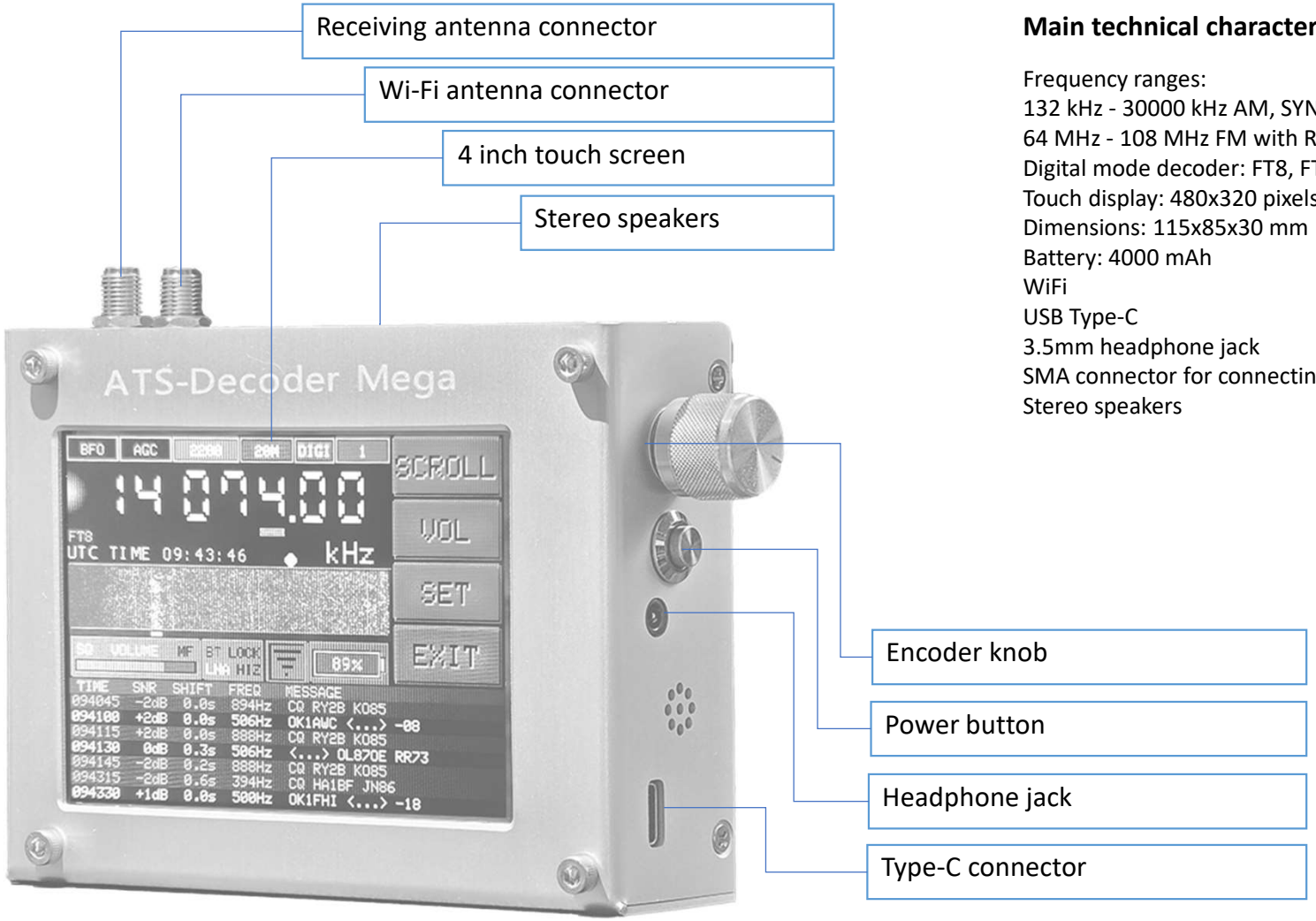
ATS-Decoder Mega

H-RADIO 4.2



Main technical characteristics of the receiver:

Frequency ranges:
132 kHz - 30000 kHz AM, SYNC, SSB, CW, DIGI
64 MHz - 108 MHz FM with RDS function
Digital mode decoder: FT8, FT4, PSK, RTTY
Touch display: 480x320 pixels
Dimensions: 115x85x30 mm
Battery: 4000 mAh
WiFi
USB Type-C
3.5mm headphone jack
SMA connector for connecting an external antenna
Stereo speakers

