

NBEMS

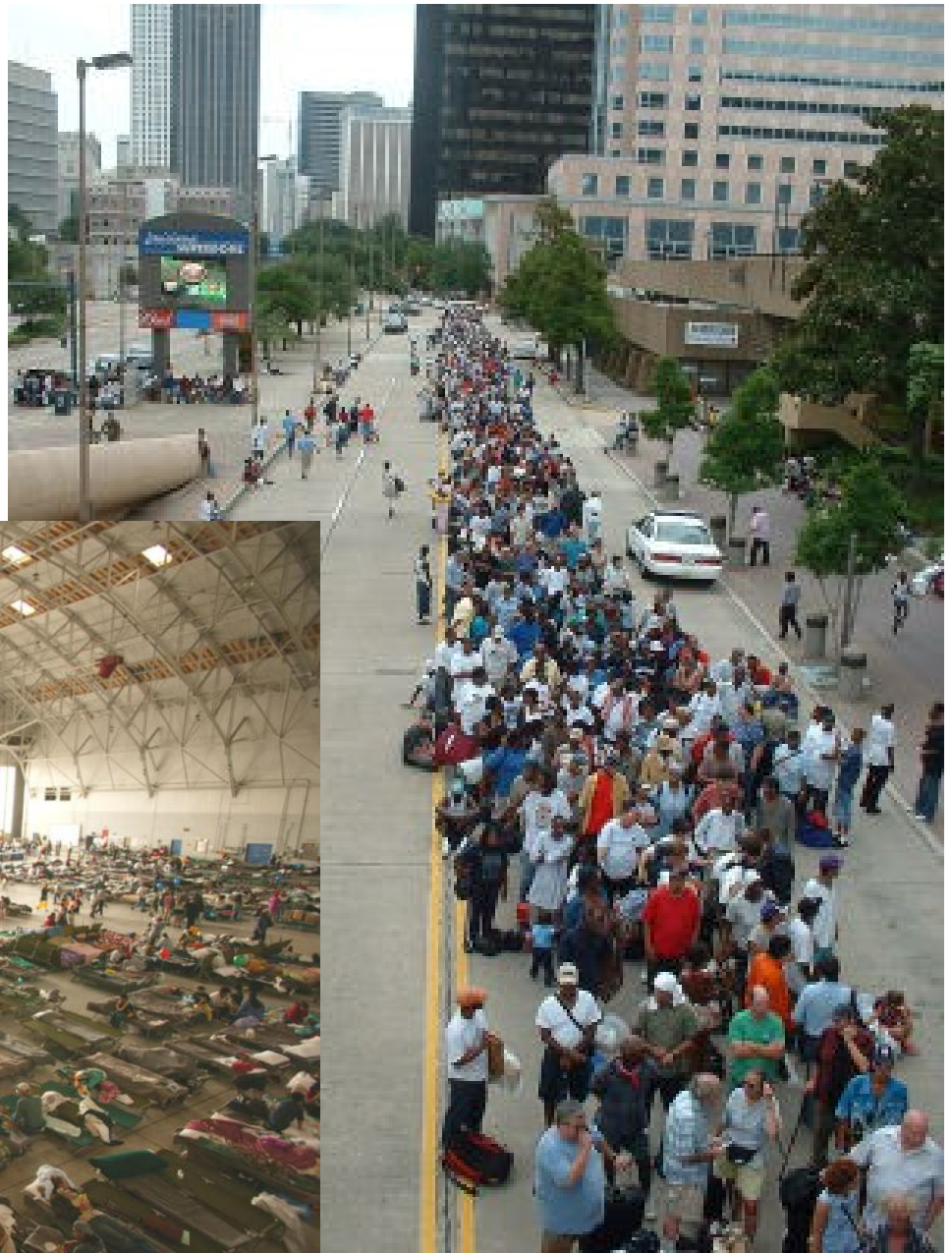


Not your daddy's digital communications

Stolen from

- http://www.arri.org/files/file/On%20the%20Air/Introduction_to_NBEMS%202_1.pdf







Wanna try this on a voice net?

ADVAIR	ADVICOR
ANTACID	ATACAND
AMICAR	OMACAR
ALDARA	ALORA
ARIXTA	ARISTA AH
AZILECT	ARICEPT
ACTOS	ACTONEL
ANACIN	ANACIN-3
AMLODIPINE	AMILORIDE
ADACEL	DAPTACEL
ADDERALL	INDERAL
ADVICOR	ALTOCOR

FLMSG: 1.1.1

FileTemplateConfigHelp

filename: \WR5J-Anti-Psychotic-Request-1

ICS

Radiogram

Generic

Blank

DnD

Title

West Seattle Delridge Shelter Medication Request WSEA-097

To

W7ACS - Seattle EOC/MST

Date

2011-01-12

...

Fm

West Seattle Hub/WR5J for Nurse Rachel/Delridge

Time

1351L

...

Sub.

Anti-Psychotic Meds Needed by Delridge Shelter

Message:

The following request for medications has been received from the Delridge Shelter in West Seattle. The request is immediate and they have declared their situation as an emergency. Please provide the following:

120 capsules -200mg Carbamazepine,

40 capsules -250mg Divalproex Sodium,

80 capsules -25mg Desvenlafaxine,

80 capsules -10mg Tranylcypromine,

40 capsules - 10mg Escitalopram

They believe that request will see them through the next 72 hours. The appreciate that all bridges are down and that West Seattle is

Why Digital EmComm?

- The needs of our Served Agencies have changed.
- They still need voice communications but...
- There's an increasing need for data communications.
- We need to be able to provide more than just voice communications from a ham



NBEMS

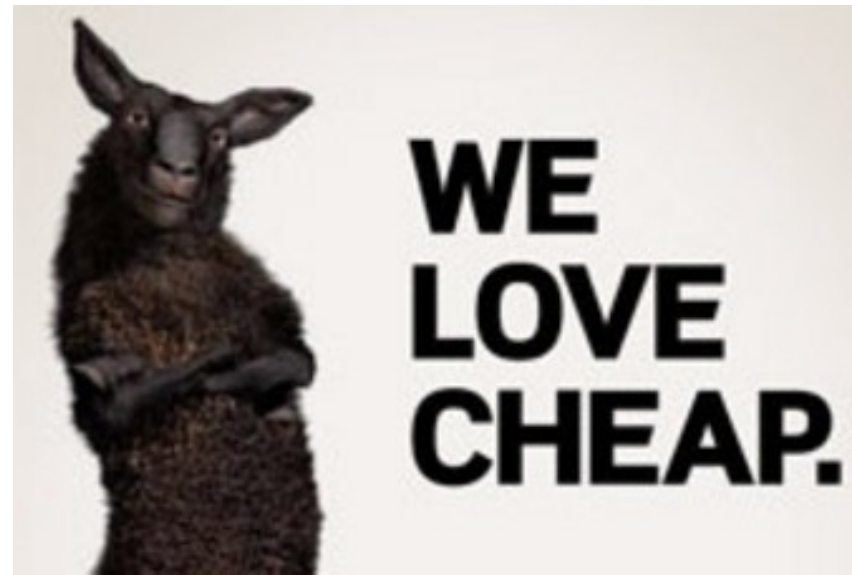
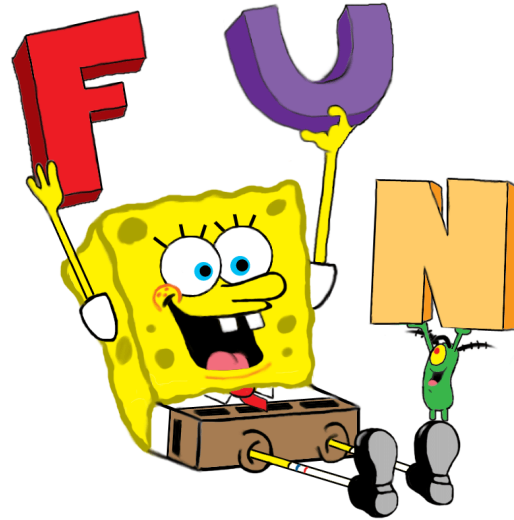
- Narrow Band Emergency Messaging System
- David Freese Jr, W1HKJ (& others)
- 2012 ARRL Special Technical Service Award
- 2014 Hamvention Technical Excellence Award





