NH ARES Academy

MARCH 24, 2018

BASIC NBEMS WORKSHOP

NBEMS

Narrow Band Emergency Messaging Software
For
Emergency Radio Communications

Presenters

Larry Beagle	KB1RIJ
Jon GrosJean	KB1SWW
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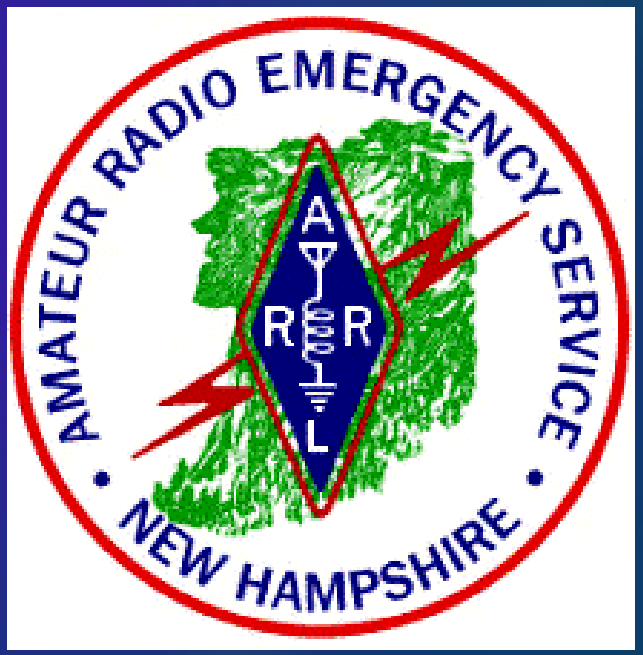
Resource Materials from

George Blakeslee	N1GB
Harry Bloomberg	W3YJ
David Kleber	KB3FXI



A Little About the Group
What stage are you in?

- *What is NBEMS?*

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- *I've heard about NBEMS.*

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- *I use NBEMS (Fldigi) occasionally.*

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- *I use NBEMS (Fldigi) frequently.*

A Little About the Group
What stage are you in?

- *What is NBEMS?*
- *I've heard about NBEMS.*
- *I use NBEMS (Fldigi) occasionally.*
- *I use NBEMS (Fldigi) frequently.*

- *How many of you know someone who has been confused, annoyed, or frustrated by Fldigi?*

Workshop Goal

Expand your knowledge so you

(and any frustrated people you know)

can continue training at home

- **Individually**
- **With a buddy**
- **In groups**
  - **In a classroom setting**
  - **On the air**

Today's Focus is on VHF / UHF FM

Basic NBEMS Competencies

- Set up computer and radio for Fldigi and FLmsg
- Start Fldigi and the Autostart programs
- Configure Fldigi and FLmsg
- Use basic macros
- Send messages from the transmit screen
- Send and receive messages on ICS 213 form
- Send and receive messages on ARRL Radiogram

Agenda

- What is Digital Communication?
- Why Digital EmComm?
- What is NBEMS?
- Computer Operating Systems
- Interfacing Radio and Computer
- Configure FLdigi
- Configure FLmsg
- Macros & Modes
- Training Possibilities
- Winlink Email over Radio

Agenda

- **What is Digital Communication?**

Why Digital EmComm?
What is NBEMS?
Computer Operating Systems
Interfacing Radio and Computer
Configure FLdigi
Configure FLmsg
Macros & Modes & Instances
Training Possibilities

What is Digital Communication?

- ANY information that can be digitized can be sent via a digital mode.
- Some data are just too big to reasonably send via sound card digital modes (Video, MP3, big pictures) etc.
- We will be focusing on smaller file types: text, spreadsheets in .csv format.

What is Digital Communication?

Best Used for:

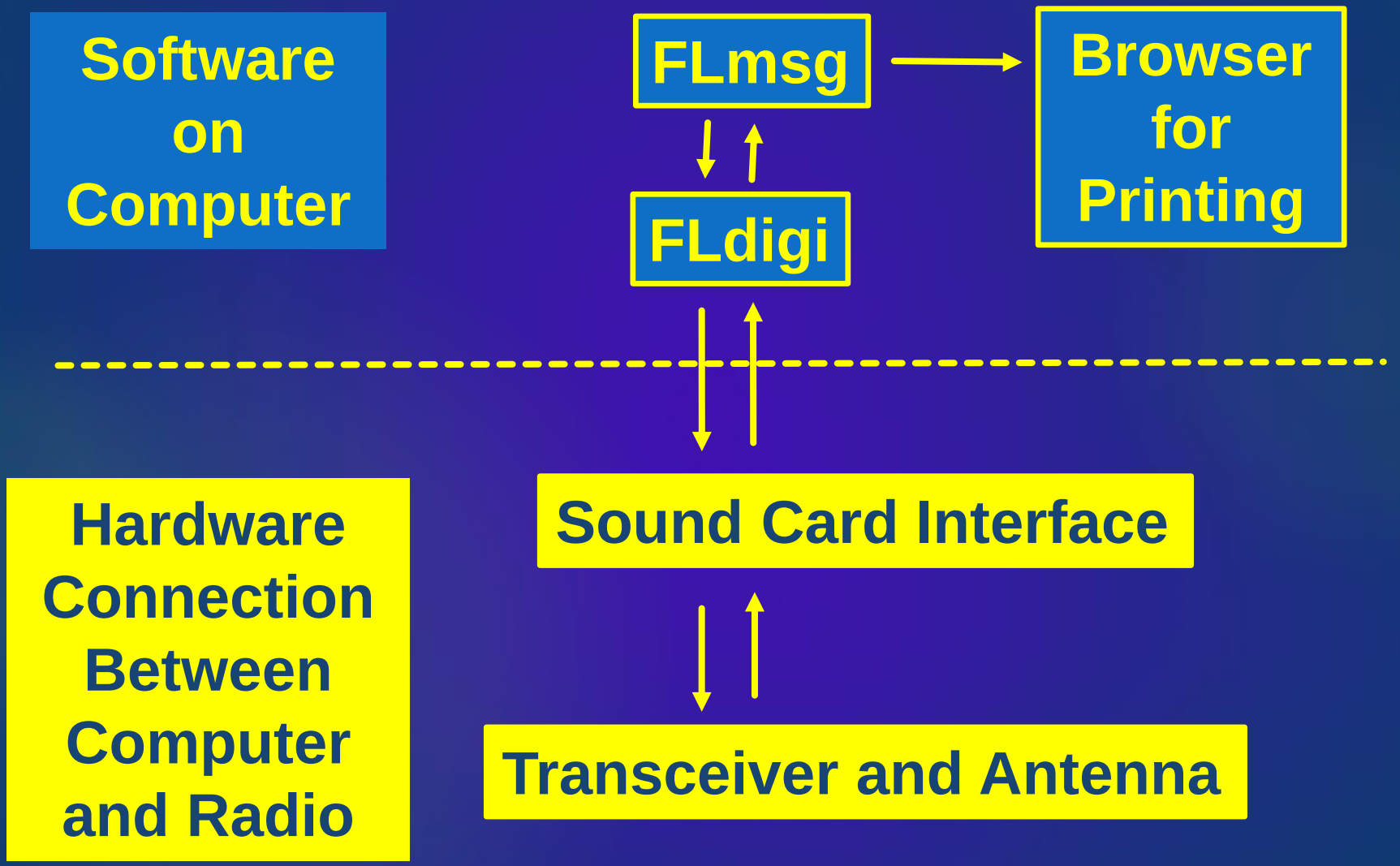
- **Specific directions / instructions.**
- **Long lists of information.**
- **Difficult to spell names.**
- **Medication prescriptions.**
- **Difficult operating conditions.**
  - ***Some modes work at negative S/N!***
- **Printing and documenting messages.**

What is Digital Communication?

Best NOT USED for:

- **Short, tactical messages.**
- **Quick exchanges of simple information.**
- **Simple status updates.**
- **Station call-ups – basic Net operation.**

What is Digital Communication?



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Why Digital EmComm?

Accurate, Rapid Communications

Why Digital EmComm?

Think back to your last public service event, drill, or deployment.

You probably passed a lot of traffic best suited for voice communications but...

What if you had been asked to pass:

- Roster of evacuees
- Required prescription medications
- List of needed supplies
- Directions to a disaster scene

Why Digital EmComm?

- The needs of our Served Agencies are changing.
- They still need voice communications but...
- There's an increasing need for data capability for agency-specific forms and reports.
- We need to be able to provide more than just voice communications between hams with HTs.
- Digital modes that operate below the noise level, where voice is not heard, may succeed when voice doesn't.
- May need to email a hard copy of a message by internet or WinLink.

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NBEMS Philosophy

- Keep it cheap.
- Keep it simple.
- Use Open Source software.
- Don't depend upon infrastructure.
- Make it fun to use between drills and deployments.
- Any computer, any radio, any time.

How FLdigi works

- Fldigi uses your computer's sound card to generate and decode digital signals.
- Flmsg talks to Fldigi to send and receive messages.
- All work is done by your computer, you don't need a separate Terminal Node Controller (TNC).
- Audio from your computer speakers goes into your radio's mike input for transmission.
- Audio from your radio speaker goes into your computer's mike or line-in for decoding.
- Don't need an extremely powerful new computer, older machines work just fine.

Narrow Band Emergency Messaging Software

Consists of program suite:

- **Fldigi – Fast Light Digital modem application**
- **Flwrap – Wrap a file with a checksum**
- **Flmsg – Easily send ICS forms and ARRL Radiograms**
- **Flamp -- File transfer, more advanced, not covered today**

Download from

https://sourceforge.net/projects/fldigi/files/

or

http://www.gblakesl.net/N1GB/N1GB_ARES.html

- **Runs on Windows, Linux, and Mac.**
- **Released under GNU Public License, so it is completely FREE.**

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- Configure Soundcard
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Operating Systems

Windows

Mac OS

Linux

Prerequisites for NBEMS Operations:

- FLDIGI, FLWRAP and FLMSG downloaded and installed
- A basic understanding of your computer Operating System (OS)
- Ability to create file folders, move files, find Com Ports in Device Manager Control Panel
- Ability to convert formatted Word and Excel files to .txt and .csv files, and back again

Operating Systems

Most of this presentation pertains to the Windows operating system.

Once loaded, Fldigi functions similarly on Mac and Linux operating systems (Raspberry Pi becoming popular}.

Jon, KB1SWW, will give us a brief introduction to Linux.

FLdigi in Linux-Mint

- I am using Mint Mate. Other distros may compile programs with slight differences.
- The package manger may provide an old version, so I prefer to compile it from source. Believe me, it's not to difficult. After you do it once, all the libraries for flmsg, flamp and probably others will be installed.
- The operation of all the programs is the same as in Windows with the exception of controlling the sound cards. The usual interface between the computer and your rig is just a sound card with some extra external hardware added.
- I made my own.

Where to Store Everything

- I prefer to just put everything in my Home Folder. All the downloads go into Downloads. Forget about creating special folders because when you compile the programs everything you need to access will be in your Home Folder. Just enable the hidden files by pressing <Ctrl>+h
- Messages and pictures will be in one of the files or folders which will be created when you compile the program.
- Start by going to the fldigi page in Sourceforge and download all the files which end in .tar.gz
- I usually get fldigi, flmsg, flwrap and flamp.
- When you have downloaded the compressed files, right click on each one and select 'Extract Here'. This will create a folder for each program.
- Everything in Linux is case sensitive.

Install the Required Libraries

- **Check your package manager and install these libraries or check that they are installed, it reduces the time required for compiling the programs a lot. Many may have already been installed by default. Don't worry if you forget something. The listing at the end of the compile will tell you what is missing.**
- **g++**
- **fltk1.3**
- **libfltk1.3.dev**
- **pkg-config**
- **libpulse.dev**
- **libsamplerate0**
- **libsamplerate0.dev**
- **libpng12.dev**
- **portaudio19.dev**
- **libsndfile1.dev**
- **libasound2-plugins**
- **pavucontrol – not necessary but I prefer it for controlling the sound cards**

Compiling

- Assuming the fldigi folder is in your Downloads, do the following:
- Open up a terminal. There should be one in your taskbar on the bottom left. It's the little black box.
- type the following: cd Downloads then type ls This will show you all the folders and files in Downloads.
- If you have downloaded and extracted fldigi-4.0.11 it will be listed. type cd fldigi-4.0.11 or you can mark the name and paste it after cd. All the copying and pasting in the terminal must be done with the edit command in the terminal screen and not with the control+C or control+P key.
- Now, you should be in the fldigi-4.0.11 folder and ready to go. Type ./configure and press the 'Enter' key.
- Everything happens pretty fast at this point and when it stops, it will list any missing libraries. Remember, if you need to install one, to also install the same name with .dev after it because it will usually be needed.

Compiling

- If all the lines have a yes after them, you should be set for the next step.
- Now type: make If everything is ok, be prepared to wait a while, especially if you are using an old computer.
- If this step completes, then type: sudo make install It will ask you for your password. Enter it and then press the 'Enter' key. This step is much faster. When it is done, check our menu under Internet and Fldigi should be listed. If not try logging out 'Ctrl + Backspace' and log back in to see if it appears.
- It's not necessary, but you can use the command make clean to remove unnecessary temporary files.
- If all has gone well, repeat the same steps for flamp, flmsg, and flwrap.

The Sound Card

- I find the Pulse Audio Volume Control easy to work with and keep it on my desktop and running when I am running Fldigi.
- Under the Configuration tab, make sure all audio devices are off except the one which is used for your transceiver interface.
- The receive and transmit levels can be set in the Input Devices and Output Devices tabs. Click on the little lock symbol in Output Devices to be able to set the L and R outputs independently. I set my R channel at maximum because my interface adapter uses it to turn on the transmitter.
- The other levels will depend on which adapter you are using and what they recommend. If you go over 100% for the output, it will usually be distorted.
- The nice part about compiling the programs is that they are set up for your computer. No worrying about 32 or 64 bit versions. It is usually very reliable. I set up mine so Flamp starts so I don't forget to start it when someone sends an Flamp message.

Getting Started

Download and Install
FLDIGI, FLWRAP and FLMSG from

https://sourceforge.net/projects/fldigi/files/

or

http://www.gblakesl.net/N1GB/N1GB_ARES.html

N1GB Resource Page by George Blakeslee

FLdigi NH-ARES Standard versions (2017 Q3)

Windows
- FLdigi 4.0.10
- FLwrap 1.3.4
- FLmsg 4.0.3.3
- FLamp 2.2.03

Linux
- FLdigi 4.0.11
- FLwrap 1.3.4
- FLmsg 4.0.3.3
- FLamp 2.2.03

Mac
- FLdigi 4.0.11
- Flwrap 1.3.4
- FLmsg 4.0.3.3
- FLamp 2.2.03

Installing or Upgrading FLdigi

- Fldigi installation places the
  - Executable program in the Program (x86) folder
  - And the related files in the User folder.
- So upgrading the executable program does not alter the existing flies.
- Your previous files are intact and will be used by the new version.

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Accoustic Interface

Easy way to interface radio to computer is to...

- Hold radio mike up to computer speakers.
- Hold radio speaker up to computer mike.
- You do PTT manually.

Works especially well with VHF/UHF FM.

Real game saver during emergencies.

Allows you to easily send data using any radio.

Hams can participate who do not have a sound card interface.

MT63 is sufficiently robust to deal with background noise, even in a noisy EOC or field site.

Radio-to-Computer Interfaces

- Signal Link USB – just uses USB Port
- Rig Blaster – uses USB and audio ports
- Easy Digi – uses USB and audio ports, or just audio ports if transceiver (or HT) has VOX
- Anything hardwired is better, but

  Audio coupling does work, and can be used.

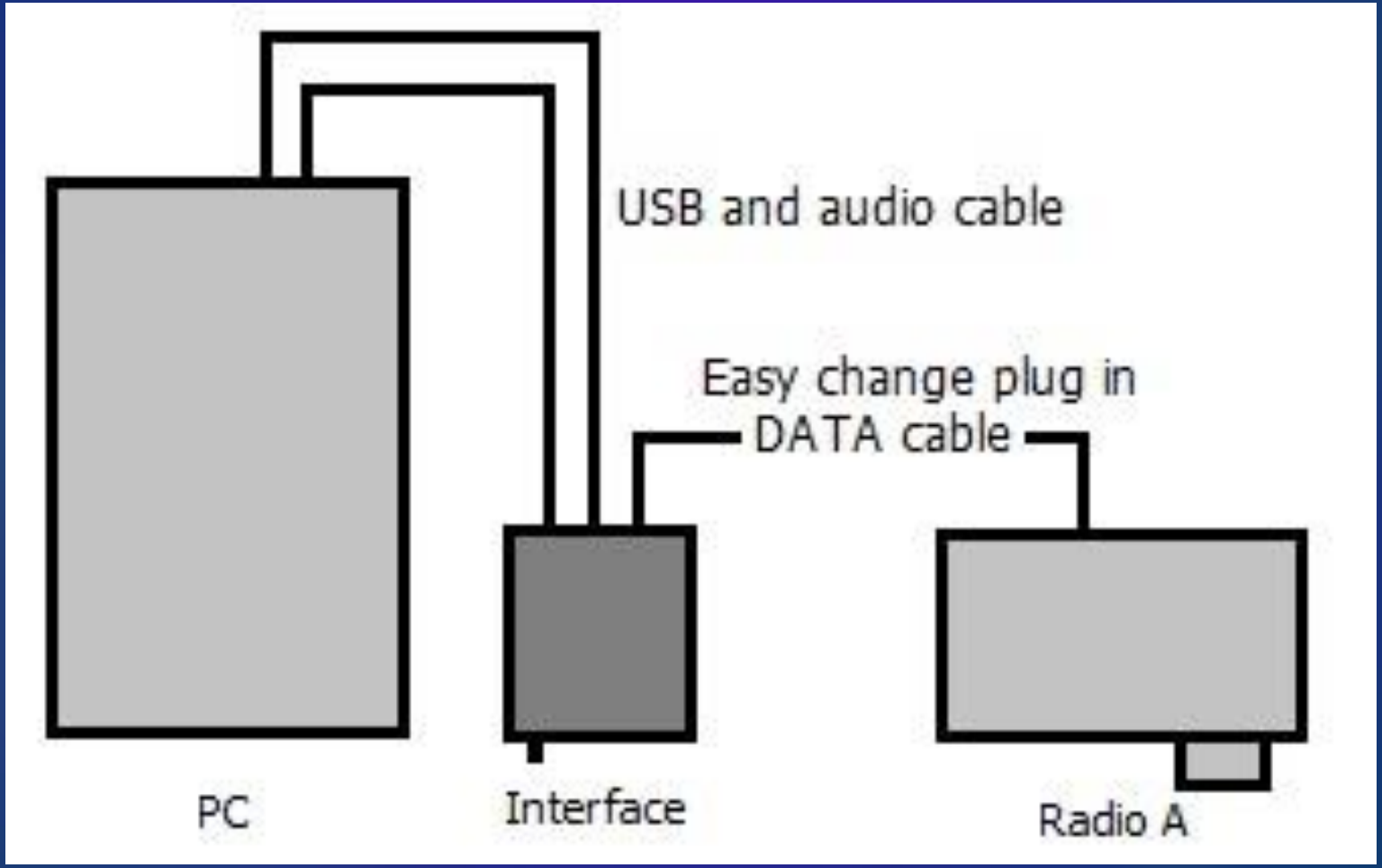
DO THESE STEPS IN ORDER!

1. Turn off computer, radio and interface
2. Plug in all equipment connections
3. Start computer -- give it a minute to load drivers for interface
4. Turn on interface and radio
5. Start Fldigi

DO THESE STEPS IN ORDER!

SET UP EQUIPMENT

Connect the interface and computer to the radio

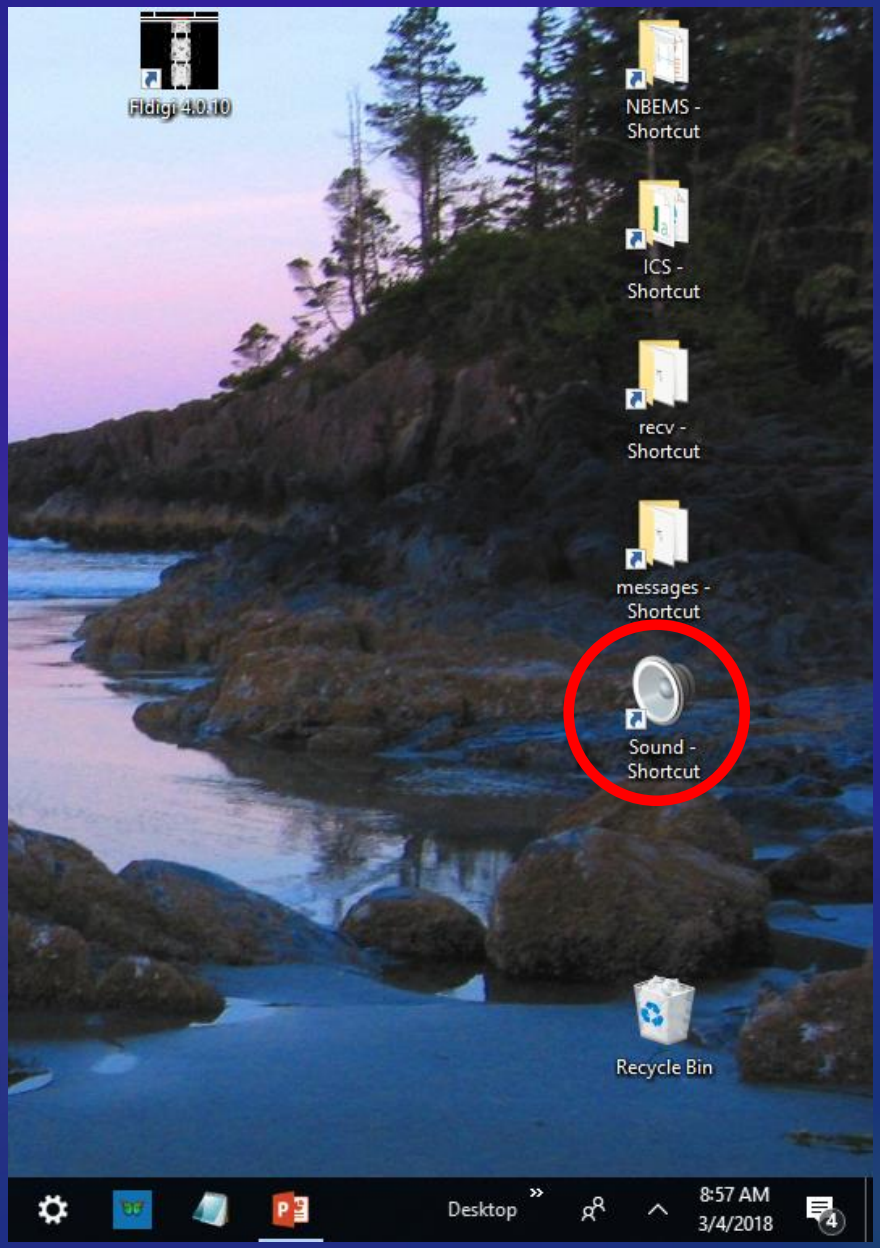


SignaLink

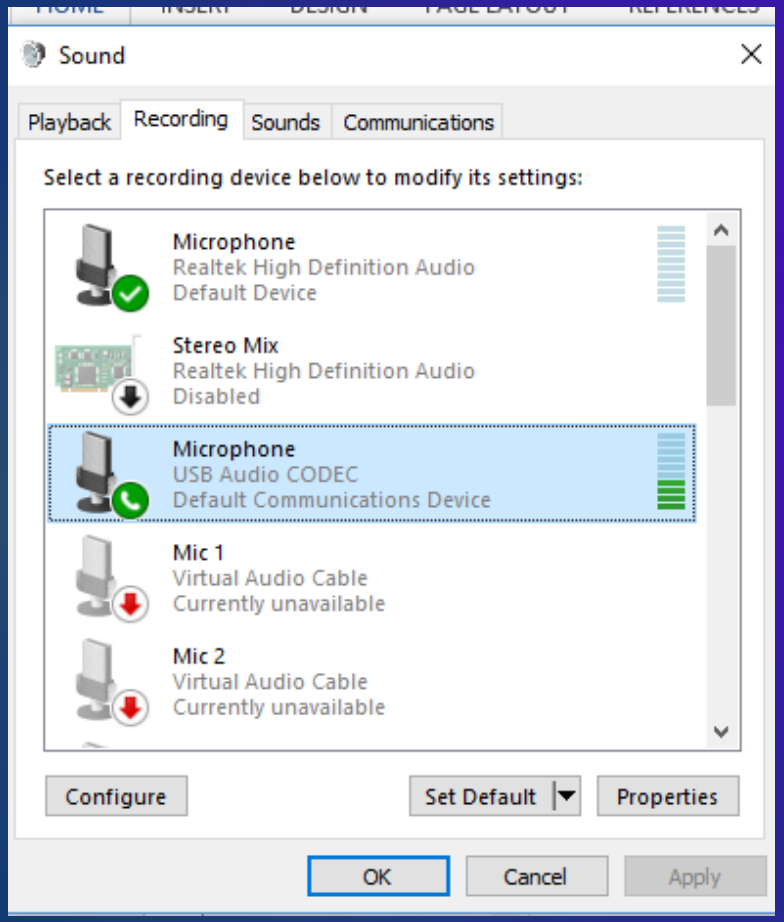
SignaLink is popular and works well.

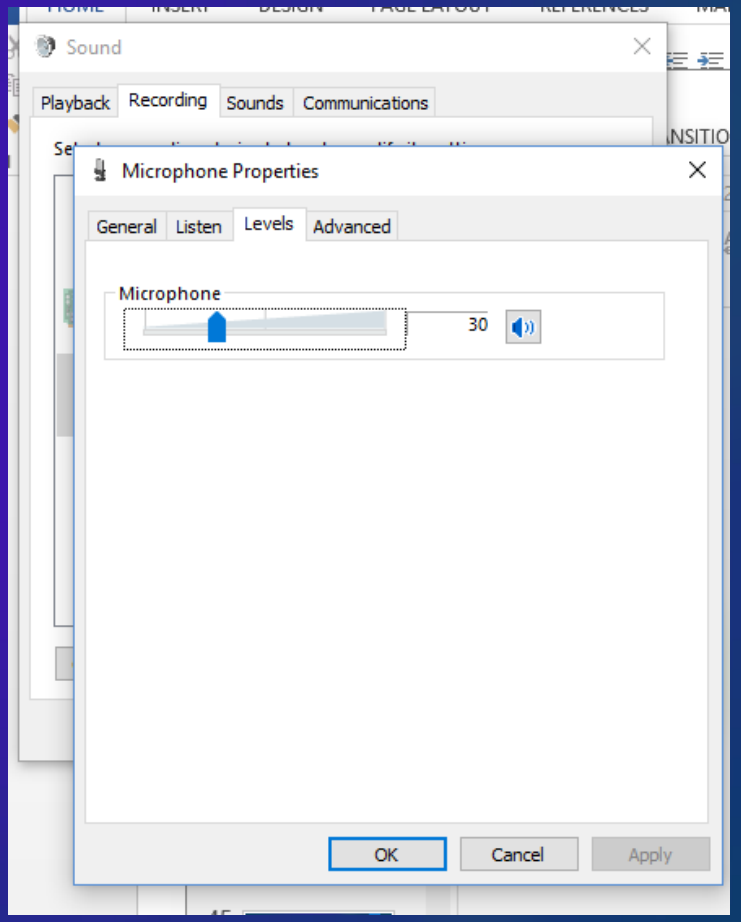
- Connect to computer via USB, and to radio with radio-specific cable and jumper configuration.
- Configure Fldigi to use SignaLink USB sound card.
- Generate just enough audio from computer to trigger SignaLink VOX (audio activated push-to-talk keying).
- Then use volume controls on SignaLink and don't change computer audio settings

Desktop shortcut for Sound control panel is handy when using FLdigi



Audio Input from Radio to Computer





Set interface gain to about 30% (~10 o'clock)

Fldigi Audio Adjustment

http://www.w1hkj.com/FldigiHelp/audio_adjust_page.html

File Edit View History Bookmarks Tools Help

FLDIGI Users Manual: RX/TX Audio

www.w1hkj.com/FldigiHelp/audio_adjust_page.html

Search

Most Visited eHam.net - Amateur R... Google QRZ.com timeanddate.com WSPRnet | Welcome t... animation depicting i... KMHT WX

FLDIGI Users Manual 4.0

Main Page | Related Pages

Configuration

RX/TX Audio Adjustment

Receive audio

Table of Contents

- Receive audio
- Windows Audio Properties
- Transmit audio

Setting the correct hardware, operating system, and fldigi received audio levels is not difficult, but it is the one setup procedure most often done incorrectly. The most commonly used sound card devices contain either a 16 or 24 bit analog to digital (a/d) converter. A 16 bit a/d can provide approximately 90 db of signal conversion. For the 16 bit converter, if the peak audio signal that the a/d can handle is +/- 1 volt then the minimum discernable signal (1 bit) will be +/- 30.5 microvolts. If more than a +/- 1 volt signal is applied to the a/d input then either one of two things may occur, (1) the audio is clipped, or (2) the audio is wrapped, large positive signals wrap to large negative signals and vice versa.

The objective in adjusting the Rx audio is to use the full dynamic range of the a/d without incurring overdrive. fldigi provides a number of display controls to assist in setting up the Rx audio. There are two controls that ONLY adjust the visual appearance of the waterfall and DO NOT effect the a/d or the signal decoders. These controls are below and to the left of the waterfall, "Upper signal level (dB)", and "Signal range (dB)".

Waterfall level/range controls

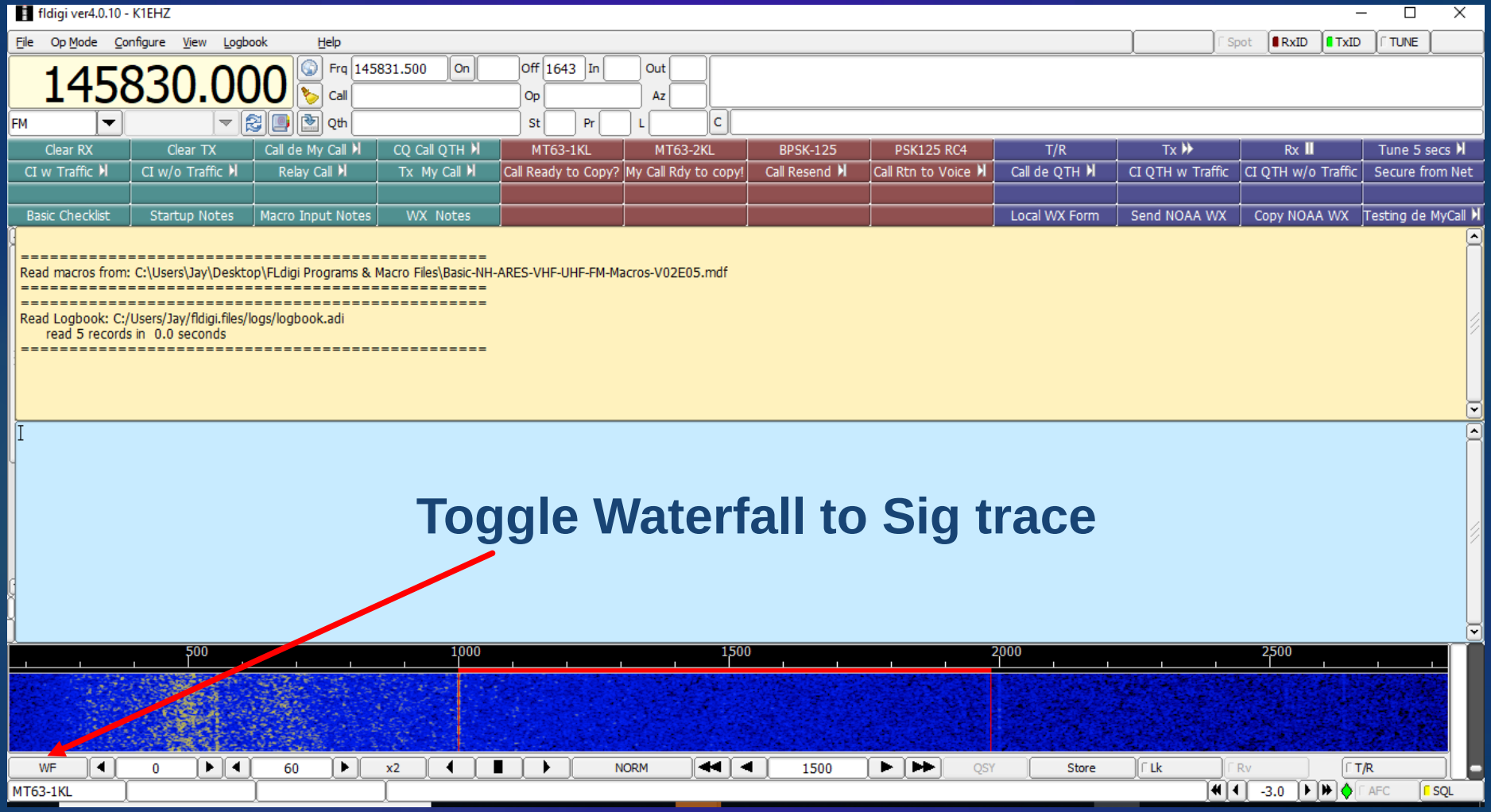
Change the waterfall display to the "Scope" view. Do this by pressing the "WF" button twice if it is currently displaying the waterfall. You can also right click once on that button. That button acts as a rotary and is left/right click sensitive. The display should show what looks like an oscilloscope view of the received audio. This is the entire audio signal and not just the signal that is currently decoded.

