

QRP with the QMX+ 160m-6m multimode radio by QRPLABS

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What is QRP?

QRP radio operations involve amateur radio transmissions using low power, generally 5 watts or less for CW (Morse code) and up to 10 watts for SSB. Derived from the Q-code "reduce power" (QRP), this, specialized, often portable, hobby focuses on:

- maximizing range with minimal energy,
- enhancing skills in antenna design, and
- operating from remote locations with lightweight, battery-powered gear.

QRP Operations

Key Characteristics

- **Power Limits**

- **CW (Morse Code):** 5 watts or less
- **SSB (Single Sideband):** Up to 10 watts peak envelope power (PEP)

- **Challenges**

- Operating at low power presents unique challenges, including:
- Weaker signals that can be difficult to receive.
- Variability in radio propagation conditions.

- **Techniques for Success**

- **Optimized Antennas:** Using efficient antenna systems to maximize signal strength.
- **Enhanced Operating Skills:** Developing skills to improve communication effectiveness.
- **Special Modes:** Utilizing modes like QRSS (very slow Morse code) to improve reception or FT8

QMX+ Features

- Full 160m to 6m band coverage
- CW, FSK Digi, and SSB (USB/LSB) modes
- All features of QCX+ (VFO A/B/Split, RIT, Message and frequency memories, beacon, keyer, etc)
- 3-5W output at 12V supply (can be built for 3-5W at 9V supply)
- SWR bridge built in
- Internal RTC powered by the common CR2032 coin cell battery (battery not included)
- Single signal digi mode transmission (zero unwanted sideband, zero residual carrier, zero intermodulation distortion)

QMX+ Features (cont)

- Solid-state band switching and transmit/receive switching under CAT control
- High performance embedded SDR SSB receiver with 60-70dB of unwanted sideband cancellation
- Built-in 24-bit 48ksps USB sound card
- Built-in USB Virtual COM Serial port for CAT control
- Si5351A Synthesized VFO with 25MHz TCXO as standard
- Easy to build single-board design, Professional quality 6-layer, through-hole plated, silk-screen printed PCBs
- All SMD components factory assembled

QMX+ Features (cont)

- Connectors: 2.1mm power barrel connector, USB-C (for audio and CAT control), BNC RF input/output, 3.5mm jacks for audio out, paddle/GPS/mic/PTT in, and PTT out
- Built-in test signal generator and testing tools
- GPS interface for frequency calibration, real time clock and location (internal WSPR beacon)
- IQ output mode for use with SDR software
- Switched mode regulators Receive current 80mA, Transmit current 1.0-1.1A for 5W output with 9V supply (around 0.7A for 5W with 12V supply).
- Internal microphone ready for the future SSB firmware
- Optional aluminum extruded cut/drilled/laser-etched black anodized enclosure
- Weight: 578 grams including enclosure

QMX+



QMX+



QMX+power

- 12v NOT 13.8v VERY IMPORTANT
- Two options
- Battery pack with trigger cable
- Buck/Boost converter

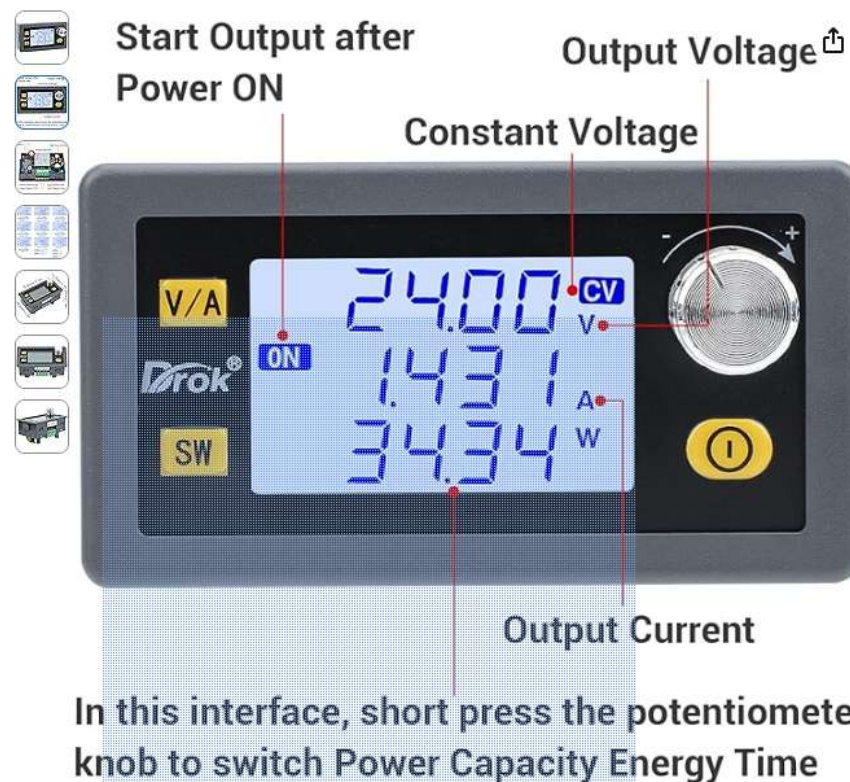
Battery pack and Trigger cable

- Thanks to Jerry (N5SGM)
- Works great for CW and SSB



Buck/Boost converter

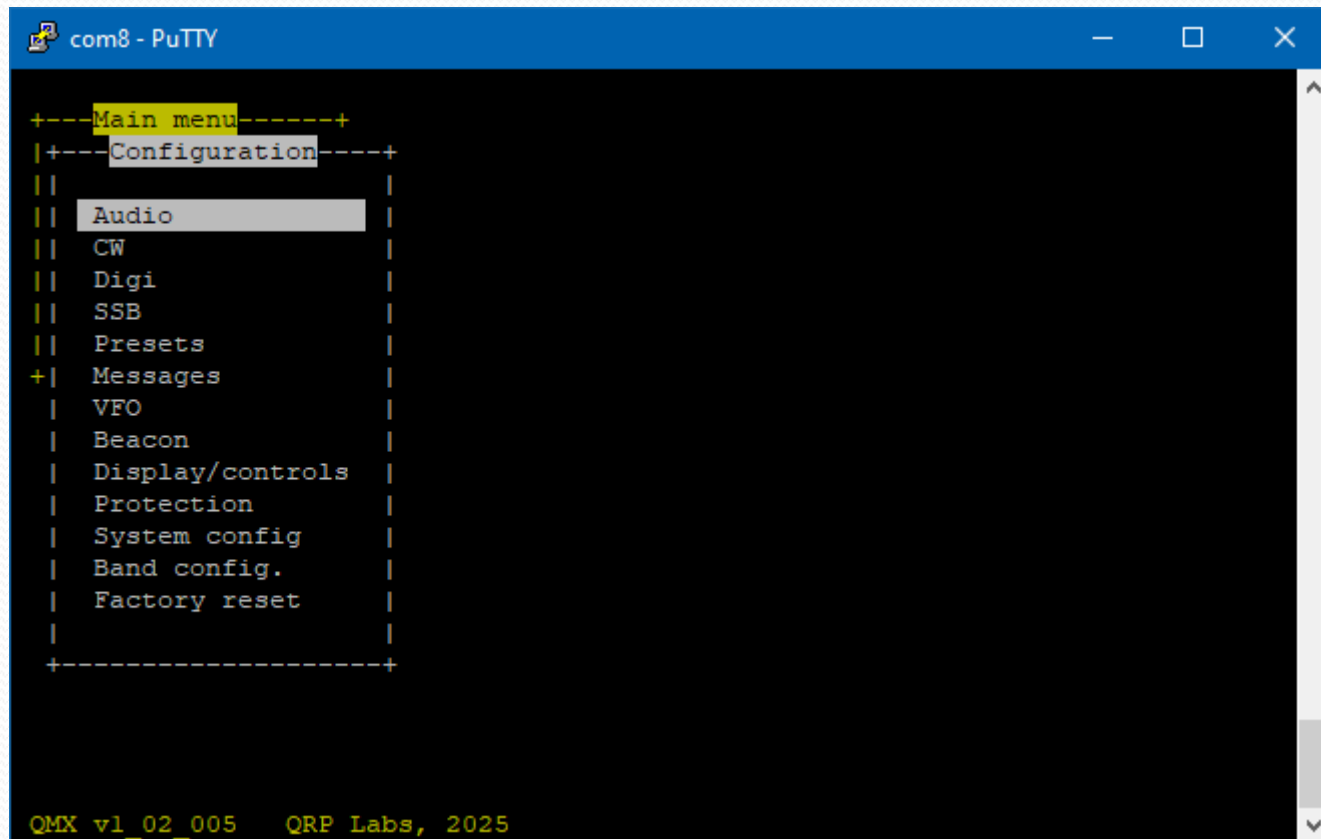
https://www.amazon.com/dp/BoBQC163CW?ref_=ppx_hzsearch_conn_dt_b_fed_a_sin_title_1&th=1



