



New QO-100 Full Duplex Groundstation

An all-in-a-box station

for easy satellite operation

The Ground Station works as FULL DUPLEX and SIMPLEX radio station (RX/TX) as recommended by AMSAT.

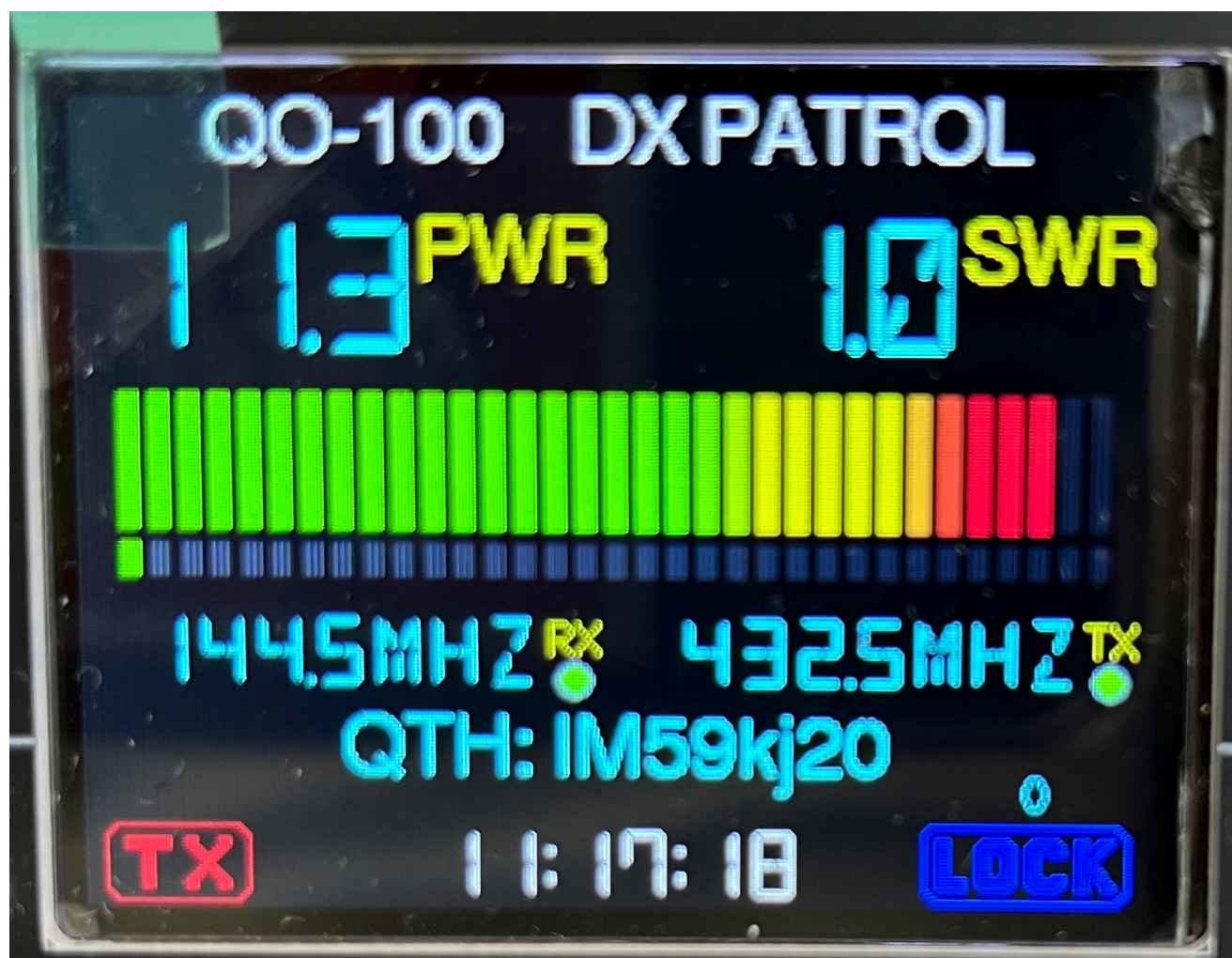
DX PATROL

August 20, 2022

Authored by: CT1FFU v1.0

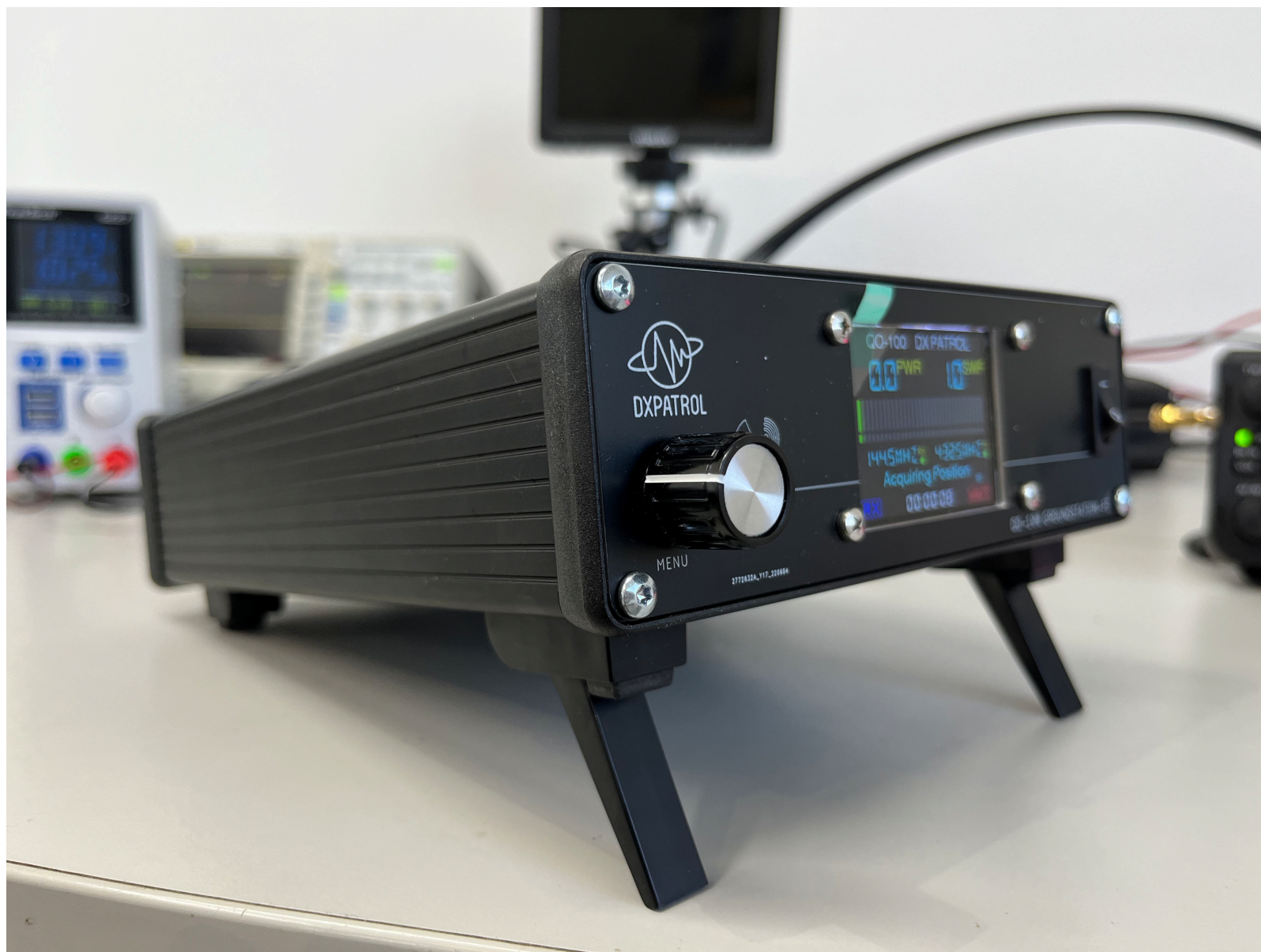
- Reception frequency: 10489.500 to 10490.000MHz;
- Transmission Frequency: 2400.000 to 2400.500 MHz;
- IF TX and RX Frequency: 28,500 to 29,000 / 50,500 to 51,000/ 70,000 to 70,500/ 144,500 to 145,000/ 432,500 to 433,000/ 1296,500 to 1297,000 Mhz;
- GPS Lock internal 10MHz reference;
- Transverter stage output up to 100mW;
- Maximum Output RF Power 10 W @2.4 GHz based on NXP MHR1008NT1;
- Factory set input power 500 mW for VOX operation;
- Maximum input RF 5W (1W optimum drive);
- Auto TX and RX by VOX PTT (optional PTT RCA connector on back panel)
- External 10Mhz reference Output.
- Supply voltage 12V to 14V;
- Thermal alarm > 60° C;
- SWR protection and alarm> 1:3;
- High voltage input alarm;
- Power output bar and Watt indication;
- SWR bar and ratio indication;
- Current consumption indication and alarm
