

Linux® in Your Ham Shack



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Westford, MA USA

Presented to the
Barnstable Amateur Radio Club
October 03, 2022

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Biographical Info

Tech: 1/07, General 1/08, Extra 1/09

President: PART of Westford, MA (9/09 - 8/19)

ARRL EMA: Assistant Section Manager (2016), ACC (2017)

Founder: Worcester Linux Users' Group (1997)

Founder and Acting President:
Chelmsford Linux Meetup Group (2006-2020)

Linux Instructor:
Chelmsford Community Education (2004 - 2011)

Linux user since 1997

Computer Engineer – digital logic verification

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Most Recent Interests

- Antique radios
  - Electrical restoration, especially late 1930s radios
- Homebrewing
  - Many kits
  - Built a 1920s style regenerative receiver with plugable coils for different frequency ranges
- FT-8 and GridTracker
- Fox hunting
- Of course: Andy’s Ham Radio Linux

Goals

- Promote Linux
- Give back to ham radio and Linux communities
- Build on top of an existing Linux distribution
- Create a software collection containing as much ham radio software as possible – nothing proprietary
- Goal: Everything just works!
- Focus on the radio hobby!
- The idea of ”Andy’s Ham Radio Linux” began this way

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Andy's Ham Radio Linux

- V25 is Xubuntu 22.04.* remastered
- Download the ISO file from SourceForge
  - Search for: Andy's Ham Radio Linux
  - Software is GPL or similarly free license
- Ways to get started:
  - Download the ISO first, then…..
  - Boot it in Virtualbox, or…..
  - Create a bootable USB thumb drive
- Install to the hard drive once you decide you like it
- Be sure to read the GETTING_STARTED guide(!!!)

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Target Computer

- Any x86_64 computer 10 years old or less
- Minimum: 2-4 GB of memory
- Disk Space: 15 GB after installation
- Processor speed is not an issue for most ham radio programs, Exception: SDR
- Networking: wired or wireless
- USB or DVD required for installation

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Initial Boot before Installation



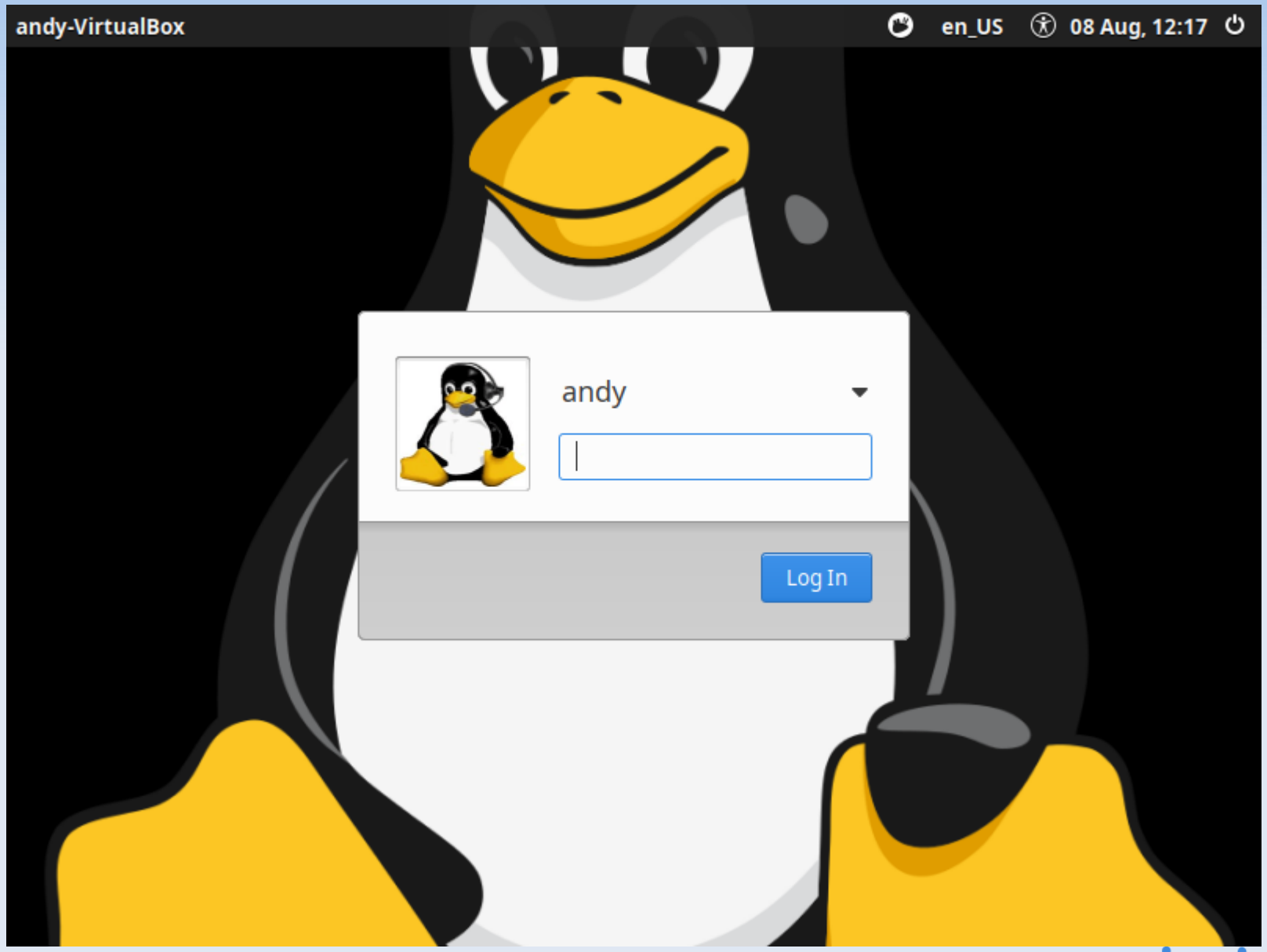
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GETTING_STARTED

- PLEASE:
  - Be sure to download and read the GETTING_STARTED document BEFORE you begin the installation.
  - Follow the helpful hints!
- If you have problems logging in, you likely didn’t read the document.

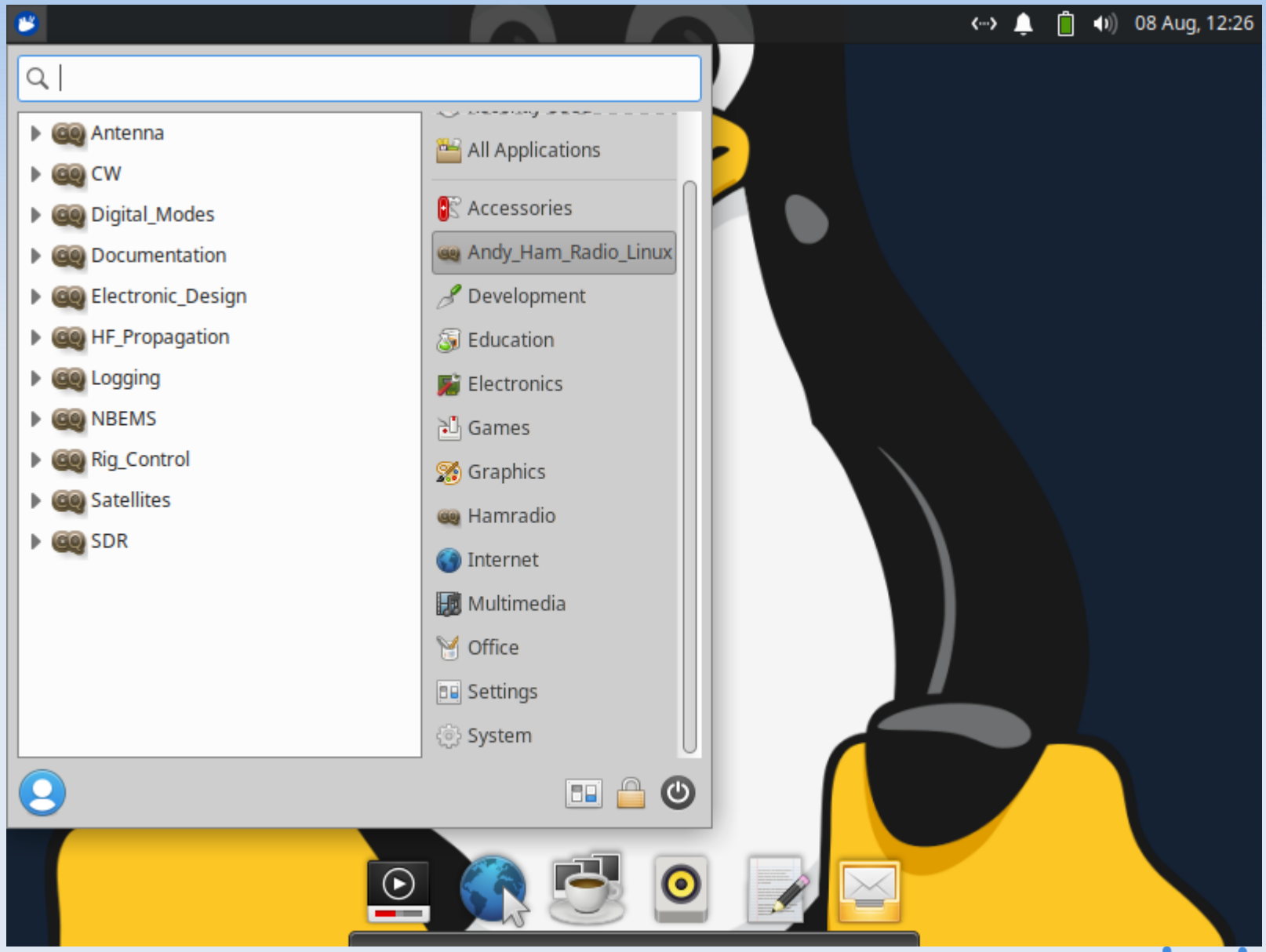
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Initial Login Screen After Installation



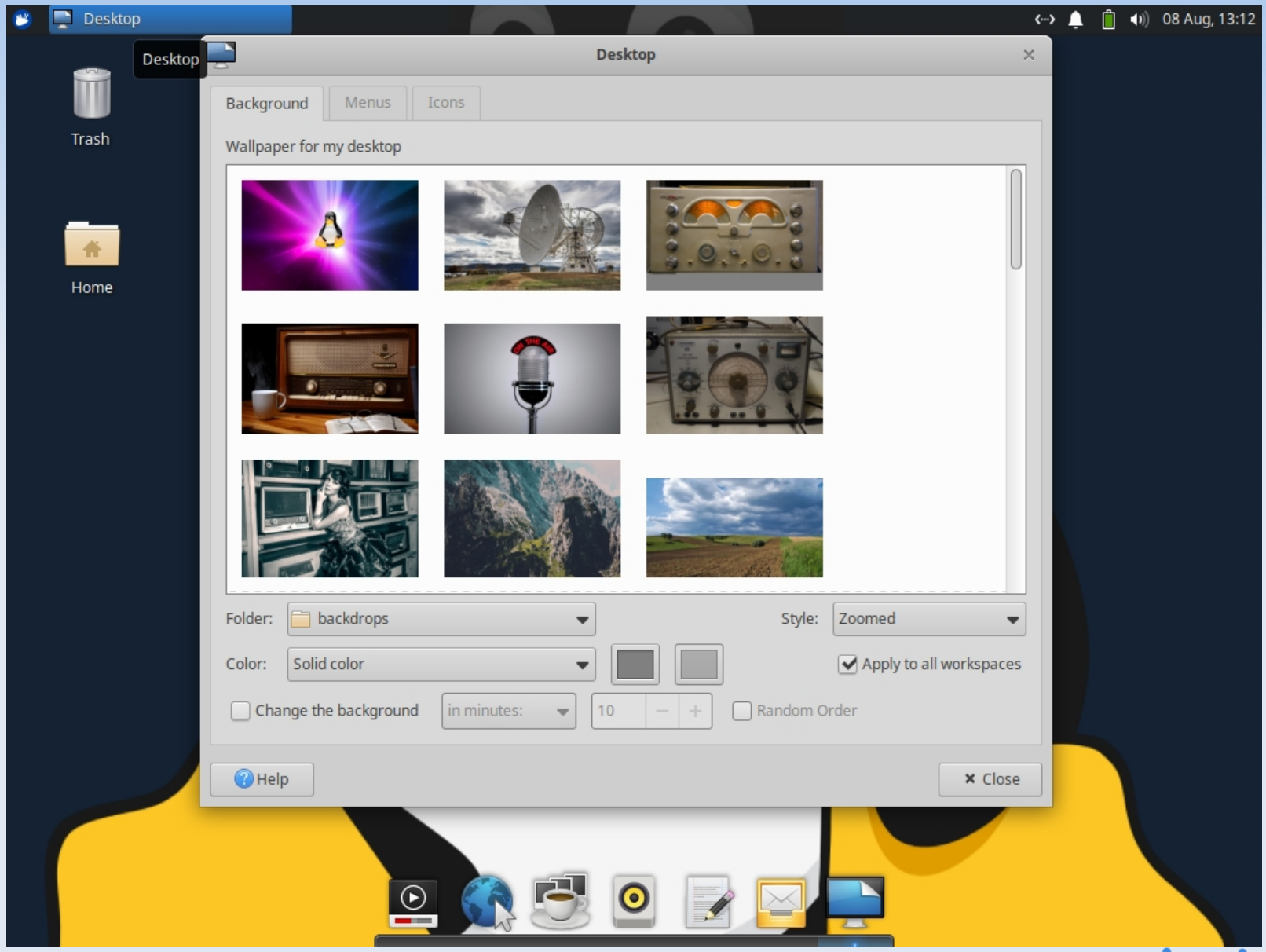
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Initial Desktop



