

RttyStation

User Manual

Installation · configuration · menus and options · operating modes
RTTY · CW · PSK · Hellschreiber · Olivia/Contestia · MFSK · DominoEX · THOR · FT8/FT4 · WSPR · SSTV · Weather fax

Version 1.33.0 · November 2026

IZ4WNP · https://www.iz4wnp.it · Free software for private use

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License and credits

1. Introduction

RttyStation is a program for amateur radio digital modes designed for the **Icom IC-7300** and for use together with **Log4OM**, but it works with almost any radio thanks to Hamlib and with any logging program that receives QSOs over UDP. It decodes the signals coming from the radio's sound card, transmits in AFSK or FSK, handles macros, controls the radio via CAT and logs the contacts.

1.1 Available modes

Mode	Receive / transmit
RTTY	45.45 / 50 / 75 baud, 170 Hz shift, AFSK or FSK. Receive only: DWD weather RTTY, utility RTTY, NAVTEX/SITOR-B, custom parameters.
CW	Decoder with automatic speed tracking; transmission through the radio keyer (CI-V) or a DTR/RTS line.
PSK	PSK31, PSK63, PSK125, PSK250.
Hellschreiber	Feld Hell, Slow Hell, Hell X5, Hell X9.
Olivia / Contestia	16 variants (tones/bandwidth), compatible with fldigi.
MFSK	MFSK16, MFSK32, MFSK64 with error correction, compatible with fldigi.
DominoEX	DominoEX 4, 5, 8, 11, 16, 22 (18-tone IFK+), with secondary ID text.
THOR	THOR 4, 5, 8, 11, 16, 22: DominoEX IFK+ with MFSK error correction.
FT8 / FT4	Receive and transmit with auto sequencing, split, Hound mode for Fox/Hound DXpeditions.
WSPR	Low-power beacons: reception down to about -30 dB and transmission in 2-minute periods.
SSTV	Martin, Scottie, Robot, PD, Wraase: automatic reception (VIS) and transmission.
Weather fax	HF radiofacsimile 120 lpm, IOC 576/288, automatic start and stop (APT).

1.2 Main features

- Radio control: direct Icom CI-V or more than 300 models through Hamlib (rigctld is included in the setup).
- QSOs saved in a local ADIF log and sent to up to 3 logging programs (ADIF or WSJT-X format).
- Contest mode with serial numbers, dupe checking and contest ADIF/Cabrillo files updated after every QSO.
- Clock synchronization with NTP servers (essential for FT8/FT4 and WSPR) and automatic update of the cty.dat country list.
- User interface in 5 languages (Italian, English, German, French, Spanish), light or dark theme.

> The pictures in this manual were taken with versions 1.25.2 to 1.32.1 (those of the MFSK, DominoEX, THOR and WSPR modes with 1.30.0, those of the macros with 1.31.0, those of the map with 1.32.1; the other screens are identical in the current version except for the mode row, which now also includes MFSK, DOMINO, THOR and WSPR), light theme (unless stated otherwise), using recorded test signals. The callsigns of the other stations are fictitious.

2. Installation

2.1 Requirements

- Windows 10 or 11, 64-bit. There is no need to install .NET: the program already contains it.
- A radio with a USB audio interface (such as the IC-7300) or an external audio interface.
- For radio control: the radio's USB COM port (CI-V/CAT).
- For FT8/FT4: an internet connection for clock synchronization (or an already accurate PC clock).

2.2 Starting the setup

Run `RttyStation-Setup-1.33.0.exe`. If Windows shows the **"Windows protected your PC"** warning (the program is not digitally signed), click **More info** and then **Run anyway**.

At start-up the setup may ask whether to install **for all users** (administrator rights required; proposed folder `C:\Program Files\RttyStation`) or **for the current user only** (no rights required; proposed folder `%LocalAppData%\Programs\RttyStation`). The setup is available in Italian, English, German, French and Spanish: it uses the Windows language and, if that is not one of them, asks which one to use.

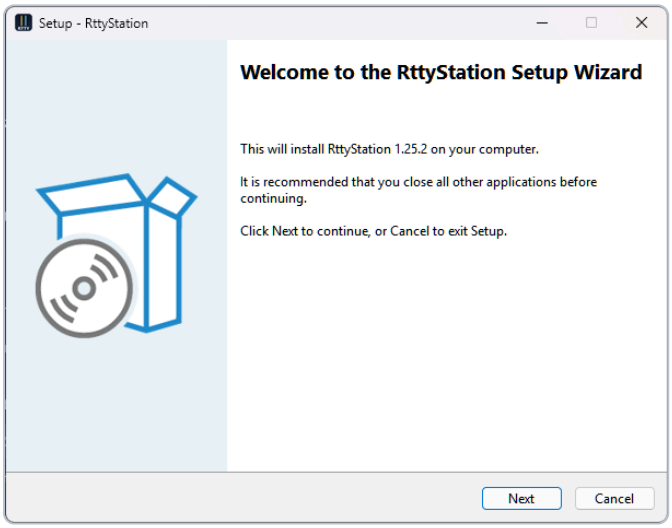


Fig. 2.1 – Welcome page.

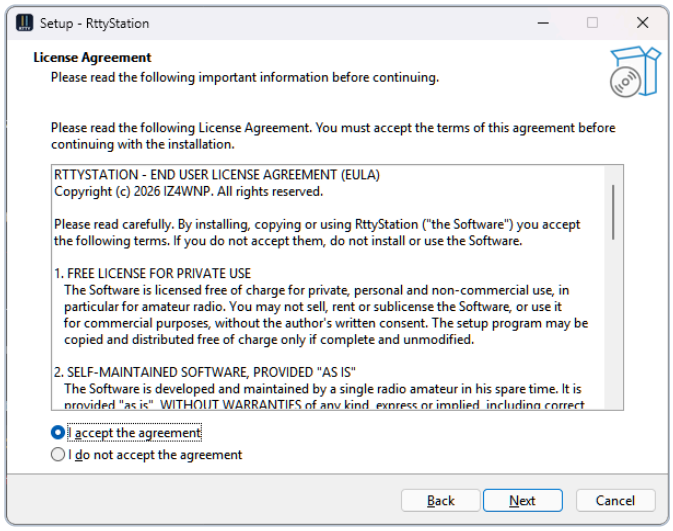


Fig. 2.2 – License agreement (EULA).

2.3 The setup pages

1. **Welcome** (fig. 2.1): click **Next**.
2. **License Agreement** (fig. 2.2): the program is free for private, non-commercial use and provided "as is". Select **I accept the agreement** and click Next.
3. **Information** (fig. 2.3): summary of what is installed and where (program, Hamlib, data, pictures, shortcuts) and of the program's internet connections.
4. **Destination location** (fig. 2.4): the program folder; it can be changed with **Browse**.
5. **Data folders** (fig. 2.5): where RttyStation saves its settings (`config.json`), the QSO log (`rttystation.adi`) and the country list (`cty.dat`), and where it saves received SSTV and fax pictures.

You can keep the proposed folders or choose others; existing settings and log are copied to the new folder at first start.

6. **Station data** (fig. 2.5b): callsign and locator, required on the first installation: setup does not continue without valid data. The page is not shown on updates if the settings already contain them. They can also be given on the command line: `/CALL=IZ4WNP /LOCATOR=JN54RK`.
7. **Start Menu folder** (fig. 2.6) and **Additional tasks** (fig. 2.7): the desktop shortcut is optional.
8. **Ready to Install** (fig. 2.8): summary of the choices. It also says whether **Hamlib** will be installed: if a rigctld is already on the PC (for example the one of WSJT-X) the setup does not add it and RttyStation uses the existing one. Click **Install**.
9. **Finish**: you can start the program right away and view the licenses of the third-party components.

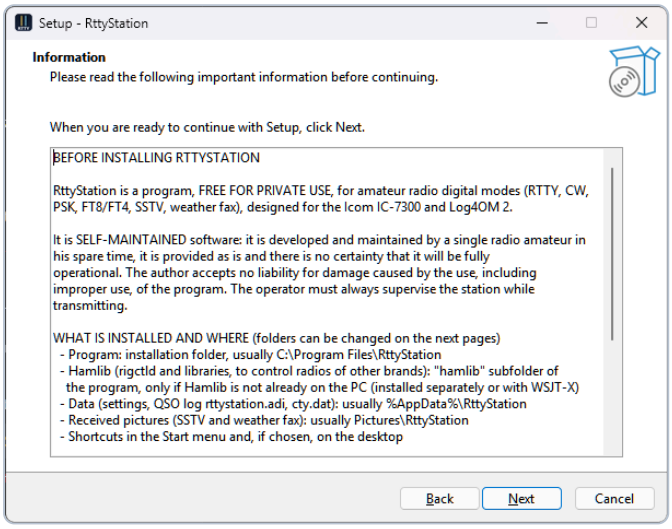


Fig. 2.3 – Information before installing.

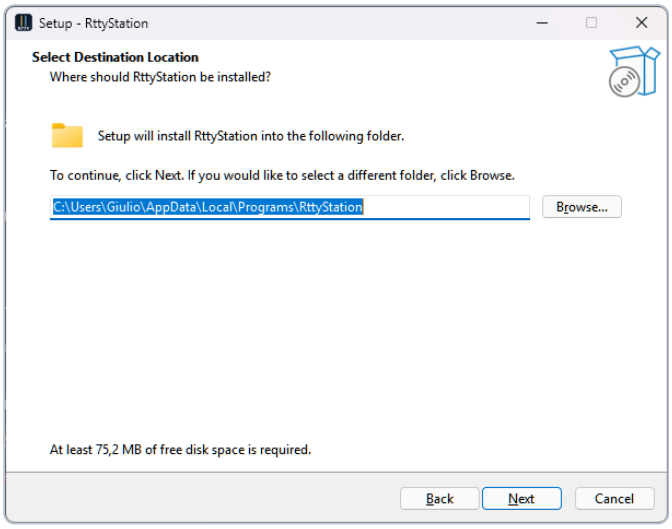


Fig. 2.4 – Destination location (here in a "current user only" installation).

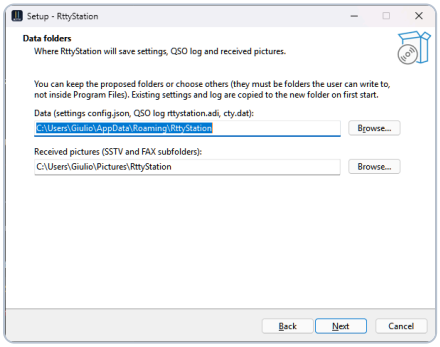


Fig. 2.5 – Data and picture folders.

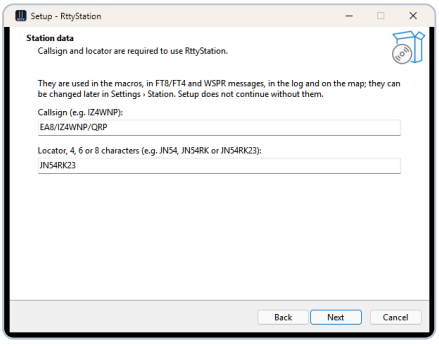


Fig. 2.5b – Station data (required).

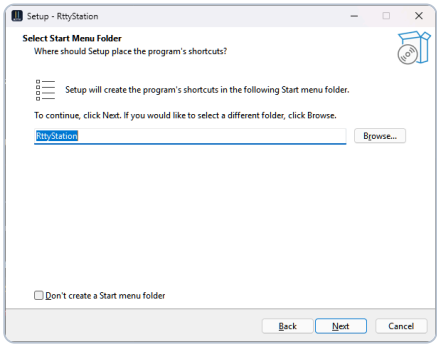


Fig. 2.6 – Start Menu folder.

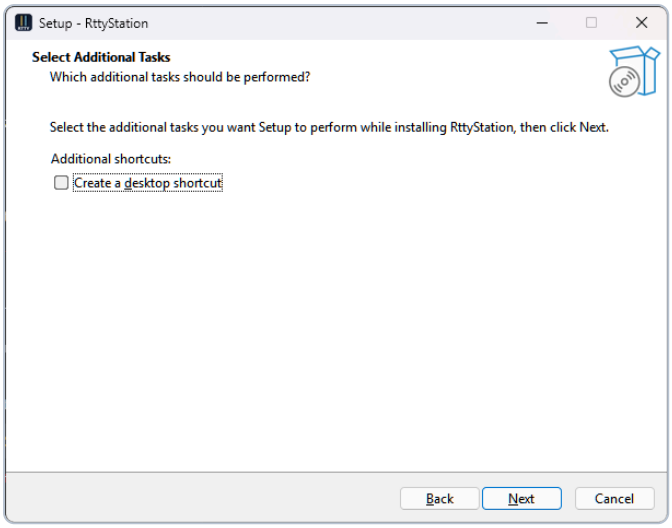


Fig. 2.7 – Desktop shortcut.

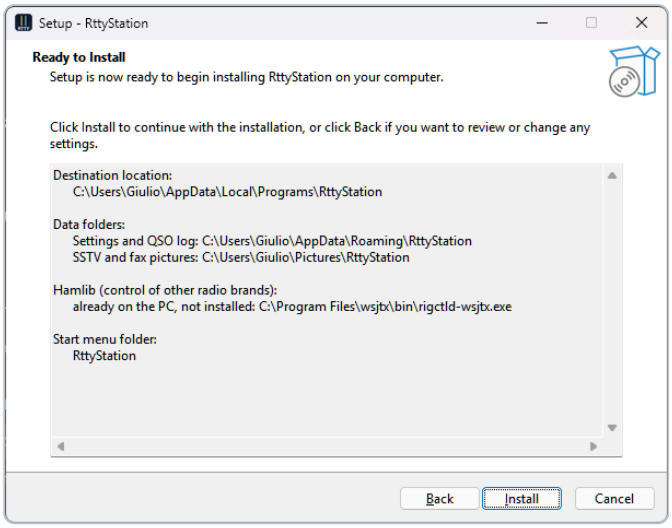


Fig. 2.8 – Summary before installing.

2.4 Updating and uninstalling

- **Update**: just run the setup of the new version over the existing one. Settings, log, macros and pictures are kept.
- **Uninstall**: from *Windows Settings › Apps*. At the end you are asked whether to delete the settings too (`config.json`); the QSO log and the received pictures always stay on disk.

2.5 Program files and folders

File or folder	Contents
`config.json`	All settings (data folder, usually `%AppData%\RttyStation`).
`rttystation.adi`	The RttyStation QSO log, as a plain-text ADIF file; `rttystation.adi.bak` is the copy before the last change.
`cty.dat`	DXCC country list (AD1C) used in FT8/FT4 and WSPR, updated automatically once a week (chapter 5.5).
`Contest\`	Contest ADIF and Cabrillo files (chapter 19).
`Pictures\RttyStation\SSTV`, `\FAX`	Received SSTV pictures and weather charts (PNG with UTC date and time).
`hamlib\`	Hamlib rigctld and libraries, in the program folder (only if not already on the PC).
`paths.ini`	The folders chosen during setup, next to the program.

3. The main window

The main window holds everything needed while operating; the configuration is collected in the **Settings** menu. Figure 3.1 shows the program in RTTY while receiving a station.

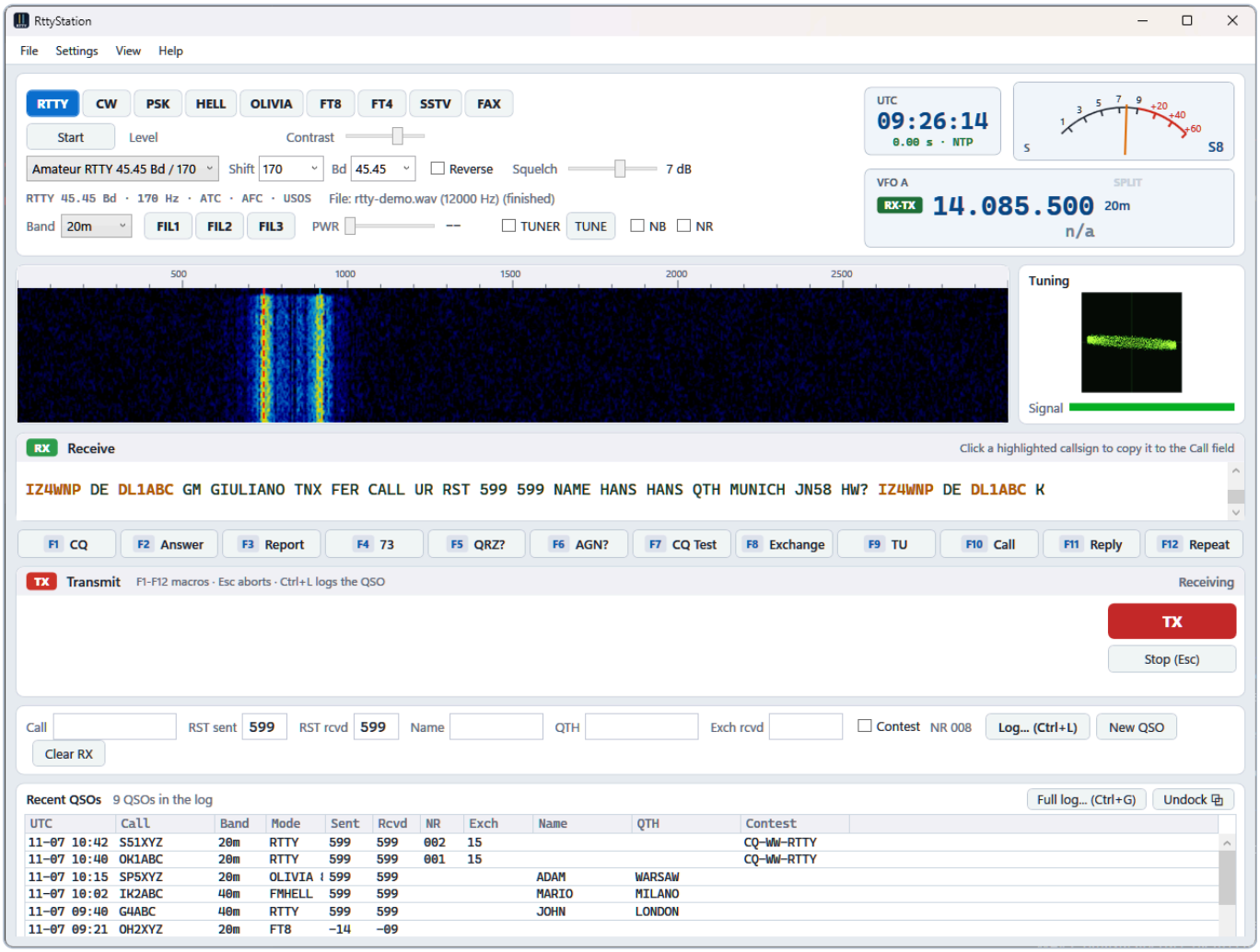


Fig. 3.1 – Main window in RTTY, light theme.

3.1 Areas of the window

1. **Menu bar**: File, Settings, View, Help (chapter 4).
2. **Mode row**: RTTY, CW, PSK, HELL, OLIVIA, MFSK, DOMINO, THOR, FT8, FT4, WSPR, SSTV, FAX.
3. **Start / Stop** listening to the sound card, input **Level** bar and waterfall **Contrast**.
4. **Parameters of the current mode**: e.g. RTTY type, shift, baud, Reverse and squelch; in CW the TX/RX speed and zero beat; in PSK the speed; in Hell, Olivia, MFSK, DominoEX and THOR the variant.
5. **Summary** of the parameters and audio source (sound card or WAV file).
6. **Radio controls**: band, FIL1-FIL3 filters, power, tuner, NB, NR (chapter 21).
7. **UTC clock** corrected by NTP: a click opens clock synchronization.
8. **VFO display**: radio frequency, band, RX/TX role, split.
9. **S-meter**, analog or bar; while transmitting it shows the power.
10. **Waterfall** with the scale in Hz: click on a signal to tune it.
11. **Tuning** (tuning indicator) and signal bar.
12. **Receive**: decoded text; highlighted callsigns are copied to the Call field with a click.

13. **F1-F12 macros** (right click = edit).
14. **Transmit**: text to transmit, **TX** and **Stop (Esc)** buttons.
15. **QSO data**: Call, RST, name, QTH, exchange, contest, **Log… (Ctrl+L)**, New QSO, Clear RX.
16. **Recent QSOs**, docked at the bottom or in a separate window (chapter 20).
17. **Status bar**: program messages and, in FT8/FT4 and WSPR, the cycle bar.

3.2 Layout and sizes

- In the top bar each row has its own function and never wraps. If the window is narrow, the UTC clock, VFO and S-meter move onto two rows (UTC and S-meter above, VFO below) and, if needed, get smaller.
- Waterfall, tuning indicator and receive/transmit panels are resized by dragging the splitters; double-click a splitter = default size. **View › Reset panel layout** restores everything as installed.
- Window position and size are remembered when closing.

