

Welcome to the `uv-k5-firmware-custom` wiki!

On this wiki the (custom and extended) functions are described, which have been realized with this adapted firmware ([release v0.17](#)).

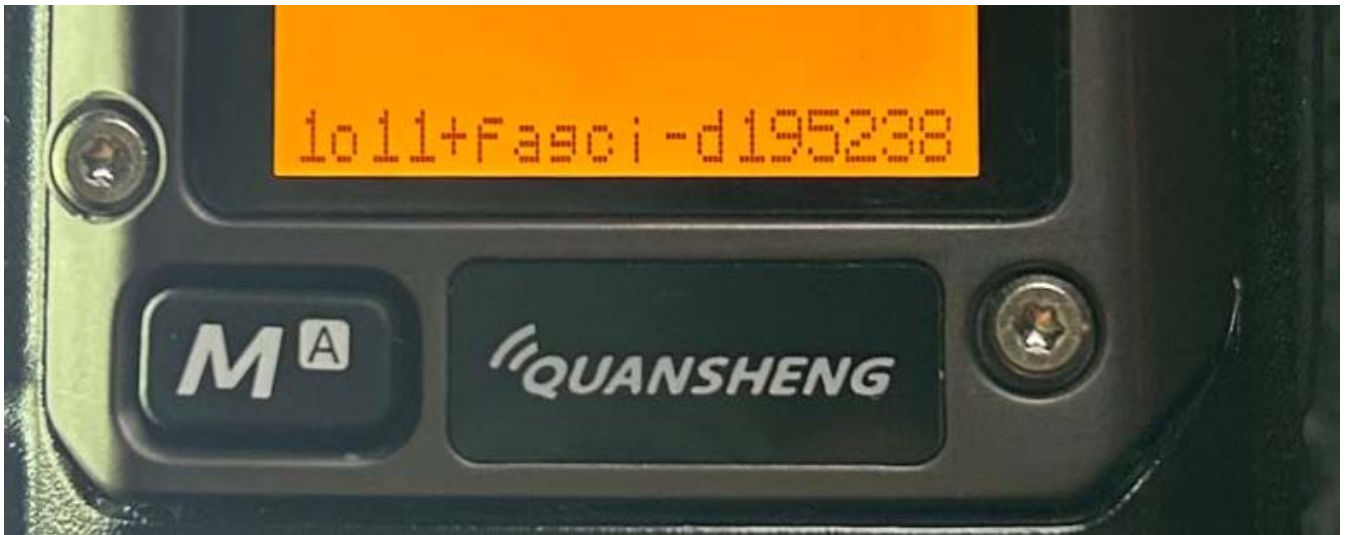
This Manual is located as Wiki at <https://github.com/egzumer/uv-k5-firmware-custom/wiki>.

If you have a *suggestion to add to this Wiki*, please report the suggestion here under [Discussion](#).

Chapters

- [Radio operation](#)
- [Menu](#)
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- [Spectrum analyzer](#)
- [Flashing the firmware](#)
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Read this wiki in your language

With the links below you can translate the info on this Wiki in your language using Google translate.

We have two languages predefined. But at the top of a translated screen you can adjust to your preferred language.

- [POLSKIE TŁUMACZENIE / Polish translation](#)
- [Nederlandse vertaling / Dutch translation](#)

Dutch channel list (chirp-format) for demo at 3 november 2023

- [Dutch-A05-2en70enLPDenPMR-Quansheng_UV-K5_20231103-rename-2-img.docx](#)

Rename extension from .docx to .img and [use Chirp](#) to load it into radio.

If you are (an English) native speaker and you see any language errors, please do the corrections, there should be an edit button. If editing needs some permissions create an issue, I will try to grant you access.

Basic operation & configuration

Radio display is split into upper VFO and lower VFO. You can change upper/lower selection by pressing **F + 2 A/B** (or by long press **2 A/B**).

Each VFO can independently of each other function in either frequency or channel mode. To switch modes select the desired VFO and press **F + 3 VFO/MR** (or long press **3 VFO/MR**).

In the `frequency mode` you manually type in the frequency with the keypad. You can also switch different options for that VFO in the menu (first 13 menu entries). If you setup the VFO, the settings can be saved to a memory channel by going into the menu `chSave` and choosing the memory channel the VFO should be saved into.

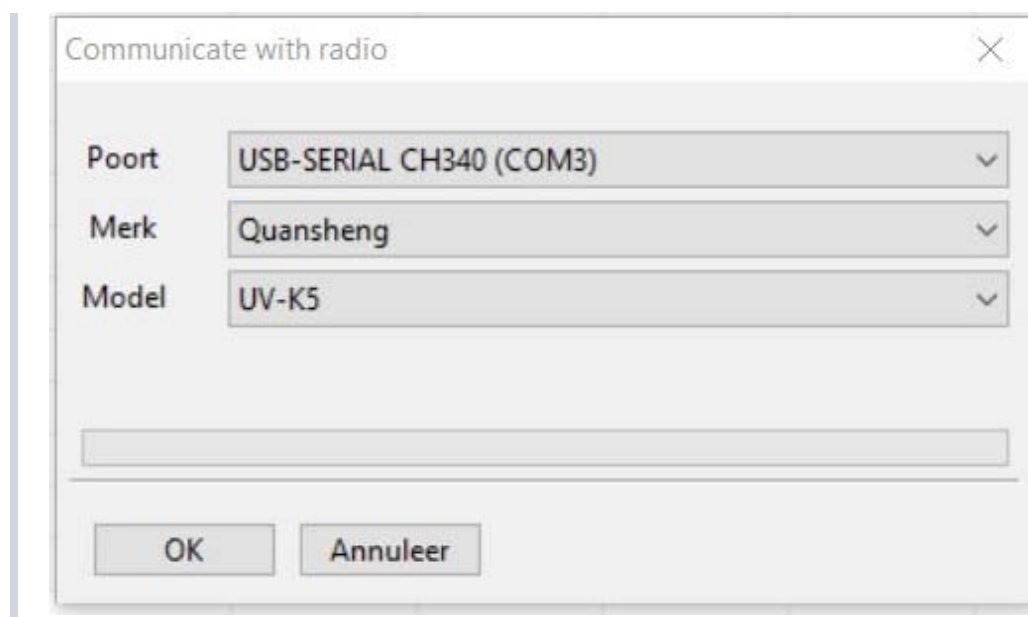
In the `channel mode` you can switch between saved memory channels. Memory channels can be added manually as mentioned before or with a computer software. You can use either Quansheng Portable Radio CPS or the recommended open source software called [Chirp](#).