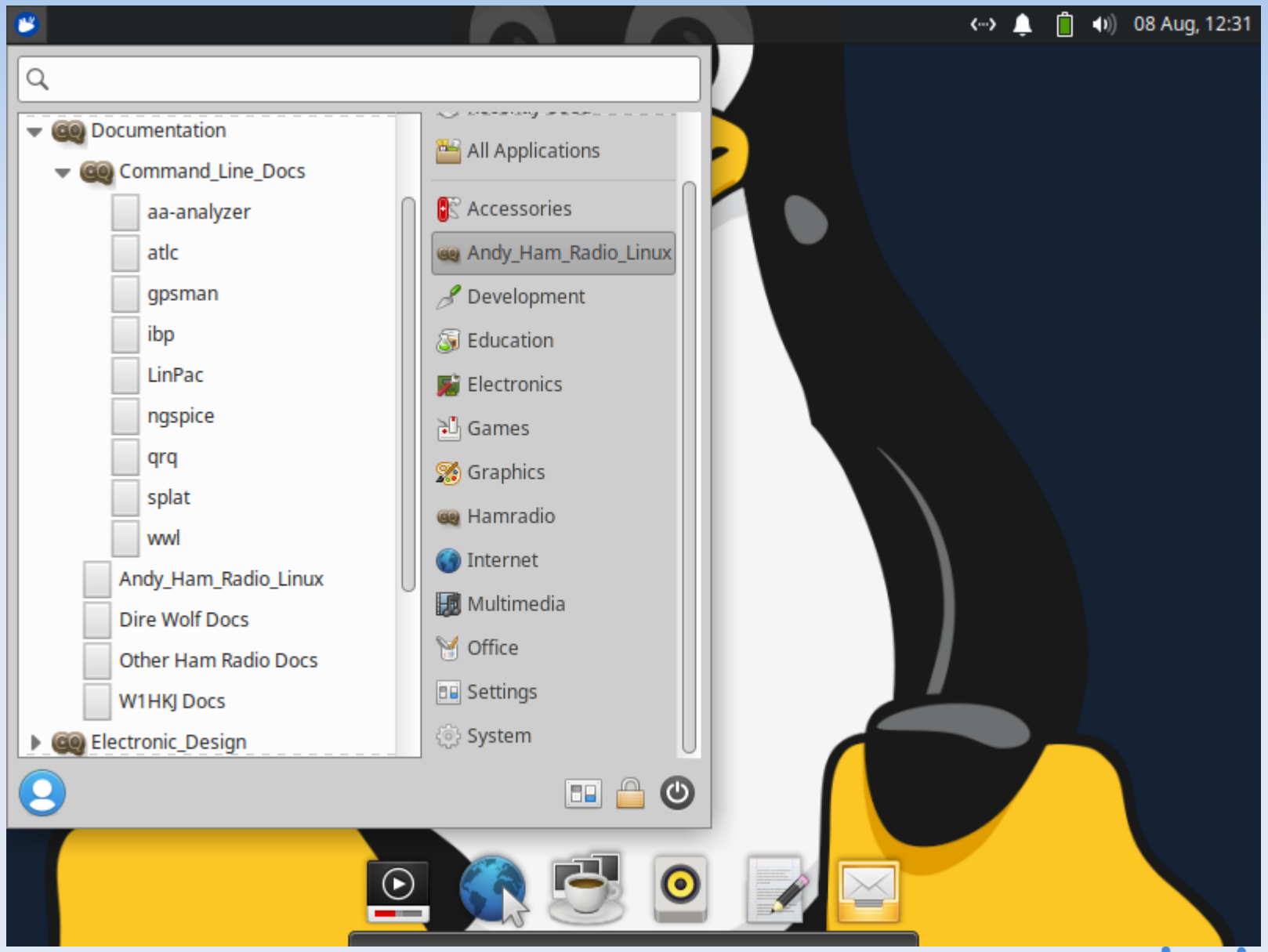
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Desktop Backgrounds



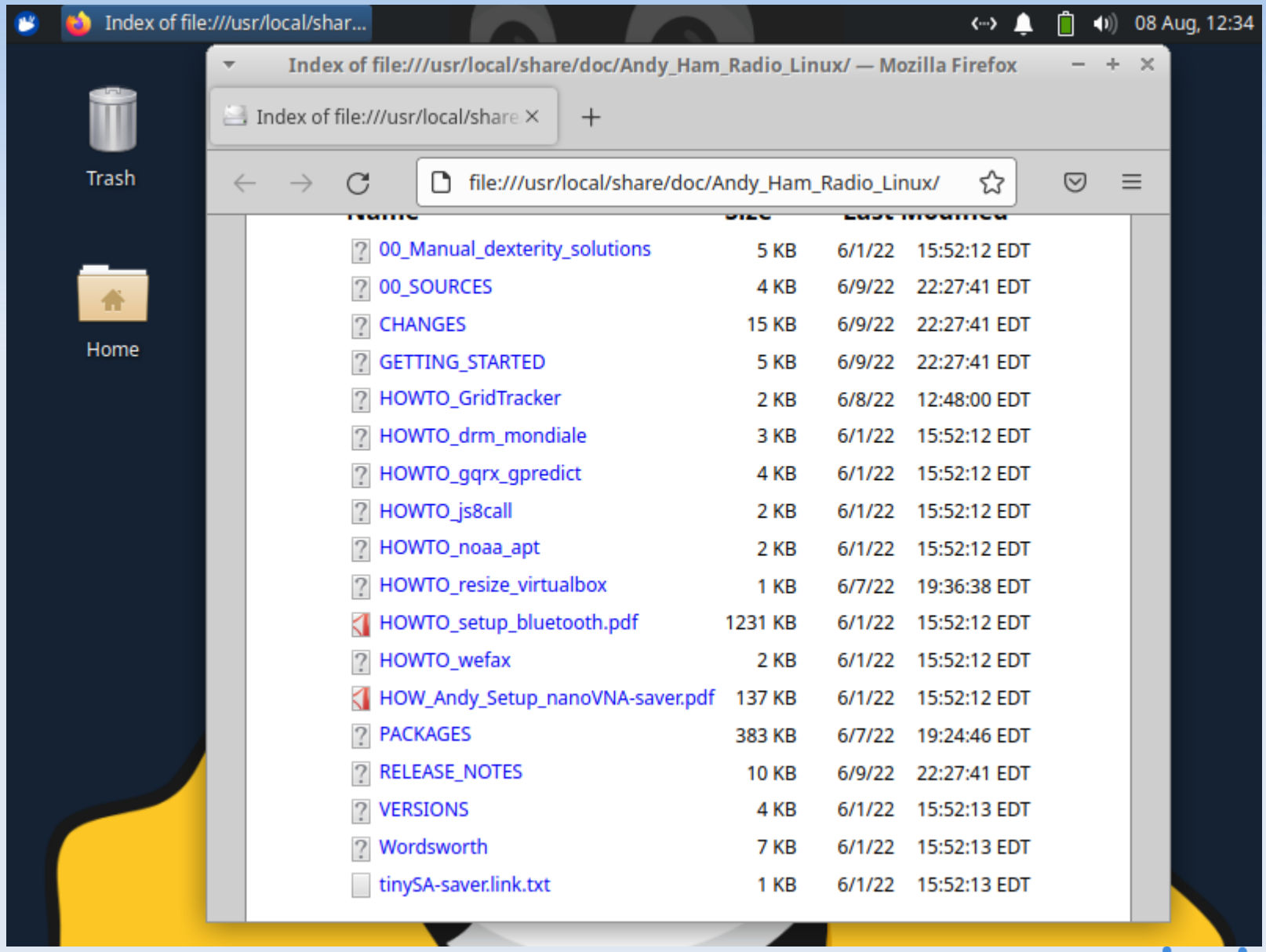
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Documentation



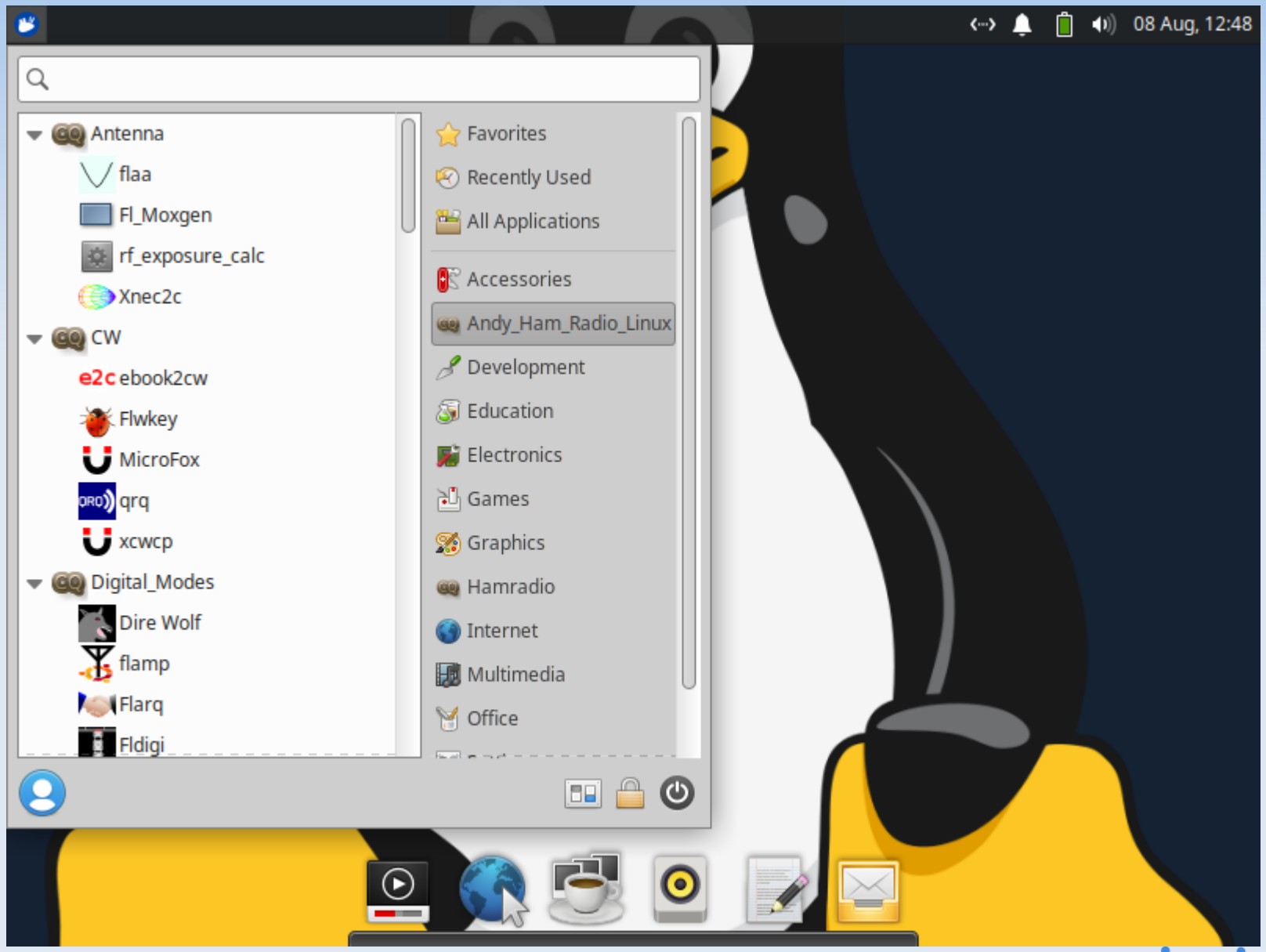
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AHRL Documentation



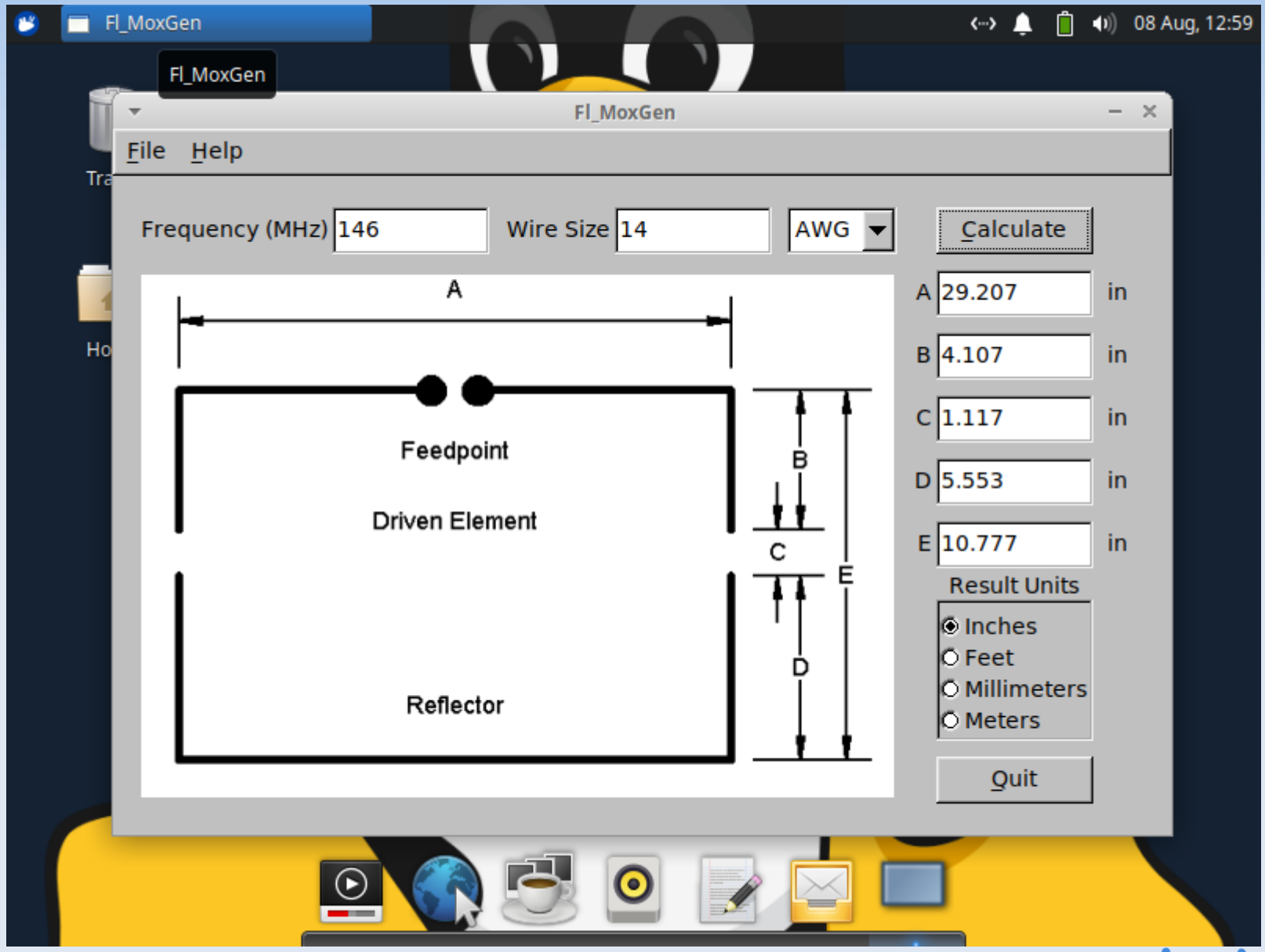
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Menu #1



