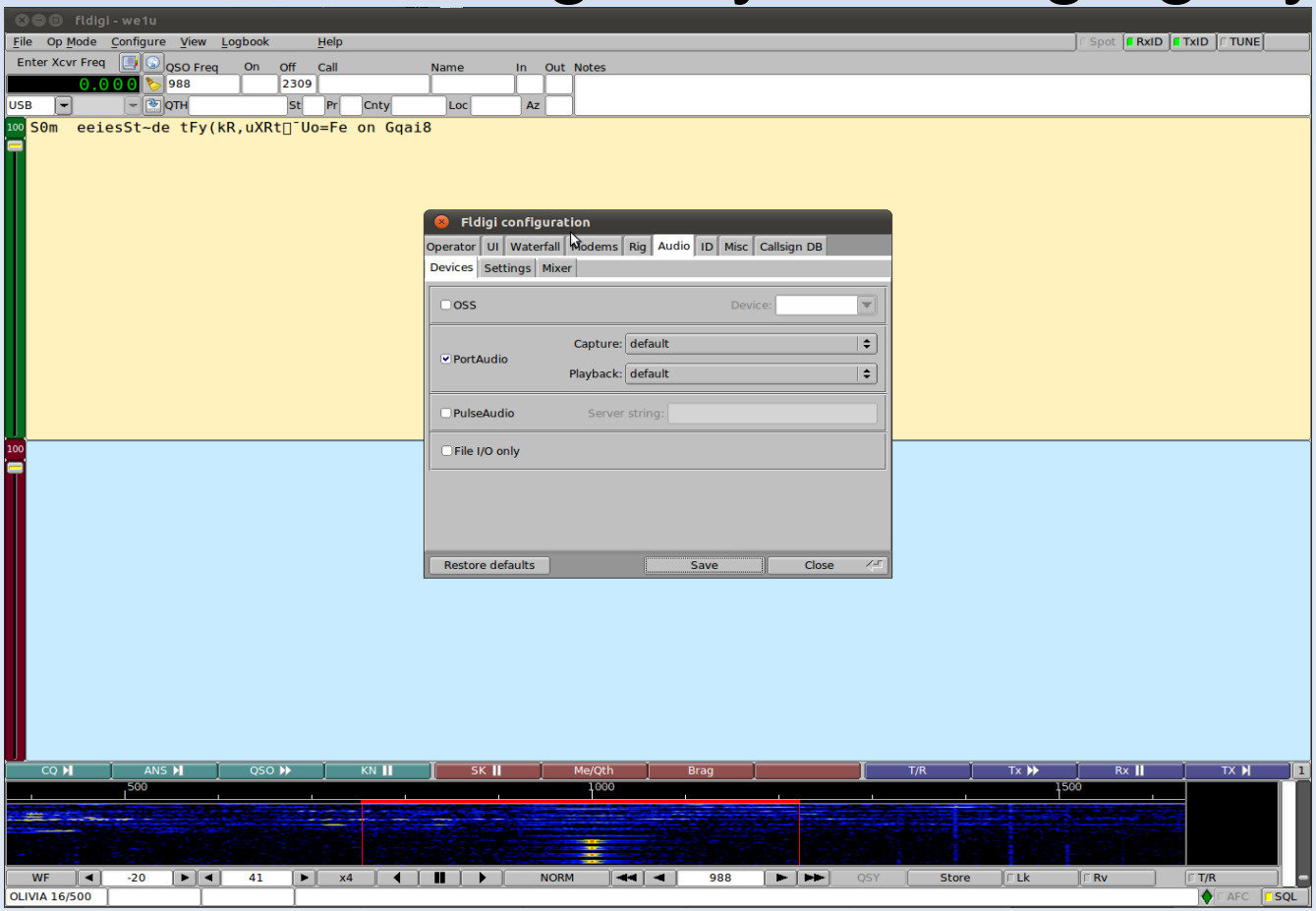
# FLDigi NBEMS Suite

## FLDigi for
## Narrow-Band Emergency Messaging System



# Why NBEMS Communications?

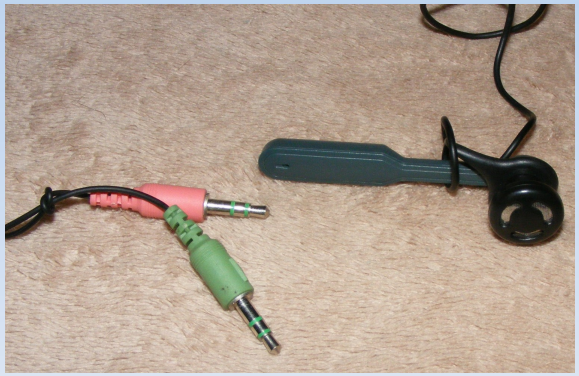
- Voice communication is not always best
- Data communication is often needed:
  - Supply list, especially one with part numbers
  - Roster of Personnel
  - Telephone Directory for a incident
  - Images
  - Binary files

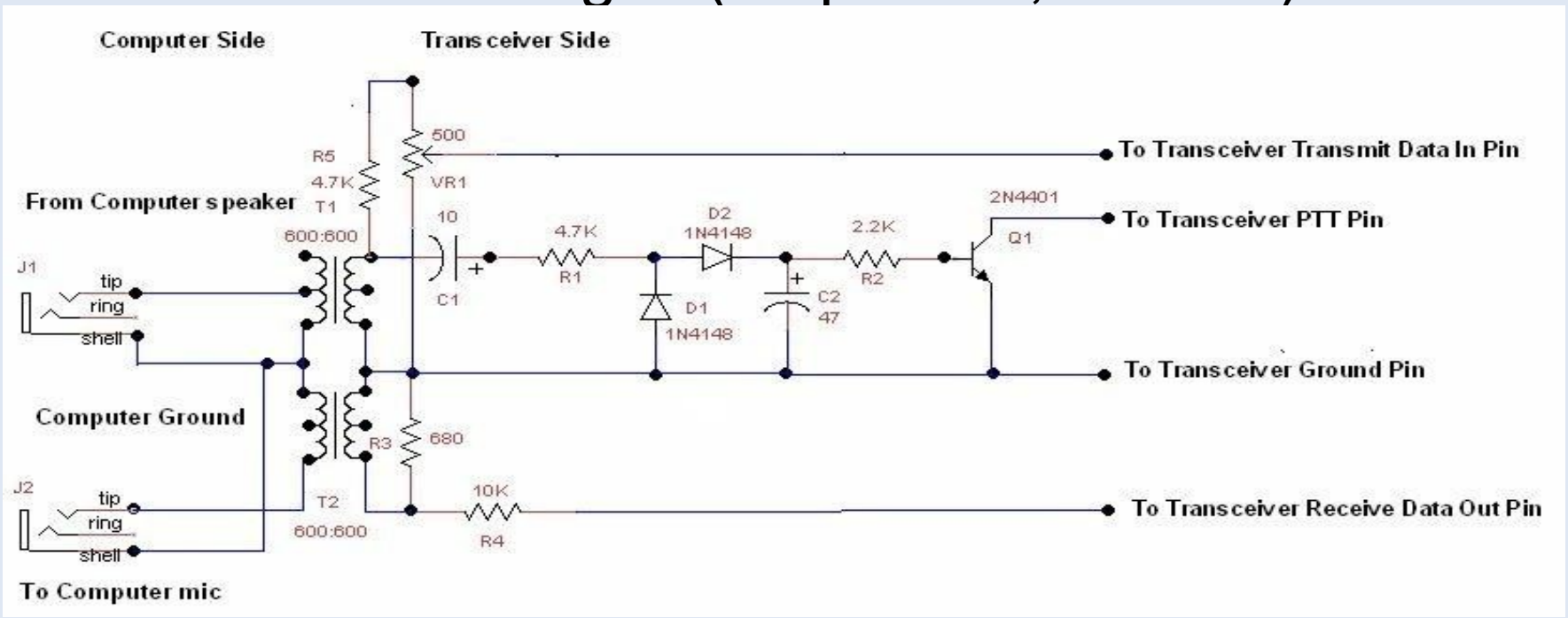
# What do you need?


- Radio
- Laptop
  - Built-in speaker and microphone can be used
  - Wireless mouse is recommended
    - Touchpads are RF sensitive

# Useful Items

- External microphone is helpful
- Interface box
  - That isolates radio from computer
  - Generates PTT signal(Skip Teller, KH6TY)



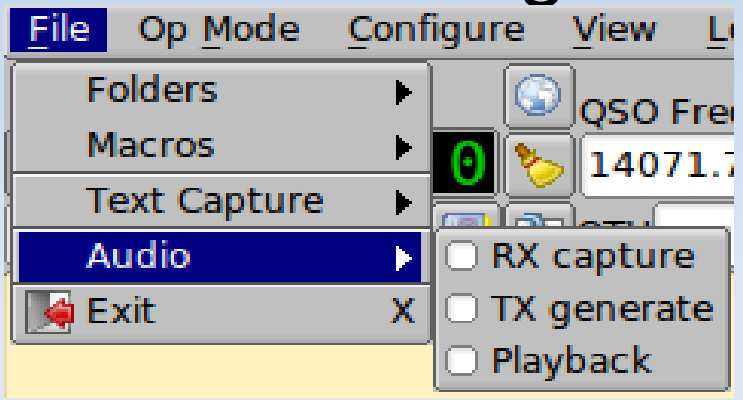


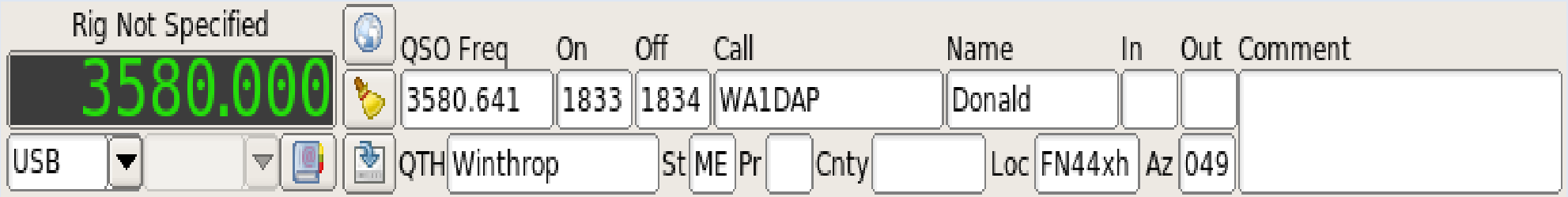
# The FLDigi Suite

- fldigi
  - Digital sound card modem
- flwrap
  - Checksum verifier and (un)compressor
- flmsg
  - Form-based Message Generator

# FLDigi -Digital Modem

- Uses sound card to encode and decode signal
- Record Audio to a“wav” file
  - Capture incoming audio
  - Save outgoing audio
  - Playback saved audio into decoder
- Control some Radios
- Save and Compile Log files

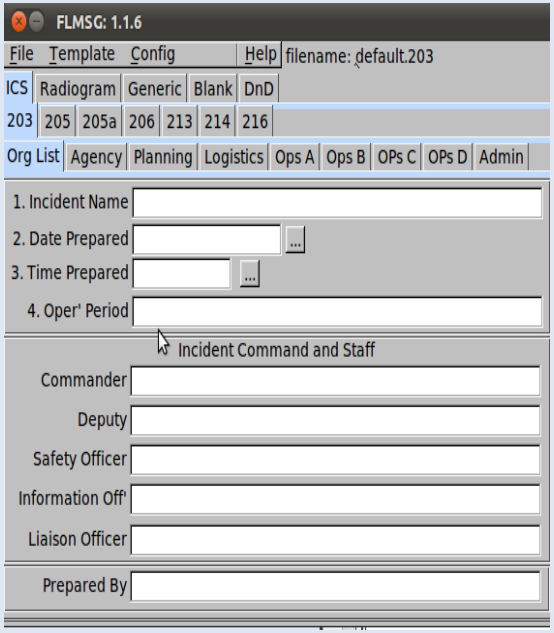


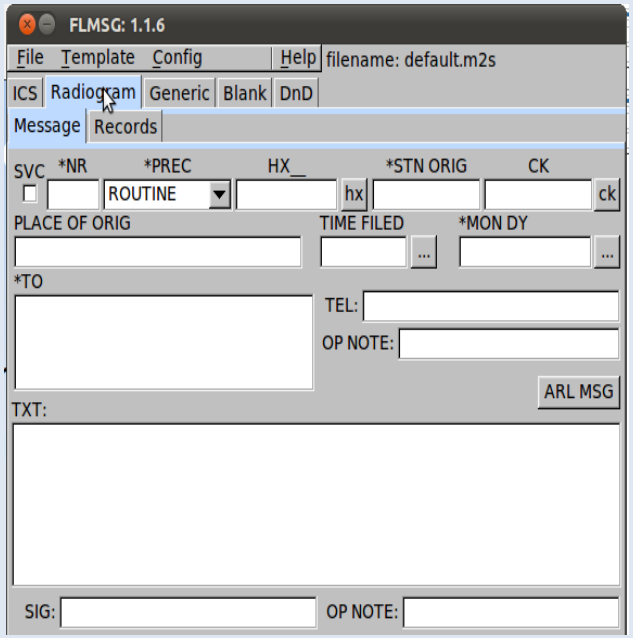



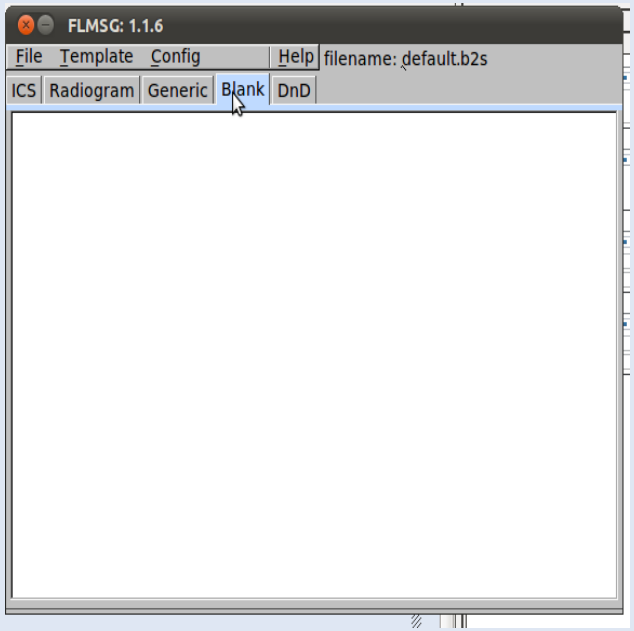
# Flmsg-Message Form Editor

Flmsg has common message forms templates

- Incident Command System forms
- Radiogram or just a blank page



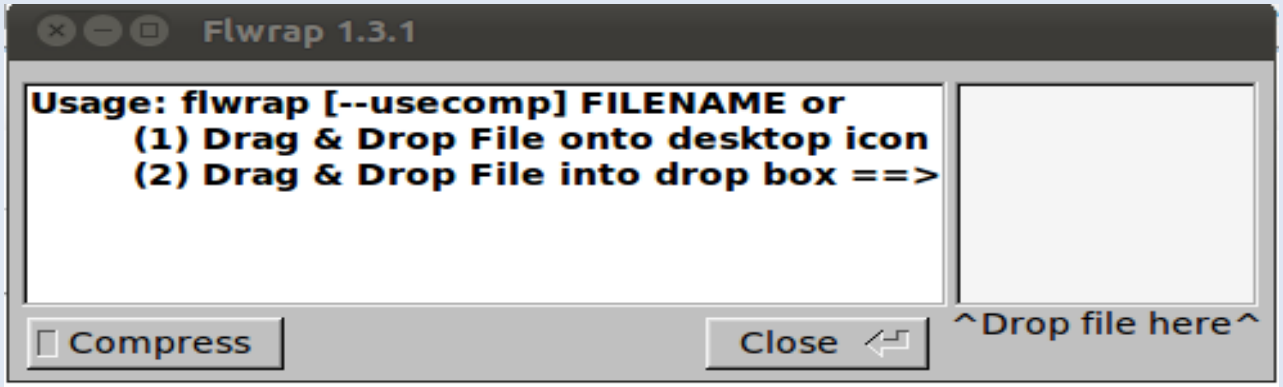
# Flwrap-Outgoing Message Wrapper

Delineates Message with start/end text markers

- Binary files are first converted to a base-64
  - http://en.wikipedia.org/wiki/Base-64