How2 use Chirp with this radio.

Use a Baofeng/Kenwood-like USB-2-Serial-cable with CH340-chip inside.

Press the programming cable firmly into the radio and check if a `plug icon` is displayed, to the left of the `battery icon`.

Initially, Chirp comes with popup. Configure that something like this.



In addition to memory channels, you can also adjust various Settings, such as the power-on screen and more...

Logo string 1 (12 characters)	egzumer
Logo string 2 (12 characters)	Zen70 UV-K5

Just keep in mind that this firmware's options are expanded in many cases. Some functions or settings may not be available in the computer software, e.g. backlight timeout will have different settings, backlight brightness or MENU button long press function won't be available at all, etc. Those can be changed only in the radio menu.

Frequency/Memory scanning

Frequency scanning

To start a frequency scan switch the VFO to frequency mode. Set the start frequency. Set the frequency step (menu `Step`). Start scanning with [custom button scan function](#) or by long pressing `* Scan` button.

Memory-channels scanning

To scan channels saved in the radio memory switch the VFO to Memory mode.

The radio has 2 scanning lists. Each memory-channel can belong to 0, 1 or 2 lists. To add/delete a channel to/from a list switch current VFO to desired channel and go to a menu `ScAdd1` or `ScAdd2`, alternatively you can long press `5 NOAA` button, you will see icons `I` and `II` toggling on and off on the right side of the channel label.

If you set up the scanning lists you can start scanning by using [custom button scan function](#) or by long pressing `* Scan` button. If you press the function button or long press `* Scan` while scanning, the scanning list will be switched, you will see corresponding icon on the top left of the screen: 1, 2 or * (star means: All memory channels). Active scanning list can also be changed with menu `SList`. You can view scan lists and its channels by going to menu: `SList1` or `SList2`.

Editing of memory- and scan-list is much easier on an PC with [Chirp](#).

Common frequency/channel scanning features

You can change the scan direction while scanning with `UP/DOWN` buttons.

The scan can be stopped with the `EXIT` button, the search result will be ignored and frequency/channel will return to the one that was set before scan begun. Alternatively you can stop the scan with `PTT` or `MENU` button in which case the frequency/channel will be set to the last channel where transmission was found.

Single frequency scanning (frequency copy),

DCS/CTCSS scanning

This function will allow you to find out and copy frequency and coding settings. The frequency search will only work for strong signals. The transmitting radio has to be close. To start a frequency copy (FC) function use `4 FC` function button. Scanner screen will open. Push and hold a PTT button on the other radio. Wait couple of seconds until frequency and code (if used) appears on the screen. The settings can be saved with the `MENU` button. The settings will be save either to a channel or the main VFO, depending in which mode you started the scan.

You can also search only the DCS/CTCSS code for a frequency set on the main VFO. Choose desired frequency or channel and press `F + * SCAN`. The same screen will appear, but the frequency search will be omitted, instead the frequency of the main VFO will be used. Wait for a signal to appear or press the PTT on the other radio. It takes 1-2sec for the code to be found. The save procedure is the same as above.

There is another option of DCS/CTCSS code scanning. Choose desired frequency or a channel. Go to the menu `RxDcs` or `RxCtcs`. Enter the menu option and press `* SCAN` button. A `SCAN` label will appear. Wait for a radio signal or press the PTT button on the other radio. When code is found the `SCAN` label will disappear, to save confirm the option with the `MENU` button. It doesn't matter on which of the two menu items you start the scan. Both DCS and CTCSS will always be found, and the menu entry will be changed to the correct one.

1750 Hz toneburst for repeater access

When the `PTT` is pressed, the 1750 Hz can be activated by pressing [Function-button-II](#) (*side key 2, bottom*)

DTMF calling (decoding)

[DTMF](#) calling can be turned on in the menu `D Decd` (DTMF Decoding). You need a computer and programming cable to setup the whole system. You need to change `ANI ID` (programmable from the computer) of each radio to be unique in your network. It is also a good idea to program the list of contacts, their IDs and names.

The basic idea is to be able to dial a one particular person (or a group) among many on the same frequency. If you turn on the DTMF calling on a given channel your radio will be silent on that channel until an incoming call arrives with the destination ID matching `ANI ID` of your radio. If you receive the call a time window opens up in which the speaker activates and a person on the other side can talk to you. The time window expires after a delay set in `D Hold` menu entry from the time when incoming signal disappears.