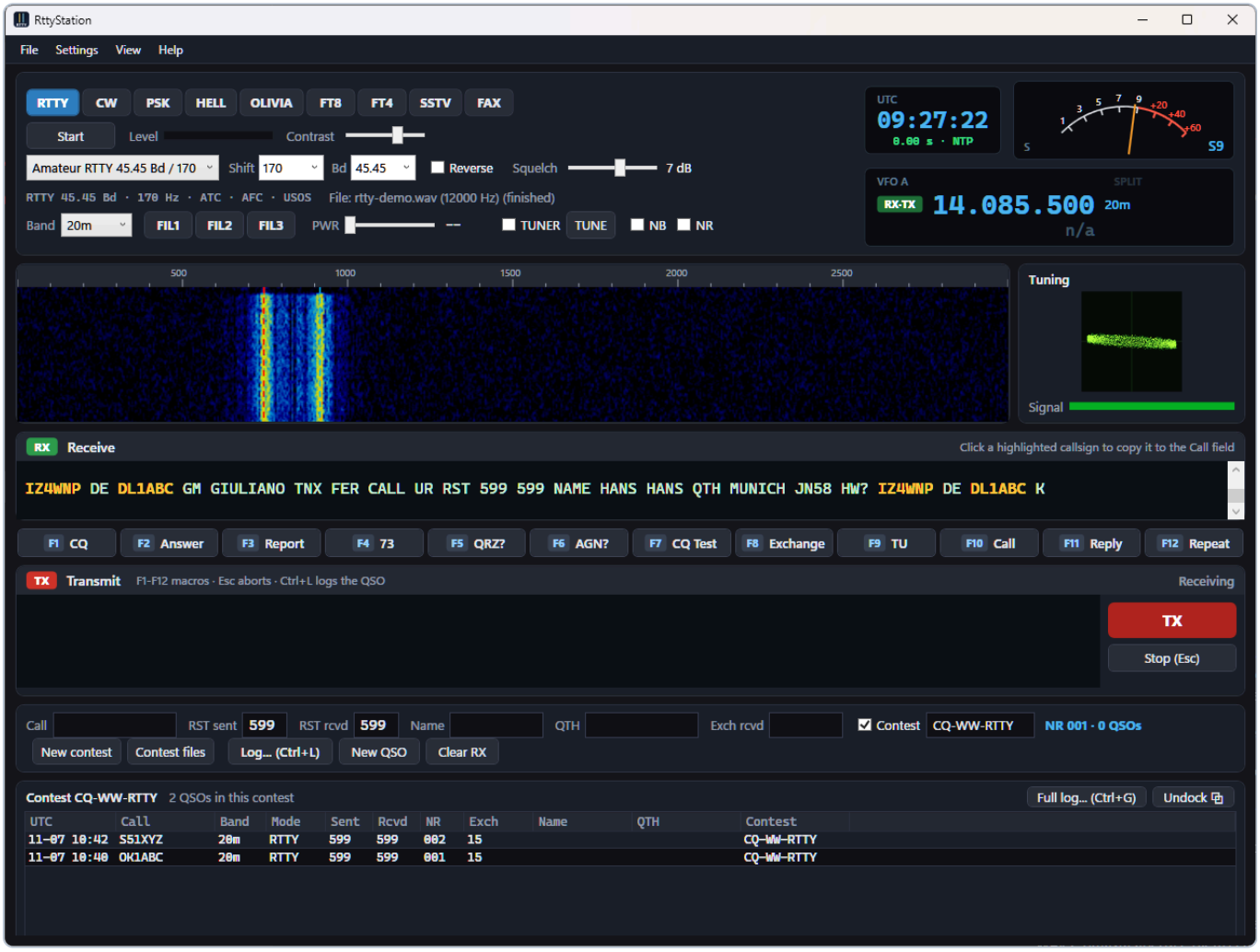


Fig. 3.2 – Dark theme (View › Dark theme), here with contest mode on.

3.3 Keyboard shortcuts

Keys	Function
F1 – F12	Sends the corresponding macro.
Shift + F1 – F12	Macros 13 to 24, if present.
Esc	Stops transmission immediately (also the radio's CW keyer and FT8 transmission).
Ctrl + L	Opens the QSO summary to log the contact.
Ctrl + G	Opens the QSO log.
Alt	Activates the menu bar from the keyboard.

4. The menus

4.1 File menu

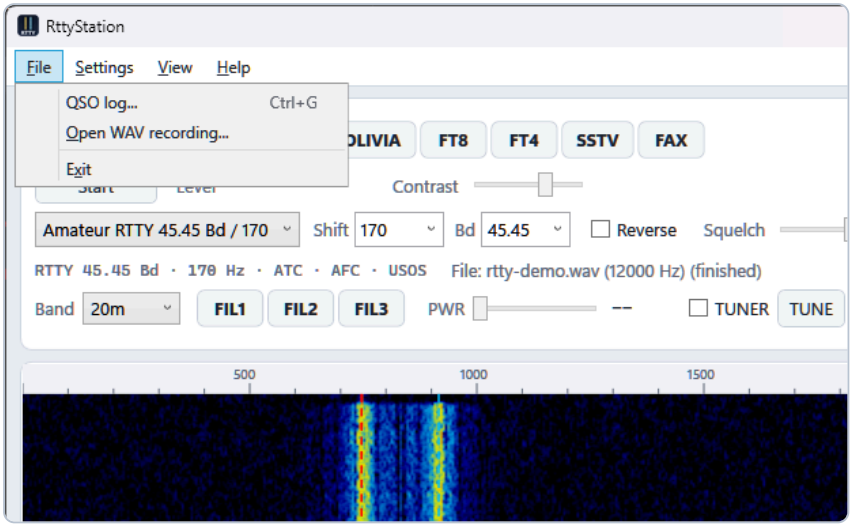


Fig. 4.1 – File menu.

Item	Function
QSO log... (Ctrl+G)	Opens the RttyStation QSO log: search, edit, delete, ADIF and Cabrillo export (chapter 20).
Open WAV recording...	Decodes a WAV audio file instead of the sound card, in the selected mode: useful to try the program or to replay a recording.
Exit	Closes the program, saving settings and window layout.

4.2 Settings menu

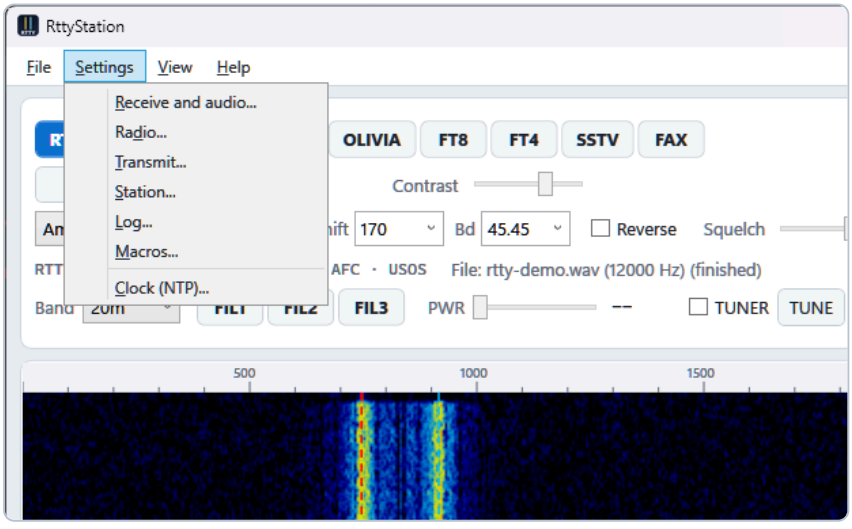


Fig. 4.2 – Settings menu.

Item	Function
Receive and audio...	Input sound card and RTTY parameters (chapter 5.1).
Radio...	Controlled radio, CAT port, PTT, band plan, split (chapter 5.2).
Transmit...	AFSK/FSK, audio output, level, FSK, CW (chapter 5.3).
Station...	Callsign and station data, contest mode and files (chapter 5.4).
Log...	Logging programs, FT8/FT4 logging, "worked before" colors, Log4OM database, country list, recent QSOs (chapter 5.5).
Macros...	Macro editor for each mode (chapter 5.6).
Clock (NTP)...	Clock synchronization (chapter 5.7).

The items from Receive to Log open the same **Settings** window on the corresponding tab; changes apply when you click **OK**.

4.3 View menu

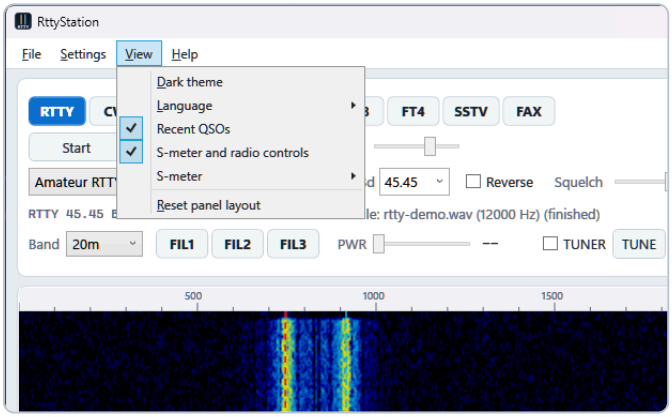


Fig. 4.3 – View menu.

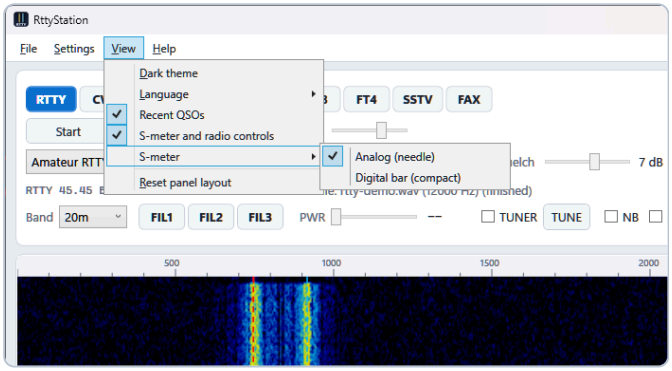


Fig. 4.4 – S-meter submenu.

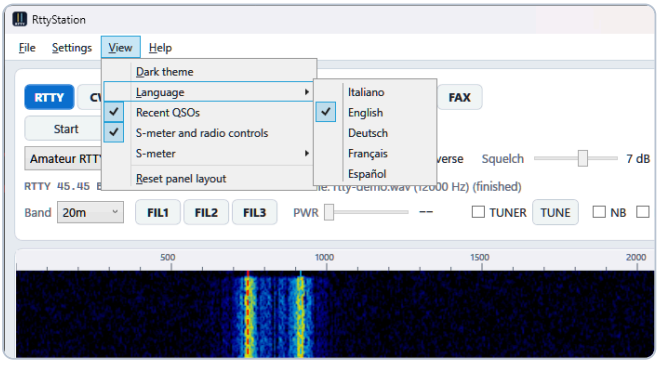


Fig. 4.5 – Language submenu.

Item	Function
Dark theme	Switches between dark and light theme (fig. 3.2). In the light theme clock, VFO and S-meter have a light background with dark digits.
Language	Italiano, English, Deutsch, Français, Español: the interface changes at once, without restarting.
Recent QSOs	Shows or hides the list of the latest QSOs (docked or in a separate window).
Station map (Ctrl+M)	Shows or hides the map of the stations heard (in a separate window or docked on the right, left or bottom, chapter 34).
S-meter and radio controls	Shows or hides the S-meter and the row of radio controls.
S-meter › Analog / Digital bar	Needle meter or compact bar; it also toggles with a click on the meter.
Reset panel layout	Restores waterfall, tuning indicator and panels to their default sizes.

4.4 Help menu

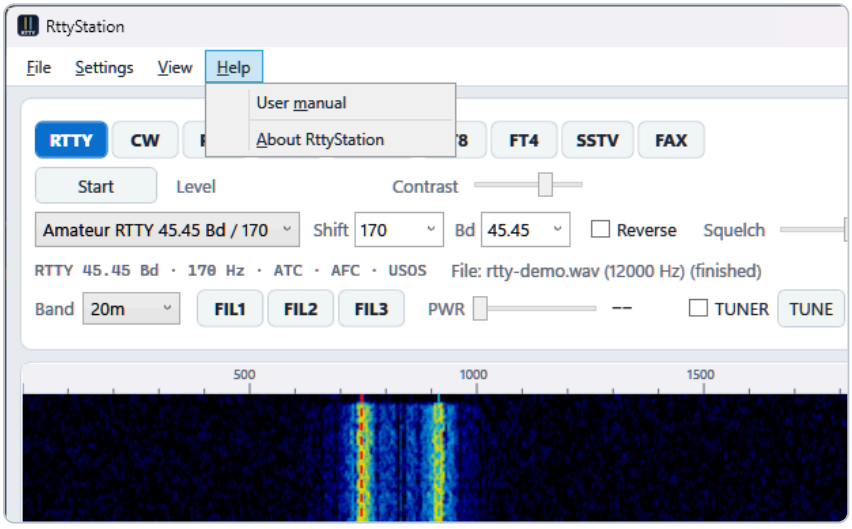


Fig. 4.6 – Help menu.

Item	Function
User manual	Opens the built-in manual in the browser, in the interface language.
About RttyStation	Version, author and web site (fig. 4.7).

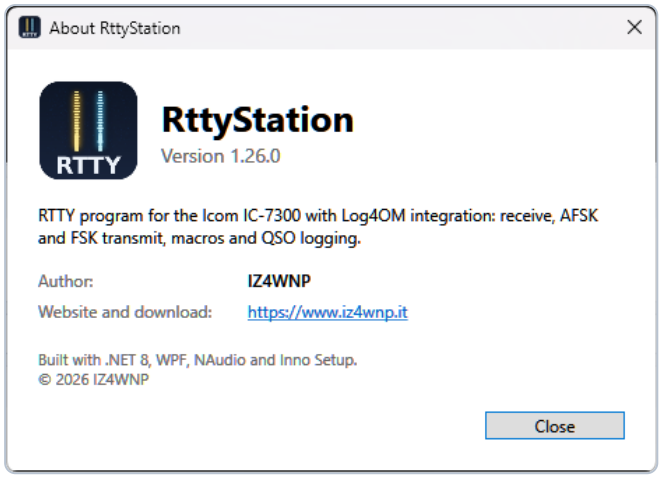


Fig. 4.7 – About RttyStation.

5. Settings

Settings are saved automatically and are kept across updates. Each tab opens from the corresponding item of the Settings menu; **OK** applies the changes, **Cancel** discards them.

5.1 Receive and audio

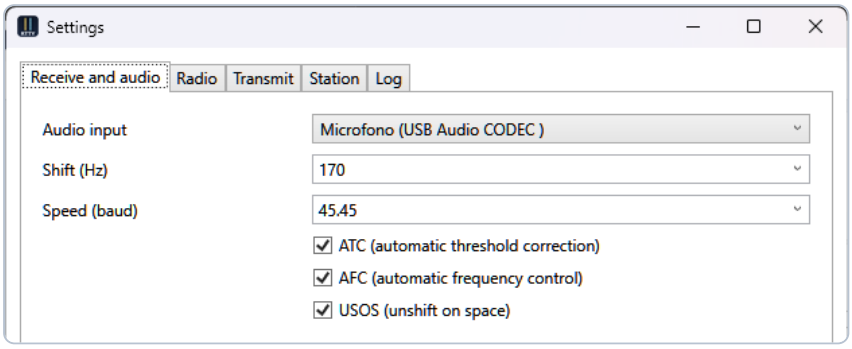


Fig. 5.1 – Receive and audio tab.

Option	Description
Audio input	The sound card the radio signal comes from; for the IC-7300 "Microphone (USB Audio CODEC)".
Shift (Hz) / Speed (baud)	Default RTTY parameters: 170 Hz and 45.45 baud for amateurs (they can also be changed on the fly in the main window).
ATC	Automatic threshold correction: compensates selective fading between the two tones.
AFC	Automatic frequency control: follows small drifts of the signal.
USOS	Unshift On Space: after a space the decoder goes back to letters (recommended).

5.2 Radio

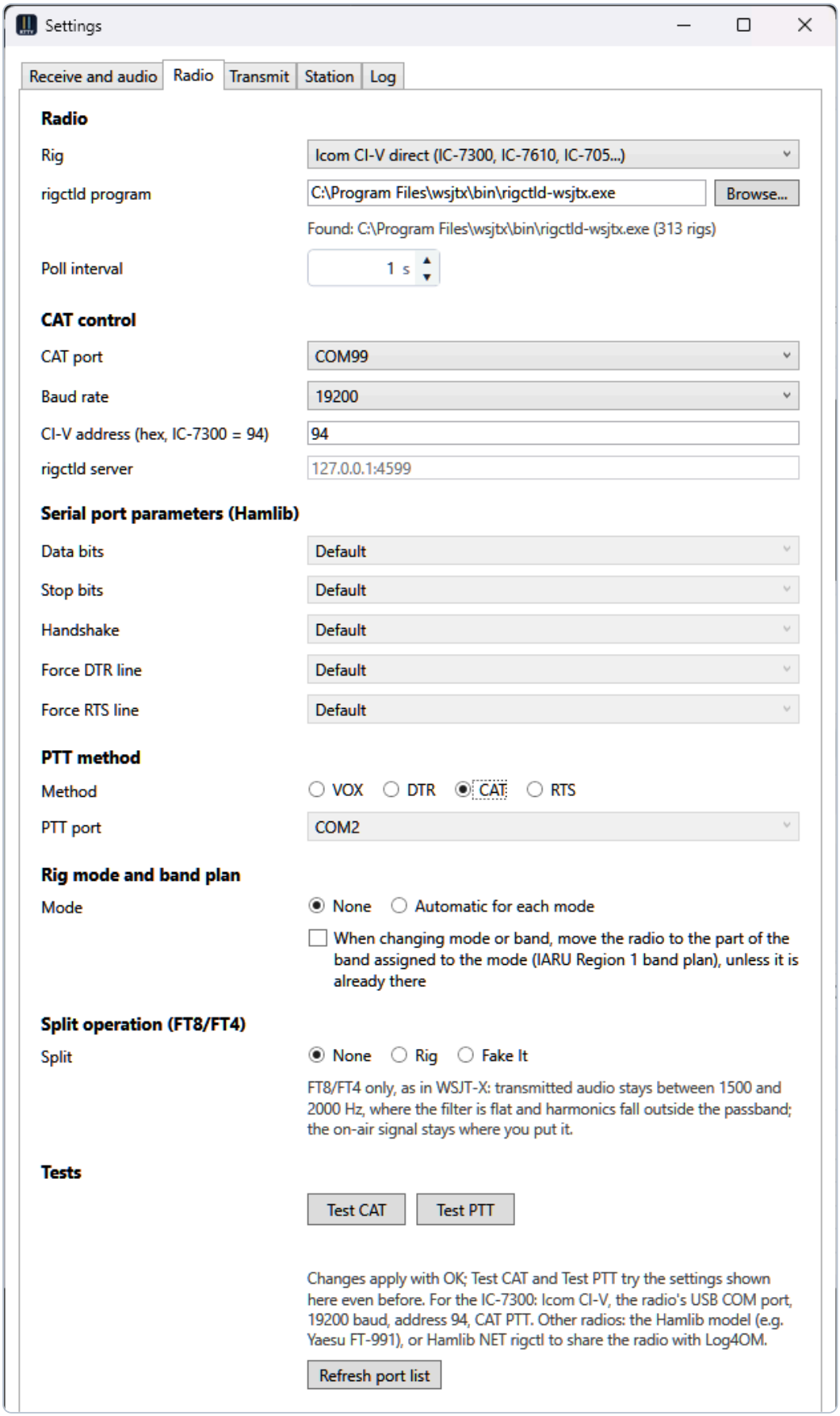


Fig. 5.2 – Radio tab with the recommended IC-7300 configuration (direct Icom CI-V, PTT via CAT).

Option	Description
Rig	**None (audio only)**; **Icom CI-V direct** (IC-7300, IC-7610, IC-705..., recommended for Icom); **Hamlib NET rigctl** to share the radio with another program that already started rigctld (e.g. Log4OM); or one of the more than 300 Hamlib models (typing the first letters jumps to the item).
rigctld program / Browse	The Hamlib rigctld used with Hamlib models; below, the one found and how many radios it supports.
Poll interval	How often frequency and mode are read from the radio (1 s recommended).
CAT port / Baud rate	COM port of the radio and speed (IC-7300: 19200, or any with "CI-V USB Baud Rate = Auto").
CI-V address	Hexadecimal; the IC-7300 default is **94**.
rigctld server	Hamlib NET only: address and port of rigctld, usually `127.0.0.1:4532`.
Serial port parameters (Hamlib)	Data bits, stop bits, handshake, forcing DTR and RTS: leave "Default" unless the radio is set differently.
PTT method / PTT port	**VOX**, **DTR**, **CAT** (radio command on the CAT port, recommended) or **RTS**; with DTR or RTS the PTT port.
Rig mode	**None** (the mode is not changed), or **Automatic for each mode** (CW, RTTY in FSK, LSB-D/USB-D in AFSK, USB-D in PSK and FT8...).
Band plan	When changing mode or band, moves the radio into the part of the band assigned to the mode (IARU Region 1), unless it is already there.
Split operation (FT8/FT4)	**None**, **Rig** or **Fake It**, as in WSJT-X (chapter 26).
Test CAT / Test PTT	Test the settings shown in the tab even before clicking OK. **Test PTT** keys the radio for a moment: do it into a dummy load or at low power.
Refresh port list	Re-reads the available COM ports (e.g. after connecting the radio).

5.3 Transmit

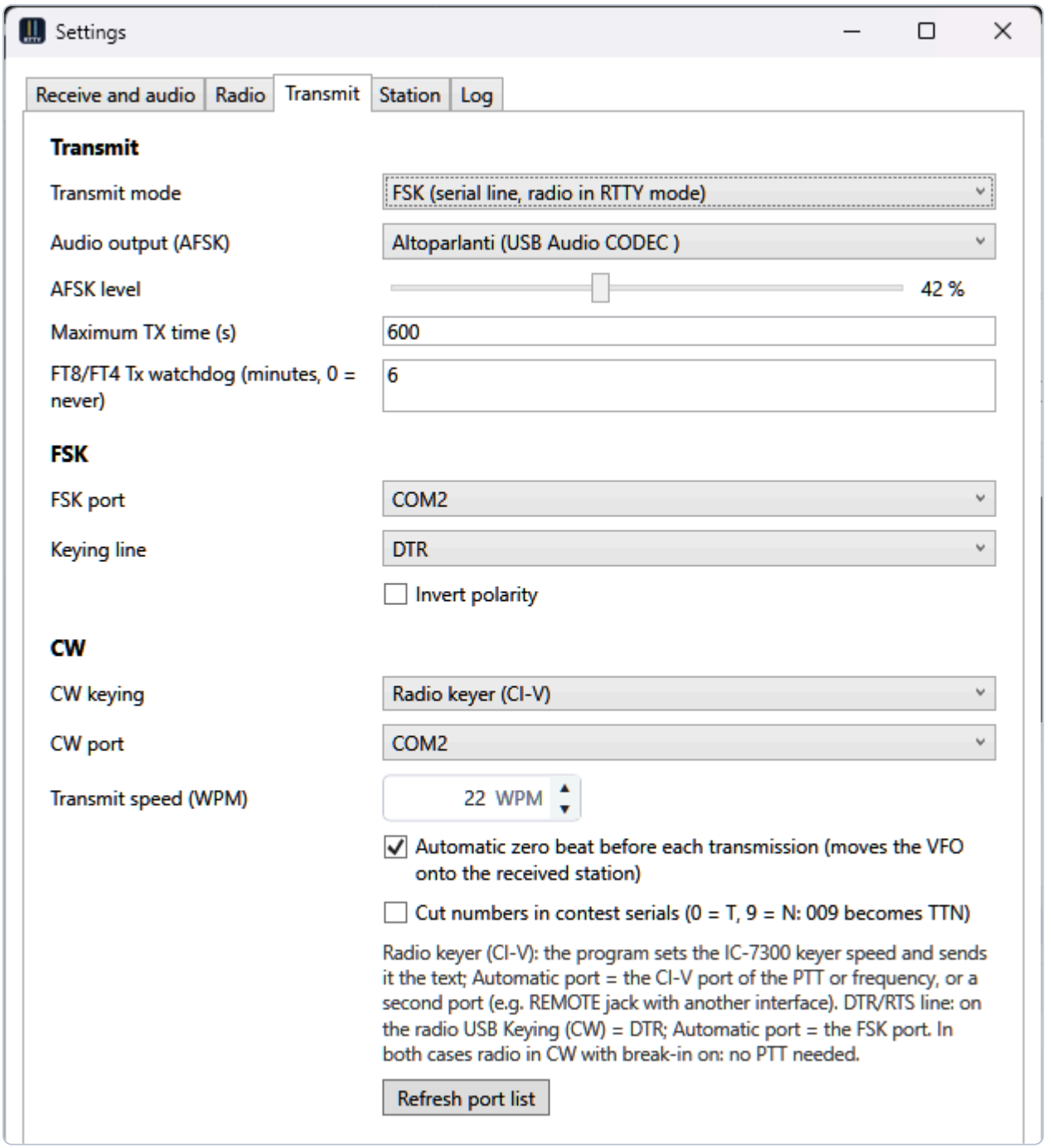


Fig. 5.3 – Transmit tab.

