

Configuring Digital Mode for Radios with USB

Introduction

Newer Icom radios are now equipped with a USB (Universal Serial Bus) interface. These radios do not require you to purchase, and use an interface (Rigblaster, Signalink™) to connect your PC to your radio to allow you to use digital modes on your radio.

Applicable Radios

This Guide applies to newer Icom HF radios with a USB interface, such as the IC-7200, IC-7850, IC-7851, IC-7300, IC-7610, IC-7600, and IC-7100.

Definitions

- USB – Universal Serial Bus
- USB-D – Upper Sideband Data Mode

Prerequisites

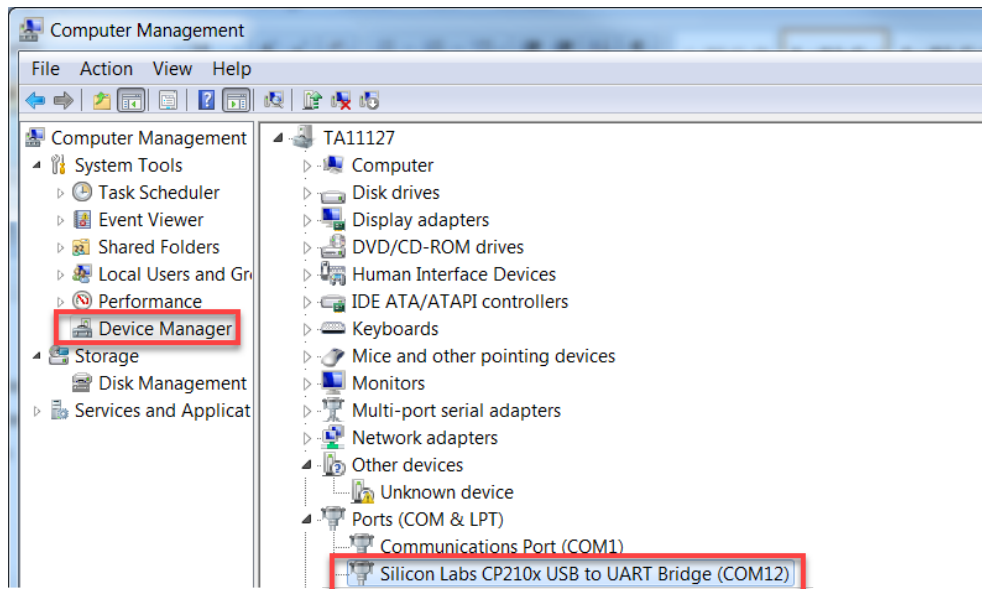
- A basic understanding of the Windows operating system, and configuration
- Successfully installed USB drivers for your radio
- The radio connected to your computer

COM Port assignment

1. Open the **Windows Device Manager** to verify which COM Port(s) are assigned to your radio.
2. Go to **Ports (COM & LPT)**. Verify a Silicon Labs port is available with a COM assigned .

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

Output/Transmit device

The **Speakers USB Audio Device Driver*** provides sound data from your PC to your radio.

On your PC, go to: **Control Panel > Speakers > Properties > Levels.**

From here you can 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 most optimum signal.

** Note: In some installations the USB Audio Device may be preceded by a number and dash (example: 3 – USB Audio Device).*

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

Input/Receive Device

The **Microphone USB Audio Driver** receives the audio signal from your radio into your PC. The signal needs to be set at the best level.

