Operating instructions for the transceiverWolf (7 inches)
ver 5.0.0

Telegram channel of the community:https://t.me/TRX_Wolf

OwnersTRX Wolf who allowed to be added to the map: https://www.google.com/maps/d/u/0/viewer?mid=16UhWjxvadv0S3G1z9T-6MfIIim4ncmPD&ll=44.5960 6228170554%2C75.28182055943621&z=3

Principle of operation

The RF signal is digitized by a high-speed ADC chip and sent toFPGA CPU.

What happens in itDDC/DUC conversion (digital frequency shift down or up by spectrum) - by analogy with a direct conversion receiver.

I and Q quadrature signals obtained during the transformations are supplied to microprocessorSTM32.

It filters, (de)modulates and outputs sound to an audio codec/USB. He also handles the entire user interface.

During transmission, the process occurs in the reverse order, only at the end of the chain there is a DAC that converts the digital signal back to analog RF.

Specifications

- Reception frequencies:0 MHz - 750 MHz with attenuation every 61.44 MHz
- Transmission frequencies:0 MHz - 80 MHz, 120 MHz - 160 MHz
- Transmission frequencies in harmonic mode (CW, FM): 360 Mhz - 480 Mhz
- PowerTX (QRP version): 7W+ (HF), 5W (VHF)
- PowerTX (QRP++ DB5AT version): 20W (HF), 7W (VHF)
- PowerTX (RU4PN and WF-100D versions): 100W (HF), 80W (VHF)
- Sensitivity at signal-to-noise ratio10dB (up to 150MHz): -131dBm
- Two Antenna Inputs
- Types of modulation (TX/RX): CW, LSB, USB, AM, SAM, FM, WFM, DIGI
- LNA(LNA) and Preamplifier
- Adjustable attenuator on0-31dB
- Bandpass filters
- ADC dynamic range (16 bit) ~100dB
- Supply voltage:13.8v
- Current consumption when receiving: ~0.9A
- Current consumption during transmission: ~15A+

Transceiver functions

- Panorama (spectrum + waterfall) up to384 kHz
- Several types of spectrum design
- Dual receiver (audio mixingA+B or A&B in stereo)
- Adjustable bandwidth: high-pass filter from0Hz to 2700Hz, low-pass filter from 100Hz to 20kHz
- Built-in SWR/Power meter (KW)

- Automatic and manualNotch filter
- Switchable AGC (AGC) with adjustable attack speed
- Band map, with automatic mode switching capability
- Digital noise reduction (DNR), Burst Noise Rejector (NB)
- CAT virtual COM port (FT-450 and TS-2000 emulation), CW port: RTS - PTT, DTR - CW
- Work onUSB (audio transmission, CAT, KEY, PTT)
- RDS/CW/RTTY decoder, self-monitoring, Gaussian filter
- Plotting SWR graphs by range
- Spectrum analyzer
- EqualizerTX/RX, reverb
- FT8 receiver/transmitter
- SSB/FM Scanner Mode
- Channel mode support
- VOX
- ModeWSPR lighthouse
- SupportSDHC/SDSC/SDXC memory cards up to 16 GB
- Digital tape recorder, playing a quick message on air
- AGC takes into account the characteristics of human hearing (K-Weighting)
- TCXO frequency stabilization
- Work onWiFi: Time synchronization, virtual CAT interface (see Scheme/WIFI-CAT-instruction.txt), WiFi services
- PTT supportYaesu MH-36 and MH-48
- Hardware self-diagnosis mode
- Firmware updateUSB, SD, WiFi
- And more (see working with the menu)

Controls

- 1 – volume control
- 2 - IF gain adjustment, set to minimum noise
- 3 - Secondary encoder for moving through menus or for quick access to functions.

  Pressing changes adjustment modes:

FAST STEP - fast transition by frequency
SET WPM - setting the speed of the automatic key SET
RIT - setting the reception detuning
SET NOTCH - setting the notch filter (if manual mode is enabled) SET
LPF - setting the low-pass filter cutoff filter
SET HPF - settings for the high-pass filter cutoff of the low-pass filter
SET SQL - setting the FM noise suppressor threshold

- 4 - select the range, long press - store the frequency in memory, when Press again to move through the frequency memory.
- 5 - main encoder for controlling the transceiver frequency. During transmission regulates power.
- 6 – functional buttons that change their purpose depending on the mode, repeat the on-screen buttons at the bottom of the screen
- 7 - headset input
- 8 - headphone output
- 9 - mute
- 10 - antenna tuning mode, smoothly increases power to the specified value settings and turns on the automatic tuner.
- 11 – enter/exit menu
- 12 - transceiver on/off button

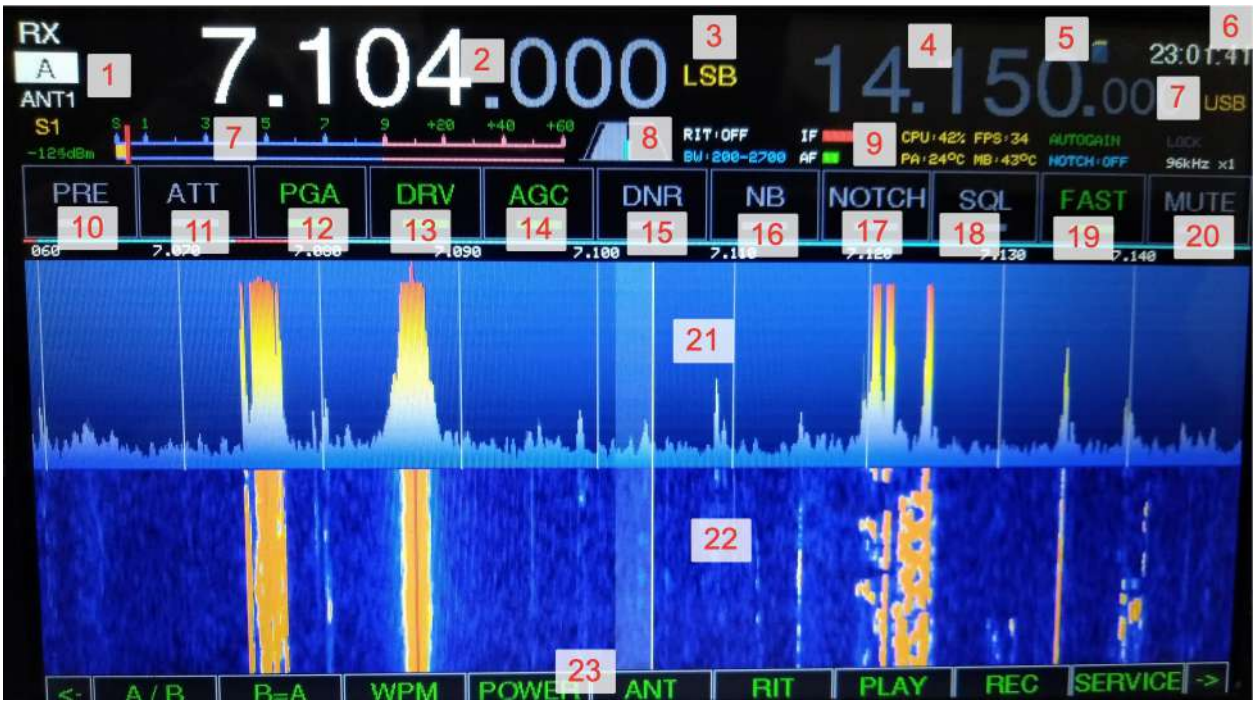
Combinations when turning on the transceiver:

- 12+11 – switch to firmware mode
- 12+F1 – reset settings to “default”
- 12+F1+F8 – reset and calibrate the transceiver

1. First antenna
2. Second antenna
3. Connector for controlling peripherals (PA, LPF, Tuner, etc.)
4. WiFi antenna
5. Power connector
6. PTT pedal connector

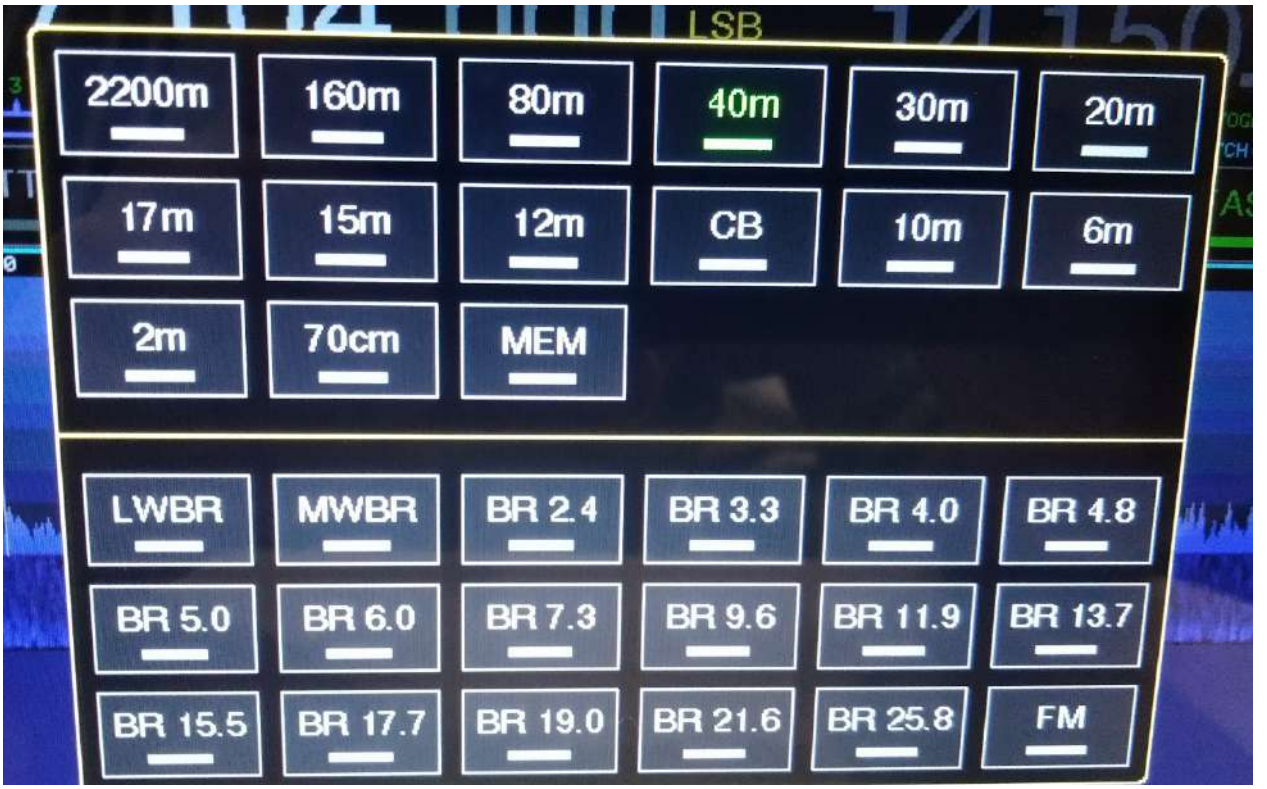
7. “Earth”
8. Connector for connecting an external amplifier (closes contacts during transmission)
9. Connector for telegraph key
10. Linear LF input
11. Microphone input
12. Bass output (headphones)
13. Connector for connecting to a computer

