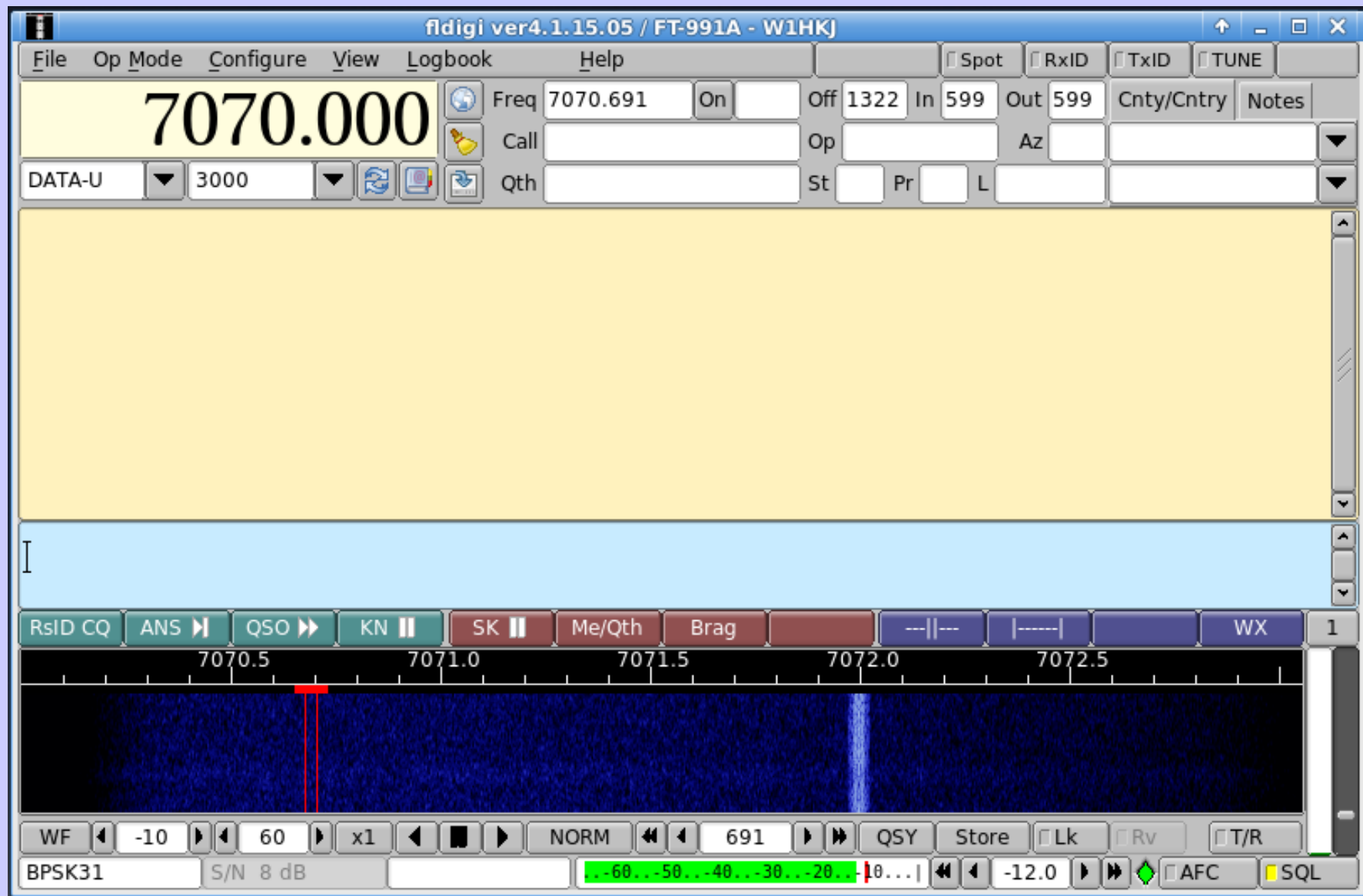


Fldigi



Application Suite

FLdigi – digital modem *

FLarq – Automated Repeat reQuest *

FLmsg – message management/transfer *

FLamp – Amateur Multicast Protocol *

FLrig – transceiver control *

FLwrap - file encapsulation *

FLwkey – Winkeyer control

FLnano – Mortty / Nano keyer interface

FLlog – logbook server

FLnet – net management

FDserver – field day server

FDclient – field day client

LinSim – propagation simulator

FL in acronym indicates GUI based on Fast Light Toolkit

* - collectively referred to as NBEMS suite

Operating Systems

- Linux / Unix
- Windows – Win-7 / Win-8 / Win10
- OS-X – i386 or x86 cpu
- Desktop / Notebook / Netbook / Tablet

Why Use Digital Modes

- Low Power – never need to run over 25 W
- Reliable comms – succeeds when even CW fails. Some modes work below -16 dB s/n
- Many modes – select mode depending on condition
- It's fun – adds another dimension to ham radio
- Error free data transfers for EMCOMM

Most Common Digital Modes

- PSK-31 – ideal for keyboard to keyboard casual comms
- Thor-16 – forward error correcting multi-tone; very easy to tune; excellent s/n performance; FAX image transfers
- Olivia – 8/500 & 16/500 – very slow for keyboard communications, excellent s/n performance
- Contestia – 8/500 – like Olivia, upper case only; great casual comms at marginal s/n
- MT63 – immune to interference – moderate speed
- RTTY – legacy digital mode; not for QRP; poor s/n performance; contesting

Hardware for Fldigi Transceiver



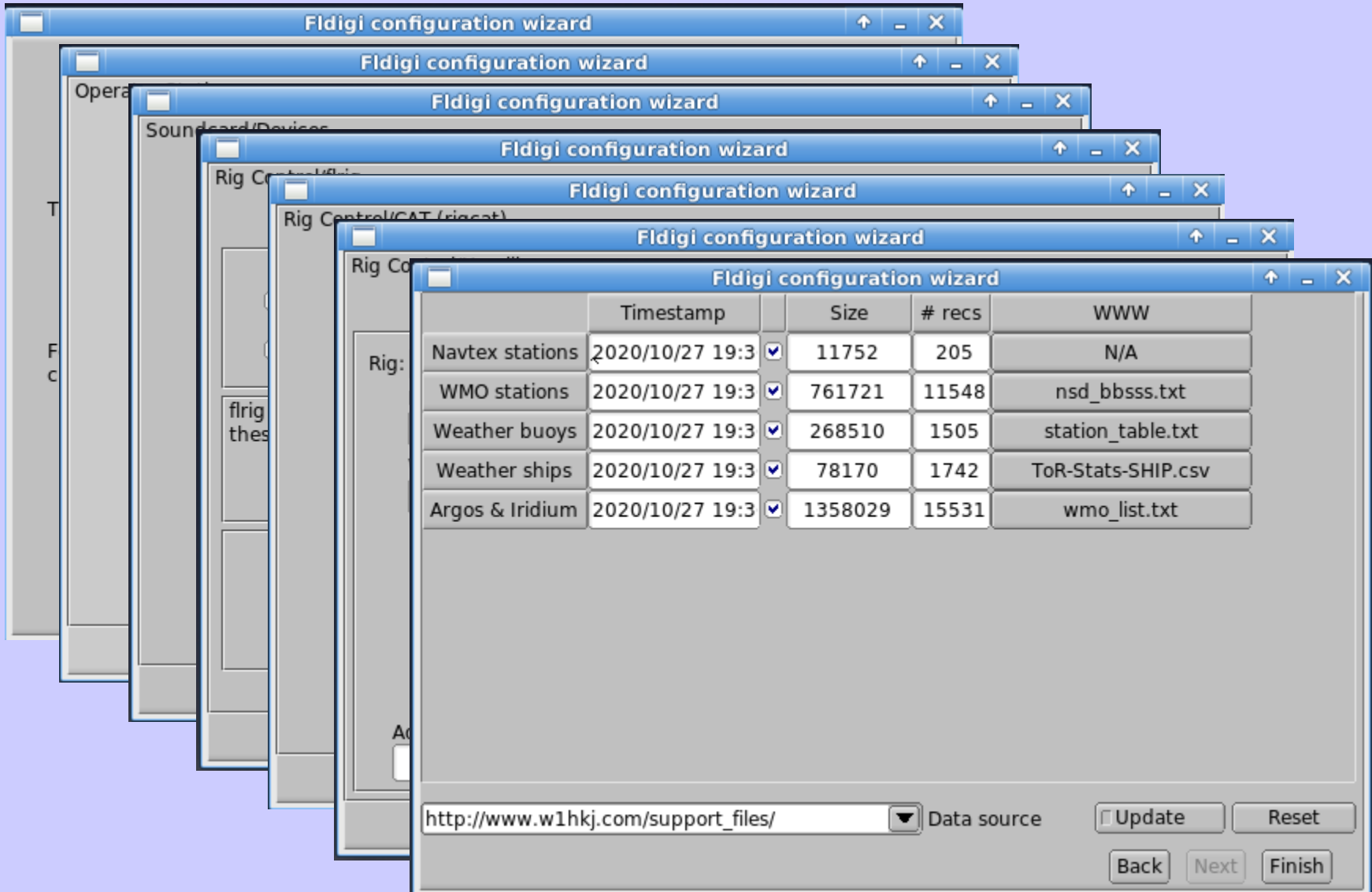
And sound card interface

Sound Card I/O

- Connects computer sound card to the radio
- RF isolation
- ground loop isolation (transformer coupling)
- Can automate the PTT when you transmit.



New Install Wizard



Configure Operator

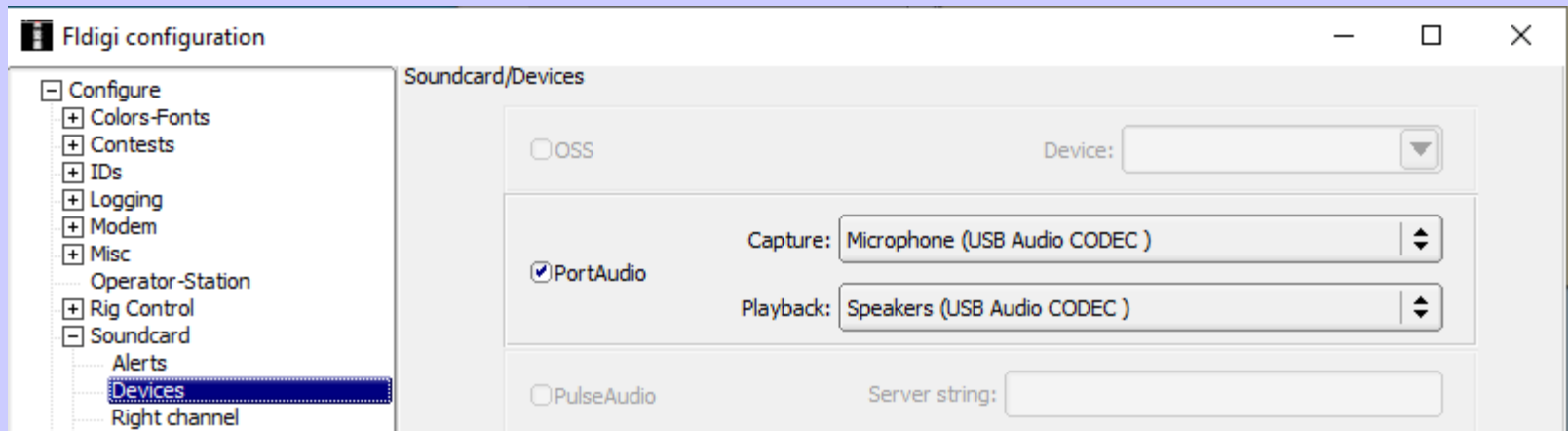
The screenshot shows the 'Fldigi configuration' window with the 'Operator-Station' tab selected. The left sidebar contains a tree view with the following items: 'Configure' (expanded), 'Colors-Fonts', 'Contests', 'IDs', 'Logging', 'Modem', 'Misc', 'Operator-Station' (selected), 'Rig Control', 'Soundcard', 'UI', 'Waterfall', and 'Web'. The main area contains the following fields:

- Station Callsign: W1HKJ
- Operator Callsign: W1HKJ
- Operator Name: Dave
- Antenna: OCF dipole
- Station QTH: Toney AL
- Station Locator: EM64qv
- State / Provinces: Alabama (dropdown) AL (button)
- Counties / Regions: Madison (dropdown) MDSN (button)

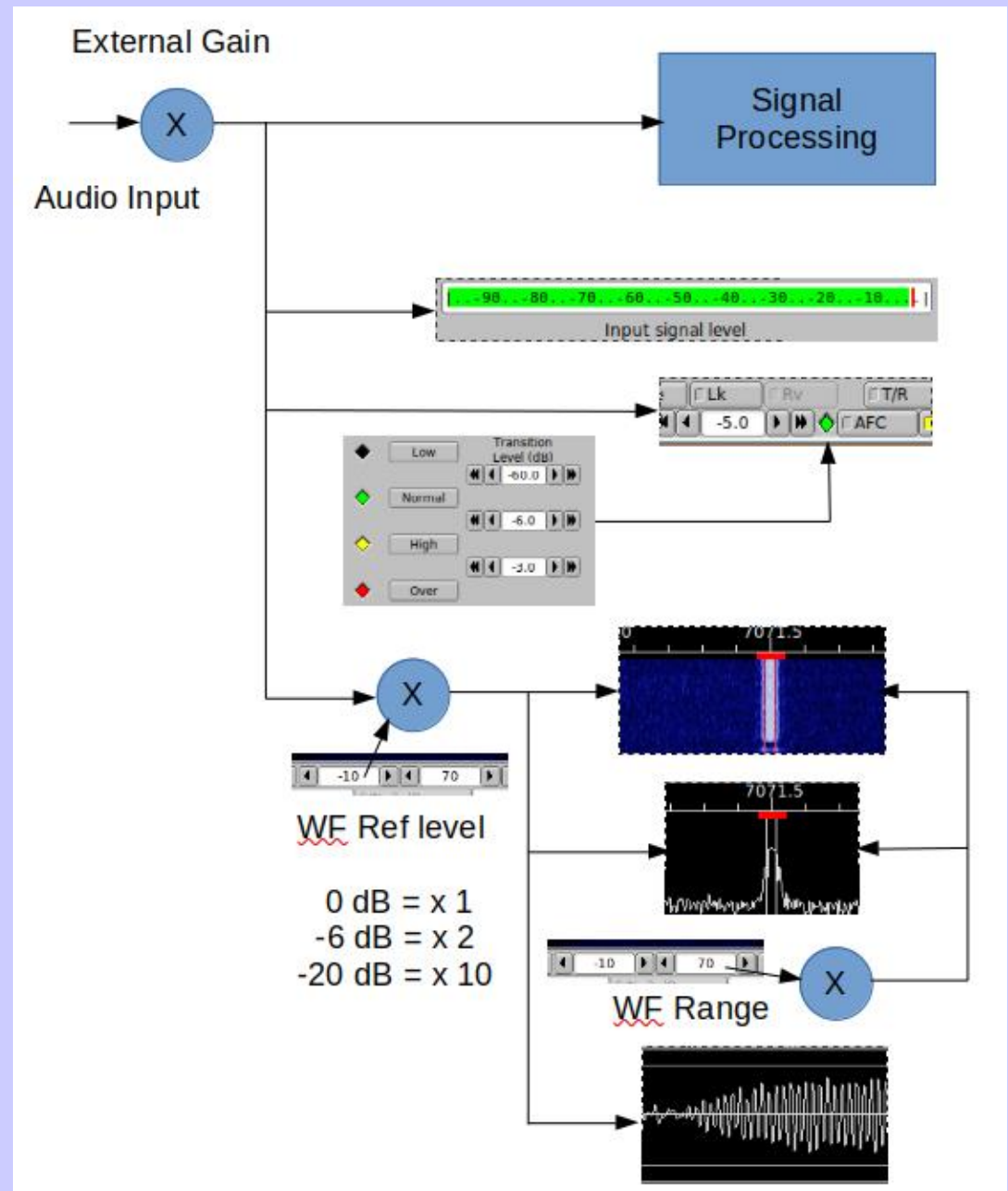
At the bottom of the window are four buttons: 'Collapse Tree', 'Restore defaults', 'Save', and 'Close'.

Fldigi Setup - audio

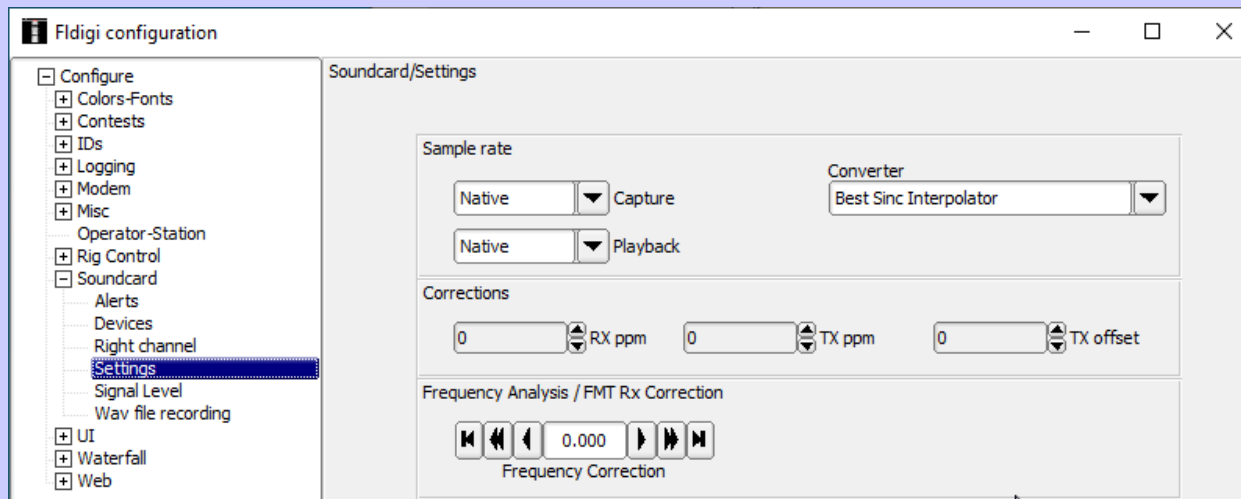
- Install audio device drivers for OS
- On Windows & Apple – select Portaudio listed device
- Shown for an IC-7100



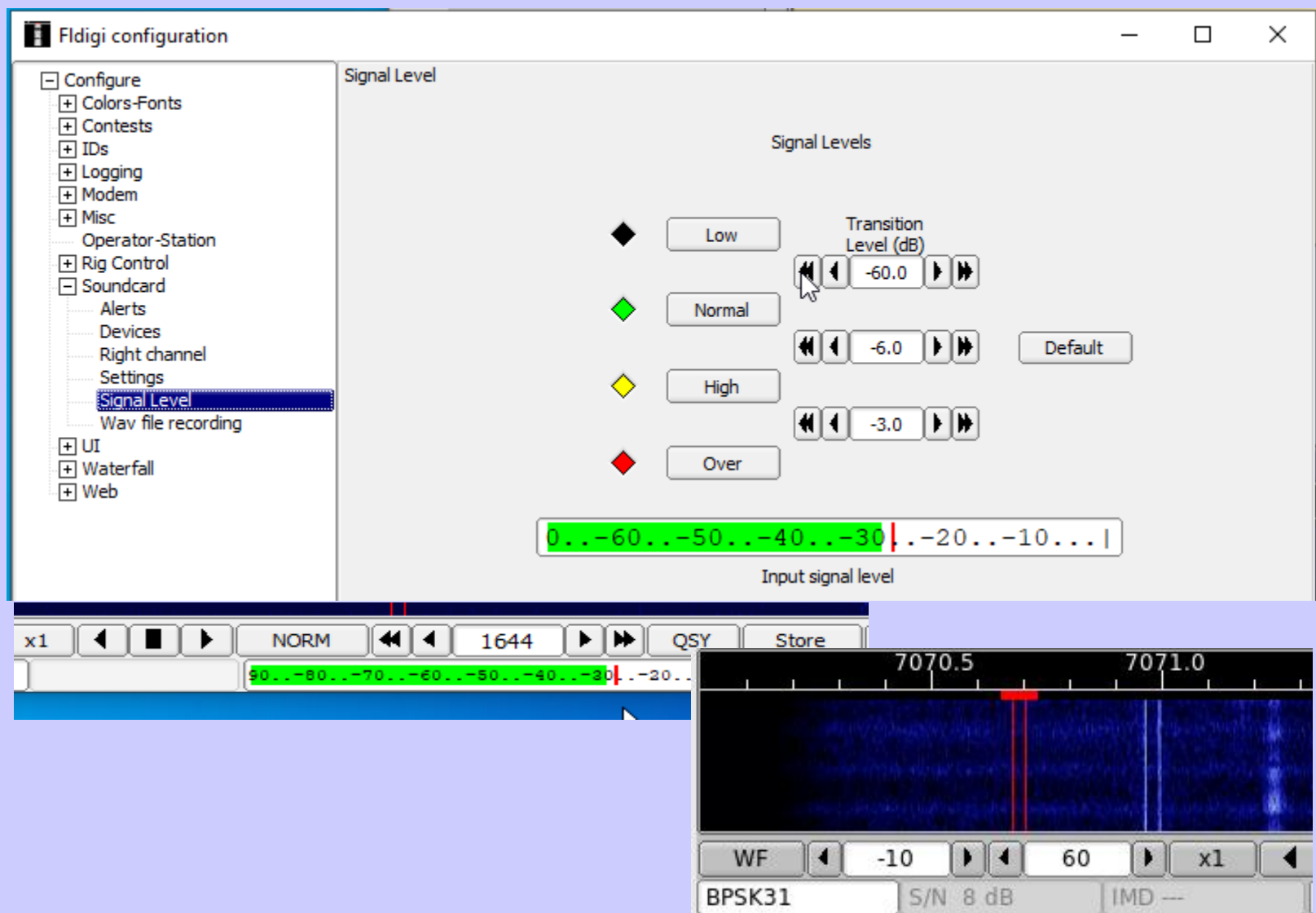
Received Audio Paths



Soundcard Settings



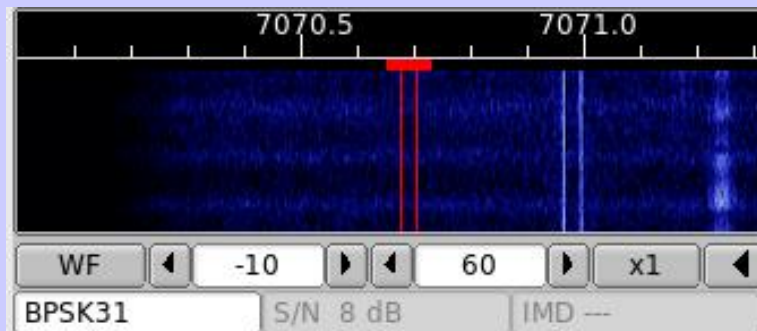
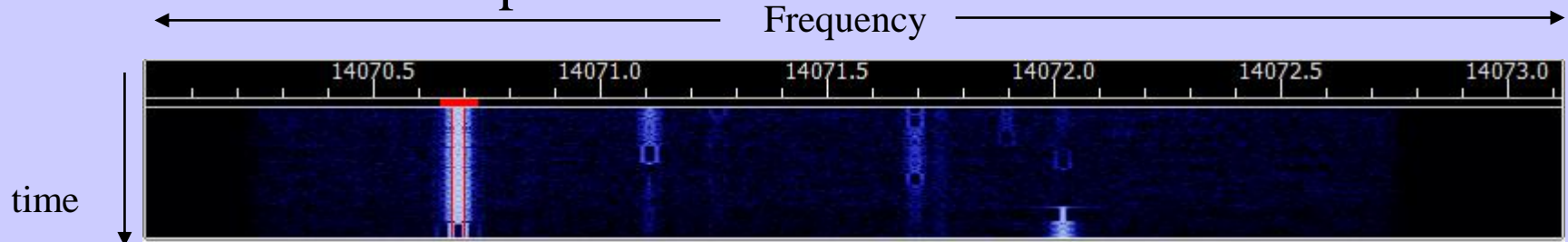
Input Signal Level