Go to **Sound > Recording > Microphone > Levels.**

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

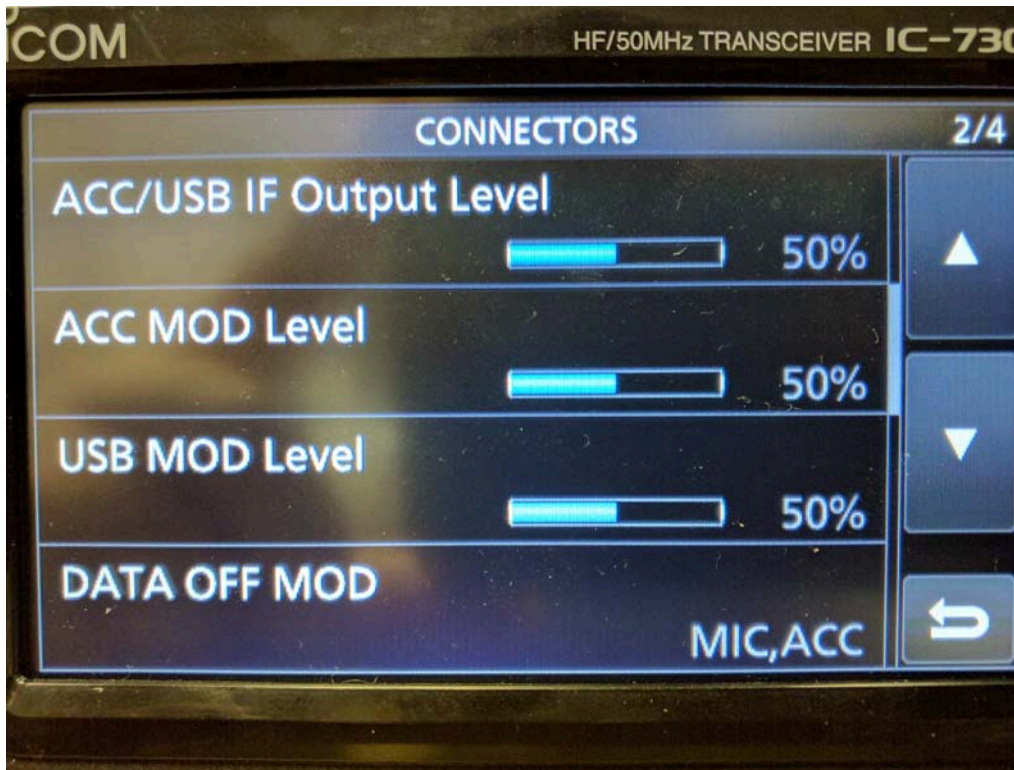
Radio Settings

Please refer to your radios' Instruction Manual for the location of these settings within the Set Mode menu.

Note: The IC-7300 is used for illustration purposes. The location of these settings will vary from radio to radio within the Set Mode menus.

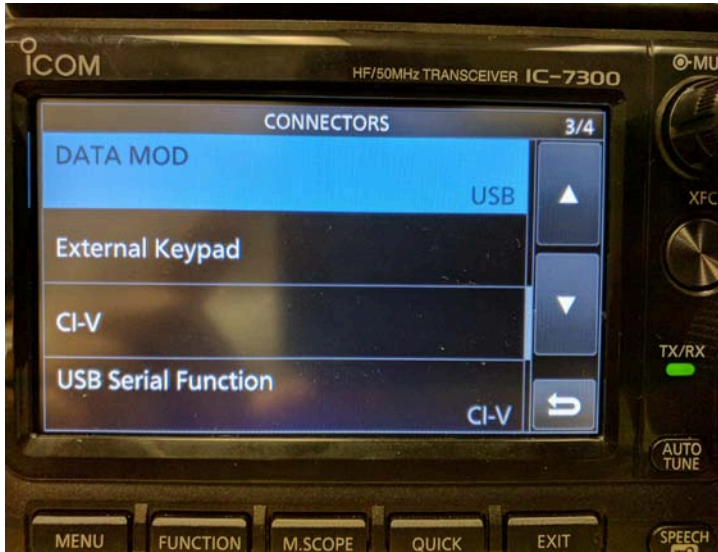
USB MOD Level/DATA OFF MOD

The **USB MOD Level** is used with the **Speakers USB Audio Device** output from your computer. This modulates your radio when the radio is set to **DATA MODE**. Be sure to have **DATA OFF MOD** set as **MIC**, **ACC**. Changing it will disable your hand microphone when operating in non-DATA MODE.



DATA MOD

The **DATA MOD** setting is used when your radio is in **USB-D** (Upper Sideband – Data Mode). Here you select the 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. When set to **Auto** (default setting), the radio will set itself to the data rate set in the software. The **CI-V Address** is the address used to communicate to the radio. The only time this should be changed is if you have more than one of the same radio model connected to your PC.



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

The Baud Rate 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]**.



USB-D / Filter Settings

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



A word about ALC

In general, you should not see any ALC (Automatic Level Control) when working 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, so ALC will have no affect on them. The amount of distortion that ALC adds to a PSK31 signal depends on the time constants of the ALC circuits in the particular transmitter.

