

PREPPER DOCK



v.2026-03-06

User Manual

PrepperDock is the open-source software that interfaces with the PrepperRadio firmware. It allows you to read information, make specific changes that you cannot do directly from the radio or use the radio remotely.

It's worth more than K5prog, Multi-UVTools and CHIRP combined. 😊

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1. Installation

Windows

No installation, simply double-click on the file PrepperDock-Win.exe.

Linux (Debian and derivate)

Right-click on 'PrepperDock-Linux-install.run' and choose the option 'Run as program' option.

A terminal opens briefly and closes by itself. Press the windows key and type 'prep' and PrepperDock appears. Or search in the Amateur Radio (HAM) menu and you will find PrepperDock.

If some libraries are missing from the system, the terminal will ask you for the password and install them before closing automatically.

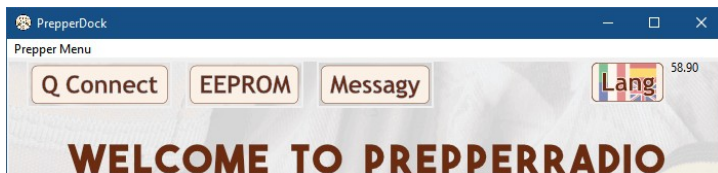
Mac

The Python files are located in the 'PrepperDock-for_MAC' folder.

- Download Python for Mac:: <https://www.python.org/downloads/release/python-3132/>
This file: "macOS 64-bit universal2 installer".
[Direct link: \(https://www.python.org/ftp/python/3.13.2/python-3.13.2-macos11.pkg\)](https://www.python.org/ftp/python/3.13.2/python-3.13.2-macos11.pkg)
- Then install Python
- Install pyperclip, pyserial and cryptodome, then open the terminal and copy these commands:
 - pip3 install pyperclip
 - pip3 install pyserial
 - pip3 install pycryptodomex
 - pip install pyaudio
- Open the 'prepperdock' folder right-click 'prepperdock.py' > Open with > Python Launcher.

2. Using PREPPER DOCK

⚠ Beware, at start-up in Windows, 'Defender' may warn that it is an unknown programme, indicate that you want to continue anyway.



2.1 Q Connect

This window allows you to load the firmware, but not only ours, also other firmware or the original one. You can save the log using the first 'Save' button.

Select connection: select 'Serial'. *In the future, it will be possible to connect via WiFi.*

WiRadio IP v4: Enter the IP address of your WiRadio connected via TCPv4. (e.g.: 192.168.1.1)

Select serial: select the COM port where the USB cable is connected.

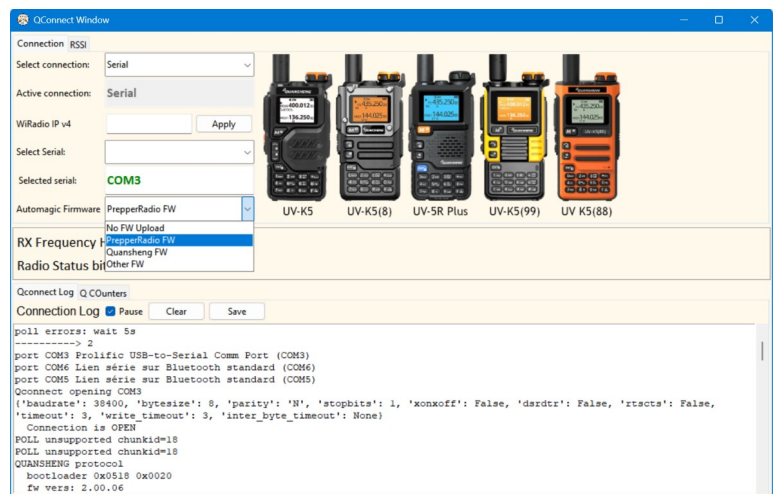
Automatic Firmware:

- **No FW Upload:** Does not upload any firmware, but will recognise the radio and display its photo to ensure that PrepperDock has recognised it correctly.
- **PrepperRadio FW:** Will automatically upload the PrepperRadio firmware to the radio.
- **Quansheng FW:** Automatically uploads the original firmware corresponding to the model.
- **Other FW:** Automatically uploads other firmware to be placed in the 'resources.prepperdock' folder with the name requested in the Log (e.g. OtherFW-Kradio-2.00.06.bin).

