with a mode so slow you can run to the bathroom after you push "transmit", and perfect for two finger typists? Use **Olivia 16/500** (and also **Olivia 8/500**, which is a little faster with a little less link margin).
- Want to have a decently fast QSO in extremely poor conditions, almost as good as Olivia 16/500 but good for medium fast touch typists? Use **Contestia 16/500** (all upper case mode, strangely not as popular as it ought to be given its performance).
- You are a fast typist or want to send a lot of data/canned messages? Use **MT63-MT1000** (Kind of a bandwidth hog, but speed has a price. **MTTY** is also damn fast but not very common).
- Want to make a million contacts, either short award/logbook building stuff or longer QSOs? Use **PSK31**. This is ***THE*** most popular mode, hands down. Occasionally in good conditions you will see people switch to the faster **PSK63** or **PSK125** modes, both very easy to recognize when you see them.
- Want to send/receive email? Use **Pactor** or **Winmor**, and to a much lesser but growing extent **PSKmail**.
- Want to be old school? Use **RTTY**. ☺
- Want to be really old school? Use **CW**. ☺ ☺

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Digital Packages

The following digital packages (in alphabetical order) are covered in this HOWTO. More may be added later.

The "VOX" and "CAT" columns contain the page numbers in this HOWTO for the package setup descriptions.

Package	*CAT Page*	*VOX Page*	*Comment*
Digipan		20	No obvious means of CAT control
DXLab WinWarbler + Commander	6	23	
Fldigi	8	25	
MixW	12	27	
MMTTY	15	30	
V4 Chat	18		VOX control not fast enough for ARQ

For most packages you can use either "CAT Command TX Keying" or "VOX TX Keying". The advantages and disadvantages of each method are:

TX Keying Method	*Advantages*	*Disadvantages*
CAT Command	**Simple to set up** **Provides CAT control of frequency tuning and TX/RX switching** **Faster TX/RX switching time (recommended for ARQ modes)**	**Uses a COM port** **Requires a separate cable if using the serial COM port**
VOX	**Does not use a COM port**	**Can be difficult to set up the correct VOX levels** **Slower TX/RX switching time (not suitable for ARQ modes)**

The remainder of this HOWTO sets out the essential configuration details for the digital packages. The banner headline on each page is in:

- **PURPLE for CAT Command TX Keying**
- **BLUE for VOX TX keying**

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DXLAB WINWARBLER + COMMANDER TX KEYING: CAT COMMAND TX1;

WINWARBLER	Audio Device Selection	> Config > Soundcard	Reception: USB Audio CODEC	Transmission: USB Audio CODEC
	Audio Output Level	> Config > Soundcard > Mixer Adjustments > Transmission	Speaker USB Audio CODEC	
	Audio Input Level	> Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the WINWARBLER input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
COMMANDER	Radio Select	> Config > General	Radio: KENWOOD	Data transmission using ACC2 input: check
	PTT Port	> Config > Ports	Primary CAT Serial Port	Port#: COM*n* Baud: 115200 Word: 8 Parity: None Stop: 1 DTR: Off RTS: On
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 62: USB Baud Rate	115200	Switch radio off and on again after changing this value
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into WINWARBLER
		Menu 69: Data VOX	**oFF**	

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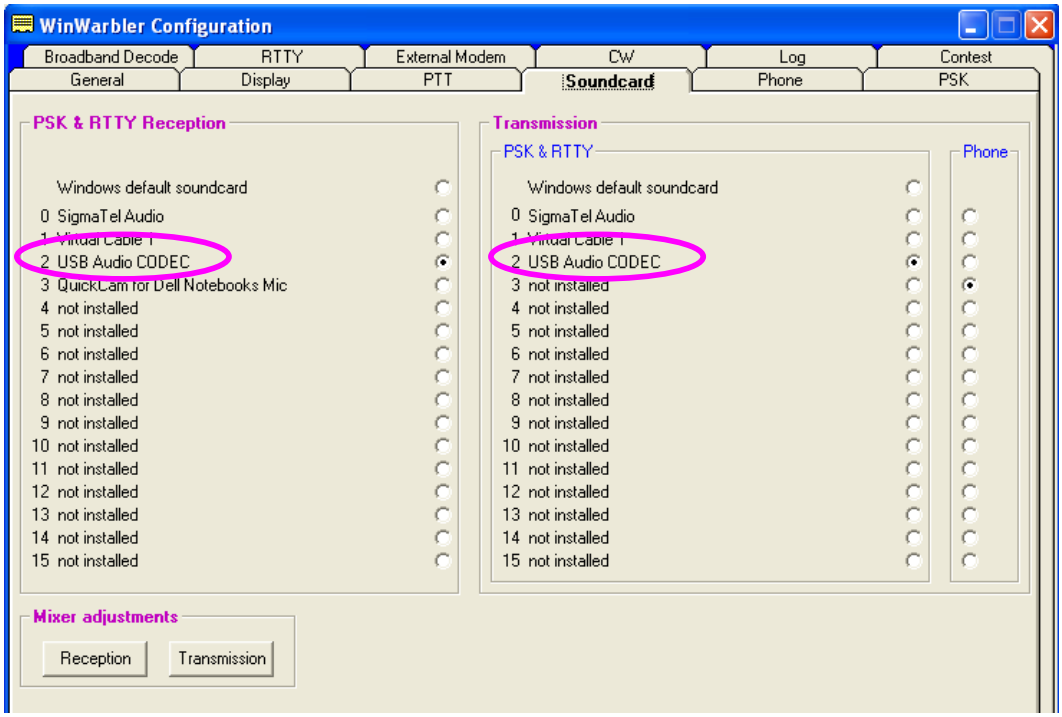
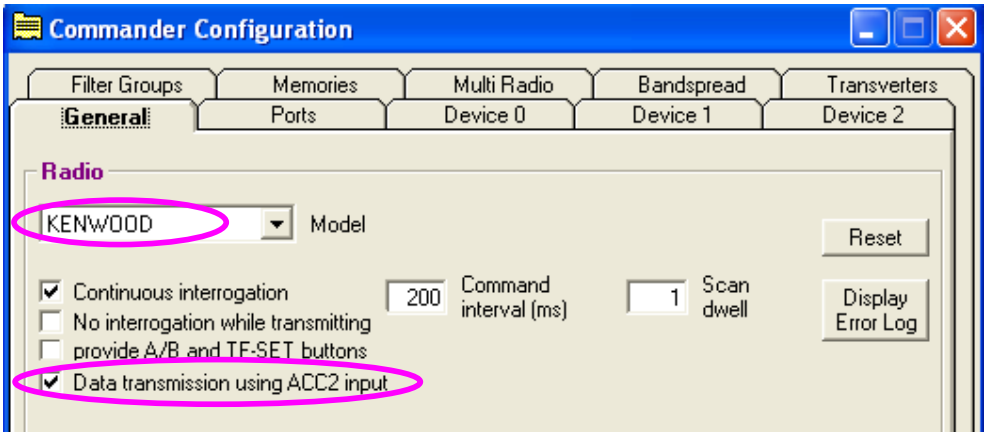
DXLAB WINWARBLER + COMMANDER TX KEYING: CAT COMMAND TX1;





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FLDIGI — TX KEYING: CAT COMMAND TX1;

FLDIGI	Audio Device Selection	> Configure) > Soundcard > Devices	Port Audio: check	Playback: USB Audio CODEC Capture: USB Audio CODEC
	Left/Right Channel Selection	> Configure) > Settings > Right Channel	Reverse Left/Right channels: check	
	Audio Output Level	> Windows Volume Control > Options > Properties > Mixer Device	Playback USB Audio CODEC	
	Audio Input Level	> Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the FLDIGI input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
	PTT Port	> Configure > Rig Control > RigCAT	Use RigCAT: check Rig description file: TS-590S.xml	Device: COM*n* Baudrate: 115200 Stopbits: 1 CAT command for PTT: check RTS/CTS flow control: check
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 62: USB Baud Rate	115200	Switch radio off and on again after changing this value
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into FLDIGI
		Menu 69: Data VOX	**oFF**	