The call pattern is `recipient*sender` where recipient is the `ANI ID` of a radio to which the call

is being sent to, and sender is ANI ID of a radio that transmits the call (e.g. 102*103). In QS radio you only need to enter the recipient ID, the rest is appended automatically. You can send the call in two ways. One is, you go to the menu `D list` and choose a contact from the list and hit MENU button, its ID will be copied to the DTMF input box. You can transmit the call with PTT button. You can also open the DTMF input box by short press `* SCAN` button, and enter 3 digit recipient ID and hit PTT to send.

You can use `#` wildcard in place of any of the ID digits to make a group calls where every radio matching the pattern will activate. In particular you can call `###` to call everyone.

Menu items for DTMF calling:

- ANI ID - ID of your radio.
- D ST - DTMF site tone, whether you want to hear the tones in your speaker while they are being sent
- D Resp
 - DO NOTHING - does nothing
 - RING - radio beeps while the receiving time window is active
 - REPLAY - sends a DTMF call back to the caller
 - BOTH - both REPLAY and RING
- D Hold - length of a receiving time window
- D Pre1 - DTMF call preload, time from the RF path activation to when the DTMF codes start being sent, higher value gives the receiving radio time to detect the signal and open squelch on time so it will not lose the codes
- D Decd - turns on the DTMF decoding
- D List - list of DTMF contacts

TX on all bands

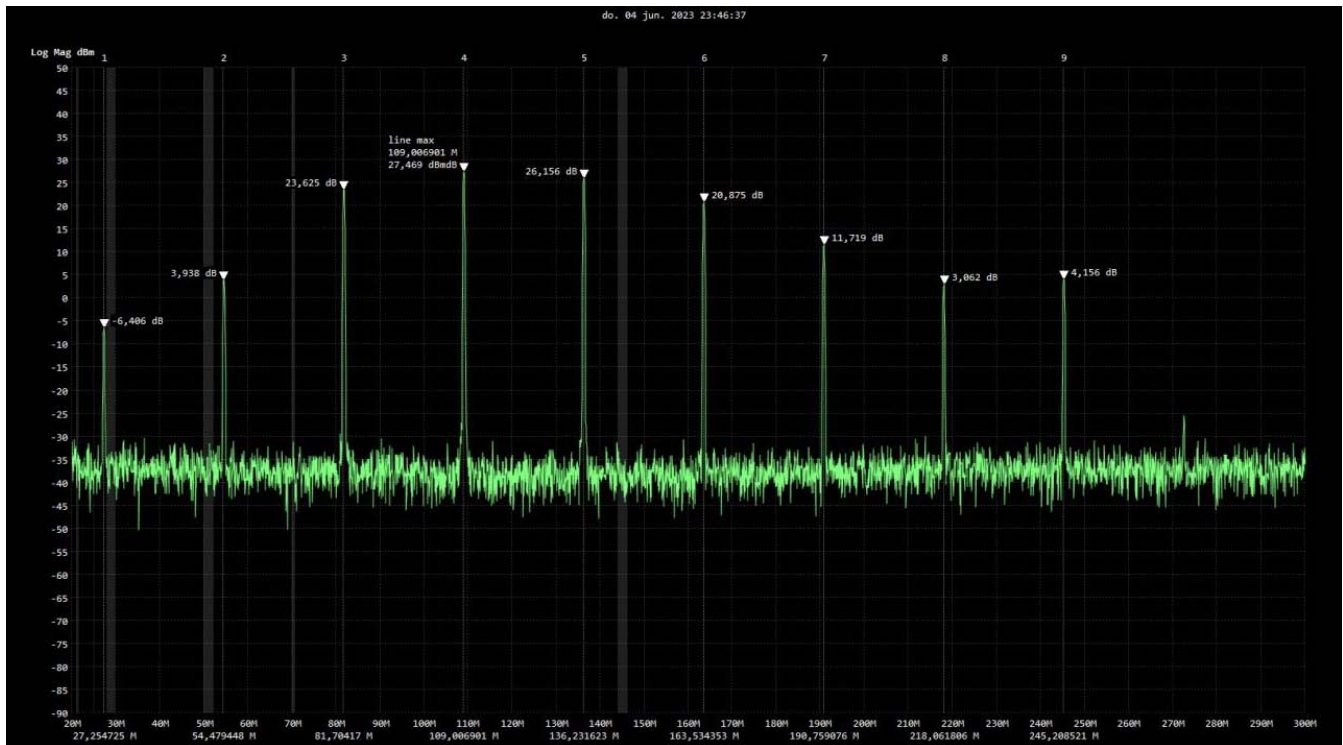
Warning

This modification is UNTESTED and is for RESEARCH PURPOSES ONLY, to explore the capabilities of the device and its chipset. DO NOT transmit on illegal frequencies. DO use a dummy load. The author(s) and contributor(s) of this repository are NOT liable for any damages, litigation, or other consequences of the misuse of this research firmware and do not accept any culpability. By installing any firmware from this repository, you accept full responsibility for any consequences that may arise and waive the right to pursue legal action against the author(s).

This option won't give you ability to transmit in any other modulation than FM, this is a hardware limitation. Switching to AM or SSB only switches AF audio output mode of a RF IC. It doesn't switch the whole IC into AM/SSB mode. This is for listening only. This firmware is also

doesn't switch the whole IC into AM/SSB mode. This is for listening only. This firmware is also built with additional lock that blocks TX when AM or SSB is on.

As an example against using this for actual communications, consider the following chart for transmission power for a transmission at 27.254MHz:



- 27.254MHz -> 228 microwatts
- 54 Mhz -> 2.4 milliwatts
- 81 Mhz -> 230 milliwatts
- 109 Mhz -> 558 milliwatts
- 136 Mhz -> 412 milliwatts
- 163 Mhz -> 122 milliwatts
- 190 Mhz -> 14.8 milliwatts
- 218 Mhz -> 2 milliwatts
- And finally, on 245 Mhz -> 2.6 milliwatts.

