

# Amateur Radio with Linux: Opening Doors without Windows

David Ranch  
Pacificon 2013  
Salon D @ 10:45am



# What is this talk about?

- This talk is meant to interest both the Linux novice as well as the Linux expert
- We cover what's available for Amateur Radio run on Linux covering a broad array of interests
- Homework: How you can try Linux on your own computer without touching your hard drive!

# So who is the presenter anyway?

- Been running Linux since 1991 installed from floppies
- Author of the Linux documentation sets:  
IP Masquerade (NAT), TrinityOS (entire system administration), Linux Security - Step by Step\* and now the Centos HamPacket set
- First licensed 2009 and quickly moved up to Extra
- My bent on Ham Radio? Digital HF modes, SDR, Packet Radio

# A Poll: Who is the Audience?

- What OS is running on your primary amateur radio computer?
  - XP, 7, 8, OSX, Linux, other
- What is your primary digital modes program?
  - HRD+DM780, Fldigi, cocoaModem, etc
- What is your primary logging program?
  - HRD, Fldigi, N1MM, WriteLog, other?

# I've heard of Linux but why this talk..

## Why now?

- Most HAMs like to build, create, and learn and there is no better environment for this than Linux for *many reasons*
- Windows XP is about to go EOL (End of Life) and must be replaced to keep computers secure
- Many (many!) people don't like the prospect of Windows 8

# Other Reasons to Consider Linux..

- People are interested in learning something new: Linux presents GUIs in very intuitive ways, many people are very productive in a short time
- Huge wealth of other applications like OpenOffice (office suite), Gimp (photo editor), Web browsers (Firefox, Chrome).. all free!
- Learn a programming language: Python, Scratch, Ruby, Java, Perl, Scala, shell scripting, C, C++, Fortran, Cobal, Assembly.. they are ALL here.. all free!

# Ok, I'm listening.. What can Linux do for Amateur Radio?

There are so many uses with a computer but here is what I'm going to talk about..

- Digital modes (PSK31, JT65, RTTY, SSTV, ...)
- SDR, Echolink / IRLP server & client, D\*star
- Propagation Simulation, Logging & Rig Control
- APRS client/server, soft TNCs, Packet
- Satellite tracking, CW trainers
- Antenna modeling, PCB layout, etc.

# So I thought Linux was for servers

- Sure, it's well suited for dedicated servers..

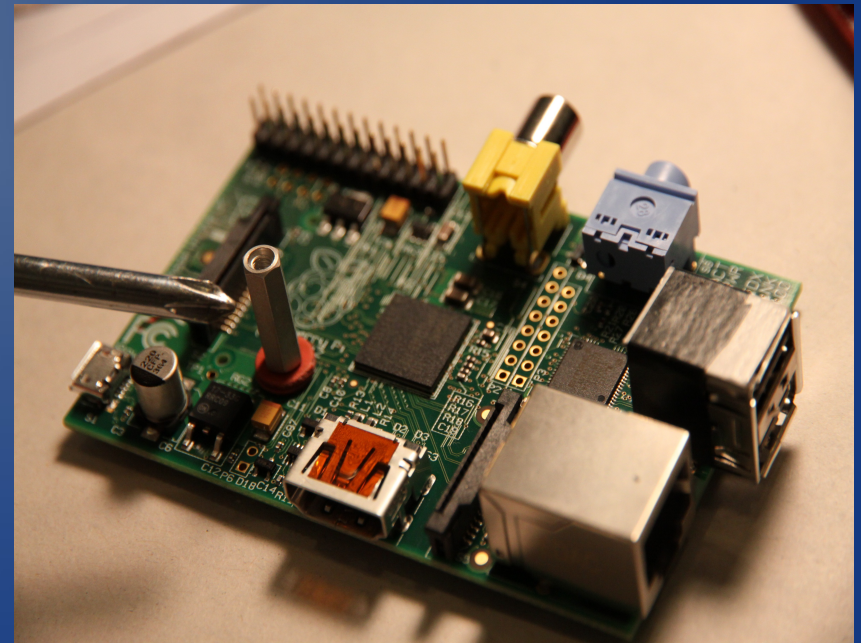




But it's also well suited for desktops,  
laptops and recently.. small Arm  
computers!



A Raspberry Pi



# Ok, so Linux is adaptable..

- What can it do for Amateur Radio operators?
  - It runs your needed applications
  - It supports very powerful automation
  - Easily supports adaption to the external world for experimentation and other purposes...
- So let's talk software for a bit...

# Digital Modes

# Digital modes with Fldigi

The screenshot displays the Fldigi software interface for station KI6ZHD. The main window shows a digital mode transmission in progress. The frequency is set to 14070.746 MHz, and the mode is USB with a 3000 Hz bandwidth. The transmission text is displayed in a yellow background:

```
ete  
NK71 ~ XE1/AA0AA  
thanks for coming back  
  
My info:  
my name ... Scott Scott  
my QTH .... Dache r - H 2algo, Mexico Pachuca, Hidalgo,  
Mexico  
my LOC .... EL00pc EL0c  
Report .... 599 59  
PODXS i0 Club: 1550  
  
QSL by
```

The interface also shows a list of other digital modes on the left, including 14071.82, 14071.64 # USA 247e k nac, 14071.50 T2TE p, 14071.37 eel]Tel ttie TtCt, and 14071.06 it, Dah Dit Dah >>. The bottom of the window features a waterfall display showing the frequency spectrum from 14070.5 to 14073.0 MHz, with a red vertical line indicating the current frequency. The interface includes various controls for frequency, mode, and bandwidth, as well as a menu bar with options like File, Op Mode, Configure, View, Logbook, and Help.



# Fldigi supports many many modes..

- CW
- Contestia (10 variants)
- DominoEX (8 variants)
- Hell (8 variants)
- MFSK (9 variants)
- MT63 (6 variants)
- Olivia (9 variants)
- PSK (13 variants)
- QPSK (5 variants)
- PSKR (24 variants)
- AFSK RTTY (4 variants)
- FSK RTTY
- THOR (10 variants)
- THROB (6 variants)
- WEFAX (2 variants)
- Navtex / SITOR-B

# WSJT

- Weak Signal (terrestrial, m.scatter, moon bounce) for HF / VHF with SDR support and more

WSJT 9.2 by K1JT

File Setup View Mode Decode Save Band Help

Moon  
Az: 289.06  
El: -14.75  
Dop: -27  
Dgrd: 29.1

44.4 Time (s) Mon 120818 035800

FileID	Sync	dB	DT	DF	W				
035300	9	-8	-0.3	207	4	*	KF5REP NR50 -17	1	0
035400	5	-12	-0.1	323	4	*	K5WHR KD0MTA RRR	1	0
035500	3	-13	0.3	328	2	*	KD0MTA K5WHR 73	1	0
035600	2	-12	-0.2	320	4	*	K5WHR KD0MTA 73	1	0
035700	0	-21	3.1	191	4				
035800	5	-10	-0.0	320	2	*	CQ KD0MTA EM18	1	0
035800	1	5/5					K5WHR KD0MTA -07	1	0
035800	2	5/6					KF5REP NR50 -17	1	0

Log QSO Stop Monitor Decode Erase Clear Avg Include Exclude TxStop

To radio:  Lookup  
Grid:  Add

Sync 1  Zap  
Tol 400  AFC  
 Freeze  
 Tx First TxDF = 0  
Gen Msgs Auto is Off

2012 Aug 18  
03:58:58  
Dsec 0.0

1.0005 1.0005 JT65A Freeze DF: 0 Rx noise: -3 dB T/R Period: 60 s Receiving

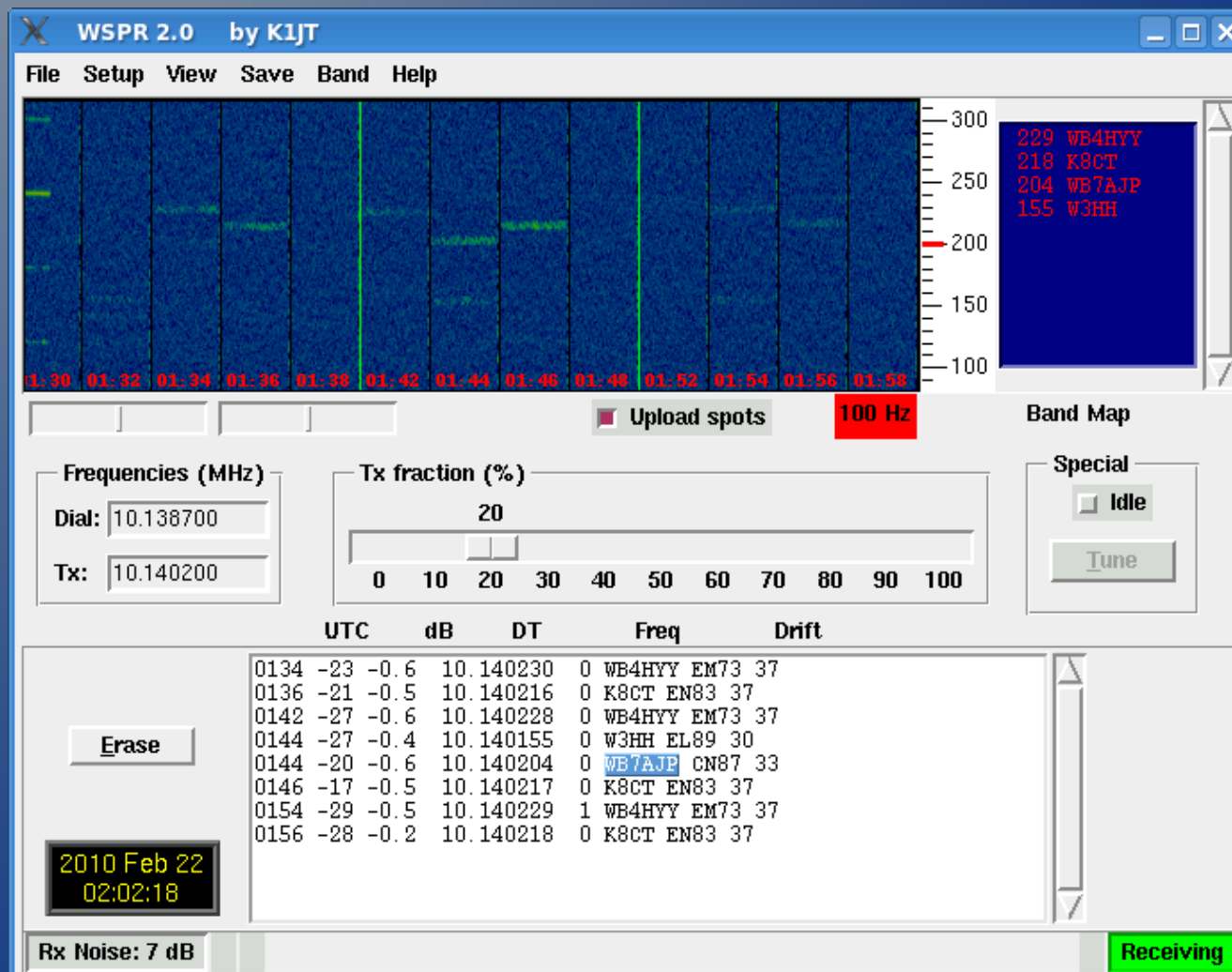
# WSJT-X

- New generation application with new JT9 mode and support for JT65.. no other modes supported yet
- Does not have IQ interface support for SDRs yet
- Now natively supports 44khz sampling for soundcards
- Re-written in Qt (KDE) for improved UI, speed, and sound support