Option	Description
Transmit mode	**AFSK** (the program generates the audio tones, radio in LSB-D/USB-D) or **FSK** (keying on a serial line, radio in RTTY mode). It applies to RTTY; the other modes always transmit audio.
Audio output (AFSK)	The sound card towards the radio; for the IC-7300 "Speakers (USB Audio CODEC)".
AFSK level	Level of the transmitted audio (usually 20-40 %): set it so that the radio's ALC stays at or near zero.
Maximum TX time (s)	Protection against forgotten transmissions (default 600 s).
FT8/FT4 Tx watchdog	Minutes after which FT8/FT4 transmission without a reply is disabled (0 = never).
FSK port / Keying line	COM port and line (DTR or RTS) for FSK; IC-7300: the radio's port, DTR line.
Invert polarity	Swaps mark and space in FSK (use it in one place only: here or in the radio).
CW keying / CW port	**Radio keyer (CI-V)**, recommended, or a DTR/RTS line on a port.
Transmit speed (WPM)	Speed of the transmitted CW (also adjustable from the main window).
Automatic zero beat	Before each CW transmission moves the VFO onto the received station.
Cut numbers	In CW contest serials: 0 = T, 9 = N (009 becomes TTN).

5.4 Station

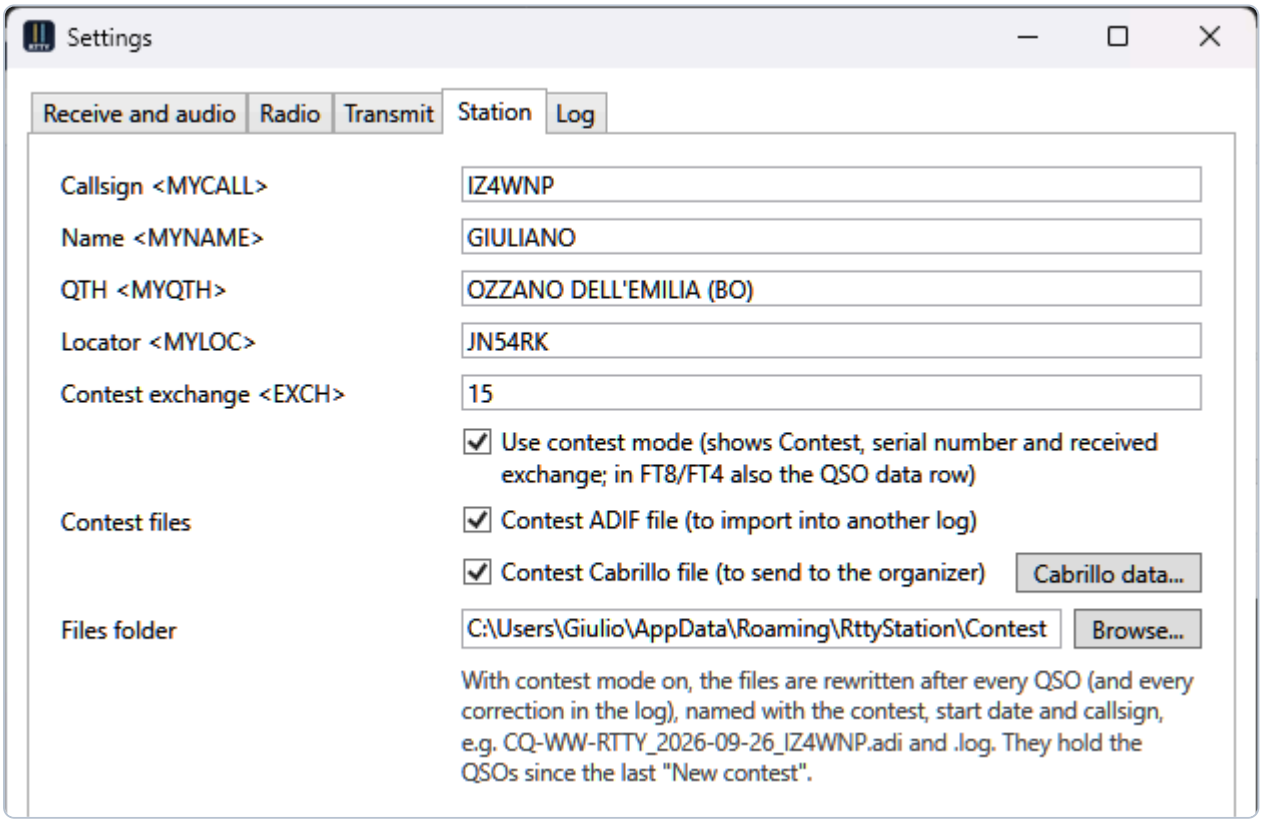


Fig. 5.4 – Station tab with the contest options.

Option	Description
Callsign, Name, QTH, Locator	Station data, used in macros (`<MYCALL>` , `<MYNAME>` , `<MYQTH>` , `<MYLOC>`), in FT8 messages and in the log.
Contest exchange `<EXCH>`	The fixed contest exchange (e.g. CQ zone). Empty if the contest only uses the serial number.
Radio, antenna, power, free texts 1-3	Used only by the macros: tags `<MYRIG>` , `<MYANT>` , `<MYPWR>` , `<MYINFO1>` - `<MYINFO3>` (chapter 9).
Use contest mode	Shows the Contest box, the serial number and the received exchange in the QSO row; in FT8/FT4 also the QSO data row.
Contest files	**Contest ADIF file** (to import into another log) and **Contest Cabrillo file** (to send to the organizer), rewritten after every contest QSO.
Cabrillo data...	Categories, name, address, club, sent exchange and soapbox for the Cabrillo header (fig. 5.5).
Files folder	Where the contest files are saved (default: `Contest` in the data folder).

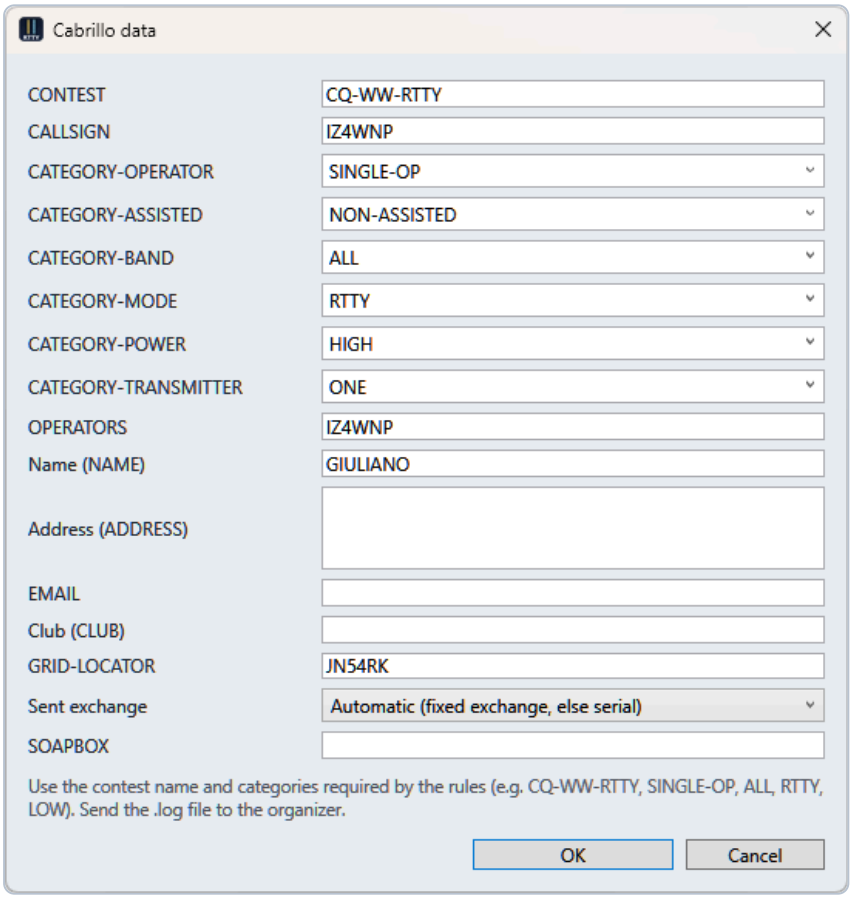


Fig. 5.5 – Cabrillo data for the header of the contest files.

5.5 Log

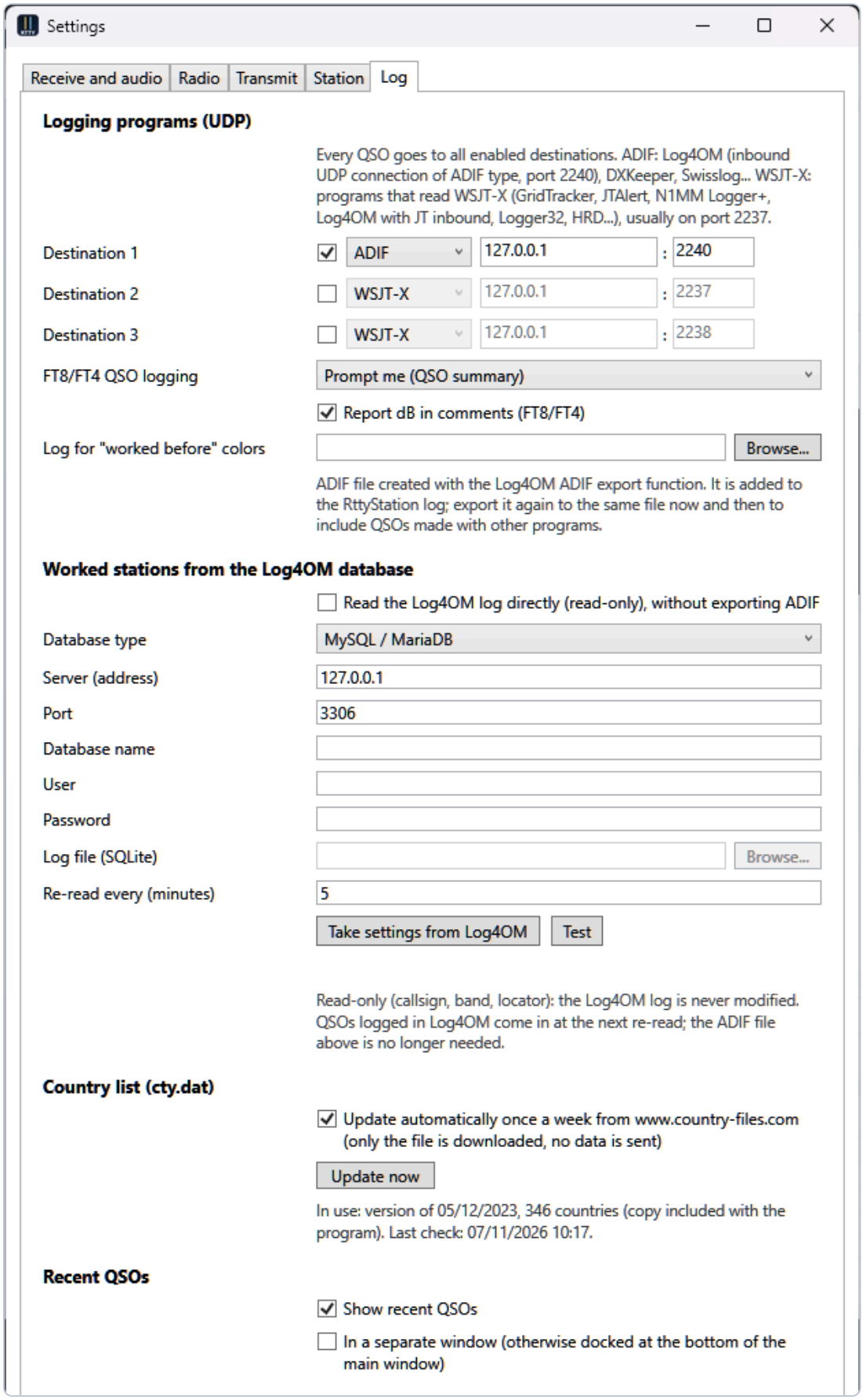


Fig. 5.6 – Log tab.

Option	Description
Destination 1 – 3	Up to 3 logging programs that receive every QSO over UDP: enabled box, format, address and port. **ADIF**: the ADIF record as text (Log4OM "ADIF_MESSAGE" on port 2240, DXKeeper, Swisslog...). **WSJT-X**: the same messages as WSJT-X (GridTracker, JTAlert, N1MM Logger+, Log4OM with JT inbound, Logger32, HRD...), usually port 2237.
FT8/FT4 QSO logging	**Prompt me (QSO summary)** or **automatic** when RR73 or 73 is sent.
Report dB in comments	As in WSJT-X, the comment of FT8/FT4 QSOs holds the reports, e.g. `FT8 Sent: -12 Rcvd: -08`.
Log for "worked before" colors	ADIF file exported from Log4OM (or another log) that is added to the RttyStation log for the CQ colors in FT8/FT4.
Log4OM database	As an alternative to the ADIF file: direct, read-only access to the Log4OM log (MySQL/MariaDB or SQLite), re-read every few minutes. **Take settings from Log4OM** fills server, port, database and user; the password is stored encrypted for your Windows user; **Test** shows how many QSOs are read.
Country list (cty.dat)	The country list used in FT8/FT4 updates itself **once a week** from www.country-files.com: only the file is downloaded (about 100 kB, and only if it has changed), no data is sent; the new file is checked before it replaces the one in use. You can turn the automatic update off or run it now with **Update now**; below are the version in use, the number of countries and the last check.
Recent QSOs	**Show recent QSOs** and, if ticked, **In a separate window** instead of docked at the bottom of the main window.

5.6 Macros

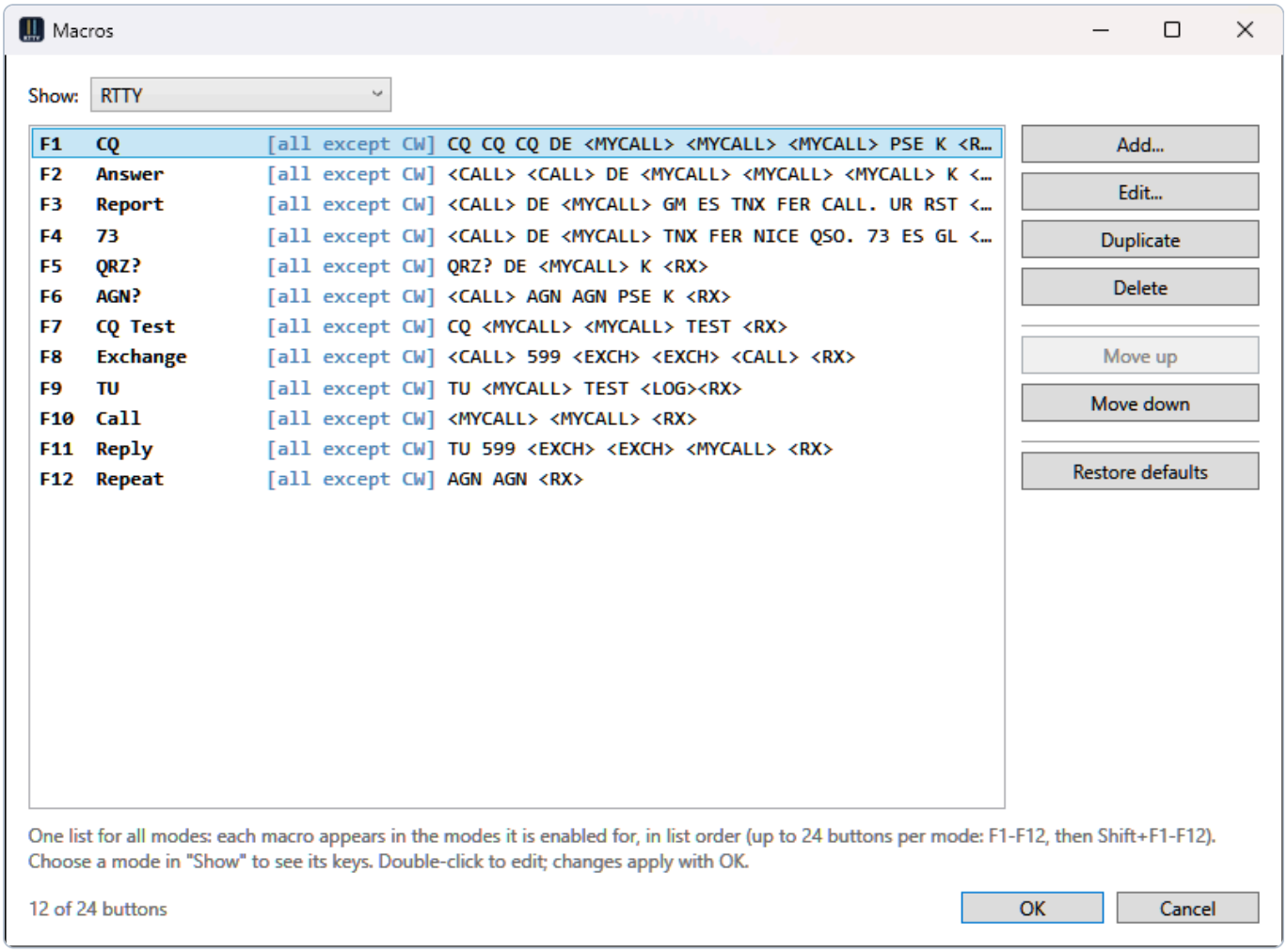


Fig. 5.7 – The macro list, shown for RTTY.

As in Ham Radio Deluxe there is **one list** of macros for all text modes (RTTY, PSK, CW, Hell, Olivia, MFSK, DominoEX, THOR): each macro is enabled for the chosen modes and appears among their buttons in list order, up to 24 per mode (F1-F12, then Shift+F1-F12). **Show** filters the list on one mode and shows the keys; next to each macro are the modes it is enabled for. **Add**, **Edit** (or double-click), **Duplicate**, **Delete**, **Move up/down** and **Restore defaults**; changes apply with OK. A right click on a button in the main window opens its macro directly. The editor and all the tags are described in chapter 9.

5.7 Clock (NTP)

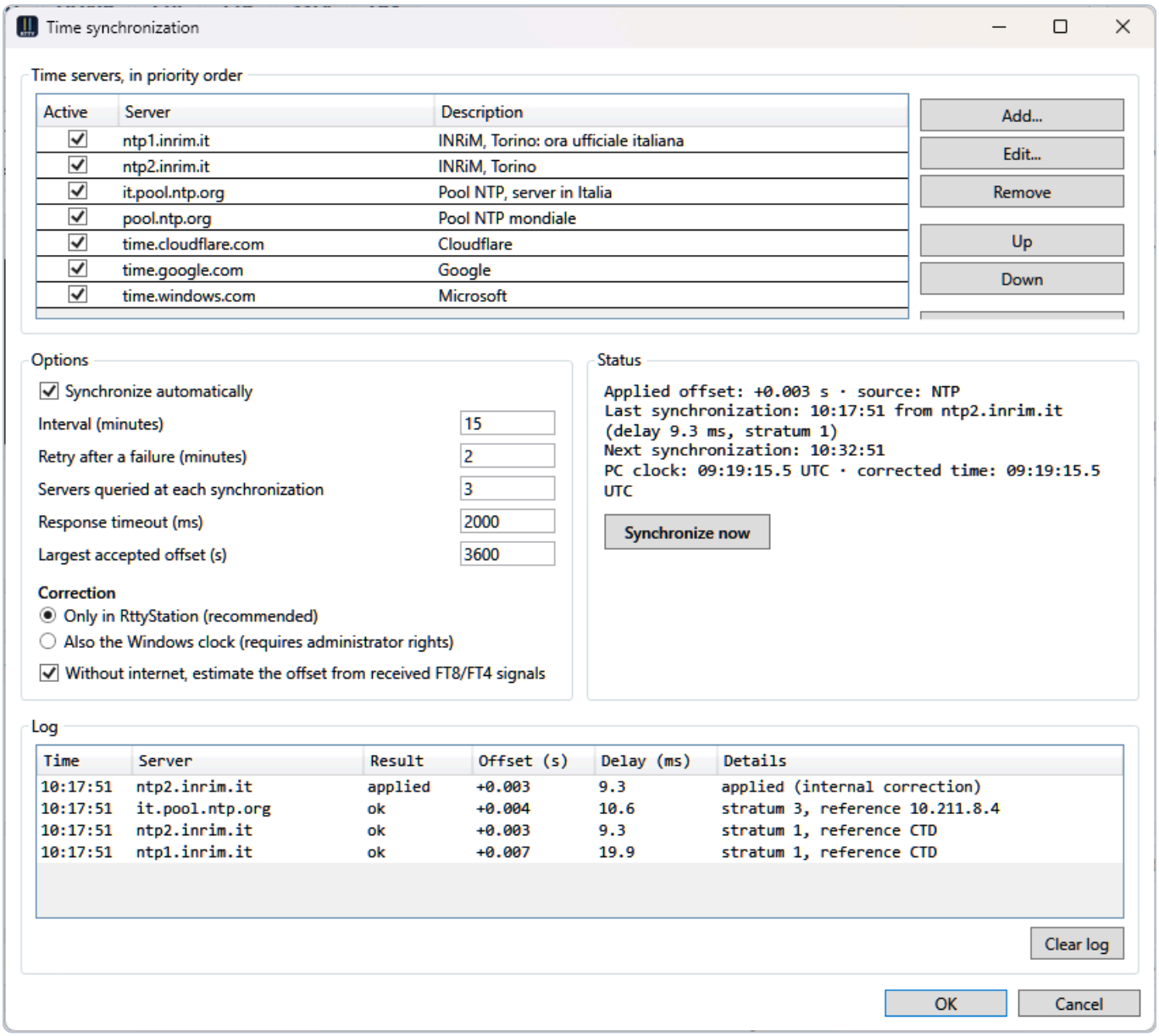


Fig. 5.8 – Clock synchronization.