Adds a checksum

Can compress a message



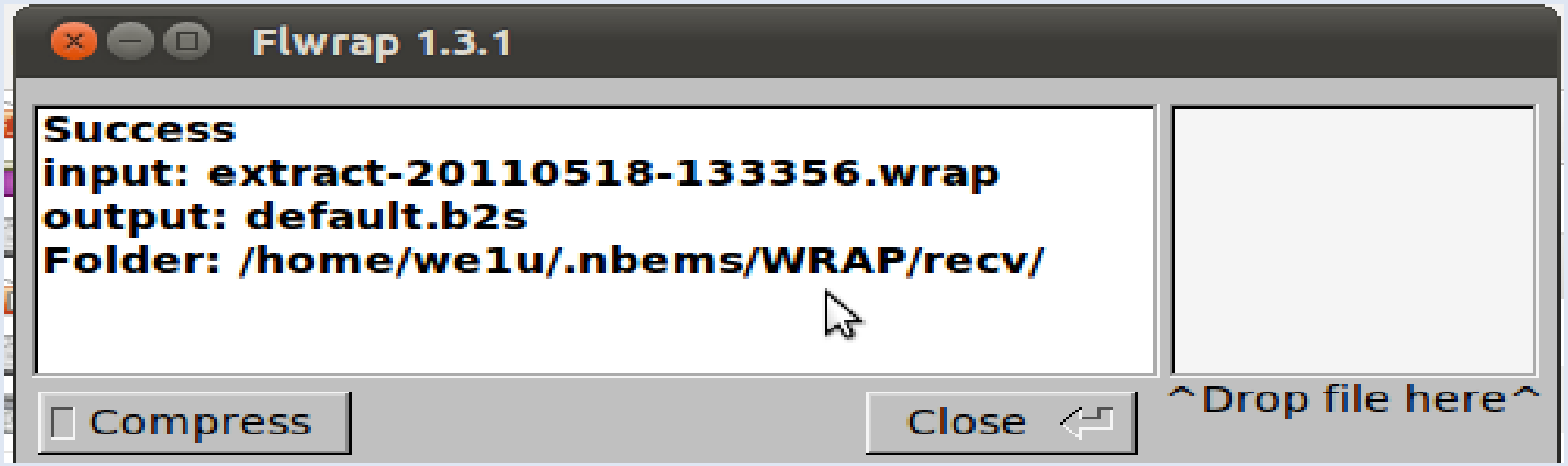
# Flwrap output in fldigi

# Flwrap-Incoming Message Unwrapper

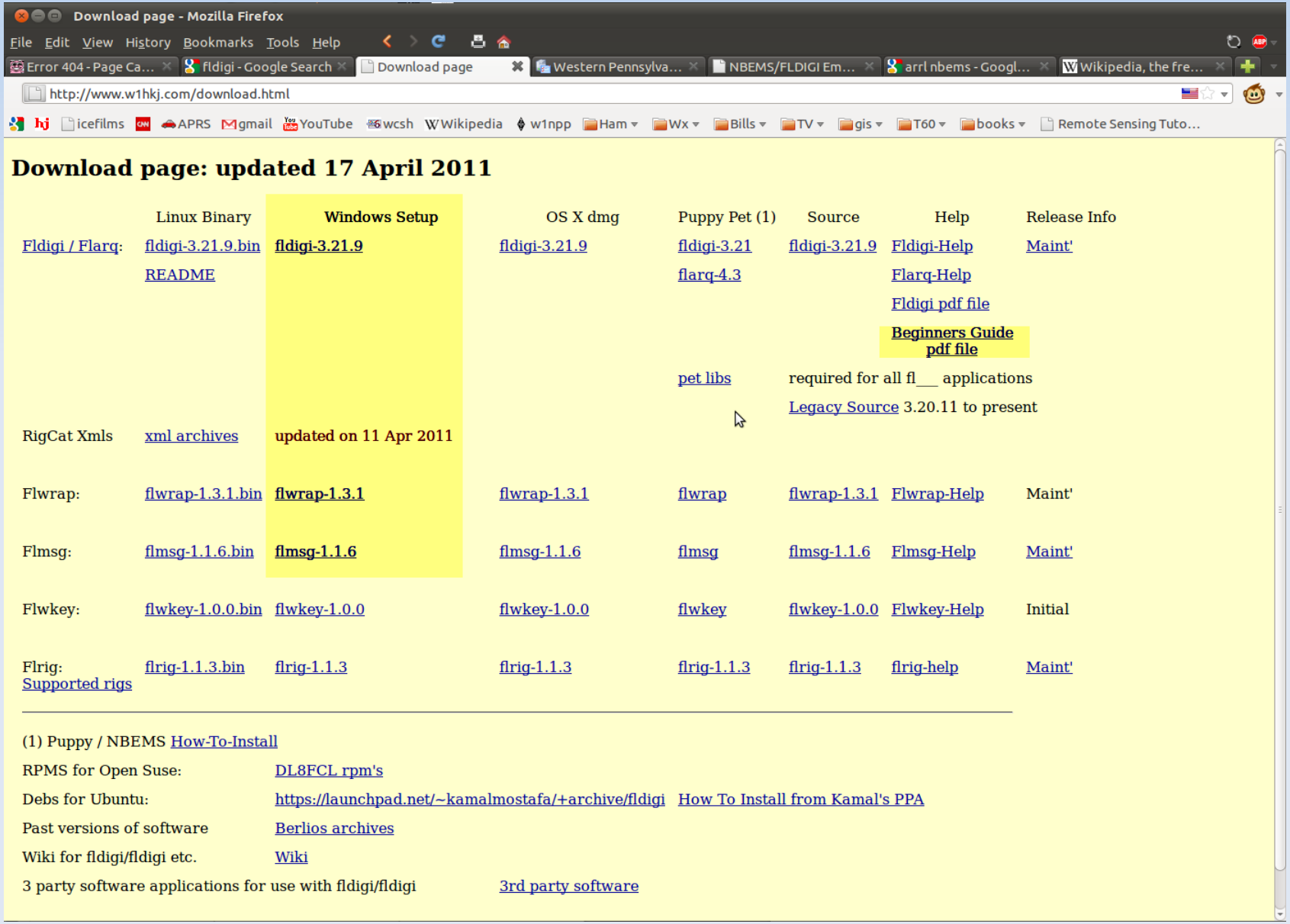
Verifies Checksum

Recover Binary file from any base-64 text

Uncompress Message if needed



# http://www.w1hkj.com/download.html




## Download page: updated 17 April 2011

| | Linux Binary | **Windows Setup** | OS X dmg | Puppy Pet (1) | Source | Help | Release Info |
|---|---|---|---|---|---|---|---|
| Fldigi / Flarq: | fldigi-3.21.9.bin | **fldigi-3.21.9** | fldigi-3.21.9 | fldigi-3.21 | fldigi-3.21.9 | Fldigi-Help | Maint' |
| | README | | | flarq-4.3 | | Flarq-Help | |
| | | | | | | Fldigi pdf file | |
| | | | | | | **Beginners Guide pdf file** | |
| | | | | pet libs | required for all fl___ applications | | |
| | | | | | Legacy Source 3.20.11 to present | | |
| RigCat Xmls | xml archives | **updated on 11 Apr 2011** | | | | | |
| Flwrap: | flwrap-1.3.1.bin | **flwrap-1.3.1** | flwrap-1.3.1 | flwrap | flwrap-1.3.1 | Flwrap-Help | Maint' |
| Flmsg: | flmsg-1.1.6.bin | **flmsg-1.1.6** | flmsg-1.1.6 | flmsg | flmsg-1.1.6 | Flmsg-Help | Maint' |
| Flwkey: | flwkey-1.0.0.bin | flwkey-1.0.0 | flwkey-1.0.0 | flwkey | flwkey-1.0.0 | Flwkey-Help | Initial |
| Flrig: Supported rigs | flrig-1.1.3.bin | flrig-1.1.3 | flrig-1.1.3 | flrig-1.1.3 | flrig-1.1.3 | flrig-help | Maint' |

(1) Puppy / NBEMS How-To-Install

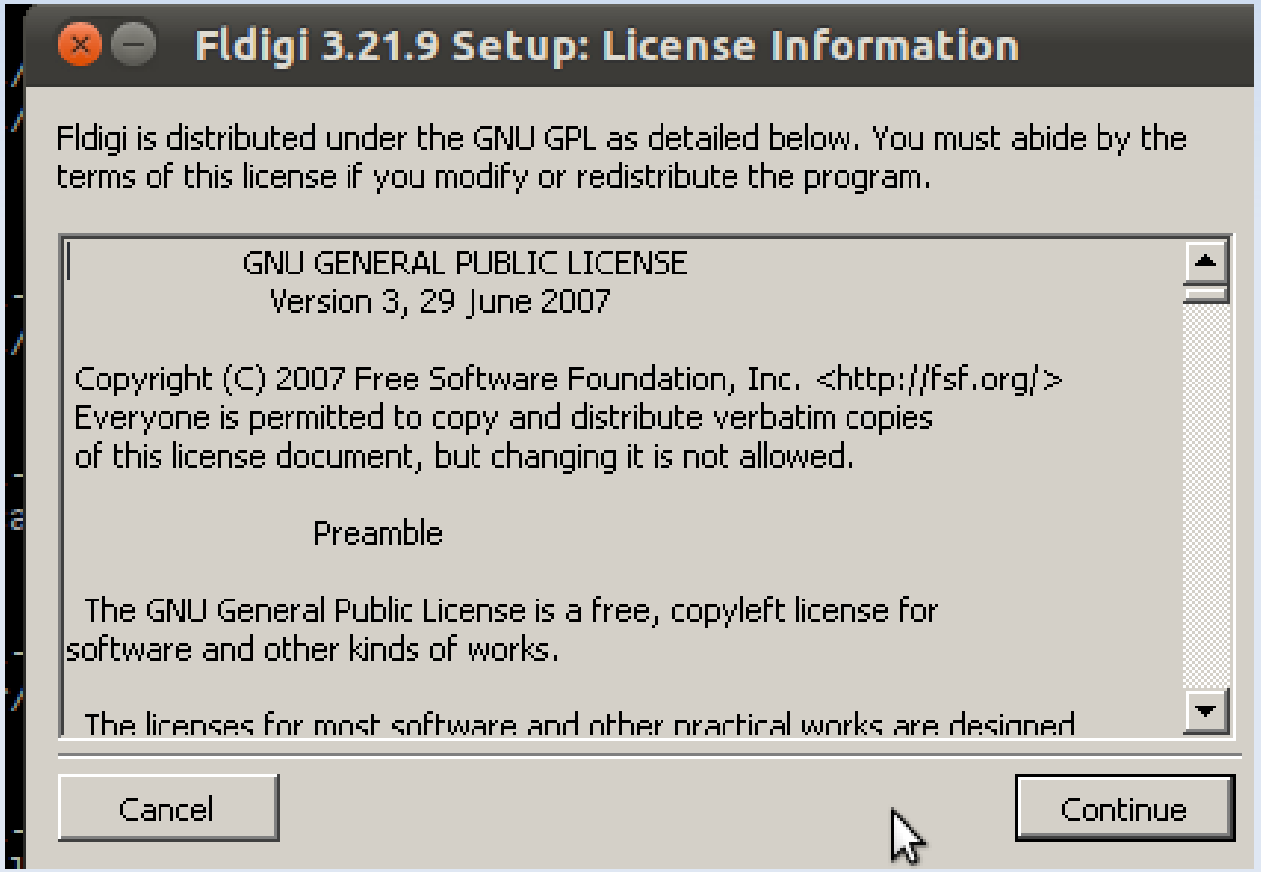
| | | |
|---|---|---|
| RPMS for Open Suse: | DL8FCL rpm's | |
| Debs for Ubuntu: | https://launchpad.net/~kamalmostafa/+archive/fldigi | How To Install from Kamal's PPA |
| Past versions of software | Berlios archives | |
| Wiki for fldigi/fldigi etc. | Wiki | |
| 3 party software applications for use with fldigi/fldigi | 3rd party software | |

# fldigi Windows Installation

- The three setup files install in the same steps:
  - fldigi-3.21.9_setup.exe
  - flmsg-1.1.6_setup.exe
  - flwrap-1.3.1_setup.exe
- The Default setting should be fine.
- Do the four steps for each program
  - Window Security may require you to verify additional steps
- Be aware the programs are being actively developed and updates are frequent