Type here to search

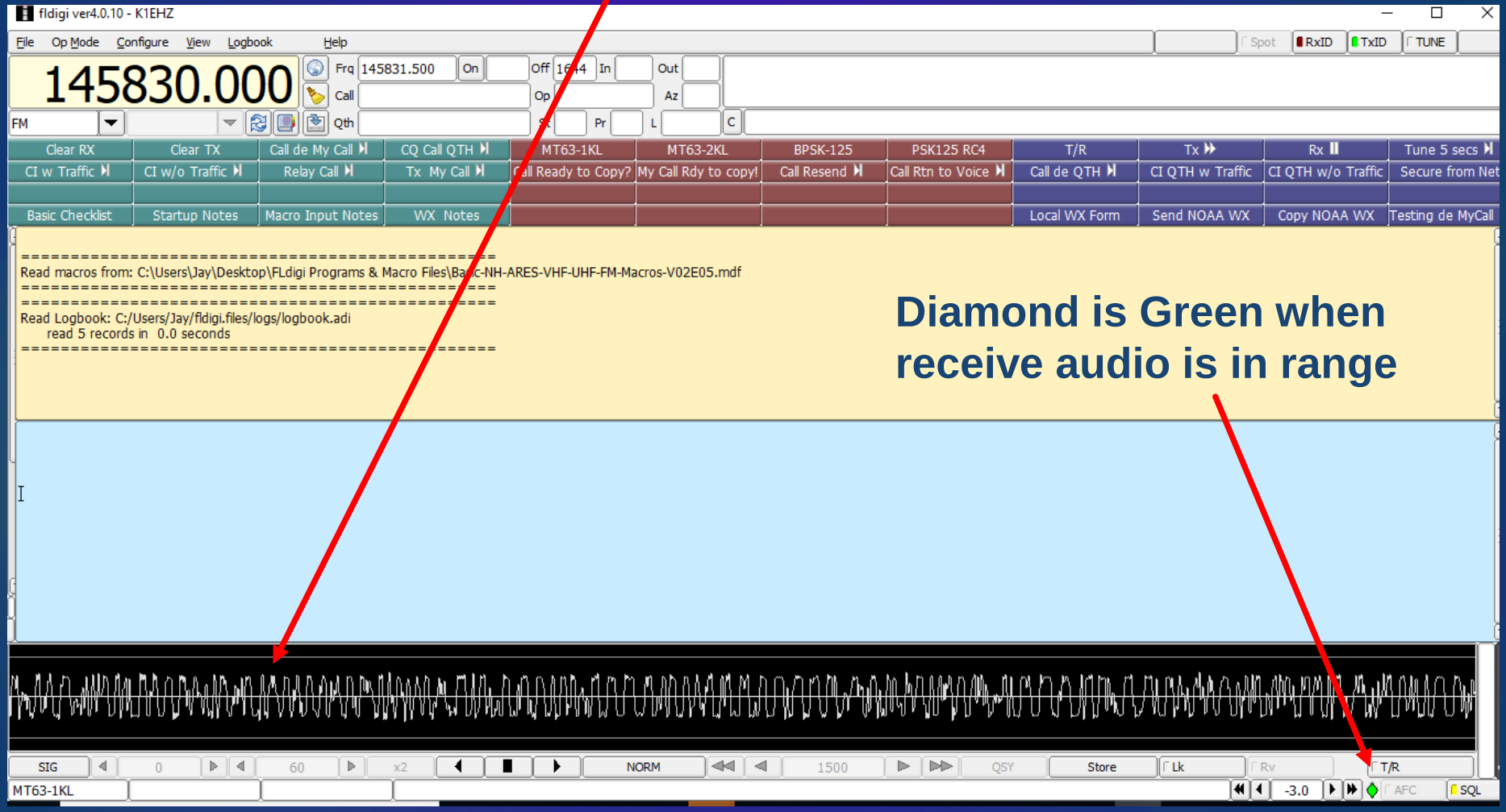
Desktop

9:05 AM
3/4/2018

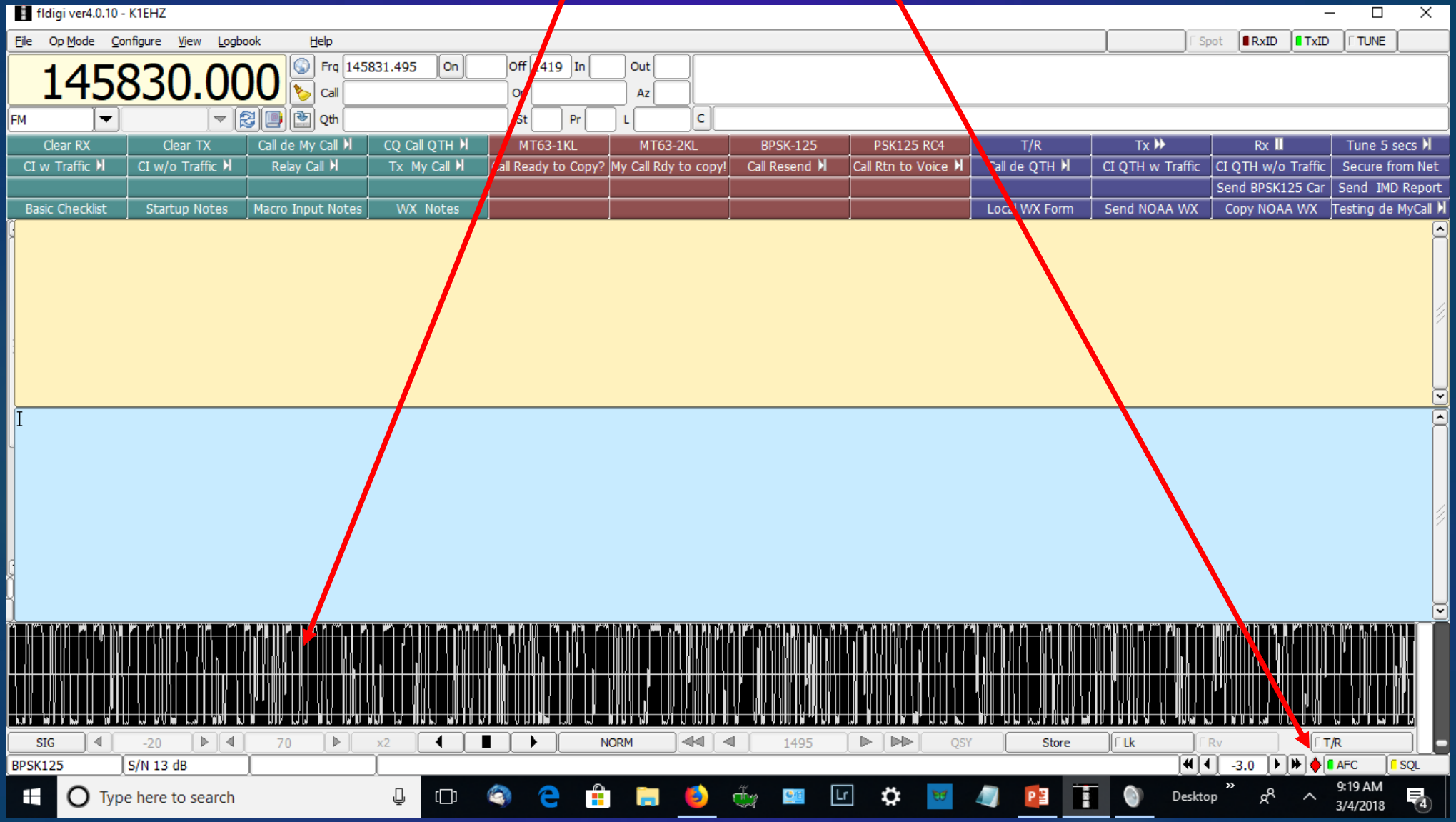
Receive Audio Adjustment



Adjust audio gain on radio, interface and computer so Sig trace is centered on midline and within gray lines

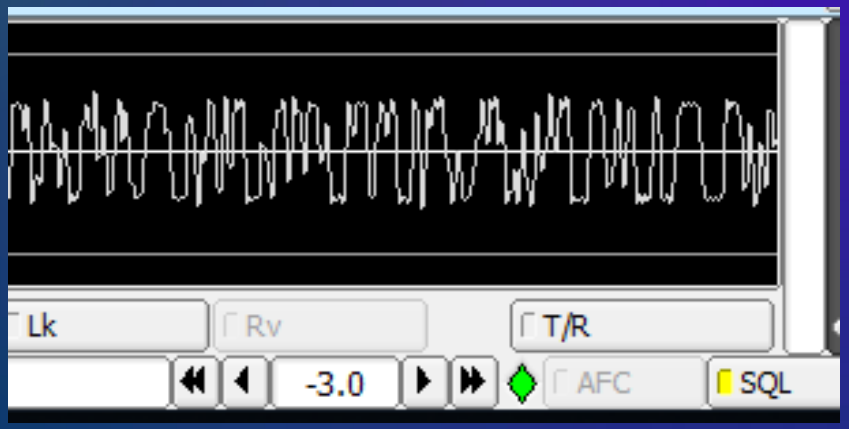


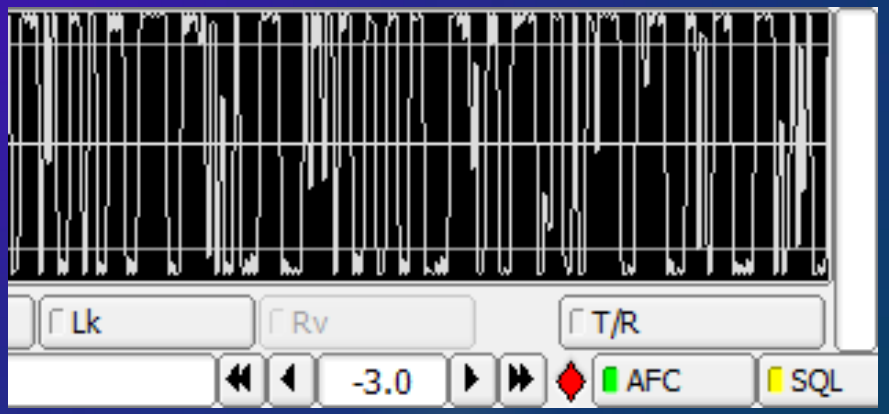
Too much receive audio gain!



Keep an eye on the Diamond

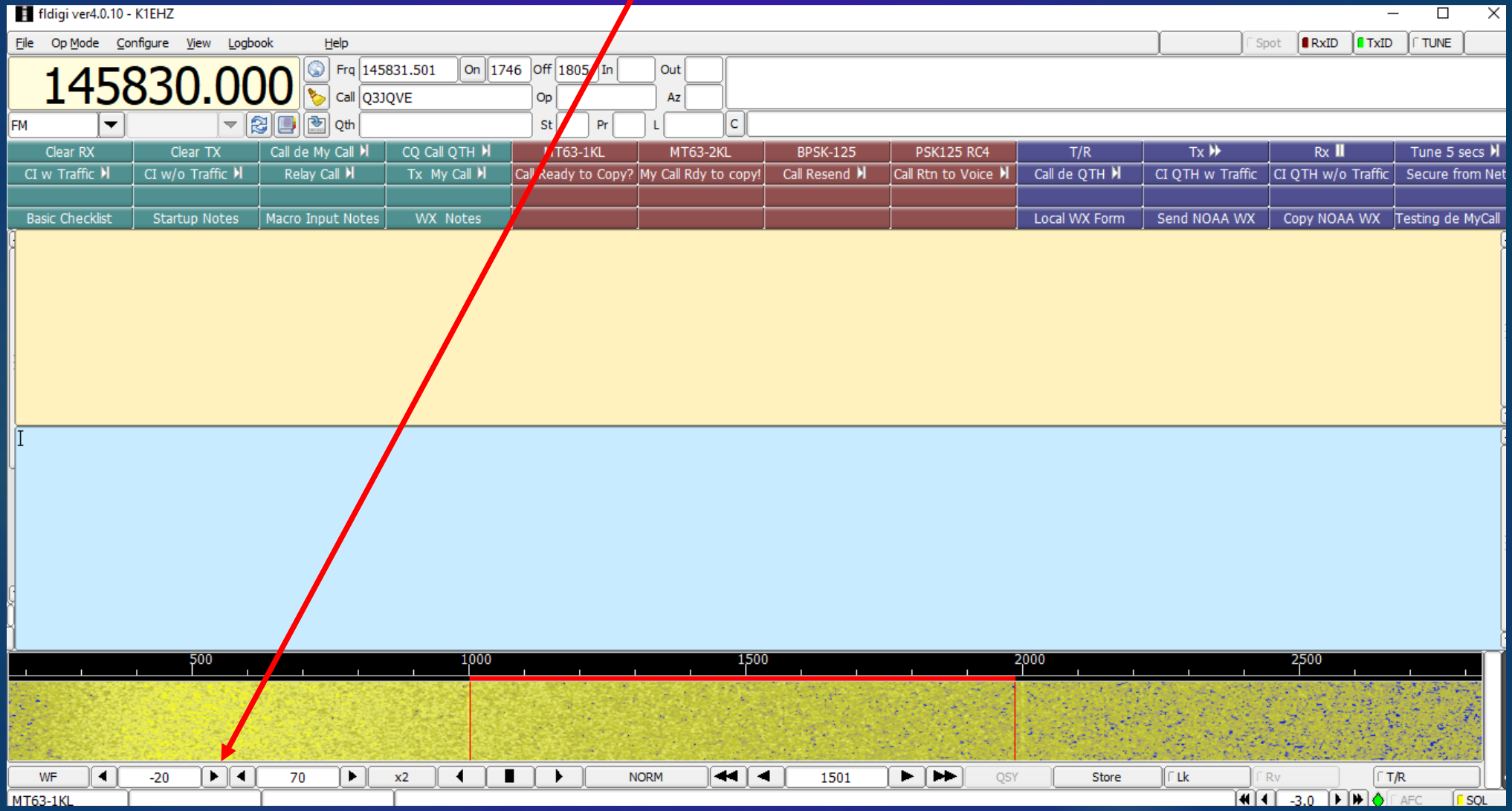
- BLACK - no signal, or insufficient Rx audio
- GREEN - signals are in the correct range
- YELLOW - signals are exceed 75% of maximum, but are less than 90% of maximum
- RED - signals exceed 90% of maximum a/d capability - WARNING WILL ROBINSON!



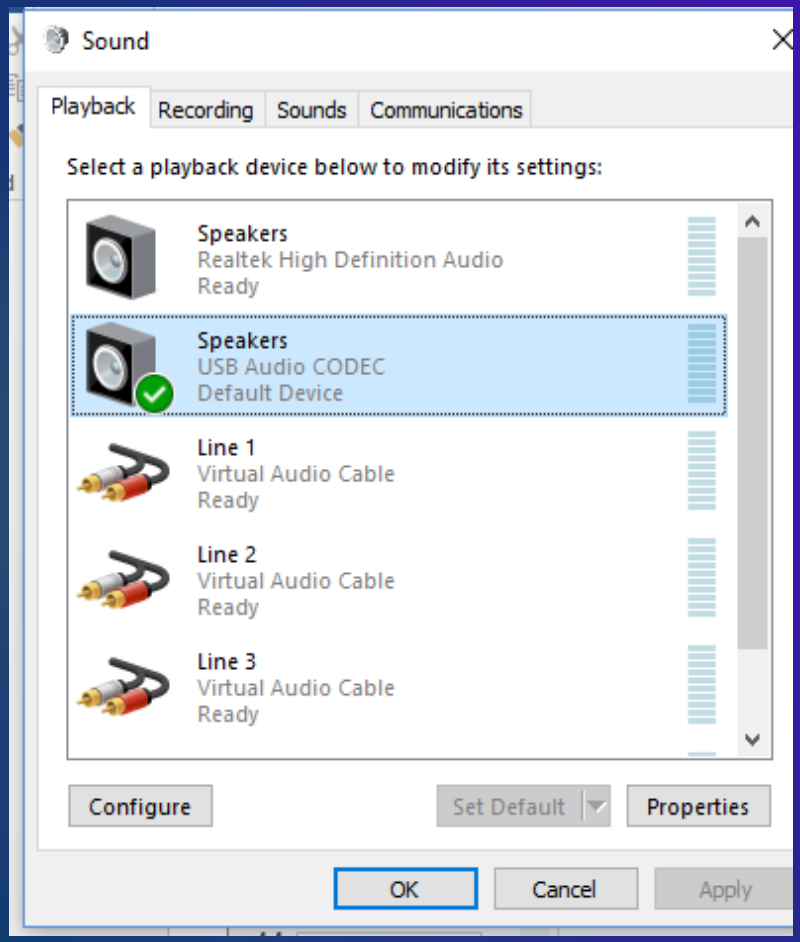


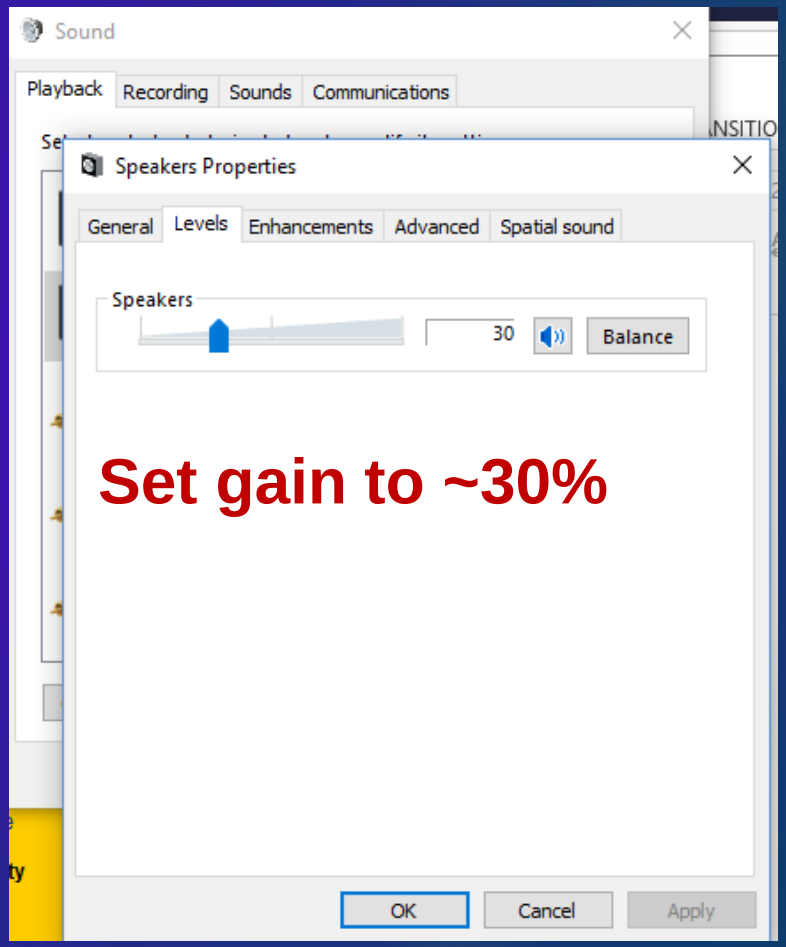
Adjust WF Controls

Manual says 0 to 60dB -- I prefer -20 to 70dB



Audio Output from Computer to Radio





Set interface gain to about 30% (~10 o'clock)

Adjust transmit audio gain to ~30% on all gain controls

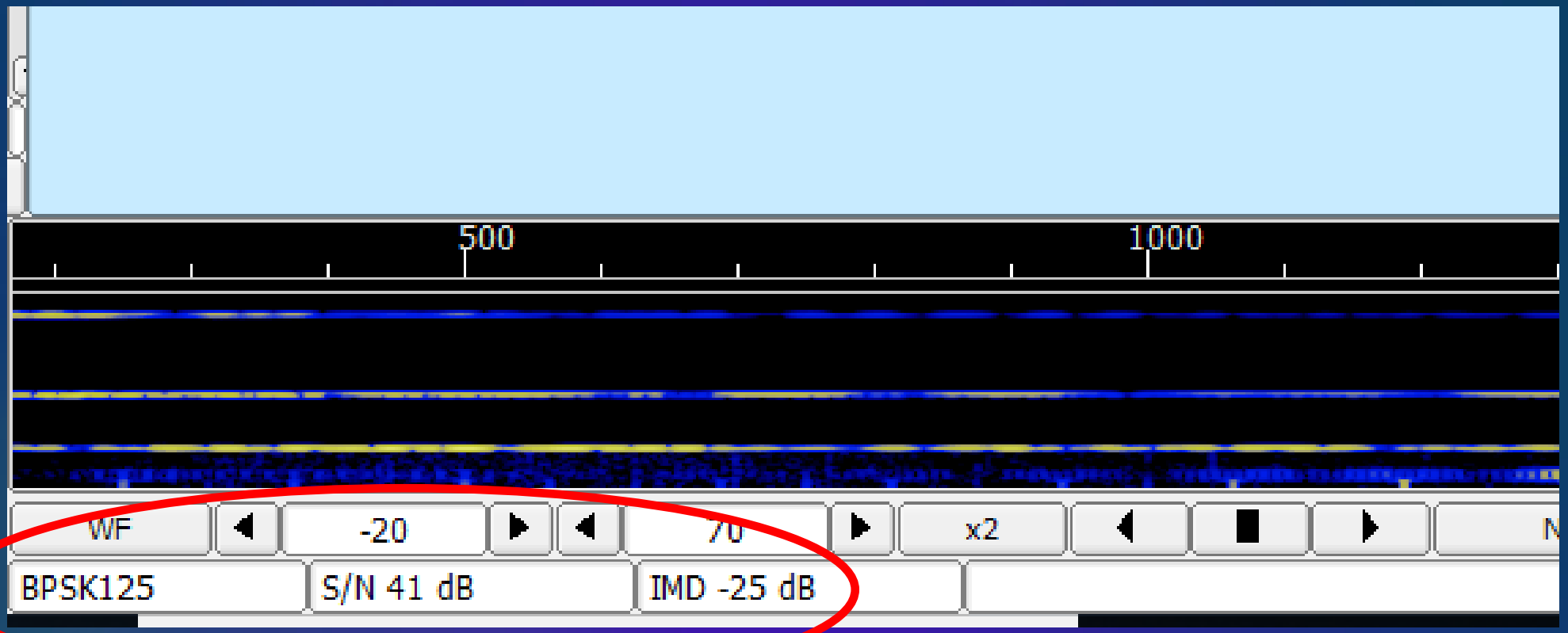
- If your radio has ALC, check that it is not out of normal range on transmit.

- If your radio does not have ALC, request feedback from receiving stations.
  - Transmit a carrier in BPSK125
  - Receiving stations can read S/N and IMD (Intermodulation Distortion) on your signal
  - Signal should be distortion-free at -20 to -26dB
  - If your carrier is higher than -20dB, reduce transmitting audio gain
  - Remember, -10dB is higher than -20dB
  - Also remember, not all operators appreciate unsolicited feedback on their digital signals.

BPSK125 IMD Check Macros

- Transmit BPSK125 carrier for 10 seconds
  - <GOFREQ:1500> <MODEM:BPSK125>
  - <TXRSID:on> <RXRSID:on>
  - <TX> <IDLE:10.00> <RX>
- Transmit report IMD back to other station
  - <GOFREQ:1500> <MODEM:BPSK125>
  - <TXRSID:on> <RXRSID:on>
  - <TX> <CALL> <INFO1> <INFO2>
  - de <MYCALL> k <RX>

Read S/N and IMD on Received Signal



When set in BPSK125, IMD should be close in other modes.

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Let's get to the fun part!

Configure Fldigi Together

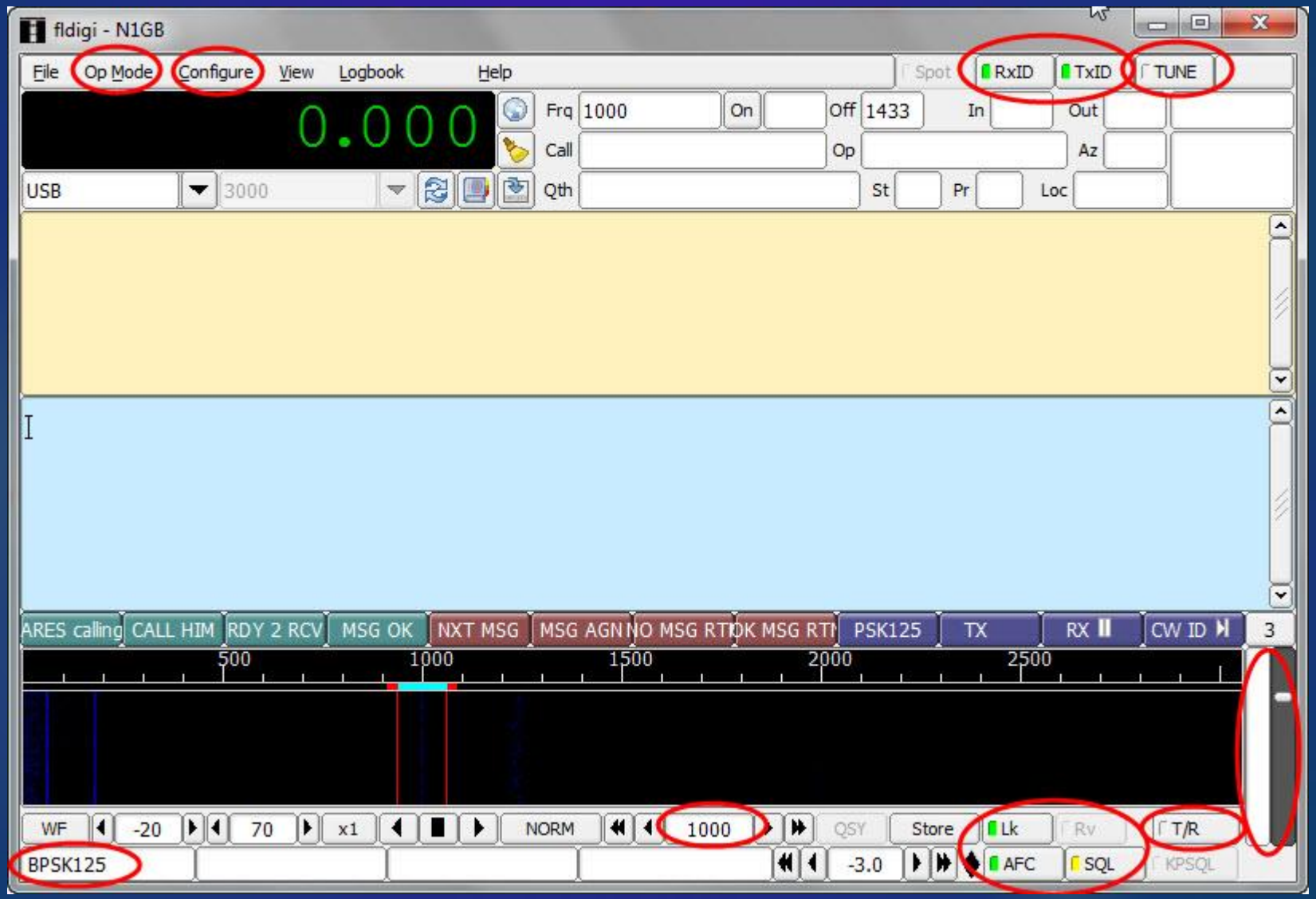
Refer to Minimum Settings Checklist (Orange Handout at Workshop)

Configure FLdigi

Double click on your FLdigi icon

Configure FLdigi

Operating Display



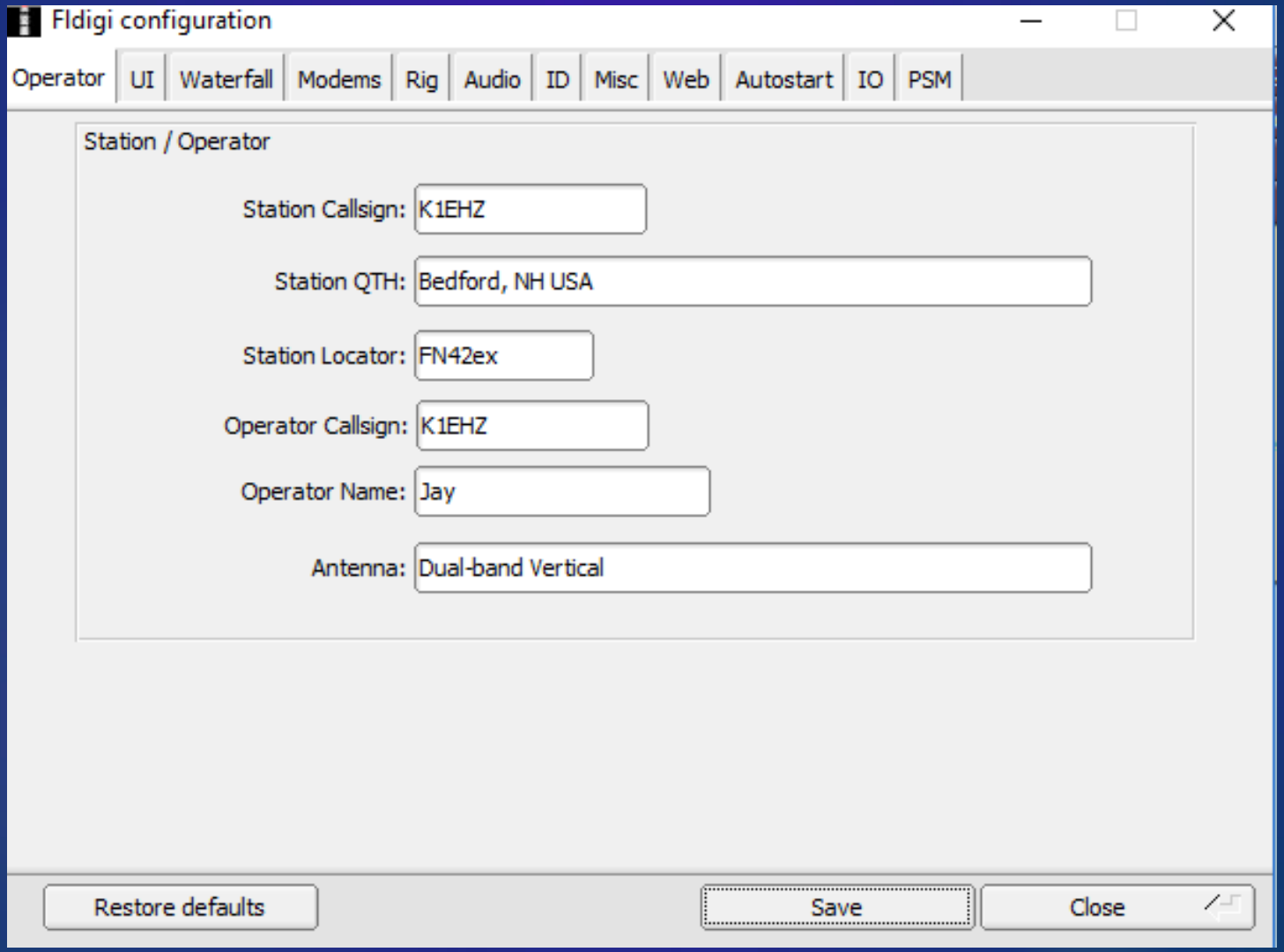
Configure FLdigi

Optional Configuration Wizard

Opens the first time Fldigi is used

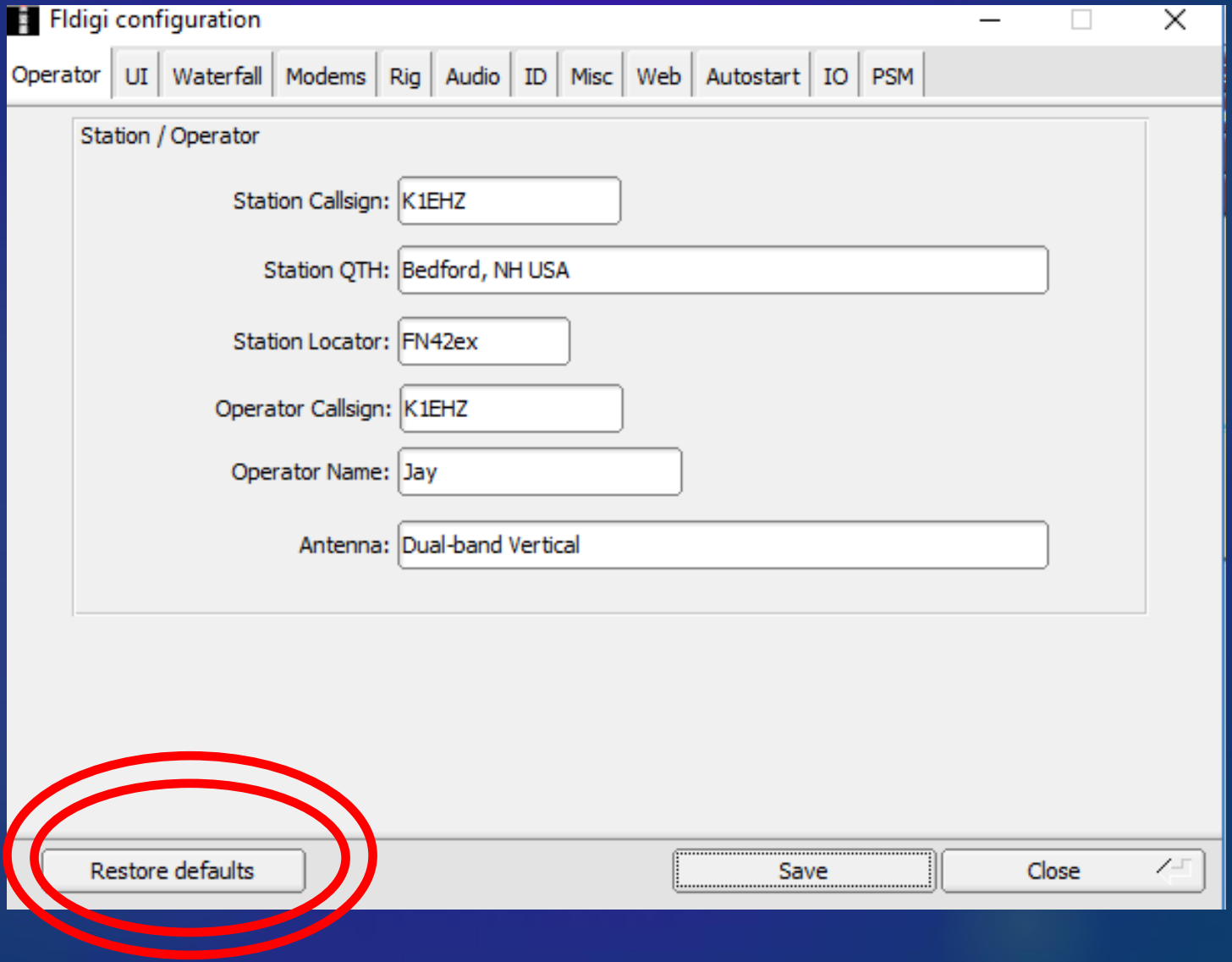
Configure FLdigi

Operator Info – very important, used in macros



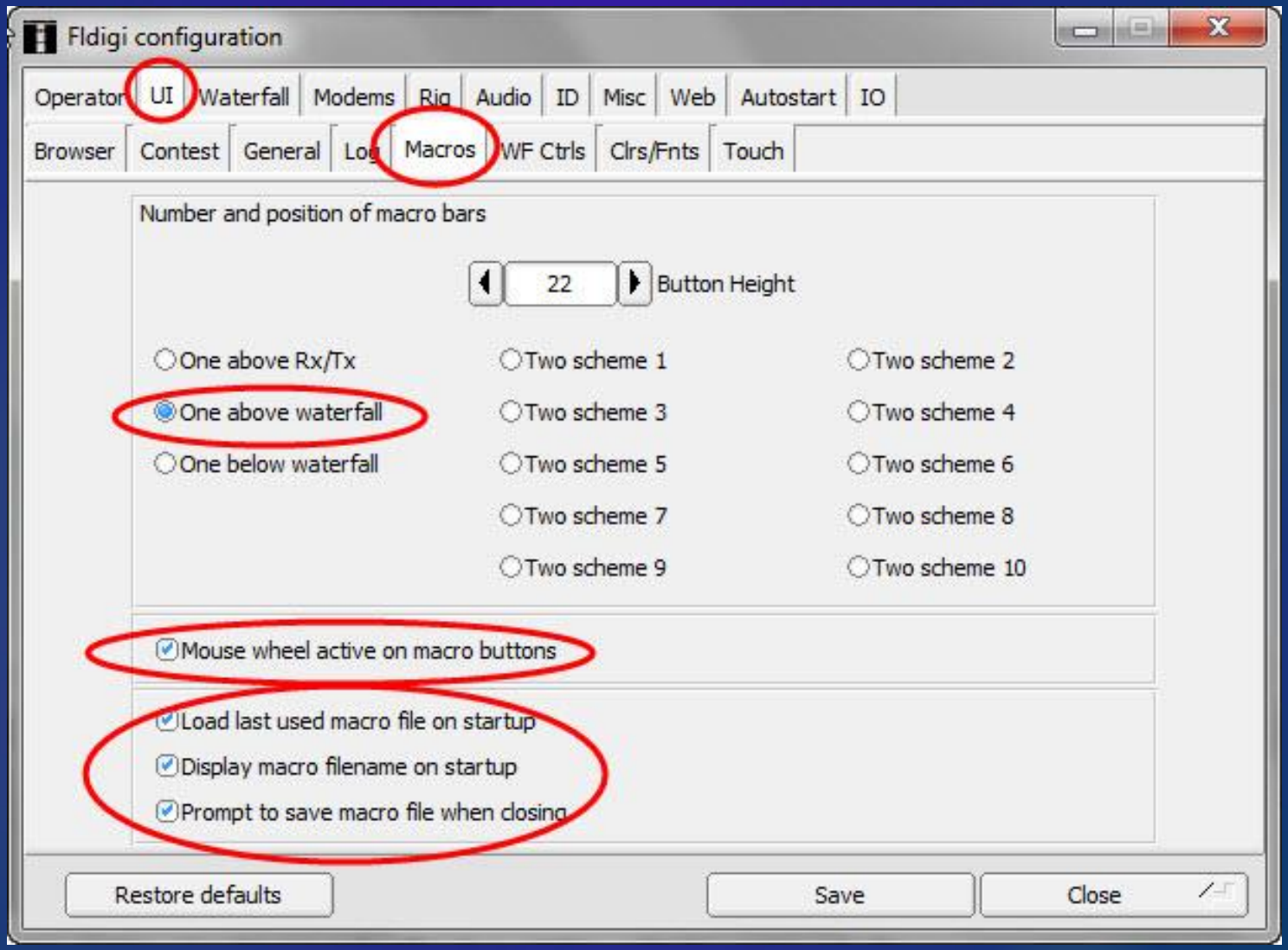
Beware!!!