Option	Description
Time servers	List in order of priority (INRiM, pool.ntp.org, Cloudflare, Google, Microsoft...): add, edit, remove, move, enable or disable. You can add your own servers, also with the port (`192.168.1.1:123`).
Options	Automatic synchronization, interval, retry after an error, servers queried, maximum response time, maximum accepted offset.
Correction	**Only in RttyStation** (recommended, no rights needed) or **also the Windows clock** (the program must run as administrator). Without internet the offset can be estimated from the FT8/FT4 signals.
Status and Log	Last applied offset, server, delay and stratum; **Synchronize now** takes a measurement at once.

Operating the program

The following chapters describe the radio set-up and the use of each mode. They cover the same topics as the built-in manual (Help › User manual), with reference pictures.

6. IC-7300 settings

The items are in the radio menu: **MENU** key, then **SET > Connectors**, unless stated otherwise. The names are those shown on the display.

6.1 Common settings (AFSK and FSK)

- **USB Serial Function = CI-V**: the radio's USB COM port must be used for CI-V (not for «RTTY Decode»), otherwise PTT by command and frequency reading do not work.
- **ACC/USB AF Output Level**: level of the received audio sent to the PC. Adjust it so that the RttyStation **Level** bar moves between one third and two thirds, without reaching the end.
- **ACC/USB AF SQL = OFF (OPEN)**: audio reaches the PC even with the radio squelch closed.
- **CI-V Address = 94h** (default): the same address goes in RttyStation, Settings > Radio.
- **CI-V USB Baud Rate**: with «Auto» (default) any speed chosen in RttyStation works; with a fixed value, set the same in the program. **CI-V USB Echo Back** can stay as it is: RttyStation ignores the echo.
- In RttyStation, Settings > Receive and audio: audio input **USB Audio CODEC**, shift 170, 45.45 baud.

6.2 AFSK step by step

In AFSK the program generates the audio tones, which the radio transmits in SSB data mode. You transmit exactly on the frequency you receive on.

1. Radio in **LSB-D** (normal tones). Alternatively **USB-D**, enabling **Reverse** in RttyStation (it applies to both receive and transmit).
2. **DATA MOD = USB**: in data mode the radio takes the transmit audio from the USB port.
3. In RttyStation, Settings > Transmit: mode **AFSK**, audio output **USB Audio CODEC**.
4. PTT: **CI-V command** on the radio's COM port (no radio setting needed), or **RTS** with **USB SEND = RTS** in the radio.
5. Level: transmit into a dummy load or at low power and adjust **USB MOD Level** in the radio and the **AFSK level** in RttyStation (usually 20-40%) so that the **ALC stays at or near zero**. A high ALC distorts and widens the signal.
6. Tuning: click the signal in the waterfall and answer there. It is best to work with tones between about 1000 and 2300 Hz: with very low tones the harmonics fall inside the passband.

6.3 FSK step by step

In FSK the radio generates the tones, keyed by the program through a line of the USB port. The transmit frequency is the VFO frequency.

1. Radio in **RTTY** mode.
2. **USB Keying (RTTY) = DTR**: the radio takes the FSK keying from the DTR line of the USB port.

3. PTT: **CI-V command** in RttyStation, or **USB SEND = RTS** in the radio with PTT on **RTS** in the program. PTT and FSK cannot use the same line.
4. In RttyStation, Settings > Transmit: mode **FSK**, FSK port = the radio's COM port, line **DTR**, «Invert polarity» off.
5. Receive tones: in RTTY mode the radio uses **RTTY Mark Frequency** (2125 Hz by default) and **RTTY Shift Width** (170 Hz). These items, together with **RTTY Keying Polarity**, are in the SET menu (the section may vary with the firmware). In RttyStation click once on the waterfall at **2210 Hz** (halfway between 2125 and 2295): the dashed lines move onto the radio tones.
6. Tuning: do **not** click on signals; turn the **VFO** until the two traces of the signal fall on the dashed lines. This way you receive and transmit on the same frequency.

6.4 Summary

	AFSK	**FSK**
Radio mode	LSB-D (or USB-D + Reverse)	RTTY
DATA MOD	USB	—
USB MOD Level	ALC at or near zero	—
USB Keying (RTTY)	OFF	DTR
USB SEND	RTS if PTT is on RTS, otherwise OFF	RTS if PTT is on RTS, otherwise OFF
RttyStation: mode	AFSK, output USB Audio CODEC	FSK, radio COM port, DTR line
RttyStation: PTT	CI-V or RTS	CI-V or RTS
Transmit frequency	the one clicked in the waterfall	the VFO frequency
Tuning	click on the signal	VFO, signal on the dashed lines

6.5 Tips

- **Power**: RTTY transmits a continuous carrier; for long transmissions or contests it is wise to reduce power (for example to around 50 W).
- **Filters**: with a wide filter (2.4 kHz or more) you see more signals in the waterfall; a narrow filter helps with QRM, but in AFSK the signal must be in the centre of the passband.
- **FSK polarity**: if the other station reads garbled text, invert the polarity in one place only, either in RttyStation («Invert polarity») or in the radio (RTTY Keying Polarity), not in both.
- **Check**: before going on the air, check your signal by listening to it on a web receiver (WebSDR) or with the help of a friend.
- **Log4OM and CAT**: the COM port used by RttyStation cannot be opened by Log4OM at the same time. If Log4OM must also read the radio, connect it to the **REMOTE** jack (CI-V) with a separate interface and set **CI-V USB Port = Unlink from [REMOTE]**.

7. Receiving

- Press **Start**: the signals in the band appear in the waterfall.
- An RTTY signal looks like two close vertical traces. Click **halfway between them**: the dashed lines (red = mark, blue = space) move onto the signal and text appears in the RX window.

- The **Tuning** panel (tuning indicator) shows a cross when the signal is centred; a tilted blob means wrong tuning, a cloud means noise only.
- If a strong, centred signal gives garbled text, enable **Reverse**.
- **Squelch** blocks spurious text during pauses (3 dB is a good value); **Contrast** sets the waterfall dynamic range.
- Recognised callsigns are highlighted: a click copies them to the Call field.

8. Transmitting

- Type your text in the TX box and press **TX**. You can keep typing while transmitting; characters already sent turn yellow and can no longer be edited.
- Pressing the button again (it reads **RX** while transmitting) returns to receive at the end of the text; **Esc** stops immediately.
- While transmitting, the waterfall and the tuning indicator (in red) show the transmitted signal.
- A maximum transmit time (600 s by default) protects against forgotten transmissions.

9. Macros

Keys **F1-F12** (or the matching buttons) send the macros, **Shift+F1-F12** the next ones, up to 24 per mode. The default macros are F1-F6 for normal QSOs and F7-F12 for contests. A right-click on a button opens the macro editor.

As in Ham Radio Deluxe, the macros are kept in **one list** (Settings › Macros) and each one is enabled for the modes you choose: a macro written once works in RTTY, PSK, Olivia and the other text modes. **Show** filters the list on one mode and shows the key of each macro in that mode; the list order is the button order. **Duplicate** makes a copy to adapt to another mode (for example the CW version of a macro). Macros from earlier versions (one list per mode) are converted automatically: identical macros in several modes become one.

The macro editor contains:

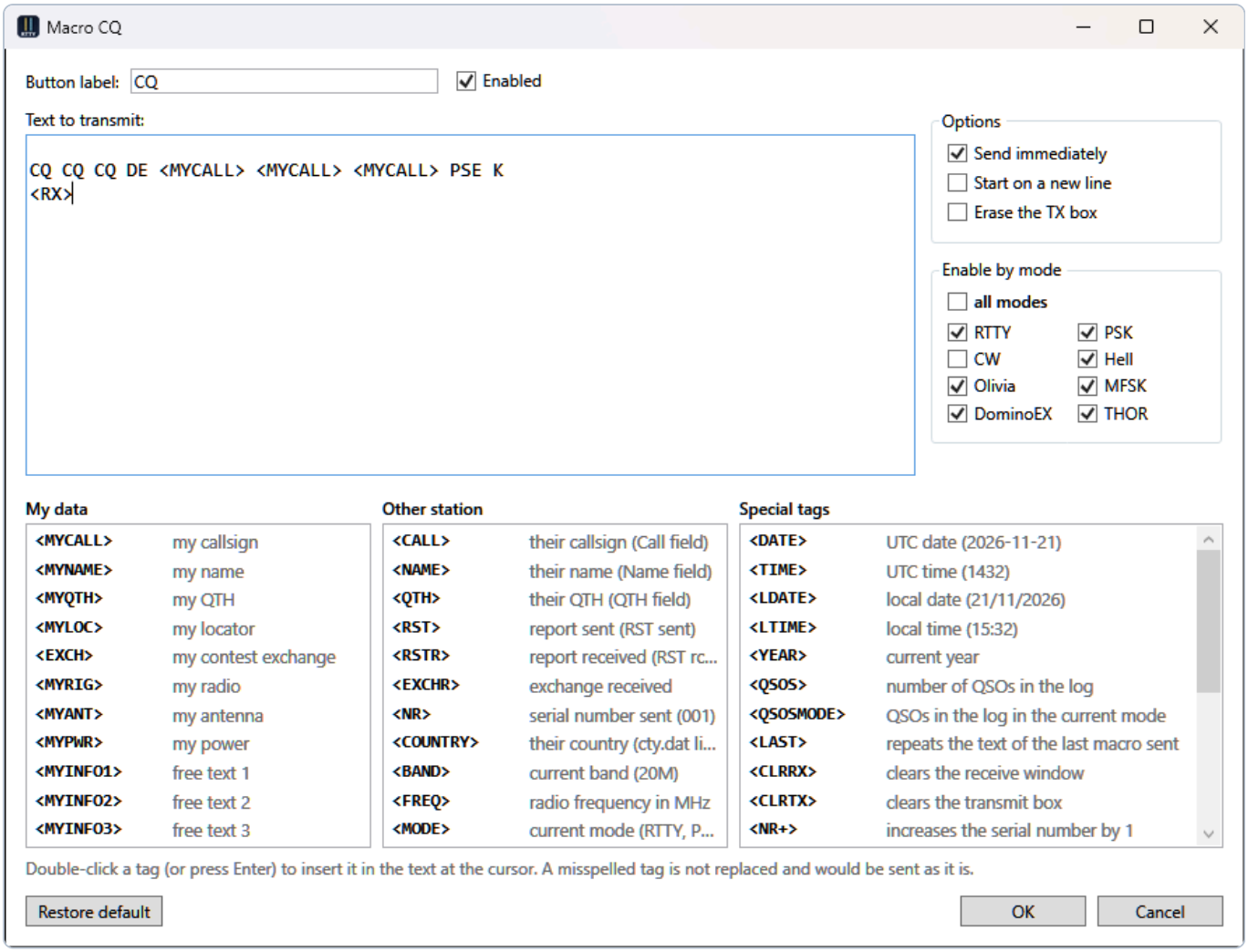
- the button **label** and **Enabled** (a disabled macro stays in the list but has no button);
- the **text to transmit**, with tags; line breaks become new lines (a space in CW);
- **Options**: **Send immediately** (otherwise the text only goes into the TX box, to be completed and sent with TX), **Start on a new line**, **Erase the TX box** (only when not transmitting);
- **Enable by mode**: the modes in which the macro has a button;
- the three **tag** lists (my data, other station, special tags): a double-click inserts the tag at the cursor.

Available tags (upper or lower case; a misspelled tag is not replaced and would be sent as it is):

My data	
`<MYCALL>`	my callsign
`<MYNAME>`	my name
`<MYQTH>`	my QTH
`<MYLOC>`	my locator
`<EXCH>`	my contest exchange
`<MYRIG>`	my radio
`<MYANT>`	my antenna
`<MYPWR>`	my power
`<MYINFO1>`	free text 1
`<MYINFO2>`	free text 2
`<MYINFO3>`	free text 3
Other station	
`<CALL>`	their callsign (Call field)
`<NAME>`	their name (Name field)
`<QTH>`	their QTH (QTH field)
`<RST>`	report sent (RST sent)
`<RSTR>`	report received (RST rcvd)
`<EXCHR>`	exchange received
`<NR>`	serial number sent (001)
`<COUNTRY>`	their country (cty.dat list)
`<BAND>`	current band (20M)
`<FREQ>`	radio frequency in MHz
`<MODE>`	current mode (RTTY, PSK31...)
Special tags	
`<DATE>`	UTC date (2026-11-21)
`<TIME>`	UTC time (1432)
`<LDATE>`	local date (21/11/2026)
`<LTIME>`	local time (15:32)
`<YEAR>`	current year
`<QSOS>`	number of QSOs in the log

`<QSOSMODE>`	QSOs in the log in the current mode
`<LAST>`	repeats the text of the last macro sent
`<CLRRX>`	clears the receive window
`<CLRTX>`	clears the transmit box
`<NR+>`	increases the serial number by 1
`<NR−>`	decreases the serial number by 1
`<RX>`	back to receive at the end of the text
`<LOG>`	opens the QSO summary at the end of the transmission
`<AR>`	CW: end-of-message prosign
`<SK>`	CW: end-of-contact prosign
`<KN>`	CW: go ahead, named station only
`<BT>`	CW: separator (=)
`<AS>`	CW: wait
`<BK>`	CW: break
`<SOS>`	CW: SOS

Radio, antenna, power and the three free texts are entered in Settings › Station. `<FREQ>` and `<BAND>` need the radio connected via CAT.

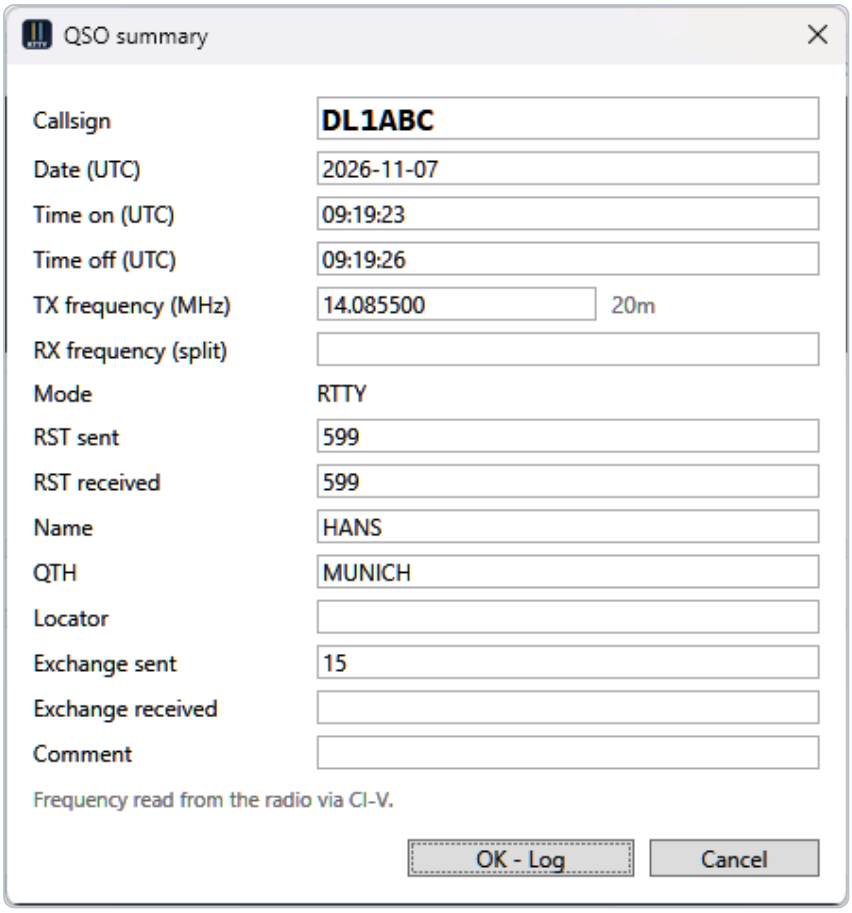


The macro editor: text, options, enabled modes and the three tag lists (double-click to insert).

10. Logging QSOs

Fill in the fields at the bottom (Call, RST, name, QTH, exchange). The QSO summary opens by itself after the macros containing `<LOG>` (73 and TU), or with **Log...** or **Ctrl+L**. Check the data and press **OK - Log**: the QSO is sent to Log4OM and also saved in the file `%AppData%\RttyStation\rttystation.adi`.

The Log4OM configuration, needed only once, is explained in chapter 11.



The QSO summary (Ctrl+L).

11. Configuring Log4OM

RttyStation sends every logged QSO to Log4OM as an ADIF message over UDP. In Log4OM you create, once only, an inbound connection that receives these messages:

1. Open Log4OM and go to **Settings > Program Configuration**.
2. In the list on the left choose **Software Integration > Connections**.
3. Among the **UDP inbound** connections create a new one with:
   - name: anything you like, for example `RttyStation`;
   - type: **ADIF_MESSAGE**;
   - port: **2240**, the same one set in RttyStation.
4. Add the connection to the list, check that it is **enabled** and save the configuration.

In RttyStation, menu **Settings > Log**, **Destination 1**: enabled, format **ADIF**, address `127.0.0.1` if Log4OM runs on the same computer (otherwise the IP address of the computer running Log4OM) and the same port chosen in Log4OM.

Other logging programs: destinations 2 and 3 send the same QSOs to other programs too, together with Log4OM or instead of it. Format **ADIF** for programs that receive the ADIF record over UDP; format **WSJT-X** for programs that listen to WSJT-X (GridTracker, JTAlert, N1MM Logger+, Logger32, HRD Logbook, MacLoggerDX, and Log4OM too with a JT-type inbound connection): RttyStation sends the same messages WSJT-X sends when it logs a QSO (heartbeat, "QSO Logged" and "Logged ADIF"), usually to port **2237**. If WSJT-X is open on the same computer use a port different from WSJT-X's, or a multicast address such as

`224.0.0.1` if the program supports it. Every QSO goes to all enabled destinations; if a send fails a warning says which one.

Test: with Log4OM open, type a test callsign in the Call field of RttyStation, press **Ctrl+L** and then **OK - Log**. The QSO must appear immediately in the Log4OM QSO list; then delete it from Log4OM.

Tips:

- Log4OM must be open when you log a QSO. QSOs sent while Log4OM is closed are still kept in the backup file `%AppData%\RttyStation\rttystation.adi`, which can be imported into Log4OM with its ADIF import function.
- The port must not be used by other programs: for example WSJT-X and JTDX usually use 2237.
- In the connection options, Log4OM lets you choose whether received QSOs are automatically forwarded to online services (UPLOAD_QSO option).
- The exact names of menus and buttons may vary slightly with the Log4OM version.

Worked stations read from Log4OM: in Settings > Log, database section, RttyStation reads the Log4OM log directly (MySQL/MariaDB or SQLite), read-only, and re-reads it every few minutes, with no ADIF export. **Take settings from Log4OM** fills server, port, database and user; the password is typed once and stored encrypted for your Windows user. **Test** shows how many QSOs are read.

12. VFO display

At the top right the large line is the selected VFO (receive), the small line the other VFO. Without split the selected VFO is **RX·TX**; with split active the other VFO becomes **TX** and **SPLIT** lights up. While transmitting, the label of the transmitting VFO turns red. The IC-7300 does not report whether the selected VFO is A or B.

13. Appearance and shortcuts

- **View** menu: dark or light theme, language (Italian, English, German, French, Spanish), reset of the panel layout.
- Panels are resized by dragging the dividers between them; double-click a divider to restore the default size.
- Shortcuts: **F1-F12** macros, **Esc** stops transmitting, **Ctrl+L** logs the QSO, **Alt** activates the menu bar.

14. Troubleshooting

- **No text or garbled text**: click the centre of the signal, try Reverse, check shift and baud in Settings > Receive and audio.
- **The radio does not transmit**: check the PTT method and port; with RTS or DTR the radio must have USB SEND on the same line.
- **A steady tone in FSK**: the radio must be in RTTY mode with USB Keying (RTTY) on the chosen line (DTR).
- **The frequency does not appear**: check the CI-V port and address; the port must not be used by another program.
- **Log4OM does not receive QSOs**: check that the UDP connection is active and on the same port; QSOs are still kept in the ADIF file.
- **«Windows protected your PC» warning** when installing: press «More info» and then «Run anyway».