Equipment:

- Receiver
- telescopic antenna
- wifi antenna
- USB charging cable
- stylus

Indicators and panel quick start

- S-meter (press to change view and switch
  to the histogram or “waterfall” mode for the low-frequency signal,
  press and hold to turn metering on/off
  RSSI/SNR signal quality, use for
  reduce digital noise)
- volume (press to turn sound on/off)
  SQ – indicator of a working squelch
  MF – simultaneous function indicator
  listening to multiple frequencies (page 5)
- indicator panel for switching on circuit elements
  (click to display control buttons)
  (page 3)
- Wi-Fi connection (tap to turn on/off)
  indicator color:
  green - connection active
  orange - no Internet connection
  red - connection error
  gray - no available networks
- battery charge level (tap to display in percentage or volts)
  "lightning" is displayed while the battery is charging
  as the charge level decreases, the color changes to yellow and red

Status panel

- use of BFO generator for
  fine tuning to frequency
- automatic gain or attenuator
- LF bandwidth
- range
- modulation
- setup step

Main screen (FM band)

- tuning frequency in MHz (press and hold
  to switch between VFO A/B)
- signal quality:
  RSSI – level
  SNR – signal to noise ratio
- stereo broadcast reception indicator in range
  FM (press to turn on/off stereo reception)
- current date and time
- RDS information (station name, text and
  program type)

Home screen buttons

Main screen (SSB modulation)

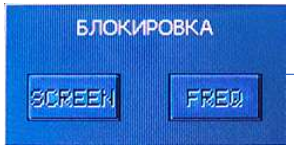
- tuning frequency in kHz (click to directly set frequency without using BFO offset, color the numbers will change to white)
- indicator of a variable digit in the frequency when tuning (click on the corresponding digit to installations)
- indicator of the passage of waves on the selected range (information obtained from the Internet), color indicator shows the quality of passage (red - bad, yellow - average, green - good)
- information about the type of amateur radio communication used in the current range section

Buttons

- **HAM** selection of amateur radio band (page 6)
- **BAND** selection of broadcast band (page 6)
- **FREQ** frequency setting / simultaneous mode listening to multiple frequencies (page 5)
- **STEP** selection of tuning step (page 6)
- **BANDW** selection of bass bandwidth (page 6)
- **MODE** modulation selection / decoder modes (page 6)
- **VOL / MUTE** volume control (page 4)
- **AGC** on/off automatic gain (page 4)
- **ATT** attenuator control (page 4)
- **BFO** control of BFO oscillator (page 3)
- **UP** search for broadcast station up in frequency
- **DN** search for broadcast station downward in frequency
- **SCAN** range scanner (page 8)
- **LIGHT** display brightness control (page 19)
- **MEMO** memory of stations and cities (page 9)
- **RETRO** retro receiver scale (page 12)
- **CB** civil band CB channels (page 11)
- **FM** fast switching of saved stations FM band of current location (page 11)
- **RDS** on/off RDS functions
- **SETUP** device settings (page 13)
- **INFO** information about the device, settings and passing waves (page 17)
- **NEXT / BACK** switching between pages

Panel for quick inclusion of circuit elements

Called up by clicking on the panel indicating the inclusion of circuit elements.
- **LOCK** locks the touch screen and encoder (press to open the lock panel)



Lock panel

- **SCREEN** enable touch screen lock, use to block accidental taps on the screen
  (can also be used to reduce your own digital noise)
- **FREQ** on/off encoder rotation lock

The locks are disabled by pressing the encoder button.

BFO generator

To fine tune to the transmitter frequency in SSB mode, use a BFO generator.
Entering the oscillator trim mode is available for each amateur radio band using
BFO button or long press the encoder button.
In this case, each range retains its own BFO frequency value.
The adjustment frequency value varies from -1999 to +1999 Hz. The adjustment step is displayed on the status panel and can be changed by pressing the STEP button.
Resetting the BFO frequency to default value is done by long pressing the frequency.

Volume control

To control the volume, press the VOL button or the encoder button once.
To mute the sound, press the MUTE button or the volume indicator.
To automatically mute the sound when there is no station signal, use the squelch.
To adjust the squelch level, press in volume control mode to the value
volume or once on the encoder button. The squelch level bar will be highlighted.
brighter and can be adjusted using an encoder.
Squelch is not available for SSB mode.