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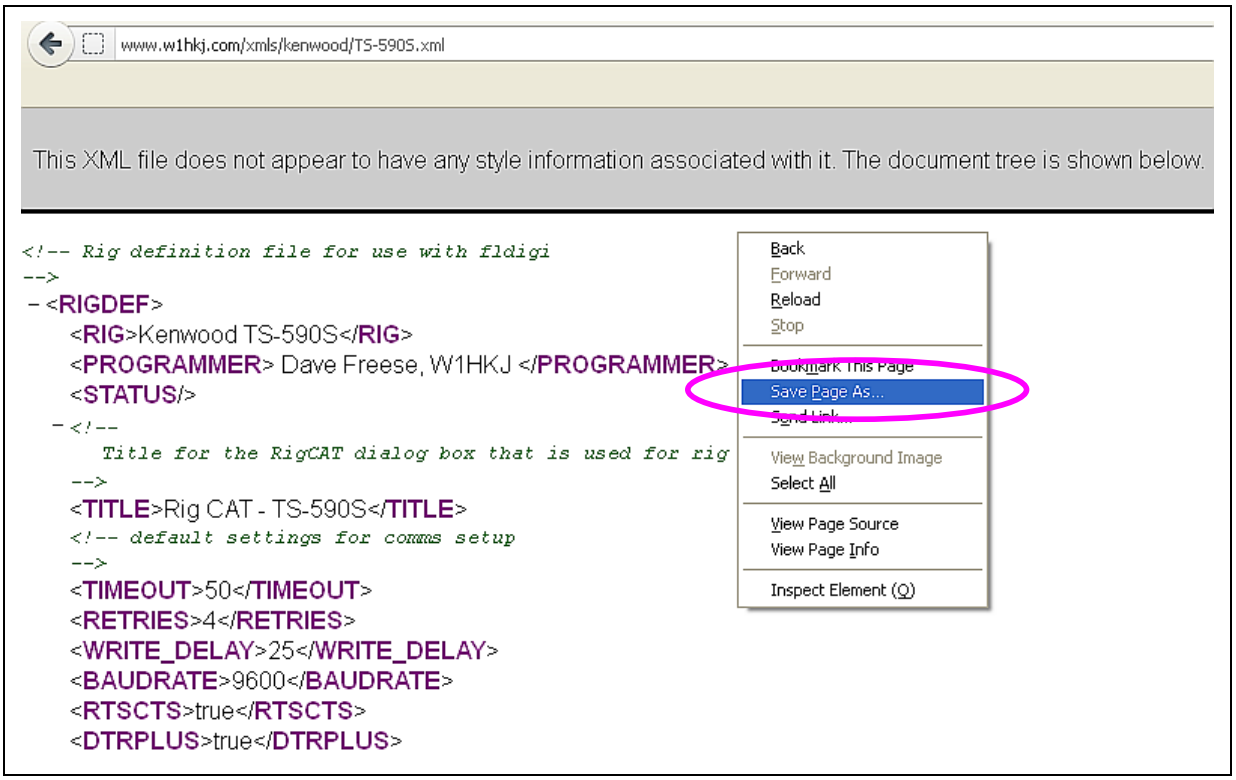
FLDIGI — TX KEYING: CAT COMMAND TX1;

Installing the TS-590S XML file

Prior to configuring fldigi, you need to download and save the TS-590S xml file:

1. Go to: http://www.w1hkj.com/xmls/kenwood/TS-590S.xml
2. In the browser, move the cursor to the displayed window, then right-click on "Save Page As" (or similar, depending on the browser), and save the file as TS-590S.xml in the fldigi folder – see the screenshot below.



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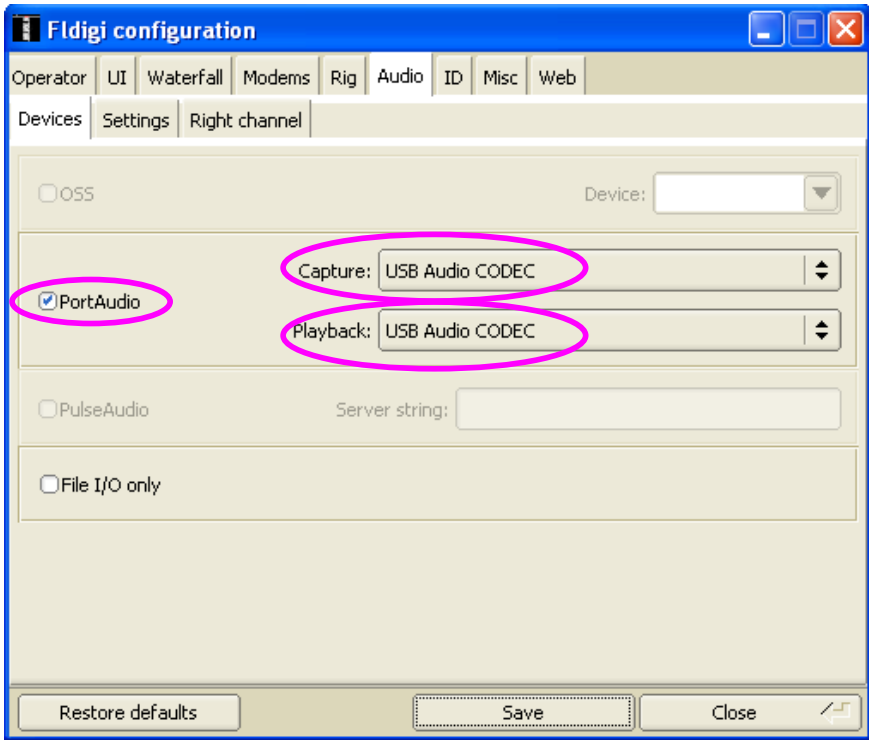
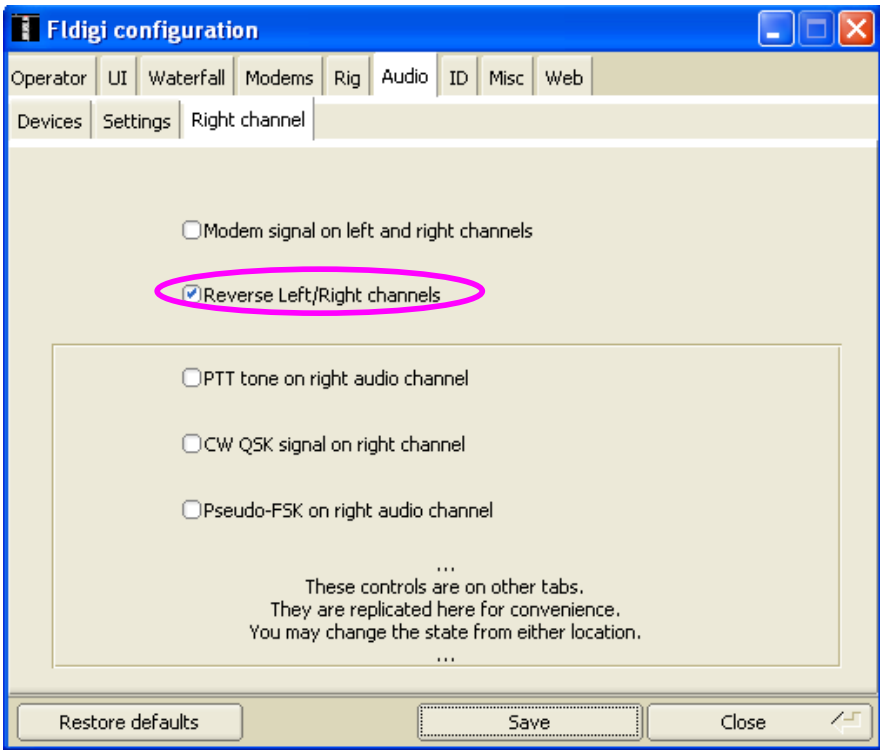
FLDIGI

TX KEYING: CAT COMMAND TX1;





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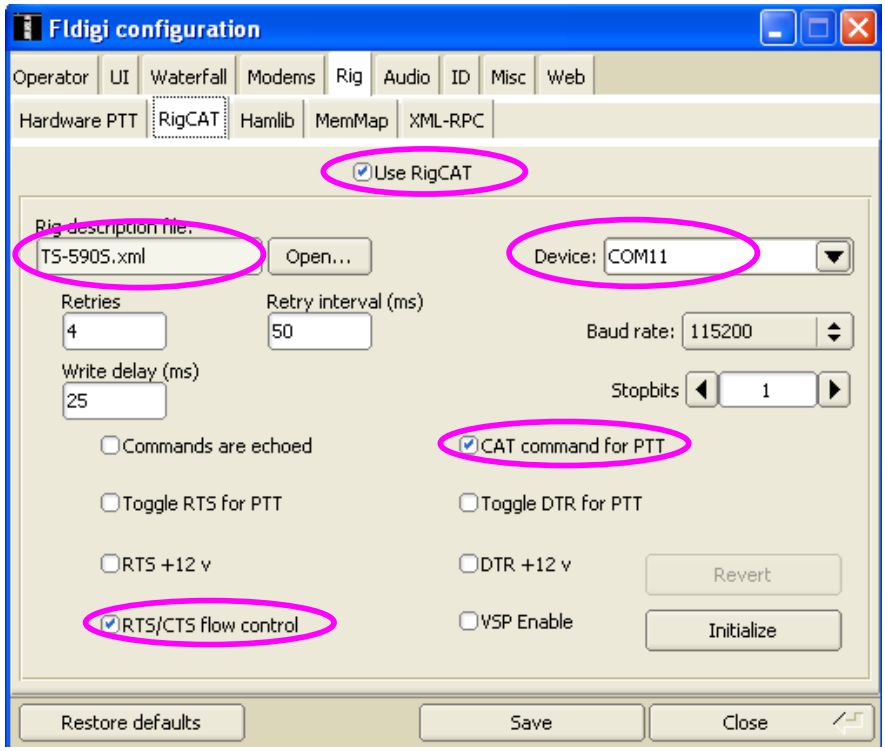
FLDIGI — TX KEYING: CAT COMMAND TX1;



When setting up the RigCAT page as above, click on the "Open..." button, and select the downloaded TS-590S.xml file.

Attention: When you select the XML file, the baudrate is automatically set to 9600. You may need to change this back to your normally used rate.

Click on "Initialize", "Save" and "Close"..