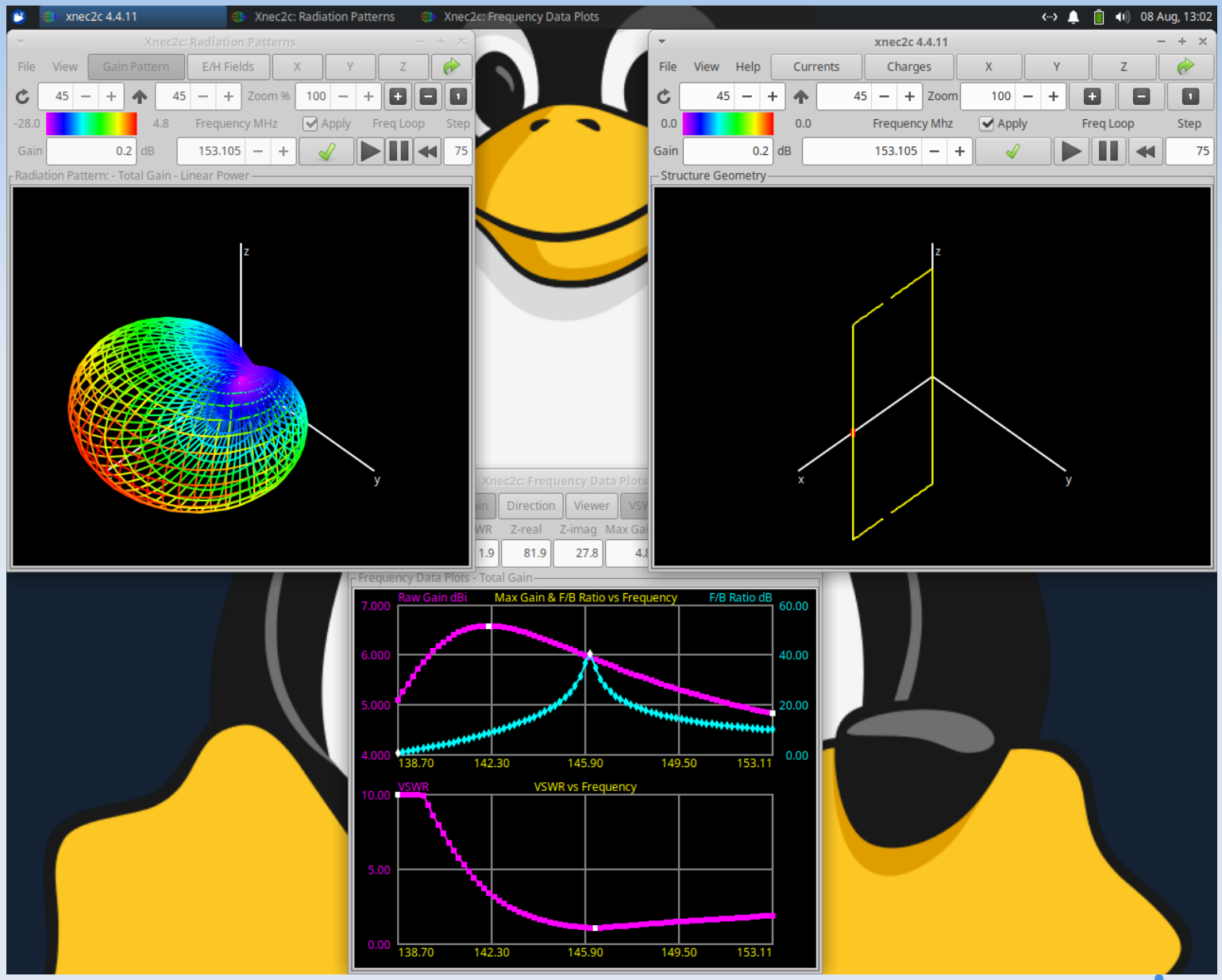
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Moxon Rectangle - fl_moxgen



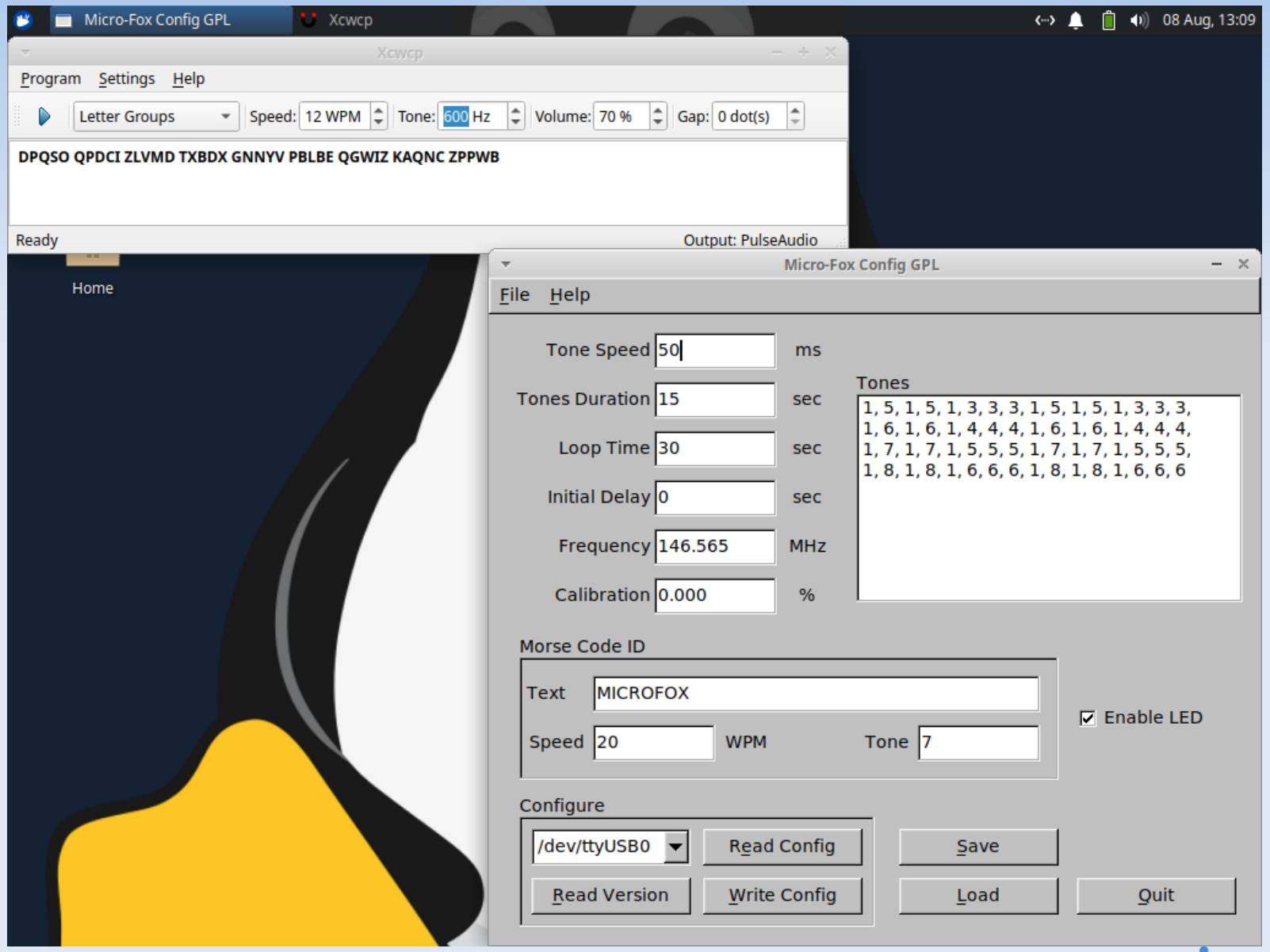
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Antenna modeling - xnec2c



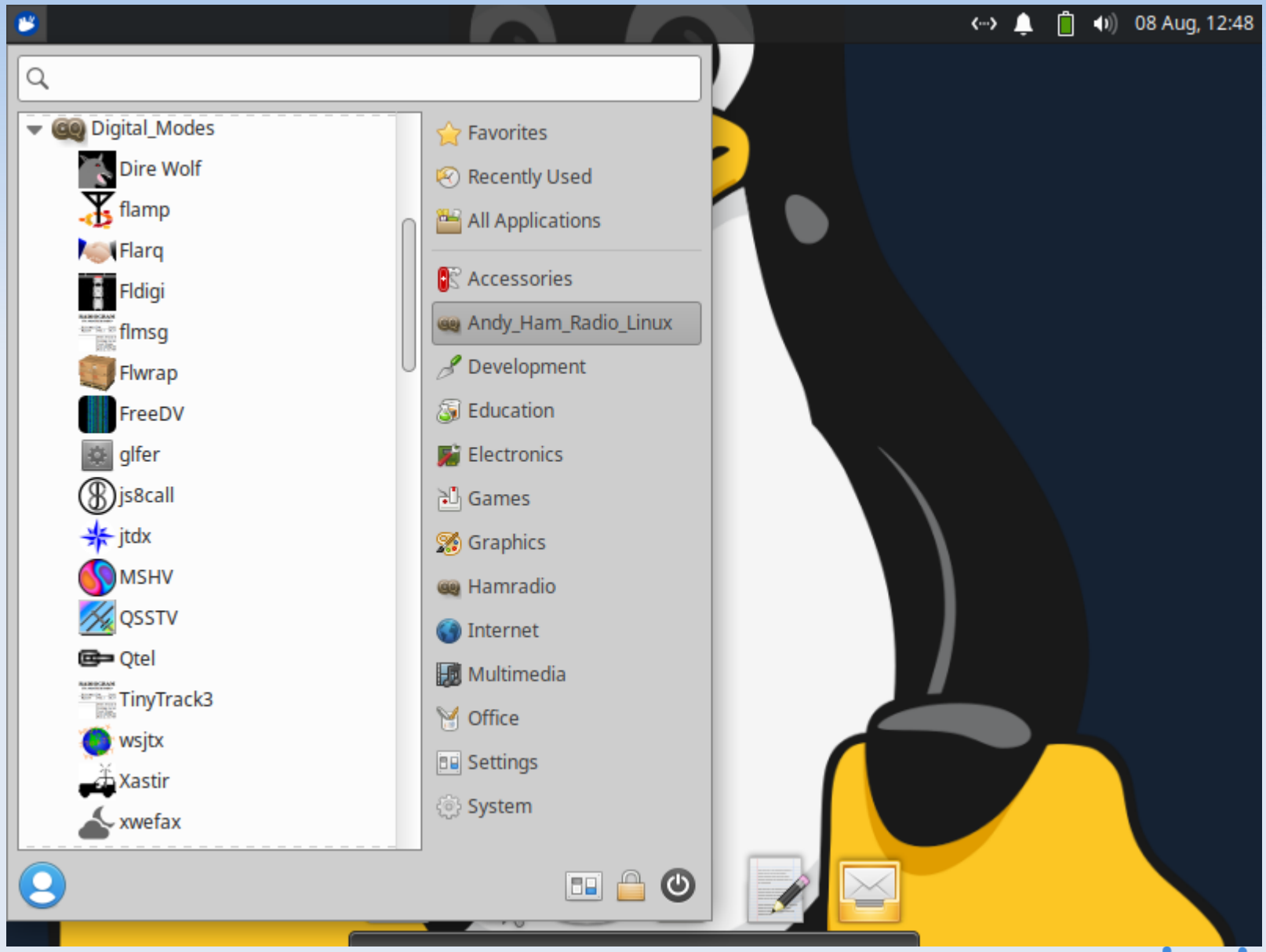
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CW and Fox Hunting



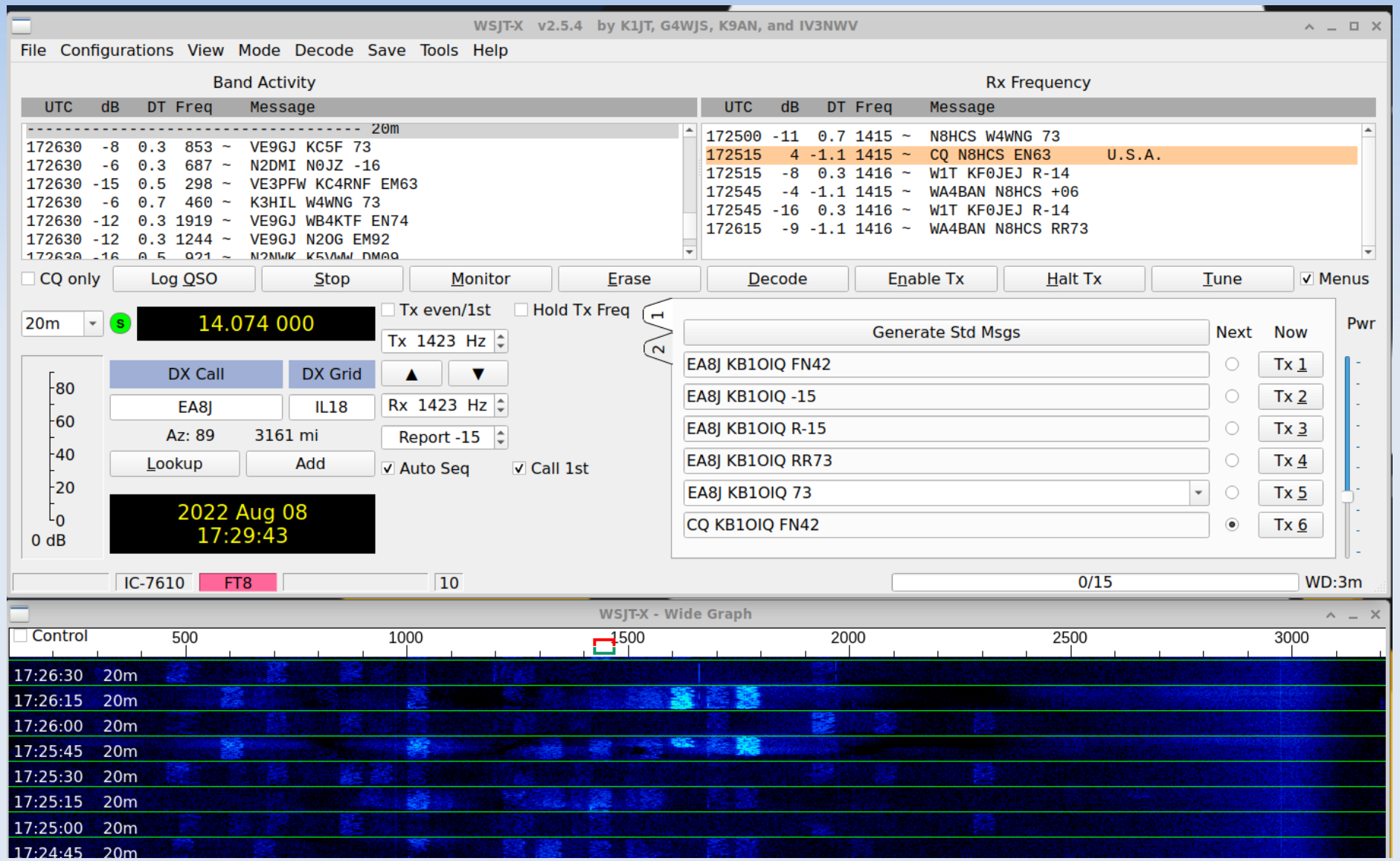
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Menu #2



