Low Power Communications

Wires - MLA and low power

Stations: K3GO (EM90)

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Thank you – k3go@bellsouth.net John

WSPR (Weak Signal Propagation Reporter)

Station: K3GO (EM90)

Introduction to FT8, FT4 & WSPR

- FT8 and FT4 are digital communication modes designed for efficient, reliable QSOs under weak-signal and noisy propagation conditions.

- All modes are part of the WSJT-X suite developed by Joe Taylor (K1JT) and his team, building upon the success of earlier weak-signal modes such as JT65 and WSPR. WSPR is part of the WSJT-X which may be selected in your configuration.

WSPR-Weak Signal Protocols

- WSPR, or "Weak Signal Propagation Reporter," is a radio protocol and software application for amateur radio operators that uses low-power, Weak Signal Digital communications to test and monitor radio propagation paths. Developed by Joe Taylor, K1JT, the software encodes a station's callsign, location, and power into slow, 2-minute transmissions that can be decoded by other WSPR stations even with signal-to-noise ratios well below the threshold of audibility.

WSPR Features

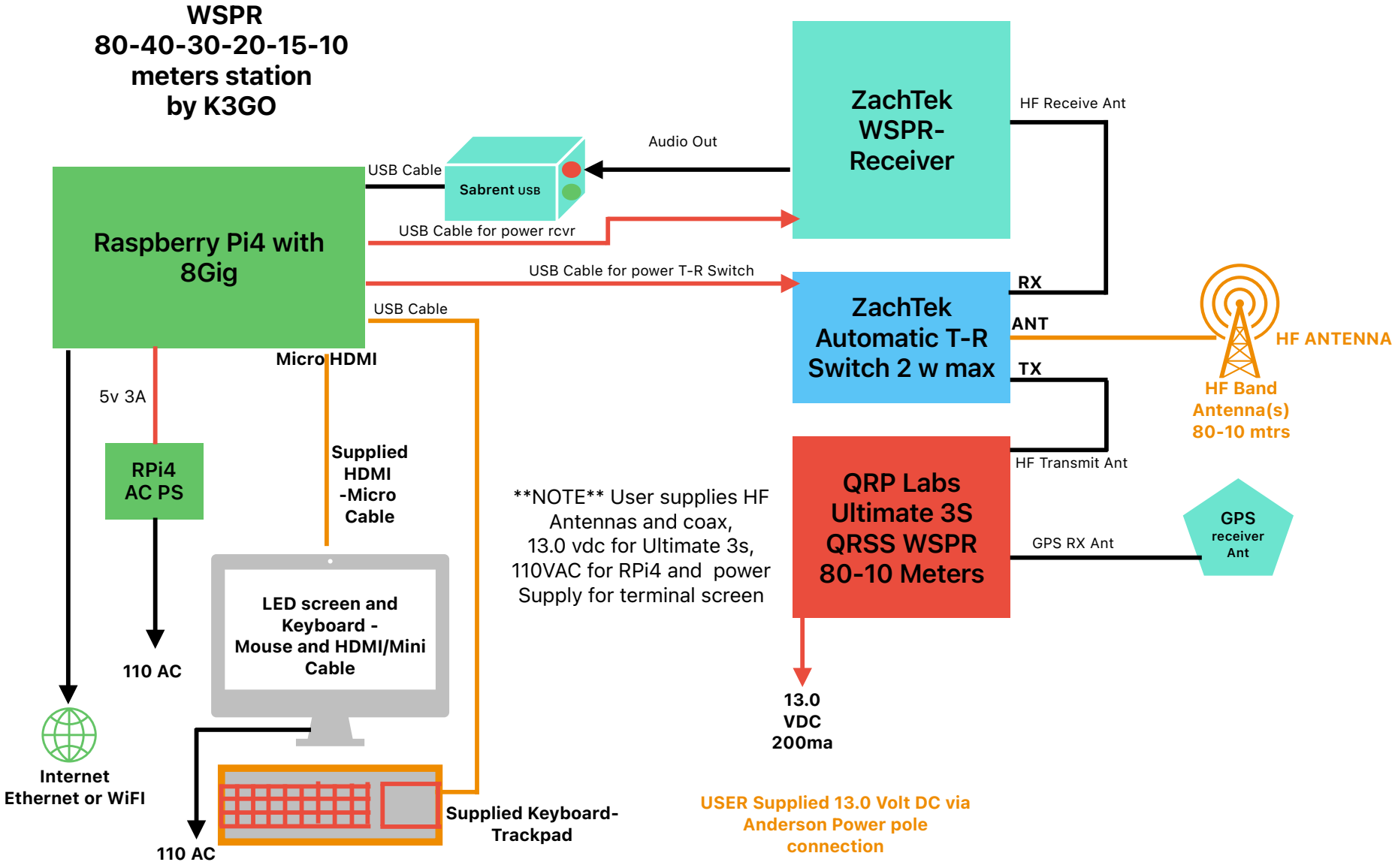
(Weak Signal Propogation Reporter)