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MIXW — TX KEYING: CAT COMMAND TX1;

MIXW	Audio Device Selection	> Configure > Sound Device Settings	Device: Sound card (internal or external) Input: USB Audio CODEC	Output: USB Audio CODEC Samplerate: 11025
	Audio Output Level	> Configure >Output Volume > Windows Mixer > Speaker	USB Audio CODEC	Adjust TX audio drive level
	CAT Control	> Configure	Unselect Disable CAT	
	PTT	> Configure > TRCVR CAT PTT …	CAT	Kenwood
			Model	TS-480
			Check PTT via CAT Command	
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 62: USB Baud Rate	57600	Switch radio off and on again after changing this value
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	Use this control in conjunction with the MMTTY Audio Out Level control to achieve suitable level.
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into MMTTY
		Menu 69: Data VOX	**oFF**	

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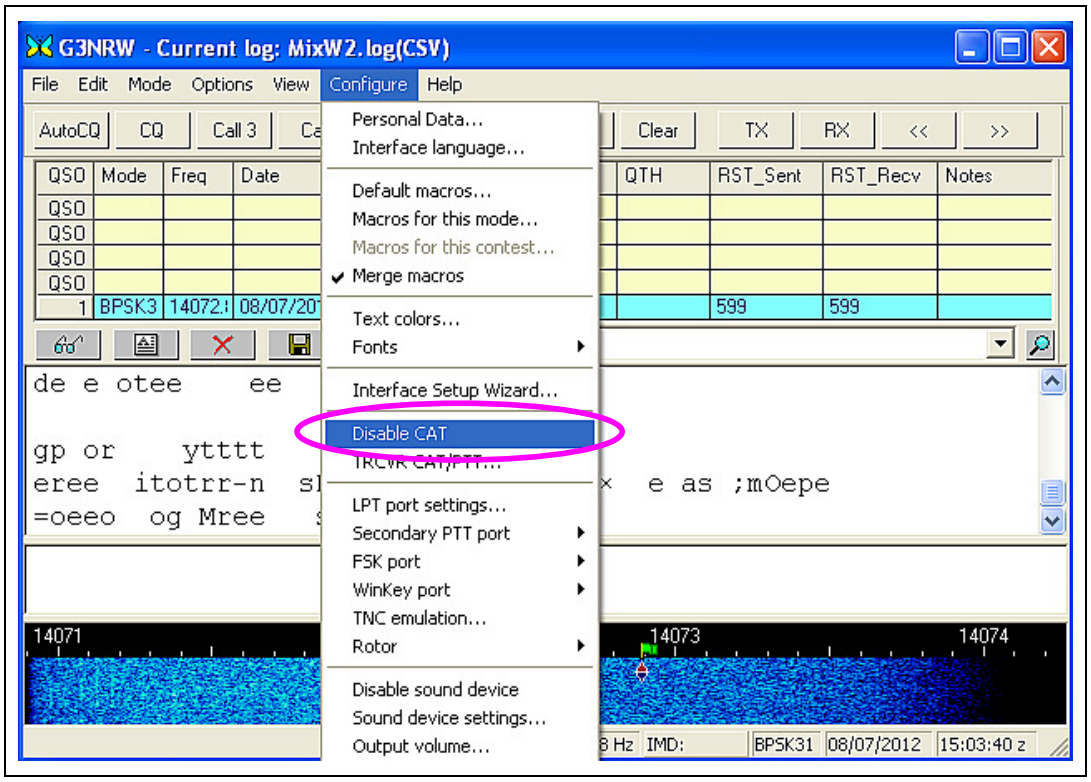
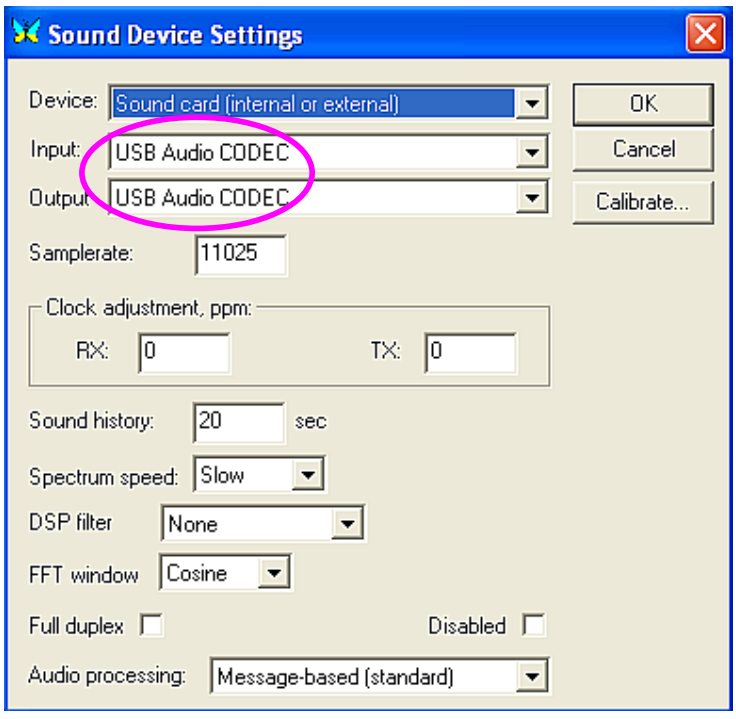
MIXW — TX KEYING: CAT COMMAND TX1;





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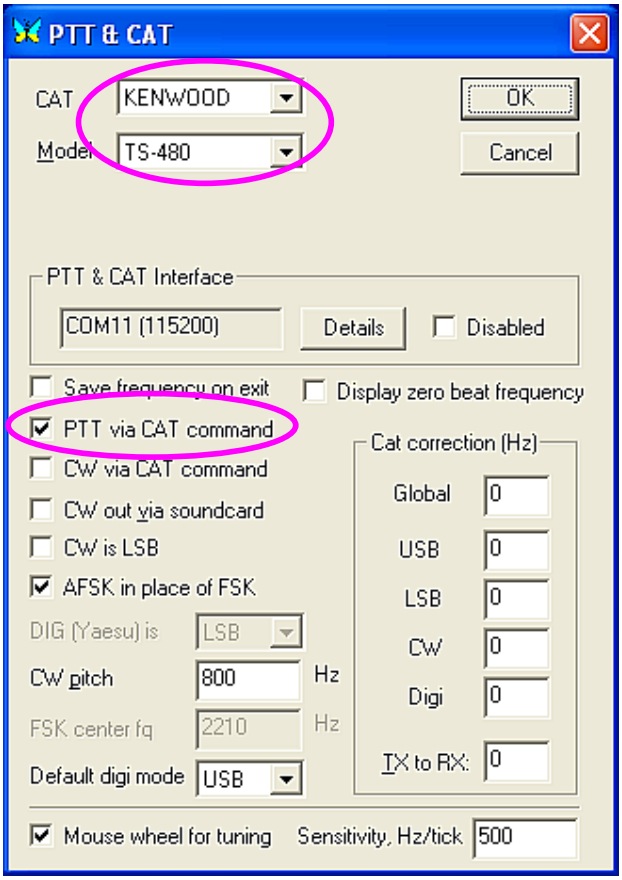
MIXW

TX KEYING: CAT COMMAND TX1;



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MMTTY — TX KEYING: CAT COMMAND TX1;

MMTTY	Audio Device Selection	> Option(O) > Setup MMTTY > Soundcard	Reception: USB Audio CODEC	Transmission: USB Audio CODEC
	Audio Output Level	> Option(O) >Soundcard output level (V) > Windows Volume Control > Options > Properties > Mixer Device	Playback USB Audio CODEC	
	Audio Input Level	> Option(O) >Soundcard input level (I) > Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the MMTTY input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
	PTT Port	> Option(O) > Setup MMTTY(O) > TX	PTT & FSK Port	COM*n*
	Radio Command	> Option(O) > Setup MMTTY (O) > TX > Radio Command	Port	COM*n*
			Baud	57600
			Stop	1 bit
			Flow Control	CTS
			Tx	TX1;\w10 **The default is TX;** **Be sure to change this to TX1;**
			Model	Kenwood, Elecraft
			Frequency Offset	LSB or USB
			Group	Kenwood, Elecraft
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 62: USB Baud Rate	57600	Switch radio off and on again after changing this value
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	Use this control in conjunction with the MMTTY Audio Out Level control to achieve suitable level.
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into MMTTY
		Menu 69: Data VOX	**oFF**	

