

# Kiisu Development Board v4b

## User Manual

## Quick Start Guide

Rainwalker OU, 2025

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Find the latest version here: <https://github.com/kiisu-io/kiisu4>

# Cautions and warnings

1. This is a development board **intended for experienced users**; it is not a toy and not a consumer product.
2. The **development board can contain small and/or dangerous parts** and **must be kept away from children**.
3. Use **only LIR2032 batteries**, never use CR2032 or another types on coin cell batteries.
4. Development **board can emit radio frequency signals**. Users are responsible for complying with local EMI regulations.

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## 1. Overview

Kiisu is a development board with two STM32 MCUs, OLED screen, Bluetooth, RFID, NFC and SubGhz modules that can be used directly for experimenting with different wireless technologies and can run most of Flipper Zero firmware and apps.

## 2. Quick Start with Kiisu Firmware

Board ship tested and preflashed with Kiisu Firmware. Follow these steps:

1. **MicroSD-Card.** If you bought “prepared SD card to Kiisu”, just get it from storage holder and insert into Kiisu board. If not:

- a. Obtain any microSD card (even 1 Gb will be enough) and
- b. Format microSD card in FAT32 using your computer or phone.
- c. Download “kiisu.sdcard.zip” from GitHub  
<https://github.com/kiisu-io/kiisu-firmware/releases/>
- d. Extract contents of this archive to your microSD card.
- e. Insert this card into Kiisu (2) **before** powering on.

If you can't or don't want to go this way, you may install empty microSD, format it with Kiisu and then update firmware. Read the manual for detail.

2. **Battery.** If your board shipped with battery, just pull-out isolation sticker. If not, obtain LIR2032 (**not CR2032 nor other types**) and insert it into holder (9). You can also power from USB only without battery.
3. **Switch board on.** Use switch on the top of the board (5) and demonstration firmware based on Flipper Zero firmware should start.

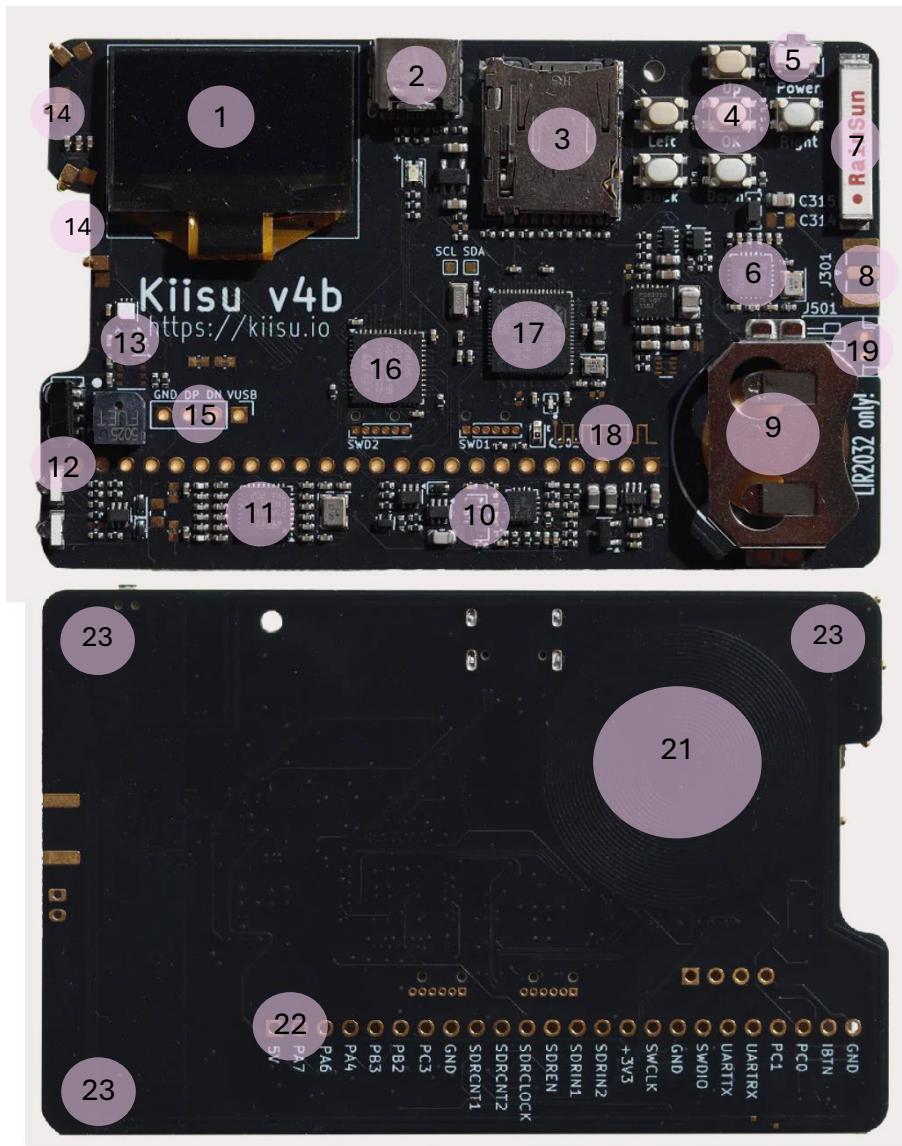
4. **Read the docs** here <https://docs.flipper.net/> to know more about different functions. Please note that Kiisu is not a “Flipper clone” and there are some limitations, you can read about it below.
5. **Read this manual** to know more about your board, updating firmware for Main and aux MCU, using external antenna or battery and much more.
6. **Print a case** if you want protect the board using your 3D printer and files from here:  
<https://www.printables.com/@planmarks/collections/2364779>  
<https://makerworld.com/ru/collections/6517412-kiisu-devboard>
7. **Updating firmware** is not necessary for starting, but you can do this using the same tools as for Flipper Zero. For example, you can find the instructions and files here: <https://github.com/kiisu-io/kiisu-firmware> and more links and information in the manual below.
8. **Go deeper** examining Kiisu schematics and docs that can be found here <https://github.com/kiisu-io/kiisu4> or write your own firmwares for Aux or Main MCU. You can use any tools for STM32 such as STM32Cubelde or Visual Studio with VisualGDB. Project for.
9. **Join the community** to ask questions, find answers or share your ideas by joining our Discord <https://discord.gg/kiisu>.
10. **Contact the support** if your board isn't working or you still have questions by writing an email to [mail@kiisu.io](mailto:mail@kiisu.io)

