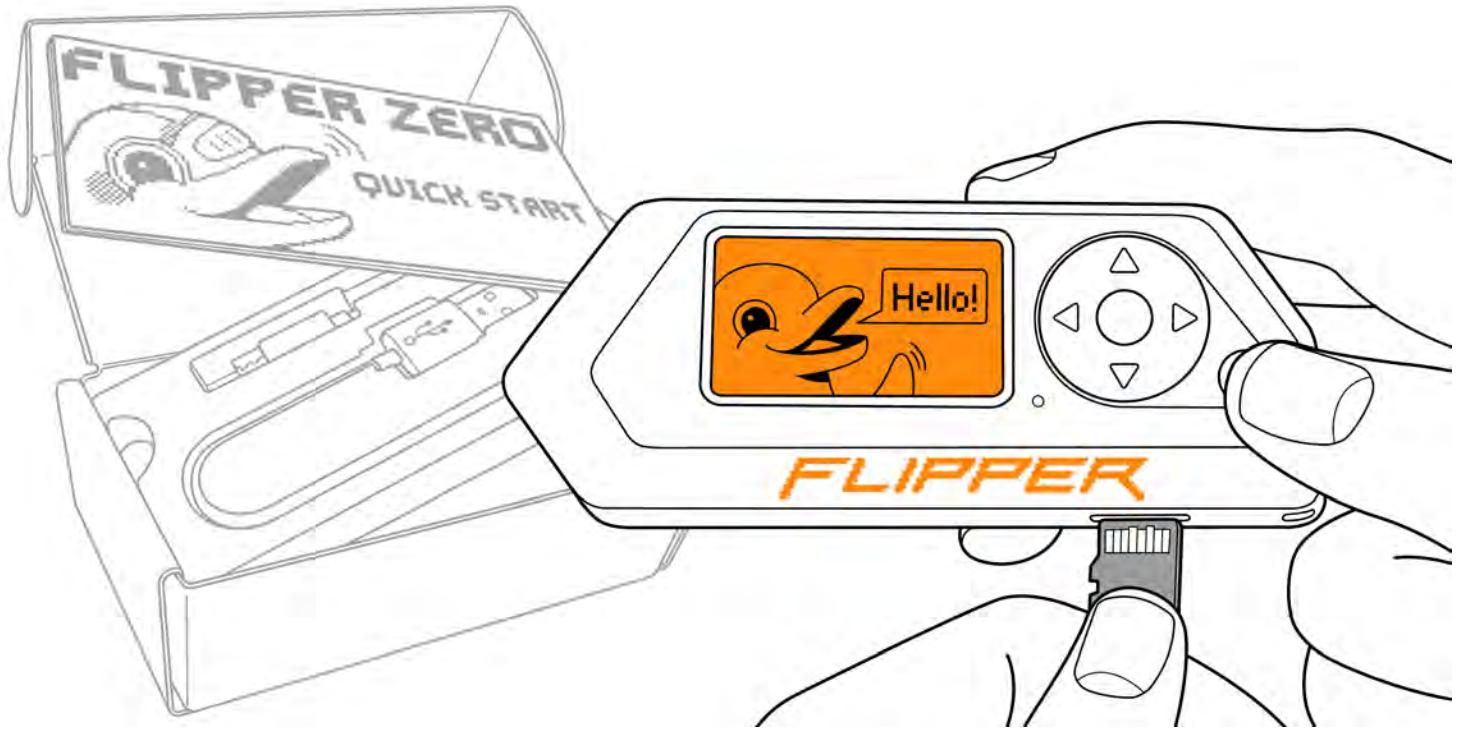


# First start



Thank you so much for buying Flipper Zero! We're excited for you to explore all the possibilities this device offers and can't wait to hear about the amazing things you'll accomplish with it. Enjoy your new Flipper Zero!

## Powering on

Power on your Flipper Zero by pressing and holding the BACK button for 3 seconds.

Power your Flipper Zero with a press of a button

## If your Flipper Zero doesn't power on

Your Flipper Zero may have a fully drained battery. To power it on, simply plug in the USB charging cable, and the device will turn on automatically.

In case your Flipper Zero fails to turn on even after charging, try pressing and holding the  **LEFT** and  **BACK** buttons for 5 seconds.

If your Flipper Zero is still not turning on, follow the steps described in [Firmware recovery](#).

## Rebooting

If your Flipper Zero freezes while in use, press and hold the  **LEFT** and  **BACK** buttons for 5 seconds to reboot the device.

If your Flipper Zero freezes—reboot it

Flipper Zero can be rebooted into different modes, including recovery mode. To find out more about the types of reboot, visit [Reboot](#).

# Inserting a microSD card

Flipper Zero doesn't come with a microSD card, so you'll need to purchase one separately.

The microSD card stores various types of data, such as keys, cards, remotes, databases, and more. Flipper Zero supports microSD cards of up to 256 GB, but a 4 GB microSD card is sufficient to store all the necessary data. Keep in mind that the process of mounting a microSD card with a high storage capacity may require additional time.

For more information, visit the [\*\*MicroSD card setup\*\*](#) page.

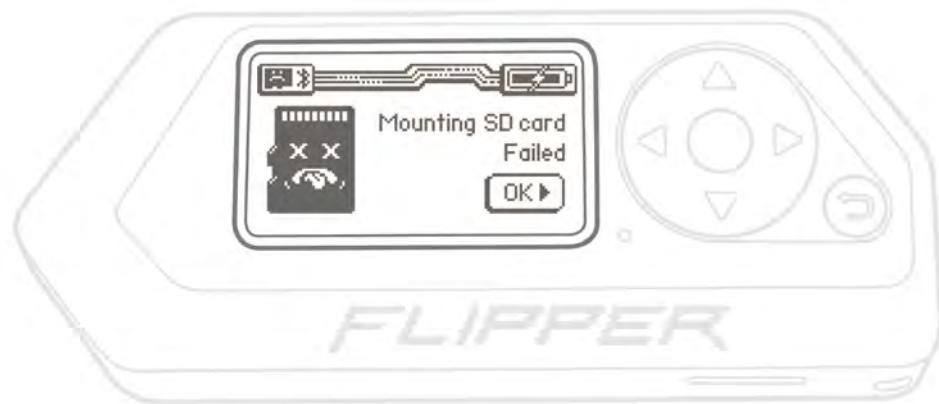
Insert the microSD card pins up

Unlike modern smartphones and computers that use a high-speed [SDIO interface](#), Flipper Zero uses a slower energy-efficient [SPI interface](#). Despite being slower than SDIO, Flipper Zero's SPI interface can read data at almost 400 KB per second, which is sufficient for the device's tasks.

### Use a high-quality microSD card

It is important to use high-quality, branded microSD cards such as **SanDisk**, **Kingston**, **Samsung**, or others to ensure the proper performance of your Flipper Zero. Using low-quality microSD cards may not only result in poor performance but can also brick or even **damage your device**.

### If the card mounting failed



Not all microSD cards function immediately after insertion

In case you see the message above on the screen after inserting the microSD card, it may be due to one of the following reasons:

- The microSD card doesn't have an SPI interface. -> Try using a different microSD card.
- The microSD card has a file system other than FAT12, FAT16, FAT32, or exFAT. -> [\*\*Format the microSD card.\*\*](#)
- There is no file system on the microSD card. -> Format the microSD card.
- The microSD card is damaged. -> Try using a different microSD card.

## Updating the firmware

### **Insert a microSD card before updating your Flipper Zero**

It is important to insert the microSD card into your Flipper Zero before updating the firmware, as the device stores its databases there. For more information, visit [MicroSD card setup](#).

The Flipper Zero firmware is under active development and changes frequently. We recommend updating the firmware of your Flipper Zero to the latest version right away.

You can update your Flipper Zero via the [Flipper Mobile App](#) or [qFlipper](#):

 [Update via Flipper Mobile App](#)