Connection to PC

- Single USB-C cable
- Use terminal emulation to access menus
- QMX+ has 24bit soundcard and CAT control for digital modes

Menus



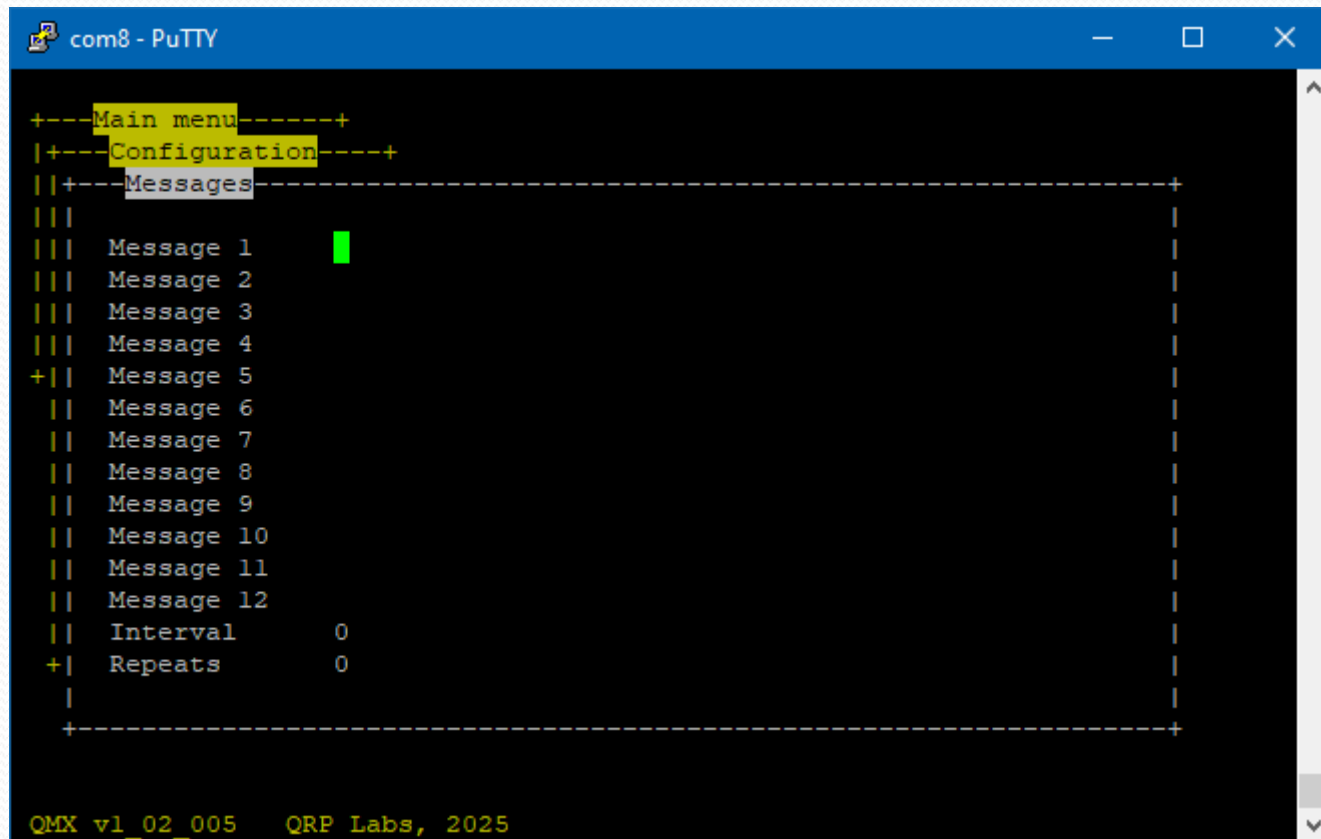
The image shows a PuTTY terminal window titled "com8 - PuTTY". The terminal displays a menu system with a yellow highlight on "Main menu" and a grey highlight on "Audio". The menu structure is as follows:

```
+---Main menu-----+
|+---Configuration---+
||
|| Audio
|| CW
|| Digi
|| SSB
|| Presets
+| Messages
| VFO
| Beacon
| Display/controls
| Protection
| System config
| Band config.
| Factory reset
+-----+

QMX v1_02_005  QRP Labs, 2025
```

The terminal window has a blue title bar with standard Windows window controls (minimize, maximize, close). A vertical scrollbar is visible on the right side of the terminal area.