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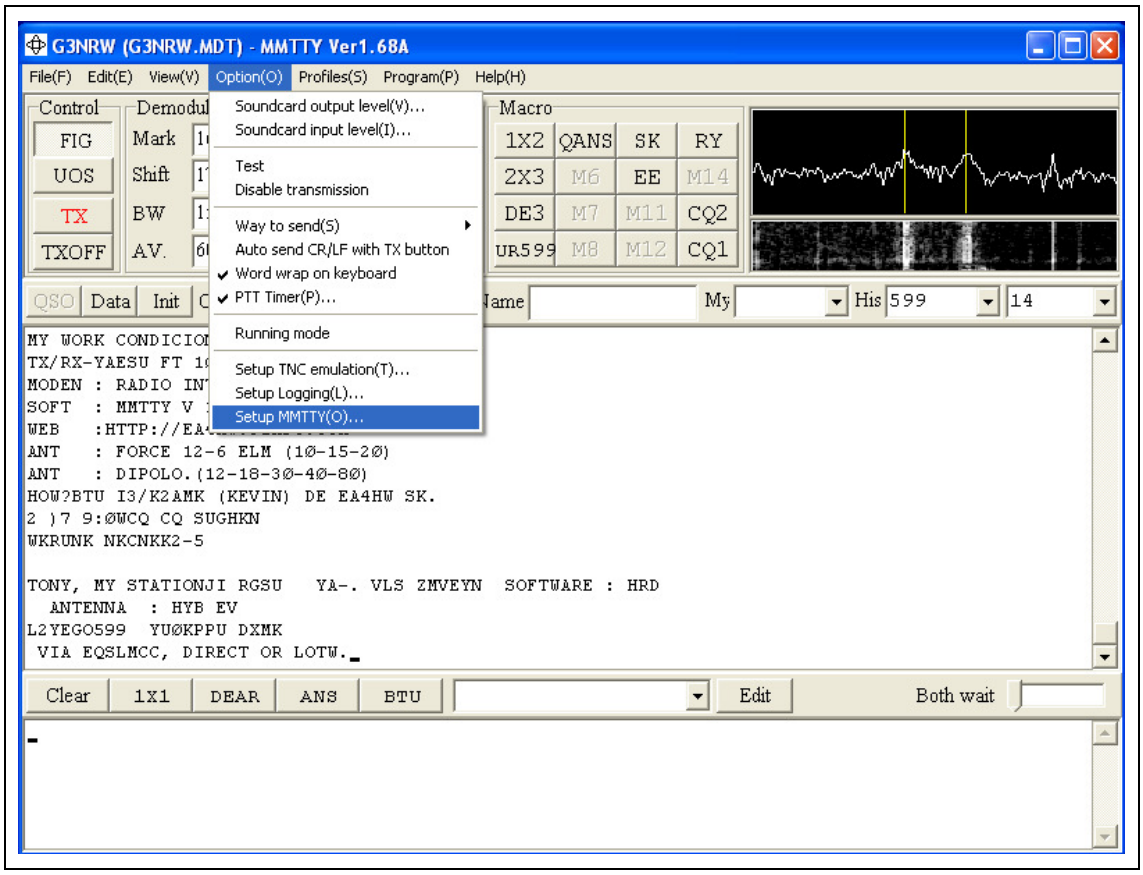
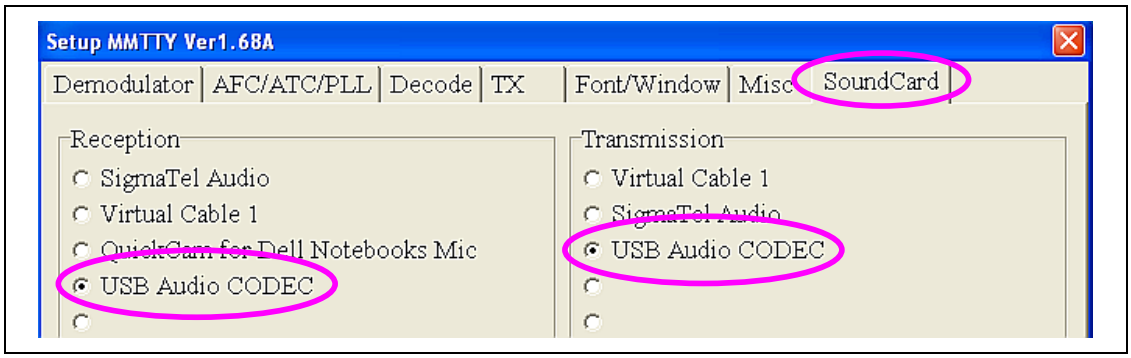
MMTTY — TX KEYING: CAT COMMAND TX1;





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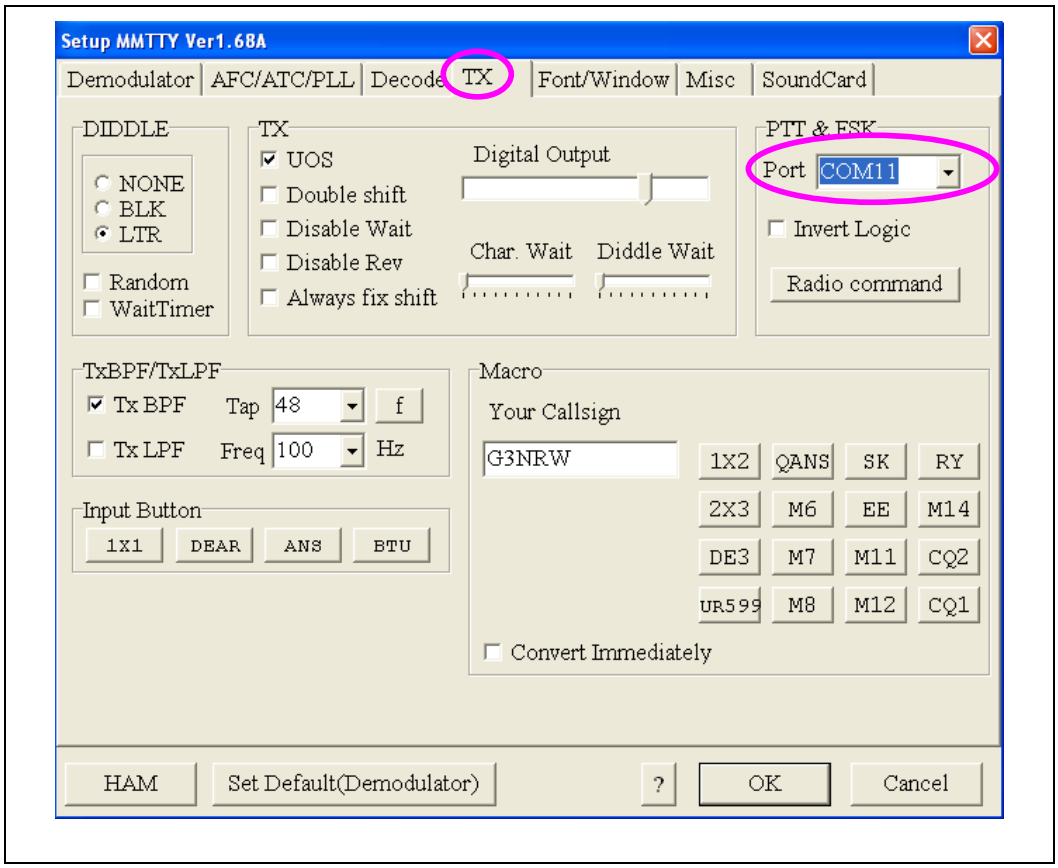
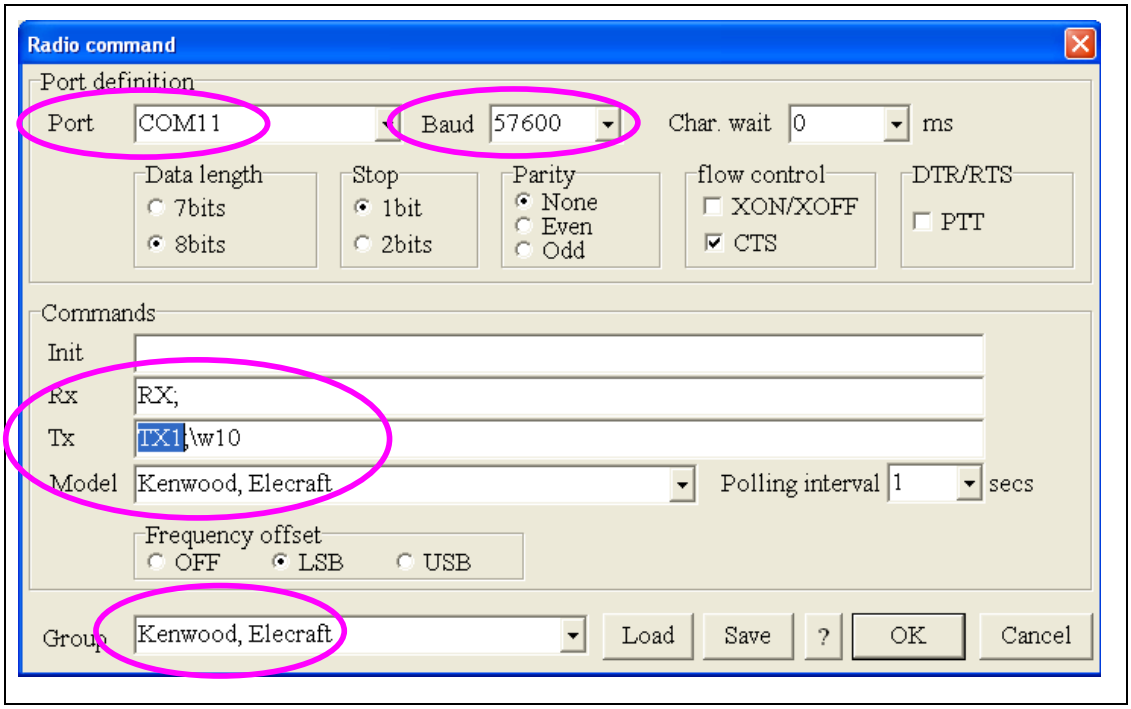
MMTTY — TX KEYING: CAT COMMAND TX1;





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V4 CHAT — TX KEYING: CAT COMMAND TX1;

V4 CHAT	Audio Device Selection	> File > Setup	V4 Capture Device: USB Audio CODEC-03	V4 Playback Device: USB Audio CODEC-03 (Click on Update when done)
	Audio Output Level	> Windows Volume Control > Options > Properties > Mixer Device	Playback USB Audio CODEC	
	Audio Input Level	> Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the V4 CHAT input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
	PTT Port	> File > Setup > Radio Setup	Radio Model	Kenwood Radios
			USB	Select
			Radio Control Port	COM*n*
			Baud	115200
			Enable RTS	Select
			PTT Serial Port	K590-Data
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 62: USB Baud Rate	115200	Switch radio off and on again after changing this value
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	Use this control in conjunction with the Windows Volume Control to achieve suitable level.
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into V4 CHAT
		Menu 69: Data VOX	**oFF**	