Pause connection: Pauses QConnect from attempting to connect to the radio in loop.

For more details, please refer to the user manual:
user-manual-PrepperRadio--.pdf.

For Linux, the serial device name is typically /dev/ttyUSB0



2.2 EEPROM

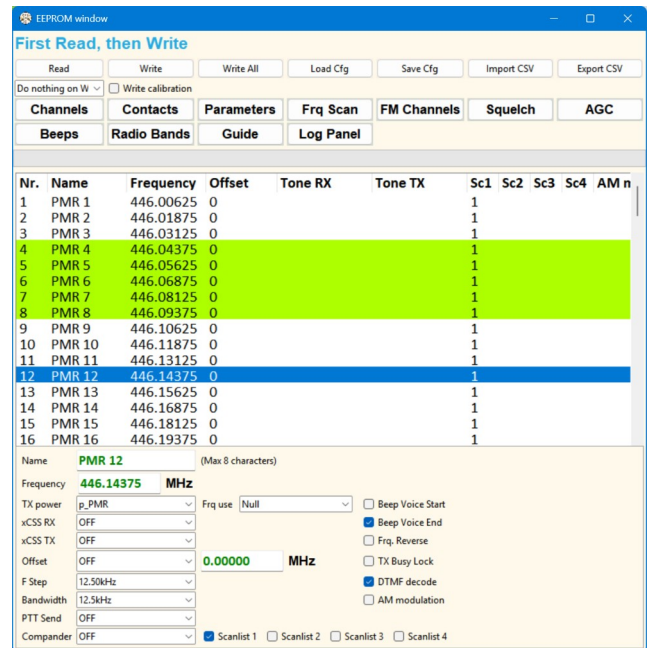
In this section it is possible to change certain parameters stored in the radio's EEPROM.

First of all, read them via the 'Read' button. Then edit them and lastly, write them via the 'Write' button.

Read: Reads the contents of the radio's EEPROM which means all its parameters.

Write: It only overwrites on the radio the parameters that have been changed.

Write All: Overwrites the entire EEPROM on the radio with the parameters in PrepperDock. Useful if you want to configure several radios in the same way.



◆ The **Halt CPU** option allows a foreign configuration and firmware to be installed. In practice, it stops the CPU after the EEPROM has been written. Step by step:

1. Load the configuration file of another firmware with the 'Load Cfg' button.
2. Select 'Halt CPU' and check 'Write calibration'.
3. Click on 'Write All'.
4. You can now flash the desired FW in Q Connect.

Load Cfg: Loads a configuration file in PrepperDock.

Save Cfg: Saves the radio configuration to a file.

Import CSV: Load memory channels, frequencies and main parameters from a .csv file onto the radio.

Export CSV: It exports the list of stored channels and main parameters to a .csv file.

The screen is divided into several sections: Channels, Parameters, Frq Scan, FM Channels, Squelch, Log Panel.

2.2.1 Channels

Here you can configure all channels stored in the radio. It is similar to the radio's Channel Config menu, but with additional parameters.

Each changed parameter will be saved automatically; this is practical for changing several channels simultaneously. This saves changes to the computer only, to load them on the radio press the 'Write' or 'Write All' button.

The channel section recognises keyboard shortcuts: Ctrl + C, X, V, the Delete key and multiple selection via the Shift key.

2.2.2 Contacts

Phonebook. Possibility of editing or adding contacts.

Each changed parameter must be confirmed with the 'Save' button, this saves the changes to the computer only. To load them later on the radio, press the 'Write' button.

The Contacts section recognises keyboard shortcuts: Ctrl + C, V, Delete and multiple selection using the Shift key.

2.2.3 Parameters

ID + String

My ID: idem menu radio.