Transceiver interface



1. -TX/RX/TUNE mode;
   - Current reception mode:A - only VFO-A, B - only VFO-B, A+B - a mixture of two VFOs in both earphone,A&B - A in the left earphone, B - in the right;
   - ANT1/ANT2 - selection of the transceiver antenna. 1T2 - reception on the first antenna, transfer to second.
   -Clicking on this area switches modesANT

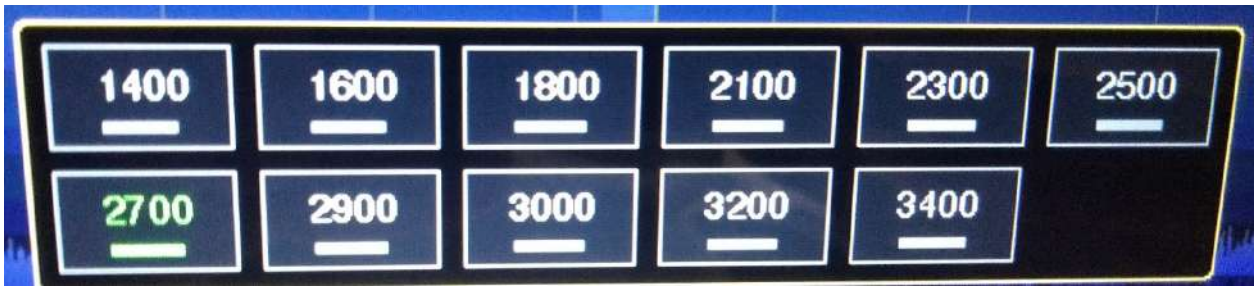
2. Current VFO-A frequency, when pressed, the bend selection window opens



3. Current VFO-A mode, press to open the mode selection screen

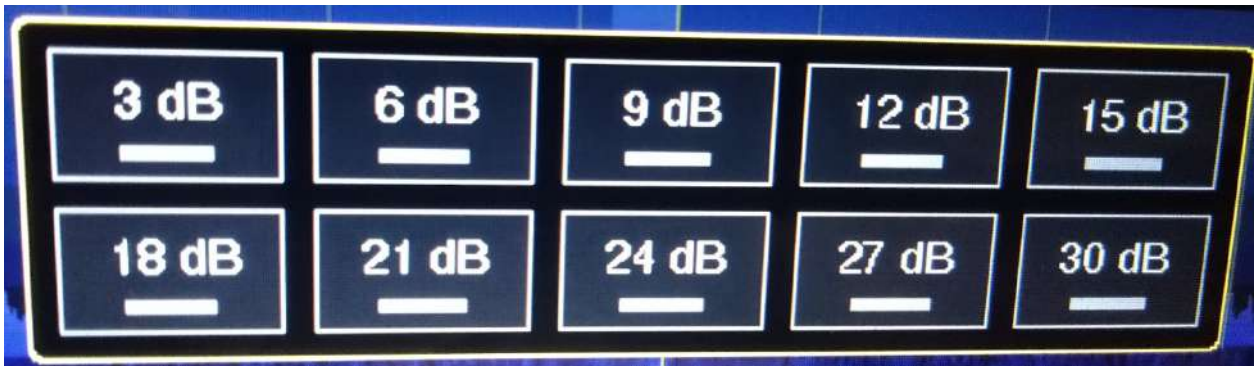
4. Current VFO-B frequency, when pressed, the bend selection window opens
5. Display the status of the SD card, RF fan and WiFi
6. Clock (synced via WiFi or manually)
7. S-meter, signal strength in dBm and report for the correspondent
8. Bandpass low-pass filter settings, when pressed, the band selection menu opens (each fashion has its own set). If pressed during transmission, setup is in progress

transmitting bandpass filter.



9. Transceiver statuses: current detuning, LF/IF values, processor load, number of frames per second, final stage temperature andCPU. Statuses Auto Gain Corrector, Notch Filter, Control Lock, Bandwidth and zoom (spectrum approximation).

10. Enable LNA
11. Turn on the attenuator, long press - select the level. When the Autogainer function is enabled, the attenuator setting is automatic and optional the user does not respond.



12. Turning on the “Preamplifier” built into the ADC
13. Enabling the ADC driver
14. AGC control
15. DNR1 is the first stage of the noise suppressor, DNR2 is the second stage of the noise suppressor (the most powerful, the response threshold is adjustable in the settings; if you overdo it, there will be a gurgling sound)
16. Pulse noise suppressor
17. Short press - turn on the automatic notch filter, long press - manual (controlled by secondary encoder).
18. Turn on the noise suppressor. Long press - go to settings. Level squelch inFM mode is displayed on the S-meter.
19. Accelerated (with a coefficient) frequency tuning step.
20. Mute the transceiver. Long press - disables only ULF, without headphones (in transceivers where there is support).
21. FFT (spectrum), above it there is a color line displaying the boundaries fashion/range.
    By pressing - it tunes to the desired frequency section By
    swiping - smooth movement along the frequency
    Moving/spreading your fingers - activationzoom (zooming in/out of the spectrum)
22. Waterfall (WTF)
23. Selected function keys and their status (scroll using the arrows on edges or swipe your finger left and right across the panel area)

Function keys

- A/B – VFO bank switching
- B=A – copying information to adjacent VFO
- WPM – automatic key speed adjustment
- POWER – selection of output power in %
- ANT - ANT1/ANT2 - select the transceiver antenna. 1T2 - reception for the first antenna, transmission to the second.
- RIT - reception detuning relative to transmission (regulated by secondary encoder)
- XIT - transmission detuning relative to reception
- SPLIT - reception on the current VFO, transmission on the secondary (cross-band possible)
- PLAY – playback of CQ Message recorded on the SD card (recorded in service menu)
- REC – recording broadcast to SD card
- SERVICE - go to the services menu (description below)

- SAMPL- - reducing the sampling rate and span at the waterfall
- SAMPL+ - increases the sampling rate and span on the waterfall
- ZOOM- - distance signal at the waterfall
- ZOOM+ - zooming signal at the waterfall
  ZOOM and SMPL can be used together. For WFM it is not recommended to reduce sampling frequency (the entire signal band will not reach the receiver).
- DOUBLE - enable SO2R mode: A - only VFO-A, B - only VFO-B, A+B - a mixture of two VFOs in both headphones, A&B - A in the left earphone, B - in the right;
- HPF - setting the high-pass filter of the low-pass filter
- TUNE – tuning mode. In this mode, SWR protection is turned off and the PA transmits set in calibrationsTUNE-power, recommended for starting auto tuner. During normal operation, the transceiver drops power when it exceeds the SWR3.

- SCAN - scanning a range or channels in search of a signal
- BW – adjustment of reception and transmission bandwidth
- MODE- - select a mode group (FM/SSB/CW, etc.)
- MODE+ - select a mode within a group (for example NFM/WFM, LSB/USB)
- BAND- - select a downward bend
- BAND+ - select upward bend
- BANDMP - enable automatic mode selection mode from the current region to range.

- AUTOGN – allow the transceiver to control ATT, DRV, PGA itself depending on situations, blocks control of these functions by the user
- LOCK – transceiver control lock

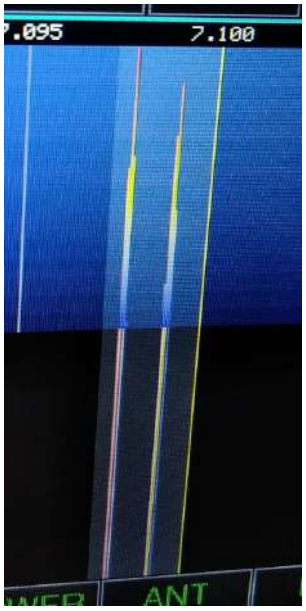
Settings menu

TRX Settings

- RF Power - Transmission power, %
- Channel Mode - Channel operating mode (for LPD/PMR and the like)

- Band Map - Band map, automatically switches mode depending on frequencies

- AutoGainer - Automatic control of ATT/PREAMP depending on the level signal to ADC
- RF Filters - Control of hardware filters (LPF/HPF/BPF) (for QRP versions of the board)
- Two Signal tune - Two-signal generator in TUNE mode (1+2kHz)



- RIT Interval - RIT detuning range (+-)
- XIT Interval - XIT detuning range (+-)
- Fine RIT Tune - Coarse or fine tuning for RIT/XIT (by secondary encoder or with a penIF/Shift)
- TRX Samplerate - Maximum panorama width in CW/SSB/NFM/DIGI modes, etc.
- FM Samplerate - Maximum panorama width in NFM/WFM mode
- Freq Step - Frequency tuning step by the main encoder
- Freq Step FAST - Frequency tuning step by the main encoder in FAST mode
- Freq Step ENC2 - Frequency tuning step of the main additional. encoder
- Freq Step ENC2 FAST - Frequency tuning step of the main additional. encoder in FAST mode

- CW Freq Step divider - Frequency step divider for CW mode

- Encoder Accelerate - Encoder acceleration at high speeds
- Att step, dB - Attenuator tuning step
- DEBUG Type - Output debugging and service information to USB/UART ports
- Auto Input Switch - Automatic input selection (PTT - microphone, CAT - USB)
- Input Type - Select audio input (microphone, line input, USB)
- Callsign - User's call sign
- Locator - QTH user locator
- TUNER Enabled - Enables the antenna tuner
- ATU Enabled - Enables the automatic antenna tuner
- ATU Ind - Tuner inductance combination
- ATU Cap - Tuner Capacitance Combination
- ATU T - Position of the capacitive tuner arm
- Transverter XXcm - Supports external transverter for amateur radio bends

- Custom Transverter - Enable external transverter control for custom offset to any frequencies (simply shifts the displayed frequency)

- Transverter Offset, mHz - Frequency offset of the external transverter, mHz

AUDIO Settings

- Volume - Bass boost
- Volume step - Volume change step with a secondary encoder (X1, Lite)
- IF Gain, dB - IF Gain
- AGC Gain target, LKFS - Maximum AGC gain (maximum volume at enabled AGC)

- Mic Gain - Microphone gain
- Mic Boost - +20dB hardware microphone gain
- DNR xxx - Digital noise reduction adjustment
- SSB HPF Pass - High-pass filter cutoff frequency when operating in SSB
- SSB LPF Pass - Low-pass filter cutoff frequency when operating in SSB
- CW LPF Pass - Low-pass filter cutoff frequency when operating in CW
- DIGI LPF Pass - Low-pass filter cutoff frequency when working in DIGI
- FM LPF Pass - Low-pass filter cutoff frequency when operating in FM
- Squelch - SSB/AM/CW/FM Noise Reduction
- FM Squelch level - FM noise reduction level
- MIC EQ xxx - Microphone equalizer levels
- MIC Reverber - Microphone reverb
- MIC Noise Gate - Level below which the signal from the microphone is turned off, dbFS
- RX EQ xxx - Receiver equalizer levels
- RX AGC Speed - AGC (automatic level controller) response speed signal) for reception (more, faster)
- RX AGC Max gain - Maximum gain level during AGC operation, dB
- RX AGC Hold time - Time before releasing AGC gain in signal peaks, ms
- TX Compressor Speed - AGC/compressor response speed for transmission (more is faster)
- TX Compressor MaxGain - Maximum gain for the compressor
- Beeper - Key press sound

