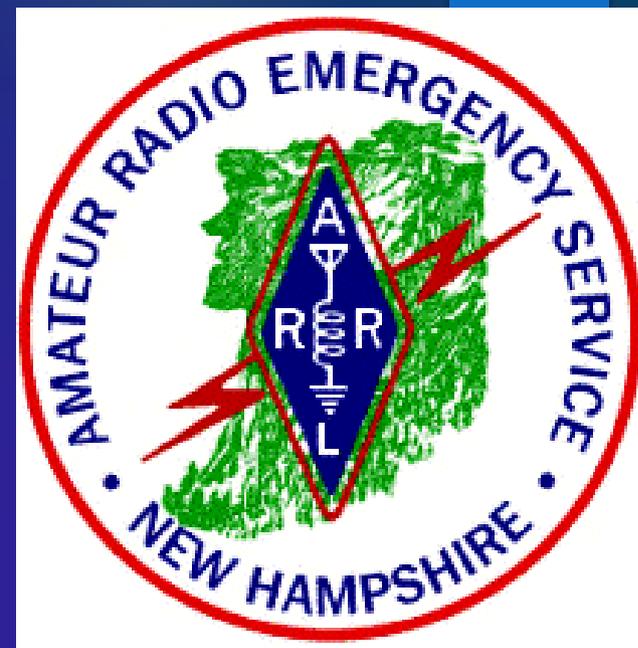


NH ARES Academy

MARCH 24, 2018

BASIC NBEMS WORKSHOP



NBEMS

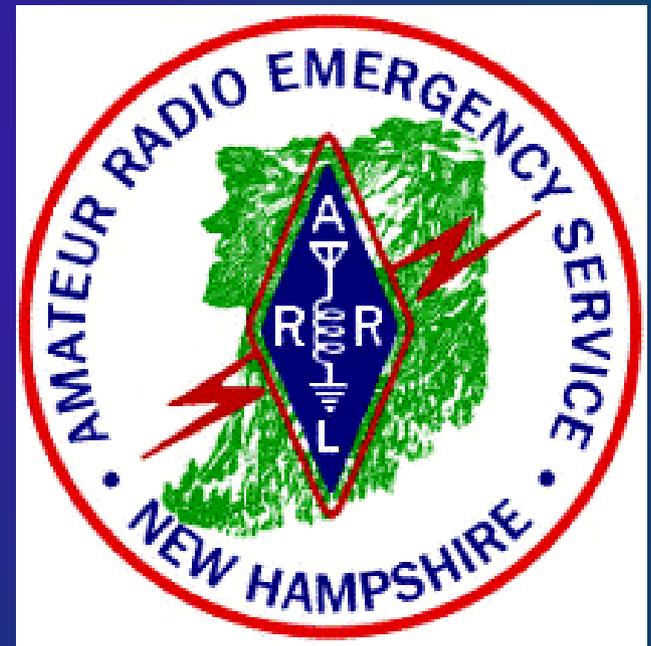
Narrow Band Emergency Messaging Software For Emergency Radio Communications

Presenters

Larry Beagle	KB1RIJ
Jon GrosJean	KB1SWW
Jay Taft	K1EHZ

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?*

A Little About the Group

What stage are you in?

- ▶ *What is NBEMS?*
- ▶ *I've heard about NBEMS.*

A Little About the Group

What stage are you in?

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

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.*

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?

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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:

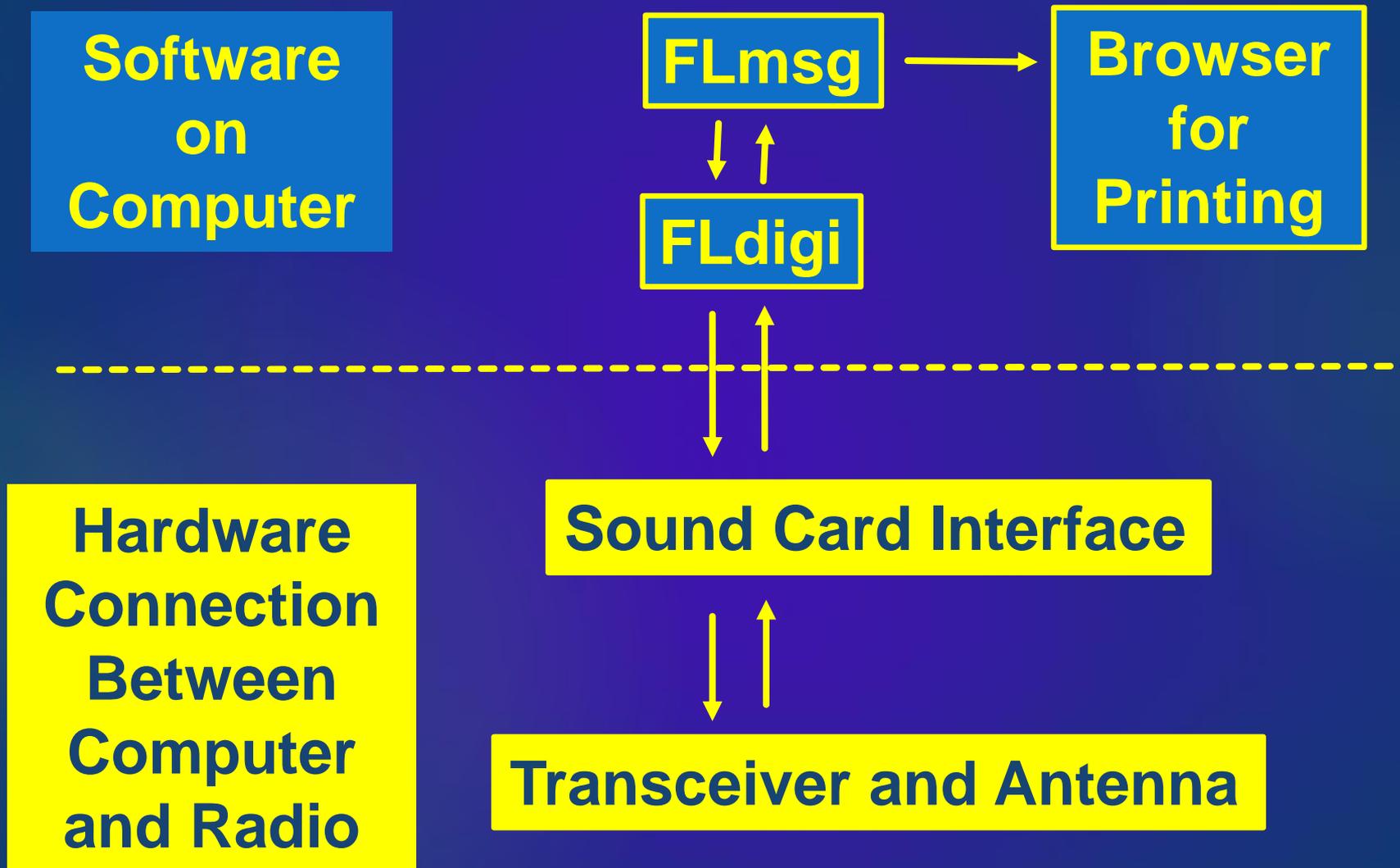
- Specific directions / instructions.
- Long lists of information.
- Difficult to spell names.
- Medication prescriptions.
- Difficult operating conditions.
 - ***Some modes work at negative S/N!***
- Printing and documenting messages.

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?



Agenda

What is Digital Communication?

➤ **Why Digital EmComm?**

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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.

Agenda

What is Digital Communication?

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➤ **Computer Operating Systems**

Interfacing Radio and Computer

Configure FLdigi

Configure FLmsg

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 files.**
- ▶ **Your previous files are intact and will be used by the new version.**

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➤ **Interfacing Radio and Computer**

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Acoustic 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.



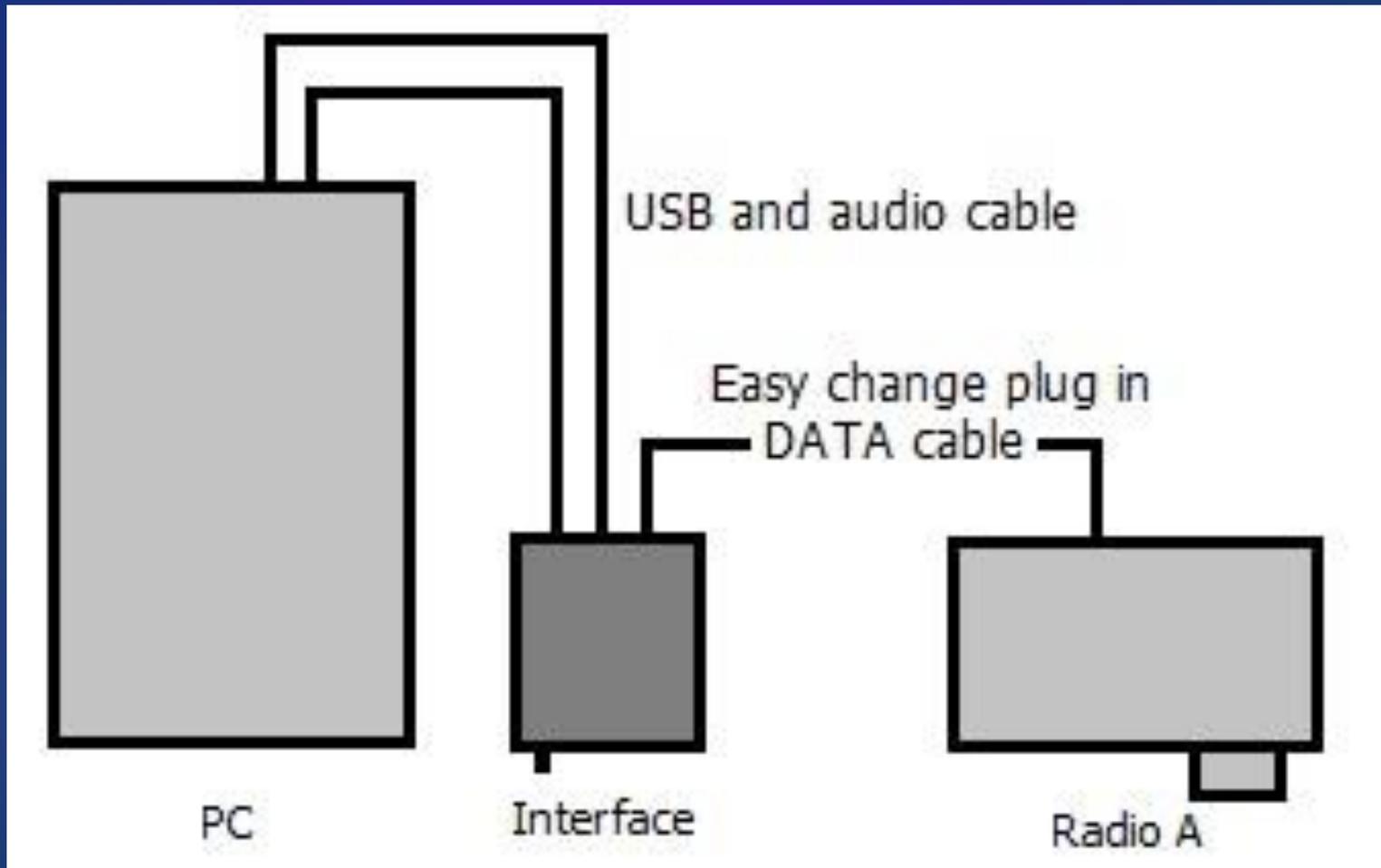
DO THESE STEPS IN ORDER!

- 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

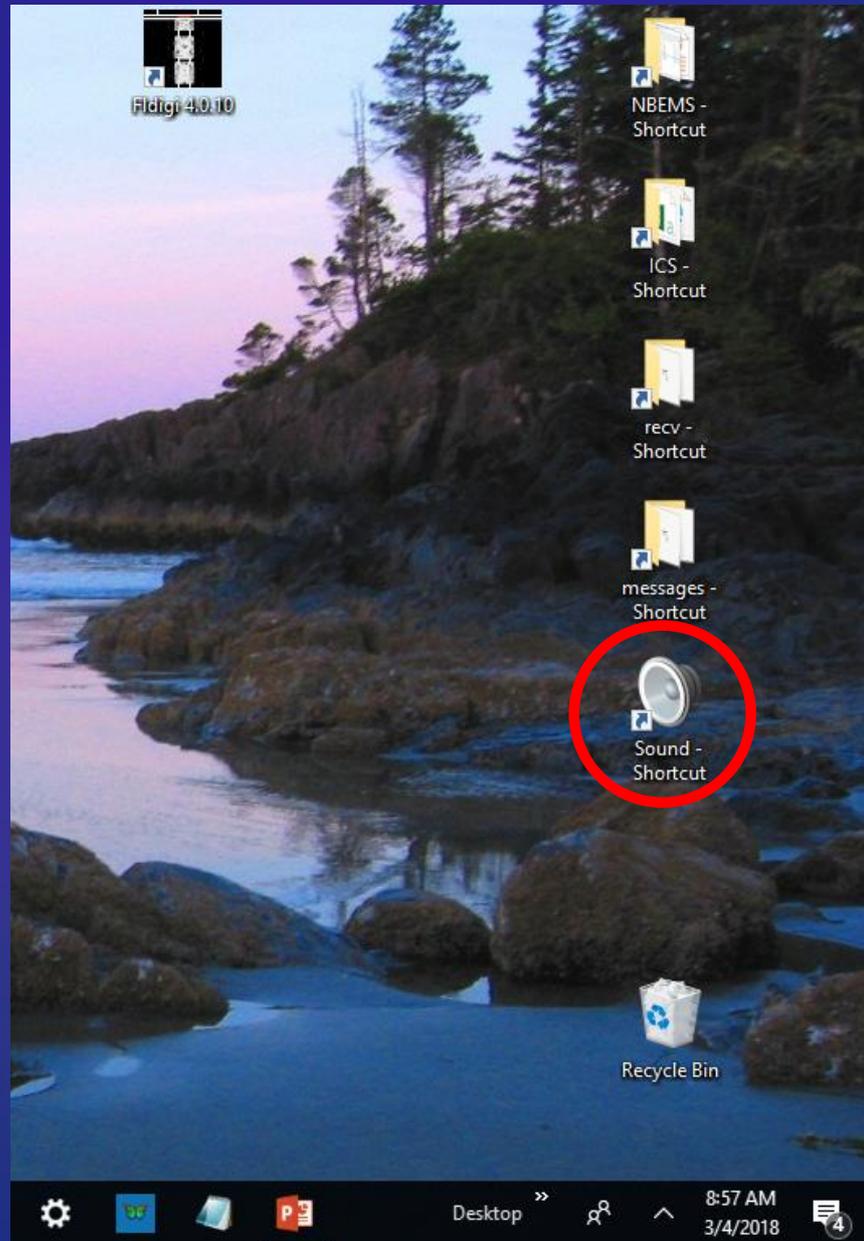


Signalink

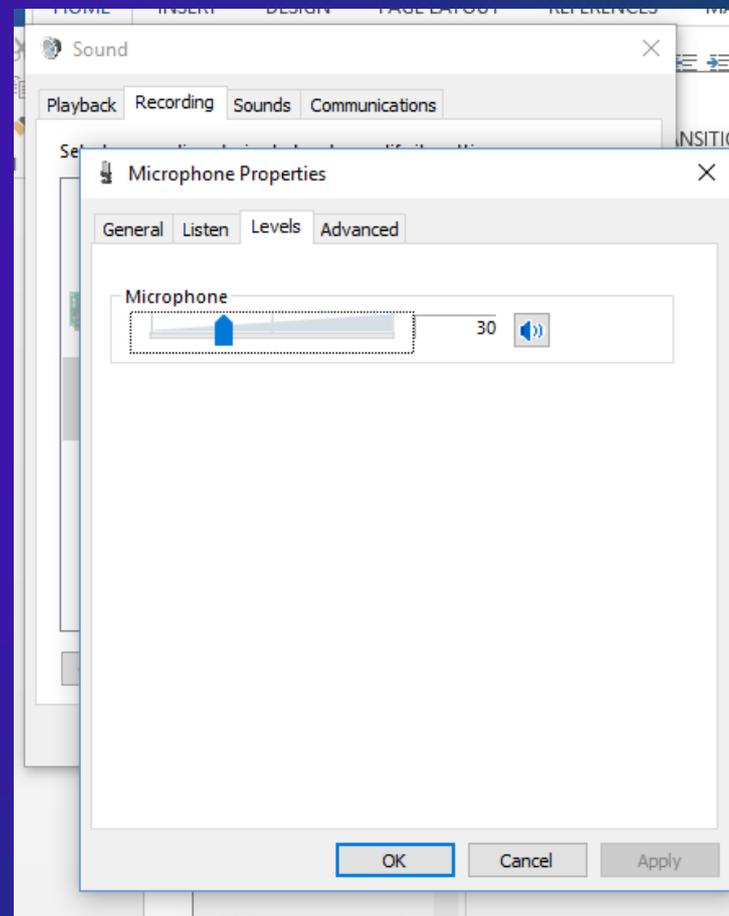
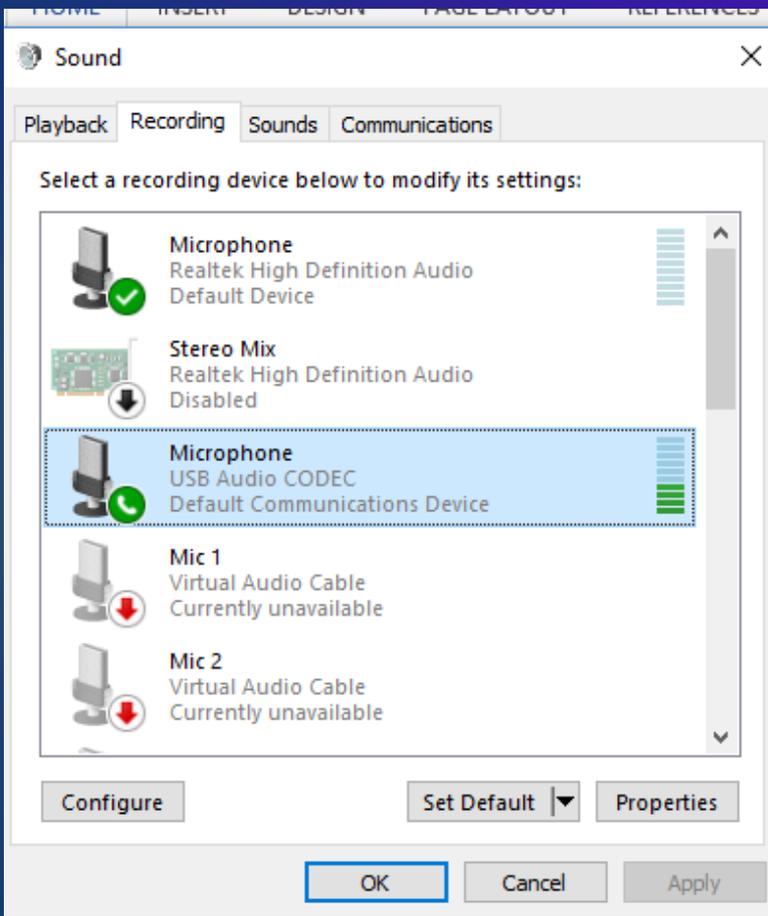
Signalink is popular and works well.

- 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

FLDIGI Users Manual 4.0

Main Page Related Pages

Configuration

RX/TX Audio Adjustment

Receive 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.

Table of Contents

- ↓ Receive audio
- ↓ Windows Audio Properties
- ↓ Transmit audio

Receive Audio Adjustment

The screenshot shows the fldigi ver4.0.10 - K1EHZ software interface. The main display area is a waterfall plot showing a signal trace. The frequency axis is labeled from 500 to 2500. The signal trace is a blue horizontal bar with a red vertical line indicating the current frequency. The text "Toggle Waterfall to Sig trace" is overlaid on the waterfall plot area, with a red arrow pointing to the "WF" button in the bottom control panel.

fldigi ver4.0.10 - K1EHZ

File Op Mode Configure View Logbook Help

145830.000 Frq 145831.500 On Off 1643 In Out

Call Op Az

FM Qth St Pr L C

Clear RX	Clear TX	Call de My Call	CQ Call QTH	MT63-1KL	MT63-2KL	BPSK-125	PSK125 RC4	T/R	Tx	Rx	Tune 5 secs
CI w Traffic	CI w/o Traffic	Relay Call	Tx My Call	Call Ready to Copy?	My Call Rdy to copy!	Call Resend	Call Rtn to Voice	Call de QTH	CI QTH w Traffic	CI QTH w/o Traffic	Secure from Net
Basic Checklist	Startup Notes	Macro Input Notes	WX Notes					Local WX Form	Send NOAA WX	Copy NOAA WX	Testing de MyCall

=====
Read macros from: C:\Users\Jay\Desktop\Fldigi Programs & Macro Files\Basic-NH-ARES-VHF-UHF-FM-Macros-V02E05.mdf
=====
Read Logbook: C:/Users/Jay/fldigi.files/logs/logbook.adi
read 5 records in 0.0 seconds
=====

Toggle Waterfall to Sig trace

500 1000 1500 2000 2500

WF 0 60 x2 NORM 1500 QSY Store Lk Rv T/R

MT63-1KL -3.0 AFC SQL

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

The screenshot displays the fldigi ver4.0.10 - K1EHZ interface. At the top, the frequency is set to 145830.000. Below the frequency, there are various control buttons and a menu bar. A yellow banner in the center contains the text: "Read macros from: C:\Users\Jay\Desktop\Fldigi Programs & Macro Files\Basic-NH-ARES-VHF-UHF-FM-Macros-V02E05.mdf" and "Read Logbook: C:/Users/Jay/fldigi.files/logs/logbook.adi read 5 records in 0.0 seconds". Below the banner is a large blue area. At the bottom, there is a signal trace window showing a waveform centered on a horizontal midline. The trace is contained within a gray shaded area. A red arrow points from the top text to the signal trace, and another red arrow points from the text "Diamond is Green when receive audio is in range" to the signal trace.

Diamond is Green when receive audio is in range

Too much receive audio gain!

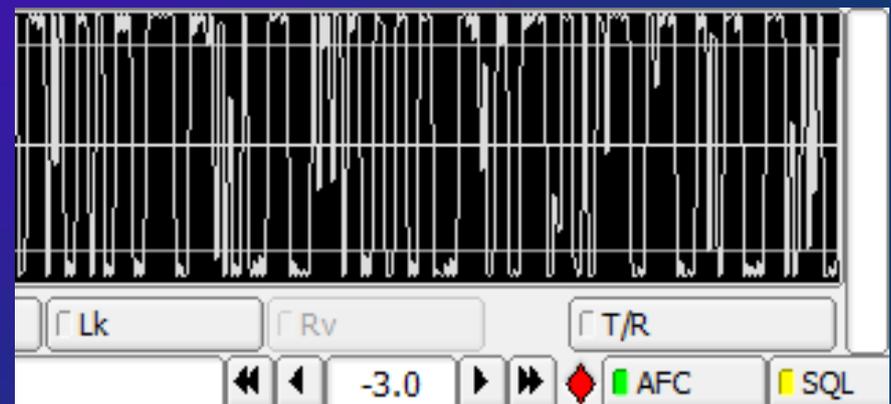
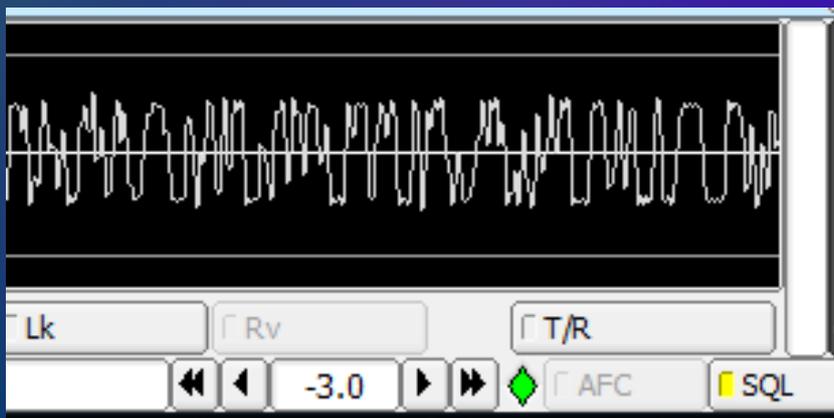
The screenshot displays the fldigi ver4.0.10 - K1EHZ interface. At the top, the frequency is set to 145830.000. Below the frequency display is a menu bar with options: File, Op Mode, Configure, View, Logbook, and Help. The main interface is divided into several sections:

- Control Panel:** Includes buttons for Clear RX, Clear TX, Call de My Call, CQ Call QTH, MT63-1KL, MT63-2KL, BPSK-125, PSK125 RC4, T/R, Tx, Rx, and Tune 5 secs.
- Function Buttons:** Includes CI w Traffic, CI w/o Traffic, Relay Call, Tx My Call, Call Ready to Copy?, My Call Rdy to copy!, Call Resend, Call Rtn to Voice, Call de QTH, CI QTH w Traffic, CI QTH w/o Traffic, Secure from Net, Basic Checklist, Startup Notes, Macro Input Notes, WX Notes, Local WX Form, Send NOAA WX, Copy NOAA WX, and Testing de MyCall.
- Audio Waveform:** A large section showing a highly distorted and noisy audio waveform, indicating excessive receive audio gain. A red triangle is drawn over this section, with its base at the top and its apex pointing to the waveform.
- Audio Controls:** At the bottom, there are controls for SIG, S/N 13 dB, NORM, 1495, QSY, Store, Lk, Rv, T/R, and AFC.

