HAM Radio Control — User guide

Alessandro IA5KRO · version 1.1

HAM Radio Control is a Windows program that controls **Icom IC-7300, IC-7300MK2, IC-7610 and IC-705** and **Yaesu FT-710, FT-991 and FT-991A** radios over the USB cable or over the network (LAN or Internet). It includes digital decoders, voice transcription and translation, its own digital mode for chatting over the air (MesNet), broadcast and number station listings. The program is available in Italian, English, French, German and Spanish. The software is developed by Alessandro IA5KRO. This guide covers **version 1.1**.

What it is and what you need

A USB cable between the radio and the PC is all you need: radio commands and audio travel on the same cable, with no external interfaces or other programs.

Item	Requirement
System	Windows 10 or 11, 64-bit, with Microsoft Edge (already installed)
Radio	Icom IC-7300, IC-7300MK2, IC-7610, IC-705 or Yaesu FT-710, FT-991, FT-991A
Drivers	The radio's USB drivers (COM port and «USB Audio CODEC» sound card)
Internet	Needed for maps, translation, «browser» transcription, broadcast and number station schedules
Disk space	About 12 MB for the program; optional 60–570 MB for local speech recognition

The program handles the serial port and audio itself, so the radio is read continuously and the window never freezes. The title at the top shows the selected radio, for example «FT-991A by IA5KRO».

Installation and first start

There is no installer: extract the zip and run `HAMRadioControl.exe`.

1. Extract the zip to a fixed folder, for example `Documents\HAMRadioControl`.

2. Double-click `HAMRadioControl.exe`. If Windows shows «Windows protected your PC», choose «More info» and then «Run anyway»: the program is not signed.
3. The application window opens. When asked, allow microphone access: it is used to read the radio's audio.
4. Choose the language with the flags at the top, then open **Settings** (gear icon) and choose the **Radio model**.
5. To update, close the program and replace only the `.exe` file. Settings and data stay in `%LOCALAPPDATA%\HAMRadioControl-IA5KRO`.

When you close the window the program exits by itself within a minute. If Windows says the folder is in use, end `HAMRadioControl.exe` from Task Manager.

Safe mode. If a start does not complete (freeze or PC restart), at the next start the program opens in the normal Edge or Chrome instead of its own window. To force it use `HAMRadioControl.exe --sicura`; to go back to the dedicated window delete `modalita-sicura.txt` from the data folder.

Antivirus. Some antivirus programs with «heuristic» checks may flag the program by mistake because it is not signed. It is a false positive: you can add the program folder to the antivirus exceptions.

Supported radios

In **Settings › Radio model** you choose the radio: speed and address are set automatically and the settings to make on the radio appear below. The program's functions are the same for all radios; for Yaesu radios the program translates the commands into Yaesu CAT by itself.

Radio	Connection	Network	Radio RF spectrum	Bands
Icom IC-7300	CI-V via USB, 115200 baud, address 94h	No	Yes	160 m – 4 m
Icom IC-7300MK2	CI-V via USB, 115200 baud, address 94h or B6h	Yes	Yes	160 m – 4 m
Icom IC-7610	CI-V via USB, 115200 baud, address 98h	Yes	Yes	160 m – 6 m (MAIN receiver)
Icom IC-705	CI-V via USB, 115200 baud, address A4h	Yes (Wi-Fi or LAN)	Yes	160 m – 6 m, 2 m, 70 cm (max 10 W)

Radio	Connection	Network	Radio RF spectrum	Bands
Yaesu FT-710	CAT via USB, «Enhanced COM Port», 38400 baud	No	No	160 m – 6 m
Yaesu FT-991	CAT via USB, «Enhanced COM Port», 38400 baud	No	No	160 m – 6 m, 2 m, 70 cm
Yaesu FT-991A	CAT via USB, «Enhanced COM Port», 38400 baud	No	No	160 m – 6 m, 2 m, 70 cm

In all cases audio goes through the radio's USB sound card, which Windows shows as «USB Audio CODEC».

