



Narrowband Emergency Messaging System (NBEMS) Basics

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What is NBEMS?

- NBEMS – a simple and easy way to send error-free digital messages
 - You don't have to buy an expensive modem or software
 - You don't even need a dedicated connection to your radio.
- The speaker and microphone on the computer and radio will do and the software is **free**
- NBEMS uses the **FLDIGI suite of software routines**
 - FLDIGI (**F**ast **L**ight **D**igital Modem – Software Modem Emulation)
 - FLWRAP (**F**ast **L**ight **W**rapper – File Encapsulation)
 - FLMSG (**F**ast **L**ight **M**sg – Forms Manager)
- FLDIGI is able to operate many popular digital modes
 - We use MT-63 2KL for UHF/VHF messaging
- NBEMS works with Windows, Linux and Mac computers and can be used on HF too
- There is even a variant for Android phones and tablets
- What more could you ask for?



Why NBEMS?

- Some disaster response traffic is better suited for digital mode than voice.
 - Voice is too slow and error prone for long or involved messages
- Such traffic may include:
 - City Situation Reports (SitReps)
 - Detailed Damage Assessment
 - Numbers and Types of Injuries
 - Resource requests for provisions/supplies/medication/personnel
 - Directions to field locations
- NBEMS can handle this traffic at 20 characters/second ... and without error



How NBEMS Works

- Computer does all the work, no need for a hardware TNC
- Sound card generates and decodes signals
- PC's sound goes into radio's microphone
- Radio's sound goes into PC's microphone
- Any radio with a microphone and speaker
- Any computer
 - No need for a powerful new computer - older machines work just fine
- No interface required – audio coupling works
- Hold the radio's speaker up to the computer's microphone and the message is automatically decoded.
- Hold the radio microphone up to the computer speaker press PTT and play the message from the PC!
- You can of course use a computer electrical interface for permanent installations:
 - Rigblaster, Signalink





Getting Started

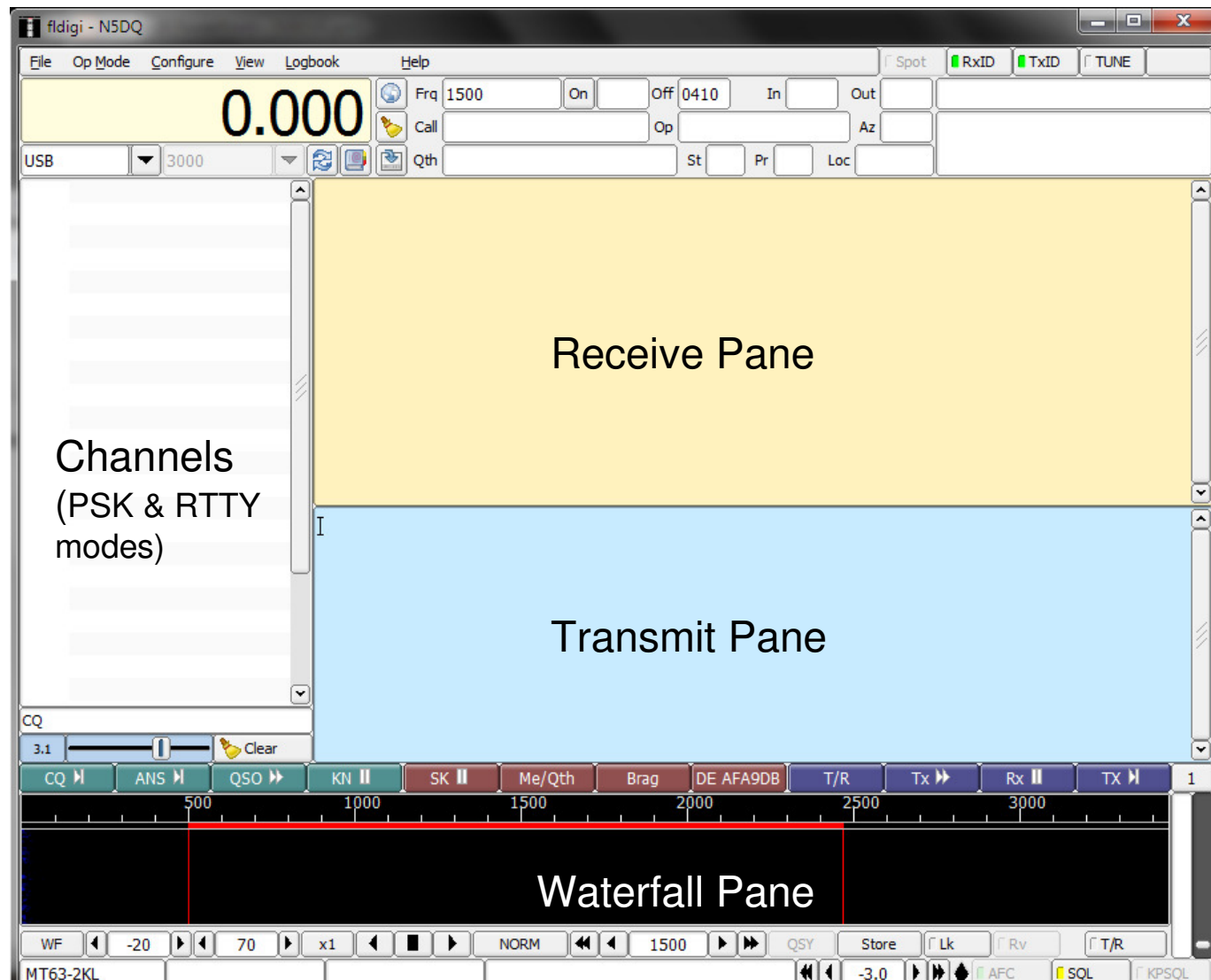
- Author's web site <http://w1hkj.com>
- Download the two components of NBEMS for your OS
 - From the author's site or: <http://sourceforge.net/projects/fldigi/files/>
 - **fldigi** – digital modem emulation – version 4.1.08 *
 - **flmsg** – forms manager – version 4.0.14
- Install these programs following the instructions
 - Accept the defaults
- Setup the configuration parameters
 - For FLDIGI and FLMSG
 - Once configured you are ready to go
- The author's web site has links to On-line Help and pdf Users Manuals for each program.
- FLDIGI also has an extensive Beginner's Guide under the help menu

* **Note: flwrap** – file encapsulation / compression – version 1.3.4 is contained in the zipped fldigi archive