The Windows taskbar at the bottom shows the system time as 9:19 AM on 3/4/2018.

Keep an eye on the Diamond

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

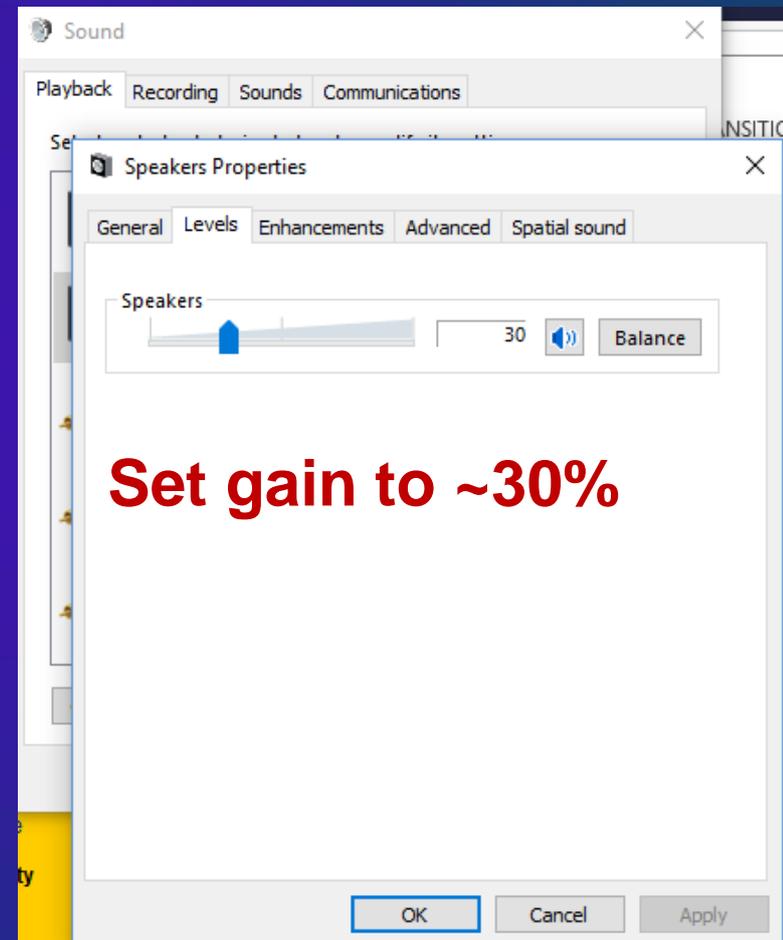
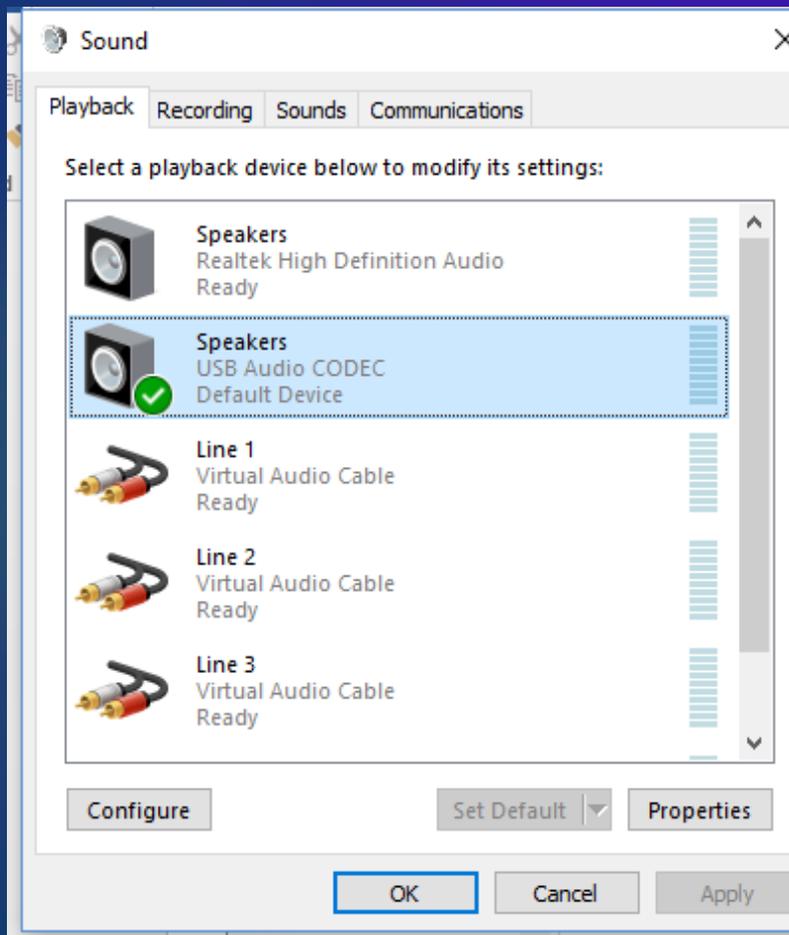


Adjust WF Controls

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

The screenshot shows the fldigi ver4.0.10 - K1EHZ software interface. The main window displays a frequency of 145830.000 and a call sign of Q3JQVE. The interface includes a menu bar (File, Op Mode, Configure, View, Logbook, Help) and a toolbar with buttons for Spot, RxID, TxID, and TUNE. Below the frequency and call sign fields is a control panel with various buttons for Clear RX, Clear TX, Call de My Call, CQ Call QTH, MT63-1KL, MT63-2KL, BPSK-125, PSK125 RC4, T/R, Tx, Rx, and Tune 5 secs. A red arrow points from the text above to the waterfall control panel at the bottom of the window. The waterfall control panel includes a frequency scale from 500 to 2500 Hz, a waterfall display showing signal activity, and a control panel with buttons for WF, -20, 70, x2, NORM, 1501, QSY, Store, Lk, Rv, and T/R. The bottom status bar shows MT63-1KL, -3.0, AFC, and SOL.

Audio Output from Computer to Radio



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



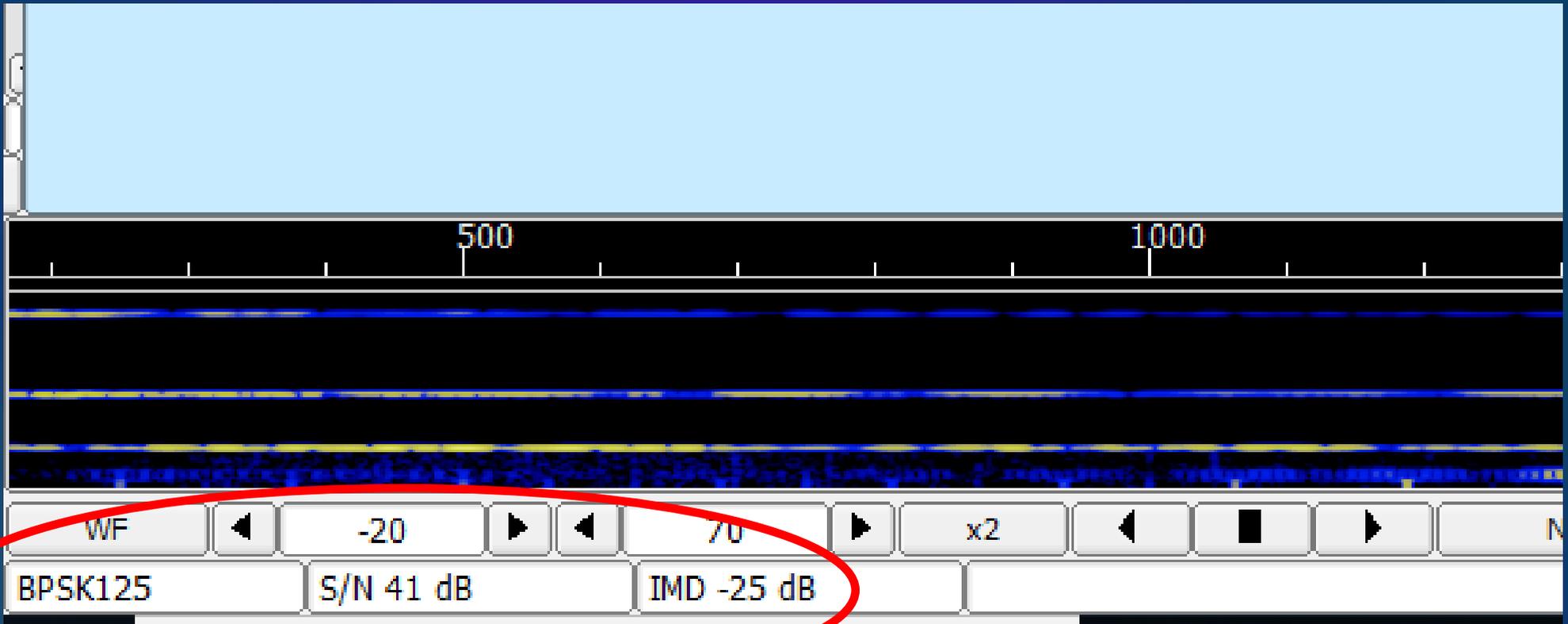
Adjust transmit audio gain to ~30% on all gain controls

- 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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➤ **Configure FLdigi**

Configure FLmsg

Macros & Modes

Training Possibilities

Winlink Email over Radio

Let's get to the fun part!





Configure Fldigi Together

**Refer to Minimum Settings Checklist
(Orange Handout at Workshop)**

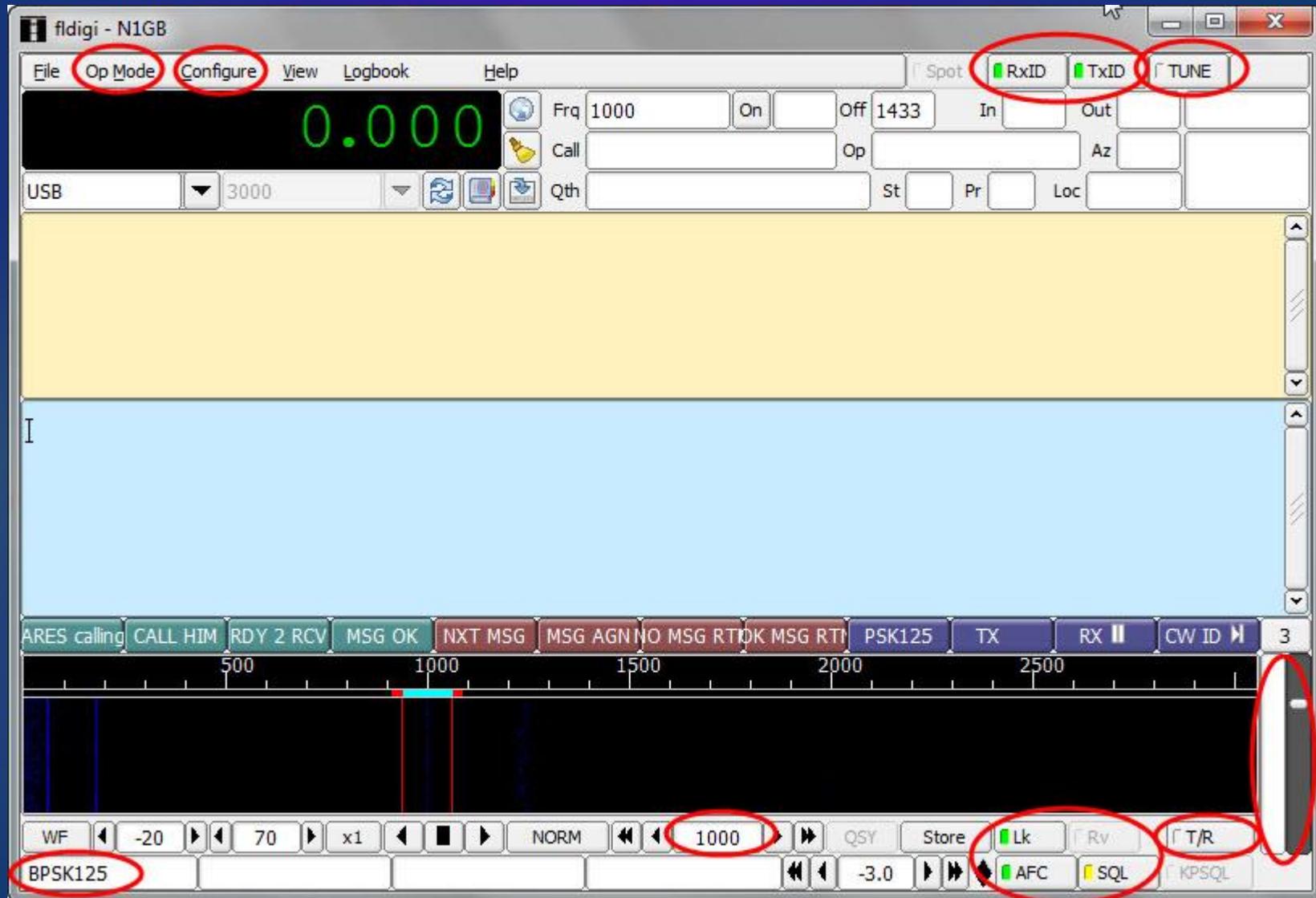
Configure FLdigi

Double click on your FLdigi icon



Configure FLdigi

Operating Display



Configure FLdigi

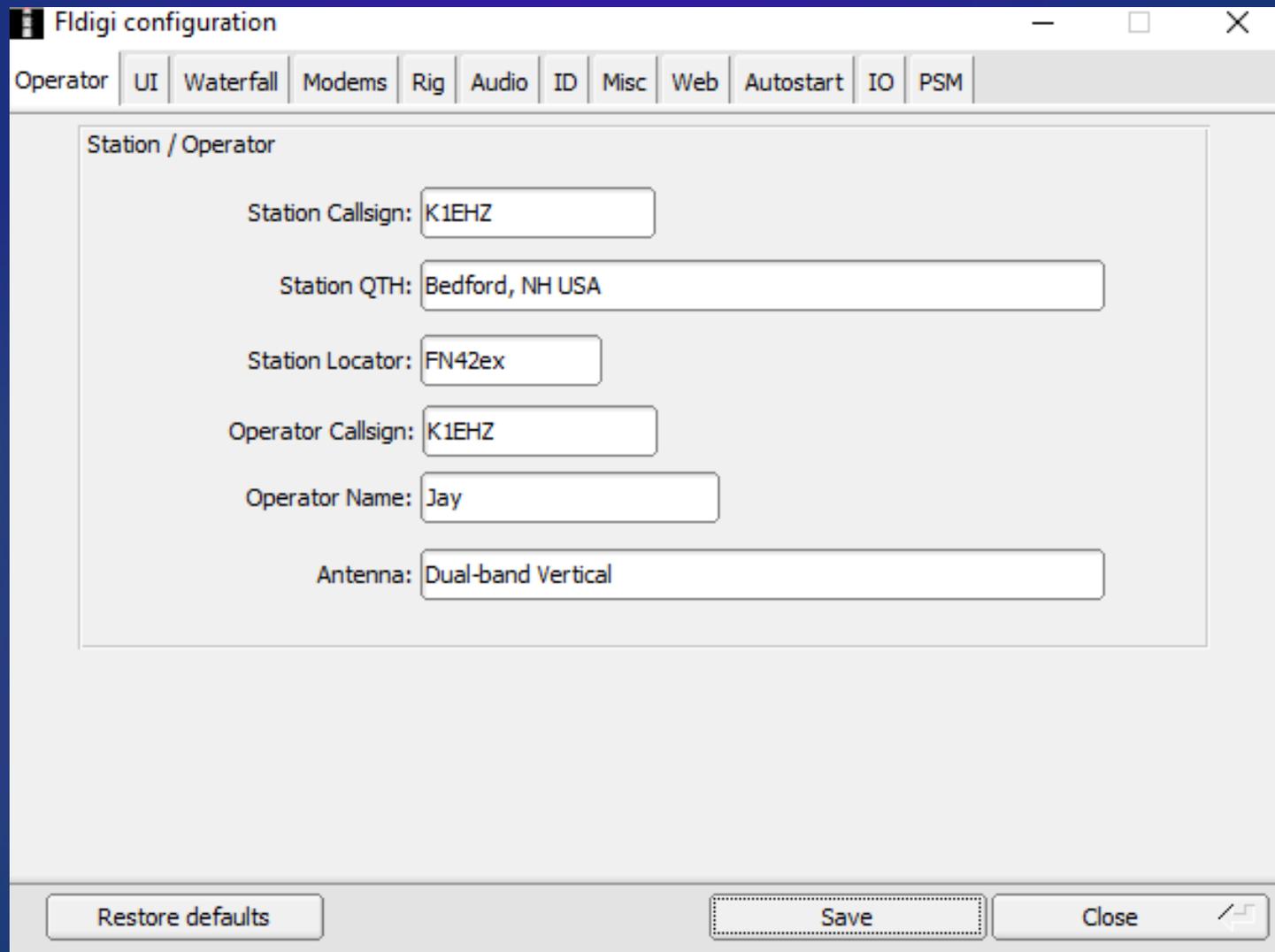
Optional Configuration Wizard

Opens the first time Fldigi is used



Configure FLdigi

Operator Info – very important, used in macros



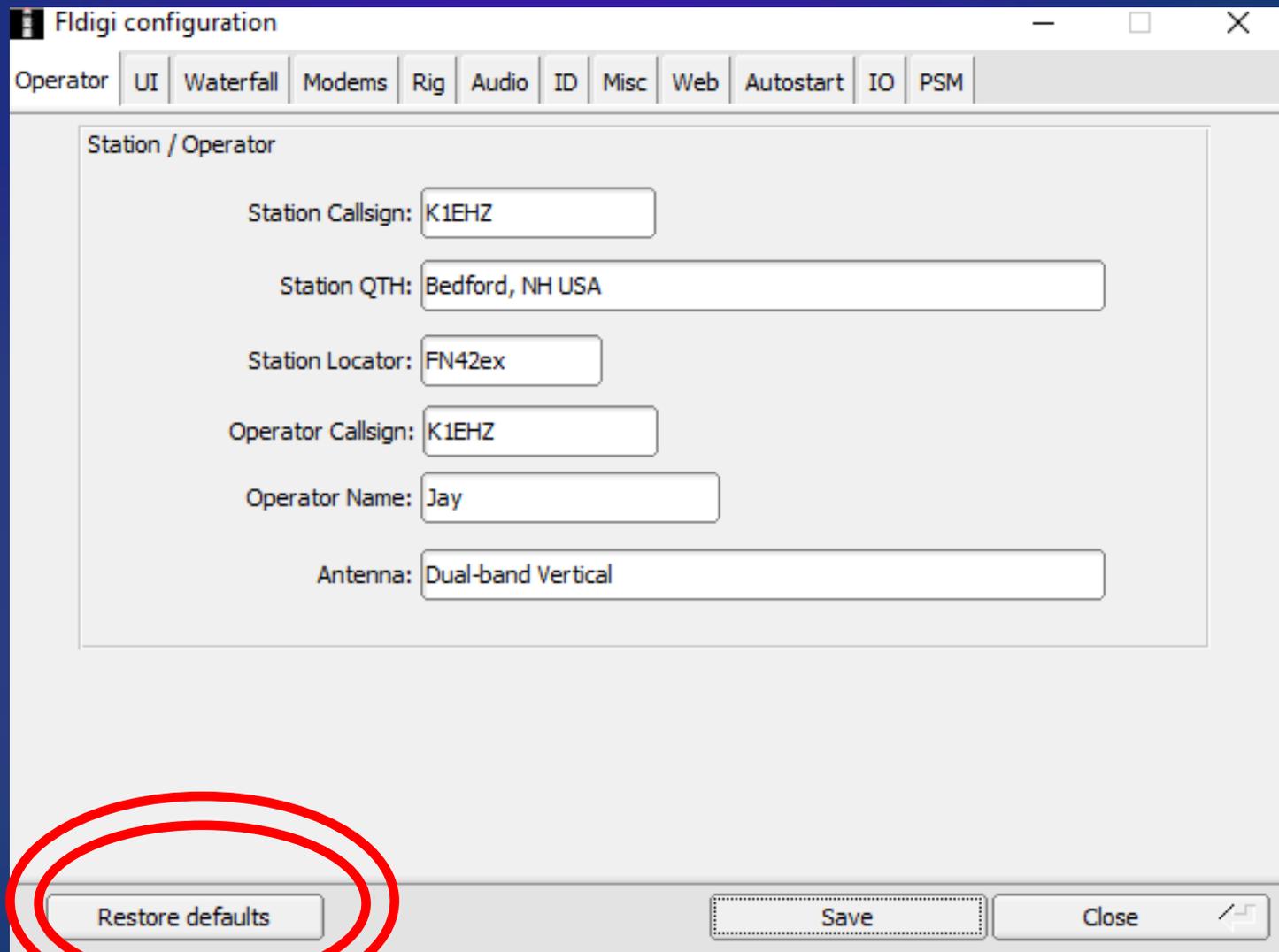
The screenshot shows the 'FLdigi configuration' window with the 'Operator' tab selected. The window title is 'FLdigi configuration'. The tabs are: Operator, UI, Waterfall, Modems, Rig, Audio, ID, Misc, Web, Autostart, IO, PSM. The 'Station / Operator' section contains the following fields:

- Station Callsign: K1EHZ
- Station QTH: Bedford, NH USA
- Station Locator: FN42ex
- Operator Callsign: K1EHZ
- Operator Name: Jay
- Antenna: Dual-band Vertical

At the bottom of the window, there are three buttons: 'Restore defaults', 'Save', and 'Close'.

Beware!!!

