Custom Bootloader with Multiple Firmwares on Quansheng UV-K5 UV-K6

> Disclaimer
>
> Instructions written by SV2TLJ - 25/1/2025
> I'm not associated with the tools mentioned below and I'm not responsible for any damage may be caused to your device.

This method allows us to store up to 4 firmwares in EEPROM and select which one to flash on the go. The selection is done through a list menu and allows us to switch between firmwares without a computer.

You will need:

- 2x 2Mib EEPROM chips (M24M02, AT24CM02, BL24CM02A)
- Soldering Iron
- ST-Link and four wires with female Dupont
- Chrome based browser

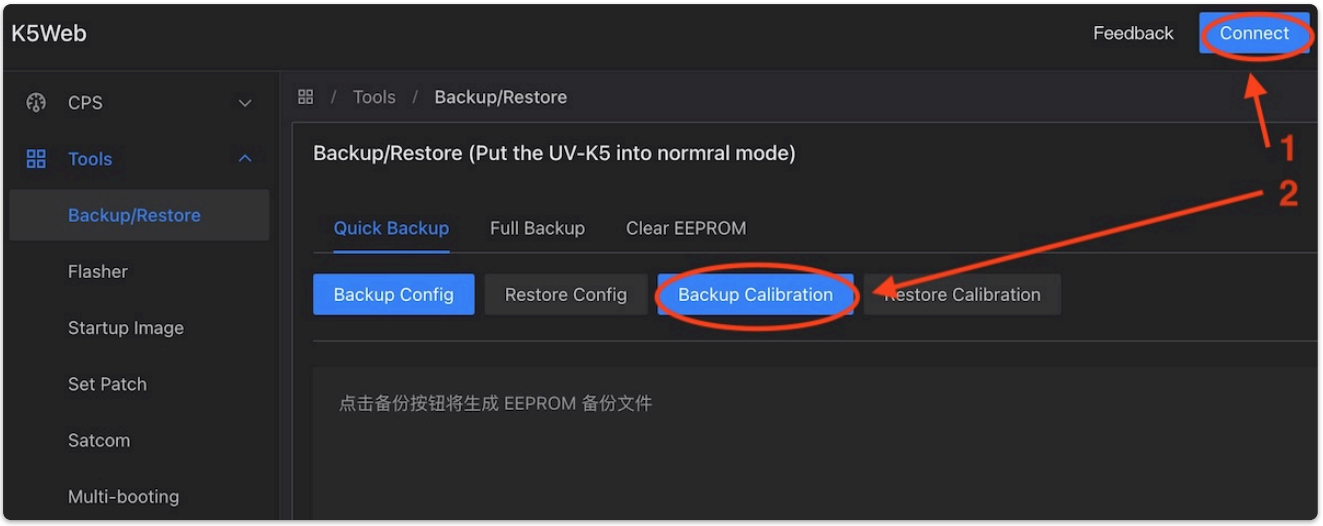
Install EEPROM

Backup Calibration Data

> ⚠ Don't miss this step. Always keep a backup of calibration data.

Use k5prog-win or K5Web to backup calibration.

1. Turn on the radio in *normal mode* and connect the USB cable
2. Click on `Connect` and then `Backup Calibration`
3. Optionally backup configuration data.