CREDITS: <https://github.com/Tunas1337/UV-K5-Modded-Firmwares#even-bigger-warning>

How to unlock TX on all bands

1. Go to [hidden menu](#)
2. Enter menu F-Lock
3. Choose option UNLOCK ALL
4. Repeat steps 2-3 10 times. Do it carefully, if you confirm any other option in the process counter will get zeroed and you will have to repeat that 10 times more.

Frequency scanning

Memory-channels scanning

Common frequency/channel scanning features

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1750 Hz toneburst for repeater access

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How to unlock TX on all bands

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Radio operation

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Add a custom sidebar

Frequency/Memory scanning

Clone this wiki locally

<https://github.com/egzumer/uv-k5-firmware-custom.wiki.git>

Using the Menu

The radio includes a menu system that uses a short term to describe a function that can be somewhat unclear to users, especially users for whom this is their first radio. This explanation of the menu items should help all users understand each menu item.

Entering the Menu

The large key labeled **M** on the radio serves to enter the menu of the radio. A short press will open the menu to the last item accessed in the menu.

Exiting the Menu

The large key labeled **EXIT** on the radio serves to exit the menu of the radio. A short press will exit the menu. A long press registers as a short press and exits the menu.

Selecting a Menu Item

Once in the main menu, the menu items will be displayed on the left-hand side of the screen. The currently selected menu item will be highlighted. The currently selected value for that menu item will be shown on the right. Also, at the bottom of the left-hand side is shown the number of the menu item, ranging from 01 to highest number (originally 51 and now upto 60 and with Hidden-menu up to 70).

To find the menu item to access, the **UP/DOWN** arrow keys may be used, or the **menu item number** (see lists below) may be entered on the numeric keypad. For instance, to access the VOX settings, the down arrow can be pressed 57 times, or the number 57 can be entered on the keypad.

Accessing a Menu Item

Once the desired menu item is highlighted, pressing the **M** enu key will enter into that menu item.

Adjusting a Menu Item

Once the menu item is selected, pressing the up and down arrow keys will adjust the setting for that menu item. To confirm the selection, press the **M** enu key. To cancel the selection, press the **EXIT** key.

Main menu

The number in front of the menu-item-description is an *menu item number* that can be used for quick selection.

1. Step - step of the frequency (in kHz), up/down buttons change frequency by this value, also you can only set a frequency that is multiple of this value. 2.50/5/6.25/10.00/12.50 /25.00/8.33 are the steps that can be set by programming software, all other steps are extension from standard software, and can only be selected from this menu entry.
2. TxPwr - radio output power (LOW/MID/HIGH)
3. RxDcs - receiver Digital-Coded Squelch, if you enable this, squelch will only unlock if this code is being received. You can start a DCS/CTCSS scan while you are in this menu option by pressing * SCAN button
4. RxCTCS - receiver Continuous Tone-Coded Squelch System, squelch will only unlock if this code is being received. You can start a DCS/CTCSS scan while you are in this menu option by pressing * SCAN button
5. TxDCS - transmitter Digital-Coded Squelch, radio will send given code while transmitting
6. TxCTCS - transmitter Continuous Tone-Coded Squelch System, radio will send given code while transmitting
7. TxODir - transmitter frequency offset direction
8. TxOffs - transmitter frequency offset value
9. W/N - bandwidth used by transceiver
 - o WIDE - 25kHz
 - o NARROW - 12.5kHz
10. Scramb - scrambler, distorts the audio so it would be harder to understand for other listeners, if two radios use the same setting they can communicate
11. BusyCL - busy channel lockout, blocks radio from transmitting because signal is being received (with **BUSY** on screen while PTT is pressed)
12. Compnd - compander (compressor/expander), allows signals with a large dynamic range to be transmitted over facilities that have a smaller dynamic range capability, improves audio quality, both radios should use this option
13. Demodu - demodulator mode, default is FM, AM/USB can be used for listening only
14. ScAdd1 - add channel to scan list 1
15. ScAdd2 - add channel to scan list 2
16. ChSave - save current setting to a memory channel
17. ChDele - delete memory channel
18. ChName - modify memory channel name
19. SList - selects which channel is used by memory channel scanner
20. SList1 - channels assigned to scan list 1
21. SList2 - channels assigned to scan list 2

21. `ScnChan` - channels assigned to scan list

22. `ScnRev` - scan resume mode

- `CARRIER` - resume scan after signal disappears
- `TIMEOUT` - resume scan after 5 seconds pause
- `STOP` - after receiving a signal, stop the scan

23. `F1Shrt` - side button 1 short press function

24. `F1Long` - side button 1 long press function

25. `F2Shrt` - side button 2 short press function

26. `F2Long` - side button 2 long press function

27. `M Long` - menu button long press function

28. `KeyLck` - auto keypad lock option

29. `TxTOut` - max transmission time limit

30. `BatSav` - battery save option, the rate between active time and sleep time (OFF/1:1/1:2/1:3/1:4)

31. `Mic` - microphone sensitivity (+1.1dB .. +15.1dB)

32. `MicBar` - microphone bar that appears while transmitting

33. `ChDisp` - channel display style (Name + Freq or Number)

34. `POnMsg` - power on message

35. `BatTxt` - additional battery value on the status bar in % or V(oltage)

36. `BackLt` - backlight duration (OFF/ON/configured Time)