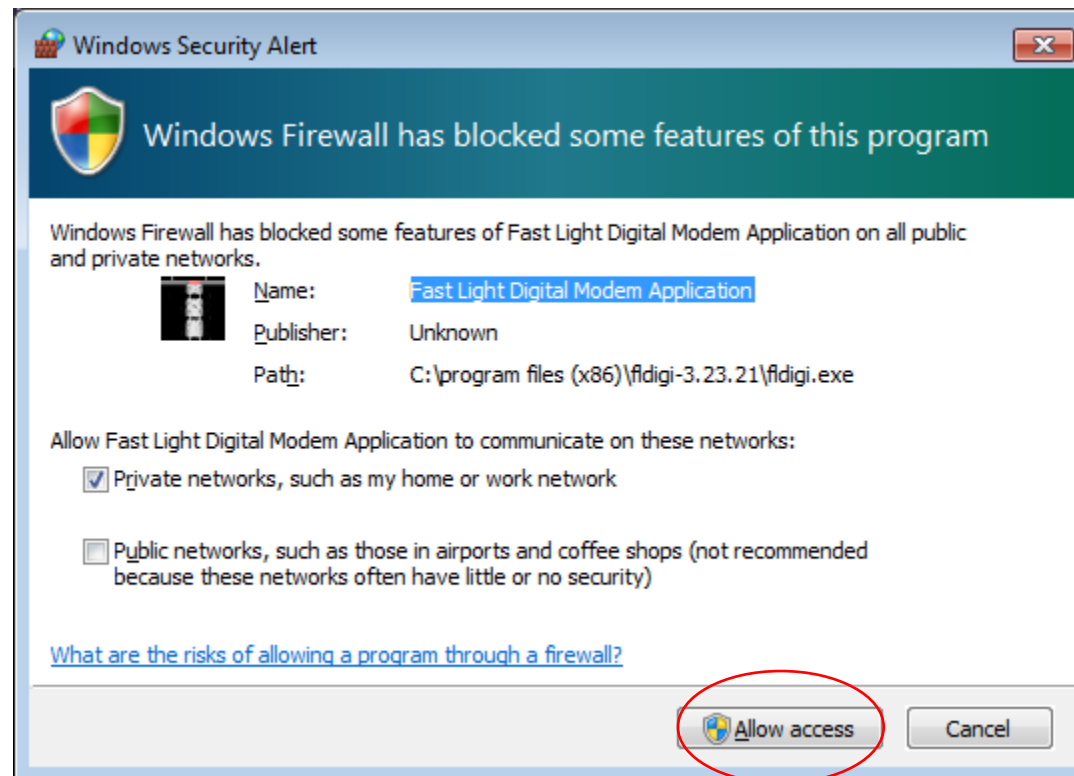
FLDIGI Main Window

- Receive Pane – text from decoded incoming signals displayed
- Transmit Pane – text to transmit when not using forms
- Waterfall pane – spectrogram of audio signal strength versus frequency over time
- Control group of buttons between the transmit and waterfall panes execute macros





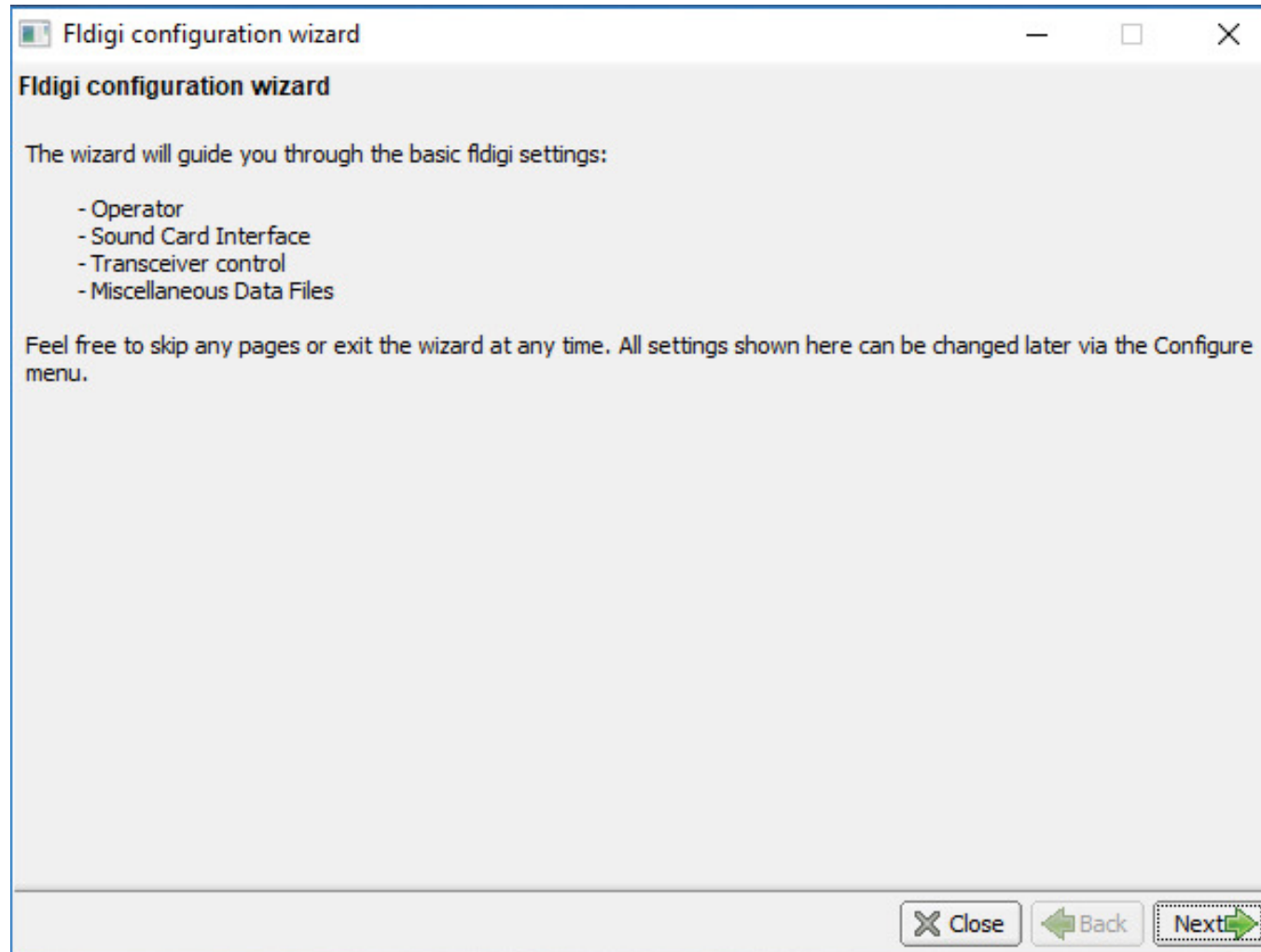
Allow Access for fldigi



- The first time you run the program tell the O/S that it is OK



FLDIGI Configuration



- You will see the Configuration Wizard when you do a clean install of FLDIGI



FLDIGI Configuration

The screenshot shows the 'Station / Operator' tab of the Fldigi configuration window. The fields are filled with the following information:

- Station Callsign: NSDQ
- Operator Callsign: NSDQ
- Operator Name: Deane Bouvier
- Antenna: (empty)
- Station QTH: Torrance, California
- Station Locator: DM03TT
- State: California (dropdown menu)
- County: Los Angeles (dropdown menu)

The 'Save' button at the bottom is circled in red.

- Operator
 - Enter your information

The screenshot shows the 'Modems' tab of the Fldigi configuration window. The 'MT-63' modem is selected. The following options are checked:

- ☒ 8-bit extended characters (UTF-8)
- ☒ Long receive integration
- ☒ Transmit lower start tone
- ☒ Transmit upper start tone
- ☐ Low tone at 500 Hz
- ☒ Centered at 1500 Hz (SHARES)
- ☐ Manual tuning

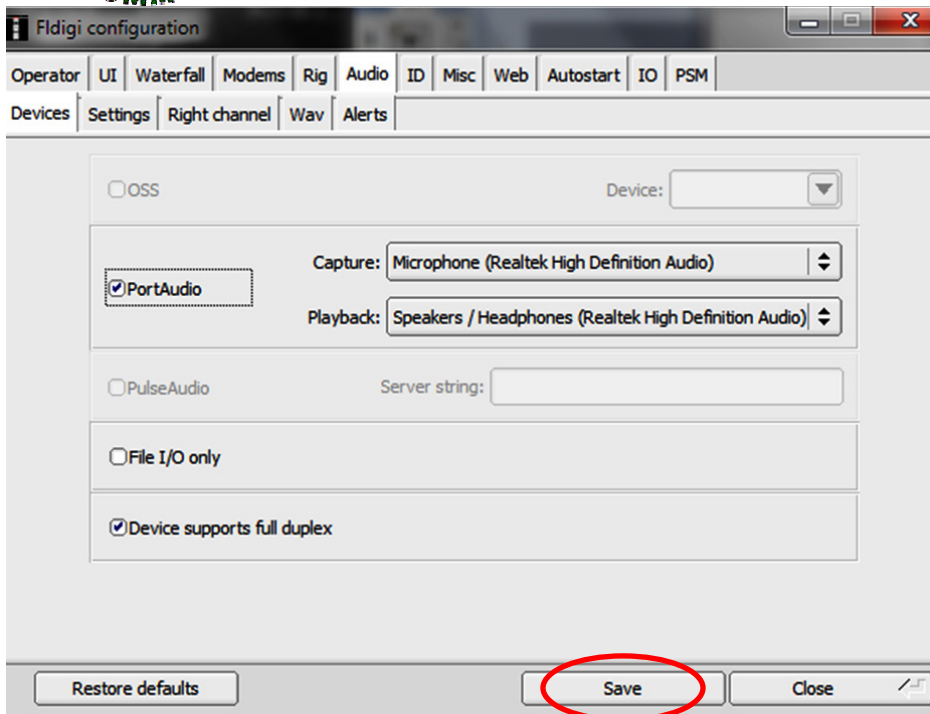
The 'Save' button at the bottom is circled in red.