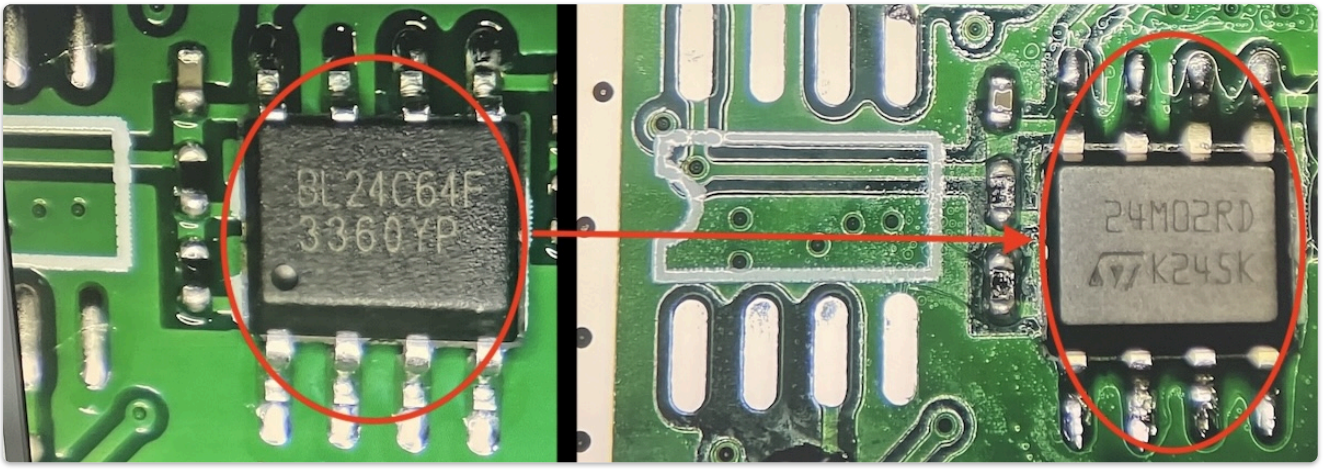
Solder EEPROM chips

1. Remove the PCB

The EEPROM is located at the back of the PCB. There are 5 screws (2 of them are located behind the LCD).

2 Replace the EEPROM

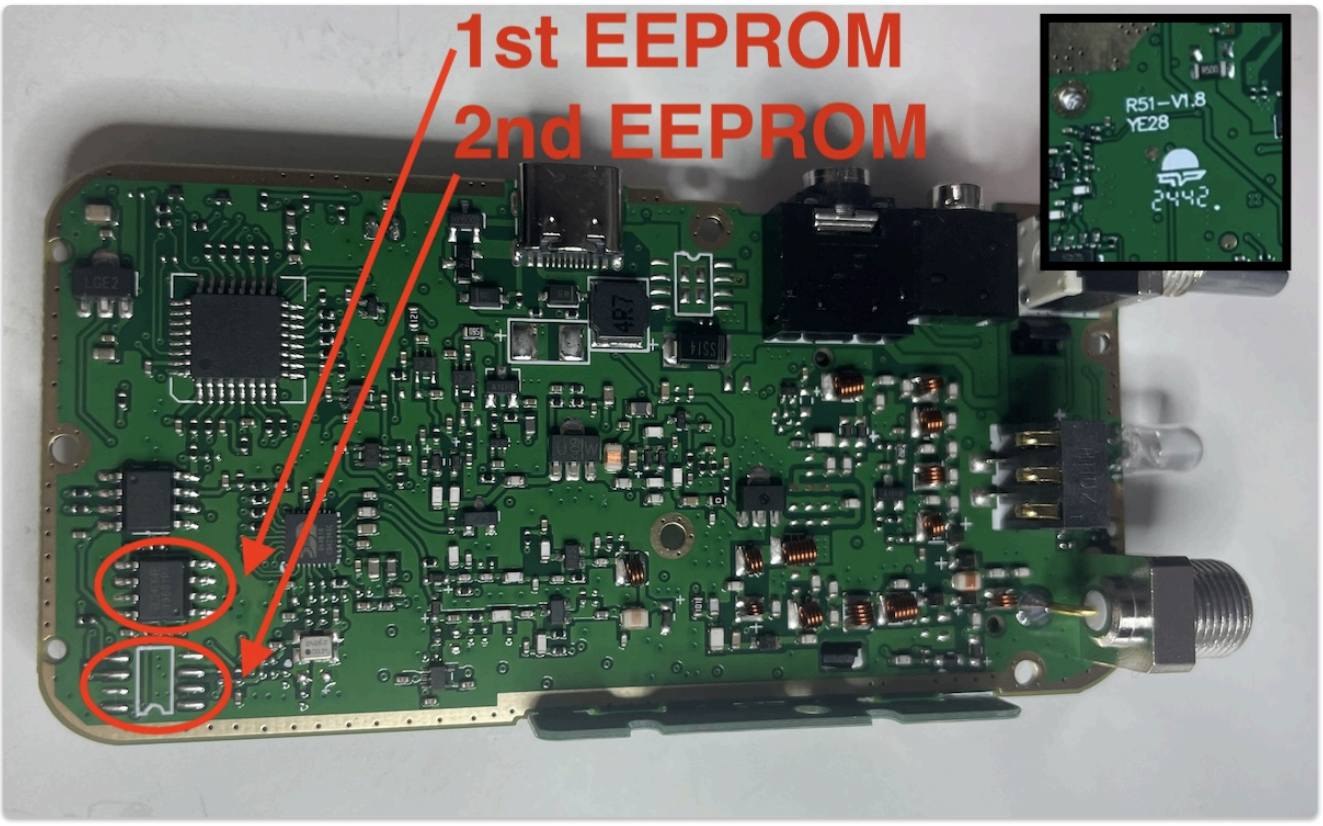
Desolder the original chip BL24C64 (64Kb) and solder the 2Mib chip. Be careful to keep the same orientation.



