fldigi Wiki

Ham Radio Digital Modem Application

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Using the IC-7100 with fldigi and flrig

First of all, CAT control involves both software and settings on the radio itself. The default radio settings on the 7100 are not likely to work “out of the box”.

Some initial things to verify are in place:

1. Download and install the USB driver for the radio. NOTE: be sure the USB cable is UNPLUGGED from the computer when you install the driver regardless of the OS your are using.
2. If you’re using Windows get the driver from Icom or use the one on the CD that comes with the radio.
3. If using Linux or MacOS then get the drivers direct from Silcon Labs. Note: Some versions of Linux have a driver built in.

Note: For MacOS High Sierra and later be sure to go to Security & Privacy in the System Configuration settings and in the General tab allow the driver to be accessed. Without doing that it will be unusable.

1. Download the latest version of Fldigi. I also highly recommend downloading flrig for transceiver control. Flrig is written as a companion to fldigi and adds much greater rig control than is possible with just fldigi. It is especially good with the 7100. I basically only touch the radio to turn it on or off when running digital modes.

and there's more controls than you see here. Download both from W1HKJ web site.

It is highly recommend that you also download the flrig and fldigi help pdf files from the W1HKJ web site website. They are well written help files. Fldigi's help is hundreds of pages long and has a great deal of helpful info. When you get to installing fldigi it will be a big help to you and should guide you in the setting of the necessary and optional parameters. Once it’s running there are so many features to use that are not always obvious that reading it or at least a detailed scan through it should be a goal.

IC 7100 settings

On the rig, press the SET menu button then the on screen item: Connectors.

Make sure the settings for these items are as follows (Unmentioned items leave alone):

1. ACC/USB Audio SQL - Off
2. ACC/USB Output Select - AF
3. ACC/USB AF Output level - start at 50%. This is the built-in soundcard in the radio output level that goes into fldigi on receive. Too much and you overdrive fldigi and decoding suffers, too little and you may miss weak signals though fldigi does very well with very weak signals. Something to play with to make it work best for you. See the fldigi manual on setting up the sound levels.
4. DATA MOD Level - 50%
5. USB MOD Level - 50%
6. Data Off Mod - Mic, ACC or just Mic if you wish. This applies only when the rig is not in data mode.
7. CI-V
   CI-V Baud Rate - 19200
   CI-V Address - 88h
   CI-V Transceiver - OFF
   CI-V Output (for ANT) - OFF
8. USB2/DATA1 Function
   USB2 Function - OFF
   DATA1 Function - GPS
9. Data Mod - USB
   VSEND - Off

10. Function
    Monitor - ON
    Monitor Level - 35%
    Beep Level - 20%

Software setup

You should have already installed the driver for the built-in sound card in the 7100.

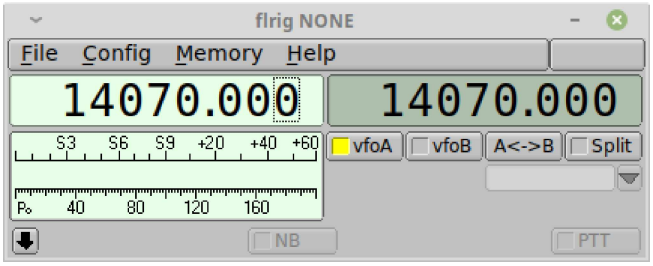
Connect the rig to the computer with a USB A-Male to B-Male cable and turn on the radio.

Install fldigi and flrig. On Windows the programs install to their own folders and should be installed in the normal application directory where other apps are installed. Putting them in other folders can causes permissions issues sometimes on Windows 10. For Mac and Linux install them as you would any other application.For those choosing to use flrig continue below, otherwise scroll down to the RigCat setup:

flrig control option

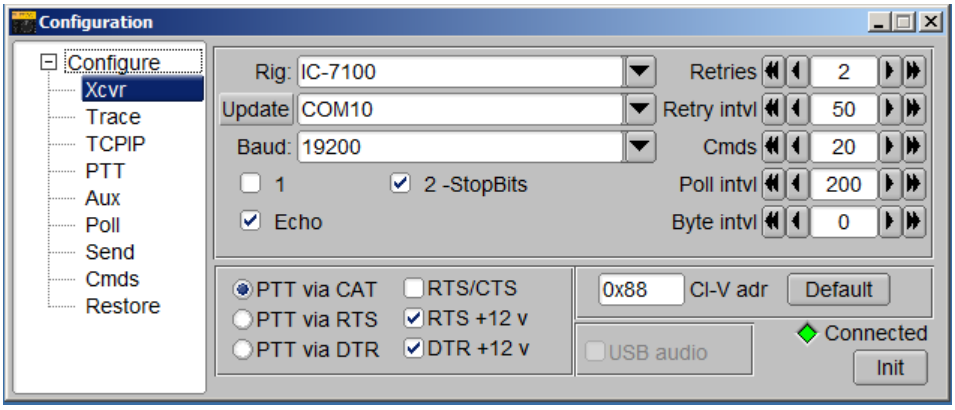
First, we get flrig going then it's easy to configure fldigi to use flrig for xcvr control.