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



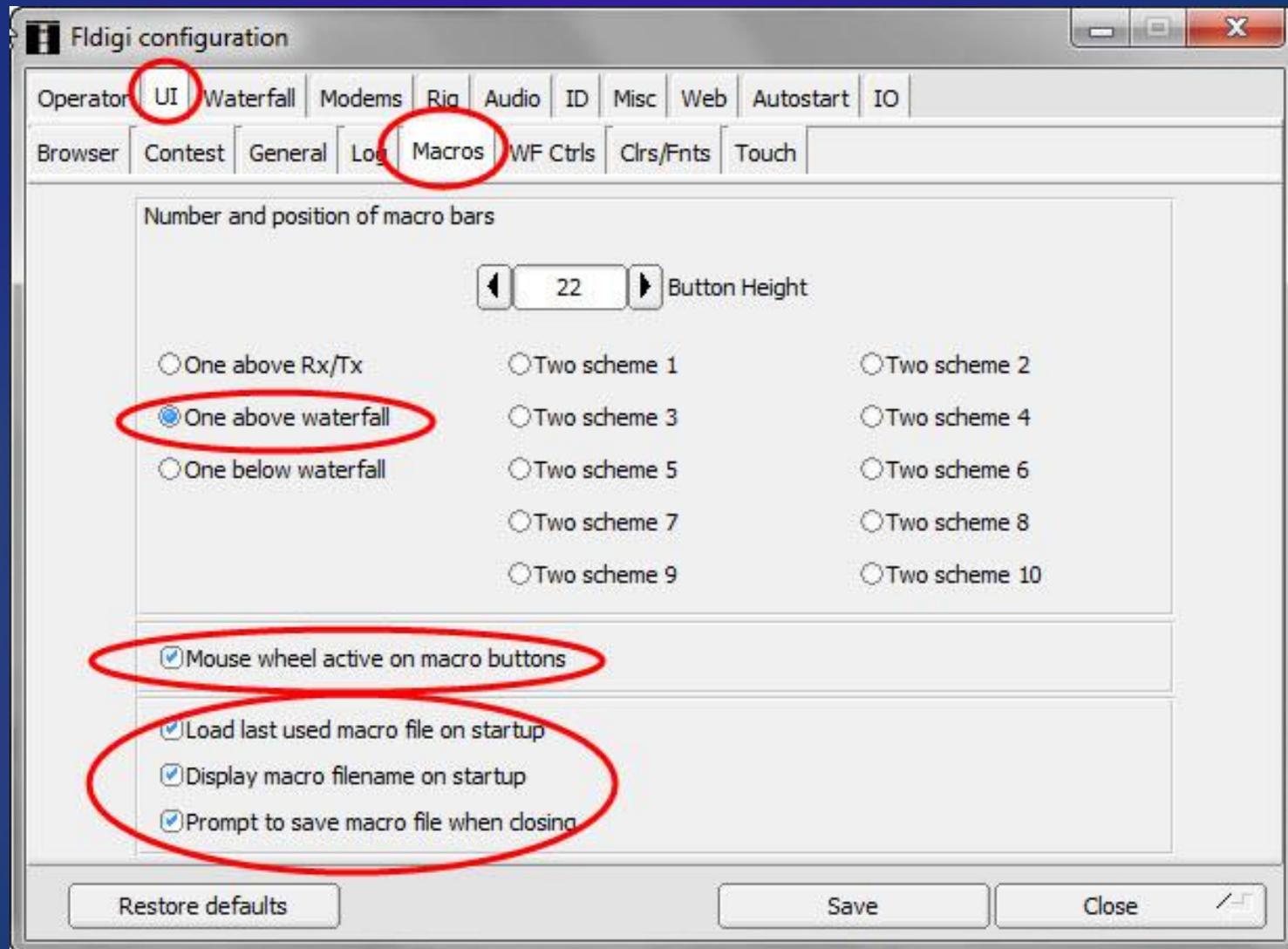
The screenshot shows the 'Fldigi configuration' window with the 'Operator' tab selected. The 'Station / Operator' section contains the following fields:

- Station Callsign: K1EHZ
- Station QTH: Bedford, NH USA
- Station Locator: FN42ex
- Operator Callsign: K1EHZ
- Operator Name: Jay
- Antenna: Dual-band Vertical

At the bottom of the window, the 'Restore defaults' button is circled in red, along with the 'Save' and 'Close' buttons.