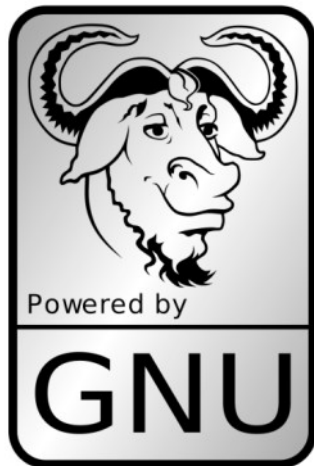
open source
initiative

NBEMS philosoph



NBEMS – a suite of programs

- **FDigi** – **F**ast **L**ight **D**igital modem application
- **FIArq** – **F**ast **L**ight **A**utomatic **R**epeat **R**equest
- **FIWrap** – embed a checksum in a file
- **FIMsg** – ICS forms, Radiogram, text, CSV
- **FIAMP** – **A**mateur **M**ulticast **P**rotocol



download from
<http://www.w1hkj.com/>

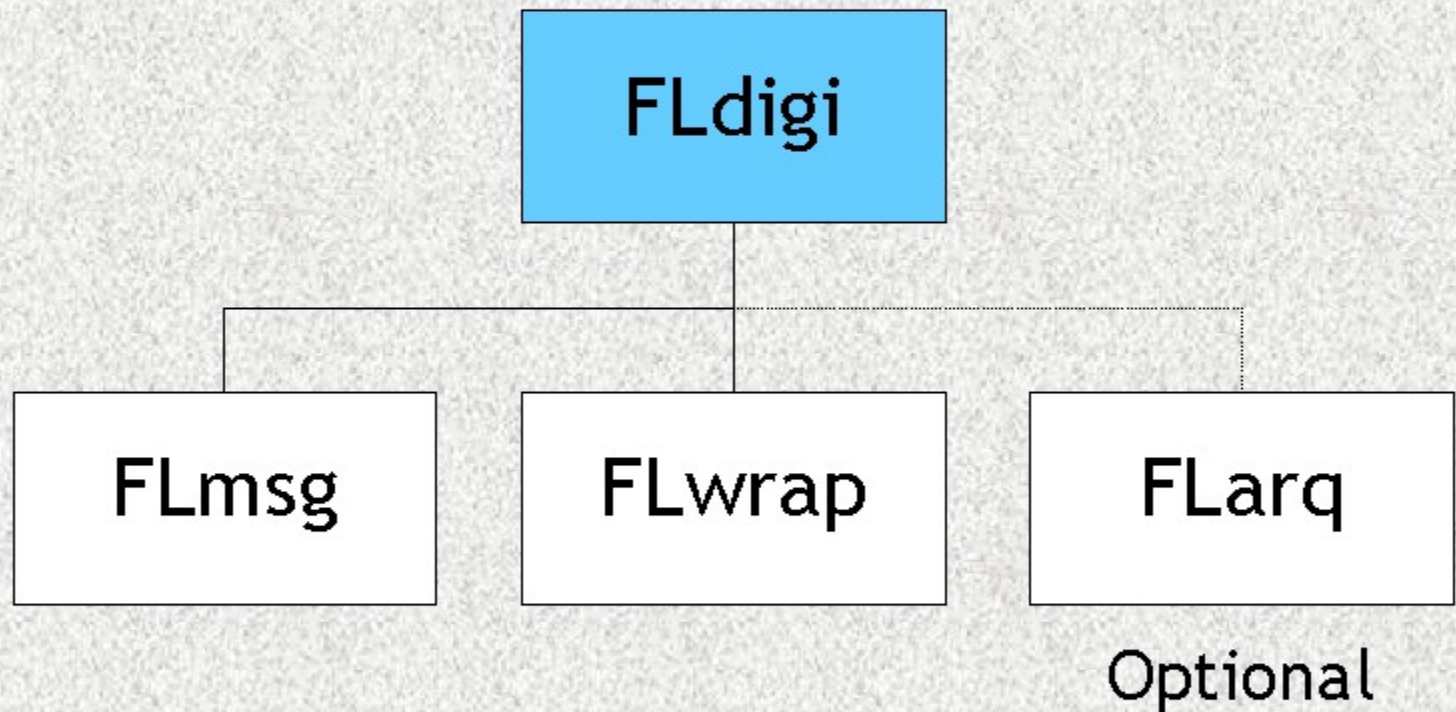
on Windows, Linux, and Mac



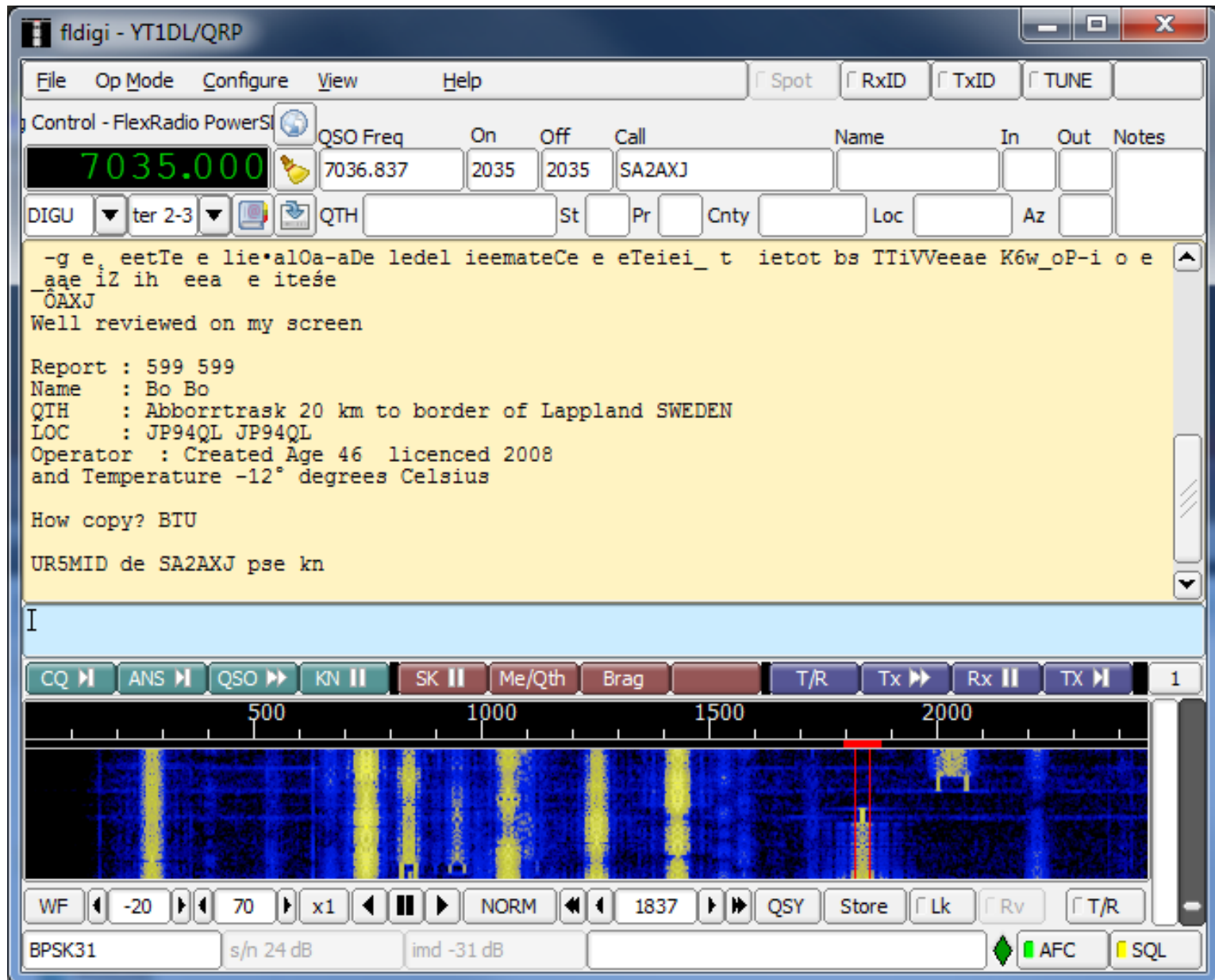
Wait there's more...