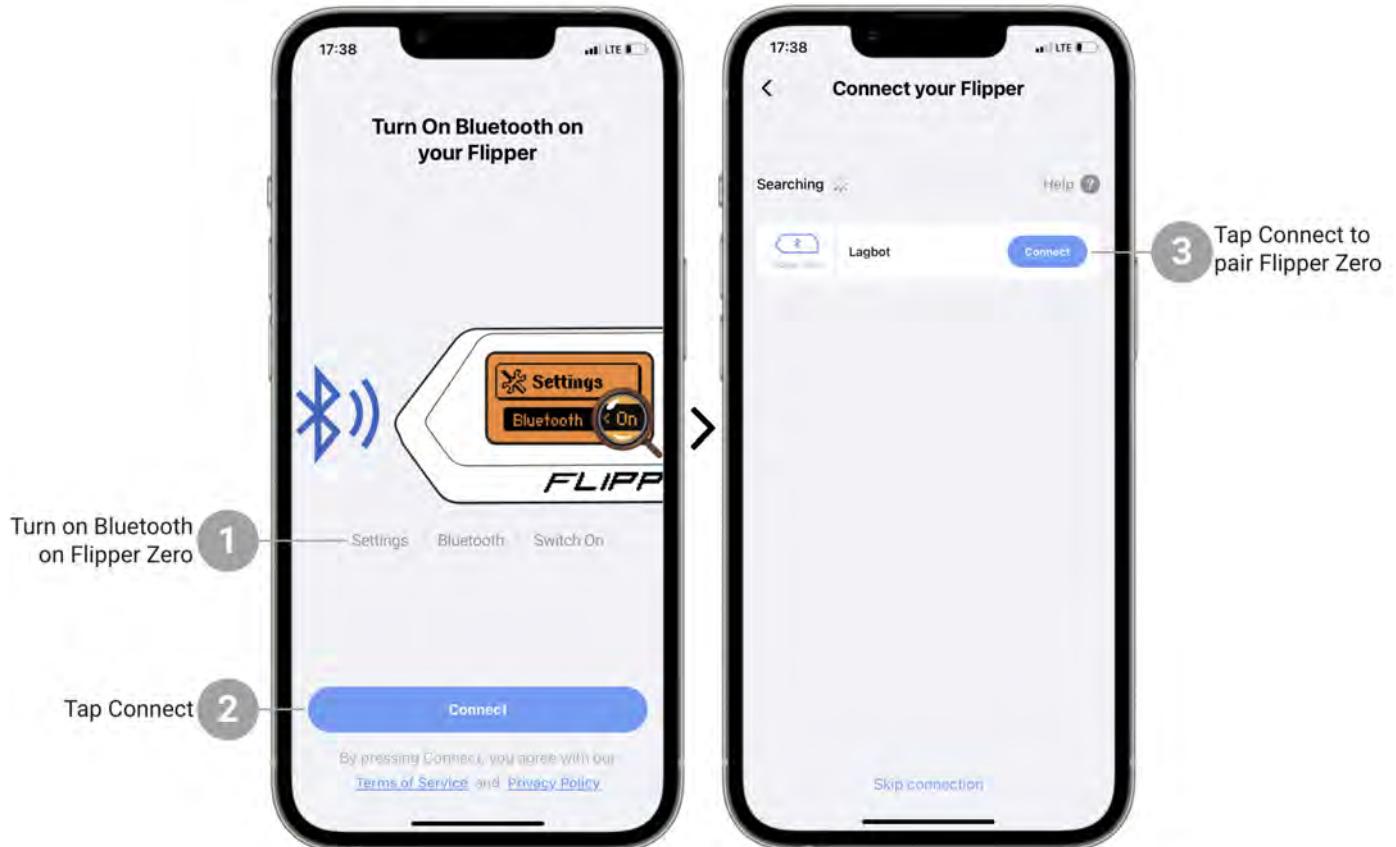
 [Update via qFlipper](#)

With the **Flipper Mobile App**, you can update your Flipper Zero via Bluetooth. The application is available on iOS and Android:

## Connecting to Flipper Zero

After you downloaded the Flipper Mobile App and activated Bluetooth on your phone, connect the mobile application to your Flipper Zero:

- 1 Activate Bluetooth on your Flipper Zero by following these steps:
  - 1) Go to **Main Menu -> Settings -> Bluetooth**.
  - 2) Set **Bluetooth** to **ON**.
- 2 In the Flipper Mobile App, tap **Connect**.
- 3 On the next page, next to the detected Flipper Zero's name, tap **Connect**.



You can connect Flipper Zero to your phone via Bluetooth

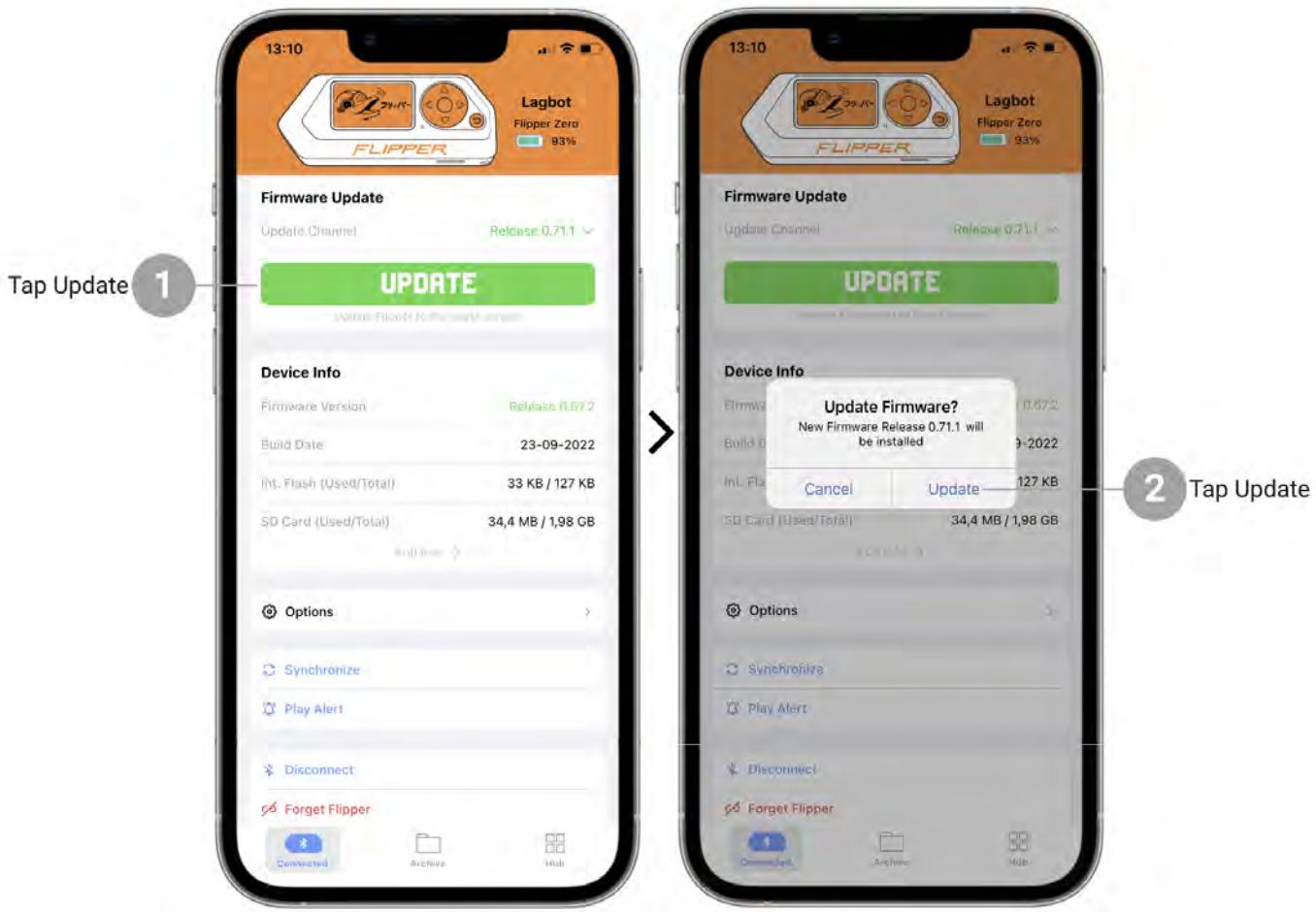
- 4 In the Flipper Mobile App, **enter the pairing code** displayed on the Flipper Zero screen.
- 5 Tap **Pair** to finalize pairing.

## Updating Flipper Zero via the Flipper Mobile App

To update your Flipper Zero via the Flipper Mobile App, do the following:

- 1 In the Main Menu tab, tap the **Update** button.
- 2 Tap the **Update** button to confirm the action.

The update process via the Flipper Mobile App **usually takes 2-3 minutes**.



You can update your Flipper Zero via the Flipper Mobile App

For additional information regarding the firmware update steps, visit [Firmware update](#).

## Customizing system preferences

Once you update your Flipper Zero, you can modify system settings, such as choosing a left-handed mode, setting your preferred units for measurements, and selecting your time and date formats by going to **Main Menu -> Settings -> System**.



Settings --> System

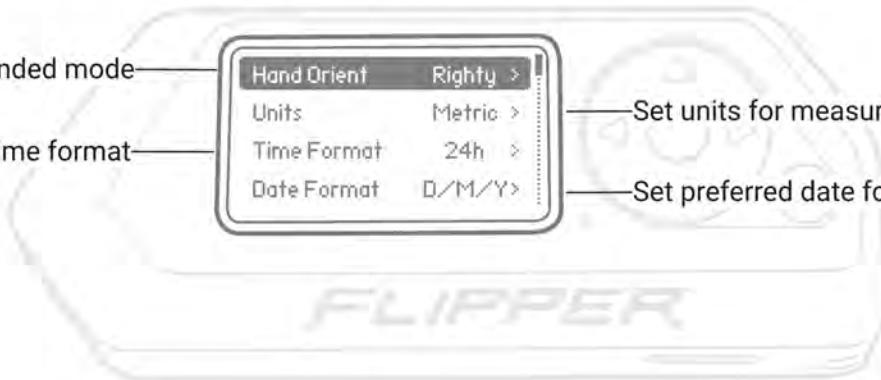
Right-handed or left-handed mode

Hand Orient	Righty >
Units	Metric >
Time Format	24h >
Date Format	D/M/Y>

Set units for measurements

Set preferred time format

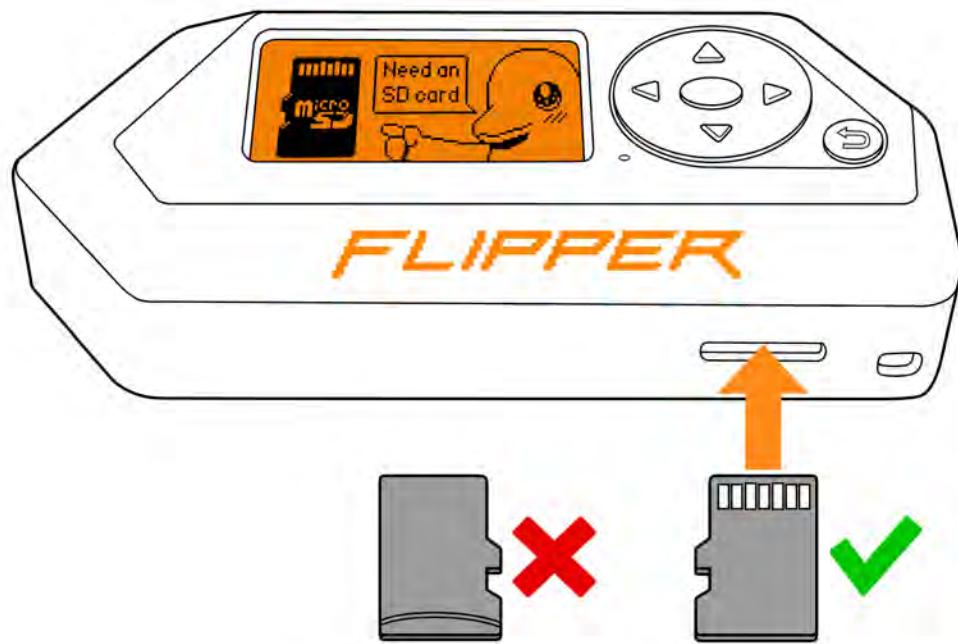
Set preferred date format



A grayscale photograph of the Flipper Zero handheld device. The word "FLIPPER" is printed across the bottom of the device's body. A circular overlay highlights the "System" settings menu displayed on the screen.