3. Add the second EEPROM

The radio I modded is a UV-K5(99) and it came with a PCB version R51-V1.8. On this PCB there is already a populated footprint for another EEPROM.

> For other PCB versions:
> If there is not a location to solder the 2nd chip, you need to solder jumper wires between the two chips. Connect all the pads of the two chips in parallel (pad 1 to pad1, pad 2 to pad 2 e.t.c), except pad 3.
> Pad 3 on the 1st EEPROM is connected to ground. Pad 3 on the 2nd EEPROM should be pulled up to Vcc. Put a jumper or a 10K resistor between pad 3 and pad 8 on the 2nd chip.



Bootloader with multiple firmwares

ⓘ Bootloaders info from developer:

Bootloader A (4KB)

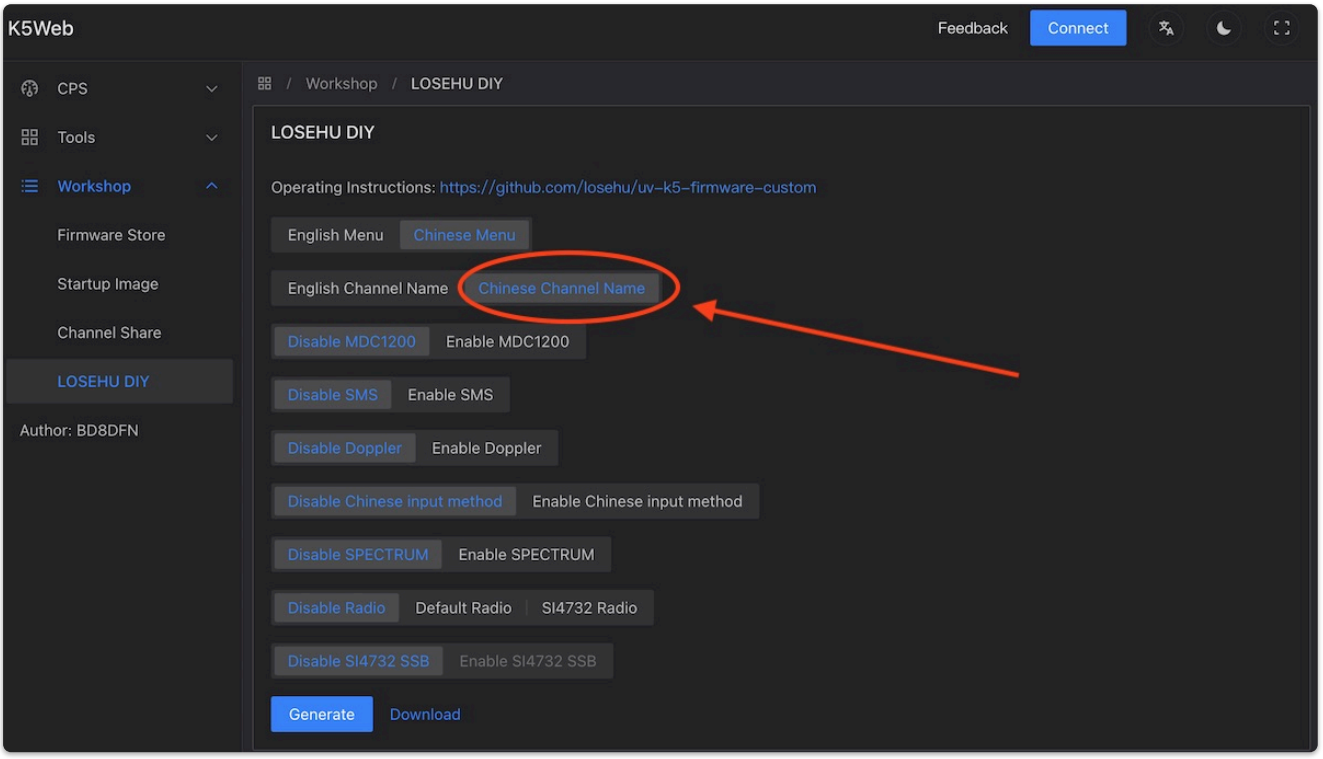
- Programmed using STLINK to replace the original bootloader.
- Main functions:
  - Press MENU while powering on: Load Bootloader B from EEPROM into RAM and execute Bootloader B in RAM.
  - Press PTT while powering on: Enable firmware upgrade via the serial port.

Bootloader B (about 12KB)

- Stored in EEPROM.
- Main functions:
  - Select the firmware to load via the UI.
  - Read the selected firmware from EEPROM and write it to flash memory for the next boot.