Message from: idem menu radio.

Call Channel: idem menu radio.

Radio Name: Second line of the boot screen.

Welcome: Third line of the boot screen.

UpCode: idem menu radio.

DownCode: idem menu radio.

Options

Enable PMR446 TX: Activates transmission for PMR446 (UHF) band.

Enable Ham TX: Activates the transmission of certain amateur radio bands:

144.000 → 146.000 MHz

430.000 → 433.0625 MHz

435.000 → 438.000 MHz

Write Memory Name: Enables writing to radio memory channels.

Switch on, select Call Channel: The radio will always start on the channel set as Call.

Filter Messages: Activate it to filter only messages addressed to you and not receive them all.

White LED Blip: The white LED on the radio flashes every so often to indicate that it is always on, which is useful if you are in the dark. To be used as a beacon

Mic AGC: (Automatic Gain Control), automatic microphone gain.

White LED blink on SYNC FSK: The white LED flashes when a SYNC FSK is received. *The radio is always listening, the DSP of the radio chip continuously searches for the 'preamble' (a series of 0/1 transmissions, and if it finds it, it 'synchronises') and then looks for a 'key' (series of bits) indicating the start of the packet. At that point it generates a SYNC 'interrupt' and the LED lights up.*

Keys Locked: Keypad lock.

Keys Autolock: Automatic keypad lock.

Message ACK: (Acknowledge) Activates the acknowledgement of receipt of the sent message.

Beep Keys: Keypad beep.

Ringtone Message: Ring when receiving a message.

Ringtone Selective Calls: Ring when receiving a selective call.

Power On Time: Boot screen display time. Tenths of a second.

Tail Tone length: Duration of the end-of-call tone in hundredths of a second. Default 30 (= 3 tenths of a second).

Beeps volume: Beep volume. Changes the volume for all radio ringtones. Min 30, Max 85.

LCD contrast: Setting of the LCD screen contrast, default value 31. Max 63.

MIC gain: microphone sensitivity. Recommended 16. Max. = 31. (0.5dB per step)

Keys lock time out: Time before the keypad lock is triggered. To be multiplied by 6 seconds.

White LED2 ON time: At position 2 of the white LED (Flash Light), it decides how long it stays on.

White LED2 OFF time: At position 2 of the white LED (Flash Light), it decides how long it stays off.

Scan No Audio time: Duration of listening to a channel during scanning. Min 1, max 50, default 1. (in hundredths of a second)

Scan No audio delay: Waiting time between the loss of signal and the restart of scanning in 'Resume on NO audio' mode. (In tenths of a second.) ⚠ Only for V3 and K1.

Scan TimeOut: Scan resume time after signal disappears in 'Resume Wait Time' mode. Min 1, max 255, default 5. (in seconds)

EEPROM structure version: info on the revision of the EEPROM structure. Do not touch.

TX bias PMR subtract: A value that is subtracted from the minimum transmission power (Low) to calibrate a power consistent with the legal 0.5Watts of PMR446 (max = -95).

TX bias LPD subtract: Value that is subtracted from the minimum transmission power (Low) in order to calibrate a power in accordance with the legal 0.01Watt of LPD433 (max = -95).

Back to Call Ch.: Delay time to automatically return to the call channel after the last transmission or reception (in seconds).

VOX

Active VOX: Activates VOX.

Detect delay: Detection Delay Time in 128ms. Length of time before considering a voice volume. Default 8, max 15.

Detect interval: Detection Interval Time. Average duration where it detects if there is voice. Default 8, max 15.

Off level threshold: Listened volume threshold that considers silence.

On level threshold: Listening volume threshold considering voice. Visible in the microphone level display on the left.

Minimum active time: Minimum time of VOX transmission activation.

Battery

In hundredths of seconds. (min 1, max 255)

Battery Save 1 off	20	Battery Save 2 off	40	Battery Save 3 off	60	Battery Save 4 off	80
Battery Save 1 on	80	Battery Save 2 on	60	Battery Save 3 on	40	Battery Save 4 on	20

TX with Low Battery: It allows transmitting even when the battery is almost empty.