Customize your Flipper Zero system settings

# MicroSD card setup



Flipper Zero doesn't come with a microSD card, so you'll need to purchase one separately.

On this page, you'll learn how to insert, format, and safely remove a microSD card.

It is important to insert the microSD card into your Flipper Zero before updating the firmware. The microSD card stores various types of data, such as keys, cards, remotes, databases, and more. Flipper Zero supports FAT12, FAT16, FAT32, and exFAT file systems and is compatible with microSD cards up to 256 GB, but a 4 GB microSD card is sufficient to store all the necessary data. Keep in mind that the process of mounting a microSD card with a high storage capacity may require additional time.

Unlike modern smartphones and computers that use a high-speed SDIO interface, Flipper Zero uses a slower energy-efficient SPI interface. Despite being slower than SDIO, Flipper Zero's SPI interface can read data at almost 400 KB per second, which is sufficient for the device's tasks.

## Use a high-quality microSD card

It is important to use high-quality, branded microSD cards such as **SanDisk**, **Kingston**, **Samsung**, or others to ensure the proper performance of your Flipper Zero. Using low-quality microSD cards may not only result in poor performance but can also brick or even **damage your device**.

## Inserting a microSD card

To insert the microSD card into your Flipper Zero, do the following:

- 1 Locate the microSD card slot on your Flipper Zero—it's at the bottom of the device.
- 2 Hold the microSD card with pins facing up. Align the microSD card with the slot and gently push it in until the card clicks into place.
- 3 Check if your Flipper Zero recognizes the microSD card.

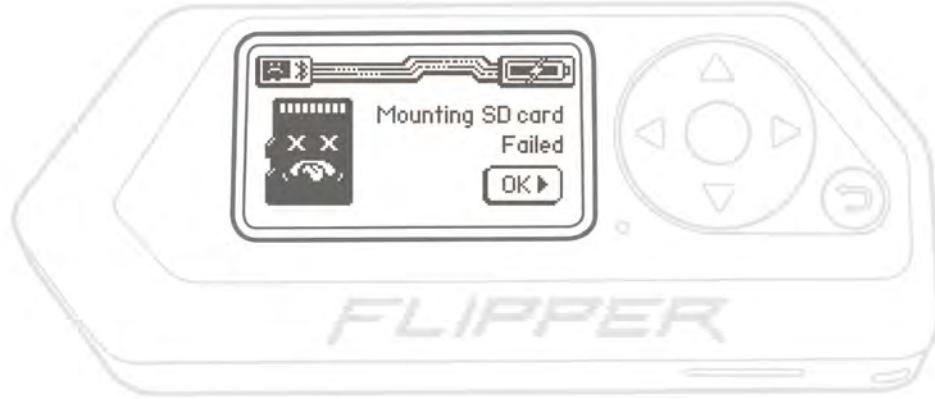
Insert the microSD card pins up

## **Use a high-quality microSD card for longer battery life**

When the display backlight is on, Flipper Zero's current consumption with a genuine branded microSD card is up to 30 mA. With a non-genuine microSD card, the overall current consumption may reach up to 50 mA leading to a shorter battery life of your device.

If the battery of your Flipper Zero is draining fast, check the current consumption: Main Menu -> Settings -> Power -> Battery Info.

## **If your Flipper Zero doesn't recognize the card**



Not all microSD cards function immediately after insertion

In case you see the message above on the screen after inserting the microSD card, it may be due to one of the following reasons:

- The microSD card doesn't have an SPI interface. -> Try using a different microSD card.
- The microSD card has a file system other than FAT12, FAT16, FAT32, or exFAT. -> Format the microSD card.
- There is no file system on the microSD card. -> Format the microSD card.
- The microSD card is damaged. -> Try using a different microSD card.

## Formatting the microSD card

Sometimes, a microSD card may fail to mount correctly. It might happen if the microSD card uses an incompatible file system or doesn't have one. If the card didn't mount after insertion, try to format it. Once formatted, the microSD card will have a FAT32 file system.

To format your microSD card, do the following:

- 1 Go to **Main Menu -> Settings -> Storage**.
- 2 Select **Format SD Card** and follow the instructions on the screen.

⚙️ Settings → Storage → Format SD Card



The microSD card is successfully formatted

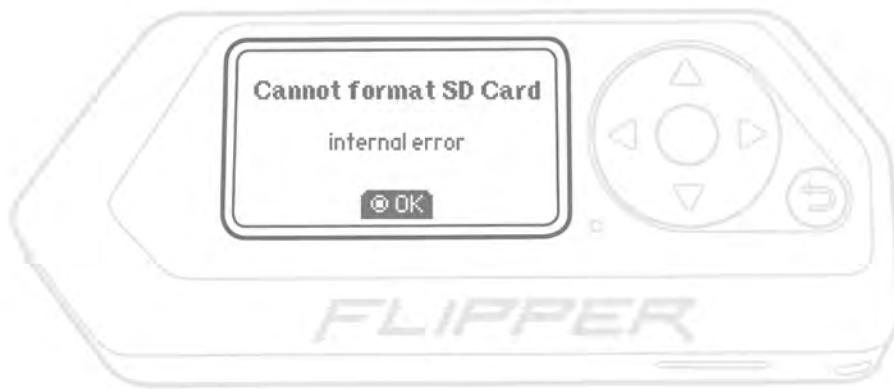
## Update your Flipper Zero after formatting the microSD card

The formatting procedure erases all data on the microSD card. It is important to update your Flipper Zero, even if you have already done so prior to formatting. This is because the device stores databases on the microSD card, and the databases must be reinstalled as part of the update process.

## If the card formatting failed

If the formatting procedure was unsuccessful, try formatting the microSD card with the help of a PC or use a different microSD card.

⚙️ Settings → Storage → Format SD Card



The formatting procedure failed

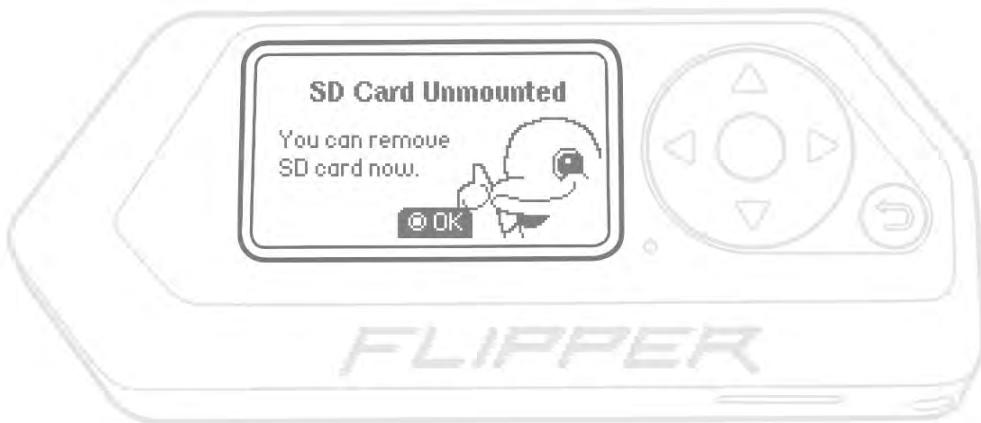
## Safely removing the microSD card

It is important to remove microSD cards safely to prevent potential data loss or corruption. When a microSD card is in use, Flipper Zero reads from and writes to the card. If you remove the card while the device is still accessing it, you may corrupt the data or damage the file system on the card.

To safely remove the microSD card from your Flipper Zero, do the following:

- 1 Go to **Main Menu -> Settings -> Storage**.
- 2 Select **Unmount SD Card** and follow the instructions on the screen.

Settings → Storage → Unmount SD Card



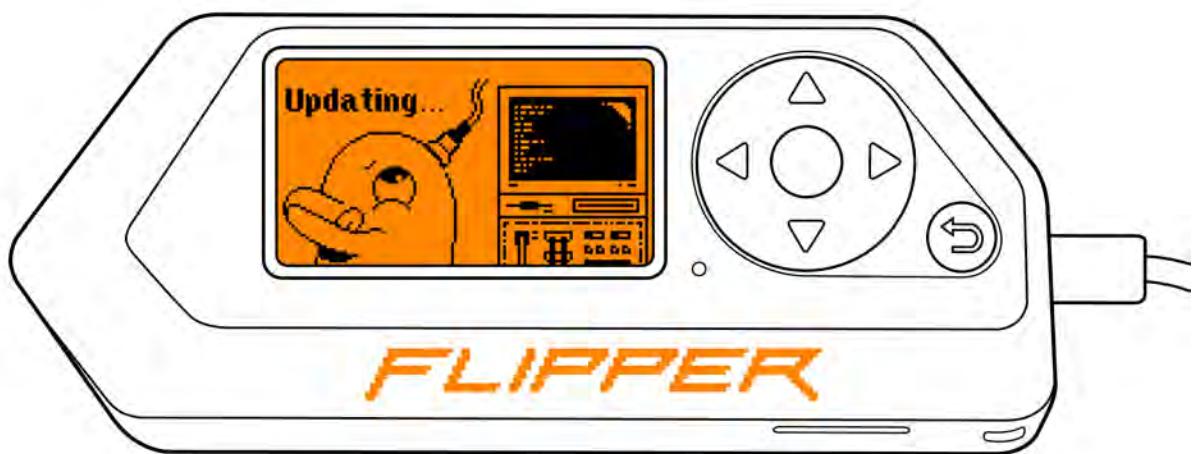
Unmount the microSD card before removing it from your Flipper Zero

- 3 Once you have been notified that the microSD card is unmounted, remove the card from your Flipper Zero by gently pushing and then pulling the card.