- FIWkey – simple interface to Winkeyer Code Generators
- FILog – logging function
- FINet- NCS management tool

Software Interaction



FLDIGI





FLMSG

- PLUS
- .txt
- .CSV
- Transfer (any data file)

Home

Forms

News

Contact Us

ICS forms are available for download here.

[ICS 201](#) Incident Briefing

[ICS 202](#) Incident Objectives

[ICS 203](#) Organization Assignment List ★

[ICS 204](#) Assignment List

[ICS 205](#) Radio Communications Plan ★

[ICS 206](#) Medical Plan ★

[ICS 207](#) Organization Chart

[ICS 208](#) Safety Message/Plan

[ICS 211](#) Check In

[ICS 213](#) General Message ★

[ICS 214](#) Unit Log ★

FLMSG: 1.1.25

File

Form

Template

Config

AutoSend

Help

ICS-213 report

file: new.213

Originator

Responder

To

Pos.

Fm

Pos.

Sub.

Date

12

...

Time

...

Message:

Sig.

Pos.

☐ Comp

base64

▼

MT63-2K

▼

FLMSG: 1.1.1

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RADIOGRAM

VIA AMATEUR RADIO



NUMBER 1	PRECEDENCE 2	HX 3	STATION OF ORIGIN 4	CHECK 5	PLACE OF ORIGIN 6	TIME FILED 7	DATE 8
-------------	-----------------	---------	------------------------	------------	----------------------	-----------------	-----------

TO 9

THIS RADIO MESSAGE WAS RECEIVED AT

AMATEUR STATION _____ PHONE _____

NAME _____

STREET ADDRESS _____

CITY, STATE, ZIP _____

TELEPHONE NUMBER 10

11

12 SIGNATURE

REC'D

FROM

DATE

TIME

SENT TO

File Form Template Config

Help

ARRL radiogram

file: default.m2s

Message

Records

SVC *NR

☐

ROUTINE

▼

HX__

hx

*STN ORIG

CK

ck

PLACE OF ORIG

TIME FILED

*MON DY

*TO

TEL:

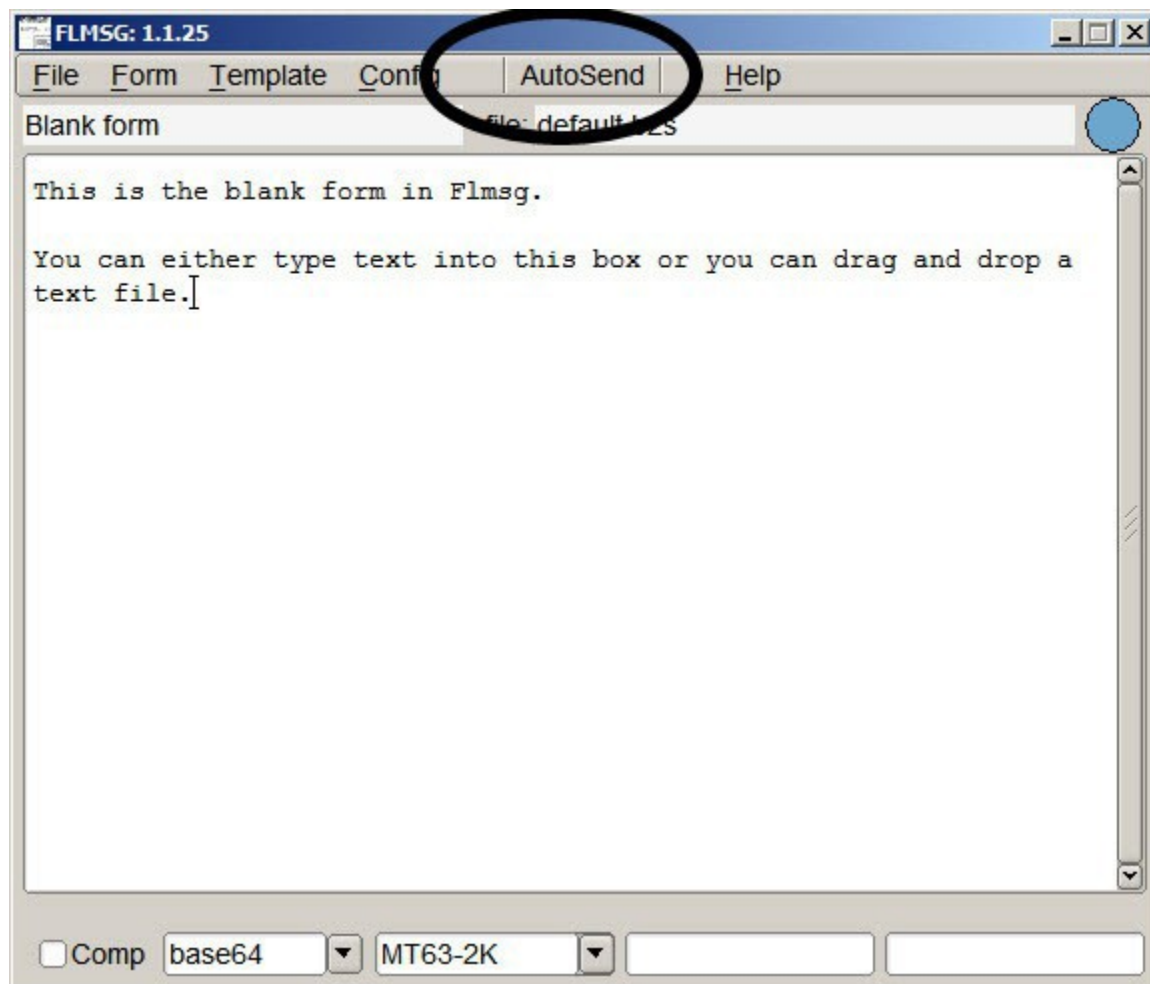
OP NOTE:

ARL MSG

TXT:

SIG:

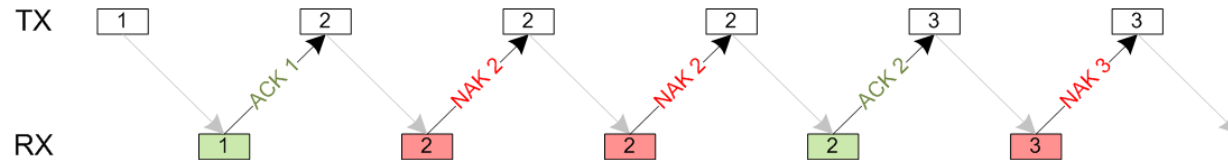
OP NOTE:



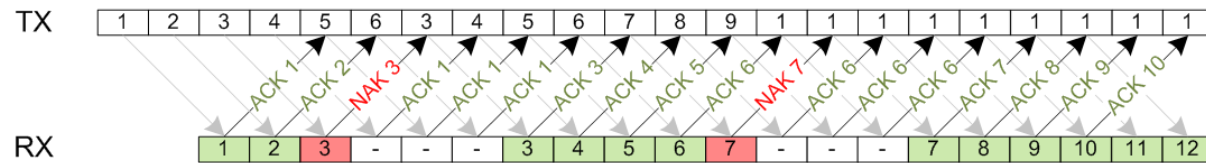
Auto Display of Messages

- Possible to automatically open messages in FLMsg and or default browser
- Simpler workflow in an EOC
- No searching through lists of extract messages
- Walk away and come back to see messages displayed