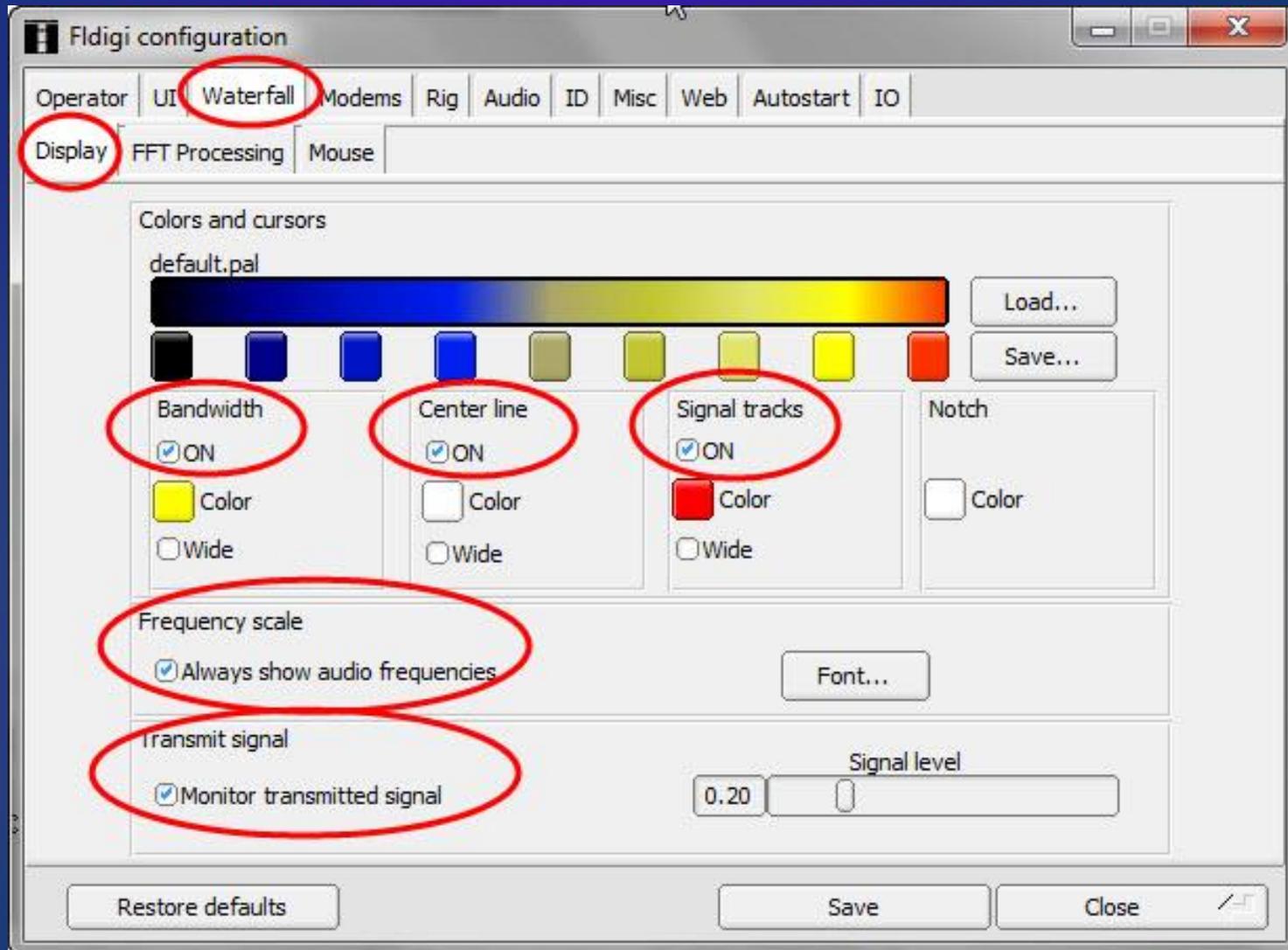
Configure FLdigi

UI – User Interface



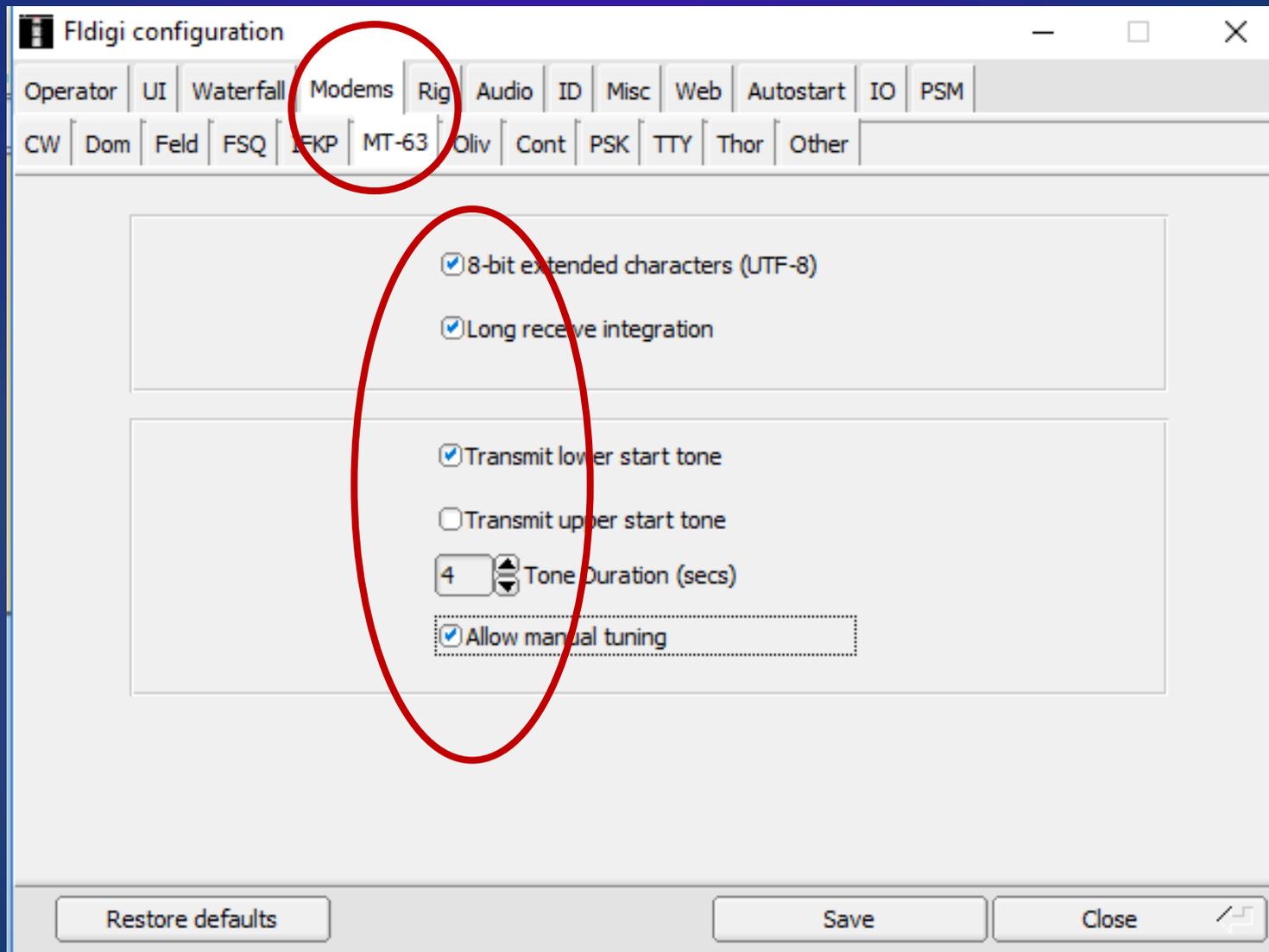
Configure FLdigi

Waterfall



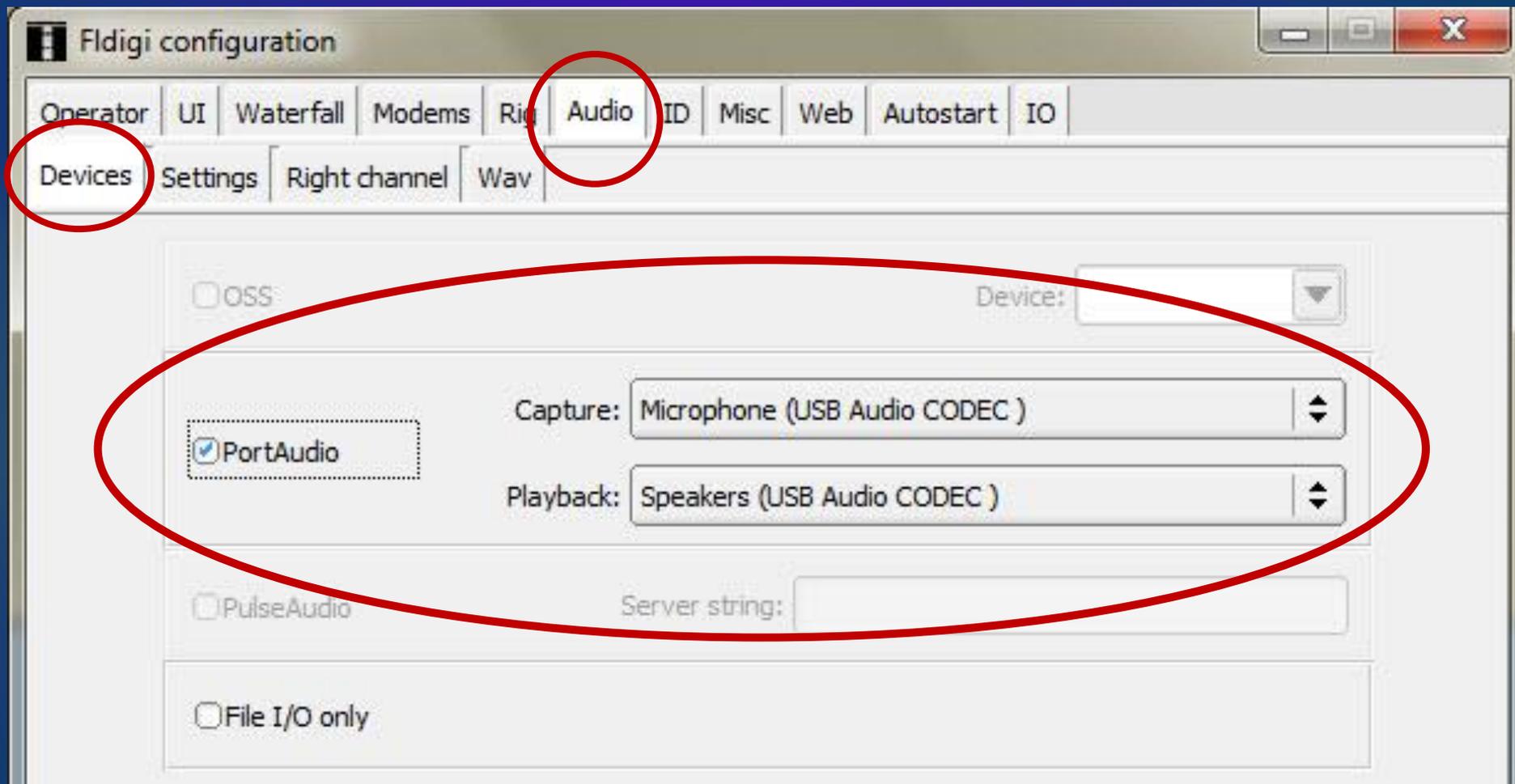
Configure FLdigi

Modem – MT63

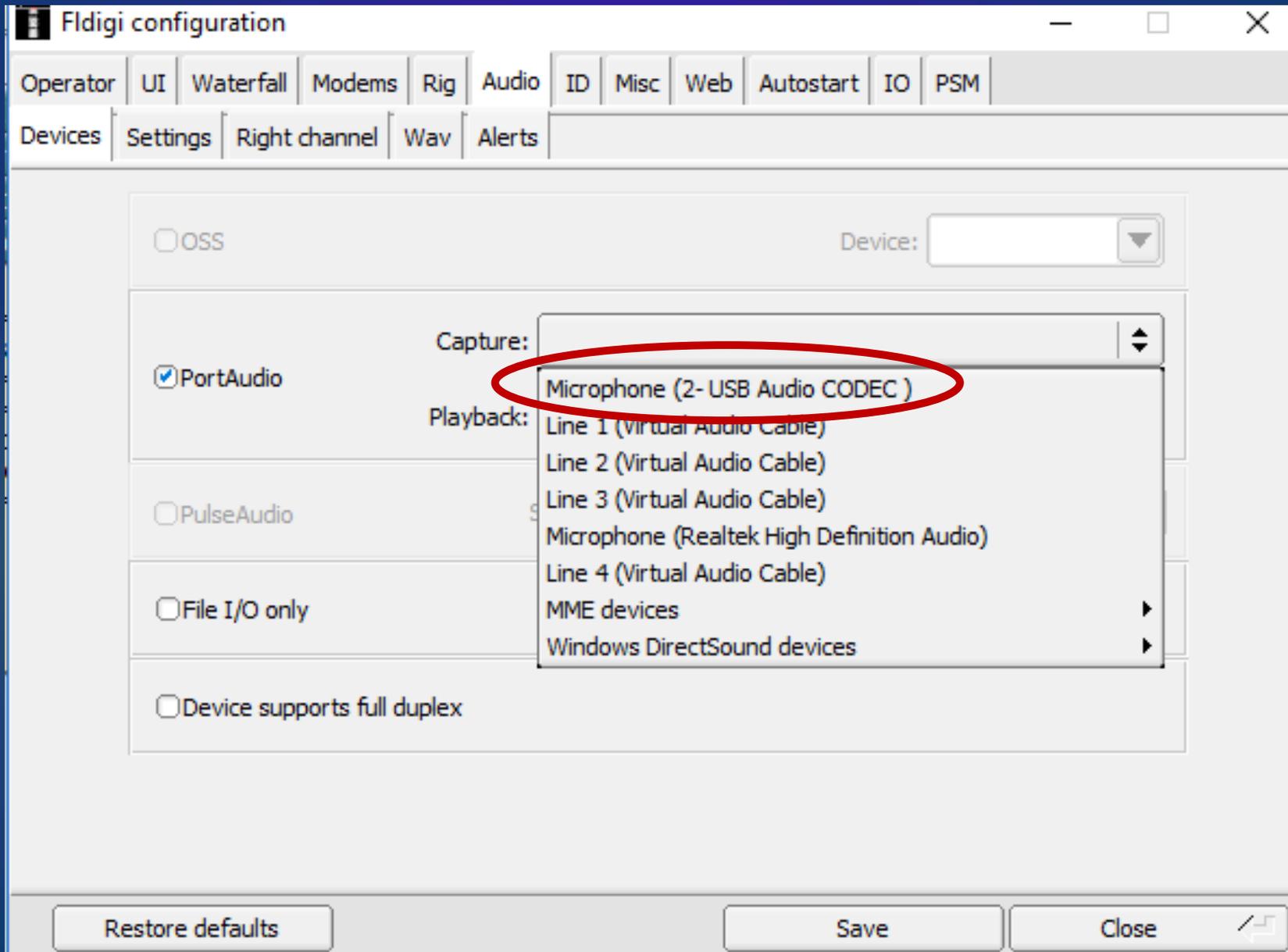


Configure FLdigi

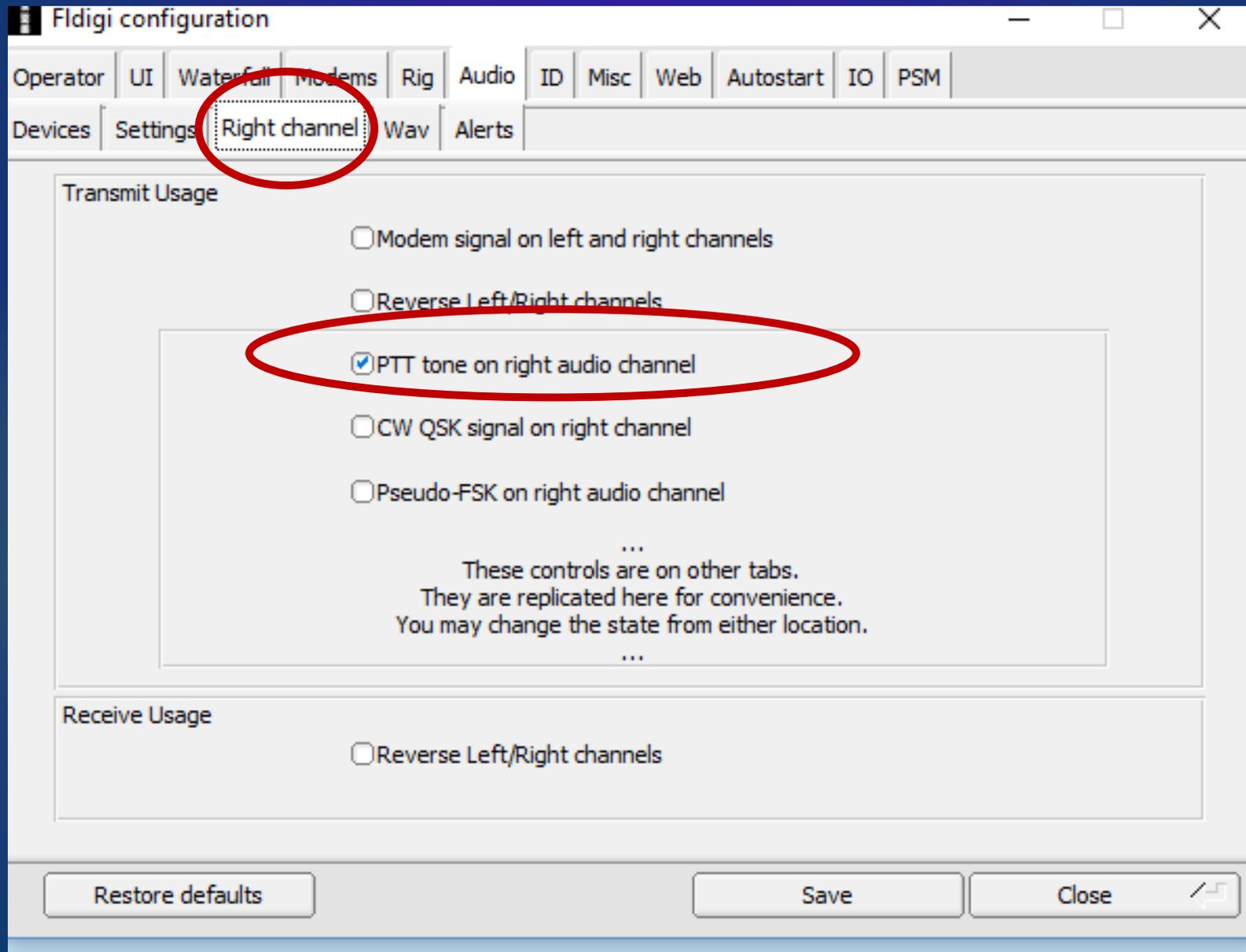
Audio Device



Signalink Audio

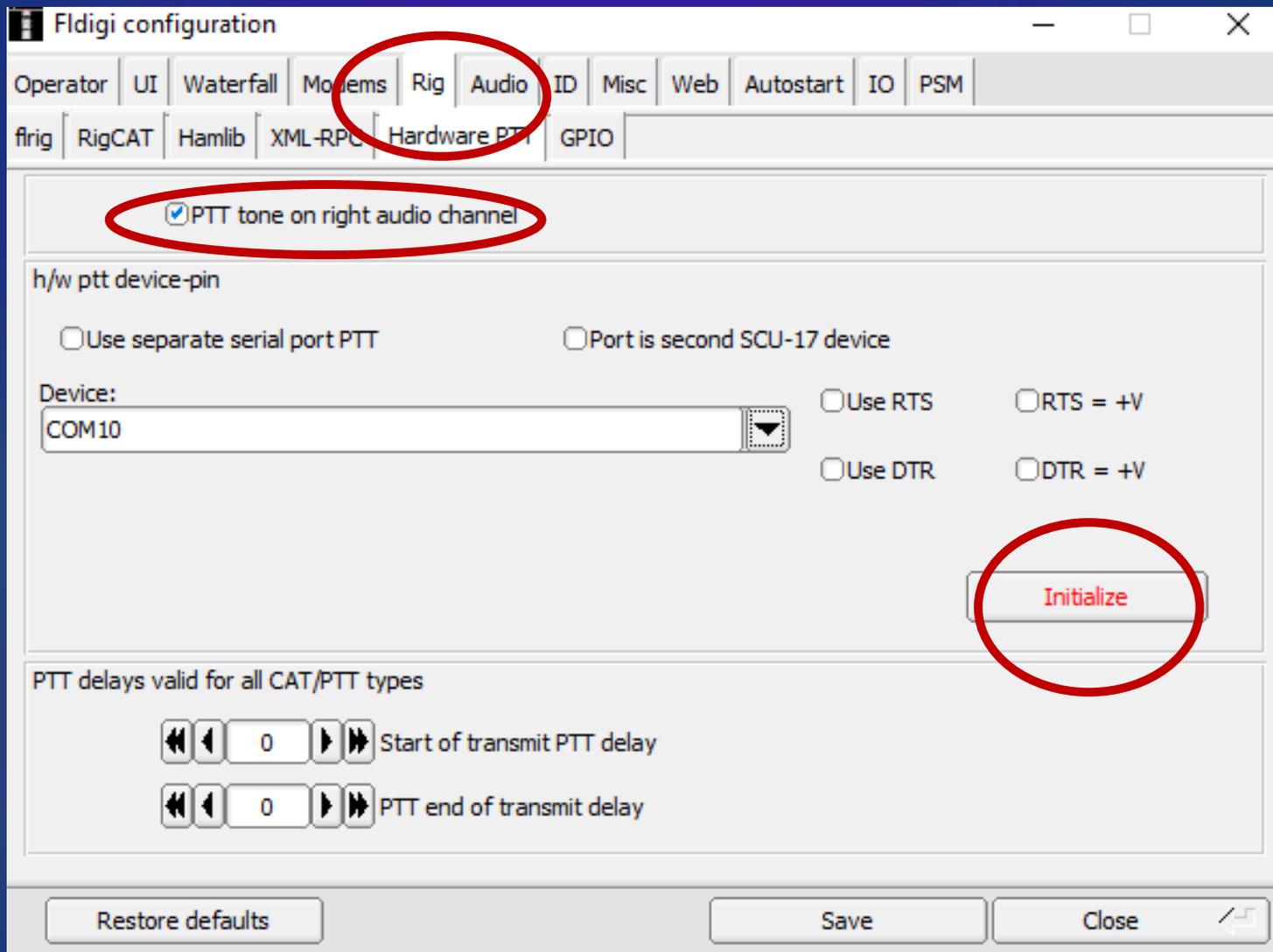


VOX Push-To-Talk

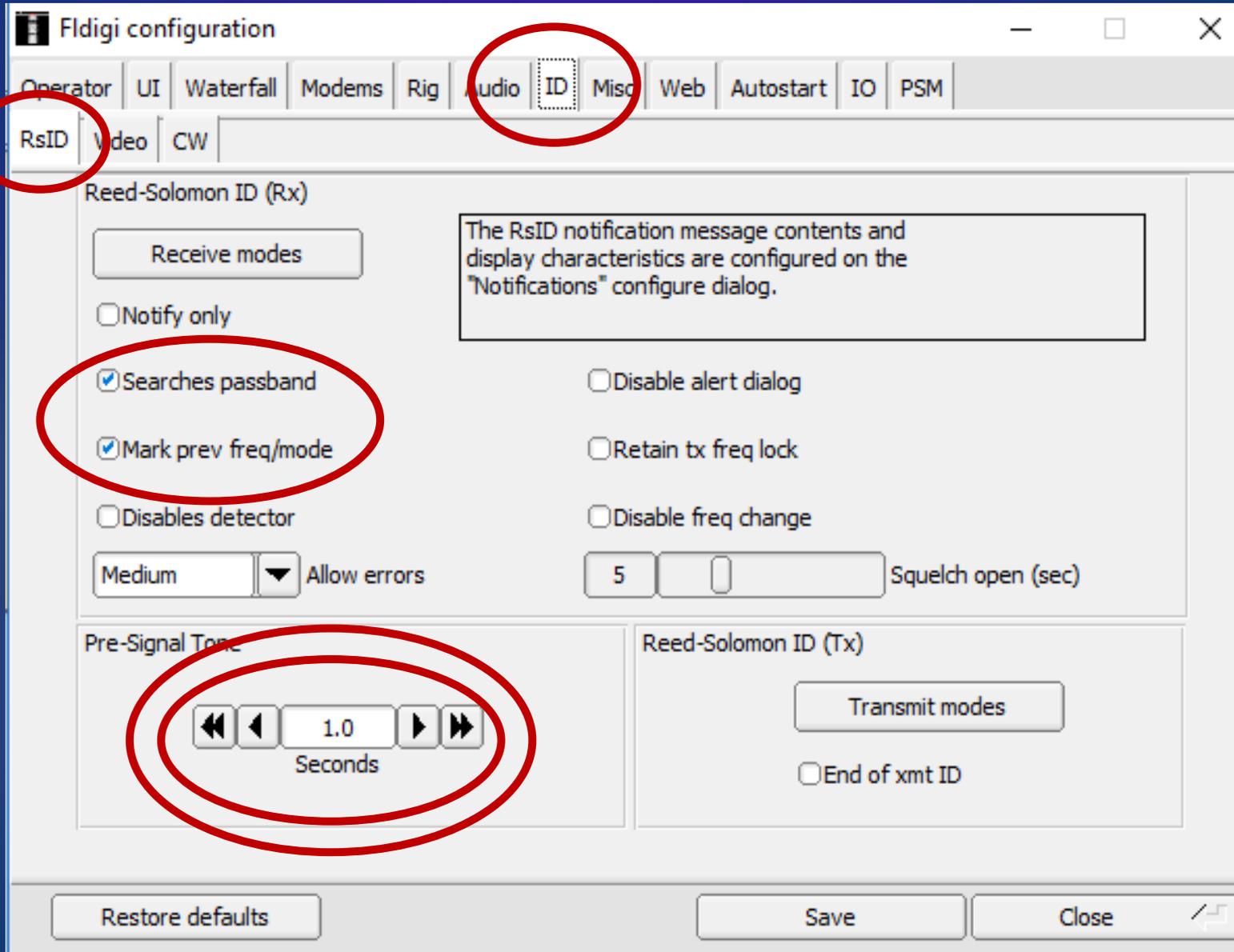


Configure FLdigi

Rig Control - Push-to-Talk



Configure FLdigi RsID



Wrap Info First and Last Lines

fldigi ver4.0.10 - K1EHZ

File Op Mode Configure View Logbook Help

145830.000

Frq 145831.500 On 1733 Off 2154 In Out

Call Op Az

FM Qth St Pr L

CQ	ANS	QSO	BTU	SK	Me
C Ans	C rpt	C Rep	C Incr	C Decr	Log QSO
Long Call	Ready	Copied OK	Resend	Next Message	ID/Clear
Welcome					

```
... start
[WRAP:beg][WRAP:if][WRAP:fn FLdigi_Test_1_K1EHZ-20180122-124043L-2.213]<flmsg>4.3
:hdr_fm:21
K1EHZ 20182201214228
:hdr_ed:21
K1EHZ 20182201211846
<ics213>
:to:7 NH ARES
:fm:20 Basic NBEMS Workshop
:d1:8 01/22/18
:t1:6 15:41L
:sb:14 FLdigi Message
:mg:79 Hello
... end
[WRAP:chksum 1E2C][WRAP:end]
... end
```

First wrap could be missed if repeater delay is too short

^r

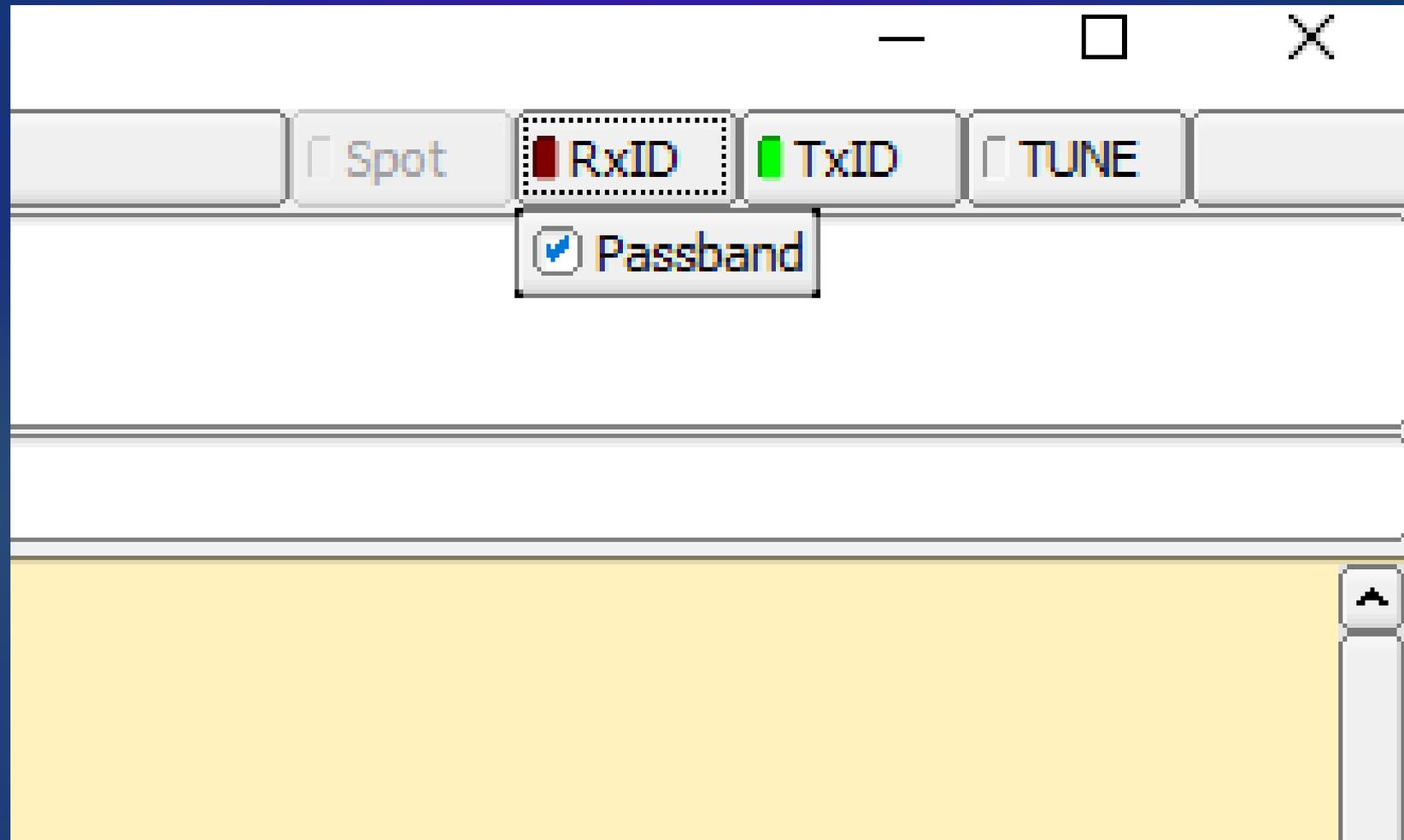
I

500 1000

RxID – TxID - Passband

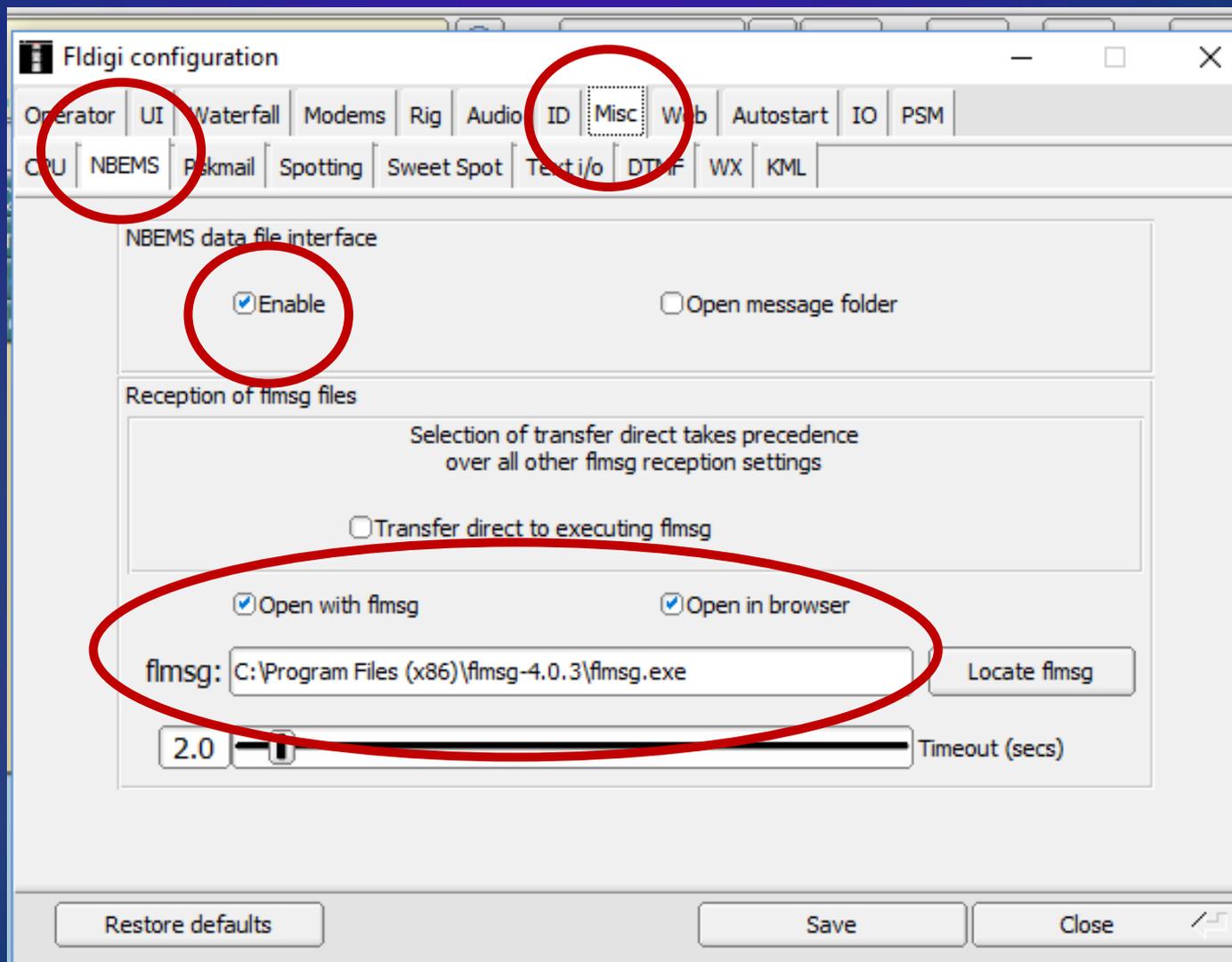
The screenshot displays the fldigi ver4.0.10 - K1EHZ software interface. The main window features a menu bar (File, Op Mode, Configure, View, Logbook, Help) and a toolbar with buttons for Spot, RxID, TxID, and TUNE. The RxID and TxID buttons are circled in red. The frequency field shows 145830.000, and the call field shows K1SMD. The mode is set to FM. The interface includes a large yellow display area, a blue display area, and a frequency scale at the bottom with various mode buttons (CQ, ANS, QSO, BTU, SK, Me, QTH, Brag, BPSK63, BPSK125, MT63-1KL, MT63-2KL). The Windows taskbar is visible at the bottom, showing the time as 10:16 AM on 1/22/2018.

Right Click RxID to Set “Passband”



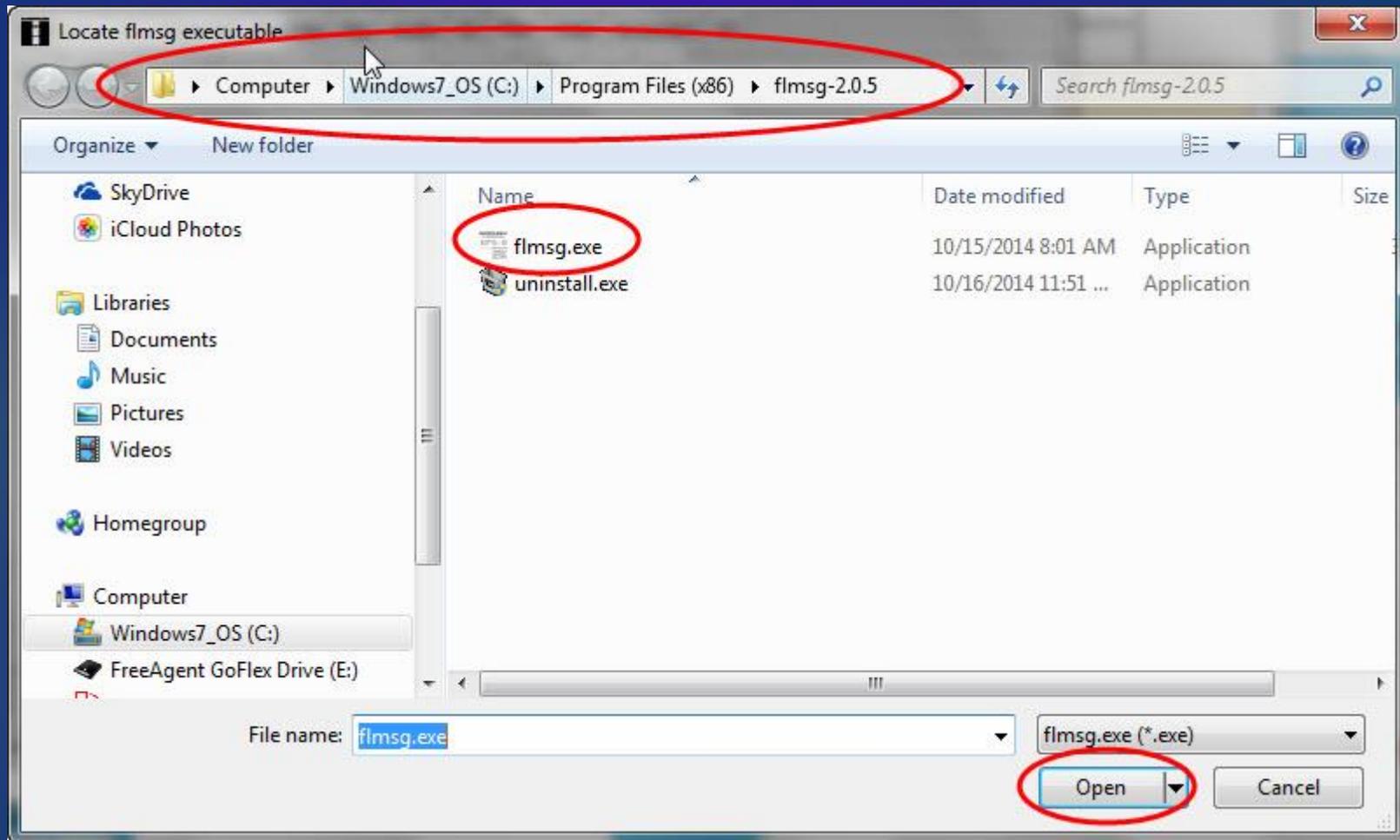
Configure FLdigi

Misc - NBEMS: FLmsg auto-unwrap



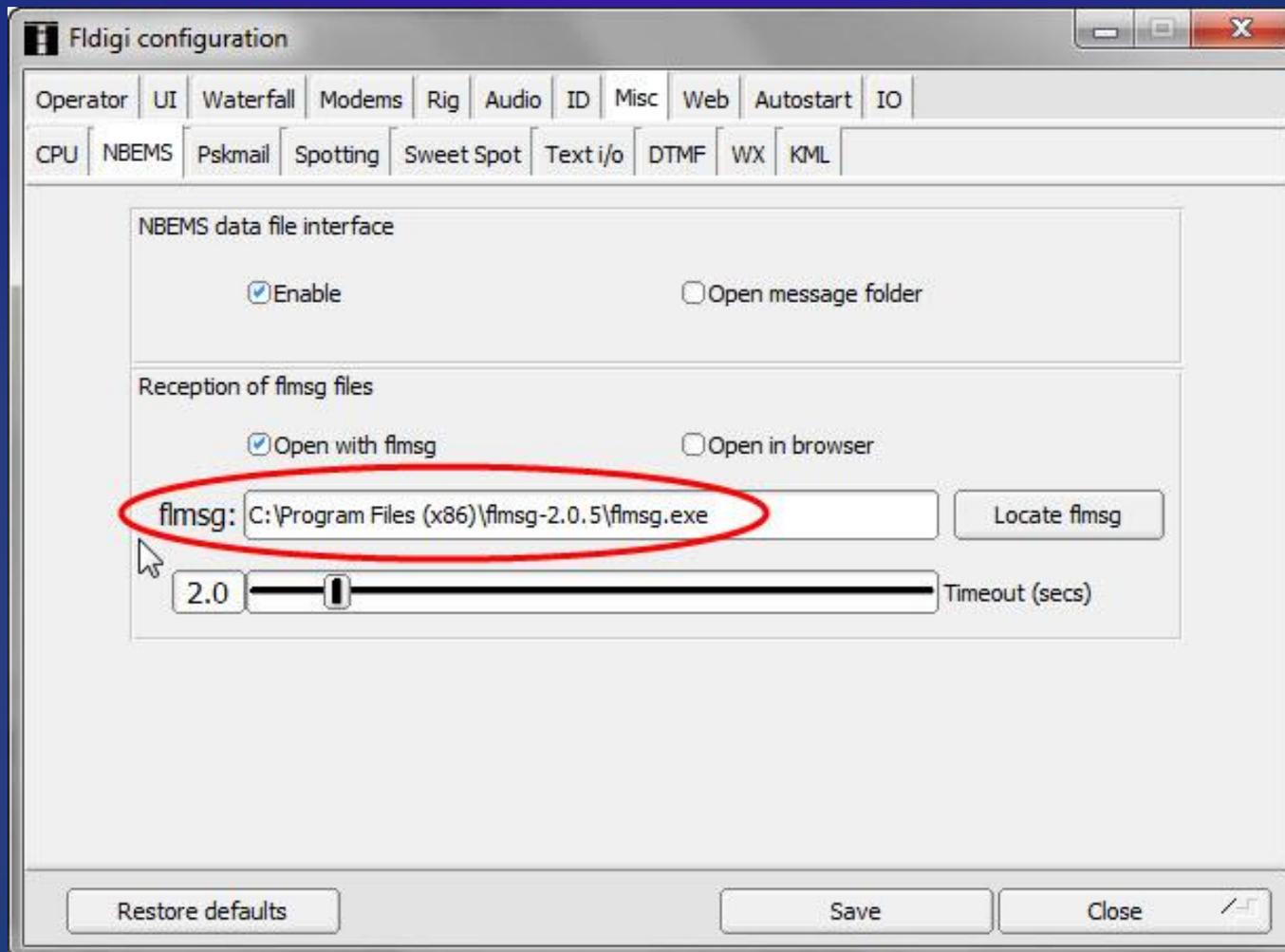
Configure FLdigi

Misc - NBEMS: FLmsg auto-unwrap message



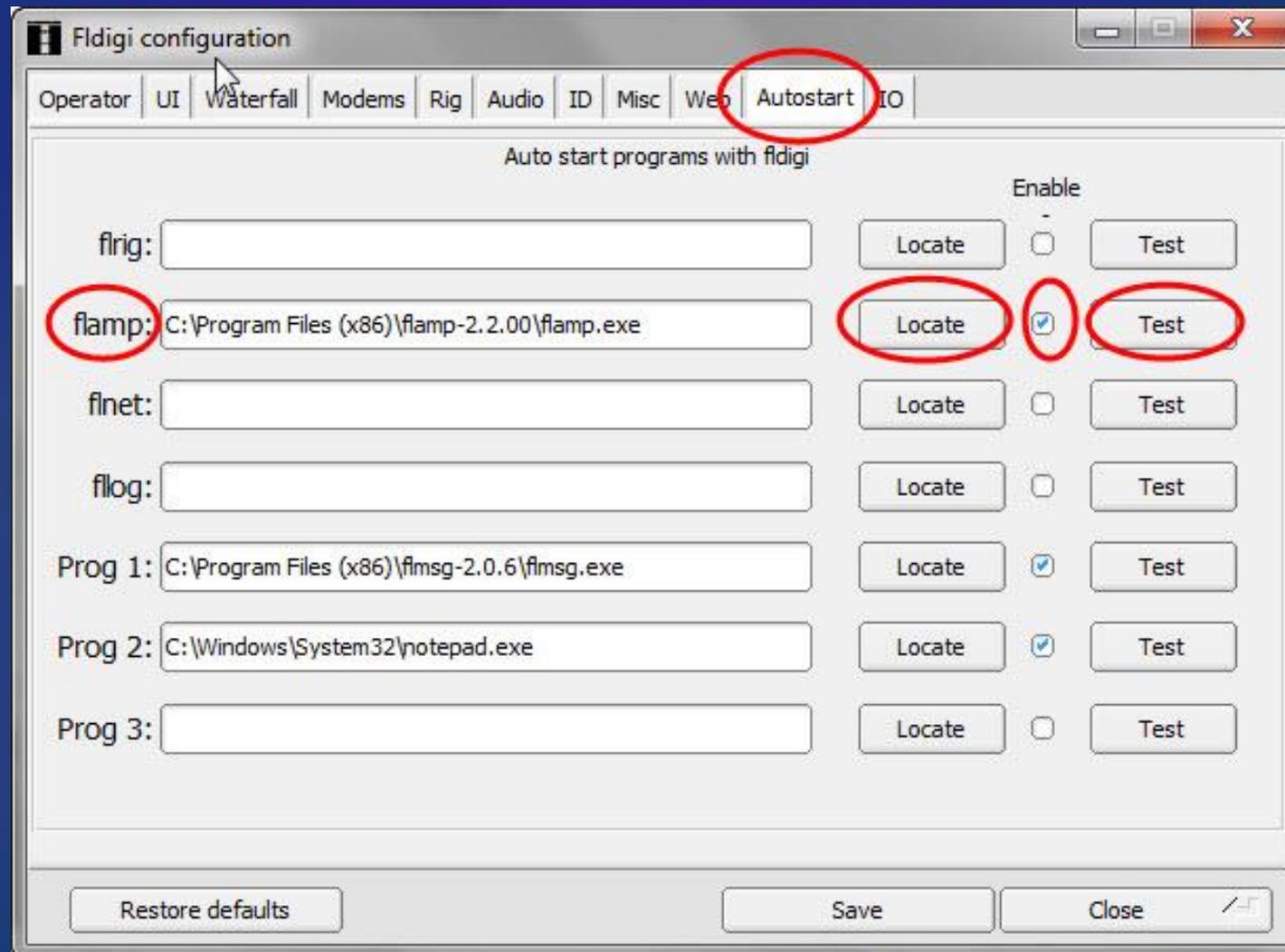
Configure FLdigi

Misc - NBEMS: FLmsg auto-unwrap message



Configure FLdigi

Autostart



Configure FLdigi

IO - Enable ARQ (Automatic Repeat reQuest)

The screenshot shows the 'FLdigi configuration' window with the 'IO' tab selected. The 'IO' tab is circled in red. The window contains the following configuration options:

- Enable ARQ for programs that support TCP and FLDIGI ARQ protocol.
Enable KISS for programs that supports UDP and TNC-2 KISS protocol.
Only one interface (ARQ/KISS) can be active at any given time.
IP address and port number changes require FLDIGI restart.
- Lock
- Enable ARQ
- Enable KISS
- AX25 Decode
- Enable CSMA

KISS

127.0.0.1 IP Address 7342 I/O 7343 O Dual Port

Enable Busy Channel Continue After (sec)

KPSQL Attenuation

ARQ

127.0.0.1 IP Address 7322 Port

XMLRPC

127.0.0.1 IP Address 7362 Port

Where are Program-related Files?