37. `BLMin` - minimal backlight brightness, when the screen backlight turns OFF it will go dim to this value

38. `BLMax` - maximal backlight brightness, when the screen backlight turns ON it will turn bright to this value

39. `BLtTRX` - backlight activation on TX or RX

40. `Beep` - keypad press beep sound

41. `Roger` - roger beep at the end of transmission (OFF/ROGER/MDC1200)

42. `STE` - squelch tail eliminator, eliminates noise at the end of a transmission

43. `RP STE` - repeater squelch tail eliminator

44. `1 Call` - one key call channel, lets you quickly switch to the channel with `9 Call` button

45. `ANI ID` - DTMF communication radio ID

46. `UPCode` - DTMF code that is sent at the beginning of transmission

47. `DWCode` - DTMF code that is sent at the end of a transmission

48. `PTT ID` - sets if `UPCode` and/or `DWCode` should be transmitted

49. `D ST` - DTMF side tone switch, lets you hear transmitted tones in the radio speaker

50. `D Resp` - DTMF decoding response

- `DO NOTHING`: do nothing
- `RING` - Local ringing

- REPLY - reply response
 - BOTH - local ringing + reply response
51. D Hold - DTMF auto reset time
 52. D Pre1 - DTMF pre-load time
 53. D Decd - enables DTMF decoder
 54. D List - list of DTMF constacts
 55. D Live - displays DTMF codes received by radio in the middle of the screen
 56. AM Fix - activates autogain AM fix function
 57. VOX - voice TX activation sensitivity level VOX Setting (OFF/1 .. 10)
 58. BatVol - battery voltage and percentage
 59. RxMode - sets how how the upper and lower frequency is used
 - MAIN ONLY - always transmits and listens on the main frequency
 - DUAL RX RESPOND - listens to both frequencies, if signal is received on the secondary frequency it locks to it for a couple of seconds so you can respond to the call
 - CROSS BAND - always transmits on the primary and listens on the secondary frequency
 - MAIN TX DUAL RX - always transmits on the primary, listens to both
 60. Sq1 - squelch sensitivity level (0=OFF/1 .. 9)

Hidden menu

Hidden menu is activated by holding PTT + SIDE BUTTON 1 while turning on the radio and than Release All Keys.

The number in front of the menu-item-description is an *menu item number* that can be used for quick selection.

61. F Lock - sets the TX frequency band plan.
 - DEFAULT+ (137-174, 400-470) - allows TX on default bands, plus options Tx 200 , Tx 350 , Tx 500
 - FCC HAM (144-148, 420-450)
 - CE HAM (144-146, 430-440)
 - GB HAM (144-148, 430-440)
 - (137-174, 400-430)
 - (137-174, 400-438)
 - DISABLE ALL - disables TX on all frequencies
 - UNLOCK ALL - enables TX on all bands (it has additional lock, read a wiki on [how to](#)

[turn that on\)](#)

62. Tx 200 - enables TX on 200MHz
63. Tx 350 - enables TX on 350MHz
64. Tx 500 - enables TX on 500MHz
65. 350 En - enables RX on 350MHz
66. ScraEn - enables scrambler function
67. BatCal - battery calibration, measure the voltage on the back of the radio, and adjust the value in the menu accordingly
68. BatTyp - battery type, 1600mAh and 2200mAh battery has very different discharge curve, this is used to calculate battery level percentage
69. Reset - resets radio configuration settings
 - VFO - removes only channel settings
 - ALL - resets all radio settings

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Using the Menu

Entering the Menu

Exiting the Menu

Buttons have functions assigned to them, these functions can be activated by either pressing F/# button first, then the function button (I will call it F+ call). Other method is by long pressing the function button alone without F/# . Most buttons replicate the F+ with long press, but some buttons might have assigned different functions for F+ and long press (for example button 5, * and Exit).

Front keypad

M

- short press - enter menu
- short press while channel/frequency scanning - last found channel is preserved on the screen
- long press - user programmable in the menu: M Long

EXIT

- short press - exits current menu/function, deletes one digit in an input box
- long press - deletes all input, exits DTMF input box

UP/DOWN

- Move Upward/Downward in MEnu, Frequency, Settings, etc.

1 BAND

- F+
 - in frequency mode - switches frequency bands 1-7, there is also band 7+ for >1GHz frequencies
 - in channel mode - channel settings are copied to frequency mode
- long press - same

2 A/B

- F+ - switch display upper/lower frequency
- long press - same

3 VFO/MR

- F+ - switch between frequency and channel modes
- long press - same

4 FC

- F+ - turns on frequency and CTCSS copy mode, turn the scan on and start transmitting with the other radio, the frequency and CTCSS code will be detected, you can save those setting with M button
- long press - same

5 NOAA

- F+ - turns on spectrum analyzer
- long press - in channel mode toggles scan lists that the selected channel is assigned to. You will see I and II symbols changing on the right side of the channel label

6 H/M/L

- F+ - toggles power levels for current channel
- long press - same

7 VOX

- F+ - turns on/off VOX mode
- long press - same

8 R

- F+ - turns on reverse mode for channel that have frequency offset set. It will replace TX frequency with RX frequency.
- long press - same

9 Call

- F+ - switches current channel to the 1-Call channel set in the radio.
- long press - same

0 FM

-
- F+ - turns on FM radio
 - long press - same

If FM radio reception is active, it stops when a signal is received on a Frequency/Memory-channel. If that signal stops, the FM radio switches back on after a five seconds. Bij pressing side-button- PTT you also temporary interrupt FM-reception.