Remove the microSD card by gently pushing it

If you're having trouble removing the microSD card with your nails, gently push it with another thin object like a plastic card. Avoid applying too much pressure, or else you may cause damage to the card slot.

# Firmware update



We are constantly updating the Flipper Zero firmware, which is why it is important to update your Flipper Zero regularly. You can update your Flipper Zero via the [Flipper Mobile App](#) or [qFlipper](#).

On this page, you'll learn how to update your Flipper Zero firmware via the Flipper Mobile App and qFlipper.

There are three firmware update channels:

- **DEVELOPMENT (Dev):** the ongoing development is constantly building a new version of the firmware with every new commit, often multiple times per day. This Development version includes all the latest features, but it may be unstable, cause freezing or corruption of your data, or fail to function altogether.
- **RELEASE-CANDIDATE (RC):** the version submitted for validation testing to the QA department. If any bugs are detected during the testing phase, the version is revised, and a new Release candidate is issued. Once the release candidate successfully passes all tests, it

becomes the Release version.

- **RELEASE:** the stable version of the firmware is extensively tested to ensure its reliability and is therefore recommended for general use.

### Insert a microSD card before the update procedure

A microSD card must be inserted into your Flipper Zero to update the firmware correctly. Flipper Zero databases are stored on a microSD card. To learn more, see [MicroSD card setup](#).

You can find the changelog for the Flipper Zero firmware by visiting [this page](#).

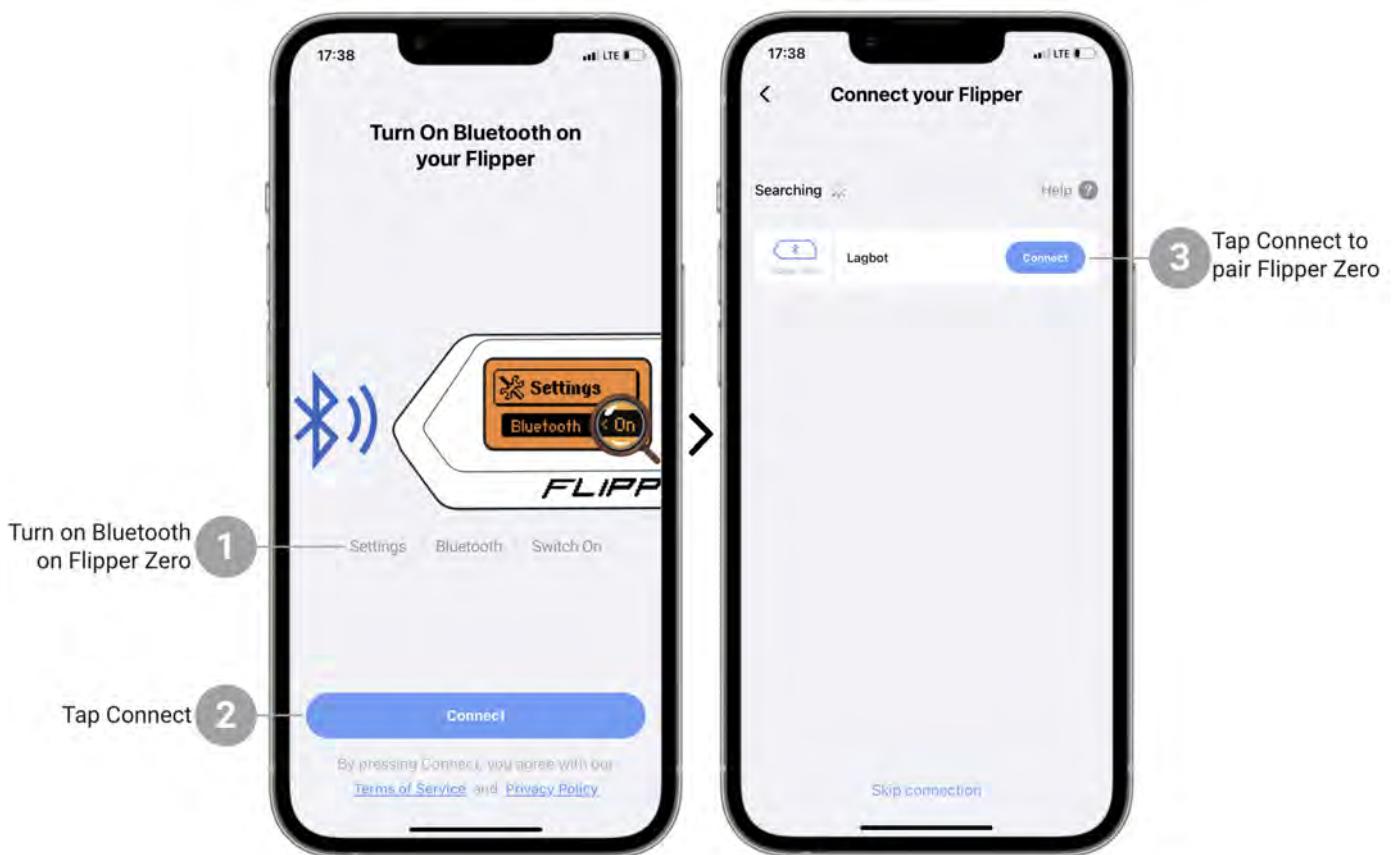
## Updating via Flipper Mobile App

With the [Flipper Mobile App](#), you can update your Flipper Zero via Bluetooth. The application is available on iOS and Android:

# Connecting to Flipper Zero

After you downloaded the Flipper Mobile App and activated Bluetooth on your phone, connect the mobile application to your Flipper Zero:

- 1 Activate Bluetooth on your Flipper Zero by following these steps:
  - 1) Go to **Main Menu -> Settings -> Bluetooth**.
  - 2) Set **Bluetooth** to **ON**.
- 2 In the Flipper Mobile App, tap **Connect**.
- 3 On the next page, next to the detected Flipper Zero's name, tap **Connect**.



You can connect Flipper Zero to your phone via Bluetooth

- 4 In the Flipper Mobile App, **enter the pairing code** displayed on the Flipper Zero screen.
- 5 Tap **Pair** to finalize pairing.

## If your Flipper Zero is not detected

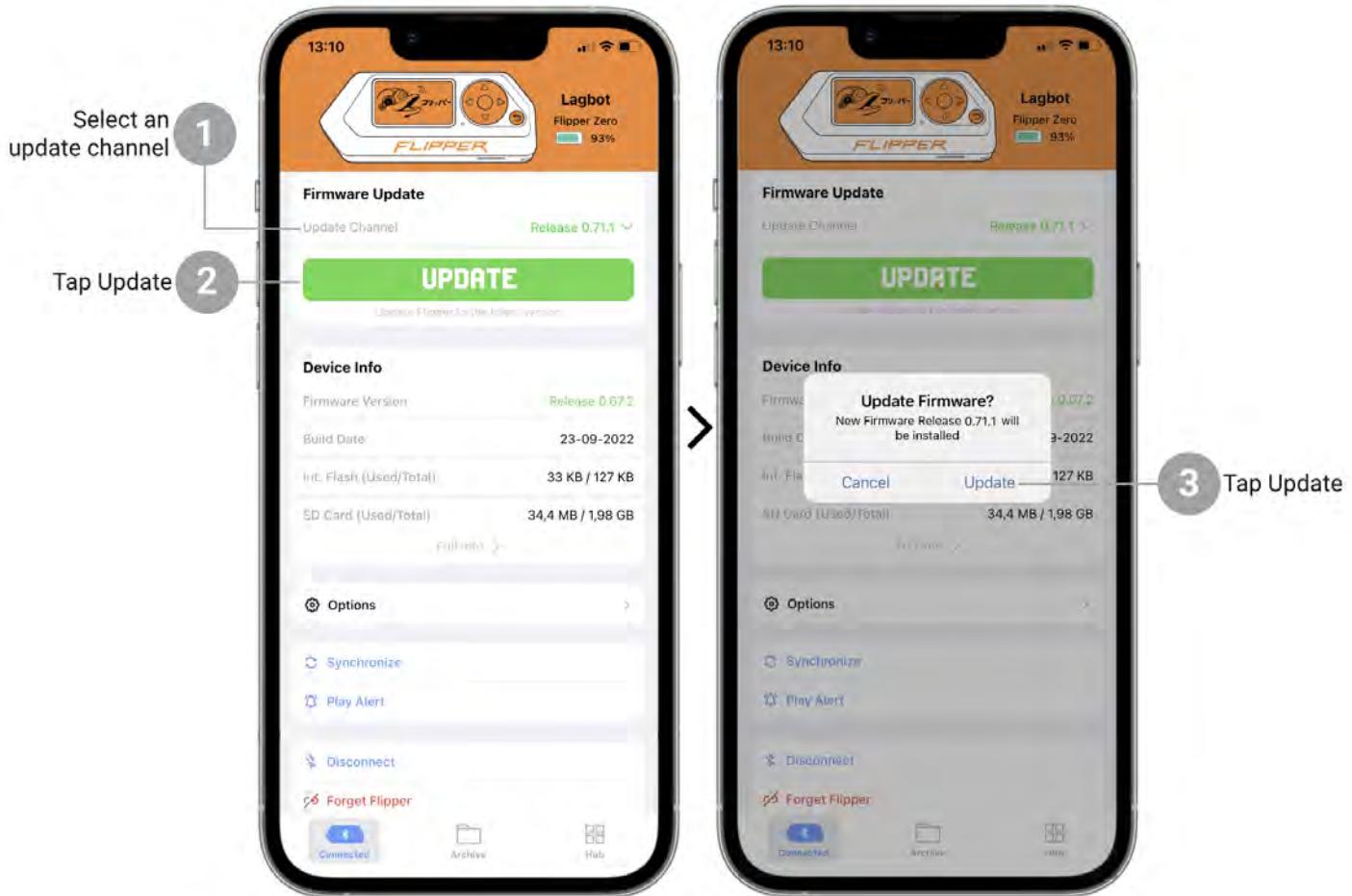
- Make sure Bluetooth is activated on your Flipper Zero. -> [How to turn on Bluetooth on Flipper Zero.](#)
- Check the Bluetooth connection on your phone.
- Disconnect Flipper Zero from other devices. -> [How to forget all paired devices on Flipper Zero.](#)
- Update Flipper Zero to the latest firmware version. It is important to update your Flipper Zero regularly. -> [How to update the firmware on Flipper Zero.](#)
- Check if the latest version of the Flipper Mobile App is installed on your phone. -> [App Store](#) or [Google Play](#).
- Reboot your Flipper Zero by pressing and holding the  LEFT and  BACK buttons for 5 seconds.