Preset Messages/Beacons



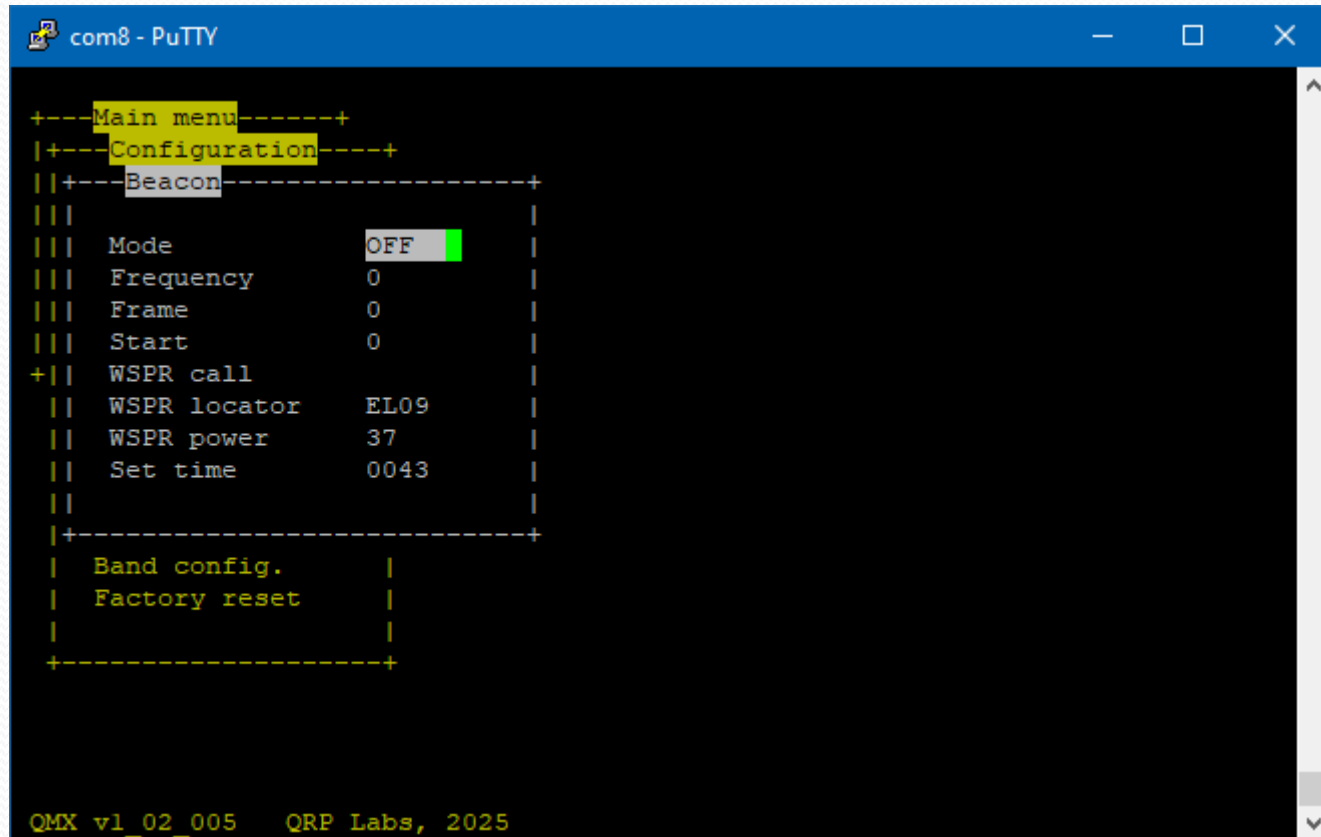
The screenshot shows a PuTTY terminal window titled "com8 - PuTTY". The terminal displays a menu system with the following structure:

```
+---Main menu-----+
|+---Configuration---+
||+---Messages-----+
|||
||| Message 1
||| Message 2
||| Message 3
||| Message 4
+|| Message 5
|| Message 6
|| Message 7
|| Message 8
|| Message 9
|| Message 10
|| Message 11
|| Message 12
|| Interval      0
+| Repeats       0
|
+-----+
```

A green cursor is positioned at the end of the line "Message 1".

At the bottom of the terminal window, the text "QMX v1_02_005 QRP Labs, 2025" is displayed.

Beacon/WSPR settings

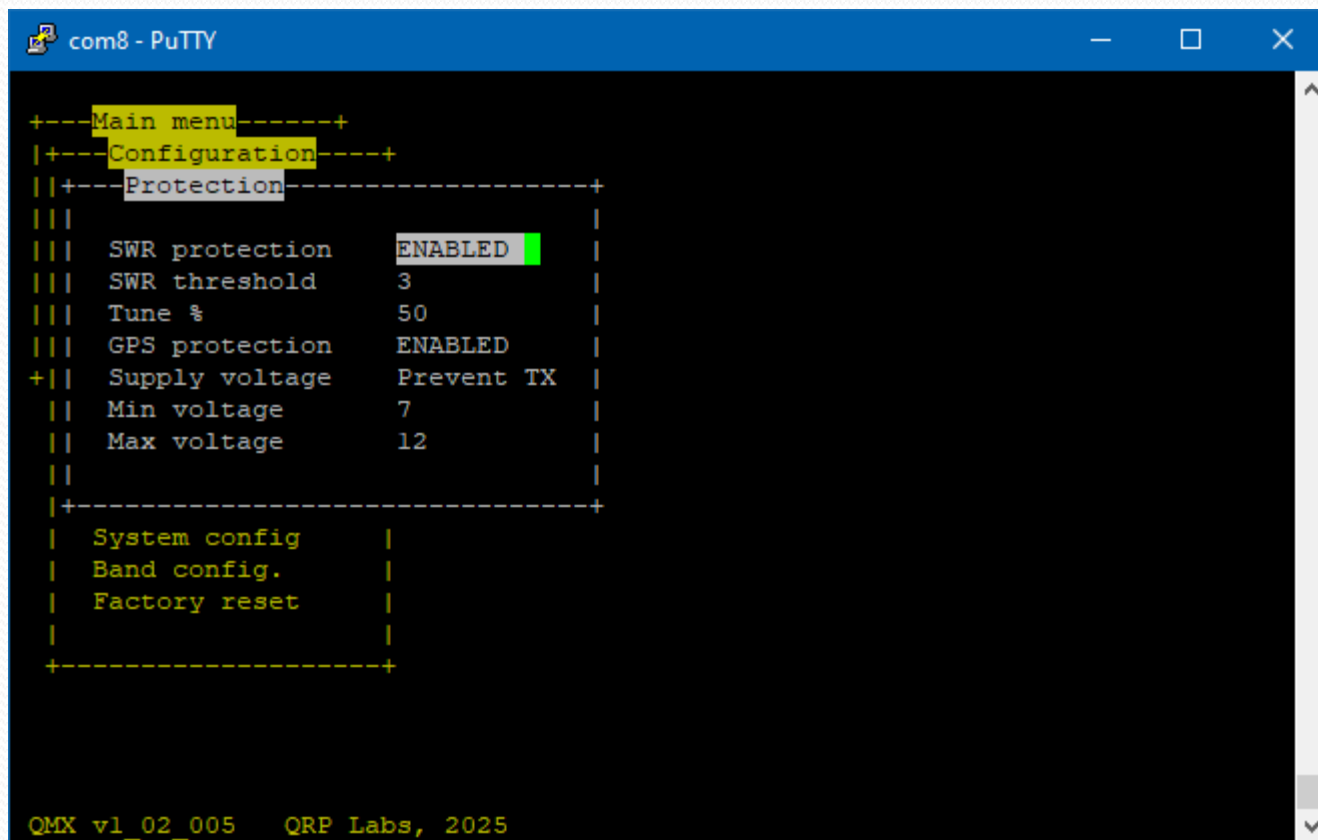


The screenshot shows a PuTTY terminal window titled "com8 - PuTTY". The terminal displays a menu system for configuring Beacon and WSPR settings. The menu is structured as follows:

```
+---Main menu-----+
|+---Configuration---+
||+---Beacon-----+
|||
||| Mode          OFF
||| Frequency     0
||| Frame         0
||| Start         0
+|| WSPR call
|| WSPR locator   EL09
|| WSPR power     37
|| Set time       0043
||
||+-----+
|| Band config.   |
|| Factory reset  |
||+-----+
+-----+
```

At the bottom of the terminal, the text "QMX v1_02_005 QRP Labs, 2025" is displayed.