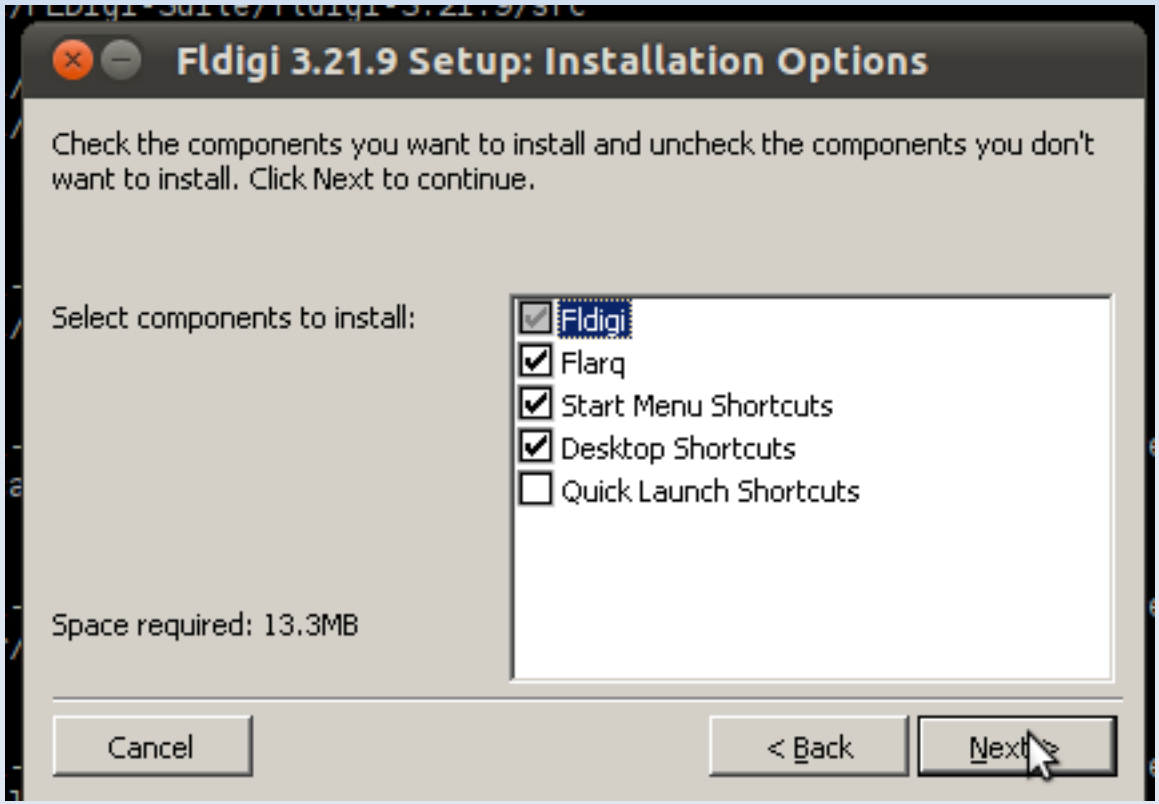
# Setup Step 1-License Information

Click Continue Button



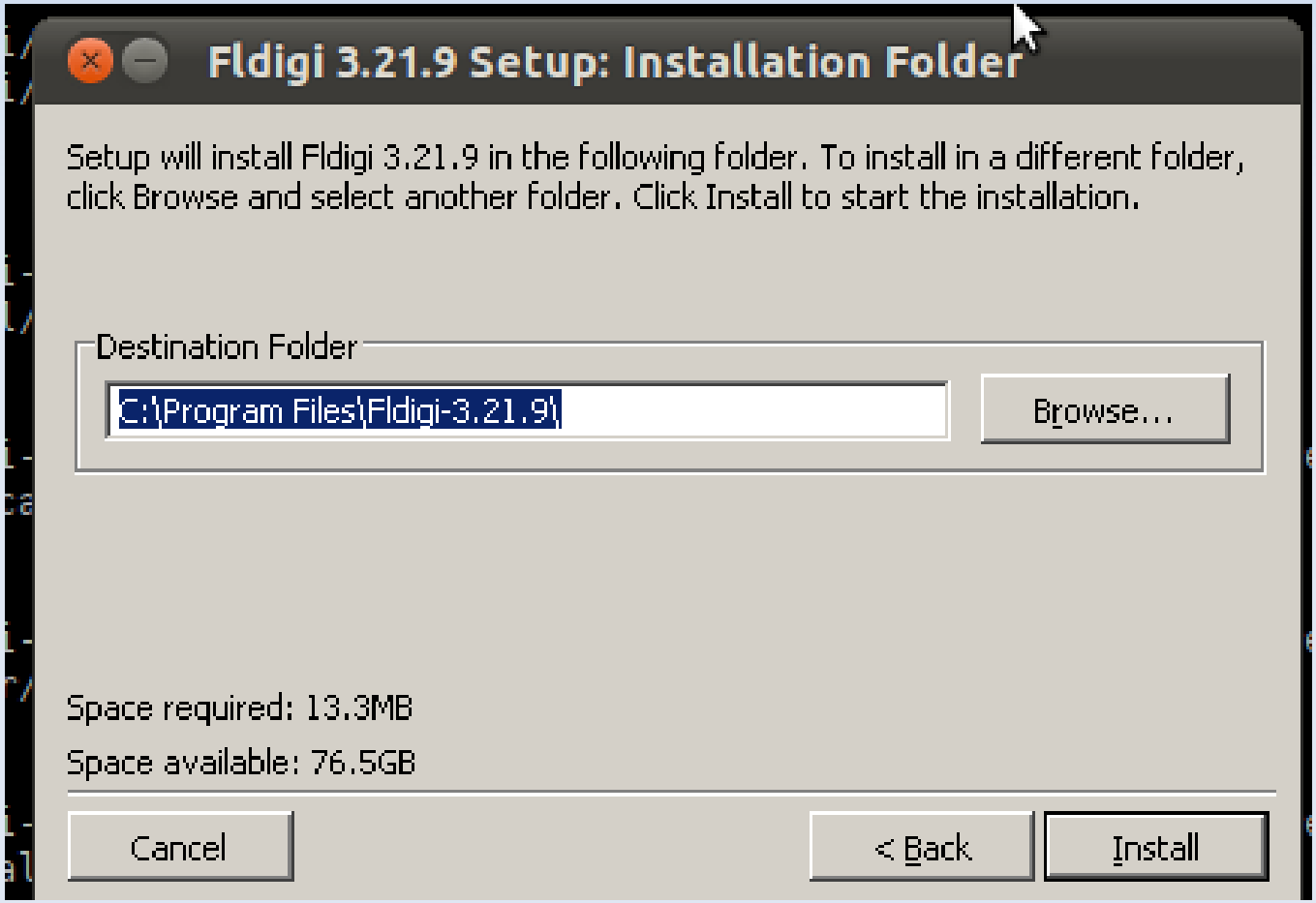
# Step 2 Installation Options

Click “Next” Button



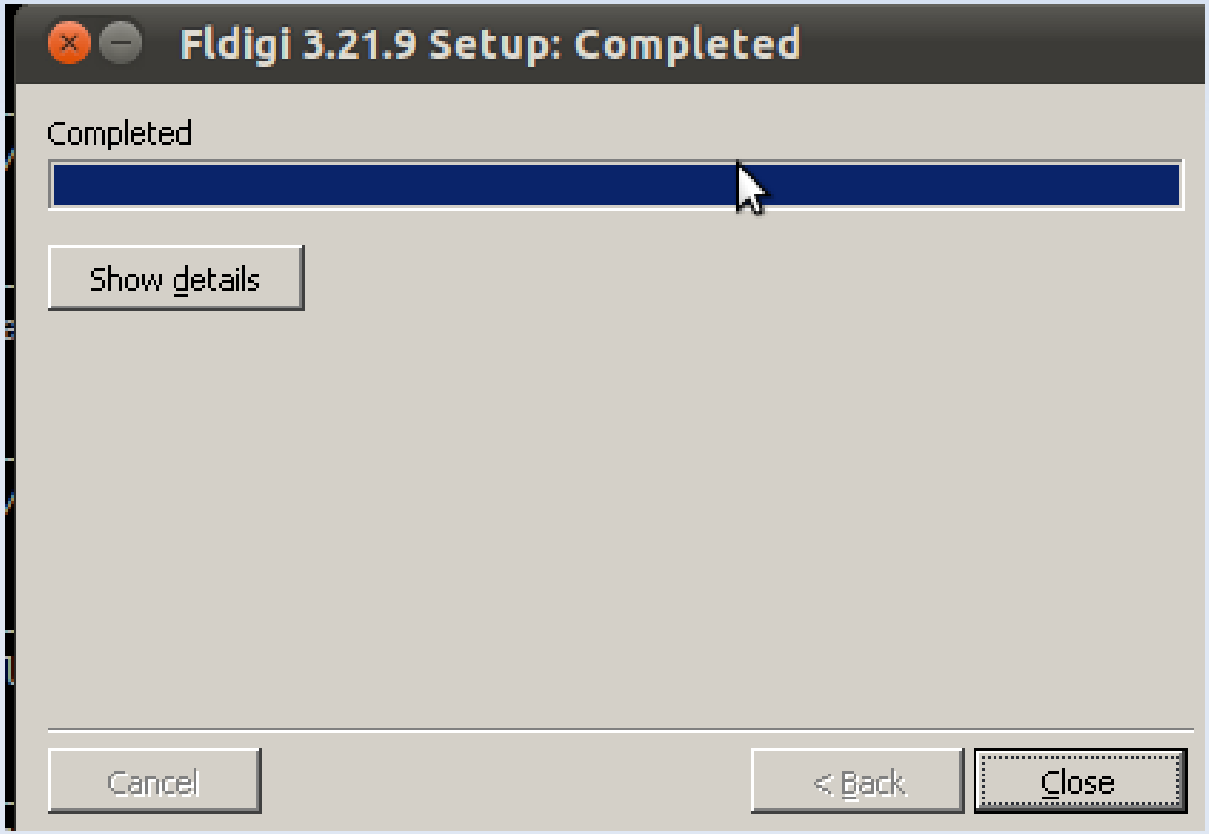
# Step 3-Installation Folder

Click the “Install” Button



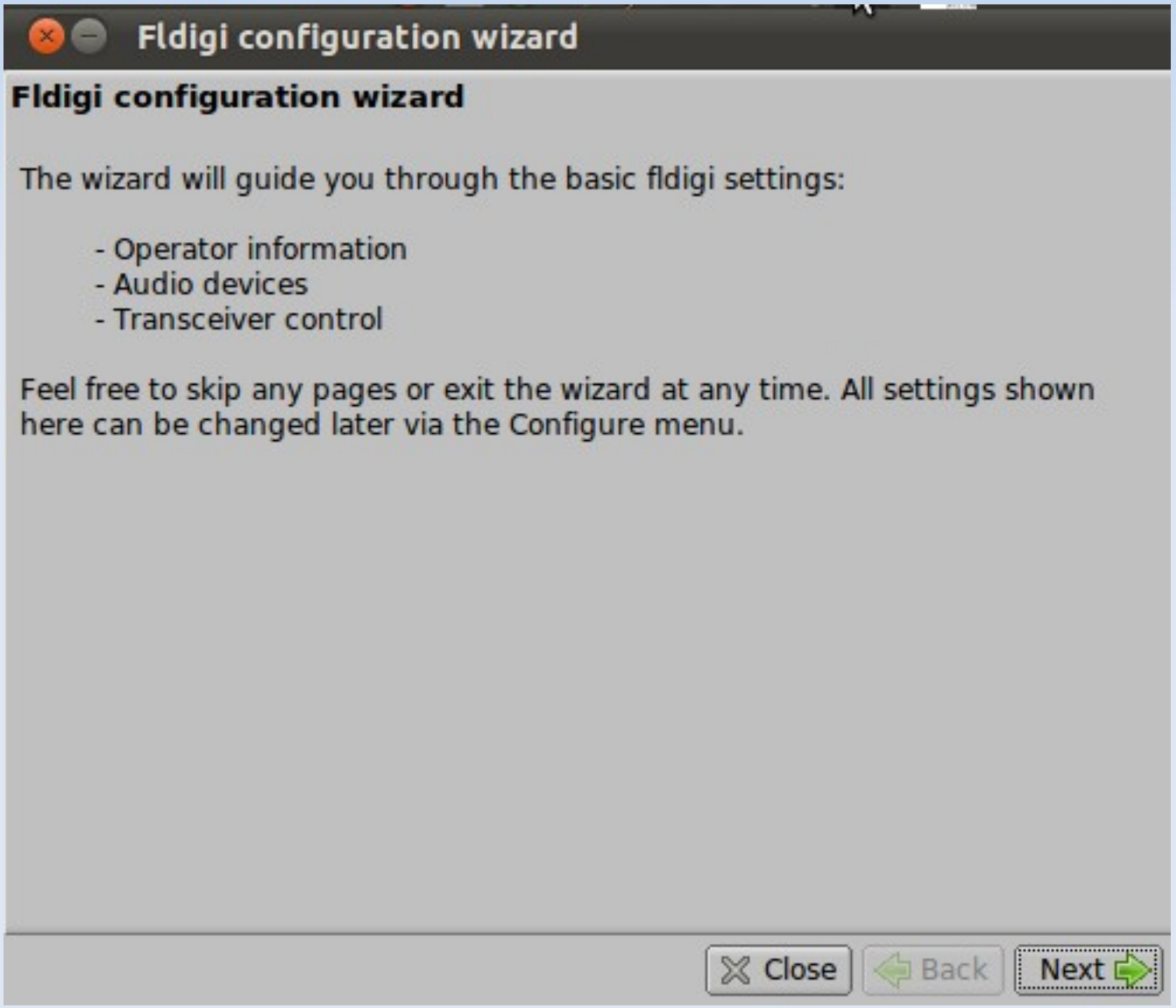
# Step 4-Completed

Click “Close” Button



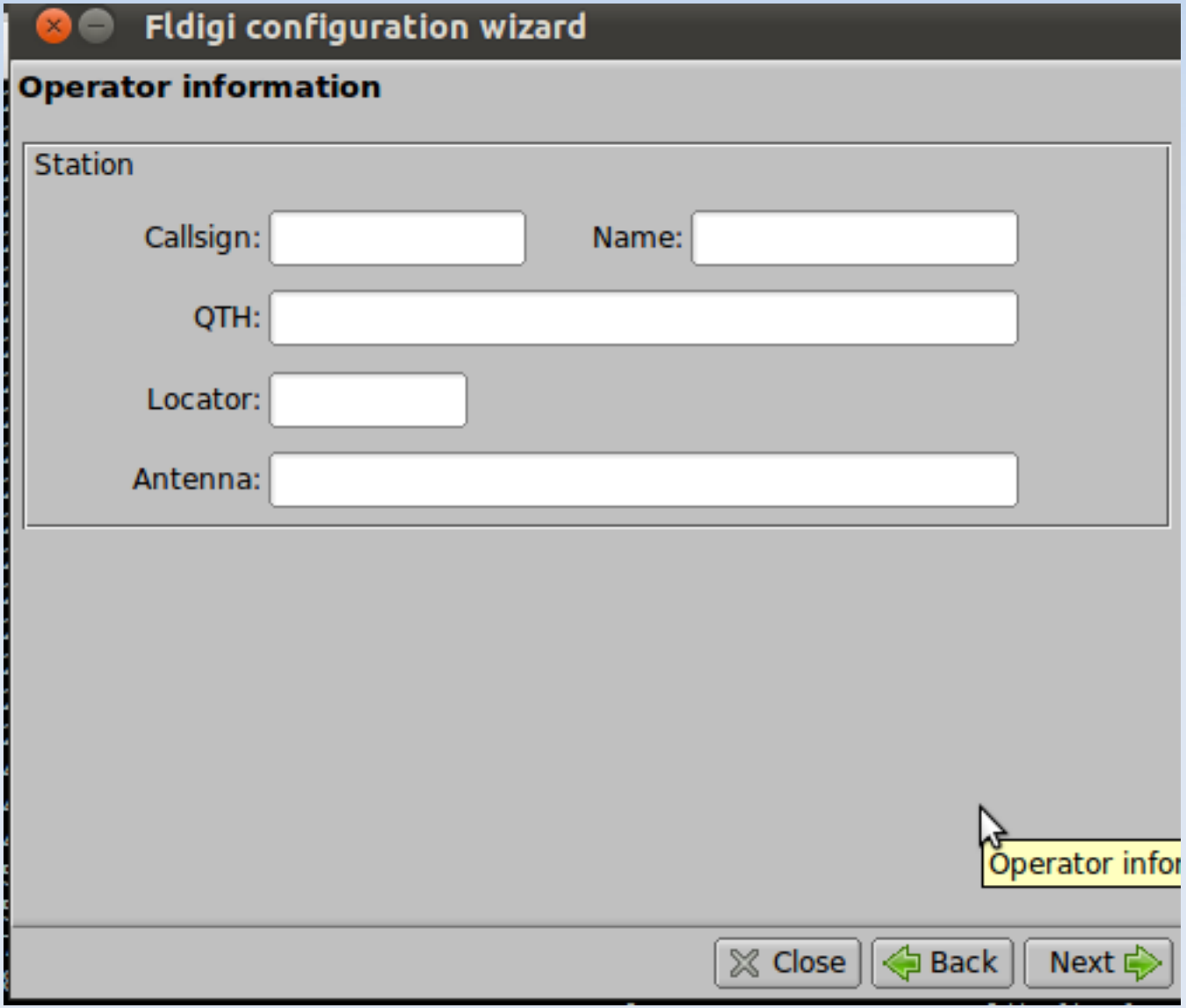
# Fldigi -Configuraton Wizard Step 1

Click “Next” Button



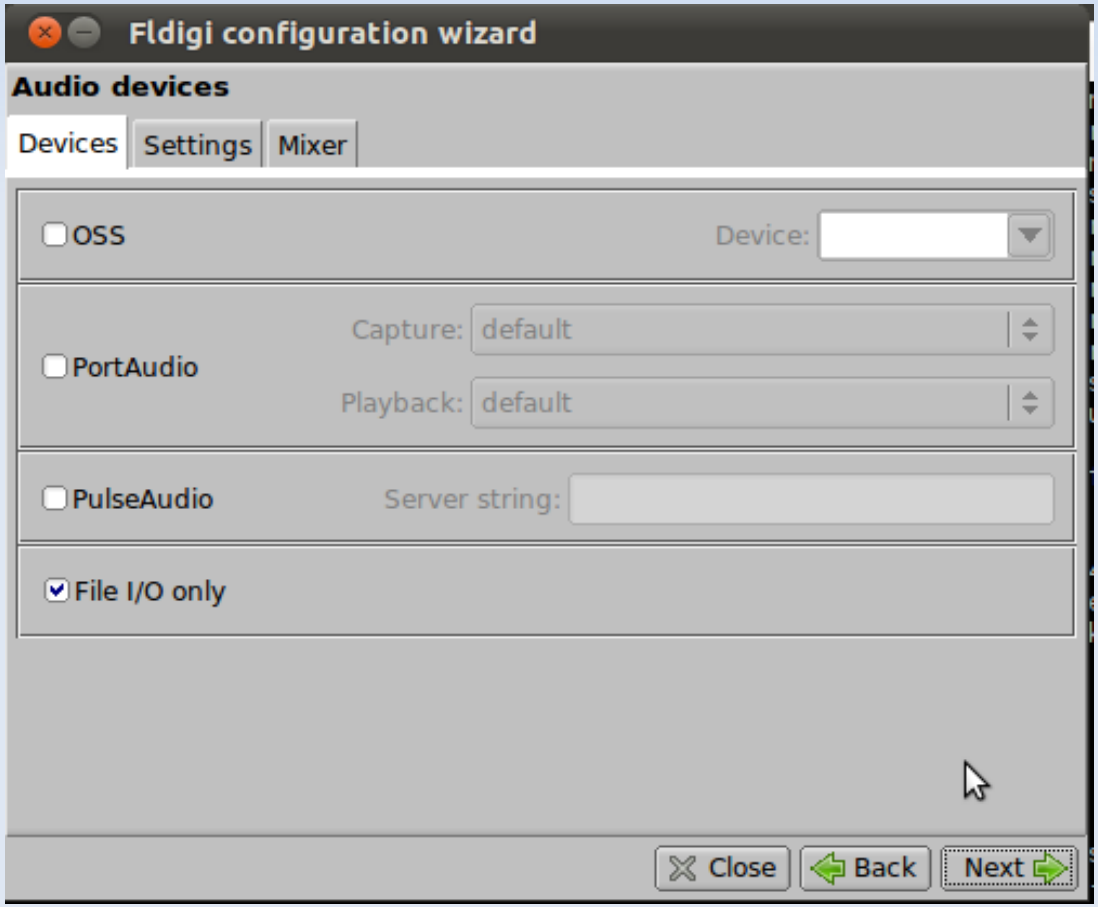
# Fldigi -Configuraton Wizard Step 2

Enter your information and Click “Next” Button



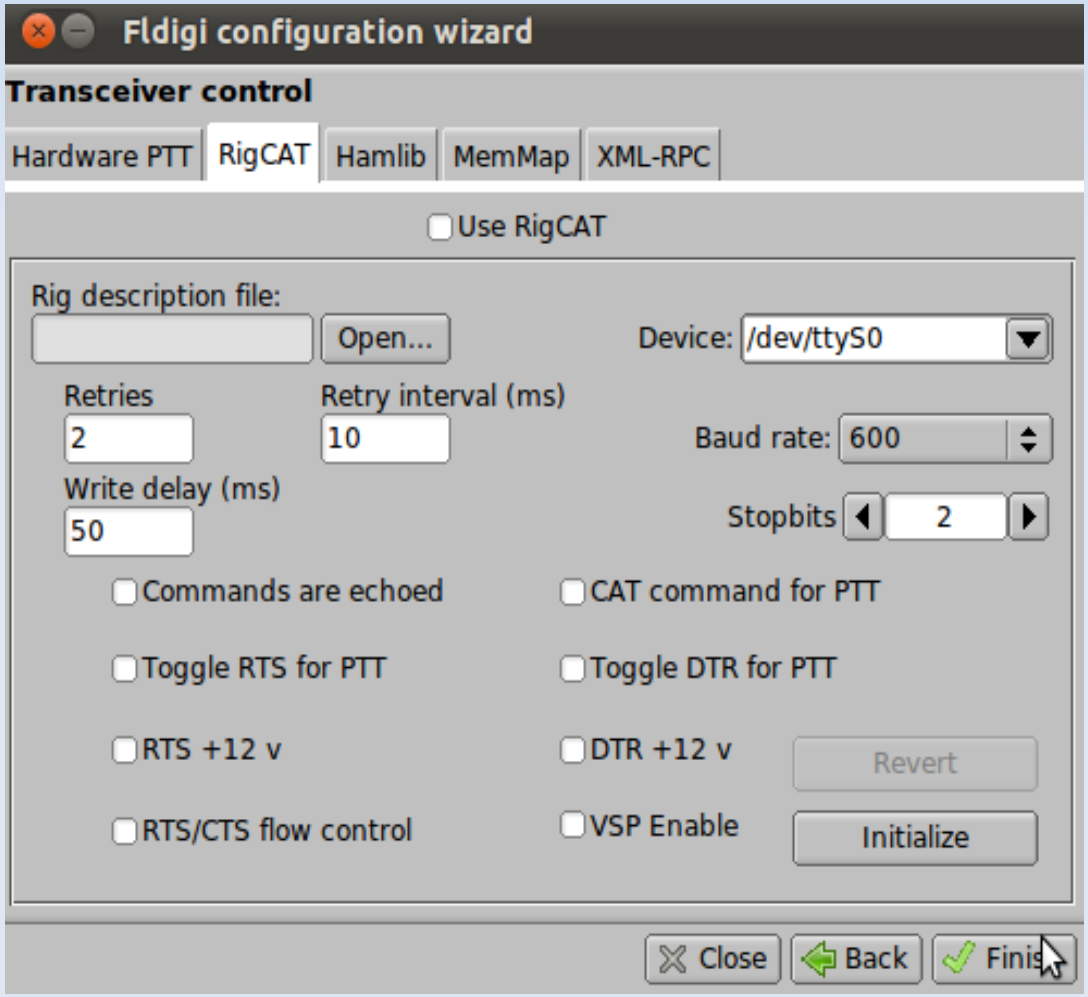
# Fldigi -Configuraton Wizard Step 3

Select your Audio Devices and Click “Next” Button