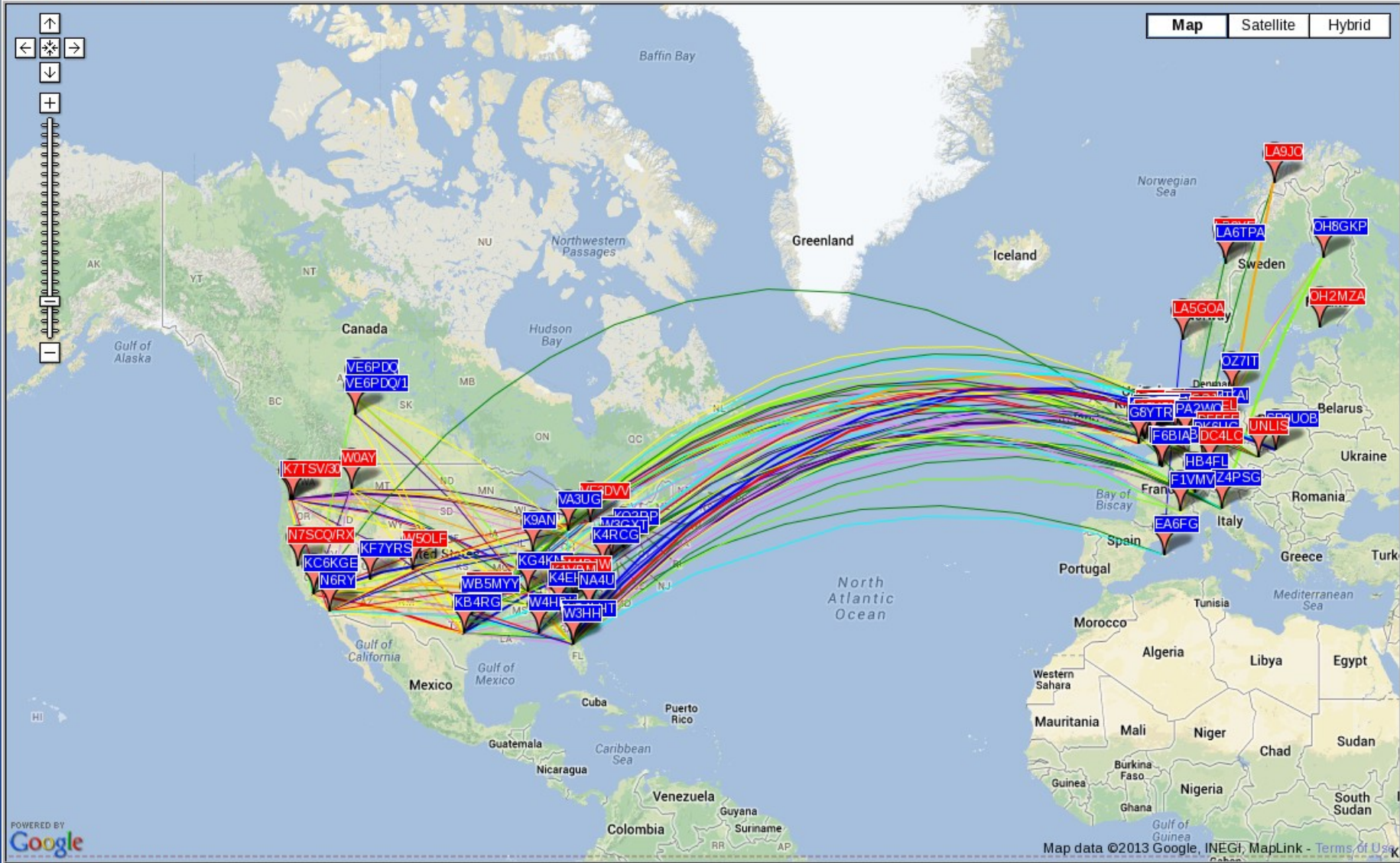
# WSPR – most stations run <5w!

- Weak signal / Internet enabled Beacon network



# PropNet

## Propagation Map



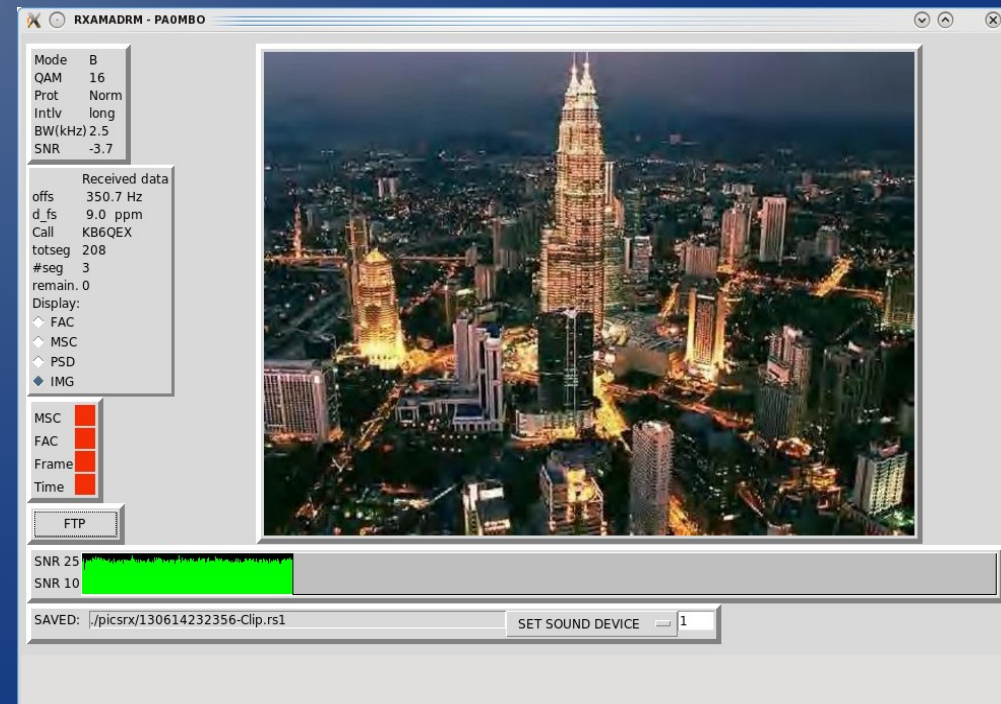
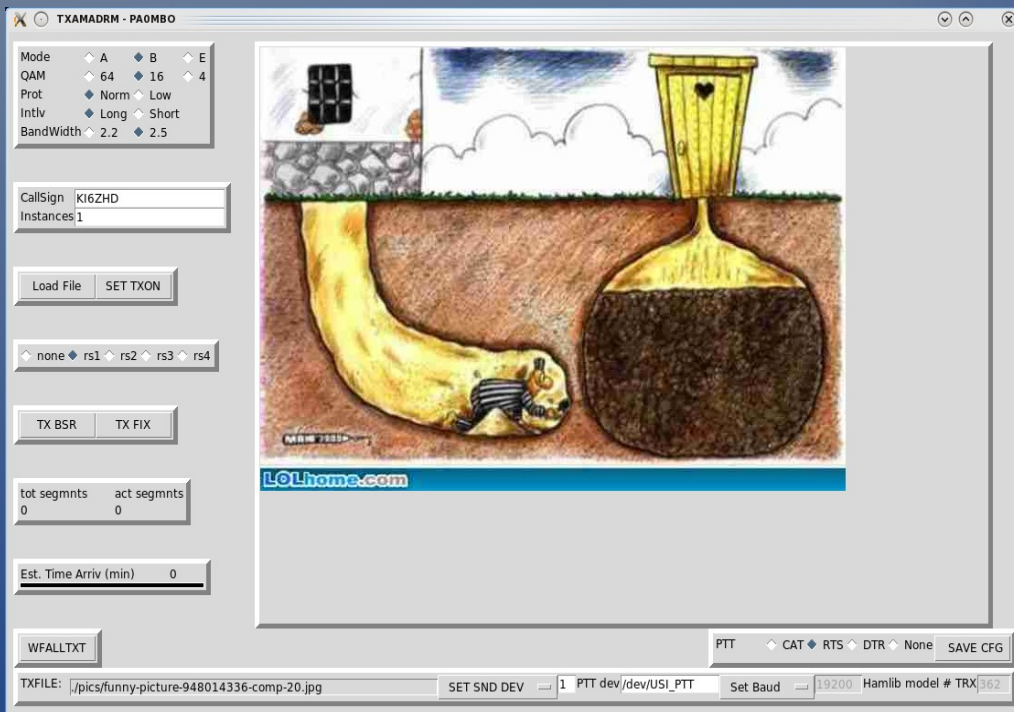
# SSTV: Analog modes



- Full QSO editor with templates and macros
- Supported modes
  - Martin
  - Scottie
  - Robot
  - PD
  - MP & more

# SSTV: Digital modes

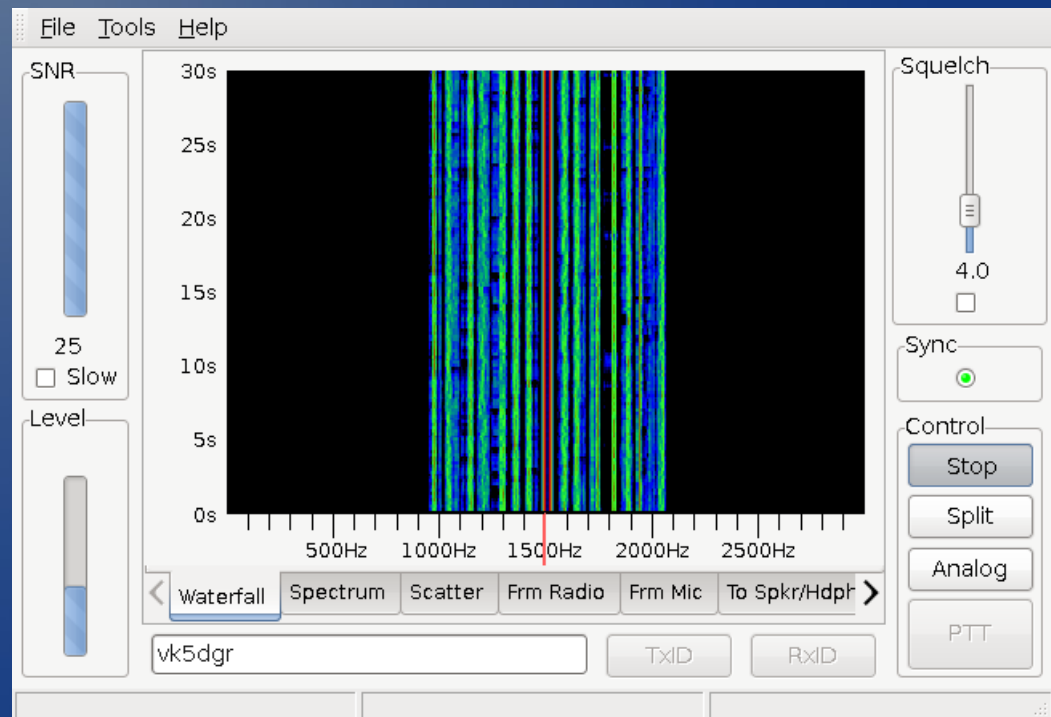
- Supports HAM-DRM QAM modes
- Interoperates with EasyPal and the new Hybrid mode





# Digital Voice with OpenDV and CODEC2

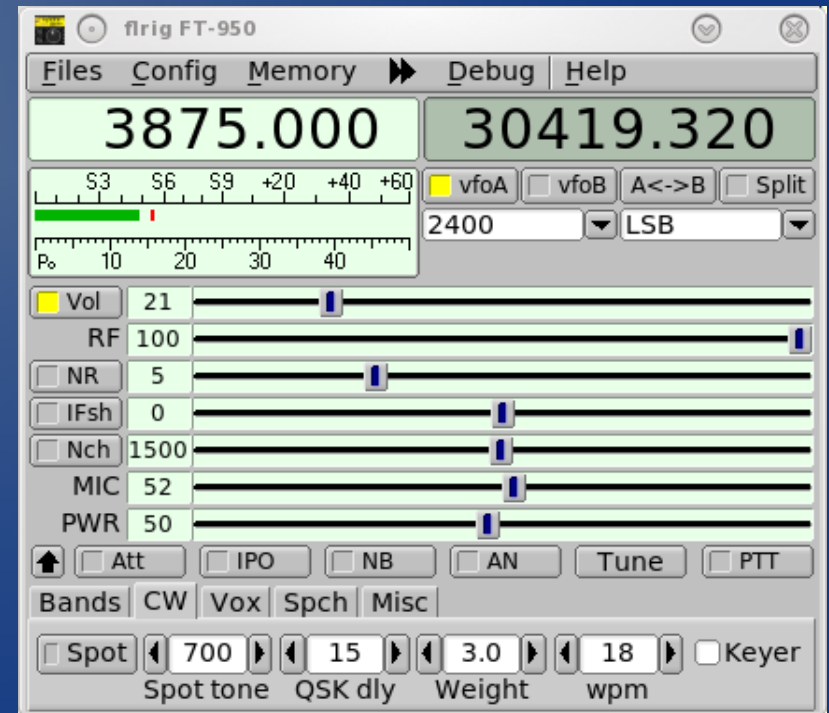
- A new, open digital mode is here for HF + VHF
- CODEC2 is the open source codec
- FreeDV is the HF modem and there are GMSK modems for VHF