The image displays three overlapping Windows File Explorer windows, all showing the same path: **This PC > OS (C:) > Users > Jay**. The main pane shows a list of folders with the following columns: Name, Date modified, Type, and Size. Two folders are circled in red: **fldigi.files** and **NBE-MS.files**. The **NBE-MS.files** folder is currently selected, indicated by a blue highlight bar.

Name	Date modified	Type	Size
Creative Cloud files	01/19/2014 1:47 PM	File folder	
Desktop	1/9/2018 3:50 PM	File folder	
Documents	1/9/2018 1:14 PM	File folder	
Downloads	1/9/2018 12:38 PM	File folder	
Favorites	1/9/2018 12:38 PM	File folder	
fldigi.files	1/7/2018 10:30 AM	File folder	
flnet.files	12/22/2017 10:02 ...	File folder	
flrig.files	10/7/2016 10:34 PM	File folder	
iCloud Drive	3/24/2017 9:07 AM	File folder	
Links	1/9/2018 12:39 PM	File folder	
Music	1/9/2018 12:38 PM	File folder	
My Online Documents	11/8/2013 3:17 PM	File folder	
NBE-MS.files	1/8/2018 5:48 PM	File folder	
Old fldigi-flex1500	2/15/2017 11:08 AM	File folder	
Old fldigi-FT857	3/11/2017 4:40 PM	File folder	
Old fldigi-FT991	2/15/2017 10:59 AM	File folder	
OneDrive	12/13/2017 11:30 ...	File folder	
OpenVPN	4/19/2017 8:17 AM	File folder	
Pictures	1/9/2018 12:38 PM	File folder	
Ready Share	4/15/2017 9:26 AM	File folder	
Saved Games	1/9/2018 12:39 PM	File folder	
Searches	1/9/2018 12:38 PM	File folder	
SkyDrive	8/15/2013 9:58 AM	File folder	
Tracing	5/26/2016 9:35 PM	File folder	

Where are Program-related Files?

The image displays four overlapping Windows File Explorer windows, all showing the same directory structure for a folder named 'fldigi.files' located at 'This PC > OS (C:) > Users > Jay > fldigi.files'. The windows are arranged from left to right, with the rightmost window being the most prominent and showing a detailed view of the files and folders.

The directory structure includes the following folders and files:

- iCloud Drive
- _LongPath
- Eclipse 2017
- Documents
- Pictures
- iCloud Photo
- FLdigi Text Files
- macros
- Power Exp
- Screenshots
- OneDrive
- Creative Cloud F
- This PC
- 3D Objects
- Desktop
- Downloads
- Music
- Videos
- OS (C:)
- Data (D:)
- MEMORYCARD
- Network
- Homegroup

The rightmost window shows a detailed view of the files and folders in the 'fldigi.files' directory:

Name	Date modified	Type	Size
avatars	7/1/2017 1:23 PM	File folder	
data	7/1/2017 1:23 PM	File folder	
etpro	10/2/2013 10:22 AM	File folder	
FLdigi Text Files	1/25/2018 3:55 PM	File folder	
help	7/1/2017 1:23 PM	File folder	
images	7/1/2017 1:23 PM	File folder	
kml	1/25/2018 4:36 PM	File folder	
logs	9/21/2017 8:08 PM	File folder	
LOTW	7/1/2017 1:23 PM	File folder	
macros	1/25/2018 4:37 PM	File folder	
palettes	7/1/2017 1:23 PM	File folder	
rigs	7/1/2017 9:57 PM	File folder	
scripts	7/1/2017 1:23 PM	File folder	
talk	11/16/2017 8:04 PM	File folder	
temp	9/21/2017 8:08 PM	File folder	
wrap	7/1/2017 1:23 PM	File folder	
fldigi.prefs	1/25/2018 4:38 PM	PREFS File	3 KB
fldigi_def.xml	1/24/2018 2:51 PM	XML Document	81 KB
fldigi_def.xml-old	1/23/2018 11:11 PM	XML-OLD File	81 KB
frequencies2.txt	1/25/2018 4:38 PM	Text Document	1 KB
lang.txt	1/24/2018 2:51 PM	Text Document	1 KB
notify.prefs	10/11/2017 8:25 PM	PREFS File	1 KB
stacktrace.txt	1/25/2018 4:25 PM	Text Document	3 KB

Where are Message Files?

The image shows a sequence of four File Explorer windows illustrating the navigation path to message files. The path is: This PC > OS (C:) > Users > Jay > NBEMS.files.

The final window displays the contents of the NBEMS.files folder, with the following table:

Name	Date modified	Type	Size
ARQ	7/12/2017 9:11 PM	File folder	
CSV	7/18/2016 7:44 AM	File folder	
CUSTOM	7/18/2016 7:44 AM	File folder	
TEMP	7/18/2016 7:43 AM	File folder	
ICS	1/8/2018 6:39 PM	File folder	
Temp_files	7/18/2016 7:44 AM	File folder	
TRANSFERS	7/13/2017 9:25 AM	File folder	
WRAP	2/14/2015 9:23 AM	File folder	
flmsg_log_log.txt	1/9/2018 3:45 PM	Text Document	1 KB
FLMSG.prefs	1/9/2018 3:45 PM	PREFS File	1 KB
flmsg.sembrs	1/8/2018 5:48 PM	SERNBRS File	1 KB

The folders 'ICS' and 'WRAP' are circled in red in the original image.

Create Shortcuts

The screenshot shows a Windows File Explorer window titled 'ARES' with the address bar set to 'This PC > Documents > Amateur Radio > ARES'. The file list shows various folders, with 'NBEMS' selected. A context menu is open over 'NBEMS', and the 'Send to' > 'Desktop (create shortcut)' option is highlighted. The taskbar at the bottom shows the search bar and several application icons. The system tray on the right shows the time as 4:29 PM on 1/9/2018.

**-- Right Click Folder
-- Send To
-- Desktop (create shortcut)**

Desktop Shortcuts

The image shows a Windows File Explorer window with four panes. The left pane shows the navigation pane with 'This PC' selected. The right pane shows a file list for the 'NBEMS.files' folder. A yellow oval highlights three desktop shortcuts: 'rcv - Shortcut', 'messages - Shortcut', and 'ICS - Shortcut'. The taskbar at the bottom shows the search bar and various application icons.

Name	Date modified	Type
ARQ	7/12/2017 9:11 PM	File folder
CSV	7/18/2016 7:44 AM	File folder
CUSTOM	7/18/2016 7:44 AM	File folder
FLAMP	7/18/2016 7:43 AM	File folder
ICS	1/8/2018 6:39 PM	File folder
temp_files	7/18/2016 7:44 AM	File folder
Text Files	7/13/2017 9:25 AM	File folder
TRANSFERS	7/18/2016 7:44 AM	File folder
WRAP	2/14/2015 9:23 AM	File folder
debug_log_.txt	1/9/2018 3:45 PM	Text Document
FLMSG.prefs	1/9/2018 3:45 PM	PREFS File
flmsg.sernbrs	1/8/2018 5:48 PM	SERNBRS File

Shortcuts to Files Can be Renamed

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

Agenda

What is Digital Communication?

Why Digital EmComm?

What is NBEMS?

Computer Operating Systems

Interface Radio and Computer

Configure FLdigi

➤ **Configure FLmsg**

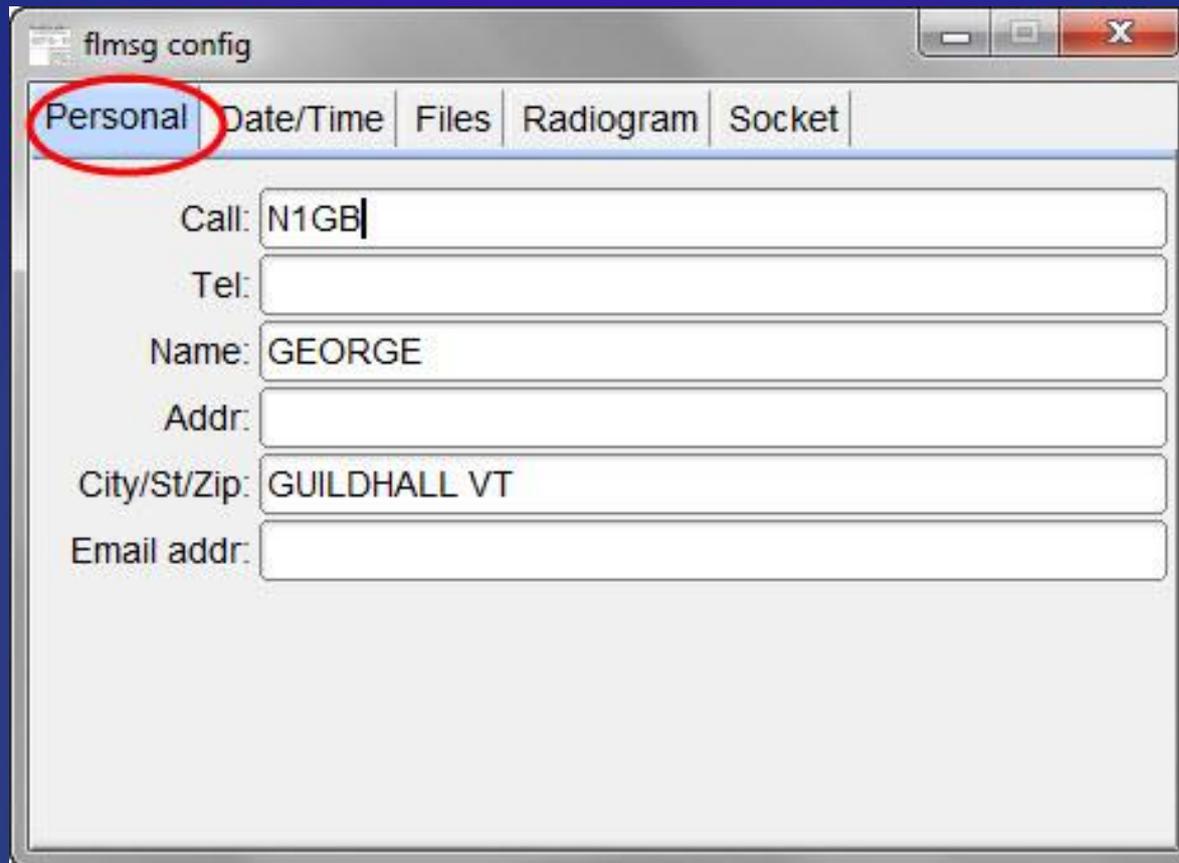
Macros & Modes

Training Possibilities

Winlink Email over Radio

Configure FLmsg

Personal Data

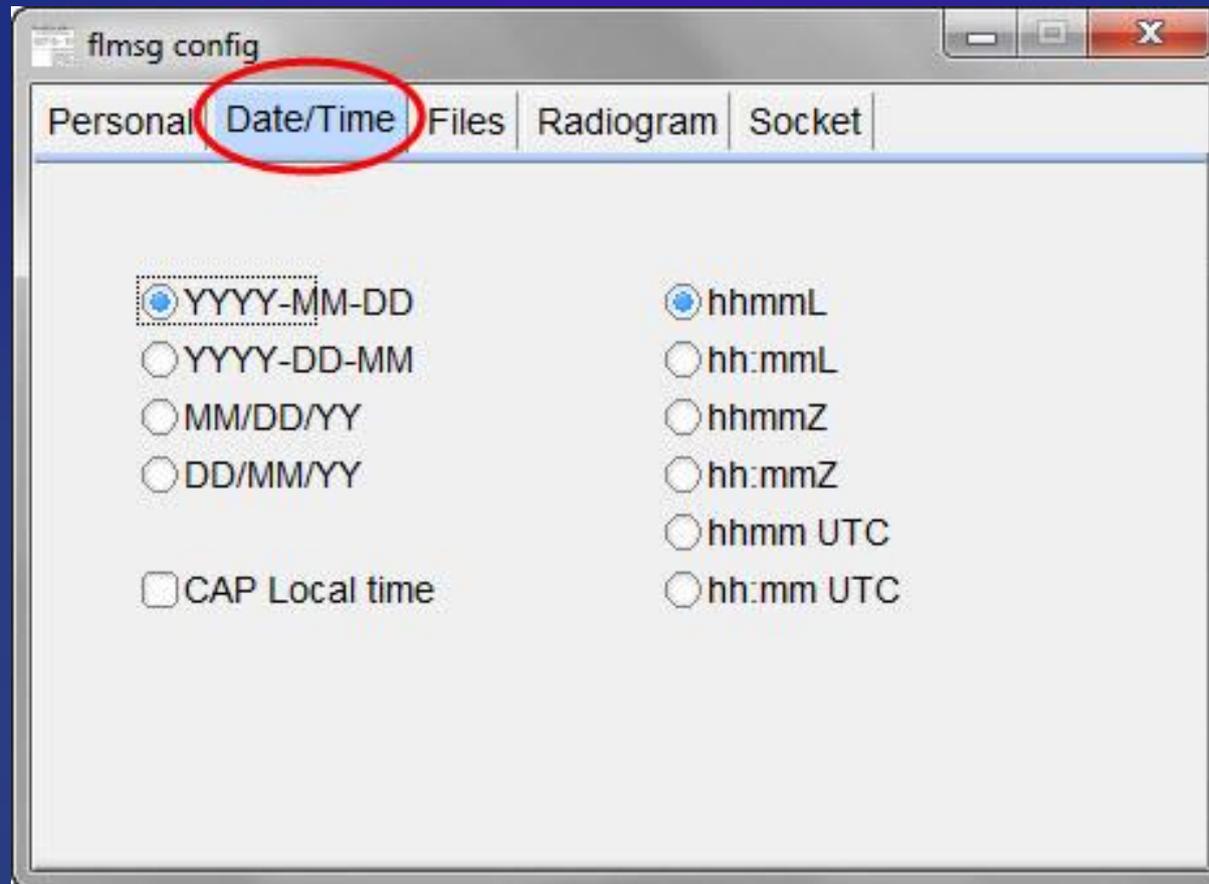


The image shows a screenshot of a software configuration window titled "flmsg config". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a tabbed interface with five tabs: "Personal", "Date/Time", "Files", "Radiogram", and "Socket". The "Personal" tab is selected and highlighted with a red circle. The main area of the window contains several text input fields:

- Call: N1GB
- Tel: (empty)
- Name: GEORGE
- Addr: (empty)
- City/St/Zip: GUILDHALL VT
- Email addr: (empty)