- MT-63 modem
 - 5 check boxes

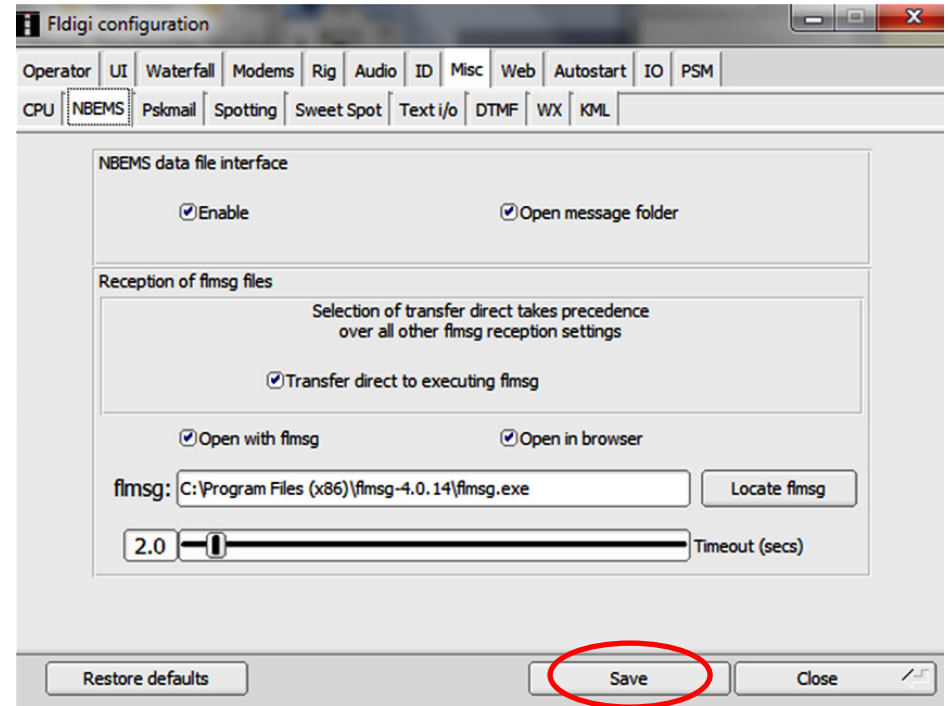
After each configuration change click save



FLDIGI Configuration



- Audio
 - Check Port Audio
 - Select sound card to use for Capture and Playback

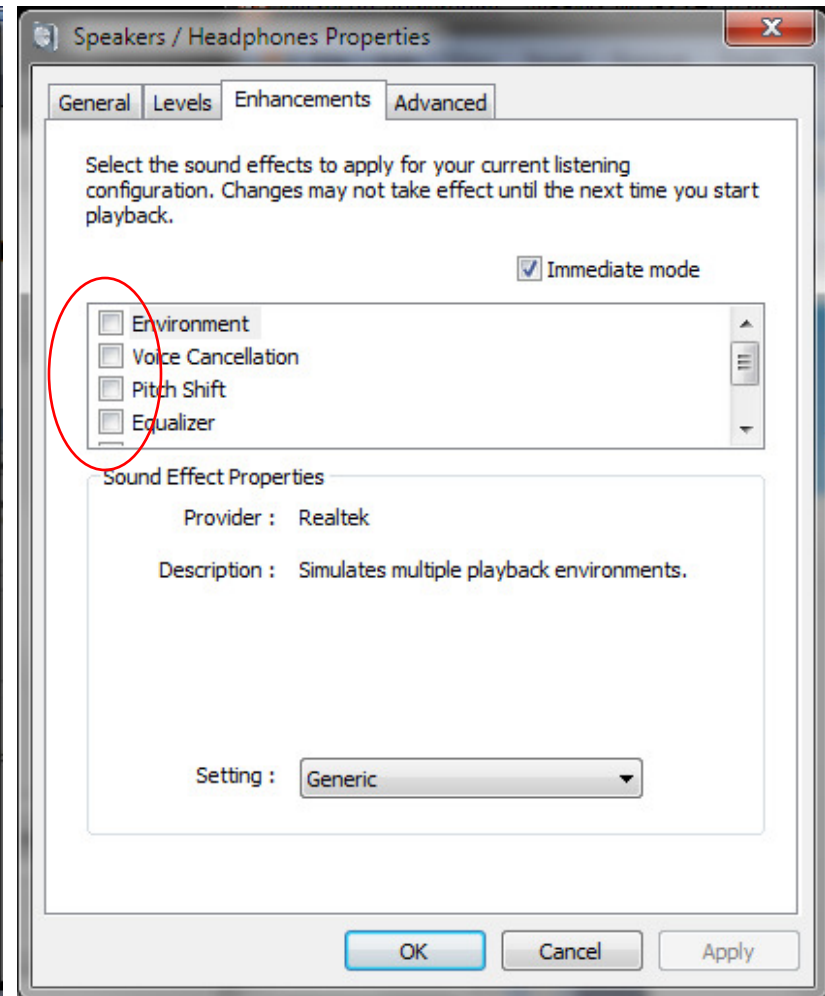
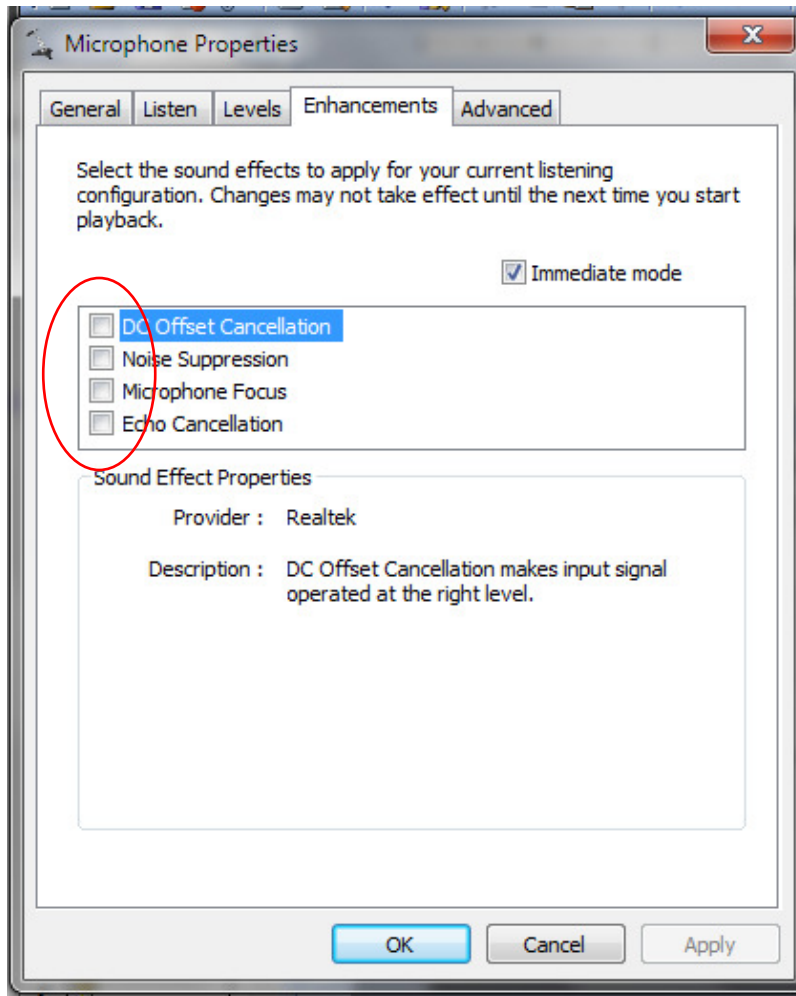