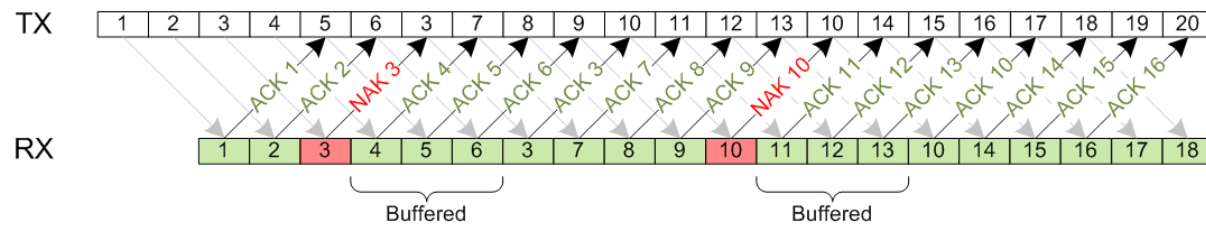
FLARQ- Fast Light Automatic Repeat Request



Stop-And-Wait



Go-Back-N (N = 5)



Selective Repeat

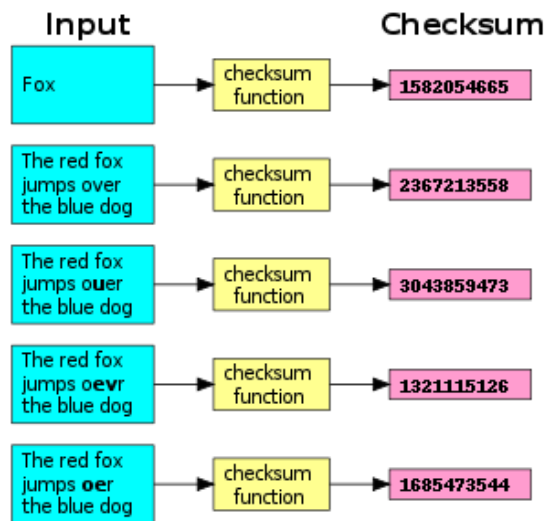
- SSSSSSSSSIIIIIIIIIIIIloooooooooooooooooowwwwwwww...
- One to one only (no Multicasting)
- No acoustic coupling

Acoustic Whaaa....



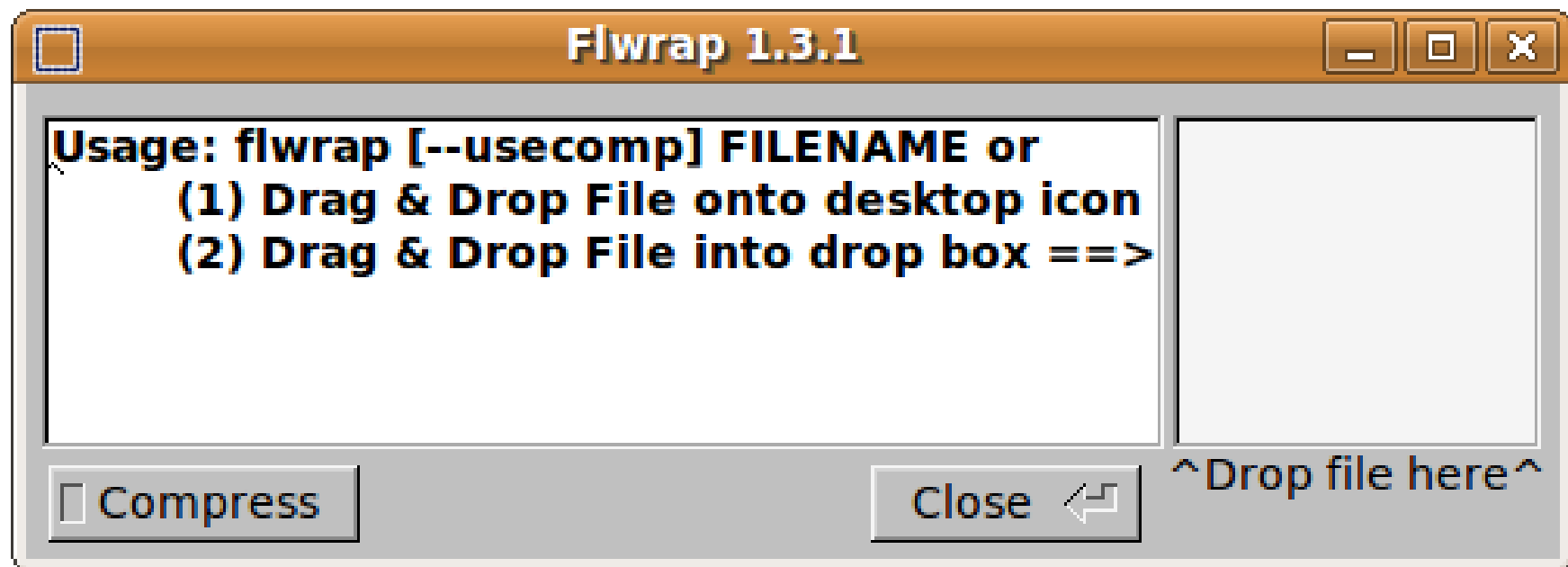


Checksum- inserted by Flwrap



- Allows you to be 100% sure your message was received accurately
- Rxing stn computes the checksum on the incoming file and...
- If the two checksums are identical, the file was rx'd without error
- Allows multiple stations to receive and confirm data 100%
- 10mg vs 19mg

FLWRAP



Example

- [WRAP:beg][WRAP:crLf][WRAP:fn
example.txt]This is an example of a
wrapped file. Here's what happens
when we wrap something.
[WRAP:chksum B71E][WRAP:end]
- WRAP:beg & WRAP:end
- Checksum =B71E

Flarq vs Wrap

- Flarq is used for station to station communication.
- Message delivered is guaranteed correct.
- **This can be slow.**
- Wrap is used for broadcasting a message
- It has a checksum to use in confirming the message received has no errors.



FLAMP: 1.0.01



File Help

Receive

Transmit

Events

Configure

File: MedicationList.csv

Date time: 20120207002850

Save

Description:

Remove

Call/info

bytes 755

Nbr blks 6

Blk size 128

Missing

Report

Blocks

Data

```
type,NDC Product Code,Medication Name,Units  
Required,Location  
1,54092-371,Adderall,10,ER  
2,0024-5401,Ambien,10,ER
```

Receive Queue

```
100 % ARES_test_spreadsheet.csv  
100 % Lawrence_County_SET.214  
100 % MedicationList.csv
```

Logbook Server - logbook.adif

File

Help

File: /home/dave/.fldigi/logs/logbook.adif

On Date

Time

Off Date

Time

Call

Name

20110624

1811

20110624

1815

KD0ECS

Mark

Freq.