Check Input Audio on Waterfall

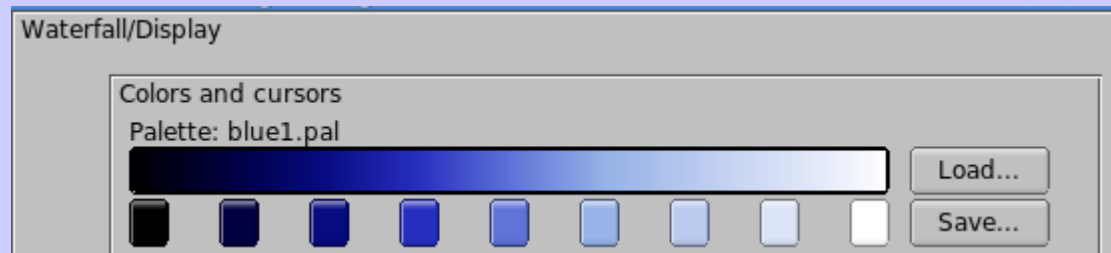
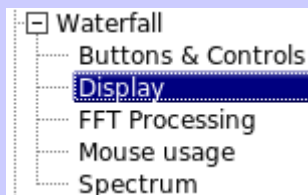
A visual representation of time,

- Frequency,
- Amplitude



Color == Amplitude

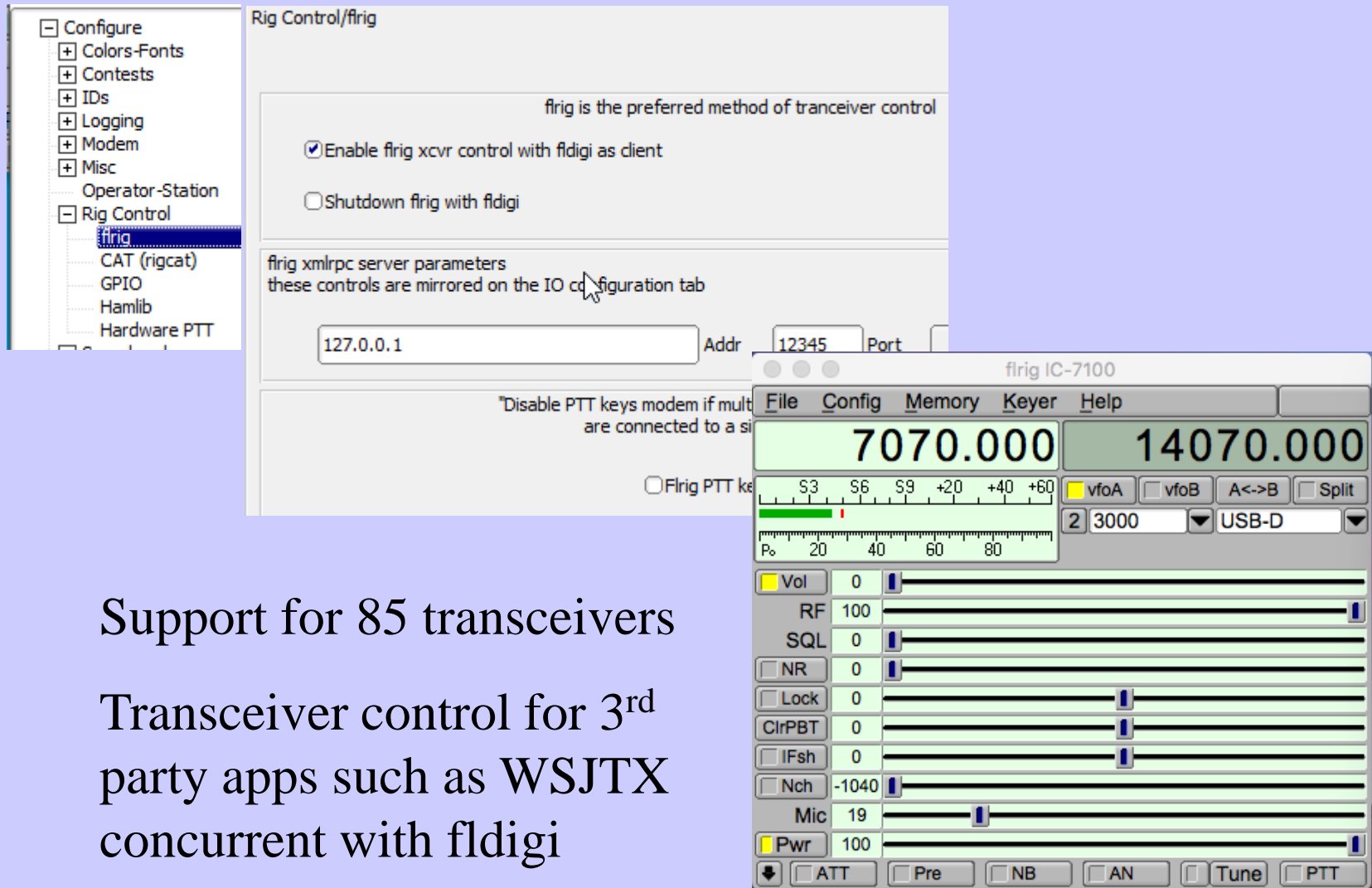
- Blue = low amplitude
- White = medium amplitude
- Red = high amplitude



Transceiver Control

- . flrig – separate application
- . rigcat – fldigi user definable interface
- . hamlib – public domain library
- . 3rd party control access using remote procedure calls, xmlrpc

Transceiver Control - flrig



The image displays the flrig software interface, which is used for transceiver control. The left sidebar shows a tree view with categories like Configure, Colors-Fonts, Contests, IDs, Logging, Modem, Misc, Operator-Station, Rig Control, and flrig. The main window is titled "Rig Control/flrig" and contains the following elements:

- A message: "flrig is the preferred method of transceiver control"
- Two checkboxes: ☒ "Enable flrig xcvr control with fldigi as client" and ☐ "Shutdown flrig with fldigi"
- A section for "flrig xmlrpc server parameters" with a note: "these controls are mirrored on the IO configuration tab". It includes input fields for "Addr" (127.0.0.1) and "Port" (12345).
- A warning: "Disable PTT keys modem if multiple modems are connected to a single serial port".
- A checkbox for "Flrig PTT key".

Overlaid on the bottom right is the "flrig IC-7100" control panel, which includes:

- Frequency displays: 7070.000 and 14070.000.
- Mode and filter settings: S3, S6, S9, +20, +40, +60; vfoA, vfoB, A<->B, Split.
- Band and mode selection: 2, 3000, USB-D.
- Various sliders and buttons for control: Vol, RF, SQL, NR, Lock, CtrPBT, IFsh, Nch, Mic, Pwr, ATT, Pre, NB, AN, Tune, PTT.

Support for 85 transceivers

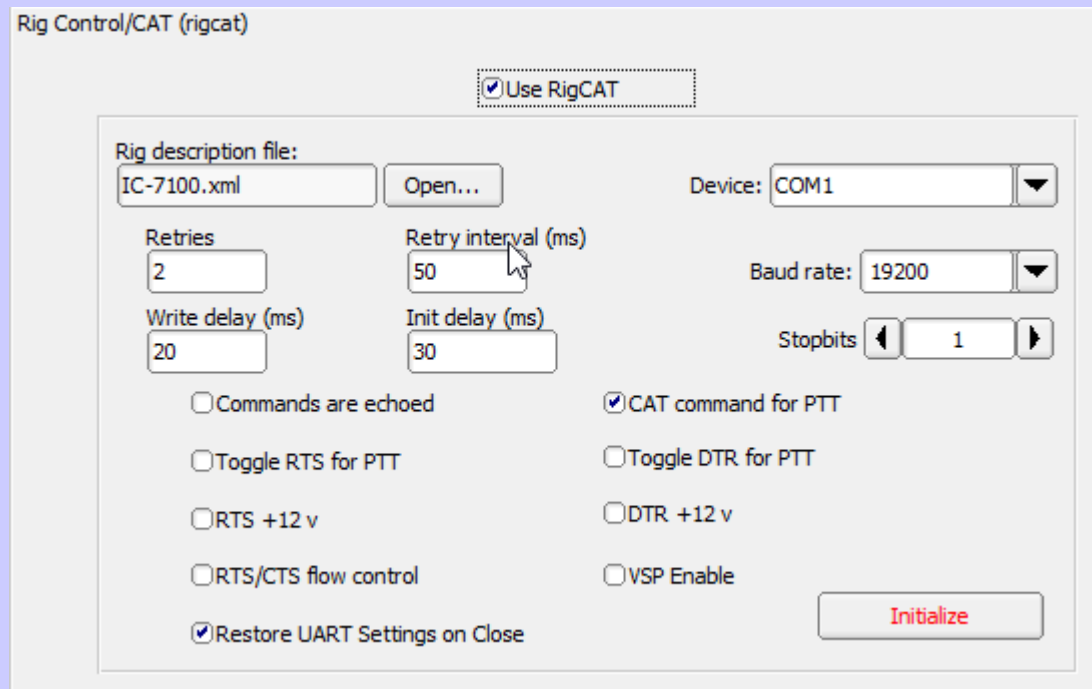
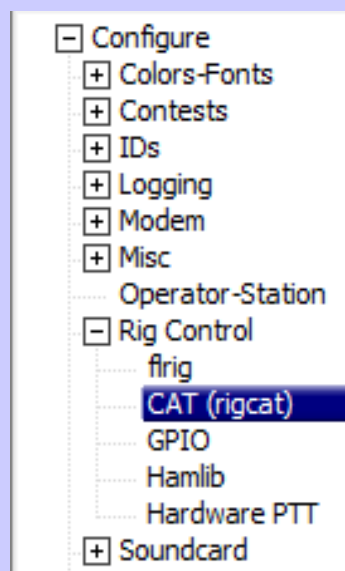
Transceiver control for 3rd party apps such as WSJTX concurrent with fldigi

RigCAT Xcvr Controls

- Set/Read Frequency
- Set/Read Mode
- Set/Read Bandwidth
- Set/Read PTT
- Read/Display Smeter
- Read/Display SWR
- Read/Display Power Out
- Set Power level
- Set/Read Notch Frequency (on WF)