- Internal 5A fuse protection;
- LNB Phantom Power PTC protection (bias-T)
- NMEA GPS indication;

- Number of GPS satellites in range;
- GPS coordinates;
- QTH Locator presentation on screen;
- UTC clock and date;
- Wireless Firmware upgrade



The Ground Station has 2 tilt feet on the bottom, front side, for easy access and use.

Left the menu knob, next OLED color screen and on the right the ON/OFF switch.





Back Panel connections from Left to Right

-DC : in Power connector 13,8V

-IF-TX/RX : TX input and RX output for simplex operation

-RX : RX only (for Full Duplex operation) DO NOT TX INTO !!!

-SIGNAL IN : 75 Ohms RX cable from LNB

-LO IP : 75 Ohms RX cable, 25Mhz UP local oscillator to LNB

-10MHz Out external reference to sincronize an external radio/equipment

-GPS antenna

-RF OUT: N-type connector for Output 2,4Ghz 10W

-TX-Send: Enable GS to TX when grounded and goes to ground when GS transmits

Connecting the Ground Station

Equipment needed:

A power supply 12V or (13,8V) 5A minimum;

Two coaxial TV 75 Ohm cables for satellite LNB fitted with male F connectors;

Low loss coax cable (50ohm) from RF out to patch/helix antenna. .