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Digital Modes - wsjtx



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GridTracker

- GridTracker is not installed by default.
  - It will be included in the next AHRL release.
- I strongly encourage you to install it!
  - Read the local documentation for instructions.
- This is a MOST EXCELLENT program!
- Graphically manage grids:
  - Needed, Contacted but not confirmed, confirmed
- Talks to wsjtx
- Logs sent to LoTW and others

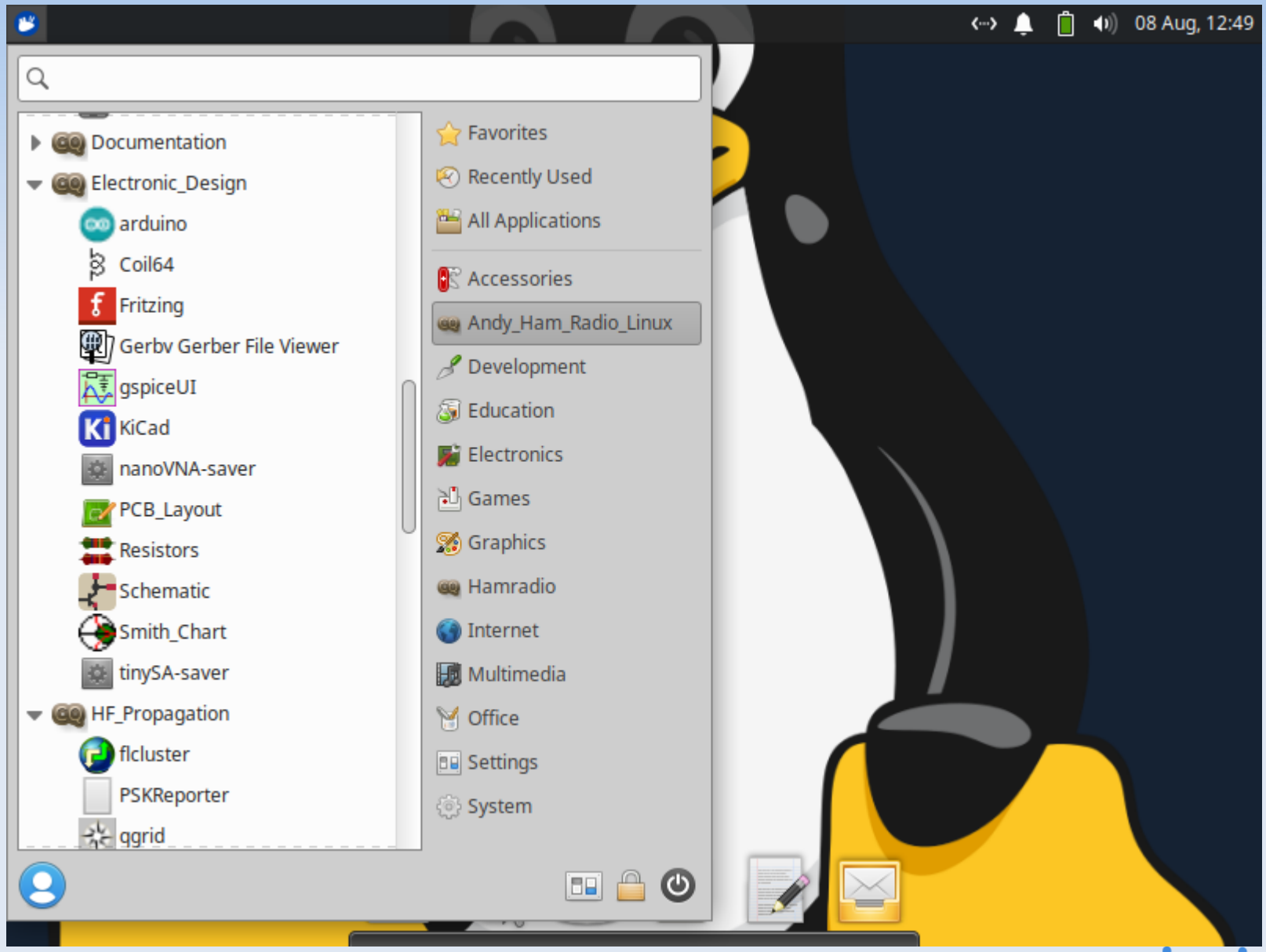
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GridTracker



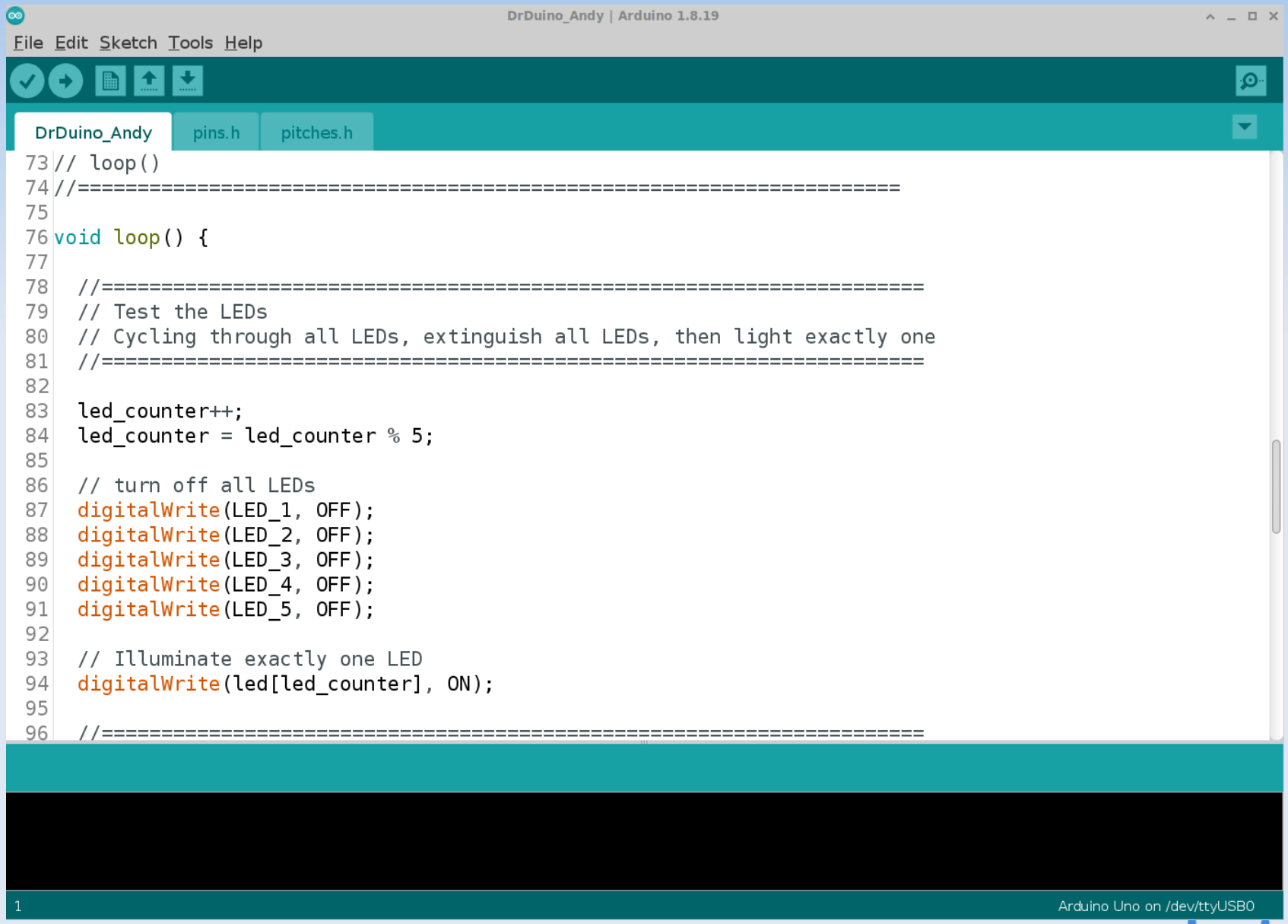
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Menu #3



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Electronic Design - arduino

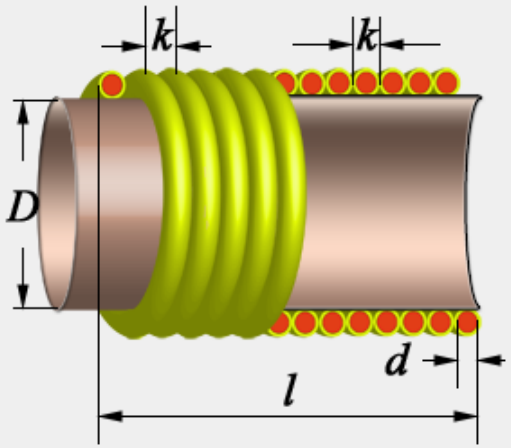


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Electronic Design - coil64

Coil64 v2.1.23

File Actions Additional calculations Ferrite cores Branded cores Customize Help



Select the coil form

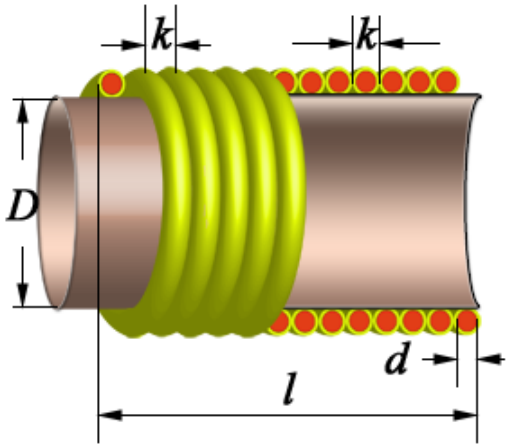
- One layer close-winding coil
- One layer coil with round wire
- One layer coil with rect wire
- One layer coil on a polygonal former
- Multilayer coil
- Multilayer coil with insulated pads
- Multilayer coil on a rectangular former
- Multilayer foil-wound coil
- Ferrite toroid coil
- PCB flat coil
- Tesla flat spiral coil

Coil | Inductance | LC circuit

Inductance L:	50	microH
Frequency f:	0.6	MHz
Former diameter D:	37	mm
Wire diameter d:	3	mm
Wire diameter with insulation k:	3.27	mm

Wire material:

- (•) Copper
- ( ) Silver
- ( ) Aluminum
- ( ) Tin



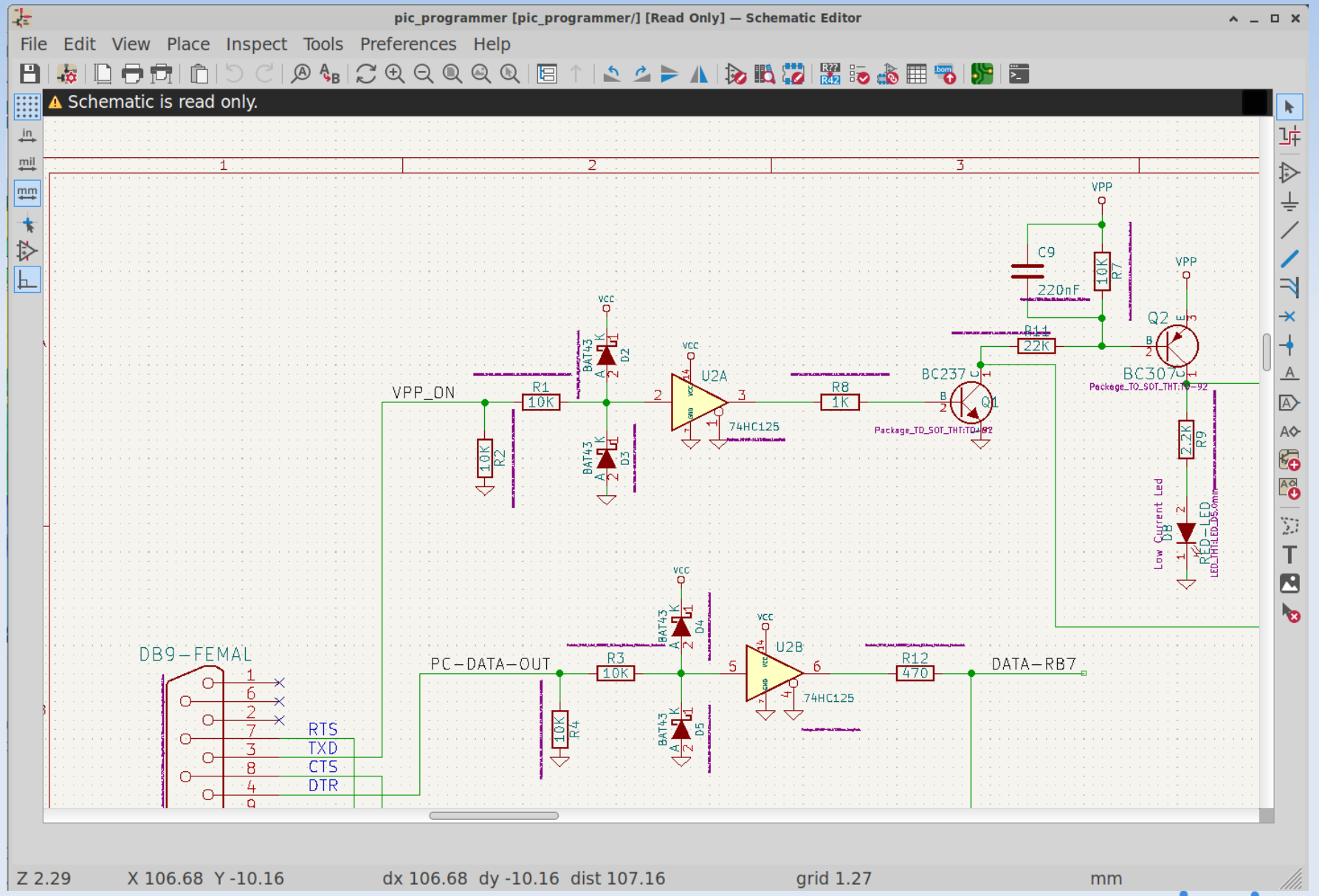
Input:
Inductance L: 50 microH
Frequency f: 0.6 MHz
Former diameter D: 37 mm
Wire diameter d: 3 mm
Wire diameter with insulation k: 3.27 mm

Result:
Number of turns of the coil N = 110.639
Length of wire without leads lw = 14.002 m
Length of winding l = 365.059 mm
Weight of wire m = 886.798 g
DC resistance of the coil Rdc = 0.034 Ohm
Reactance of the coil X = 188.496 Ohm