Set your radio to Data Mode (LSB-D, or USB-D), set the power 90~100%, and 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 power control to maximum and adjusting the output power with the USB Data MOD setting (or the computer mixer control) is that the power control on some radios works by using the ALC setting to limit the power output. If you try to control the output in digital modes with the power control you will have a difficult time preventing any ALC.

If you set the power control on a 100W transmitter for 30W output, you will have ALC activity any time you have enough audio drive that approaches 30W. If you max out the power setting on a 100W transmitter you will not get any ALC activity until you approach 100W. If you then turn down the audio level to get 30W output you will be well below the ALC threshold. Consequently you won't have to worry about a few dB of filter ripple causing ALC on some parts of the audio spectrum.

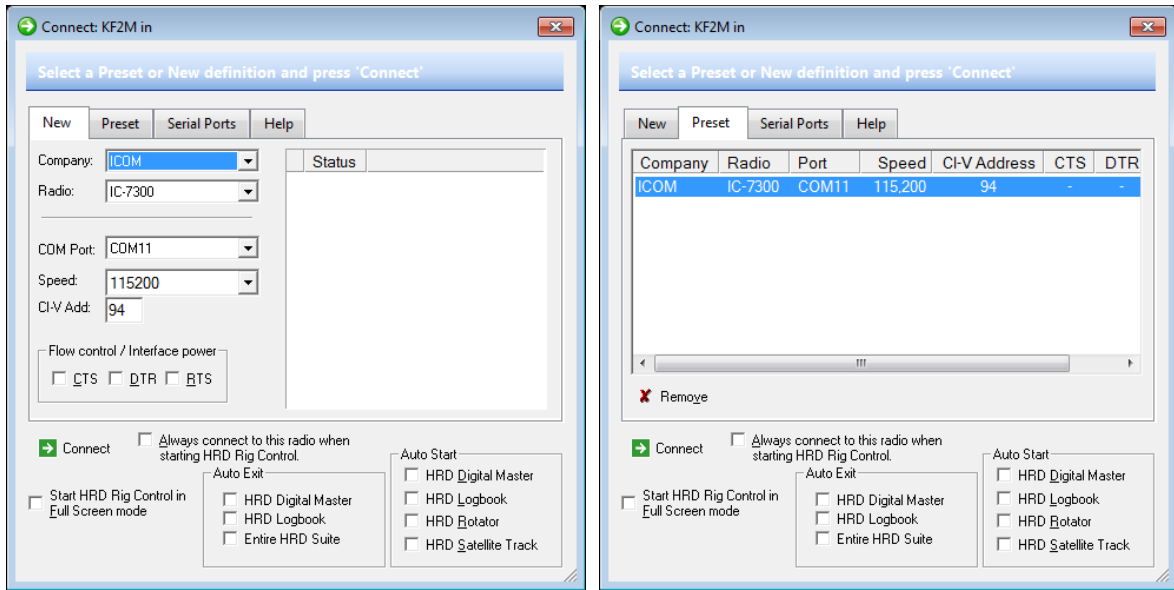
Sample Configuration Setups

Here are some sample configuration setups. Follow the instructions for the software for properly configuring the software to operate with your radio.