## Updating Flipper Zero

To update your Flipper Zero via the Flipper Mobile App, do the following:

- 1 In the Main Menu tab, tap **Update Channel** and select a firmware (**Release is recommended**).
- 2 Tap the **Update** button.
- 3 Tap the **Update** button to confirm the action.

The update process via the Flipper Mobile App **usually takes 2-3 minutes**.

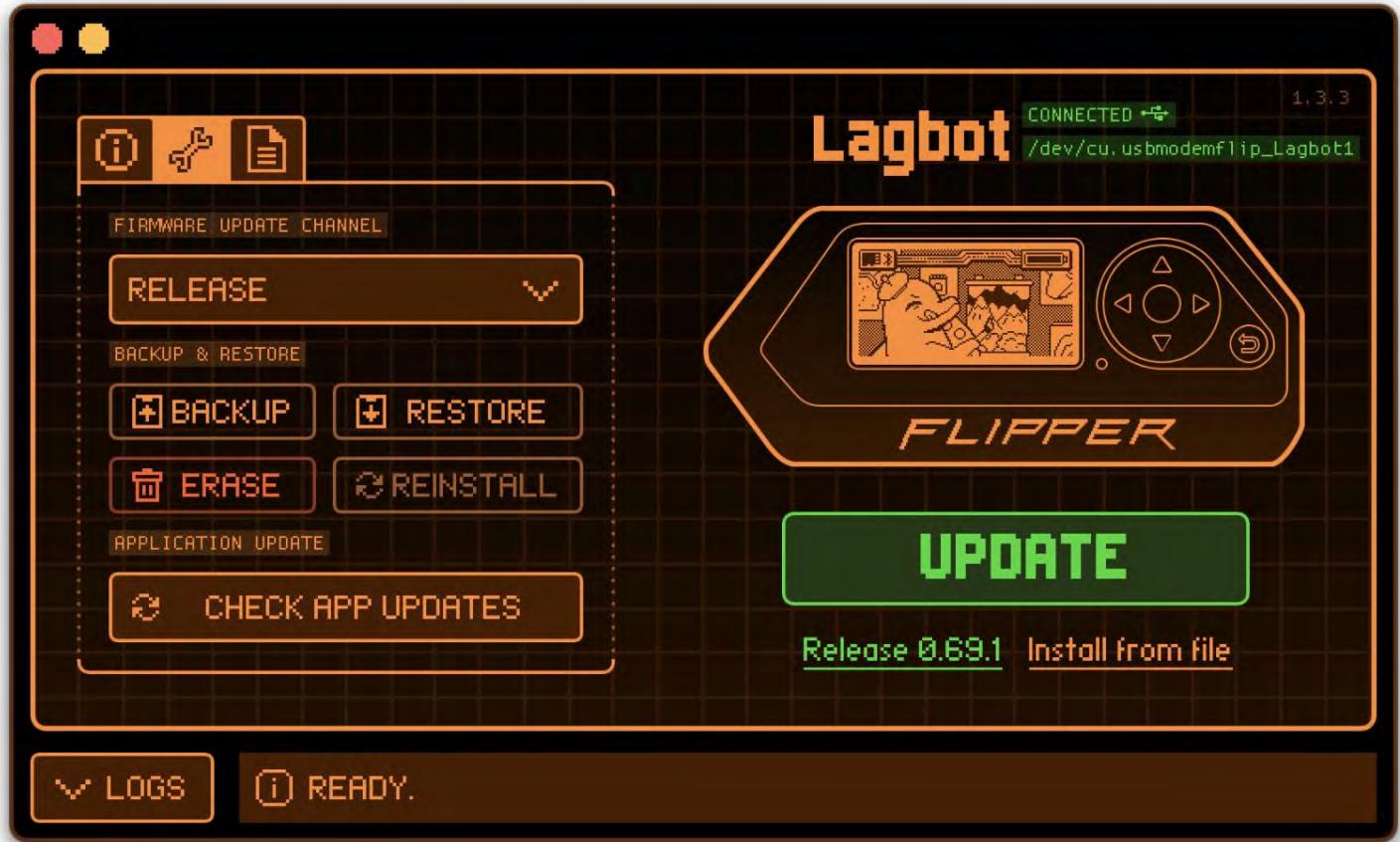


You can update your Flipper Zero via the Flipper Mobile App

## If Flipper Zero update failed

- Check the Bluetooth connection with your Flipper Zero.
- Make sure your Flipper Zero is turned on.
- If your Flipper Zero doesn't respond, reboot it by pressing and holding the **LEFT** and **BACK** buttons for 5 seconds.
- Restart firmware update.
- Update your Flipper Zero via qFlipper.

## Updating via qFlipper



With qFlipper, you can update firmware, manage files, and repair corrupted firmware

**qFlipper** is a desktop application that allows you to update your Flipper Zero via a USB cable. The qFlipper application is available on Windows, macOS, and Linux. To install the qFlipper application on your computer, do the following:

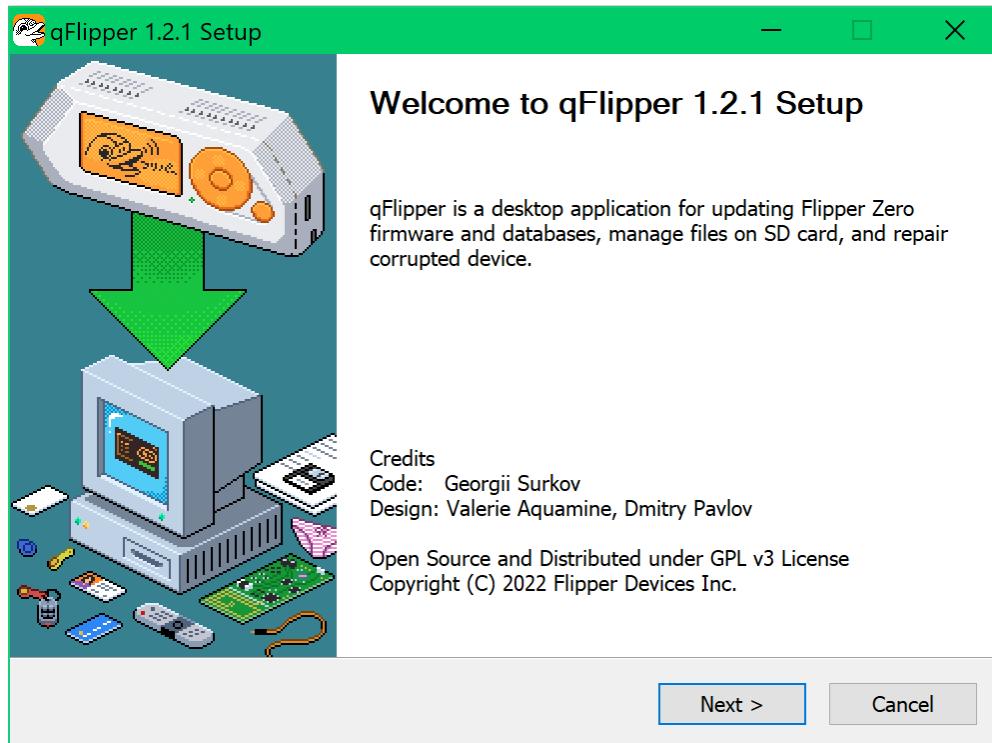
- 1 Download the qFlipper installation file for your operating system.

## Download qFlipper for Windows

You can also download qFlipper on the [Flipper Zero Firmware update](#) page.

- 2 Run the downloaded file and follow the instructions for your operating system.