Self capacitance Cs = 4.554 pF
Coil self-resonance frequency Fsr = 17.551 MHz

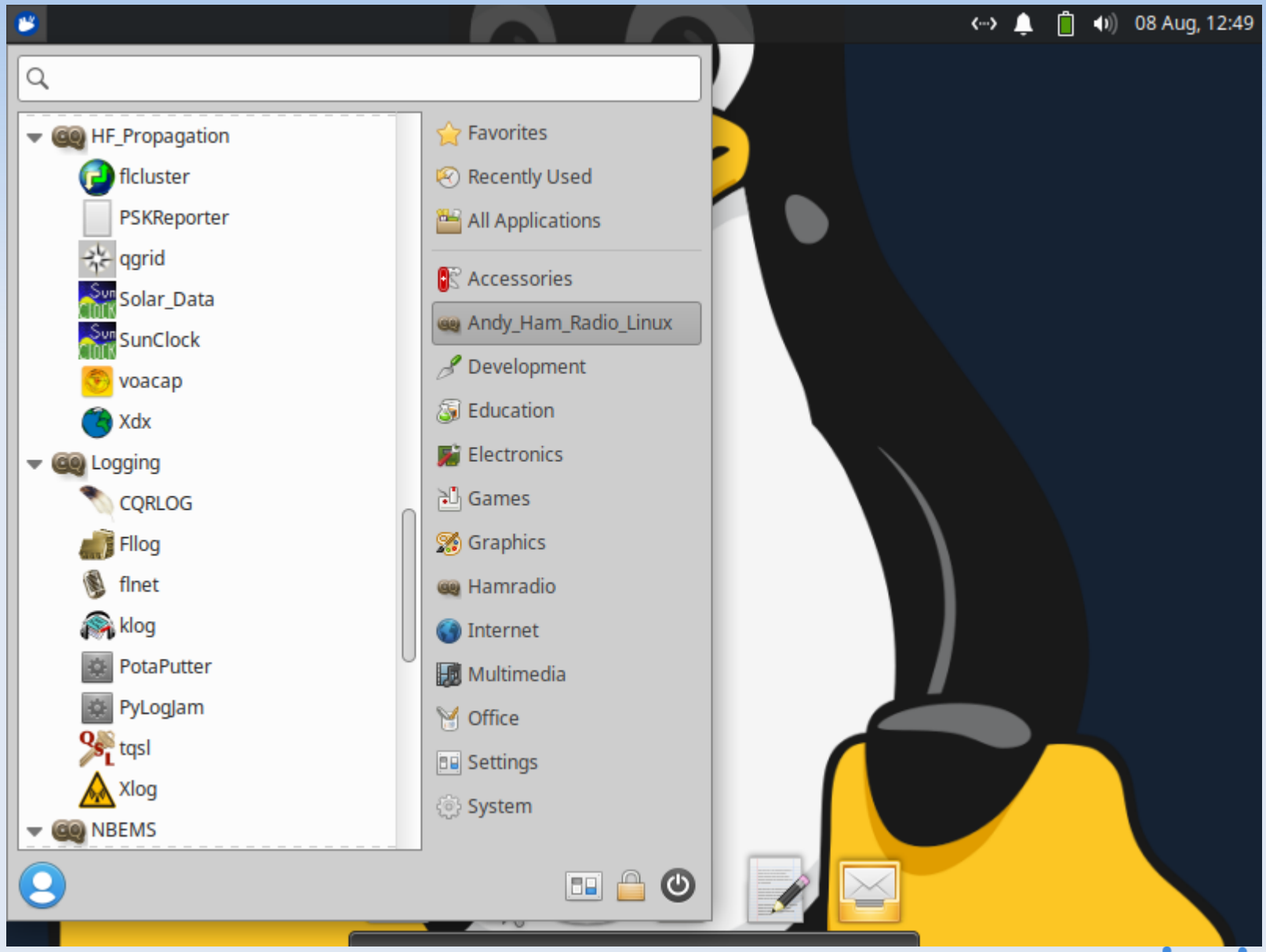
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Electronic Design - kicad



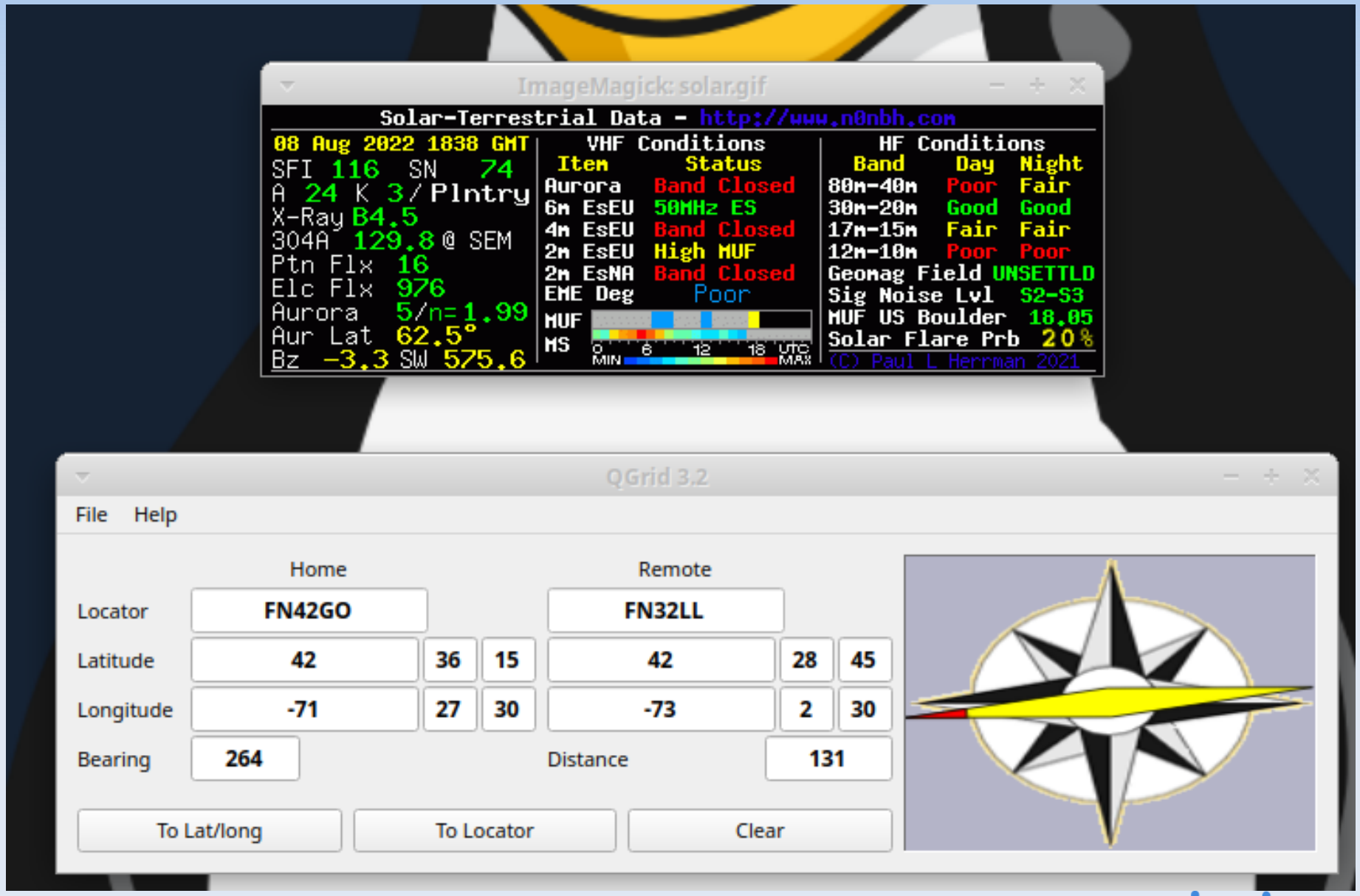
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Menu #4



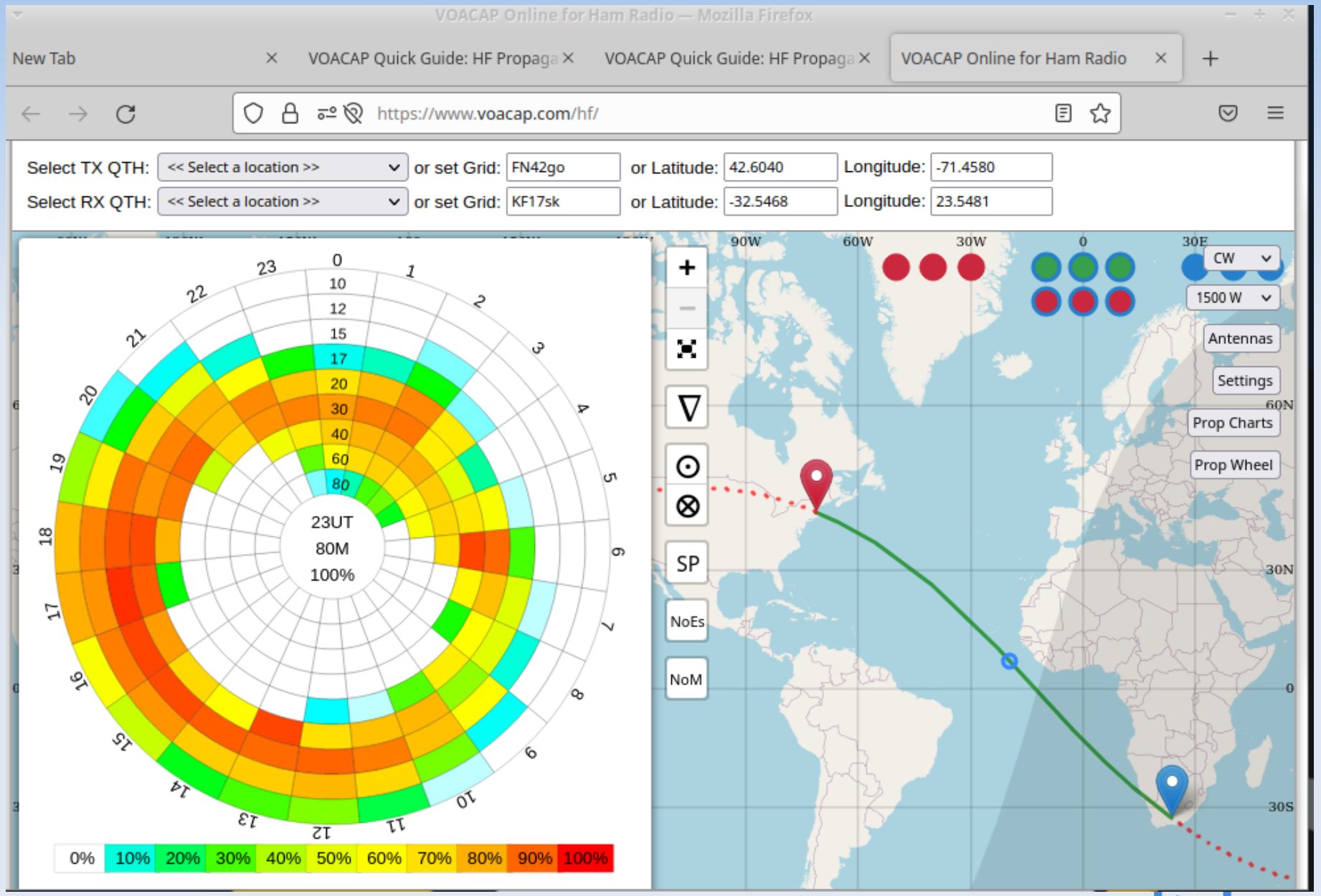
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HF Propagation #1



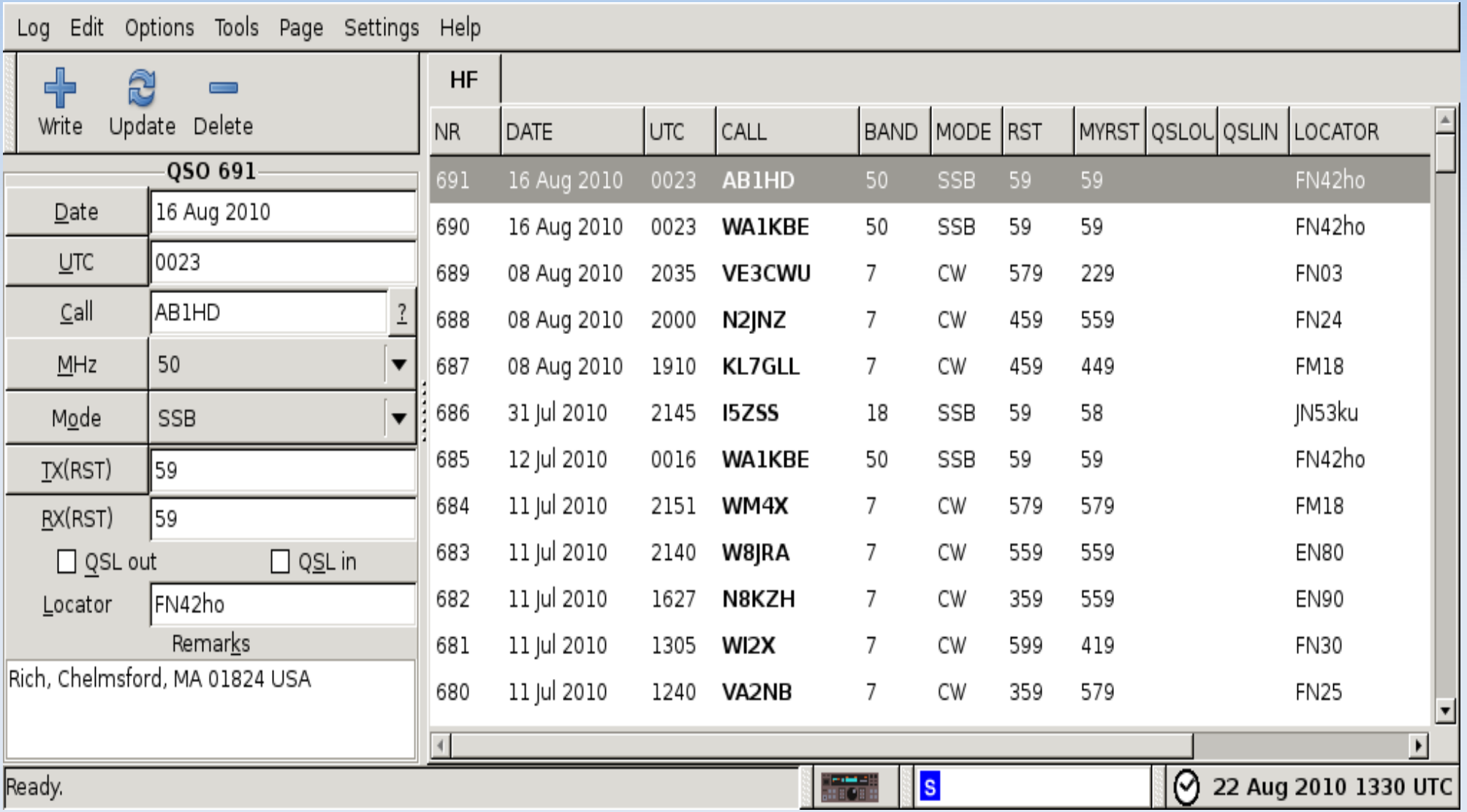
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HF Propagation #2