### 3. Useful links

- <https://discord.gg/kiisu> - our Discord with community.
- <https://kiisu.io/kiisu-v4b/> - our website.
- <https://store.rainwalker.ee/> - our online store.
- <https://github.com/kiisu-io> - our GitHub.
- <https://github.com/twoelw> - useful apps and firmwares for Kiisu.
- [https://t.me/kiisu\\_io](https://t.me/kiisu_io) - our Telegram channel.
- <https://docs.flipper.net/> - great Flipper Zero documentation to know more

about Bluetooth, RFID, NFC, IR and other technologies and how to interact with it using compatible firmware on Kiisu board.

## 4. Take a closer look at the board



1. OLED 128x64 screen, SSD1306 compatible in SPI mode.
2. USB Type C connected to Main MCU (17), supports charging of LIR2032 battery (9).
3. microSD Card slot.
4. Control buttons.
5. Power On button.
6. SubGhz transceiver CC1101.
7. Internal 433 MHz antenna for CC1101.
8. Place for SMA connector for external antenna.
9. LIR2032 battery connector. **Do not use another type of coin cell batteries!**
10. RFID reader and emulator with built-in antenna (21).
11. NFC reader and emulator ST25R3916 with built-in antenna (23).
12. Infrared receiver and transmitter.
13. GXHTC3C temperature and humidity sensor installed.  
The digital accelerometer and compass LSM303AGR may or may not be present, depending on the board revision, but can be soldered on by the user. The BME680 gas sensor, measuring humidity, pressure, temperature, and VOCs, is also user-solderable.
14. iButton memory reader and emulator pins.
15. USB header connected to Aux MCU (16).
16. Aux MCU STM32G431CBU6 up to 170 MHz
17. Main MCU STM32WB55RGV6 up to 80 MHz
18. Ambient light sensor.
19. Place for li-ion battery connector.
22. GPIO pins.

## 5. Schematics and docs

Board schematics, latest version of this manual can be found here:

<https://github.com/kiisu-io/kiisu4>

Aux MCU firmware can be found here:

<https://github.com/kiisu-io/kiisu4-companion-fw>

This aux MCU firmware lets you run and develop any Flipper Zero firmware, with some restrictions. (**Note:** Rainwalker OU and Kiisu board are NOT affiliated with Flipper Zero Devices Inc or team).