Clicking Restore Defaults on any tab resets all tabs to default conditions, not just active tab!!!



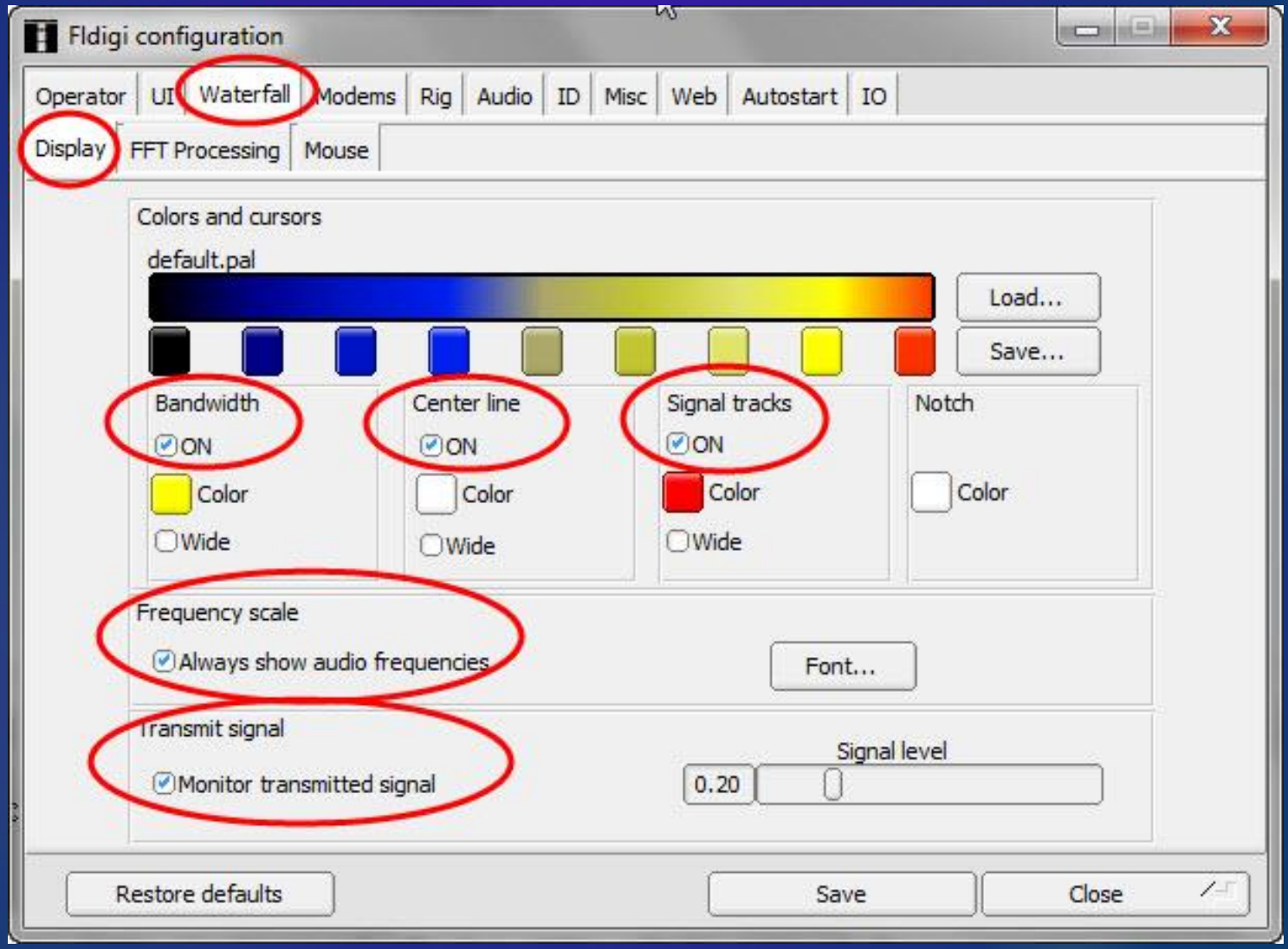
Configure FLdigi

UI – User Interface



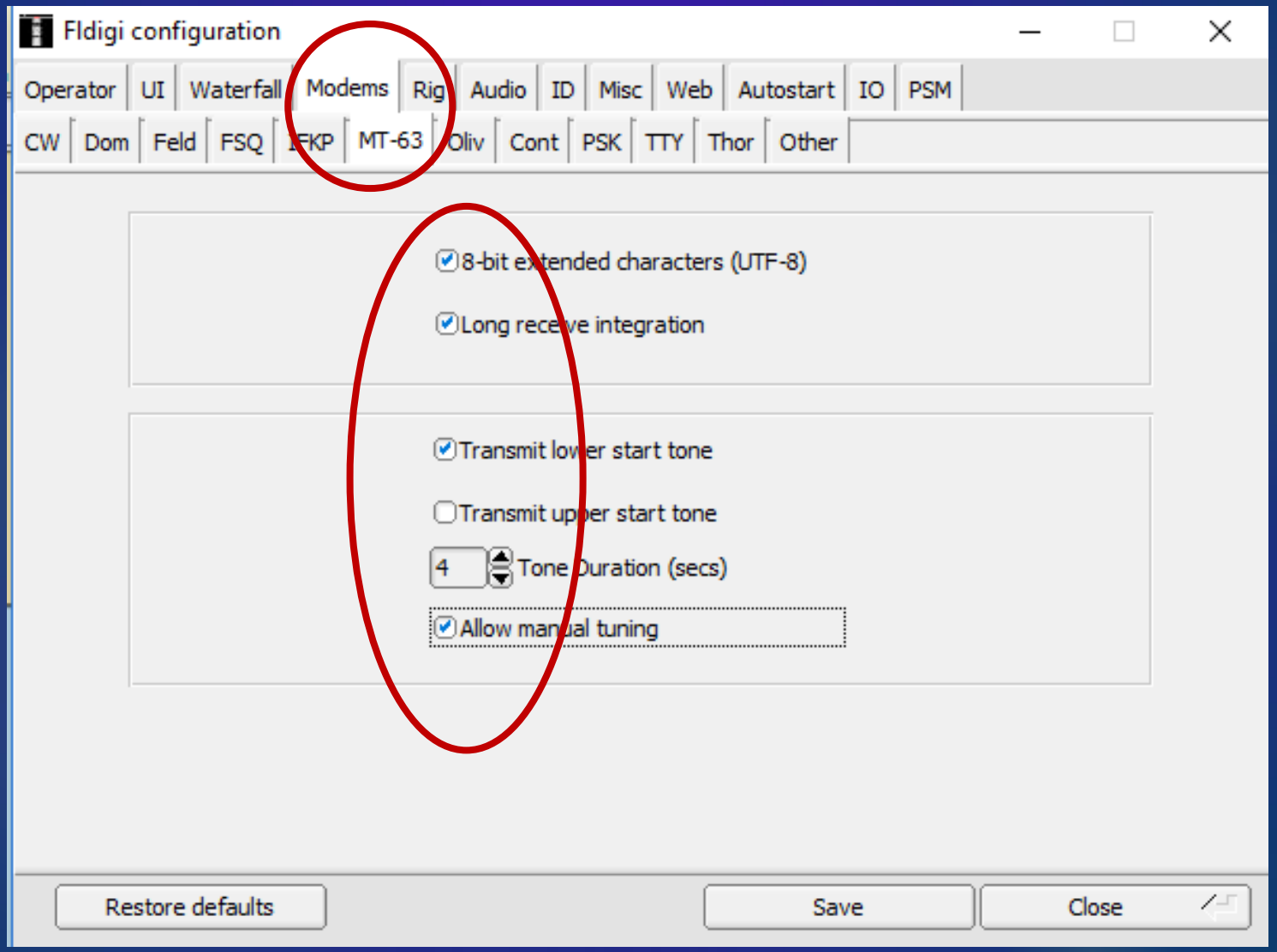
Configure FLdigi

Waterfall



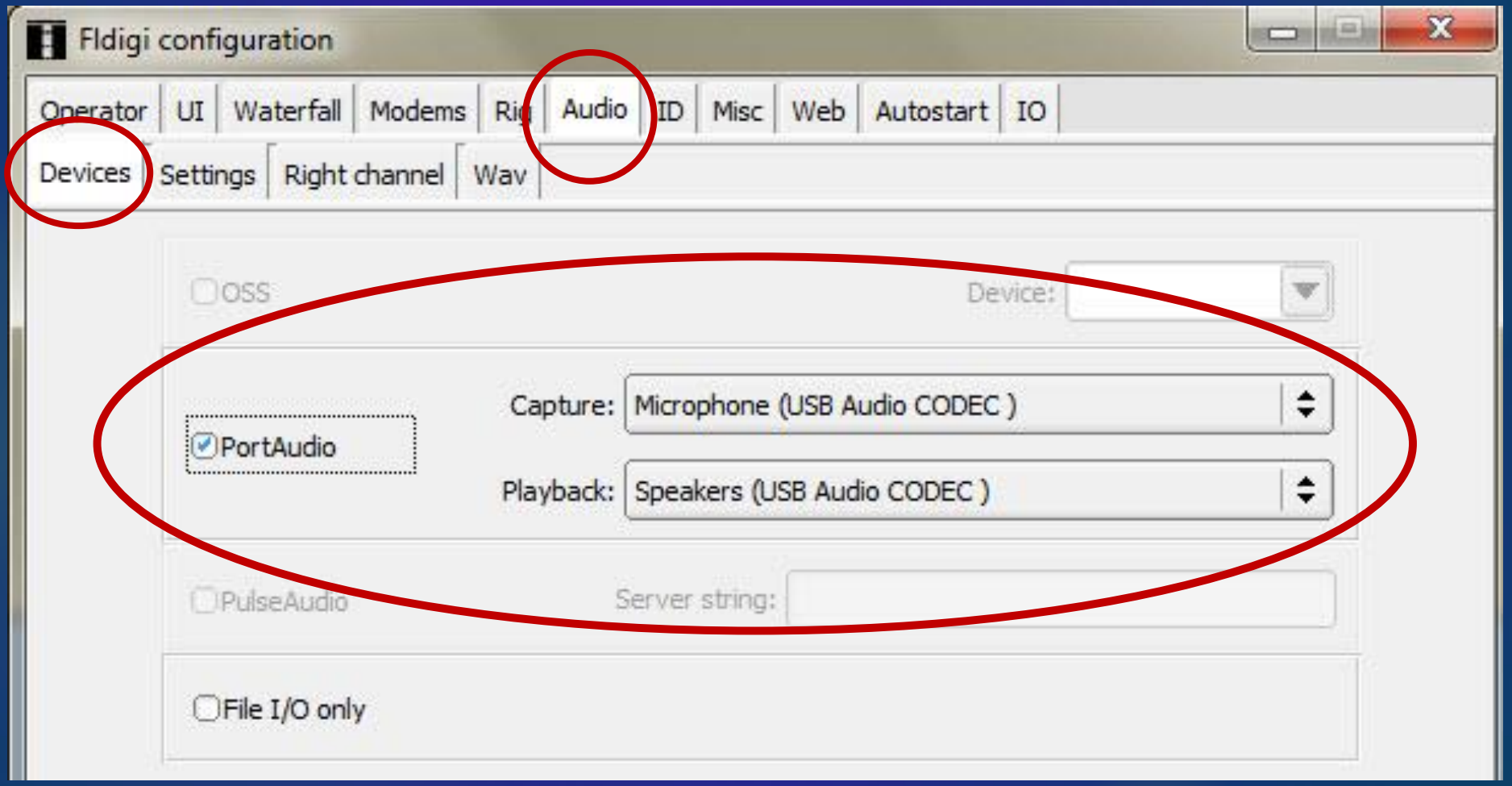
Configure FLdigi

Modem – MT63

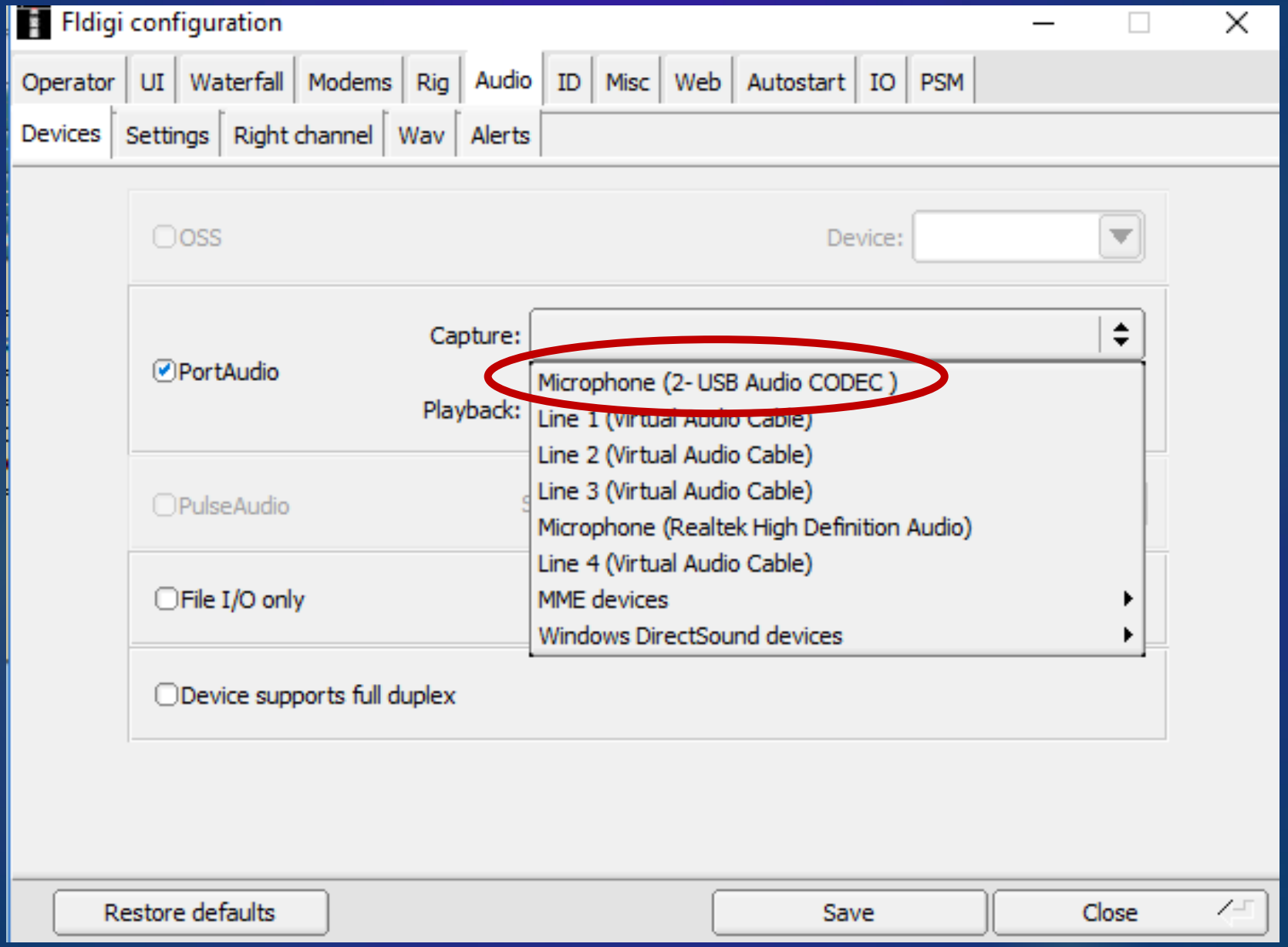


Configure FLdigi

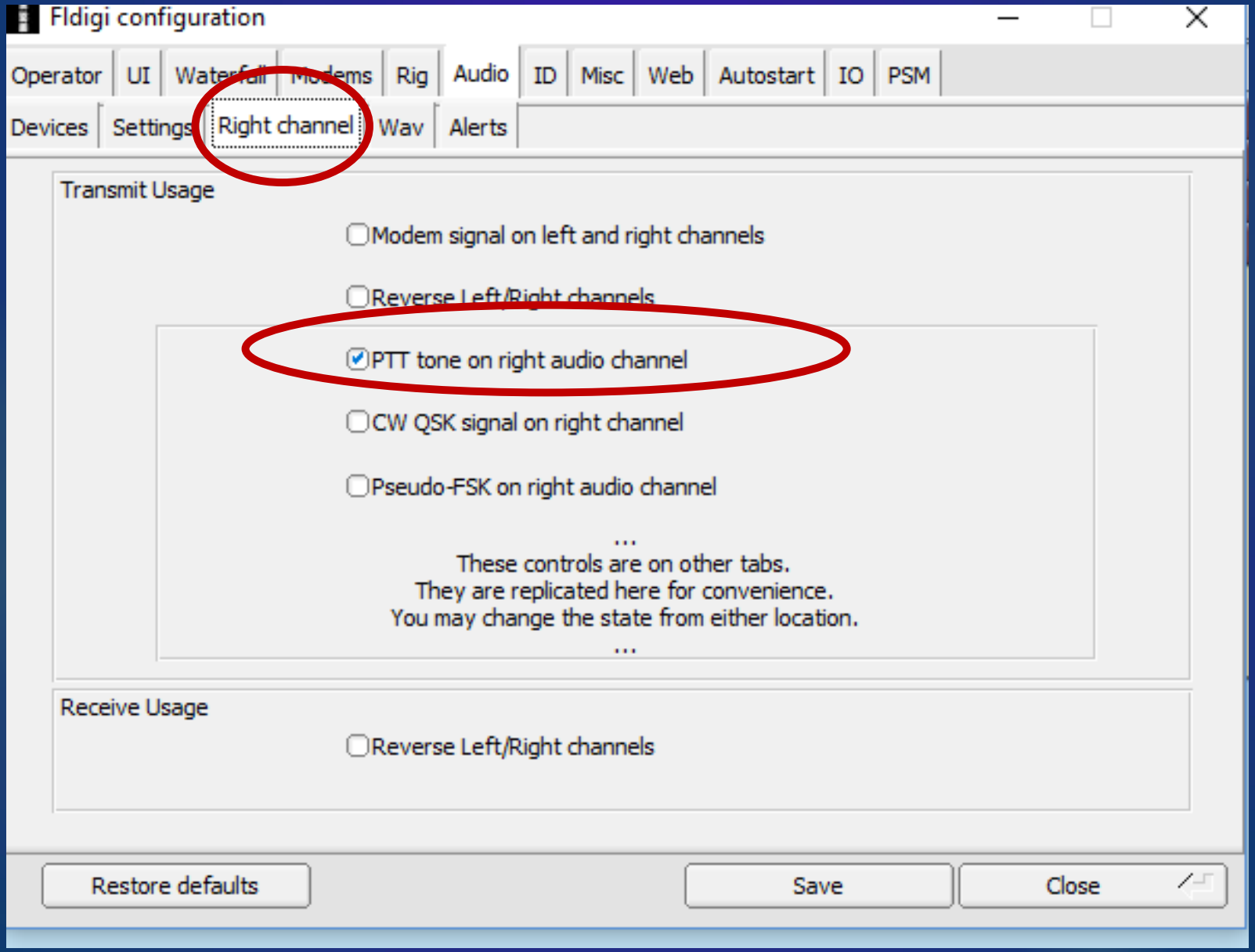
Audio Device



SignaLink Audio

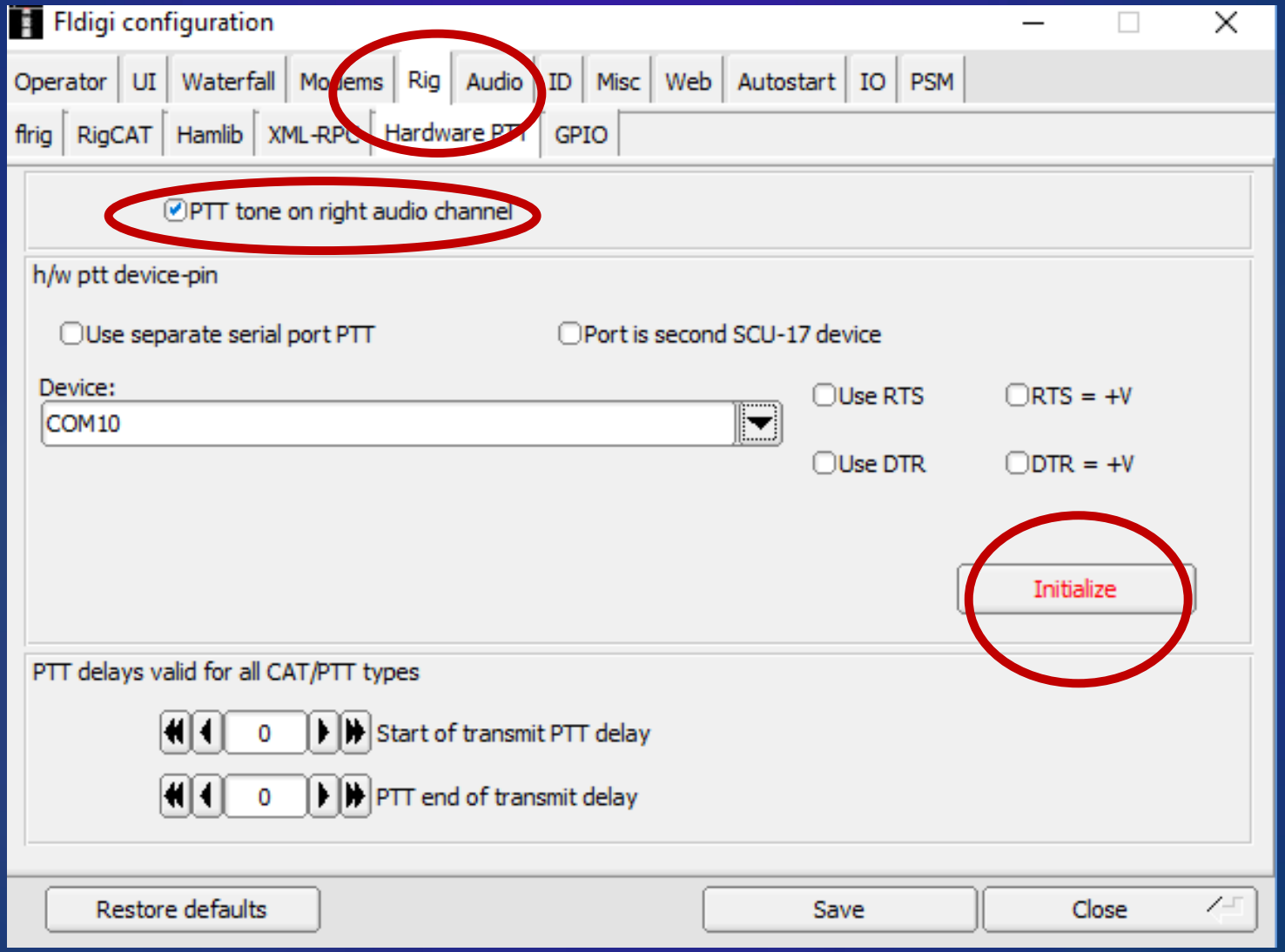


VOX Push-To-Talk



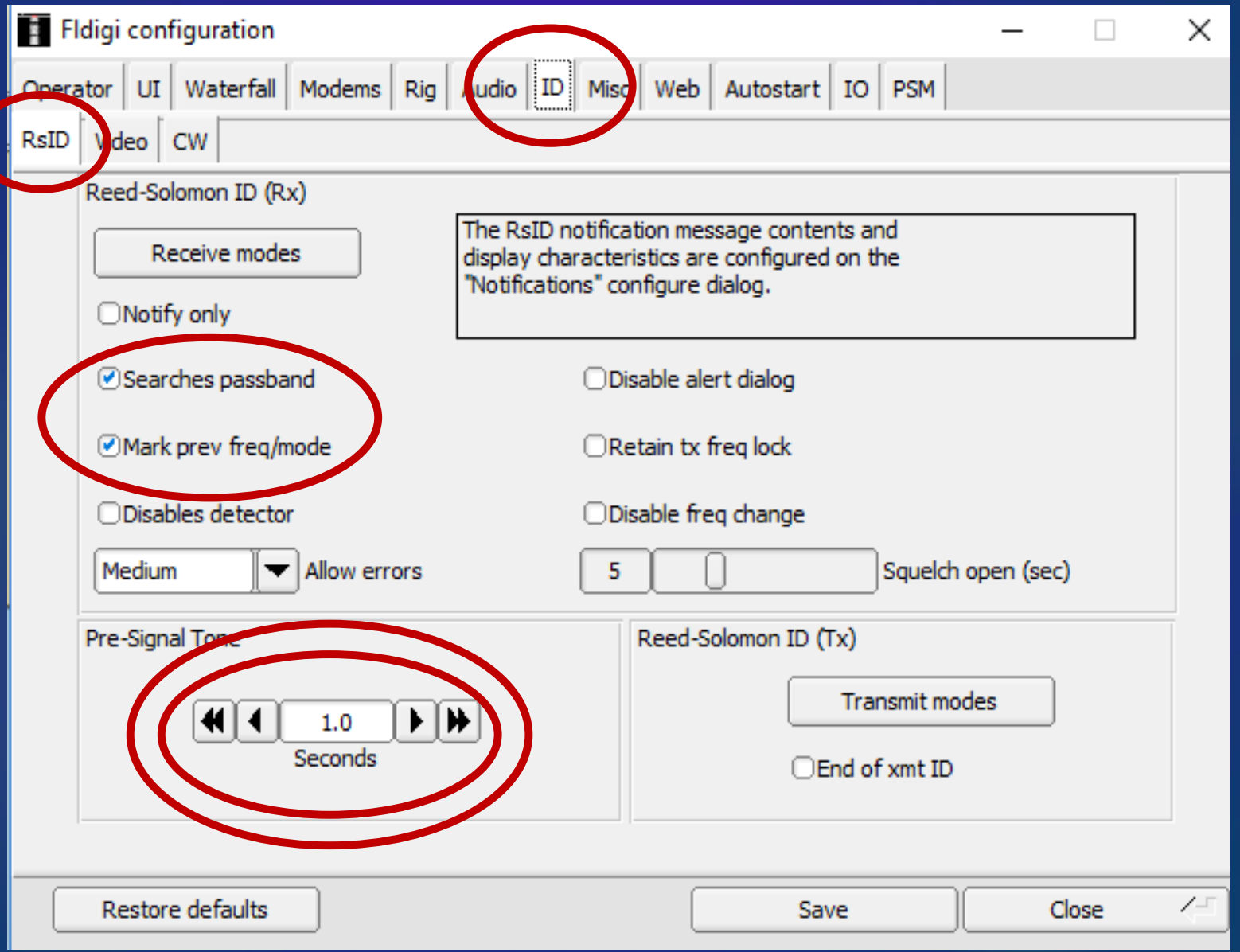
Configure FLdigi

Rig Control – Push-to-Talk

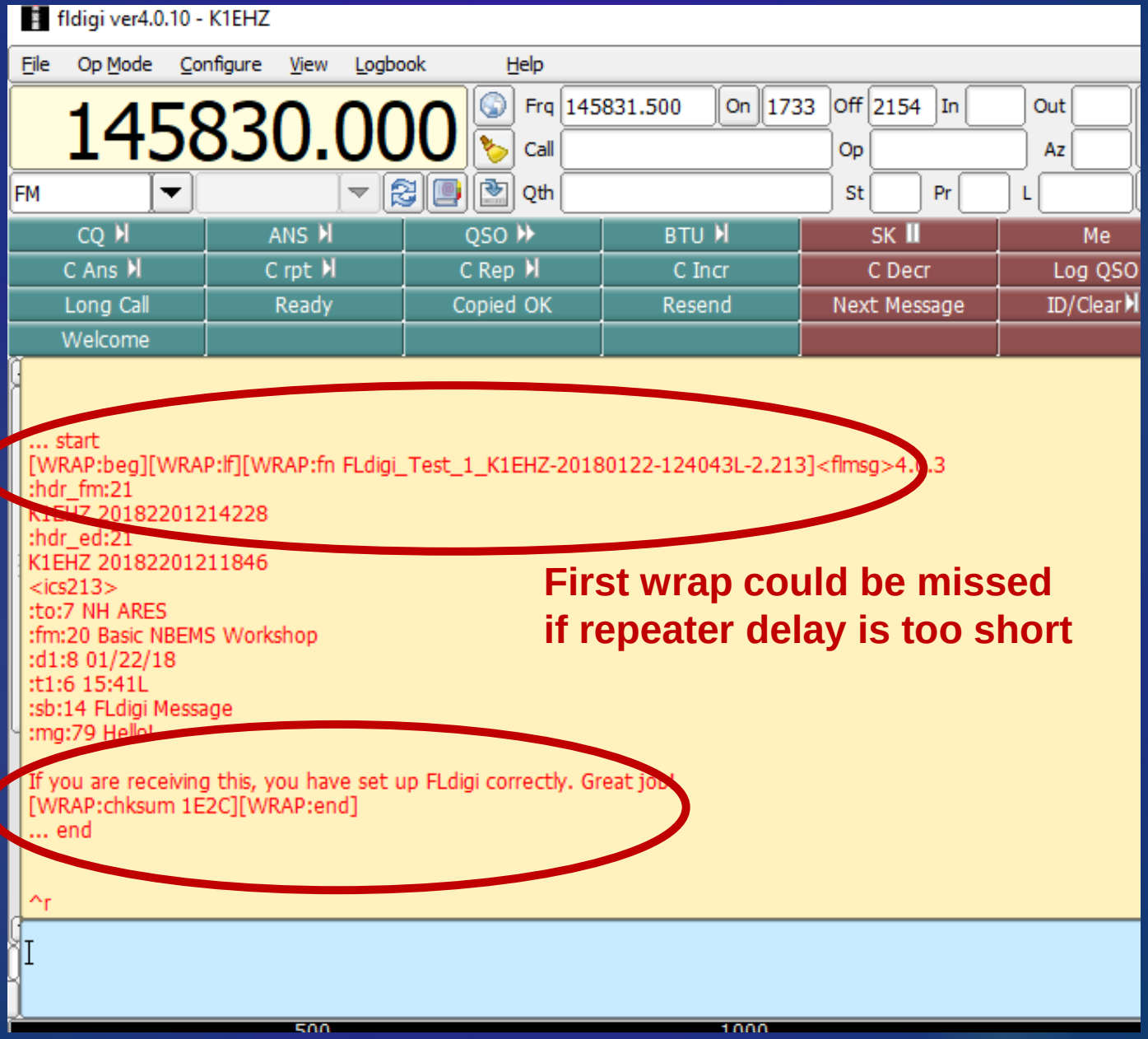


Configure FLdigi

RsID

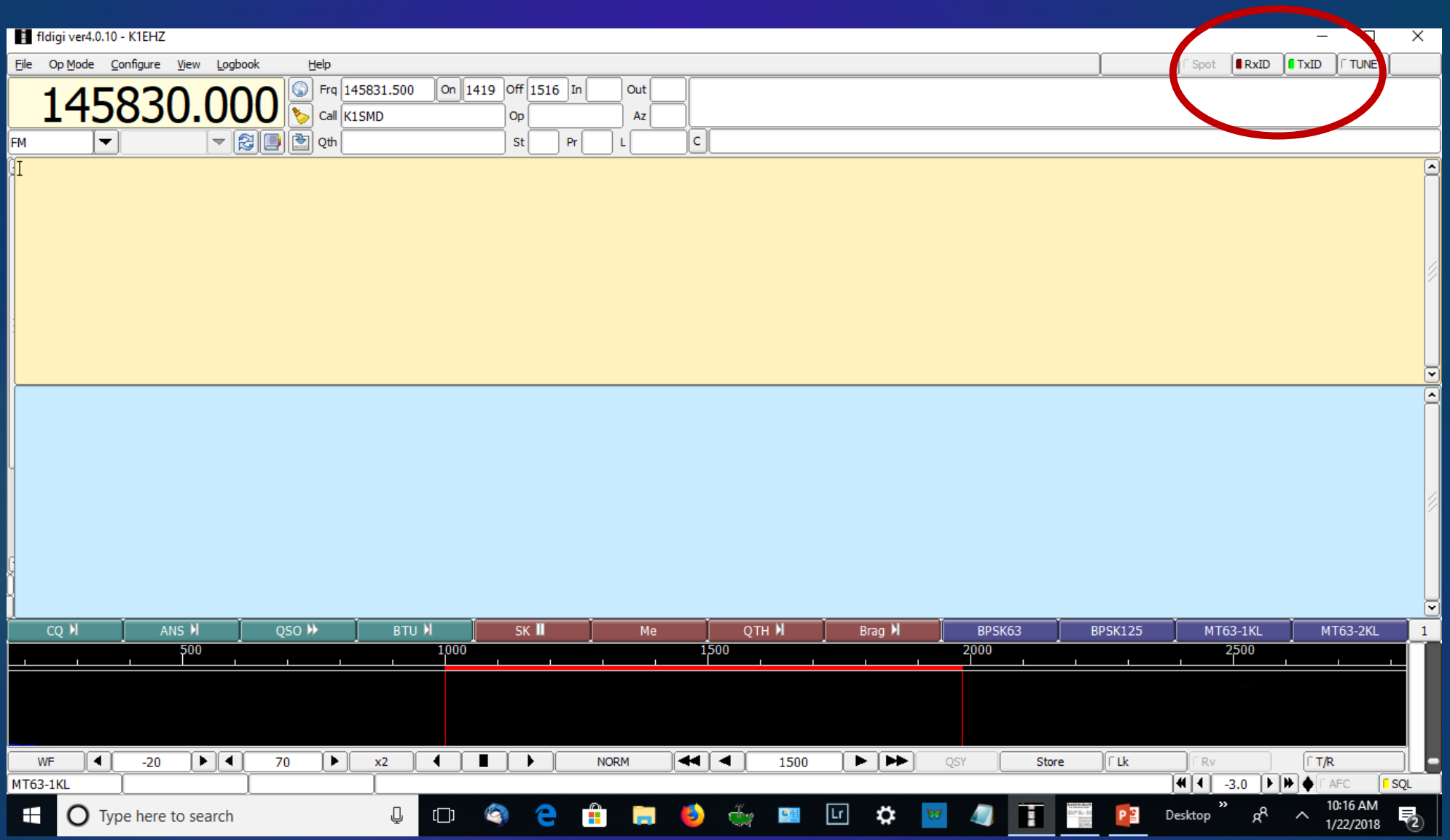


Wrap Info First and Last Lines

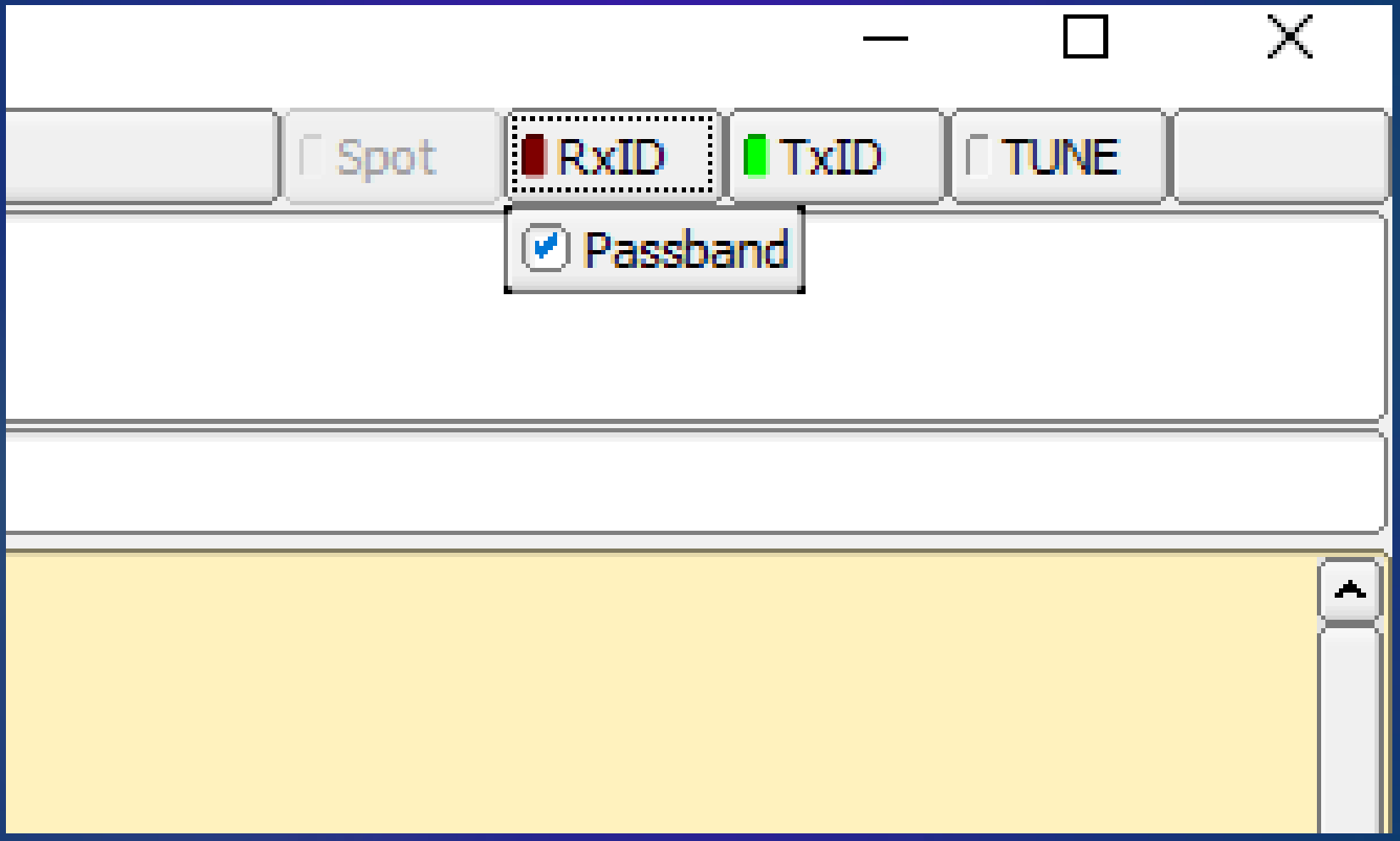