Ham Radio Deluxe

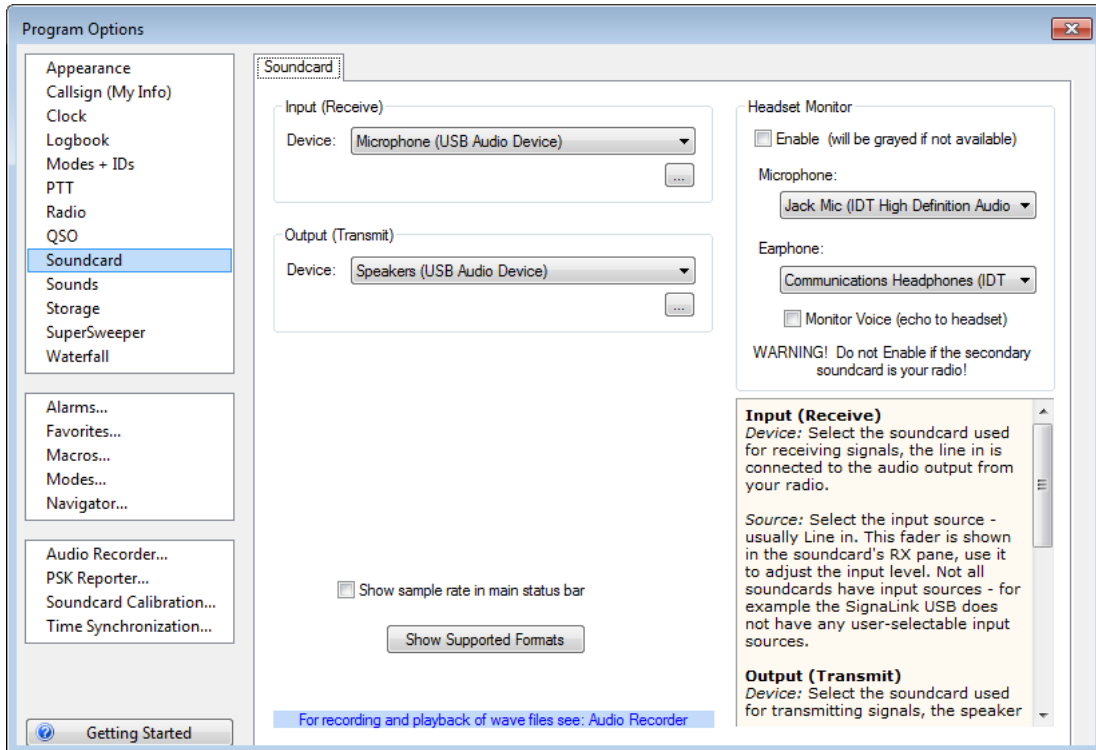
To configure HRD Rig Control to communicate with the radio you will need to set the following:

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

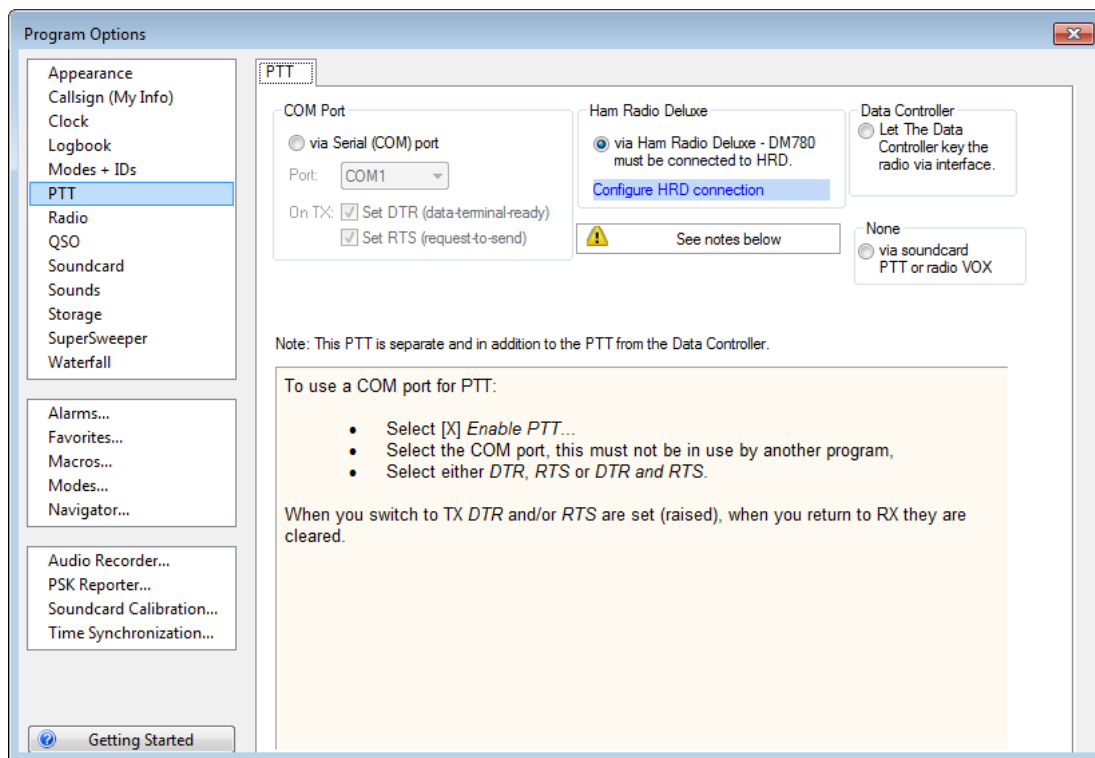


Ham Radio Deluxe/Digital Master 780

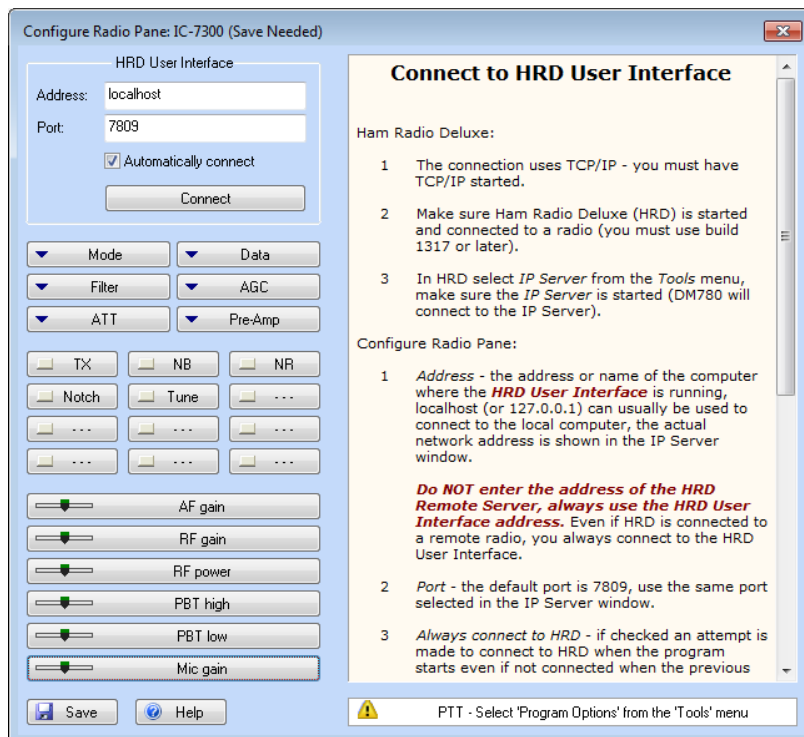
1. At **Soundcard**, set the Device Input and Output to Microphone and Speaker **USB Audio Device**.