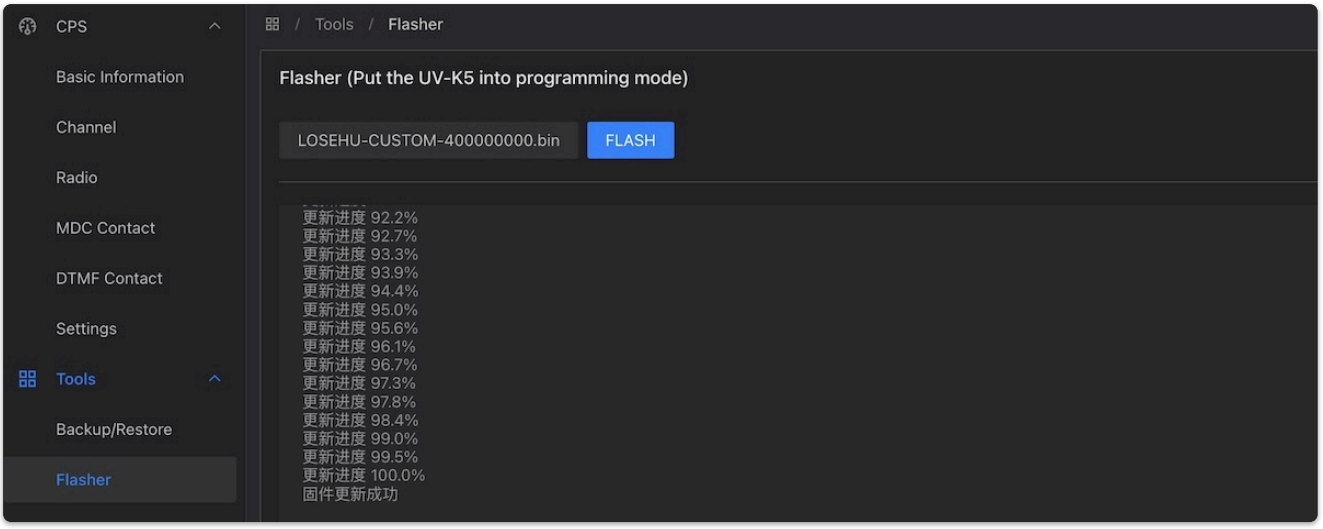
1. Flash the losehu firmware

Go to LOSEHU DIY and select the `Chinese Channel Name`. This firmware requires a 4Mib EEPROM installed and its name ends with `400000000`.

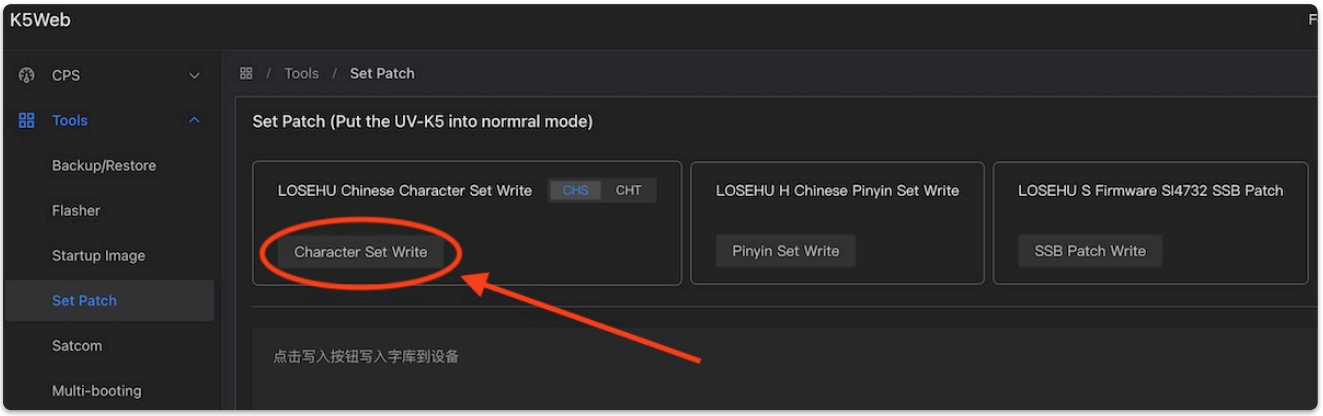


You need to flash this firmware to access the 4Mib EEPROM and write the firmwares of your choice.

Click on `Download` to flash it with the tool of your choice or `Generate` to go directly to K5Web Flasher. Put the radio in *flash mode* and flash the firmware.