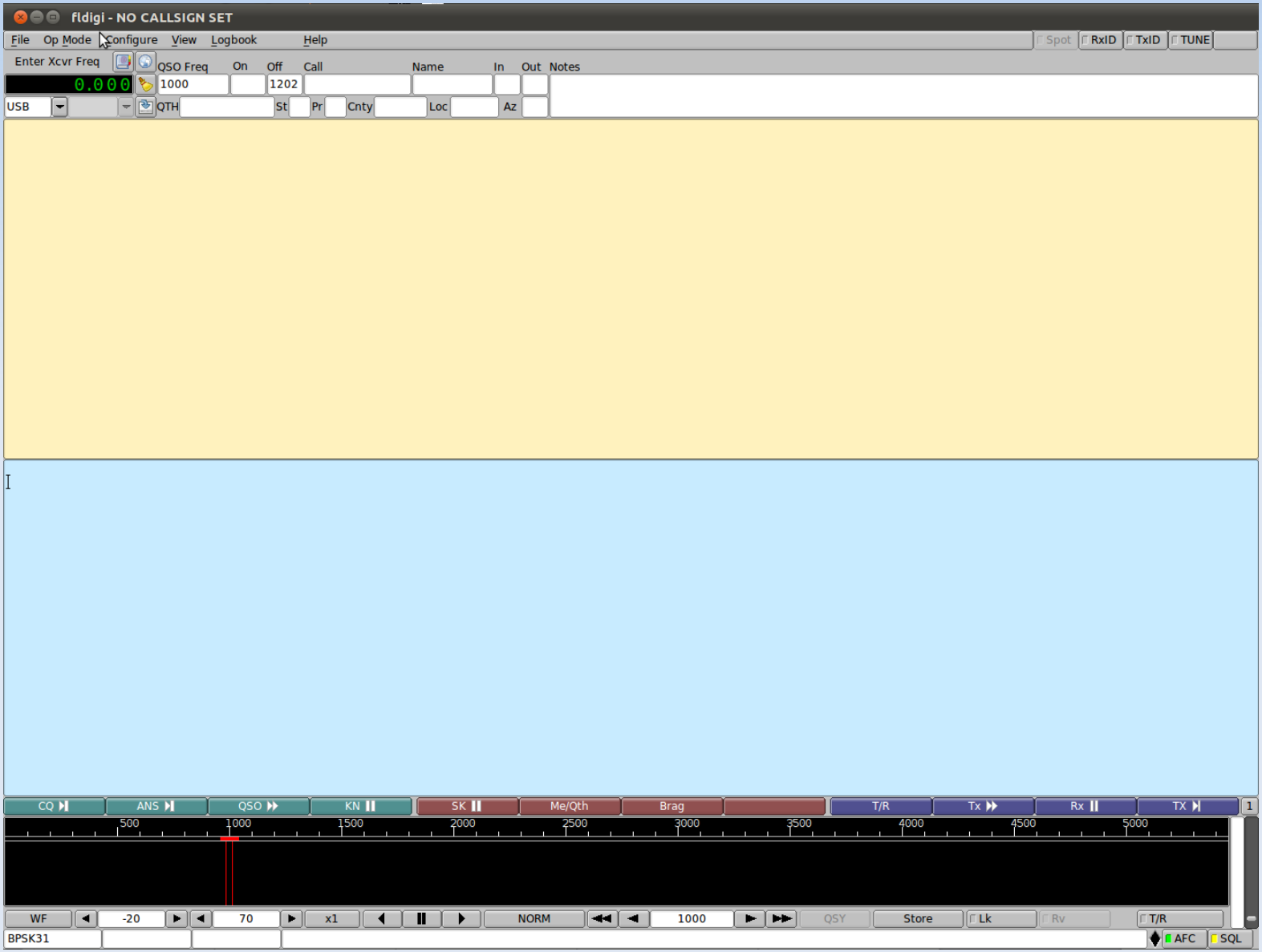


# Fldigi -Configuraton Wizard Step 4

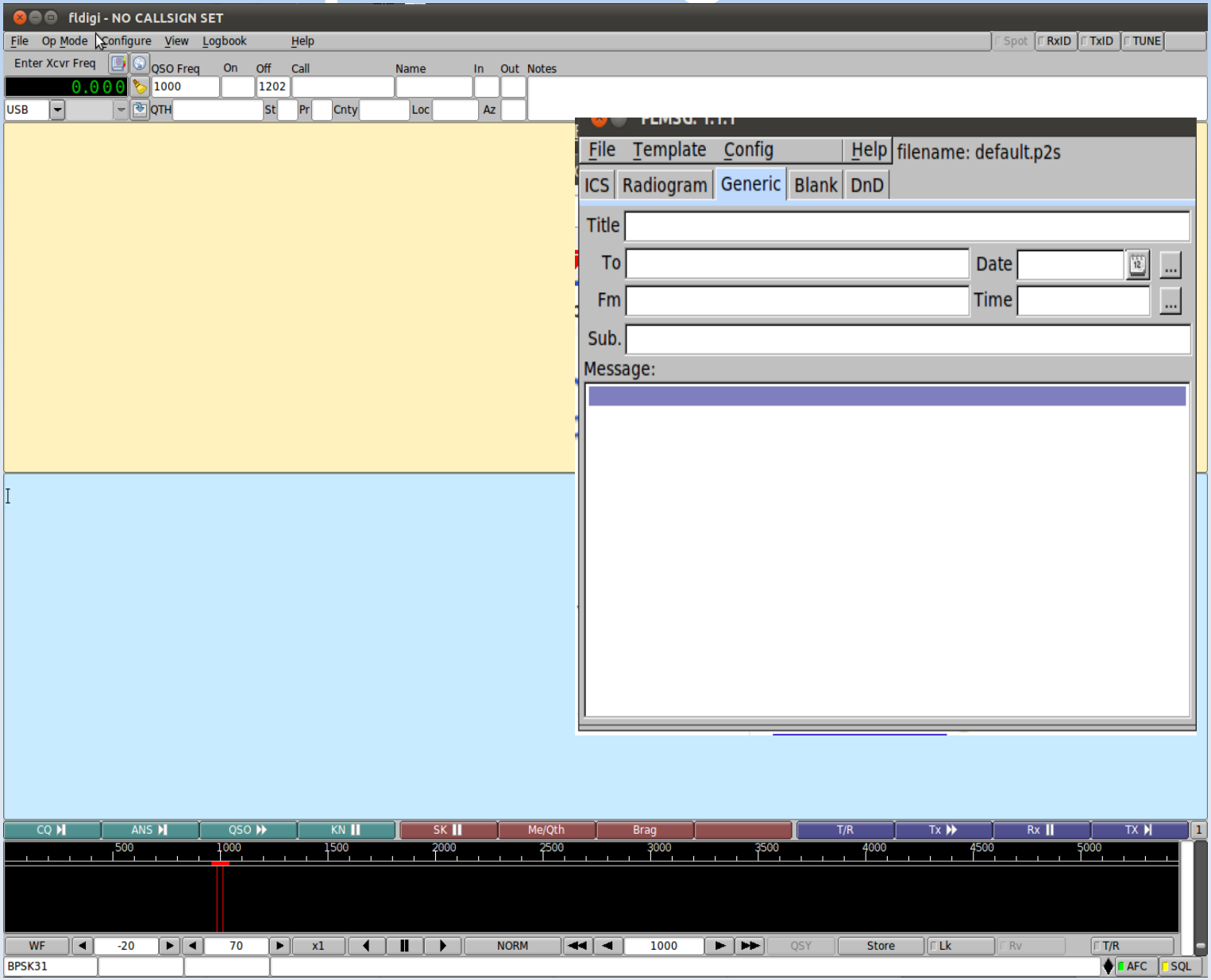
Leave this as is for now and Click “Finish” Button



# Open fldigi for the first time



# Open flmsg too

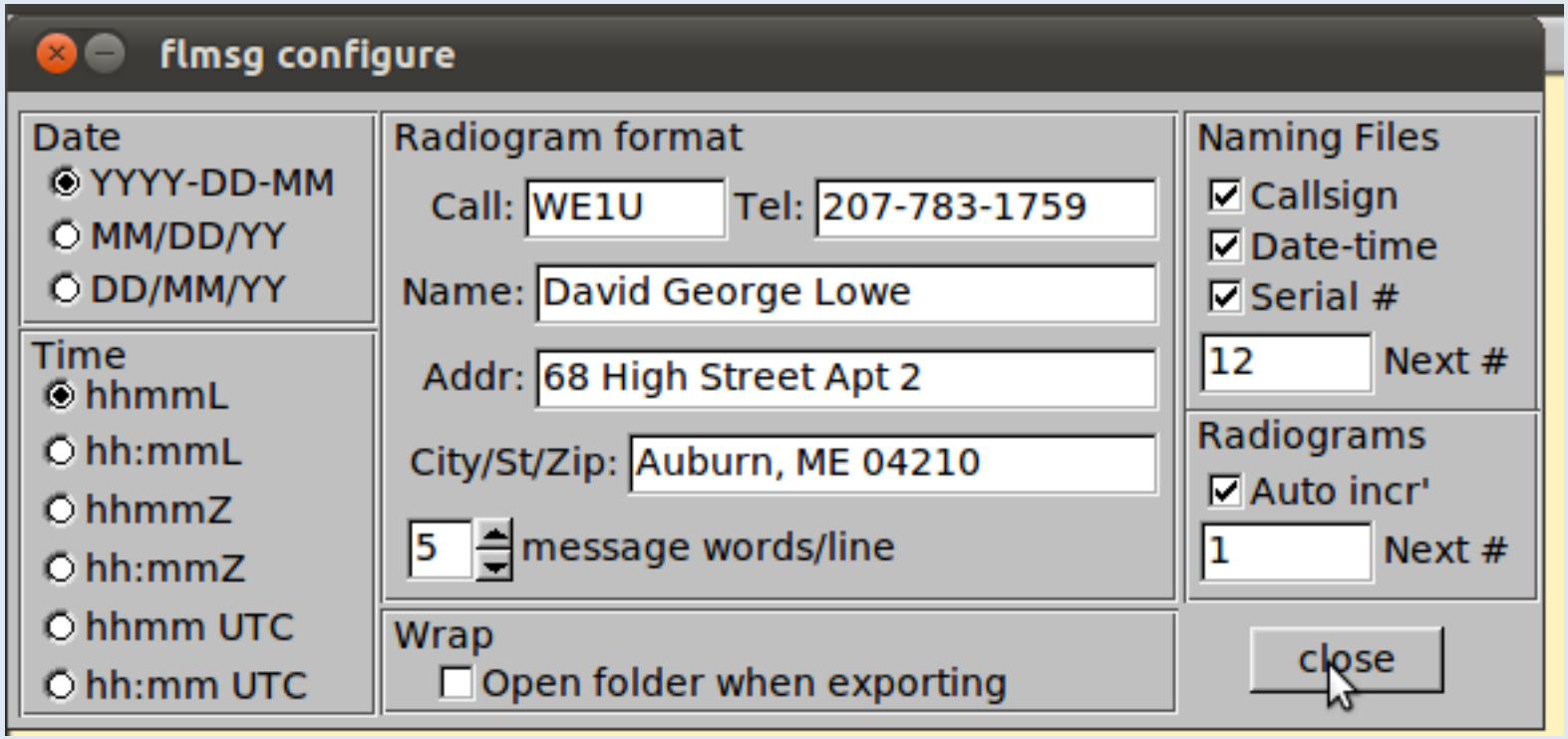


# Config flmsg

Open flmg

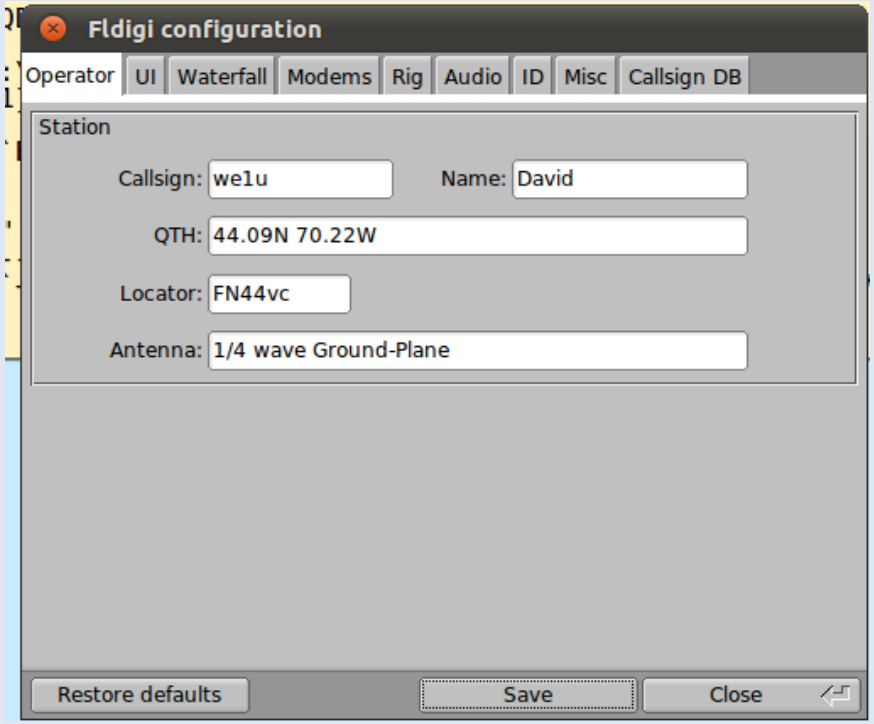
Click on flmsg's “Config” Menu

Edit Settings and Click “close” Button

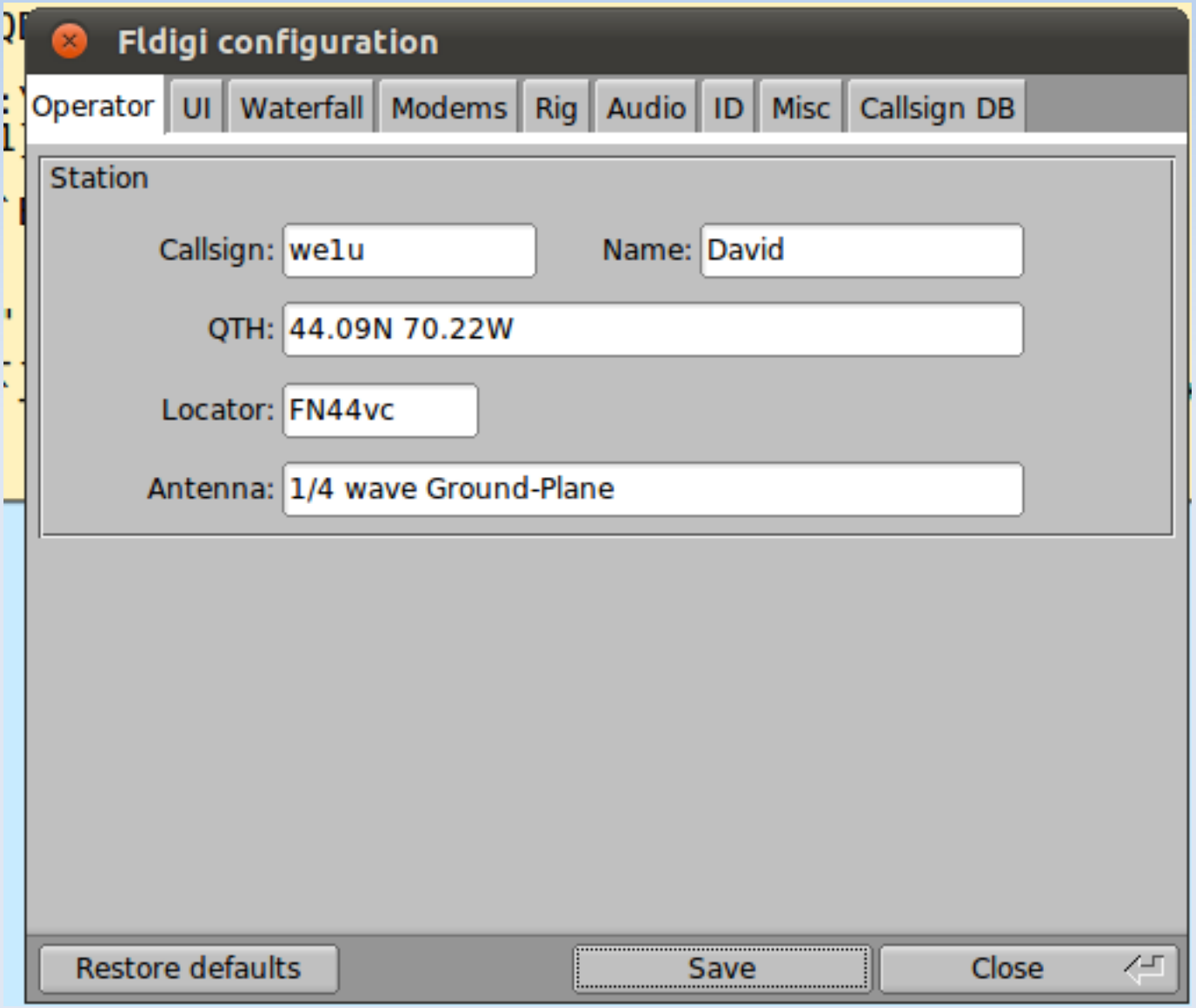


# Closer look at Fldigi's Configure Menu and Dialogs

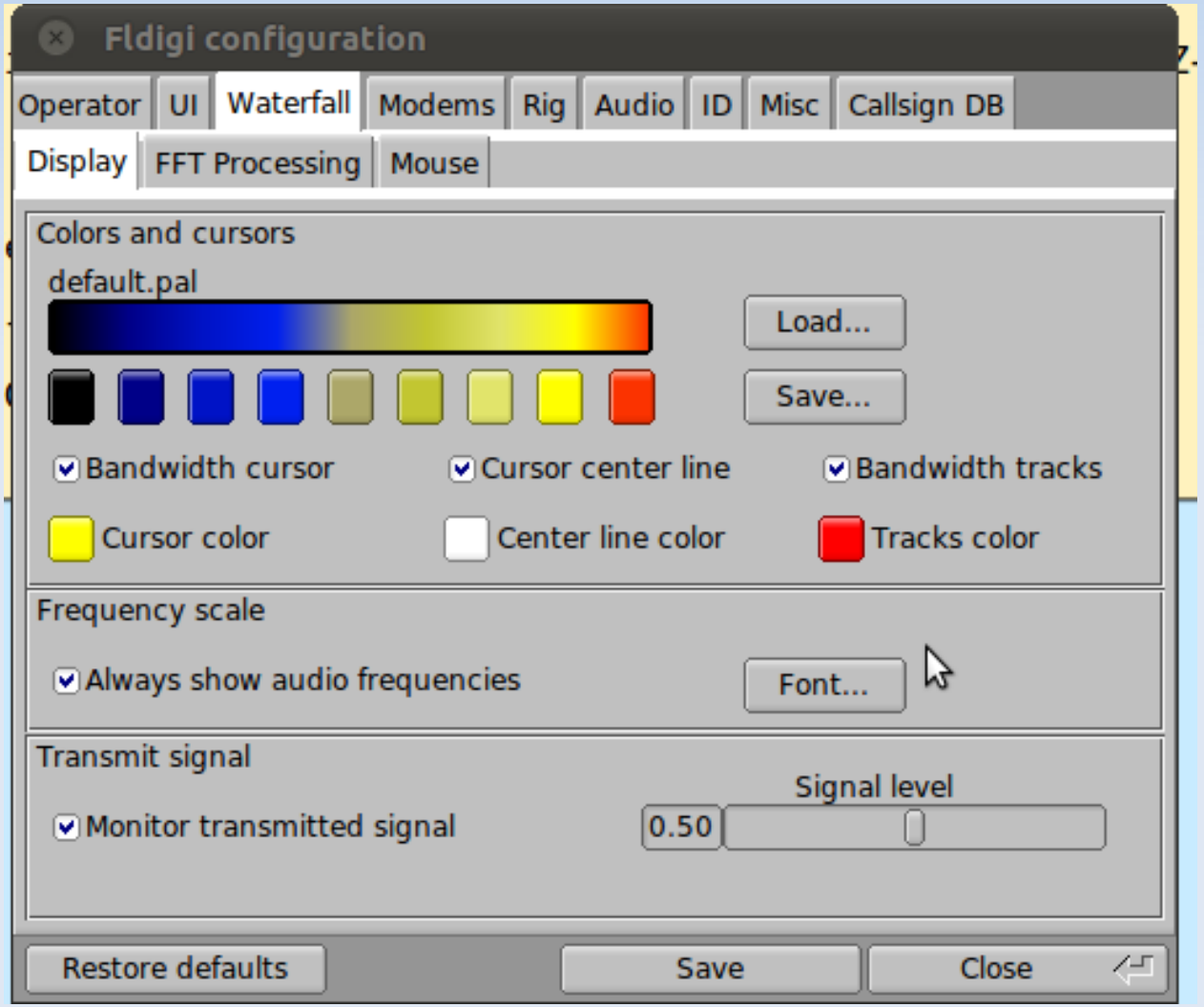
The “Configure” Menu items bring up a tabbed dialog except for the “Colors and Fonts” and “Notifications” items