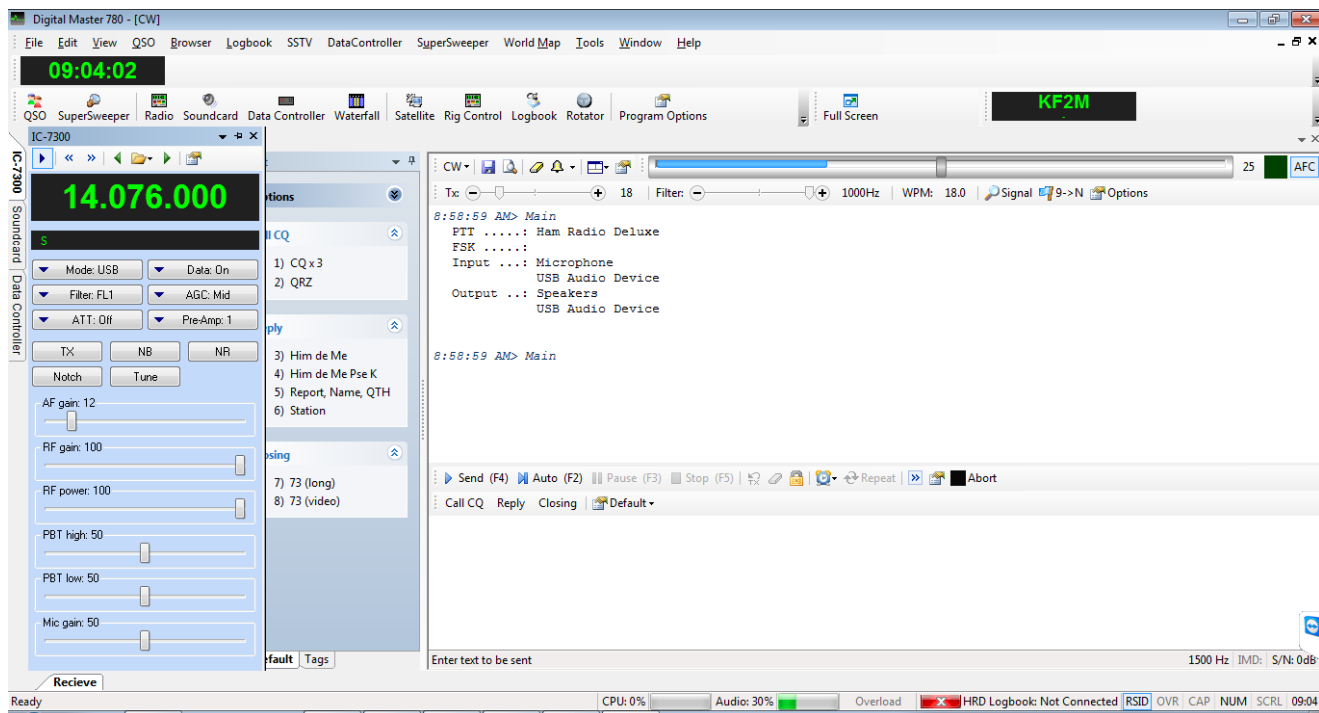


2. At the **PTT** tab, select **Ham Radio Deluxe**.



3. Customize your radio interface.



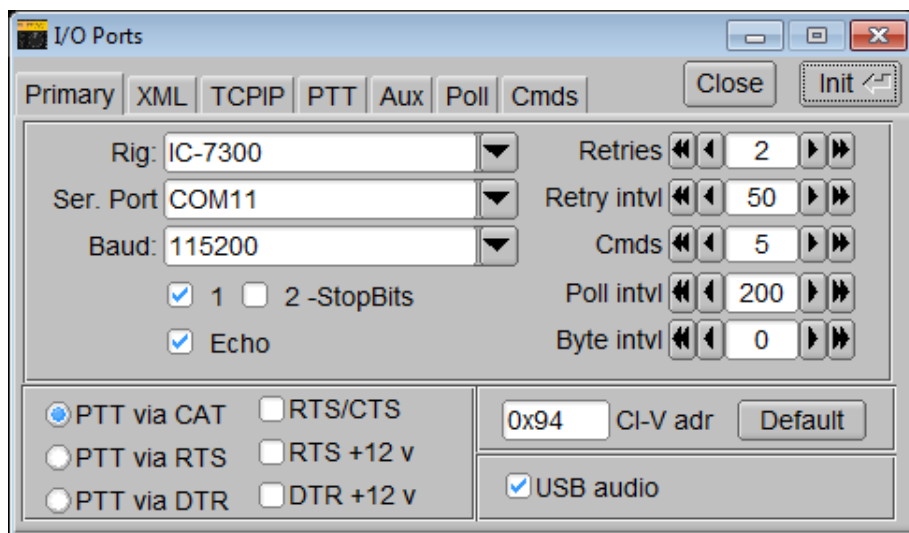


FLRig/FLDigi

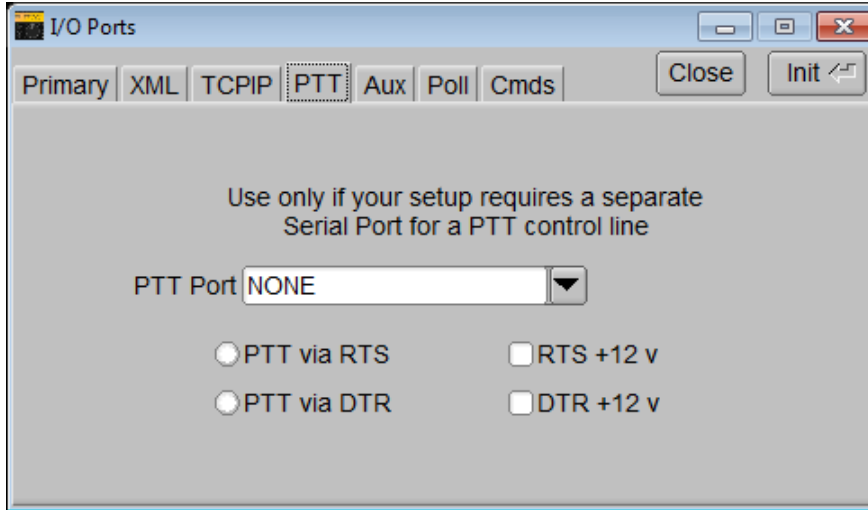
FLRig

Configure FLRig to control the radio.