Settings to make on the radio

Icom IC-7300 / IC-7300MK2 (MENU › SET)

Menu item	Value	Why
Connectors › CI-V › CI-V USB Port	Unlink from [REMOTE]	USB commands independent of the REMOTE jack
Connectors › CI-V › CI-V USB Echo Back	OFF	Prevents commands from coming back as replies
Connectors › CI-V › CI-V Transceive	ON	Frequency changes made on the dial reach the program immediately
Connectors › MOD Input › DATA MOD	USB	Transmitting PC audio (APRS, MesNet, voice from the PC)
Connectors › USB AF/SQL Output › AF Output Level	about 50%	Right level for waterfall, decoders and transcription

Icom IC-7610 (MENU › SET): the same items as the IC-7300, plus **CI-V Address = 98h** and **CI-V USB Baud Rate = 115200**. The program uses the main receiver (MAIN).

Icom IC-705 (MENU › SET): the same items as the IC-7300, plus **CI-V Address = A4h**. Maximum power is 10 W: the power slider, the Po meter and TUNE use the 10 W scale automatically.

Yaesu FT-710 (OPERATION SETTING › GENERAL): **CAT RATE = 38400**, **CAT TIME OUT TIMER = 100 ms**, **CAT RTS = OFF**; DATA mode audio source set to **USB (REAR)**.

Yaesu FT-991 / FT-991A

Menu item	Value	Why
CAT RATE (menu 031)	38400	CAT connection speed
CAT TOT	100 ms	Command time-out
CAT RTS	OFF	Avoids port lock-ups
DATA mode audio input	USB (REAR)	Transmitting PC audio in DATA modes

The Yaesu USB cable creates two COM ports: CAT uses the **«Enhanced COM Port»**, which the program tries first when the port is set to «automatic». Check your radio's manual for the menu number of the DATA mode audio input.

Connection, power on and off

Press «Connect radio»: the program finds the COM port, speed and address of the selected radio by itself.

- **Port**: leave «automatic» or choose the radio's port from the menu next to the button.
- **Radio off**: if the radio does not respond when connecting, the program tries to turn it on from the USB port used last time (or the chosen one) and connects as soon as it is ready.
- **On / Off**: the two buttons at the top turn the radio on and off. Turning off asks for confirmation.
- **Audio**: RX audio starts automatically on connection, so waterfall and decoders are active right away.

Powering on via USB only works if the radio stays powered and connected to the PC. A COM port can be used by only one program at a time: close WSJT-X, fldigi or your logging program before connecting.

Network connection (IC-7300MK2, IC-7610 and IC-705, also remote)

IC-7300MK2, IC-7610 and IC-705 have a built-in network server, the same one used by Icom RS-BA1 (the IC-705 also over Wi-Fi). With the radio connected to the router, the program controls it from the home network or from the Internet, without a USB cable.

1. **On the radio**, in the network menu: assign an IP address (preferably fixed or reserved on the router), enable the server, keep control port 50001 and create a user with a password, as for RS-BA1.
2. **In the program**: Settings › «Connection to the radio» = «LAN or Internet», then address (IP or DDNS name, e.g. `myradio.ddns.net`), port, username and password. The port list shows «🌐 Network: address»: press «Connect radio».
3. **From the Internet**: on the router forward UDP ports 50001, 50002 and 50003 to the radio's IP (control, CI-V and audio: the set port, +1 and +2). If your public IP changes, use a DDNS service (DuckDNS, No-IP or the router's own). A safer alternative is a VPN such as WireGuard or Tailscale, which avoids opening ports on the router.

Over the network the program receives commands and RX audio at 48 kHz (about 0.8 Mbit/s): waterfall, decoders, recording and Whisper transcription work as over USB. Audio to the radio (MesNet, APRS, PTT with PC voice) also travels over the network. «Browser» transcription only listens to the PC microphone, so over the network the program switches to local recognition by itself. The radio's server accepts only one program at a time: close RS-BA1 before connecting.