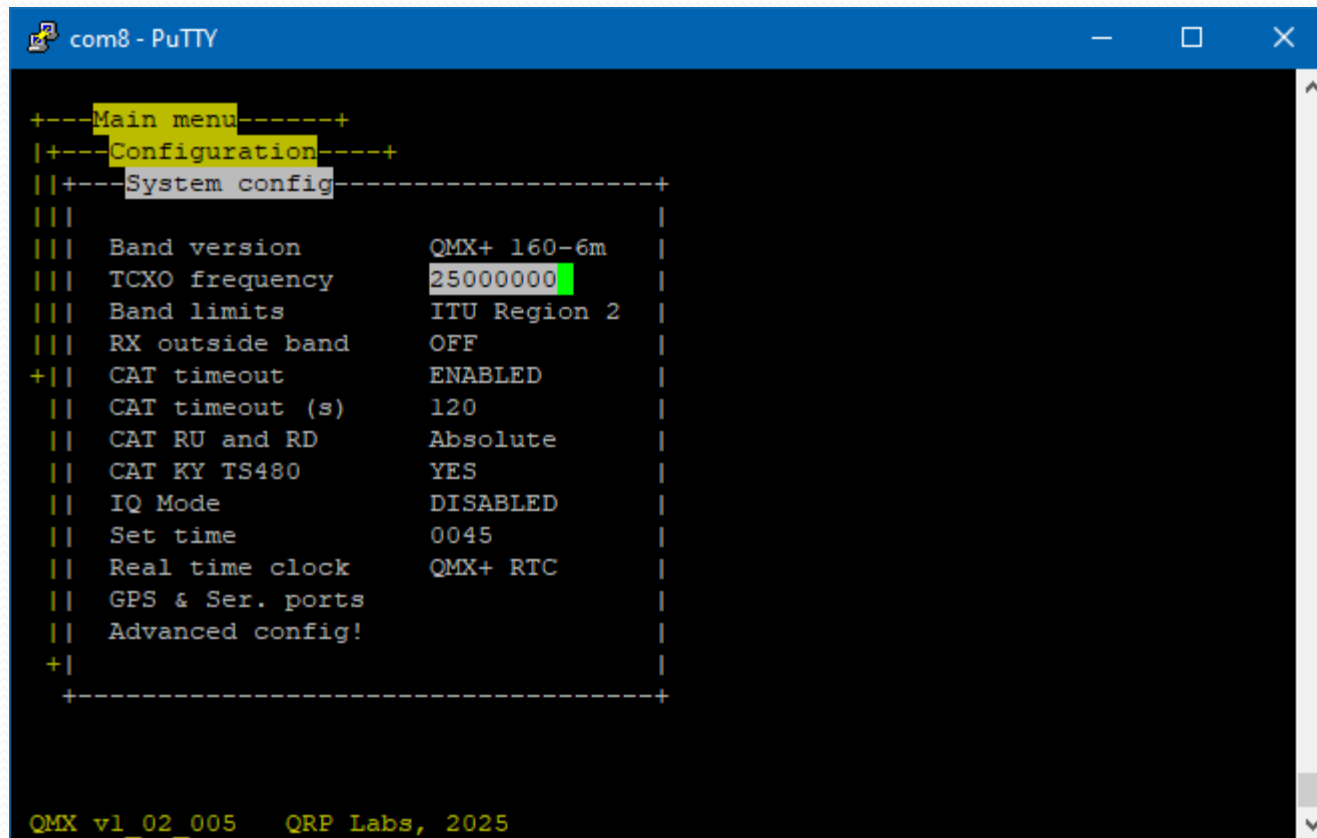
Protection menu



```
com8 - PuTTY
+---Main menu-----+
|+---Configuration---+
||+---Protection-----+
|||
||| SWR protection  ENABLED
||| SWR threshold   3
||| Tune %          50
||| GPS protection  ENABLED
+|| Supply voltage  Prevent TX
|| Min voltage     7
|| Max voltage     12
||
||+-----+
|| System config   |
|| Band config.    |
|| Factory reset   |
||+-----+
+-----+

QMX v1_02_005   QRP Labs, 2025
```

System Configuration menu

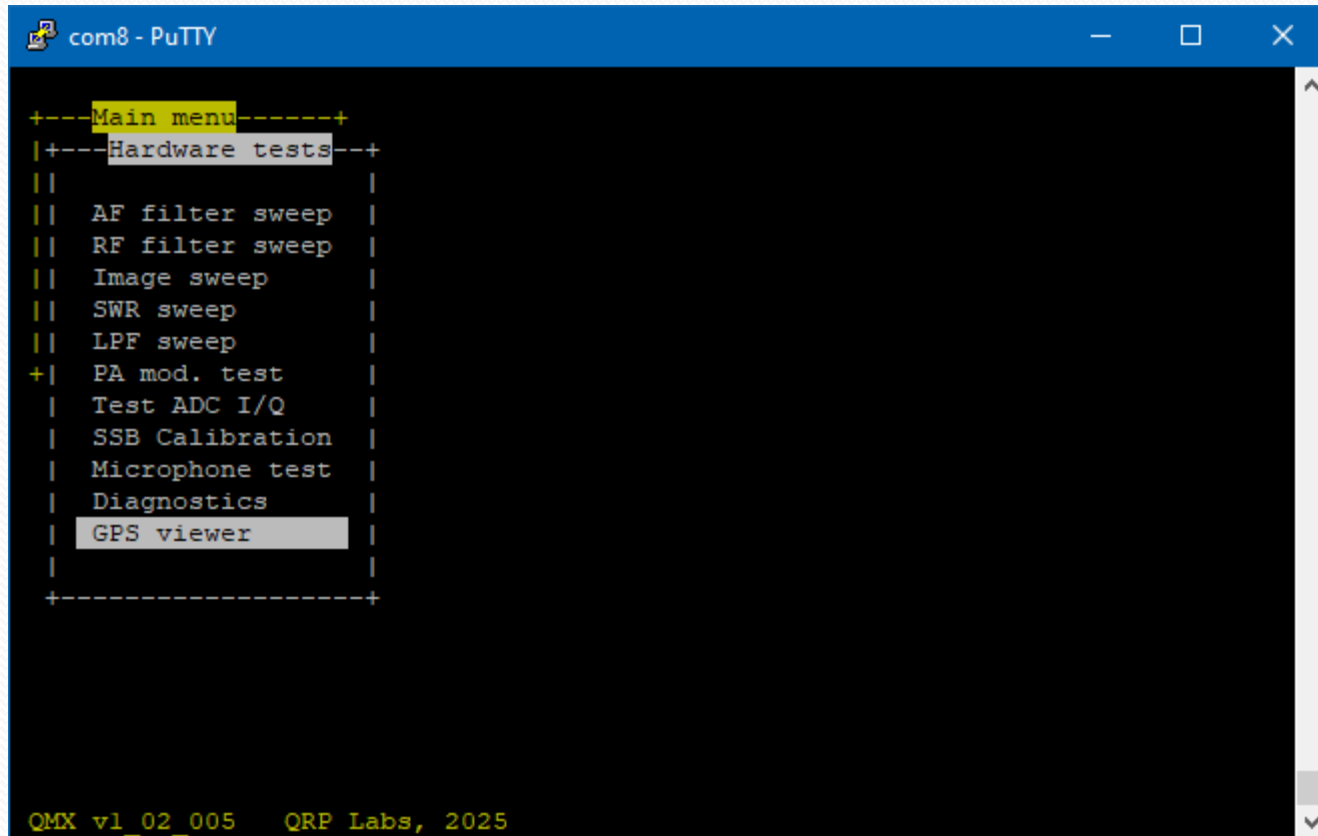


The screenshot shows a PuTTY terminal window titled 'com8 - PuTTY'. The terminal displays a menu system with the following structure:

```
+---Main menu-----+
|+---Configuration---+
||+---System config-----+
|||
||| Band version      QMX+ 160-6m
||| TCXO frequency    25000000
||| Band limits       ITU Region 2
||| RX outside band   OFF
+|| CAT timeout       ENABLED
|| CAT timeout (s)    120
|| CAT RU and RD      Absolute
|| CAT KY TS480       YES
|| IQ Mode            DISABLED
|| Set time           0045
|| Real time clock    QMX+ RTC
|| GPS & Ser. ports
|| Advanced config!
+|
+-----+
```

At the bottom of the terminal, the text 'QMX v1_02_005 QRP Labs, 2025' is displayed.