Auto gain and attenuator

Use the built-in attenuator to control signal gain. Entering control mode
the attenuator is performed by pressing the ATT button. Set the required value using the encoder
attenuator level to eliminate overload at the RF input. The higher the value, the weaker
signal amplification.
Press the ATT button again to exit the attenuator adjustment mode.
The set level will be displayed in the status bar.
Press the AGC button to enable automatic signal gain. The status bar will display
corresponding indicator. Press the AGC button again to set the maximum level
gain. The corresponding indicator in the status line will be extinguished.

Direct frequency entry buttons

Press the FREQ button on the main screen to enter the frequency or set the listening mode several frequencies.
Use the number buttons to enter the frequency. The units of measurement will be selected automatically.
Use the dot to enter the FM broadcast frequency.
To delete incorrectly entered numbers, use the ←| button.
A frequency that cannot be set is displayed in red.
Click OK to set the frequency. The range and type of modulation will be selected automatically.
To exit without changing the frequency, press CANCEL.
Press SCAN to enter multi-frequency simultaneous listening mode.
This mode is not available for SSB.

For each range and type of modulation AM or FM can be created your own list of 7 frequencies to scan. Range will be selected automatically according to the entered frequency.
- **MODE** select the type of modulation, if possible
- **OFF** disables the frequency of the selected slot from scanning
- **ADD** adding the current frequency to a free slot
- **DEL** release the selected slot
- **SCAN** start listening.

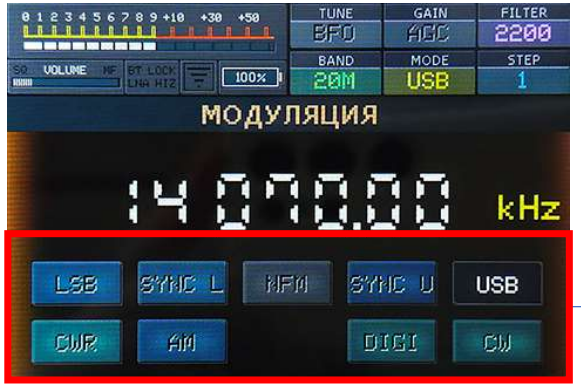
The sound will be muted and scanning of frequencies from the list will begin. When a signal appears on one of the frequencies, scanning will paused and the frequency will appear in white.
Tap the screen to exit the mode.

Amateur radio bands

Broadcast bands

Lists are available using the HAM and BAND buttons.
The lists contain frequency ranges allocated for radio amateurs and radio broadcasting.
Range boundaries can be overridden in the file setting.ini. Frequency values are available for viewing in INFO section.

To select modulation, bandwidth or tuning step, click the appropriate MODE, BANDW or STEP button on the main screen.
The current range, modulation type, bandwidth and tuning step are indicated in the lists pressed button.
Ranges and types of modulation not available in the receiver configuration are indicated by gray buttons and cannot be selected (see the description of your device).
To exit without changes, click on the frequency.



Types of modulation / decoder of Morse code and digital modes of communication

All possible types of modulation are available for the amateur radio and HF bands.
The CWR and CW buttons enable the Morse code decoder. Select the alphabet in the settings (page 14).
The DIGI button opens a list of digital communications to launch the corresponding decoder (page 7).
When you select a band, the priority modulation type will be turned on automatically.

Morse code decoder

For successful decoding, align the red mark on the “waterfall” with the signal while adjusting the frequency. Select the volume level so that the signal is clearly visible at the “waterfall” (usually volume 45). The yellow indicator will flash in time with the signal. The decode line displays the decoded characters and words per minute.

Digital mode decoders

To decode RTTY, PSK and Feld-Hell transmissions, align the red mark on the "waterfall" with the signal and adjust the volume. For RTTY L, use the left signal stream, and for RTTY U, use the right signal stream.

To manually scroll the RTTY, PSK and FT4/FT8 decoding screen, press SCROLL and rotate the encoder.

The SET button for RTTY sets the baud rate to 45.45/50/75 baud. For Feld-Hell, turn on/off anti-aliasing Pictures. For PSK, switches between BPSK31 and BPSK63 modes. In FT4/FT8 decoder it is used to set time manually (page 13).