Program language

The flags at the top, next to «?», change the language of the whole program: **Italian, English, French, German and Spanish**. Buttons, menus, settings, notices and confirmation windows are translated, and the choice is saved. The translation of transcribed voice also goes into the chosen language: with the interface in English, for example, a station speaking German is translated into English.

Interface and radio controls

VFO and meters are at the top, waterfall and decoders below; less used controls are further down.

- **VFO**: large frequency display with mode, filter, AGC and preamp. Tune with the mouse wheel on a digit, with the knob, with the ← → keyboard arrows or by typing the frequency (e.g. `14.074`, `7074` or `145.500`).
- **Modes and filters**: LSB, USB, CW, CW-R, RTTY, RTTY-R, AM, FM, DATA, FIL1–3, VFO A/B, A=B, A/B, SPLIT.
- **Band ▾**: drop-down menu with the selected radio's bands and their limits. Each band remembers the last frequency and mode used.
- **Meters**: S-meter, Po, SWR, ALC, COMP, Vd, Id and RF power, read continuously (Vd is not available on Yaesu radios).

- **Receiver**: AF volume, RF gain, squelch, NR level, preamp, AGC, ATT, NB, NR.
- **Transmit, CW, DSP and RIT**: a section that opens with the arrow. It contains microphone, compressor, VOX, keyer speed, CW pitch, break-in, Twin PBT (Icom only), notch, RIT and ΔTX.
- **Digital modes, voice, utility and broadcast**: the tabs to choose modes, frequencies, broadcast stations, number stations and memories.
- ☕ **Support**: button at the top for a free donation to development.
- **Log**: at the bottom of the page, for diagnostics.

Waterfall and audio

The waterfall shows the audio received from the radio; clicking a signal centers the active decoder on that frequency.

- **RX audio**: starts on connection; the radio input («USB Audio CODEC») is selected automatically.
- **Audio band**: 0–3000, 0–4000 or 0–6000 Hz, with adjustable level, contrast and speed.
- **RF spectrum**: second tab, with the radio's spectrum and span from ±2.5 to ±500 kHz (Icom only).
- **Monitor**: listen to the radio through the PC speakers, with a separate volume.
- **Record**: saves the received audio to a `.webm` file.

Digital modes and decoders

All decoders are built in: when you choose a mode, the radio goes to the right frequency for the current band, sets USB-D or LSB-D and opens the decoder. With «Automatic» the decoder detects the signal parameters by itself.

Mode	Detected automatically	Notes
FT8 / FT4	All signals in the slot (15 s / 7.5 s)	Message list, «CQ only» filter, station map from the locator
WSPR	Callsign, locator, power, drift	2-minute periods, map
CW	Tone and speed (about 5–45 WPM)	Click the waterfall to change tone
RTTY	Shift 170–850 Hz, 45.45–300 baud, polarity, code	Also DWD weather RTTY 50 Bd / 450 Hz
PSK	BPSK31, 63, 125, 250	Automatic AFC

Mode	Detected automatically	Notes
Olivia / Contestia	Number of tones and bandwidth	Measures the occupied bandwidth and tries the variants
NAVTEX / SITOR-B	Lock and polarity	518, 490 and 4209.5 kHz, message headers
Hellschreiber	—	Feld, Slow, x5, x9, FSK, Hell 80; text as an image
APRS / Packet	300 or 1200 baud	Station map, details on click, transmission
MesNet	300 or 1200 baud	Chat, groups and files over the air (see the dedicated section)
SSTV	Mode from the VIS code	Martin, Scottie, Robot, PD; image gallery
Weather FAX	Speed (LPM) and IOC	Automatic alignment, PNG saving
DTMF	—	Telephone tone digits

For FT8, FT4 and WSPR the PC clock must be accurate: Windows synchronizes it by itself. Modes that require proprietary programs are not included: JS8, JT65/JT9, MSK144, VARA, FreeDV, PACTOR, ALE, DRM, HFDL.