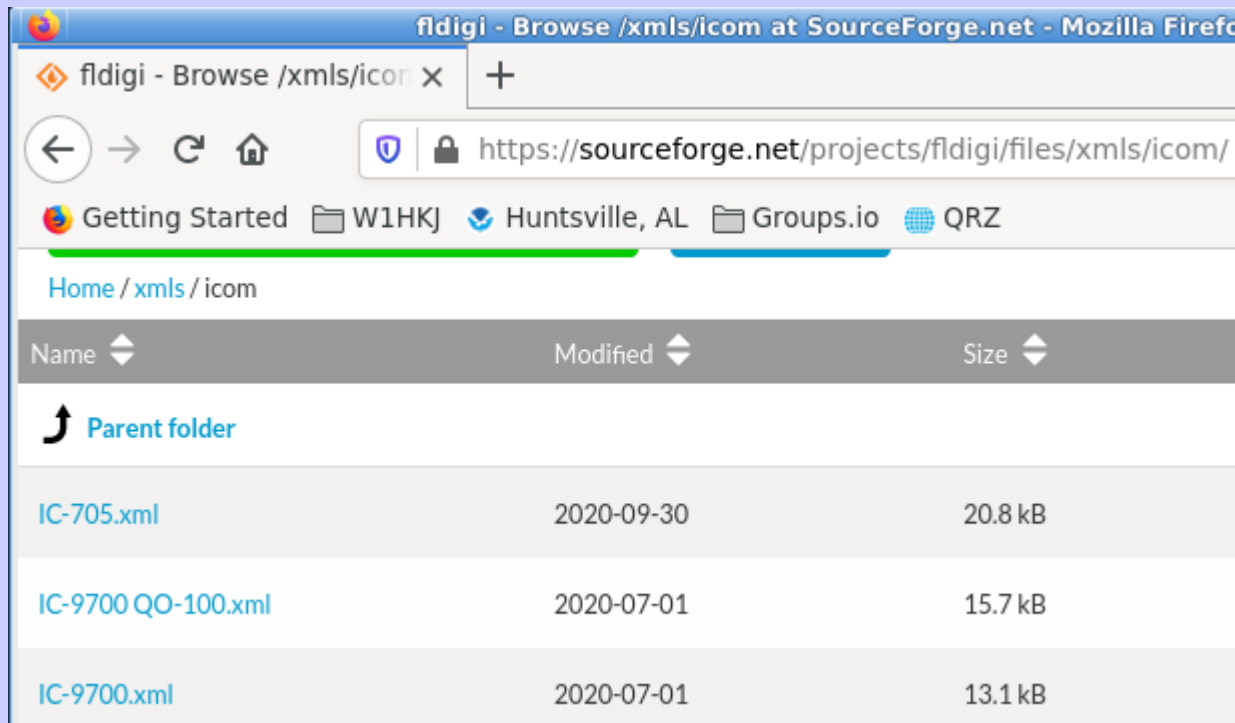
Transceiver Control

flrig - rigcat



RigCAT xcvr definition files

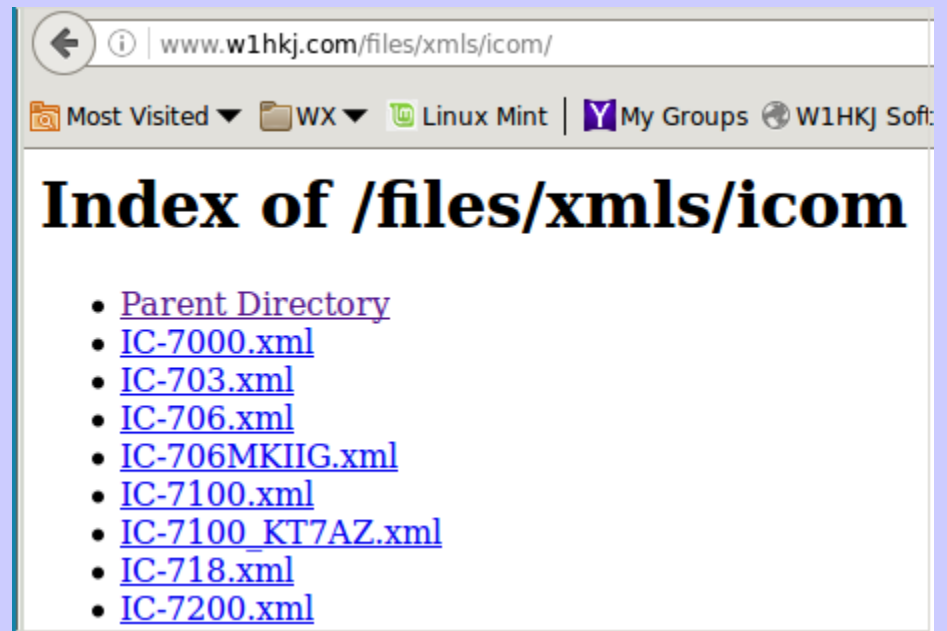
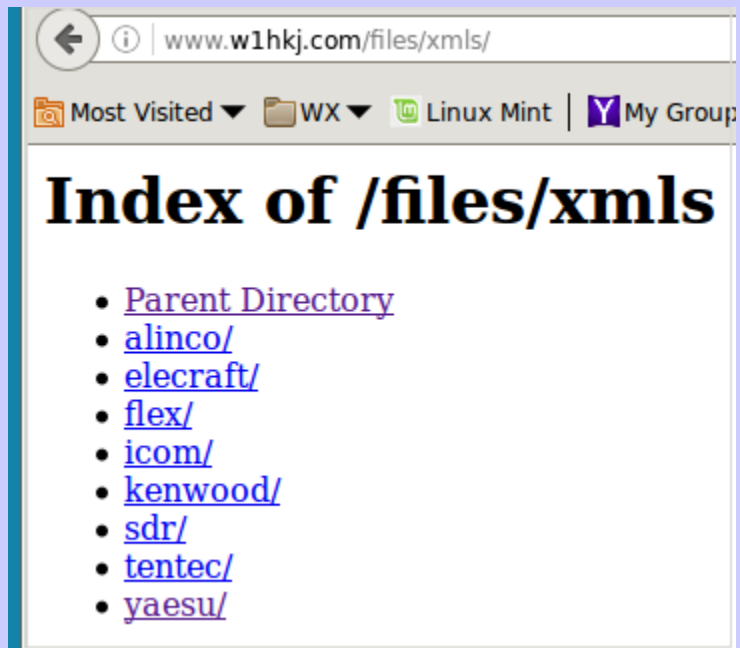
- Download the CAT definition file (xml) from Source Forge



Copy file to the fldigi.files\rigs\ folder in your home folder

RigCAT xcvr control

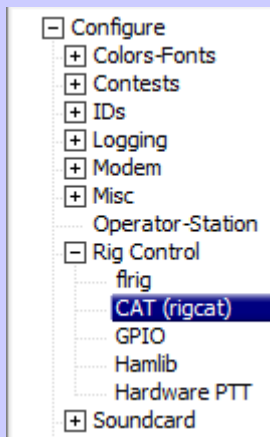
Or from <http://www.w1hkj.com/files/xmls/>



Copy file to the fldigi.files\rigs\ folder in your home folder

RigCAT xcvr setup

- Configure RigCAT tab



Rig Control/CAT (rigcat)

☒ Use RigCAT

Rig description file: IC-7100.xml Device: COM1

Retries: 2 Retry interval (ms): 50 Baud rate: 19200

Write delay (ms): 20 Init delay (ms): 30 Stopbits: 1

☐ Commands are echoed ☒ CAT command for PTT

☐ Toggle RTS for PTT ☐ Toggle DTR for PTT

☐ RTS +12 v ☐ DTR +12 v

☐ RTS/CTS flow control ☐ VSP Enable

☒ Restore UART Settings on Close

RigCAT xml file

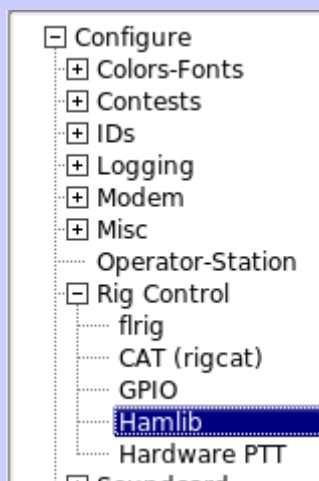
- Check the files interface spec's

```
<!--  
default settings for initial setup  
-->  
<TIMEOUT>50</TIMEOUT>  
<RETRIES>2</RETRIES>  
<WRITE_DELAY>50</WRITE_DELAY>  
<INIT_DELAY>30</INIT_DELAY>  
<BAUDRATE>19200</BAUDRATE>  
<STOPBITS>1</STOPBITS>  
<RTSCTS>false</RTSCTS>  
<ECHO>true</ECHO>  
<CMDPTT>true</CMDPTT>
```

- Baudrate should match xcvr (use fixed baud in xcvr)
- On Icom Xcvr make sure the xcvr is set to default CI-V addr. and that CI-V transceive is OFF.
- Other values have been verified by developer / tester

Transceiver Control

flrig - rigcat - hamlib



Rig Control/Hamlib

☐ Use Hamlib Defaults

Rig: Icom IC-7100 (Untested) Device: Controller_00C970EB-if00-port0

Retries: 3 Timeout (msec): 1000 Baud rate: 19200

Write delay (msec): 0 Post write delay (msec): 0 Stopbits: 1

Polling Interval (msec): 250

☒ PTT via Hamlib command Mode delay (msec): 200

☐ Audio on Auxiliary Port Sideband: Rig mode

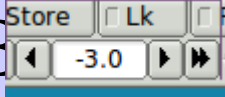
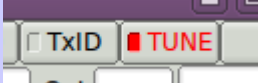
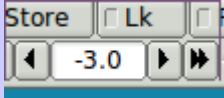
☐ DTR +12 ☐ RTS +12 ☐ CW is LSB mode

☐ RTS/CTS flow control ☐ XON/XOFF flow control ☐ RTTY is USB mode

Advanced configuration:

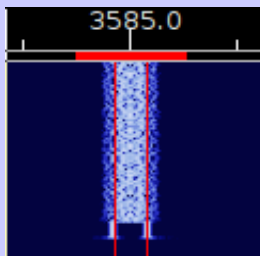
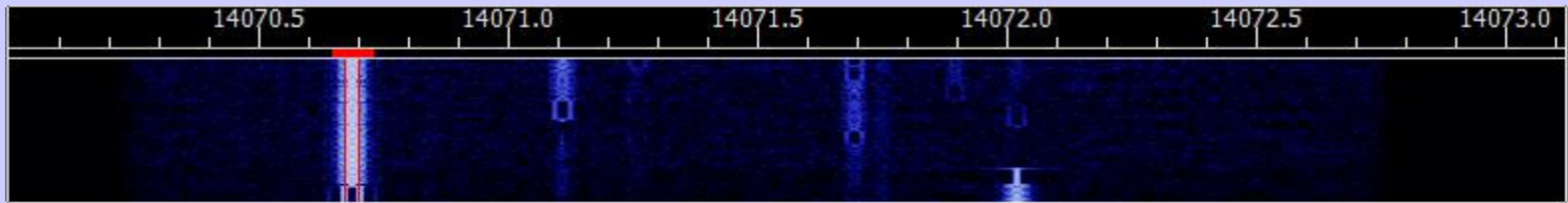
Initialize

Transmit Level Control

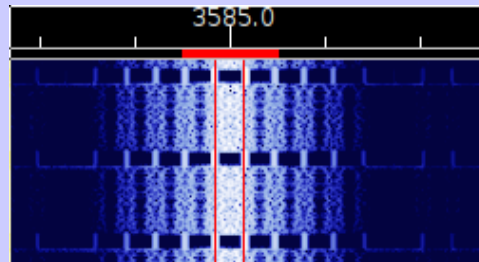
- Set TX attenuator to -3 dB 
- Set xcvr power to max (usually 100 W)
- Open OS mixer control for xcvr device
- Press the fldigi “tune” button 
- Adjust the mixer control for desired pwr out
25 W or less 
- Fine tune with fldigi TX attenuator
- Adjust for zero ALC => clean signal
- Repeat with on air tests

PSK – good neighbor

- You are sharing the spectrum
do not splatter!