# Rig Control and Radio Programming

# Rig Control

- Hamlib for the backend
- Or Flrig for the frontend
  - 46 rigs and counting
- Over 200 radios, SDRs, rotators, etc. Supported
- Run from the command line or Grig



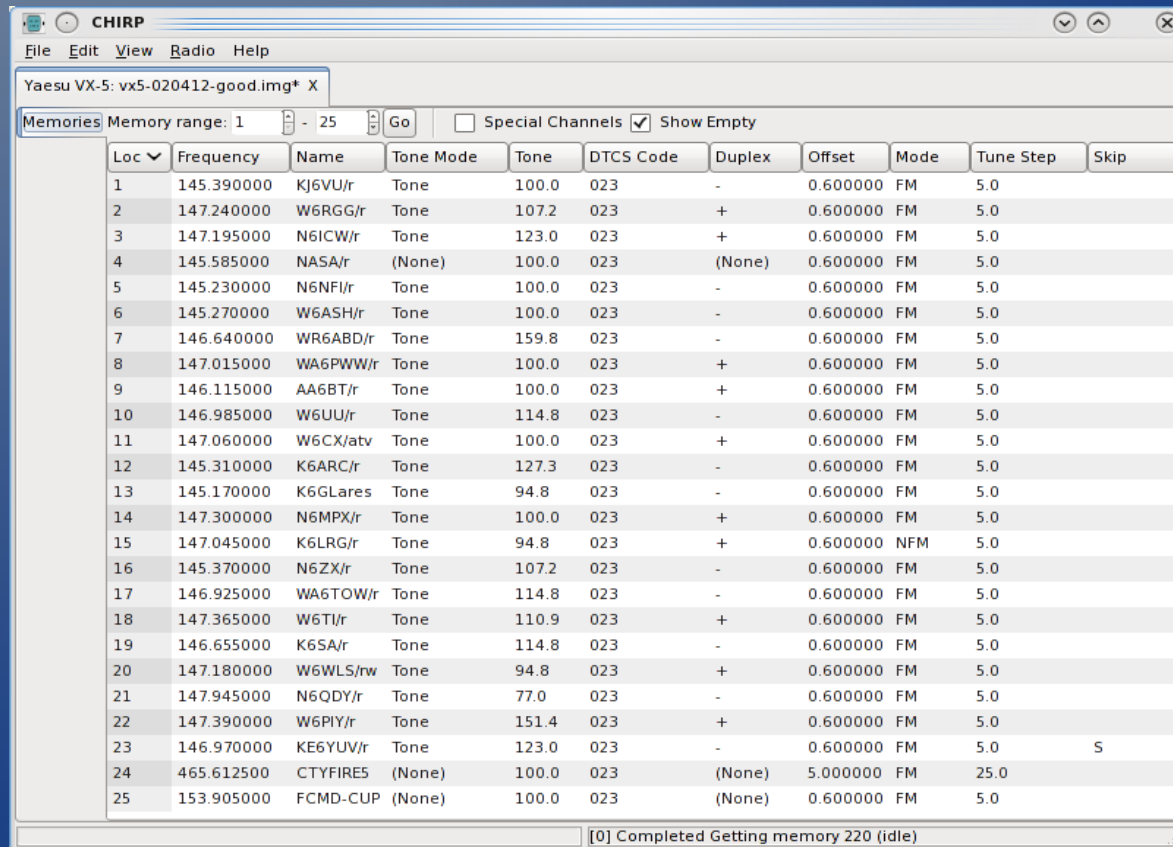


# Supported Rigs today..

<b>Elecraft</b>	<b>Icom</b>	<b>Kenwood</b>	<b>Ten-Tec</b>	<b>Yaesu</b>	<b>Other</b>
<a href="#">K2</a>	<a href="#">IC-703</a>	<a href="#">TS 140</a>	<a href="#">TT 516</a>	<a href="#">FT 100D</a>	<a href="#">RAY152</a>
<a href="#">K3</a>	<a href="#">IC 706 MK IIG</a>	<a href="#">TS 450S</a>	<a href="#">TT-535</a>	<a href="#">FT 450</a>	<a href="#">PCR1000</a>
	<a href="#">IC-718</a>	<a href="#">TS 480HX</a>	<a href="#">TT 538</a>	<a href="#">FT747GX</a>	
	<a href="#">IC 728</a>	<a href="#">TS 570</a>	<a href="#">TT 550</a>	<a href="#">FT 767</a>	
	<a href="#">IC 735</a>	<a href="#">TS590S</a>	<a href="#">TT-563</a>	<a href="#">FT 817</a>	
	<a href="#">IC 746</a>	<a href="#">TS 2000</a>	<a href="#">TT-566</a>	<a href="#">FT 847</a>	
	<a href="#">IC 746 Pro</a>		<a href="#">TT-588</a>	<a href="#">FT 857D</a>	
	<a href="#">IC 756 Pro II</a>		<a href="#">TT-599</a>	<a href="#">FT 897D</a>	
	<a href="#">IC 756 Pro III</a>			<a href="#">FT 950</a>	
	<a href="#">IC 910H</a>			<a href="#">FT-1000MP</a>	
	<a href="#">IC 7000</a>			<a href="#">FT 2000</a>	
	<a href="#">IC 7100</a>			<a href="#">FTdx3000</a>	
	<a href="#">IC 7200</a>			<a href="#">FTdx5000</a>	
	<a href="#">IC 7600</a>				
	<a href="#">C 7700</a>				

# Programming Radios: Chirp

- Supports 79+ radios
- Import / export via CSV files
- Flexibility allows to synchronize all your HT, Mobile, etc. Memories!



The screenshot shows the CHIRP software interface for a Yaesu VX-5 radio. The window title is "CHIRP" and the menu bar includes "File", "Edit", "View", "Radio", and "Help". The main window displays a list of 25 radio memories. The table below is a representation of the data shown in the screenshot.

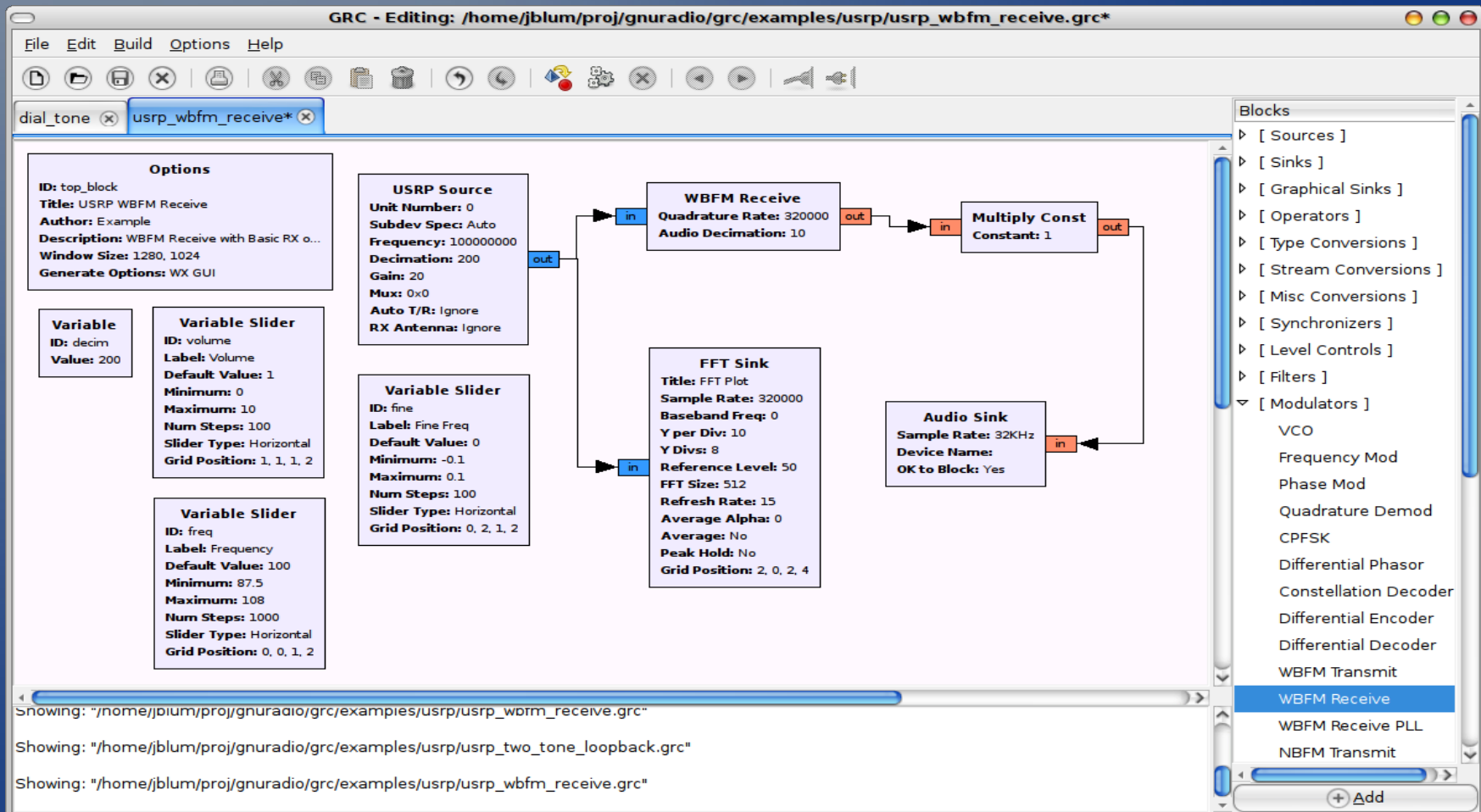
Loc	Frequency	Name	Tone Mode	Tone	DTCS Code	Duplex	Offset	Mode	Tune Step	Skip
1	145.390000	KJ6VU/r	Tone	100.0	023	-	0.600000	FM	5.0	
2	147.240000	W6RGG/r	Tone	107.2	023	+	0.600000	FM	5.0	
3	147.195000	N6ICW/r	Tone	123.0	023	+	0.600000	FM	5.0	
4	145.585000	NASA/r	(None)	100.0	023	(None)	0.600000	FM	5.0	
5	145.230000	N6NFI/r	Tone	100.0	023	-	0.600000	FM	5.0	
6	145.270000	W6ASH/r	Tone	100.0	023	-	0.600000	FM	5.0	
7	146.640000	WR6ABD/r	Tone	159.8	023	-	0.600000	FM	5.0	
8	147.015000	WA6PWW/r	Tone	100.0	023	+	0.600000	FM	5.0	
9	146.115000	AA6BT/r	Tone	100.0	023	+	0.600000	FM	5.0	
10	146.985000	W6UU/r	Tone	114.8	023	-	0.600000	FM	5.0	
11	147.060000	W6CX/atv	Tone	100.0	023	+	0.600000	FM	5.0	
12	145.310000	K6ARC/r	Tone	127.3	023	-	0.600000	FM	5.0	
13	145.170000	K6GLares	Tone	94.8	023	-	0.600000	FM	5.0	
14	147.300000	N6MPX/r	Tone	100.0	023	+	0.600000	FM	5.0	
15	147.045000	K6LRG/r	Tone	94.8	023	+	0.600000	NFM	5.0	
16	145.370000	N6ZX/r	Tone	107.2	023	-	0.600000	FM	5.0	
17	146.925000	WA6TOW/r	Tone	114.8	023	-	0.600000	FM	5.0	
18	147.365000	W6TI/r	Tone	110.9	023	+	0.600000	FM	5.0	
19	146.655000	K6SA/r	Tone	114.8	023	-	0.600000	FM	5.0	
20	147.180000	W6WLS/rw	Tone	94.8	023	+	0.600000	FM	5.0	
21	147.945000	N6QDY/r	Tone	77.0	023	-	0.600000	FM	5.0	
22	147.390000	W6PIY/r	Tone	151.4	023	+	0.600000	FM	5.0	
23	146.970000	KE6YUV/r	Tone	123.0	023	-	0.600000	FM	5.0	S
24	465.612500	CTYFIRE5	(None)	100.0	023	(None)	5.000000	FM	25.0	
25	153.905000	FCMD-CUP	(None)	100.0	023	(None)	0.600000	FM	5.0	