First wrap could be missed if repeater delay is too short

RxID – TxID - Passband

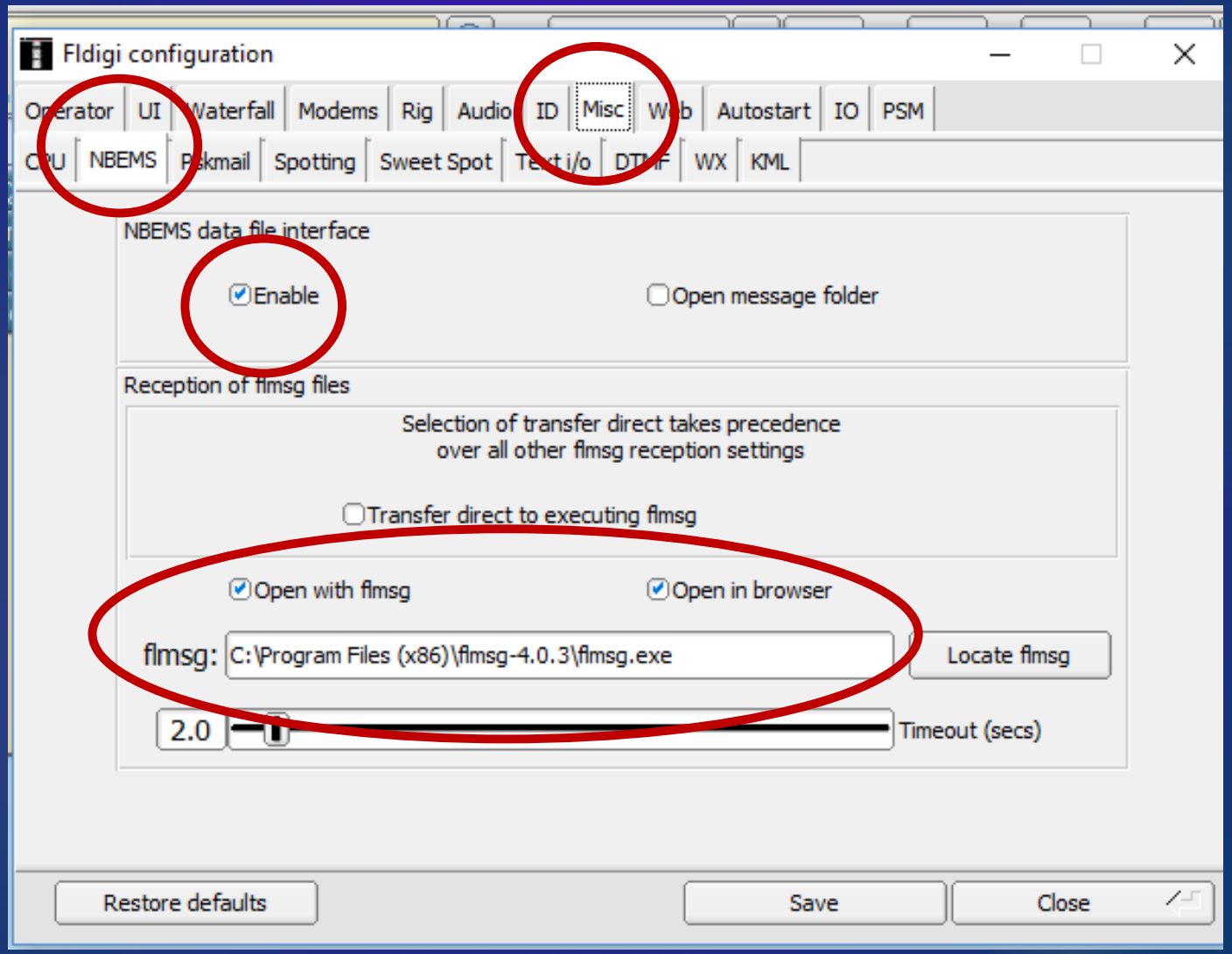


Right Click RxID to Set “Passband”



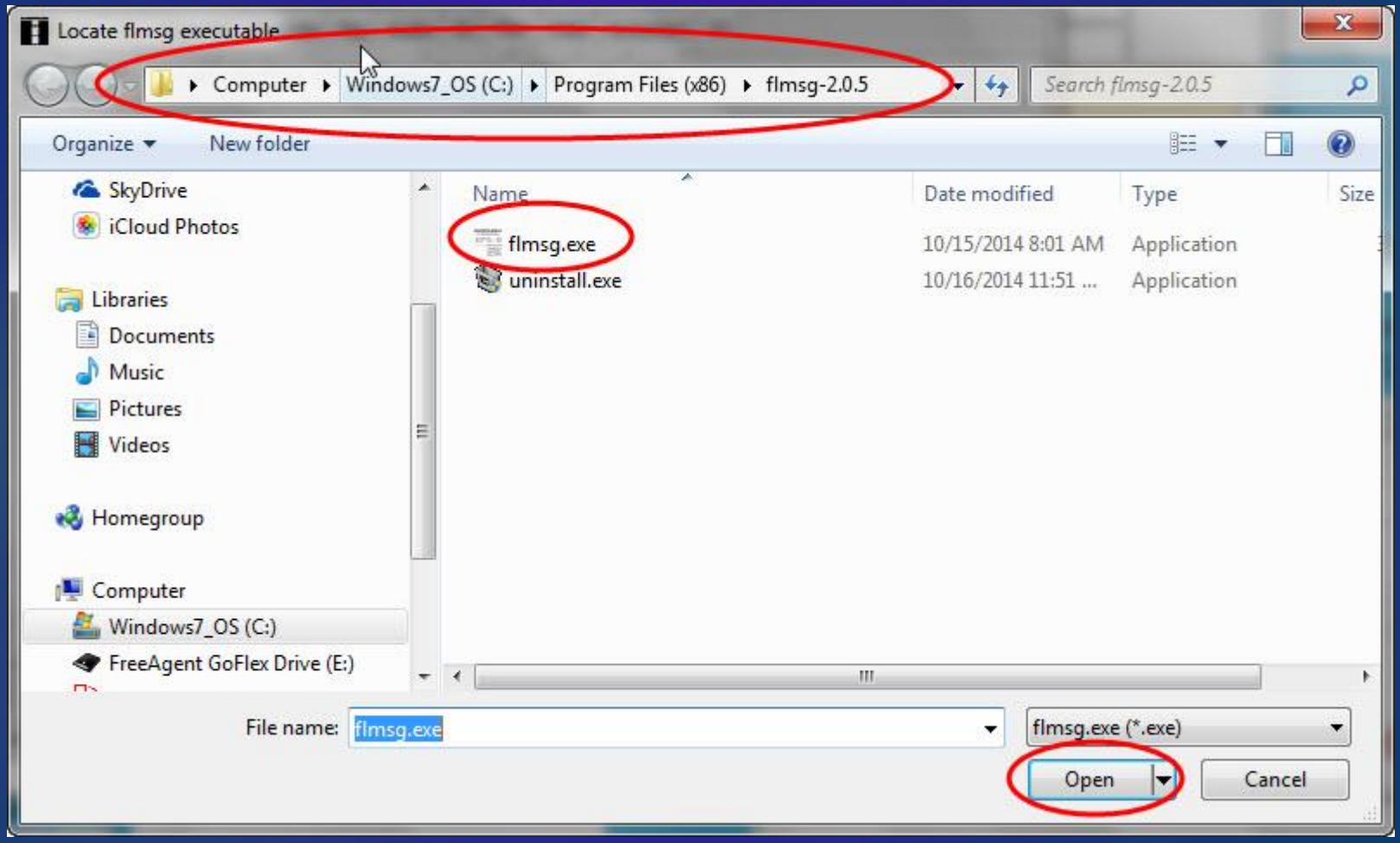
Configure FLdigi

Misc - NBEMS: FLmsg auto-unwrap



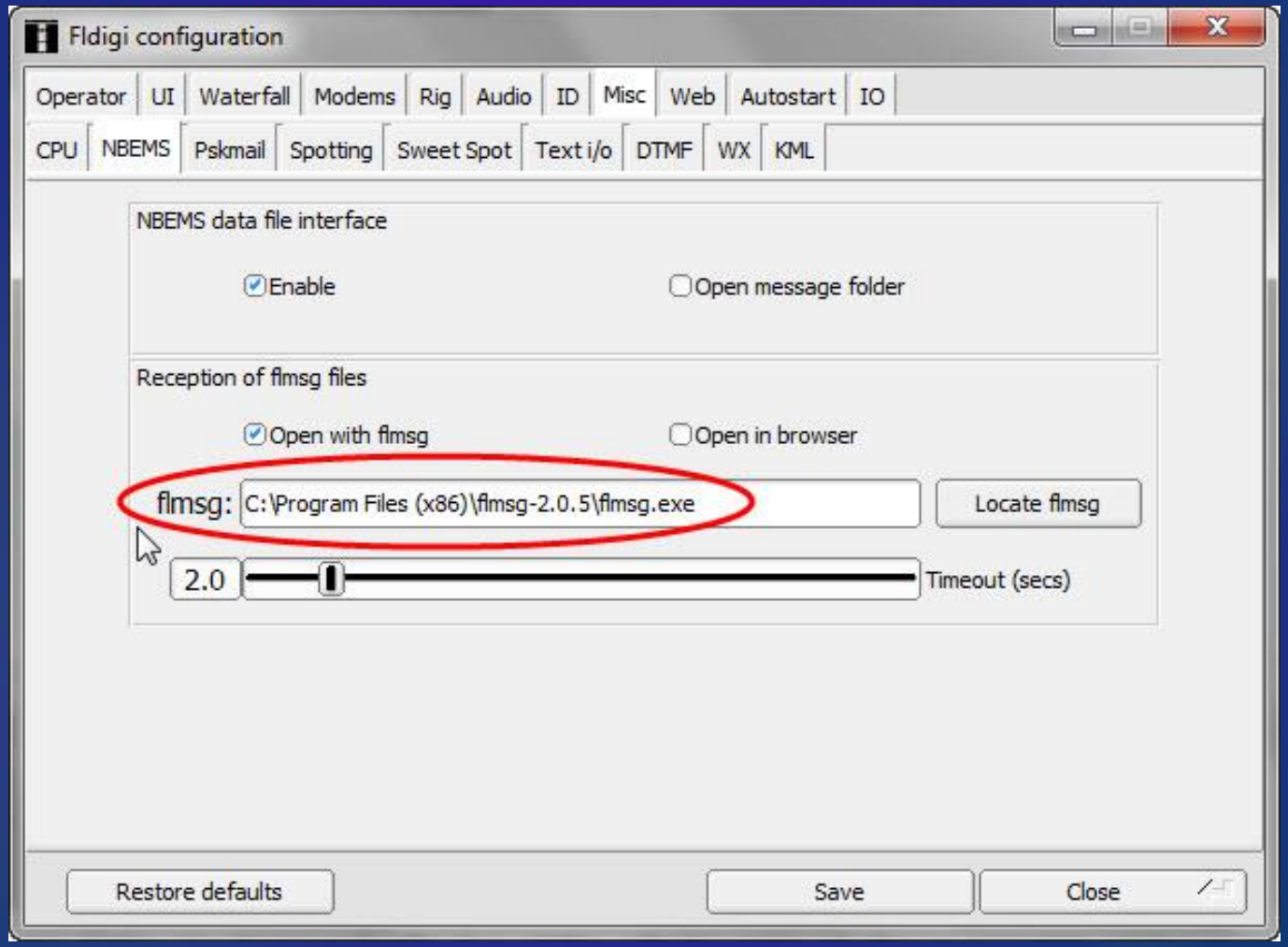
Configure FLdigi

Misc - NBEMS: FLmsg auto-unwrap message



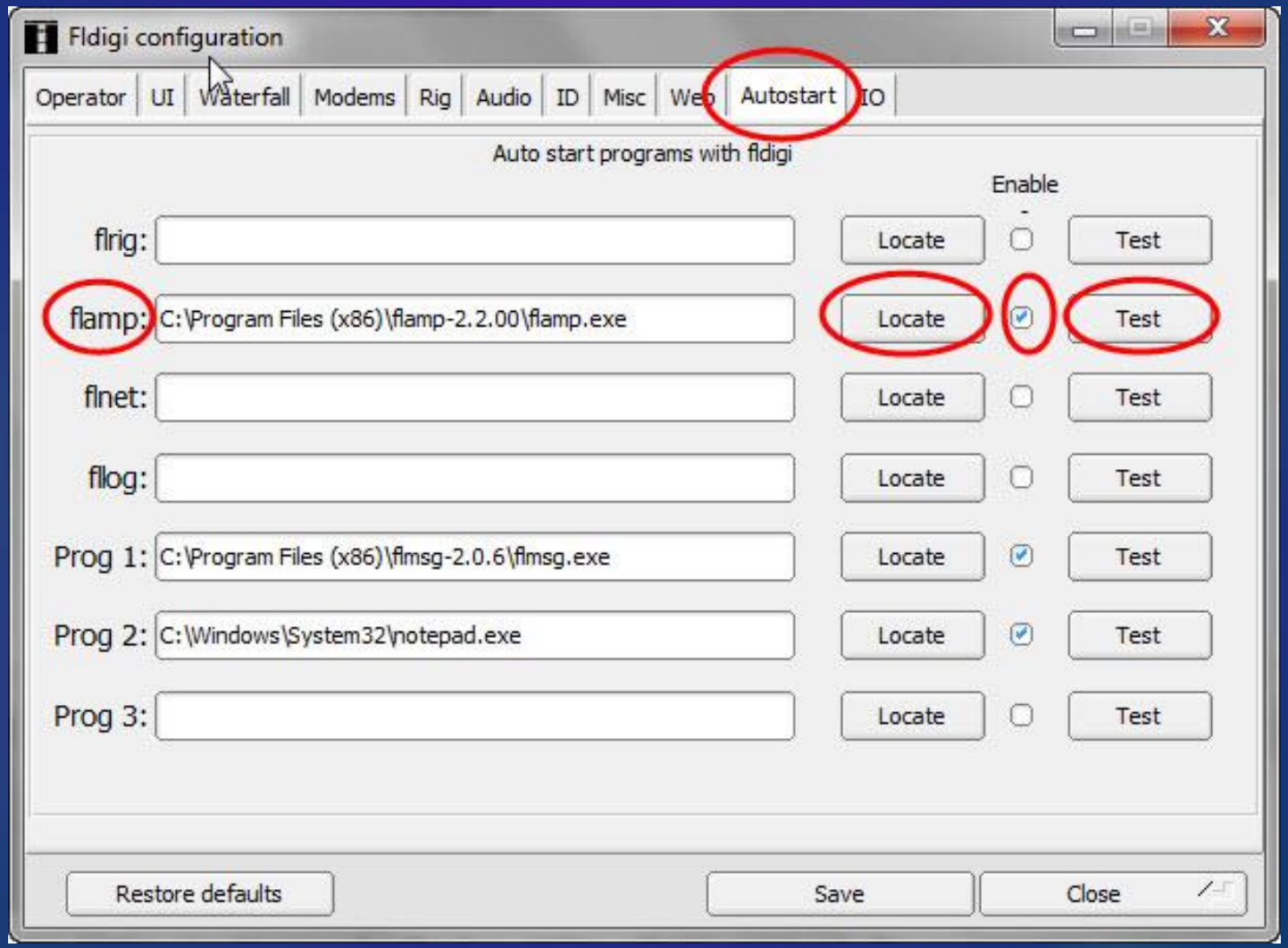
Configure FLdigi

Misc - NBEMS: FLmsg auto-unwrap message



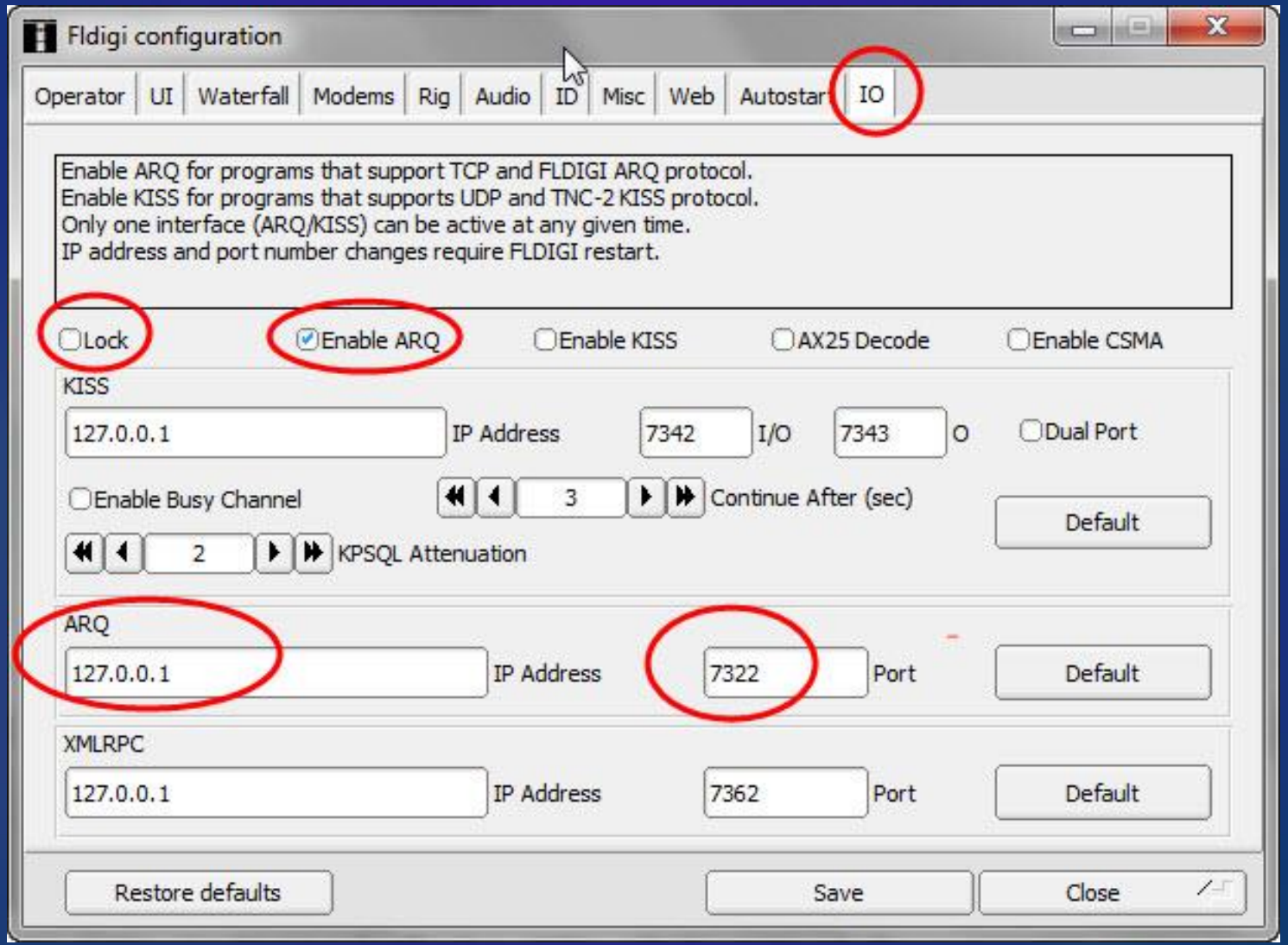
Configure FLdigi

Autostart

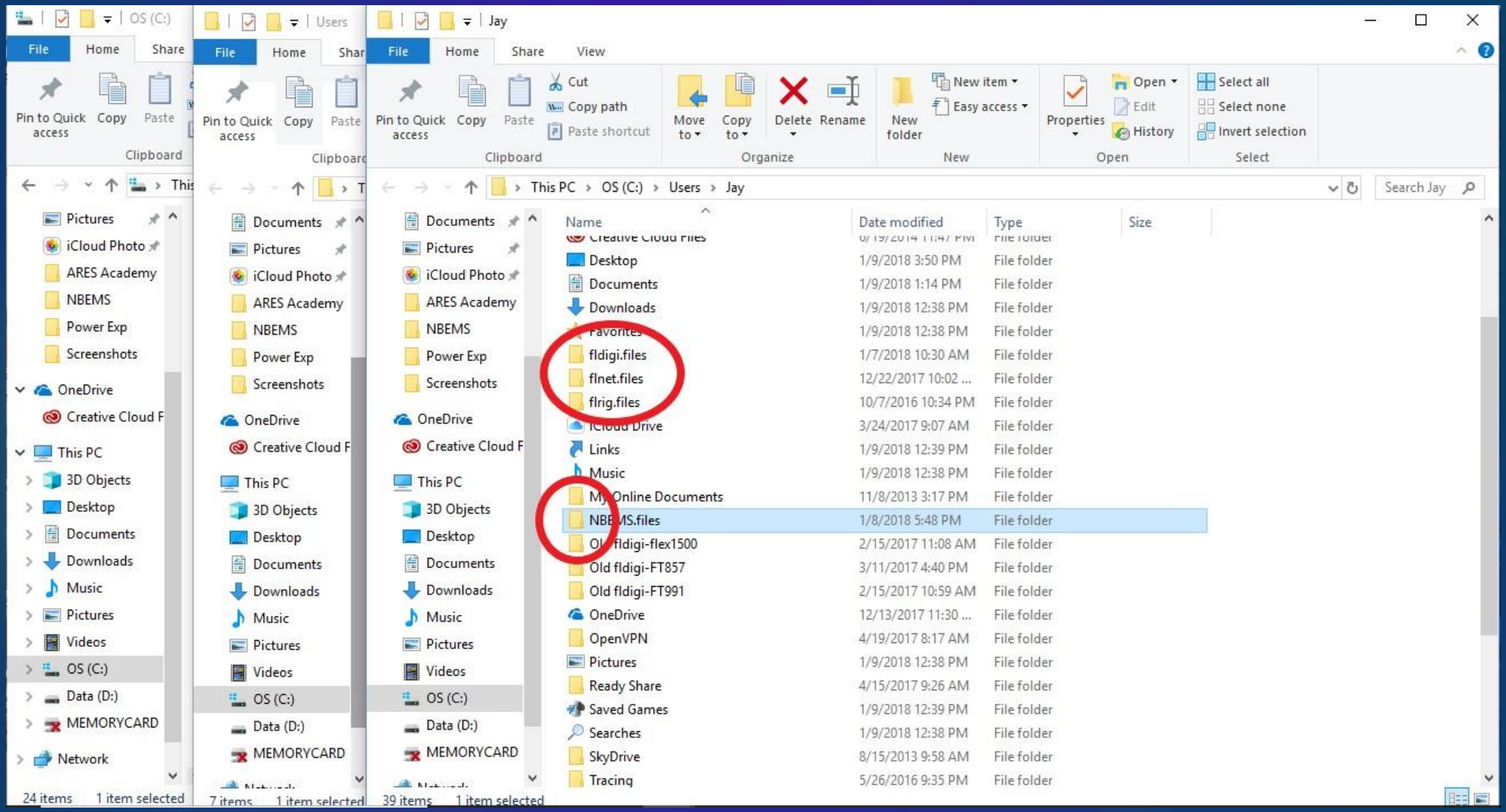


Configure FLdigi

IO – Enable ARQ (Automatic Repeat reQuest)



Where are Program-related Files?



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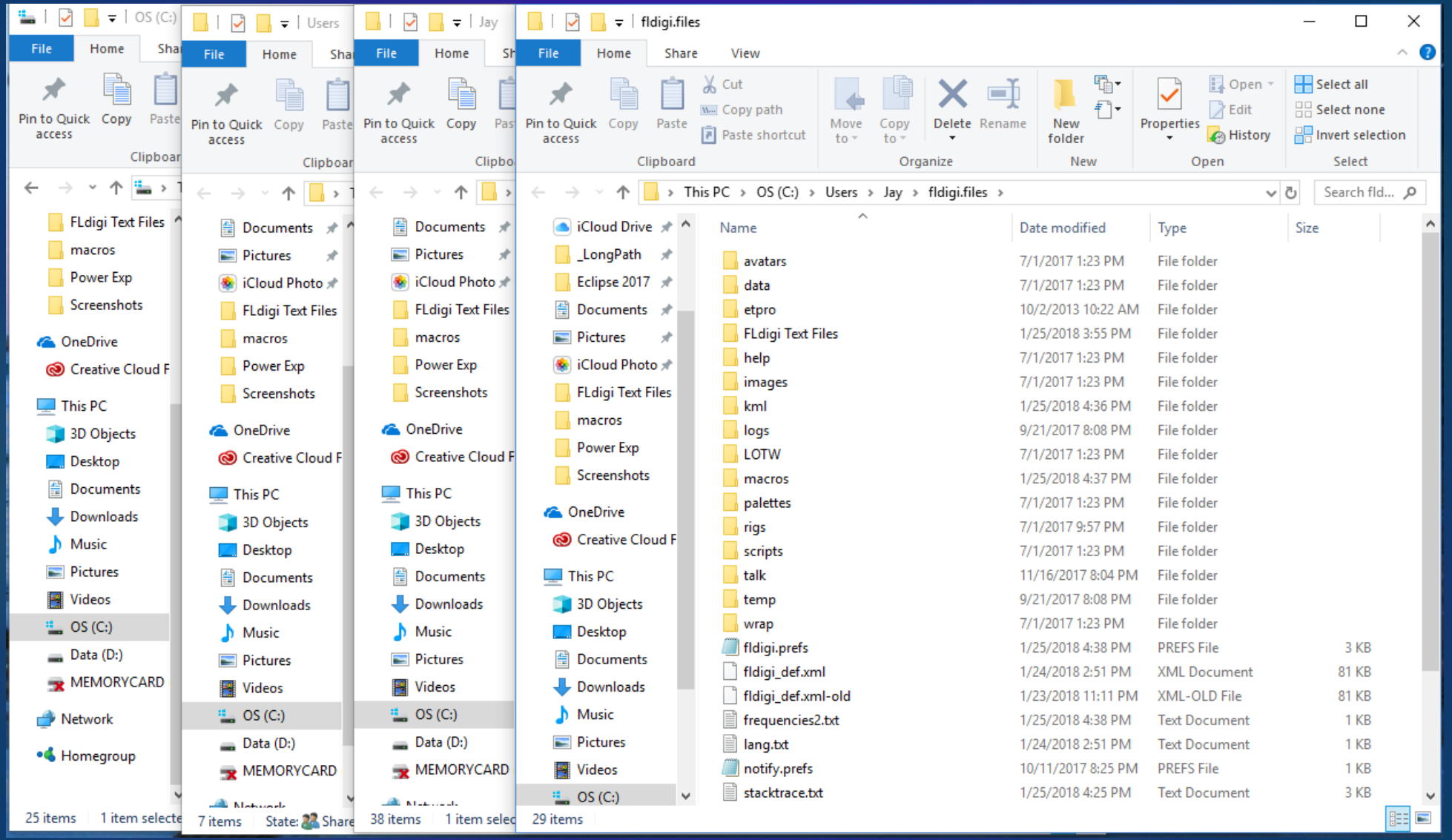
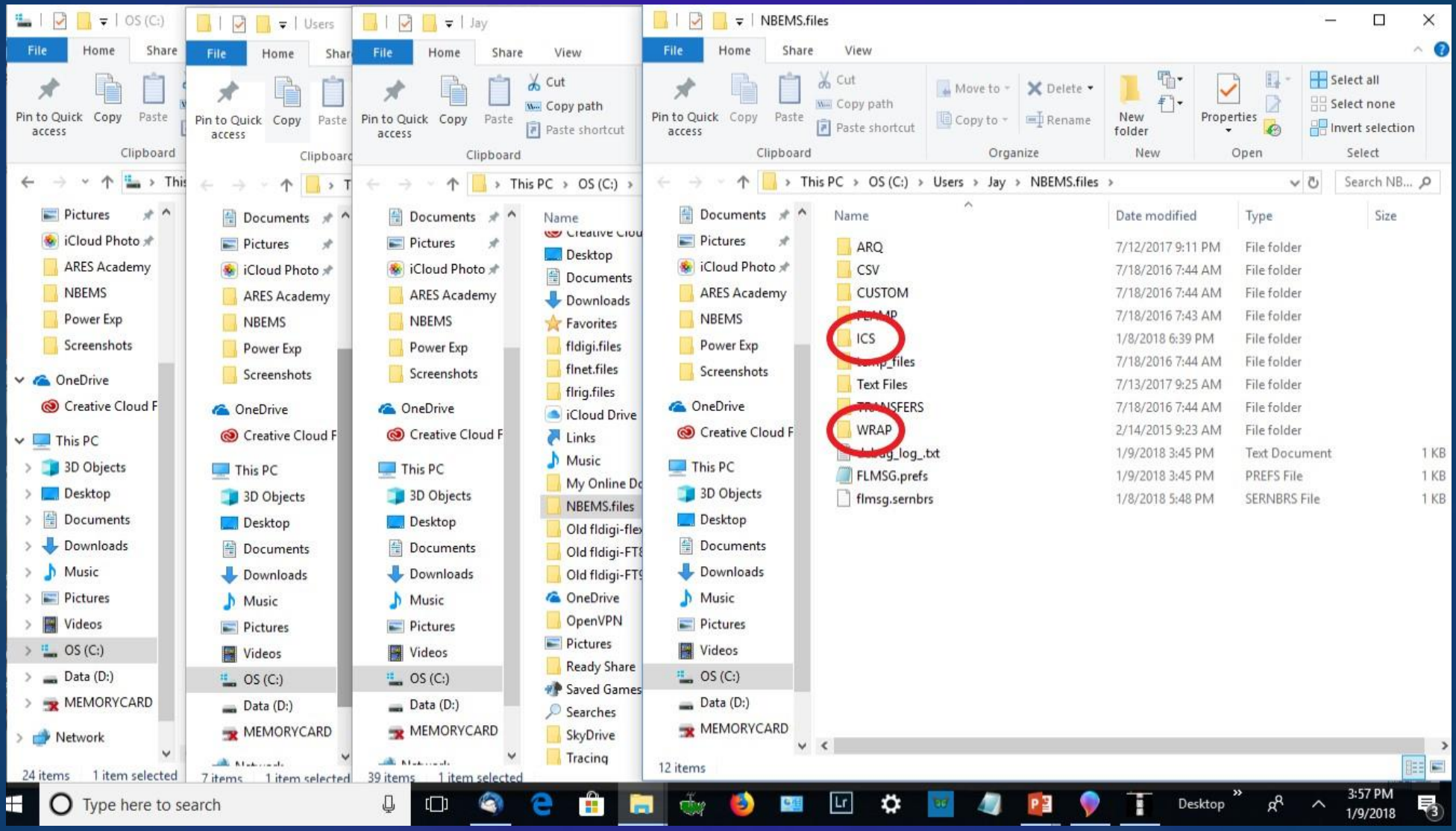
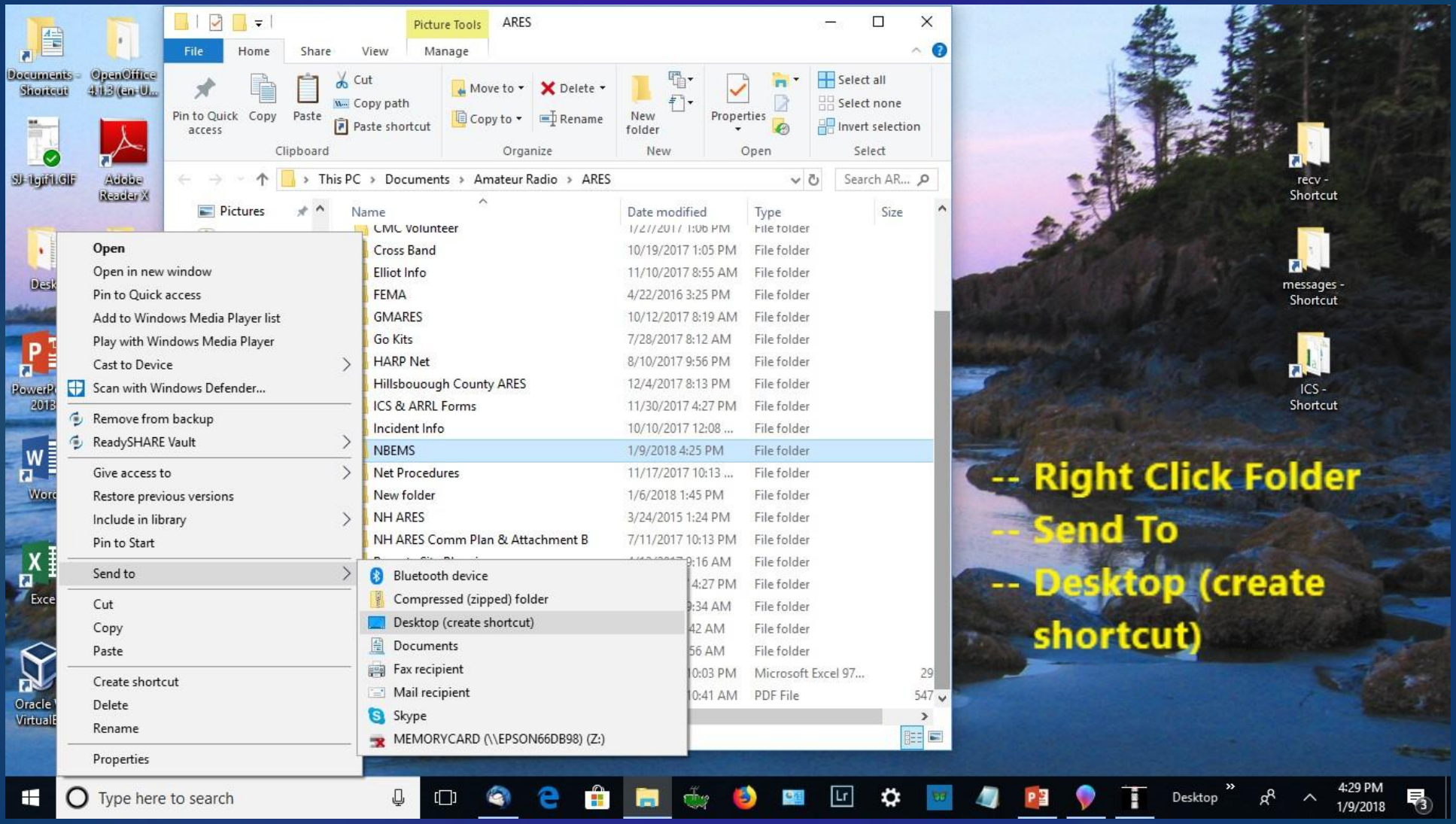