Ideal



Overdriven - ALC

QSO Logging

Freq **7071.299** On **1432** Off **1444** In Out **599** Cnty/Cntry Notes
 Call **WN8A** Op **Jim** Az **018**
 Qth **LIVONIA** St **MI** Pr L **EN82hi**

MI Allegan
 MI Alpena
 MI Antrim
 MI Arenac
 MI Baraga
 MI Barry
 MI Bay
 MI Benzie

K04FZJ btu WN8A de K04FZJ k
 WN8A We just threw out about 40 sp
 arse put5ro ed todo it but itewas in the frer e
 advice I got said to off it. My family is new to MI

- Look up call
- Call
- Name
- QTH
- State
- County
- Province
- Country
- Locator
- RST(r)
- RST(s)
- Insert marker
- Copy
- Clear
- Select All
- Save as...
- ☒ All entries

Logbook - logbook.adi

Date On	Time On	Call	Name	In	Recs
20201031	22:32:00	KZ3T	Daniel	599	4

Date Off	Time Off	Freq.	Mode	Pwr	Out	Loc
20201031	22:34:54	7.071563	PSK31		599	EM95fu

Qth Lenoir St NC Pr Country United States

QSL Other Notes My Station Contest CW SS JOTA

QSL-rcvd EQSL-rcvd LOTW-rcvd QSL-VIA
 QSL-sent EQSL-sent LOTW-sent

Call Search

Retrieve

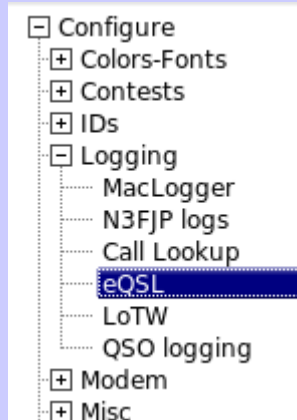
File: C:/Users/12566/fldigi.files/logs/logbook.adi

New Update Delete

Date	Time	Callsign	Name	Frequency	Mode
20201016	23:49	KE0STT	Robert	7.071500	PSK31
20201018	00:19	KD0NMD	Dudley	7.070678	PSK31
20201018	00:24	KC2BPP	Harold	7.070771	PSK31
20201031	22:34	KZ3T	Daniel	7.071563	PSK31

- Logbook Help
- View
- Files
 - ADIF
 - LoTW
 - Reports
 - ☐ Connect to server
 - Field Day Logging
- home/dave/.../fldigi7m

EQSL



Logging/eQSL

www url

User ID

Password

QTH Nickname

Options

- ☐ send when logged (log button, <LOG>, <LNW>)
- ☐ Use date/time off for log entry
- ☒ Show delivery message

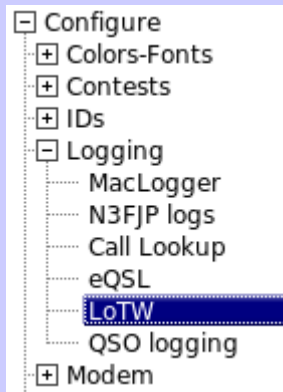
Default message

Text Tags (tags use { } delimiters)

These tags can also be used in <EQSL:[message]>

{CALL}	other ops call sign	{NAME}	other ops name
{MODE}	full mode / submode		

LoTW



Logging/LoTW

You must have tqsl installed and it's location recorded for LoTW updates to work!

tqsl:

Password ☒ Password required

Location Use this tqsl station location

☐ Quiet mode [-q], do not open tqsl dialog Timeout

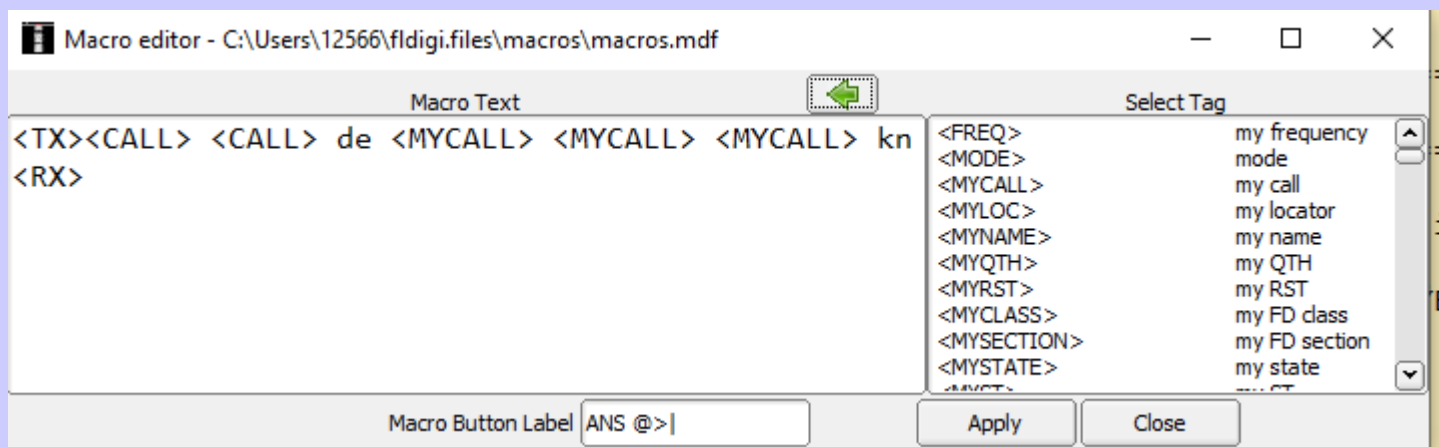
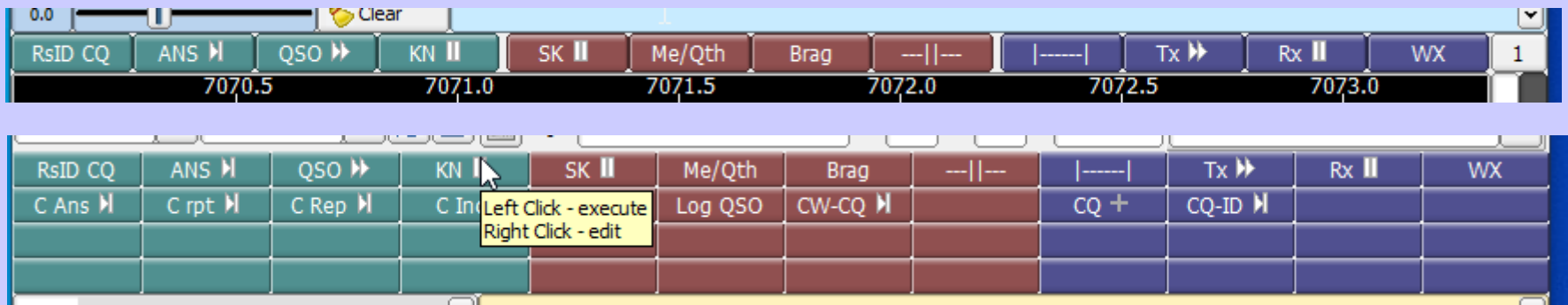
☒ Send QSO data to LoTW when logged

☒ Show delivery message

<input type="button" value="Export"/>	Export logbook records for LoTW upload
<input type="button" value="Check"/>	Review / edit the exported LoTW upload adif file
<input type="button" value="Send"/>	Submit the upload adif file to LoTW
<input type="button" value="Match"/>	Match logbook records with LoTW download file

Macros

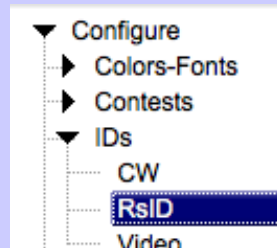
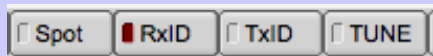
Ease routine operation – Facilitate contesting – Add program control



Reed Solomon Identifier (RsID)

- Sequence of 15/30 tones
- Reed Solomon encoding similar to that used by deep space probes
- Each mode uniquely identified by it's RsID
- Can be detected at -18 dB s/n
- Both Tx and Rx behavior configurable

Reed Soloman Identifier (RsID)



IDs/RsID

Reed-Solomon ID (Rx)

Receive modes

☒ Notify only

☐ Searches passband

☐ Mark prev freq/mode

☐ Disables detector

☐ Disable alert dialog

☐ Retain tx freq lock

☒ Disable freq change

Low Allow errors

0 Squelch open (sec)

Pre-Signal Tone

0.0 Seconds

Reed-Solomon ID (Tx)

Transmit modes

☐ End of xmt ID

The RsID notification message contents and display characteristics are configured on the "Notifications" configure dialog.

Transmit mod...

- ☒ NULL
- ☐ CW
- ☒ Contestia
- ☒ Cont4-125
- ☒ Cont4-250
- ☒ Cont4-500
- ☒ Cont4-1K
- ☒ Cont4-2K
- ☒ Cont8-125
- ☒ Cont8-250
- ☒ Cont8-500
- ☒ Cont8-1K
- ☒ Cont8-2K
- ☒ Cont16-500
- ☒ Cont16-1K
- ☒ Cont16-2K
- ☒ Cont32-1K
- ☒ Cont32-2K
- ☒ Cont64-500
- ☒ Cont64-1K
- ☒ Cont64-2K
- ☒ DominoEX Micro
- ☒ DominoEX 4
- ☒ DominoEX 5
- ☒ DominoEX 8
- ☒ DominoEX 11
- ☒ DominoEX 16
- ☒ DominoEX 22
- ☒ DominoEX 44

Select All

Clear All

Close

3rd Party Logging Programs

N3FJP Logger Support

The screenshot shows a software window with a tabbed interface. The tabs are labeled 'QSO', 'Rx Text', 'MacLogger', and 'N3FJP logs'. The 'N3FJP logs' tab is currently selected. Below the tabs, there are two input fields: 'Address' with the value '192.168.1.121' and 'Port' with the value '1100'. To the right of the 'Port' field is a 'Default' button and a 'Connect' checkbox. Below these fields is a large text area labeled 'TCP/IP Data Stream'. At the bottom of the window, there are three checkboxes: 'Enable Data Stream', 'Center DXspot freq at sweet spot', and 'Report actual modem RF frequency'. A 'Clear text' button is located to the right of the first checkbox.