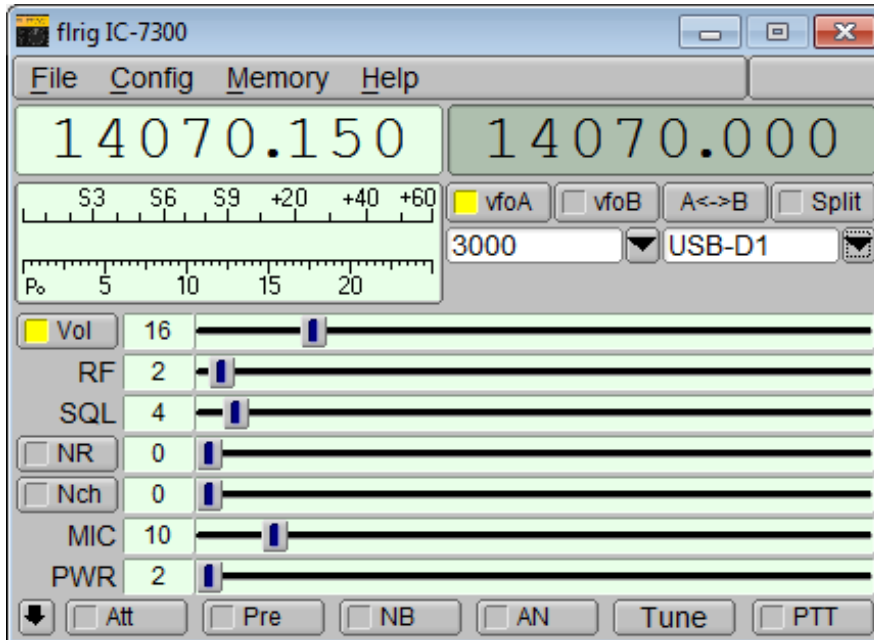
1. Set **Rig**, **Serial Port**, **Baud**, and **PTT via CAT** for your particular radio.