[0] Completed Getting memory 220 (idle)

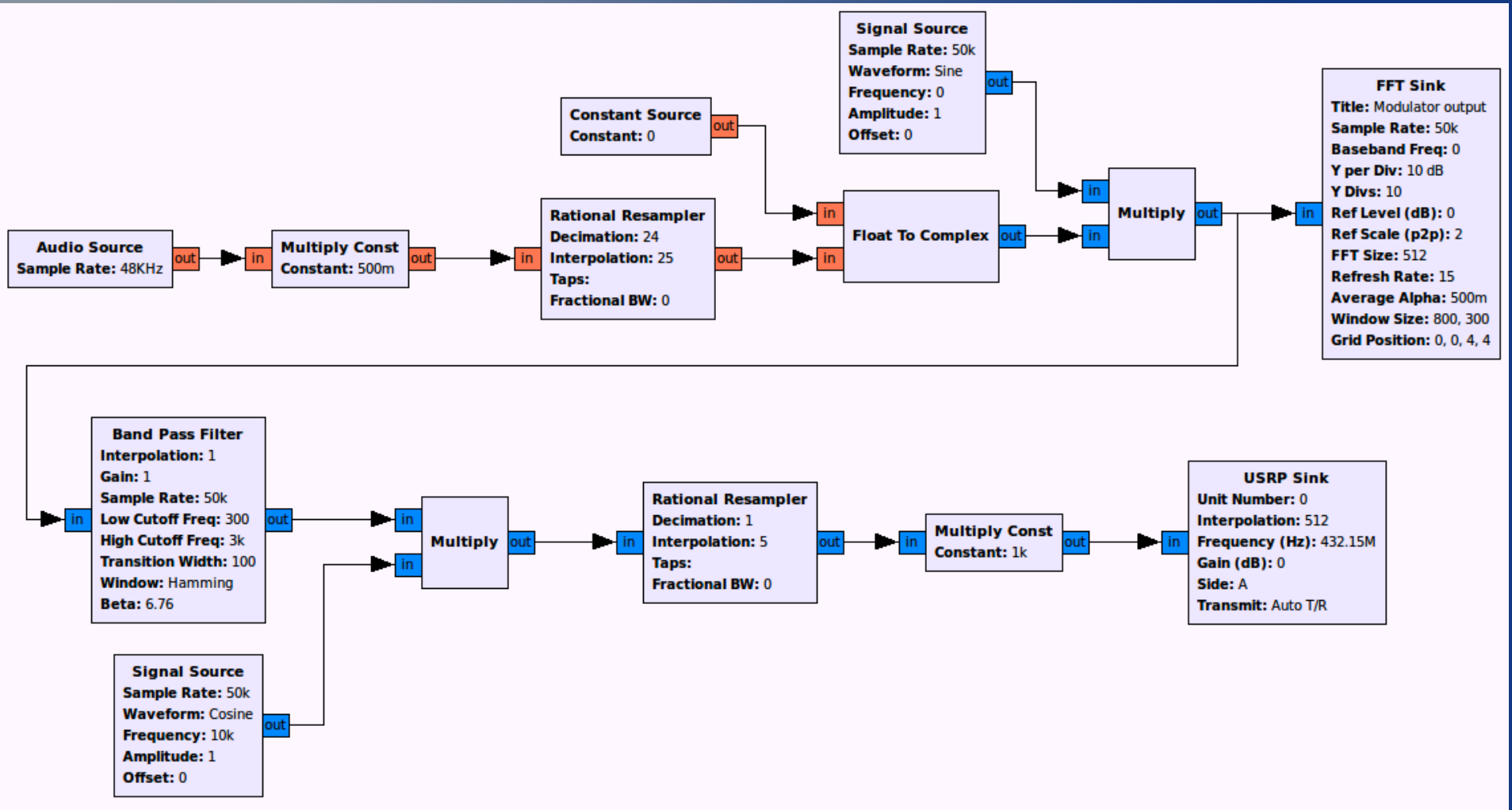
SDRs

# SDR: The next generation of radio..

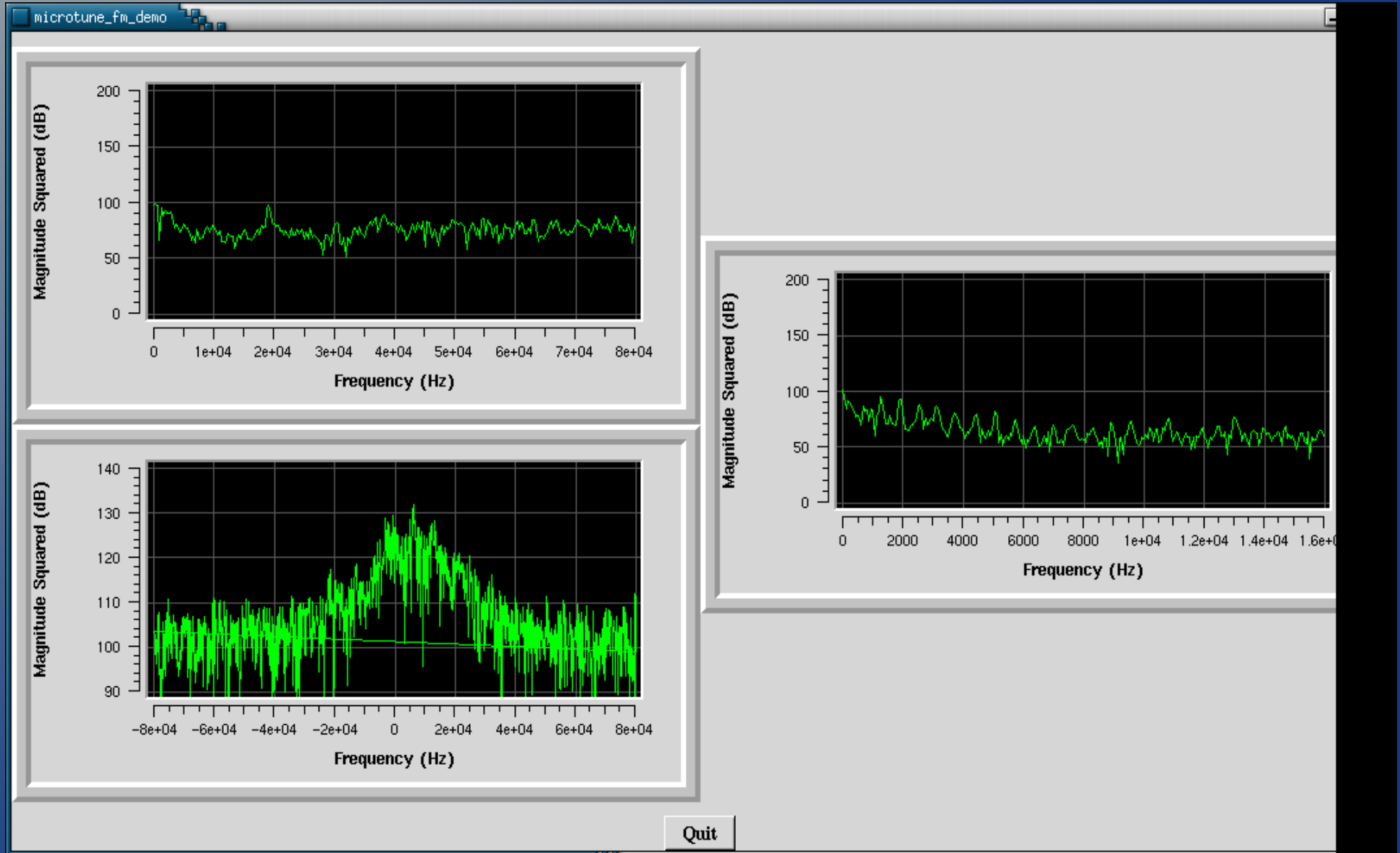
- Beyond SDR applications available, GnuRadio is a *\*premier\** SDR development platform