QSO | Rx Text | MacLogger | N3FJP logs

Address: 192.168.1.121 Port: 1100 [Default] ☐ Connect

TCP/IP Data Stream

☒ Enable Data Stream [Clear text]

☒ Center DXspot freq at sweet spot ☒ Report actual modem RF frequency

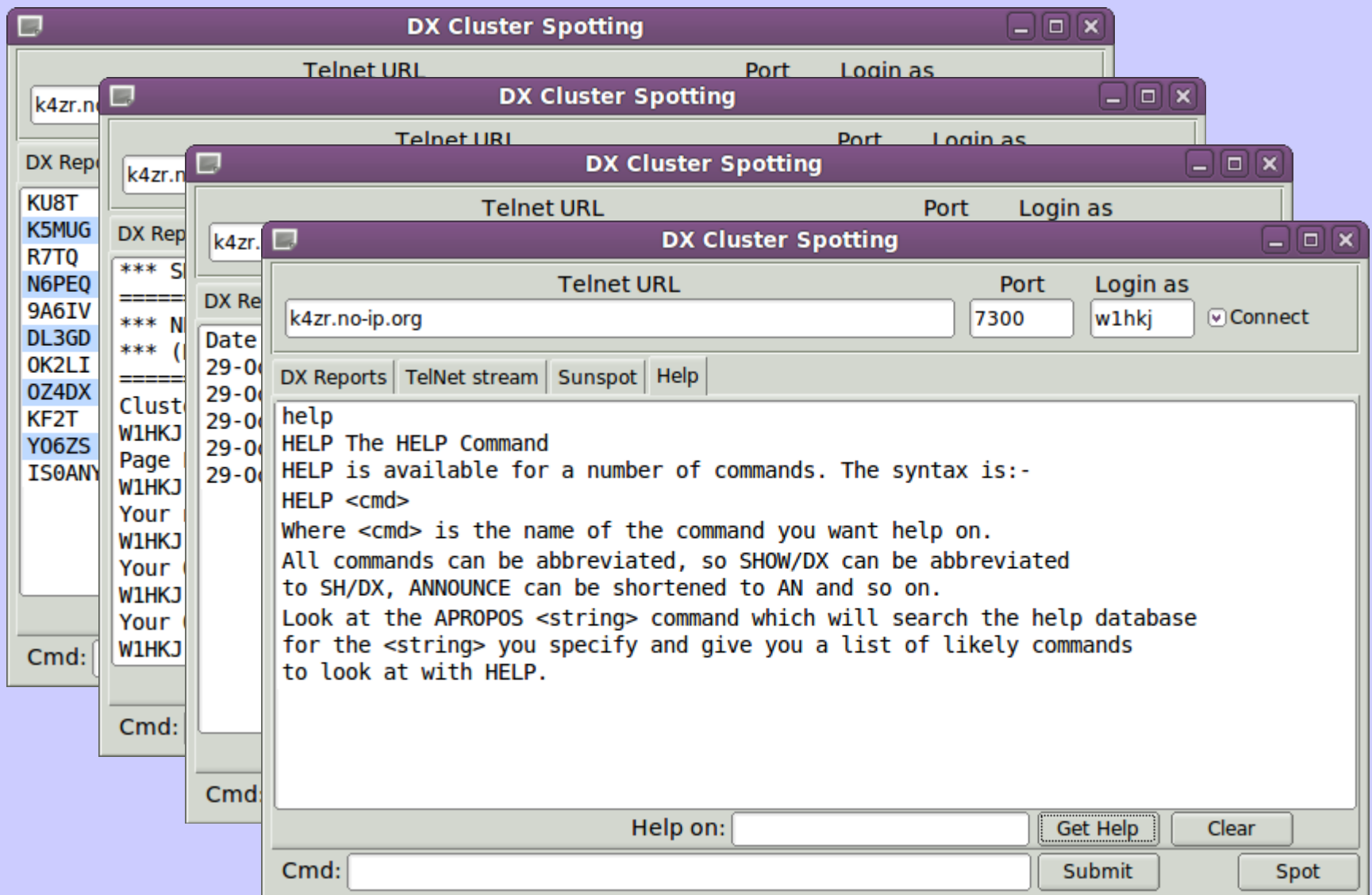
Maclogger program support

QSO	Rx Text	MacLogger	N3FJP logs
<input type="checkbox"/> Connect to MacLogger			
<input checked="" type="checkbox"/> Capture Radio Report			
<input type="checkbox"/> Capture Log Report			
<input type="checkbox"/> Capture Lookup			
<input type="checkbox"/> Capture Spot Tune			
<input type="checkbox"/> Capture Spot Report			
<input type="checkbox"/> Enable UDP log file		<input type="text" value="maclogger_udp_strings.txt"/>	<input type="button" value="Clear UDP text"/>
UDP data stream			
<div></div>			

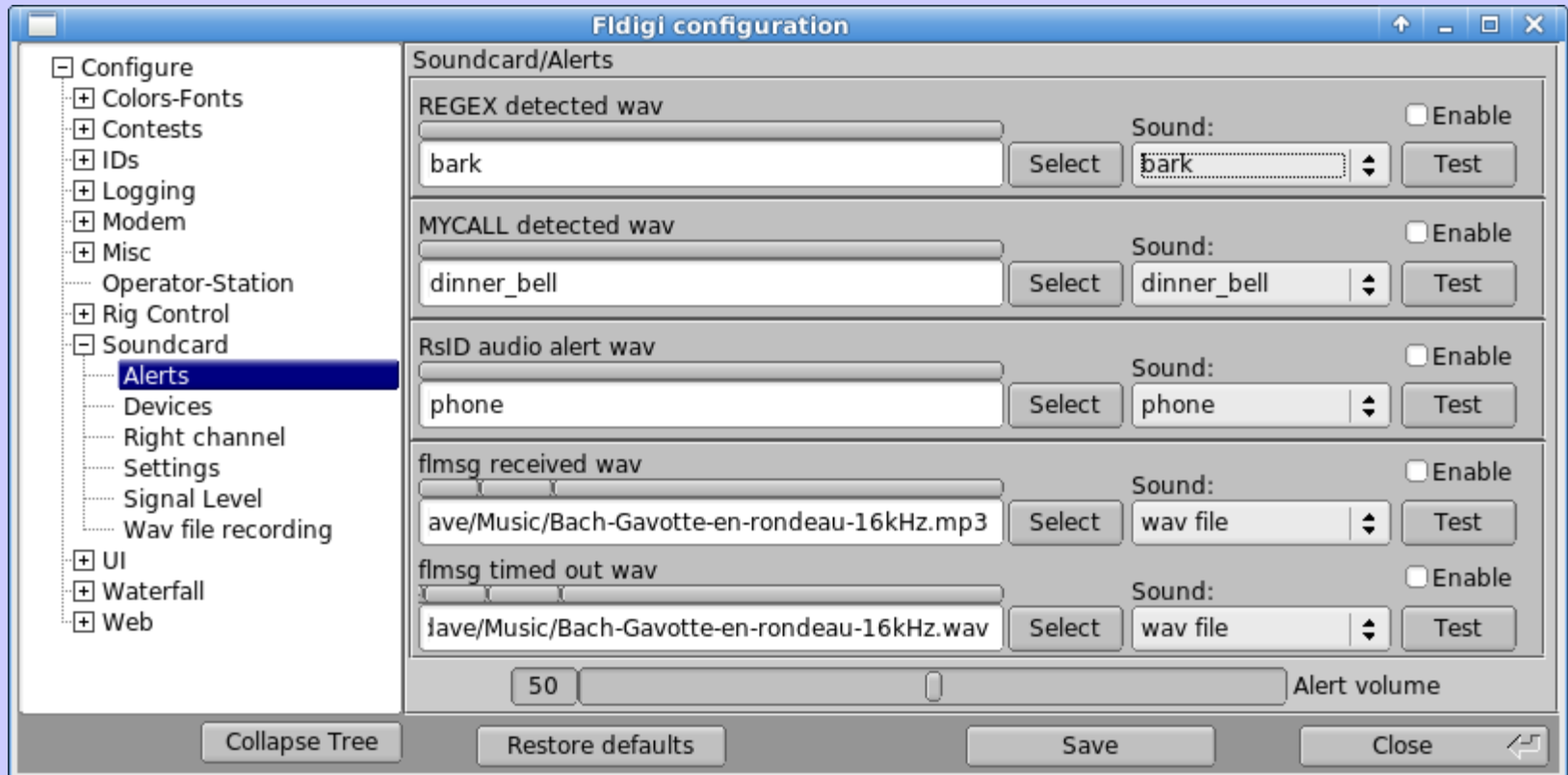
Fldigi fun features

- Built-in DX Cluster access
 - Acquire DX freq/mode from cluster report
- Audio alerts
- Audio monitor with tracking DSP filter
- Field Day Logger
- FMT – frequency measurement analyzer

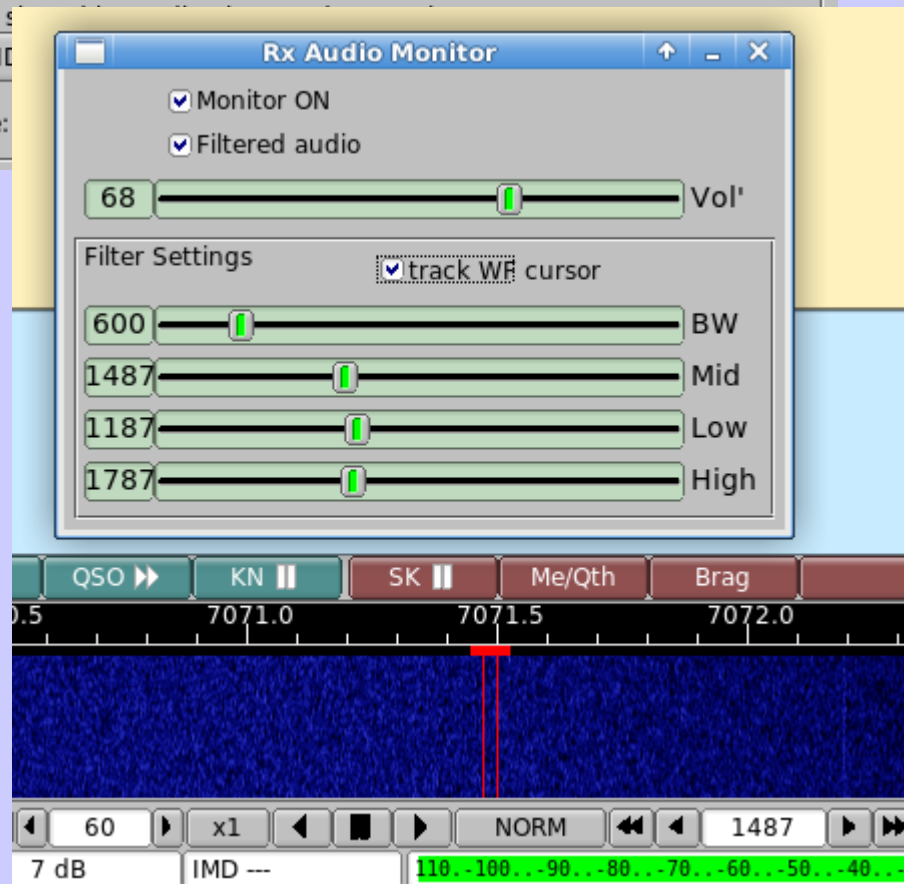
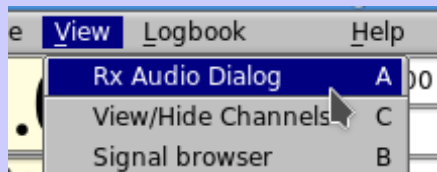
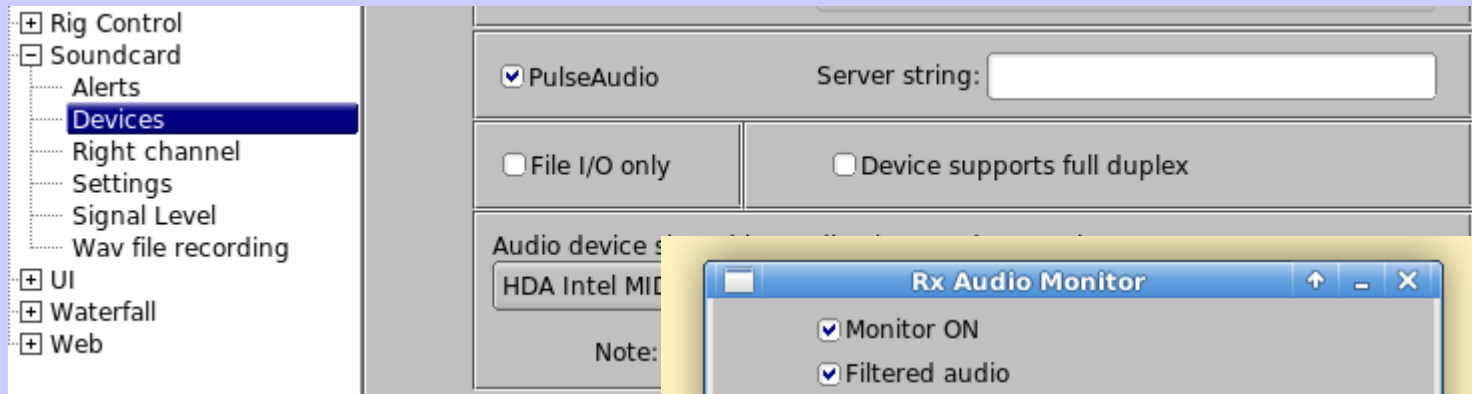
DxCluster