Voice transcription and translation

In the «Voice» decoder received speech becomes text in the large window and, if the language differs from the program's language, the translation appears on the right while the station is talking. Text arrives in small pieces, without waiting for the end of the sentence. Choosing the Voice decoder starts listening automatically.

Engine	Strengths	Requirements
Browser (default)	The most accurate, continuous	Internet; the radio audio as the Windows default microphone
Local (Whisper)	Works without internet, also over the network	One-time model download: Small 190 MB, Turbo 570 MB, Base 60 MB

- **Automatic language**: the spoken language is detected from the radio audio and shown at the top; if it changes, transcription realigns within a few seconds. This requires local recognition, installed once with «Install now».

- **Manual language**: you can always choose it from the menu, among 125 languages and variants.
- **Text clean-up**: phantom phrases typical of noise are discarded, radio terms (CQ, QRZ, 73, 5/9) corrected and phonetic spellings summarized, for example «India Kilo Zero Alfa Bravo [IK0AB]».
- ▶ **Last audio**: with the local engine, replays the last piece sent to recognition.
- **Copy, Save .txt, Enlarge**: to keep transcription and translation or read them full screen.

Transmission

PTT and TUNE are enabled in Settings with «Enable transmit commands». Transmission is allowed on any frequency, with a warning outside the amateur bands: transmitting only where you are licensed remains the operator's responsibility.

- **PTT**: transmits and stops by itself after the set time-out (180 s by default).
- **TUNE**: FM carrier at 10 W for 7 seconds for the tuner, then back to the previous mode and power (the program checks that the radio has restored the power).
- **Voice from the PC**: in Settings choose «Output to the radio» (the radio's USB sound card), «PC microphone» and the level, then enable «PTT with voice from the PC microphone». While transmitting, the radio switches to USB-D, LSB-D or FM-D by itself and then returns to the previous mode.
- **APRS**: under the Packet · APRS decoder fill in callsign-SSID, locator (or the 📍 GPS button), path (WIDE1-1 by default), icon, speed (300 baud HF in SSB, 1200 baud in FM) and a message of up to 43 characters. A preview of the packet appears below. «Send» transmits and returns to receive.
- **APRS beacon**: repeats the packet every 5, 10, 15 or 30 minutes, showing the time to the next transmission, as long as the program is open and the radio connected.

To transmit PC audio the radio must take DATA mode audio from USB (see «Settings to make on the radio»).

Adjusting the ALC. With digital modes (MesNet, APRS) the ALC must stay almost at zero. The level is set in three places, in this order:

1. In the program: Settings › **«Audio level to the radio»** (50% by default): lower it, for example to 20–25%. It applies from the next transmission.
2. On the radio: the USB transmit audio level (on Icom radios MENU › SET › Connectors › **USB MOD Level**, 50% from the factory).
3. In Windows: the volume of the output to the radio («USB Audio CODEC»), around 80%.

Output power is set with «RF power», not with the audio level: audio that is too high widens and distorts the signal.

MesNet: chat, groups and files over the air

MesNet is a new, experimental digital mode created for HAM Radio Control by Alessandro IA5KRO. It is used to exchange text messages between two stations or in groups and to send small files, with delivery confirmation. It works in **FM-D** (VHF, UHF and 10 m) and in **USB-D or LSB-D** (HF). It is lightweight: a short message lasts about one second in FM-D and 2–3 seconds in USB-D.

Before you start

1. In Settings enable **«Enable transmit commands»** and choose **«Output to the radio»** (the radio's USB sound card).
2. On the radio set DATA mode audio from USB (see «Settings to make on the radio»).
3. Open the **MesNet** decoder and type your callsign in «My callsign» (e.g. `N0CALL` or `N0CALL-7`).
4. Agree with the others on **frequency and mode**: everyone must be on the same frequency, with the same mode (FM-D or USB-D), using HAM Radio Control 1.0 or later. Use the band segments for digital modes in your band plan.
5. Press **FM-D** or **USB-D** in the MesNet bar: the radio switches to the right mode on the current frequency. Or use one of the test frequencies below.