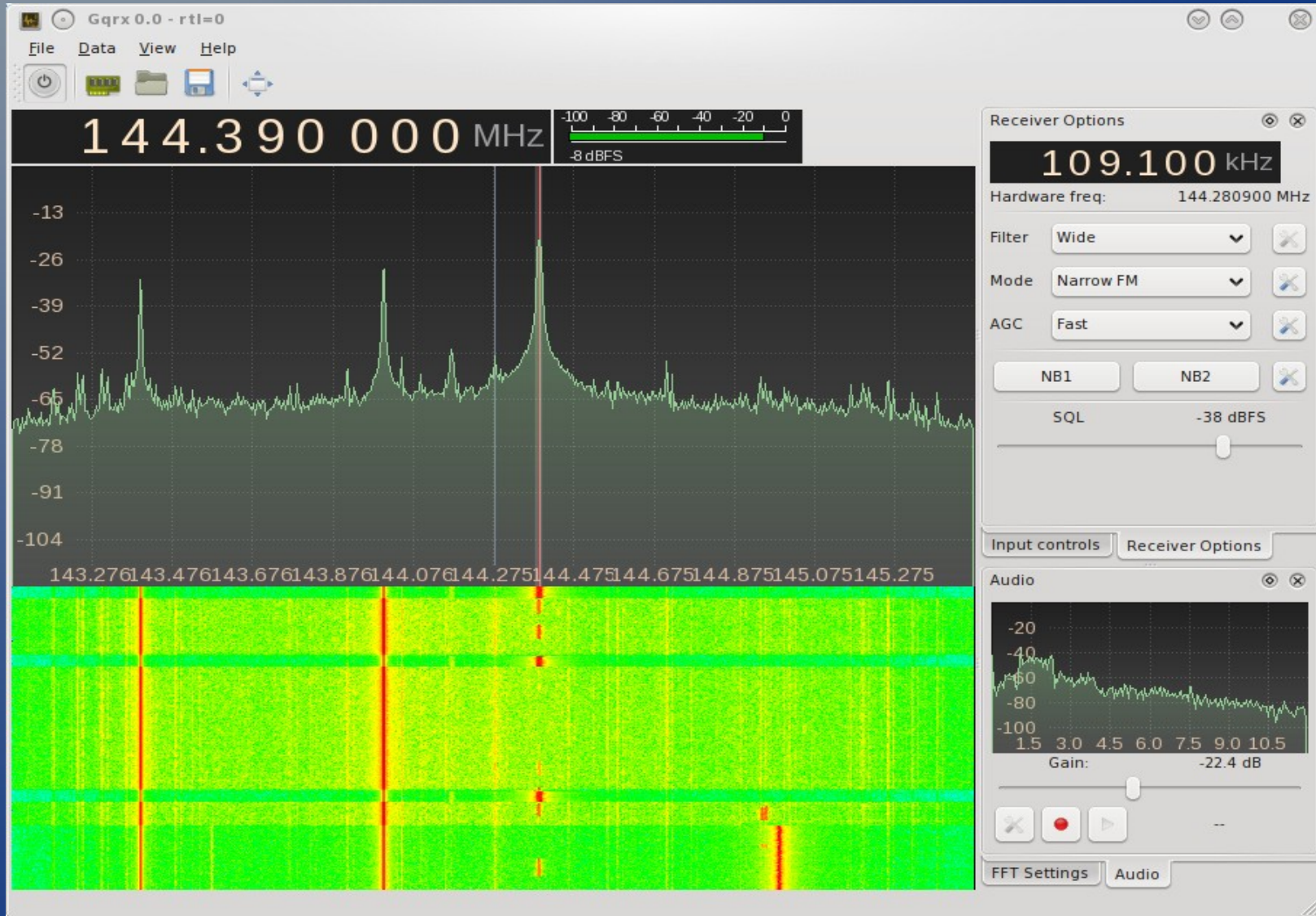
# GnuRadio – SSB transmitter



# GnuRadio graphics



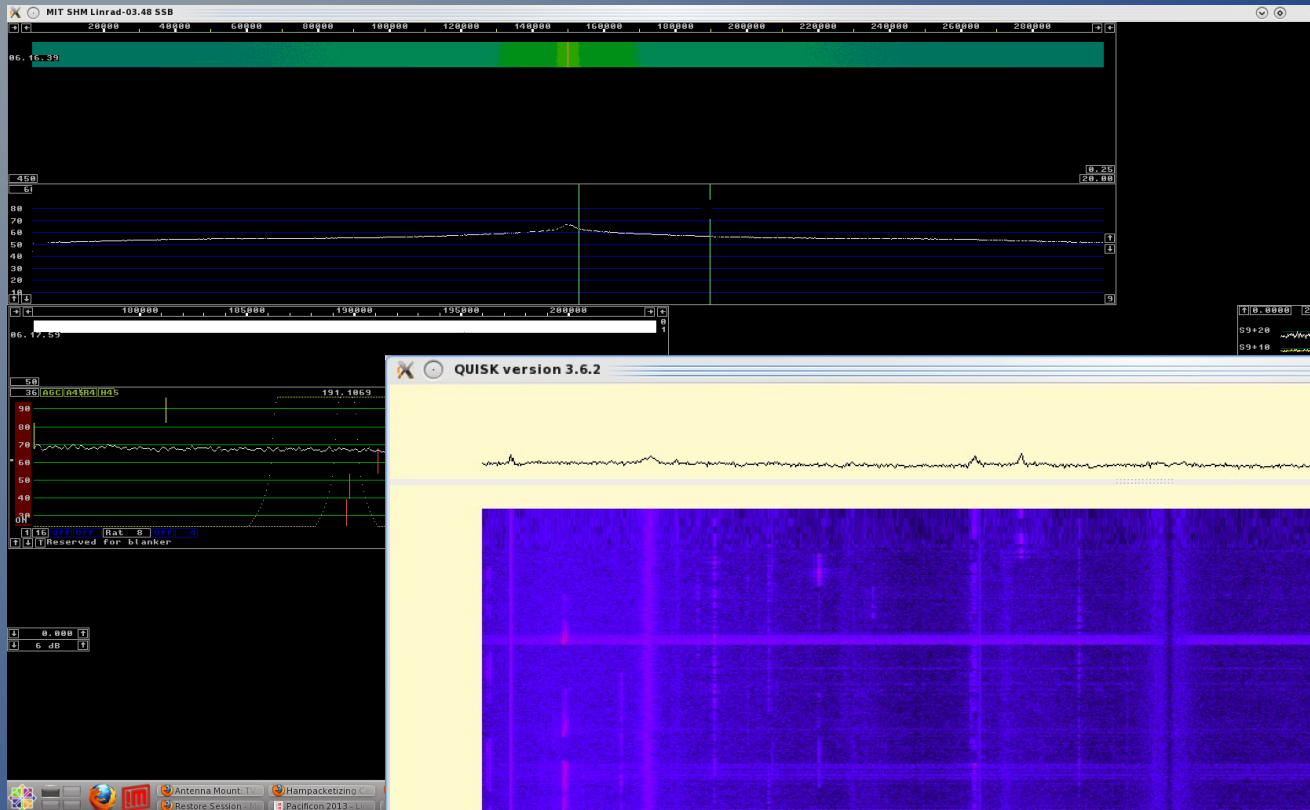
# From amazing SDR receivers also using GnuRadio: GQRX



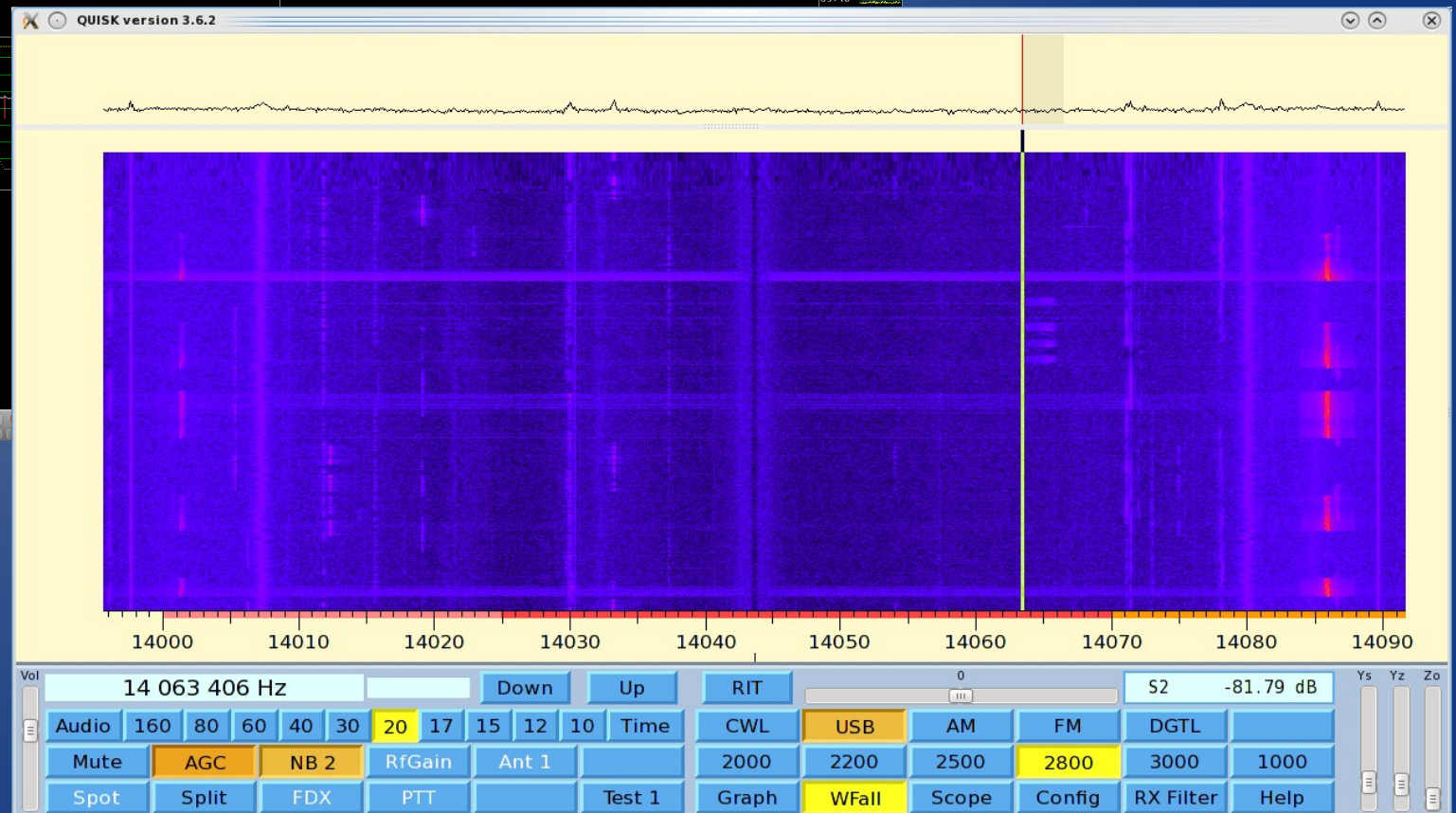




# To full blown SDR Transceivers



Linrad



QUISK

# Logging, Modeling, Simulation & Satellite Tracking

# Casual to Contest grade logging with CQRLog

**New QSO ... (CQRLOG for Linux)**

OSODATE	TIME_ON	CALL	FREQ	MODE	RST_R	RST_S	NAME	OTH
2009-09-07	20:03	DO4NW	21.2700	SSB	59	39		

QSO nr. 2 QTH profile:

Call: DO4NW Frequency: 3.6970 Mode: SSB His RST: 59 My RST: 59  
 Name: Helmut QTH: Langen-Neuenwalde GRID: JO43IQ PWR: 100 W QSL\_S: SB QSL\_R:

ITU: 28 WAZ: 14 IOTA:  County:  State:  Award:

DXCC ref. Comment to QSO: QSL VIA: DL BUREAU

Date: 2009-12-29 Start time: 12:40 End time: 12:40

DXCC stat.

	1.8	3.5	7	10.1	14	18	21	24	28	50	144	430
SSB		Q							Q	Q	Q	Q
CW												
DIG		X										

My grid (to change press CTRL+L) JO43IQ Ref. call (to change press CTRL+R) DO4NW Ver. 0.9.0

**Band map**

1822.5	TF4M
1822.5	BU2AQ
3507.6	JA7EU
3799.8	OH6RM
7005.5	OH2XX
7089.0	TM6WRC
7130.0	GB0NG
10104.6	EW80
10108.6	OM3SX
10109.0	UA3ICF
10109.4	IZ5EKV
10116.6	SM7YIN
10139.0	PA3FOE
14014.0	4X4FC
14014.6	4X4FCQ
14015.2	UR3HC
14038.1	SM5IMO
14070.8	ES7FQ
14072.1	PD0JNG
14082.0	FR5M
14144.0	YS1/HB9KNA
14195.3	9A2YM
14205.0	M0NNH
14218.2	VK6ANC
14225.0	GB1HF
14239.0	R150APC
18100.0	VE2EH
21024.9	CT3AS
144299.0	SP7HKK