- **Low power**: WSPR is designed for ultra-low-power transmission, often using just 5 watts or less. It is highly effective even with milliwatt power levels, allowing signals to be received across oceans.
- **Highly sensitive**: The WSPR protocol is extremely sensitive and can decode signals with a signal-to-noise ratio as low as -28 dB. This means it can pick up transmissions that are well below the threshold of human hearing.
- **Automated reporting**: WSPR stations automatically upload their reception reports to a central database called *WSPRnet.org*, creating a global, real-time map of propagation paths.
- **WSPR Live –** get app on your phone – tablet - https://wspr.live/#:~:text=Wspr%20Exporter%20The%20Wspr%20Exporter,the%20Database%20with%20wsprnet.org.
- **Narrow bandwidth**: A WSPR transmission occupies a very narrow bandwidth of only about 6 Hz. This allows many stations to operate within a small 200 Hz segment of an amateur radio band without interfering with each other.
- **Digital protocol**: WSPR uses a digital signal processing technique with strong forward error correction (FEC) to ensure messages can be successfully decoded even when signals are extremely weak

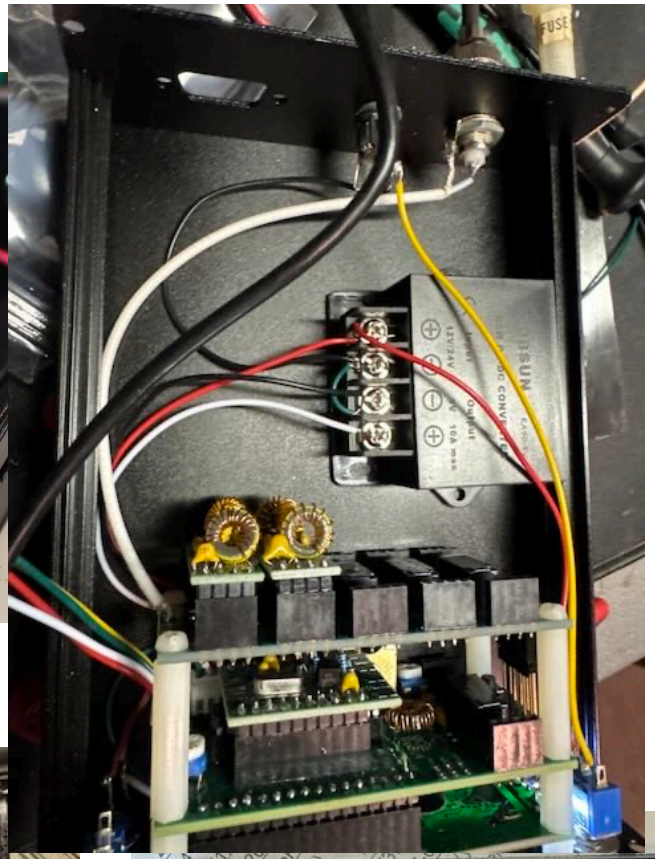
WSPR Components - build

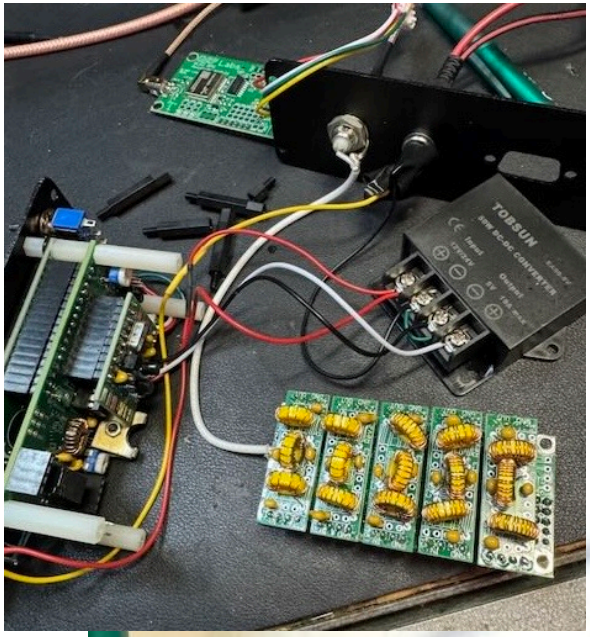
- I selected the QRP Labs Ulitimate 3S QRSS/WSPR transmitter. I use it with the GPS rec module to provide accurate clock for transmit.
- It does all modes and builds out to 6 bands
- Use the Zacktek all band WSPR receiver and Zacktek TX/RX switch good for 2 watts.
- I use the Sabrent USB Sound Card module for WSPR receiver decode
- I selected the RPi4 Raspberry Pi4 8 Gig w/32gig SD card as the terminal OS of choice.
- I bought inexpensive monitor (Ingnok Portable Monitor, Ultra Slim 15.6 Inch)
- Used a Jelly Comb keyboard/mousepad