Mode

In

Out

Tx Power

QSL-rcvd

QSL-sent

14.071307

PSK31

Qth

St

Pr

Country

Loc

Polk City

IA

United States

EN31ct

County

IOTA

CQZ

ITUZ

CONT

DXCC

Notes

Ser# out

Exchange Out

Ser# in

Exchange In

Call Search

Recs

2515

New


Update

Delete



←

→

Date	Time	Callsign	Name	Frequency	Mode
20110604	0107	AA8VG	Frank	10.140488	PSK31
20110611	1740	NG1S	Ralph	14.071785	PSK31
20110611	2329	OZ1RDP	Dirk	10.141858	PSK31
20110616	1944	K6KAR	Kirk	14.073005	OLIVIA
20110619	1415	VE3FBG	Fred	10.141500	CONTESTI
20110620	1531	K5RKS	Roger	14.071236	PSK31
20110624	1815	KD0ECS	Mark	14.071307	PSK31




flrig FT-950



Files

Config

Memory



Debug

Help

14070.000

7035.000

S3

S6

S9

+20

+40

+60

Po

5

10

15

20

☒ vfoA

☐ vfoB

A<->B

☐ Split

2400

▼

PKT-U

▼

☒ Vol

0



RF

100



☐ NR

1



☐ IFsh

0



☐ Nch

1500



MIC

0



PWR

20





☐ Att

☐ IPO

☐ NB

☐ AN

Tune

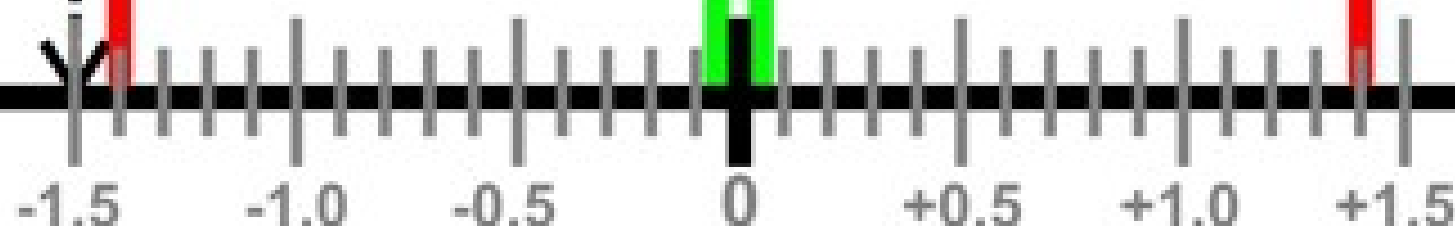
☐ PTT

VFO DIAL
USB
SUPPRESSED
CARRIER

TYPICAL DIGITAL PSK31
OR OTHER KEYBOARDING MODE
MAX SIGNAL BANDWIDTH
60 Hz

2.8kHz VOICE CHANNEL

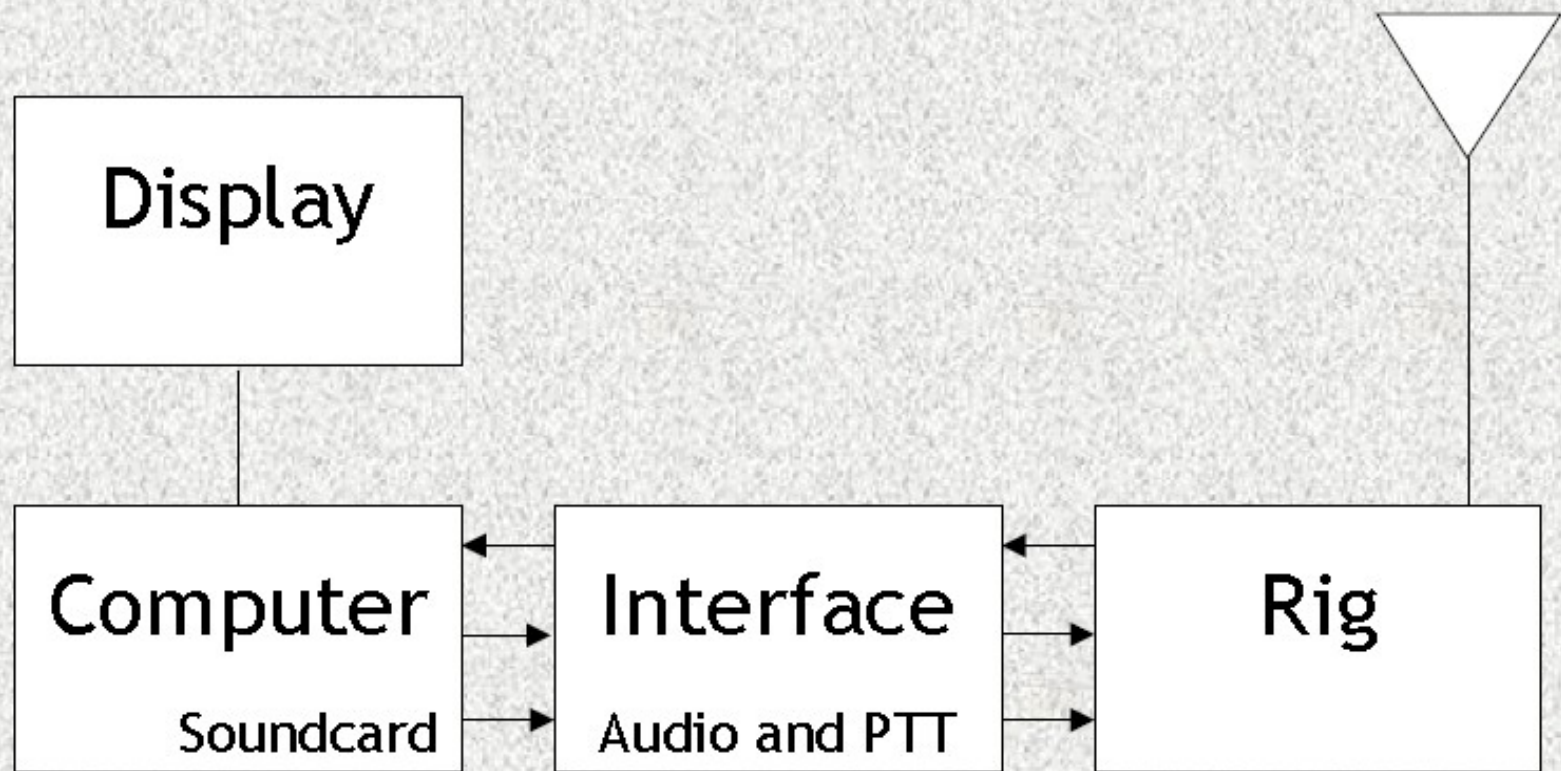
DIGITAL SIGNAL



CENTER OF
CHANNEL

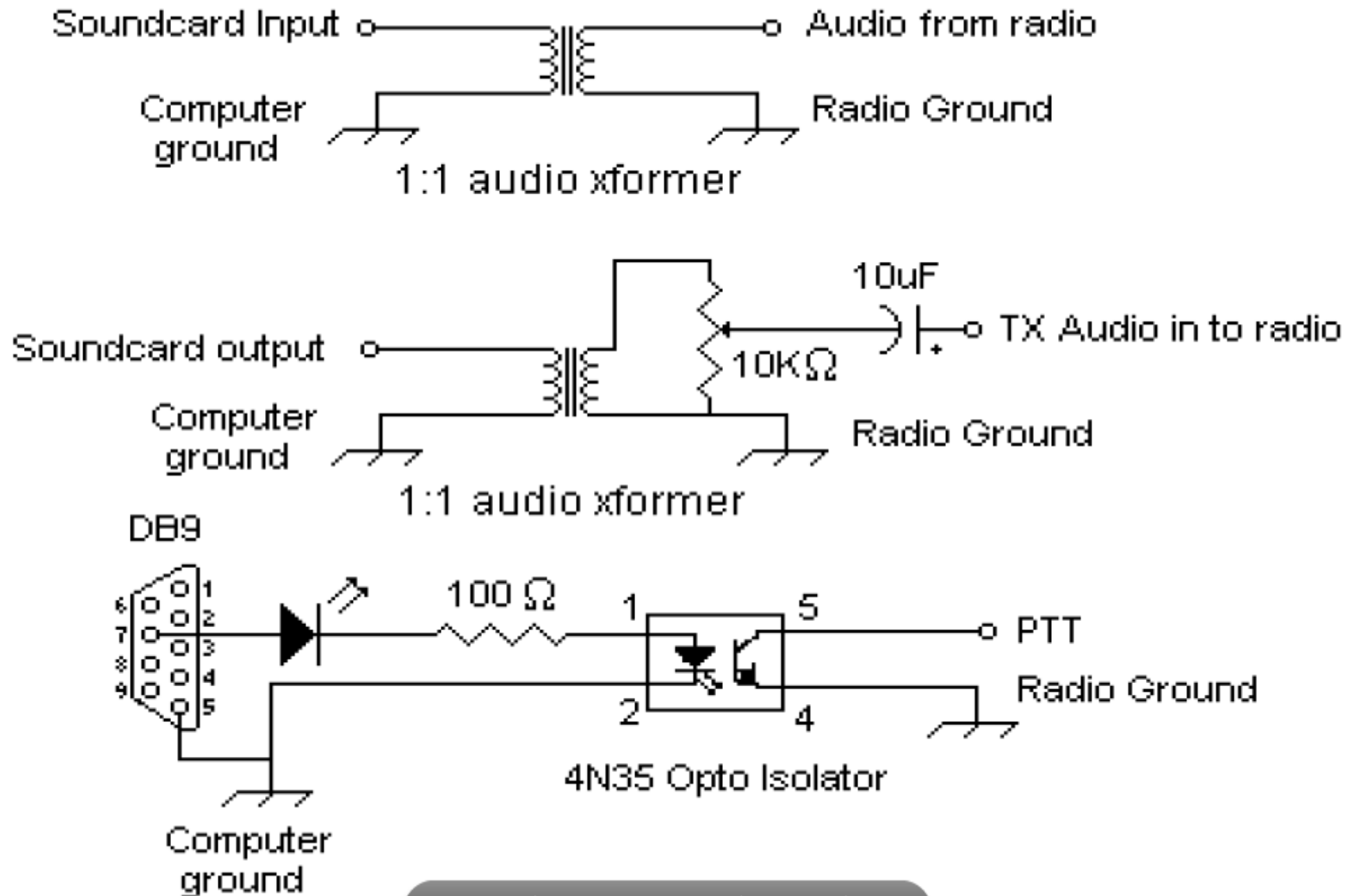
©2011 HFLINK

Basic Set-up

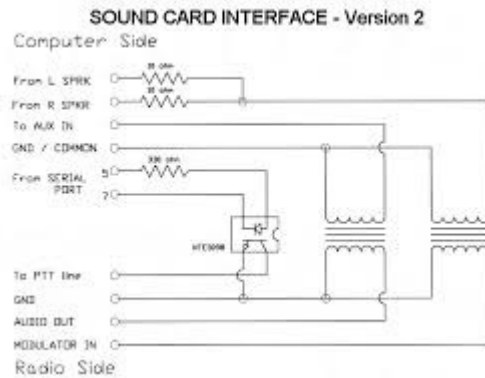
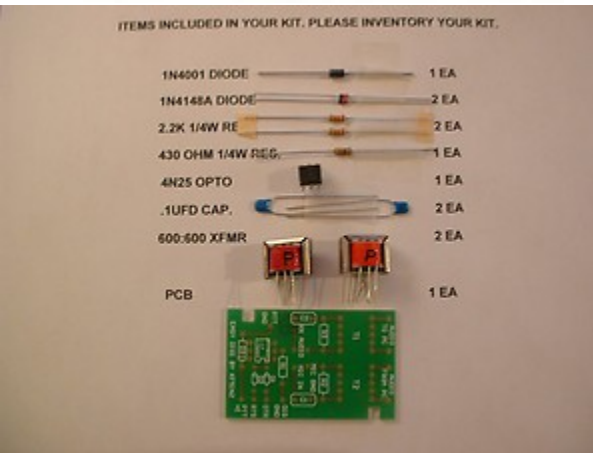
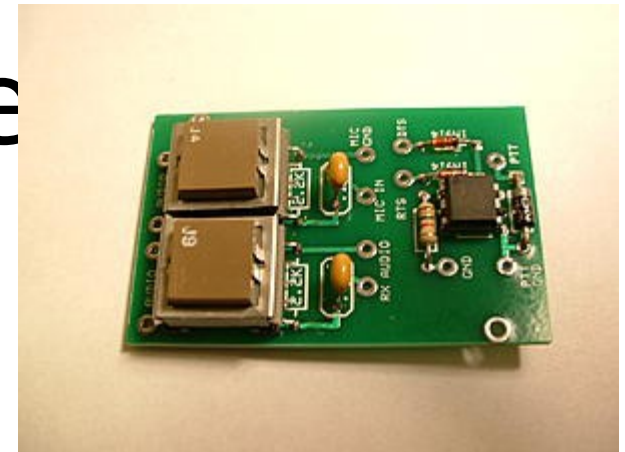


Ground isolation required

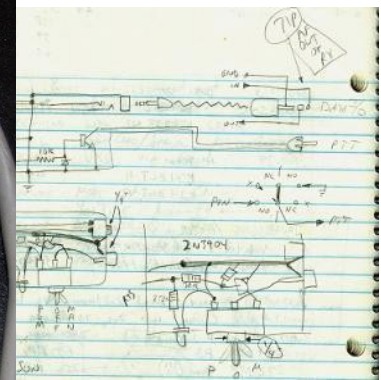
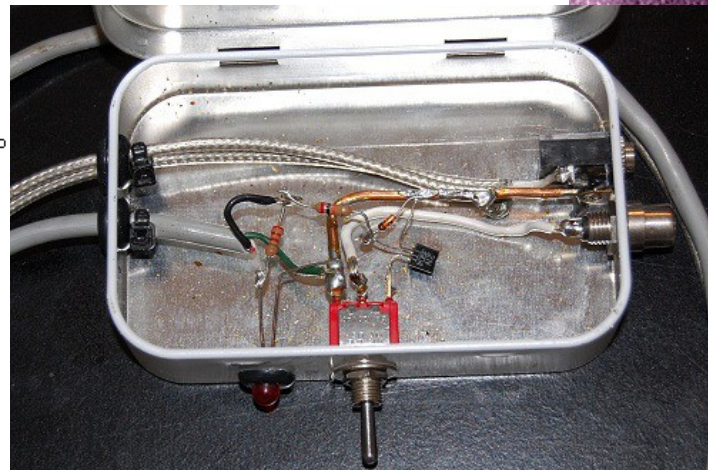
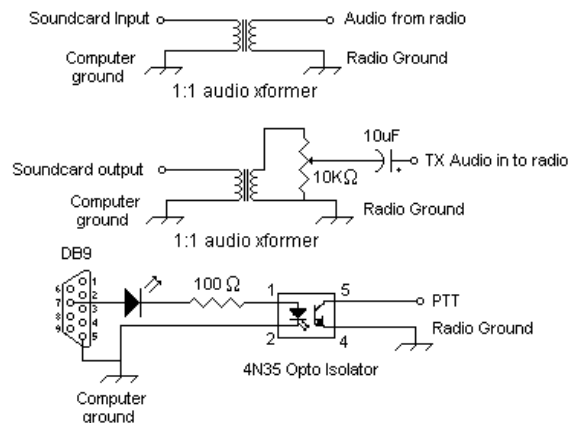
Interface?