Batt Save Hysteresis: Battery save reactivation time after last carrier or transmission reception (in seconds, min 5, max 255sec).

DTMF

Auto Clear DTMF: Duration for the received DTMF code to appear on the display, after which it automatically clears. From 3s → 60s seconds.

Preload TX time: Duration of transmission of a silent carrier before sending the DTMF code in order to ensure that the receiving radio listens in. (in hundredths of a second)

Tone length: Duration of single DTMF tone. (in hundredths of a second)

Mute length: Duration of silence between two DTMF tones. (in hundredths of a second)


Sel Call ring count: Number of rings for the selective call. From 0 to 20. 0 = no ring.

DTMF with SubTone: Leave the channel's set subtone active during DTMF transmissions. If active in a channel with subtones, DTMF tones will be heard, otherwise they will be silenced.

DTMF sidetone ON: While pressing PTT, the sent DTMF tones can be heard.

Log DTMF on Messagy: When the box is unchecked, Messagy no longer receives small parasitic DTMF messages.

2.2.4 Frq Scan

Option to add frequency bands to be scanned with SCANNY in frequency mode. These are activated with the scan lists (1, 2, 3, 4 ). If left blank, no frequencies can be scanned.

2.2.5 FM Channels

Lists the FM Broadcast frequencies stored in the radio.

2.2.6 Squelch

Allows you to dynamically change squelch sensitivity depending on VHF, UHF and their bandwidth via an automatic multiplier. Exclusive function of the PrepperRadio firmware for the K5! **You must load these tables** → read the radio with the 'Read' button, then click the two buttons 'Optimal Squelch Default' and 'Optimal Multiplier Default' and press the 'Write' button. (Thanks to Edoardo for the research and Damiano for the implementation)

Manually editing the inside of the tables is a very delicate part, only for experts.

2.2.7 AGC

The Automatic Gain Control of radio reception can be customised.

As with the Squelch tab, this table must be loaded onto the radio with the values of the '**Beken Default**' button by clicking on the SAVE and 'Write' button. Signal strength management is divided into 5 levels, from weakest to strongest between lines 3, 2, 1, 0, -1.

2.2.8 BEEP

Allows you to customise your own tones for radio beeps and ringtones.

Simple beeps stay in one line, while 4-line ringtones can be made up of 1 to 4 tones, as well as 8 tones.

- 'Tone Hz' is the audio tone of the beep, in Hertz.
- 'Play time' is the duration in which the tone is heard, in hundredths of a second.
- 'Mute time' is the duration of time between tones. Putting a 0 interrupts "Beep play".

For example, if you want to dial a 2-tone ringtone, put a 0 in the second line in the 'Mute time' column.

2.2.9 Radio Bands

Under one's own responsibility, it allows one to activate the desired bands in transmission. Those who create the Band Plan will be able to adapt the radio to local legislation and avoid transmitting in out-of-band frequencies.

First of all, the CPU ID must be imported from the radio via the **Request Identity** button. Then enter the desired bands and designate the use:

- NOT Usable:** You will not be able to use the band.
- Unlicensed:** Free band for use without a licence.
- Ham-Radio:** Ham radio band.
- Licensed:** Band for which one holds a licence.

Once the bands have been set, transfer them to the radio using the **Write on Radio**.

2.2.10 Log Panel

Event log of the EEPROM window.

The screenshot shows the 'EEPROM window' interface with the 'Additional Radio Bands in TX' section active. It features a navigation bar with buttons for 'Read', 'Write', 'Write All', 'Load Cfg', 'Save Cfg', 'Import CSV', and 'Export CSV'. Below this is a 'Do nothing on W' dropdown and a 'Write calibration' checkbox. A menu bar contains 'Channels', 'Contacts', 'Parameters', 'Frq Scan', 'FM Channels', 'Squelch', and 'AGC'. A sub-menu below shows 'Beep', 'Radio Bands', and 'Log Panel'. The main area is titled 'Additional Radio Bands in TX' and includes a warning about legislation. It has a 'User Identity' field with 'Giovanni Rozzi Niazaku' and a 'Request Identity' button. A table lists four bands with their start frequencies, spans, and uses. At the bottom is a 'Write on Radio' button.