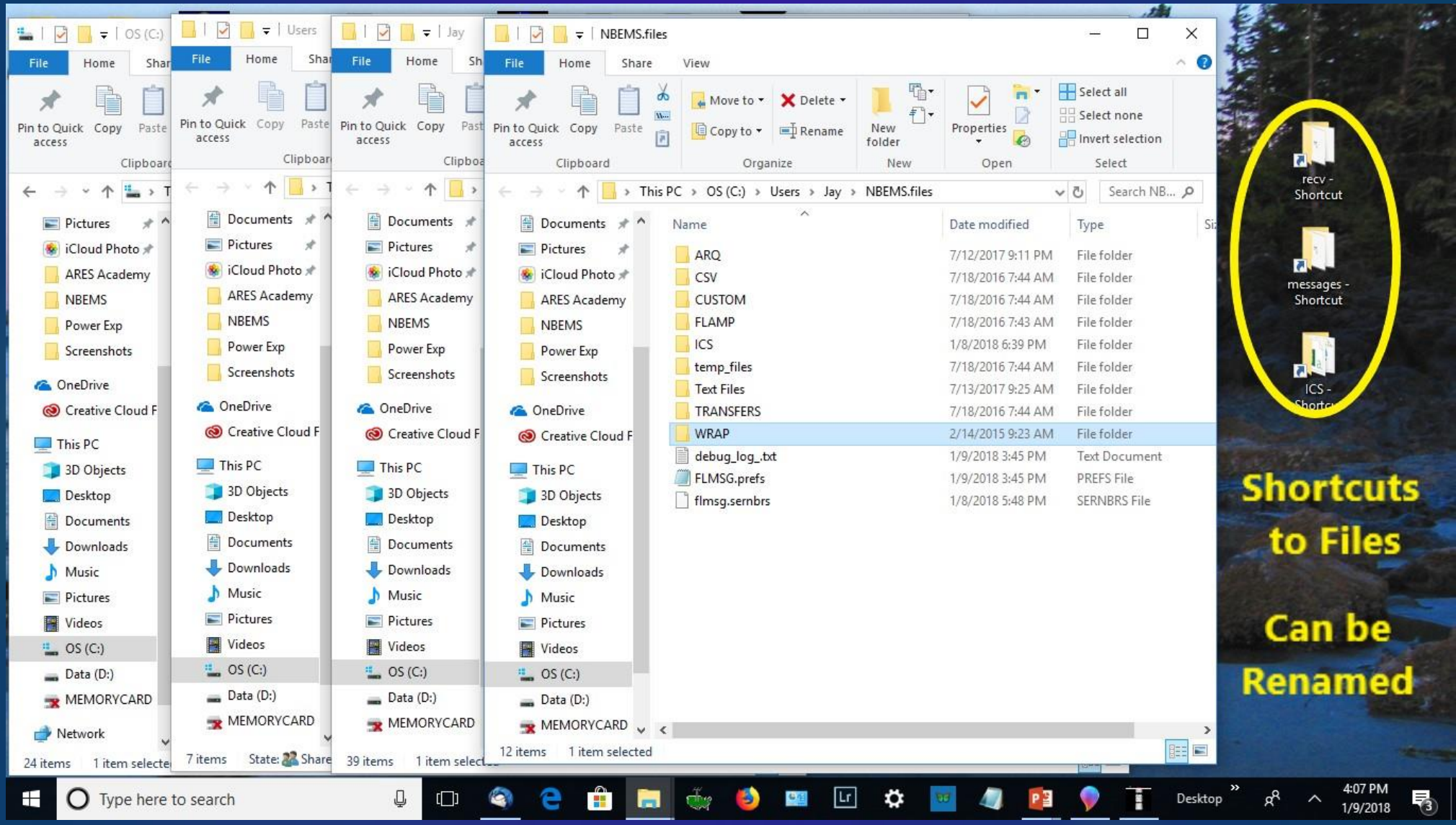
Where are Message Files?



Create Shortcuts



Desktop Shortcuts



DO THESE STEPS IN ORDER

1. Turn off computer, radio and interface
2. Plug in all equipment connections
3. Start computer -- give it a minute to load drivers for interface
4. Turn on interface and radio, Start FLdigi
5. Configure->Audio->Devices->Port Audio->Select Sound Card ->Save
6. Configure->Rig->Hardware PTT

   For SignaLink ->Use separate serial port PTT->Select Com Port-> Enable RTS or DTR depending on computer

   For VOX PTT ->PTT tone on right audio channel->Save
7. RxID and TxID to On. Right click RxID & Enable Passband (VHF/UHF, but not HF)
8. For Repeaters ->Configure->ID->RsID->Pre-signal tone 1 second ->Save

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- ➢ Configure FLmsg
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- Training Possibilities
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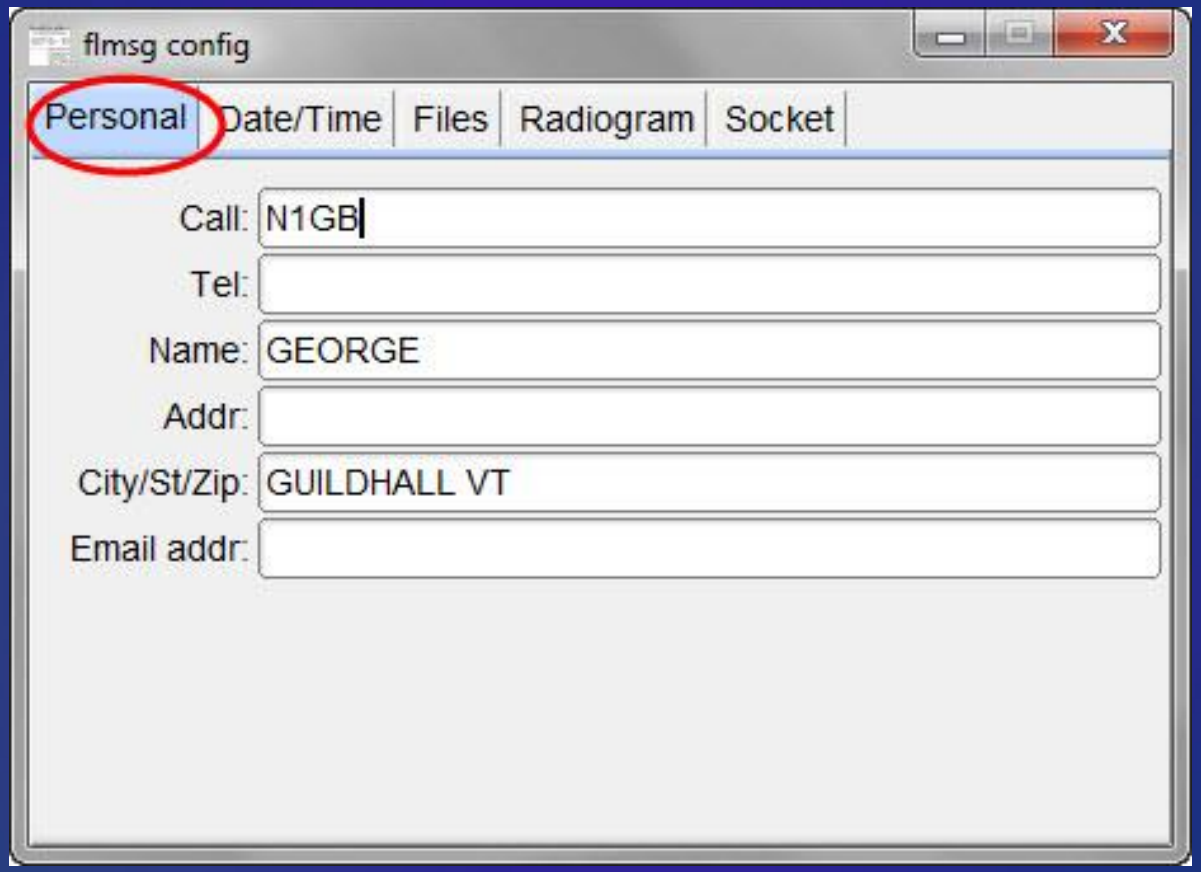
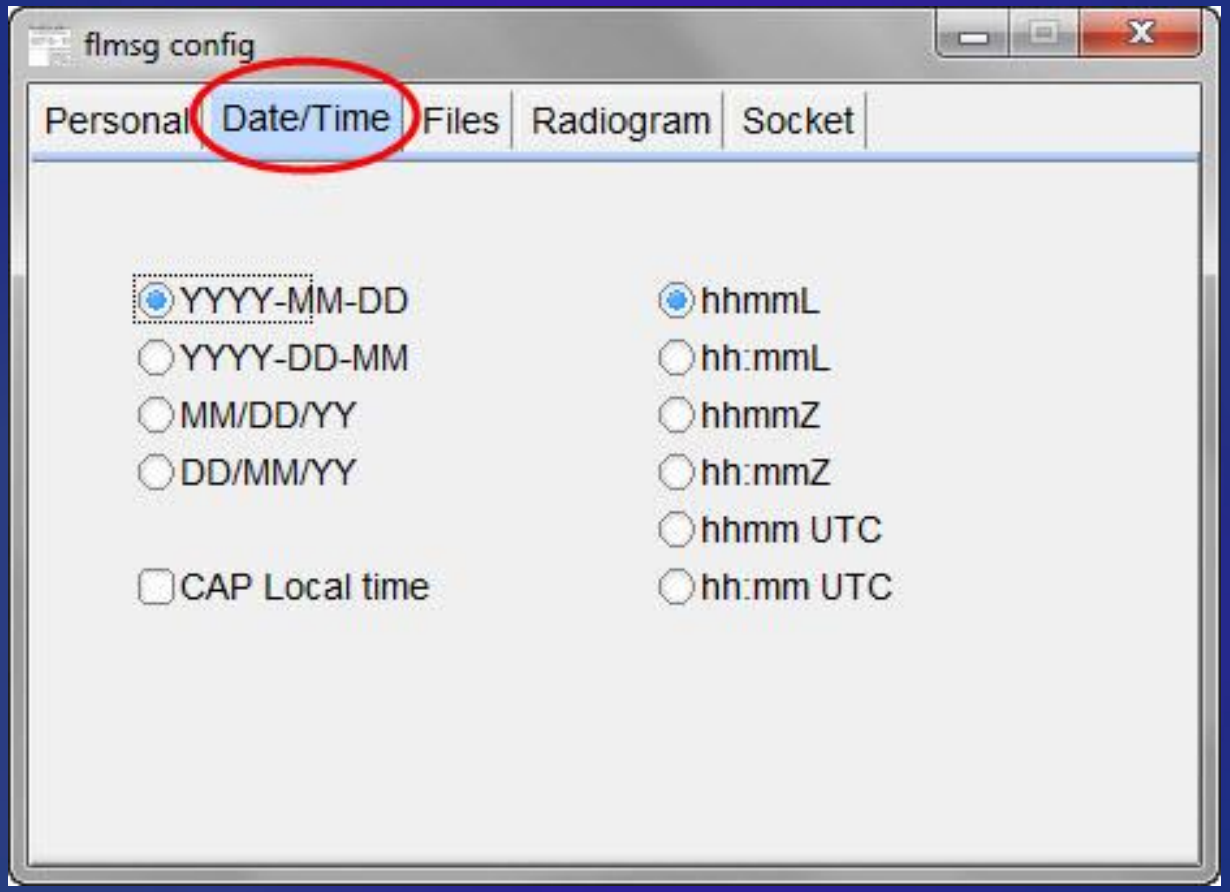
Configure FLmsg

Personal Data



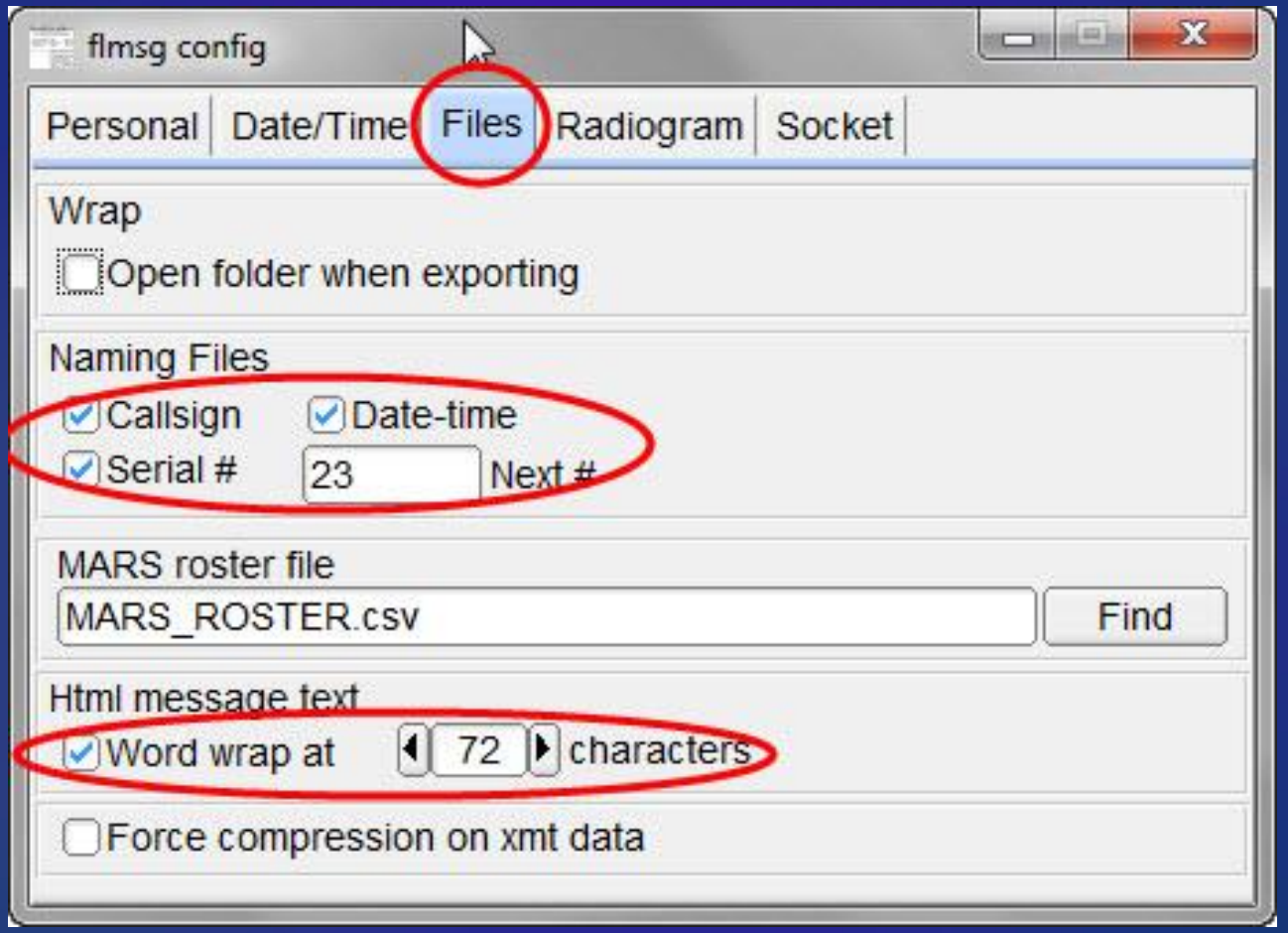
Configure FLmsg

Date – Time Format



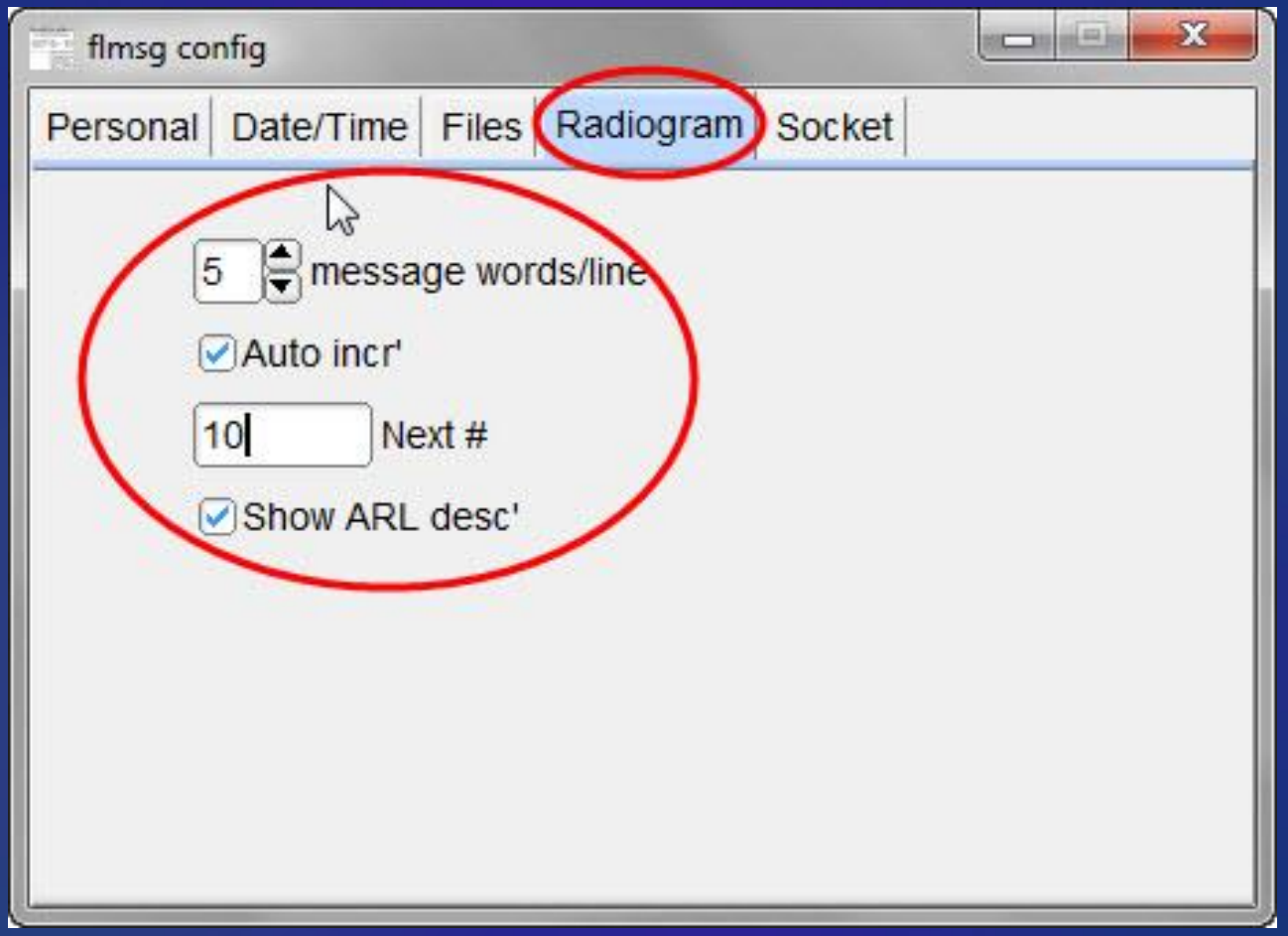
Configure FLmsg

File Names



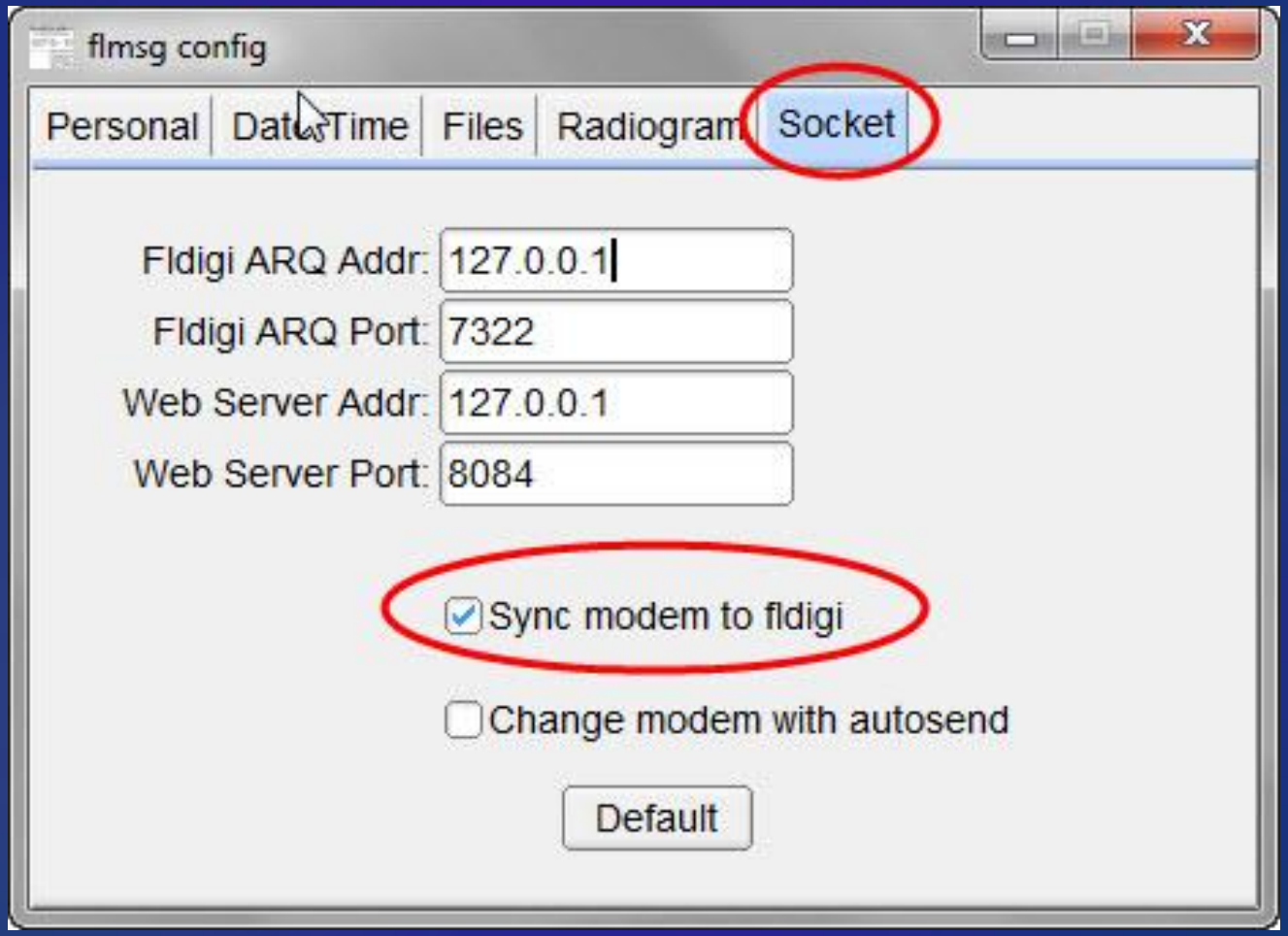
Configure FLmsg

Radiogram



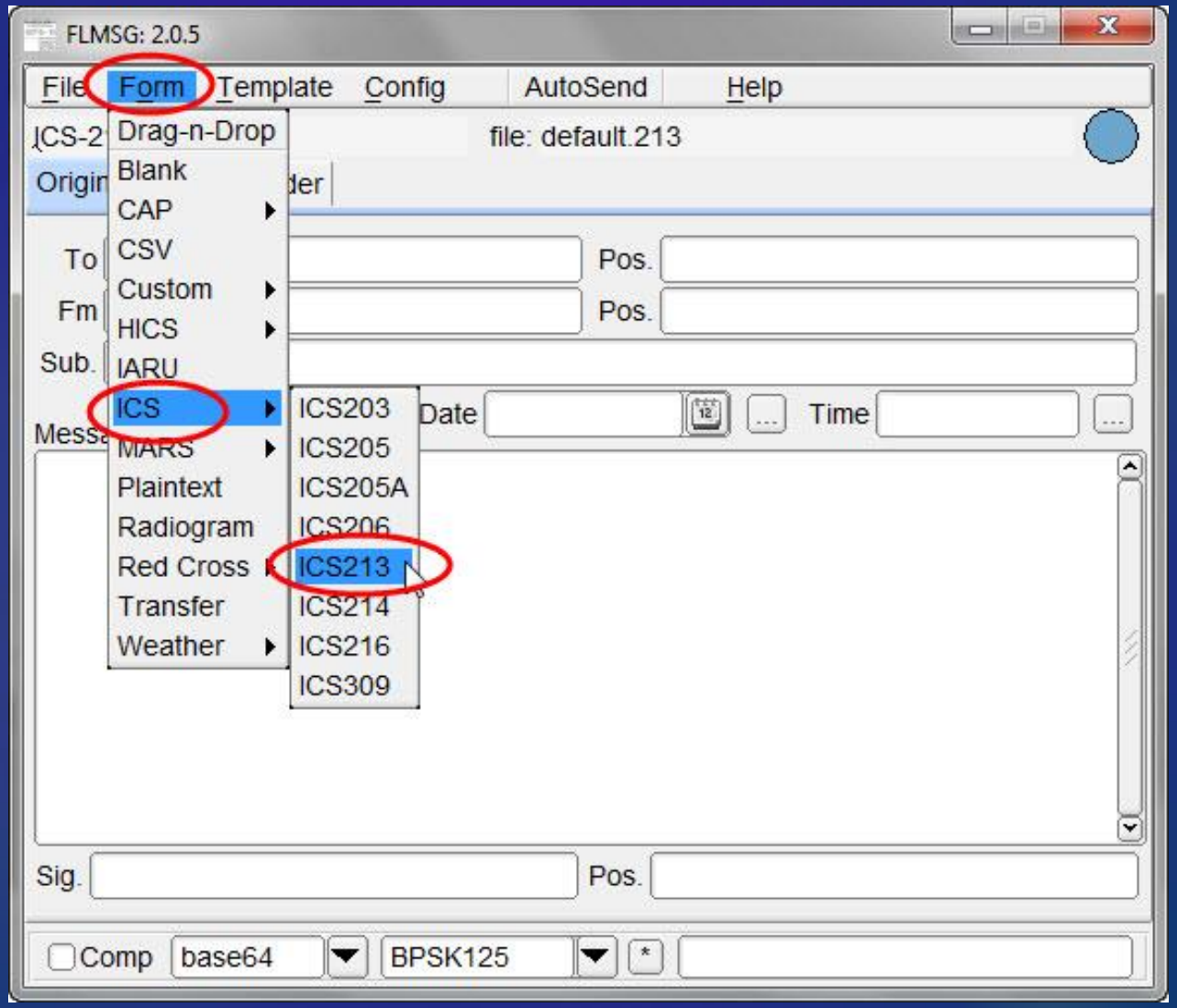
Configure FLmsg

Sync Modem with FLdigi



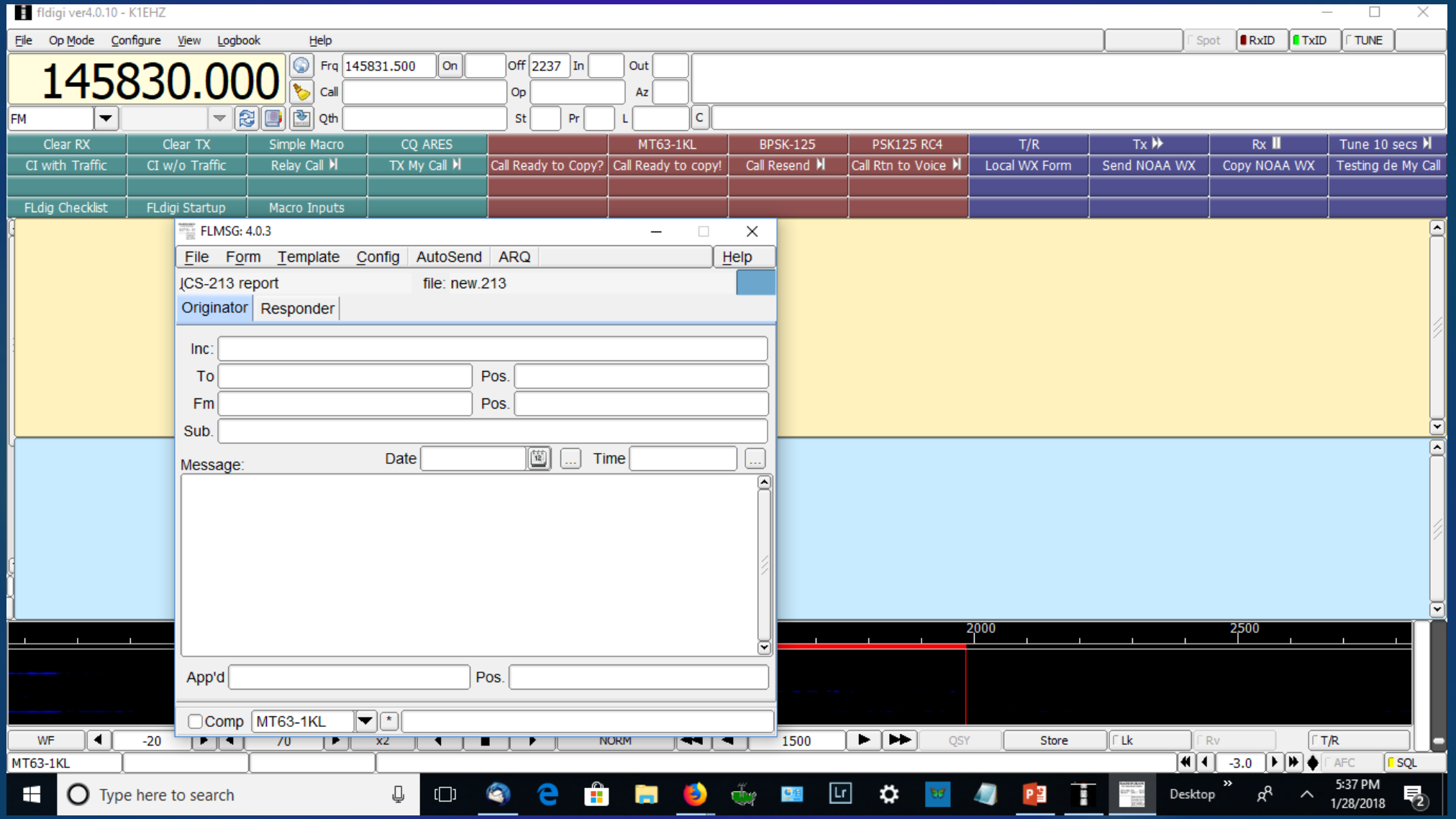
Configure FLmsg

Standard Forms



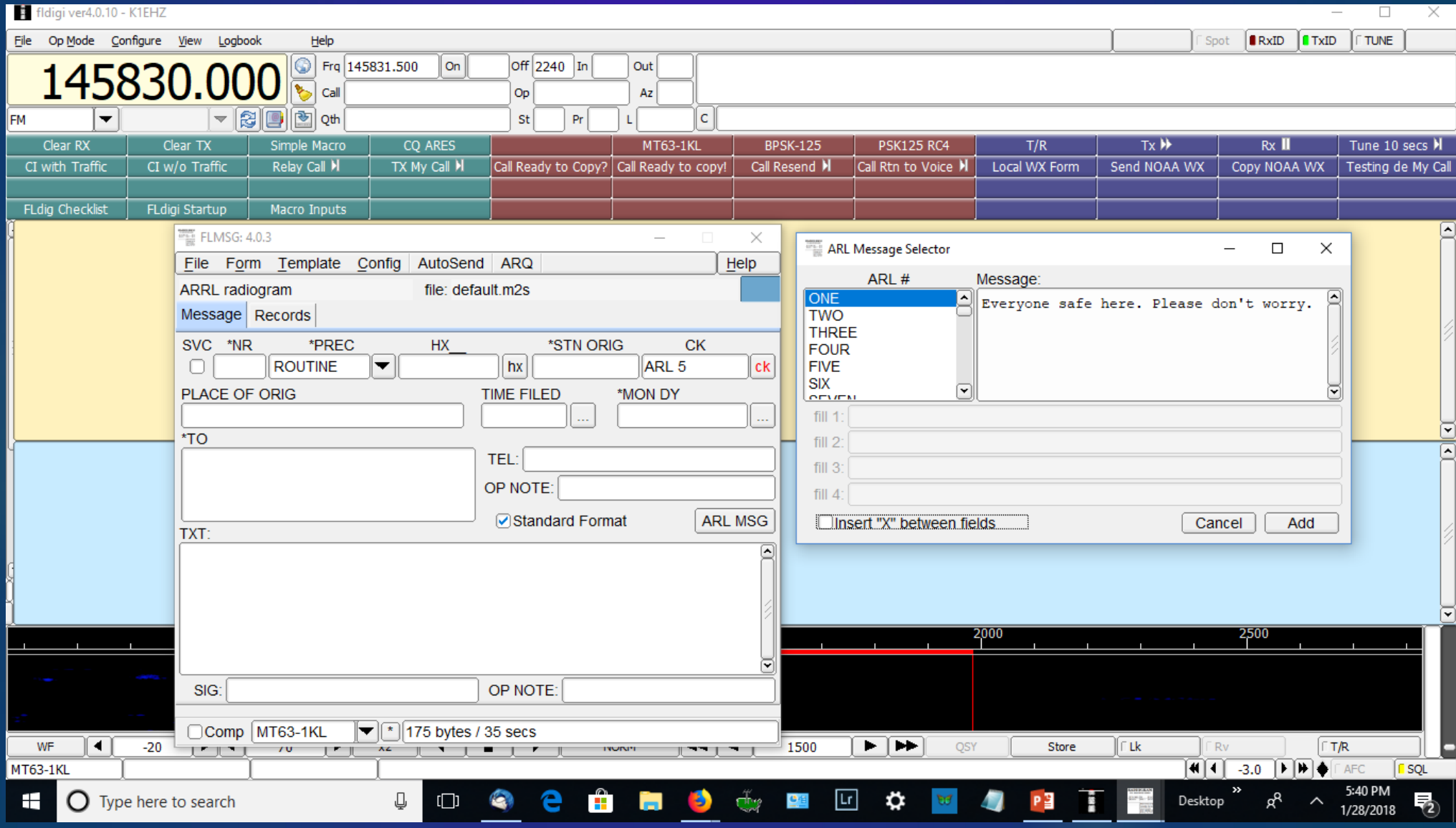
Configure FLmsg

ICS 213



Configure FLmsg

ARRL Radiogram



CSV Files for Spreadsheets

Flmsg simplifies sending and receiving Comma Separated Value (CSV) spreadsheets

To Send:

Form->CSV menu

Drag-and-drop CSV file into the large text box

Push Auto Send button.