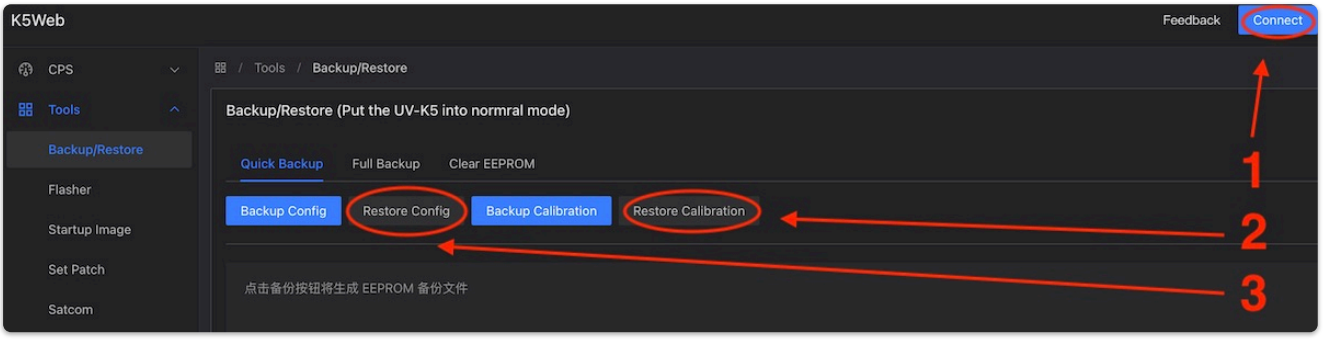


Optionally install the Chinese font library if you intend to use this firmware.