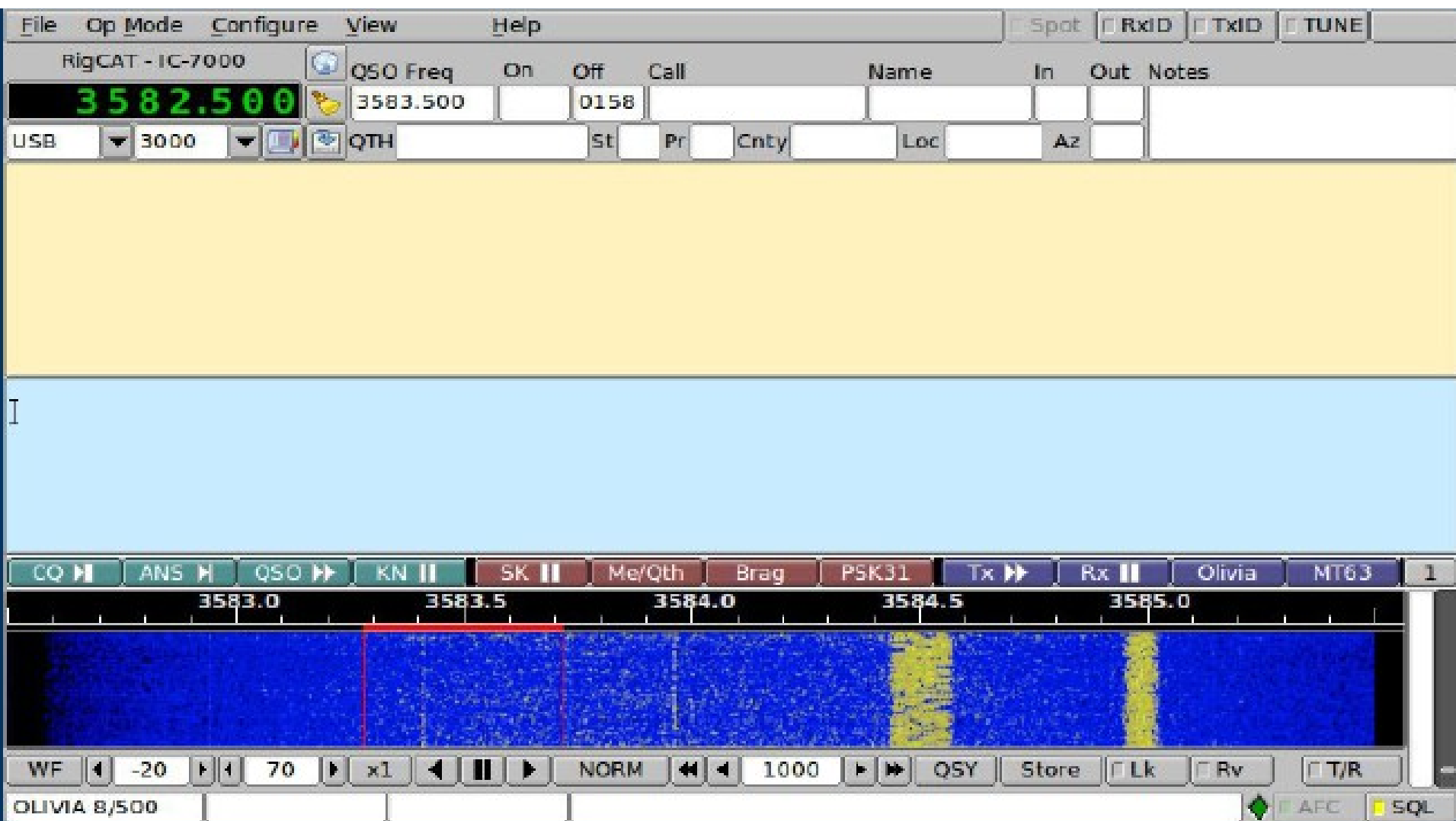
hardware



PSK Interface

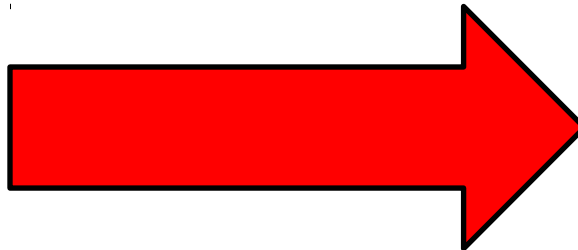


FLDigi -Waterfall





File types

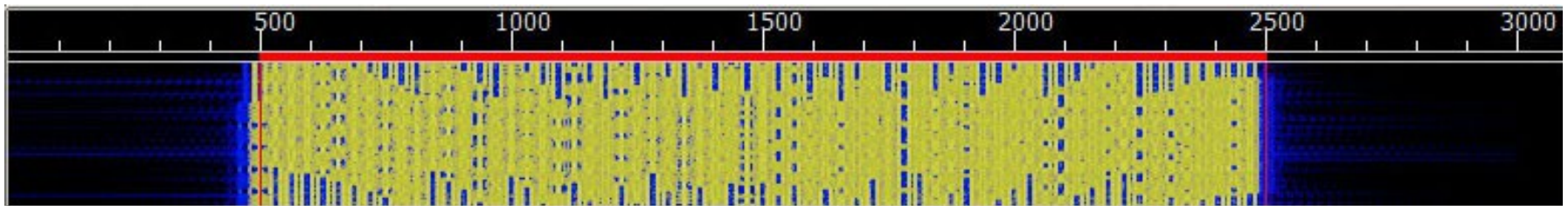


Modes – 120 – which?

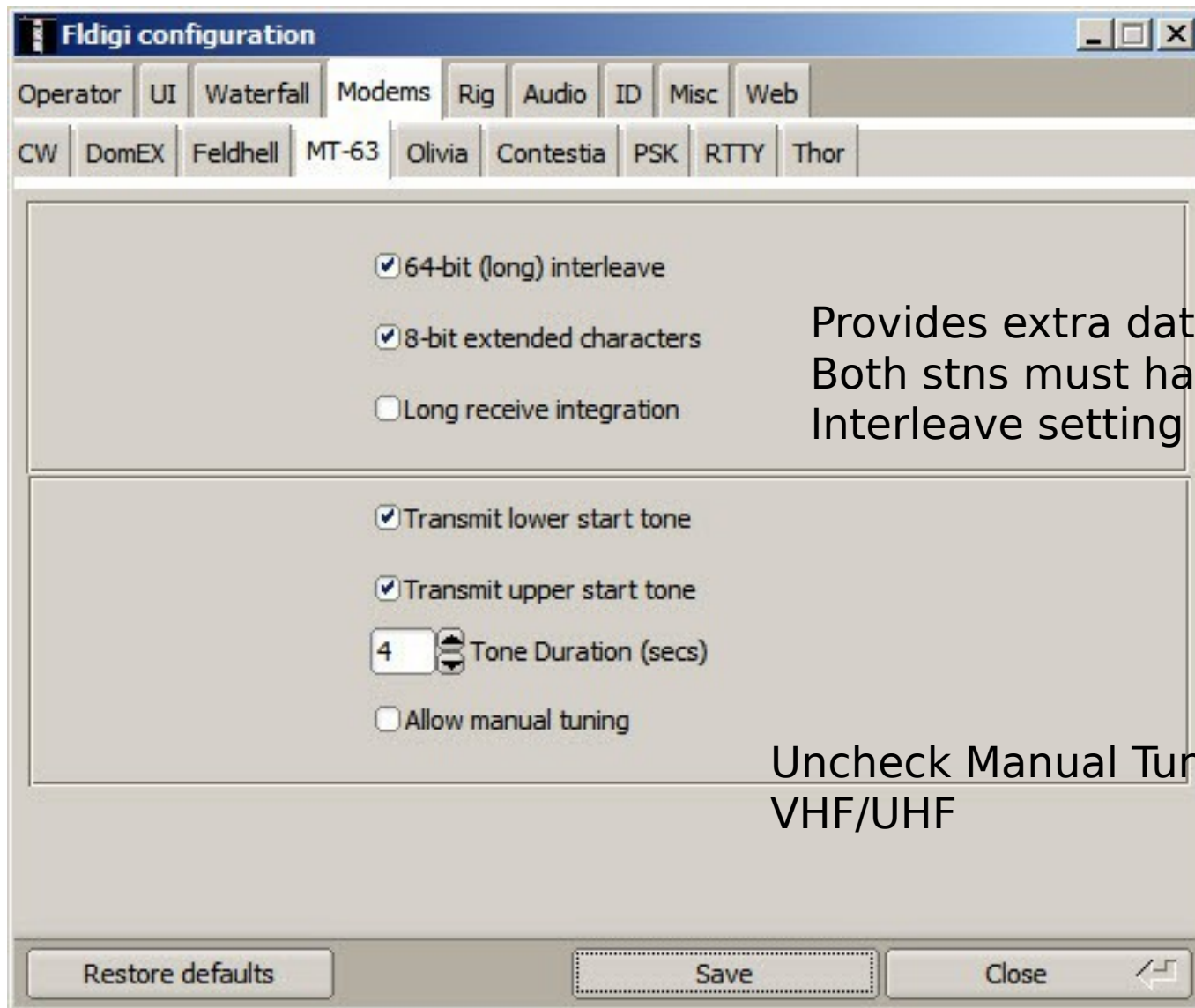
- NOT PSK31?! – no error correction
- **MT63-2000**
- fast <2min for 2Kb file – 100WPM
- QRM resistant – lose up to 25% of signal
- Works with acoustic coupling
- Not usable with Flarq