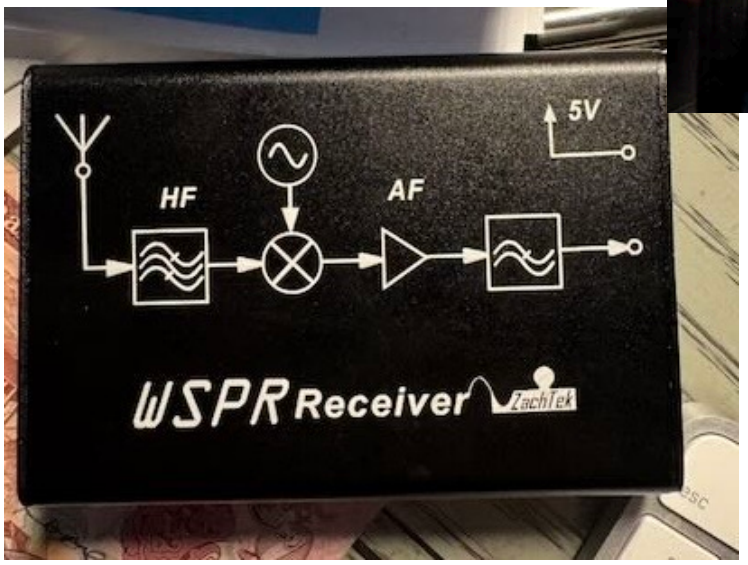
WSPR Station Layout

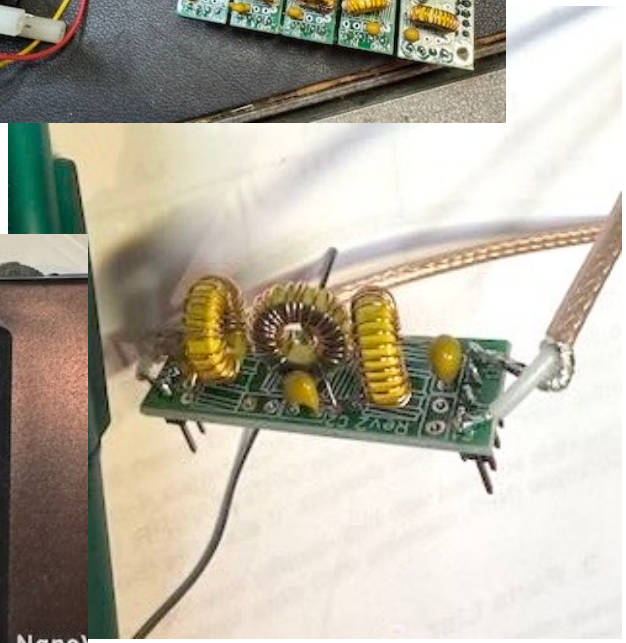


QRP Labs & Zachtek WSPR build

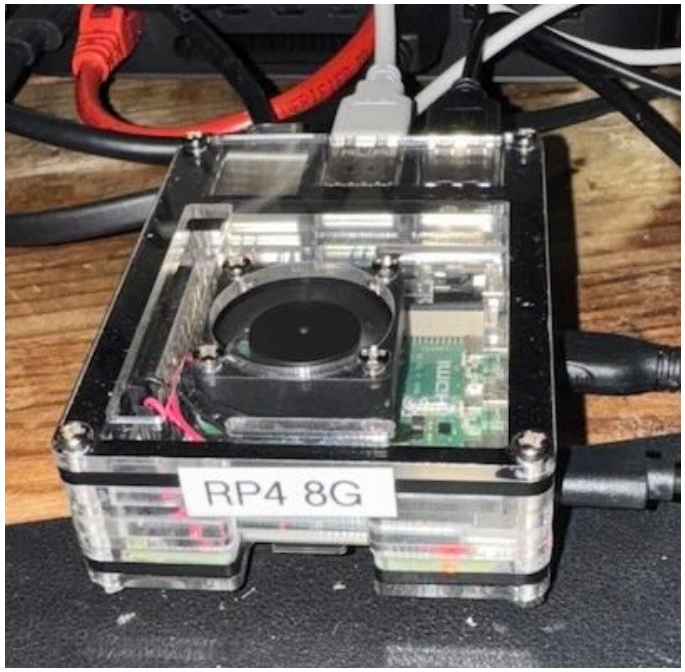


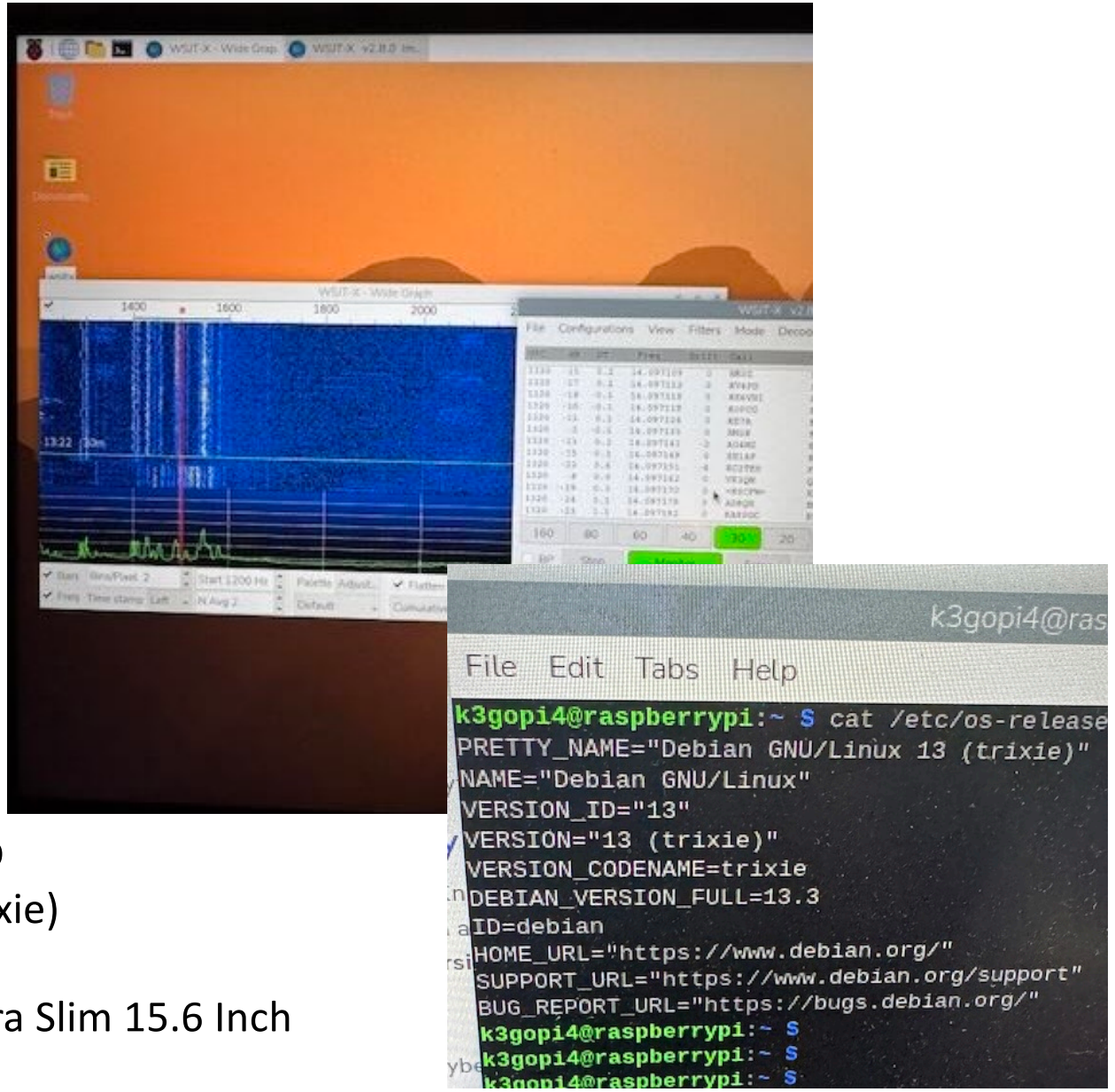






Data Processing and Control





WSJT-x ver 2.0
Raspberry Pi4 8Gig and 32 Gig SD
OS is Debian GNU/Linux 13.3 (Trixie)
Screen is from Amazon-
Ingnok Portable Monitor, Ultra Slim 15.6 Inch