- CTCSS Frequency - CTCSS subtone transmission frequency for FM
- SelfHear Volume - Adjust the volume of self-control relative to the general one transceiver volume
- WFM Stereo - Select between mono and stereo WFM decoder
- AGC Spectral - Enable experimental AGC based on FFT
- VAD Threshold - Select the threshold for the VAD voice detector (noise suppressor ForSSB mode and SCAN mode)
- VOX - Activation of voice transmission
- VOX Timeout, ms - VOX transmission delay after silence, milliseconds
- VOX Threshold, dbFS - VOX response threshold, dbFS

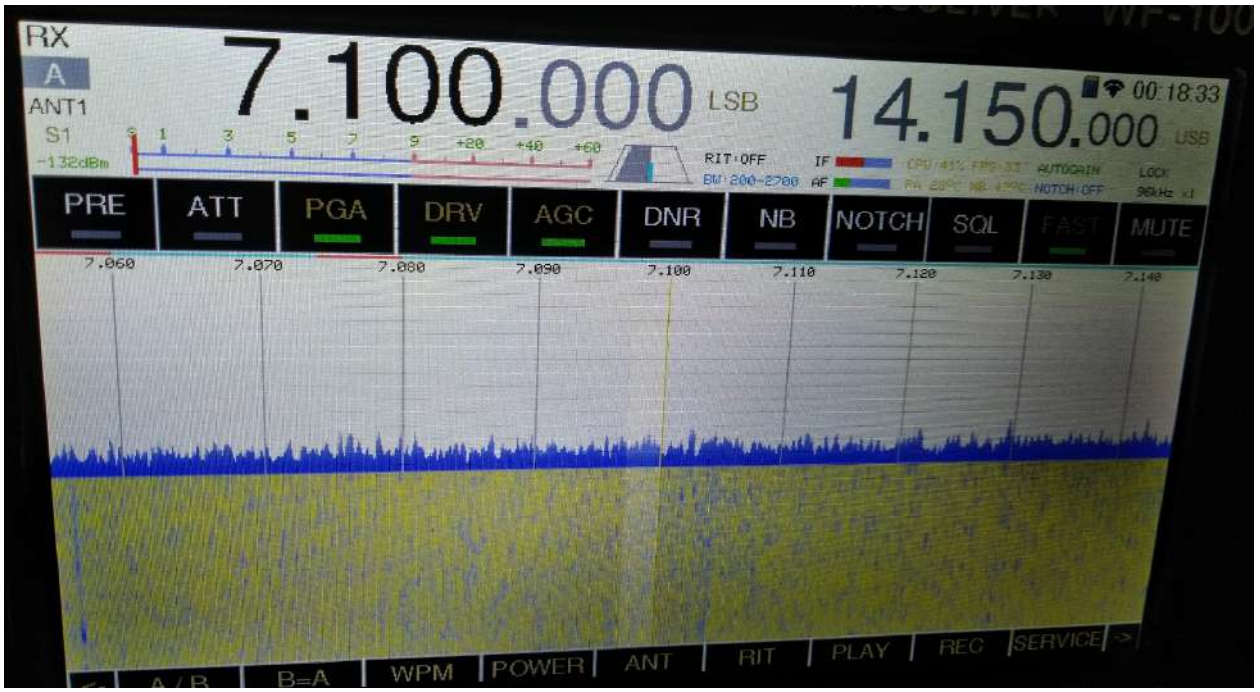
CW Settings

- CW Key timeout - Time until the transmission mode stops after releasing the key
- CW Pitch - Detuning the reception generator from the transmission frequency
- CW Self Hear - CW self-monitoring (you can hear the key being pressed)
- CW Keyer - Automatic key
- CW Keyer WPM - Key speed, WPM
- CW Gauss filter - Use a filter with a Gaussian distribution (for CW), accepts only the peak in the center of the strip
- CW DotToDash Rate - Ratio of the length of a dash to a dot
- CW Iambic Keyer - Iambic key mode
- CW Key Invert - Invert the dot/dash on the key
- CW PTT Type - Transition mode to CW transmission: from key or from PTT signal

SCREEN Settings

- FFT Zoom - FFT spectrum approximation
- FFT Zoom CW - FFT spectrum approximation for CW mode
- LCD Brightness - Control screen brightness (not for all displays)
- LCD Sleep Timeout - Time of inactivity before the screen brightness decreases, sec (0 - function disabled)

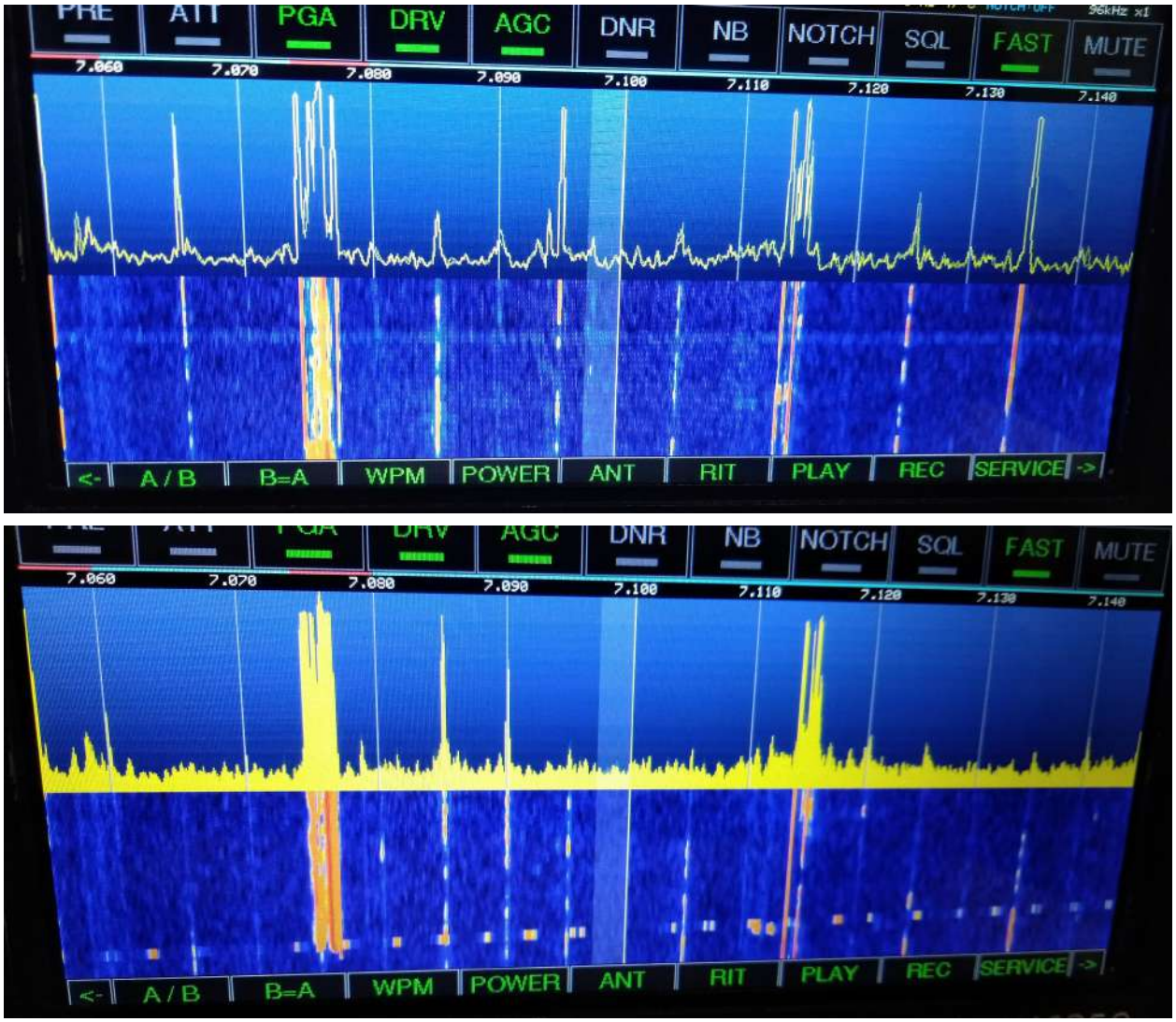
- Color Theme - Selecting a color theme



- Layout Theme - Selecting an interface theme

- FFT Speed - FFT and waterfall display speed
- FFT Automatic - Automatic adjustment of the FFT scale
- FFT Sensitivity - Upper level of FFT auto-tuning sensitivity (the lower - the more contrasting the signals,30 - alignment to the strongest signal)
- FFT Manual Bottom, dBm - Lower FFT sensitivity threshold for manual tuning
- FFT Manual Top, dBm - Upper threshold of FFT sensitivity when manually configured
- FFT Height - Proportional display height of FFT and waterfall

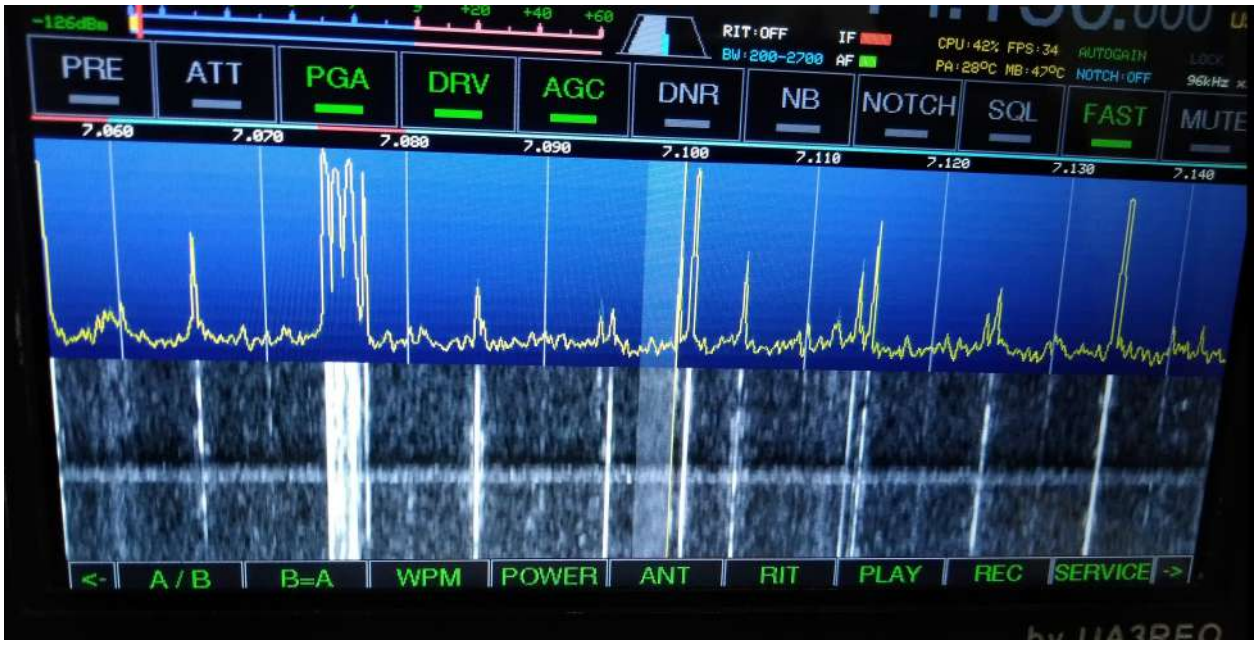
- FFT Style - FFT Style: 1(gradient), 2(fill), 3(dots), 4(outline)