**TRX control**

Freq: **3.6970**

Band: 160m, 20m, 10m, 80m, 40m, 15m, 6m, 30m, 12m, 70cm

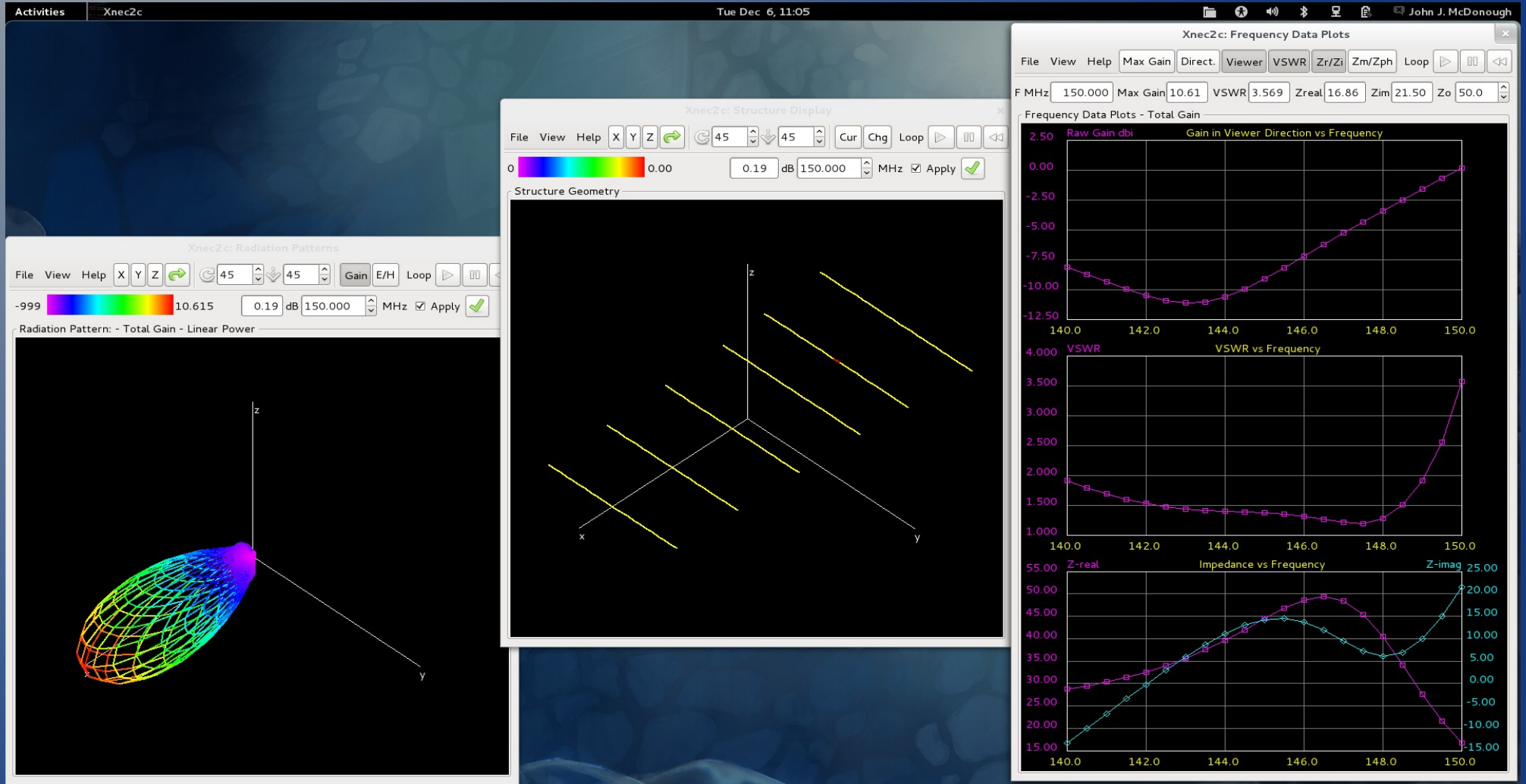
Mode: CW, SSB, RTTY, AM, FM

**Grayline**

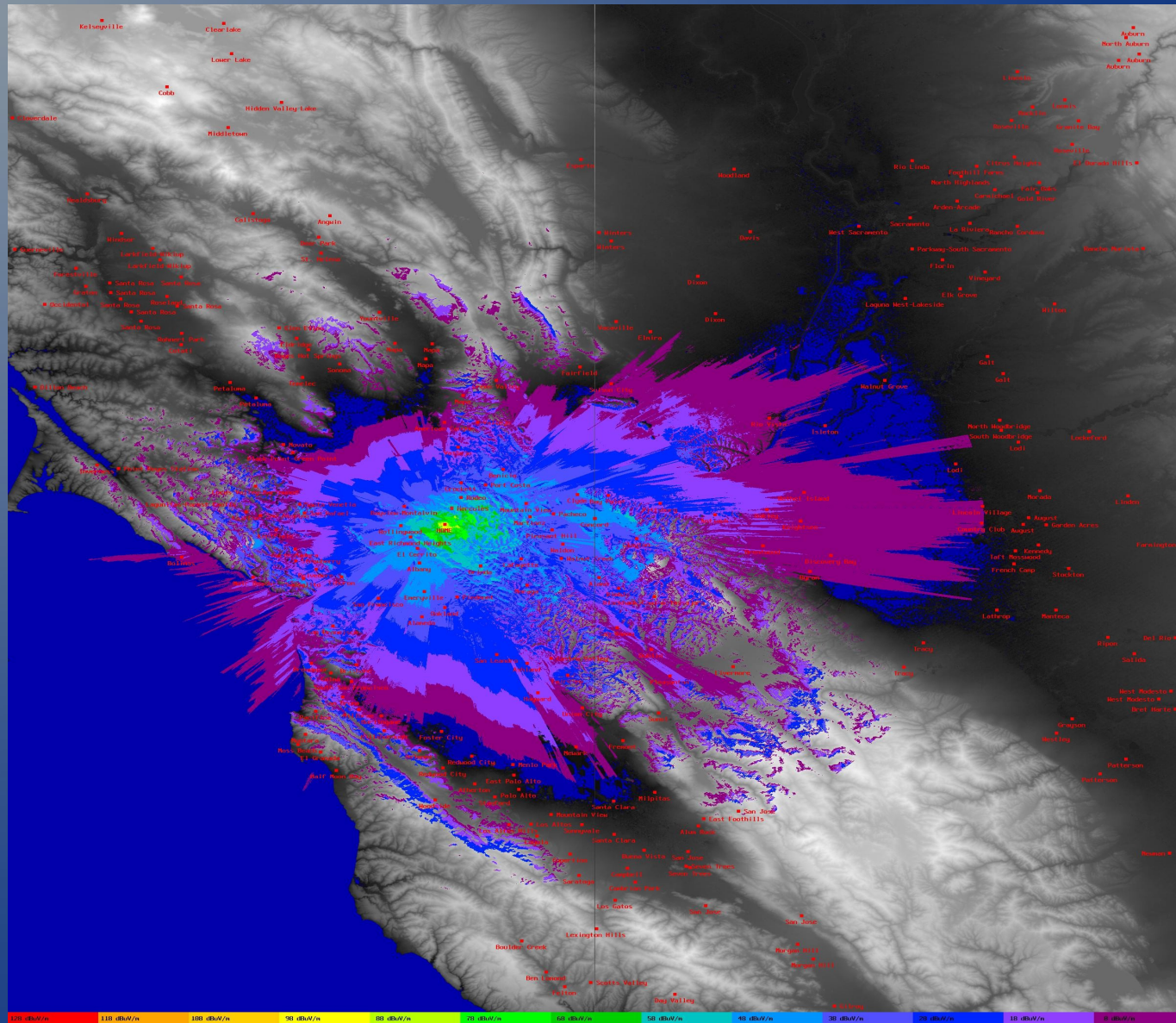
**DXCluster**

Web	Telnet	Select	Disconnect	Font
SM6YOU-2				
DX de RL3DX:	14072.1	PD0JNG	TNX FOR QSO	1337Z
DX de FITVA:	7089.0	TM6WRC	QSL via F4ELU	1339Z
DX de NN3W:	10108.6	OM3SX		1339Z FM18
DX de OK1FRG:	21024.9	CT3AS		1340Z JN79
DX de IZ5RNC:	10139.0	PA3FOE	599 in (fi)	1340Z
DX de HA1WA:	144299.0	SP7HKK	JN87IH549 !J091Q1	1340Z