15. FT8 and FT4

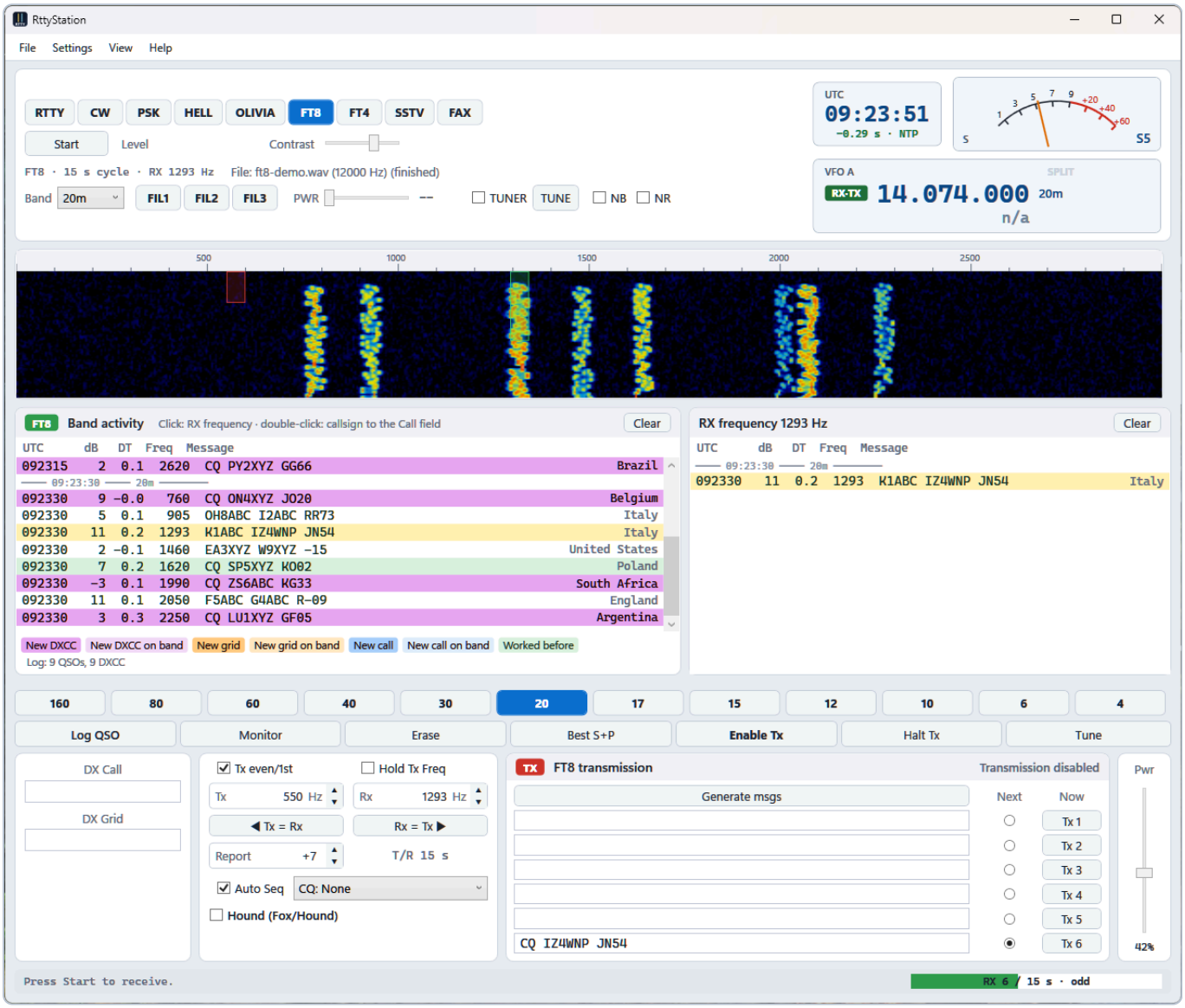
The lower part is laid out as in WSJT-X: a row of **band buttons** (the radio's band in green), the command row (**Log QSO**, **Monitor** to start or stop listening, **Erase** the lists, **Best S+P**, **Enable TX**, **Halt TX**, **Tune** which sends a steady tone for the tuner and ALC), then **DX Call** and **DX Grid** (with the distance), the parameters (period, Tx/Rx, report, Auto Seq, CQ, Hound), the six messages in a column with **Next** and the **Tx n** button that sends it at once, and on the right **Pwr**, the audio level to the radio.

The **Band activity** and **RX frequency** lists can be widened or narrowed by dragging the divider between them (double-click = initial size; the size is remembered); their height is set with the dividers above (towards the waterfall) and below (towards transmit). Bottom right, as in WSJT-X, a **cycle bar** fills during each 15 s cycle (7.5 s in FT4): green while receiving, red while transmitting, with the elapsed seconds and even or odd cycle.

The **RTTY · FT8 · FT4** selector at the top left changes the mode. In FT8 (15 s cycles) and FT4 (7.5 s cycles) the receive window becomes the **band activity**: every cycle shows all decoded messages with UTC time, signal-to-noise ratio (dB), time offset (DT, in seconds) and audio frequency. CQ calls are green, messages addressed to you are red.

- Radio in **USB-D** on the band's FT8/FT4 frequency (e.g. 14.074 MHz FT8, 14.080 MHz FT4), wide filter (at least 2.4 kHz), **Reverse off**.
- **Click on the waterfall** or **on a message**: sets the receive frequency (green band on the waterfall). The list on the right shows messages near that frequency and those addressed to you.
- **Double-click on a message**: the transmitting station's callsign goes to the Call field, for logging.
- **Band** (box to the left of FT8 transmit): choosing a band sets the radio to the standard FT8/FT4 frequency, in USB-D, via CI-V; the list follows the radio frequency by itself. The band is also shown on the lines separating the cycles.
- To the right of each message is the **country** of the transmitting station (AD1C cty.dat list). The list updates itself once a week from www.country-files.com, downloading only the file and sending no data; Settings › Log, "Country list" section, shows the version and last check, turns the automatic update off or runs it now with **Update now**.
- **Parameters panel**, as in WSJT-X: Tx (red band) and Rx (green band) frequencies with the ▲ (Tx = Rx) and ▼ (Rx = Tx) arrows, Tx even/1st, Hold Tx Freq, report, Auto Seq, CQ. **Best S+P** picks the CQ station with the best signal. Double-click or Best S+P set frequencies, callsign, report (= the station's SNR) and the transmit cycle opposite to its own.
- DT should stay within ±0.5 s: values all shifted the same way mean the PC clock needs correcting (chapter 16).
- **CQ colors**, as in WSJT-X: purple = DXCC never worked (light: new on this band), orange = new grid (light: on band), blue = new call (light: on band), green = worked before. They are based on the RttyStation log and on the ADIF file exported from Log4OM set in Settings > Log; the legend below the band activity shows how many QSOs were loaded. Every logged QSO counts immediately.
- **Transmission** (bottom panel): the six standard messages Tx1-Tx6 (call with locator, report, R+report, RR73, 73, CQ), editable, with the choice of the next one and the **Now** button. **Enable Tx** (red when on) transmits in the next even or odd cycle, 0.5 s after its start; **Halt Tx** or **Esc** stop; **Generate msgs** prepares them for the callsign in the Call field. Audio output, level and PTT are those of AFSK (Settings > Transmit); set the level for zero ALC.
- **Automatic sequencing** (Auto Seq): answering a CQ Tx1 → Tx3 → Tx5; calling CQ Tx6 → Tx2 → Tx4, then CQ again. With **CQ: First** or **Max Dist** the program chooses by itself whom to answer. The **Tx watchdog** disables transmission after some minutes without a reply.

- **Logging**: when RR73 or 73 starts, the QSO is logged as in WSJT-X, according to Settings > Log: with **confirmation** (pre-filled summary) or **automatically**. Frequency = radio frequency + transmit audio frequency; FT4 is logged as MFSK/FT4. **Log QSO** or Ctrl+L log manually. With **Report dB in comments** (Settings > Log), as in WSJT-X, the QSO comment also contains the reports, e.g. `FT8 Sent: -12 Rcvd: -08`.



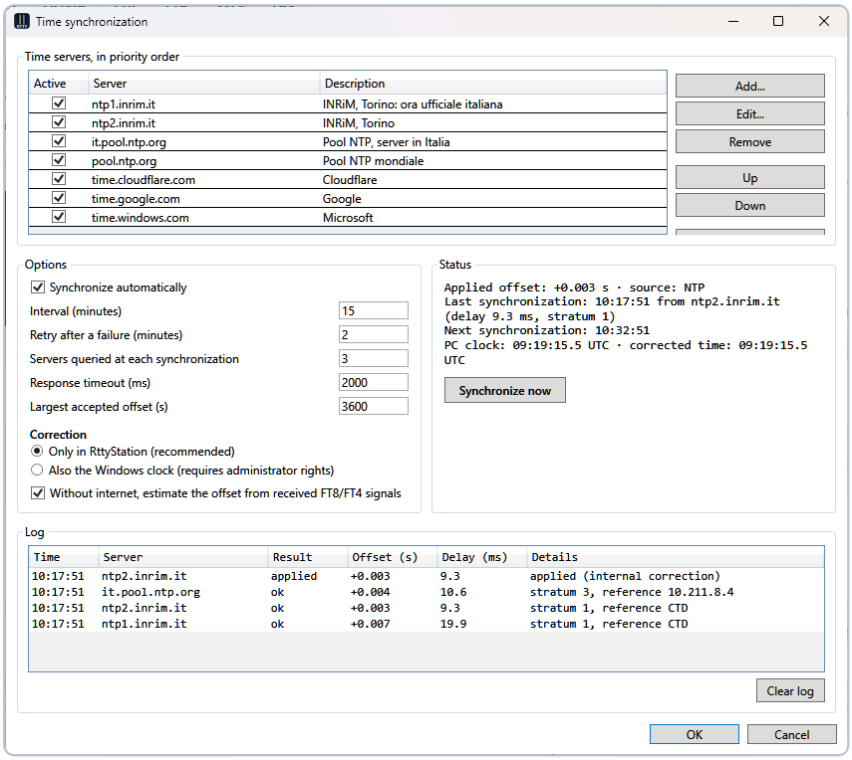
FT8: band activity with CQ colors, RX frequency, band buttons and transmit panel.

16. Time synchronization

FT8 and FT4 need a clock accurate to about one second. RttyStation checks it by itself with internet time servers (NTP): the **UTC** display next to the VFO display shows the corrected time, the applied offset and its source. **Green**: synchronized; **yellow**: time not yet verified or estimated; **red**: needs checking.

- Click on the UTC display or menu **Settings > Clock (NTP)**: server list in priority order (add, edit, remove, move, enable or disable, test), interval, largest offset, status and measurement log. **Synchronize now** also applies the changes.
- Default servers: **INRiM** (Italian official time), pool.ntp.org, Cloudflare, Google, Microsoft. You can add your own servers (e.g. your home router), also with a port: `192.168.1.1:123`.

- **Correction only in RttyStation** (recommended): no special rights needed and other programs are not affected. **Also the Windows clock**: works only when RttyStation runs as administrator; otherwise the internal correction is used.
- Without internet, if the option is on, the offset is estimated from the DT of received FT8/FT4 signals (at least 20 decodes needed).
- If no server replies, check that the firewall does not block outgoing UDP port 123.

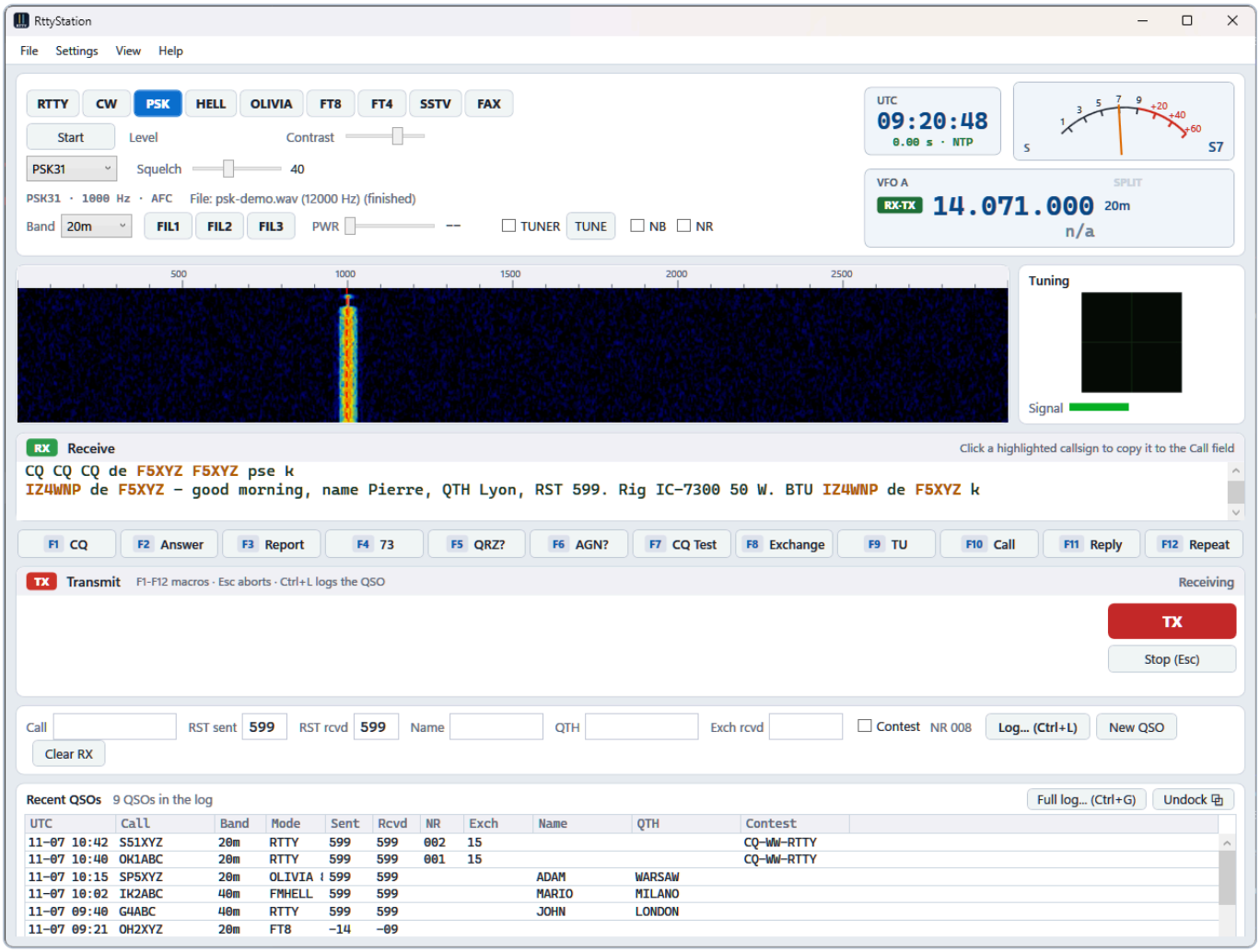


Clock synchronization (click on the UTC display).

17. PSK

Selector on **PSK**. The speed is chosen in the command bar: **PSK31** (the standard), PSK63, PSK125, PSK250. RX window, TX box, macros and QSO summary work as in RTTY.

- Radio in **USB-D**, DATA MOD = USB, wide filter; typical frequencies: 14.070, 7.040, 3.580 MHz.
- **Click in the middle of the trace** on the waterfall: the AFC locks onto the signal. The tuning display becomes a **vector scope**: two groups of dots on the left and right mean a clean signal.
- **Squelch** on quality (0-100, default 40): it opens by itself at the start of a transmission and closes at the end.
- You transmit on the frequency you receive, with the AFSK audio output, level and PTT: set the level for zero ALC (a distorted PSK signal is wide and causes interference).
- PSK macros are separate from RTTY ones. The log records PSK31 etc. as MODE=PSK with SUBMODE.

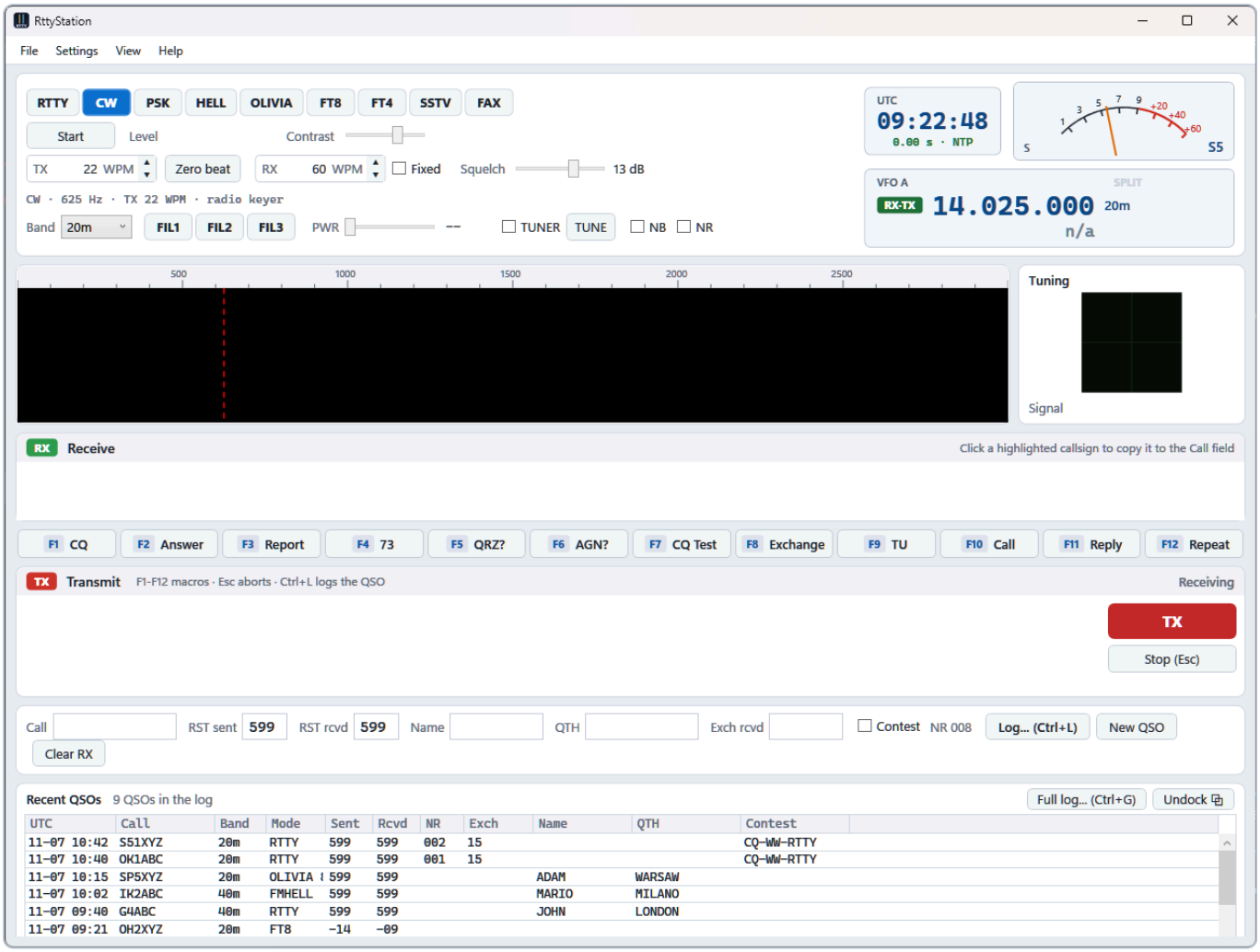


PSK31: tuned signal and vector scope in the Tuning panel.

18. CW

Selector on **CW**. The receive speed is detected automatically; the transmit speed (**WPM**) is chosen in the command bar.

- **Reception**: click on the signal on the waterfall (with the radio in CW, the tone is near the pitch frequency). The squelch (default 8 dB) blocks noise; the first letter of a transmission may be lost while it opens.
- **Transmission**, in Settings > Transmit, CW keying item: **Radio keyer (CI-V)**, recommended, or **DTR/RTS line** (IC-7300: USB Keying (CW) = DTR). Radio in **CW** mode with **break-in** on (semi or full): no PTT needed.
- Procedure signals in macros or the TX box: <SK>, <KN>, <AR>, <BT>, <AS>. Esc stops immediately, including the radio keyer.
- **Click on the signal**: the program finds the strongest signal within ±150 Hz and tracks it (AFC). **Zero beat**: moves the VFO so the station is exactly on your frequency (reads pitch and mode via CI-V; the first time it checks and remembers the radio's CW side). The automatic option, in Settings > Transmit > CW, does it before each transmission.
- **Receive speed** (RX ... WPM box): shows the detected speed; if you correct it the decoder restarts from there; with **Fixed** it stays locked (useful with very irregular keying). The decoder also learns how short the other station's letter gaps are, so letters do not merge.
- CW has its own macros (5NN report in contests).



CW: TX and RX speed, Zero beat and squelch in the command bar.

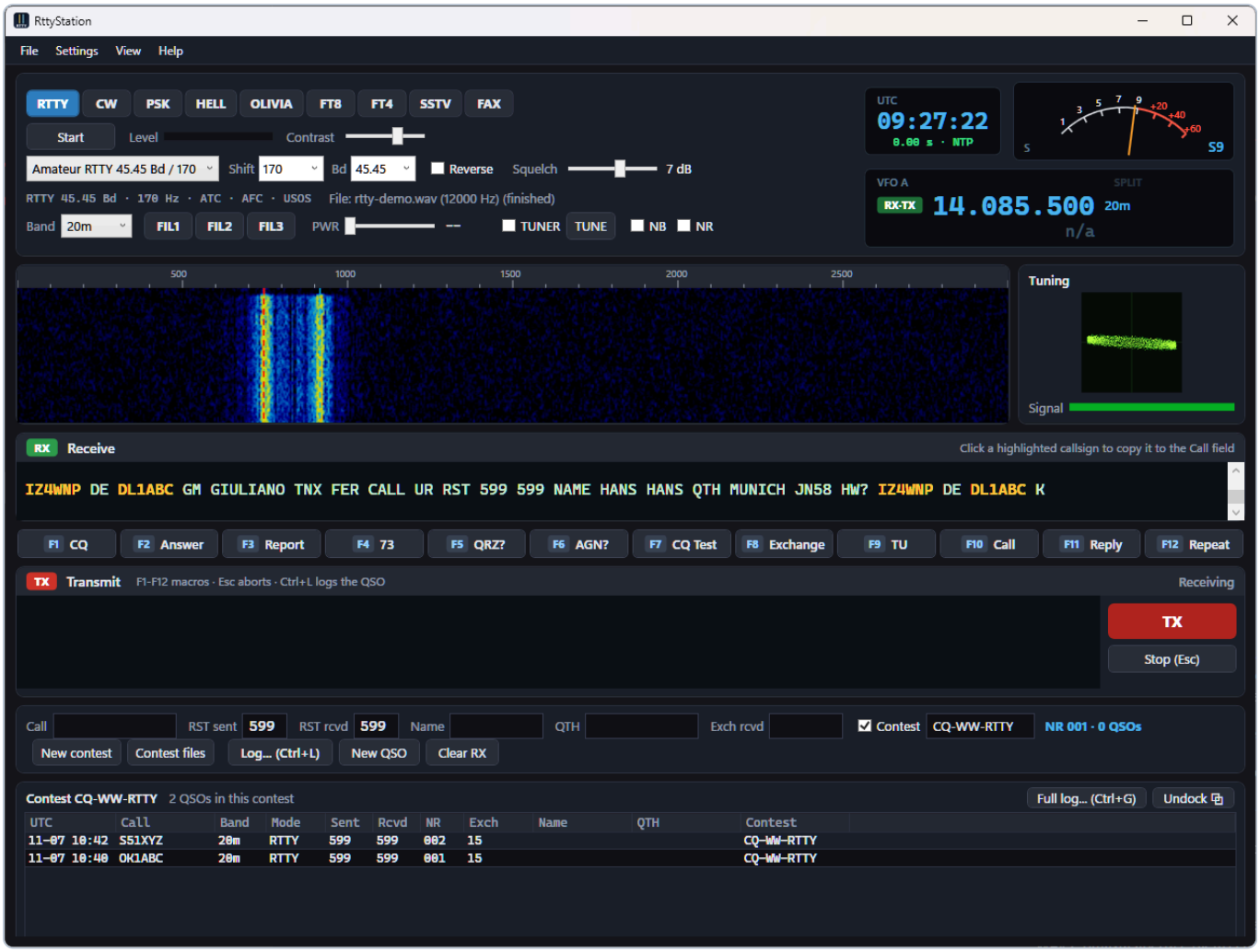
19. Contest

Contest controls (**Contest** box, serial number and received exchange) appear in the QSO row only after ticking **Use contest mode** in Settings › Station; with the option off, contest mode is disabled. In FT8 and FT4, where the QSO is filled in and logged from the FT8 panel, the whole QSO data row appears only with this option on.