With the radio on and the USB cable connected and no other communications program running, Start flrig. It will come up with just a basic display.



Go to the menu

Config/Setup/Transceiver.



Choose the 7100 from the Rig dropdown list. That will select the default settings which will be good for starters. Note: The RTS +12v and DTR +12v boxes do not normally need to be checked.

Now choose the Serial Port to use

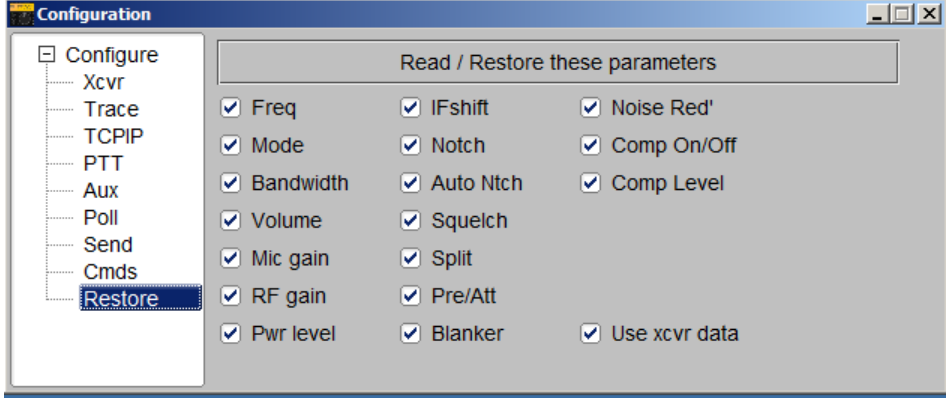
Mac / Linux

Select the SilconLabs driver from the dropdown list. If it isn't in the list then click the Update button to repopulate the list. It if still isn't in the list then the driver is not loading for some reason like the radio is not on or connected or the driver has not been installed properly so that needs to be rectified before going on. If you're using MacOS High Sierra or a later version of MacOS you may need to authorize the driver install in Security & Privacy setup in System Preferences after runing the install program. There will be a message on the General page if it has been blocked.

Windows

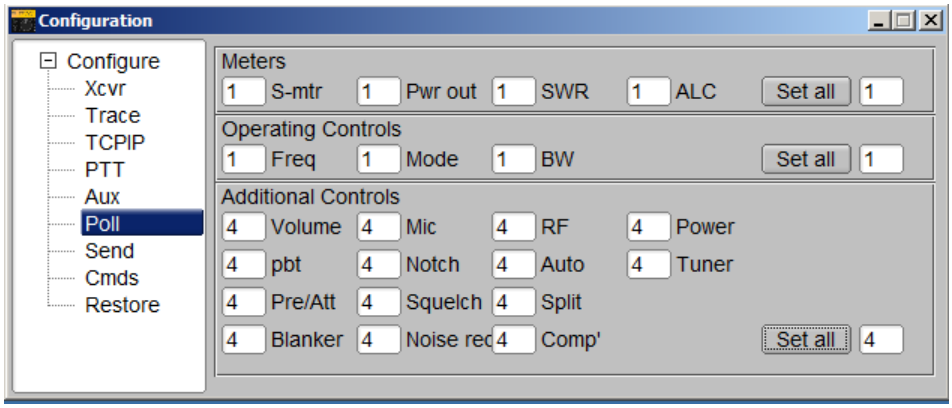
Open the device manager and determine to which com port the serial driver from Silcon Labs is assigned and choose that from the drop down list. Verify that the Baud rate in flrig matches the baud rate selected in the rig. It's better to choose a fixed baud rate than Auto. Now, click the Init button. It should go from red to black lettering. If it does not go to black lettering then verify all of the above again, especially baud rate and echo.

Next select the restore tab



and choose whether you want flrig to save and restore all the radio's parameters on startup and exit or whether you want it to open with the same settings as the rig is currently using. If Use xcvr data is checked flrig will start up with the same settings as the rig currently is using.