Test frequencies

Under «Speed» there are buttons that take the radio to the MesNet test frequencies, already in the right mode:

Band	Frequency	Mode	Speed
40 m	7.055 MHz	USB-D	300 baud
20 m	14.082 MHz	USB-D	300 baud
2 m	144.650 MHz	FM-D	1200 baud
2 m	144.125 MHz	USB-D	300 baud

The 2 m buttons appear only with radios that have this band (IC-705, FT-991, FT-991A).

How it works

Item	Detail
FM-D	1200 baud, tones 1200/2200 Hz (like VHF packet)

Item	Detail
USB-D / LSB-D	300 baud, tones 1600/1800 Hz (like HF packet)
Speed	«Automatic from mode» (FM → 1200, SSB → 300) or manual; on receive both speeds are decoded together
Frames	HDLC with CRC check, AX.25 UI format: recipient = callsign, group or CQ
Text	Compressed automatically; about 250 bytes per message
Files	Up to 64 KB, in 200-byte blocks, with confirmation of received blocks

Writing a message

1. In the **Recipient** field type a callsign, a group or **CQ**, or click a name in the list on the right.
2. Type the text and press **Enter** (Shift+Enter for a new line) or the **Send** button.
3. The status appears under the message:
   - ✓ **sent · waiting for confirmation**: the message has gone to a callsign;
   - ✓✓ **received**: the recipient has confirmed;
   - ⚠ **no confirmation**: no answer after 3 attempts; **Retry** sends it again;
   - ✓ **sent to group**: messages to CQ or a group do not request confirmation, to avoid everyone answering at once.

The **«Delivery confirmation (ACK)»** box decides whether direct messages request confirmation. Whoever receives a message addressed to them sends the confirmation automatically.

Groups

- **CQ** is the main group: everyone receives it, it is always first in the list and cannot be deleted.
- **+ Group** creates a new group (letters and numbers, up to 6 characters, e.g. `HAM` or `DX`). Anyone who wants to join creates it with the same name in their program.
- ✕ next to a group deletes it, after confirmation. Messages already received stay in the chat; if the deleted group was the recipient, it goes back to CQ.

Sending a file

1. Choose the recipient and press 📎.
2. Choose the file (up to 64 KB after compression). With **«Shrink photos before sending»** images are reduced to 640 px JPEG, so they go through in a few seconds.
3. The program shows how many blocks and about how many seconds of transmission are needed, then the progress in percent.
4. If the recipient is a callsign, at the end it confirms which blocks it received and only the missing ones are retransmitted, up to 6 rounds. To groups the file is sent twice, without confirmation.
5. The recipient sees the file in the chat and can open or save it with a click.

Presence and station list

- 📣 **Presence** announces your station to everyone (CQ), with your locator and the text in the message field (or «QRV MesNet»).
- On the right, **Groups and stations** shows groups and recently heard stations, with the elapsed time; a click makes them the recipient.
- The ✕ next to a station deletes the chat with it: it removes the station from the list and deletes the direct messages exchanged, while those to CQ and groups remain. If the station transmits again, it reappears.
- **«Also show messages for others»** also shows traffic between other stations.

Channel and transmission

- With **«Listen before transmitting»** the program waits for a clear channel, up to 6 seconds, then transmits anyway.
- Waiting messages are queued and sent in groups of up to 8 frames per transmission.
- If the program cannot transmit, it shows the reason next to the buttons (e.g. «transmission not enabled» or «radio not connected»).
- **Delete** clears the chat on your PC; the history (last 300 messages) is kept between sessions.

Tips

- In FM keep the squelch open or just closed: a squelch set too high cuts the start of the frames.
- On HF keep the radio exactly on the agreed frequency: at 300 baud a small offset is enough to lose frames.
- Keep the ALC almost at zero (see «Adjusting the ALC» in the Transmission section).