- Misc
 - NBEMS
 - Check 5 boxes
 - Locate of flmsg.exe



Turn Off Windows 7 & 8 Microphone & Speaker Enhancements

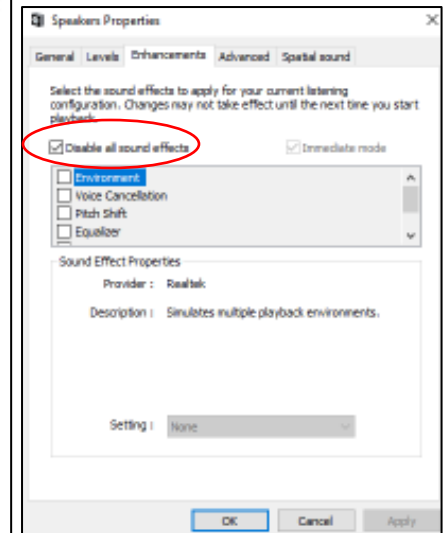
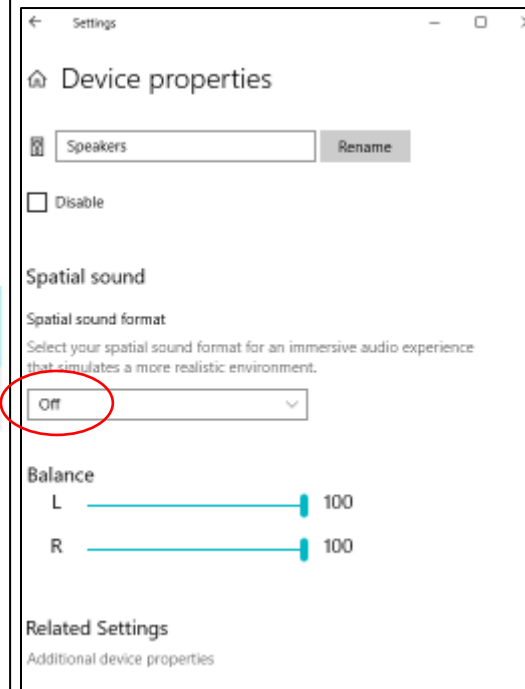
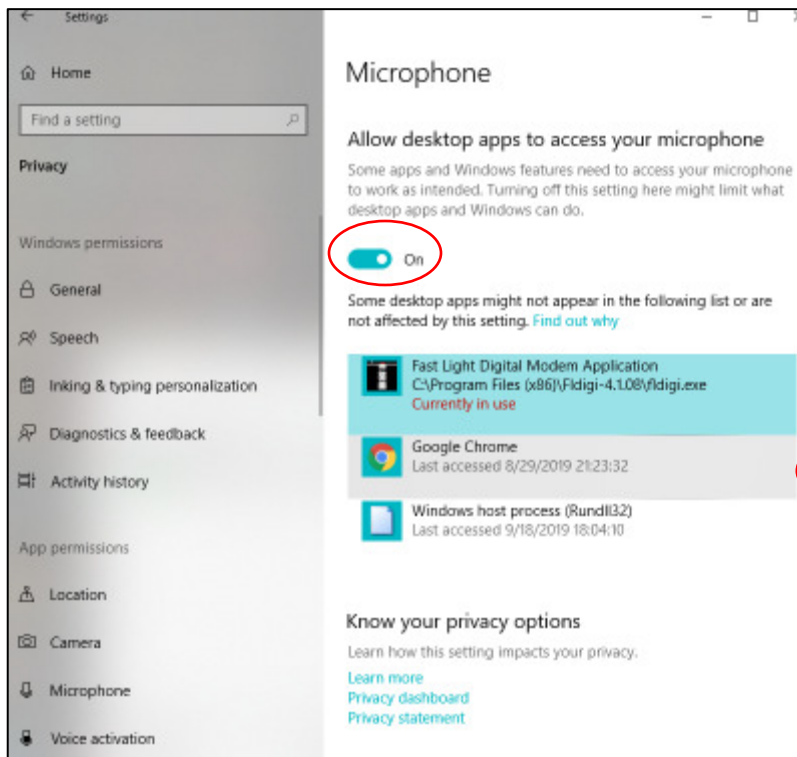
Disable all sound effects





Windows 10 Specific

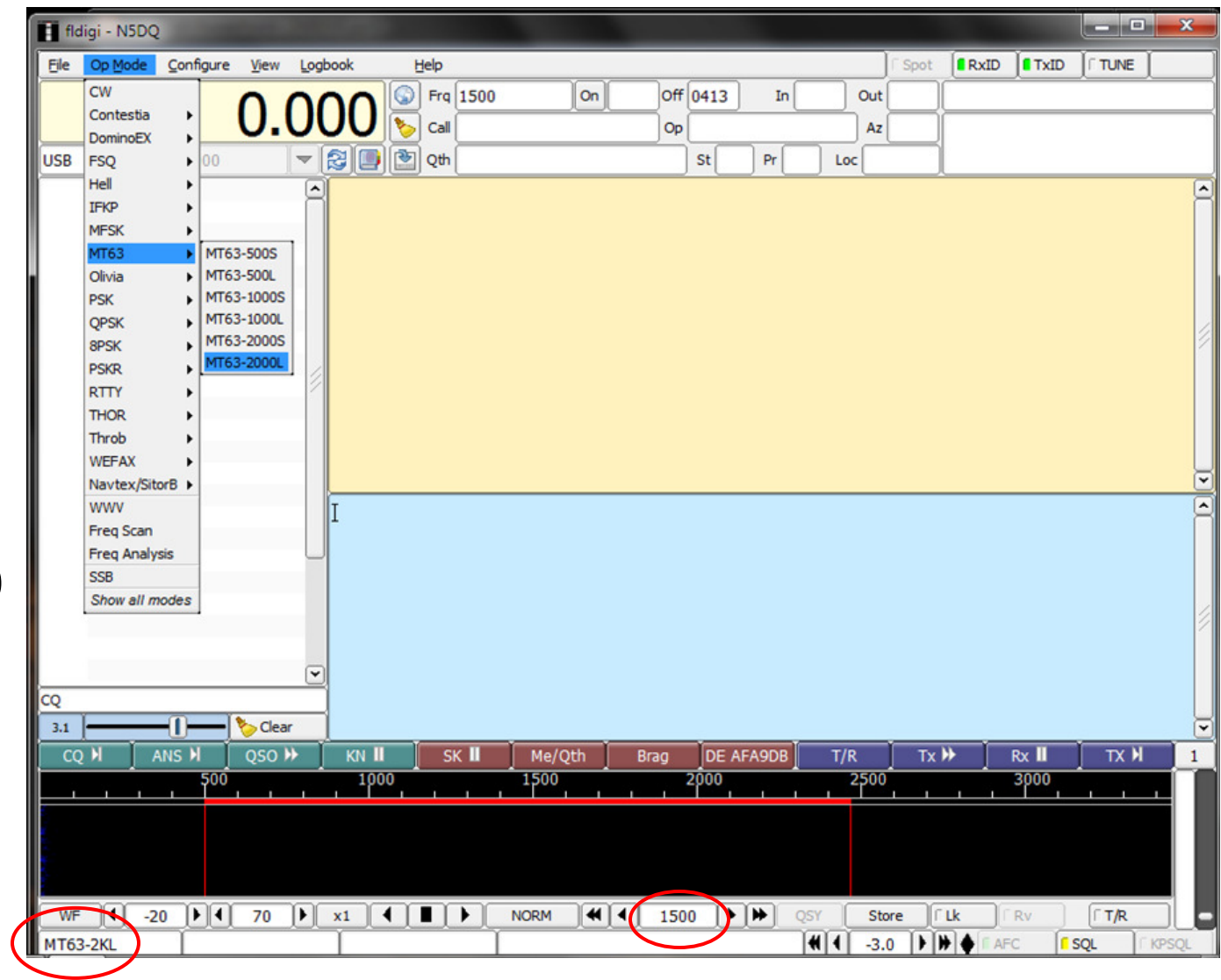
- Make sure fldigi has access to your microphone
 - Settings/System/Sound/Microphone Privacy Settings
 - Allow apps to access your microphone
- Speaker Properties
 - Settings/System/Sound/Output
 - Device Properties
 - Spatial sound format = Off
 - Additional device properties/Enhancements
 - Disable all sound effects