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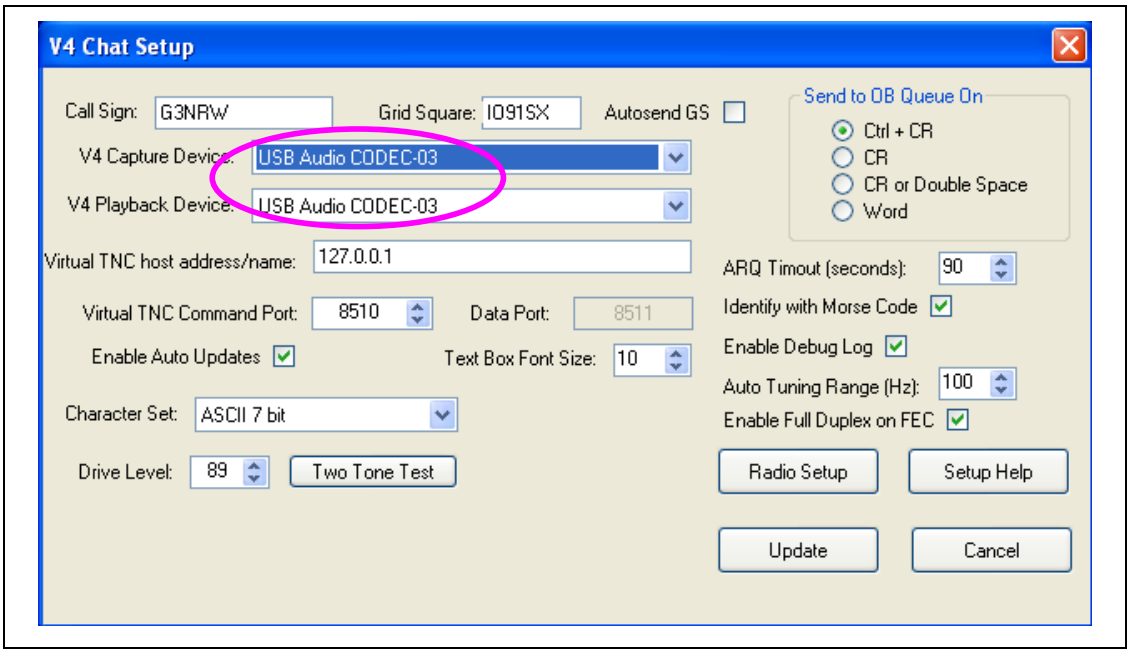
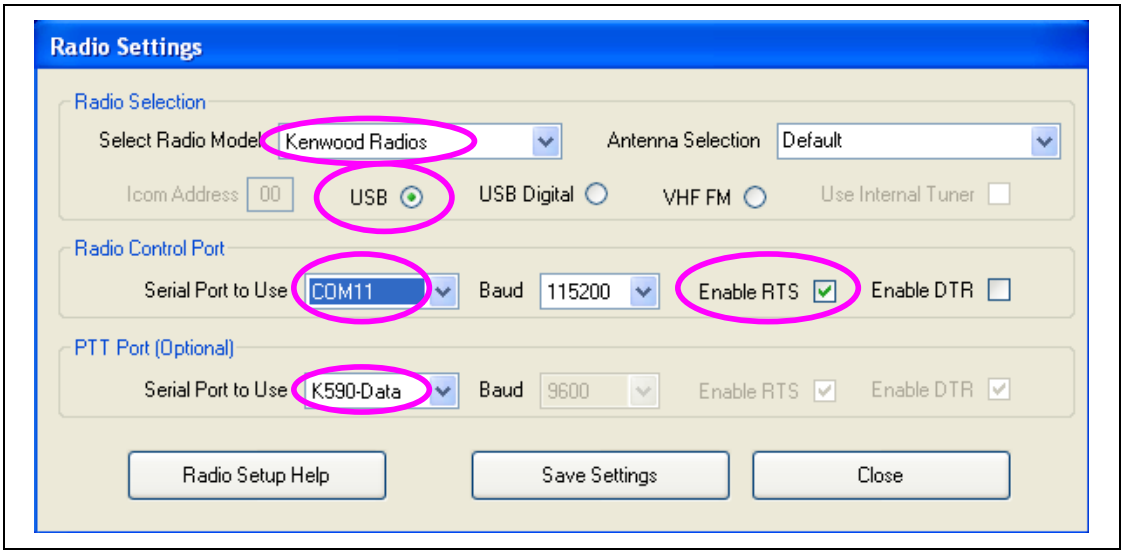
V4 CHAT — TX KEYING: CAT COMMAND TX1;





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DIGIPAN TX KEYING: VOX

DIGIPAN	Audio Device Selection	> Configure > Soundcard	Type: Computer Soundcard Input: USB Audio CODEC	Output: USB Audio CODEC Samplerate: 11025
	Audio Output Level	> Configure >Transmitter Drive > Speaker	USB Audio CODEC	Adjust TX audio drive level
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	Use this control in conjunction with the DIGIPAN Audio Output Level control to achieve suitable level.
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into DIGIPAN
		Menu 69: Data VOX	**on**	

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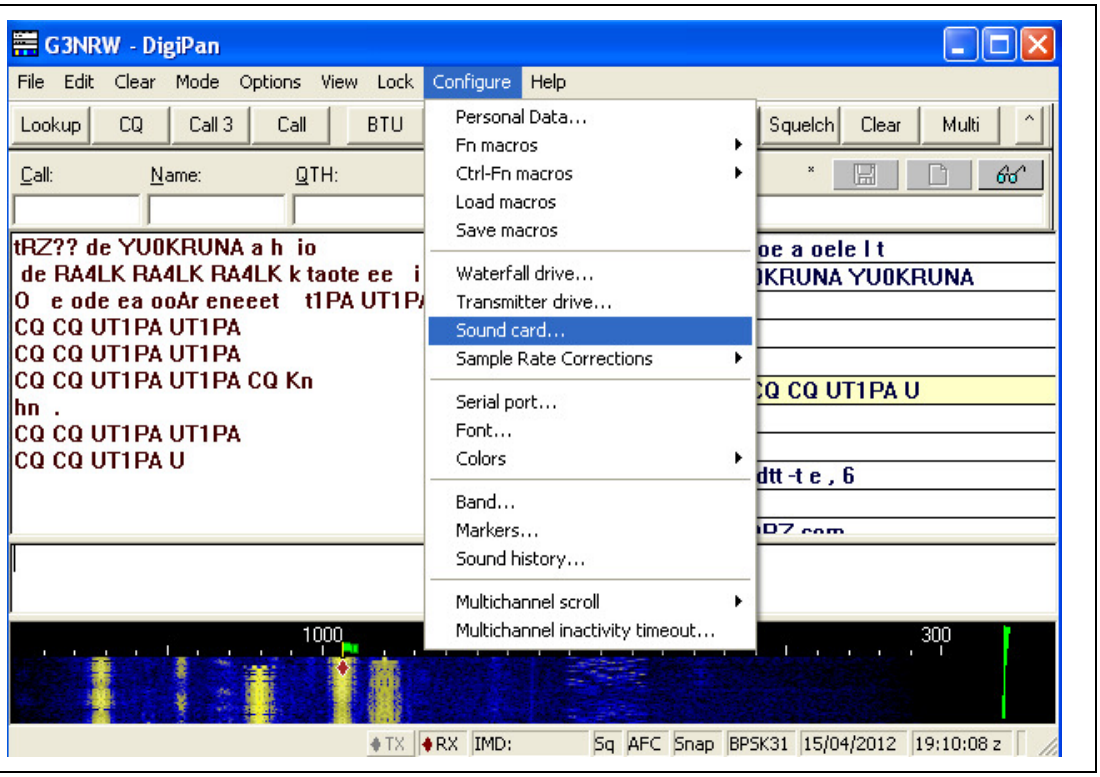
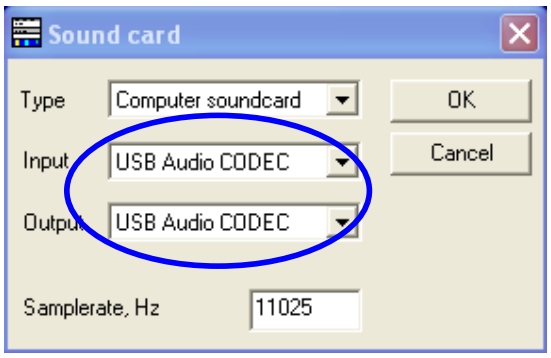
DIGIPAN TX KEYING: VOX