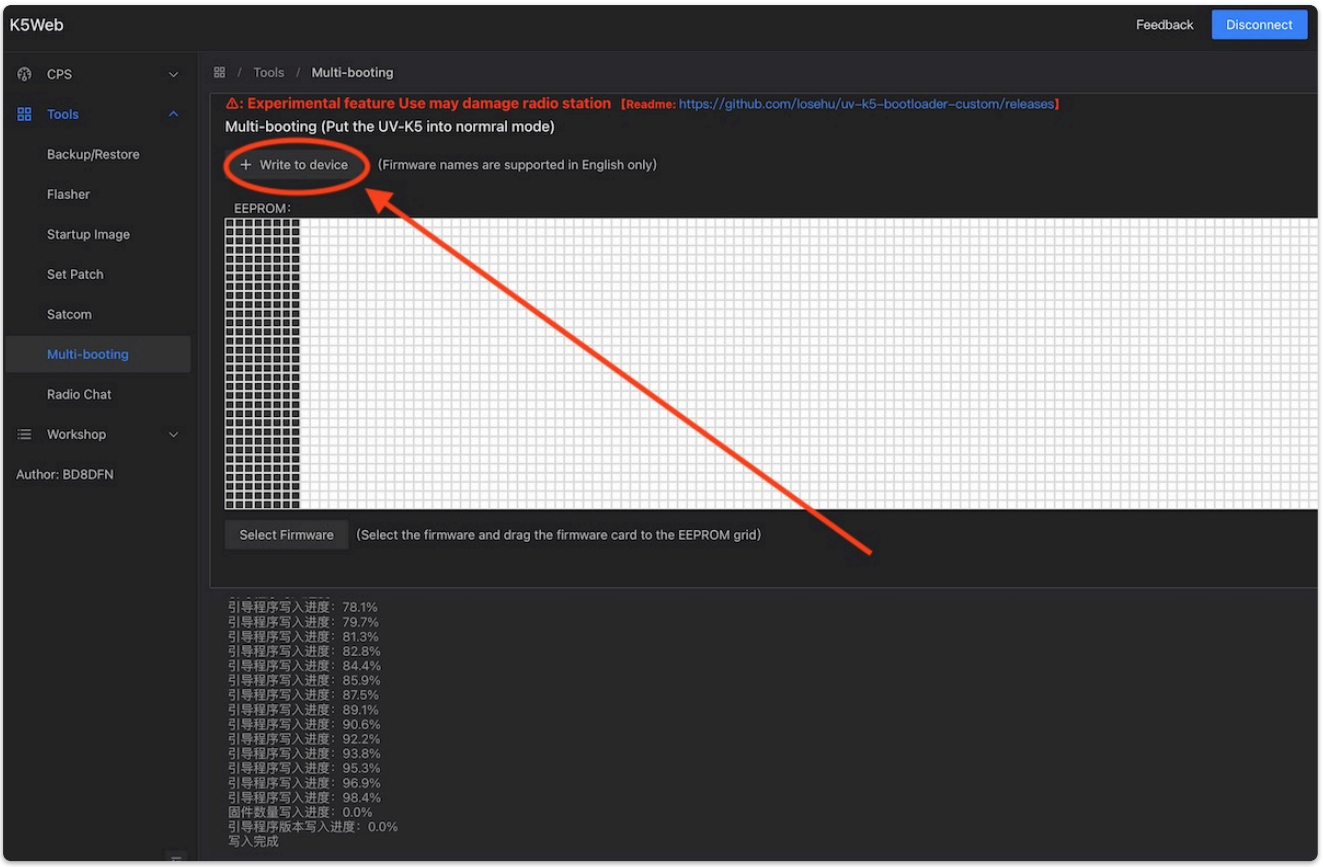


2. Restore calibration and configuration

In Backup/Restore tool, Connect the radio in *normal mode* and `Restore Calibration`. Optionally you can click on `Restore Config` to restore your previously saved configuration.

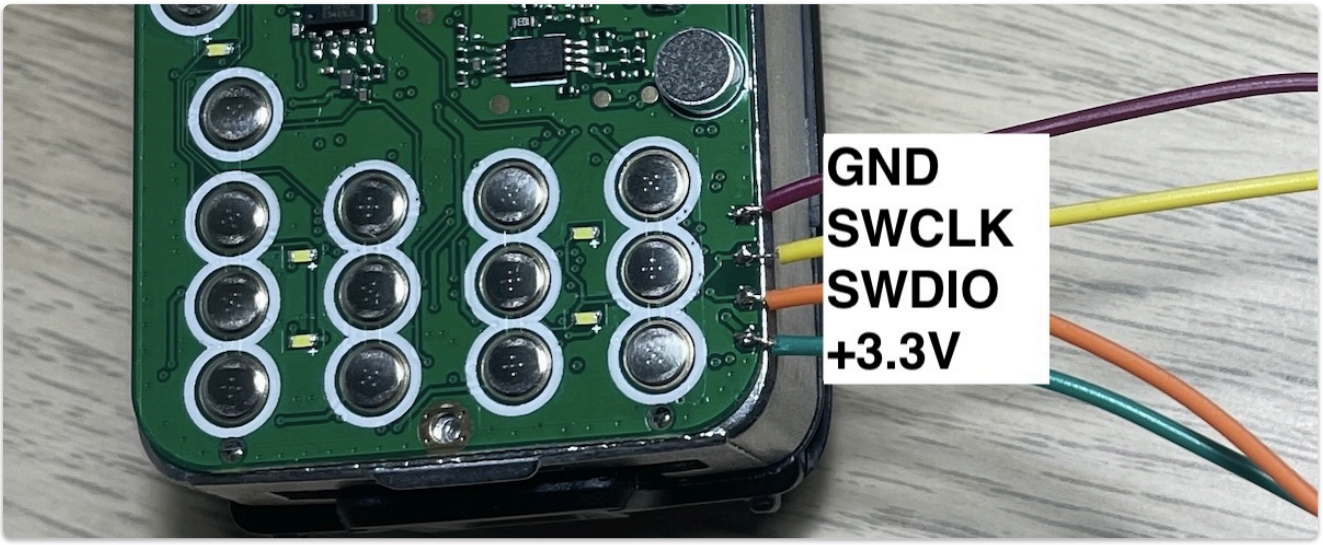


With the radio connected in *normal mode* open Multi-booting tool and click `Write to device`.