- FFT BW Style - Design style of the reception band on FFT: translucent, almost transparent, lines

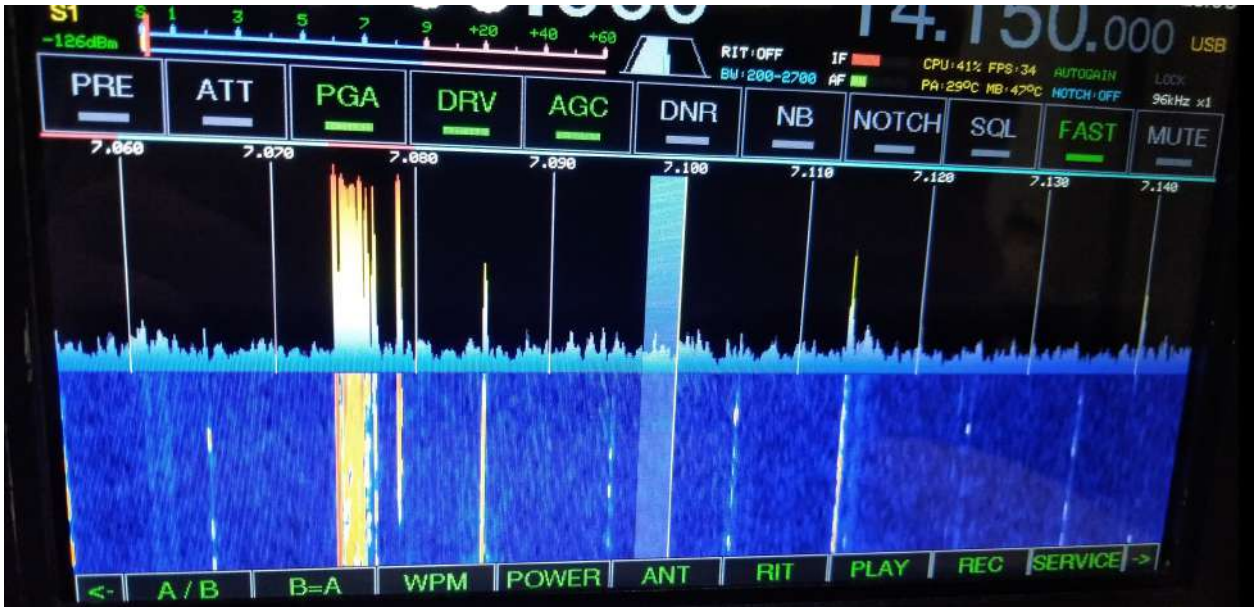
- FFT Color - FFT colors: 1(blue -> yellow -> red), 2(black -> yellow -> red), 3(black -> yellow -> green), 4(black -> red), 5(black -> green), 6(black -> blue), 7(black -> white)

- WTF Color - Waterfall colors: 1(blue -> yellow -> red), 2(black -> yellow -> red), 3(black -> yellow -> green), 4(black -> red), 5(black -> green),6(black -> blue), 7(black -> white)

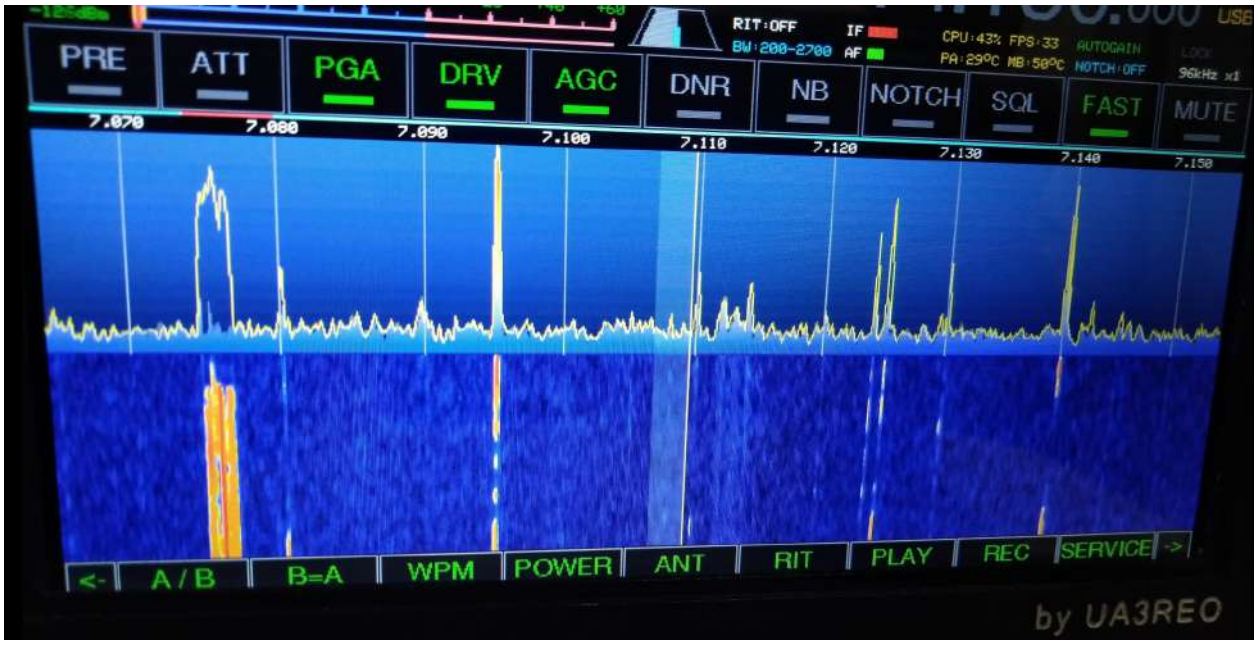


- FFT Freq Grid - Grid on FFT and waterfall: 1 (no grid), 2 (grid on FFT), 3 (grid on FFT and waterfall),4(mesh on waterfall)
- FFT dBm Grid - Signal power grid on FFT

- FFT Background - Gradient background behind the spectrum



- FFT Lens - Lens mode (increasing the center of the spectrum)
- FFT Hold Peaks - Display signal peaks on the spectrum



- FFT 3D Mode - 3D mode FFT 3D (0 - off, 1 - lines, 2 - pixels)

- FFT Enabled - Enable waterfall and FFT
- WTF Moving - Waterfall displacement along with frequency change
- FFT Compressor - Compress peaks when overloaded FFT
- FFT Averaging - FFT burst averaging level
- FFT Window - FFT window selection (1-Dolph–Chebyshev 2-Blackman-Harris 3-Nutall 4-Blackman-Nutall 5-Hann 6-Hamming 7-No window)

- FFT DXCluster - Display data from a cluster on top of a spectrum

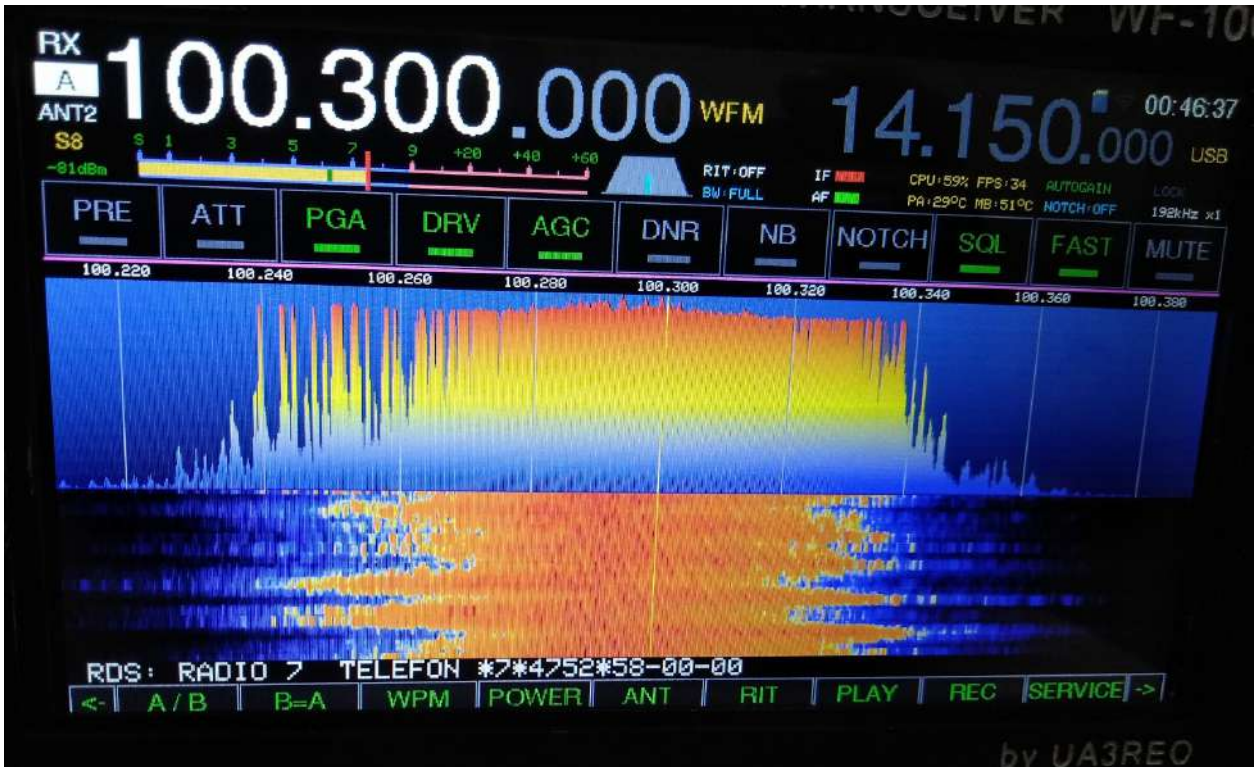
- FFT DXCluster Azimuth - Add azimuth data to the DX cluster
- FFT DXCluster Timeout - Timeout of displayed spots from the DX cluster in minutes
- Show Sec VFO - Display the position of the second VFO on the spectrum
- FFT Scale Type - Style the Y axis on the FFT between signal amplitude and dBm, allowing fit more dynamic range on screen (Useful when manually adjusting range FFT).