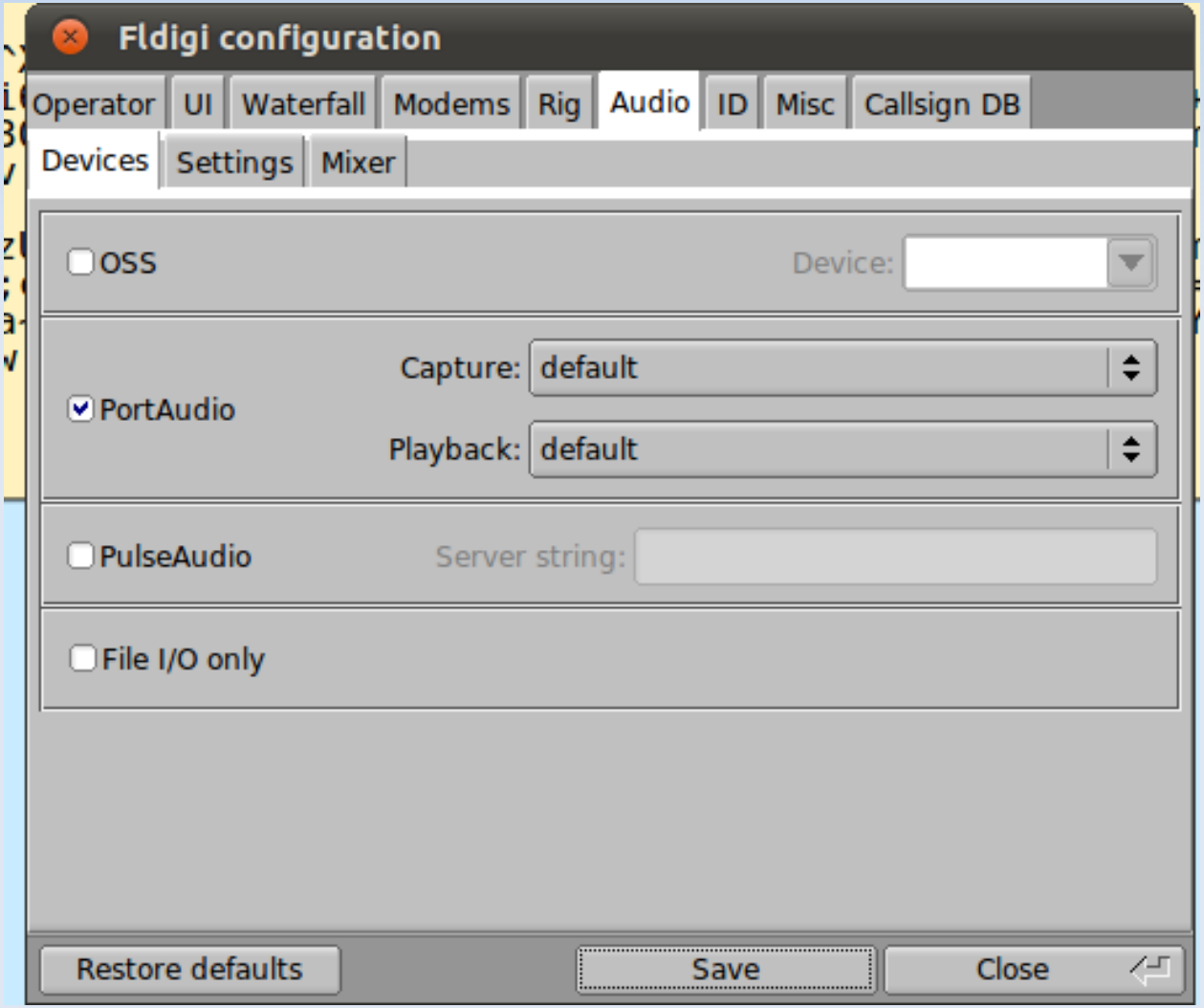
# Starting Point-Who are YOU?



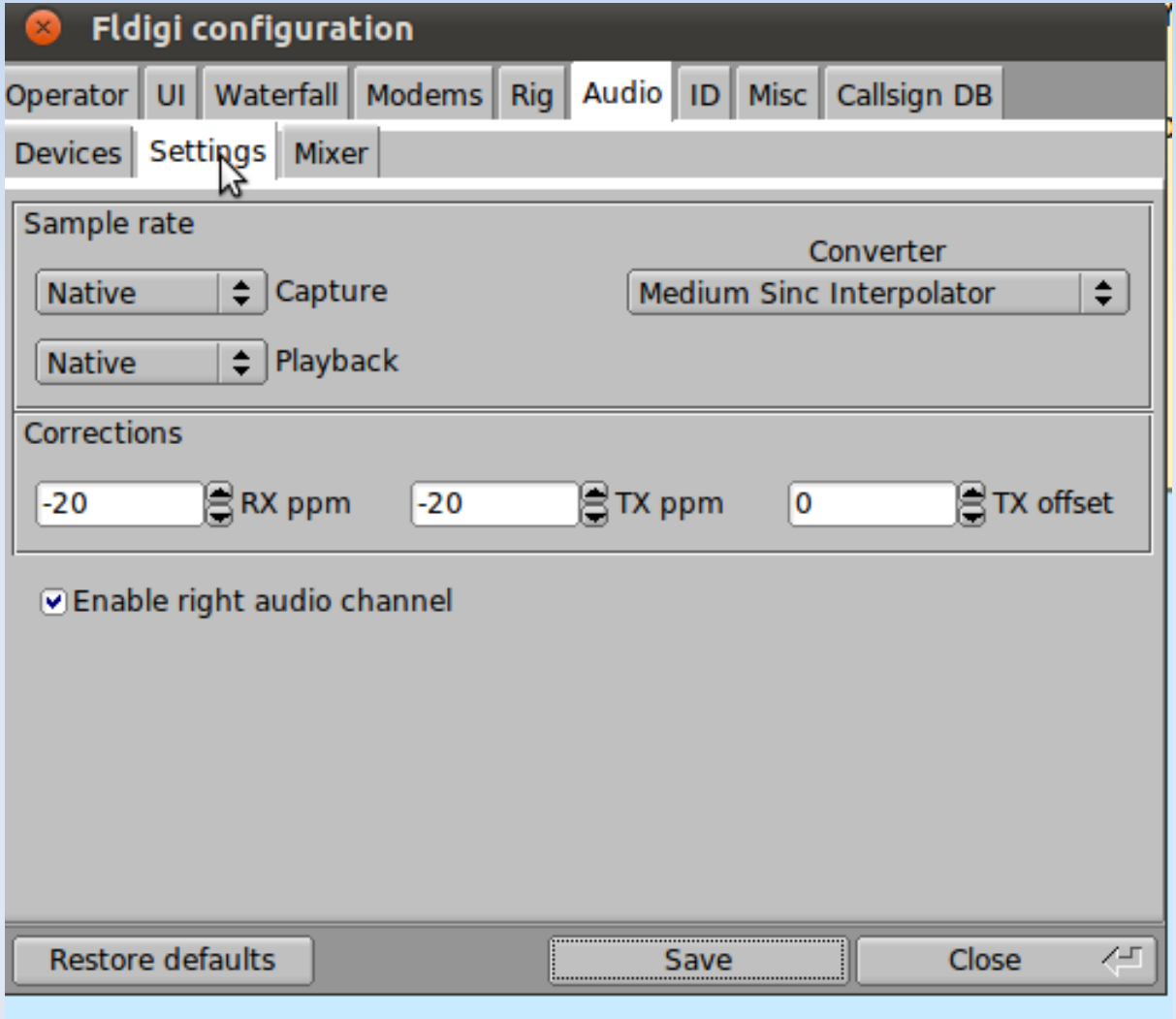
# Waterfall > Display



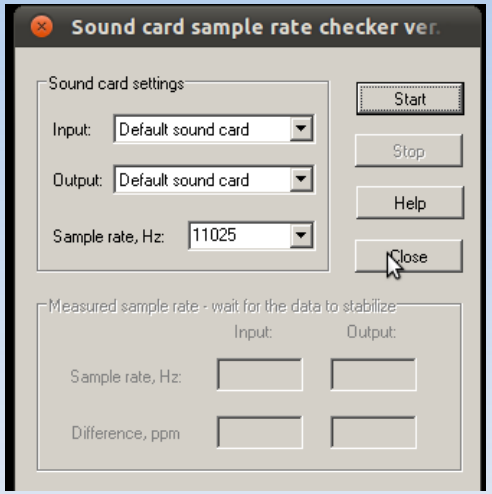
# Audio Devices



# Audio > Settings



# Audio Settings

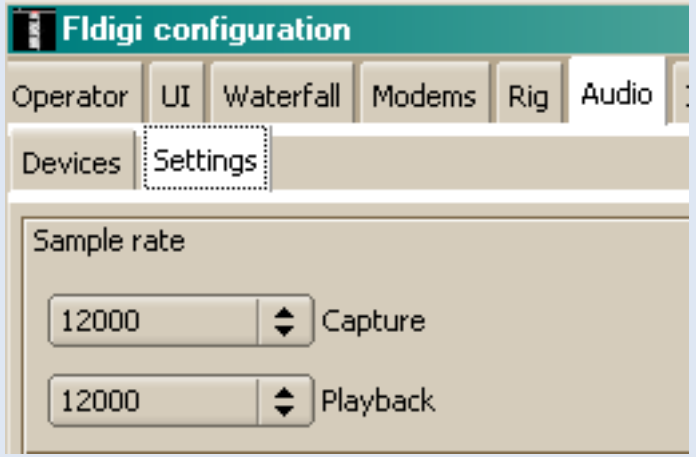



Check Sound Card with CheckSR

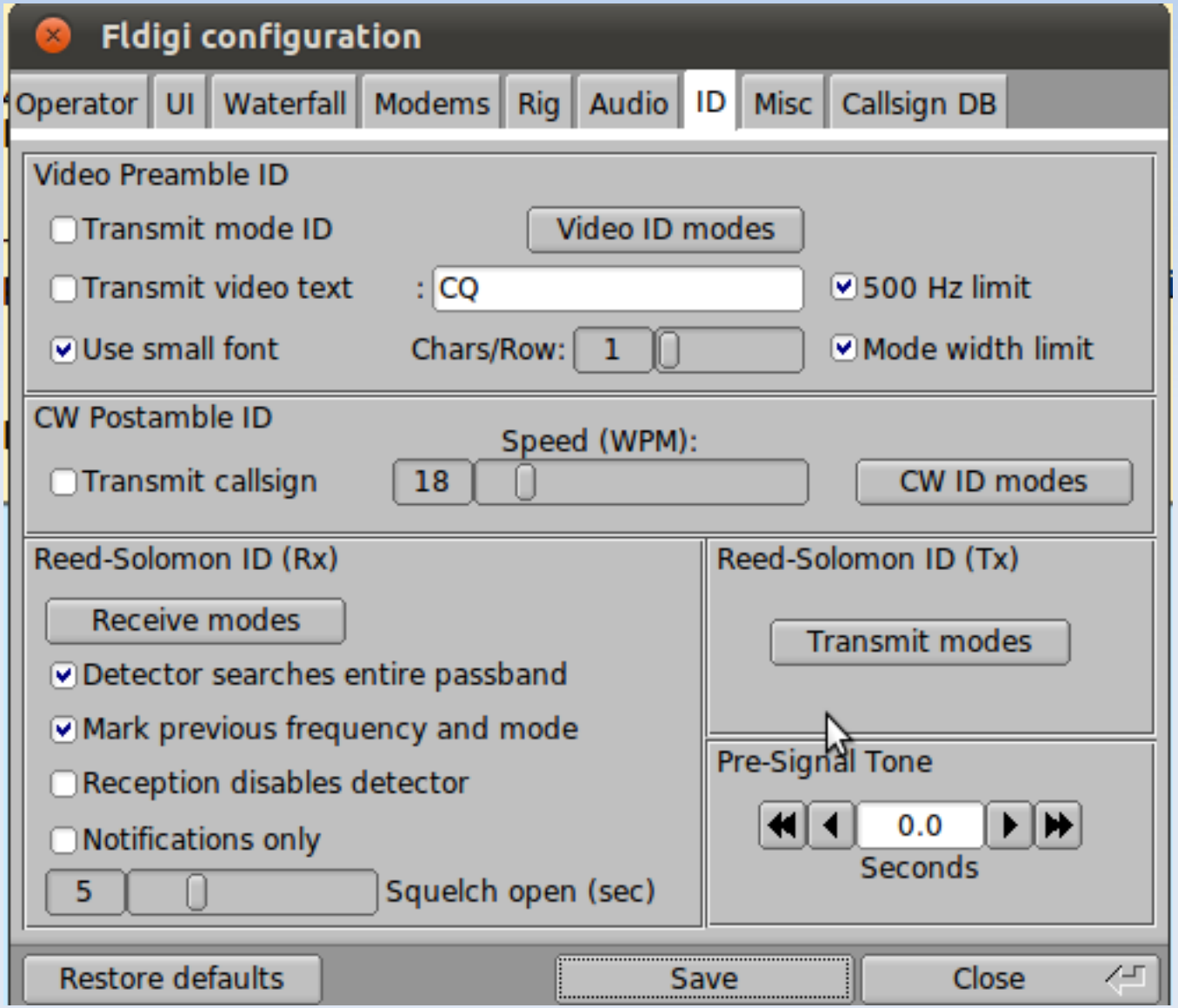
http://panbems.org/fldigi_calibration.htm

Some setups experience errors with the “Sample Rate” set to “Native” on the Settings Tab