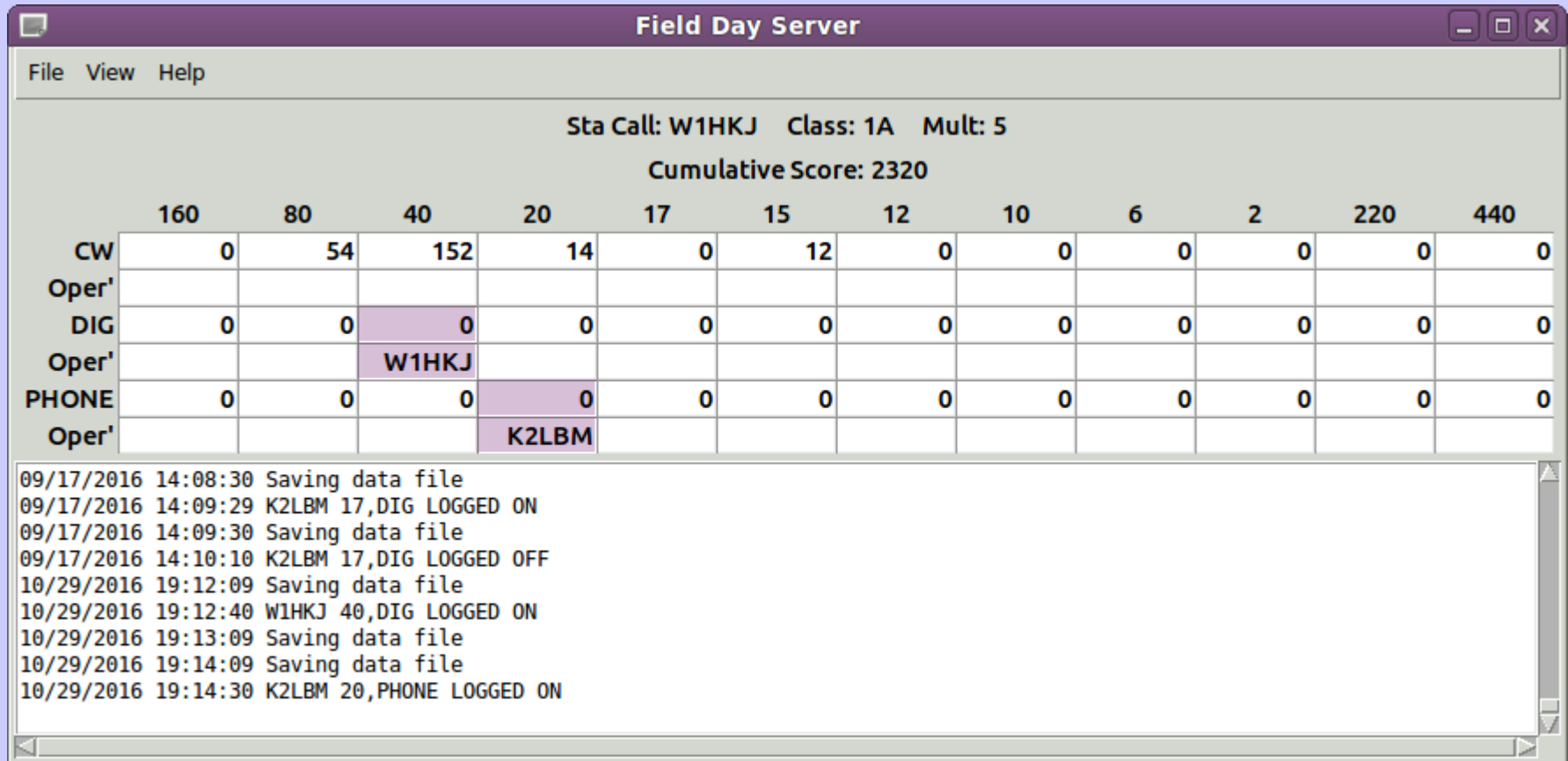
Audio Alerts



Audio Monitor



fd_server



Field Day Server

File View Help

Sta Call: W1HKJ Class: 1A Mult: 5

Cumulative Score: 2320

	160	80	40	20	17	15	12	10	6	2	220	440
CW	0	54	152	14	0	12	0	0	0	0	0	0
Oper'												
DIG	0	0	0	0	0	0	0	0	0	0	0	0
Oper'			W1HKJ									
PHONE	0	0	0	0	0	0	0	0	0	0	0	0
Oper'				K2LBM								

09/17/2016 14:08:30 Saving data file
09/17/2016 14:09:29 K2LBM 17,DIG LOGGED ON
09/17/2016 14:09:30 Saving data file
09/17/2016 14:10:10 K2LBM 17,DIG LOGGED OFF
10/29/2016 19:12:09 Saving data file
10/29/2016 19:12:40 W1HKJ 40,DIG LOGGED ON
10/29/2016 19:13:09 Saving data file
10/29/2016 19:14:09 Saving data file
10/29/2016 19:14:30 K2LBM 20,PHONE LOGGED ON

Field log support – tcltk script program
Compiled to a stand alone exe for Windows

Field Day Logger

Field Day Client

File Config Help

Sta Call: Class: Mult:

Cumulative Score:

	160	80	40	20	15	10	6	2	220	440
CW	0	0	0	0	0	0	0	0	0	0
DIG	0	0	0	0	0	0	0	0	0	0
PHONE	0	0	0	0	0	0	0	0	0	0

LOGGED OFF


CALLSIGN

Field Day Viewer - use with program 'fdserver'

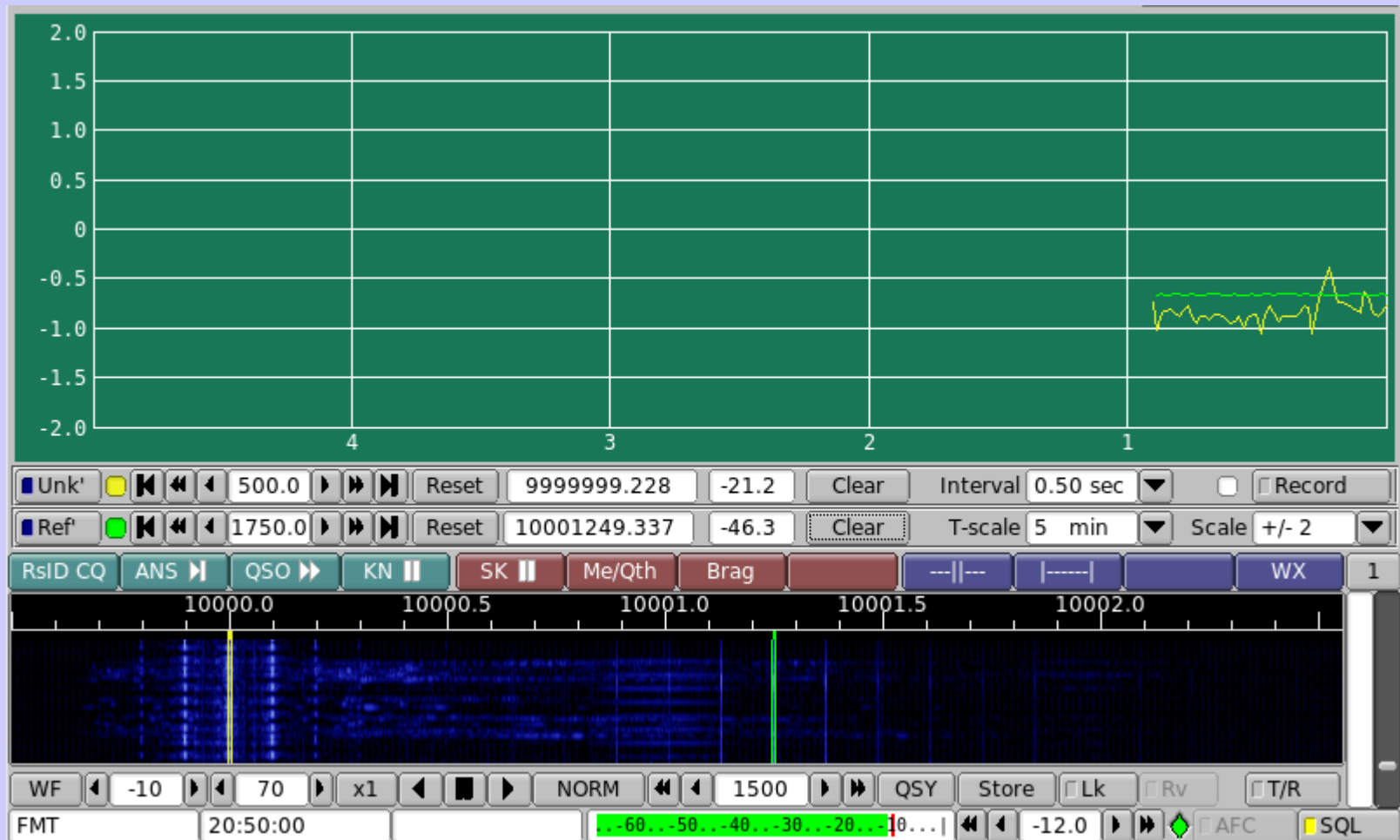
FD Call FD Class FD Section FD Mult Score

	160	80	40	20	17	15	12	10	6	2	220	440
CW	0	54	152	14	0	12	0	0	0	0	0	0
Oper'												
DIG	0	0	0	0	0	0	0	0	0	0	0	0
Oper'			W1HKJ									
PHONE	0	0	0	0	0	0	0	0	0	0	0	0
Oper'												