To move the Feld-Hell picture up or down for For ease of reading, use the SCROLL button.

Decoding FT4/FT8 broadcasts requires accurate setting the time. Connect the receiver using Wi-Fi to the Internet or set the time manually.

When the time is set, it is displayed in the UTC TIME line.

For each FT4/FT8 gear, time, power are displayed signal, offset in seconds from the start of the session, offset frequency from the set one and the transmission data packet.

Frequency at cursor position

Rotate the encoder to move the cursor or select a location on the display

Indication of types of amateur radio communications

Scale

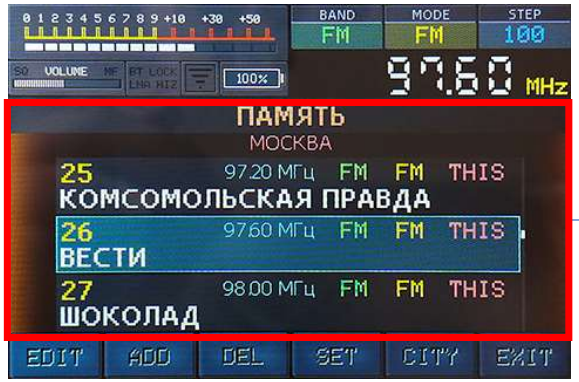
- initial and final scanning frequency
- marks of found signals

Signal graph

- scale step
- chart scale
- graph based on RSSI and SNR of the signal

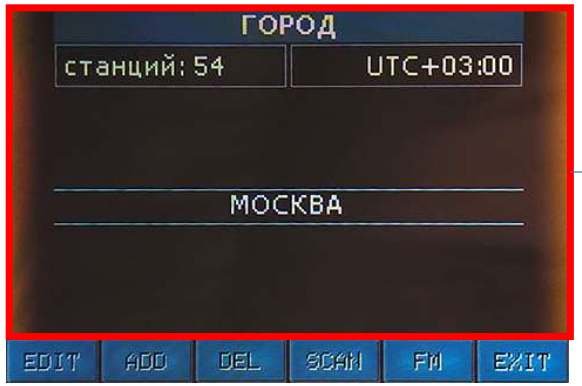
Buttons

- **FREQ** horizontal scale control
- **RSSI** vertical scale control
- **SNR** graphics contrast control
  to control, rotate the encoder or press and hold in the center of the graph to set the default value
- **PAUSE** press to stop scanning and listen to the broadcast
  turns on automatically when you move the cursor
- **STEP** press to select the encoder setting step



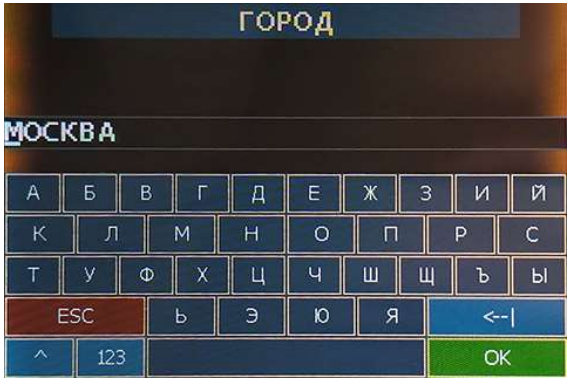
Station memory list

The current frequency, modulation type and range can be saved into the receiver's memory.
To set settings from a saved memory cell, rotate the encoder to search for the desired cell, then press the encoder button or SET button or the desired cell.
The list display filter is set in the SETUP -> MEMORY LIST section (page 14).
To save the current settings, press the ADD button. To edit a saved cell press the EDIT button. To delete a cell, press DEL.
When saving or editing a memory location, you must enter the station name using the on-screen keyboards. Then, rotate the encoder to select a location where the station can be received. THIS – the station will be saved for the current city. ALL – the station is available in any city. NONE - There is no connection to the city.
The current city is shown at the top of the list. Press CITY to go to the list of cities.