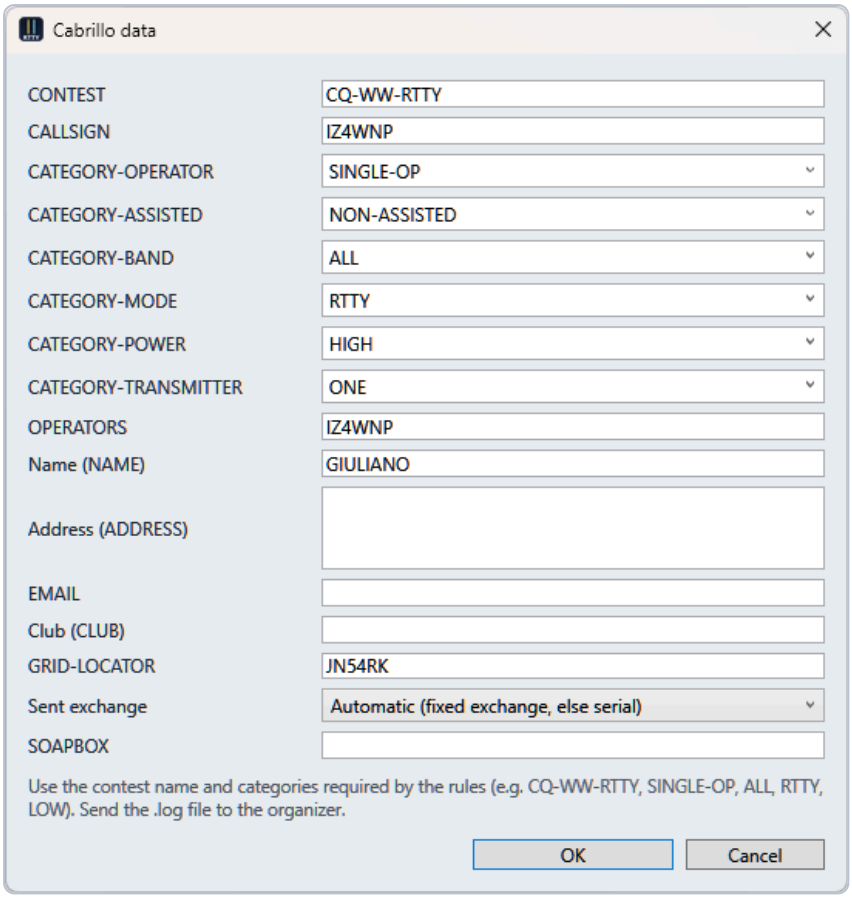
Tick **Contest** in the QSO data row and type the contest name (e.g. CQ-WW-RTTY). Before each contest press **New contest**: the serial number restarts from **001** and the dupe list is cleared.

- The number to send is clearly shown (e.g. **NR 012 · 11 QSOs**) and is sent with **<NR>** in macros (e.g. F8 Exchange). It increases only when the QSO is logged (summary confirmed, macro with <LOG>, FT8 logging): a cancelled summary does not use up numbers.
- In the log the number sent goes into STX and the contest name into CONTEST_ID. If the contest uses only the serial number, leave «Contest exchange» empty in the station settings.
- **DUPE**: if the call has already been worked in the contest on the same band and mode, the Call field turns red; hovering shows when and with which number.
- In CW cut numbers can be used (0 = T, 9 = N): Settings > Transmit > CW.
- Serial number and list are kept even if the program is closed during the contest.
- **Contest files**: with contest mode on, after every QSO (and every correction in the log) RttyStation rewrites an **ADIF** file and a **Cabrillo** file named with the contest, start date and callsign, e.g. `CQ-WW-RTTY_2026-09-26_IZ4WNP.adi` and `.log`, in the `Contest` data folder. They hold only the contest QSOs since the last

New contest: the Cabrillo is ready to send to the organizer, the ADIF to import into another log, with no export. The **Contest files** button opens the folder. In Settings › Station you choose which files to create, the folder and the **Cabrillo data** (categories, name, address, club) for the header.



Contest mode (dark theme): Contest box with the contest name, serial number, New contest, Contest files; recent QSOs show only the contest.



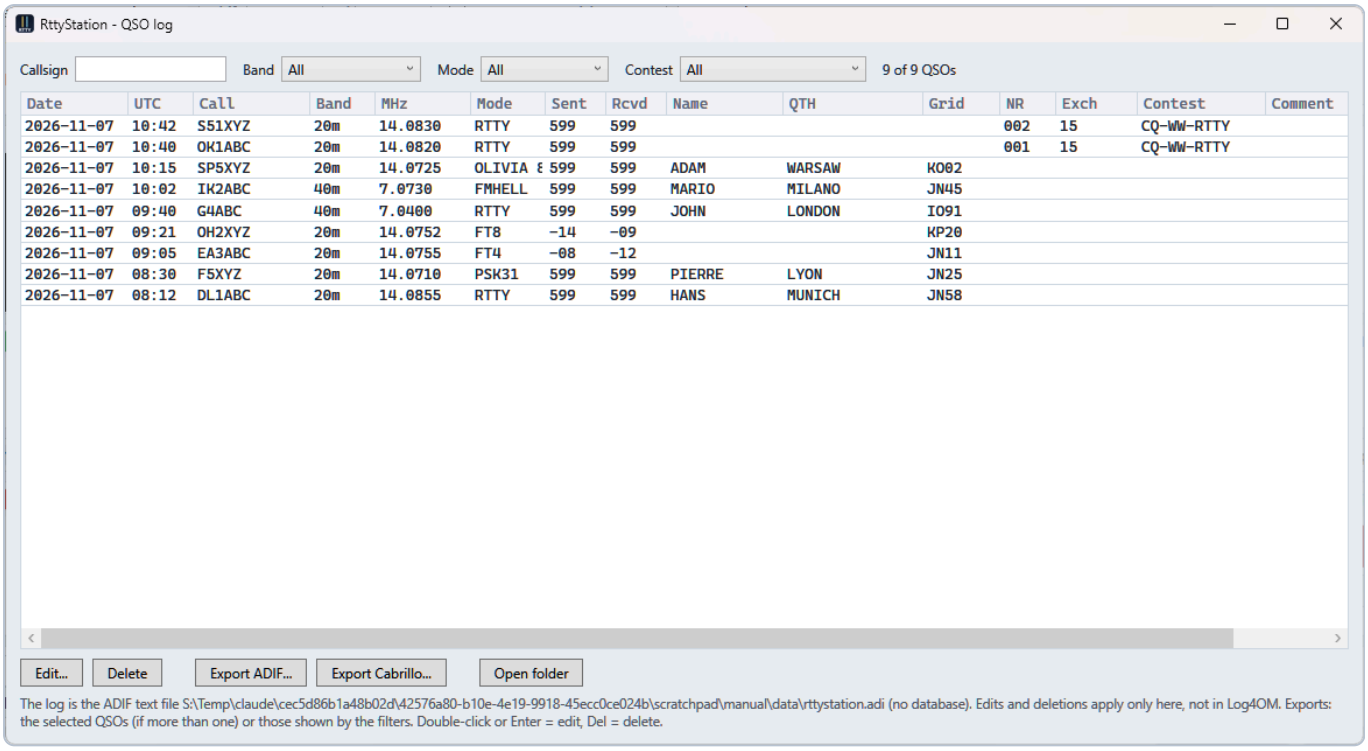
Cabrillo data (Settings › Station).

20. QSO log

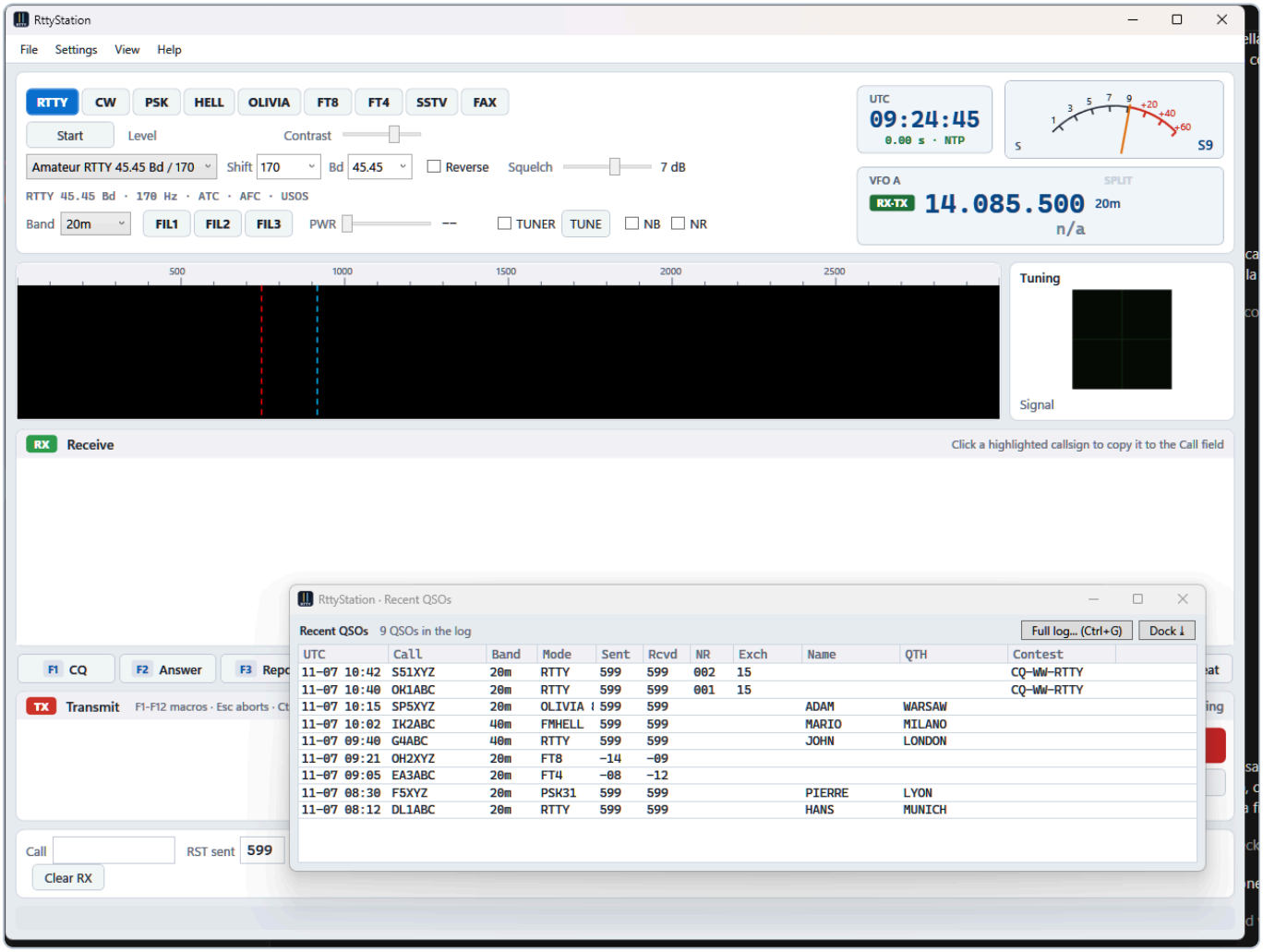
Menu **File > QSO log** (Ctrl+G): all QSOs logged with RttyStation, newest first. The log is a plain ADIF text file (rttystation.adi in the data folder), with no database: any logging program can open it.

Recent QSOs: the panel with the latest QSOs (during a contest only the contest ones) is shown or hidden from **View** or **Settings › Log**. It can stay docked at the bottom of the main window or, with **Undock**, in a separate window you can place and size anywhere (also on another screen); **Dock** puts it back in the main window. Position and size are remembered.

- **Filters**: callsign (also partial), band, mode, contest; the counter shows how many QSOs are visible. Click a column header to sort.
- **Edit** (double-click or Enter) with the QSO summary; **Delete** (Del) with confirmation. They apply only to the RttyStation log, not to Log4OM. Before each change the previous version is kept (rttystation.adi.bak).
- **Export ADIF**: the selected QSOs (if more than one) or those shown by the filters.
- **Export Cabrillo**: to submit a contest log. Filter by contest, press the button and fill in contest name, categories (operator, band, mode, power...), name and address: they are remembered. The sent exchange can be the serial number, the fixed exchange (e.g. zone) or both.
- Fields RttyStation does not use (e.g. from imported files) are kept unchanged.



The QSO log (File › QSO log, Ctrl+G).



Recent QSOs undocked into a separate window; the "Dock" button puts them back in the main window.

21. S-meter and radio controls

The S-meter can be **analog** (needle) or a more compact **digital bar**: choose it in View › S-meter or click the meter. In the light theme, clock, VFO and S-meter have a light background with dark digits. Above the frequency, **VFO A** or **VFO B** appears when the radio reports which VFO is in use (through Hamlib, for radios that allow it); the IC-7300 over CI-V does not report it, so the display just shows "VFO".

Next to the frequency is the analog **S-meter** (read from the radio five times per second; when transmitting it shows output power). Below the mode selector, the bar of **radio controls** via CI-V:

- **Band**: the radio returns to the last frequency used on that band in the current mode (the first time to the usual one: 14.080 RTTY, 14.025 CW, 14.070 PSK, 14.074 FT8).
- **Band plan** (Settings > Radio): when changing mode or band the radio moves to the part of the band assigned to the mode by the IARU Region 1 band plan (CW in the CW segment, RTTY and PSK in the narrow-band digimode segment, FT8/FT4 on the WSJT-X frequencies), unless it is already there; optionally it also sets the radio mode (CW, RTTY for FSK, LSB-D for AFSK or USB-D with Reverse, USB-D for PSK and FT8/FT4). If the last frequency used is inside the segment, the radio goes back there. Receive-only RTTY types (weather, NAVTEX) do not move the radio; 4 m is not included.
- **FIL1-FIL3**: radio filter, also in USB-D/LSB-D. **PWR**: RF power 0-100 %.
- **TUNER** on or off and **TUNE** to start tuning; **NB** and **NR**. Note: NR can alter weak digital signals.
- The controls also follow changes made on the radio. Hide them from the View menu. The CAT port must be configured (Settings > Radio); readings pause during CW transmission.

22. Other RTTY types and NAVTEX

With the selector on RTTY, the **Type** menu in the command bar chooses the teleprinter to receive; **Shift** and **Bd** next to it can be chosen or typed on the fly (Enter to apply).

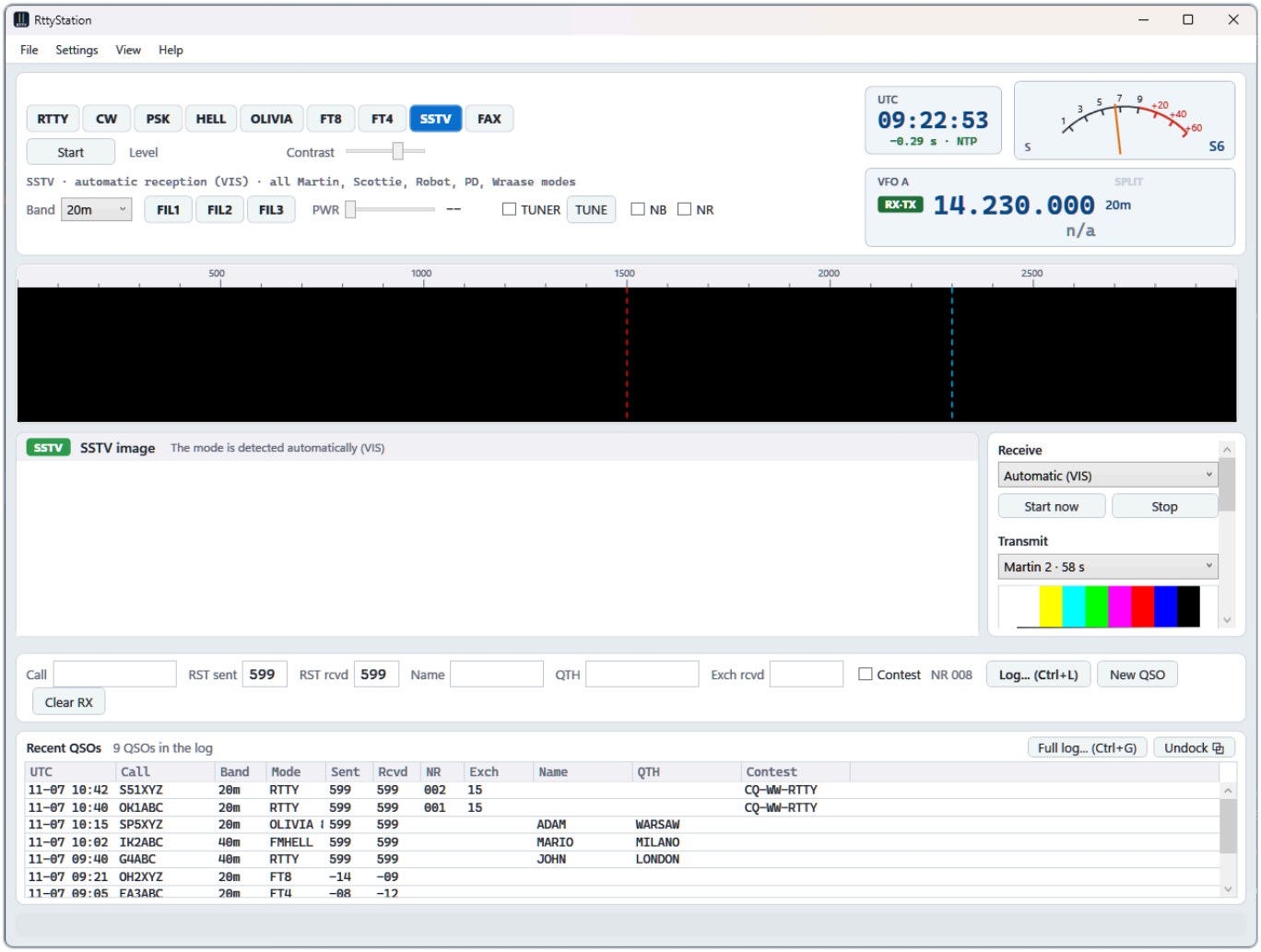
- **Amateur RTTY** 45.45 / 50 / 75 Bd, 170 Hz shift: receive and transmit.
- **DWD weather** 50 Bd / 450 Hz (e.g. 147.3 kHz, 4583, 7646, 10100.8 kHz) and **utility** 50 or 75 Bd / 850 Hz: receive only. If the text makes no sense, try **Reverse**.
- **NAVTEX / SITOR-B** 100 Bd, 170 Hz (518 and 490 kHz, 4209.5 kHz): CCIR 476 decoder with error correction; polarity is found automatically. Radio in USB, click the middle of the trace. Unreadable characters appear as «_».
- **Custom**: any shift and speed, receive only. Typing values that match a known type selects that type automatically.
- Transmission is possible only with the amateur types.

23. SSTV

With the selector on **SSTV** the receive panel shows the image, drawn line by line. Modes: Martin 1 and 2, Scottie 1, 2 and DX, Robot 36 and 72, PD 50, 90, 120, 160, 180, 240 and 290, Wraase SC2-180 (timings from N7CXI's specifications).

- **Automatic reception**: the image starts from the VIS code, which also gives the mode and the tuning error (corrected automatically). Lines follow the sync pulses: the clock difference between sound cards is measured and corrected, so the image comes out straight.
- **Manual start**: if the image has already begun, choose the mode and press **Start now**: reception starts from the next confirmed sync pulse.

- **Transmitting**: choose the mode (with its duration), an image (fills the frame, cropped in the centre) or the **test card** with callsign, QTH and locator, and the **text on the image** with macro variables (e.g. <CALL> DE <MYCALL> <RST>). **Send image** uses the audio output, AFSK level and PTT from the settings; Esc or the button stops it. The transmit time limit must exceed the mode duration (PD 290 lasts almost 5 minutes).
- **SSTV frequencies**: image centres of activity of the IARU Region 1 band plan, 3735, 7165, 14230, 21340 and 28680 kHz; choosing one tunes the radio in LSB-D (below 10 MHz) or USB-D. With the band plan enabled, switching to SSTV also moves the radio there.
- Received images are saved automatically in **Pictures\RttyStation\SSTV** (PNG with UTC date and time); **Save** and **Open folder** are in the panel. SSTV QSOs are logged as usual (Ctrl+L, mode SSTV).