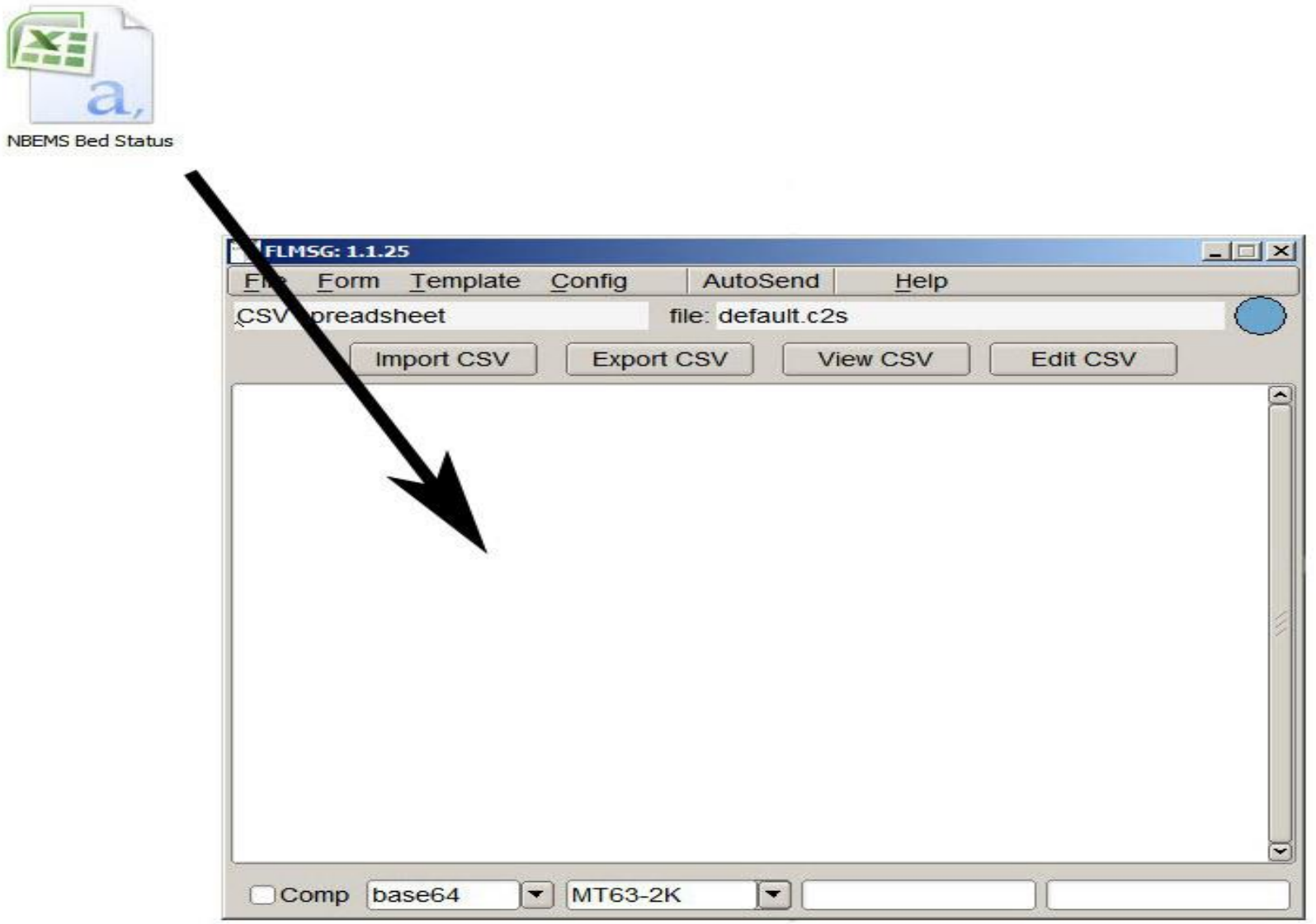
To Receive:

Incoming CSV file will auto open in Flmsg.

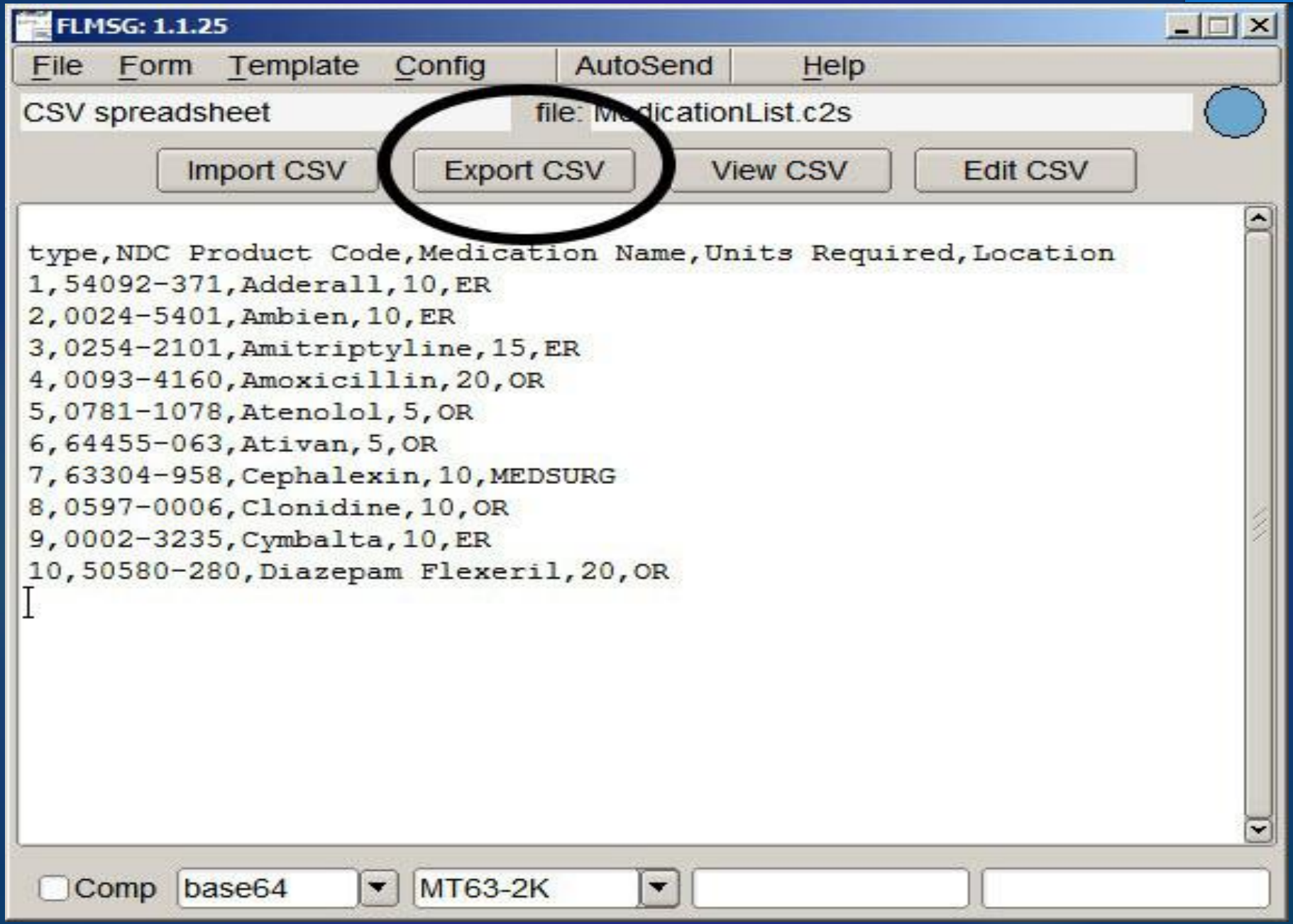
Push Export CSV button.

Save to Desktop or USB drive.

Drag and Drop CSV File



Extract Incoming CSV File



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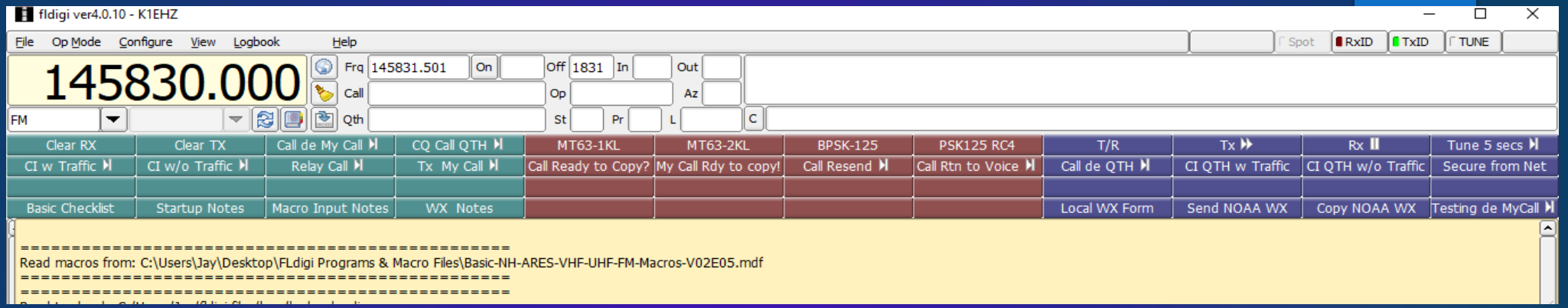
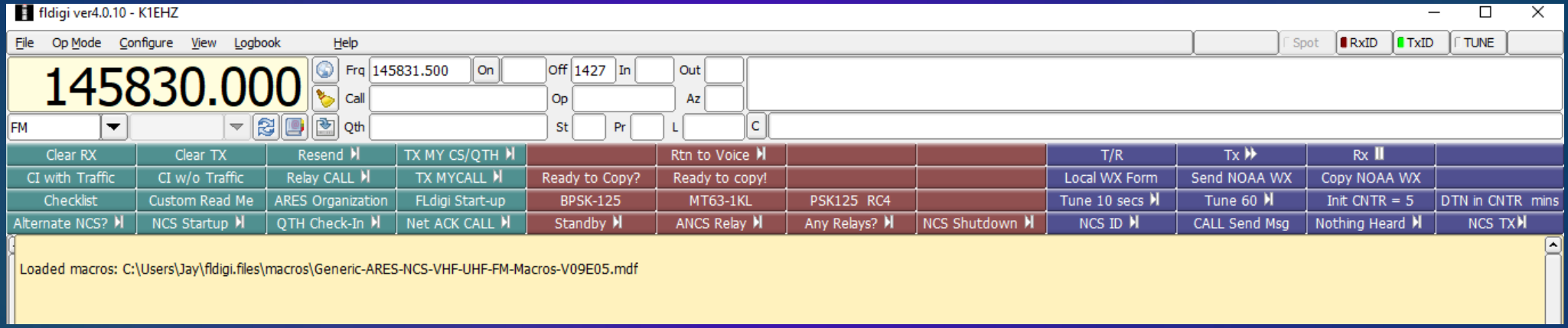
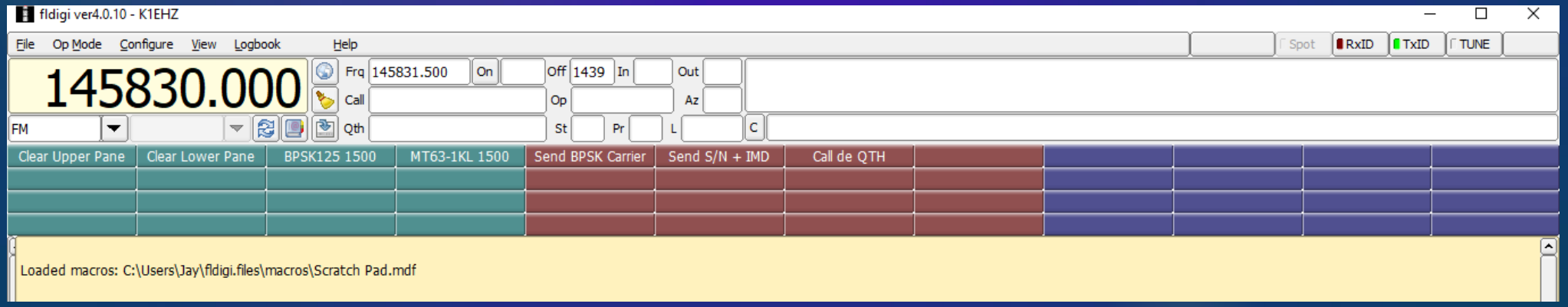
Basic and NCS Macro Files

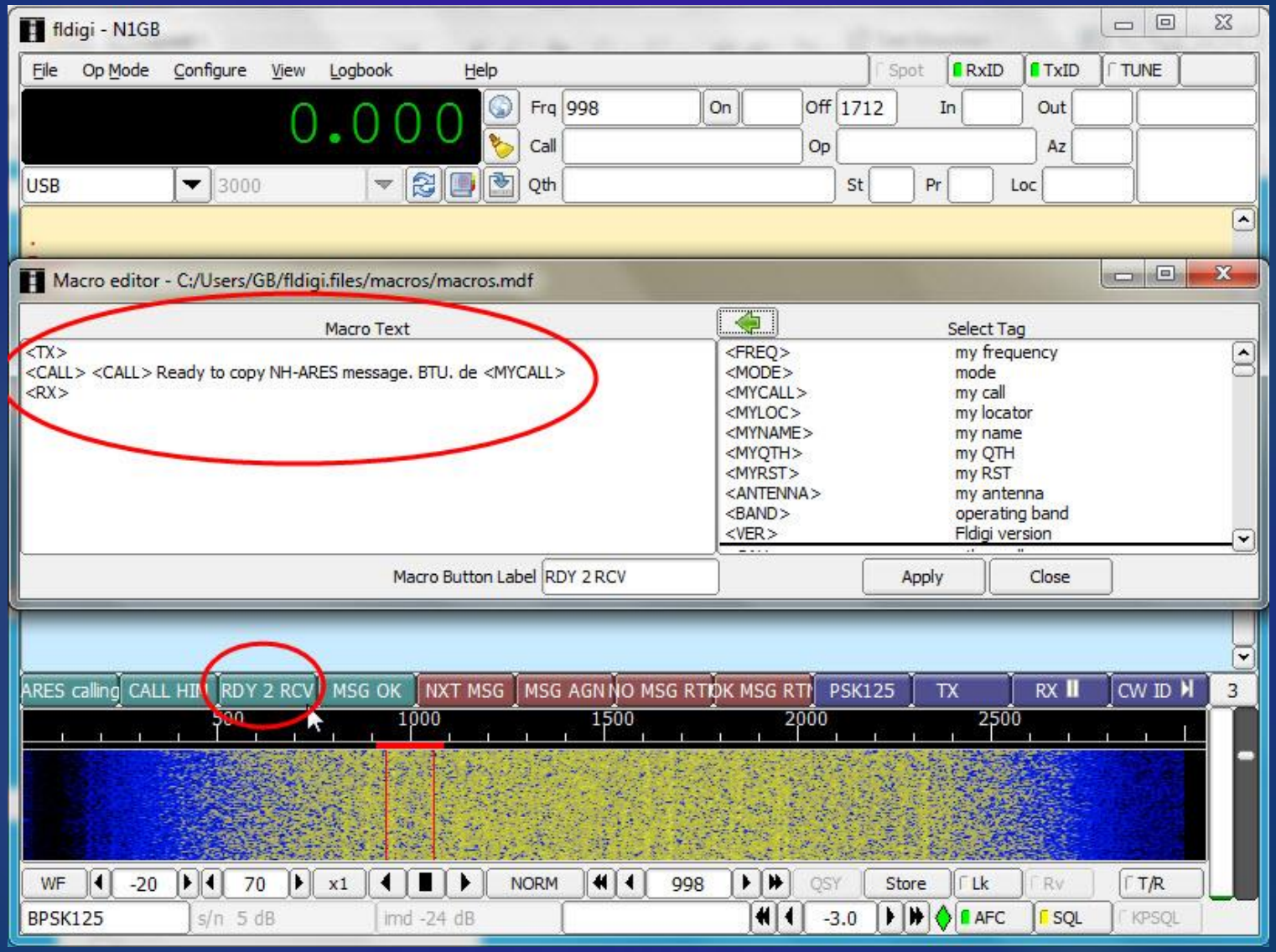




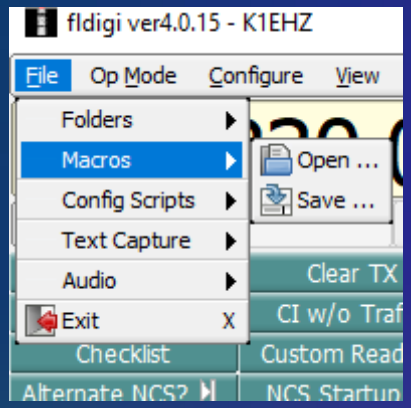


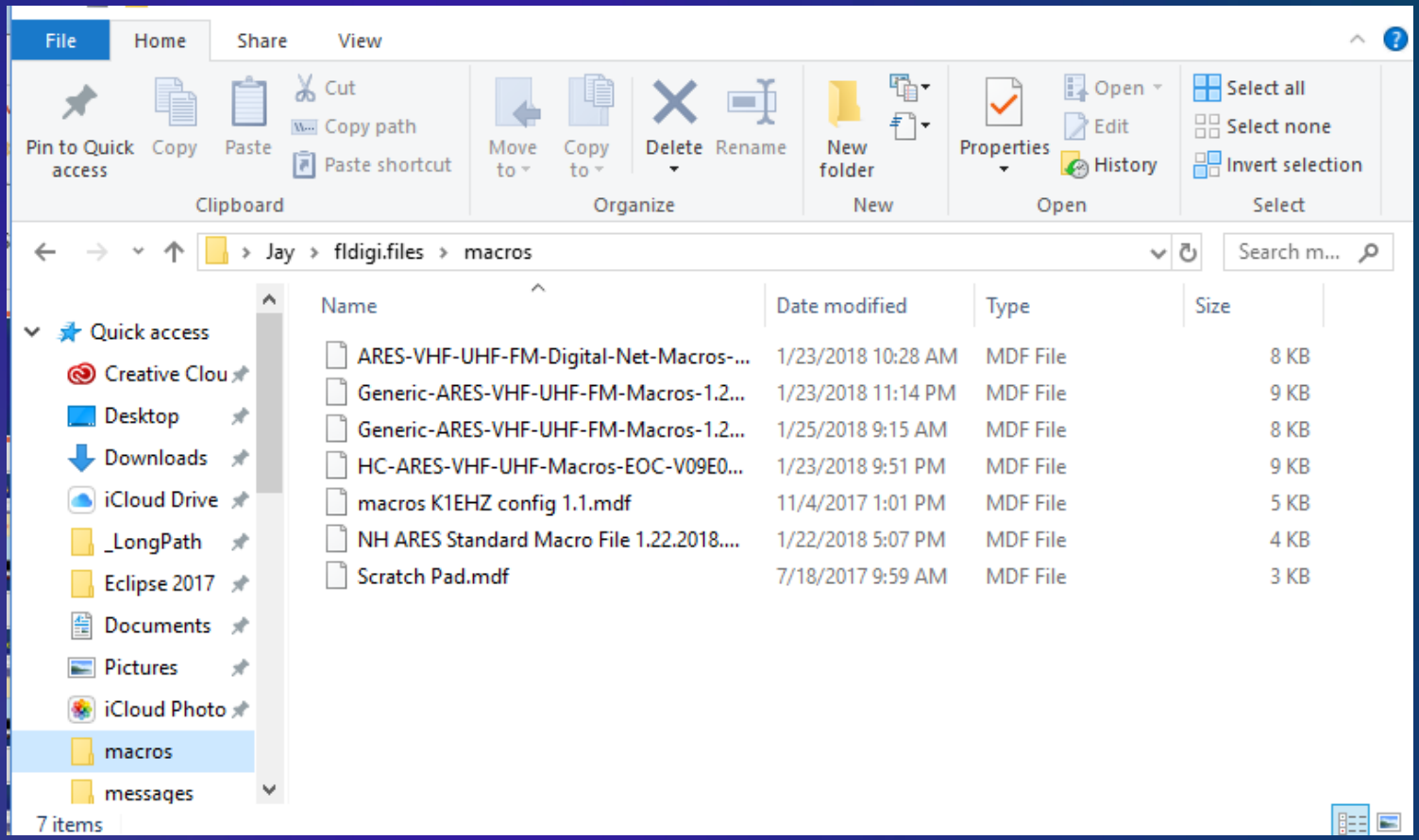
Macros

Use Macros to automate frequent procedures

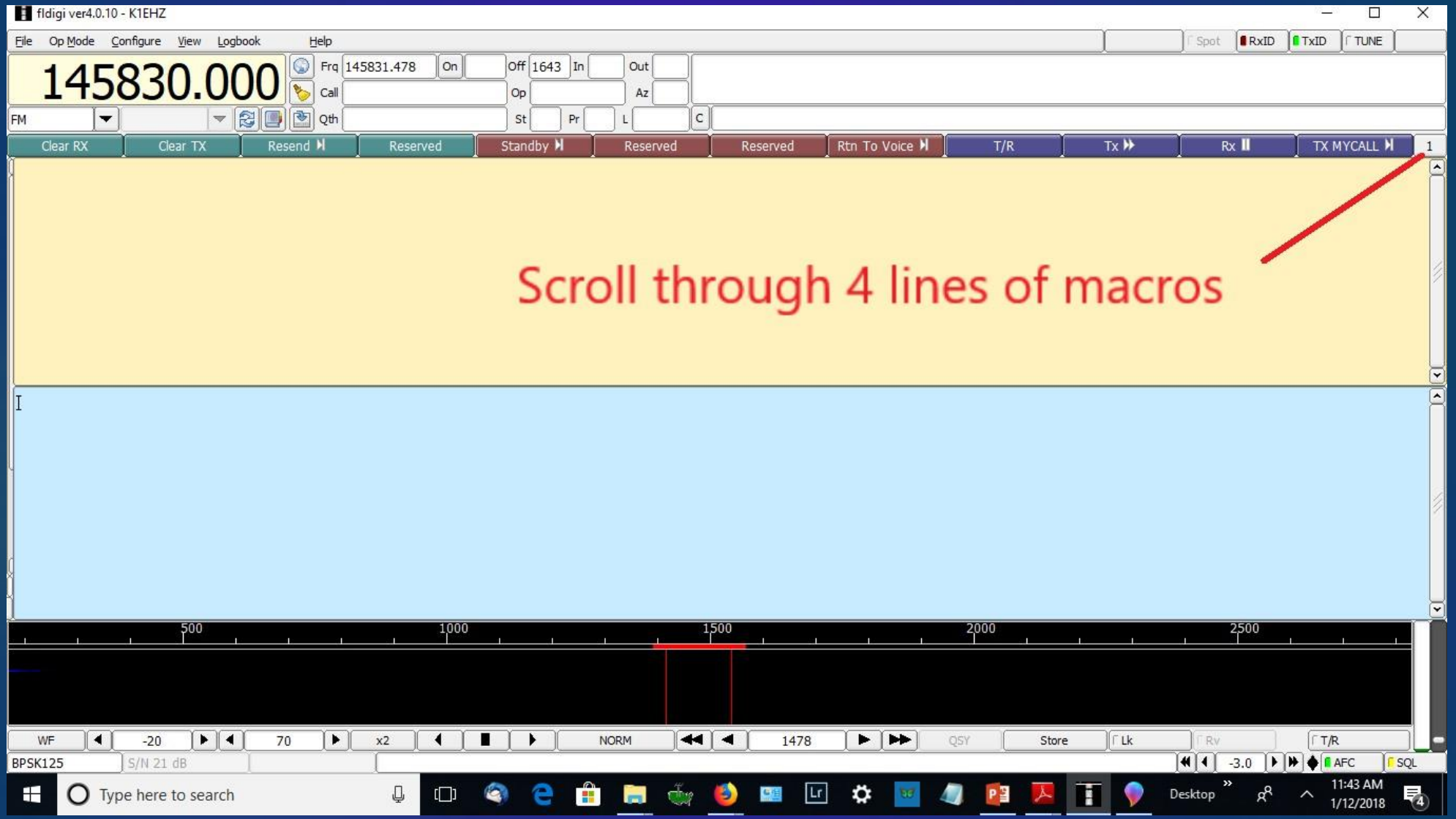


Macro Files

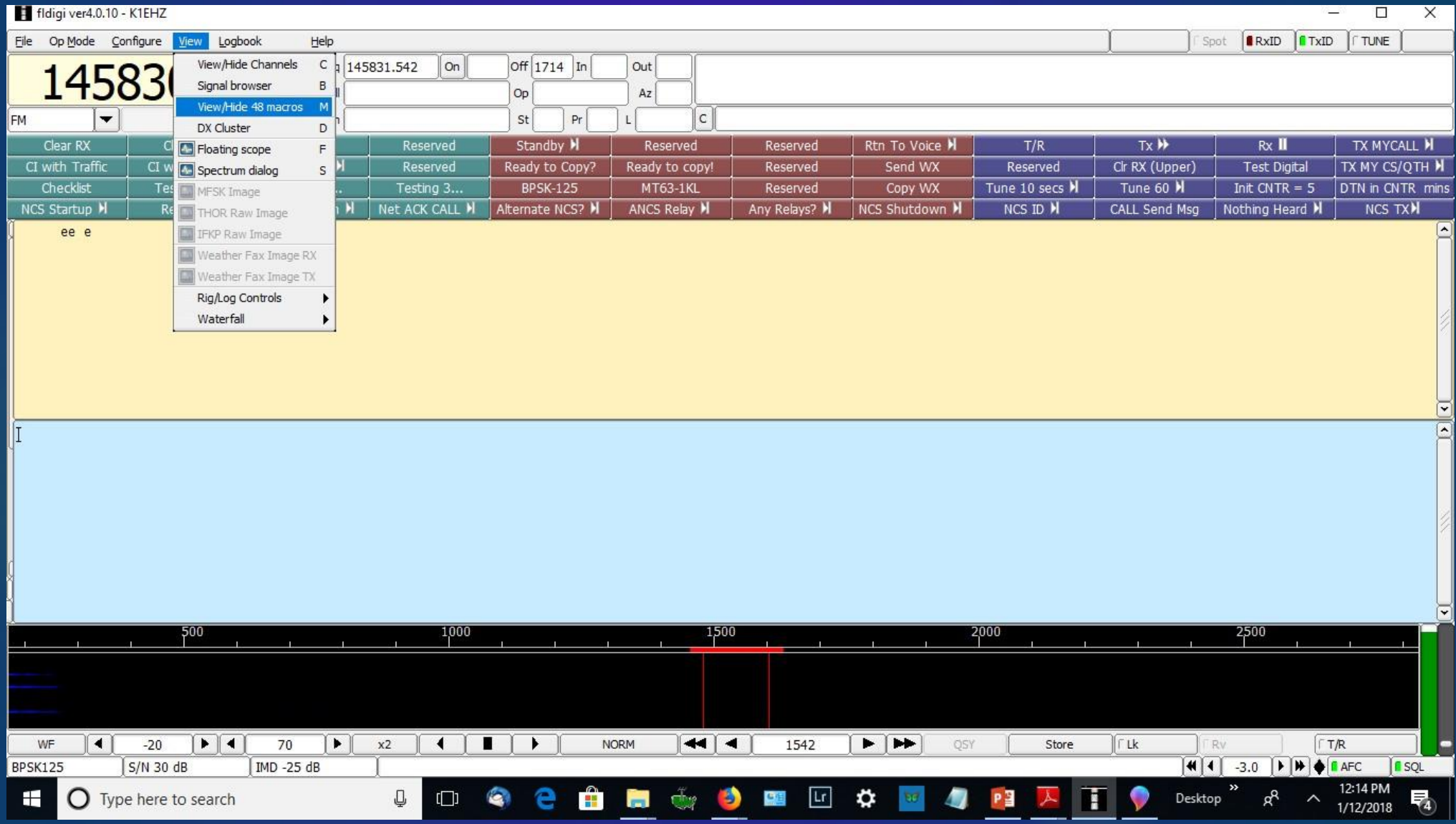

fldigi ver4.0.15 - K1EHZ
File
Op Mode
Configure
View
Folders
Macros
Config Scripts
Text Capture
Audio
Exit
X
Open ...
Save ...
Clear TX
CI w/o Traf
Checklist
Custom Read
Alternate NCS?
NCS Startup


File
Home
Share
View
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New folder
New
Properties
Open
Edit
History
Open
Select all
Select none
Invert selection
Select
Jay
fldigi.files
macros
Search m...
Quick access
Creative Clou
Desktop
Downloads
iCloud Drive
_LongPath
Eclipse 2017
Documents
Pictures
iCloud Photo
macros
messages
Name
Date modified
Type
Size
ARES-VHF-UHF-FM-Digital-Net-Macros-... 1/23/2018 10:28 AM MDF File 8 KB
Generic-ARES-VHF-UHF-FM-Macros-1.2... 1/23/2018 11:14 PM MDF File 9 KB
Generic-ARES-VHF-UHF-FM-Macros-1.2... 1/25/2018 9:15 AM MDF File 8 KB
HC-ARES-VHF-UHF-Macros-EOC-V09E0... 1/23/2018 9:51 PM MDF File 9 KB
macros K1EHZ config 1.1.mdf 11/4/2017 1:01 PM MDF File 5 KB
NH ARES Standard Macro File 1.22.2018.... 1/22/2018 5:07 PM MDF File 4 KB
Scratch Pad.mdf 7/18/2017 9:59 AM MDF File 3 KB
7 items