* SCAN

- short press - enters DTMF input mode
- F+ - turns on CTCSS scanner for current frequency
- long press - in channel mode turns on channel scanner, in frequency mode turns on frequency scanner. When pressed while channel scan is in progress toggles scan lists 1/2/ALL

F

- short press - toggles function option
- long press - turns on/off key lock

Side buttons

PTT

- Push To Talk button.
- when this button is used to stop channel/frequency scanning, last found channel is preserved on the screen
- held together with Function button II transmits tone 1750Hz
- held together with any of the front keypad buttons transmits DTMF codes

Function button I

- short press - user programmable in the menu: F1Shrt
- long press - user programmable in the menu: F1Long

Function button II

- short press - user programmable in the menu: F2Shrt

- long press - user programmable in the menu: F2Long
- this button can also be used to send tone 1750Hz by holding it together with PTT button

External key

PTT

- Push To Talk button.
- The PTT on external microphone acts different than the internal PTT (side-)button. On external PTT the TX waits until no RX-signal is received.

Custom button functions

3 buttons can have its function changed. To change the function go to menu:

- F1Shrt - side button 1, short press
- F1Long - side button 2, long press
- F2Shrt - side button 1, short press
- F2Long - side button 2, long press
- M Long - menu button, long press

Available functions:

- NONE - no action
- FLASH LIGHT - switch to the next flashlight function: on / flash / SOS / off
- POWER - switch radio output power: L (low) / M (medium) / H (high)
- MONITOR - switch monitor mode on/off
- SCAN - start channels/frequency scanning
- VOX - turn voice activation function on/off
- FM RADIO - turn FM radio on/off
- LOCK KEYPAD - lock/unlock the keypad
- SWITCH VFO - change main VFO to upper/lower
- VFO/MR - change current VFO mode, frequency mode or channel mode
- SWITCH DEMODUL - switch to the next demodulation mode (FM/AM/USB)

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F # 

Side buttons

PTT

Function button I

Function button II

External key

PTT

Custom button functions

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* SCAN

Add a custom sidebar

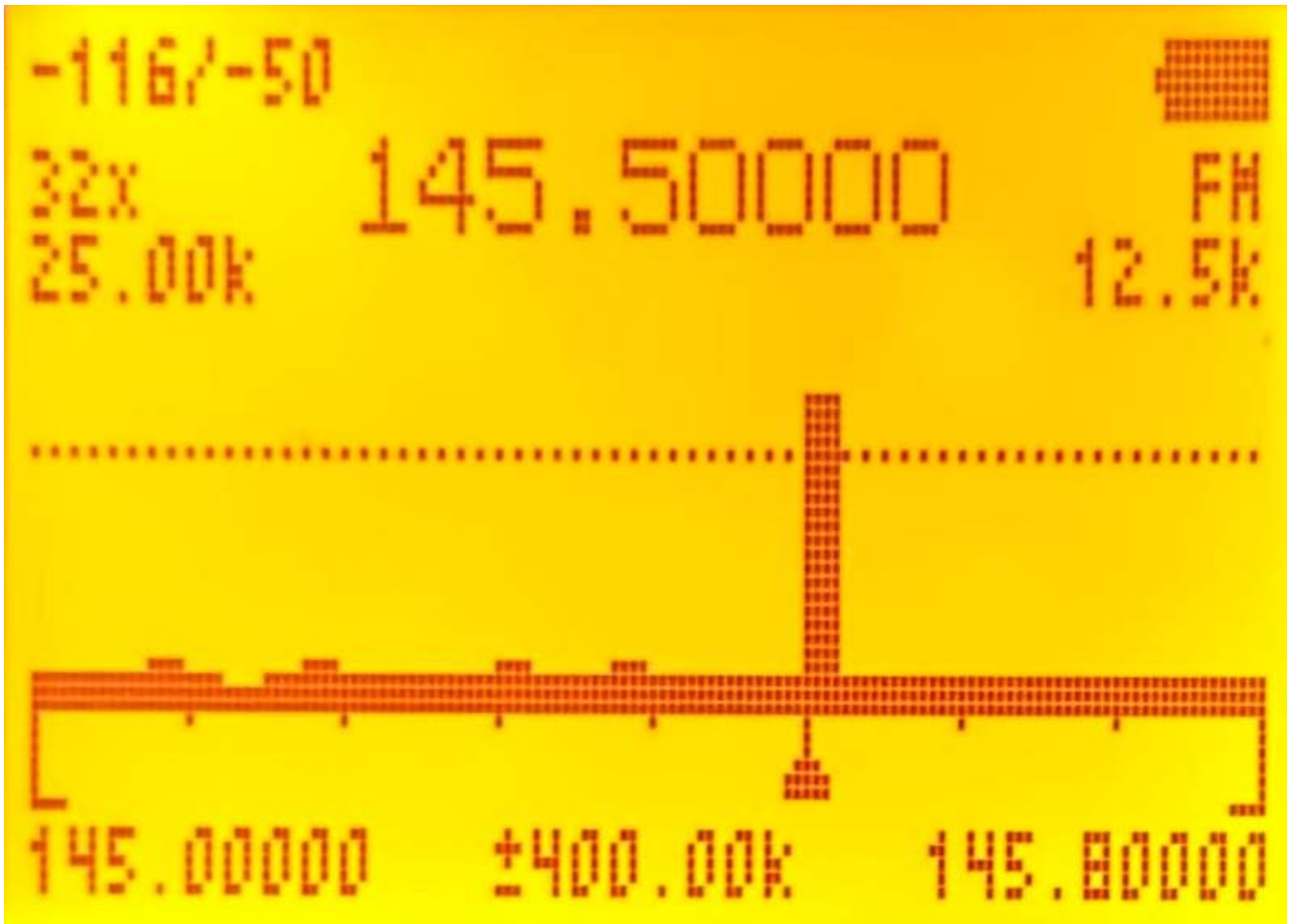
Clone this wiki locally

<https://github.com/egzumer/uv-k5-firmware-custom.wiki.git>

Spectrum Sweep screen

Press **F + 5 NOAA** to turn on the **Spectrum analyzer**.