Op Mode MT63 2KL

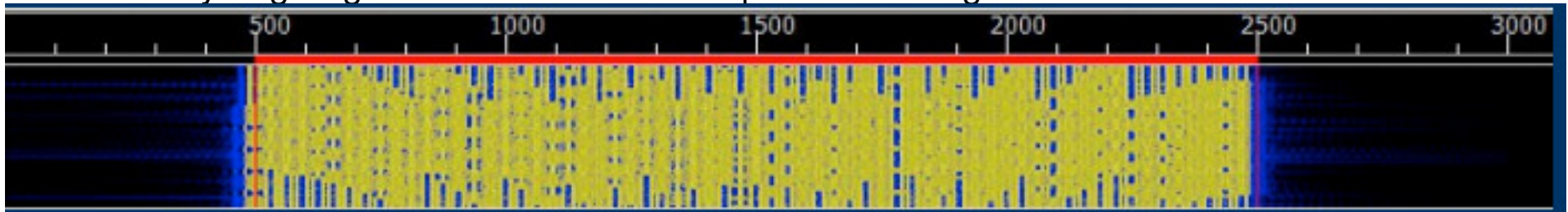
- Set the Op Mode to MT63-2000L
 - Long inter-leave
- Set the center of the processing window to 1500 Hz





MT- 63 2KL

- MT63 2K long interleave chosen for portable, mobile and fixed station operations on FM channels (repeater or simplex)
 - Effective, even under poor RF conditions
 - Accurate decoding (major duplication of data and forward error corrected)
 - Very forgiving on sound levels and requires no tuning when used on FM

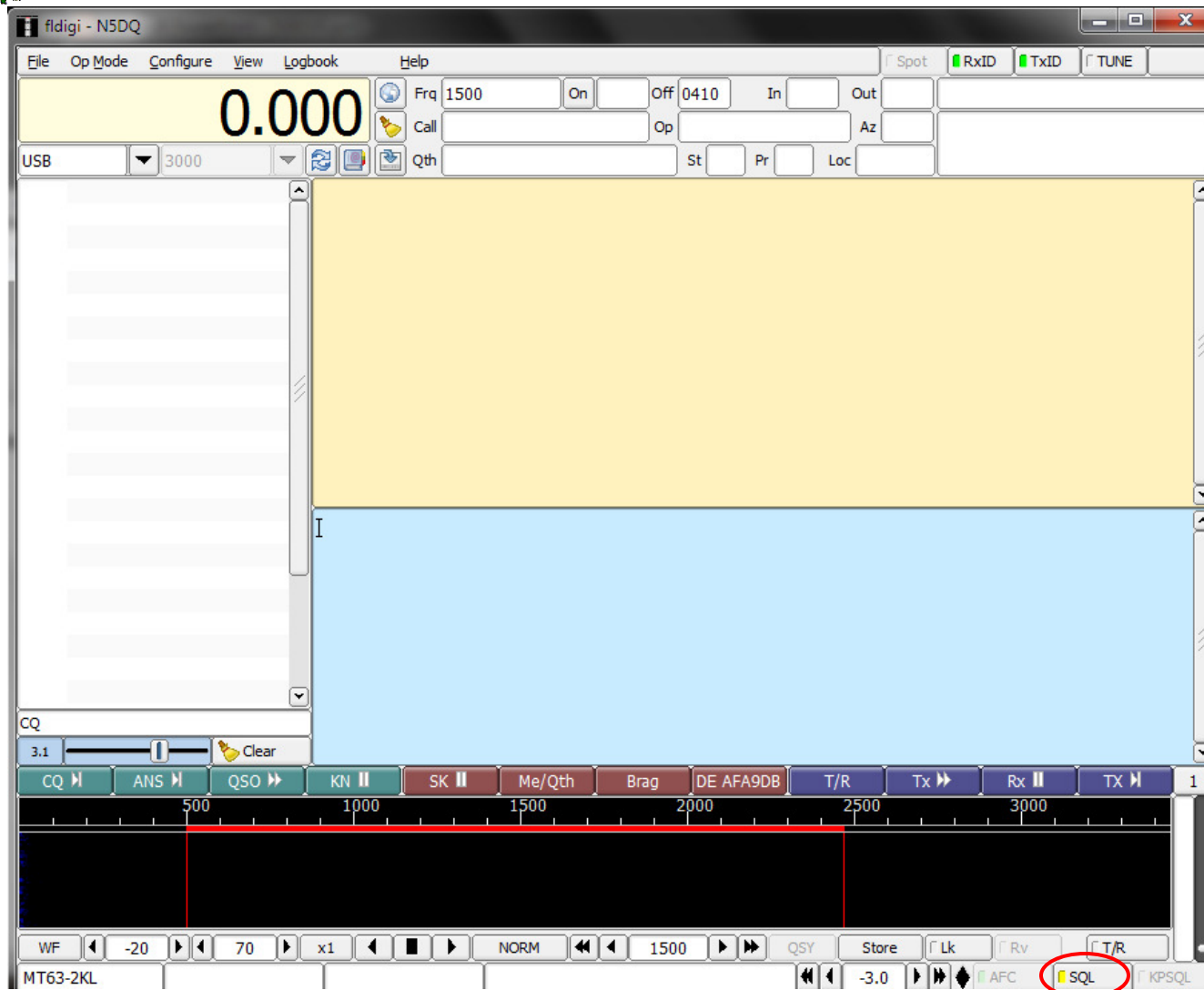


Mode	Symbol Rate	Speed	Duty Cycle	Modulation	Bandwidth	ITU Designation
MT63-2000	20 baud	20.0 cps (200 wpm)	80%	64 x 2-PSK	2000 Hz	2K00J2DEN

- Orthogonal Frequency Division Multiplexed mode
 - 64 parallel carriers differential BPSK modulated, each carrying part of the transmitted signal
 - Requires linear transmitter, overdriving creates excessive bandwidth and poor reception
- Highly redundant Forward Error Correction system
 - Robustness in the face of interference and fading
 - Can lose up to 25% of signal and still copy
- Sounds like a buzz saw