Our fork of official Flipper Zero Firmware can be found here:

<https://github.com/kiisu-io/kiisu-firmware>

## 6. Limitations of compatibility

Although this board can run almost any Flipper Zero firmware, there are a few limitations:

1. It lacks Flipper Zero secret keys, so some SubGhz protocols and U2F may not work with official firmware.
2. Antennas performance may vary.
3. Certain schematic differences mean features like battery status rely on Aux MCU firmware.
4. This is a development board, not a finished consumer product.

## 7. Powering on

Board can be powered from USB (2), from Li-Ion battery LIR2032 (9) and external Li-Ion battery.

In the case of USB, the board will turn on automatically and will remain powered until there is USB voltage. In case of LIR2032, users should press Power On button (5). Board power than controlled by Aux MCU.

## 8. Updating or installing Kiisu or Flipper compatible firmware

Go to the firmware's GitHub and follow the instructions. Here are some examples of firmware, but you can use any others.

Kiisu: [kiisu-io/kiisu-firmware](https://github.com/kiisu-io/kiisu-firmware): Kiisu firmware source code based on Flipper Zero OFW

Kiisu Momentum: [twoelw/Kiisu-Momentum-Firmware](https://github.com/twoelw/Kiisu-Momentum-Firmware): ⚡ Feature-rich, stable and customizable Kiisu Firmware (made to use with enhanced-kiisu4-fw)

Unleashed: [DarkFlippers/unleashed-firmware](https://github.com/DarkFlippers/unleashed-firmware): Flipper Zero Unleashed Firmware

## 9. Entering DFU Mode on Main MCU

The firmware of the main microcontroller can be updated at any time using the DFU mode, regardless of whether the debug board is able to boot or not.

Follow these steps to enter DFU mode on main MCU:

1. Disconnect USB and remove the battery.
2. Hold the OK Button (4).
3. Connect Kiisu USB Type C to the PC (2).
4. The main MCU will switch to DFU mode,  
The screen stays blank this time.
5. Update firmware using Flipper Lab (see links above),  
STM32CubeProgrammer, qFlipper, or similar tools.

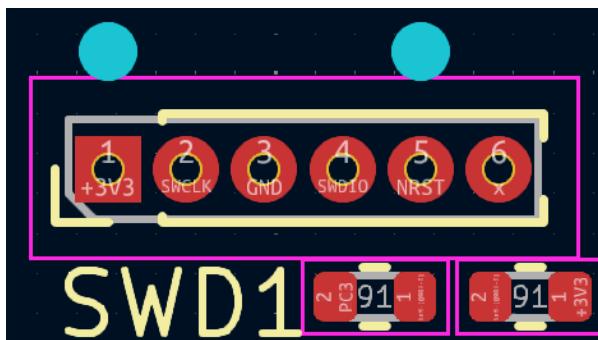
## 10. Entering DFU Mode on Aux MCU

The firmware of the auxiliary microcontroller can also be updated in DFU mode, but this will require making an adapter or temporarily soldering a cable to the USB contacts (15) on the board.

1. Disconnect all USB and remove battery.
2. Press and hold Back Button (4).
3. Connect USB Type C (2).
4. Connect USB cable to Aux USB pins (15). You need to prepare this cable by yourself.
5. Aux MCU will enter in DFU mode and can be updated by STM32CubeProgrammer and other software.

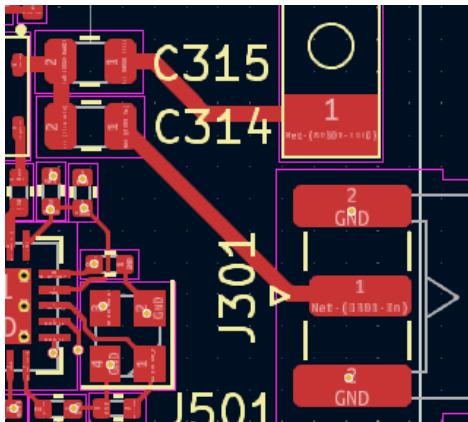
## 11. Updating and debugging Main and Aux MCU with ST-Link or other debugging tools

Connect ST-Link or another debugger to the 1x6, 1 mm-pitch SWD1 (main MCU) or SWD2 (aux MCU) header. Here is the pinout:



- 1 – Voltage reference for debugging tool
- 2 – SWD Clock
- 3 – Ground
- 4 – SWD IO
- 5 – Reset
- 6 – Not used