The current VFO/Memory frequency is the **start frequency** of the spectrum sweep

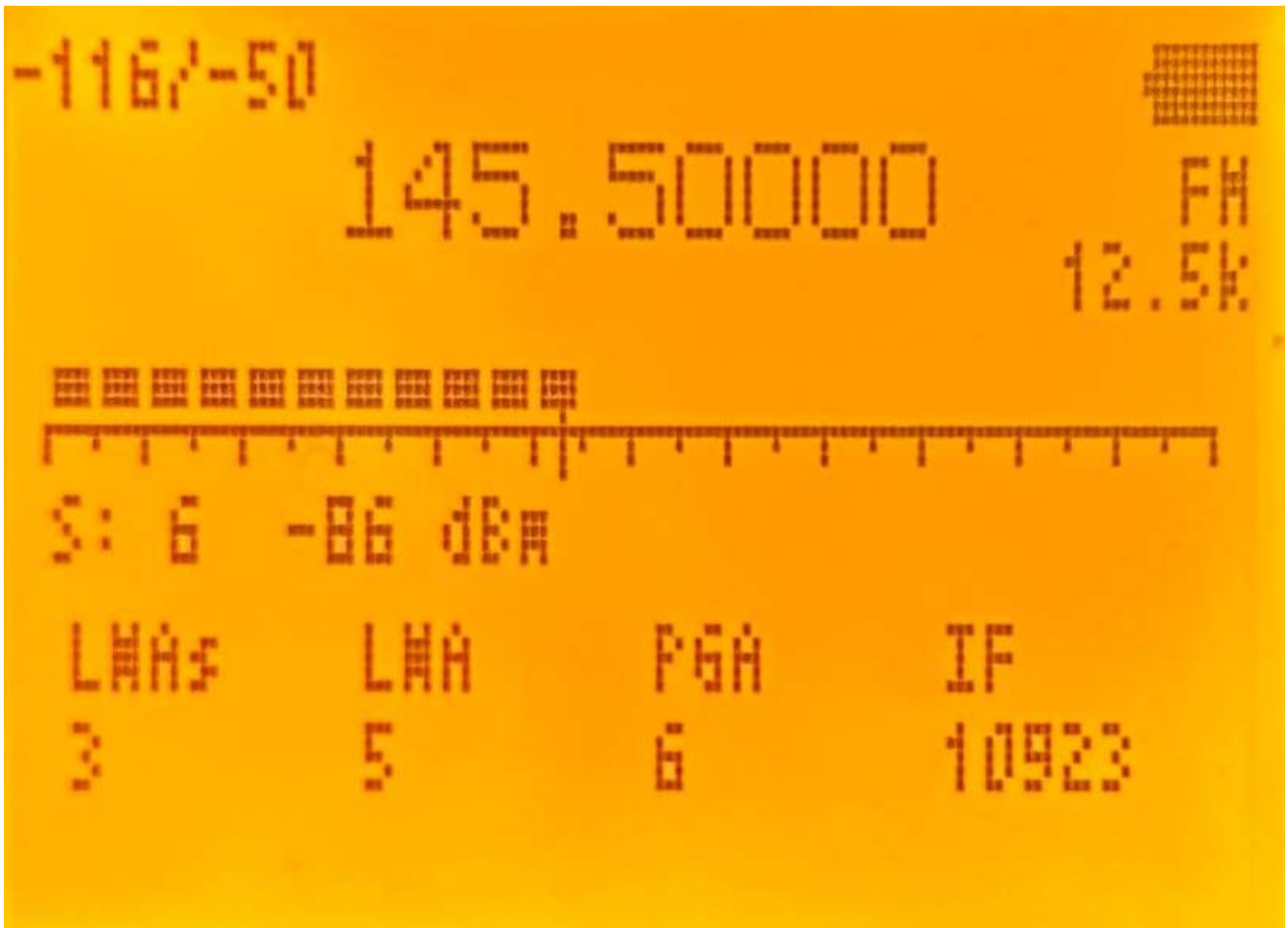


Button functions

- 1 / 7 - increase/decrease the channel separation of a single bar in the graph (typically 25.0 kHz)
- 4 - changes the number of channels to scan and toggles number of bars in the graph (typically 128x)
- 2 / 8 - increase/decrease frequency step size for UP/DOWN
- 5 - Shows a frequency input box to enter the lower sweep frequency. Enter the Mhz using the keyboard and press M. Frequency in decimals can be entered with use of *
- 3 / 9 - increase/decrease maximum dB value (vertical scale)
- 6 - toggle receiver bandwidth
- * / F - increase/decrease squelch level
- 0 - toggle modulation type (FM/AM/USB)
- Side Button I - exclude current frequency in the spectrum scan

- Side Button II - toggle backlight
- EXIT - exits to the previous screen/function
- PTT - switch screen to **detail monitoring** of last received frequency (see below)

Detail Monitor screen



Button functions

- M - Scrolls through the parameters displayed at the bottom of the screen which can be adjusted with UP/DOWN

LNA\$ - Low Noise Amplifier \$

LNA - Low Noise Amplifier

PGA - Programmable Gain Amplifier

IF - Intermediate Frequency

- EXIT - exits to the previous screen of the spectrum analyzer

Flashing firmware is possible with a separate program, but can now be done much more easily from your web browser.