Decoders

- CW Decoder - Software decoder for CW reception

- CW Decoder Threshold - CW decoder response threshold

- RDS Decoder - Enable RDS decoder for WFM mod



- RTTY Speed - Data speed for RTTY decoder
- RTTY Shift - Spacing of signals in the RTTY band

- RTTY Freq - RTTY decoding center frequency
- RTTY StopBits - RTTY stop bits
- RTTY InvertBits - RTTY bit inversion

ADC/DAC Settings

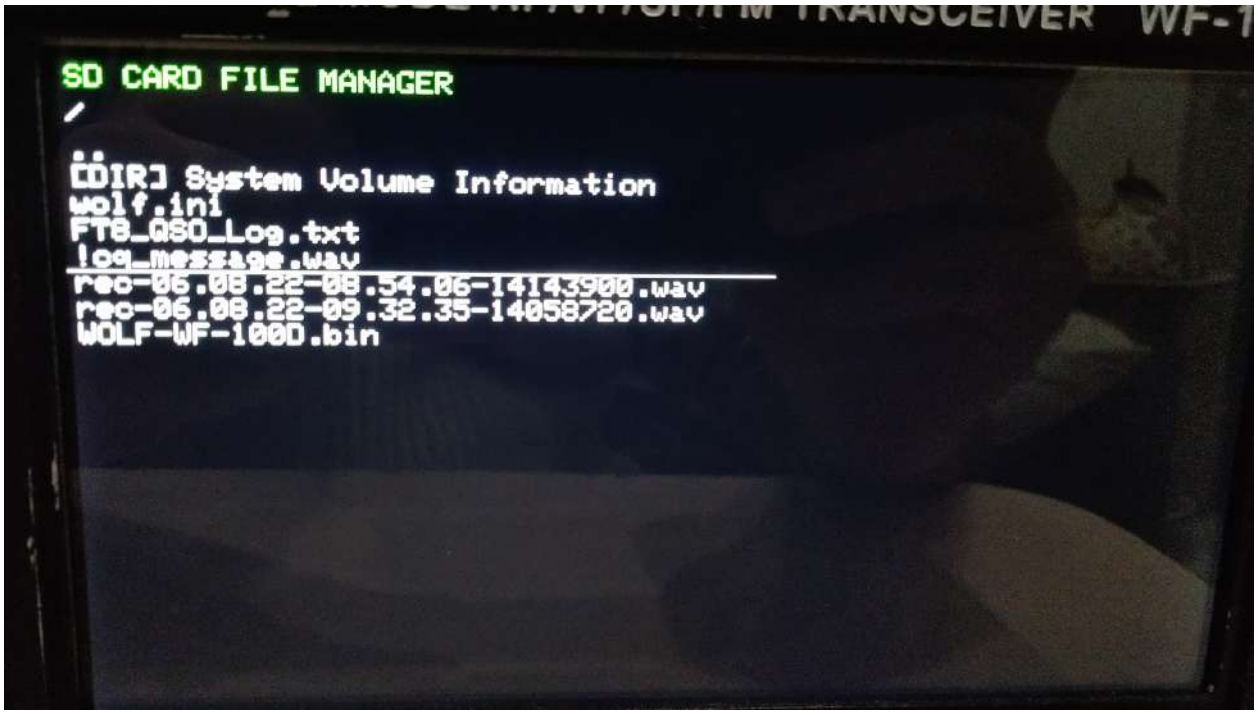
- ADC Driver - Enabling the ADC preamplifier driver
- ADC Preamp - Enables the preamplifier built into the ADC
- ADC Dither - Enable ADC dithering to suppress boreholes
- ADC Randomizer - Enable encryption of the ADC digital line
- ADC Shutdown - Turn off the ADC

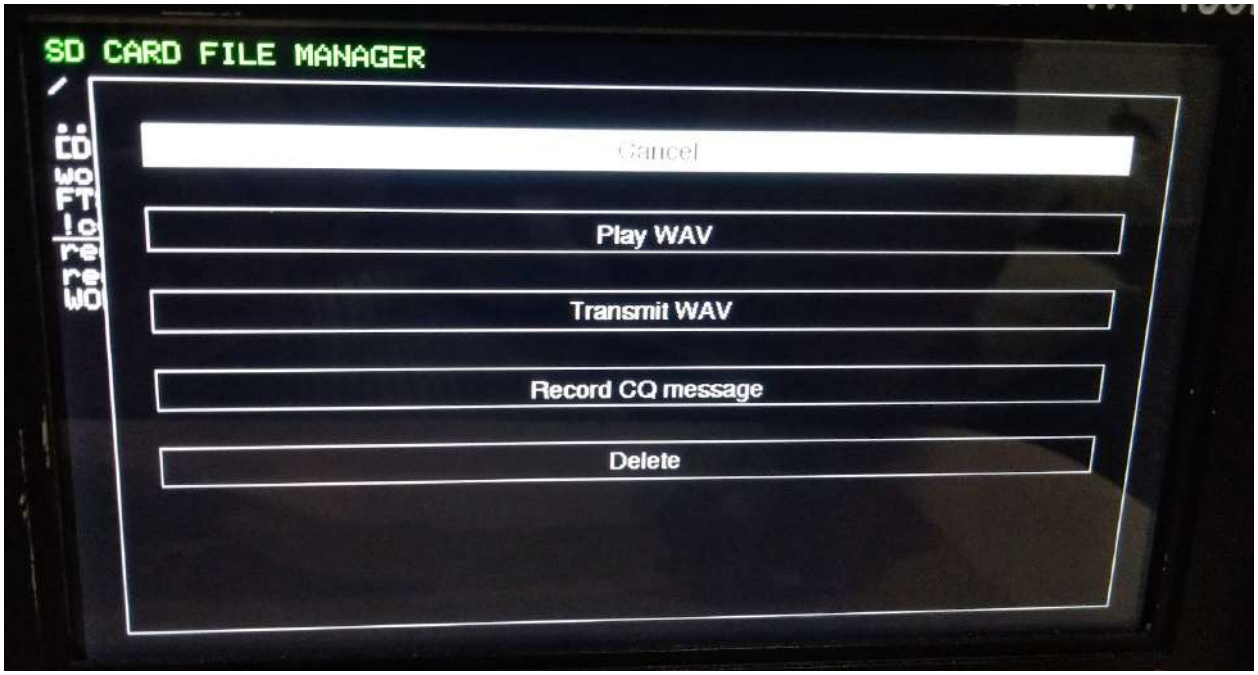
WIFI Settings

- WIFI Enabled - Enable the WiFi module (needs restart)
- WIFI Network - Select WiFi access point
- WIFI Network Pass - Set a password for a WiFi hotspot
- WIFI Timezone - Time zone (to update time via the Internet)
- WIFI CAT Server - Server for receiving CAT commands via WIFI
- WIFI Update ESP firmware - Launch auto-update of ESP-01 firmware via the Internet (if available)

SD Card

- File Manager - Launch a file manager on an SD memory card, functions playing and deleting files, listening and broadcasting recordings, as well as updating firmware from a memory card





- USB SD Card Reader - SD card reader mode via USB
- Export Settings - Export settings and calibrations to an SD card
- Import Settings - Import settings and calibrations from an SD card
- Format SD card - Formatting an SD card

Set Clock Time

Setting the clock

DFU Mode

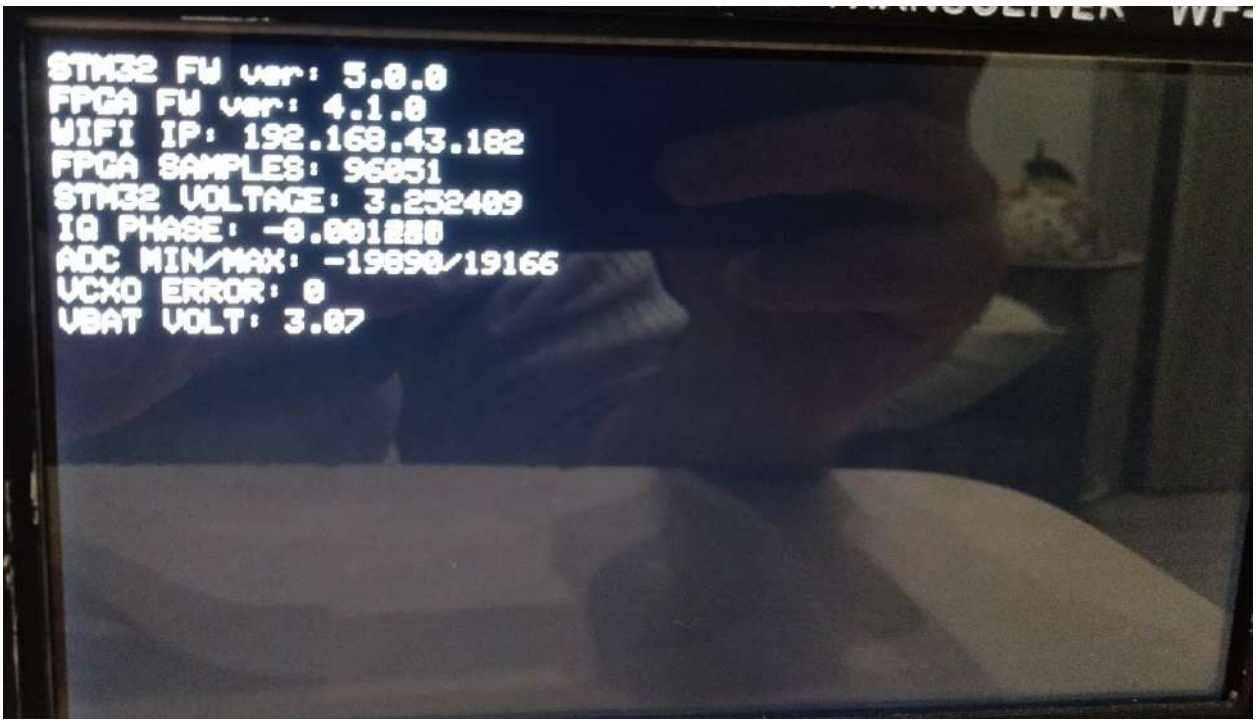
LaunchDFU mode for updating STM32 firmware via USB

OTA Update

Starting a firmware updateFPGA/STM32 via Internet

System info

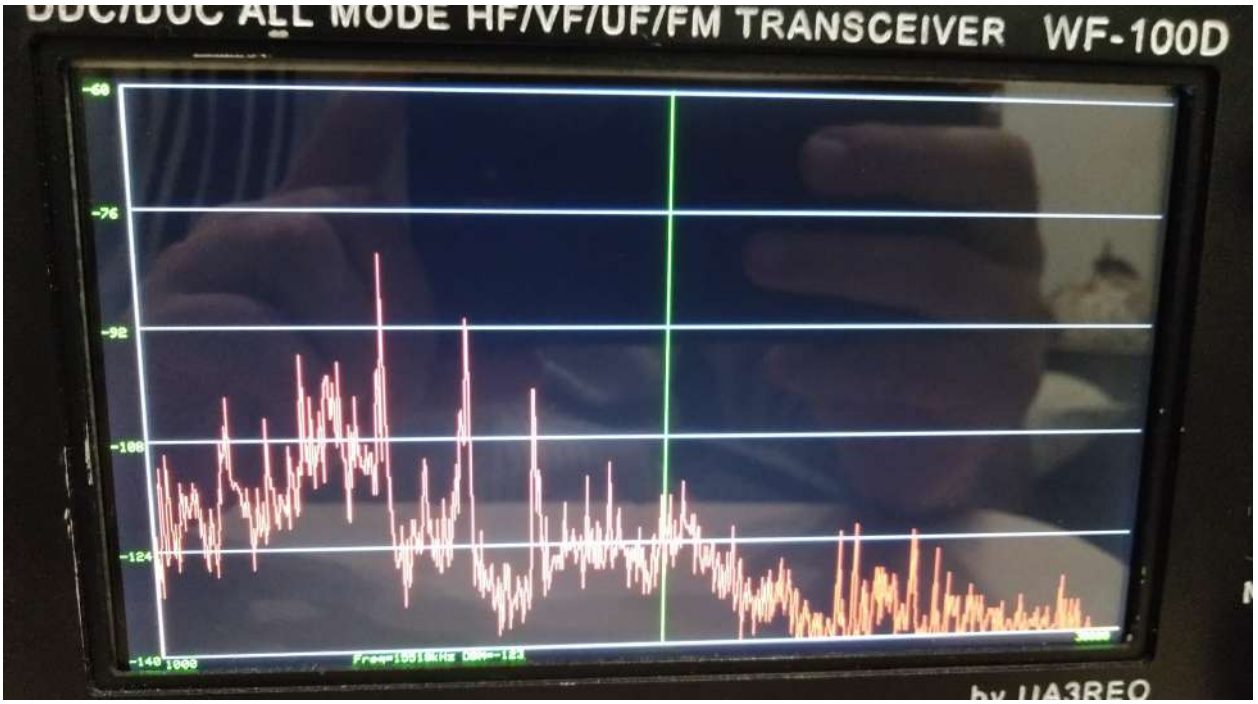
Displaying system information



Services (menuServices)