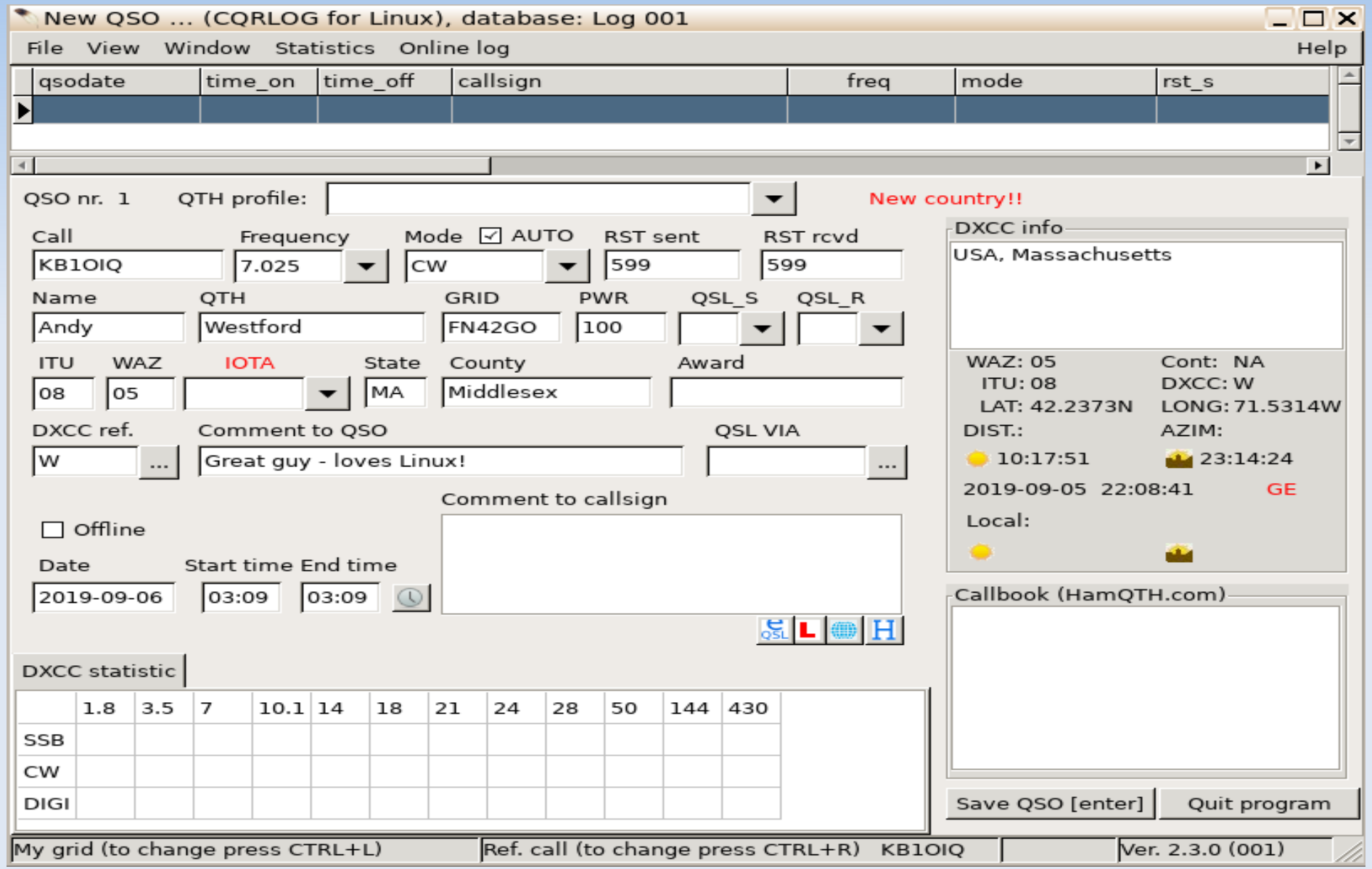
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Logging SW: Xlog



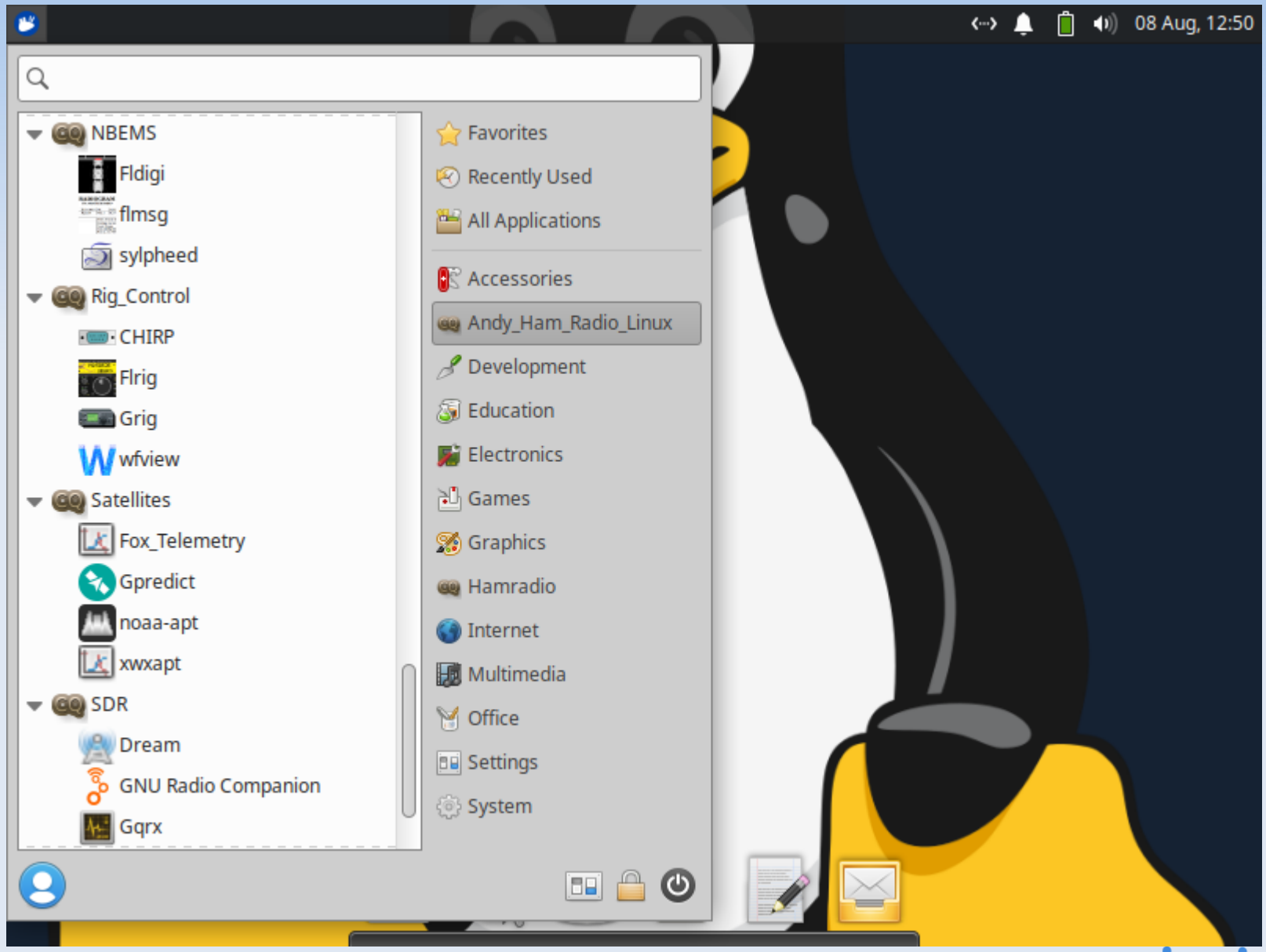
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CQRLOG



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Menu #5



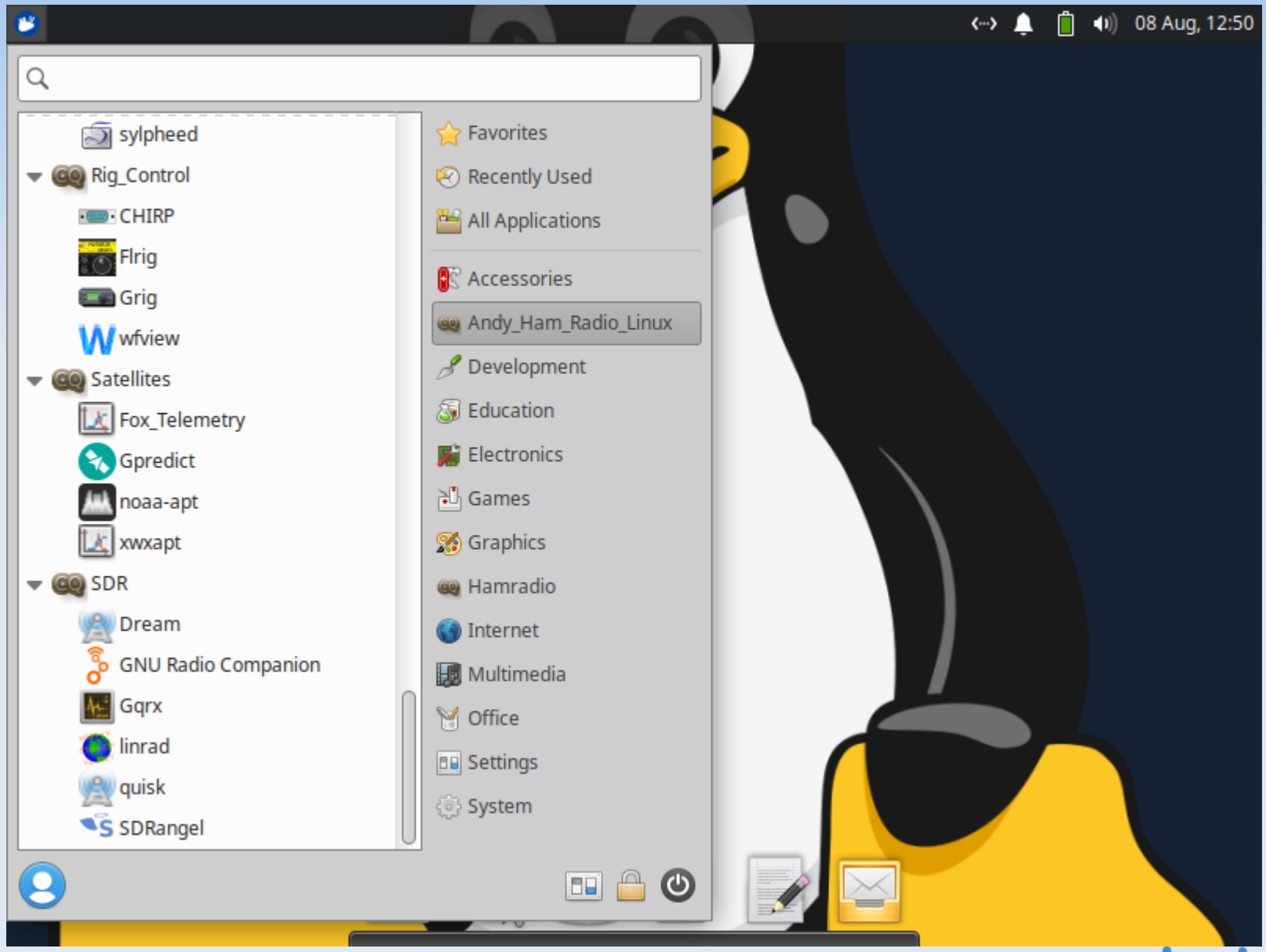
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NBEMS

- Narrow Band Emergency Messaging System
- Open Source software suite
- Runs on the 3 major operating systems
- No infrastructure required
- Used by EMCOMM folks
- Ties in with sylpheed email program

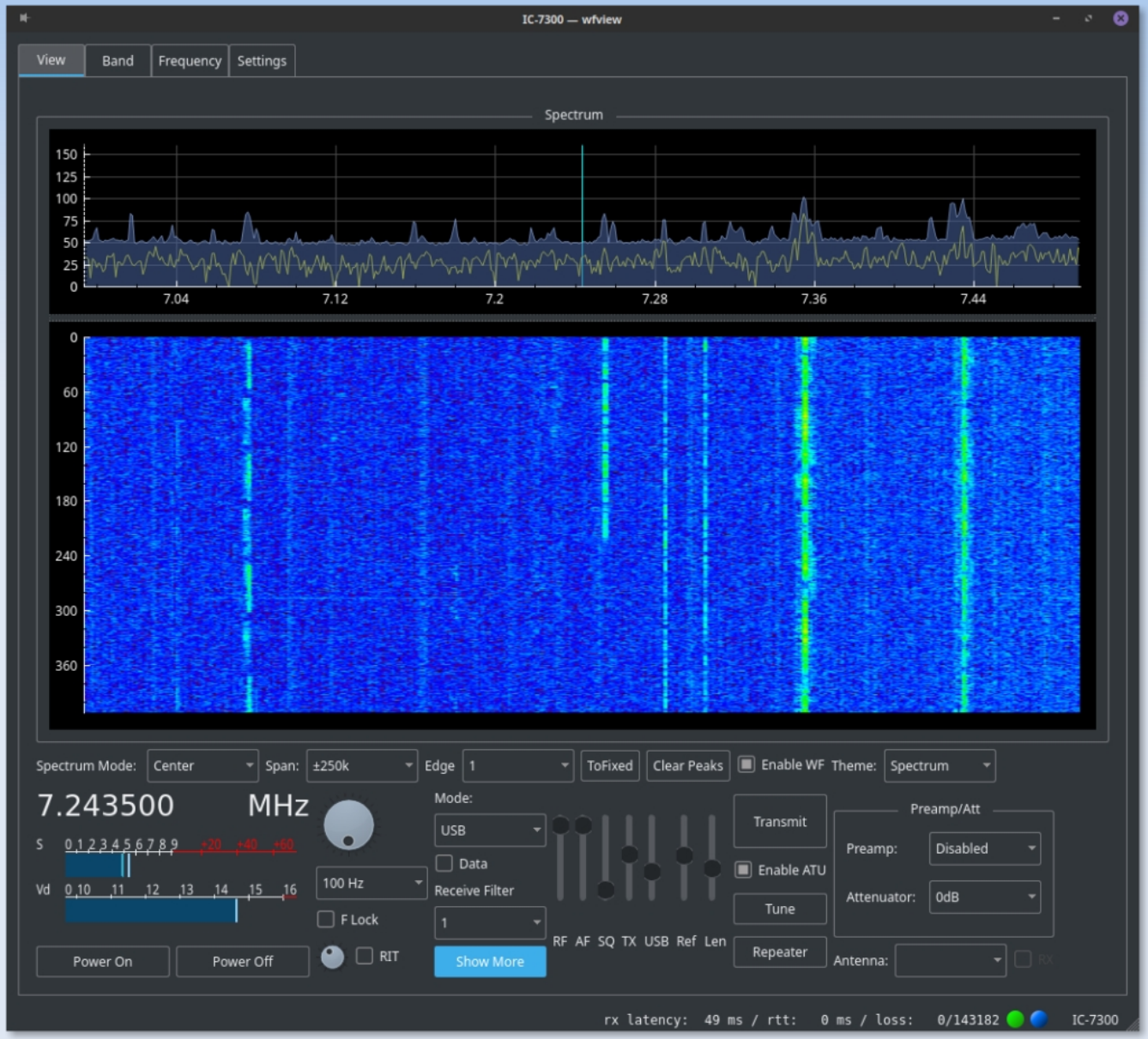
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Menu #6