Select the poll tab



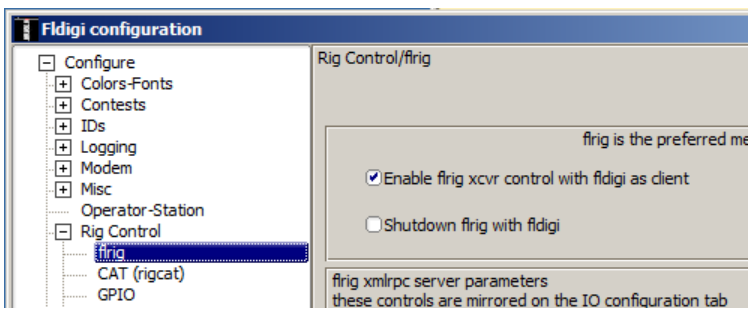
and click the Set All buttons for the initial polling options. You can play with these values later if you wish. The larger the number the slower the response time to button pushes etc, but also the less load on the system so there is a balance. A very fast machine can use all ones, but there is normally no need to add the additional load to your system for that.

Flrig now should have control of the rig so changing frequency in flrig will changed the frequency on the rig and visa versa. The buttons and sliders should do as they are labeled.

I would recommend before you move on that you go to the Config/UI menu and select Tooltips. They are a great help to the new user to figure out what each control does as not all are labeled. You can choose 4 different UI's from the narrow one with small sliders (I use this one – see above screen shot of flrig), to a narrow one with large sliders, to a wide version or a touch version. Now close flrig and restart it to be sure all is well . Everything should be working and you should be able to change frequency on the radio and flrig should follow.

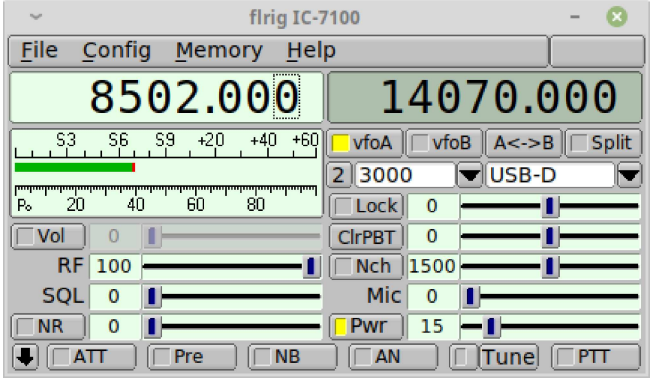
Configure fldigi for use with flrig/IC7100.

Start fldigi and fill in the initial setup pages presented. You can ignore the last page for now. All these pages can be accessed via the configuration menu later to be changed as you wish. Since you've chosen to use flrig then go to the fldigi menu "Configuration/Rig control/flrig" and check the top box to tell fldigi to use flrig for rig control with fldigi as client.



Once that is done fldigi should communicate with flrig and changes such as frequency or bandwidth in flrig or fldigi should be reflected in the other. If the lower box is checked then flrig will send fldigi audio to the radio when the PTT button is clicked otherwise PTT will just key the rig with no power out. Click Save at the bottom of the page.

Setup USB-D as the mode and bandwidth as 3000 for now.



All that is left is to customize fldigi for how you want to operate. Many things can be changed such as the UI scheme, colors, Macros, and many more. Read the help manual to learn about all the options and features that are available.

flrig manual as pdf file
on-line html manual

RigCat rig control option

To setup RigCat you first must download the IC7100.xml file and save it to the "Rigs" directory of the fldigi directory .