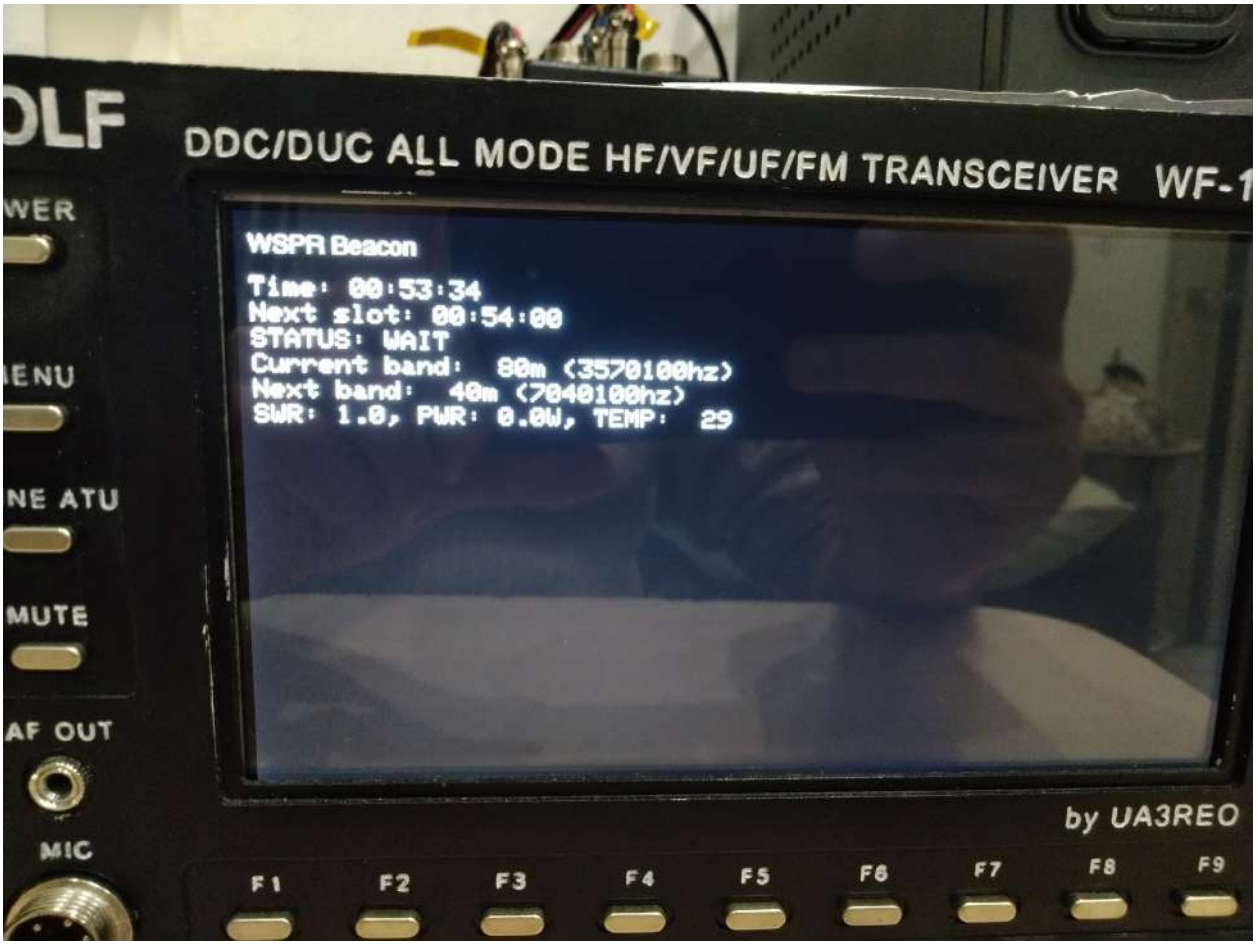
Spectrum Analyzer

- Spectrum START - Starting the spectrum analyzer
- Begin, kHz - Analyzer starting frequency in 1kHz steps
- End, kHz - End frequency of the analyzer in 1kHz steps
- Top, dBm - Upper threshold of the graph
- Bottom, dBm - Lower threshold of the graph



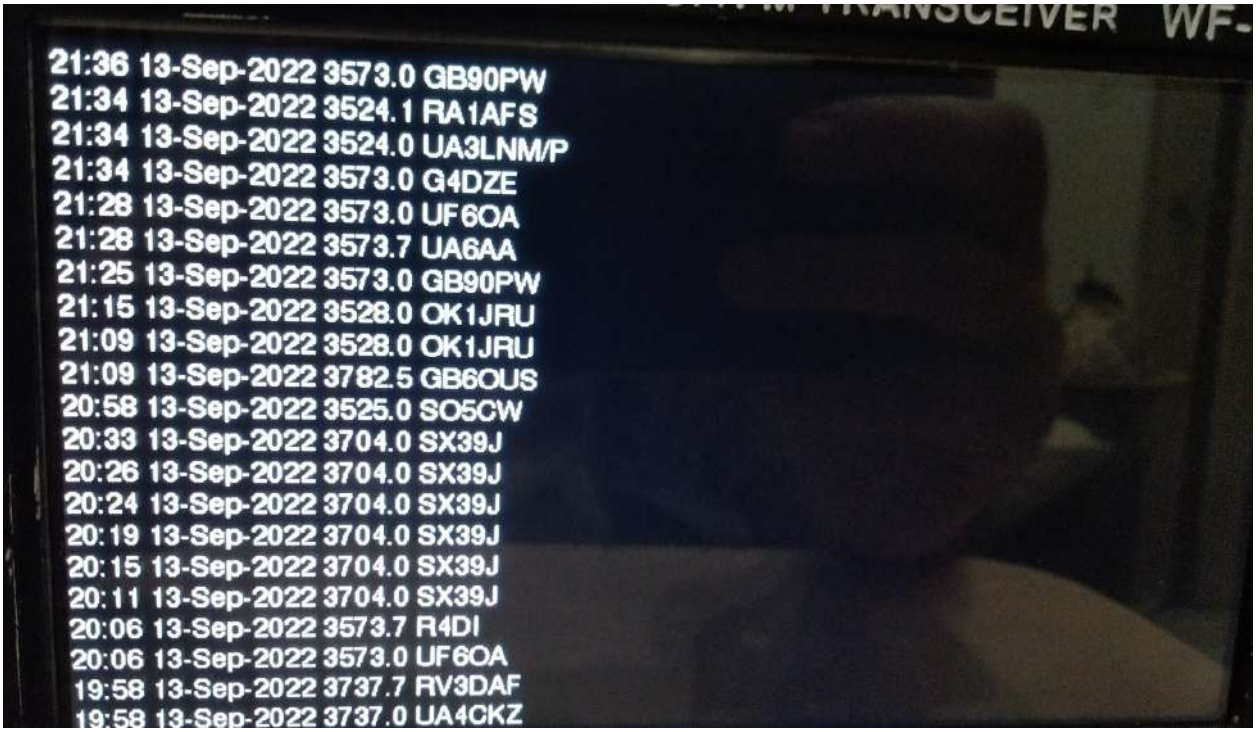
WSPR Beacon

- WSPR Beacon START - Launching the WSPR beacon
- Freq offset - Offset relative to the center of the WSPR range
- WSPR Band xxx - Selecting bands for beacon operation



DX Cluster

Displaying data for the current range fromDX cluster (requires connection to Internet)

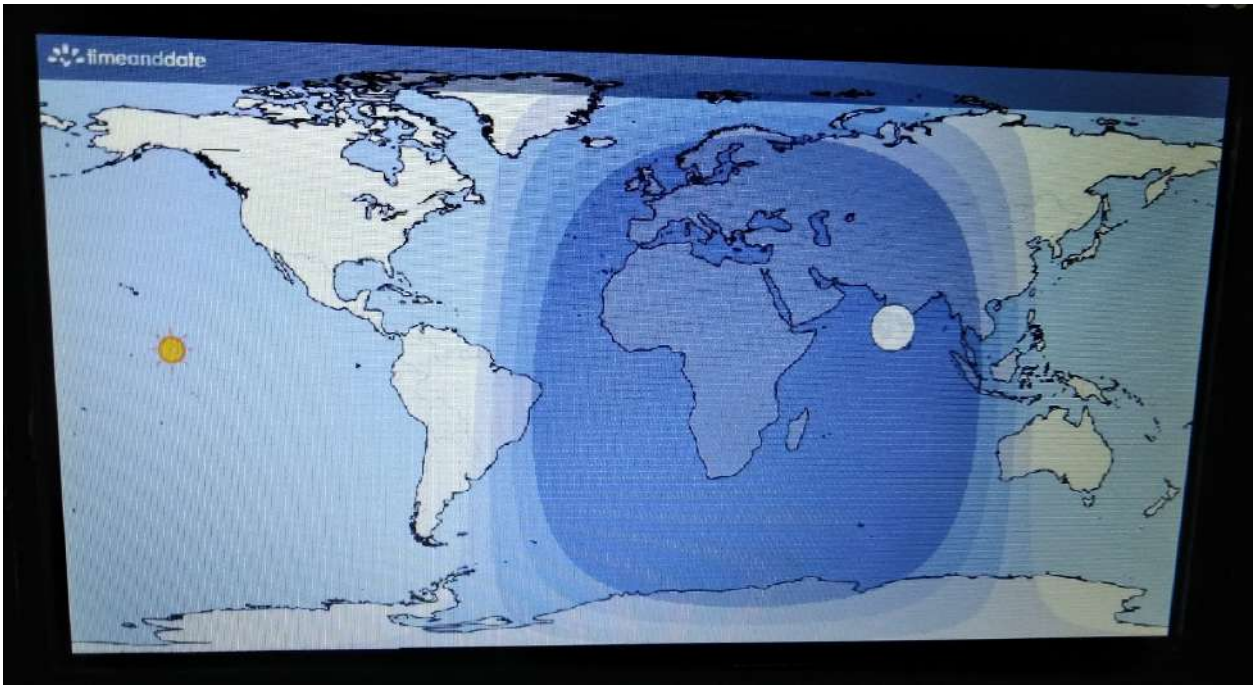


Propagation

Display statistics on the passage of radio waves (internet connection required)