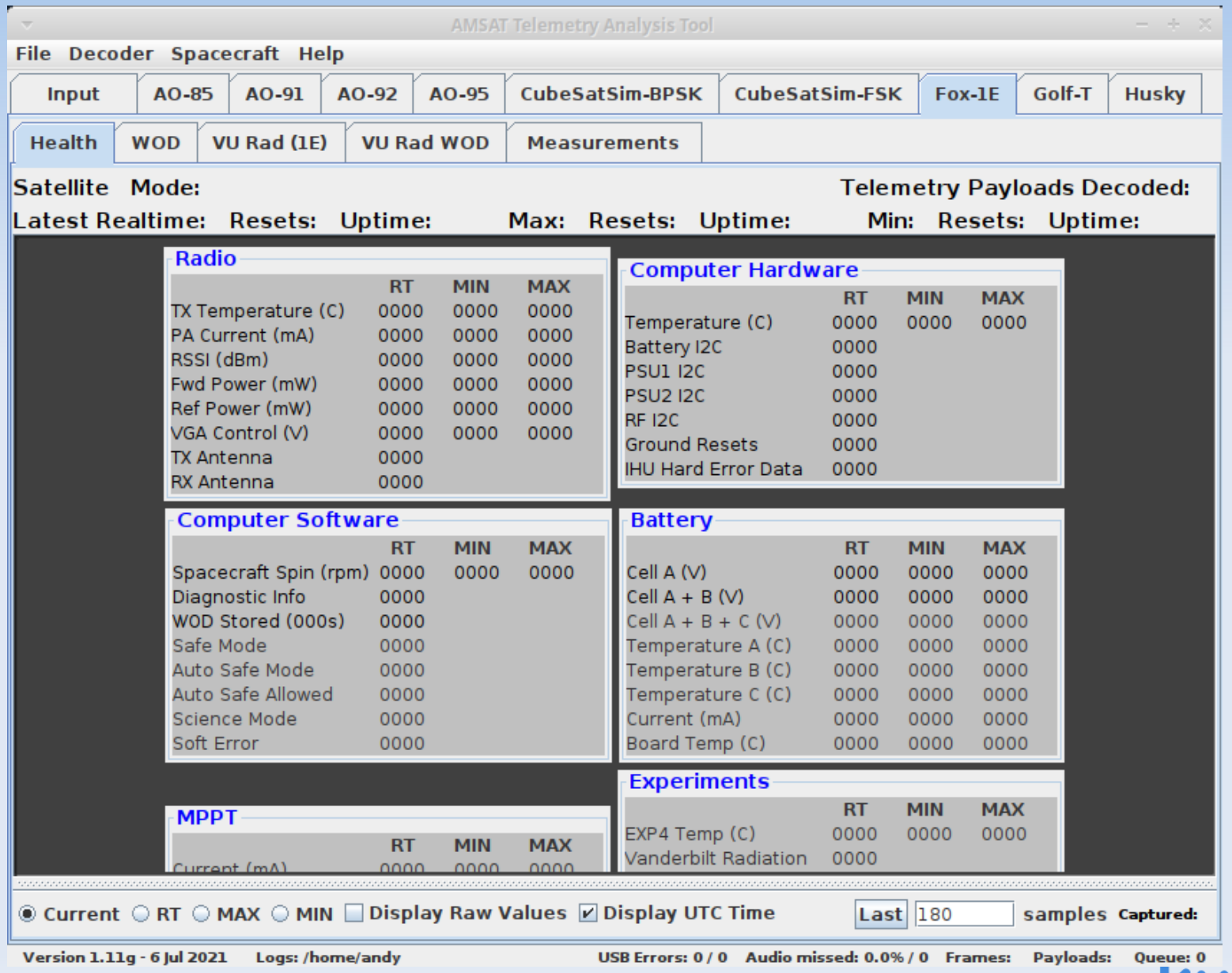
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Rig Control - wfview



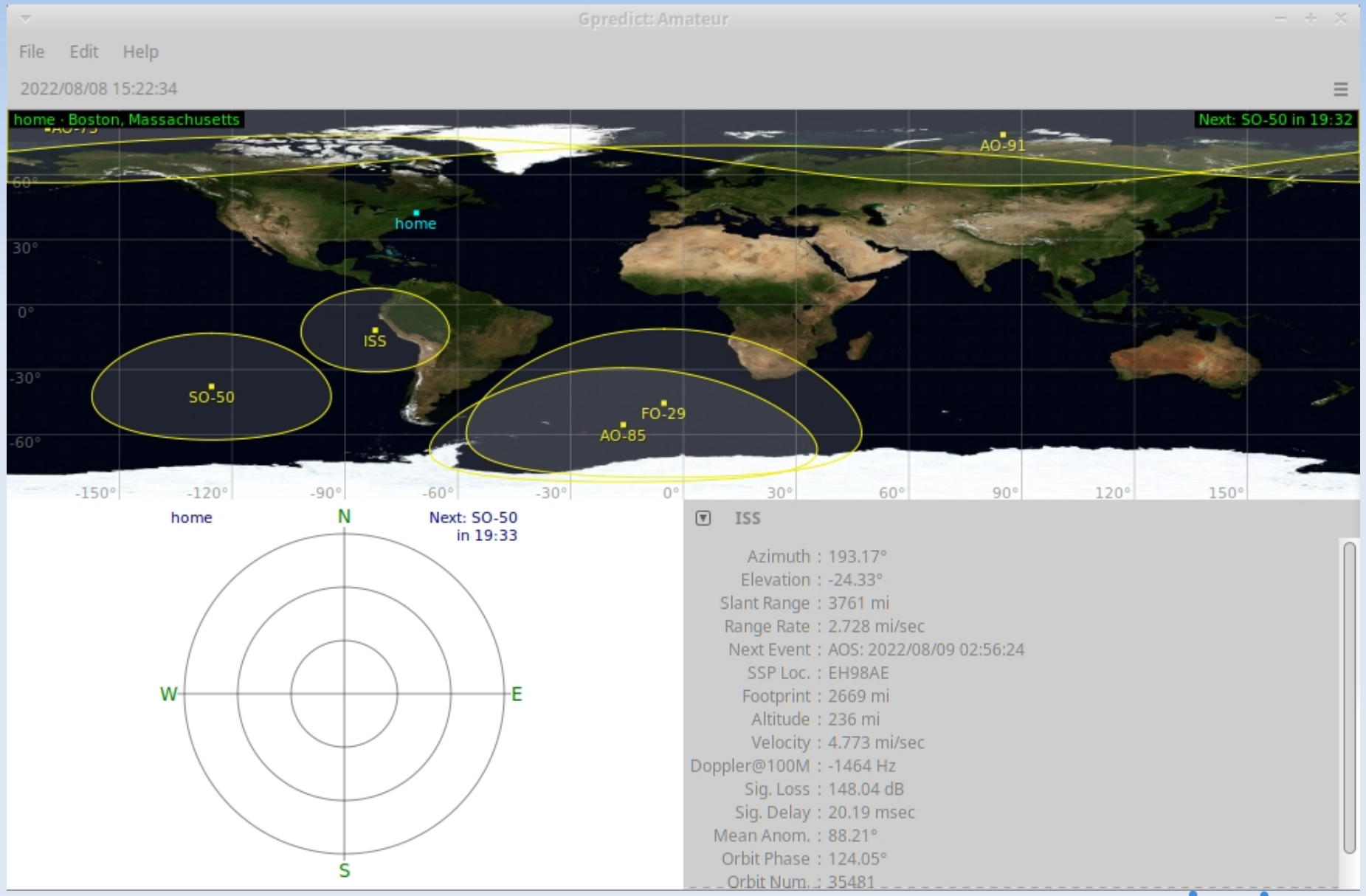
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Satellites - FoxTelem



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Satellites - gpredict



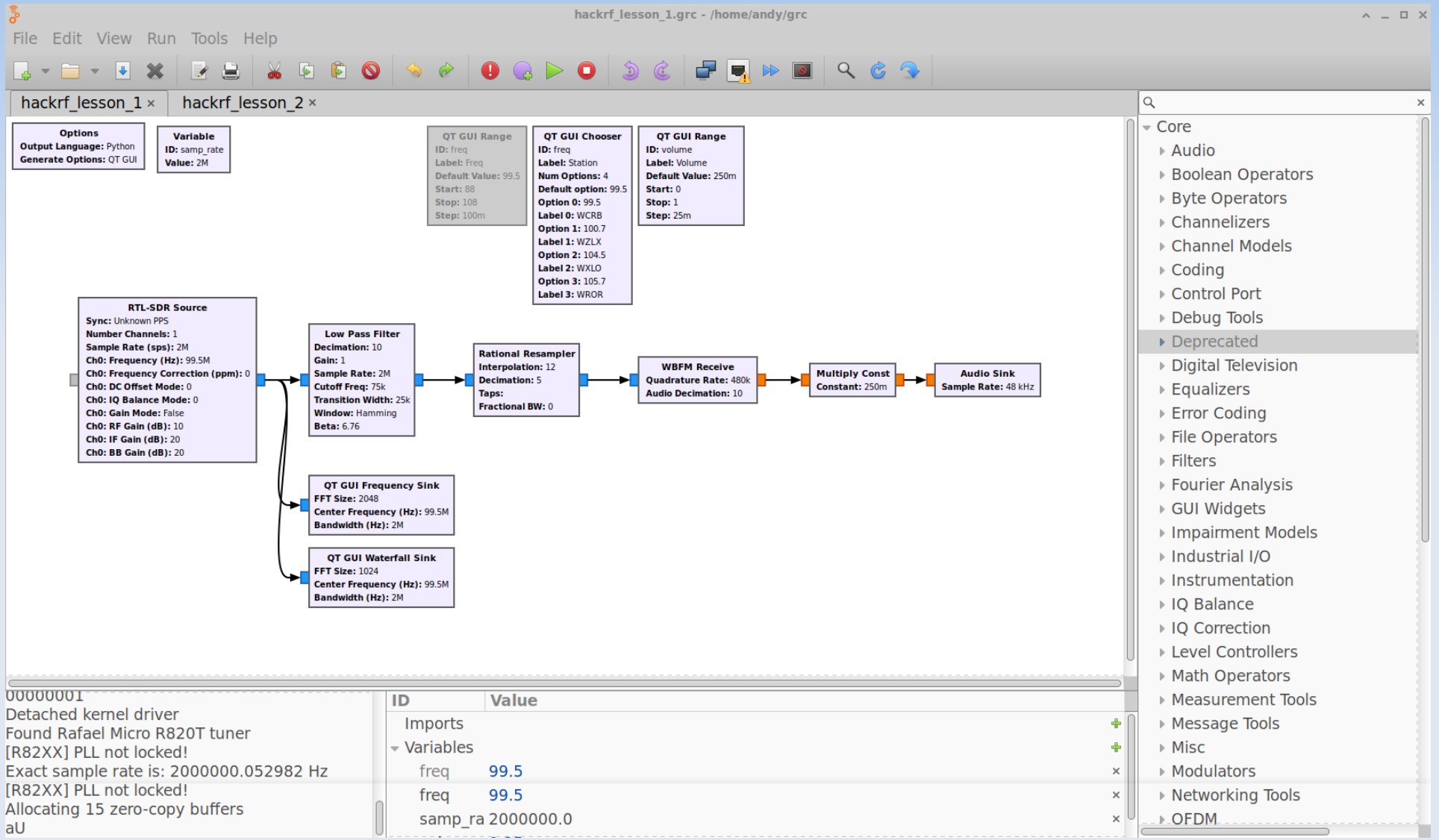
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SDR – GNU Radio Companion

- SDR = Software Defined Radio
- Draw a block diagram of your signal processing
- GRC will write the python code and execute it
- Supports SDR devices such as:
  - RTL-SDR dongle
  - HackRF
- Many tutorials are available online