WARNING

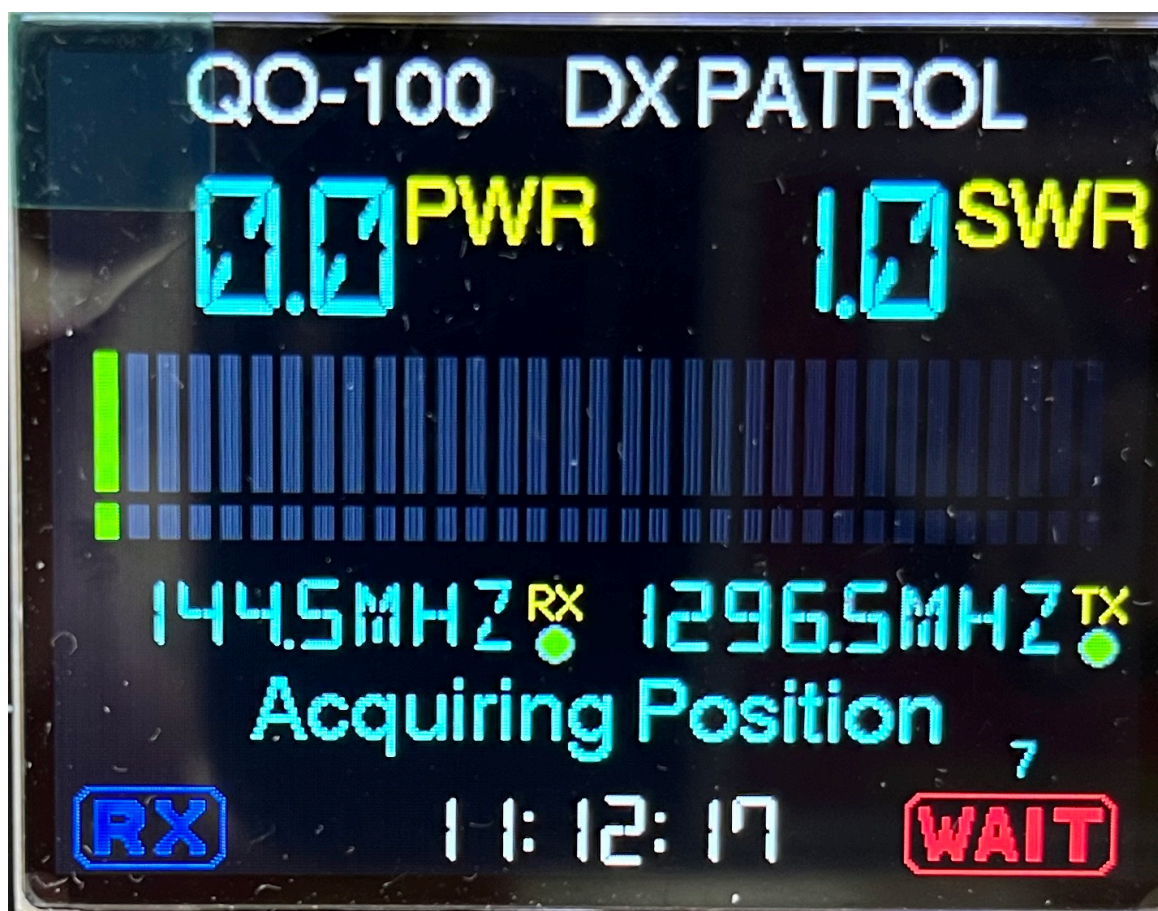
Never make these connections with Ground Station ON. There is 12V Phantom Power on the cable and a short-circuit will happen if life wire touches the shield, damaging the-Ground Station .

1. Connect the Ground Station correctly to the LNB with 75 ohm cable with F connectors;

Cable 1: LO UP to LNB's input LO

Cable 2: SIG IN to LNB's SIG

2. Connect the GPS antenna to GPS input (SMA connector);



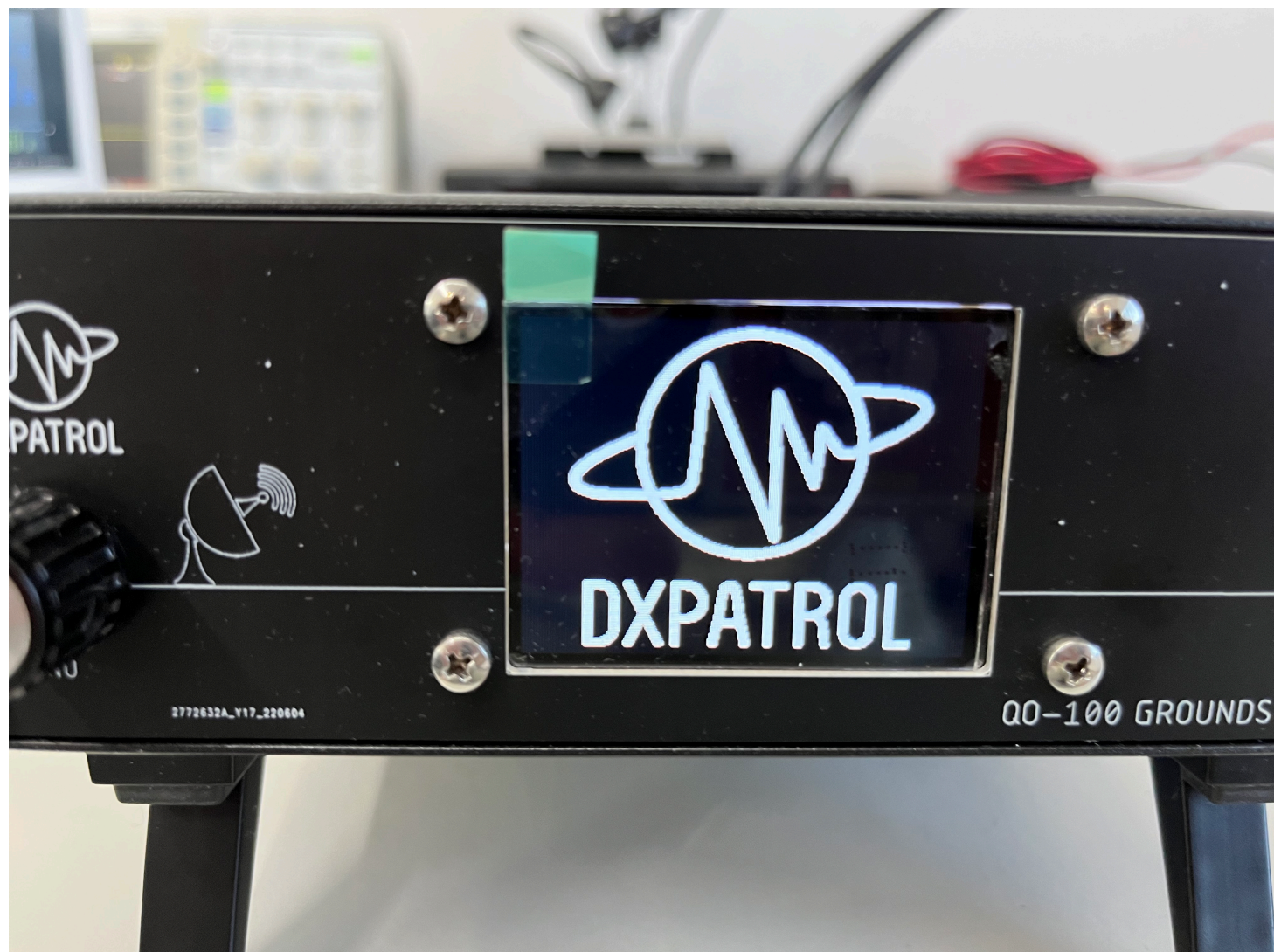
GPS antenna must be outside with clear visibility to sky. The antenna is waterproof, but will be good to fit it inside a plastic bag to avoid rain damage. In some cases it can work on a window, even inside.