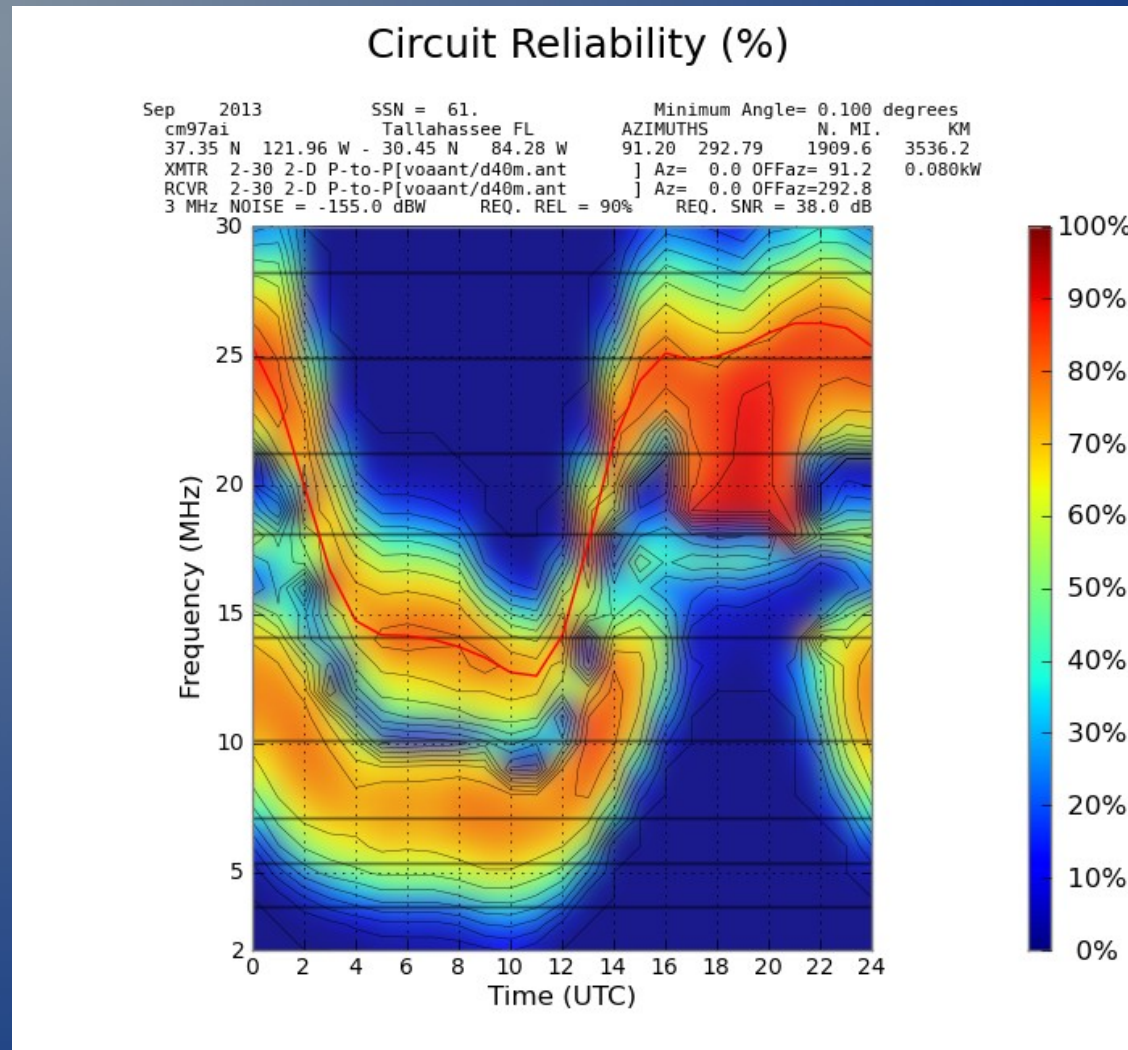
# Antenna Simulation with XNEC



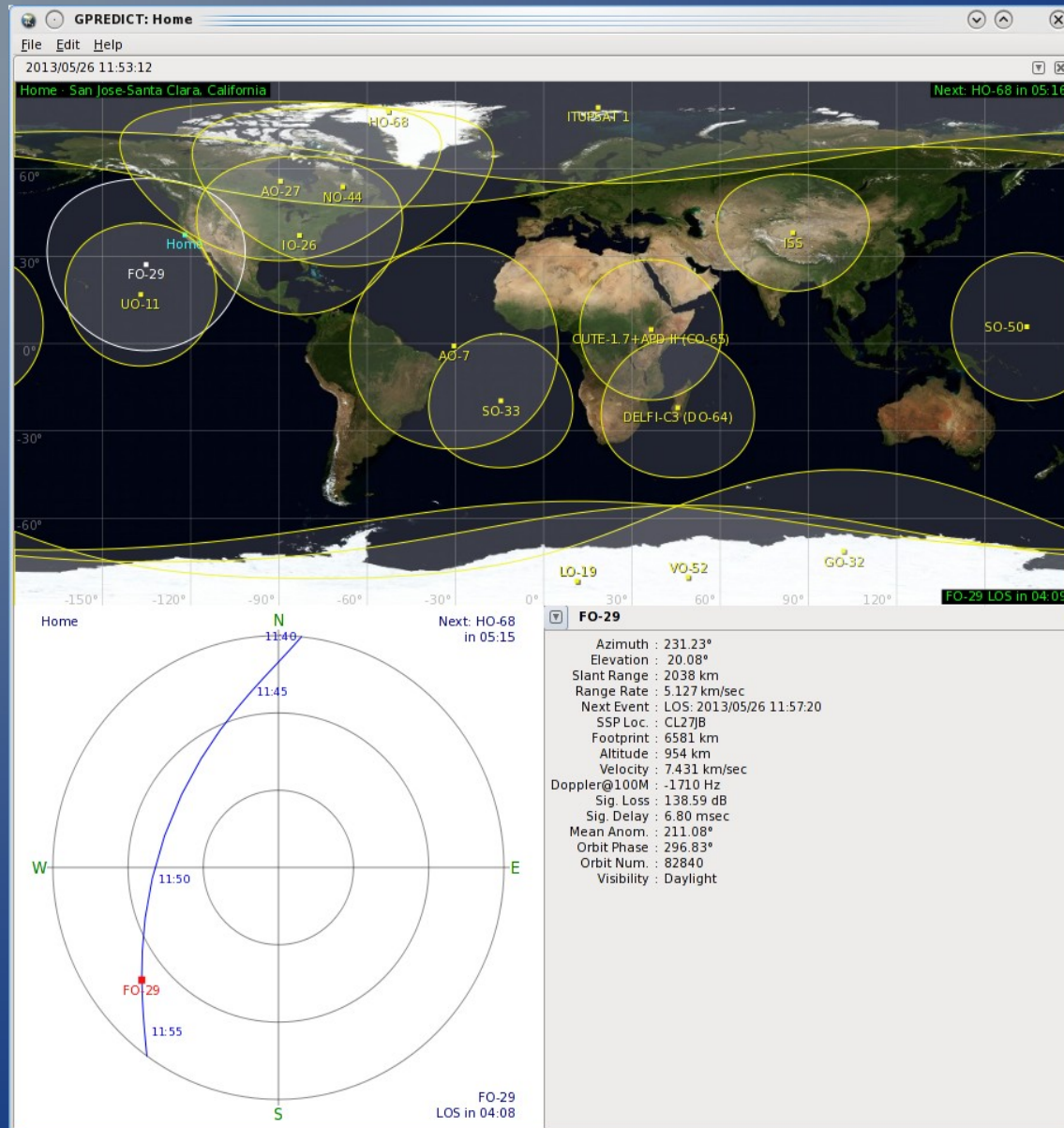
# Propogation Analysis: SPLAT



# Propogation Analysis: VOACAP



# Satellite Tracking and Rig Control with Gpredict



# Amateur Radio VoIP Systems



# VoIP Applications

- All IRLP Nodes available today run Linux!
- All AllStar (Allstar, IRLP, Echolink hybrid) nodes run Linux
- Most homebrew D\*star nodes run Linux

# Echolink Server and Client

Qtel - the Qt EchoLink Client

File Directory Station Settings Help

Bookmarks  
Conferences  
Links  
Repeaters  
Stations

Callsign	Location/Description	Status	Local Time	Node ID	IP
K6IB-L	Fremont CA	ON	20:12	302333	71
<b>KU6V-L</b>	<b>SF Bay area [0/8]</b>	<b>ON</b>	<b>20:12</b>	<b>474645</b>	<b>99</b>
W6EI-L	Palo Ato, California	ON	20:18	3330	10
W6IOS-L	San Jose, CA	ON	12:13	622334	12
W6QNE-L	Bethel Island, California	ON	20:12	228807	75

Messages

EchoLink Server v2.5.9997  
ECHOEC2-3: Herndon, VA USA

Incoming Connections

Callsign	Name	Time
----------	------	------

Accept  
Clear

# APRS & Packet

# Packet: Native AX.25 support

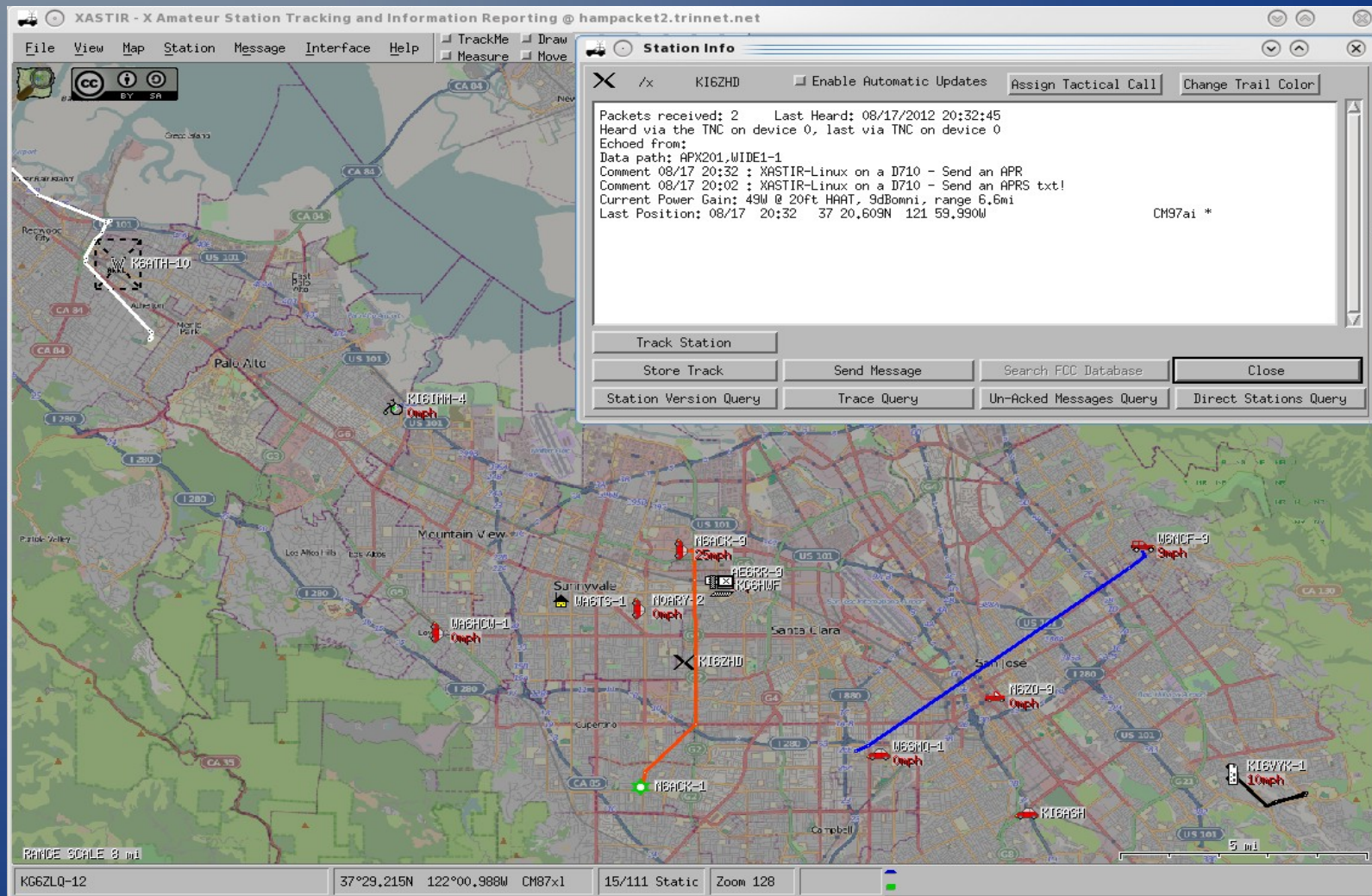
- Unlike requiring different applications to support AX.25, Linux has the stack built in!
  - One station can have any number of radios connected and communication between each other
- You can connect up classic hardware TNCs to an RS232 serial port
- Or have dedicated HW... for your project such as..

# APRS Servers

- There are so many native packages to..
  - Transmit telemetry and position
  - Digipeater
  - IGATE
  - Etc
- Then there are the APRS programs available running under Java such as javAPRSvr
- Then there are full APRS clients to graphically show stations in your area, show higher level alerts, etc.

# APRS Clients: Xastir

- Full APRS clients to graphically show stations in your area, show higher level alerts, etc.



# DanTracker: Raspberry PI Client

APRS MSG CTRL

Messages

ACK message  From callsign:  To callsign:

Enter message:


Encapsulated Packets  
 K6BJ-B->APDG02 @2000: type: 0 K6BJ-B->APDG02.TCPIRKE6AFE-2\*.:3659.94ND12159.99W&RNG0000 440 Voice 441.67500MHz +5.0000MHz

APRS MSG CTRL

Shutdown Reset Confirm:


Debug window  
 19:55: URL: rpi Port num: 8080  
 19:55: Callsign: CF\_CALL value: KI6ZHD-9 myName: KI6ZHD-9  
 20:00: Checkbox ACK checked  
 20:00: Checkbox ACK NOT checked  
 20:00: Checkbox ACK checked


APRS MSG CTRL

KD5WIN 21.7mi NE via N6ZX-3 

12.7V 34Cprofile 1

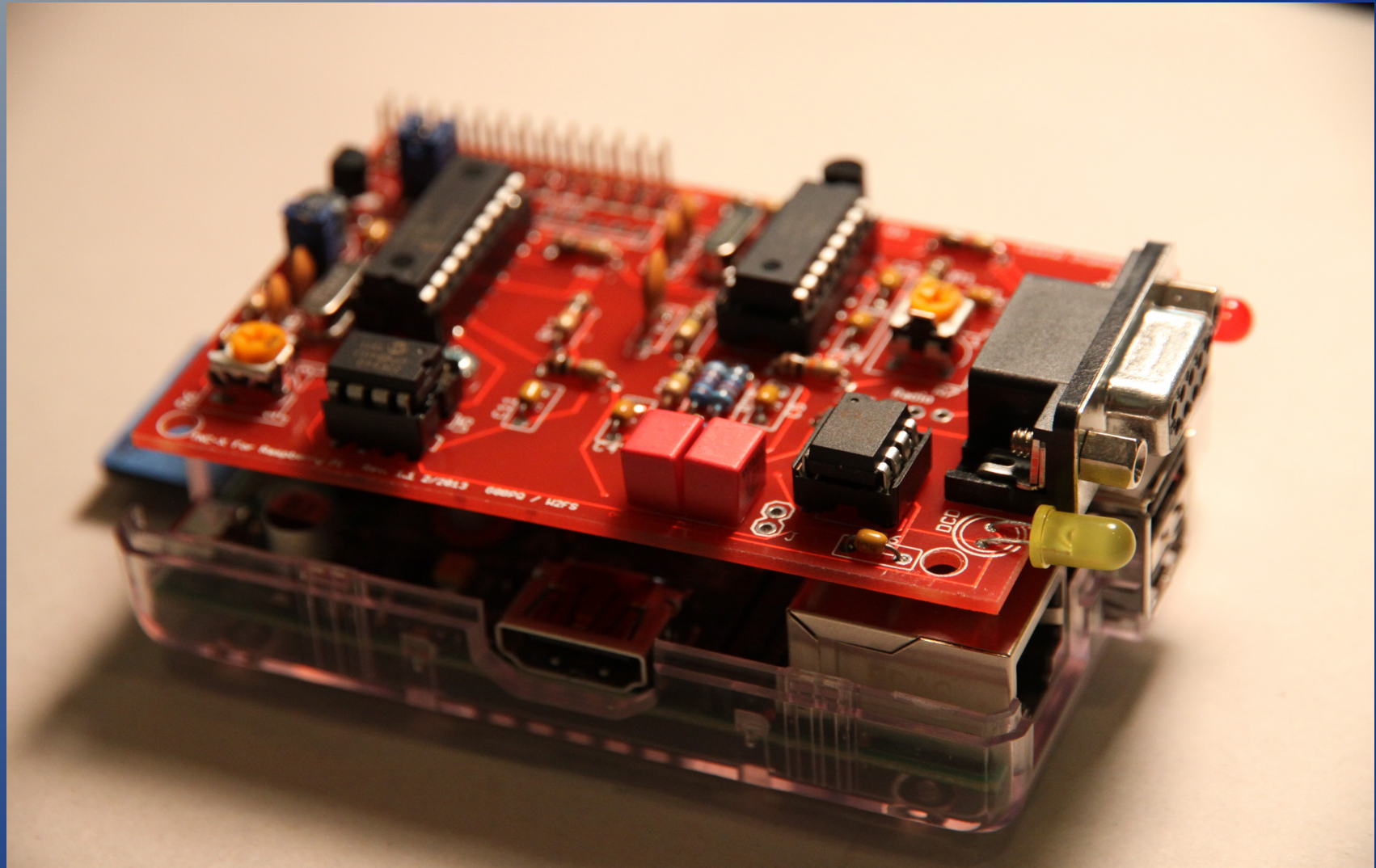
1:N6WKZ-2 21h1m 5:KJ6DBE-9 14mi N  
 2:KI6TRK-9 173mi NE 6:KD6OMV-5 99mi NE  
 3:K1DRS 10mi E 7:KK6AMA-9 56mi NE  
 4:KE6AFE 25mi S 8:KC7ADD 70mi N