Squelch

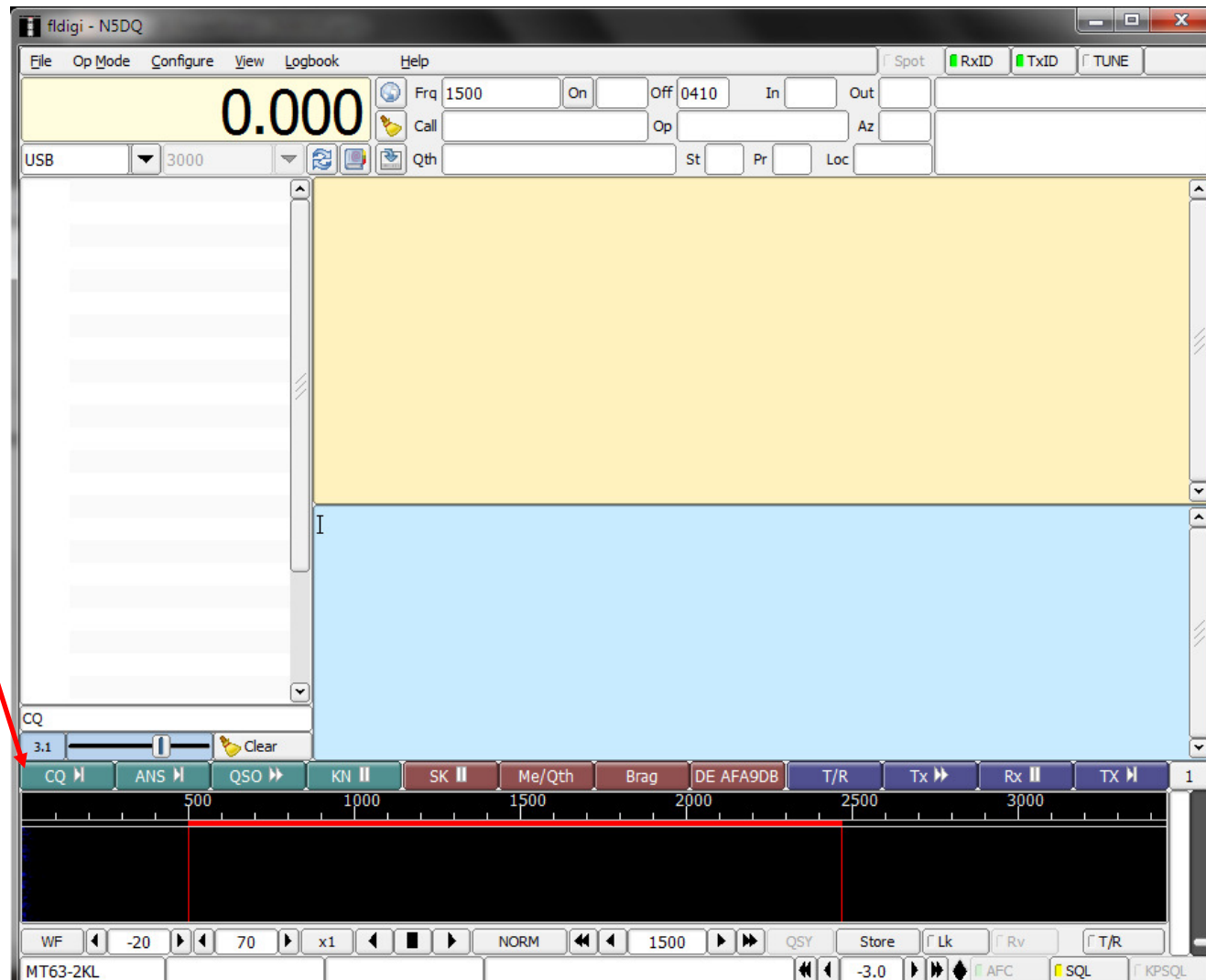


- Squelch stops fldigi from processing ambient noise
- Click the button and set the level
- Set it too high and you get no signals
- Set it just above where the random noise stops



First Exercise

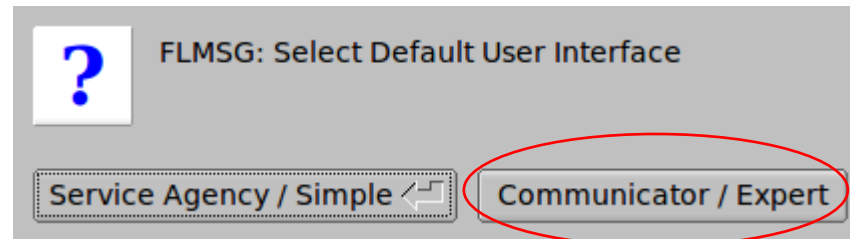
- Send CQ





Configure FLMSG

- When flmsg is run for the very first time the user will be prompted to select a default user interface.



- The simple user interface is designed for the non-communicator or served agency personnel
- The communicator / expert, user interface is designed for the amateur radio operator and provides access to all of the flmsg functions
- Select Communicator / Expert



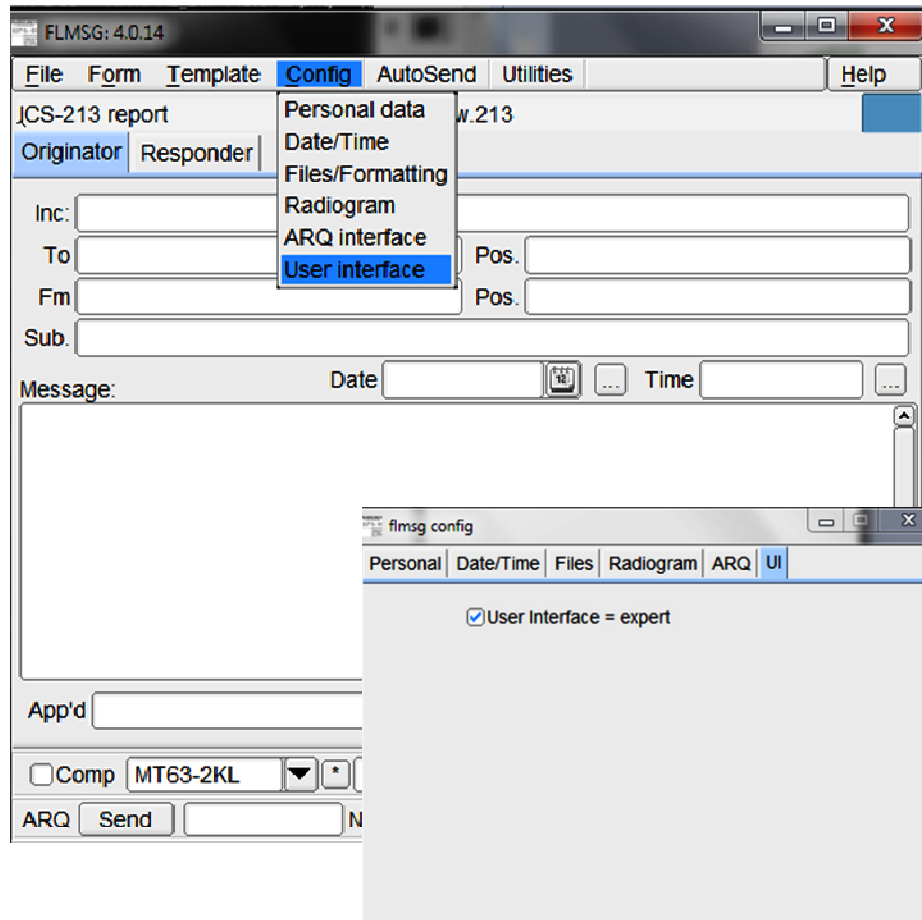
Configure FLMSG

- Click the Config drop down menu

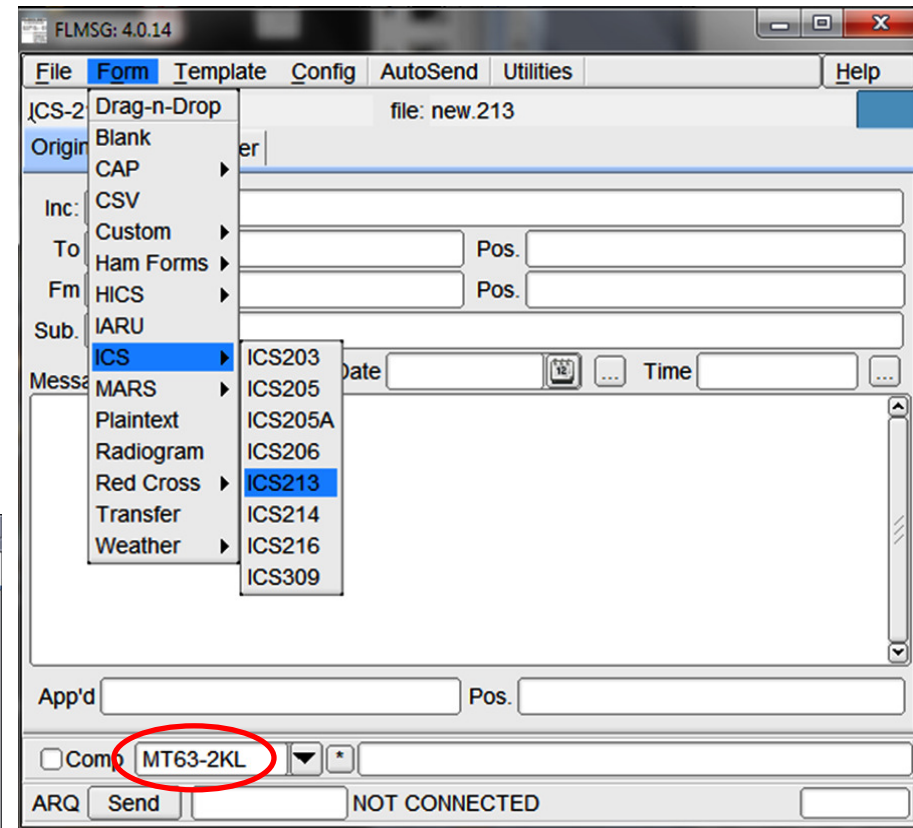
- Config personal data
- Set the date time format