4. Replace the official bootloader

4.1 Solder the 4 wires for the ST-Link

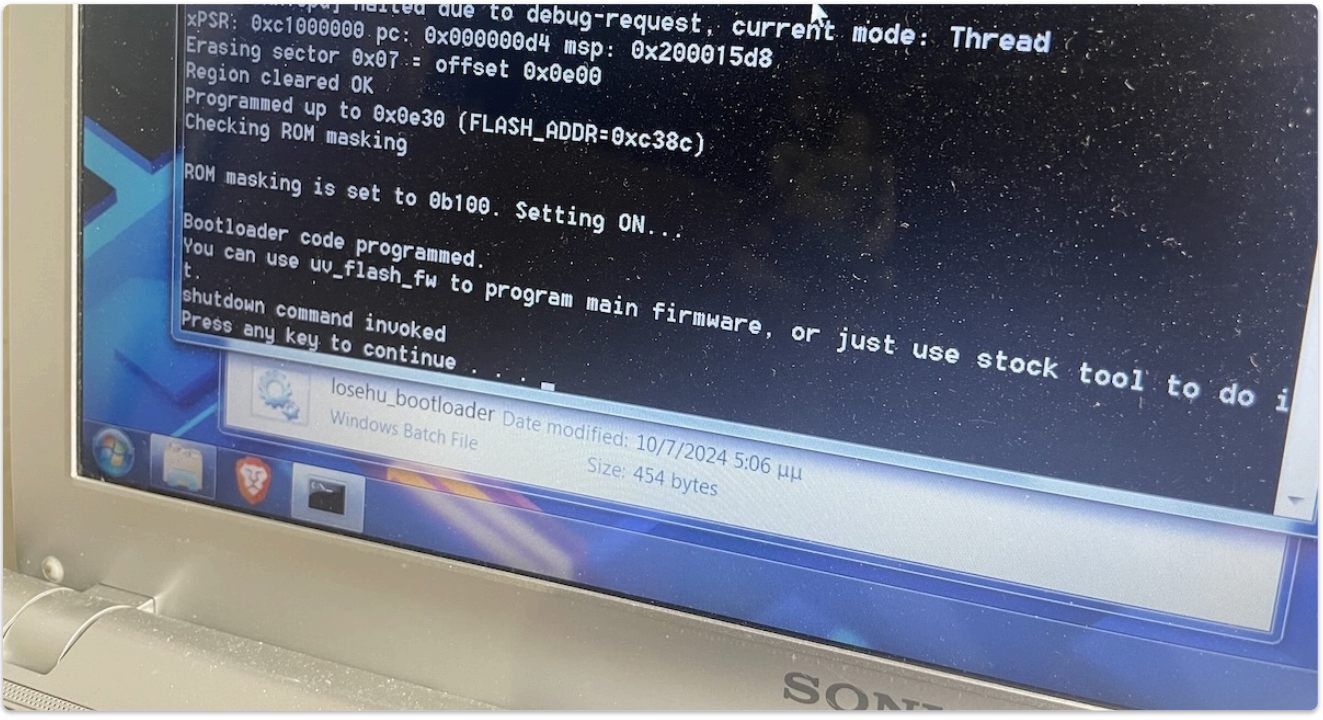


4.2 Connect with computer

Download and install the ST-Link driver
Connect with the ST-Link and turn on the radio in *flashing mode*.

4.3 Flash the losehu bootloader

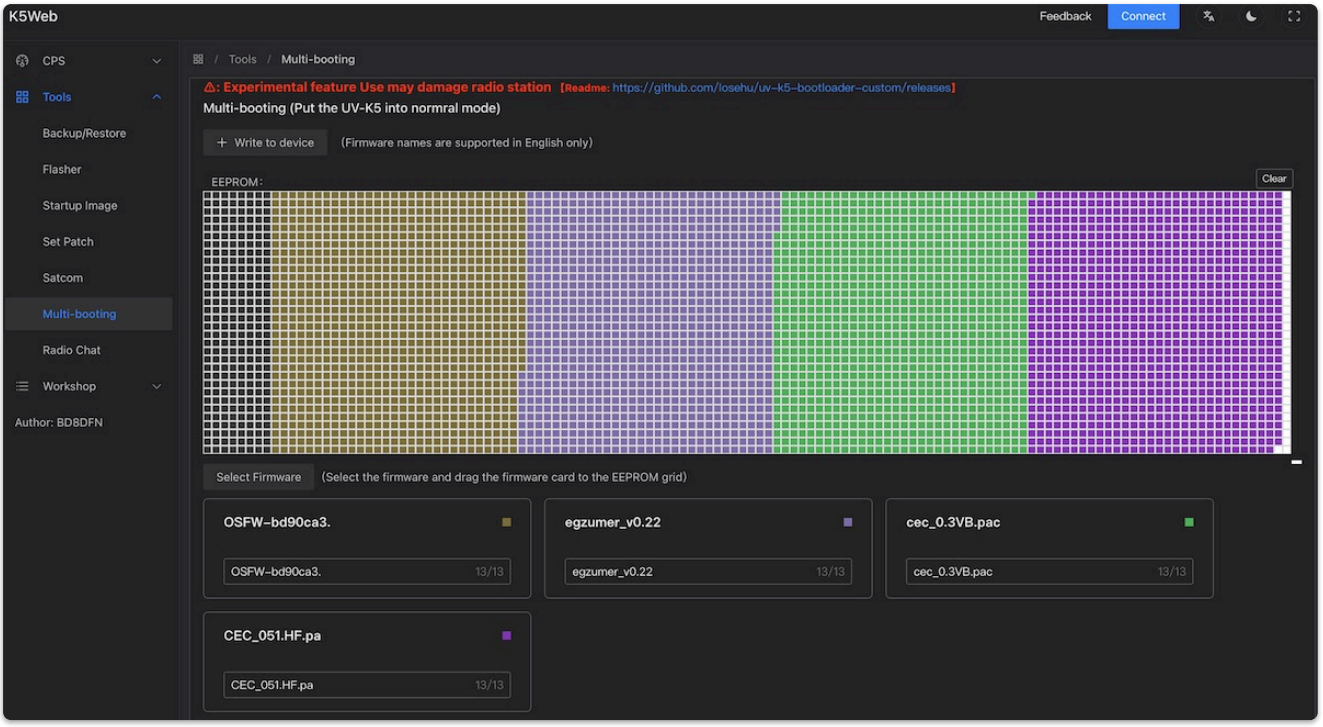
Download the latest bootlader.
Run `losehu_bootloader.bat` (found in bl-toolkit folder)