	Frq start	+ span (< 167MHz)	Use
Band0	136.00000 MHz	38.00000 MHz	Ham-Radio
Band1	350.00000 MHz	80.00000 MHz	Ham-Radio
Band2	433.06250 MHz	127.00000 MHz	Ham-Radio
Band3	0.00000 MHz	0.00000 MHz	NOT Usable

2.3 MESSAGY via PrepperDock

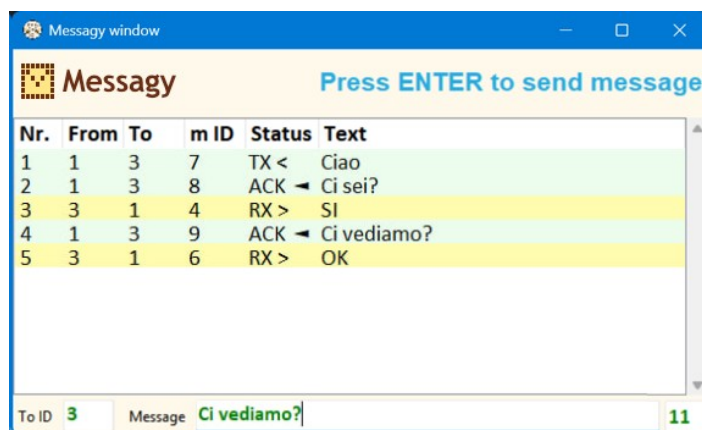
In practice, the radio becomes a modem for sending messages easily from the computer.

- > Message received.
- < Message sent.
- ◀ Message sent with confirmation of receipt.

The recipient must be entered in the "To ID" field. There are two ways to find this ID:

1. In the radio, section -CONTACTS- go to the desired contact and copy the number from the 'Message ID' line.
2. In PrepperDock > EEPROM > Load Cfg → load your personal configuration > Contacts.

The Dock version of Messagy can write up to 40 characters against the radio's 17. At the bottom right, there is a counter that turns red when you exceed 17 characters.

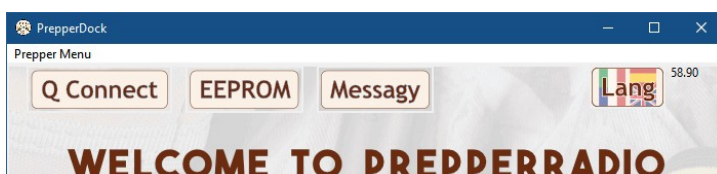


3. PrepperDock – Prepper Menu – Advanced

The main window appears. The menu opens other windows.

3.1 Home

This screen is the starting point, from here you can access everything. PrepperRadio is not just a firmware, but a complete project intended to create an emergency protocol between local people.

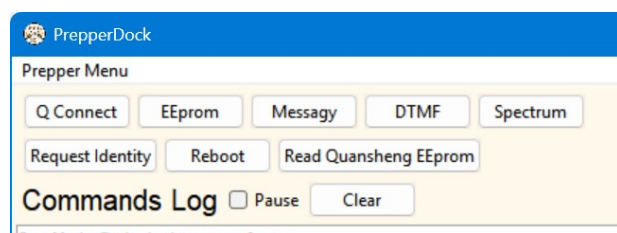


At the top there are three buttons that open the main function windows.

Below you will find several links to the entire PrepperRadio documentation.