3. Connect IF TX/RX and RX to your Radio with a 50 ohm coaxial cable fitted with a male SMA connector;

4. Connect the OUT RF N-Type connector to the transmitting antenna with a 50 ohm low loss coaxial cable

5. Connect the 13,8V power supply (center pin is positive pin)

Turning the Groundstation ON



When turning ON you will see for some seconds the Splash Screen Logo of DX patrol and then the display will present a page as show in the picture below.

Scrolling the menu

Rotation the Knob Button advances You in the menu, press the button will activate the chosen frequency for TX and RX



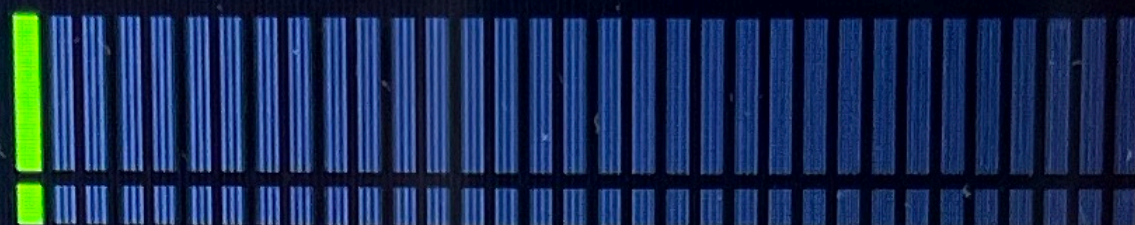
Showing also the TX and RX band IFs ON or OFF , UTC clock, Locator and Locking to GPD

Wait or Lock.

QO-100 DX PATROL

0.0 PWR

1.0 SWR



144.5MHz^{RX} 432.5MHz^{TX}

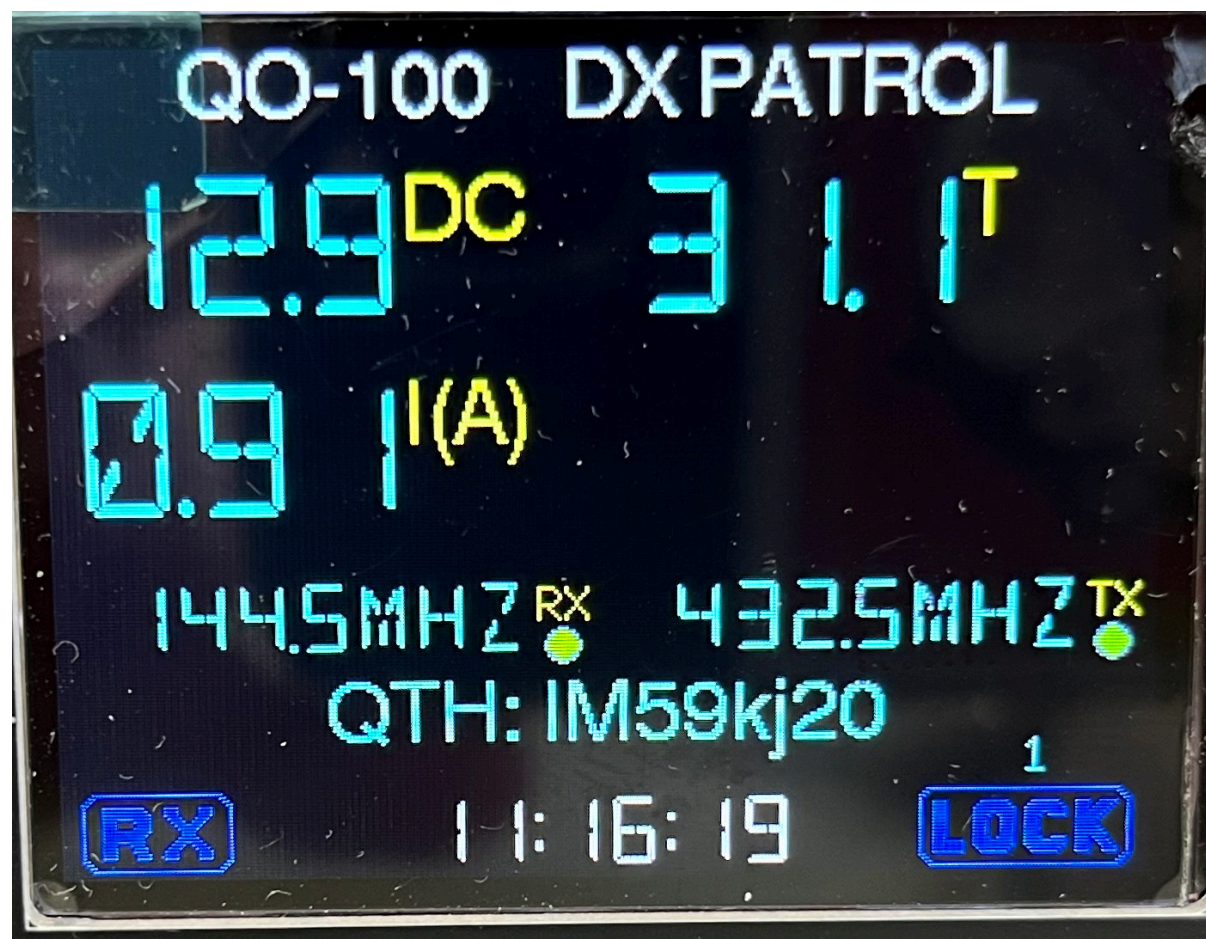
Acquiring Position

2

RX

15:58:21

WAIT



Rotation the Know you will be in the next page that shows:

DC voltage in Volts

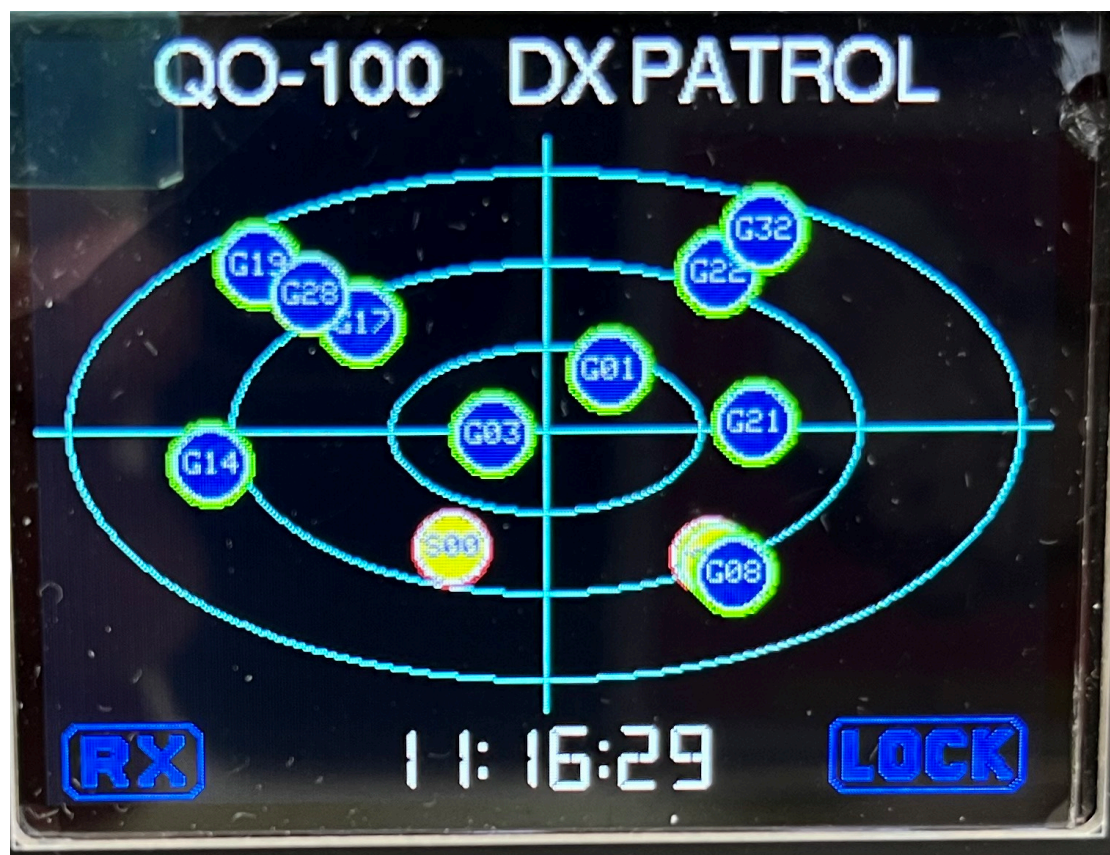
Box temperature Celsius C°

Current in Amperes A



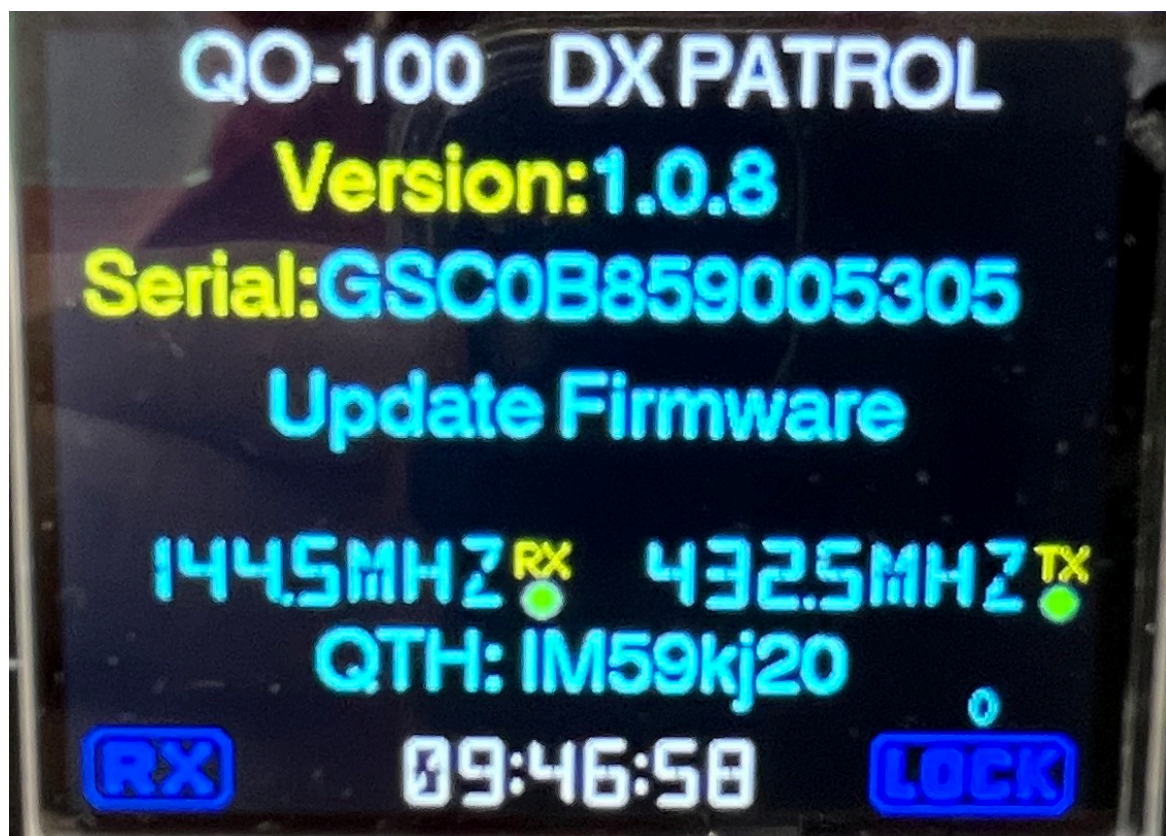
The GPS Menu

Rotating the knob again will show the GPS data.