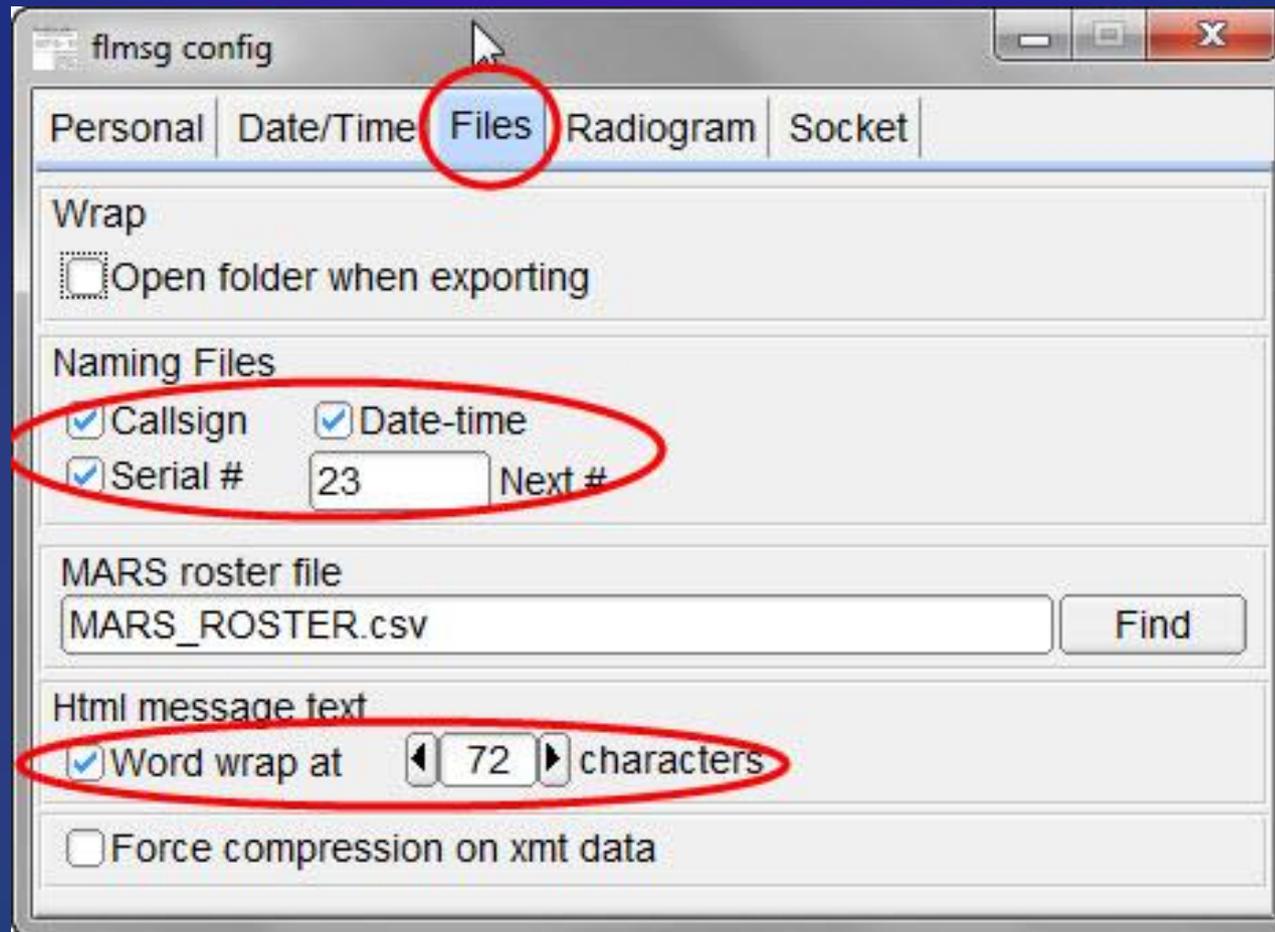
Configure FLmsg

Date - Time Format



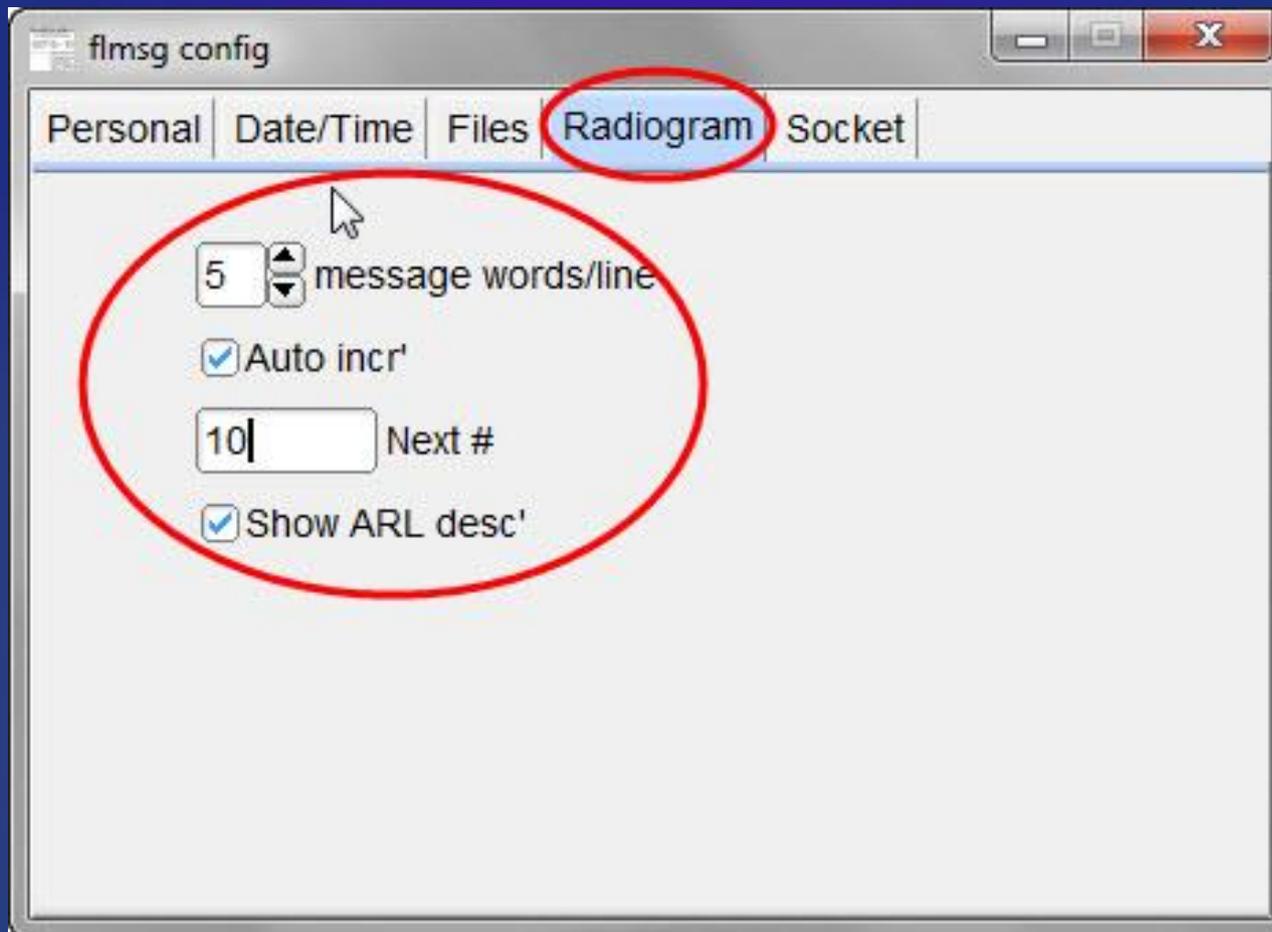
Configure FLmsg

File Names



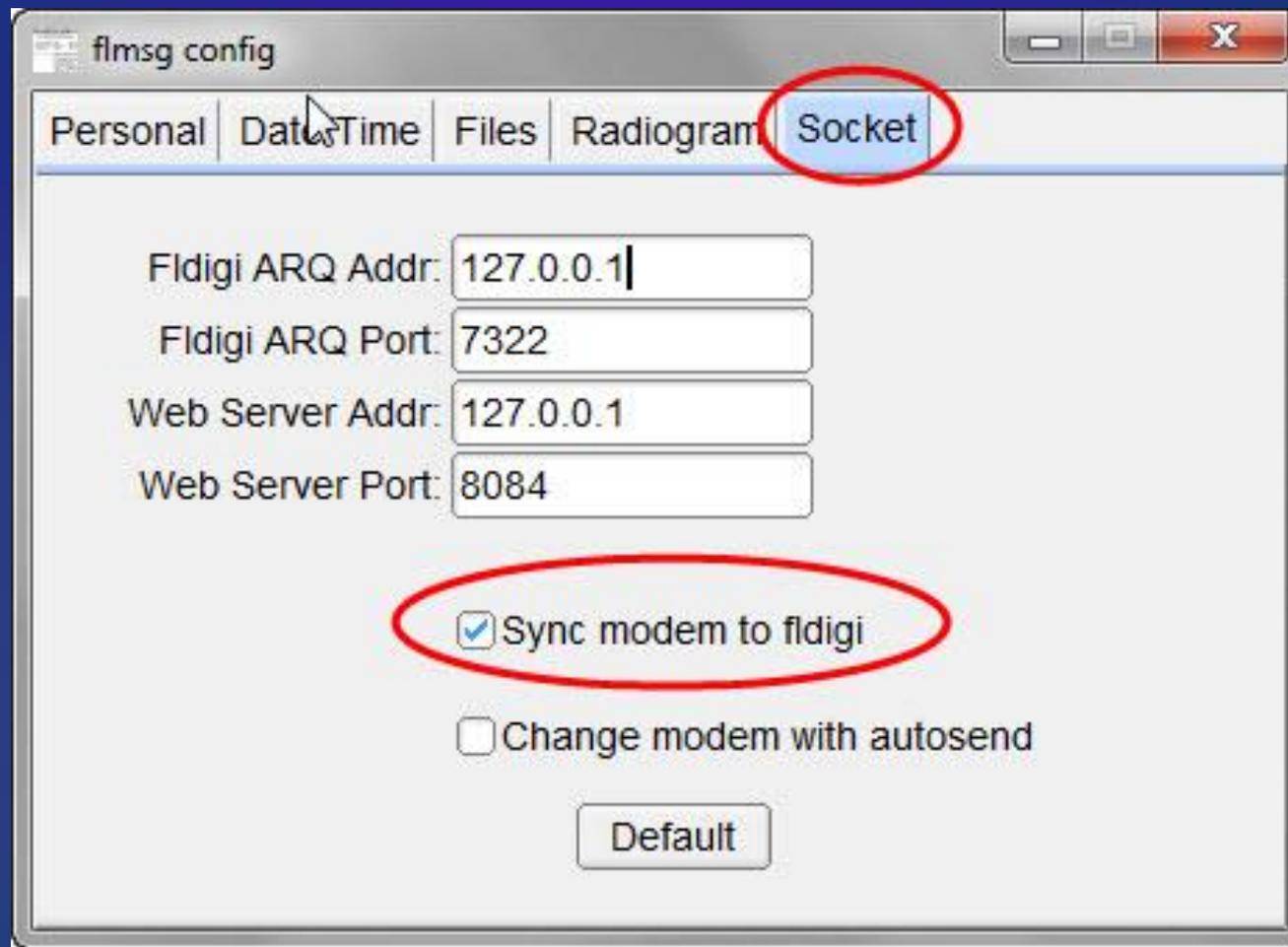
Configure FLmsg

Radiogram



Configure FLmsg

Sync Modem with FLdigi



The screenshot shows the 'flmsg config' window with the 'Socket' tab selected. The 'Socket' tab is circled in red. Below the tabs, there are four input fields: 'Fldigi ARQ Addr:' with the value '127.0.0.1', 'Fldigi ARQ Port:' with the value '7322', 'Web Server Addr:' with the value '127.0.0.1', and 'Web Server Port:' with the value '8084'. Below these fields, there are two checkboxes: the first is checked and labeled 'Sync modem to fldigi', and the second is unchecked and labeled 'Change modem with autosend'. The 'Sync modem to fldigi' checkbox is circled in red. At the bottom of the window, there is a 'Default' button.

flmsg config

Personal | Data | Time | Files | Radiogram | **Socket**

Fldigi ARQ Addr: 127.0.0.1

Fldigi ARQ Port: 7322

Web Server Addr: 127.0.0.1

Web Server Port: 8084

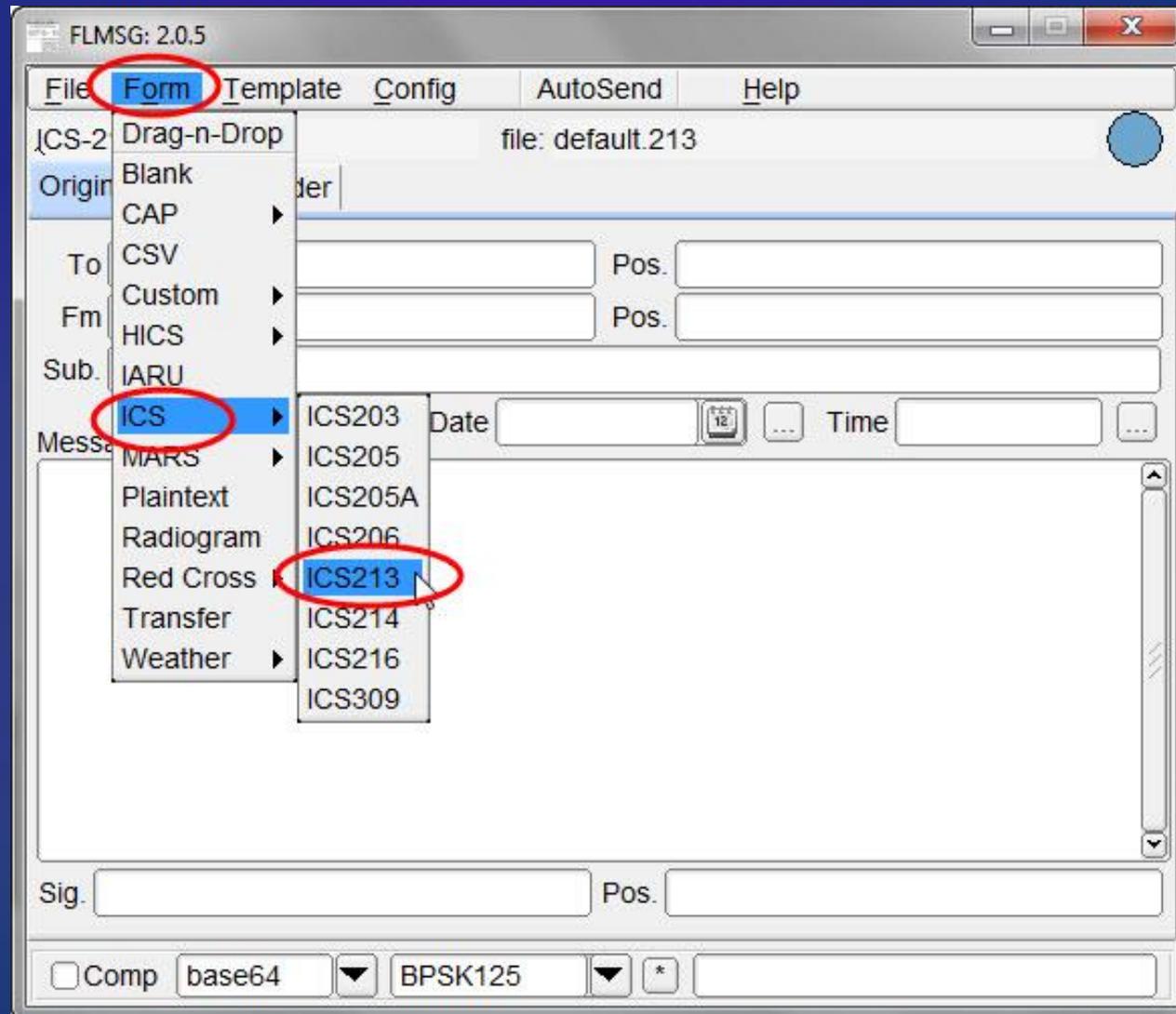
Sync modem to fldigi

Change modem with autosend

Default

Configure FLmsg

Standard Forms



Configure FLmsg ICS 213

The screenshot displays the fldigi ver4.0.10 - K1EHZ software interface. The main window shows a frequency of 145830.000 and various control buttons. A configuration window titled "FLMSG: 4.0.3" is open, showing the "ICS-213 report" configuration. The window includes fields for "Originator" and "Responder", "Inc:", "To", "Fm", "Sub.", "Message:", "Date", "Time", "App'd", and "Pos.". The "Message:" field is currently empty. The "Date" and "Time" fields are also empty. The "App'd" field is empty, and the "Pos." field is empty. The "Comp" checkbox is checked, and the "MT63-1KL" mode is selected. The background shows the main fldigi interface with a frequency display of 145830.000 and various control buttons.

Configure FLmsg ARRL Radiogram

The screenshot displays the FLdigi ver4.0.10 - K1EHZ software interface. The main window shows a frequency of 145830.000 and various control buttons. Two dialog boxes are open:

FLMSG: 4.0.3

- File Form Template Config AutoSend ARQ Help
- ARRL radiogram file: default.m2s
- Message Records
- SVC *NR *PREC HX_ *STN ORIG CK
 ROUTINE hx ARL 5 ck
- PLACE OF ORIG TIME FILED *MON DY
- *TO TEL: OP NOTE:
- Standard Format ARL MSG
- TXT:
- SIG: OP NOTE:
- Comp MT63-1KL * 175 bytes / 35 secs

ARRL Message Selector

- ARRL # Message:
- ONE Everyone safe here. Please don't worry.
- TWO
- THREE
- FOUR
- FIVE
- SIX
- SEVEN
- fill 1:
- fill 2:
- fill 3:
- fill 4:
- Insert "X" between fields
- Cancel Add

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.

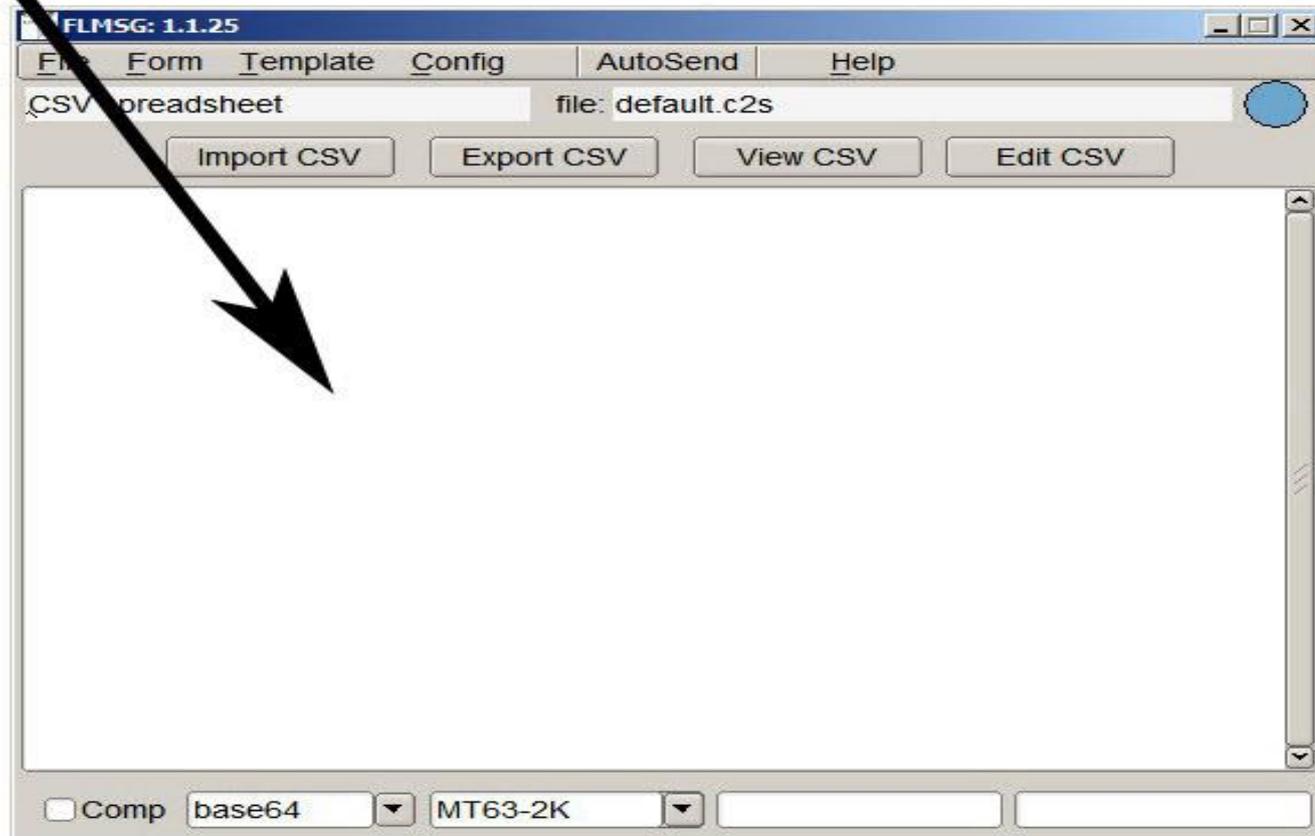
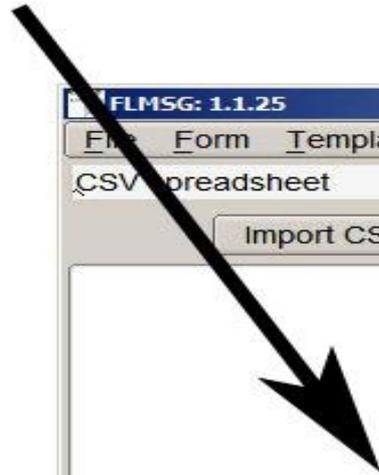
Push **Export CSV** button.

Save to Desktop or USB drive.

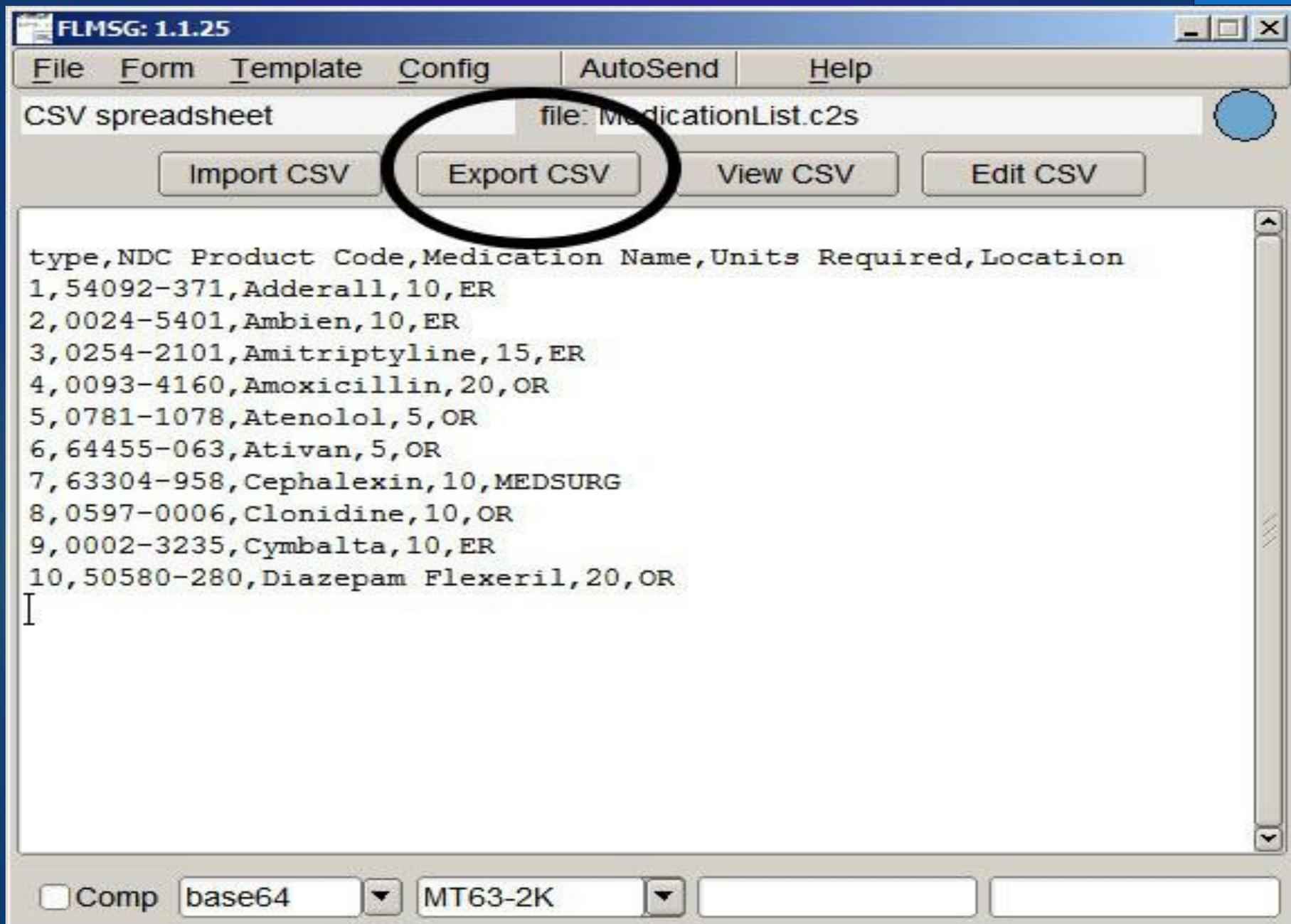
Drag and Drop CSV File



NBEMS Bed Status



Extract Incoming CSV File



Agenda

What is Digital Communication?

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Interface Radio and Computer

Configure FLdigi

Configure FLmsg

➤ **Macros & Modes**

Training Possibilities

Winlink Email over Radio

Basic and NCS Macro Files

fldigi ver4.0.10 - K1EHZ

File Op Mode Configure View Logbook Help

145830.000 Frq 145831.501 On Off 1831 In Out

Call Op Az

FM Qth St Pr L C

Clear RX	Clear TX	Call de My Call	CQ Call QTH	MT63-1KL	MT63-2KL	BPSK-125	PSK125 RC4	T/R	Tx	Rx	Tune 5 secs
CI w Traffic	CI w/o Traffic	Relay Call	Tx My Call	Call Ready to Copy?	My Call Rdy to copy!	Call Resend	Call Rtn to Voice	Call de QTH	CI QTH w Traffic	CI QTH w/o Traffic	Secure from Net
Basic Checklist	Startup Notes	Macro Input Notes	WX Notes					Local WX Form	Send NOAA WX	Copy NOAA WX	Testing de MyCall

Read macros from: C:\Users\Jay\Desktop\FLdigi Programs & Macro Files\Basic-NH-ARES-VHF-UHF-FM-Macros-V02E05.mdf

fldigi ver4.0.10 - K1EHZ

File Op Mode Configure View Logbook Help

145830.000 Frq 145831.500 On Off 1427 In Out

Call Op Az

FM Qth St Pr L C

Clear RX	Clear TX	Resend	TX MY CS/QTH		Rtn to Voice			T/R	Tx	Rx	
CI with Traffic	CI w/o Traffic	Relay CALL	TX MYCALL	Ready to Copy?	Ready to copy!			Local WX Form	Send NOAA WX	Copy NOAA WX	
Checklist	Custom Read Me	ARES Organization	FLdigi Start-up	BPSK-125	MT63-1KL	PSK125 RC4		Tune 10 secs	Tune 60	Init CNTR = 5	DTN in CNTR mins
Alternate NCS?	NCS Startup	QTH Check-In	Net ACK CALL	Standby	ANCS Relay	Any Relays?	NCS Shutdown	NCS ID	CALL Send Msg	Nothing Heard	NCS TX

Loaded macros: C:\Users\Jay\fldigi.files\macros\Generic-ARES-NCS-VHF-UHF-FM-Macros-V09E05.mdf

fldigi ver4.0.10 - K1EHZ

File Op Mode Configure View Logbook Help

145830.000 Frq 145831.500 On Off 1439 In Out

Call Op Az

FM Qth St Pr L C

Clear Upper Pane	Clear Lower Pane	BPSK125 1500	MT63-1KL 1500	Send BPSK Carrier	Send S/N + IMD	Call de QTH					

Loaded macros: C:\Users\Jay\fldigi.files\macros\Scratch Pad.mdf

Macros

Use Macros to automate frequent procedures

The image shows a screenshot of the Fldigi software interface. The main window is titled "fldigi - N1GB" and displays a frequency of 0.000 MHz. The interface includes a menu bar (File, Op Mode, Configure, View, Logbook, Help) and various control buttons (Spot, RxID, TxID, TUNE). The main display area shows the frequency and call sign fields.

Overlaid on the main window is a "Macro editor" window titled "Macro editor - C:/Users/GB/fldigi.files/macros/macros.mdf". The "Macro Text" field contains the following text:

```
<TX>  
<CALL> <CALL> Ready to copy NH-ARES message. BTU. de <MYCALL>  
<RX>
```

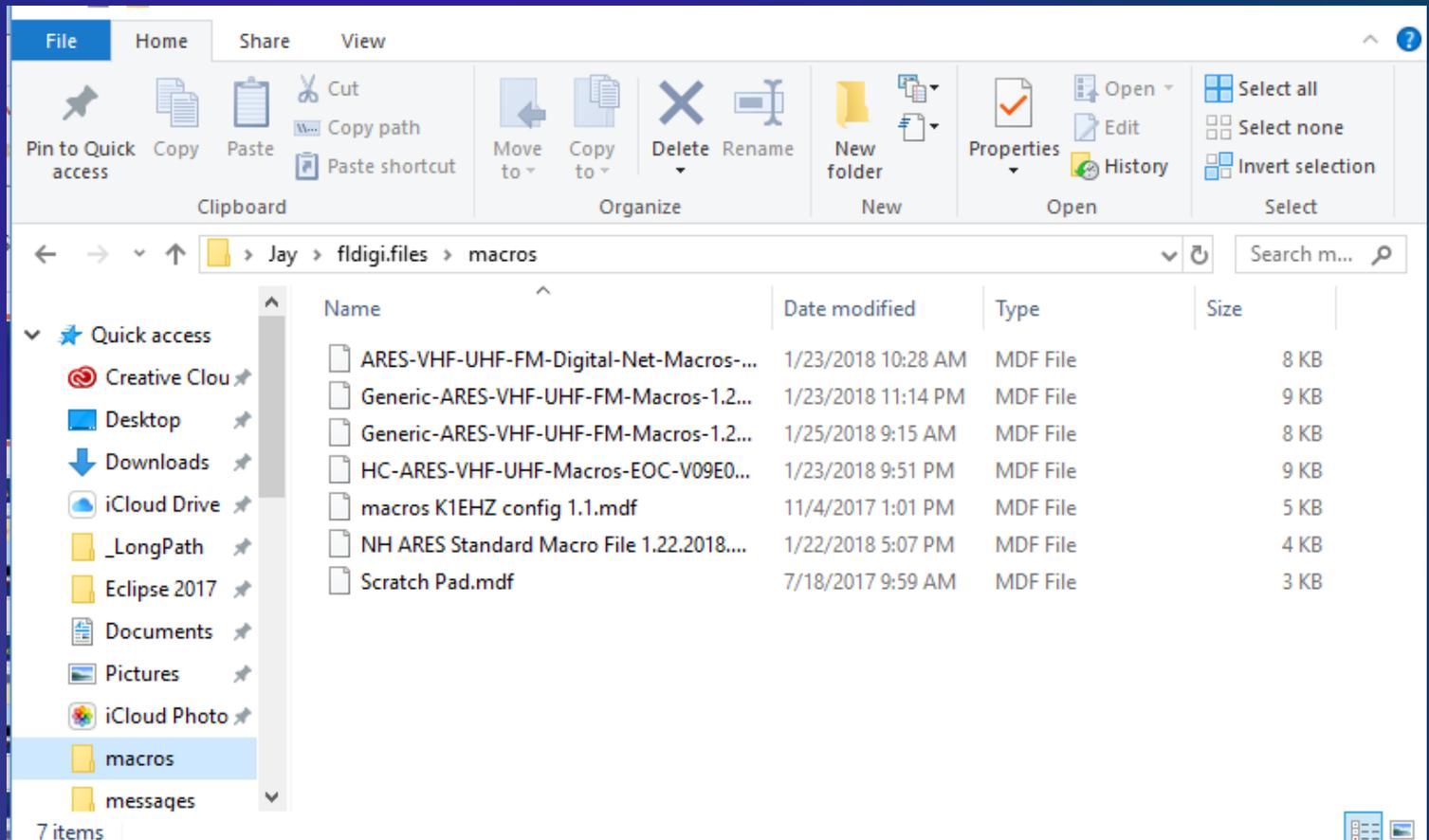
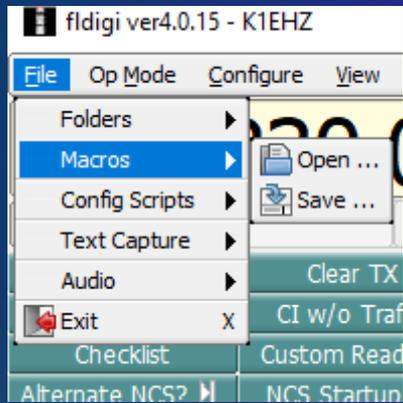
The "Select Tag" list on the right side of the macro editor includes the following items:

- <FREQ> my frequency
- <MODE> mode
- <MYCALL> my call
- <MYLOC> my locator
- <MYNAME> my name
- <MYQTH> my QTH
- <MYRST> my RST
- <ANTENNA> my antenna
- <BAND> operating band
- <VER> Fldigi version

The "Macro Button Label" field is set to "RDY 2 RCV". The "Apply" and "Close" buttons are visible at the bottom of the macro editor.