IC7100 xml file

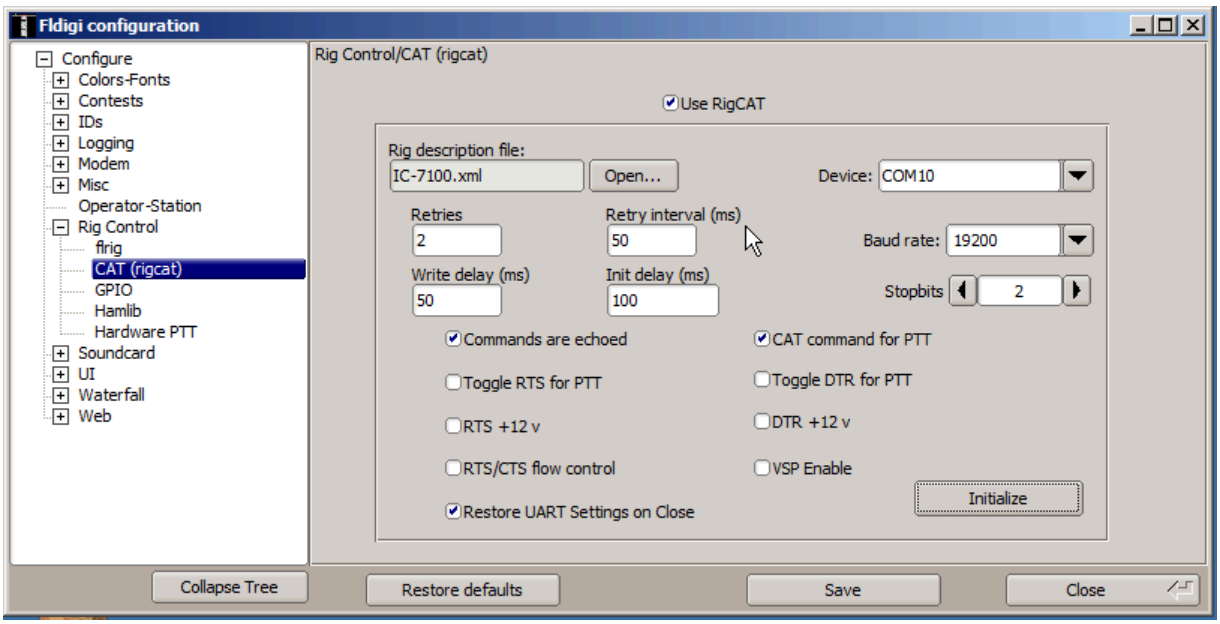
Mac/Linux

Put the file in $HOME/.fldigi/rigs/

Windows

Open the file finder. Find the fldigi.files directory and put it in the rigs directory. Where the fldigi.files directory is different depending on the version of Windows. It is normally under the user's name. Once the IC7100.xml file is in place then start fldigi. It will run you through the basic setup pages. Ignore the last setup page for now.

Start fldigi and after it is up and running



with the basic setup then from the menu choose from the menu Configuration/Rig control/RigCat. At the upper left "Rig description" click Open and choose the IC7100.xml file already downloaded. Once the rig description file is selected then verify that the Baud Rate is the same as the radio.

Choose the Device from the drop down list. On Mac or Linux there should be a device for the SilLab USBtoUart. On Windows check the device manager in Windows to see which Com port is assigned to the USB-Uart device on the radio. and then choose that Com port.

Verify that the only check boxes checked are Commands are Echoed, CAT command for PTT, and Restore Settings on close.

Check the box at the top to "Use RigCat" and then click Initialize. The lettering should go from red to black. At this point you should have rig control from fldigi and changing frequencies in fldigi should be reflected on the radio and visa versa. Set the bandwidth desired and mode to USB-D for digital mode use in fldigi.

Final Setup

With fldigi running verify you have a blue waterfall running. If you don't see that then there is a problem with the audio input to fldigi. Verify the Soundcard setup.

Note:
* For MacOS Mojave and later you must enable the microphone for fldigi in Security & Privacy in the System Preferences settings.
* For Windows 10 be sure to grant permission for fldigi to access the Microphone.

Now we will verify the power out of the radio. Set the radio power control on the rig to max, 100%
and leave it there.

Set Power Meter scale:
* Flrig: Right click on the lower portion of the S-meter scale and choose the power scale desired.
* RigCat: Menu – Configuration>UI>Clrs/Fnts>FreqDisp/Meters. Choose power scale and Save.

Note: The max digital power out used for a QSO should cause no ALC action on the radio. The 7100 will put out quite a bit of power without ALC action, but you don't want to interfere with other close signals on the band either so ideally the power should be between 25-40 watts.

Fldigi has a Transmit Attenuator at the lower right of the fldigi window and this is used to make small adjustments in power. I set mine at 9 then adjust the radio's menu item, USB MOD Level to get 30 watts of power. This allows you to add more power or reduce power as needed in fldigi with the Transmit Attenuator without touching the radio. Note: Higher numbers in the attenuator mean lower output.

Note: In Windows there is the Windows Mixer that is also in the audio stream so that will need to be included in the audio level adjustments in and out for the radio's built-in sound card.

Now click on the Tune button in fldigi upper right corner. That should put the rig into transmit. The actual power output will be dependent on the audio drive to the radio. Adjust the audio stream as described above to get about 30 watts of power with the transmit attenuator set to what ever you choose for a default number. Fldigi defaults to 3.

You should now have working copies of flrig and fldigi and be ready for a digital QSO.

Checkout the default macros. Feel free to customize them and also setup a few macros for those personal information things you always want to send like, Name, Signal report, QTH, Grid Loc, your station configuration etc. It's your software and station so set it up as you wish. Remember to read the manuals. You'll learn how to make so much better use of this fantastic software and radio.

The waterfall appearance may be adjusted by the numbers at the bottom left under the waterfall. Default settings are 0 and 60. You may want to raise the 60 to 70 to increase the contrast. Feel free to adjust the numbers for the look you like best.

Now that you're up and running, there are two things that need to be done to get the best decoding:

- Adjust the receive audio level. Fldigi-help.pdf, Paragraph 2.9, pg 20
- Calibrate the sound card. Fldigi-help.pdf, Paragraph 6.3, pg 295

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