3.2 Advanced

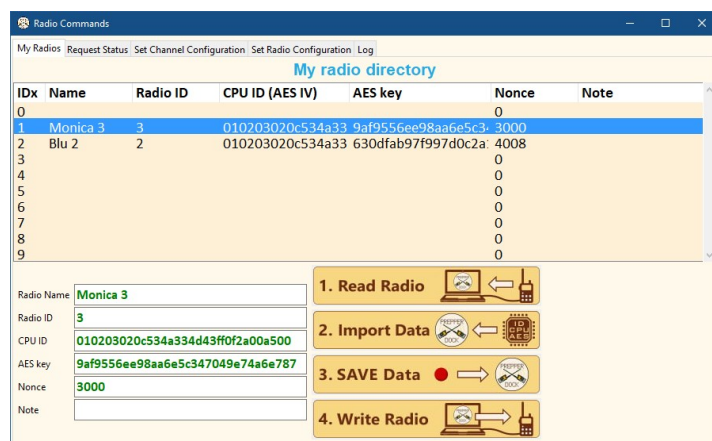
Here are functions intended for experts. DTMF, Spectrum, etc.



3.3 Radio Command

Radio Command allows you to obtain information or modify a remote radio via another radio connected with a cable to the PrepperDock. The mode used for data transmission will be either FSK or DTMF. This can be useful for example for remote assistance.

The use of 'Radio Command' requires at least 2 radios, a local one connected to the PrepperDock with a [cable](#) and another remote one within radio range. Both must be updated to the same firmware version.



My Radios

This tab will list the radios you wish to manage remotely.

🔒 To remotely read another radio, and even more so to modify it, it is essential that there is encryption of the transmitted data.

The security of this remote communication goes through four levels.

1. The ID of the remote radio is equivalent to an address. If this ID does not match that of the radio, commands are not considered.
2. The CPU ID. Even if someone knows the ID of the radio, complete identification is guaranteed by the unique CPU number.
3. The [AES](#) key. This key, in hexadecimal format, is used to encrypt communication.
4. The Nonce is a code generated by the radio valid only once. Even if someone managed to intercept the signal and get the ID, CPU ID and even the AES key, he would still miss the Nonce. If, by pure chance, he guessed it, it would change each time, increasing by one. All this makes communication between the PrepperDock and the remote radio secure.

How to set up and register radios:

- Use the [USB cable](#) to connect the radio, which will become the one to be controlled remotely, to insert the AES key.
- Select a row in the table.
- Press the button **1. Read Radio**, this key reads the EEPROM in about 10 seconds.
- Press **2. Import Data**, imports My ID, the CPU ID and the AES key, if the radio does not have one, it generates one automatically.
- Then fill in the empty fields:
 - **Radio Name**: extended radio name. Identical to 'Radio Name' in EEPROM.
 - **Radio ID**: My ID of the radio (automatically imported).
 - **CPU ID**: Unique ID of main chip (automatically imported).
 - **AES Key**: encryption key (imported or automatically generated).
 - **Nonce**: single-use password. Generated by clicking on 'Request Status'. It can also be written manually.
 - **Note**: various annotations.
- Press **3. SAVE Data**, this data will be saved on your computer. They will also be exported to the CSV file.
- Finally, press **4. Write Radio** to load settings onto the radio.
At this point, the radio is ready to be operated remotely.

To configure another radio, you must read its EEPROM again, then press the **1. Read Radio** and **2. Import Data**.

You can export and import this data manually, as all boxes can be edited using the common keyboard shortcuts: Ctrl + C, X, V and Delete. This is useful when the radio cannot be connected by cable, but has already been configured by a friend who has sent you the encryption data.

Operating a distant radio.

In the following tabs, you can interact with previously configured remote radios via another radio connected via USB cable. Make sure you are on the same frequency and subtone. Always select the radio you wish to act on via the drop-down menu.

Request Status

First, select the radio on which you want to act.

By clicking on the button `Request Status` PrepperDock interrogates the distant radio to obtain information, such as battery voltage etc...

Set Channel Config

From this section, it is possible to change parameters concerning channels.

Set Radio Config

From this section it is possible to change parameters concerning the radio.

Log

Log status of everything that happens in 'Radio Command'.

3.4 Calibration

Function allowing the radio to be precisely calibrated.