Configure FLMSG



- Select Expert User Interface



- Select ICS 213 on the Form drop down menu
- Set MT63-2KL at the bottom of the form



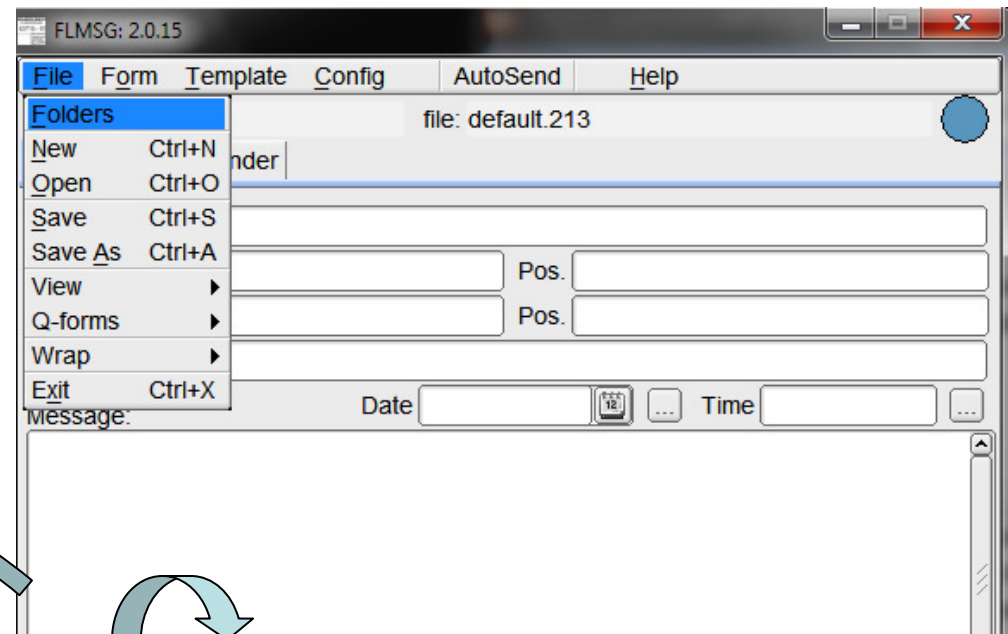
Second & Third Exercise

- Receive a General Message
- Send an ICS 213 Message



Where are the Message Files?

- On the flmsg menu open File>Folders
- In the ICS folder you find the html files
- In the messages subfolder you find the flmsg files
- You can open those files from flmsg



Name	Date modified	Type	Size
ARQ	3/17/2016 4:36 PM	File folder	
CSV	4/6/2016 2:51 PM	File folder	
CUSTOM	2/20/2015 1:50 PM	File folder	
ICS	4/6/2016 8:09 PM	File folder	
temp_files	2/20/2015 1:50 PM	File folder	
TRANSFERS	2/20/2015 1:50 PM	File folder	
WRAP	2/20/2015 1:28 PM	File folder	
debug_log_.txt	4/13/2016 12:51 PM	Text Document	2 KB
FLMSG.prefs	4/13/2016 12:50 PM	PREFS File	1 KB

Name	Date modified	Type
2015-09-26 DCS COMEX html	9/26/2015 3:46 PM	File folder
messages	4/6/2016 8:09 PM	File folder
templates	11/9/2015 1:24 PM	File folder
1.html	6/3/2015 9:30 PM	Text Document
19.html	6/17/2015 7:13 PM	Text Document
2015-09-26_DCS_3rdQtr_COMEX.html	9/26/2015 9:42 PM	Text Document
A16DF-58.html	5/11/2015 8:08 PM	Text Document
A16DF-75.html	11/4/2015 7:59 PM	Text Document
A16DF-87.html	4/6/2016 7:58 PM	Text Document