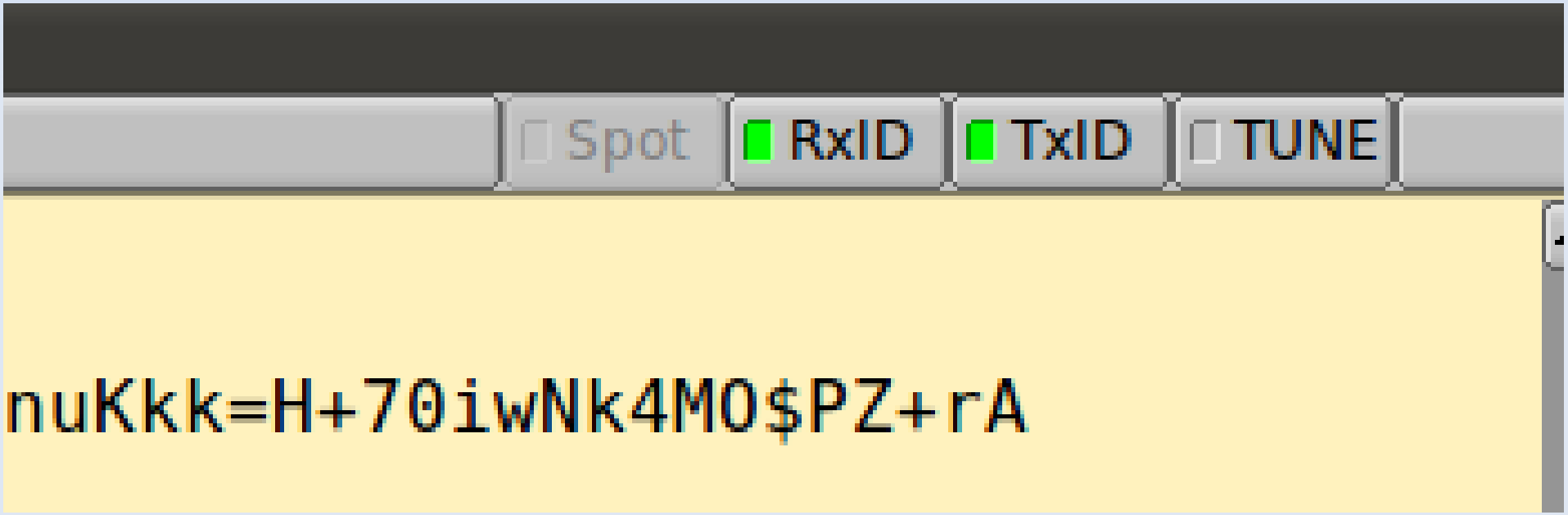
Try 12000 or 16000 avoid 11025



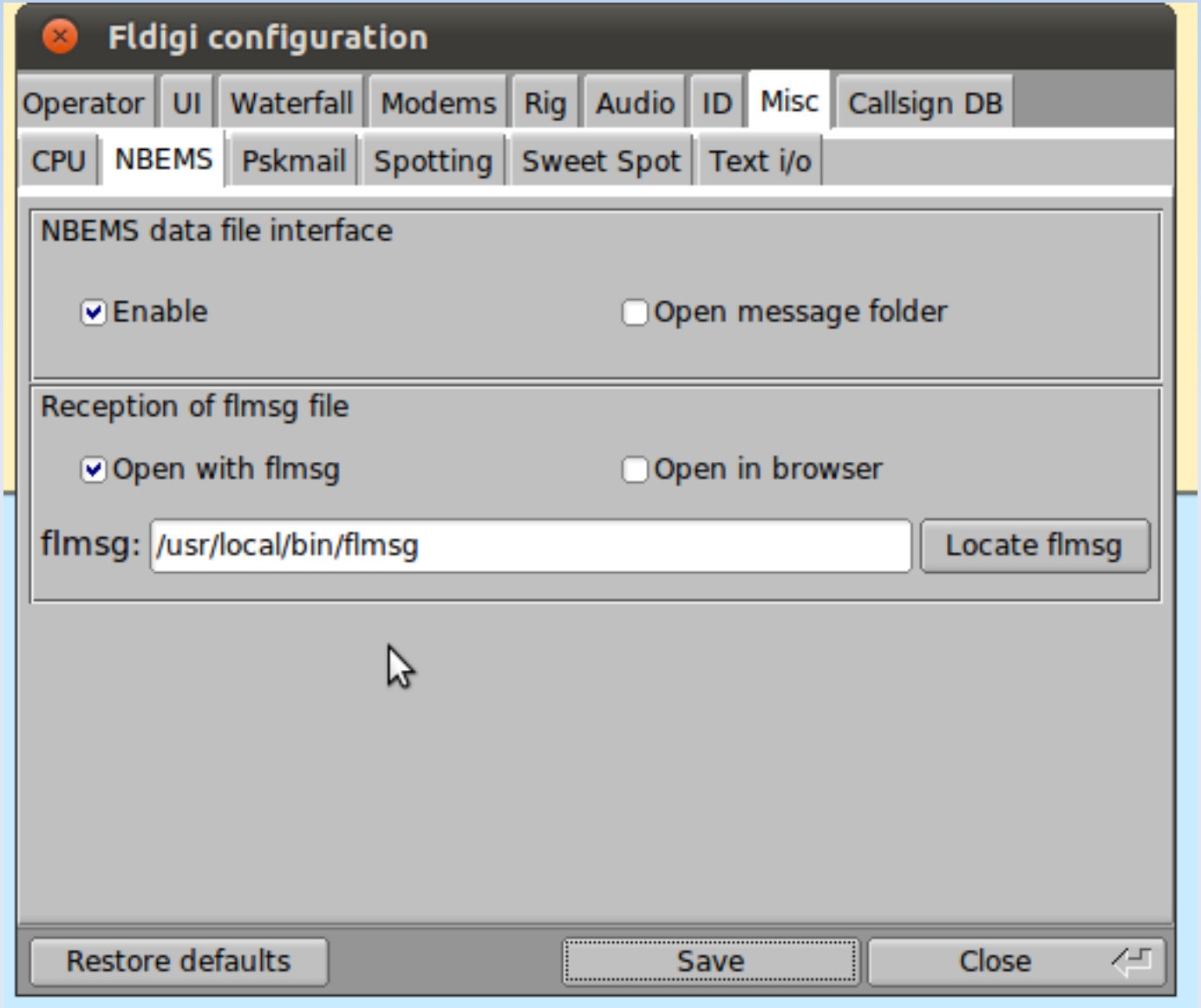
# RxID and TxID



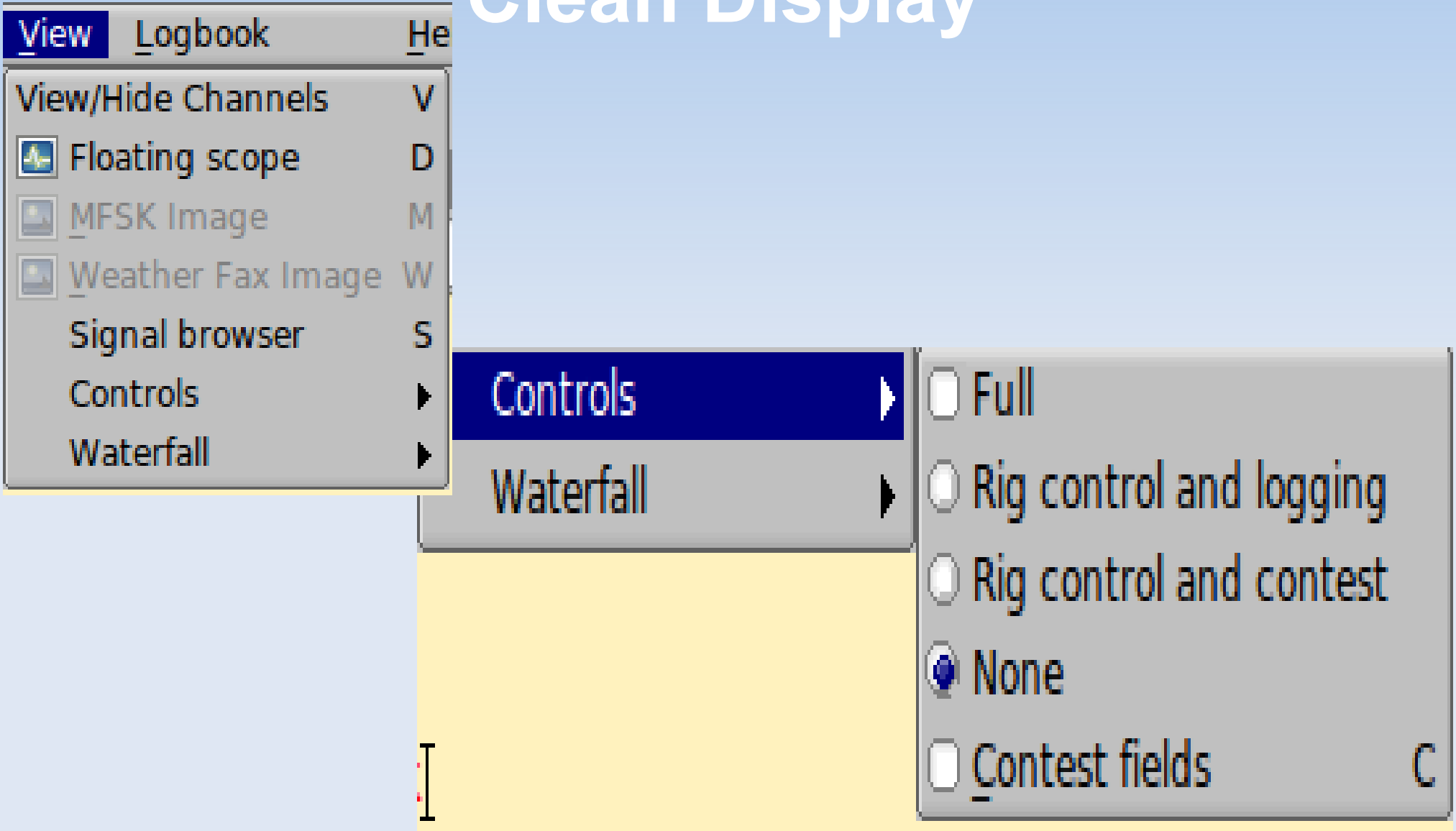
# RxID & TxID on Title Bar



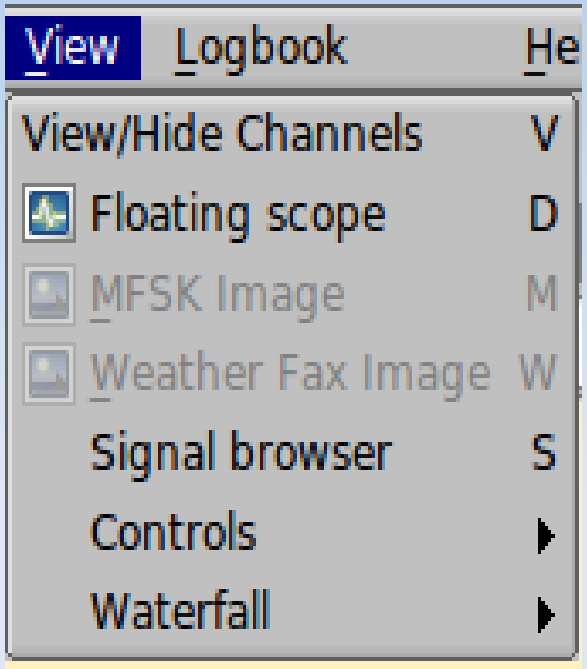
# NBEMS Settings

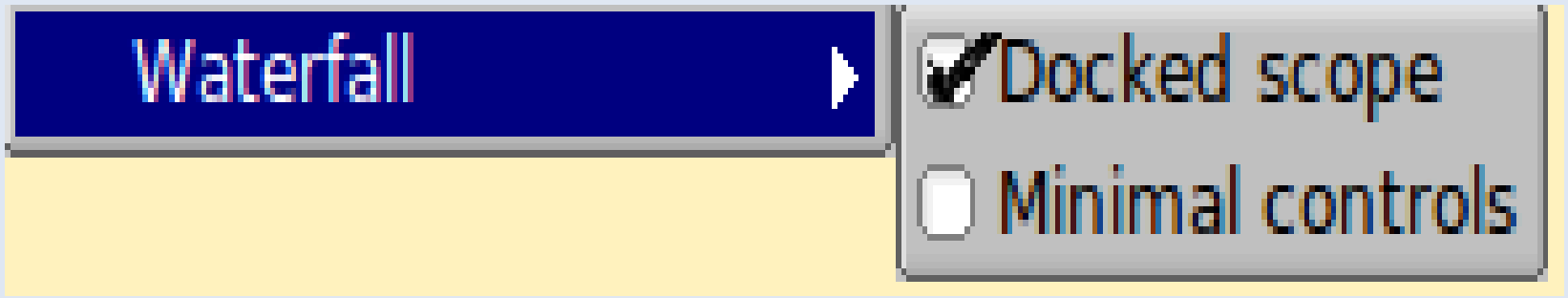


# Clean Display

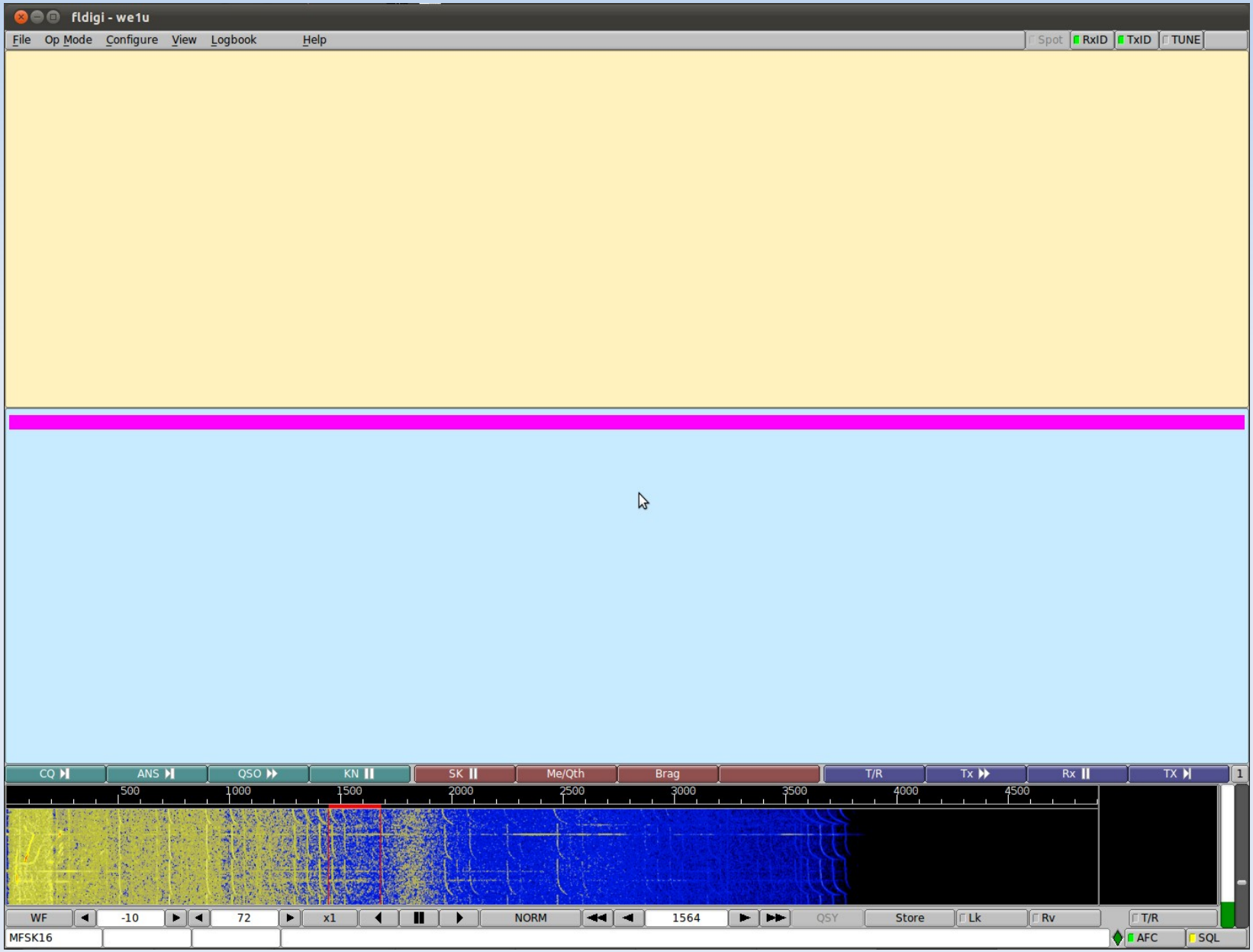


# Docked Scope



# End up like this



# Setup Test

Set fldigi to “CW” mode

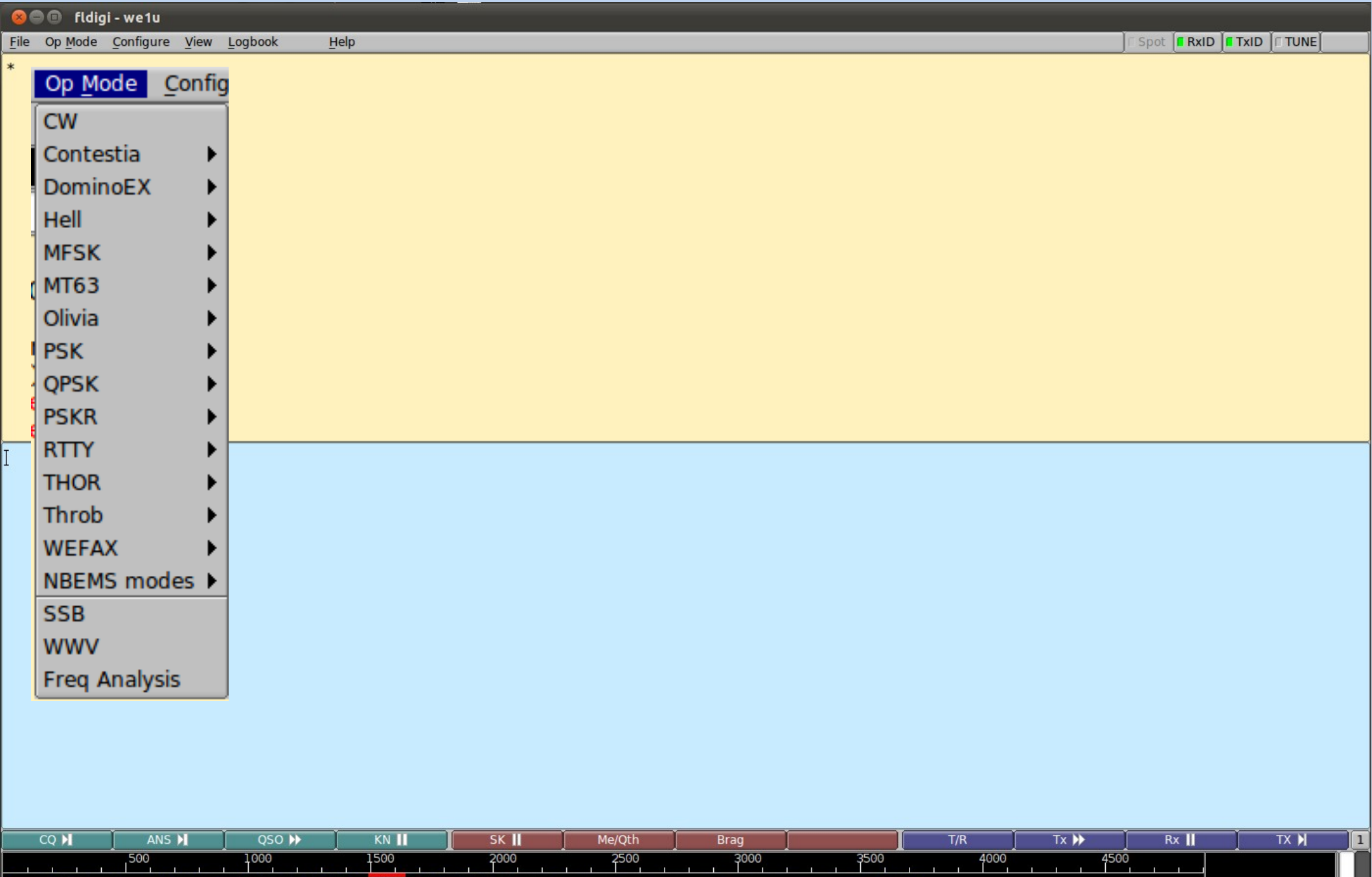
Use the “CQ” macro

Adjust Mixer for Audio Volume Level

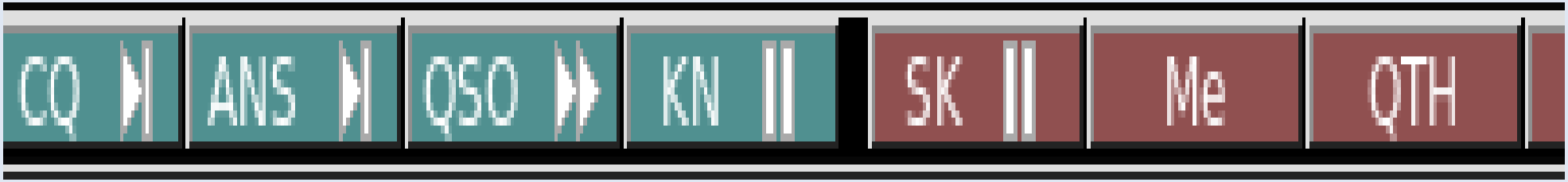
Calibrate Soundcard

- Correcting Sample Rate

# Set Op Mode to CW

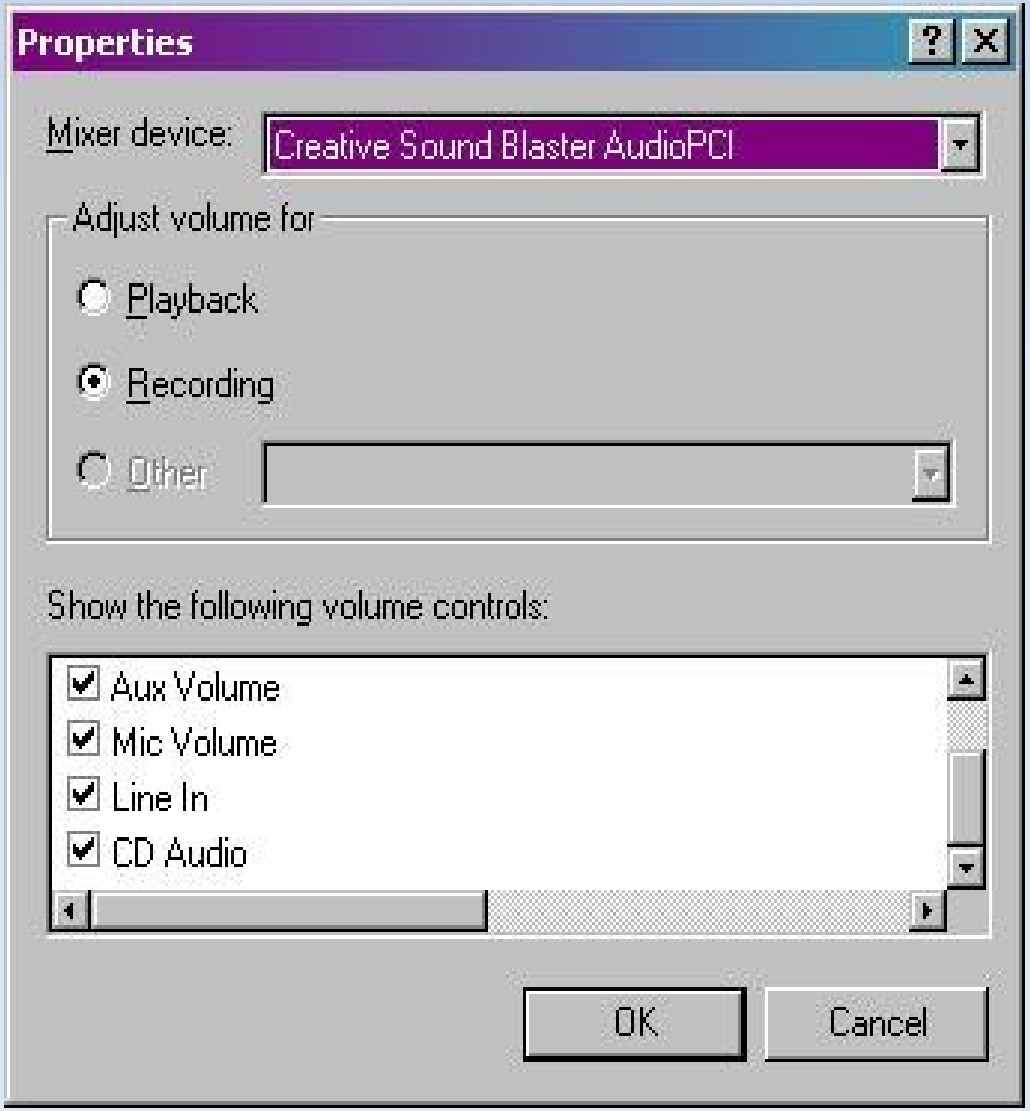


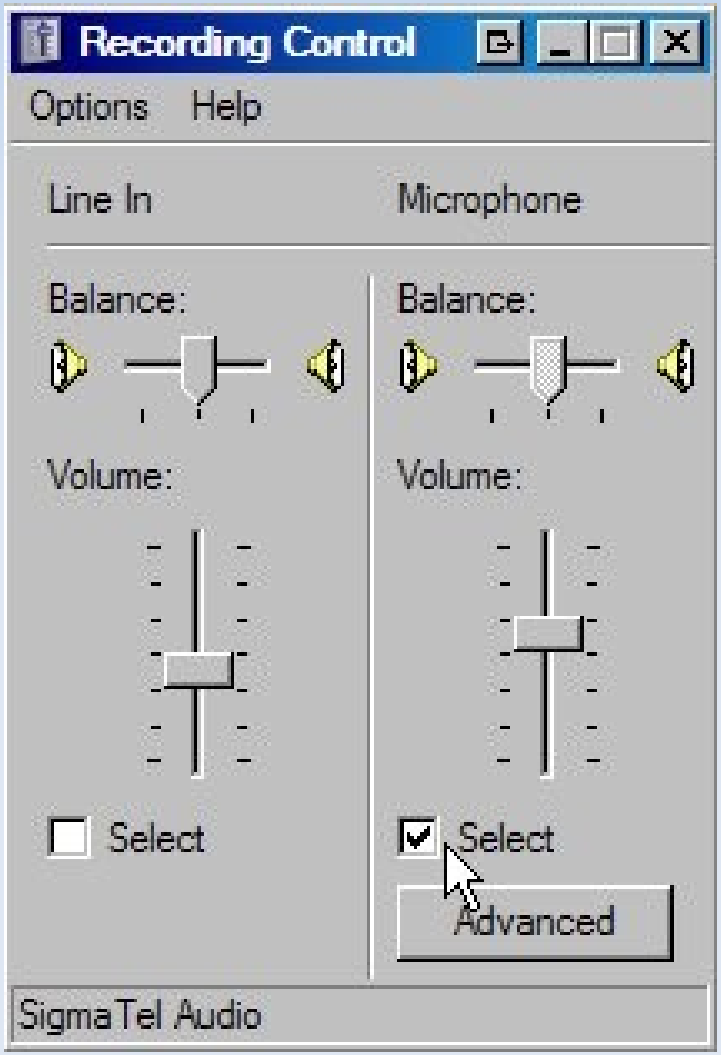
# Click the “CQ” Button ….



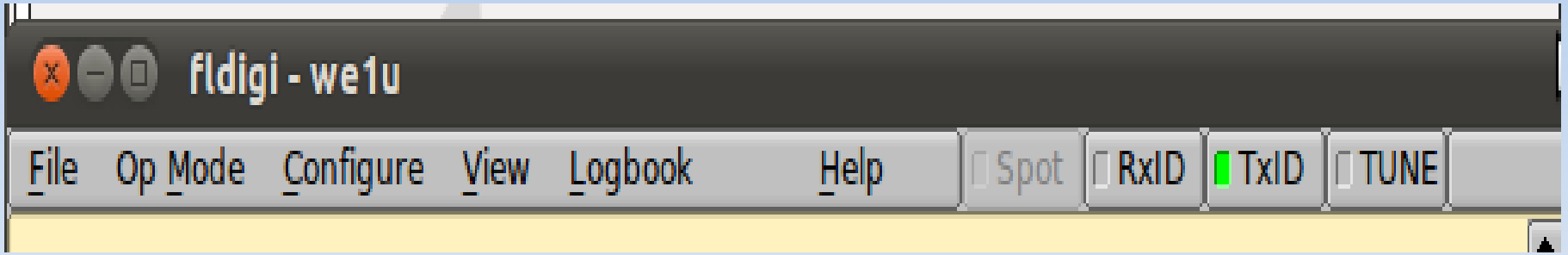
# Right-click on Speaker for Volume Control options... aka the Mixer

# Audio Levels



# “TUNE” to help set Audio Levels

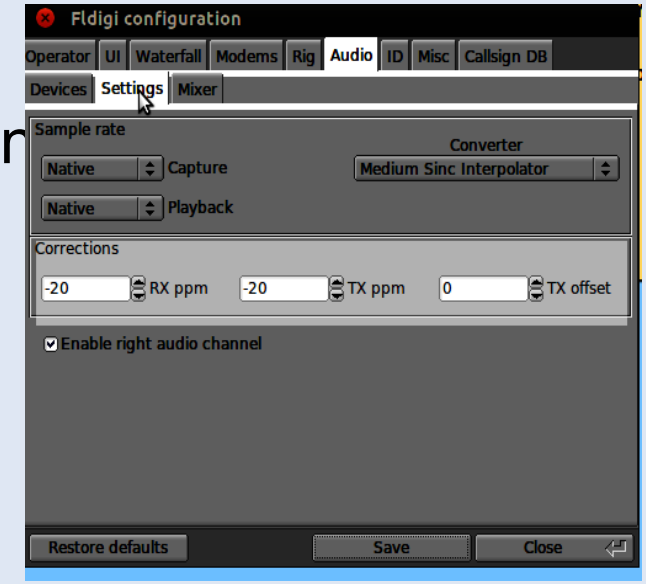