2. Set **PTT Port** to **NONE**.

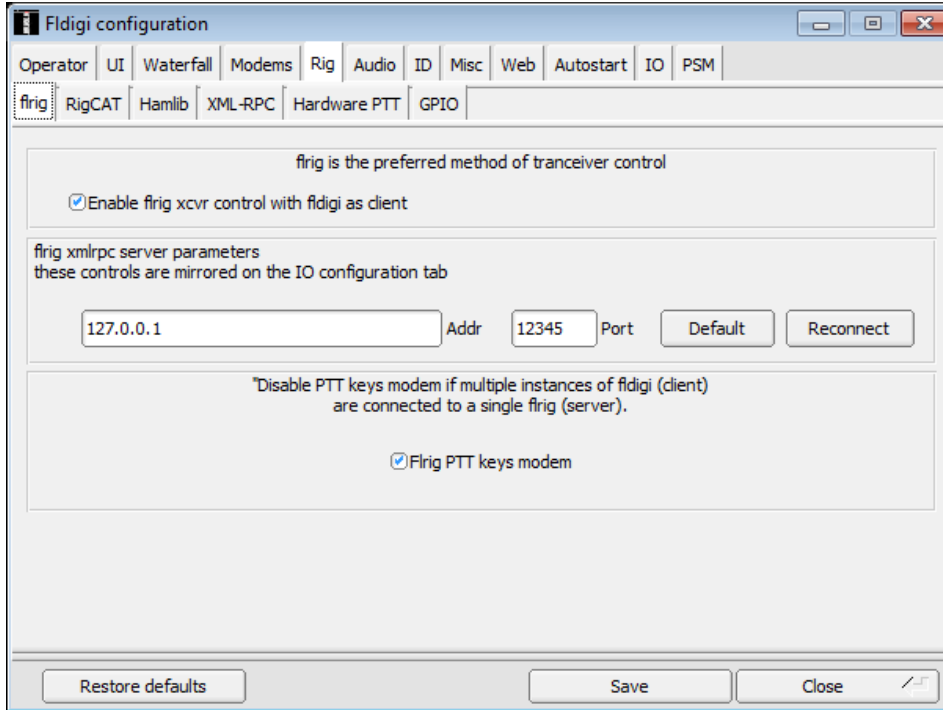


3. Set desired **Bandwidth**, and **Mode**.

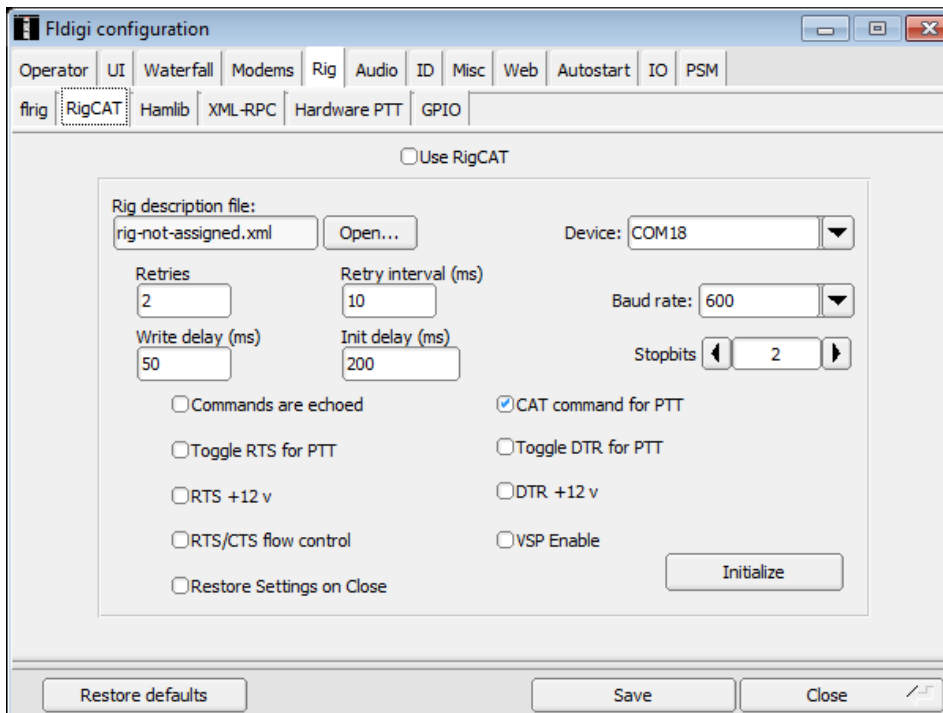


FLDigi

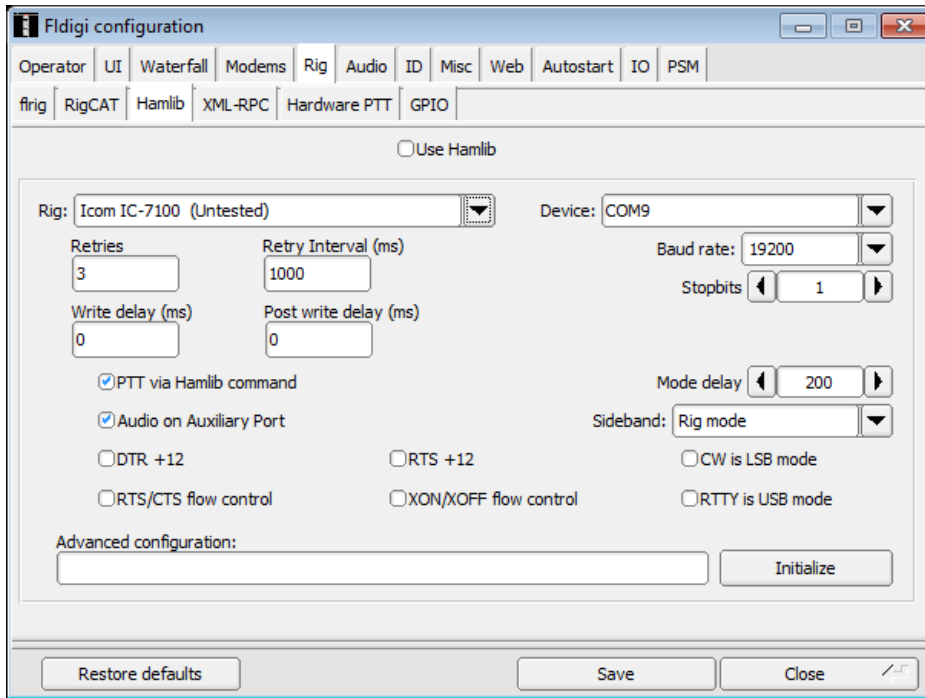
1. Click **frlg xcvr control with fldigi as a client** to enable FLRig radio control.



2. Deselect **Use RigCAT**.



3. Deselect **Use Hamlib**.



Audio configuration

4. Ensure that **Capture** and **Playback** are set to **USB Audio CODEC**.