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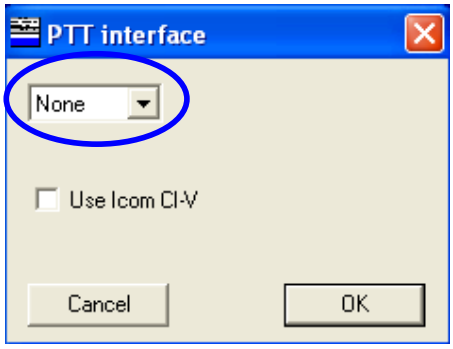
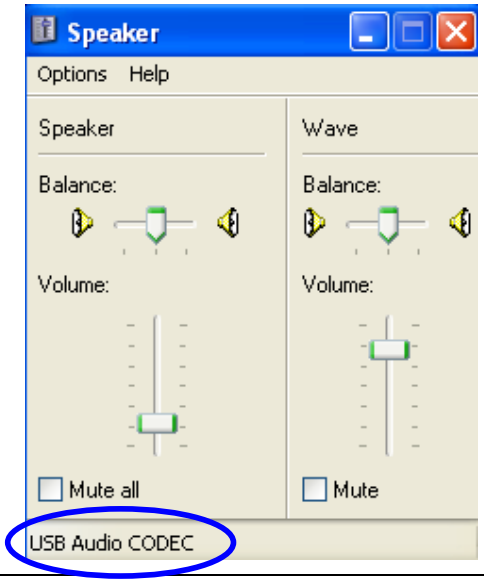
DIGIPAN — TX KEYING: VOX





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DXLAB WINWARBLER + COMMANDER — TX KEYING: VOX

WINWARBLER	Audio Device Selection	> Config > Soundcard	Reception: USB Audio CODEC	Transmission: USB Audio CODEC
	Audio Output Level	> Config > Soundcard > Mixer Adjustments > Transmission	Speaker USB Audio CODEC	
	Audio Input Level	> Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the WINWARBLER input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
COMMANDER	Radio Select	> Config > General	Radio: KENWOOD	Data transmission using ACC2 input: check
	PTT Port	> Config > Ports	Primary CAT Serial Port	Port#: (blank)
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into WINWARBLER
		Menu 69: Data VOX	**on**	

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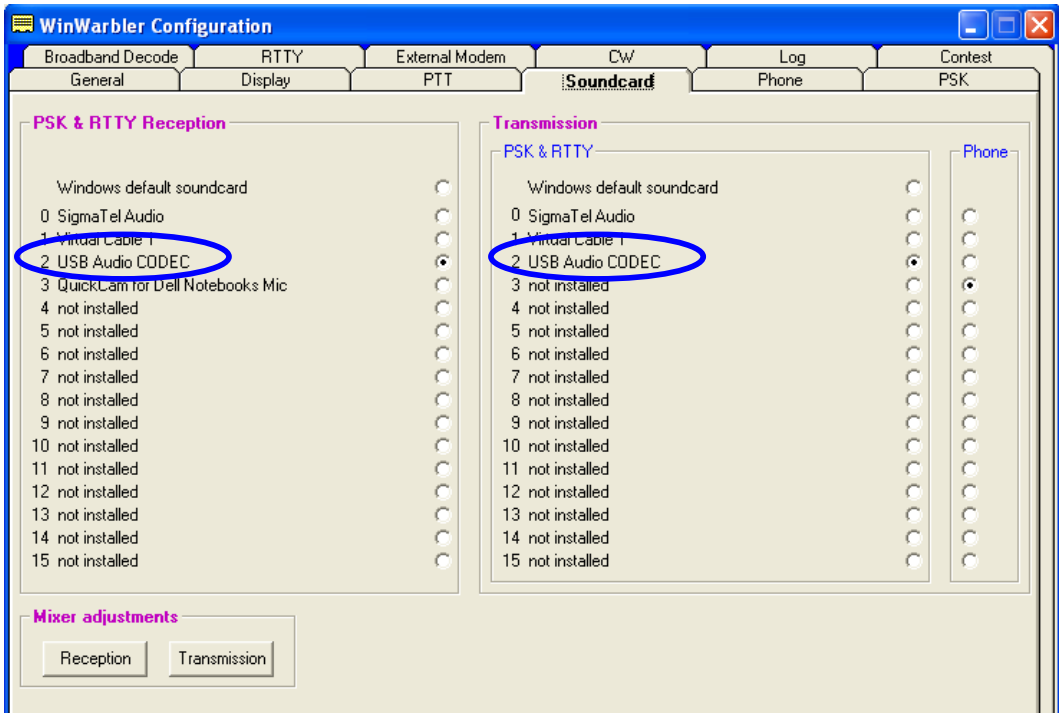
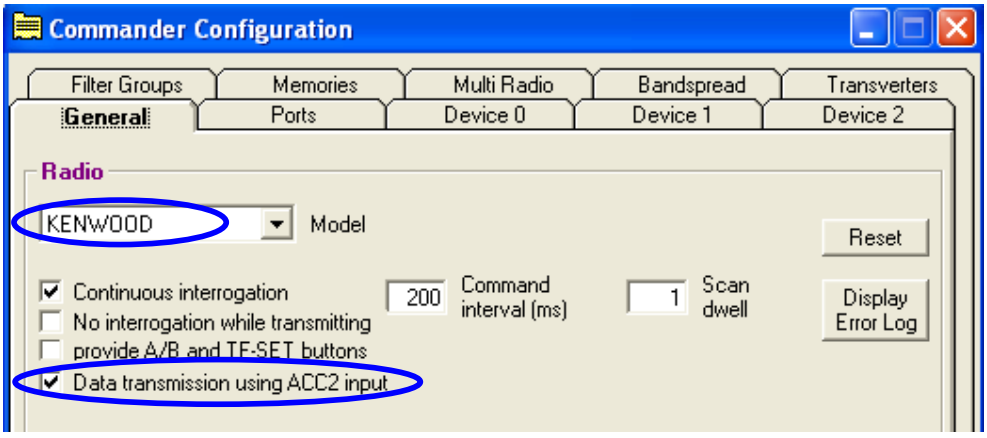
DXLAB WINWARBLER + COMMANDER — TX KEYING: VOX





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FLDIGI — TX KEYING: VOX

FLDIGI	Audio Device Selection	> Configure) > Soundcard > Devices	Port Audio: check	Playback: USB Audio CODEC Capture: USB Audio CODEC
	Left/Right Channel Selection	> Configure) > Settings > Right Channel	Reverse Left/Right channels: check	
	Audio Output Level	> Windows Volume Control > Options > Properties > Mixer Device	Playback USB Audio CODEC	
	Audio Input Level	> Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the FLDIGI input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into FLDIGI
		Menu 69: Data VOX	**on**	

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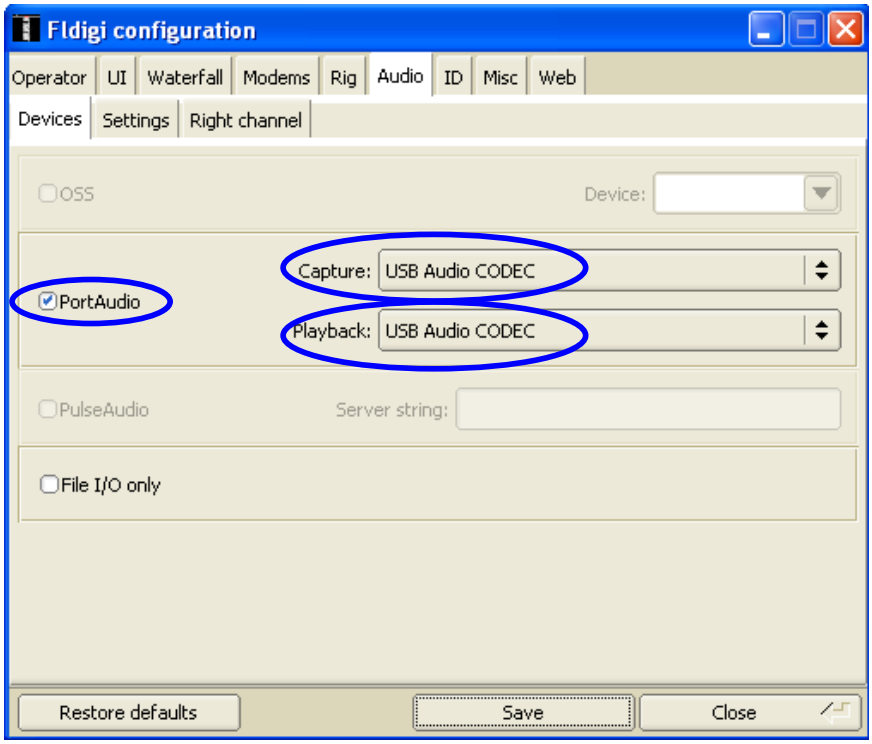
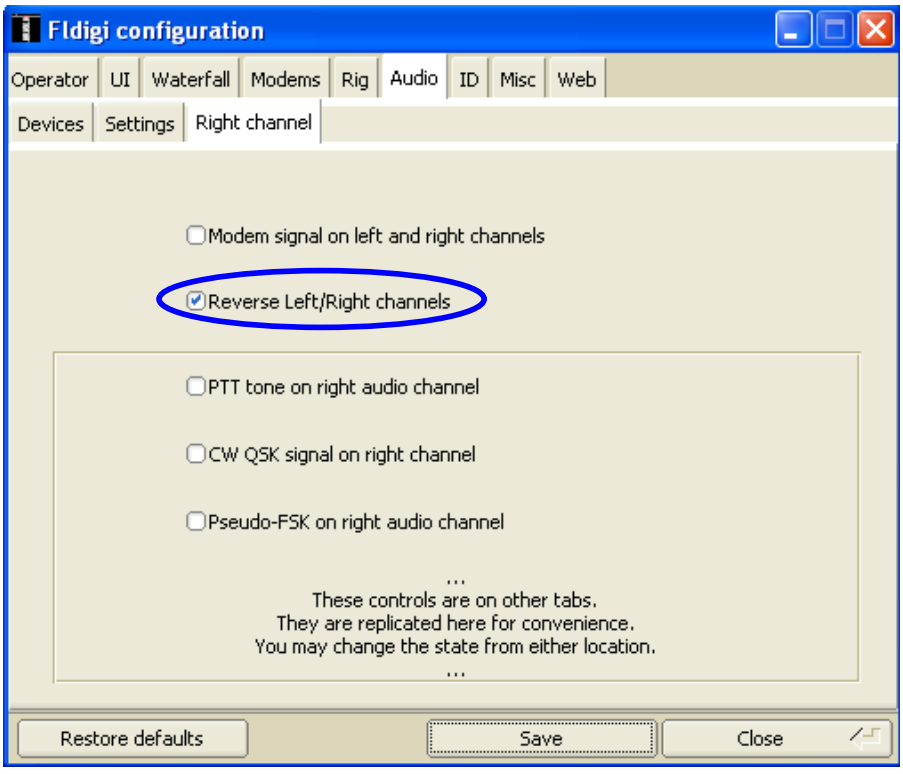
FLDIGI — TX KEYING: VOX