The radio as it leaves the factory is not always calibrated to the best of its ability, or over time the quartz may lose precision. The "Calibration" section allows you to correct these calibrations. *For now on an experimental basis.*

Prepper Menu > Calibration

- Connect the radio to PrepperDock with the cable.
- **Step 1** Click on 'Read Calibration' to read the radio's current calibration.
- Set the receiving radio to a channel with a **different frequency** from the one you will use for calibration.
- Set a high Squelch, minimum 5, to avoid interference.
- In the "Want Frequency" box, enter the frequency you want to use for calibration.
- With a high-quality transmitter you are certain of the accuracy of the frequency in TX,
 - select the same frequency
 - with the narrowest bandwidth
 - and set the TX power to the lowest.
- **Step 2** Distance the radios by 1 or 2 metres and press the PTT for 7 seconds, in silence without audio modulation.
- Click on 'Start Frequency sample' until the counter goes from 11 to 10 10.
- In the 'RX Frequency' box, the 10 sampled frequencies will appear.
In the 'RX Frequency average' box, the sampling average appears.
The maximum error is 200Hz, meaning that frequencies received that deviate more than 200Hz from the desired, are not considered.
- In the 'Status Message' string, the best adjustment to be reported manually in the 'Frequency adjust' box will be written, only with whole numbers.
- **Step 3** Step 3 Press 'Write' to send the correct calibration to the radio.

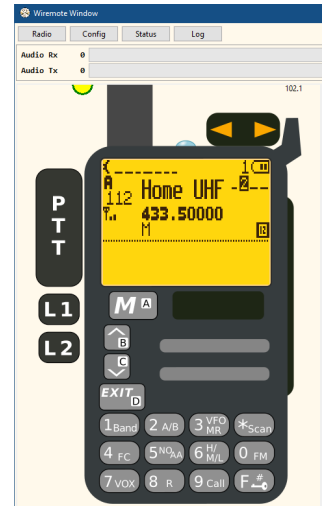
👉 AF rx gain and AF dac gain, are parameters to adjust the gain of the audio conversion from digital to analogue. They are best left in default.

3.5 Wiremote

Wiremote allows you to control the radio remotely using a USB serial cable or via Wi-Fi connection using **WiRadio**.

The interface is identical to the radio in every way: the screen displays exactly what appears on the radio screen, and the buttons work in exactly the same way when clicked with the mouse. To simulate a long press, use the right mouse button.

For this to work, you must have an audio-in device, **microphone** and audio-out device, **speakers** or **headphones** active or connected to your computer.



3.6 Built-in guide

In an emergency situation, there is no time to read the manual, and you may forget certain features of PrepperRadio. That's why we've integrated a reminder guide for each section within the radio itself, which can be consulted simply by pressing the **F+1** key combination, just like in most computer software. This feature is only available for **K5v3** and **K1** transceivers.

A basic version of the guide is already available, however, you can also modify it as you wish, up to 20 pages per section. For example, you can translate it into your language, add important telephone numbers, etc.

Edit the built-in guide:

Accessible from the EEPROM window using the **Guide** button.

The guide to be loaded separately is contained in the **resources.prepperdock** folder.

To view the guide correctly in PrepperDock, you must install the **DejaVuSansMono_PrepperDock.ttf** font. It can also be found in the **resources.prepperdock** folder.

Next to On Radio Guide there are 4 buttons:

Load from Radio: Download the existing guide from the radio.

Save to Radio: Load the guide onto the radio.