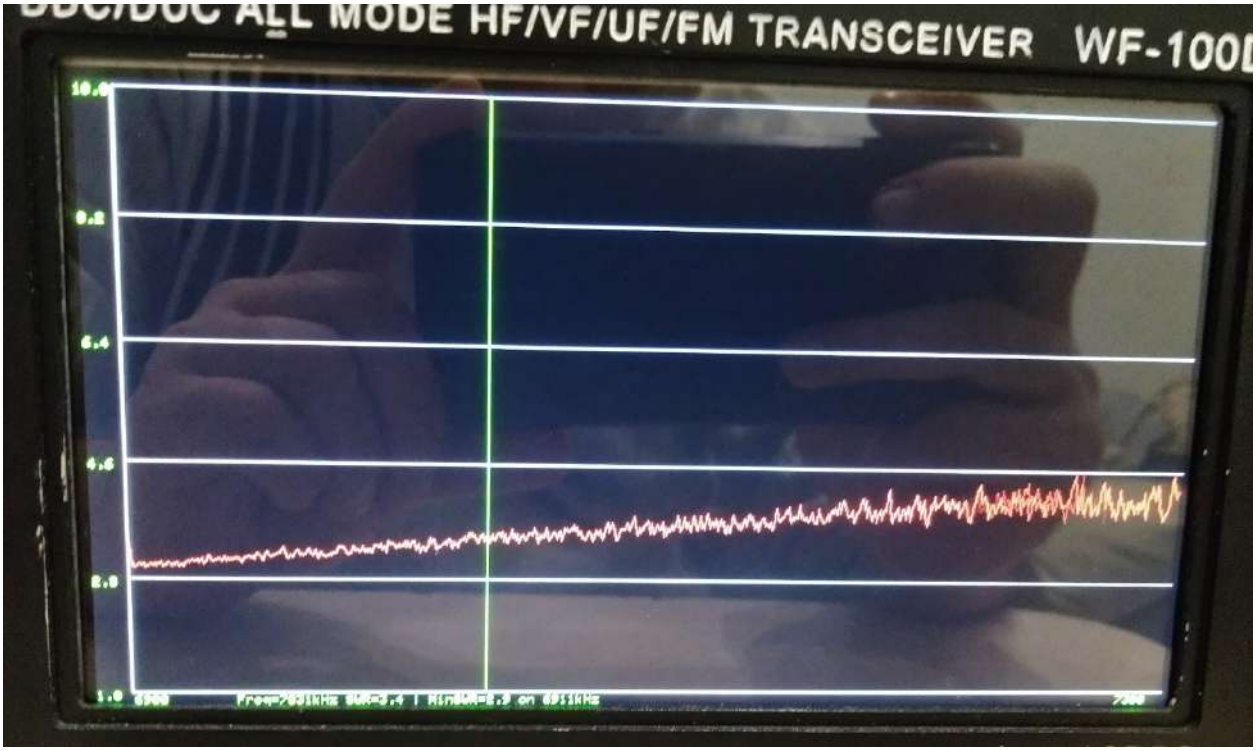
DayNight Map

Display the light section on the map (requires internet connection)



SWR Analyzer

Starting the SWR analyzer (Band SWR - by band, HF SWR - over all HF bands, Custom SWR - within selected limits)



RDA Statistics

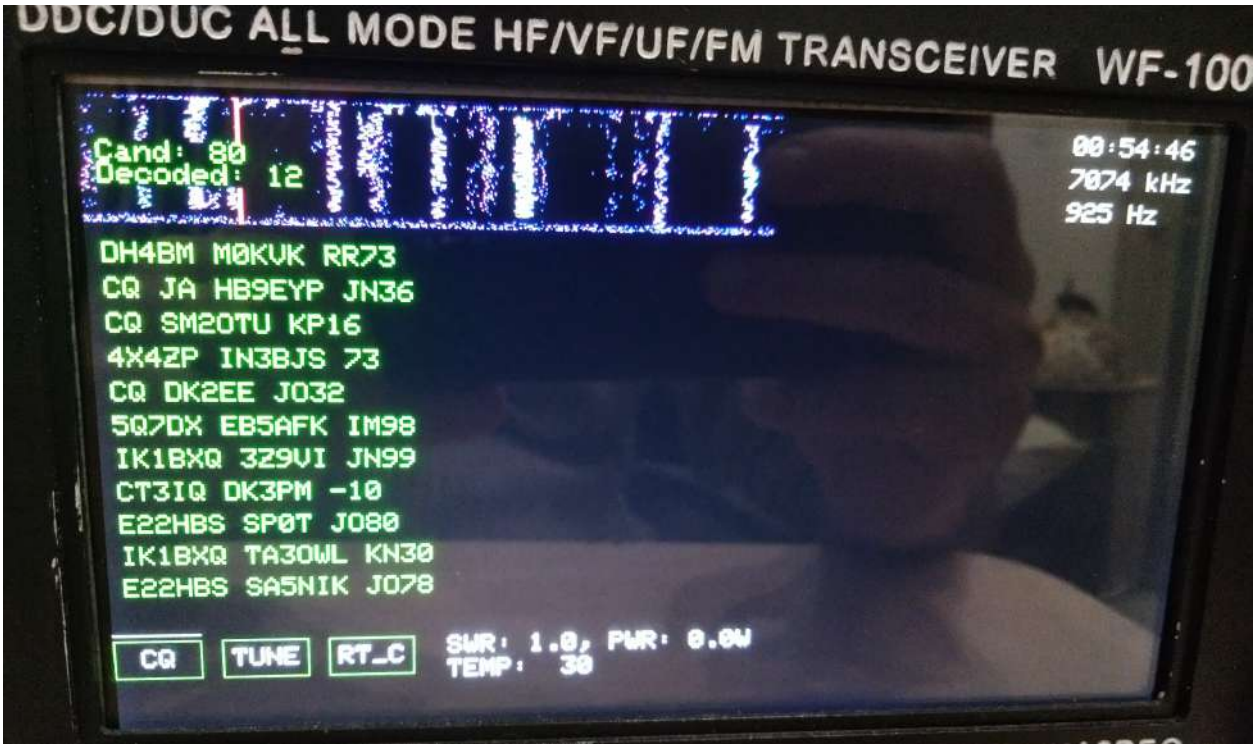
Displaying diploma statisticsRDA (requires internet connection)

Record CQ message

Record a short message for quick broadcast with a buttonPlay

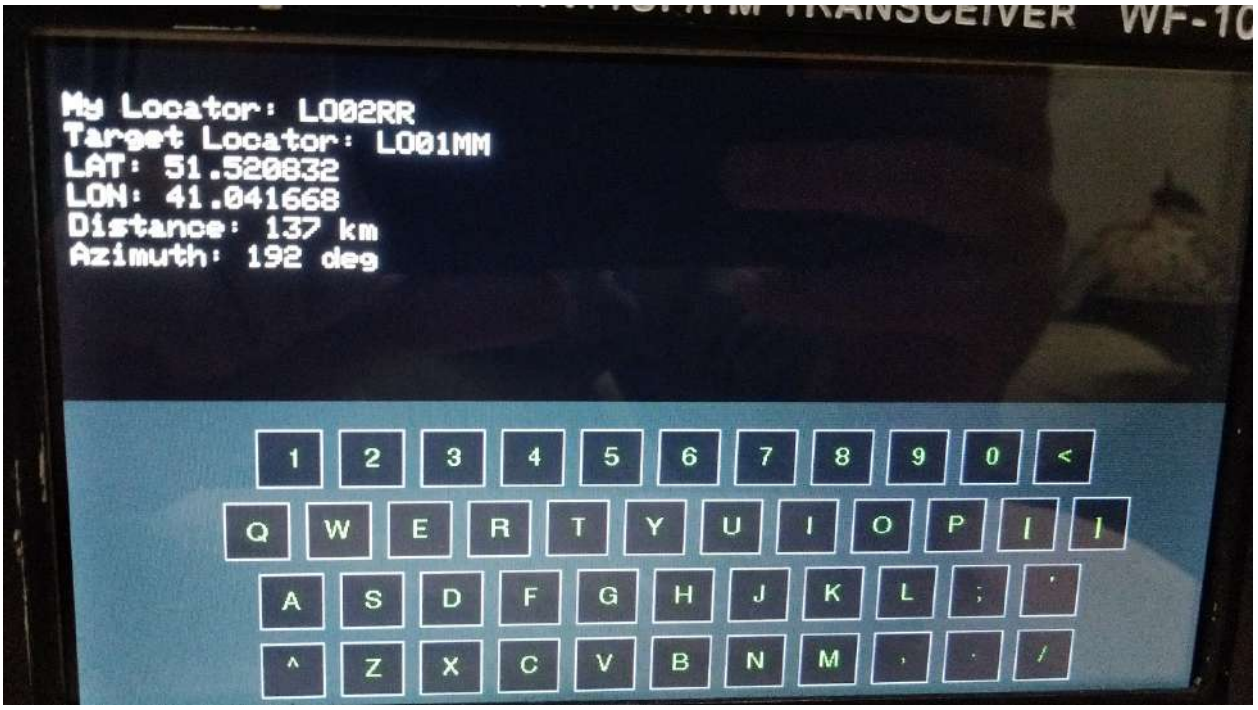
FT8-Decoder

FT8 Receiver/Transmitter



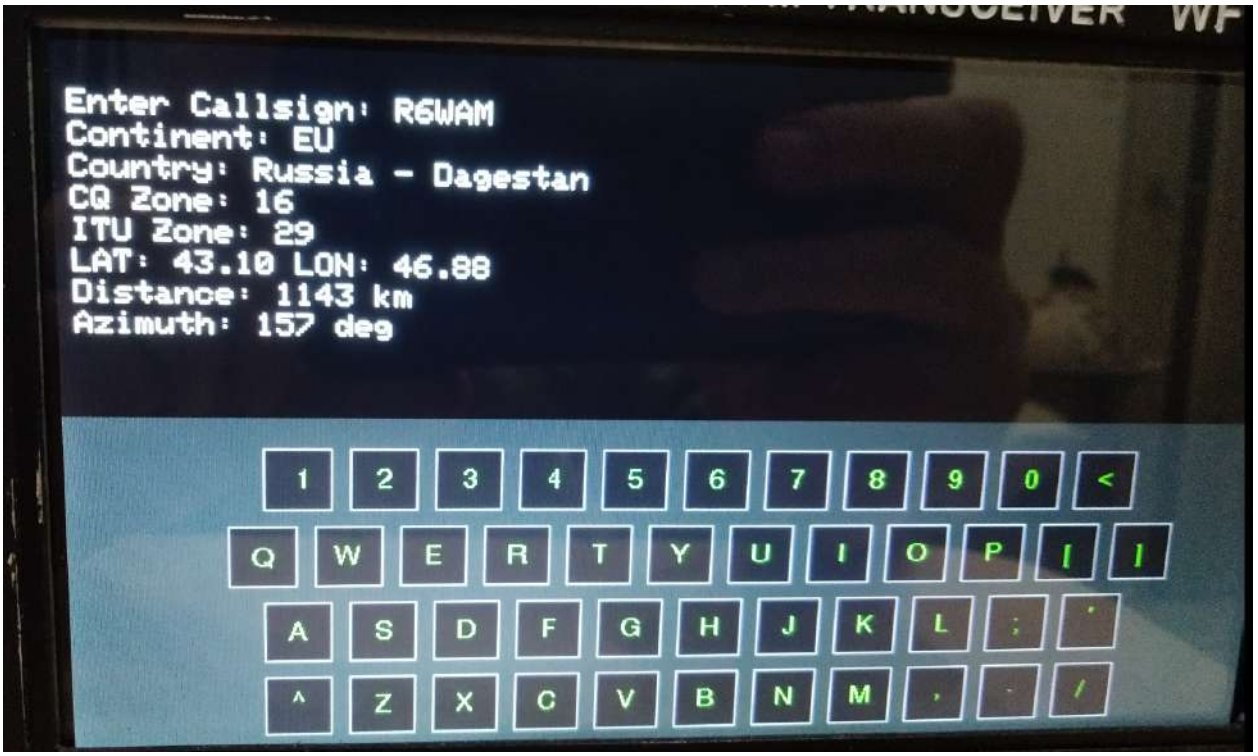
Locator Information

Calculation of distance and azimuth to the correspondent according to hisQTH locator