For Windows, the qFlipper application is compatible with **Windows 10 and 11 only**.



qFlipper is available on Windows

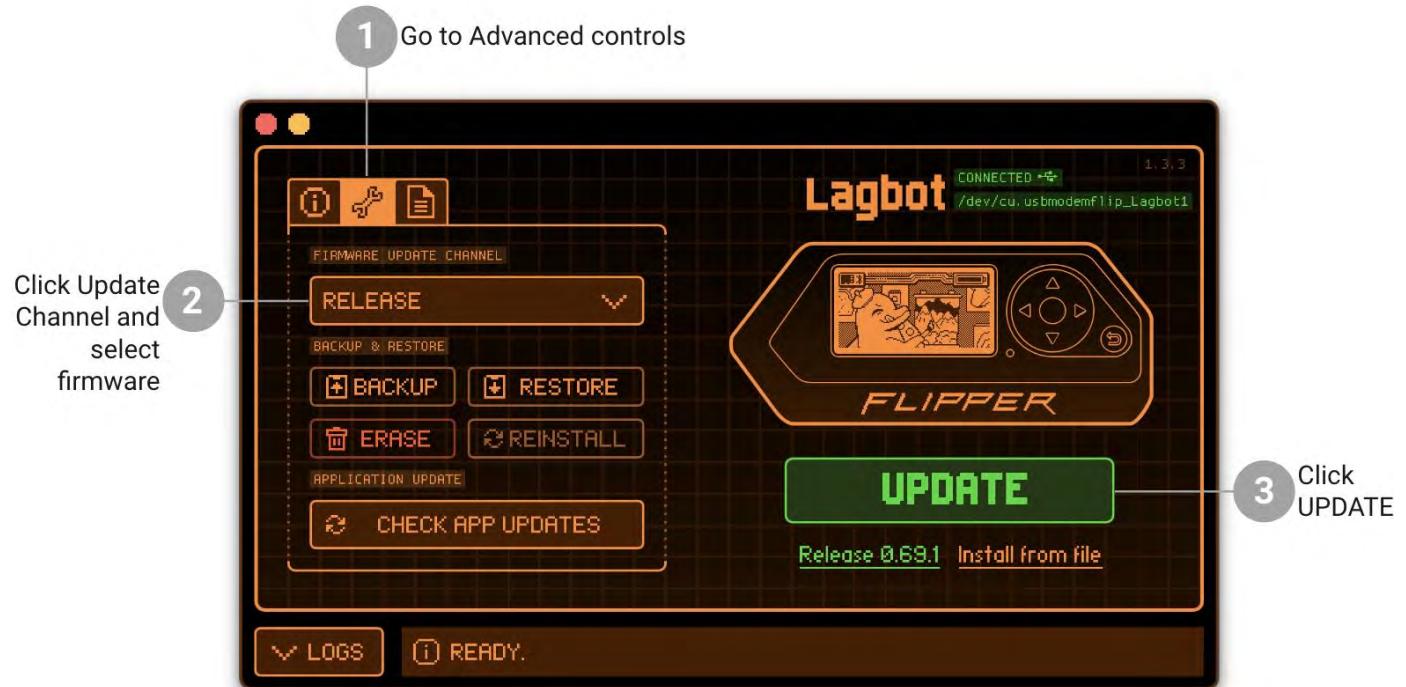
## Updating Flipper Zero

To update your Flipper Zero via the qFlipper application, do the following:

- 1 Connect your Flipper Zero to your computer via a USB cable.
- 2 On your computer, run the **qFlipper** application.
- 3 In the qFlipper application, go to the **Advanced controls** tab.
- 4

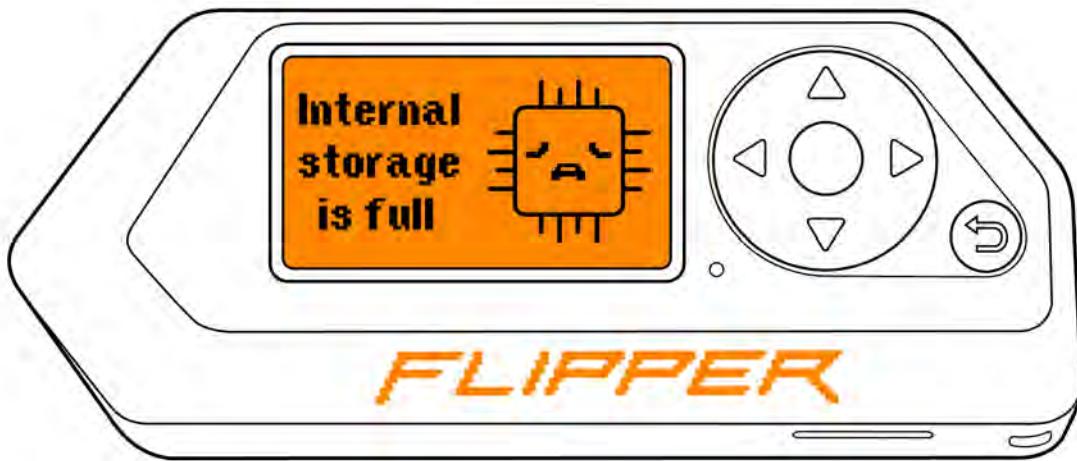
Click **Update Channel** and select a firmware version from the drop-down list (**Release is recommended**).

- 5 Click **Update** to start the update process.



Update your Flipper Zero via qFlipper

# Internal storage repair



If you can't update your Flipper Zero via the qFlipper application or Flipper Mobile App, full or broken internal storage might be the cause. To resolve this issue, we recommend resetting your Flipper Zero to the factory settings.

Flipper Zero stores data on an inserted microSD card and internal storage. The internal storage has a small capacity and is used for storing the dolphin's level, settings, and information about paired devices. It also stores saved remotes and cards if a microSD card is not inserted. When you insert the microSD card, saved remotes and cards are moved from the internal storage to the microSD card.

On this page, you'll learn how to back up your Flipper Zero, reset it to the factory settings, and restore it from a backup.

## Back up internal storage data

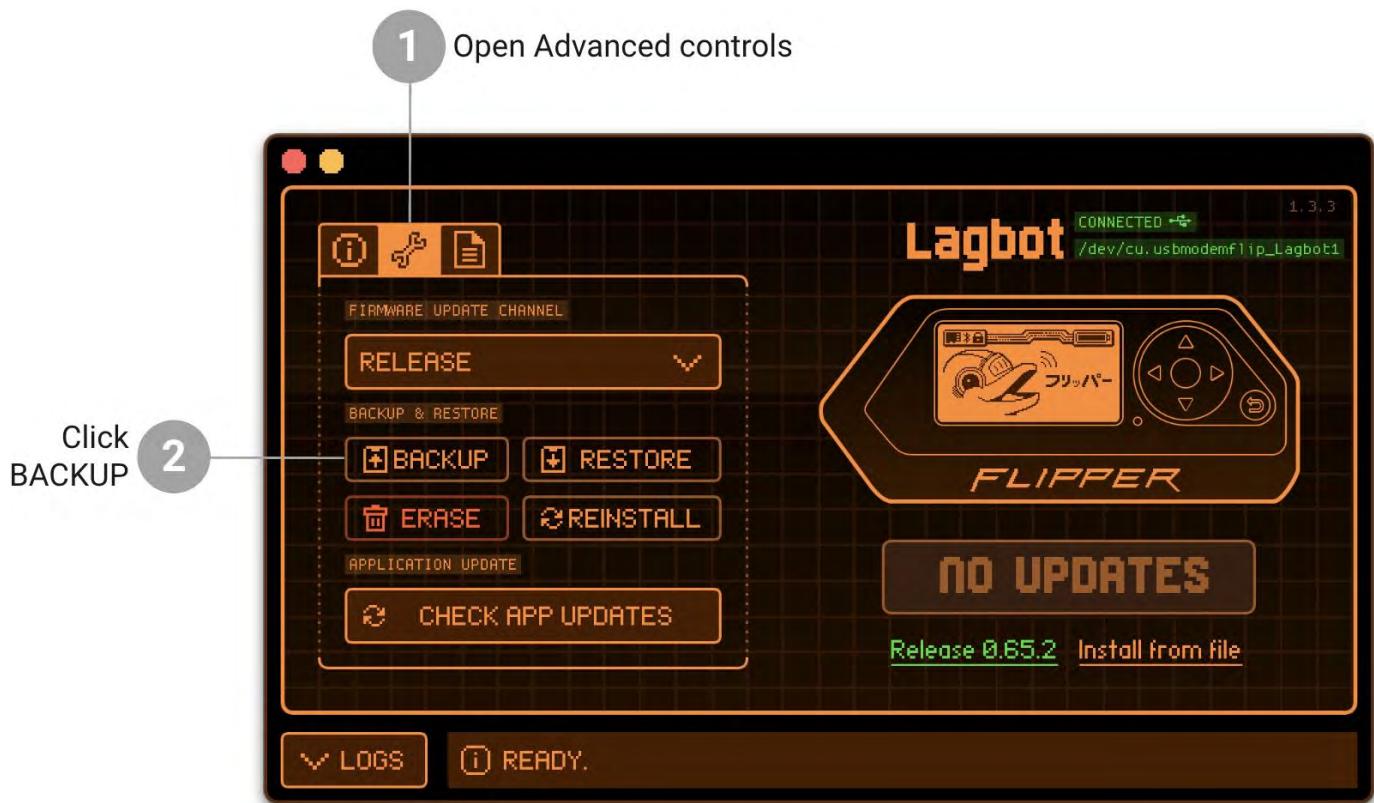
If you want to keep the dolphin's level, settings, and information about the paired devices, you can back up data by following the steps below. If

not, proceed to [Factory reset](#).

To save internal storage data, you can back up your Flipper Zero before repairing the internal storage. A backup is a copy of data stored in the internal storage. Data on the microSD card will not be backed up.

To back up internal storage data, do the following:

- 1 On your computer, run the **qFlipper** application.
- 2 Connect your Flipper Zero to the computer with a USB cable.
- 3 Open **Advanced controls** and click **BACKUP**.