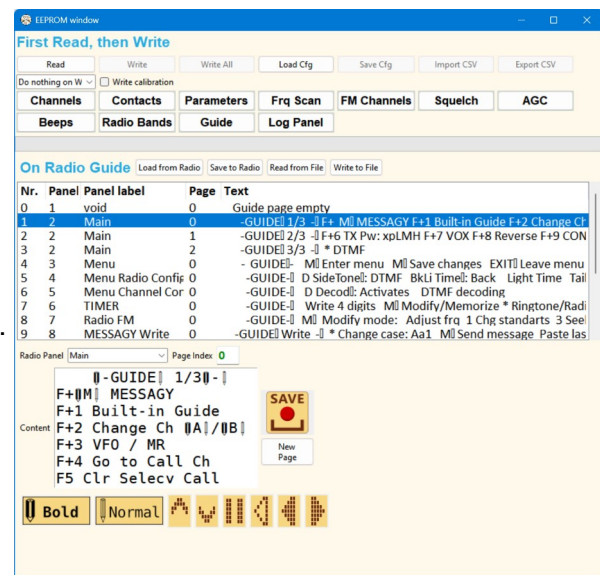
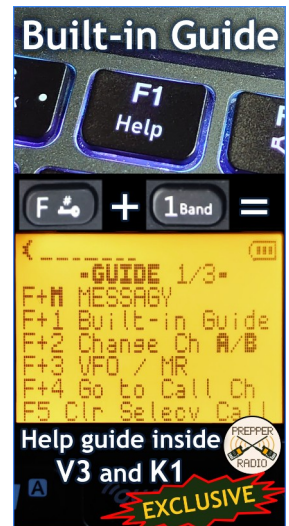
Read from File: Load the guide from a file onto PrepperDock.

Write to File: Save the current guide to an external file.

To edit a guide, select a page in the table and make the desired changes, then save the changes with the **SAVE** button. Then press **Save to Radio**.

To bold a section, place the cursor before it, press the **Bold** button, and a thick pencil will appear. To return to normal writing, place the cursor after the section you want to bold and press **Normal**. A thin pencil will appear to show that from that point onwards, you are writing in normal format.

To insert special characters, press the corresponding buttons.



EXIT Leave menu

To add a new page, press the **New Page** button, assign it a category in the **Radio Panel** drop-down menu and a page number. 0 is always the first, 1 will be the second, etc.



3.7 WiRadio

WiRadio (*WiFi Radio*) is an electronic accessory that interfaces between a transceiver and a computer to expand its functionality, in this case the QS-K5 with **PrepperRadio** firmware. One of a kind!

The project is still in progress, with new developments expected in 2026.



4. DTMF

Similar to the Message window, it allows DTMF codes to be sent.

Structure of DTMF 'commands'.

Since commands are addressed to a specific user or group, they MUST:

- ALWAYS have [to-id]*[from-id]*
- Parameters are ONLY numeric and end with an *.
- The end of the command line is always and only A*.
- The single * is used to delimit parameters of a command.
You may put several commands in a line by separating them by AA.
- Examples of managed commands: below the recipient is 123 and the sender 345, group code 222.
- Simple numbers, eg 123232 do not give call handling activation
- You CANNOT call a user without a sender: 123* the sender does not appear and you cannot receive an ACK.
- Call to a specific user, without changing channels: **123*345A***
- Calling a group without changing channels: **222#345A***

The code 3 command is used to indicate which channel to move to, let us assume to move to 23, personal call: **123*345AA3*23A***

Channel definition [99] frequency 466.1100, DCSS 1 command 4.

Request addressed to correspondent 123:

123*345AA4*99*4661100*1A*

ACK on ring request, note how 345 is now the recipient

345*123AA1A*

NACK at the request of ring, to be seen to introduce NAK motives

345*123AA2*11A*

Alarm request with alarm code 123

345*123AA4*123A*

The starting point is that addressee and sender must ALWAYS be identified.

A mix of DCSS + ID ... makes DTMF selective calls decently immune to the first person passing by.

```
/**
 * You CANNOT change them at will, since they are documented AND sent around
 */
enum Dtmf_cmds
{
    DTMF_CMD_NULL,           // ALWAYS use zero as NULL value
    DTMF_CMD_ACK,           // Will do what requested
    DTMF_CMD_NACK,          // Cannot do what requested, one code for the NAK reason
    DTMF_CMD_USECH,         // request to use a specific channel
    DTMF_CMD_TALKNOW,       // one of the two signal to the other that it is going to move to the given channel now, une param, t
    DTMF_CMD_SETCH,         // configure the given channel with F and dcss
    DTMF_CMD_ALARM,        // Emit an alarm tone one param, the tone to emit
};
```

Stay calm and switch on the radio!



<https://t.me/+3S1rKwPf-2AxMTJk>