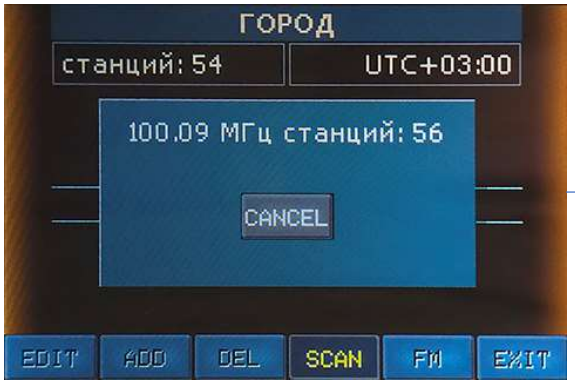
List of locations (cities)

For correct display of time and distribution stations in the cities you are located in add your location to cities memory.
Just like city stations, you can add, change and delete. After editing the city name, you must Rotate the encoder to select the time zone.
Press SCAN to search and save FM stations range (page 10). Use the FM button to go to list of saved FM stations for the city.



For each new location, unique lists of FM stations can be saved.
You can manually add stations to the receiver's memory or edit memory files (page 19).
You can automatically search for FM stations and save them to the receiver's memory for current location. First add your location to the list of cities (page 9).
Press SCAN to start automatically searching for stations.

Automatic search for FM stations



During the search process, the current frequency will be displayed and number of stations found.
You can abort the search at any time without saving list of found stations by pressing the CANCEL button.
When the search is complete, save the stations found.
Then press the FM button and change the station names created automatically. You can edit list on your computer (page 19).

Saved station names will be used in FM mode (page 11), as well as in retro scale (page 12).

FM channel mode

Stored FM stations can be switched as a channel list. To enter FM mode channels, press the FM button on the main screen. This mode displays station name, frequency, RDS information, stereo reception indicator and time. Switching channels is done by rotating encoder or by pressing the PROG+ and PROG- buttons.
STEREO button turns on/off reception of a station in stereo format.
RDS button turns on/off receiving RDS information.
To exit FM channel mode, press the FM button.

CB channel mode

It is possible to listen to CB civil band channels. To enter the mode CB channels press the CB button on the main screen. In this mode, the channel number, letter grid designation, frequency, modulation type and time.
Channels are switched by rotating the encoder.
Switching grids is done using the GRID+ and GRID- buttons.
EU button on/off using the European frequency grid.
The AM, LSB and USB buttons enable the corresponding type of modulation.
To exit CB channel mode, press the CB button.

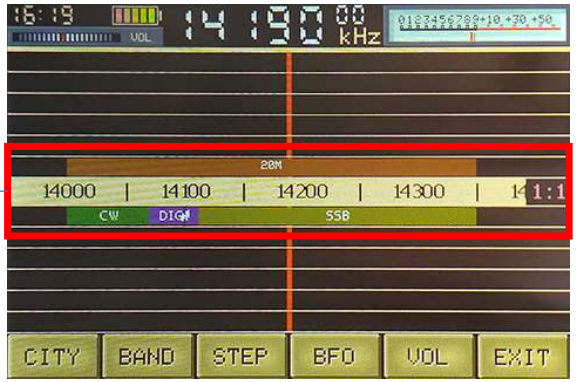
In channel modes, the search for stations up and down in frequency also works using the UP and DN buttons.
To change the theme, tap on the screen in the center. Four themes are available.