## 12. Connecting external antenna to CC1101 transceiver

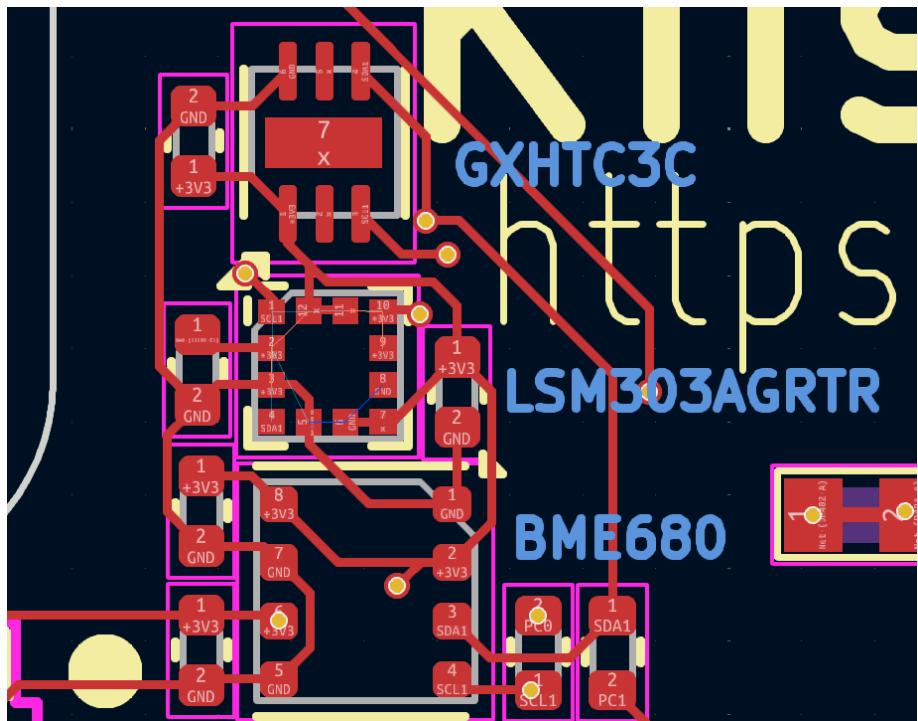


1. Get an SMA Board Edge connector.  
For example: <https://www.adafruit.com/product/1864> or  
<https://eu.mouser.com/ProductDetail/TE-Connectivity-Linx-Technologies/CONSMA020.042-G>
2. Solder the connector to J301.
3. Move capacitor from C315 to C314 to turn off internal antenna and external. This is 100 pF 0805 capacitor.
4. Find an antenna with an SMA (not RP-SMA) connector for the frequency you need (315, 433, 868, 915 MHz). Keep in mind that antennas are usually optimized for only one frequency.  
For example, antenna for popular USM band 433 MHz  
<https://eu.mouser.com/ProductDetail/Siretta/DELTA22-X-SMAM-S-S-20>
5. Connect the antenna
6. If you need to switch back to internal antenna, move capacitor from C314 to back again. You can leave SMA socket in place. Do not connect both antennas same time, this will result in poor performance.

## 13. Soldering BME680 or LSM303AGR

The BME680 gas sensor (measuring humidity, barometric pressure, temperature, and VOCs) can be user-installed; see placement and orientation details below.

If your board lacks an LSM303AGR, users can also solder it on.



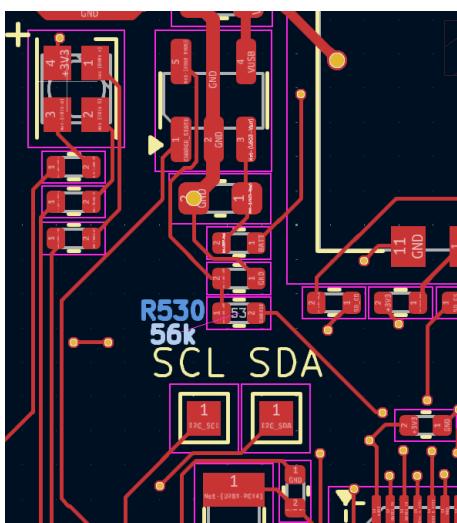
## 14. Connecting external li-ion battery



It is possible to power Kiisu board from external battery.

**Improper use of an external battery may harm you, your board, or the battery. Only proceed if you're confident in your knowledge.**

1. Remove LIR2032 battery from holder, disconnect USB.
2. Desolder LIR2032 holder.
3. Solder JST\_PH\_S2B-PH-K to J501 (or solder battery directly).
4. **DOUBLE CHECK polarity of your battery (marked blue on picture above) and battery type (only li-ion with charging voltage 4.2V).**



The charger uses MCP73831T-2ACI/OT; charging current is set by resistor R530 (default 56k, ~20 mA). Do not adjust for LIR2032.