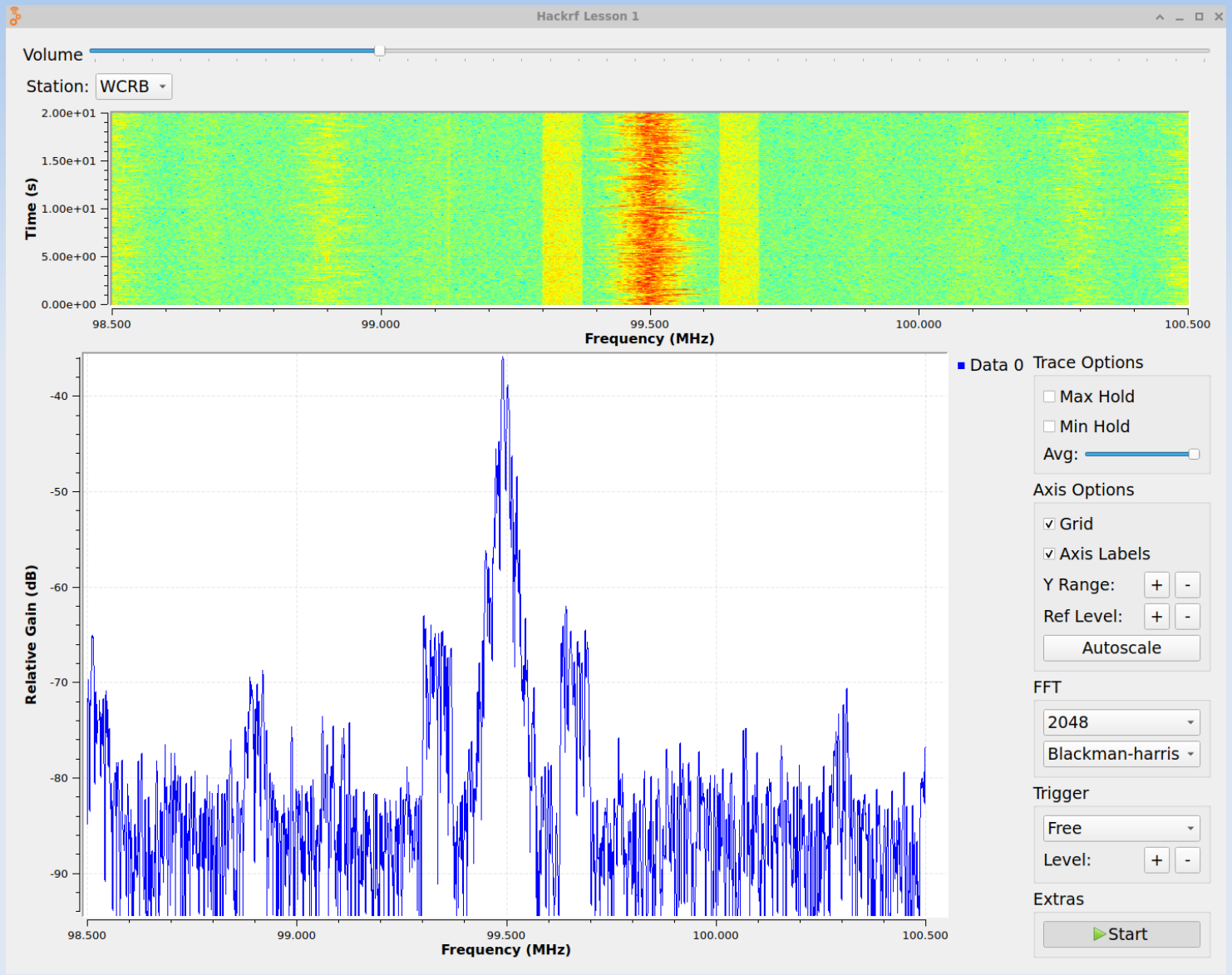
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SDR – GNU Radio Companion #1



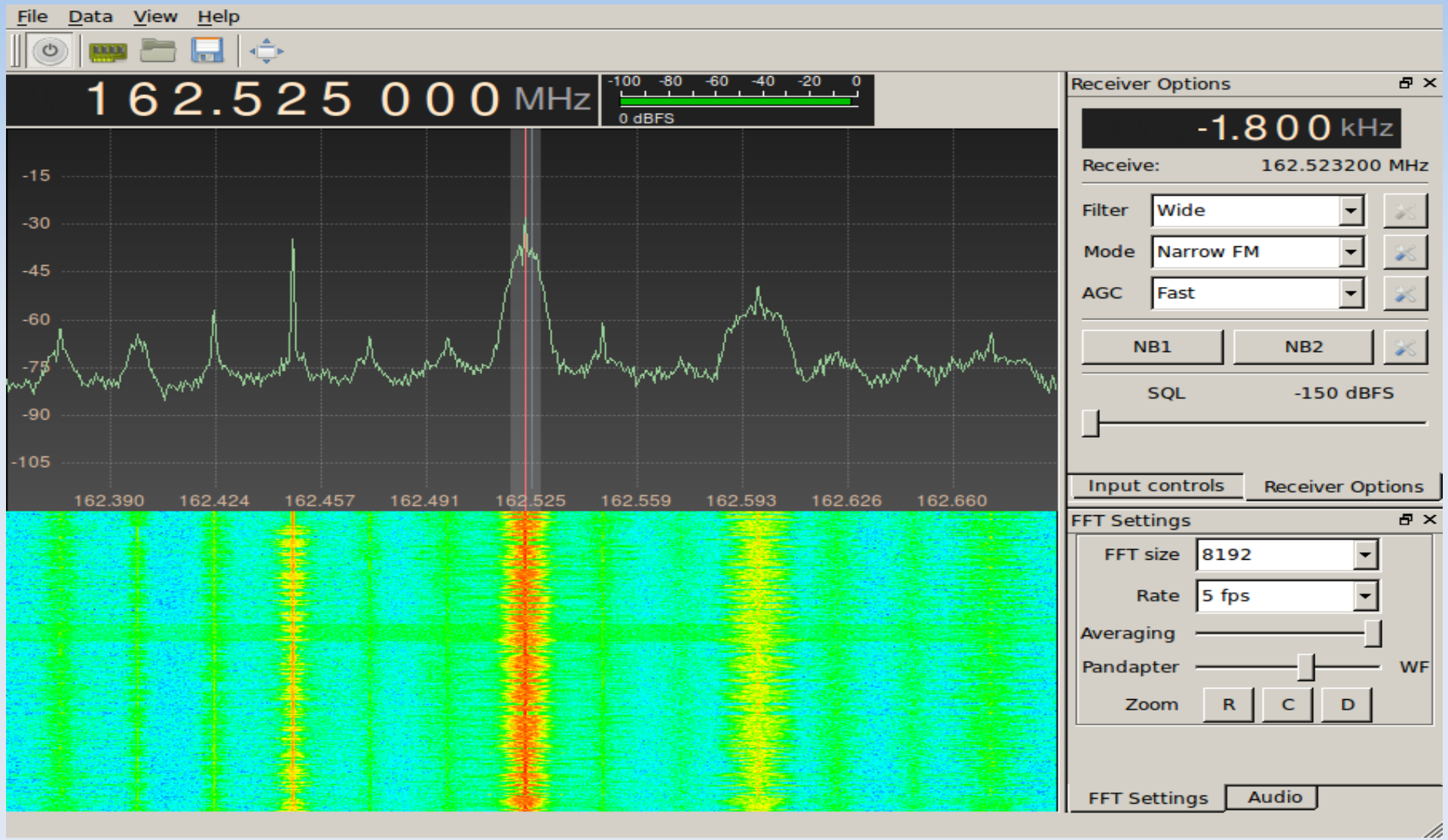
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SDR GNU Radio Companion #2



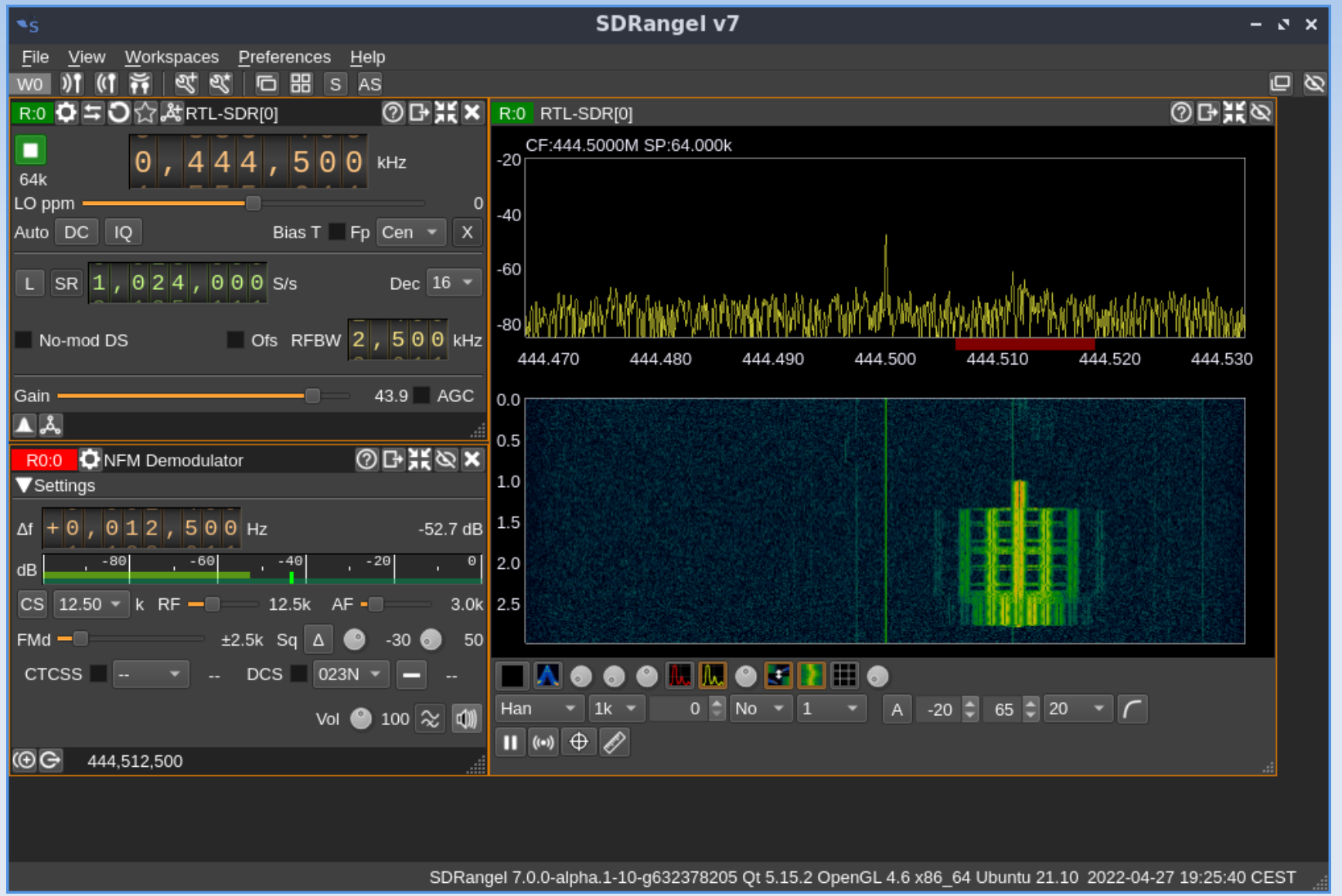
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SDR - gqrx



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SDR - sdrangel

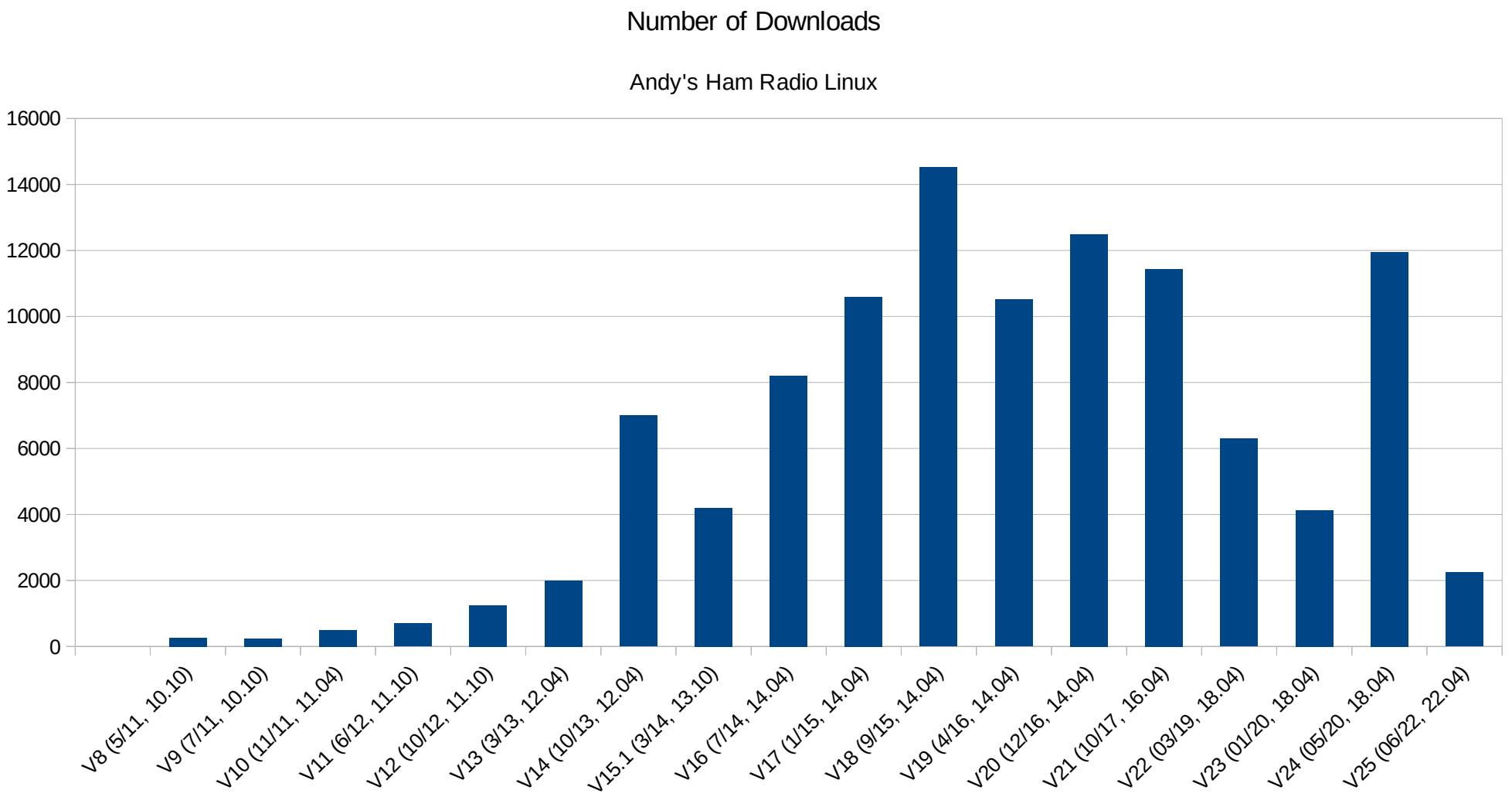


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What’s new and cool?

- Free Digital Voice (FreeDV)
  - Codec2: David (VK5DGR) Rowe
  - https://freedv.org/
- M17 Project
  - Low level protocols using Codec2
  - https://m17project.org/

Downloads



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Awarded 03/2022

- 11 years and 100,000 downloads later…….
- https://nediv.arrl.org/2022/03/02



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Sourceforge

- Go there: http://www.sourceforge.net
- Search for KB1OIQ
- Other ham radio programs are there
  - uBITX modified for blind amateur radio users
  - Bionics configuration programs
    - MicroFox, TinyTrack
  - Wordsworth – collaboration with K1IG
    - a way to learn CW
  - aa-analyzer for Rig Expert analyzers

Last Slide!

- Questions?
- Slides available:
  - Email: kb1oiq@arrl.net
- Thanks for coming to this talk!
- Have a lot of fun, and 73 de Andy KB1OIQ

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