Hardware test menu

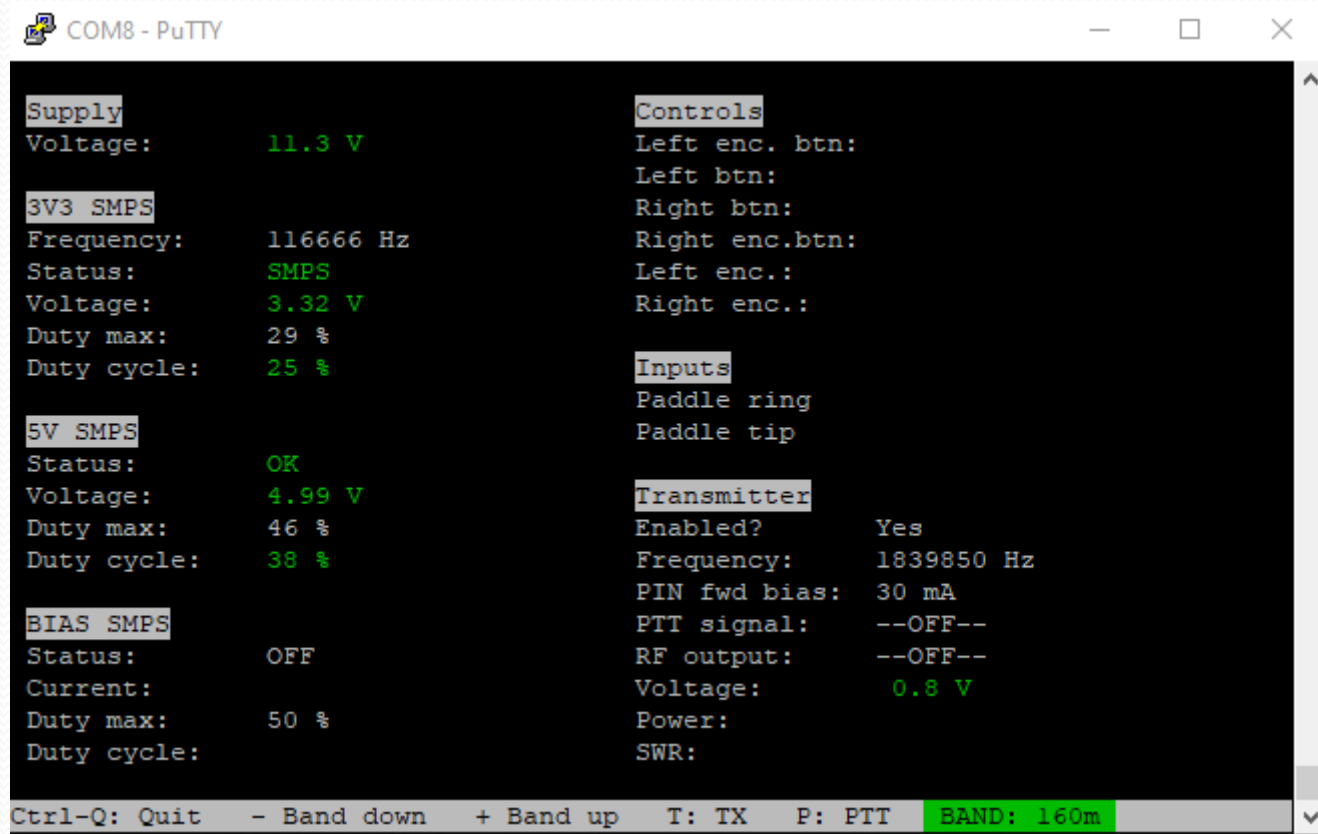


The image shows a PuTTY terminal window titled "com8 - PuTTY". The terminal displays a menu structure with a yellow highlight on "Main menu" and a grey highlight on "GPS viewer". The menu is as follows:

```
+---Main menu-----+
|+---Hardware tests---+
||
|| AF filter sweep
|| RF filter sweep
|| Image sweep
|| SWR sweep
|| LPF sweep
+| PA mod. test
| Test ADC I/Q
| SSB Calibration
| Microphone test
| Diagnostics
| GPS viewer
+-----+
```

At the bottom of the terminal, the text "QMX v1_02_005 QRP Labs, 2025" is displayed in yellow.