Broadcast and Number Station

Broadcast lists the stations on air now, sorted from the most likely to be received from your location; «Listen» tunes the station in AM.

- **Sources**: EiBi schedules plus transmissions on air read from short-wave.info, shortwave.live, radiometeo.com and shortwave.am, merged without duplicates. The sources are shown next to each station.
- **Reception probability**: an estimate based on distance, frequency, day or night on the path, target area and, when the source provides them, power and antenna direction.
- **Location**: from the locator entered in Settings or from «Use my location».
- **Filters**: long and medium wave, shortwave, search by station, country or language. The list refreshes by itself every 10 minutes.

Number Station shows the Priyom.org community calendar with transmissions on air and upcoming ones; finished ones are hidden.

- Each row has UTC time, local time, time remaining, «ON AIR» or «NEXT», and the name that opens the station's page on Priyom.
- The button on each frequency tunes frequency and mode and opens the right decoder: voice (AM, USB, LSB) with transcription, CW, or USB-D for digital modes.
- You can search for a station or show voice stations only.

Common problems

Problem	Solution
«Windows protected your PC»	«More info» → «Run anyway»
The antivirus blocks the program	False positive: add the program folder to the exceptions
The radio does not respond	Check the selected model, the USB cable and the radio's CI-V or CAT settings; close other programs using the COM port
Yaesu not found	Choose the «Enhanced COM Port» and check CAT RATE = 38400
ALC too high when transmitting	Lower «Audio level to the radio» in Settings, then USB MOD Level on the radio
Audio not started	Allow the microphone when asked; in Settings choose the radio audio as input

Problem	Solution
Waterfall empty or weak	Raise the radio's USB audio output level or the waterfall level
FT8/WSPR do not decode	Synchronize the Windows clock (Settings › Time › Sync now)
Browser transcription hears nothing	Set the radio audio as the Windows default microphone
The language is not detected automatically	Install local recognition with «Install now» and keep RX audio on
PC audio is not transmitted	Set the radio to take DATA mode audio from USB and choose «Output to the radio» in Settings
MesNet does not transmit	Read the reason next to the buttons; check «Enable transmit commands» and the output to the radio
The radio does not turn on from the PC	It must stay powered and connected via USB
Network connection fails	Check address, username and password; from the Internet, UDP ports 50001–50003 forwarded; close RS-BA1
Blue screen at start	Start with `--sicura` and install Windows updates
Cannot delete the folder	End `HAMRadioControl.exe` from Task Manager
Map or translation missing	An internet connection is needed

Support development and contacts

HAM Radio Control is free and complete for everyone. If you find it useful and want to help it grow (new radios, new decoders, the Android version), you can buy the developer a coffee with a free donation at buymeacoffee.com/ia5kro. In the program there is the ☕ **Support** button at the top, next to «?», and the «Support development» link in the footer: they open the donation page in the browser. It is not required and never appears by itself.

For reports, suggestions and feedback write to ia5kro@elbanet.org. When reporting a problem, state your radio and the version (shown in the footer) and attach the `log.txt` file from `%LOCALAPPDATA%\HAMRadioControl-IA5KRO`.

Credits and data sources

Software and guide developed by Alessandro IA5KRO.

- FT8/FT4 decoder based on ft8_lib by Kārlis Goba (MIT license).
- WSPR, Olivia/Contestia, SITOR-B and Hellschreiber written following the public specifications and the code of fldigi and WSJT-X (GPL).
- Local transcription with whisper.cpp (MIT, OpenAI Whisper models).
- Broadcast schedules: EiBi, short-wave.info, shortwave.live, radiometeo.com, shortwave.am.
- Number stations: Priyom.org community calendar.
- Map: Leaflet and OpenStreetMap.
- Icom, IC-7300, IC-7610, IC-705 and RS-BA1 are trademarks of Icom Inc.; Yaesu, FT-710, FT-991 and FT-991A are trademarks of Yaesu Musen. HAM Radio Control is an independent program.