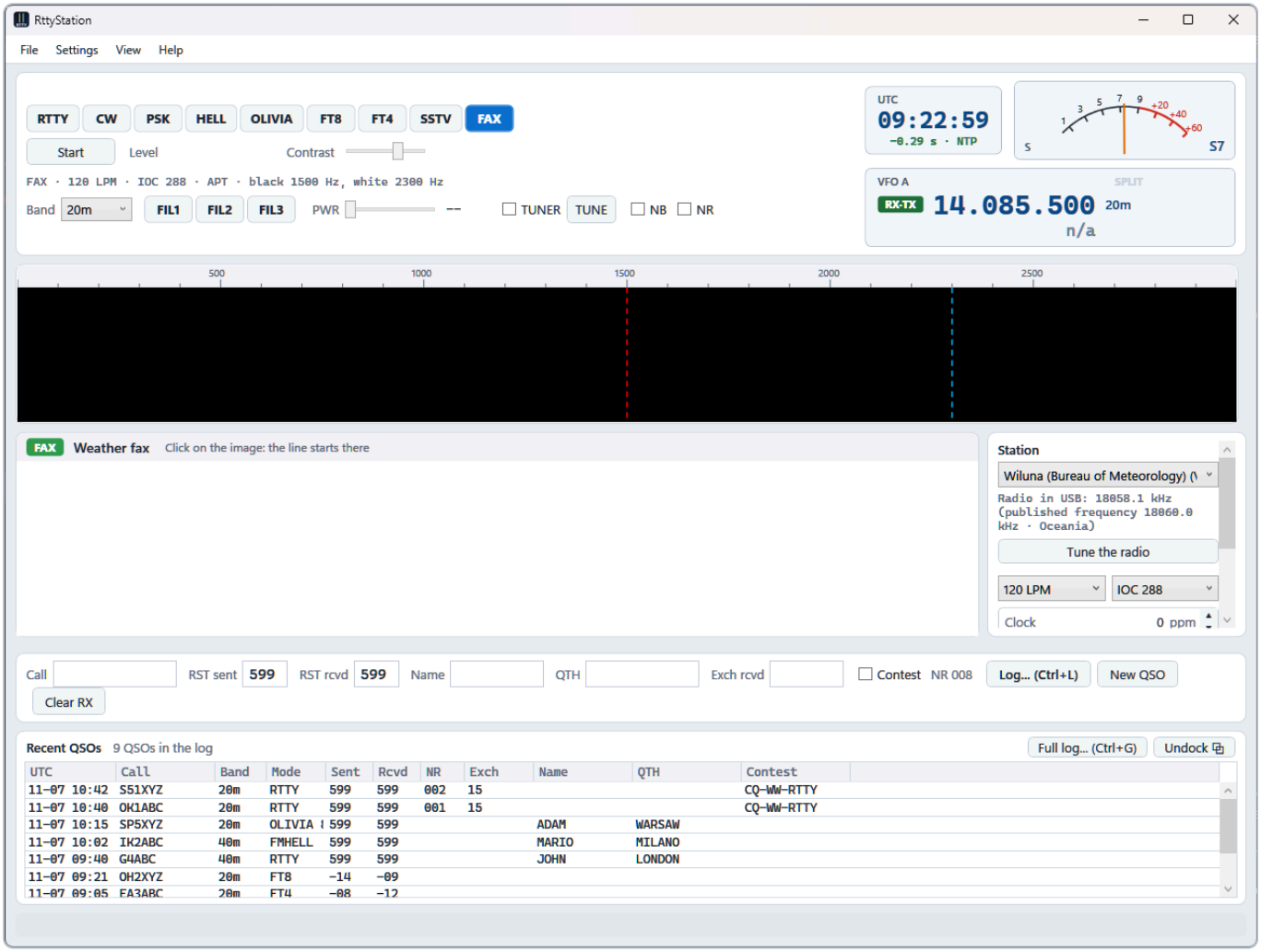
SSTV: received picture on the left, receive and transmit on the right.

24. Weather fax

With the selector on **FAX** you receive HF weather charts (radiofacsimile): 120 lines per minute, IOC 576 (1810-pixel lines), black 1500 Hz and white 2300 Hz.

- **Station**: stations from the NOAA list (DWD Pinneberg 3855, 7880, 13882.5 kHz; Northwood 2618.5, 4610, 8040, 11086.5 kHz; Athens, United States, Japan, Australia...). The panel shows the frequency to set in USB, 1.9 kHz below the published one; **Tune the radio** sets it via CI-V. Schedules change: check the current list.
- **Automatic (APT)**: the chart starts with the start tone (300 Hz), aligns with the 30 s phasing signal and ends with the stop tone (450 Hz). A 675 Hz tone selects IOC 288 automatically.

- **Start now** starts immediately, without start tone: a **click on the image** marks where the line starts (also for lines already received).
- **Clock**: if the chart is slanted, the sound card does not sample at exactly 48 kHz; change the ppm value until vertical lines are straight and leave it set.
- Charts are saved automatically in **Pictures\RttyStation\FAX**.



Weather fax: station choice, parameters and automatic start (APT).

25. Other radios with Hamlib

Besides direct Icom CI-V, RttyStation controls radios of almost every brand (Yaesu, Kenwood, Elecraft, Icom...) through **Hamlib**, the library also used by WSJT-X. Hamlib's **rigctld** program is included in the installation (**hamlib** folder); if Hamlib is already on the PC, installed separately or with WSJT-X, setup does not add it and RttyStation uses that one. **Browse** in Settings › Radio selects a different rigctld.

- **Hamlib model**: in the **Radio** list choose the model, for example "Yaesu FT-991 (Hamlib)" (typing the first letters jumps to it). Set CAT port and baud rate as in the radio menu (FT-991A: CAT RATE, usually 38400). Leave the **serial port parameters** (data bits, stop bits, handshake, DTR and RTS) on Default unless the radio is set differently. RttyStation starts rigctld by itself and closes it on exit.
- **Hamlib NET rigctl**: to control the radio together with another program that has already started rigctld, such as Log4OM connected to the radio through Hamlib. Enter the **rigctld server**, usually 127.0.0.1:4532; the program that started rigctld must stay open.

- **PTT**: CAT is the simplest. With DTR or RTS on the CAT port itself, rigctld drives the line; FSK and CW on DTR/RTS need another port.
- **Test CAT** and **Test PTT** work as with CI-V; if the radio does not answer, the message gives the reason (rigctld not found, port busy, server not listening...).
- The radio bar enables only the controls Hamlib supports for that model (S-meter, power, NB, NR, tuner, CW keyer). FIL1-FIL3 filters are only for direct CI-V: with Hamlib choose the filter on the radio.
- With the IC-7300, **Icom CI-V direct** remains recommended, as it offers every function.

26. Split operation in FT8/FT4

As in WSJT-X, **Settings › Radio › Split** chooses how to transmit when the FT8/FT4 TX frequency is outside the 1500-2000 Hz range. With split, the transmitted audio stays in that range, where the transmit filter is flat and audio harmonics fall outside the passband, while the on-air signal stays exactly where you put it.

- **None**: audio is sent at the chosen frequency, the rig is not changed.
- **Rig**: transmit on the other VFO, offset in 500 Hz steps, with the rig's split on (the display shows SPLIT and the TX VFO). The rig must accept the other VFO's frequency (the IC-7300 does); otherwise use Fake It.
- **Fake It**: for rigs without split; the VFO moves just before PTT and returns to the receive frequency as soon as the transmission ends.
- Example: TX at 2600 Hz → audio at 1600 Hz and the rig transmitting 1 kHz higher. The QSO is logged with the true signal frequency (receive + TX frequency).
- Split applies only to FT8/FT4 and only with a CAT-controlled rig; during a split transmission the transmitted signal is not shown in the waterfall.

27. Fox/Hound DXpeditions (Hound mode)

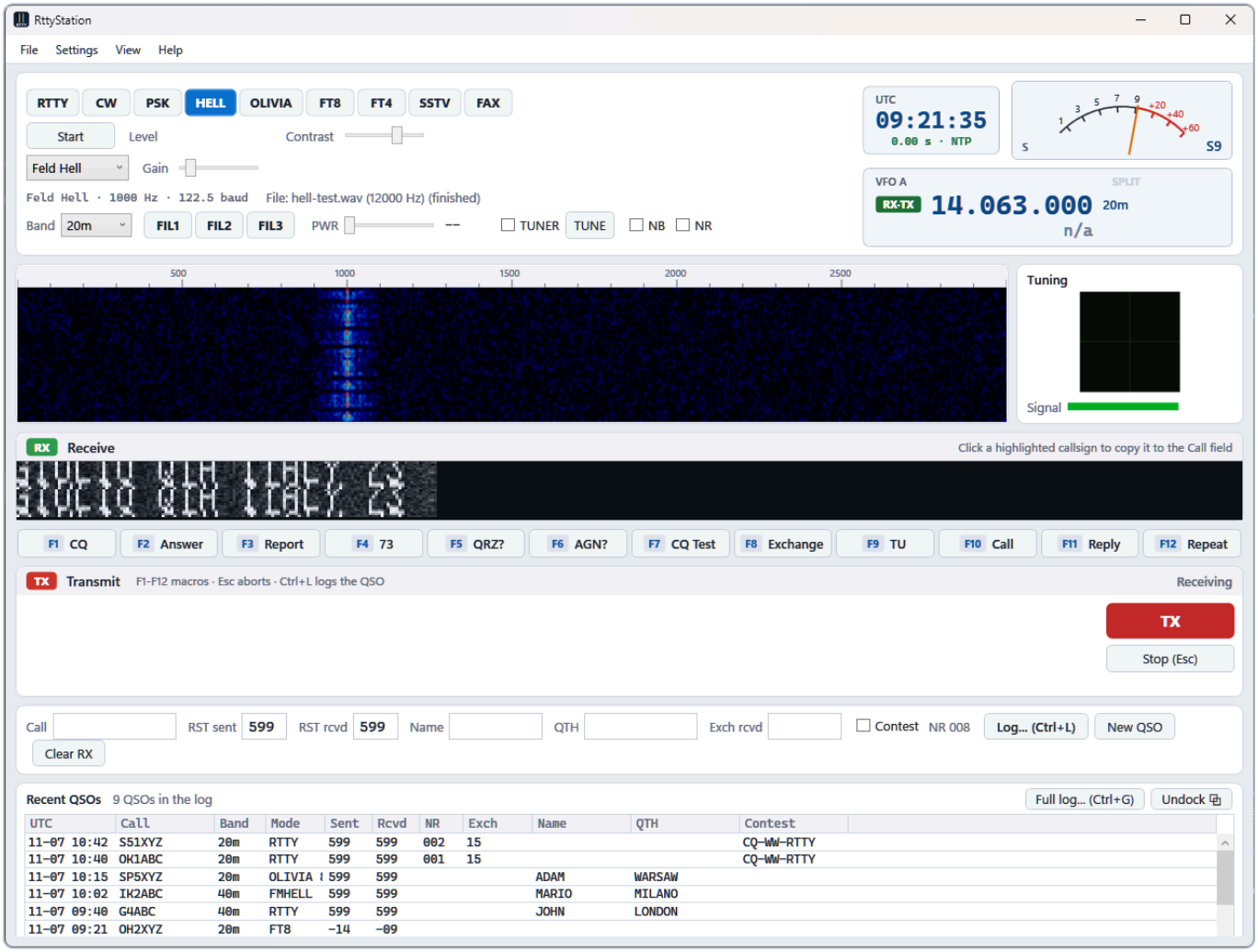
Many DXpeditions operate FT8 with the WSJT-X **Fox/Hound** method: the DXpedition (Fox) transmits between 200 and 1000 Hz in the first period, often to several stations at once; callers (Hounds) transmit above 1000 Hz in the second period. To work it, tick **Hound (Fox/Hound)** in the FT8 panel.

- With Hound on: second transmit period, auto sequence always on, no replies to CQ, Tx frequency above 1000 Hz (if lower, a random one between 1100 and 2500 Hz is chosen) and not moved to the Fox on double-click. Only **Tx1** (call with grid) and **Tx3** (R+report) are used.
- Double-click the Fox's CQ and calling starts. When its report arrives, Tx3 follows automatically; when its **RR73** arrives, the QSO is logged (summary or automatic logging, as in FT8) and transmission stops.
- RttyStation decodes the Fox's multi-part messages such as `K1ABC RR73; IZ4WNP <3Y0J> -08` (RR73 to one station and a report to another): both the RR73 and the report meant for you are recognised.
- When calling above 2000 Hz, **split** is advisable (Settings › Radio, chapter 26), as in WSJT-X.
- After the QSO, untick Hound to return to normal FT8. SuperFox mode (WSJT-X 2.7 and later) is not supported yet.

28. Hellschreiber (Feld Hell)

Feld Hellschreiber is a "facsimile" teleprinter: each character is drawn column by column by keying the carrier on and off, and the receiving station sees the text appear as a printed strip. There is no decoding: you read the text yourself, which is why Hell stays readable even with noise and fading. Choose **HELL** among the modes.

- **Variants** (menu next to the modes): **Feld Hell**, the standard (122.5 baud, 2.5 characters per second, about 350 Hz wide); **Slow Hell**, 8 times slower, for very weak signals; **Hell X5** and **Hell X9**, 5 and 9 times faster, wider. Both stations must use the same variant.
- **Tuning**: click the signal on the waterfall (red line). The transmit carrier uses the same frequency. The radio goes to USB-D, in the narrow-band digital segment.
- **Receiving**: the receive window becomes a dark strip on which the text appears, line after line. Each column is printed twice, one above the other: if letters look cut at the top or bottom, read the band where they appear whole (this is normal in Hell). If the text is slanted, one station's sound card is not running exactly at its rate. **Gain** brightens weak signals; the level adapts by itself anyway.
- **Transmitting**: as in PSK, type in the TX box or use the macros (those enabled for Hell in Settings › Macros). Lower case becomes upper case and accented letters lose their accent.
- QSOs are logged with mode HELL and submode FMHELL, SLOWHELL, HELLX5 or HELLX9. FSK Hell and Hell 80 are not available yet.

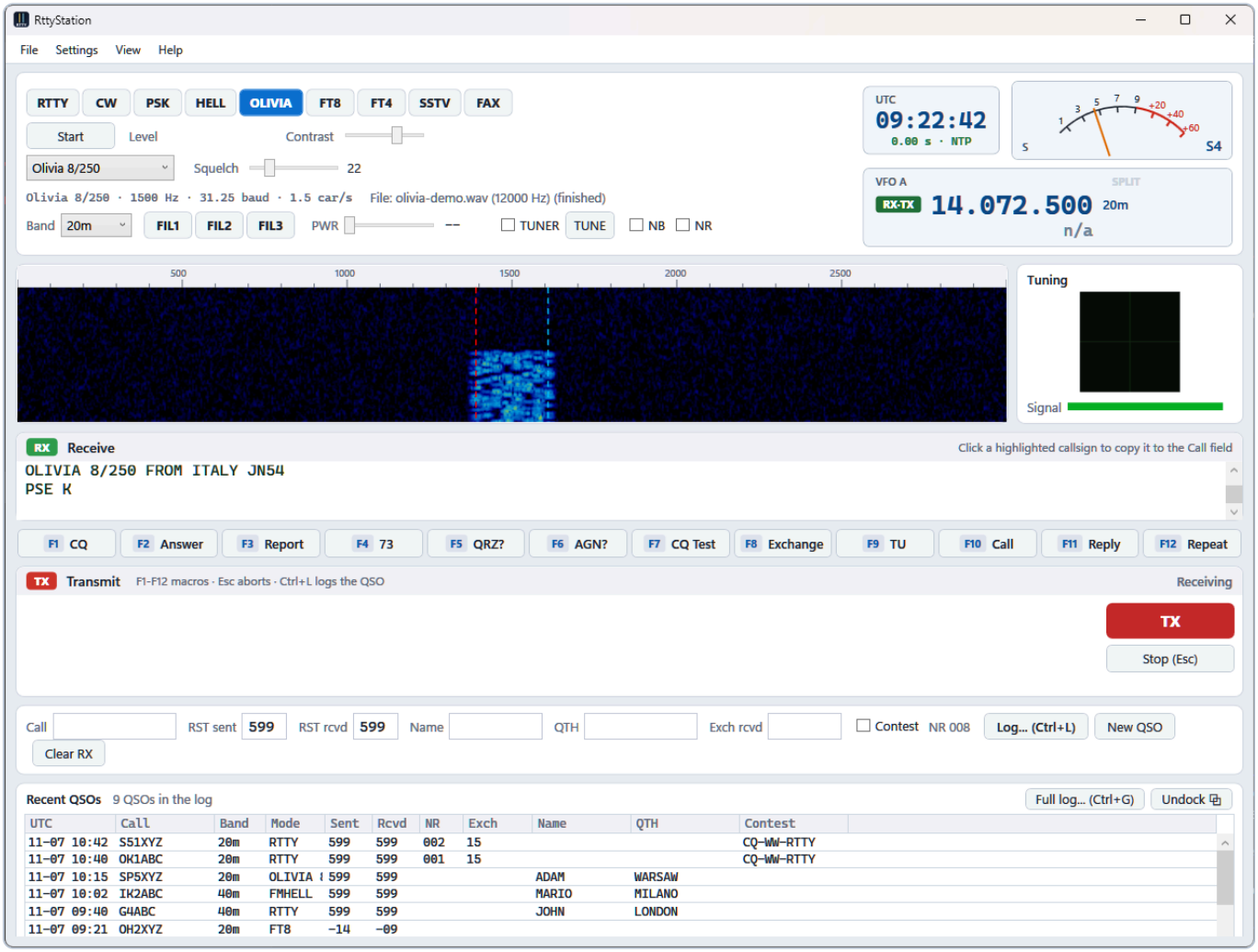


Feld Hell: the received text appears as a printed strip.

29. Olivia and Contestia

Olivia (by Pawel Jalocha SP9VRC) and its variant **Contestia** are MFSK modes with strong error correction: they can be read even when the signal is below the noise and with deep fading, at the cost of low speed. Choose **OLIVIA** among the modes and the variant in the menu next to it.

- **Variants** "tones/bandwidth": **Olivia 8/250** is the most used on HF; more tones = more robust and slower, more bandwidth = faster. Contestia is about twice as fast as Olivia with the same bandwidth, a bit less robust and upper case only. Both stations must use the same variant (fldigi and other programs use the same parameters).
- **Tuning**: click the **centre** of the signal on the waterfall; the two lines mark the lowest and highest tone. The receiver locks onto the block timing by itself and corrects up to one tone of tuning error.
- **Receiving**: text arrives in blocks (in 8/250, a block of 3 characters about every 2 seconds) with one block of delay. **Squelch** (0-100, default 22) hides blocks that are too weak: noise alone produces no characters; lower it for marginal signals, raise it if random characters appear. The Signal bar and status line show the quality.
- **Transmitting**: as in PSK, with the TX box and macros (those enabled for Olivia in Settings › Macros). Type a little ahead: text is sent in blocks.
- QSOs are logged with mode OLIVIA (submode, e.g. OLIVIA 8/250) or CONTESTI for Contestia.

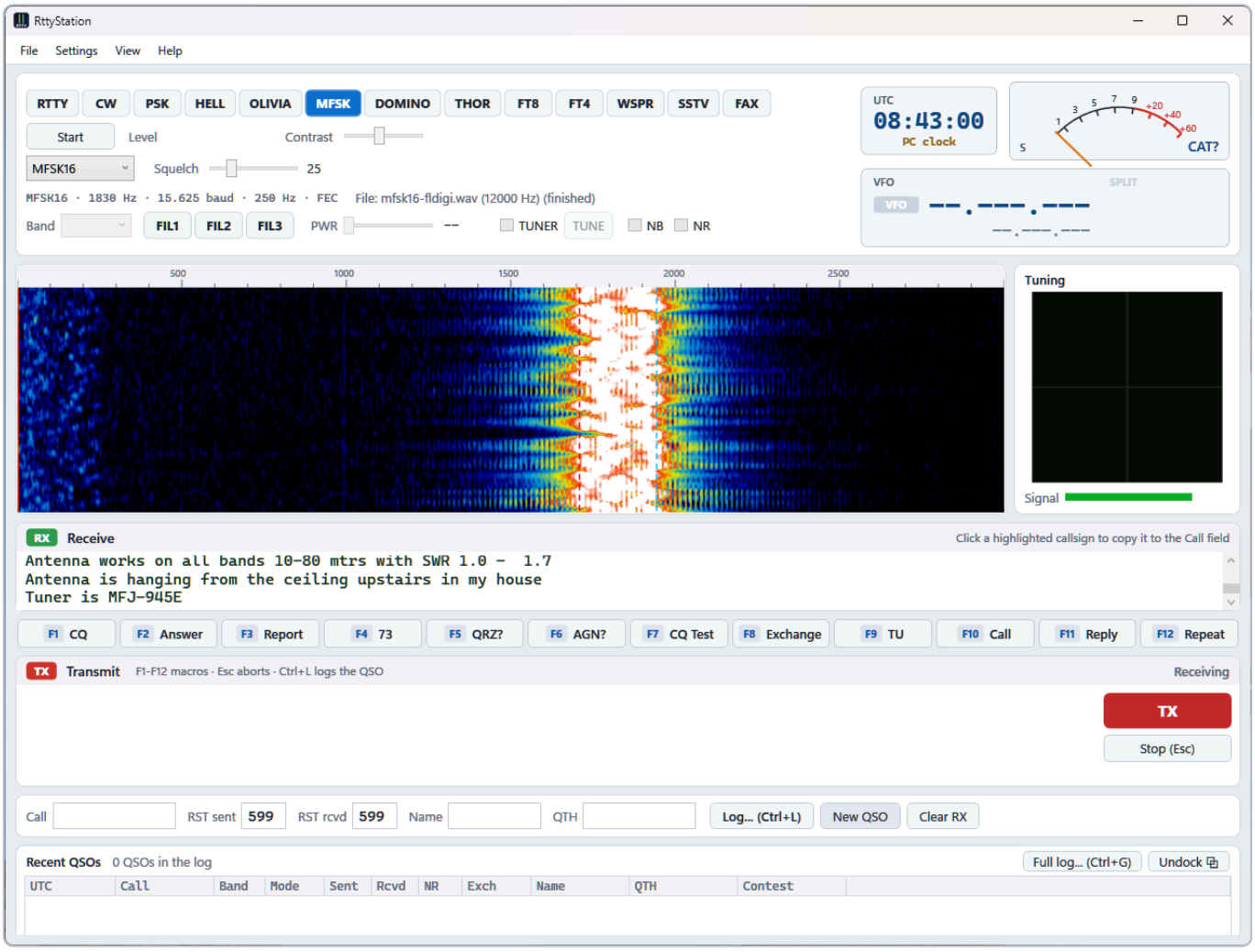


Olivia 8/250: the two lines on the waterfall mark the lowest and highest tone.