Diagnostics



```
COM8 - PuTTY

Supply
Voltage:      11.3 V

3V3 SMPS
Frequency:    116666 Hz
Status:       SMPS
Voltage:      3.32 V
Duty max:     29 %
Duty cycle:   25 %

5V SMPS
Status:       OK
Voltage:      4.99 V
Duty max:     46 %
Duty cycle:   38 %

BIAS SMPS
Status:       OFF
Current:
Duty max:     50 %
Duty cycle:

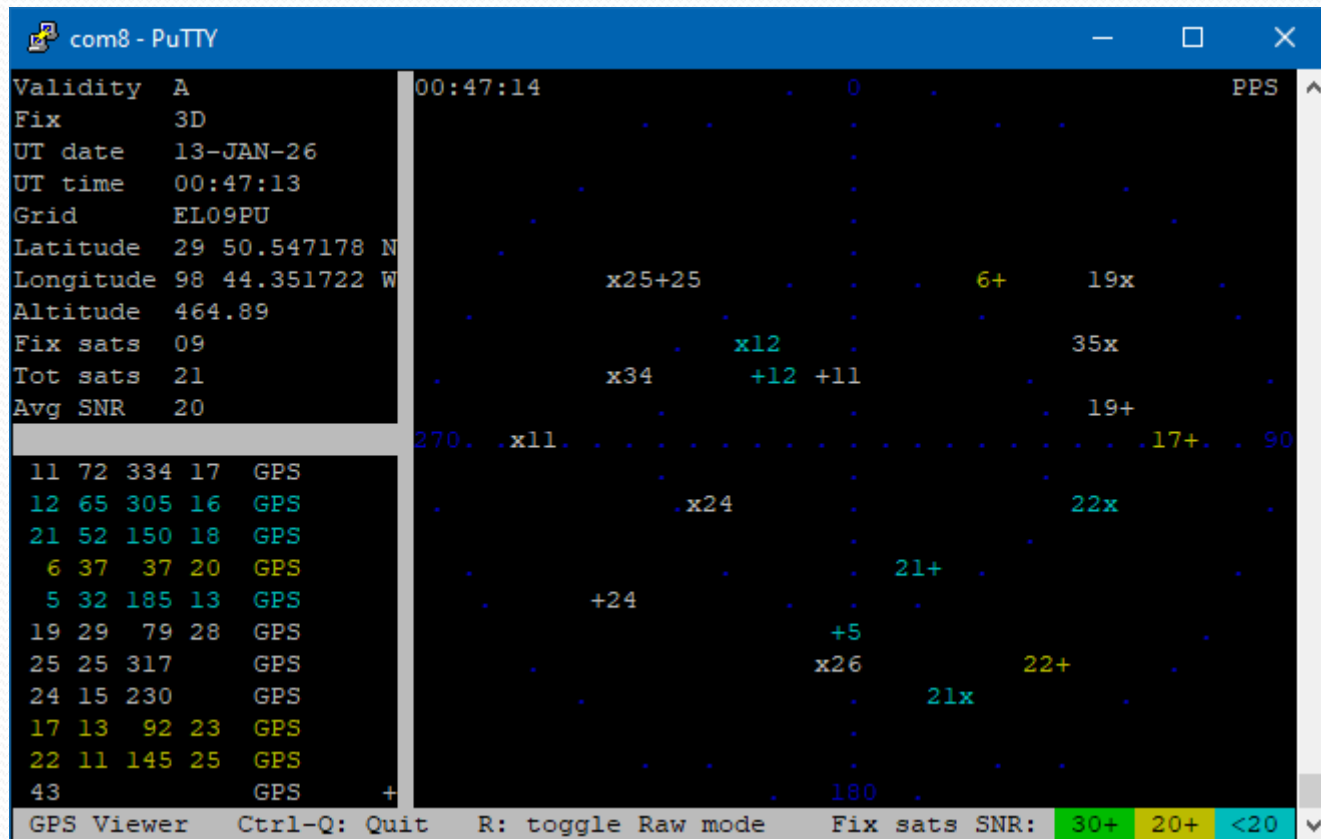
Controls
Left enc. btn:
Left btn:
Right btn:
Right enc.btn:
Left enc.:
Right enc.:

Inputs
Paddle ring
Paddle tip

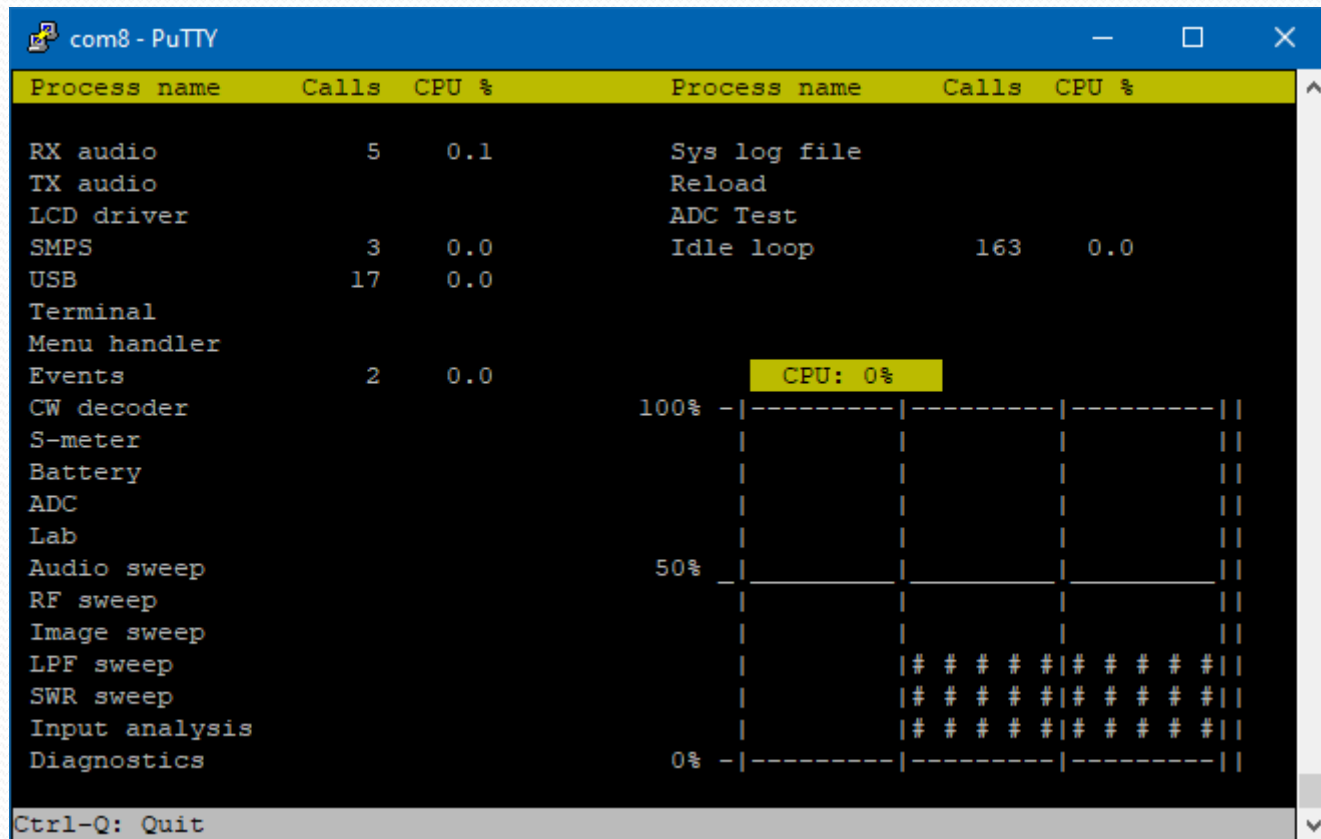
Transmitter
Enabled?      Yes
Frequency:    1839850 Hz
PIN fwd bias: 30 mA
PTT signal:   --OFF--
RF output:    --OFF--
Voltage:      0.8 V
Power:
SWR:

Ctrl-Q: Quit  - Band down  + Band up  T: TX  P: PTT  BAND: 160m
```