The main Fldigi interface also shows a "Macro Button Label" field set to "RDY 2 RCV" in the top bar. The frequency display shows 998 kHz. The interface includes various control buttons (WF, -20, 70, x1, NORM, 998, QSY, Store, Lk, Rv, T/R) and a status bar at the bottom showing "BPSK125", "s/n 5 dB", "imd -24 dB", and "AFC" and "SQL" indicators.

Macro Files



Scroll Through Macros

The screenshot displays the fldigi ver4.0.10 - K1EHZ application window. The interface includes a menu bar (File, Op Mode, Configure, View, Logbook, Help), a frequency display (145830.000), and various control buttons. A large yellow rectangular area is overlaid on the main interface, containing the text "Scroll through 4 lines of macros" in red. A red arrow points from the right side of this text to the vertical scrollbar on the right edge of the yellow area. Below the yellow area is a large light blue rectangular area, and at the bottom is a black frequency spectrum display. The Windows taskbar is visible at the very bottom of the image.

View / Hide All 48 Macros

The screenshot shows the fldigi software interface. The 'View' menu is open, and 'View/Hide 48 macros' is selected. The main window displays a frequency display at 145831.542 MHz, a signal browser, and a grid of macros. The macros are organized into columns with various labels and icons.

Reserved	Standby	Reserved	Reserved	Rtn To Voice	T/R	Tx	Rx	TX MYCALL
Reserved	Ready to Copy?	Ready to copy!	Reserved	Send WX	Reserved	Clr RX (Upper)	Test Digital	TX MY CS/QTH
Testing 3...	BPSK-125	MT63-1KL	Reserved	Copy WX	Tune 10 secs	Tune 60	Init CNTR = 5	DTN in CNTR mins
Net ACK CALL	Alternate NCS?	ANCS Relay	Any Relays?	NCS Shutdown	NCS ID	CALL Send Msg	Nothing Heard	NCS TX

The interface also shows a spectrum display at the bottom with a frequency scale from 500 to 2500 kHz. The Windows taskbar at the bottom shows the time as 12:14 PM on 1/12/2018.

Write a Simple Macro

The screenshot shows the fldigi software interface. The main window title is "fldigi ver4.0.10 - K1EHZ". The frequency is set to 145830.000. The interface includes a menu bar (File, Op Mode, Configure, View, Logbook, Help) and a toolbar with buttons for Spot, RxID, TxID, and TUNE. Below the frequency display is a control panel with buttons for Clear RX, Clear TX, CQ ARES, MT63-1KL, BPSK-125, PSK125 RC4, T/R, Tx, Rx, and Tune. A central text area displays the following message:

```
=====
Read macros from: C:\Users\Jay\fldigi.files\macros\Basic-NH-ARES-VHF-UHF-FM-Macros-V09E05.mdf
=====
Read Logbook: C:/Users/Jay/fldigi.files/logs/logbook.adi
read 4 records in 0.0 seconds
=====
```

The bottom of the interface features a frequency scale from 500 to 2500 kHz, a control panel with buttons for WF, -20, 70, x2, NORM, 1500, QSY, Store, Lk, Rv, and T/R, and a status bar showing "MT63-1KL" and "SQL". The Windows taskbar is visible at the bottom, showing the search bar and various application icons.

Write a Simple Macro

The screenshot shows the fldigi software interface with a macro editor window open. The macro editor window is titled "Macro editor - C:\Users\Jay\fldigi.files\macros\Basic-NH-ARES-VHF-UHF-FM-Macros-V09E05.mdf". The macro text is "<CLRRX>". The macro button label is "Clear RX". The macro editor window is open over the main fldigi interface, which shows a frequency of 145830.000 and various control buttons.

Macro editor - C:\Users\Jay\fldigi.files\macros\Basic-NH-ARES-VHF-UHF-FM-Macros-V09E05.mdf

Macro Text: <CLRRX>

Select Tag:

- <RST> other RST
- <QSONBR> # QSO recs
- <NXTNBR> next QSO rec #
- <MAPIT> map on google
- <MAPIT:adr/lat/loc> map by value
- <CLRRX> clear RX pane
- <CLRXT> clear TX pane
- <GET> text to NAME/QTH
- <TALK:on|off|t> Digitalk On, Off, Toggle
- <CLRLOG> clear log fields
- <LOG> save QSO data

Macro Button Label: Clear RX

Buttons: Apply, Close

Write a Simple Macro

The screenshot displays the fldigi software interface with a macro editor window open. The main window shows a frequency of 145830.000 and various control buttons. The macro editor window, titled "Macro editor - C:\Users\Jay\fldigi.files\macros\Basic-NH-ARES-VHF-UHF-FM-Macros-V09E05.mdf", contains the following macro text:

```
<TX>
de <MYCALL> k
<RX>
```

The macro editor also lists the following tags and their functions:

- <SAVECHG> save contest out
- <SERNO> current contest serno
- <LASTNO> last serno sent
- <FDCLASS> recvd FD class
- <FDSECT> recvd FD section
- <RX> receive
- <TX> transmit
- <TX/RX> toggle T/R
- <SRCHUP> search UP for signal
- <SRCHDN> search DOWN for signal
- <GOHOME> return to sweet spot
- <GOFREQ:NNNN> move to freq NNNN Hz

The macro button label is "Simple Macro".

Write a Simple Macro

The screenshot shows the fldigi ver4.0.10 - K1EHZ interface. The main window displays a frequency of 145830.000 and various control buttons. A macro editor window is open, showing the following macro text:

```
<RIGMODE:FM>
<TXRSID:on>
<RXRSID:on>
<GOFREQ:1500>
<MODEM:MT63-1KL>
<TX>

CQ ARES CQ ARES CQ ARES

de <MYCALL> k

<RX>
```

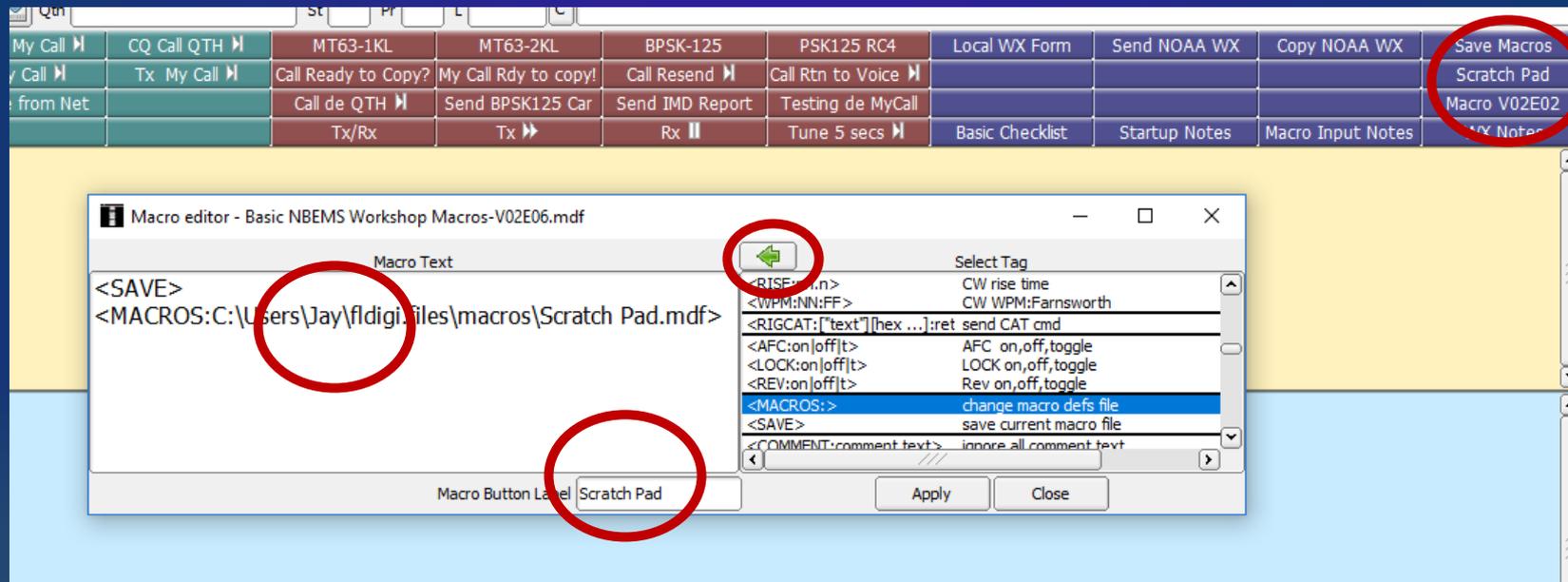
The macro editor also shows a list of tags and their functions:

Tag	Function
<TX>	transmit
<TX/RX>	toggle T/R
<SRCHUP>	search UP for signal
<SRCHDN>	search DOWN for signal
<GOHOME>	return to sweet spot
<GOFREQ:NNNN>	move to freq NNNN Hz
<QSYTO>	left-ck QSY button
<QSYFM>	right-ck QSY button
<QSY:FFF.F[:NNNN]>	qsy to kHz, Hz
<QSY +/-:/n.nnn>	incr/decr xcvr freq
<RIGMODE:mode>	valid xcvr mode
<FILWID:width>	valid xcvr filter width
<RIGLO:lowcut>	valid xcvr low cutoff filter
<RIGHI:hicut>	valid xcvr hi cutoff filter
<FOCUS>	rig freq has kbd focus
<ORG:text>	insert ORG into Rx text
<FILE:>	insert text file
<IMAGE:>	insert image file

The macro button label is set to "CQ ARES".

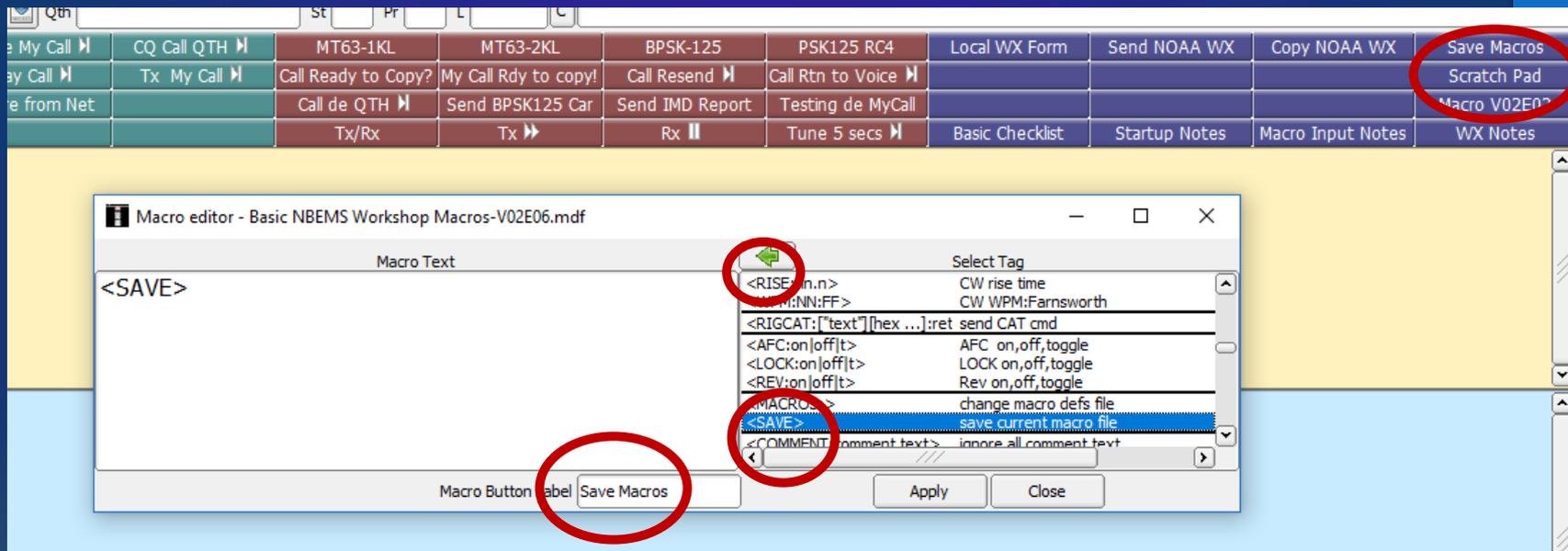
Customize a Macro

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/flidigi.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->Macros->Save.
- As an exercise, try adding <SAVE> to the macro button created on the last slide.

Fldigi Operation

Modes

The screenshot displays the Fldigi software interface. The title bar reads "fldigi - N1GB". The menu bar includes "File", "Op Mode", "Configure", "View", "Logbook", and "Help". The "Op Mode" menu is open, showing a list of modes. The "PSKR" mode is highlighted in blue, and its sub-menu is also open, showing various PSK modes. The "MultiCarrier" mode is highlighted in blue. The main window area is yellow and blue. The bottom status bar shows "BPSK125", "s/n 5 dB", "imd -30 dB", and other parameters. The frequency display shows "998" and "1720".

File Op Mode Configure View Logbook Help

Frq 998 On Off 1720 In Out

Call Op Az

Qth St Pr Loc

0.000

3000

USB

ie

MFSK

MT63

Olivia

PSK

QPSK

8PSK

PSKR

PSK-125R

PSK-250R

PSK-500R

PSK-1000R

MultiCarrier

4xPSK63R

5xPSK63R

10xPSK63R

20xPSK63R

32xPSK63R

4xPSK125R

5xPSK125R

10xPSK125R

12xPSK125R

16xPSK125R

2xPSK250R

3xPSK250R

5xPSK250R

6xPSK250R

7xPSK250R

2xPSK500R

3xPSK500R

4xPSK500R

2xPSK800R

2xPSK1000R

ARES calling CALL HIM RDY 2 RCV

MSG MSG AGN NO MSG RTDK MSG RTI PSK125 TX RX CW ID 3

500 1500 2000 2500

WF -20 70 x1 NORM 998 QSY Store Lk Rv T/R

BPSK125 s/n 5 dB imd -30 dB -3.0 AFC SQL KPSQL

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

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

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



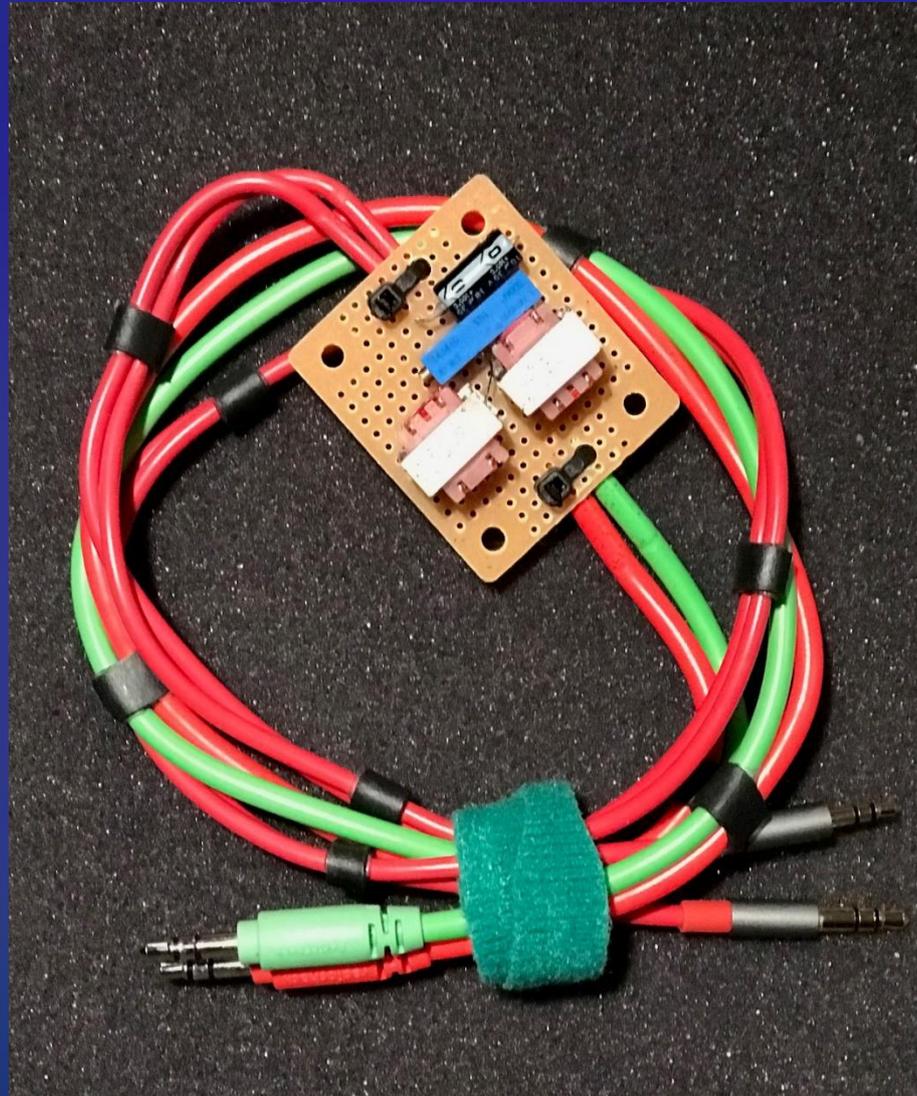
HT without VOX



Yaesu FT-60 with Signalink VOX

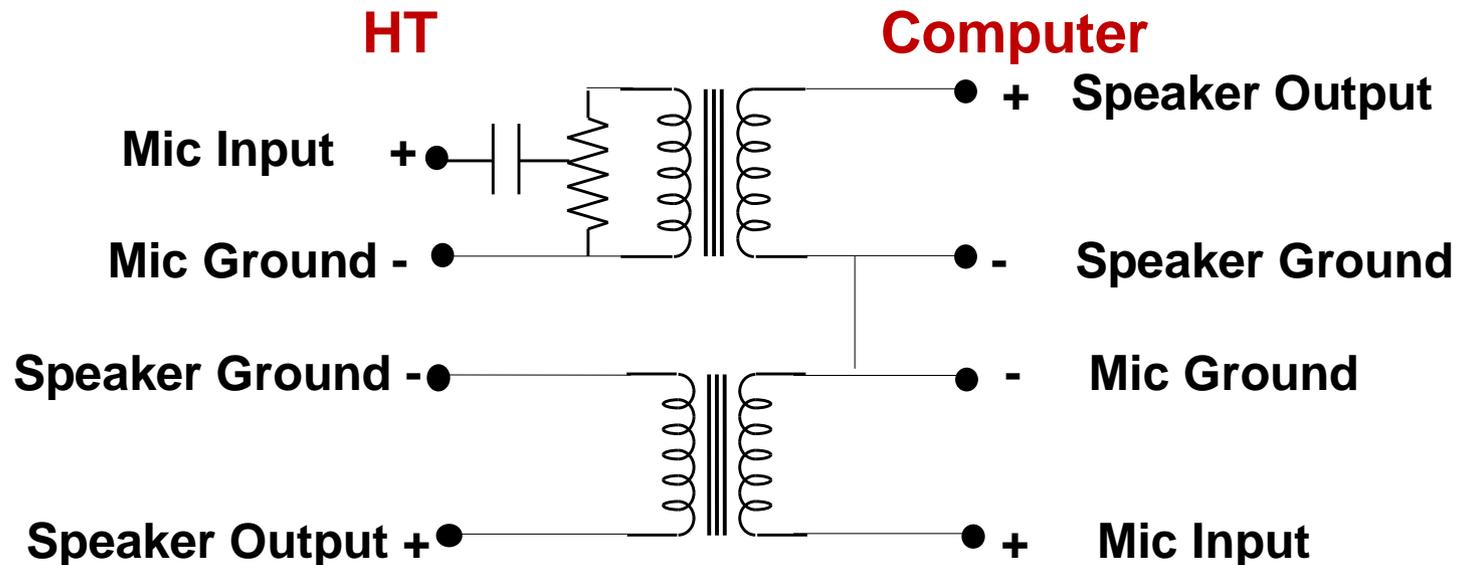


Simple Audio Interface for HTs with Built-in VOX



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 $10\mu\text{F}$. For a polarized capacitor, plus goes towards HT.
- Variable resistor is $10\text{K}\Omega$ to provide input attenuation to HT if needed