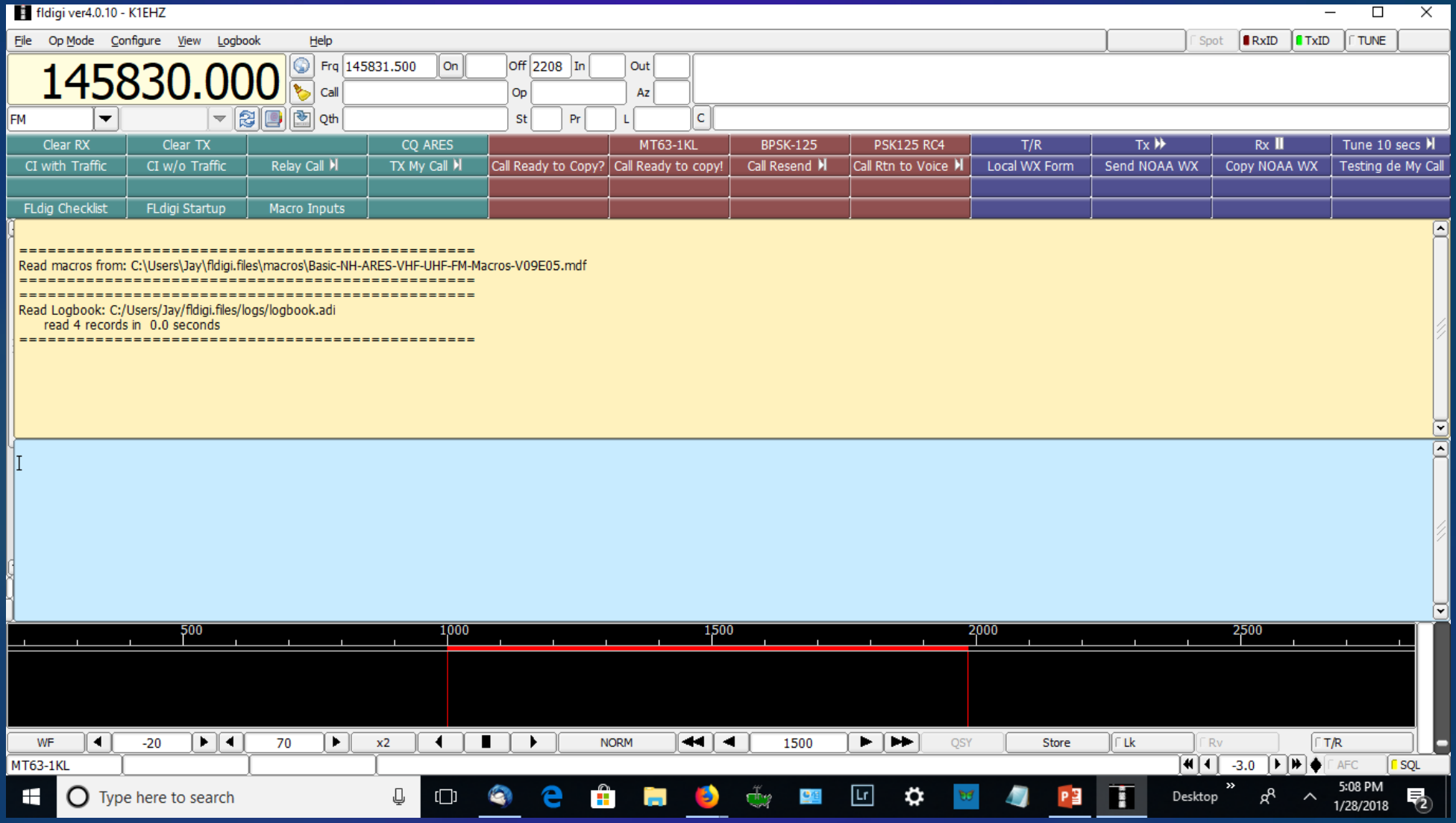
Scroll Through Macros



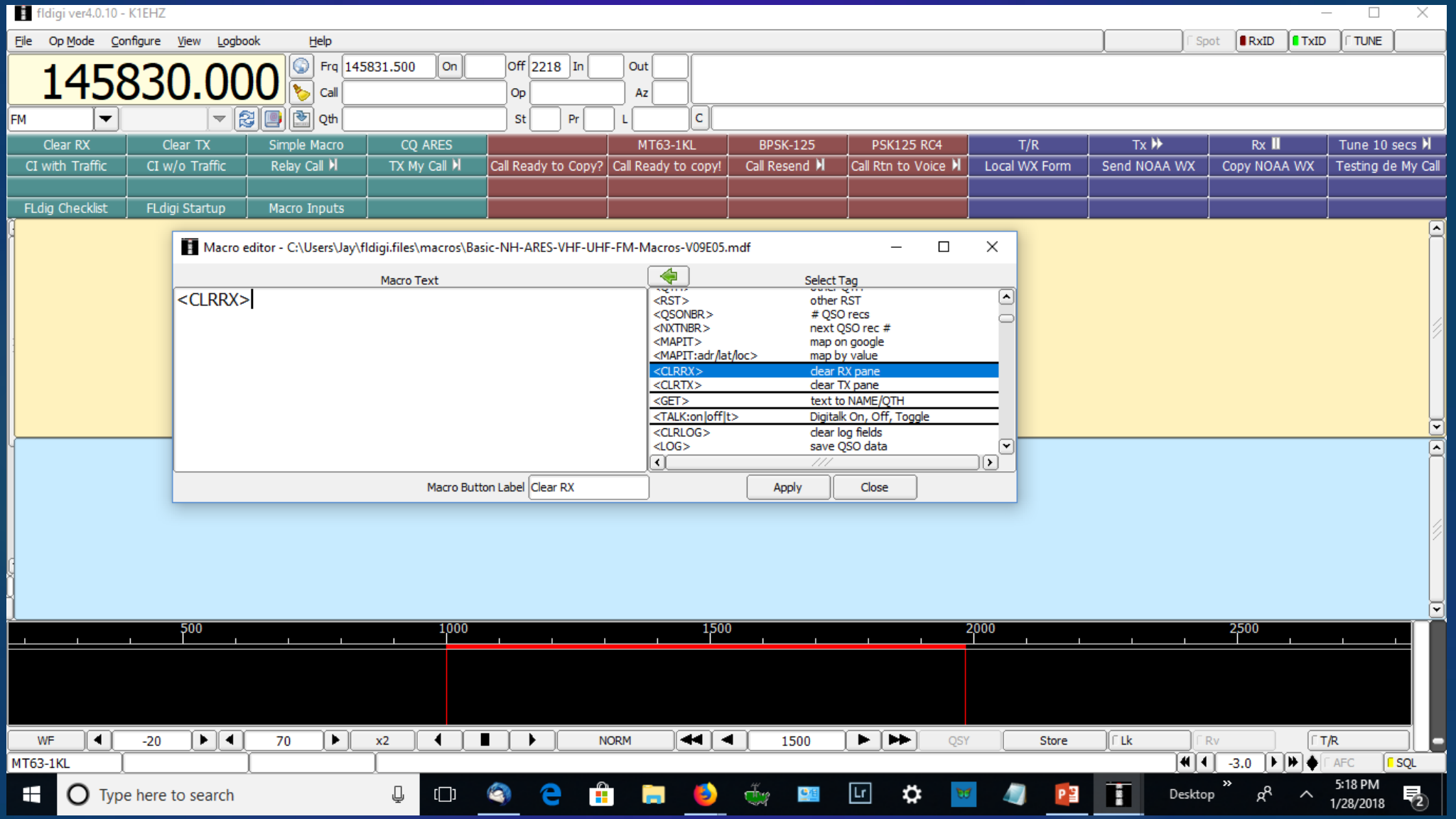
View / Hide All 48 Macros



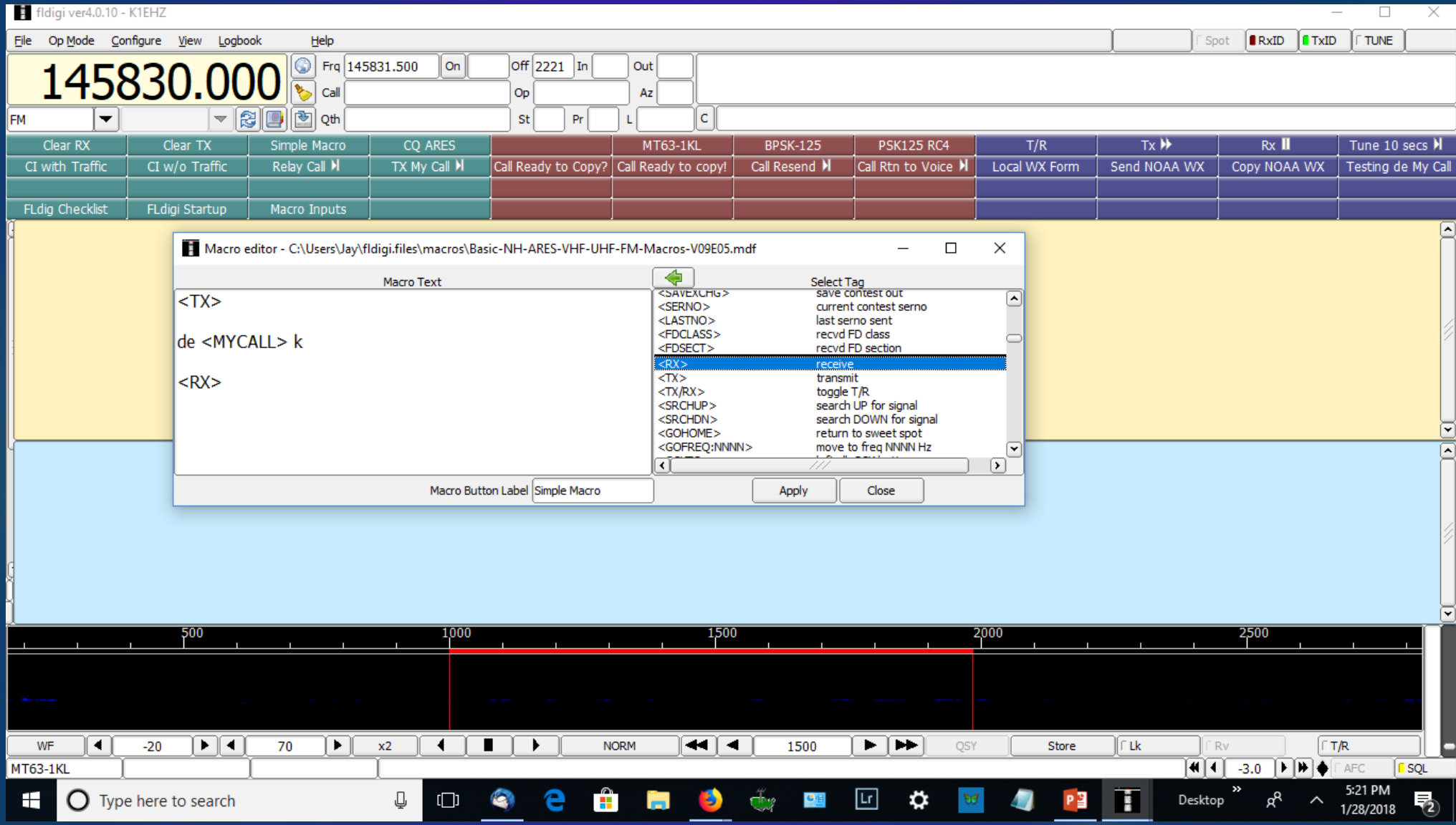
Write a Simple Macro



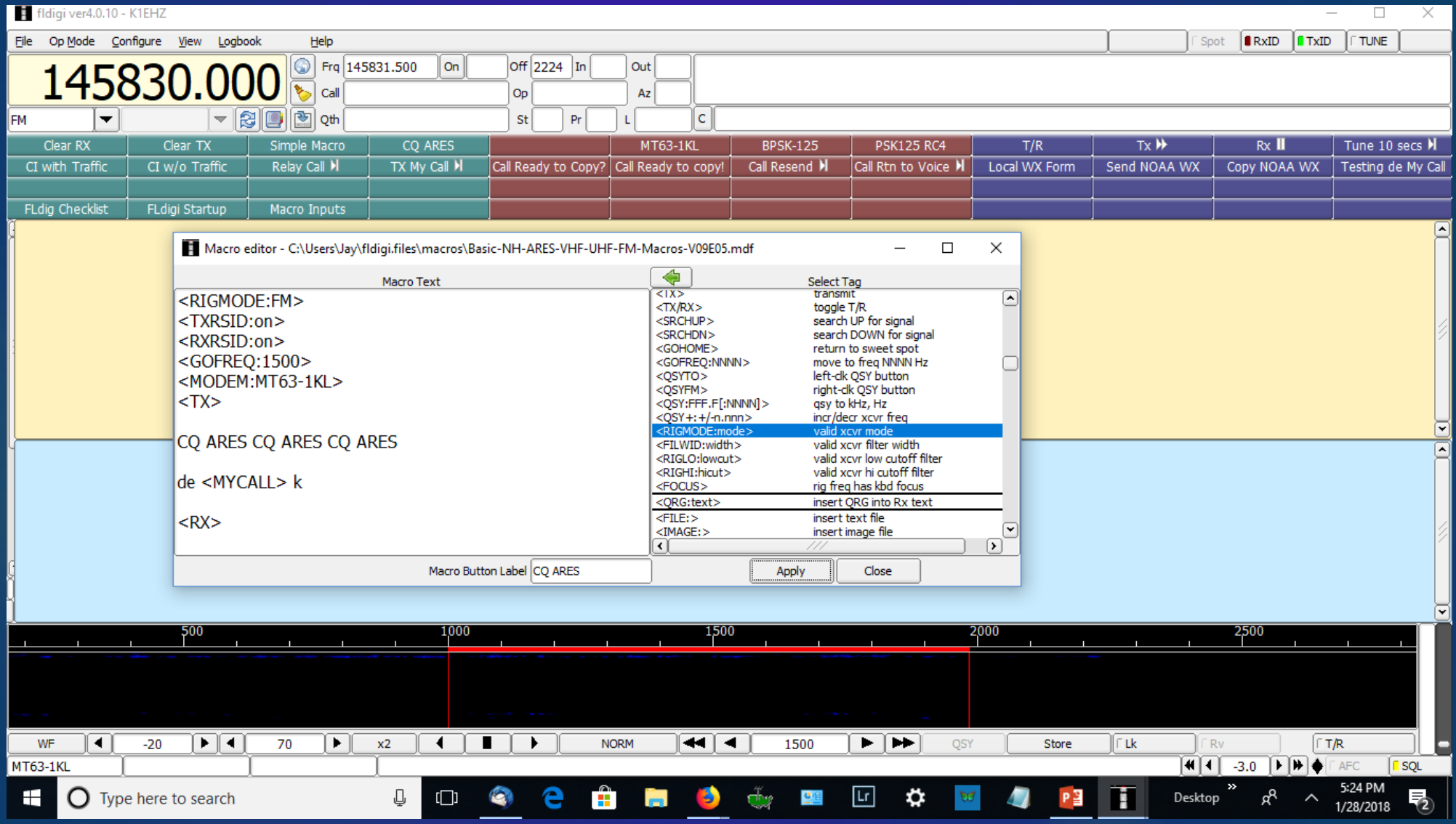
Write a Simple Macro



Write a Simple Macro

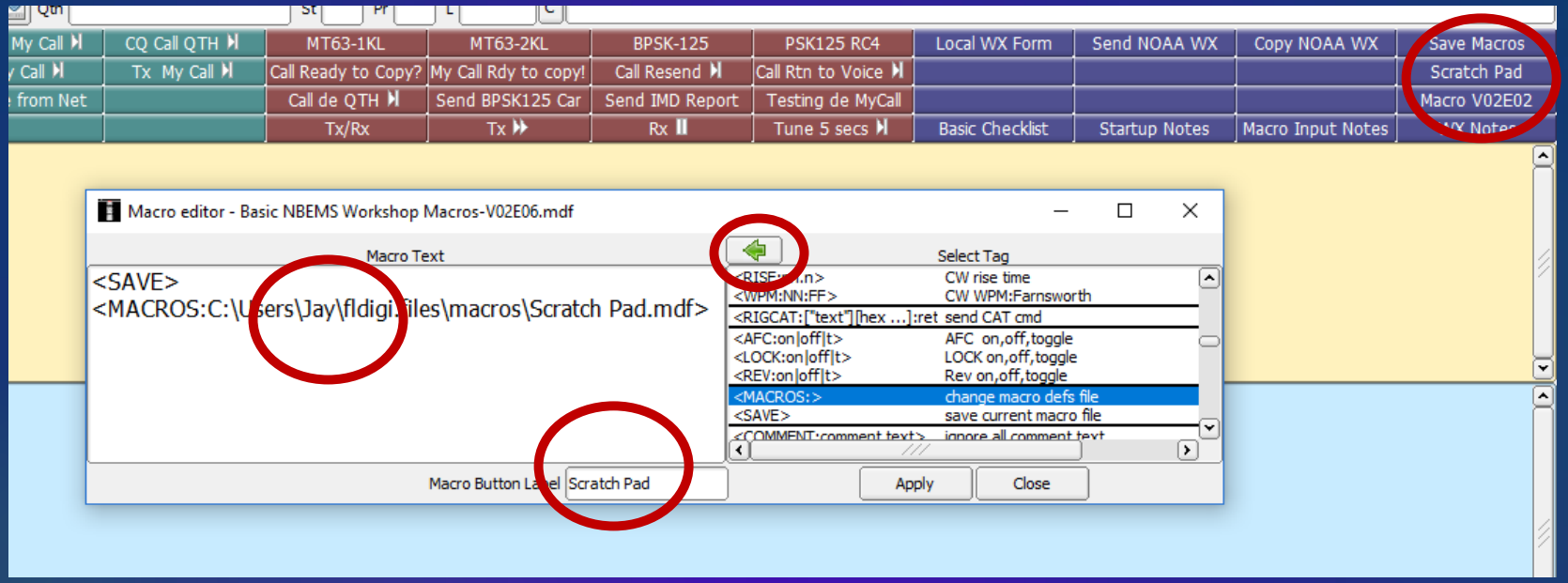


Write a Simple Macro



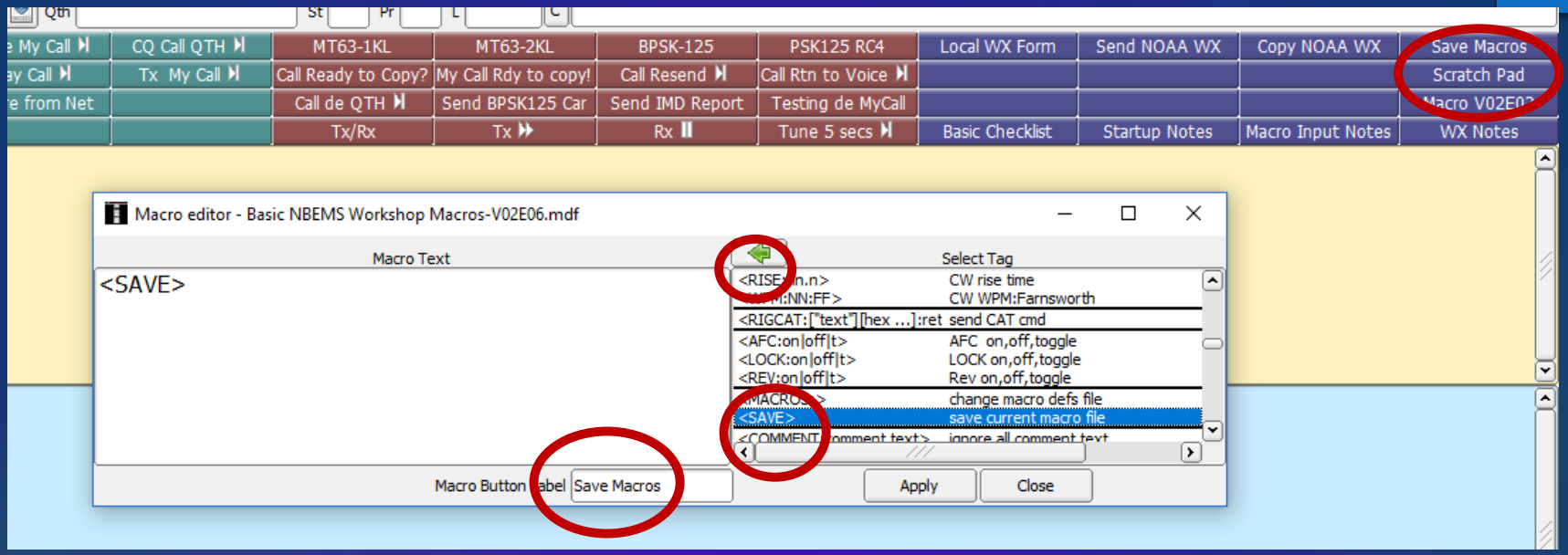
Customize a Macro

Change another user name to your user name



- Right click on Scratch Pad macro button.
- Scroll down to <MACROS> tag
- Click Green arrow at the top.
- Navigate to C:/Users/username/fldigi.files/macros.
- Select Scratch-Pad.mdf.
- Open.
- Apply.
- Save macro set using File->Macros->save.

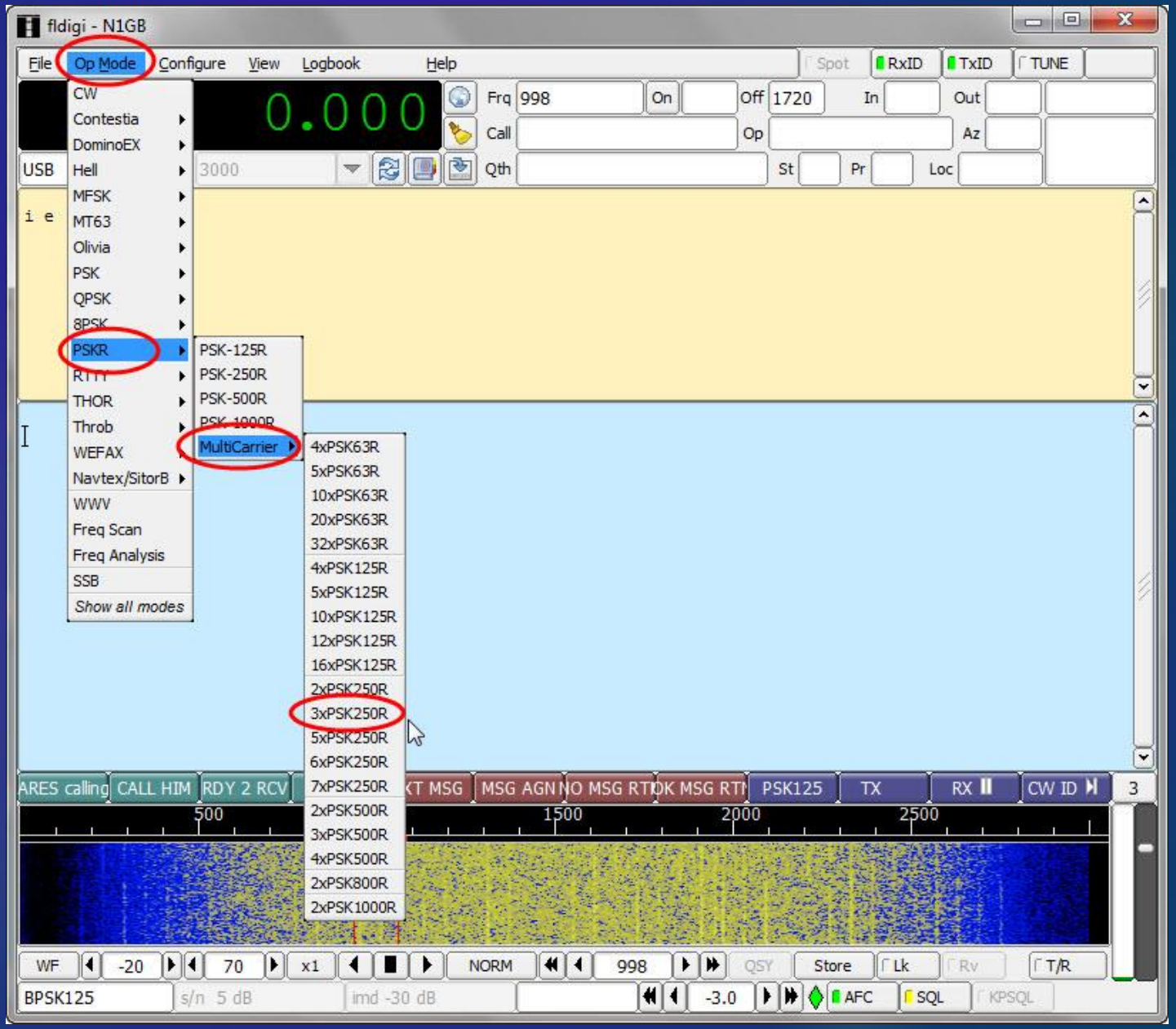
Add a Save Macro Button



- Right click an empty macro button.
- Scroll down to the <SAVE> macro tag.
- Click the Green arrow at the top.
- Apply.
- Save macro set using File->Marcos->Save.
- As an exercise, try adding <SAVE> to the macro button created on the last slide.

Fldigi Operation

Modes



Fldigi Operation

Modes

Mode	WPM	BW (Hz)	Primary Use(s)
PSK125	**150**	**320**	**HF/VHF 'live' keyboard** *
PSK 4x125R	330	475	HF/VHF file transfer mode
PSK 3x250R	660	950	HF/VHF file transfer mode *
PSK 5x250R	1100	1650	VHF file transfer mode
Olivia 8/500	30	500	HF keyboard mode
MT63-1KL	**100**	**1000**	**HF file transfer mode**
MT63-2KL	**200**	**2000**	**VHF file transfer mode**
Thor1x50	150	900	HF Keyboard mode *

* NH Digital Net & HARP

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Training Possibilities

- FLdigi has many components making it very flexible and also very confusing for new users.
- Most default settings work well.
- Train individually, in pairs, and in groups.
- FLdigi can be used on any computer without a radio, so individuals can practice at any time.
- FLdigi can be used for pair and group training.
  - Connect two computers with audio cables.
  - Use HTs connected to computers with acoustic coupling or audio interfaces.
  - Use Go Box radios with dummy load antennas.
  - Use minimum power when radios in close proximity.

Individual or Pair Training by Connecting Two Computers with Audio Cables

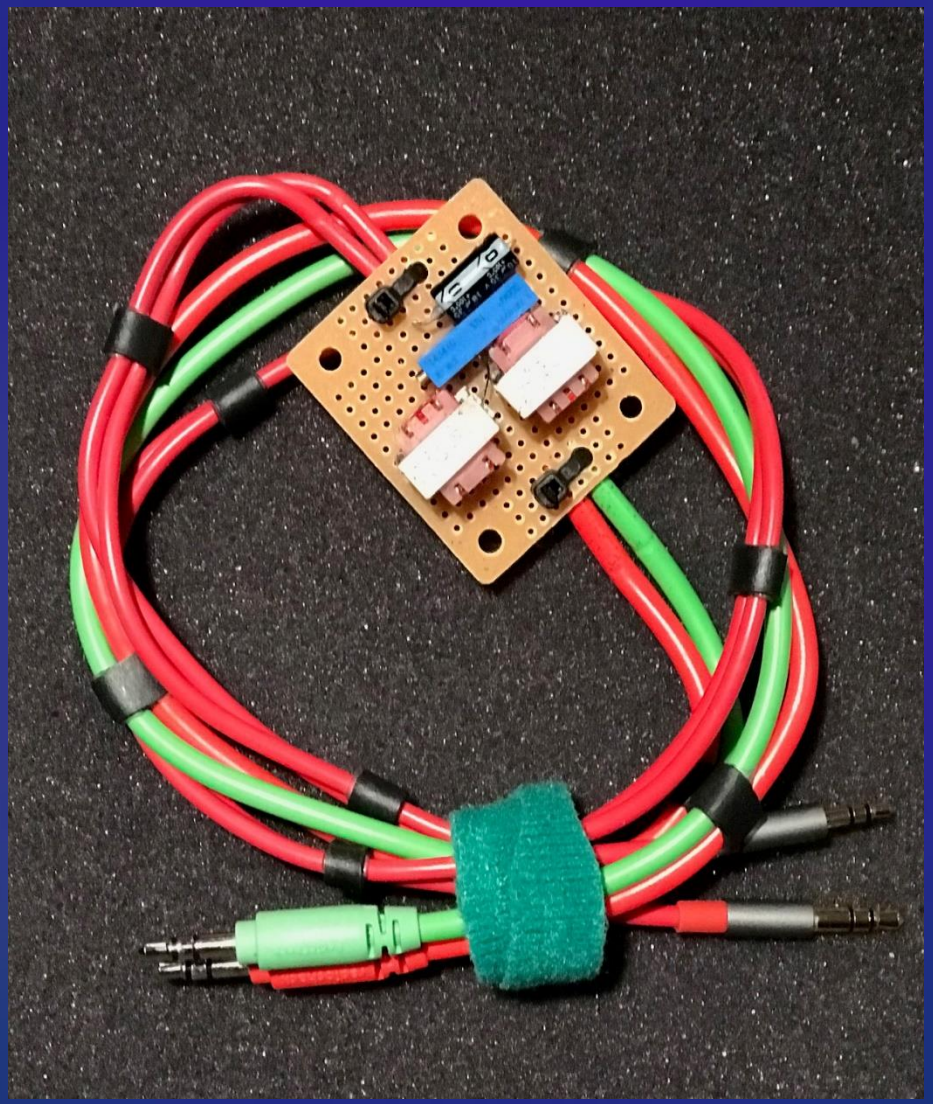
Group Training with HTs and Computer Interfaces

HTs with VOX

HT without VOX

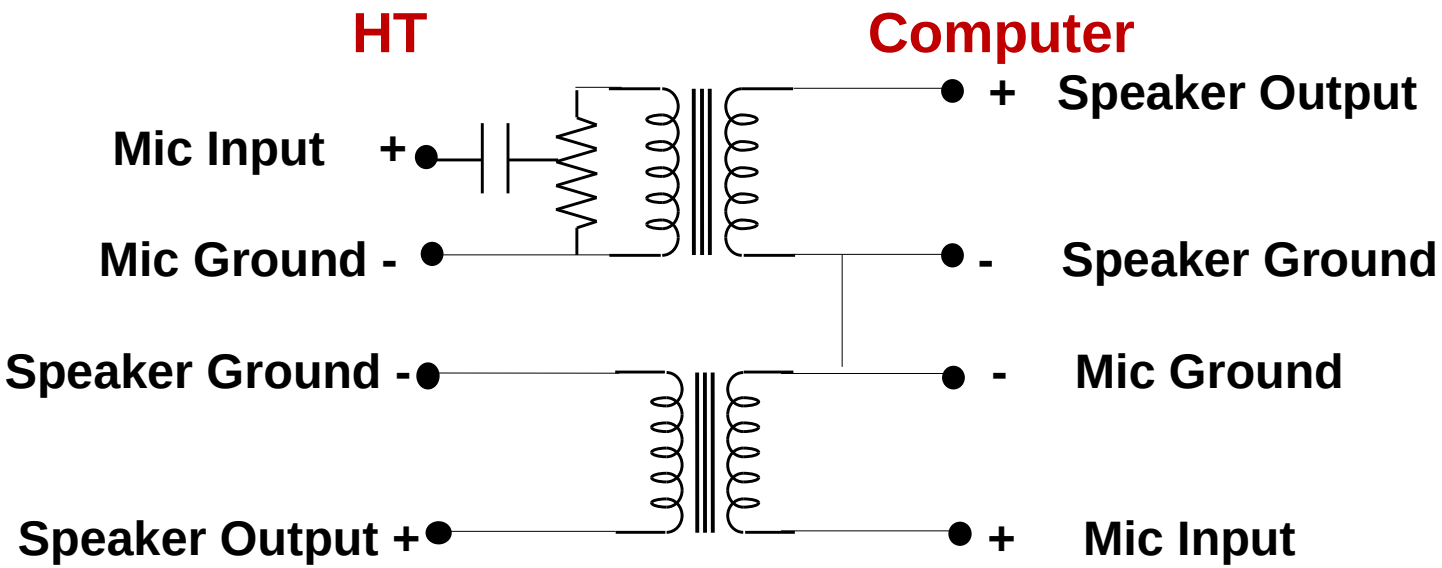
Yaesu FT-60 with SignaLink VOX

Simple Audio Interface for HTs with Built-in VOX



Sound Card Interface

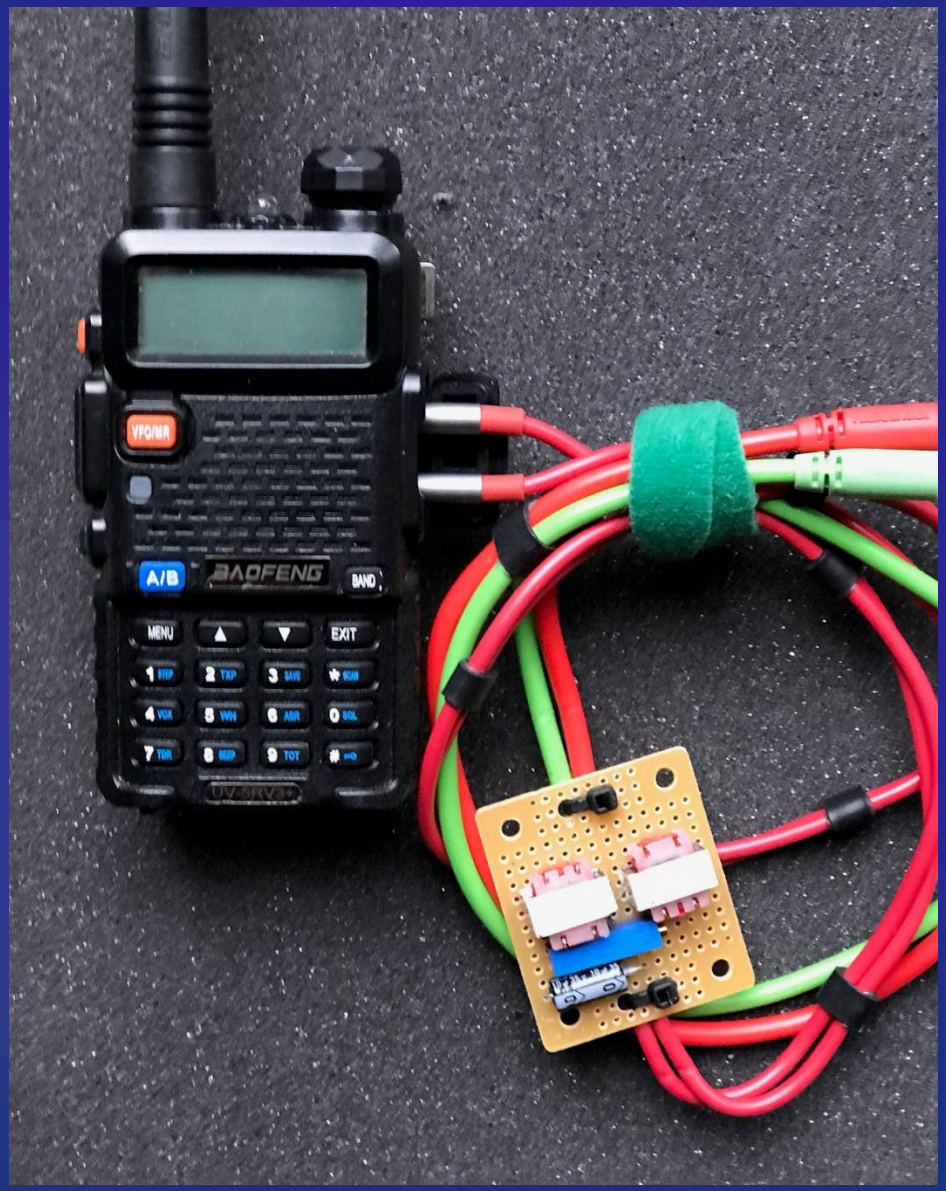
For Kenwood, Baofeng and other two-jack HTs with built-in VOX.