"fdserver" Client

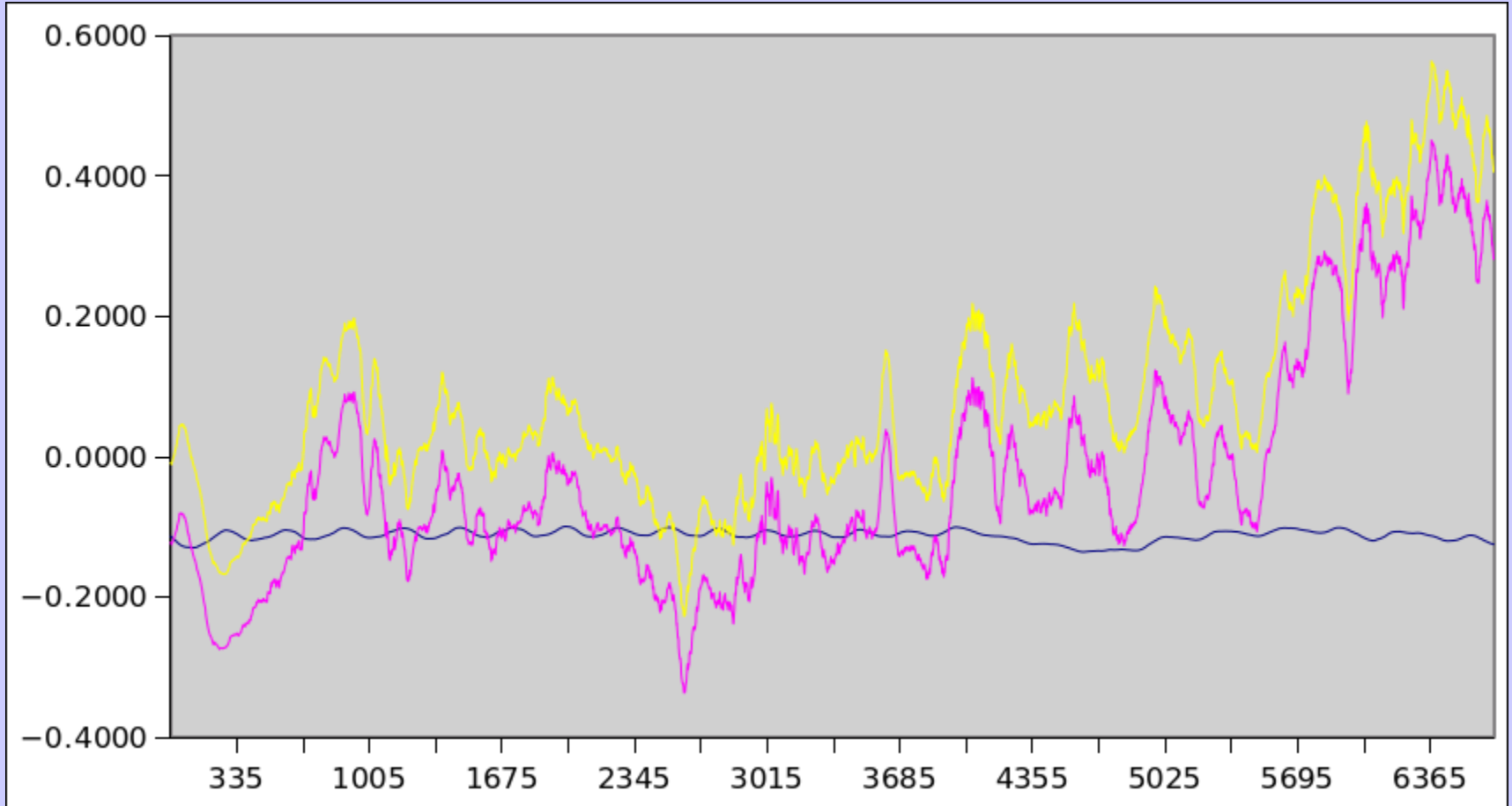
tcpip addr port OP callsign ☒ Connect Connected 

Frequency Measurement



Dual frequency measurement – milliHertz accuracy

Frequency Measurement

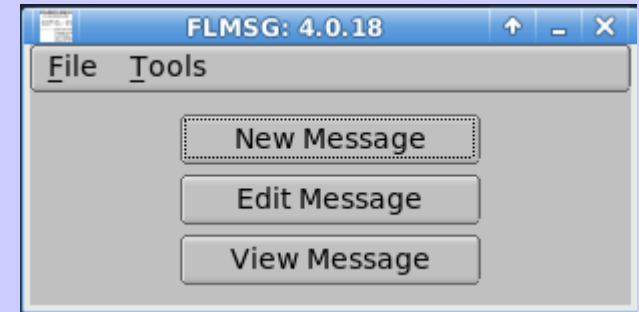


Dual frequency measurement – milliHertz accuracy

Flmsg

- Message manager
 - Generate
 - Store
 - Send
 - Receive
 - Fixed format
 - Custom html-5 format

Tyro Interface



Flmsg – Expert Interface

FLMSG: 4.0.18

File Form Template Config AutoSend Utilities Help

ARRL radiogram file: new.m2s

Message Records

SVC *NR *PREC HX_ *STN ORIG CK

☐ 2 ROUTINE

PLACE OF ORIG TIME FILED *MON DY

*TO

TEL:

OP NOTE:

☒ Standard Format

TXT:

SIG: OP NOTE:

☐ Comp 8PSK1200F

ARQ Send NOT CONNECTED

Flmsg Built-in Forms

The screenshot displays the FLMSG 4.0.17.01 application interface. The main window, titled "CSV spreadsheet" and "file: druglist.c2s", features a menu bar with "File", "Form", "Template", "Config", "AutoSend", "Utilities", and "Help". Below the menu bar are buttons for "Import CSV", "Export CSV", "View CSV", and "Edit CSV". The spreadsheet content shows a header row: "Type,NDC Product Code,Medication Name,Units Required,Location" and ten data rows. A "CSV Viewer" window is overlaid on the main window, displaying the same data in a table format. The table has five columns: "Type", "NDC Product Code", "Medication Name", "Units Required", and "Location". The data rows are numbered 1 through 10.

Type	NDC Product Code	Medication Name	Units Required	Location
1	54092-371	Adderall	10	ER
2	0024-5401	Ambien	10	ER
3	0254-2101	Amitriptyline	15	ER
4	0093-4160	Amoxicillian	20	OR
5	0781-1078	Atenolol	5	OR
6	64455-063	Ativan	5	OR
7	63304-958	Cephalexin	10	MEDSURG
8	0597-0006	Clonidine	10	OR
9	0002-3235	Cymbalta	10	OR
10	50580-280	Dizepam Flexeril	20	OR

Flmsg Custom Forms

Used for all American Red Cross flmsg forms

Download from

http://www.w1hkj.com/files/flmsg/ARC_custom_forms/

- [Parent Directory](#)
- [ARC-213_V1.1_01.18.17.html](#)
- [ARC_204_Work_Assignment_V1.0.html](#)
- [ARC_Client_Incident_Report_V1.0.html](#)
- [ARC_Daily_Shelter_Report.html](#)
- [ARC_Emergency_Welfare_Inquiry_Form_v_1.0.html](#)
- [ARC_Requisition_6409_V2.3.html](#)
- [ARC_Safe_and_Well_v1.1.html](#)
- [ARC_Staff_Injury_Illness_Record_V1.0.html](#)
- [ARC_Staff_Request_Form_V2.0.html](#)
- [ARC_Unaccompanied_Minor_Form_v_1.0.html](#)
- [ARC_custom_forms.zip](#)
- [Red_Cross_flmsg_installation_01-18-16.pdf](#)
- [Using_The_Red_Cross_Message_UTILITY.pdf](#)

Flmsg Custom Forms

127.0.0.1:8080

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✓

☰

Select the Damage Level


From the Damage Level Pictures 1 through 4 shown below, choose the damage level that more closely resembles the damage in the address you are reporting.

1




NO/MINOR DAMAGE HABITABLE

2




MAJOR DAMAGE HABITABLE

3



MAJOR DAMAGE UNINHABITABLE

4

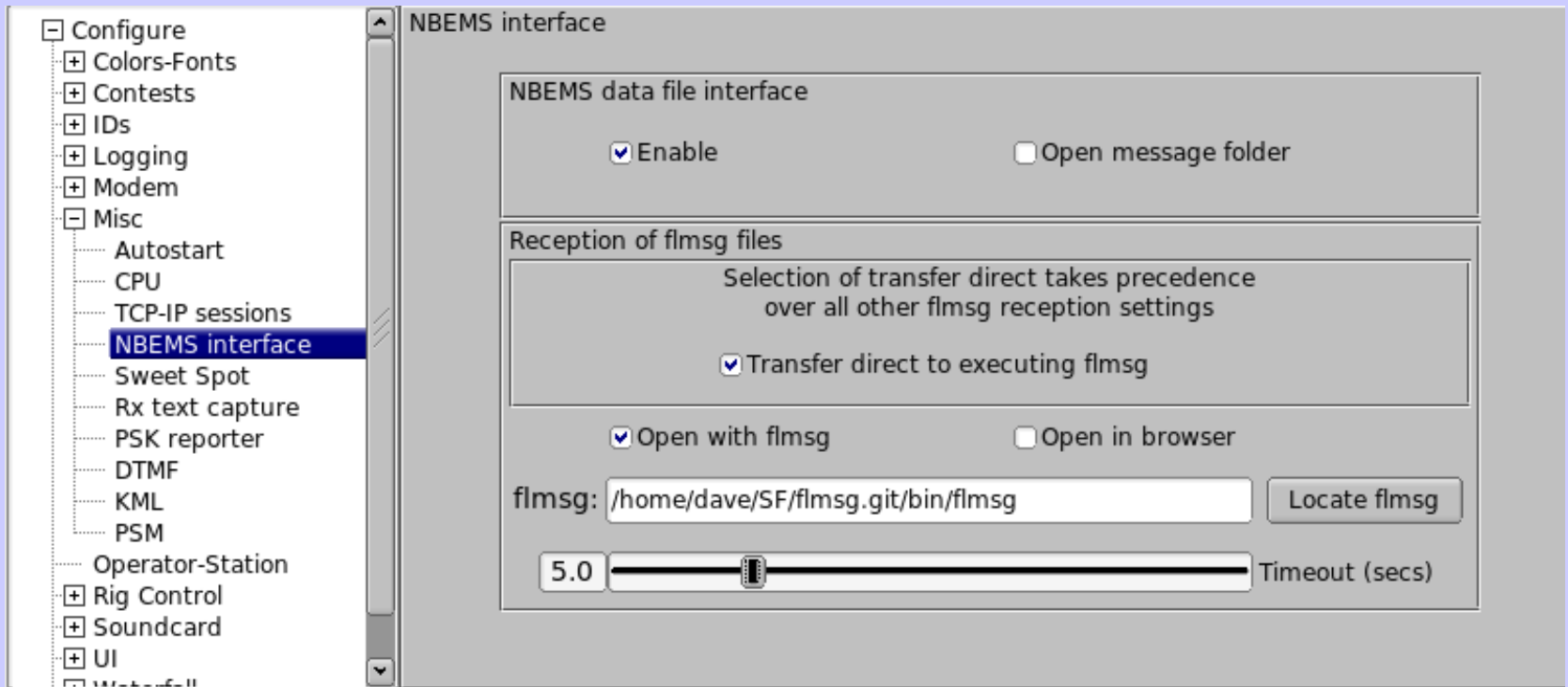


DESTROYED

Select damage level: 2. Major, habitable

Submit Form

Configure Fldigi / Flmsg



Here are some useful links:

<http://www.w1hkj.com>

Source Forge fldigi site:

<https://sourceforge.net/projects/fldigi>

Source Forge files download

<http://sourceforge.net/projects/fldigi/files/>

Alternate site for files download

<http://www.w1hkj.com/files/>

Fldigi on-line mode identification – sights and sounds

<http://www.w1hkj.com/modes/index.htm>

NBEMS EMCOMM user group:

<https://groups.io/g/nbems>

Windows fldigi user group:

<https://groups.io/g/winfldigi>

Linux / OS-X fldigi user group:

<https://groups.io/g/linuxham>

Additional useful links:

Fldigi on-line help

Flrig on-line help

Flmsg on-line help

Pdf manuals at

[fldigi_4.1.15-help.pdf](#)

[flrig-help.pdf](#)

[flmsg-help.pdf](#)

Download this PPT at
<http://www.w1hkj.com/lectures/2020.11.05.ppt>