Callsign Info

Displaying data by call sign



Self Test

Launching the hardware self-diagnosis system (modes are switched by a secondary encoder)

Calibration [appears when you long press the MENU button in the settings menu]

- Encoder invert - Invert the rotation of the main encoder
- Encoder2 invert - Invert the rotation of the additional encoder
- Encoder debounce - Time to debounce the main encoder contacts
- Encoder2 debounce - Time to debounce additional contacts encoder

- Encoder slow rate - Slowdown coefficient of the main encoder
- Encoder on falling - The encoder is triggered only when level A falls
- Encoder acceleration - Encoder acceleration during fast rotation
- RF-Unit Type - RF-Unit board type (QRP / BIG)
- Tangent Type - Select the tangent to use
- CICCOMP Shift - Bit shift after CIC compensator
- TX CICCOMP Shift - Bit shift after TX CIC compensator
- DAC Shift - Bit shift of the output to the DAC
- DAC Driver Mode - OPA2673 driver operating mode (2 = 100% bias, 1 = 75% bias, 0 = 50% bias)

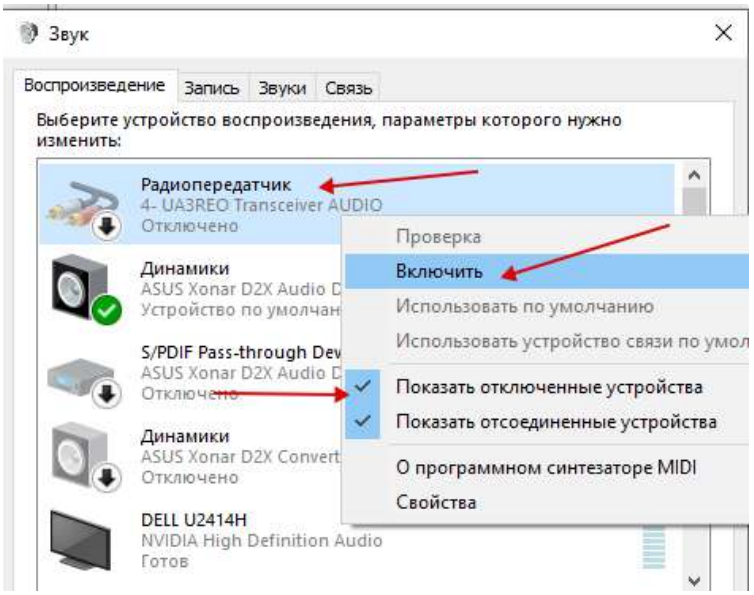
- RF GAIN xxx - Calibrates the maximum output power for each band. CalibrationRF GAIN 0-100% - 50% driver power, 101-200% - 75% power drivers,201-300% - 100% driver power.
- S METER - S-meter calibration
- ADC OFFSET - ADC offset calibration
- LPF END - Low pass filter parameters
- BPF x - Bandpass filter parameters
- HPF START - High pass filter parameters
- SWR FWD/REF RATE - Adjustment of the transformation ratio of the SWR meter for incident and reflected waves
- VCXO Correction - Adjustment of reference oscillator frequency
- FAN Medium start - Temperature of the final stage for starting the fan at average speed
- FAN Medium stop - Temperature of the final stage to stop the fan
- FAN Full start - Temperature of the final stage to start the fan at full speed

- MAX RF Temp - Maximum temperature of the final stage before triggering of protection
- MAX SWR - Maximum SWR before protection is triggered
- FM Deviation Scale - Strengthening deviation in TX FM mode
- SSB Power addition - Increase in output power in SSB mode, %
- AM Modulation Index - TX AM modulation depth
- MAX PWR on Meter - Maximum power output (for display)
- MAX Power in TUNE - Maximum power in tuning mode
- RTC COARSE CALIBR - Rough calibration of watch quartz, with large deviations
- RTC FINE CALIBR - Calibration of watch quartz, one division equals 0.954 ppm
- EXT xxx - Control of External port combinations depending on the range (EXT3, EXT2, EXT1, EXT0) - open collector
- NOTX xxx - Transmission prohibition on selected bends
- ENABLE 60m/4m/AIR/Marine Band - Enable hidden bends
- OTA Update - Enable firmware update via WiFi

- TX Start Delay - Delay when switching to TX for relay activation
- LCD Rotate - Rotate the screen 180 degrees
- ATU Averaging - Number of steps of averaging SWR values during measurements in operation automatic tuner
- CAT Type - CAT subsystem type (FT-450 / Kenwood TS-2000)
- LNA Compensation - Compensates the S-meter value when LNA is turned on, dBm
- TSignal Balance - Sets the power balance between signals in Two signal tune mode
- Linear Pwr Control - Sets the linear way the signal amplitude changes when power adjustment (if disabled - logarithmic)
- Flash GT911 - Starts the process of updating the touchpad configuration in accordance with resolutionLCD screen

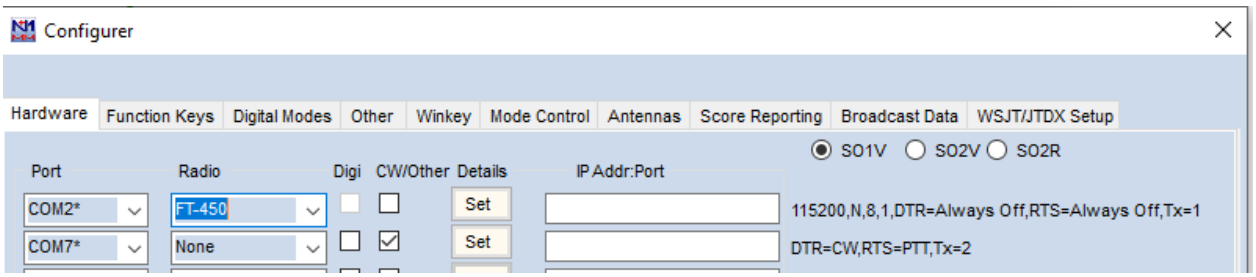
Example settings for a computer

Turning on an audio device

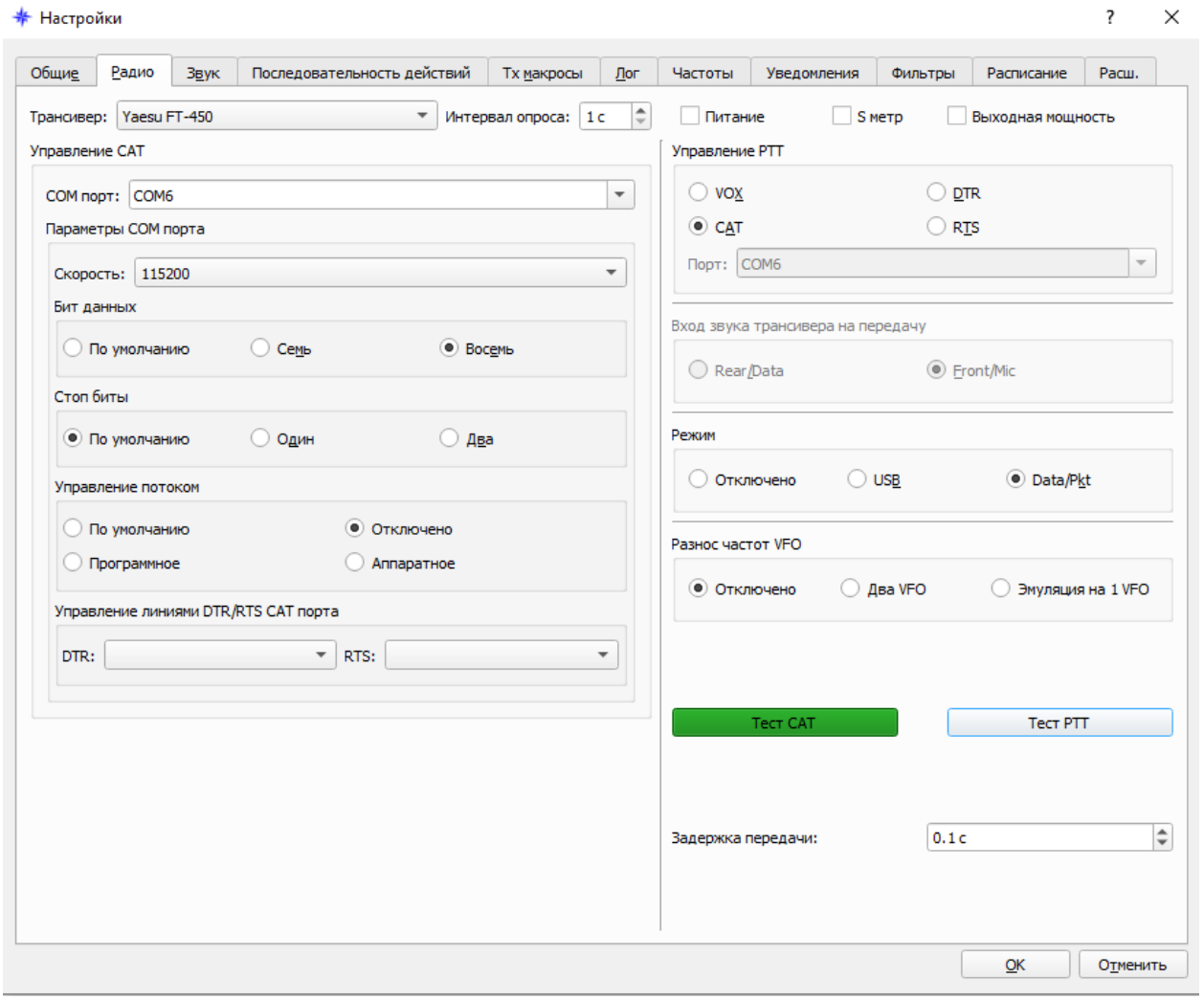


N1MM

For VHF it is better to use the modeCAT from Kenwood TS-2000 (included in calibrations).



JTDX


Настройки
Общие
Радио
Звук
Последовательность действий
Tx макросы
Лог
Частоты
Уведомления
Фильтры
Расписание
Расш.
Трансивер:
Yaesu FT-450
Интервал опроса:
1 с
Питание
S метр
Выходная мощность
Управление CAT
COM порт:
COM6
Параметры COM порта
Скорость:
115200
Бит данных
По умолчанию
Семь
Восемь
Стоп биты
По умолчанию
Один
Два
Управление потоком
По умолчанию
Отключено
Программное
Аппаратное
Управление линиями DTR/RTS CAT порта
DTR:
RTS:
Управление PTT
VOX
DTR
CAT
RTS
Порт:
COM6
Вход звука трансивера на передачу
Rear/Data
Front/Mic
Режим
Отключено
USB
Data/Pkt
Разнос частот VFO
Отключено
Два VFO
Эмуляция на 1 VFO
Тест CAT
Тест PTT
Задержка передачи:
0.1 с
OK
Отменить