You can back up internal storage data via qFlipper

- 4 Select the folder where the backup will be saved and click **Save**.
- 5 Click **BACKUP** to save Flipper Zero's internal storage data.

Once you created the internal storage backup, you can reset your Flipper Zero to the factory settings.

## Factory reset

You can reset your Flipper Zero to the factory settings in Settings or via the qFlipper application.

### All internal storage data will be erased

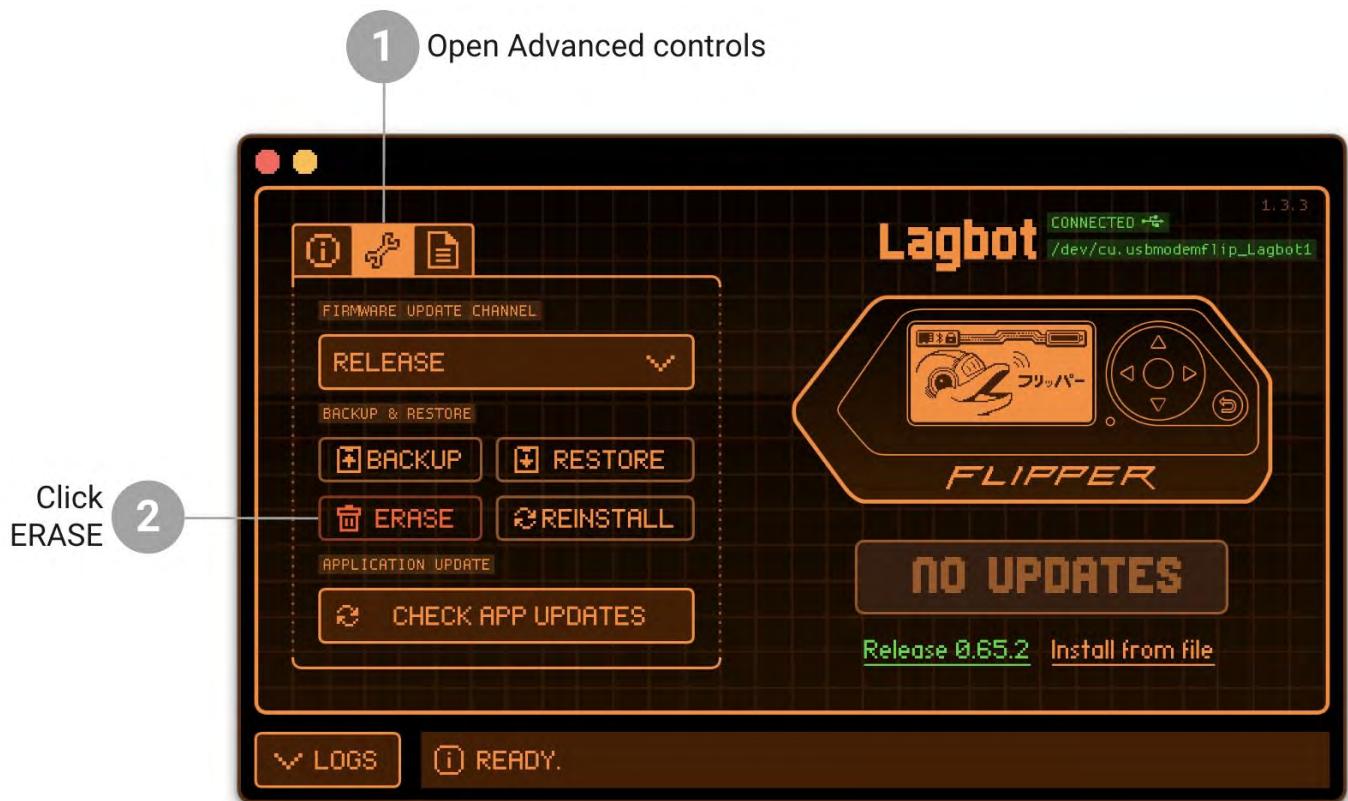
The dolphin's level, settings, and information about the paired devices will be erased. **Data on the microSD card will be saved.**

## Reset the device in Settings

- 1 Go to **Settings** -> **Storage**.
- 2 Select **Factory Reset**.
- 3 Press **Erase** five times.

## Reset the device via qFlipper

- 1 On your computer, run the **qFlipper** application.
- 2 Connect your Flipper Zero to the computer with a USB cable.
- 3 Open **Advanced controls** and click **ERASE**.



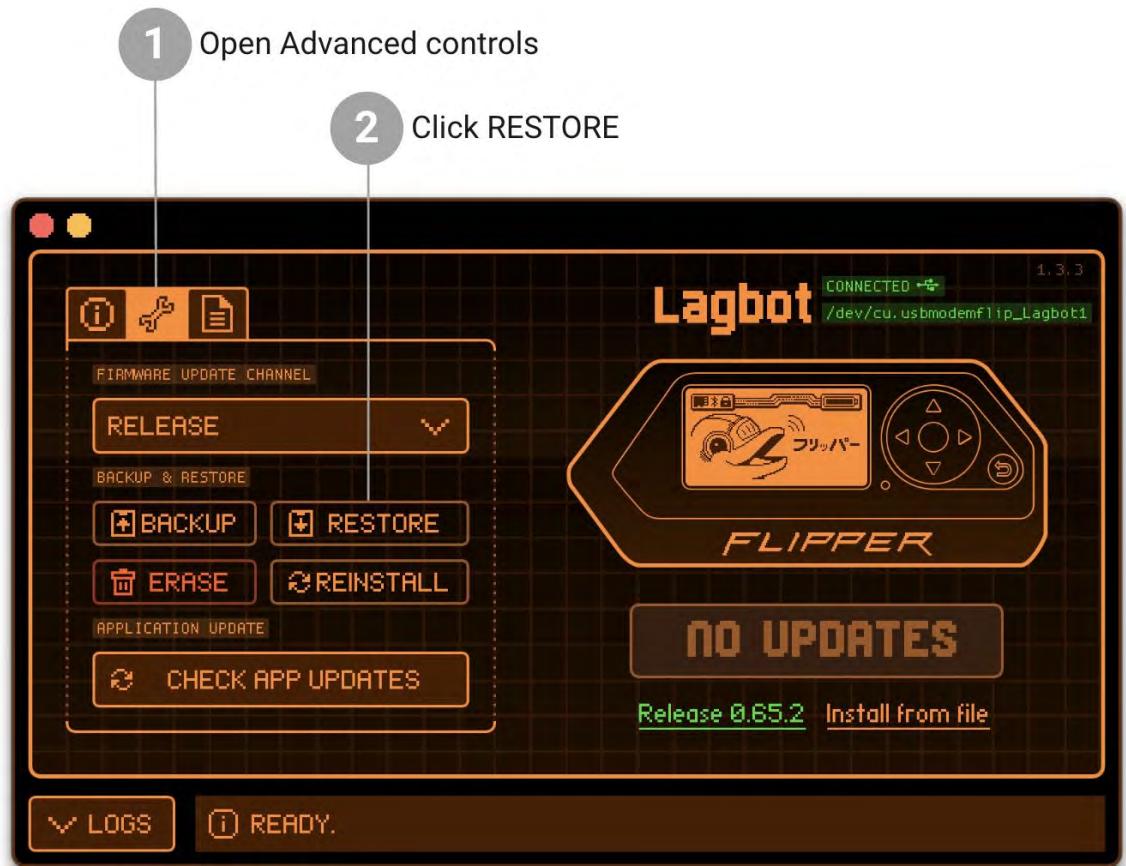
Reset the device to the factory reset via qFlipper

- 4 Click **ERASE** to start the reset process.
- 5 When the reset process is finished, click **CONTINUE**.

## Restore data from the backup

Once you have made the factory reset, you can restore your Flipper Zero's data by following these steps:

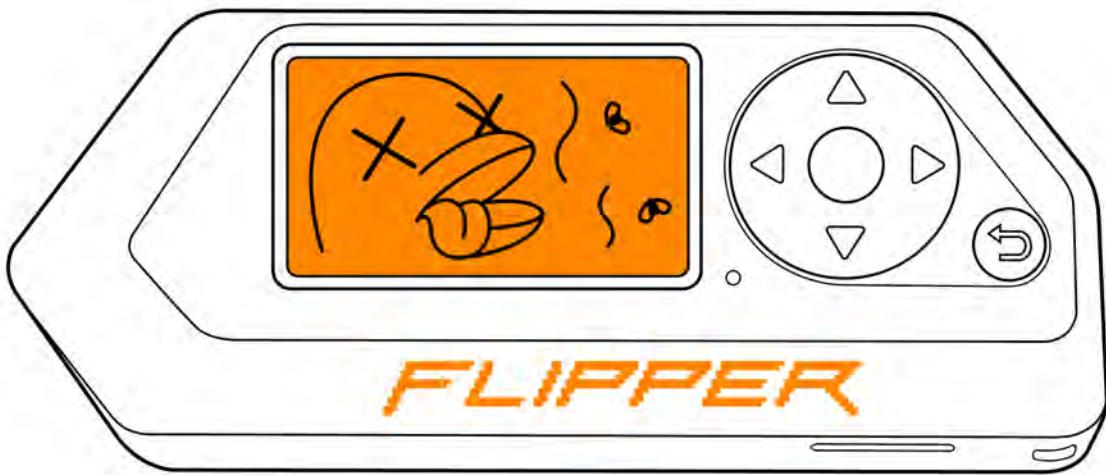
- 1 On your computer, run the **qFlipper** application.
- 2 Connect your Flipper Zero to the computer with a USB cable.
- 3 Open **Advanced controls** and click **RESTORE**.



Restore internal storage data via qFlipper

- 4 Select the `.tgz` backup file, click Open, then **RESTORE**.
- 5 When the restoration is finished, click **CONTINUE**.

