

# **Configuring Icom radios for USB Operation**

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### Introduction

Newer Icom radios are equipped with a USB (Universal Serial Bus) interface that allows you to use the digital modes on your radio. This is a general guide for basic computer and radio configuration when using USB equipped Icom radios.

This guide describes the following:

- Locating an assigned COM Port(s)
- Configuring the sound devices for proper modulation, and reception
- Explaining radio settings used in digital mode
- Sample configurations for Ham Radio Deluxe, FLdigi, and WSJT

#### Prerequisites

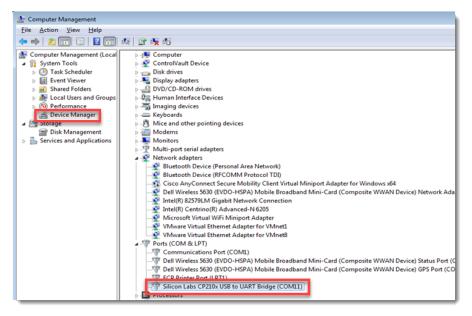
- A basic understanding of the Windows operating system
- Successfully installed USB drivers for your radio
- Your radio connected to your computer
- A basic understanding of Ham Radio Delux, Fldigi or WSJT, if used

### **Computer Settings**

#### **COM** Port assignment

To verify which COM Port(s) are assigned to your radio, go to **Windows Device Manager** > **Ports (COM & LPT)**. Ensure that the Silicon Labs CP210x driver is installed. Some radios may have two of these devices listed. Use the top most listed/first device as your rig control COM port.

#### Windows Device Manager





#### Soundcard Settings

#### Sound/Speakers

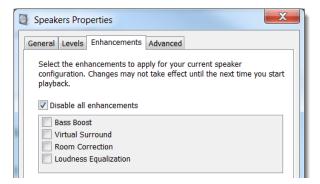
The speaker's **USB Audio Device** Driver provides sound from your PC to your radio. Select **Speakers**.



At the **Levels** tab, set your initial output sound level. Setting it to 50 will provide enough audio output to drive your radio. This adjustment is used in conjunction with the **USB MOD Level** setting on your radio for the optimal signal.

Speakers Prop	perties		-		x
General Levels	Enhancements	Advanced			
Speakers	Ó		77	Balance	

In the **Enhancements** tab, disable all audio enhancements. Keeping these enabled will distort your audio to the radio making your signal unreadable to others, and will cause interference.



#### Microphone

Click the **Recording** tab. The Microphone **USB Audio** Driver receives the audio signal from your radio into your PC. It can be found in the **Audio Device Manager** under the **Recording** tab.



Click the **Levels** tab. You can adjust the audio your PC receives from the radio. Setting the level to 50 for initial configuration then adjusting accordingly afterwards for optimum signal quality.

General	Listen	Levels	Advanced		
Micro	phone		01	100	
			U	100	

# **Radio Settings**

The following are basic settings on your radio. Please refer to your radio's Instruction Manual for the location of these settings within the Set Mode menu.

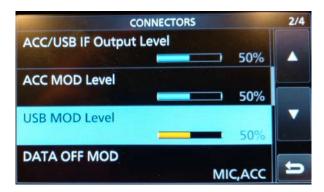
*Please note that the IC-7300 is used as an example. The actual location of these settings will vary from radio to radio within the Set Mode menus.* 

# USB MOD Level / DATA OFF MOD

The **USB MOD Level** is used in conjunction with the **Speakers USB Audio Device** output from your computer. This is how you modulate your radio when the radio is set to **DATA MODE**. **DATA OFF MOD** should be set to **MIC,ACC**.

Note: Changing it to another setting will disable your hand microphone when operating in non-DATA MODE.





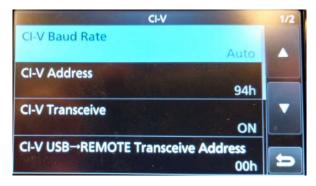
#### DATA MOD

The **DATA MOD** setting is for when your radio is in **USB-D** (Upper Sideband – Data Mode). Here you can select which connector(s) for data modulation input in Data Mode. When set to USB (Universal Serial Bus) all sound data is directed through the USB port.



### CI-V Baud Rate / CI-V Address

The **CI-V Baud Rate** sets the data transfer rate between the radio and the radio control software. Leave the baud rate set to **Auto** unless there is more than one of the same radio connected.