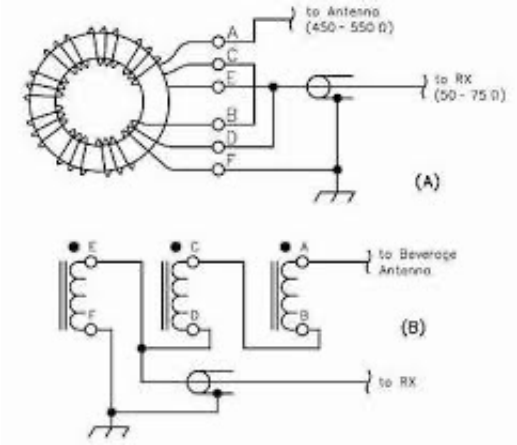
Antenna and Stuff

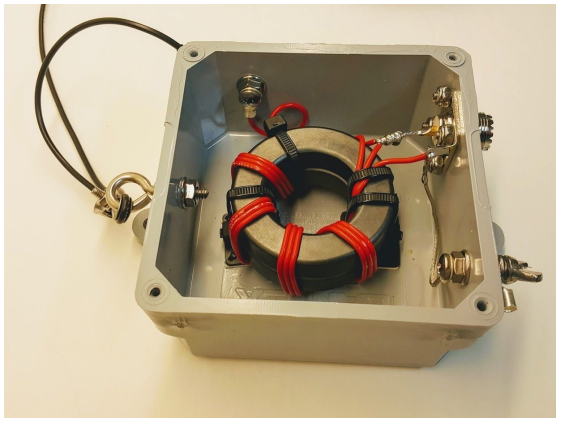
- Baluns
- EFLW
- MLA

Operating Now –

Baluns

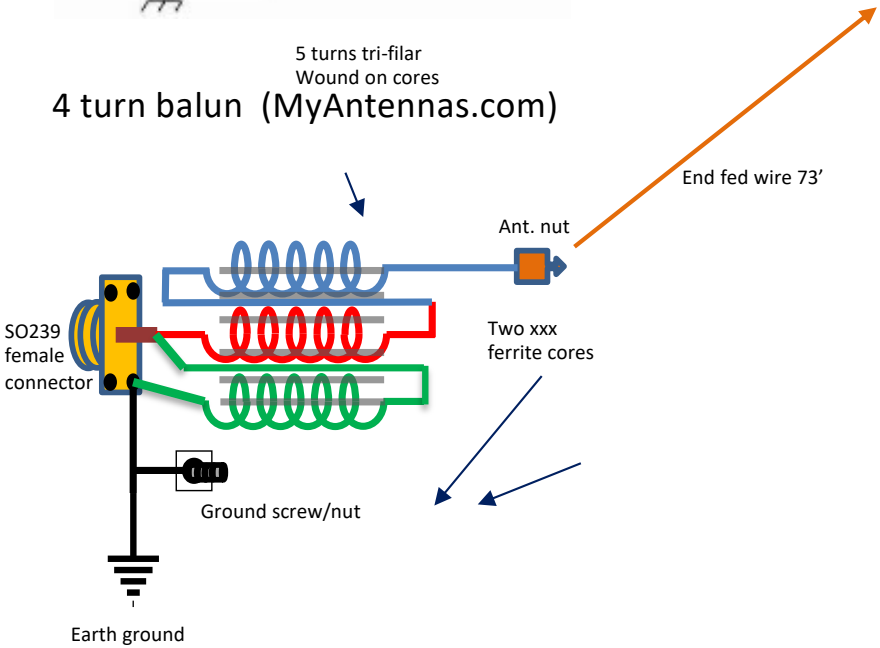
- Balun for EFLW





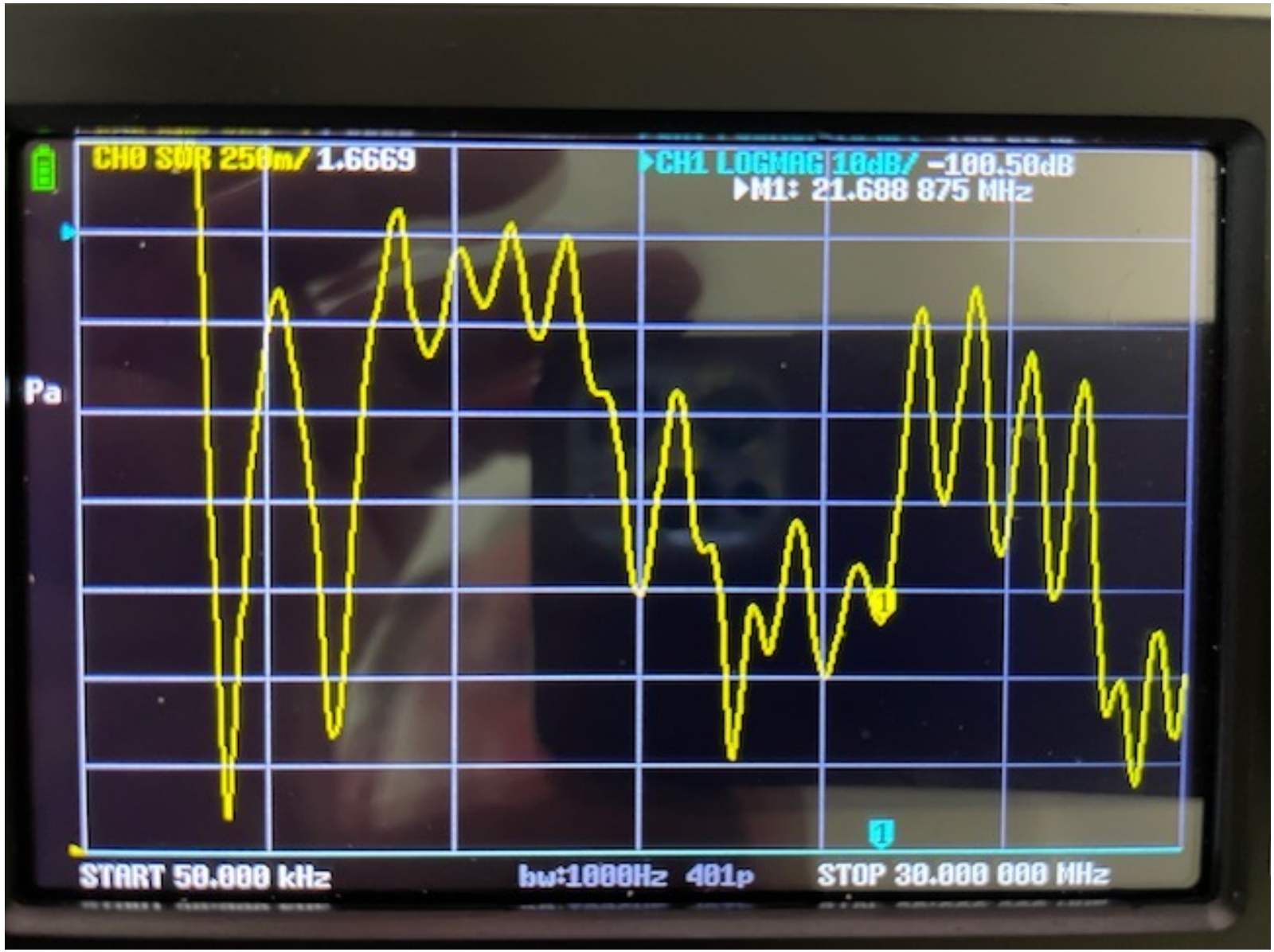
5 turns tri-filar
Wound on cores

4 turn balun (MyAntennas.com)



EFLW 9:1 in the tree 72’

EFLW – 9:1 balun 72 feet



MLA (1” tubing)

Currently in my driveway
See next pages for active
Chart of stations heard on 20 meters
0.5 watts !