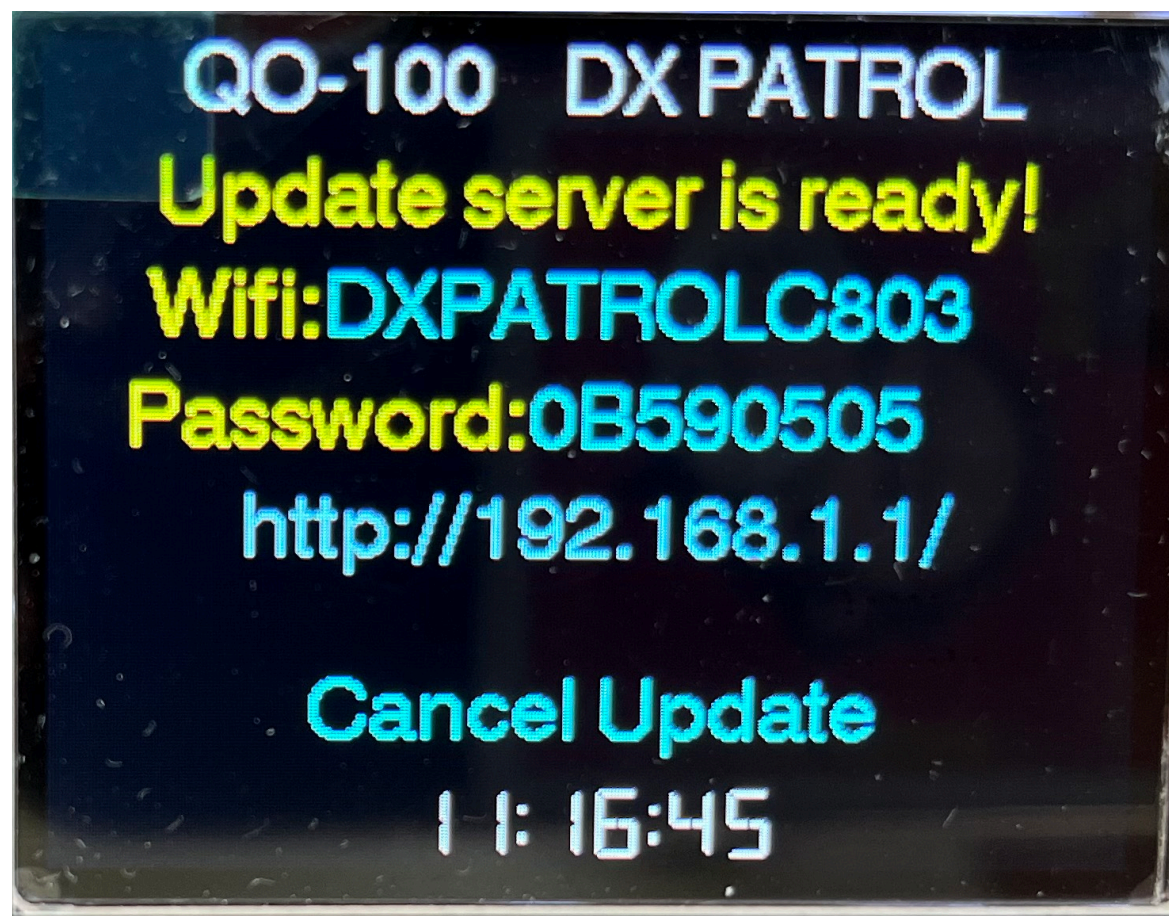
Next page will show the GPS satellites in range.

Useful to understand how good is your GPS antenna “looking” at the sky.



Next page will show you the Firmware Version and the Serial Number of you Groundstation

By clicking the knob you will Enter the Upgrade window.