Kenwood with Audio Interface



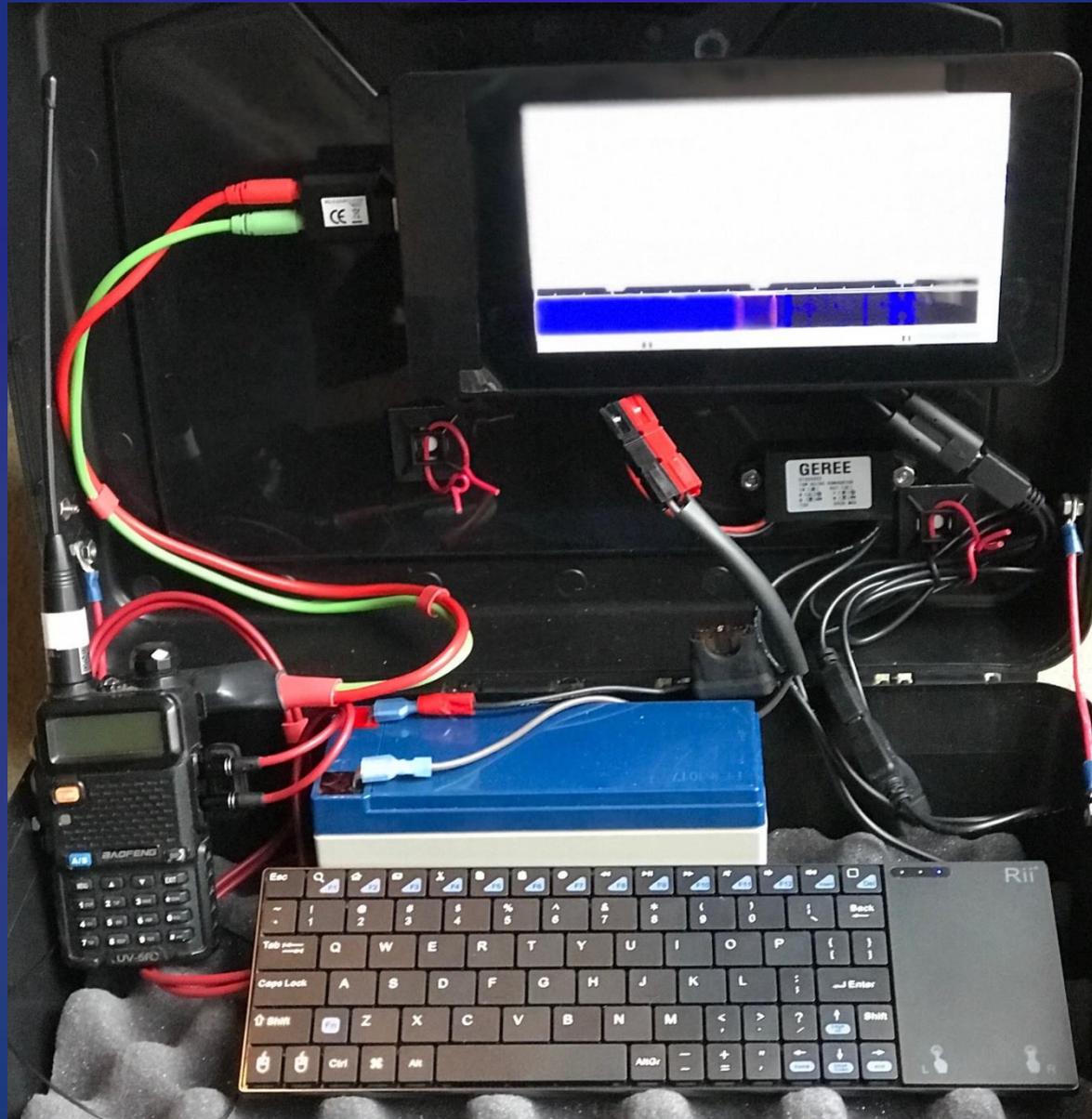
Baofeng with Audio Interface



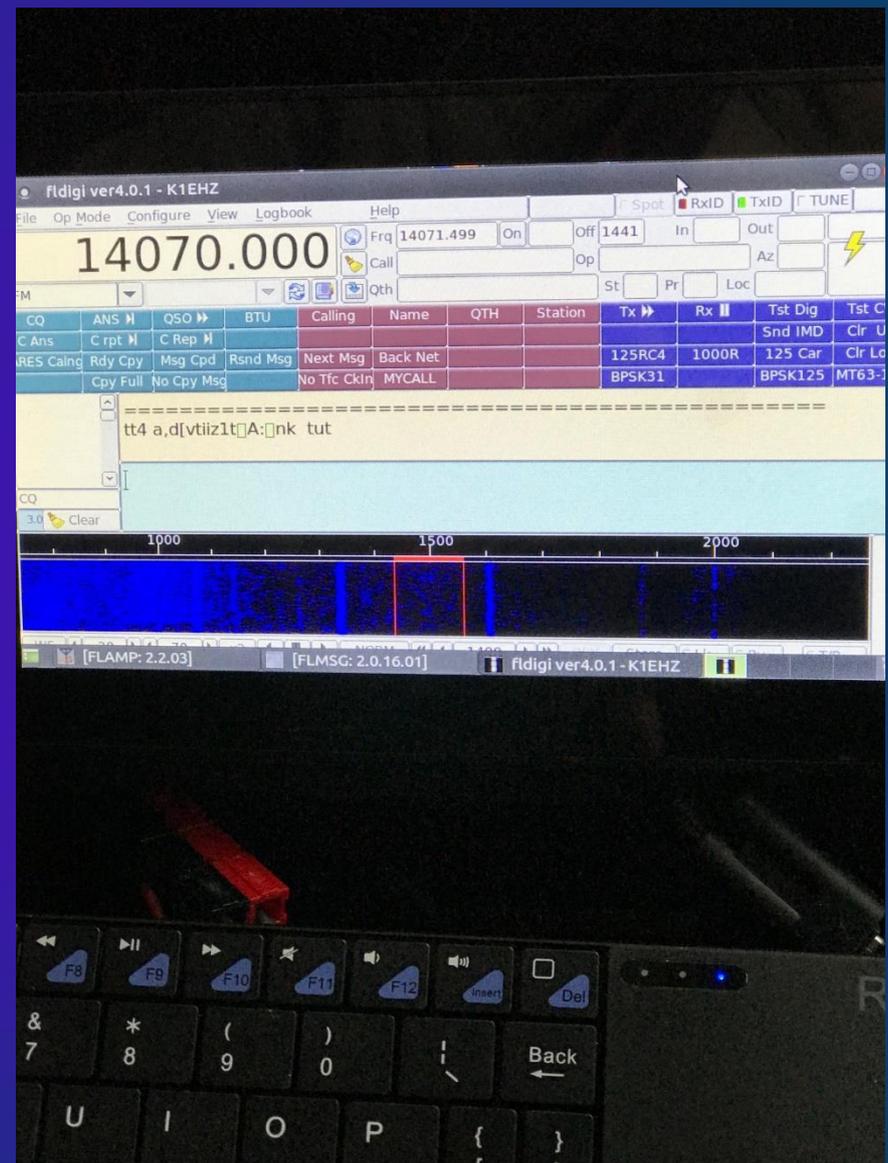
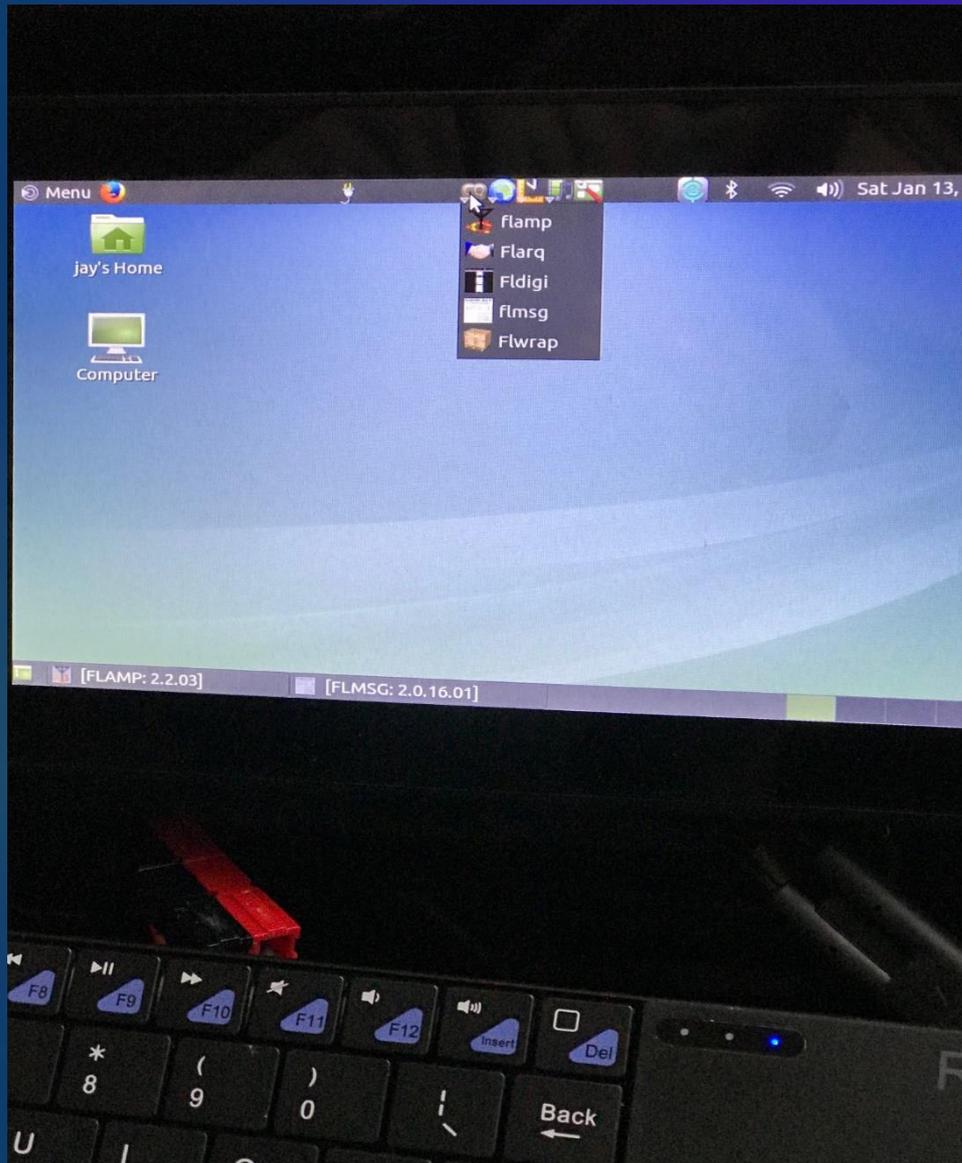
Go Box with a Dummy Load as the Antenna



Raspberry Pi Go Box with HT Whip or Mag Mount Antenna



Fldigi on Raspberry Pi



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**

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.

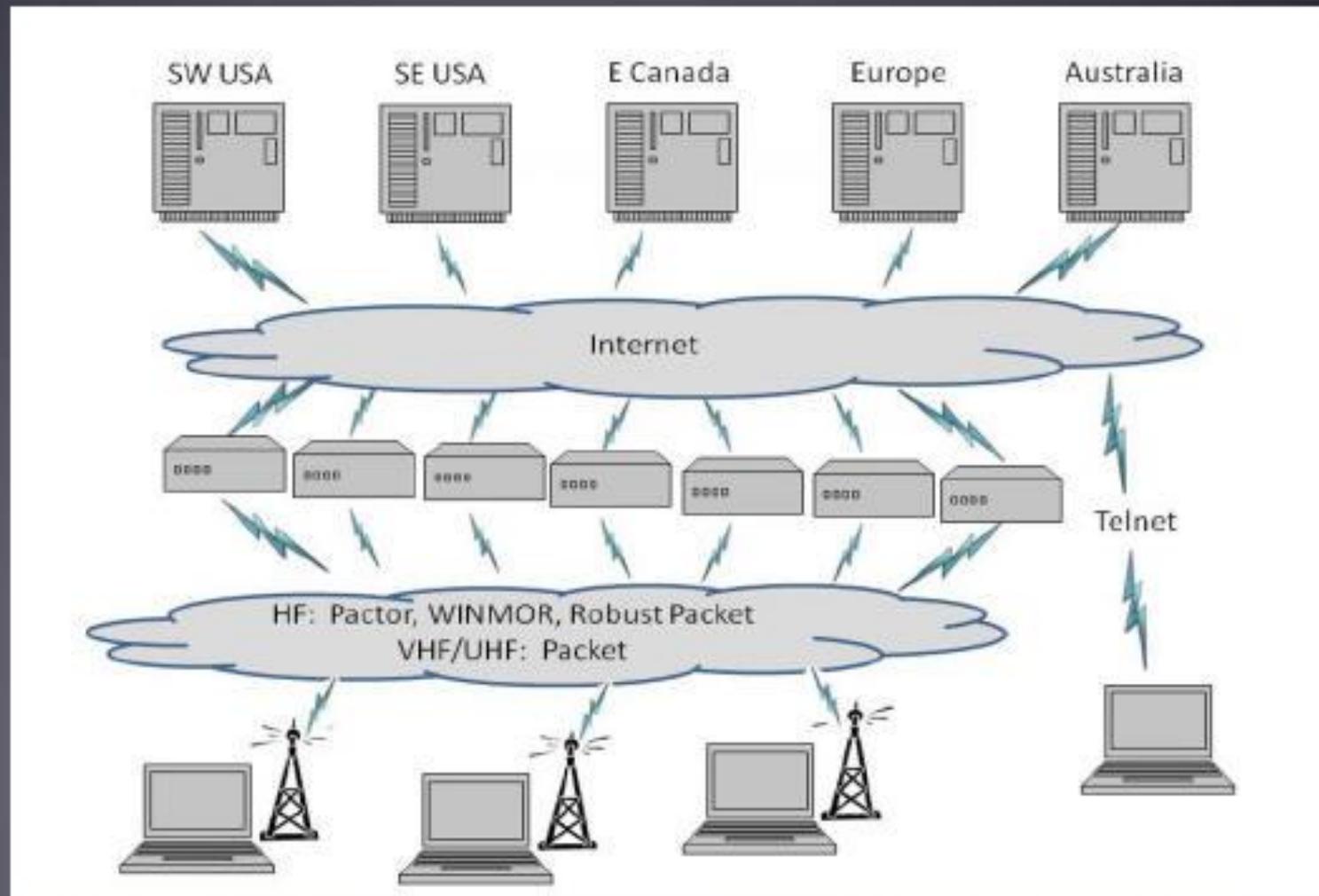
Global Winlink Requires Internet Connectivity

Winlink Normal Network Operation

CMS

RMS
(gateways)

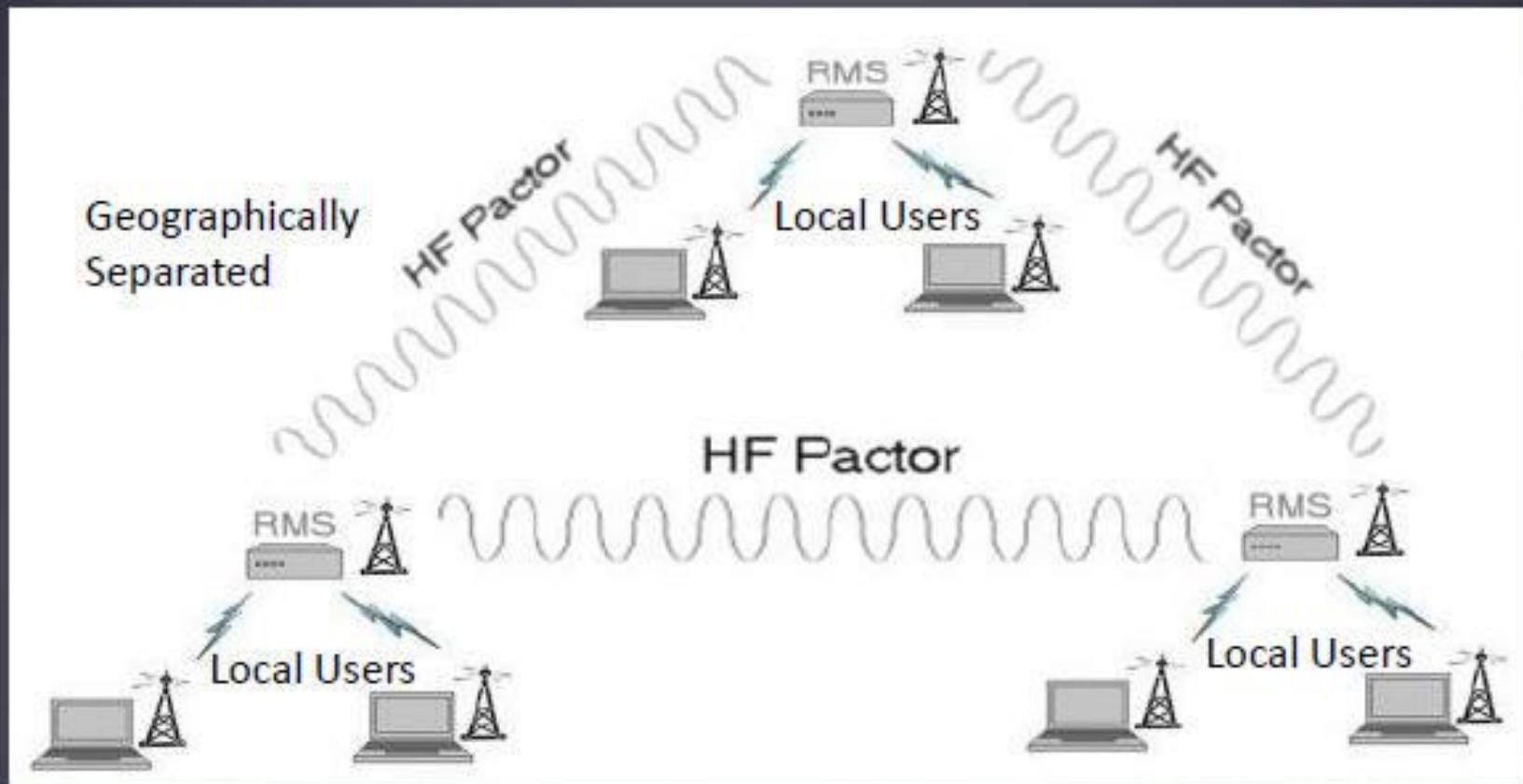
Client
(you)



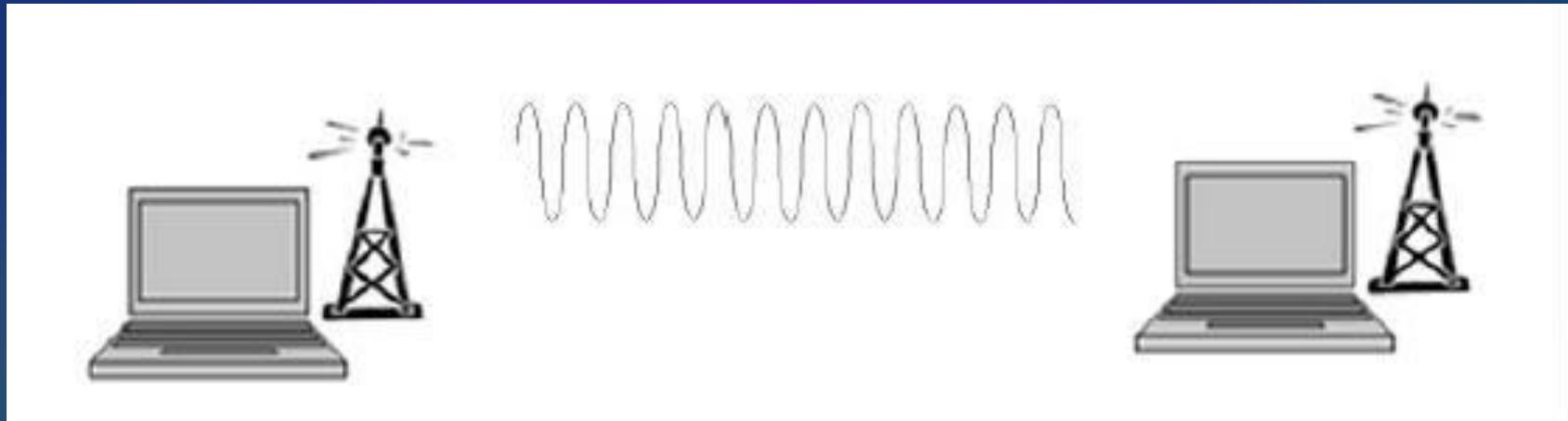
ARES Could Use This Without Needing Internet

Winlink Radio-Only Network

Local networks connected by HF, regional or long distance



Peer-to-Peer Email Without Server



Basic Elements of Packet Radio



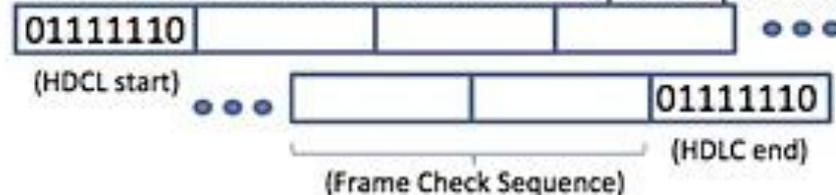
1. Hardware: Radio, TNC/modem, Computer
TNC can be implemented in software only on computer:
interface uses analog/audio soundcard connection between
computer and radio.

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

The image displays two overlapping windows from the Winlink Express 1.5.10.0 software. The top window, titled "Winlink Express 1.5.10.0 - K1EHZ", shows a menu bar with "Settings", "Message", "Attachments", "Move To: Saved Items", "Delete", "Open Session: Winmor Winlink", "Logs", and "Help". Below the menu is a toolbar with various icons. A status bar at the bottom of this window reads "In Winmor Winlink session."

The bottom window, titled "Winmor Winlink Session - K1EHZ", contains a menu bar with "Exit", "Settings", "Switch to Peer-to-Peer", "Channel Selection", "Forecast", "Best chan.", "Next chan.", "Hide TNC", "Start", "Stop", and "Abort". The main area of this window includes several input fields: "WQ2H" in a dropdown, "Center Freq. (kHz): 3595.000", "Dial Freq. (kHz): 3593.500", "Bearing: 255", and "Quality: []". Below these are "Favorites: WQ2H @ 3595.000" with "Select", "Add to favorites", and "Remove from favorites" options. A status line shows "Channel Free In: 0/0 Out: 0/0 BPM: 0/0 Disconnected".

The main text area of the bottom window displays: "*** Using Yaesu FT-991/A, NONE, 4800 baud" and "*** Ready".

Overlaid on the bottom window is a smaller window titled "WINMOR Sound Card TNC Ver:1.5.10.0 Port:8500". This window has a menu bar with "Help", "Hide", and "Send ID". It is divided into several sections: "Connection State" showing "OFF LINE" and a green "TCP" button; "Transmit" showing "0 Avg ACK Percentage 100" and an "Xmt Frame:" field; "Receive" showing "Rcv Level:" with a progress bar, "Remote Station Offset: 0 Hz", and "Rcv Frame:" field; "Busy Detector" with a "Squelch: 5" control; and a "Waterfall 2KHz" display with "Waterfall", "Spectrum", and "Disable" radio buttons. To the right of the waterfall is a "Constellation" diagram showing a black square with a red crosshair.

80m ARRL WINMOR Gateway in NH

Map

Packet Factor Winmor Robust Packet ARDOP Service Code(s) PUBLIC Refresh

80M

Gateway Channel Information

Callsign: WQ2H
Frequency: 3595.000 KHz
Gridsquare: FN32XV
Antenna: Omni
Operating Mode: Winmor / WINMOR 1600
Operating Hours: 00-23
Last Status Received: 2018-01-17 06:15 -05:00
Comments: NH-ARRL OES

Map showing various gateway locations across the United States, including Ontario, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, New York, Massachusetts, New Hampshire, Vermont, Connecticut, Rhode Island, New Jersey, Delaware, Maryland, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, and St. Pierre and Miquelon.

2m Packet Gateway

The screenshot shows a web browser window displaying the WSPRnet website. The browser's address bar shows the URL: `file:///C:/Users/Jay/De... WSPRnet | Welcome t...`. The page features a navigation menu with radio buttons for different modes: Packet, Factor, Winmor, Robust Packet, and ARDOP. A text input field for "Service Code(s)" contains the value "PUBLIC". A "Refresh" button is located to the right of the input field. Below the navigation menu is a "Map" dropdown menu. The main content area displays a map of North America with numerous green location pins. A pop-up window titled "Gateway Channel Information" is overlaid on the map, providing the following details:

- Call sign: K1ACL-10
- Frequency: 145.010 MHz
- Grid square: FN43MG
- Antenna: Omni
- Operating Mode: Packet / Packet 1200
- Operating Hours: 00-23
- Last Status Received: 2018-01-17 09:09 -05:00
- Comments:

Example Winlink Email Screen

The screenshot displays the Winlink Express 1.5.10.0 - K1EHZ interface. The window title is "Winlink Express 1.5.10.0 - K1EHZ". The menu bar includes "K1EHZ", "Settings", "Message", "Attachments", "Move To: Saved Items", "Delete", "Open Session: Telnet Winlink", "Logs", and "Help". The toolbar contains various icons for file operations and session management.

The main area shows "No active session." and a list of folders on the left: System Folders (Inbox (0 unread), Read Items (0), Outbox (0), Sent Items (0), Saved Items (1), Deleted Items (0), Drafts (0)), Personal Folders, Global Folders, and Contacts.

The email list shows one message:

Date/Time	Message ID	Size	Source	Sender	Recipient	Subject
2018/01/16 19:46	GVOYRASAOKU6	470	System	SERVICE	K1EHZ	Password Recovery Address Change Notification

The message details are as follows:

Message ID: GVOYRASAOKU6
Date: 2018/01/16 19:46
From: SERVICE
To: K1EHZ
Source: SYSTEM
Downloaded-from: Telnet:cms.Winlink.org
Subject: Password Recovery Address Change Notification

Someone, possibly you, has changed the password recovery address for your Winlink account (K1EHZ). If this was you, then you need take no action. If you did not initiate this change please visit the Winlink web site (<https://www.winlink.org/>) to verify your password and password recovery address.

Please notify the Winlink system administrator (K4CJX) if you suspect someone of tampering with your account.

Thanks for using Winlink

The Windows taskbar at the bottom shows the search bar, taskbar icons, and system tray with the time 3:20 PM on 1/16/2018.

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

www.myworldpage.net/files/fldigisetup.ppt

www.scottares.org/NBEMS%20Software/flamp2.0.pdf

<http://www.scottares.org/NBEMS.htm>