- “Tune” Button upper right corner
  - Generates a continuous single frequency audio signal at the exact frequency to which the waterfall cursor has been set.
  - Peak amplitude of this signal is the peak amplitude of every modem signal generated by fldigi.

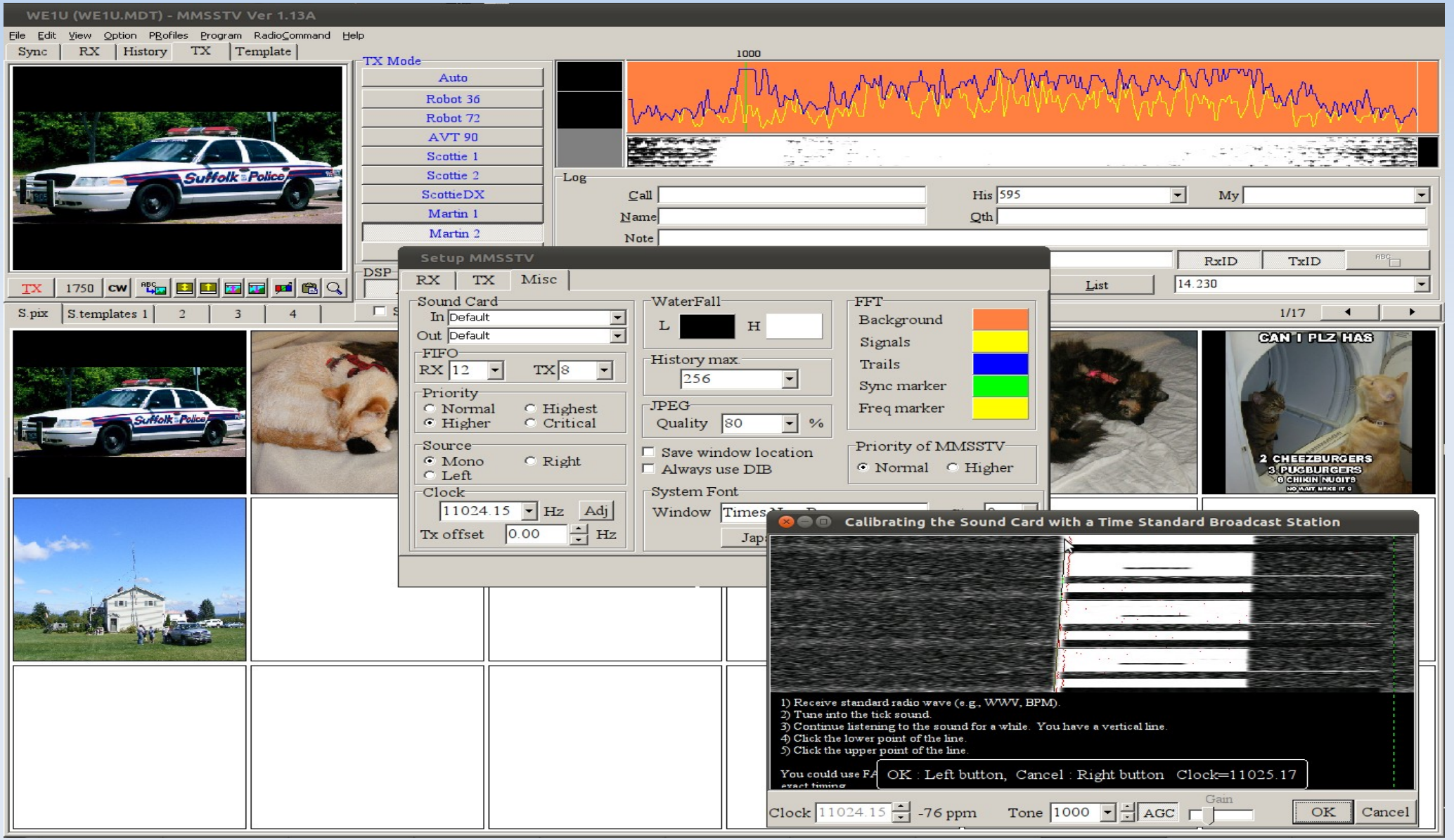
# Not all Sound Cards are Equal

Adjust(Correcting) sound cards using:

- Time Standard Station in AM, no DSP etc
  - WWV 5, 10 ,15, 20MHz or
  - CHU 3.330, 7.850, and 14.670MHz
- Adjust Corrections in Audio > Settings tab
  - Using the WWV Mode or
  - MMSSTV Calibration Function



# MMSSTV Soundcard Calibration



# Installing MMSSTV

Download MMSSTV from:

- http://hamsoft.ca/pages/mmsstv.php

Run the install program

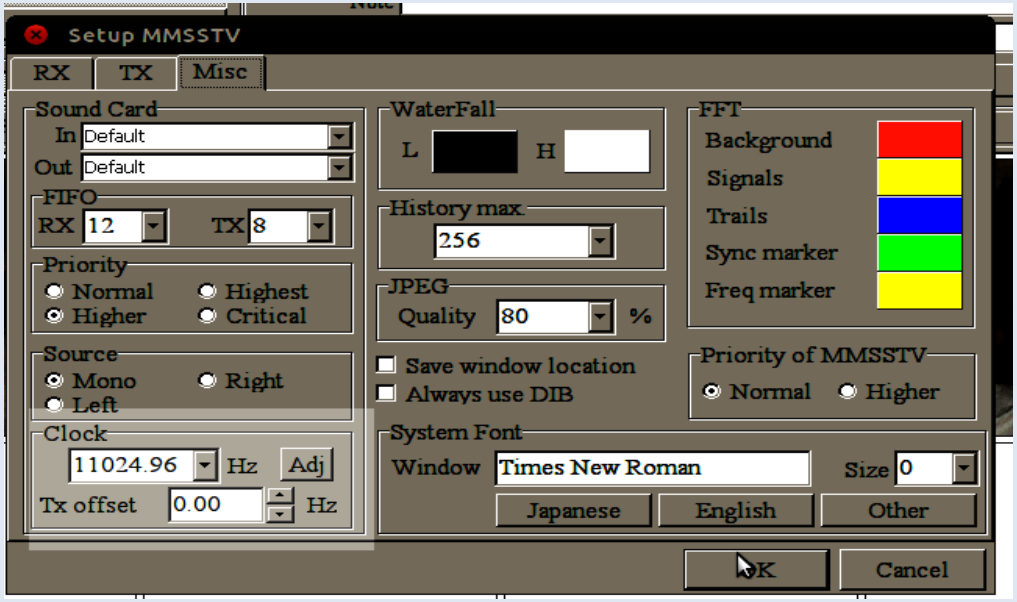
- Default setting are a safe bet

# Clock Adjust function

Under “Option” Menu select “Setup MMSSTV”