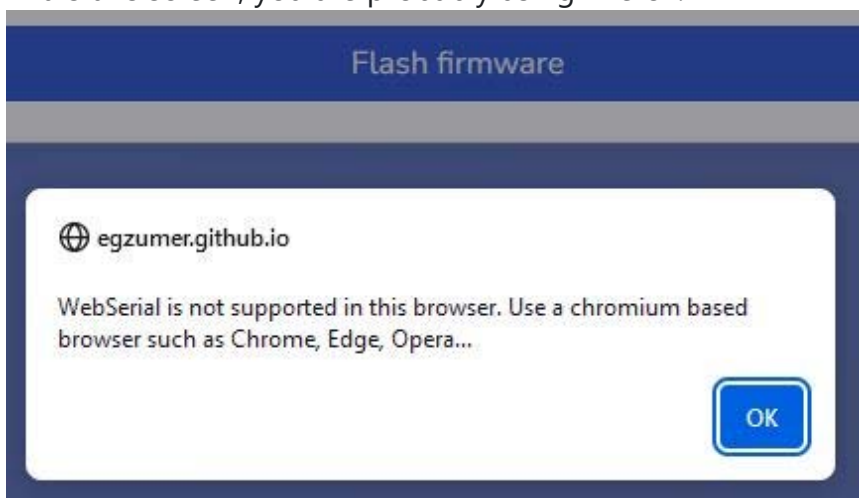
Just goto the page with official released [egzumer firmware releases](#).

- First put the UV-K5 in programming mode (press PTT and turn on the UV-K5 and check that the **white LED** lights up).
- Now connect the programming interface and a **blue LED** also lights up.
- Select the latest/desired firmware and look for **FLASH WITH A BROWSER** and the build-in *UV-mod-programming-page* start. Just wait a moment and the firmware is loaded, or select a different file from your PC.



- Press flash firmware and a screen pops-up.

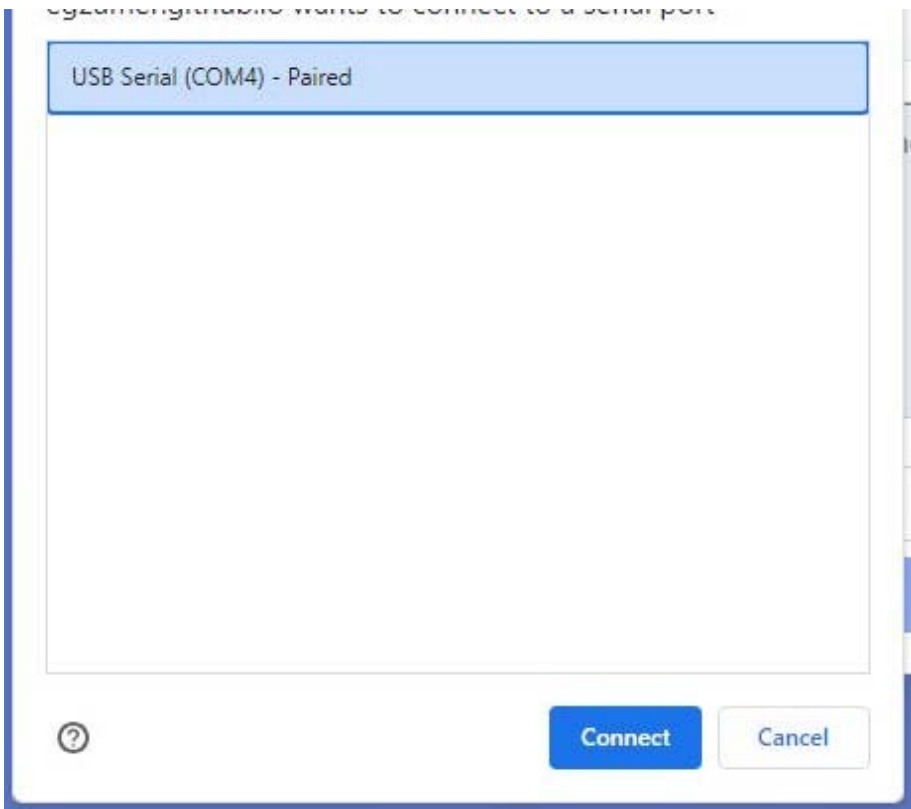
If it is this screen, you are probably using Firefox.



Solution is to use Chrome. And than you can continue with ..

- Select the Com-port where the programming-interface is connected.

egzumer.github.io wants to connect to a serial port



- Press Connect and programming starts (White LED starts flashing) and view the progress in the browser-screen
- Just wait ... until

Flashing... 100%
Successfully flashed firmware.

When finished, disconnect the programming interface and *enjoy a new release version ;-)*

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Differences from QS stock firmware

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egzumer edited this page 2 days ago · 1 revision

Not all original features are available in this firmware.

Because the size of the firmware is limited (60kB), not all functionalities may be available in the firmware. That is why a choice was made so that other functionality could be realized in the radio. The menu has also been adjusted as a result. See [Menu](#) for a current description.

The most important differences compared to the original firmware are:

```
ENABLE_AIRCOPY := 0
```

```
ENABLE_NOAA := 0
```

```
ENABLE_VOICE := 0
```

```
ENABLE_ALARM := 0
```

```
ENABLE_TX1750 := 0
```

```
ENABLE_PWRON_PASSWORD := 0
```

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