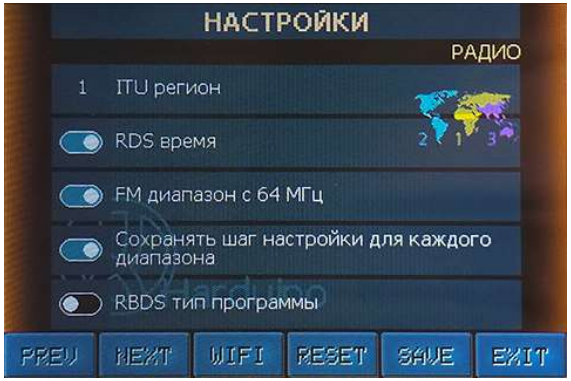
Retro receiver scale

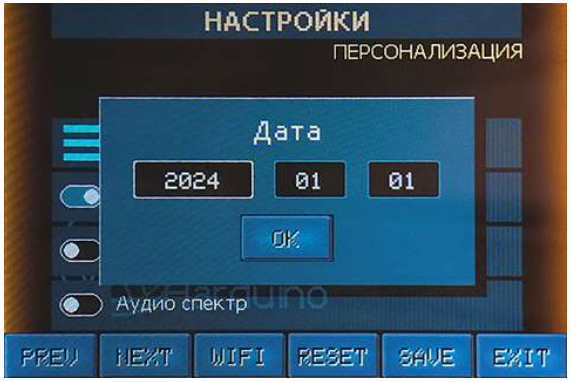
To display the retro scale, press the RETRO button on the main screen.
The scale will display stations of the selected band and cities stored in memory cells.
Navigation along the scale is carried out by rotating the encoder or sliding on the touch screen.
To automatically advance the scale to the next station, quickly swipe the screen
in the opposite direction and release. Rewinding will stop at the first available station.
The rewind direction is changed by rotating the encoder. To stop, press the screen or encoder.
To change the scale scale, click on the red 1:1 indicator on the right and, while pressing,
Move the scale indicator to the desired position.
At the top there is a volume indicator (press to mute the sound on/off).
The screen displays the current frequency, the name of the band and city, as well as the time and battery charge.
There is a retro S-meter located separately (press to switch to the spectrum indicator and back).

- **CITY** list of cities
- **BAND** band selection. The ranges are divided as in retro
receivers by the passage of waves depending on time
days. Color indication shows passing conditions.
- **STEP** selection of tuning step
- **VOL** volume adjustment (rotate the encoder to change)
- **BFO** BFO oscillator setting (available for SSB modulation)
Modulation switches automatically depending on
range at the cursor position.

Indication of range and types of communication







To enter setup mode, press the SETUP button on the main screen. Settings are divided into pages. Switching pages is done by rotating the encoder or using the PREV and NEXT buttons. Click WIFI for connection settings (page 15). Press RESET to load default settings. To save settings, press SAVE or EXIT and confirm saving.

RADIO

- **ITU region** select the region on the map
- **RDS time** get time from RDS
- **FM band start in 64 MHz** beginning of the FM band
- **Save step individual for band** step can be saved for modulation type or for each range. Only until restart
- **RBDS program type** American standard RDS TP

PERSONALIZATION

- **Frequency digit backlight** imitation seven-segment indicators
- **Highlight the frequency in SSB in color if the BFO is not zero** for tuning in SSB mode is used Oscillator BFO bias. When the offset is not equal to zero, the frequency digits are displayed darker.
- **Buttons** click to change the appearance of the buttons
- **Language** select the interface language
- **Show country flag in RDS** in information bar RDS for FM band flag will be displayed countries for the selected interface language
- **Setting clock** manually setting the date and time. Set the date first, then the time. Choose edit field on the screen and rotate encoder for installation. When the seconds field is selected. The countdown stops. Click OK to precise installation. After which the countdown will resume.
- **24-hour time format**, choice of 12/24 hour format
- **Retro S-meter** indicator display in retro style
- **Audio spectrum** switching view S-meter / spectrum

DISPLAY

- **Screen saver** enable screensaver (page 19)
- **Display light off in screen saver** turn off the backlight by after the period of inactivity has expired
- **Wait time to saver in minutes** select after how many minutes will the screensaver turn on or go off screen backlight after last action
- **Screen orientation** select the rotation angle of the display. Quickly rotate the screen at any time: press and hold the encoder and tap on the screen.

SCANNER
- **Scanning SSB in AM modulation** graph will be displayed for AM modulation when SSB is enabled

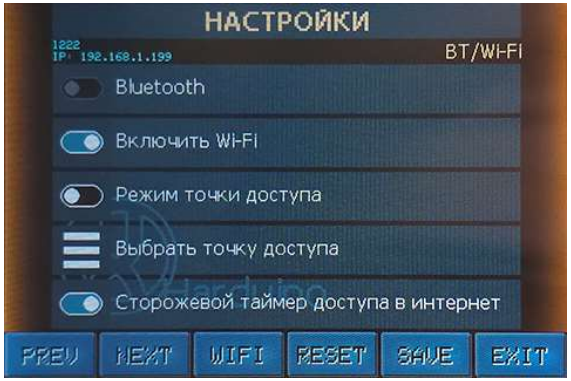
MEMORY LIST
- **View not city linked** in the list stations with city label NONE are displayed
- **View all city linked** in the list stations are displayed not only for the current cities. Stations linked to other cities are marked OTHER in the memory list.
- **View only from current band** in the list stations of the selected band are displayed