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MIXW — TX KEYING: VOX

MIXW	Audio Device Selection	> Configure > Sound Device Settings	Device: Sound card (internal or external) Input: USB Audio CODEC	Output: USB Audio CODEC Samplerate: 11025
	Audio Output Level	> Configure >Output Volume > Windows Mixer > Speaker	USB Audio CODEC	Adjust TX audio drive level
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	Use this control in conjunction with the MIXW Audio Output Level control to achieve suitable level.
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into MIXW
		Menu 69: Data VOX	**on**	

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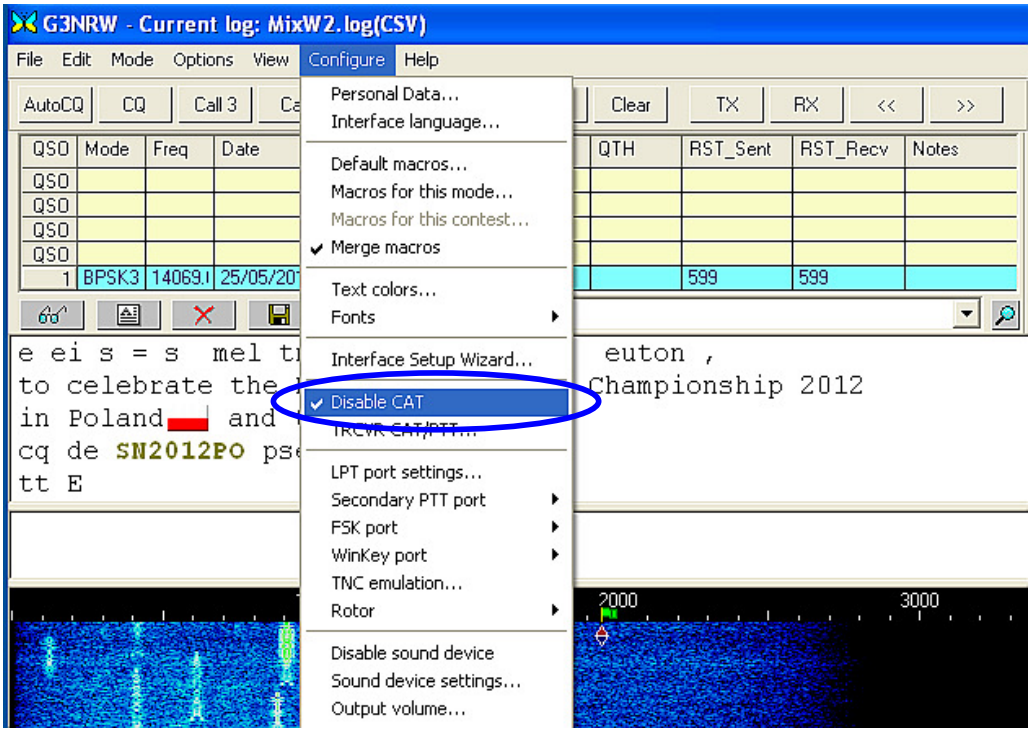
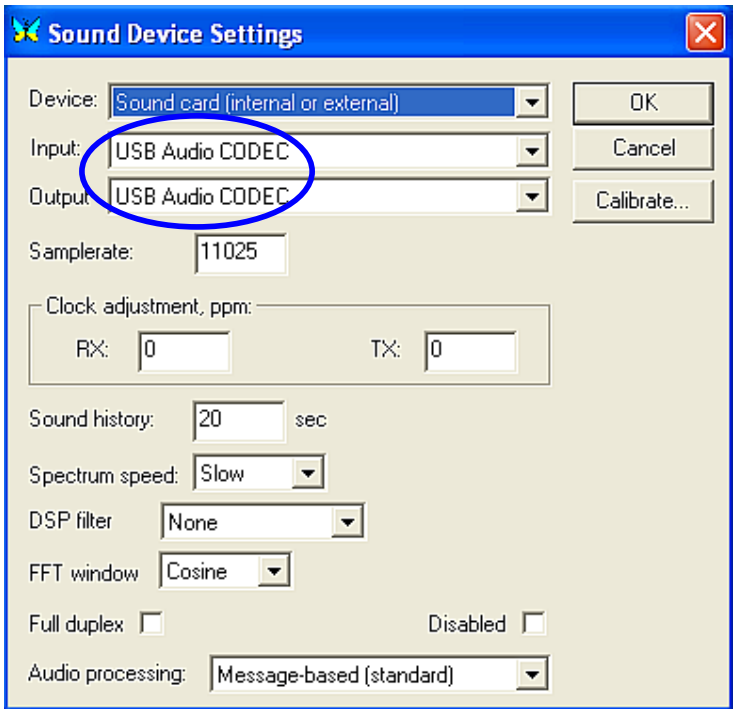
MIXW — TX KEYING: VOX





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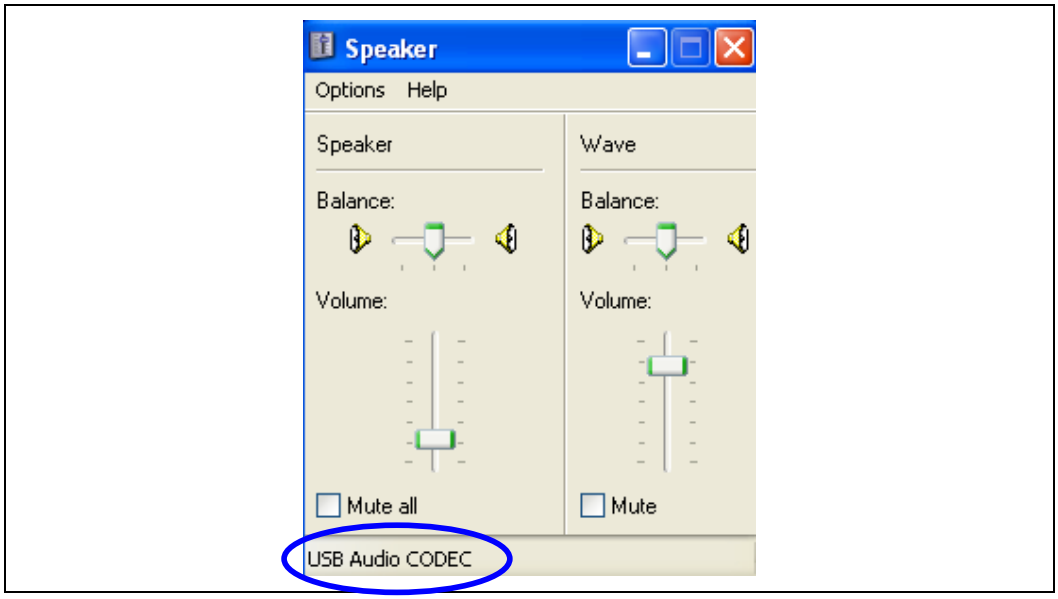
MIXW` **TX KEYING: VOX**



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MMTTY — TX KEYING: VOX

MMTTY	Audio Device Selection	> Option(O) > Setup MMTTY > Soundcard	Reception: USB Audio CODEC	Transmission: USB Audio CODEC
	Audio Output Level	> Option(O) >Soundcard output level (V) > Windows Volume Control > Options > Properties > Mixer Device	Playback USB Audio CODEC	
	Audio Input Level	> Option(O) >Soundcard input level (I) > Windows Recording Control > Options > Properties > Mixer Device	Recording USB Audio CODEC	This Windows option may not provide any volume control sliders. In that case, the MMTTY input level must be adjusted by the TS-590S USB Audio Output Level control (Menu 65).
	PTT Port	> Option(O) > Setup MMTTY(O) > TX	PTT & FSK Port	NONE
TS-590S	TS-590S Front Panel	**PROC**	**OFF**	
		DATA	ON	
	TS-590S Menus	Menu 27: SSB-DATA Low Cut	200	
		Menu 28: SSB-DATA High Cut	2500	
		Menu 30: TX Equalizer	oFF	
		Menu 31: RX Equalizer	oFF	
		Menu 63: Line Select	USB	
		Menu 64: USB Audio Input Level	3	Use this control in conjunction with the MMTTY Audio Out Level control to achieve suitable level.
		Menu 65: USB Audio Output Level	5	Use this menu to control input level into MMTTY
		Menu 69: Data VOX	**on**	