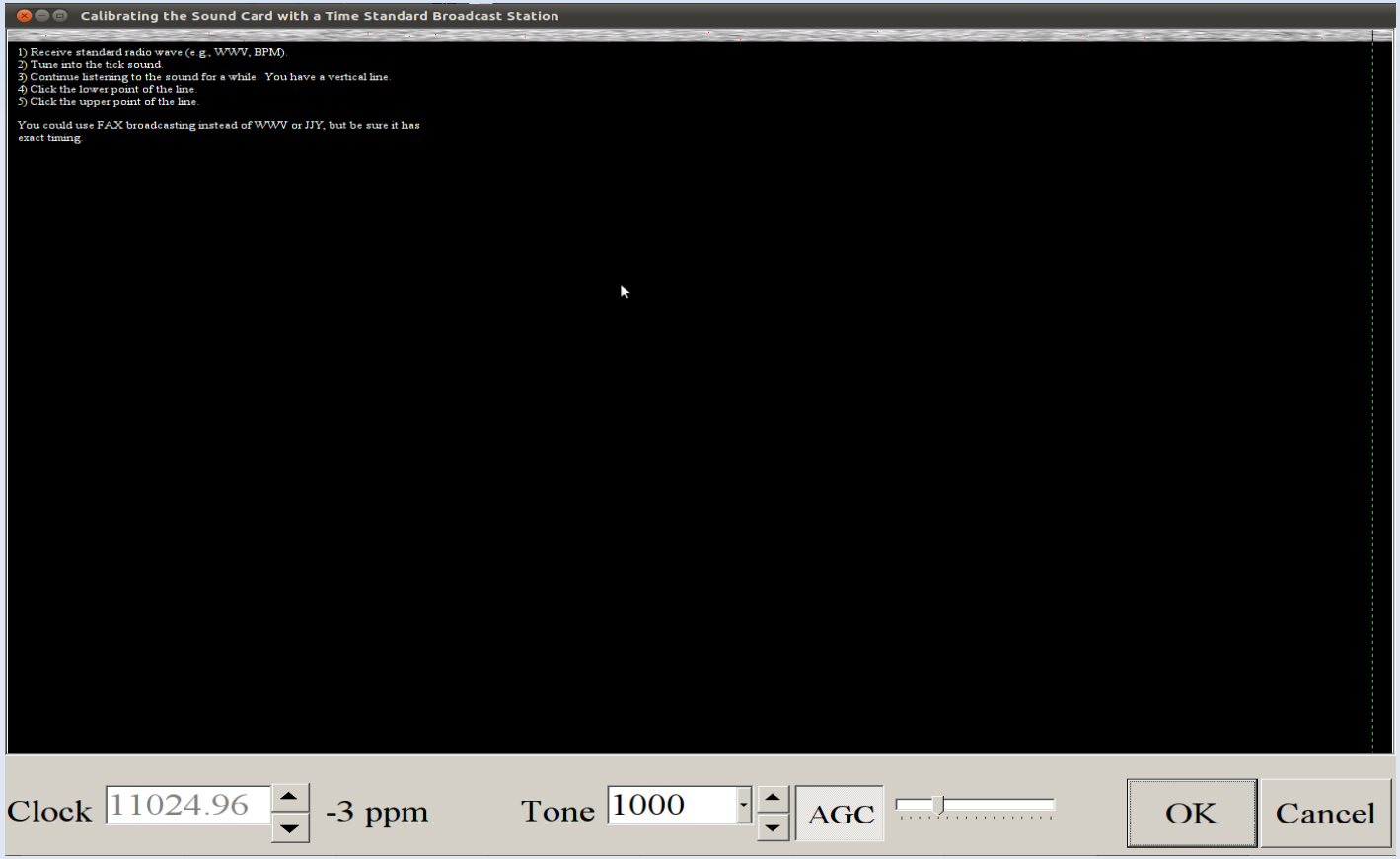
Click the “Misc” tab

Press the “Adj” button in Clock section



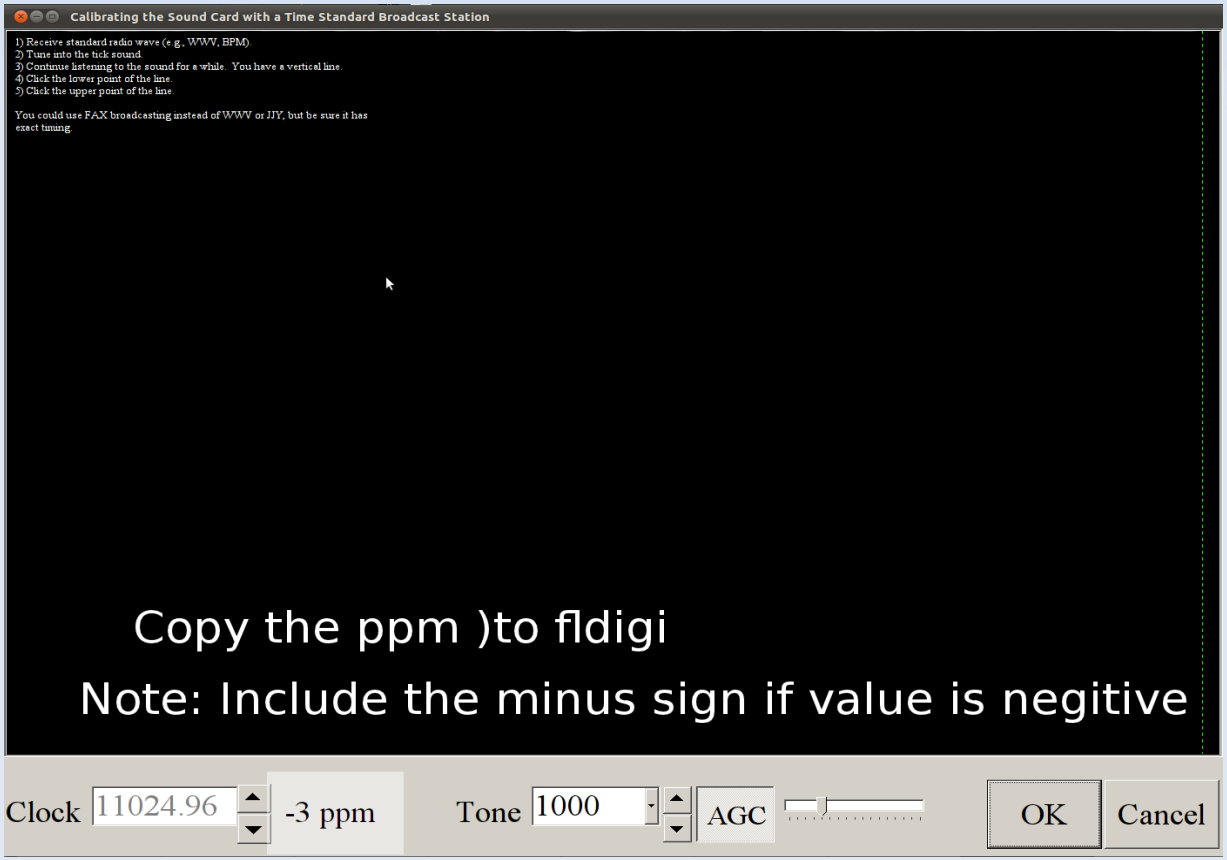
# MMSSTV Calibration Screen

Maximize the Calibration Screen and Follow the Instructions



# Copy the ppm for fldigi

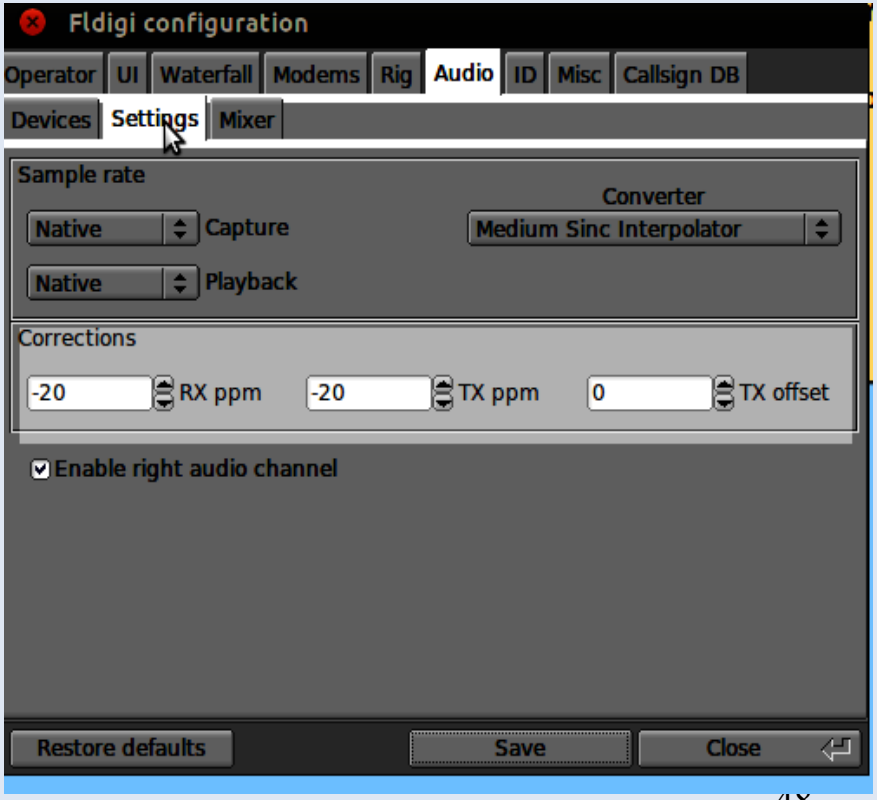
Reopen the Calibration Function and copy the ppm from the bottom left to fldigi



# Enter ppm Value in Audio > Settings

Enter ppm into the Corrections Section

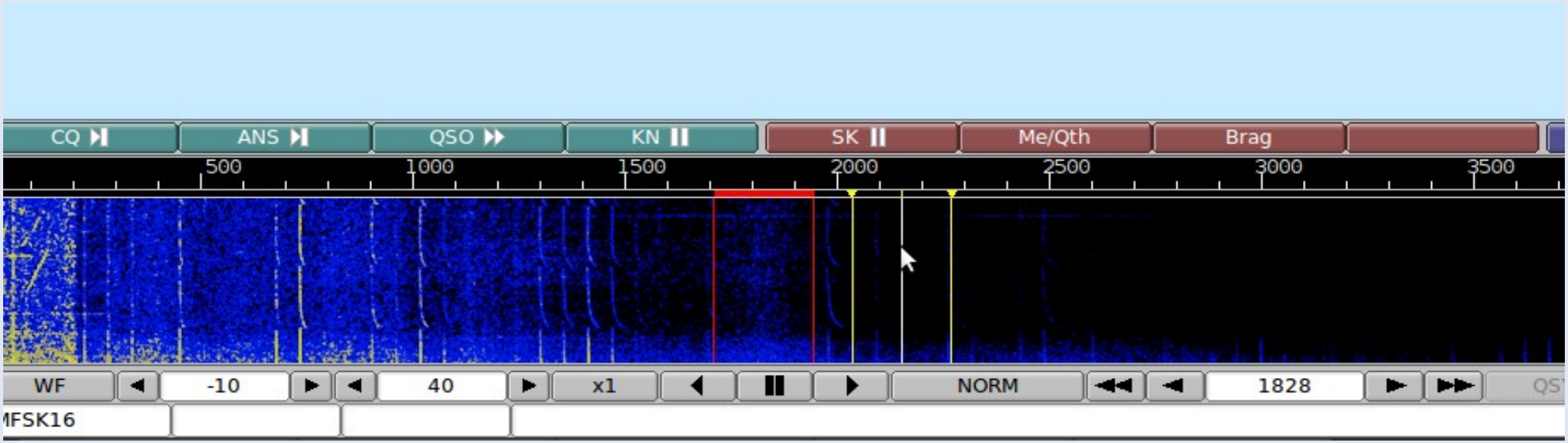
- In both Rx ppm and
- Tx ppm boxes
- And click on the “Save” button



# Waterfall Center Point

Fldigi decodes at the Waterfall's Center Point,in the center of the red outline area(bandwidth)

The Waterfall's Cursor, the three yellow lines to right, can move it by clicking anywhere in Waterfall Display.



# Now for a trick

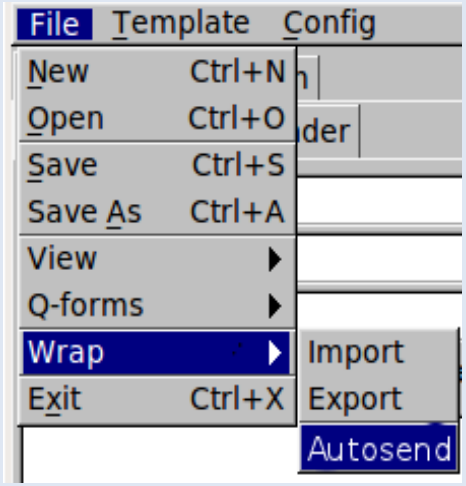
Open flmsg (Radiogram Icon) 

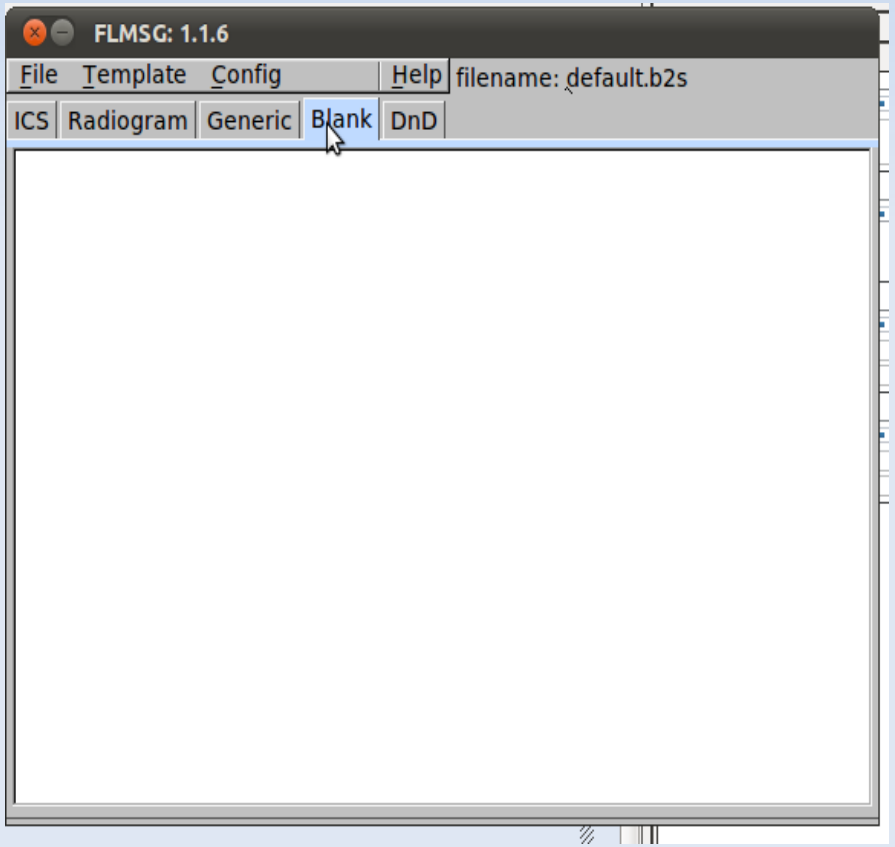

Select Blank form tab

Write a note

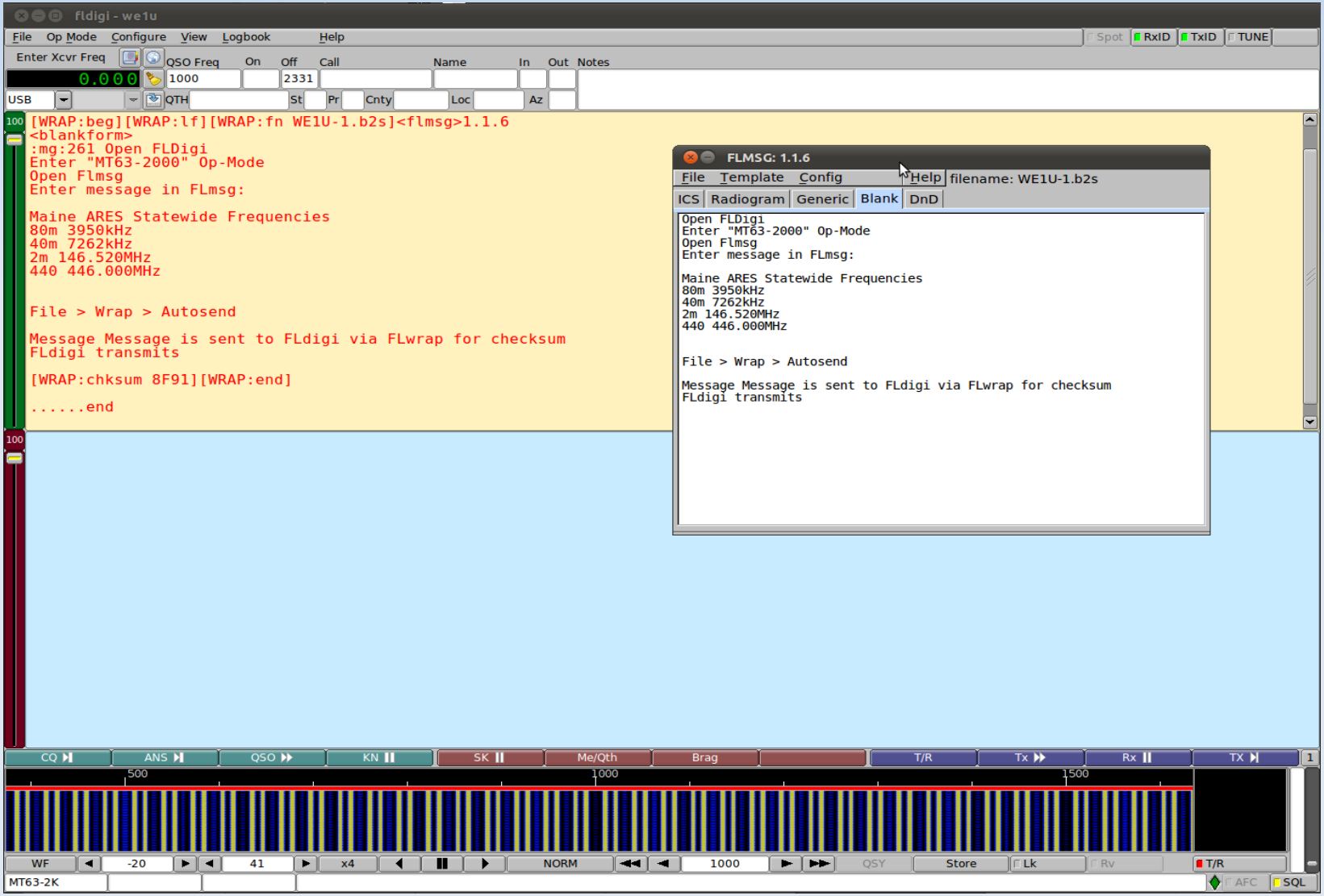
Then ….

- Autosend
- Save the form file



# Message automation



# MT63-2000

- Orthogonal Frequency Division Multiplexed
- 64 parallel carriers
- Differential BPSK modulated
- Tolerant of tuning
- This mode requires a very linear transmitter.
- Over-driving leads to excessive bandwidth and poorer reception.
  - http://www.w1hkj.com/FldigiHelp-3.21/MT63.html

# Olivia

- Forward Error Correction
- Robust mode with low error rates
- The penalty can be an annoyingly slow transfer
- The default calling mode is 32-1000
  - 31.25 baud 1000Hz Bandwidth 24WPM

# Contestia

- Derived from Olivia that is not quite as robust
- About twice as fast as Olivia
- Performs very well under weak signal conditions
- Handles QRM, QRN, and QSB very well also
- It decodes below the noise level
- Smaller 6-bit Character Set-Upper Case Only
- Most common modes: 250/8, 500/16, and 1000/32

# Multi-frequency shift keyed (MFSK)

- A single carrier of constant amplitude is stepped in a constant phase manner. As a result, **no unwanted sidebands are generated**, and no special amplifier linearity requirements are necessary.
- The tones selected are set by the transmitted (4 or 5 bit) bit pattern and a gray-code table.
- Forward Error Correction, so it is very robust
- Tuning must be very accurate.

# MFSK-16 Pictures


- Grayscale(B/W) and 24-bit color
- Double and Quadruple Speed is available
- Time(sec) = W * H / 1000 for grayscale
  - 320x240=77 seconds
- Time(sec) = W * H * 3 / 1000 for color
  - 240x180=130 seconds

# Interfaces

- Soundcard Interface
  - Acoustical mike to speaker
  - http://www.kc2rlm.info/soundcardpacket/index.html
  - http://sites.google.com/site/kh6tyinterface/
  - http://www.qsl.net/wm2u/interface.html
- Rig Control
  - http://www.iv3sbe.webfundis.net/html/Cat.htm
  - http://www.qsl.net/4s7ab/MixW_ptt.htm

# Resources

- FLDigi home page
  - http://www.w1jkj.com/
- Western Pennsylvania NBEMS
  - http://panbems.org/
- ARRL Digital Mode Page
  - http://www.arrl.org/digital-data-modes
- MMSSTV
  - http://hamsoft.ca/pages/mmsstv.php

# Remember

RF can cause problems with touchpads

- Try a cordless mouse

Use USB on all HF Bands

- The Audio + USB = correct signal

Do Not overdrive transmitter

Explore and Have Fun