MT63-2000 waterfall

- 64 tones sent simultaneously
- 2000hz wide
- Offset freq always fixed at 1500Hz
- Fixed low freq eliminates tuning errors
- Sounds like a giant buzzsaw



Important MT63 Configuration



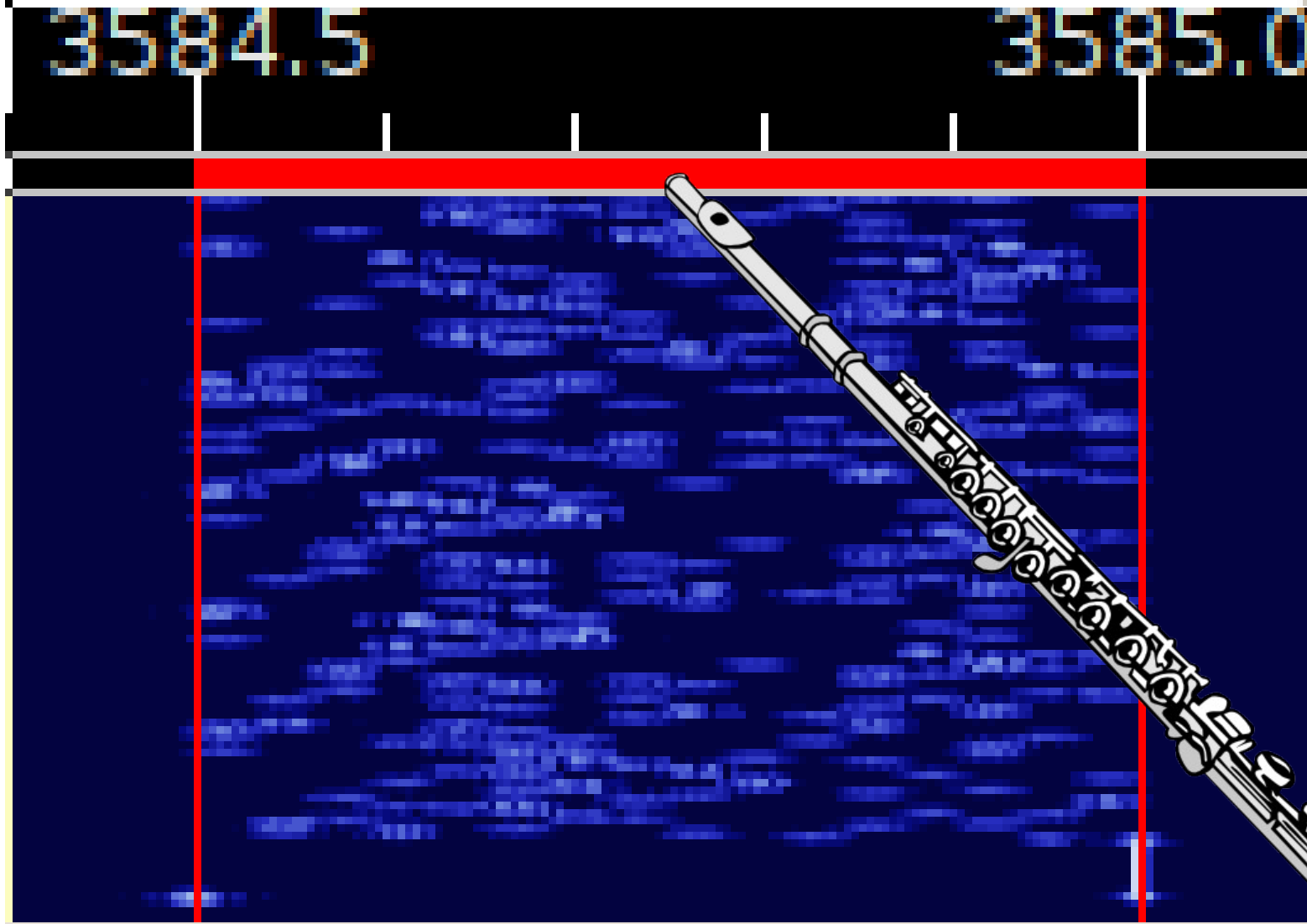
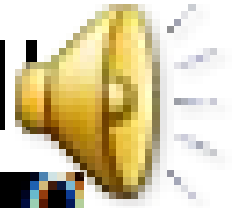
Provides extra data redundancy
Both stns must have same
Interleave setting

Uncheck Manual Tuning for
VHF/UHF

HF? Olivia!

- Will get through when no other mode will
- Can make contacts below the Noise Floor!
- Does not require precise tuning
- 8/500 typically (8 tones in 500hz BW)
- Poor Conditions - 16/500 (slower but more robust)
- SLOWer... 50%

Olivia 16/500 Waterfall



HF Tips

Band	Day	Night
80m - 40m	Fair	Good
30m - 20m	Fair	Fair
17m - 15m	Poor	Poor
12m - 10m	Poor	Poor
Geomag	Very Quiet	
Noise Level	S0-S1	

- Always USB – regardless of ba
- Don't overdrive the audio
- Disable all audio processing (noise blanker, speech compression etc)
- Adjust mike gain so that ALC moves just a **little**
- Digital modes are 100% duty cycle; so
- 50 watts is plenty (try 5 watts)
- External mouse – Touchpads don't like RF



Other thoughts

- Unattended message capture (with date & time stamp)
- Images (not as good as SSTV though)
- Printable forms in standard formats
- Packable on a Thumb Drive

Takeaways

- Digital EmComm
- FREE
- Use existing radios and repeaters
 - Unlike DSTAR, Winlink, APRS
- Can use it outside your ARES life
- Runs on any machine Win/Mac/Linux

Resources

- <http://www.pa-sitrep.com/NBEMS/>
- <http://www.arrl.org/nbems>
- <http://k2jji.org/files/NBEMS.pdf>
- <http://berkscountynbems.homestead.com/>
- <http://hlarc.org/emcomm/hlares/ares-operations/nbems-software/nbems-resources/>
- Sound Card Calibration –CheckSR
- <http://www.pa-sitrep.com/checksr/Ch>

- <https://emcommeast2011.s3.amazonaws.com/Fldigi%20Workshop%20for%20EmComm%20East%202011.pdf>
- <http://wpaares.org/html/nbems.html>
- http://www.scares.arrl-nh.org/pdf_files/fldigi%20basics.pdf

WHERE TO FROM HERE?

- everybody download Fldigi and play with it
- Fldigi Workshop one Saturday?
- Manitoba PSK net? – HF or VHF
- Use on Field Day ? Not networkable
- 4 Toughbooks – WARC
- Digital EC