- Mic and Speaker Grounds must be isolated on the HT side because the grounds are used for HT Push-to-Talk. Connecting them together keys the radio.
- Align HT and Computer grounds through the isolation transformers as shown.
- Grounds may be connected on the Computer side as shown.
- Capacitor is about 10μF. For a polarized capacitor, plus goes towards HT.
- Variable resistor is 10KΩ to provide input attenuation to HT if needed

Kenwood with Audio Interface

Baofeng with Audio Interface



Easy Digi Interface

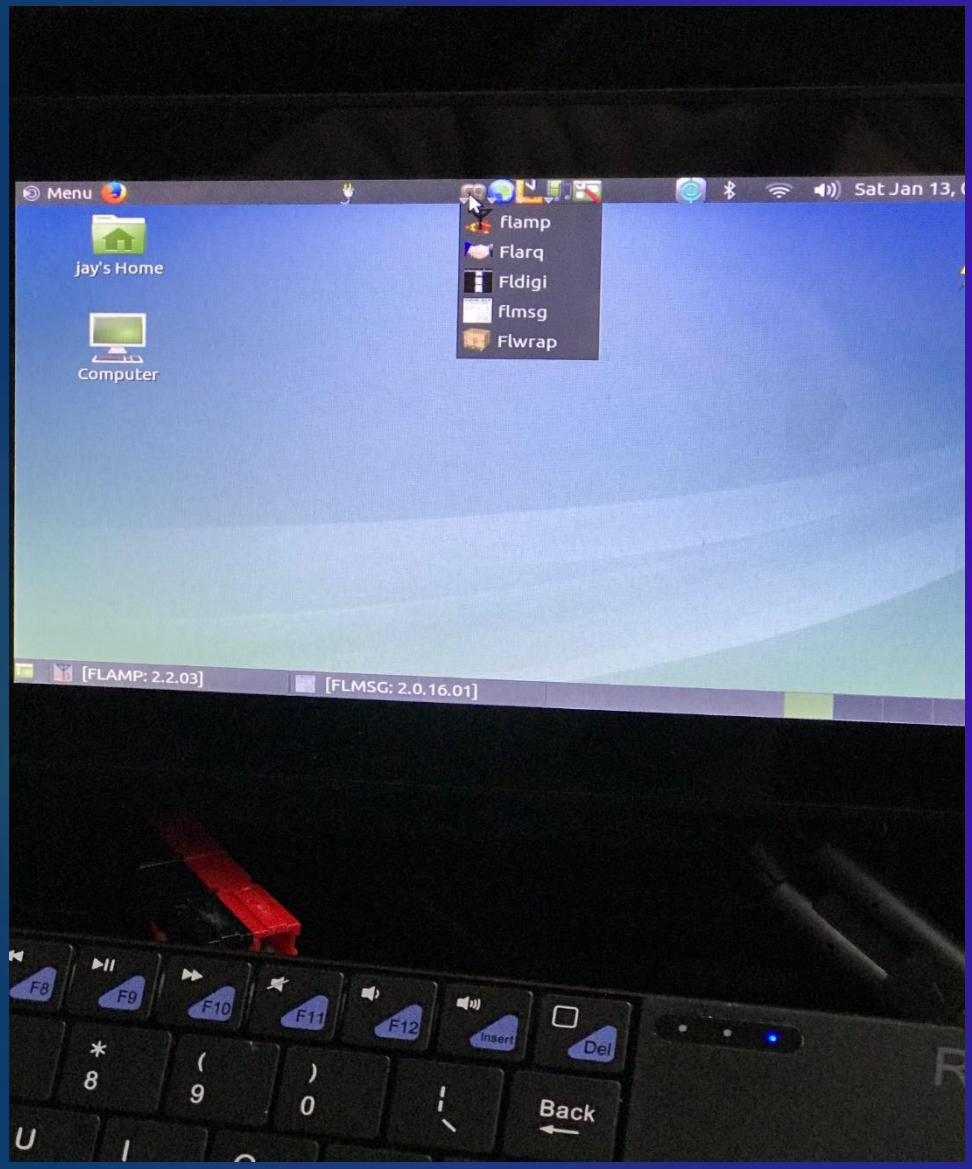
Available on eBay for many radios at about $25 to $45 depending on radio. (We are not on commission!!)

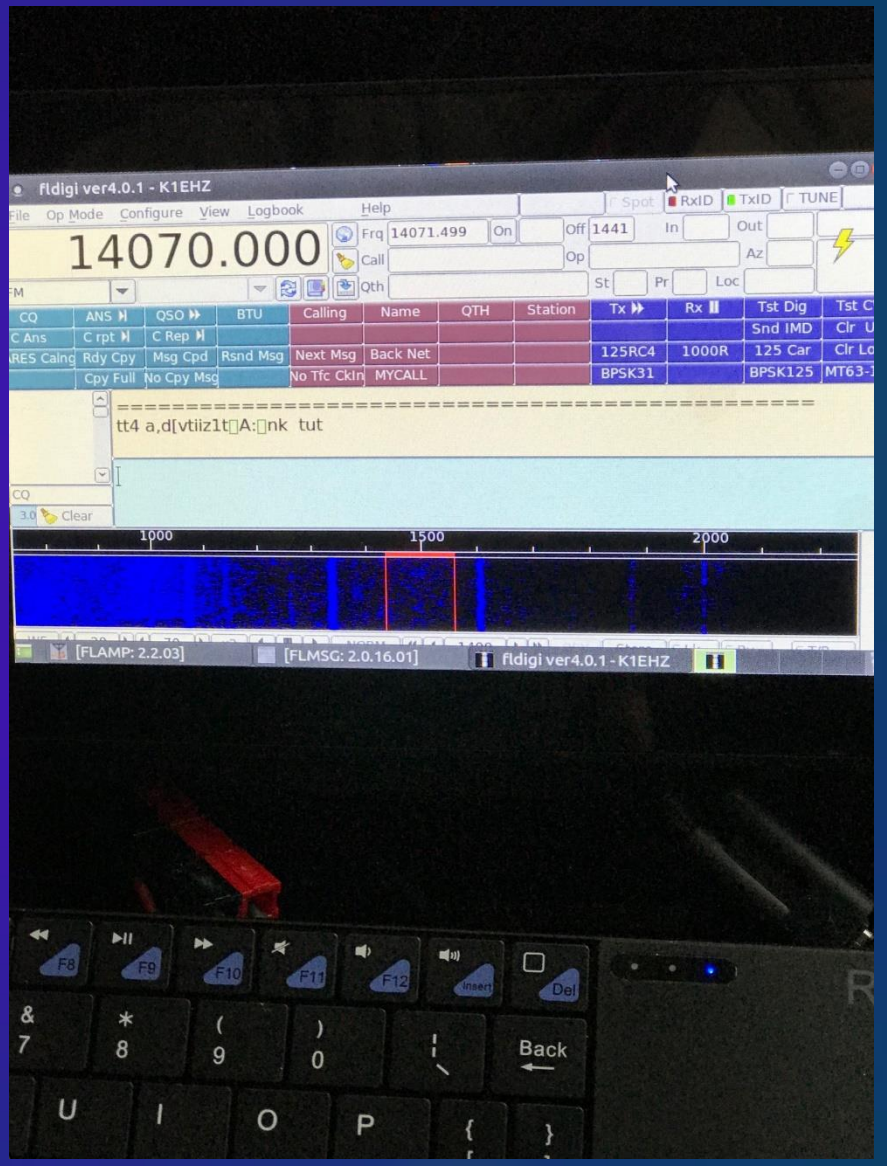
Go Box with a Dummy Load as the Antenna

Raspberry Pi Go Box with HT

Whip or Mag Mount Antenna

Fldigi on Raspberry Pi





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- Interfacing Radio and Computer
- Configure FLdigi
- Configure FLmsg
- Macros & Modes
- Training Possibilities
  - Winlink Email over Radio

Winlink for Email Over Radio

- Winlink is a world-wide store and retrieve email system used by many agencies and organizations.
- The world-wide system is based on Common Message Servers (CMS) and Radio Message Servers (RMS).
- Client computers connect to the servers via radio.
- Messages are retrieved from servers by recipients.
- Winlink RMS and CMS interconnect over the internet.
- Terminal Node Controller (TNC) is needed to support packet protocol over radio.
- WINMOR protocol using a SignaLink USB sound card is an alternative to packet but is not as fast or reliable.
- ARES could use a local RMS or direct radio-to-radio links for local EMCOM email without an internet connection.

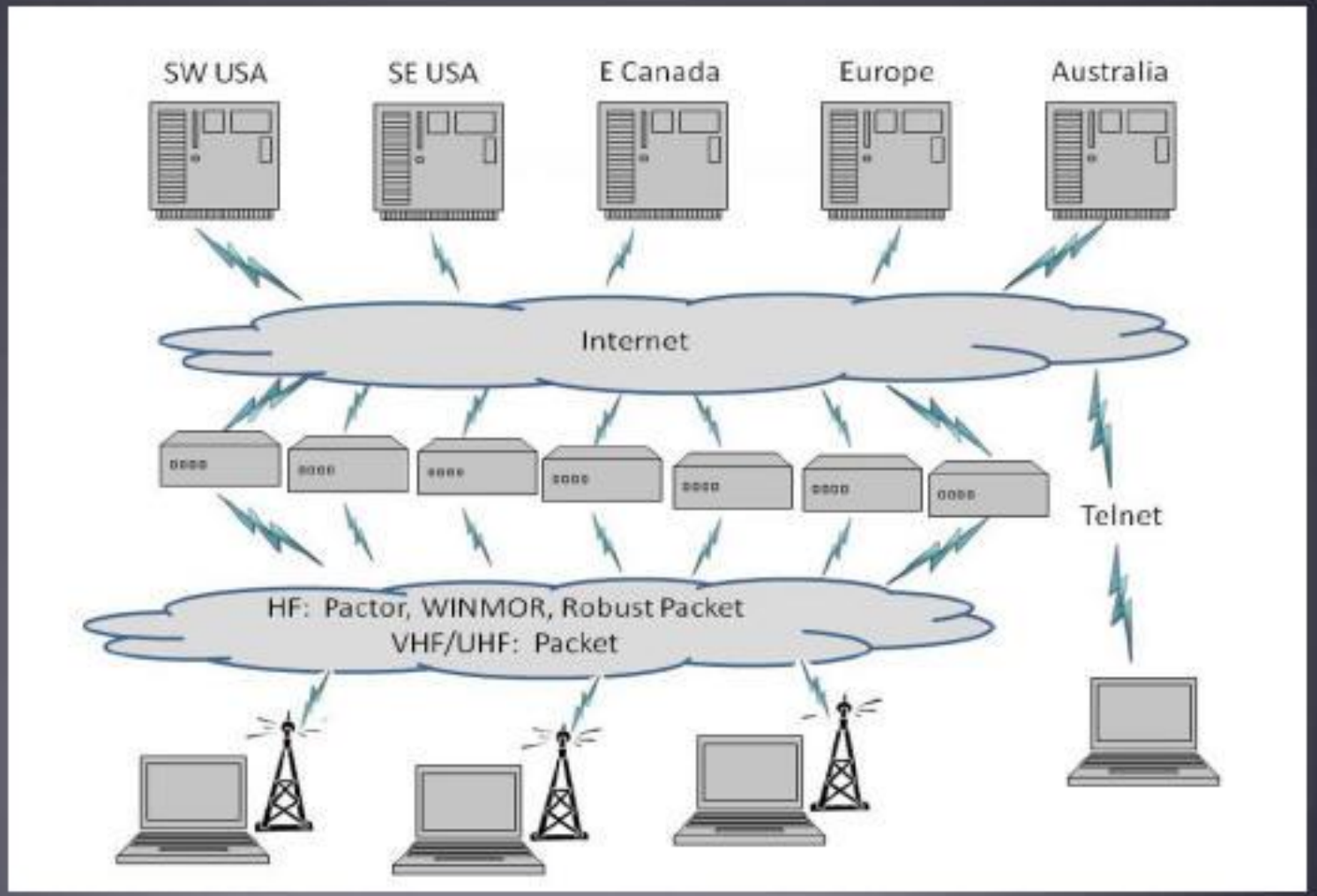
Global Winlink Requires Internet Connectivity

Winlink Normal Network Operation

CMS

RMS (gateways)

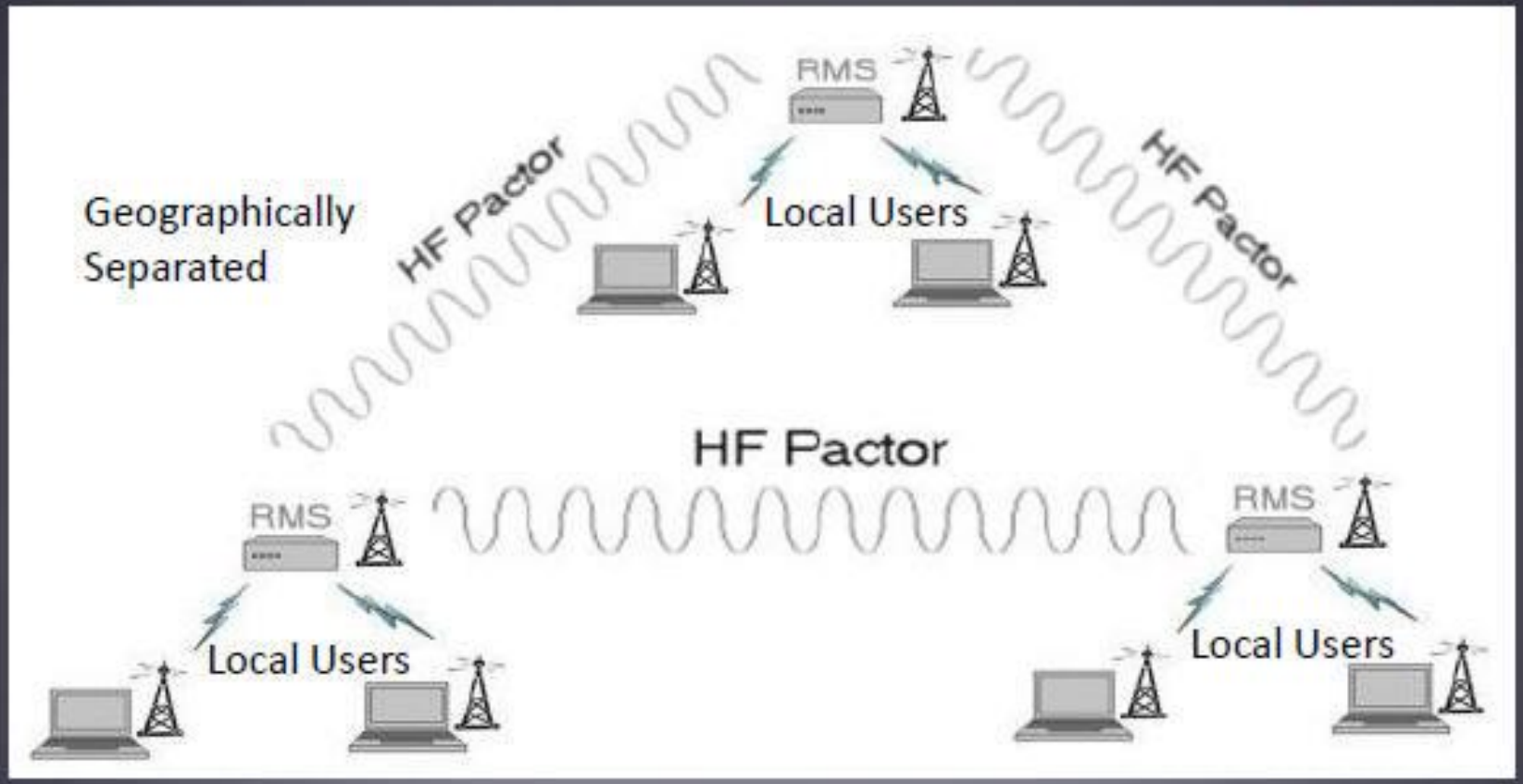
Client (you)



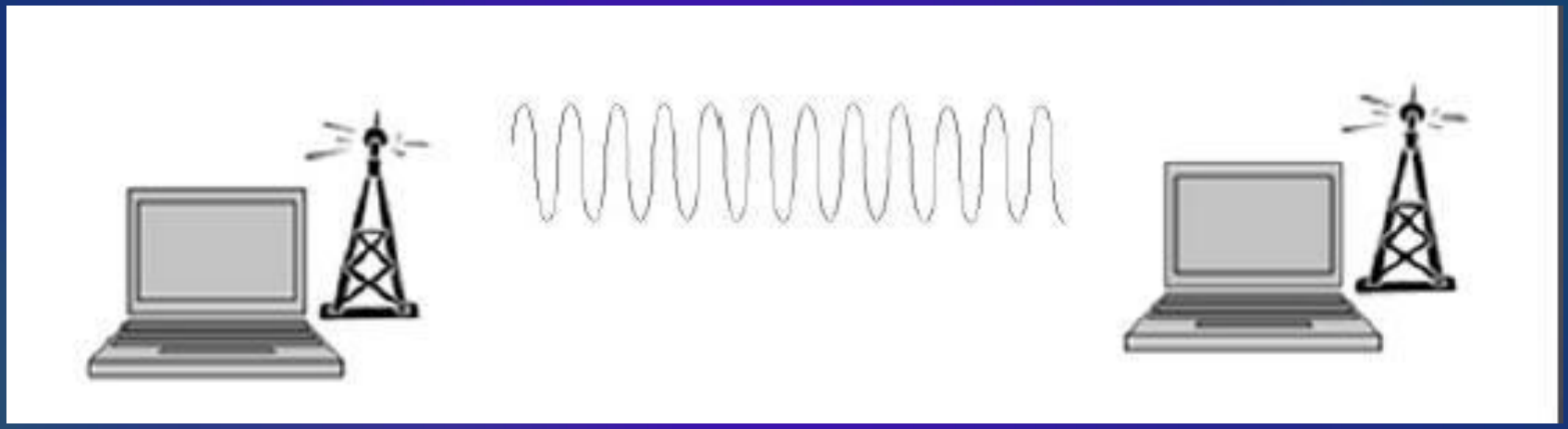
ARES Could Use This Without Needing Internet

Winlink Radio-Only Network

Local networks connected by HF, regional or long distance



Peer-to-Peer Email Without Server



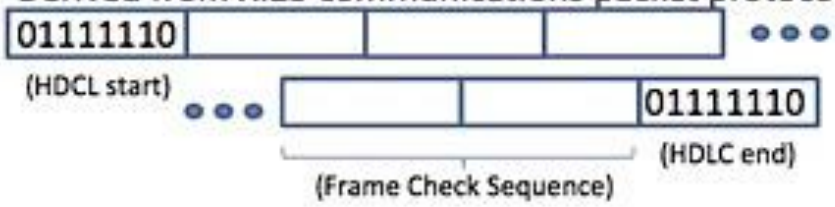
Basic Elements of Packet Radio

1. Hardware: Radio, TNC/modem, Computer

TNC can be implemented in software only on computer: interface uses analog/audio soundcard connection between computer and radio.

2. Encoding

- Computer<->TNC: serial port, ASCII (text) characters
- TNC<->Radio: typically two or three wires
  - Audio Frequency Shift Keying (Bell 202, 1200 baud)
  - 1200 hz: mark, 2200 hz: space
  - 0: change in tone, 1: no change in tone
- Data Link: AX.25
  - Derived from X.25 communications packet protocol



3. Applications

- SCC ARES/RACES: detailed reports (Situation Report, etc. using Outpost and PacForms)
- Automatic Packet Reporting System (APRS): a multi node system for reporting and recording packets that typically includes station ID and position/telemetry

Fldigi and Winlink Interfaces

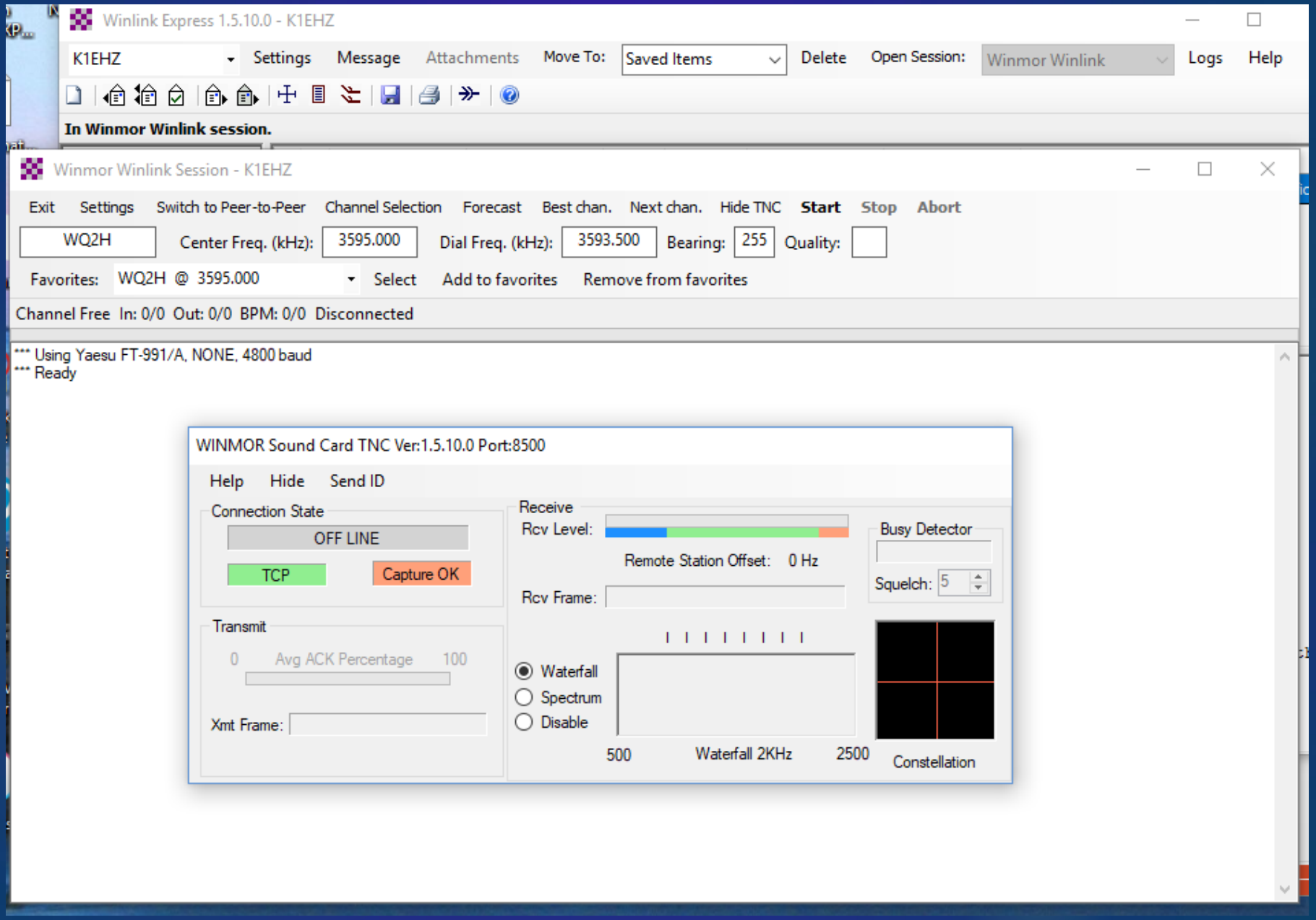
SignaLink Sound Card

- NBEMS Fldigi
- Winlink Express WINMOR Packet for on HF
- UZ7HO Sound Modem for Packet on VHF

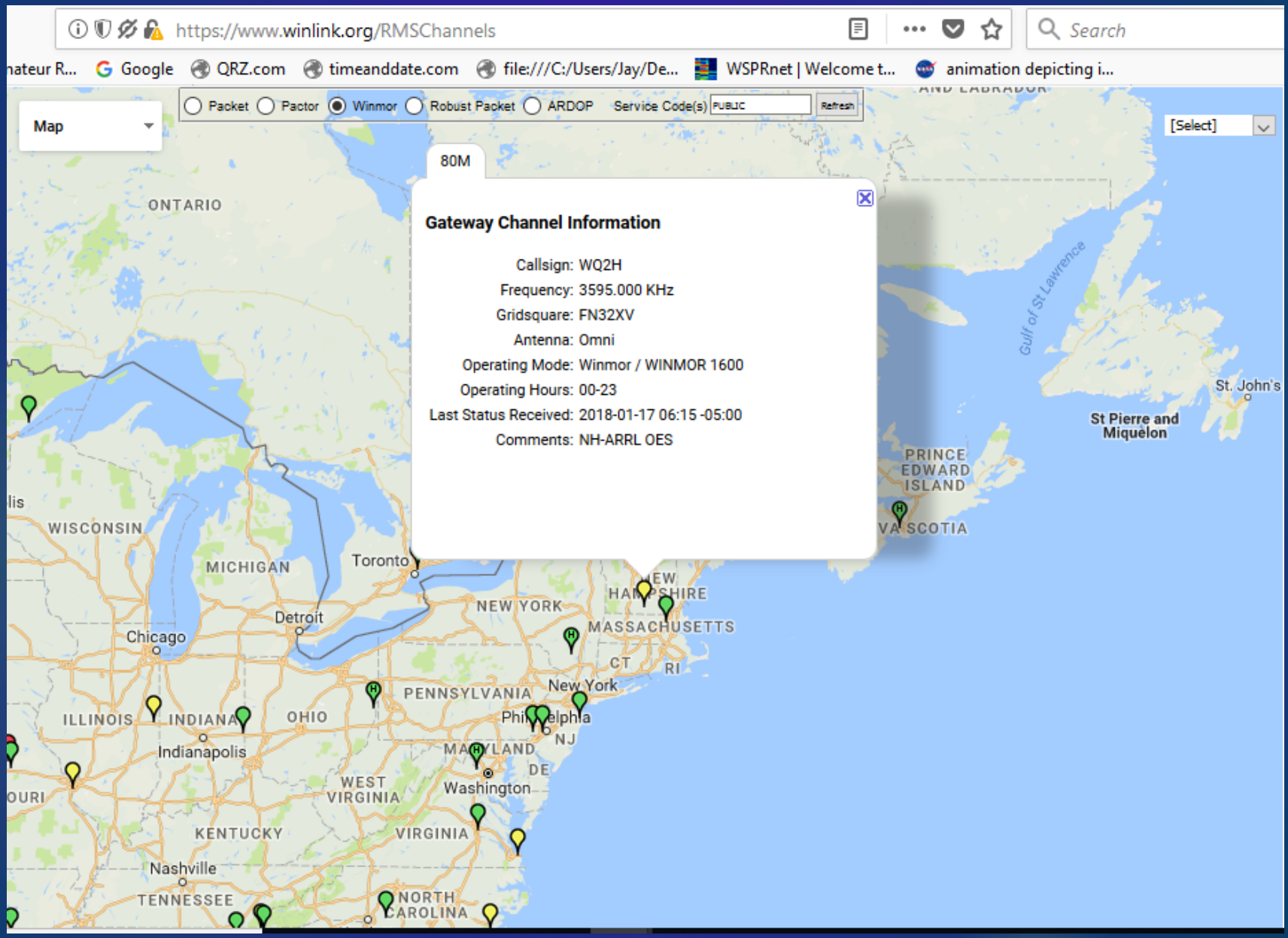
Terminal Node Controller (TNC)

- Winlink for Packet on HF and VHF
- TNC may also be used for APRS

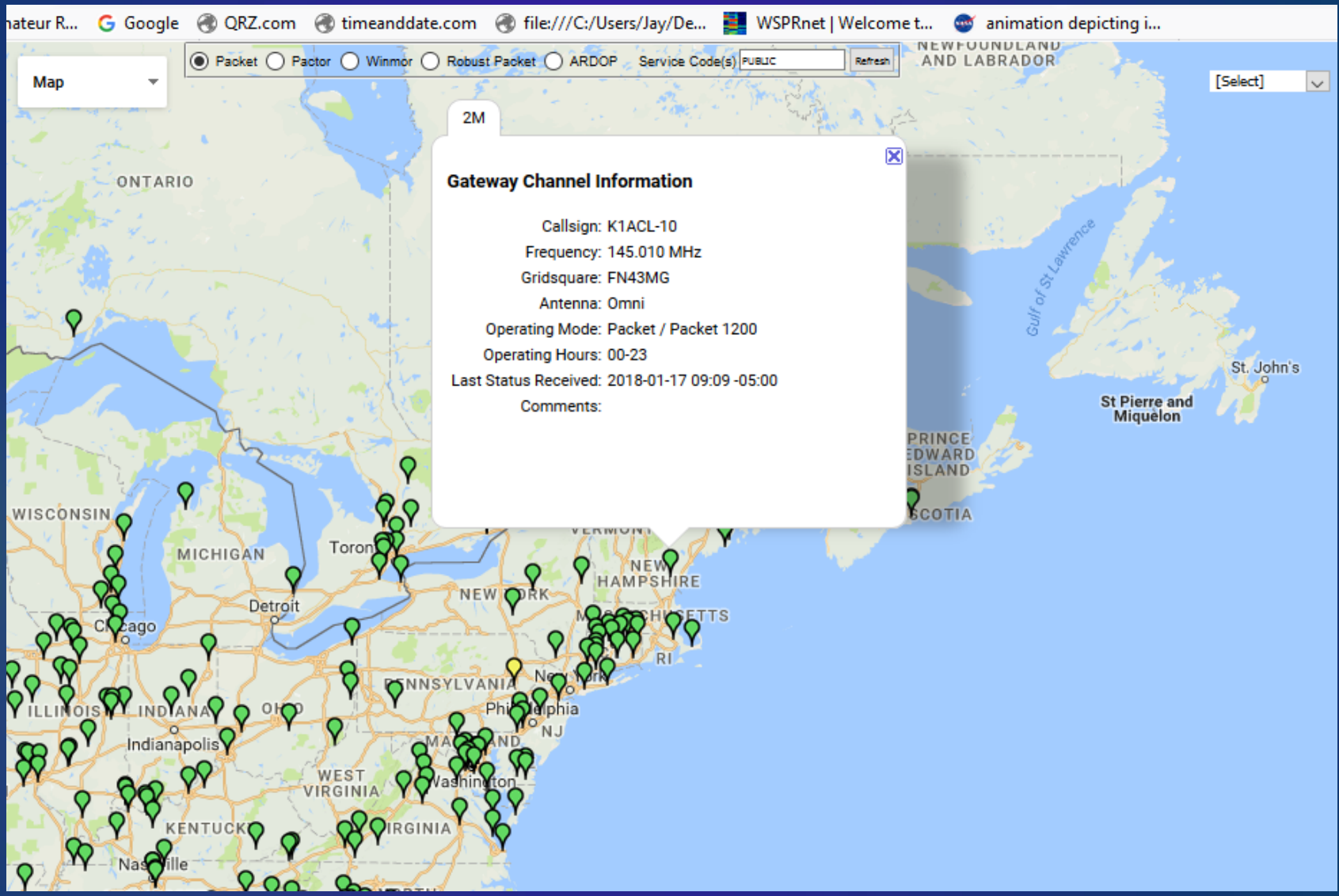
Winmor Software TNC Screens



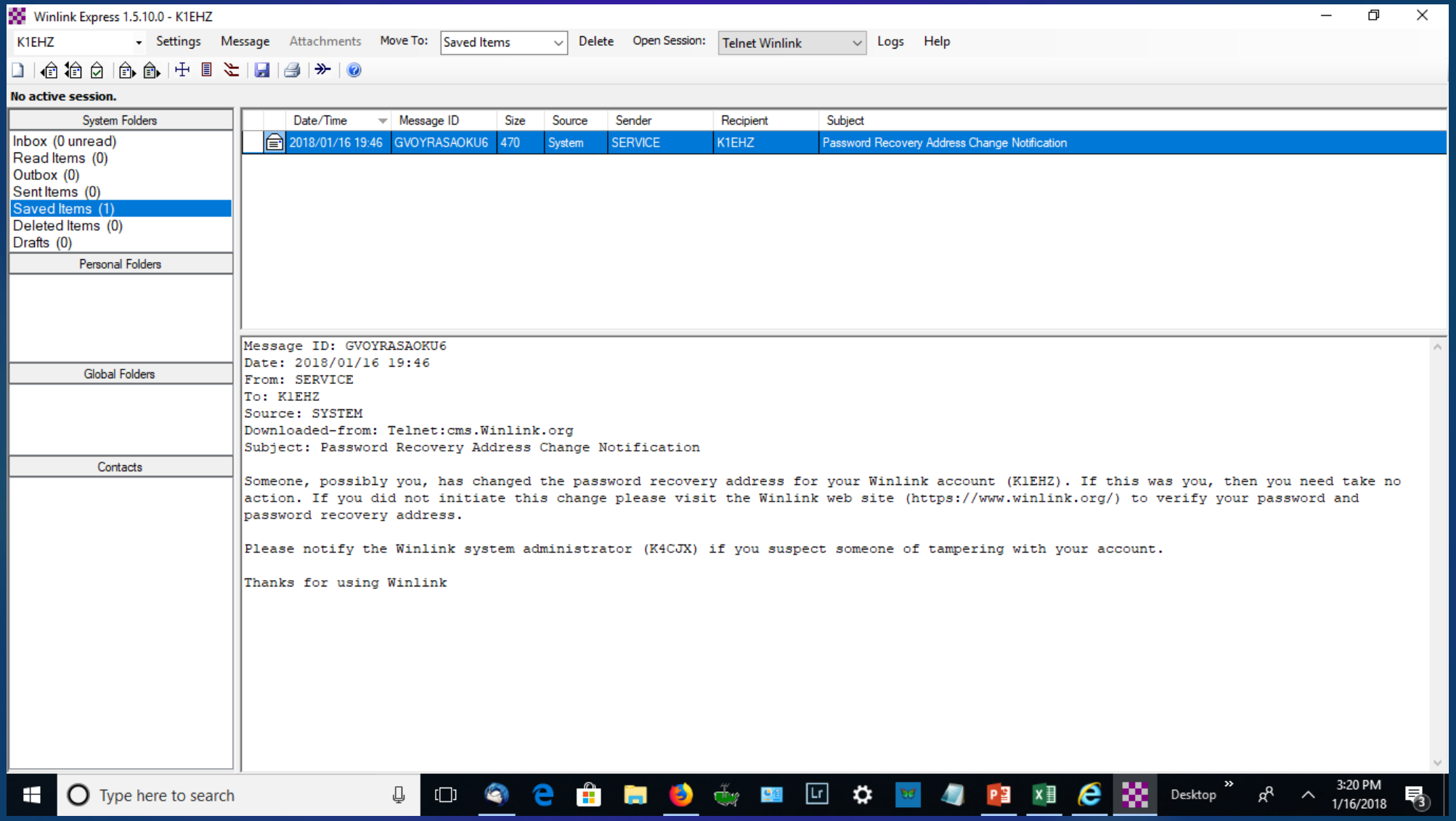
80m ARRL WINMOR Gateway in NH



2m Packet Gateway



Example Winlink Email Screen



Basic NBEMS Competencies

- Set up computer and radio for Fldigi and FLmsg
- Start Fldigi and the Autostart programs
- Configure Fldigi and FLmsg
- Use basic macros
- Send messages from the transmit screen
- Send and receive messages on ICS 213 form
- Send and receive messages on ARRL Radiogram

Fldigi Training Possibilities

- Audio cables between computers
- Acoustic Coupling between Radio and Computer
- HTs with Computer Interfaces
- Go Boxes with Dummy Load Antennas

NBEMS Wrap-up

What We Covered Today

- What is Digital Communication?
- Why Digital EmComm?
- What is NBEMS?
- Computer Operating Systems
- Interface Radio and Computer
- Configure FLdigi
- Configure FLmsg
- Macros & Modes
- Training Possibilities
- Winlink Email over Radio

Finally, Remember These Steps

1. Turn off computer, radio and interface
2. Plug in all equipment connections
3. Start computer -- give it a minute to load drivers for interface
4. Turn on interface and radio, Start FLdigi
5. Configure->Audio->Devices->Port Audio->Select Sound Card ->Save
6. Configure->Rig->Hardware PTT

   For SignaLink ->Use separate serial port PTT->Select

   Com Port-> Enable RTS or DTR depending on computer

   For VOX PTT ->PTT tone on right audio channel->Save
7. RxID and TxID to On. Right click RxID & Enable Passband (VHF/UHF, but not HF)
8. For Repeaters ->Configure->ID->RsID->Pre-signal tone 1 second ->Save

CREDITS

Help Sheets, Power Points and other files:
http://groups.yahoo.com/group/paNBEMS/files

Info and Downloads: www.w1hkj.com

http://www.scares.arrl-nh.org/pdf_files/fldigi%20basics.pdf

http://www.ground-tech.com/fldigi_setup1.htm

http://www.wacomarc.org/documents/FLDIGI_Setup.pdf

http://ns81.webmasters.com/*w3hzu.org/addon/w3hzu.com/pdfdocs/FLDIGI_config.pdf

http://www.navymars.org/central/reg4/FL/FLNMCMARS/digital/Articles/Automatically_Display_Incoming_Messages_with_Fldigi_and_Flmsg.pdf

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