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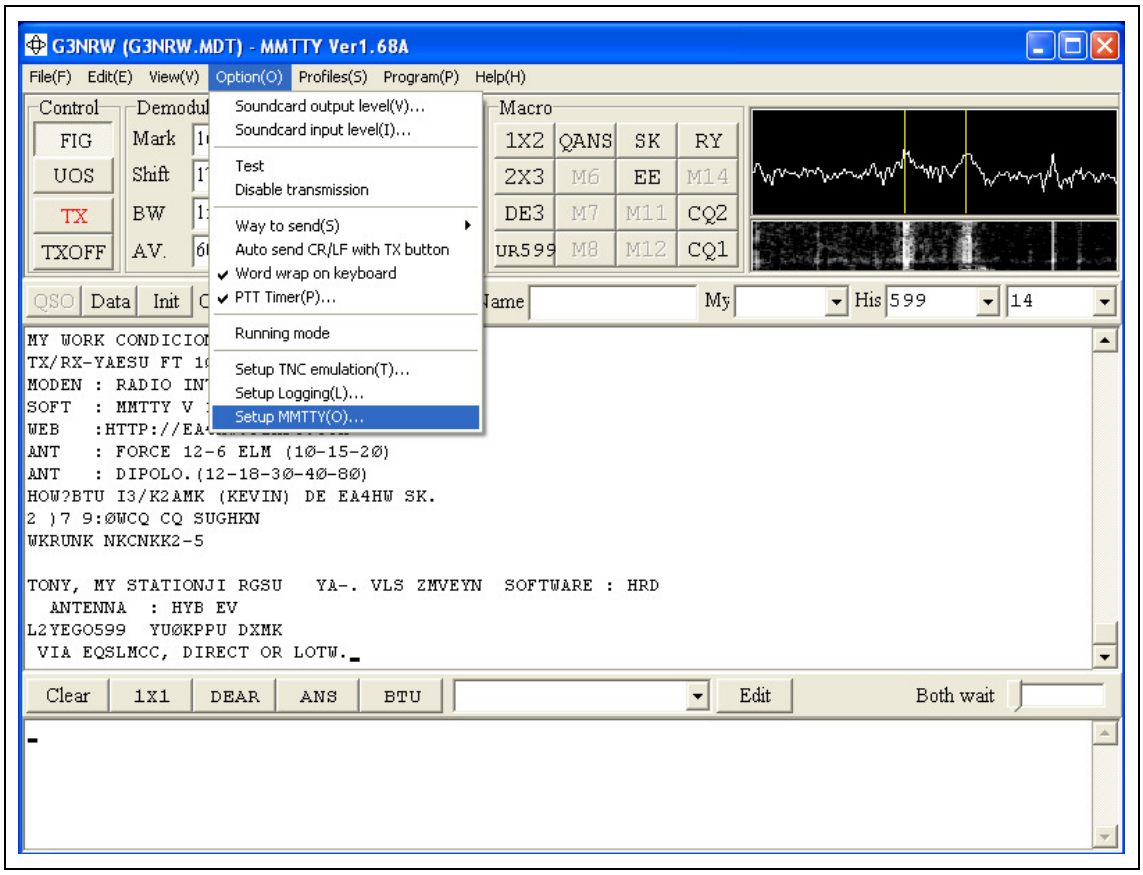
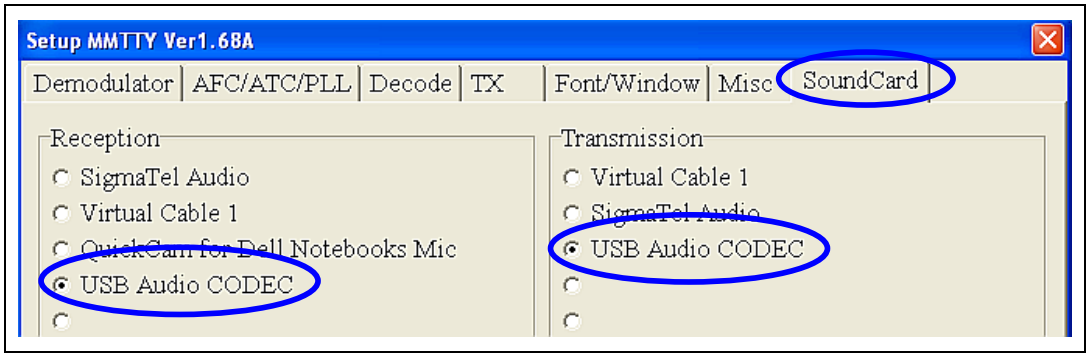
MMTTY — TX KEYING: VOX





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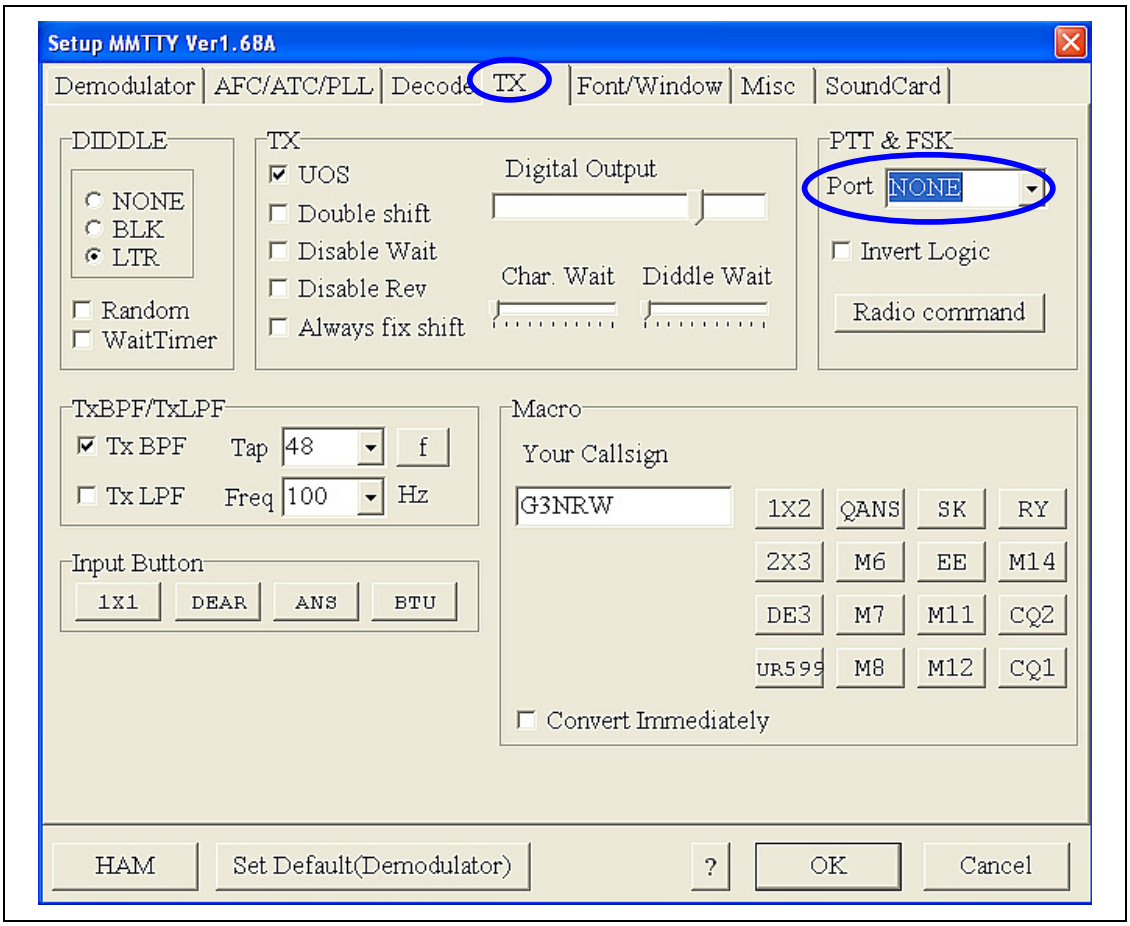
MMTTY — TX KEYING: VOX



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References

	Resource	URL
[1]	TS-590S Digital HOWTO	Go to the TS-590S Resources Page: http://homepage.ntlworld.com/wadei/ts-590s.htm Scroll down to the HOWTOs section, then click on the link: "HOWTO set up the Kenwood TS-590S for Digital Data and Digital Voice Operation"
[2]	TS-590S SSB Audio Handling TechNote	Go to the TS-590S Resources Page: http://homepage.ntlworld.com/wadei/ts-590s.htm Scroll down to the TECHNOTEs section, then click on the link: "TS-590S TechNote: SSB Audio Handling"
[3]	Virtual COM port driver	http://www.kenwood.com/i/products/info/amateur/vcp_e.html

Acknowledgement

Many thanks to Rick Muething (KN6KB) for his comments on an early draft of this HOWTO.

Thanks also to Scott Traurig (WU2O) for his illuminating introduction to digital modes.

Document Version History

Version	Date	History
1.0	3 May 2012	First public version
1.1	4 May 2012	Added note saying that the configuration descriptions apply to a Windows XP environment
1.2	25 May 2012	Major upgrade: Added explanation of VOX and CAT TX keying Added MixW Added VOX setup for several packages Added requirement for Fldigi TS-590S XML file
1.3	10 July 2012	Added summary of advantages and disadvantages of CAT Command and VOX methods of TX keying Added Scott Traurig's introduction to digital modes Added MixW with CAT Command TX keying
1.4	2 November 2012	Corrected minor typo in several places: TS-590S RX Equalizer setting is Menu 31, not Menu 30

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