# CI-V USB Baud Rate (7300 & 7851 7610 only)

This sets the CI-V data transfer rate when remotely controlling the radios through the USB CI-V port. This setting is only valid when the **CI-V USB Port** setting is set to **Unlink from [REMOTE]**.

	CI-V	2/2
	CI-V Output (for ANT) OFF	-
(	CI-V USB Port Link to [REMOTE]	
	CI-V USB Echo Back OFF	5

# USB-D / Filter Settings

To use digital modes, set to **USB-D**. This can be set on the radio or through the software that you are using. Most digital mode software will display a 3KHz waterfall. Set your filter wide enough to fully display signals within the waterfall.

# CI-V USB Echo Back

Most software applications require this to be ON. This tells the radio to echo any commands sent to the radio to be sent back, and any changes made via the radios front panel to be reflected in the software display.

# About ALC

Technically, you should not see any ALC (Automatic Level Control) when using digital modes. The reason for no ALC on digital modes is that some of those modes (like PSK31) have an amplitude component to them. ALC will limit the output power by flattening the peaks of the PSK waveform. This creates distortion (IMD), which will make the signal wider and more difficult to decode. Modes like FSK (RTTY) have no amplitude changes therefore ALC will have no affect on them. The amount of distortion ALC adds to a PSK31 signal depends on the time constants of the ALC circuits in the particular transmitter.

Your radio should be set to Data Mode (LSB-D, or USB-D), the power set to 90~100% power. Use either the USB Data MOD setting or Windows Audio Mixer (USB Speaker CODEC device) to adjust your power output to approx 20W, with Compression OFF. The reason for setting the power control to maximum and adjusting the output power using the USB Data MOD setting or computer, is that some radios use their ALC setting to limit the power output. If you try to control the output on digital modes with the radio's power control it will be difficult to stop ALC from occurring. If you set the power control on a 100W transmitter for 30W output, ALC will engage any time you have enough audio power to approach 30W. If you max out the power setting on a 100W transmitter ALC will not engage until you approach 100W.

### **Example Configuration Settings**

The following are configuration settings that can be used as examples of configuring for USB operation. Please use the developer's instructions for properly configuring the software to operate with your radio.

**Note:** Your Windows COM ports must match the COM Ports shown in Windows Device Manager and not those the following examples.

CI-V settings: Examples for the IC-7610

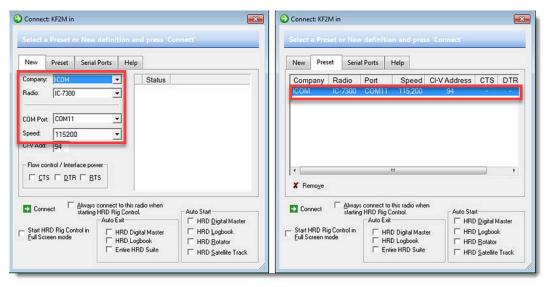
CI-V		1/2	CI-V	2/2
CI-V Baud Rate			CI-V USB Baud Rate	
	Auto			115200
CI-V Address			CI-V USB Echo Back	
	98h			ON
CI-V Transceive				
	ON			
CI-V USB/LAN→REMOTE Transceive Address				
	00h			
CI-V Output (for ANT)				
	OFF			
CI-V USB Port		4		
Unlink from [RE	EMOTE]	ŋ		<b>e</b>

# **Configuring with Radio Control Software**

#### Ham Radio Deluxe

To configure HRD Rig Control to communicate with the radio you will need to set the following:

- Company (Icom)
- Radio (your radio model)
- COM Port





### Ham Radio Deluxe/Digital Master 780

1. Set DM780 to use the USB Audio devices.

Appearance Callsign (My Info)	Soundcard	
Clock	Input (Receive)	Headset Monitor
Logbook	Device: Microphone (USB Audio Device)	Enable (will be grayed if not available)
Modes + IDs PTT	1 Contraction of the second seco	Microphone:
ladio		Jack Mic (IDT High Definition Audio 💌
050	Output (Transmit)	Earphone:
oundcard ounds	Device: Speakers (USB Audio Device)	Communications Headohones (IDT
torage	20	
SuperSweeper		Montor Voice (echo to headset)
Waterfall		WARNING! Do not Enable if the secondary soundcard is your radio!