On vacation in Ga. Mountains

MLA on Current 20Mtrs Today

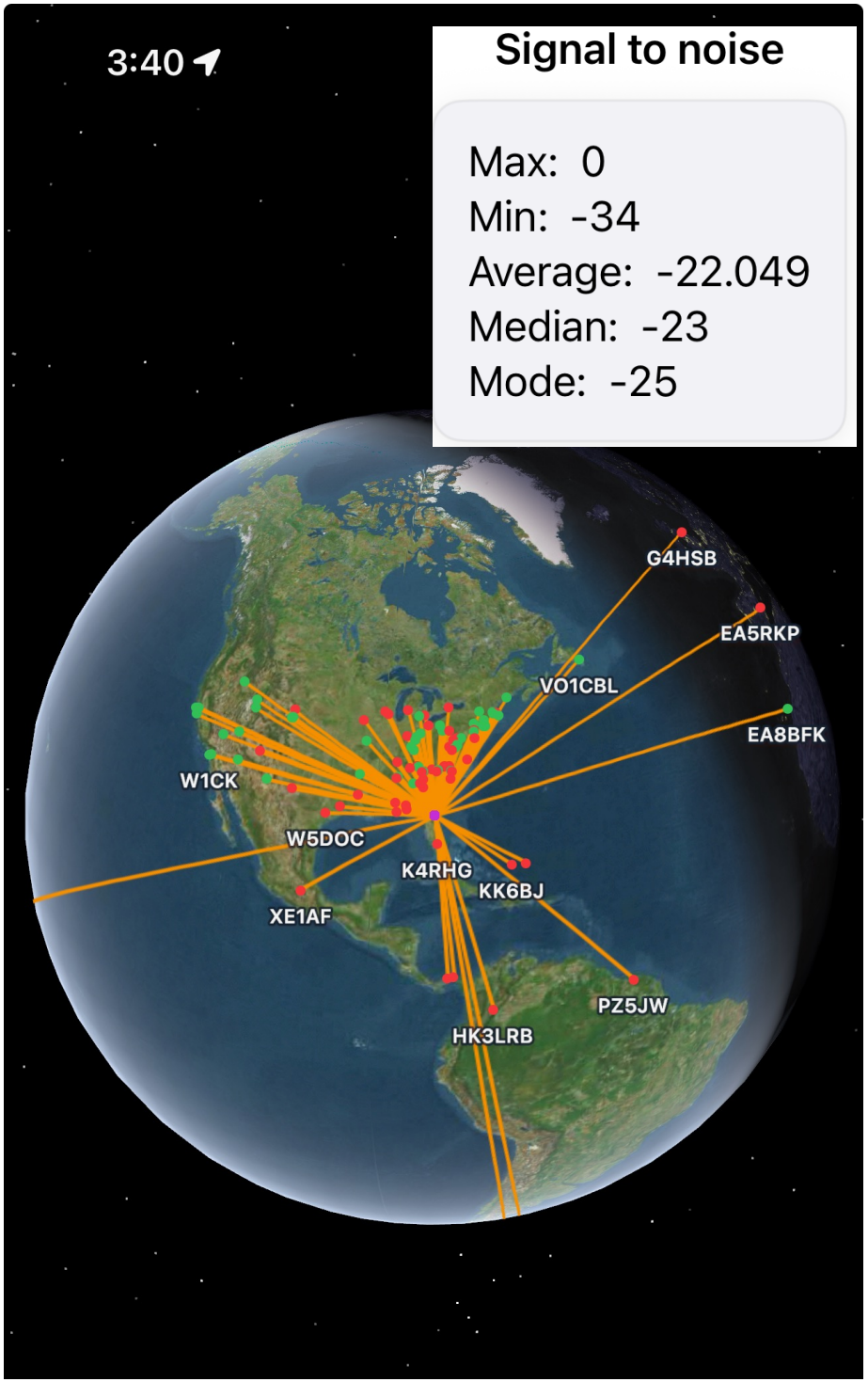
03.03.2026

Note G4, EA5 being heard while EA8 hears
My transmitter at 0.5 watt

3D2 out in pacific and South pole

Distance

Total: 422,580.126 mi
Max: 9,045.919 mi
Min: 242.956 mi
Average: 823.743 mi
Median: 596
Mode: 449



Summary: Antenna metrics (spots, avg SNR, avg distance)

Antenna	Spots	Unique Callers	Avg SNR	Min SNR	Max SNR	Avg Dist (km)	Max Dist (km)	Reporter Points (with lat/lon)
EFLW72Feet	512	33	-13.3	-31.0	10.0	4483.18	12039.0	512
MLP1" 20M	458	46	-14.06	-30.0	3.0	1305.8	11893.0	458

DXCC & QRO

DXCC can be achieved with FT8 and FT4 as a digital mode – I completed my 80 Meter DXCC using FT8 and 100 watts on a dipole.

- This enabled me to collect my 5 Band DXCC plaque.

Thanks for your time- reach out to me for questions

John K3GO https://www.qrz.com/db/K3GO

Websites:
https://qrp-labs.com/
https://www.zachtek.com/