BATTERY
- **Battery indicator** display battery indicator
- **Battery value in volts** display charge in volts or percent
- **Warning about an unacceptable battery level** A message will be displayed if the battery is charged batteries will exceed acceptable levels

HARDWARE
- **Beeper** selection of beeper sound

SI473x
- **Mute the sound when turned on**, the sound will be turned off when the receiver is turned on

DECODER
- **Decoded data send to COM port** decoded data can be received using the Putty program on a personal computer computer (connect your receiver using USB cable and install the device driver)
- **Feld-Hell picture smoothing** image, received when decoding a Feld-Hell transmission will be smoothed for easier reading
- **Cyrillic alphabet in CW** for alphabet decoder Morse will use the Cyrillic alphabet

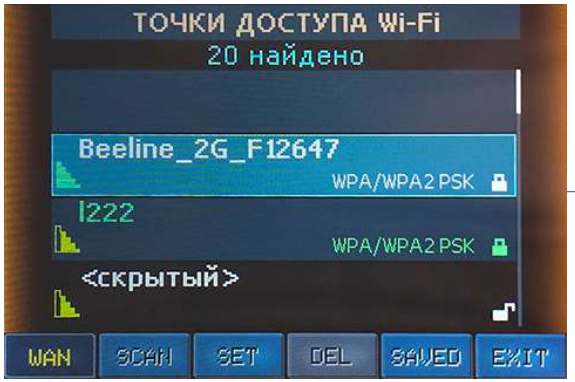


BT/Wi-Fi

- **Wireless on** on/off the Wi-Fi module
- **Access point mode** enables built-in hotspot. The connection can be used in there are no other access points to connect to the receiver (not currently used).
- **Select AP** displays a list of available access points (also available by pressing the WIFI button)
- **Internet access watchdog timer** is used to restart the connection if there is no connection Internet access

Available access points

Scanning access points takes a few seconds. Then the list and quantity will be output found access points. Rotate the encoder to search. If no access points are found or signal too weak, check the Wi-Fi antenna connection (do not use the Wi-Fi module without an antenna).

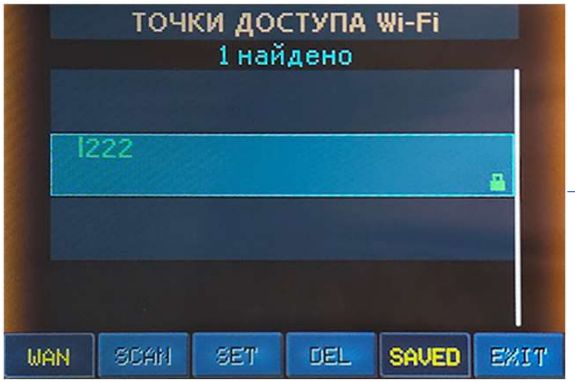


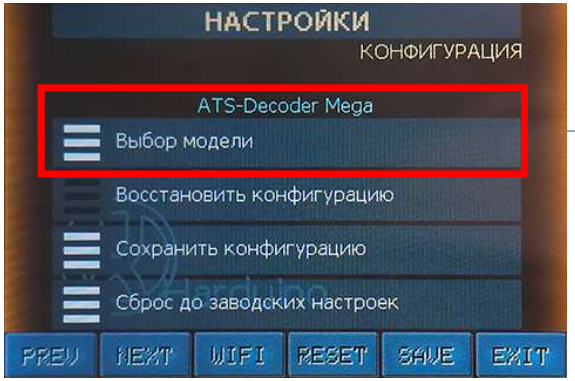
- **WAN** on/off Wi-Fi module
- **SCAN** search for access points
- **SET** establish a connection to the selected access point or click on the desired access point (when connecting for the first time you will need to enter a password)
- **DEL** remove access point from saved ones
- **SAVED** list of saved access points

Access Point Name Color:

blue – access point in the list of saved ones
yellow – a connection attempt is in progress
green – connection active