Stationary, Alt 31 FT  
 37.34352N 121.99991W 23:08:41 Locked: 8 sats  
 KI6ZHD-9 : Every 20 min 

KE6AFE 25.0mi S (1m5s ago)  
 Wind N 1/2mph 67F 33% 

Recv	Xmit	Retry	Messages	Weather	Encap Pkts	Error
25	2	0	0	1	0	0

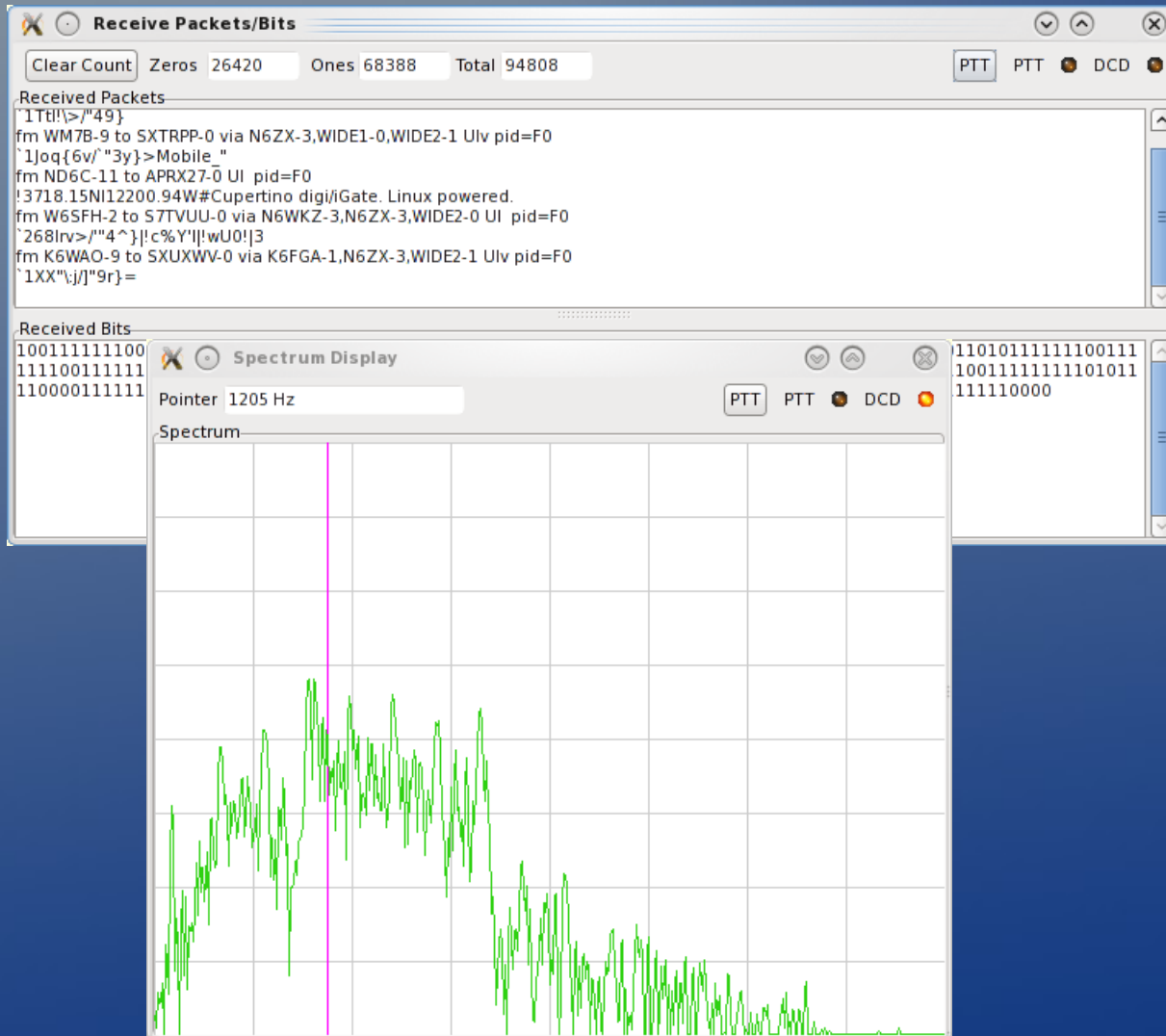
# Low cost Packet: Raspberry Pi & TNC-Pi





# Even lower cost: Soft TNCs just using the soundcard (no more hardware)

- Soundmodem, DireWolf, Extmodem, etc.



# Packet Radio: KB 2 KB

```
quisk-3.6.2 : sudo
File Edit View Scrollback Bookmarks Settings Help
:c wbay
c rdg
bbs
l
[
My: KI6ZHD xAck: 0/ 1xUnack: 0xTries: 0/10xRtt: 3x Info transferx 19:45:29

*** 19:44 Connected to WBAY
*** Info: (null)
c rdg
WBAY:N6ZX-5} Connected to RDG:WA6YNG-1
bbs
RDG:WA6YNG-1} Connected to WA6YNG-5
l
[KPC3P-9.1-HM$]
42368 BYTES AVAILABLE IN 18 BLOCK(S)
THERE ARE 19 MESSAGES NUMBERED 22-165
ENTER COMMAND: B,J,K,L,R,S, or Help >
MSG# ST SIZE TO FROM DATE SUBJECT
165 PN 310 KJ6DMR KI6ZHD 08/12/2012 12:37:24 Re Hello from Shingletown
164 PY 45 KI6ZHD KJ6DMR 08/11/2012 07:25:46 Hello from Shingletown
153 PN 646 K6TUG KI6ZHD 07/29/2012 09:52:38 RE: Checking to see if anyon
148 B 237 ALL K6KS 07/22/2012 11:54:44 ARRL VE EXAM SEPTEMBER 15TH
144 PY 474 KI6ZHD K6TUG 07/17/2012 09:07:29 RE: Checking to see if anyon
142 B 250 ALL KI6ZHD 06/20/2012 20:28:50 Checking to see if anyone ch
141 PH 537 WA6YNG KI6ZHD 06/16/2012 08:39:05 Would like to learn about WA
108 B 792 ALL KG6BAJ 05/06/2011 12:35:01 California Digital Database
22 B 1703 ALL KF6DQU 07/17/2010 22:57:56 Online Node List
ENTER COMMAND: B,J,K,L,R,S, or Help >

1:WA6YNG-5 2:----- 3:----- 4:----- 5:----- 6:----- 7:----- 8:-----
d710: fm KI6ZHD to WBAY ctl RR6v
d710: fm N6ZX-5 to K6JAC-4 ctl RR1-
d710: fm WBAY to KI6ZHD ctl I36^ pid=F0(Text) len 44
List
ENTER COMMAND: B,J,K,L,R,S, or Help >
d710: fm N6ZX-5 to K6JAC-4 ctl RR2-
d710: fm KI6ZHD to WBAY ctl RR7v
```

# Compatibility with other Applications

# But I **\*need\*** to use XYZ program..

- Beyond all the native Linux applications for Amateur Radio, Linux supports three ways to run your other programs:
  - Emulators like DOSemu
  - Compatibility libraries like WINE
  - Full Virtualization systems like KVM, VirtualBox, and others

# For example, Santa Clara County EmComm uses Outpost .. running under Wine

The screenshot shows the 'Outpost Packet Message Manager <2>' application window. The interface includes a menu bar (File, Edit, Setup, Tools, Forms, Actions, Help), a toolbar with buttons for New, Open, Archive, Delete, Print, and Send/Receive, and a profile dropdown menu set to 'Outpost'. On the left is a 'Folder List' with buttons for In Tray, Out Tray, Sent Msgs, Archive, Draft Msgs, and Deleted Msgs. The main area displays a table of messages in the 'In Tray' folder.

U	Type	From	To	BBS	Local ID	Subject	Date/Time	Size
		ki6zhd@...	KI6ZHD	W2XSC-1	ZHD147P	ZHD146P_O/R_EOC Logistics Req...	6/16/2013 18:05	453
		pktue@...	ki6zhd@...	W2XSC-1	XXX102P	RWG1045: Tuesday Weekly Check-in ...	6/11/2013 20:43	1583
		pktue@...	ki6zhd@...	W2XSC-1		DELIVERED: ZHD145_O/R_LogReq_...	6/11/2013 19:39	126
		pktue@...	ki6zhd@...	W2XSC-1	XXX101P	RWG438: Tuesday Weekly Check-in t...	3/12/2013 20:22	1610
		pktue@...	ki6zhd@...	W2XSC-1	XXX100P	RWG229: Tuesday Weekly Check-in t...	2/12/2013 20:21	2156
	B	xsc:eoc@...	xsc:perm	W2XSC-1	XXX104P	SCCo Packet Tactical Calls v130118	1/18/2013 17:10	3974
	B	xsc:eoc@...	xsc:perm	W2XSC-1	XXX103P	SCCo Packet Frequencies v130115	1/15/2013 17:59	1129
	B	k6rwg@...	30DAYS	W6XSC-1		1 Feb. Packet Net	2/1/2011 21:15	603
		pktue@...	ki6zhd@...	W6XSC-1		DELIVERED: 046_O/R_CityScan_Che...	2/1/2011 20:04	128
	B	k6rwg@...	30DAYS	W6XSC-1		31 January Packet Check-Ins	1/31/2011 20:16	510

10 Items, 30 Total      Outpost -- KI6ZHD -- SCC BBS 2 - CRYSTAL PEAK -- SCCO\_KENWOOD\_710      00:00:00      18:07:55

Linux + *YOUR*  
computer

# Things to consider with Linux

- Andy's HAM DVD is just one example of a Linux distribution. Others have different focuses for look (Gnome, KDE, LXDE, etc), feel (Sys-V, BSD, Upstart), features (multimedia), etc.
- I encourage new users to try other “Live Cds” to see what distribution, UI, etc they might prefer

# Things to consider #2: HW Requirements

- Linux is highly adaptable and supports almost ALL hardware – I **do** recommend to stay away from bleeding edge hardware for new users
- Most modern Linux distros require CPUs with the PAE instruction – this means no Pentium-M or older (there are work arounds though..)
- Most people want a GUI so I would argue that you need at **LEAST 512MB** of RAM & 20GB HD
- Dual booting into Linux or Windows on the same hard drive is **COMMON** and easy



# So on to your homework.. Really!

- Trying out Linux for your Amateur Radio and general interest is easy
- It doesn't require you to install anything to your computer
- If your computer can boot from a CD / DVD or better yet, a USB Pen drive, you're ready to go!





# Wrapping it up..

- Linux is an excellent platform for Amateur Radio
- All major HAM applications are well represented
- Strong learning environment for automation and learning other programming languages
- Check out my Amateur Radio document for Centos Linux and other docs at:

<http://www.trinityos.com> --> HAM --> hampacketizing centos

# Credits:

- Most screen captures done by David Ranch
- Front Tux 'hamradio' image copyright of Linux Journal
- Other images owned by their respective owners

Any Questions?

# Backup Slides

# Homework: So where do I start?

- There are several Amateur Radio LiveCDs available but some are out of date
- I recommend KB1OIQ's - Andy's HAM Radio Linux DVD
  - Over 45 Amateur Radio packages pre-installed including almost all of these programs mentioned in this presentation!

# Copying Andy's DVD to your Bootable device

- Download “Unetbootin” for Windows (or similar tool) to image USB Pendrives. Runs in place, no installation
- Insert the USB Pendrive
- Select “Disk Image”, point to the downloaded ISO and wait
- The image only takes 775MB so click on “Space used to preserve files across reboots” and give it at least 225MB say for a 1GB drive



# Booting your new Andy DVD pendrive

- Turn **\*off\*** your computer
- Insert the newly created USB pendrive into a free USB port
- Turn on the computer
- Your computer should briefly show you options to boot off other media say “Press F10 for boot options”
  - If you don't see anything like this, you need to go into the BIOS and either enable this option or change the boot order to boot from USB first and Hard Disk second