30. MFSK

MFSK (by IZ8BLY and ZL1BPU) transmits with 16 tones and strong error correction (convolutional code and interleaver): it copes well with noise, fading and impulse noise and is compatible with fldigi. Choose **MFSK** among the modes and the variant in the menu next to it.

- **Variants**: **MFSK16**, the standard (15.6 baud, about 316 Hz bandwidth, about 42 words per minute); **MFSK32**, double speed and 500 Hz; **MFSK64**, four times faster and 1 kHz, for good signals. Both stations must use the same variant.
- **Tuning**: click the **centre** of the signal on the waterfall; the two lines mark the lowest and highest tone. The receiver locks to the symbol timing by itself and corrects up to two tones of mistuning (AFC).
- **Receiving**: text arrives with about 3 seconds of delay in MFSK16 (the interleaver time). **Squelch** (0-100, default 25) blocks random characters on noise; the Signal bar and the status line show quality and frequency correction.
- **Transmitting**: as in PSK, with the TX box and macros (those enabled for MFSK in Settings › Macros). A few invisible filler characters are sent before the text, so the receiving station has time to lock.
- QSOs are logged with mode MFSK and submode MFSK16, MFSK32 or MFSK64.



MFSK16: fldigi test recording decoded; the two lines mark the lowest and highest tone.

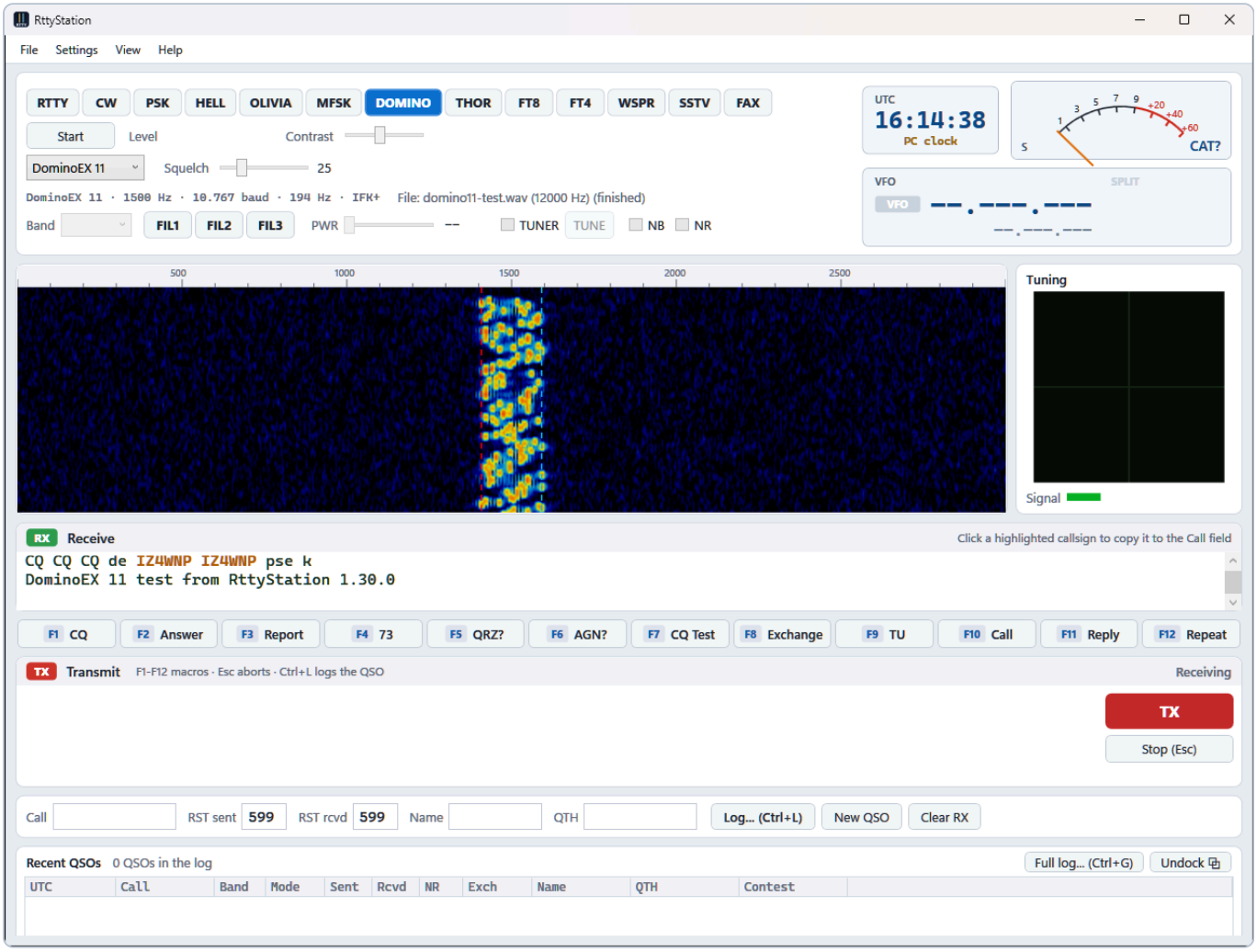
31. DominoEX

DominoEX (by ZL1BPU) uses 18 tones with **IFK+** modulation: each character lies in the *difference* between one tone and the next, so mistuning or slow drift do no harm, and the signal copes well with fading and multipath (excellent for NVIS on 80 and 40 m). It has no error correction: it is fast and smooth. It is compatible with fldigi. Choose **DOMINO** among the modes and the speed in the menu next to it.

- **Speeds**: **DominoEX 4, 5 and 8** (slow, double tone spacing, for weak signals), **DominoEX 11** (the most used, about 260 Hz wide), **DominoEX 16 and 22** (fast, for good signals). Both stations must use the same

speed.

- **Tuning**: click the **centre** of the signal; the two lines mark the lowest and highest tone. The receiver locks to the symbol timing and frequency by itself (up to two tones).
- **Identifier**: when the keyboard is idle DominoEX does not go silent but sends a secondary text (usually the callsign). RttyStation sends your callsign and shows the received one in the status line (**ID:**), without mixing it with the text.
- **Squelch** (0-100, default 25) blocks random characters on noise. **Transmitting** as in PSK, with the TX box and the macros enabled for this mode (Settings › Macros).
- QSOs are logged with mode DOMINO and submode DOMINOEX.



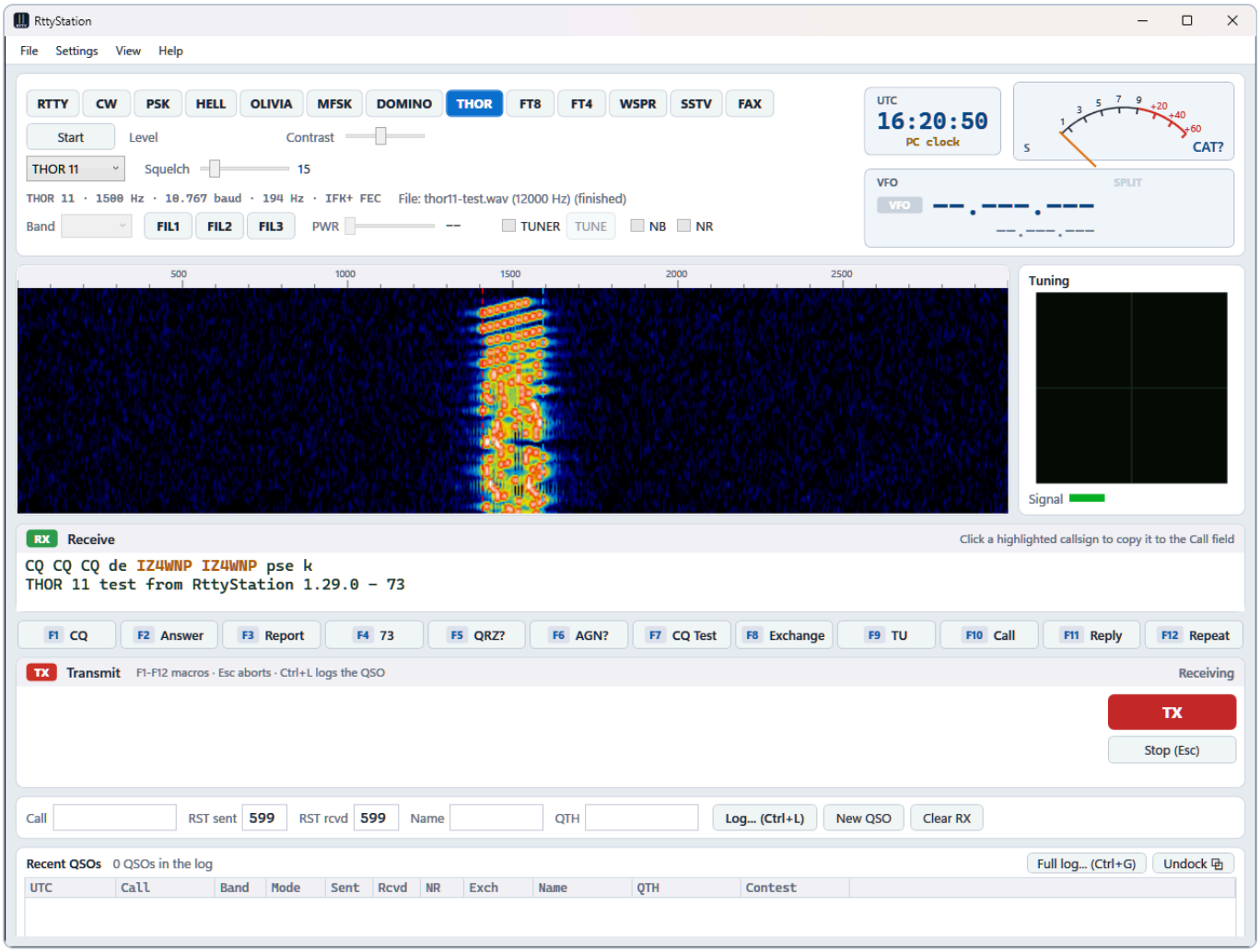
DominoEX 11: text received from a test recording; the two lines mark the lowest and highest tone.

32. THOR

THOR (by W1HKJ) combines DominoEX's 18-tone IFK+ modulation, tolerant of mistuning and drift, with MFSK16's error correction (convolutional code and interleaver): it is the most robust of these modes against noise, fading and interference, at the cost of a few seconds of delay. It is compatible with fldigi. Choose **THOR** among the modes and the speed in the menu next to it.

- **Speeds**: **THOR 4, 5 and 8** (slow, for very weak signals), **THOR 11** (default, for calling, suited to NVIS), **THOR 16 and 22** (fast). Both stations must use the same speed.
- **Tuning**: click the **centre** of the signal; the two lines mark the lowest and highest tone. Timing and frequency lock by themselves.

- **Receiving**: text arrives with a few seconds of delay (the interleaver time: about 3 s in THOR 11, more at the slow speeds). Default **squelch** 15, lower than in the other modes, because error correction reads even below the noise.
- **Transmitting**: as in PSK, with the TX box and the macros enabled for this mode (Settings › Macros). A few invisible filler characters are sent before the text. THOR's secondary identifier (text sent while the keyboard is idle) is not supported yet: invisible characters are sent while idle.
- QSOs are logged with mode THOR.



THOR 11: the text arrives a few seconds late, the time taken by the interleaver.

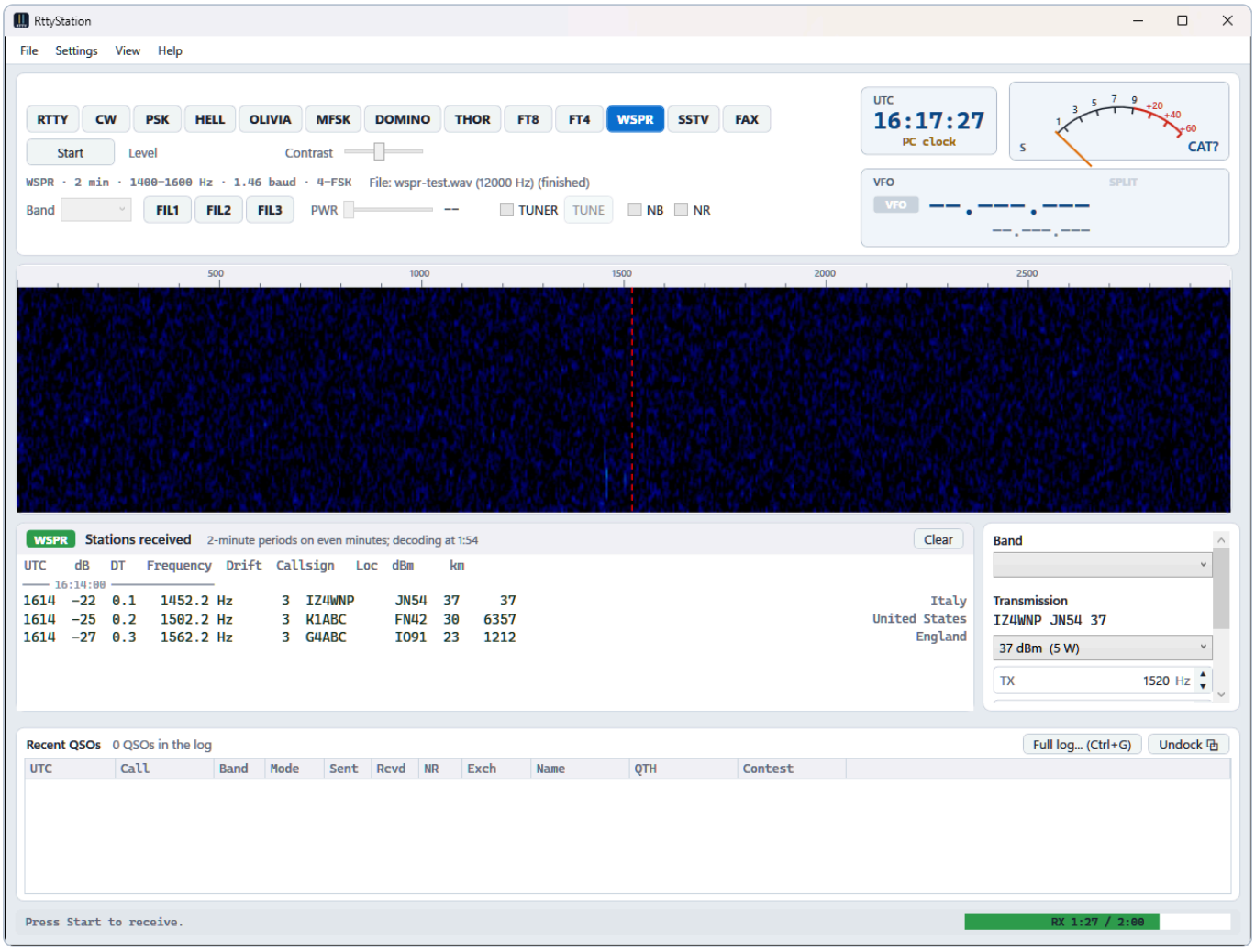
33. WSPR

WSPR (by K1JT, "whisper") is a low-power beacon mode for studying propagation: each station transmits only its callsign, locator and power, in a 110-second message that can be decoded down to about **-30 dB** signal-to-noise ratio. It is compatible with WSJT-X. Choose **WSPR** among the modes.

- **Timing**: everything happens in 2-minute periods starting on **even minutes**; the signal starts 1 second after the start and decoding takes place at 1:54. The clock must be correct to within about one second (see the chapter on time): the bar at the bottom right shows where you are in the period.
- **Band**: the menu on the right tunes the radio to the band's WSPR frequency (VFO in USB-D). All stations sit in a 200 Hz window, between 1400 and 1600 Hz audio.
- **Receiving**: just press **Start**. After each period the list shows the stations received: time, SNR, DT (time offset), frequency (VFO plus audio, if the radio is connected), drift in Hz, callsign, locator, power in dBm,

distance from you and country. Each station is also saved to the file **wspr-spots.txt** in the data folder.

- **Transmitting**: the message (callsign and 4-character locator from Settings › Station) is shown on the right; choose the stated **power** (what actually leaves the antenna), the **TX frequency** (1400-1600 Hz, also with a click on the waterfall in that range; the dashed line marks it) and the **percentage** of periods in which to transmit (20% is customary: the others are for listening).
- **Enable transmission** transmits at random in the stated share of periods, never two in a row; **TX next** transmits once in the following period; **Stop** (or Esc) stops everything. Periods in which you transmit are not decoded.
- Plain callsigns are supported (type 1 message, such as IZ4WNP): callsigns with a prefix or suffix (e.g. IZ4WNP/P) and 6-character locators can be neither transmitted nor received.
- WSPR makes no QSOs: there is nothing to log. Uploading spots to the WSPRnet website is not provided.



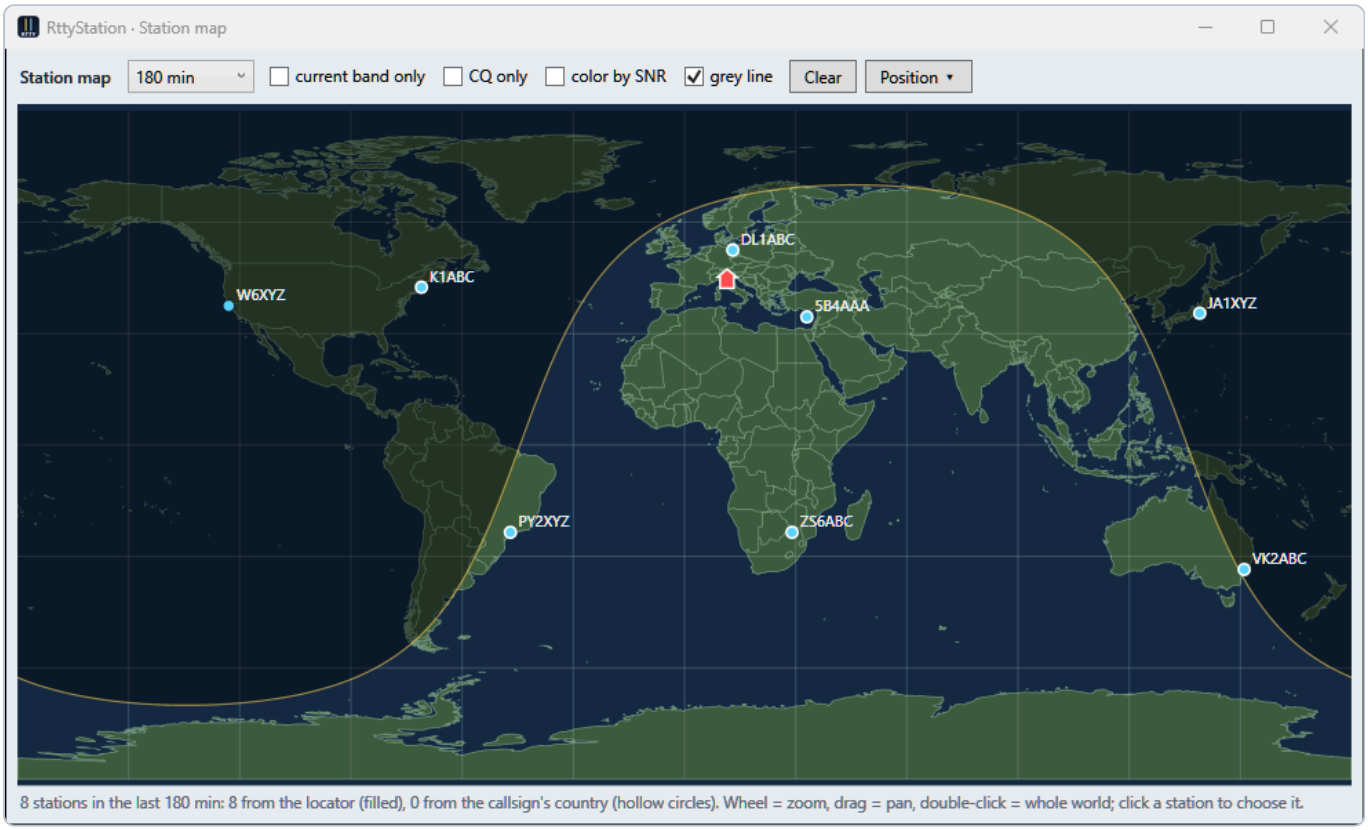
WSPR: stations received in the last period (test signals at -22, -25 and -27 dB) and transmit controls on the right; the bar at the bottom shows the position in the 2-minute period.

34. Station map

View › Station map (or **Ctrl+M**) shows your station (the red house, from the locator in Settings › Station) and the stations heard on a world map. The map is built into the program (Natural Earth borders) and does not use the internet.

- **FT8, FT4 and WSPR**: stations that send their locator appear at their exact position (filled dots; white border for stations calling CQ).

- **Text modes** (RTTY, PSK, CW, Olivia, MFSK, DominoEX, THOR): the callsigns recognized in the received text appear at the centre of their country (cty.dat list), with a hollow circle because the position is approximate. If the same station was also heard in FT8 with its locator, the exact position is kept.
- **Filters**: stations of the last 15-180 minutes, **current band only** (needs the radio connected via CAT), **CQ only**. **Color by SNR**: red for weak signals, green for strong ones; otherwise the color fades with time. **Grey line**: night zone and day/night boundary, updated in real time.
- **Mouse**: hovering over a station shows callsign, country, distance, antenna bearing (azimuth), locator, SNR, mode, band and time. The wheel zooms around the pointer, dragging pans the map, a double-click goes back to the whole world. A click on a station in FT8/FT4 selects it like a double-click in the list; in the other modes it copies the callsign into the Call field.
- **Position**: you choose where to keep the map: in a separate window (also on another monitor) or docked **on the right**, **on the left** or **at the bottom** of the main window, with the size set by the splitter. Position, size and choices are remembered.



The map in a separate window: FT8 test stations on several continents, your own station (red house) and the grey line.

License and credits

- RttyStation © 2026 IZ4WNP. Free software for private, non-commercial use, provided "as is", without warranty (see the license agreement shown during setup).
- FT8/FT4 engine derived from **ft8_lib** by Kārlis Goba (MIT license).
- **Hamlib** (rigctld and libraries) is distributed under the LGPL/GPL license; the source code is available on request and at hamlib.github.io.
- **cty.dat** country list by AD1C (country-files.com). Audio with **NAudio**; setup built with **Inno Setup**.
- The full licenses of the third-party components are in `THIRD-PARTY-NOTICES.txt` and in the program's `docs` folder.

Web site and updates: https://www.iz4wnp.it