5. Write firmware in EEPROM

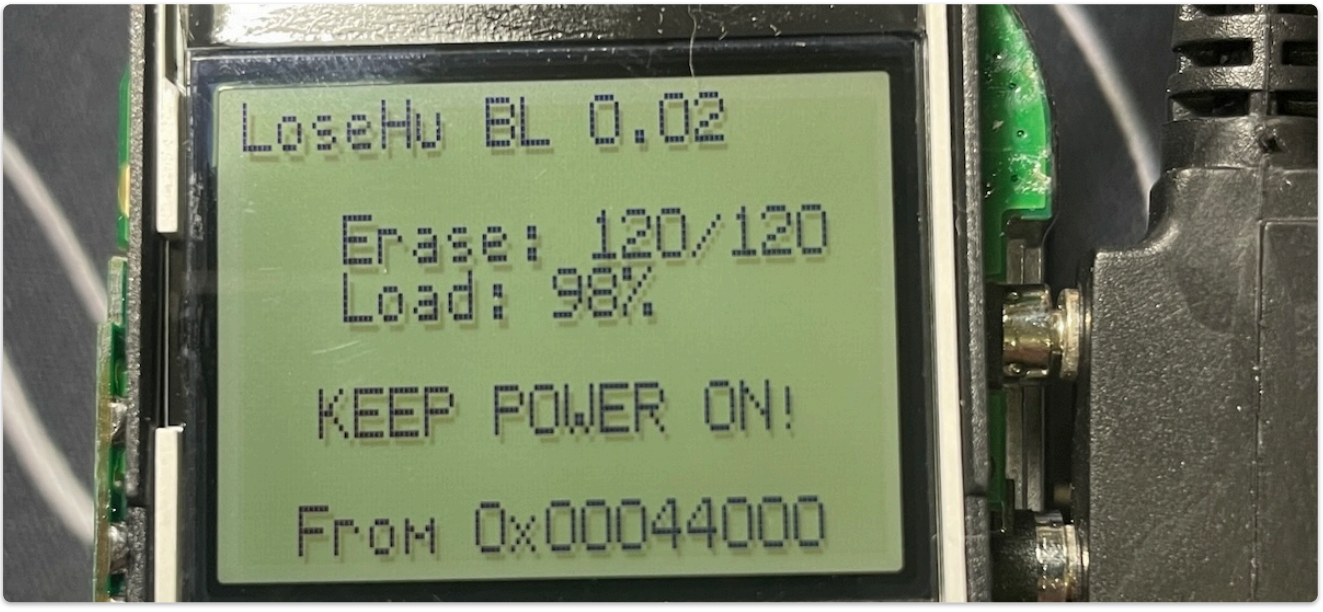
Use Multi-booting tool with the radio connected in *normal mode*.
Click `Select Firmare` and open the firmwares you want to write (up to 4 files).
Drag each one on the first white square.
Click `Write to device` to write all of them.

> ℹ You need to have losehu firmware flashed to use K5Web Multi-Booting tool.



6. Test flashing using EEPROM

Turn on the radio with the `Menu` button pressed. You should see a list of the installed firmwares in EEPROM. Select you choice with the arrows and use the `Menu` button to start flashing. If it stucks for a while and it's not rebooting you might have forgotten to restore the calibration data.



🐞 Bootloader issues

If you have any issues with the bootloader you can restore the official bootloader.
Run `qs_bootloader.bat` (found in bl-toolkit folder)

Useful links

losehu uv-k5-firmware-custom - README en
losehu uv-k5-bootloader-custom - README en - Instructions in Chinese

Tools:

- K5Web
- k5prog-win