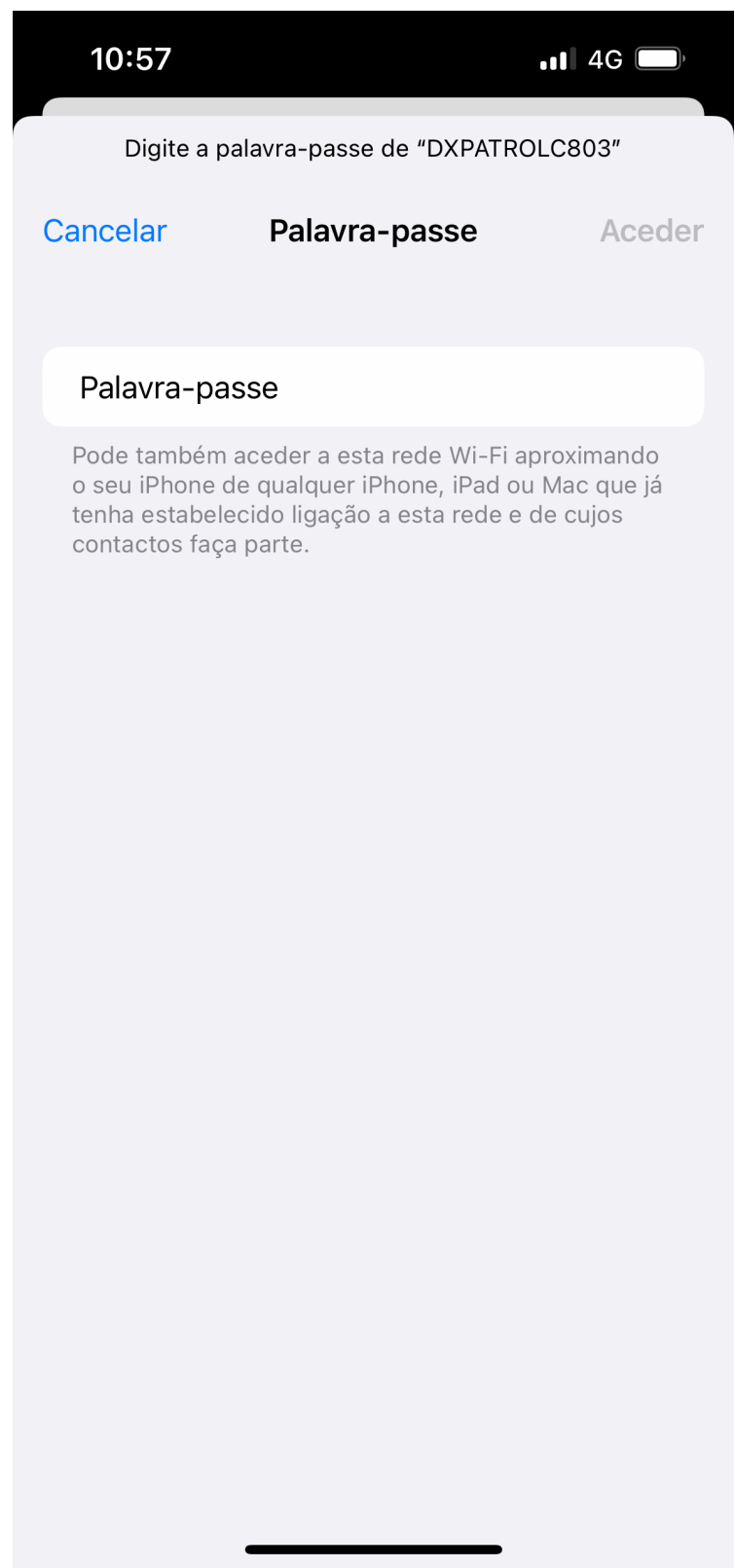


Upgrade page will indicate the Wifi page name with is the Dxpatrol and the serial number of your Groundstation. Each unit is exclusive Wifi Name and Password

Open you Cell Phone Wifi Menu and look for a DXpatrol Net and access.



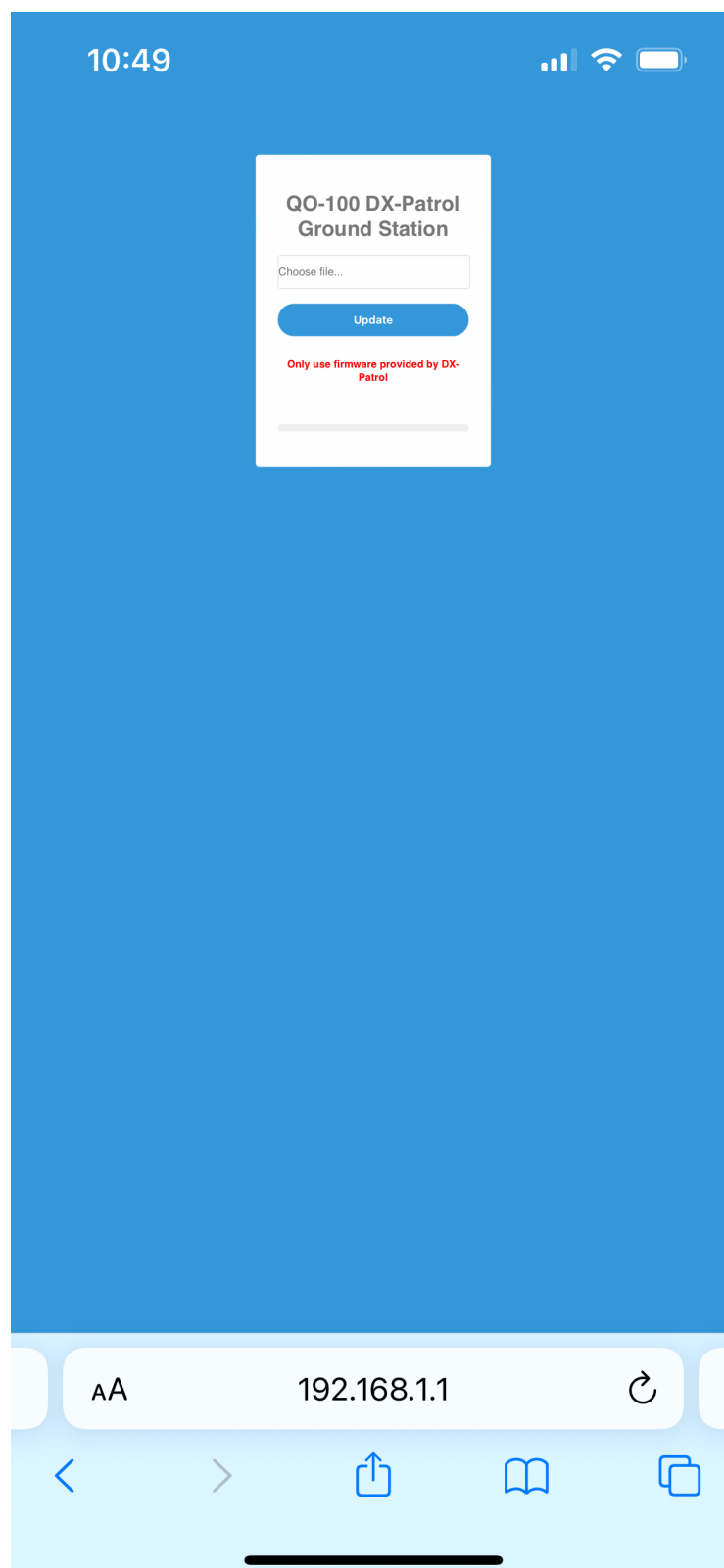
Insert your Password given in your Groundstation Display



Navigate on you browser and insert address : 192.168.1.1

A blue page like this will show.

Select the file previously downloaded from Dxpatrol webpage and Update.



10:49

4G

QO-100 DX-Patrol
Ground Station

firmware.bin

Update

Only use firmware provided by DX-Patrol

AA

192.168.1.1



Ready for operation

When both LOCK indications are shown on screen, you are ready to start using the QO-100 satellite.

IMPORTANT

Do not start transmission till both references are locked.

In the warm up phase, that is till dual lock, frequency excursions as big as 25 kHz are possible!