2. Set PTT to use Ham Radio Deluxe.

llsign (My Info) ock	COM Port		
gbook odes + IDs T	© via Serial (COM) port Port: COM1 +	Ham Radio Deluxe via Ham Radio Deluxe - DM780 must be connected to HRD. Configure HRD connection	<ul> <li>Data Controller</li> <li>Let The Data Controller key the radio via interface.</li> </ul>
dio O undcard	On TX: IV Set DTR (data-terminal-ready) IV Set RTS (request-to-send)	See notes below	None via soundcard PTT or radio VOX

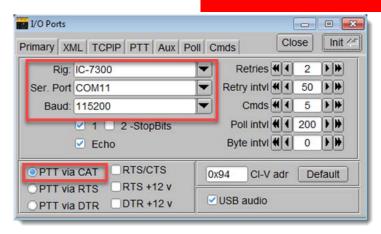
3. Customize your radio interface as desired, and you will be ready to use HRD.

#### FLRig and FLDigi Software (All radios except the IC-7610)

FLRig

- 1. Open the software, and in **I/O Ports > Primary**, enter/select the following:
- Radio
- Serial Port
- Baud Rate
- PTT via CAT

# Knowledge Base |



2. At the PTT Tab, set PTT Port to NONE.

I/O Ports	
	II Cmds Close Init <=
	p requires a separate
PTT Port NONE	
OPTT via RTS	RTS +12 v
OPTT via DTR	DTR +12 v

3. At the main menu, set the bandwidth, and mode.

🖬 flrig IC-7300 📃 🔲 🔤				
File Config Memory Help				
14070.150 140	070.000			
S3 S6 S9 +20 +40 +60 vfoA	vfoB A<->B Split			
3000	USB-D1			
P₀ 5 10 15 20 1				
Vol 16				
RF 2 -				
SQL 4				
Nch 0				
MIC 10				
PWR 2				
Att Pre NB AN				



#### FLDigi

- 1. Open FLdigi and click Configure > Rig Control.
- 2. At the Flrig tab, select Enable FLRig xcvr control with Fldigi as client.

Fldigi configuration					
Operator UI Waterfall Modems Rig ID Audio Misc Web Autostart IO PSM					
frig RigCAT Hamlib XML-RPC Hardware PTT GPIO					
firig is the preferred method of tranceiver control					
firig xmlrpc server parameters these controls are mirrored on the IO configuration tab					
127.0.0.1 Addr 12345 Port Default Reconnect					
"Disable PTT keys modem if multiple instances of fidigi (dient) are connected to a single firig (server).					
⊘Flrig PTT keys modem					
Restore defaults Save Close					

#### At the RigCAT tab, deselect Use RigCAT.

Fldigi configuration	
Operator UI Waterfall Modems Rig ID Audio M	Misc Web Autostart IO PSM
firig RigCAT Hamlib XML-RPC Hardware PTT GPI	0
Ouse	RigCAT
Rig description file: Open	Device: COM1
Retries Retry interval	(ms) Baud rate: 600
Write delay (ms) Init delay (ms) 50 200	Stopbits 🔶 2
○ Commands are echoed	○CAT command for PTT
○Toggle RTS for PTT	□Toggle DTR for PTT
□RTS +12 v	ODTR +12 v
ORTS/CTS flow control	
Restore UART Settings on Close	Initialize
Restore defaults	Save Close



#### At the Hamlib tab, deselect Hamlib.

Fldigi configuration	
Operator UI Waterfall Modems Rig ID Au	dio Misc Web Autostart IO PSM
firig RigCAT Hamlib XML-RPC Hardware PTT	GPIO
	OUse Hamlib
Rig:	Device: COM1
Retries Retry Interval	(msec) Baud rate: 600
Write delay (msec)	v (msec)
0 5	Polling Interval (msec)
OPTT via Hamlib command	Mode delay (msec)
Audio on Auxiliary Port	Sideband: Rig mode
ODTR +12 (	ORTS +12 OCW is LSB mode
ORTS/CTS flow control	OXON/XOFF flow control
Advanced configuration:	
	Initialize
Restore defaults	Save Close <

At the **Audio** tab, be sure that **Port Audio** is selected and that Capture and Playback are defined as in the following window.

E.					Audio	ID   Mi	sc   web	Autostar		SM		
vices	Settings	Right	channel	Wav								
	oss								evice:		•	
	Port	Audio		Cap	ture: [	Micropho	ne <mark>(</mark> USB /	Audio CODE	C)		\$	
	CFOR	Addio		Playt	oack:	Speakers	(USB Au	dio CODEC	)		\$]	
	OPuls			Server string:								
	OFile	I/O onl	Y									
	estore de	Faulto					ſ	6	ave		Close	/

# FLDigi for the 7610

The 7610 is currently not supported in FLDigi, but you can download the following linked XML file to make it work. Add this file it to the hidden fldigi.files folder located in C:\Users\*yourusername*\.