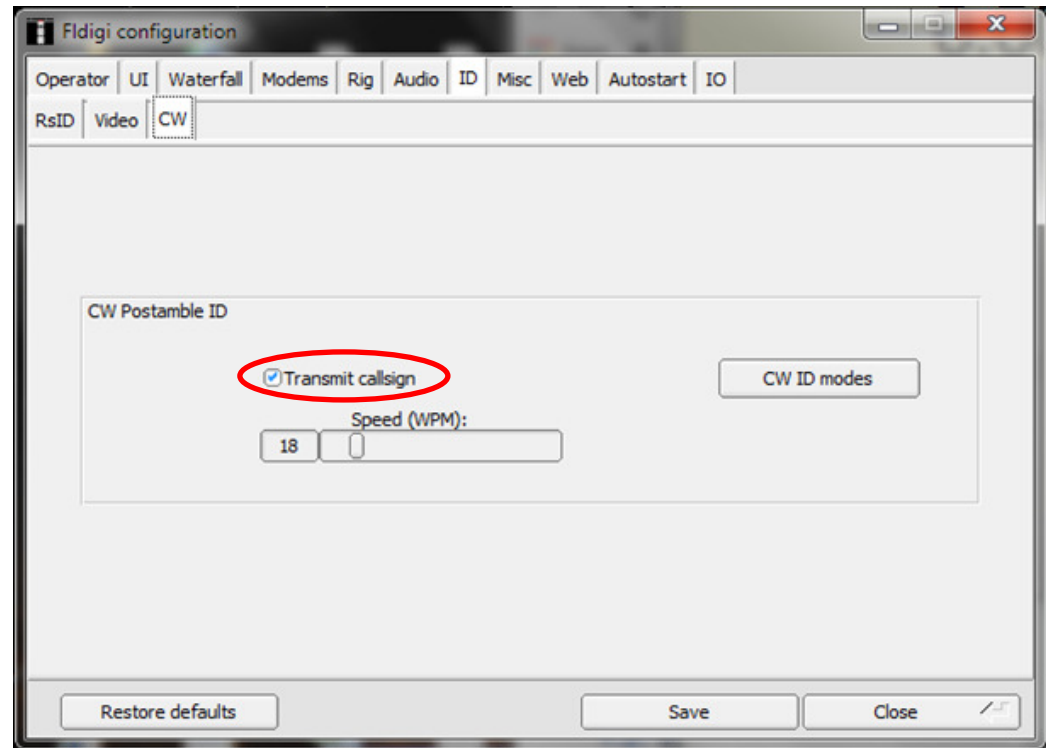
Other Configuration Options

- Morse Code ID
- Monitor Tx Signal
- Reed Solomon Identifier



Morse Code Identification

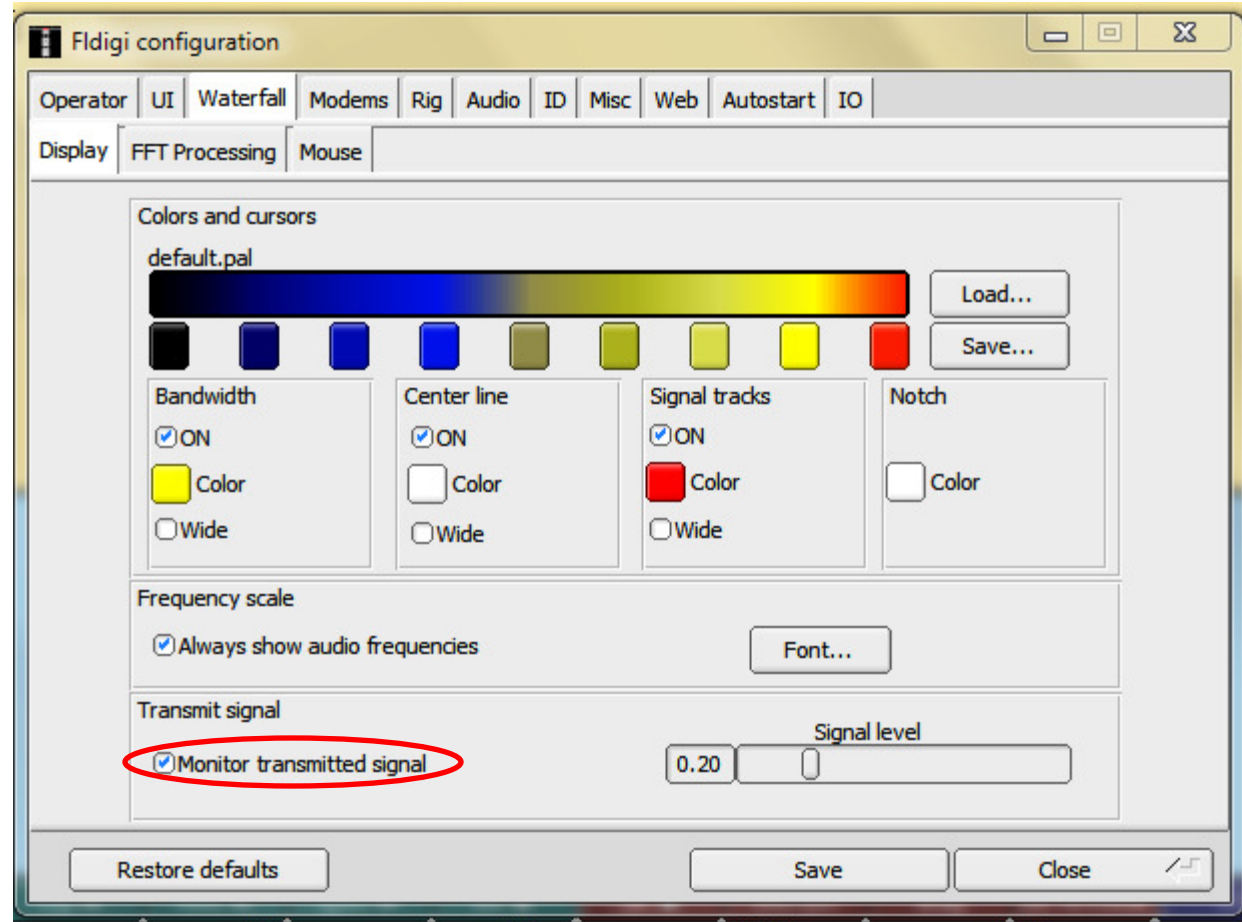
- Configure
 - ID
 - CW
 - Checkbox
- Sends your call sign at the end of the transmission and keeps you legal





Monitor Transmit Signal

- Helps to monitor operation while transmitting
- Configure > Waterfall
- Check Monitor transmit signal box





Reed Solomon Identifier (RSID)

- The RSID (automatic mode detection and tuning) feature uses a special sequence of tones transmitted at the beginning of each transmission to identify and tune in the signals received.
- This is helpful when you are using FLDIGI for more than one mode
- For this feature to work, not only do you need to enable the feature in the receiver, but in addition the stations you are wishing to tune in need to have this feature enabled on transmission.
- Use the menu Configure→IDs item to set whether you wish to transmit RSID data at the start of each over (this is for the benefit of others and does not affect RSID reception).
- If you plan to regularly use the RSID feature on receive, you should deselect the option that starts new modems at the “sweet spot” frequencies in Misc→Sweet Spot.



RS ID on Rx & Tx



- Click the buttons at the top of the window to enable



Another Exercise

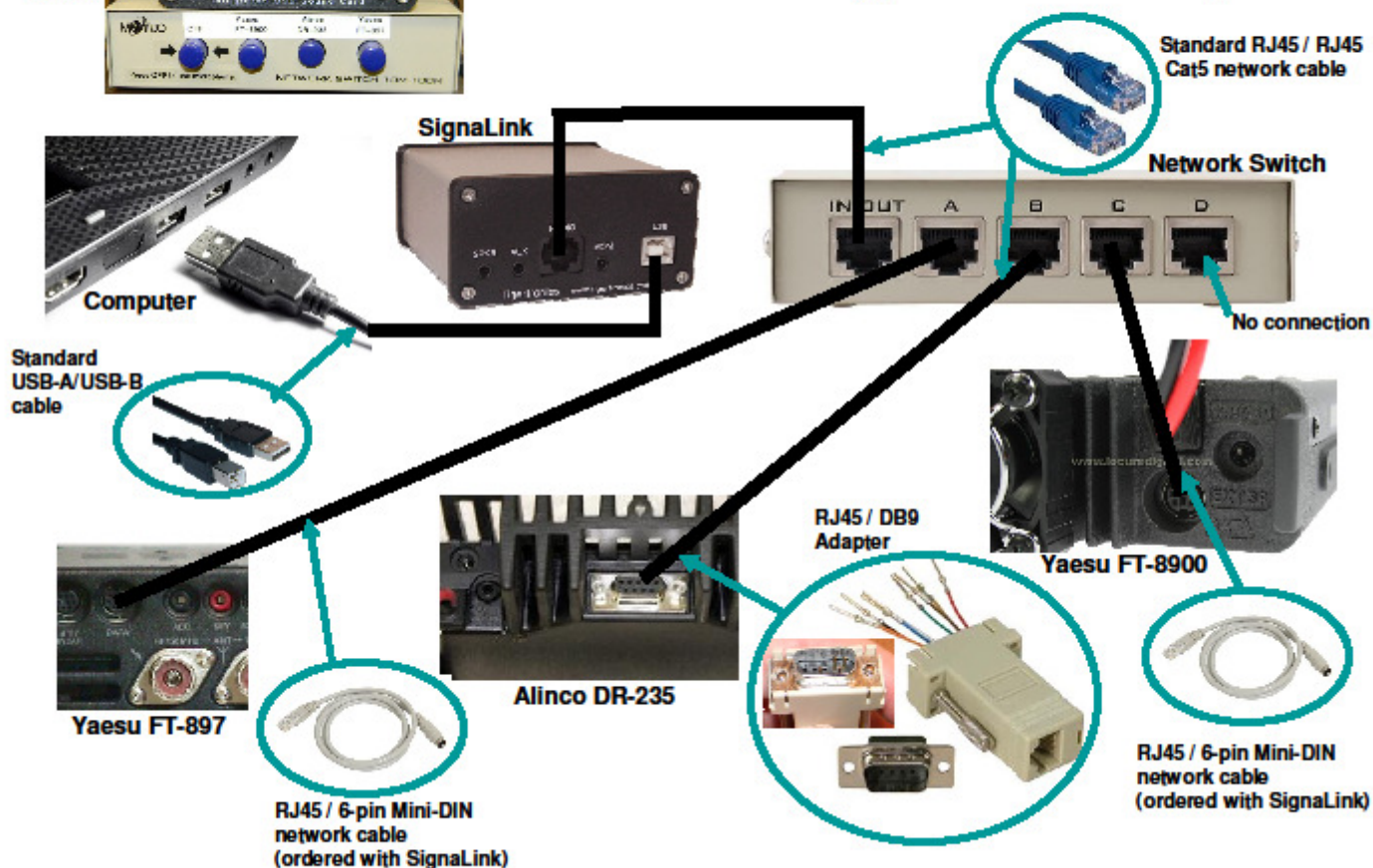
- From flmsg navigate to a comma separated values (CSV) spreadsheet
 - Right click > Insert File
 - Navigate to the file and highlight it
 - It gets loaded into flmsg
 - Click AutoSend
 - Saves file and transmits via fldigi
- Receive spreadsheet
 - Html file can be printed in typical spreadsheet format
- Anyone else want to send a message?



Signalink Configuration for Multiple Radios



DCS Digital Hardware Station Configuration Concept



J. Kendrick, N6BR, T-03, May 2018



Questions/Comments?

- This presentation and other references can be found at <http://W6LMT.net> and click the [NBEMS Info](#) link

Los Angeles County Disaster Communications Service
Lomita Station – District 17 &
South Los Angeles Station – District 3

Disaster Communications Service for the South Bay

Serving Area G of the Los Angeles County Operational Area and the contract and contact cities of:
Lomita, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Torrance,
El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Lawndale, Manhattan Beach
and Unincorporated Areas within the Lomita & South Los Angeles Station jurisdictions

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NTAS
NATIONAL TERRORISM AIRBORNE SYSTEM
NO ACTIVE ALERTS

04/13/2016, 13:19:27 PDT

Lomita, CA
68 °F
Clear
at 12:53 PM
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