Lock might take up to 10 minutes and that is due to the usage of a double oven OXCO

That rises the internal temperature up to 60°C

Any HF/VHF/UHF SSB radio as IF will receive very loud and clear satellite signals. Lower beacon should be at 28.500, 144.500, 432.500 MHz etc

and upper beacon should be at 29.000, 145.000, 433.000 MHz etc.

The Ground Station will receive the QO-100 very clearly with the included LNB with any dish, even small ones as 30cm.

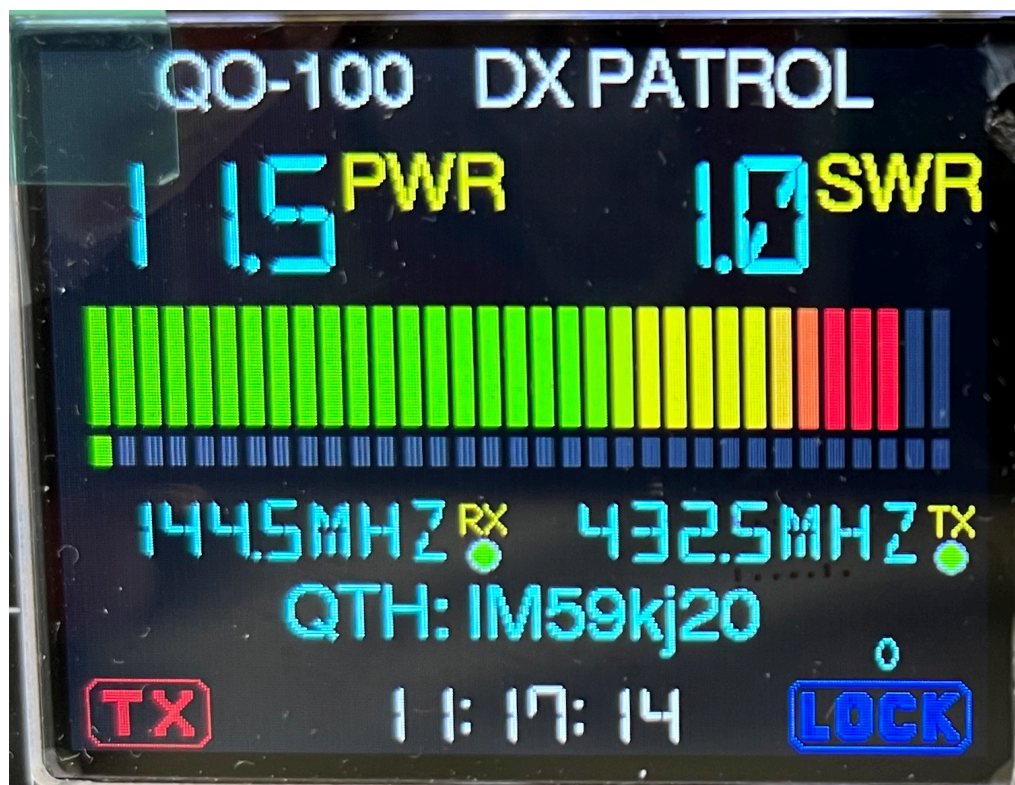
However, in transmission, to have a clear loud signal, you should use a minimum 60cm dish and an efficient antenna feed, such as a Helix or a Patch antenna, low loss cable as short as possible is preferred to feed the 2.4 GHz up to the dish.

! Practical test have shown that with 4 Watts at the feed of a 1m offset dish you are very close to the CW beacon signal!

Transmitting

There is no need for any PTT, switch or cable (except for the coaxial cable from radio to Ground Station) to activate

the Ground Station into TX mode.



Even 500mW of RF is enough to trigger the VOX and switch to TX mode.

The TX indication will be visible, as well the Output Power in Watts and in a bar-graph.

Maximum power is 10 W output and SWR bar and ratio will be presented if reflected power is detected. Alarm will display if SWR raises more than 1:3, to clear an SWR or Temperature Alarm, rotate the Knob button.



Note that if select the same band for TX and RX, the Groundstation will disable the RX while is transmitting and the operation will be in Simplex mode.
Obviously is not possible to TX and RX on same frequency because would create a local feedback loop.

Included Items with DXpatrol Groundstation:

Modified DX Patrol LNB



DX Patrol GPS + Glonass antenna



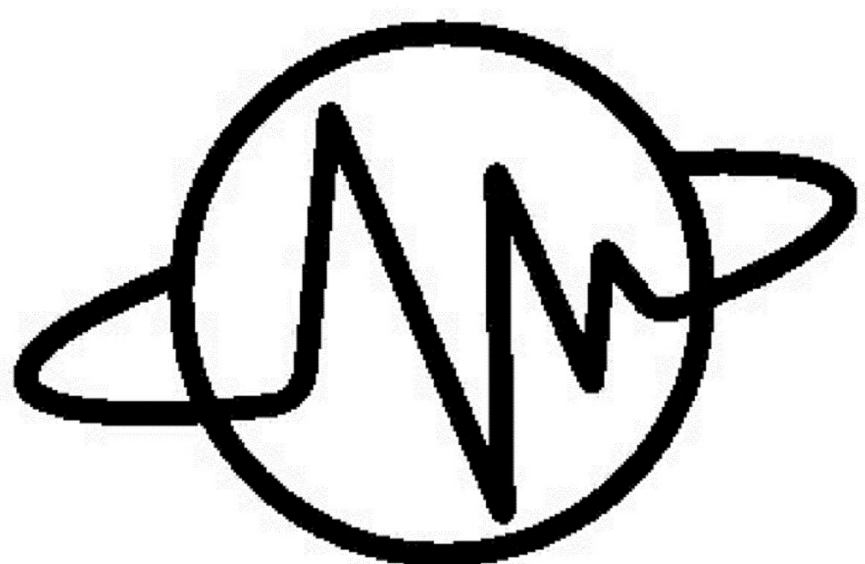
Optional Helix antenna

Available accessories

DX PATROL Helix QO-100 antenna

With quick mount system





DXPATROL

dxpatrol.pt by Gadgetpriority-electronics Lda , registered company in Portugal since 2014

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73

Have great fun on QO-100