#### 7610 XML: <u>https://www.george-smart.co.uk/wordpress/wp-</u> content/uploads/2018/05/IC7610\_M1GEO.zip



At the **RigCAT** tab, ensure that your settings match (COM port may vary) the following window.

Fldigi configuration	
Operator UI Waterfall Modems Rig ID Audio Misc	Web Autostart IO PSM
firig RigCAT Hamlib XML-RPC Hardware PTT GPIO	
✓Use RigC	AT
Rig description file: IC7610_M1GEO.xml Open	Device: COM1
Retries Retry interval (ms) 5 5 5	Baud rate: 115200
Write delay (ms) Init delay (ms) 0 0	Stopbits 1
✓Commands are echoed	CAT command for PTT
○Toggle RTS for PTT	□Toggle DTR for PTT
□RTS +12 v	ODTR +12 v
ORTS/CTS flow control	OVSP Enable
	Initialize
Restore defaults	Save Close Z



At the **Audio** tab, be sure that **Port Audio** is selected and that Capture and Playback are defined as in the following window.

erator	UI Wa	terfall	Modems	Rig	Audio	ID	Misc	Web	Aut	ostart	IO	PSM	
vices	Settings	Right o	hannel	Wav									
	oss									De	vice:		•
	Port	A. da		Ca	pture:	Microp	ohone	(USB A	udio	CODEC	:)		\$
	Por	AUGIO		Play	/back:	Speak	ers (U	SB Aud	dio CC	DEC)	1		\$
	() Puls	eAudio			S	erver :	string:						
	OFile	I/O only											
-	estore de	Faulta						ſ		Sa			 Close

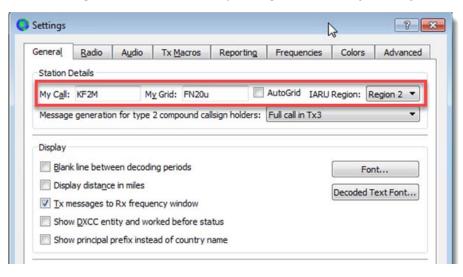
### WSJT-X Software

WSJT operational window.

		Band A	ctivity					Rx Fre	quency			
UTC	dB	DT Freq	Message		UTC	dB	DT	Freq	Mes	sage		
					100210	**		1000 .	~	NEZE I		
					130245	Tx		1500 ~		KF2M B		
					130351	Tx		1500 ~		KF2M H		
					130415 130445	Tx Tx		1500 ~	~~	KF2M H		
					130515	Tx		1500 ~		KF2M H		
					130545	Tx		1500 ~	- *	KF2M H		
								III			1	
						_					ine	
n	- •	14.07	4 000	Tx even/1st		5	Ge	nerate Sto	Msgs	Next	Now	P
r	•	<b>14.07</b> DX Call	<b>'4 000</b> DX Grid	Tx even/1st Tx 1500 Hz	Tx ← Rx		Ge	merate Sto	l Msgs	Next		Pi
-80 -	•			Tx 1500 Hz 🗢		2	Ge	merate Sto	l Msgs	Next	Now	P
-80	•		DX Grid		Rx ← Tx	3/2/	Ge	nerate Sto	l Msgs	Next	Now Tx 1	P
-60	•			Tx 1500 Hz 🗢		3/2/	Ge	merate Sto	i Msgs	Next	Now Tx <u>1</u> Tx <u>2</u>	
-80 -60	•	DX Call	DX Grid	Tx 1500 Hz 🗢	Rx - Tx	3/2/	Ge	merate Sto	i Msgs		Now Tx <u>1</u> Tx <u>2</u> Tx <u>3</u>	



In the Settings > General tab, select your region and set My Call/My Grid.



At the Radio tab, select Rig, Serial Port, Baud Rate, Handshake > None.

General Radio Audio Tx Macros	Reporting Frequencies Colors Advanced						
Rig: Icom IC-7300	▼ Poll Interval: 1s						
CAT Control	PTT Method						
Serial Port: COM2 -							
Serial Port Parameters	© CAT © RIS						
Baud Rate: 115200 💌	Port: COM9 👻						
	Transmit Audio Source						
Data Bits	Rear/Data						
🔘 Default 🔘 Seven 💿 Eight	Mode						
Stop Bits	○ None ○ USB						
Default One Two							
	Split Operation						
Handshake	None Rig Fake It						