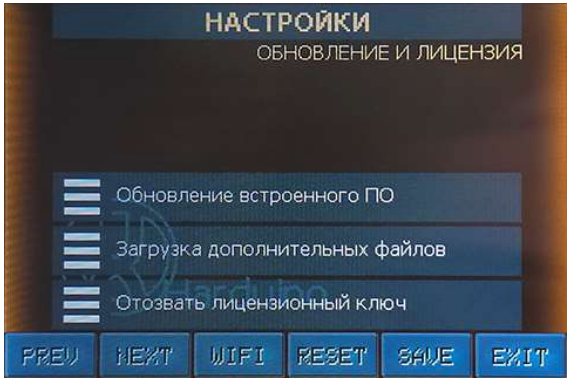
Saved access points





Selecting your device model

For the correct functioning of all components of the receiver, it is necessary to select the correct model.
The currently selected model is displayed on the CONFIGURATION page. Here you can save or restore the settings configuration, as well as load the factory settings.
Click Select Model. If your device has not been modified and only contains components installed at the manufacturer's factory, you should rotate the encoder to select your model from the list.
If changes have been made to your receiver, then choose a model "Generic" Click "next". And then, by rotating the encoder and pressing the screen, check the boxes opposite those components that are installed in your receiver.



The firmware update can be installed using a PC or obtained automatically from a server updates. Information about the availability of an update is available on the UPDATE & LICENSE page.

To update online, you must connect the receiver to the Internet. Then click "Update" embedded software." The update files will be searched for and downloaded. Read the information and run update process.

After updating the software, download additional files (localization file, etc.).

If you need to revoke your activation key for use on another device, first obtain the code from website. Log in to your account using your Email and activation key. Then revoke the key on this settings page.

Information section

The section is entered using the INFO button on the main screen.

This section contains several pages of information. To turn pages, rotate the encoder.

Press the screen or encoder to exit the section.

Here you can find information about the firmware version, settings and status of the equipment, connection Wi-Fi, device components, range limits, receiver manufacturer and model, serial device number, software developers and copyrights.

Information on the passage of waves on the HF bands, obtained from the website HAMQSL.COM, is also available.

The date and time of the last download of information are indicated.

Virtual encoder

In all modes, you can use on-screen buttons that duplicate the actions of the encoder.
The virtual encoder is called by sliding upward from the bottom edge of the screen.
To close the virtual encoder, use the slide in the opposite direction.
After a period of inactivity, the screen encoder will close automatically.
Press and hold the arrow buttons to simulate encoder rotation.

Actions to take when turning on the receiver

RESET TO FACTORY SETTINGS

With the device turned off, press and hold the encoder button and turn on the power. When the LOADED DEFAULTS message appears, release encoder All receiver settings will be restored to their original values. After the reset, you need to perform the initial setup main parameters.

FILE SHARING MODE FROM PC

If you need to access files in the device's memory before starting, then with the device turned off, press and hold the screen and turn on the power.
When a message appears indicating that you are ready to exchange files using the A-explorer program, release the screen and connect your receiver to the PC with using a USB cable. The device driver and A-explorer file sharing application must be installed on the PC. Applications to install and user manual are available on the website HARDUINO.RU in the “Download” section. Tap the screen to exit the mode.

SCREEN CALIBRATION

In file sharing mode with a PC, press and hold the screen until a message appears indicating that screen calibration has started. Continue holding for reset calibration settings or release the screen and then click on the positions indicated by the green arrow one by one. Calibration is complete.

Files in the receiver's memory

To download files from the receiver to your PC, upload or delete, use the A-explorer application. Use notepad for editing.
city.csv list of locations (id, name, time zone)
preset.csv list of stations (frequency, name, city id, modulation)
label.csv list of frequency boundaries of various types of communication
decoder.log decoder log file (erased when the decoder starts)
scan.csv frequency lists for simultaneous listening mode
ap.csv list of saved Wi-Fi access points
setting.ini override settings
***.lng** interface localization files
value.hex dump of saved settings
flag.ini data for forming the country flag in the RDS information band

To increase the battery life of your device without recharging, use simple functions.
- enable a short period of inactivity in the settings until the screen saver appears. During the transition
  When the receiver enters standby mode, some functions are suspended. At the same time, listening to the broadcast doesn't stop.
- enable in the settings to turn off the display backlight after a period of inactivity. Disable
  You can also turn on the backlight by pressing the LIGHT backlight control button on the main screen and then pressing backlight brightness level indicator. You can turn on the backlight by tapping on the screen.
- reduce the brightness of the screen backlight. Press the LIGHT button on the main screen and rotate the encoder.
- turn off Wi-Fi after receiving the necessary data from the Internet.
- Use wired headphones to reduce energy consumption.