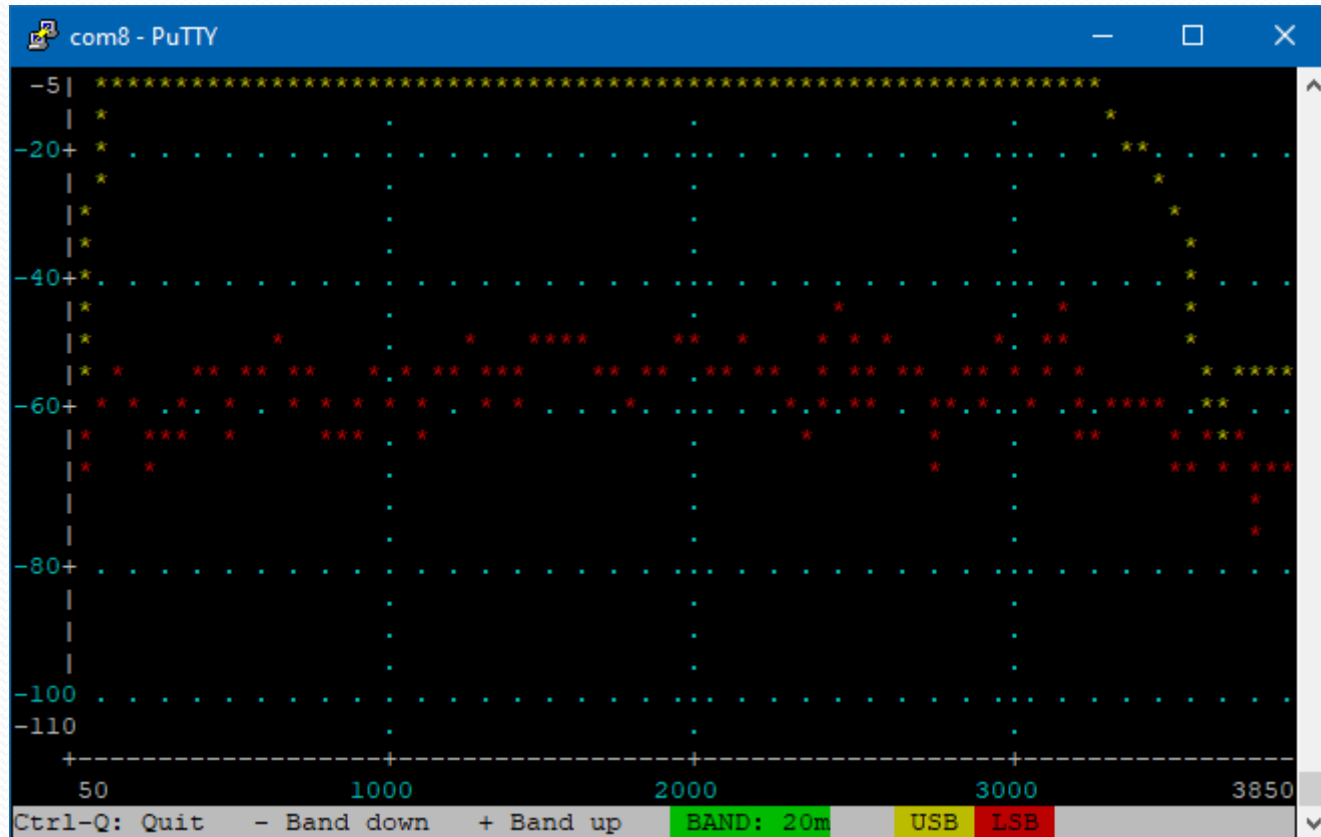
GPS menu



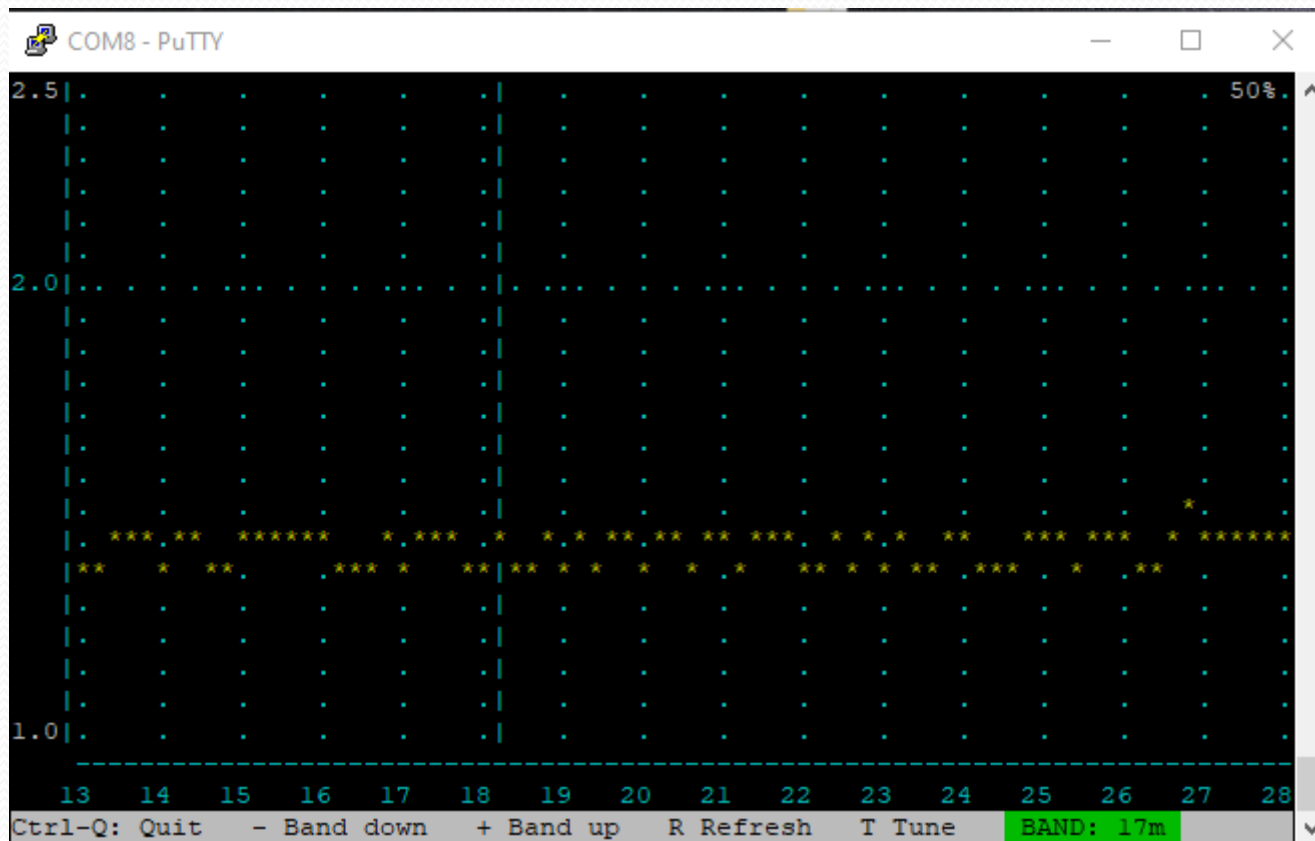
CPU activity



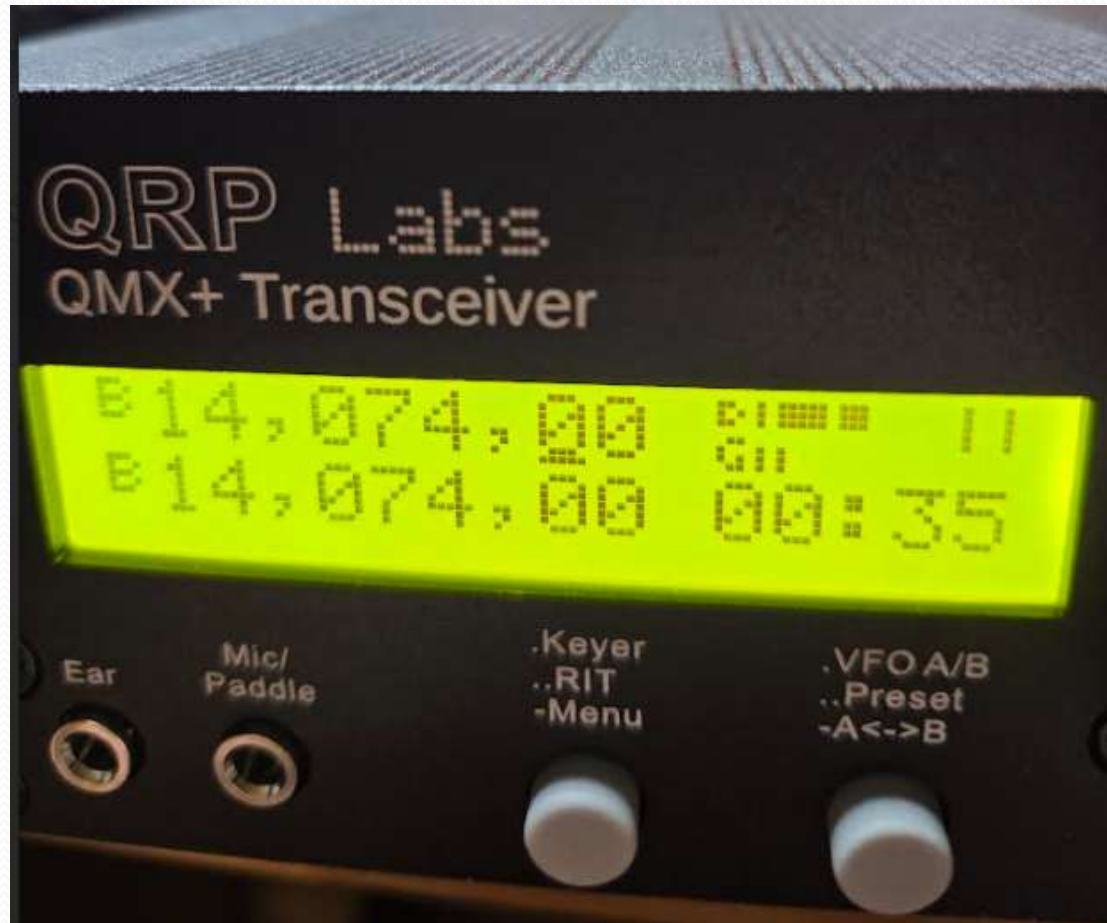
LPF Sweep



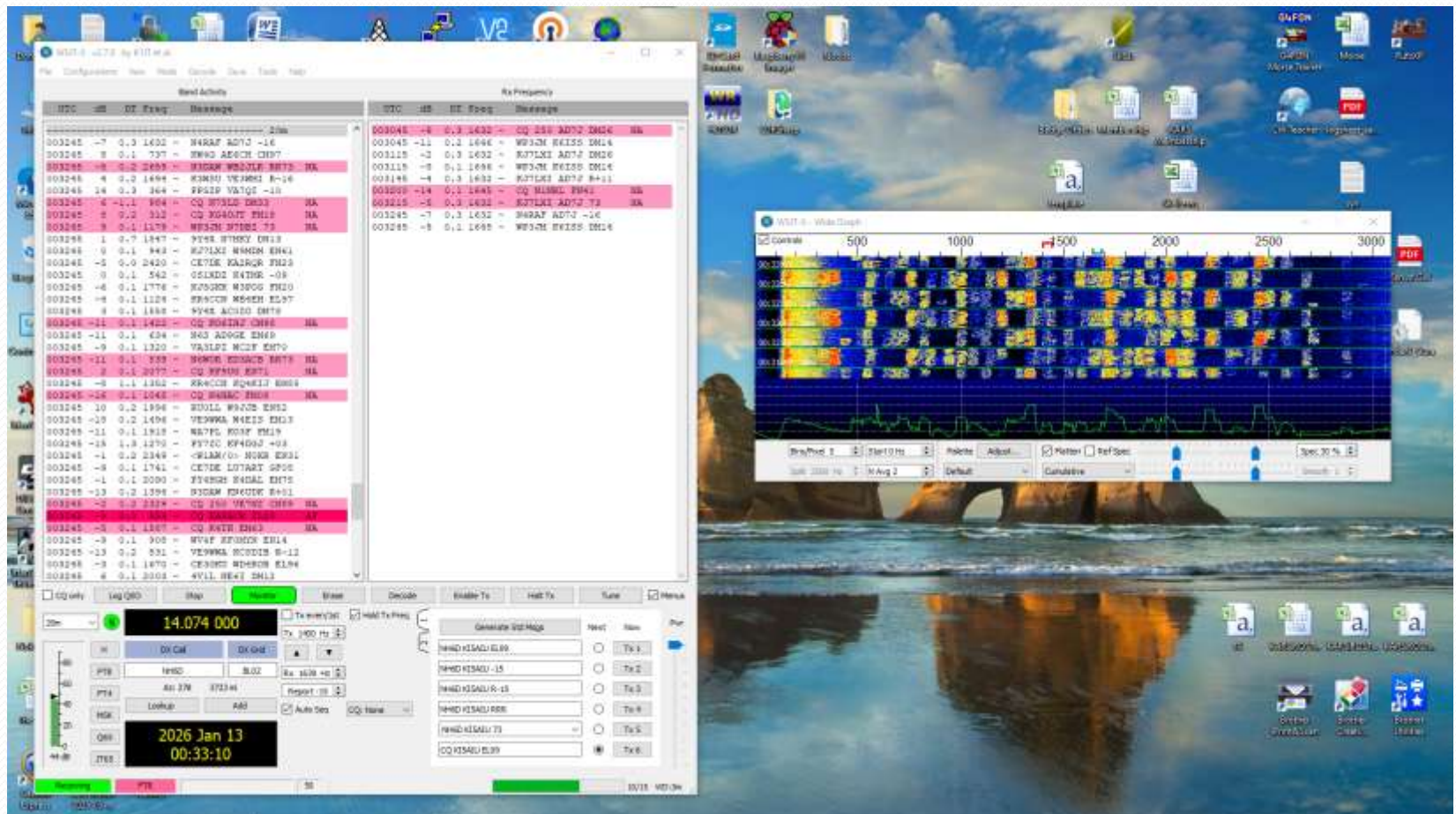
SWR sweep



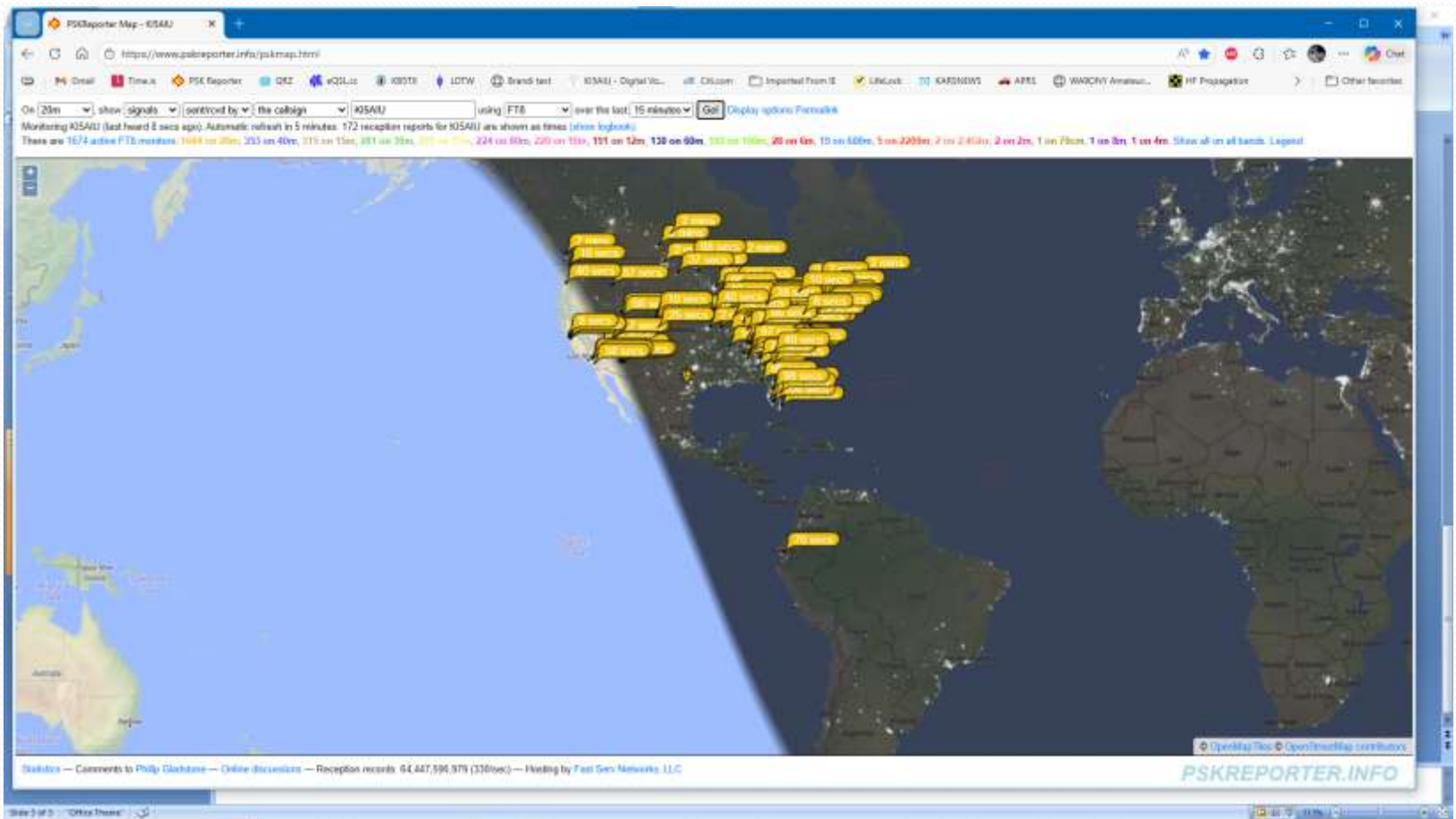
Display



Running FT8



PSK Reporter



Interested?

- <https://qrp-labs.com/>
- \$125 kit; \$185 assembled
- \$25 for optional case
- \$21 for optional GPS receiver
- When I ordered, the wait was 3 months. Getting better.