# Firmware recovery



Occasionally, your Flipper Zero may fail to update correctly, display images, or respond to button presses. These issues could be caused by corruption in the device's firmware.

On this page, you'll learn how to repair the corrupted firmware of your Flipper Zero.

You can repair the corrupted firmware with the help of the [qFlipper](#) desktop application and the built-in USB Device Firmware Update (DFU) bootloader. The USB DFU bootloader allows you to update your Flipper Zero by bypassing the device's operating system, which minimizes the risk of errors during the update process.

But first, try doing the following:

- Reboot your Flipper Zero by pressing and holding the **LEFT** and **BACK** buttons for 5 seconds.
- Charge your device with the provided USB Type-C cable for several minutes because your Flipper Zero might have the battery completely drained.

If your Flipper Zero still fails to update correctly, display images, or respond to button presses, follow the steps below.

### **Firmware repair erases all internal storage data**

The dolphin's level, settings, and information about paired devices will be erased. **Data on the microSD card will be saved.**

## **Step 1: Switching to Recovery mode**

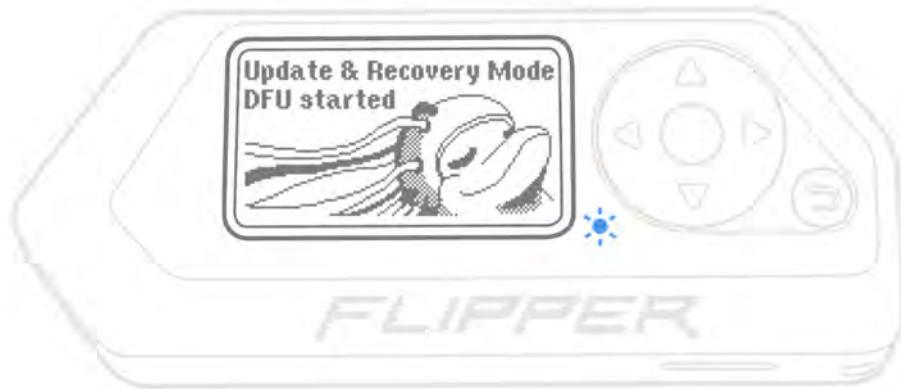
Before starting the repair procedure with qFlipper, you must switch your Flipper Zero to Recovery mode, which activates the built-in USB DFU bootloader. The process of switching your device to Recovery mode can vary depending on the state of the device.

### **If your device is operational but fails to update properly**

Switch your Flipper Zero to Recovery mode by doing the following:

- 1** Go to **Main Menu -> Settings -> Power.**
  
- 2** Then go to **Reboot -> Firmware upgrade.**

❖ Settings → Power → Reboot → Firmware upgrade



You'll see the Recovery mode screen

- 3 Connect your Flipper Zero to your computer via a USB cable. The computer should detect your Flipper Zero as a DFU device.
- 4 [\*\*Proceed to the firmware repair via qFlipper.\*\*](#)

Alternatively, you can switch the device to Recovery mode by doing the following:

- 1 Press and hold the **LEFT** and **BACK** buttons at the same time.
- 2 Release the **BACK** button, but keep pressing the **LEFT** button until the blue LED lights up.

- 3 Connect your Flipper Zero to your computer via a USB cable. The computer should detect your Flipper Zero as a DFU device.
- 4 [\*\*Proceed to the firmware repair via qFlipper.\*\*](#)

To exit Recovery mode, press and hold the %left%**LEFT** and %back%**BACK** buttons.

**If your device fails to display any images or respond to button presses**

If your Flipper Zero is bricked, switch the device to Recovery mode via a hard reboot:

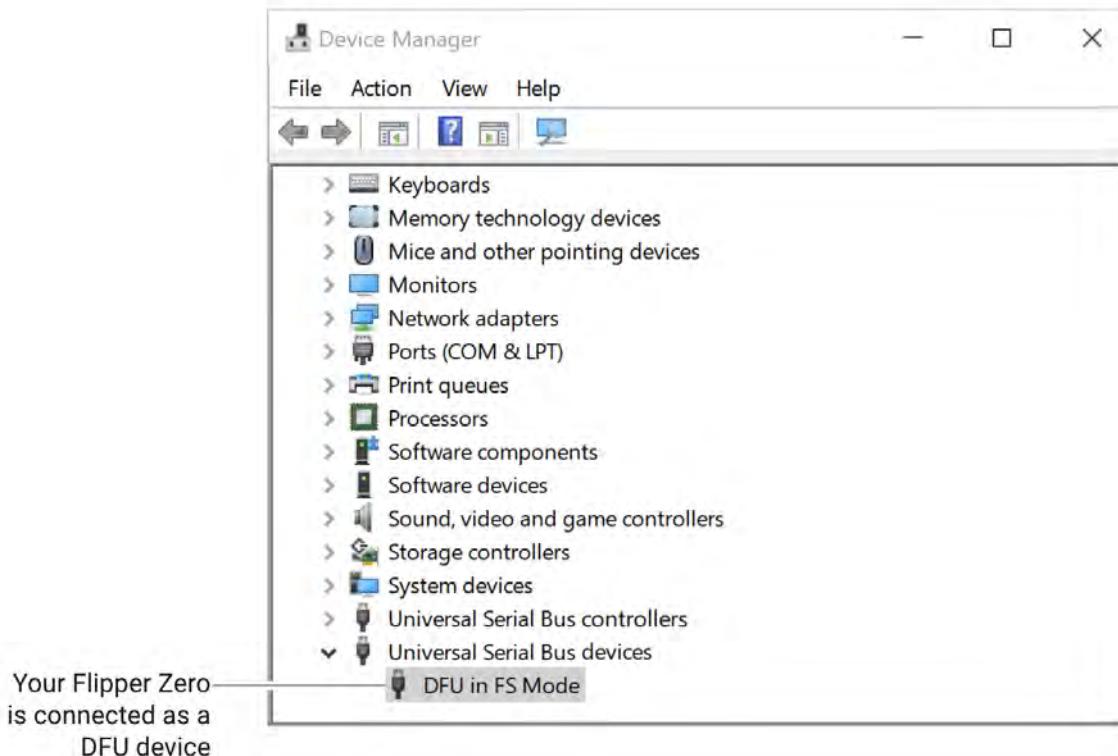
- 1 **Unplug the USB cable from your Flipper Zero** if connected.
- 2 Press and hold the  **OK** and  **BACK** buttons for 30 seconds. It is normal if your Flipper Zero has no indications on the screen.
- 3 Connect your Flipper Zero to your computer via a USB cable. The computer should detect your Flipper Zero as a DFU device.
- 4 [Proceed to the firmware repair via qFlipper.](#)

## Checking the connection

You can check if the device is connected to your computer as a DFU device by doing the following:



- 1 Go to **Device Manager**.
- 2 Find the **DFU in FS Mode** device.



Your Flipper Zero is successfully connected as a DFU device

The Flipper Zero DFU device doesn't come with a driver for Windows. The driver is automatically installed during the qFlipper application installation process.

If your Flipper Zero isn't detected as a DFU device

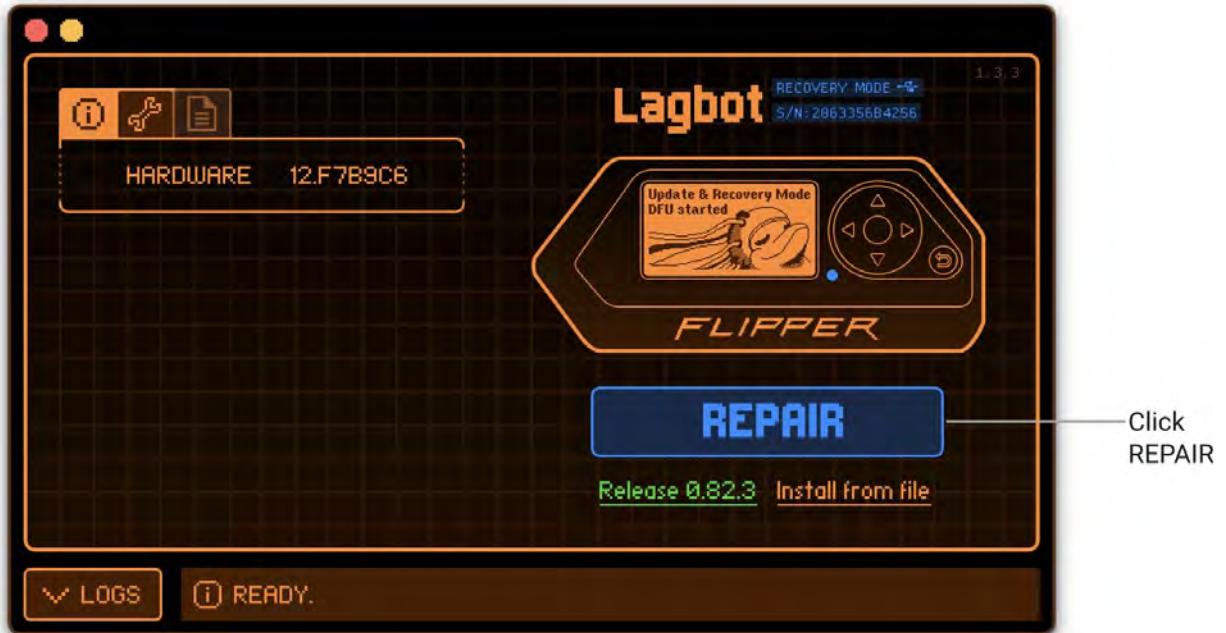
- Use a different USB cable.
- If possible, connect your Flipper Zero directly to a USB port on your computer's motherboard, avoiding the use of an adapter or hub.
- First, remove the microSD card from your Flipper Zero, charge the device for one hour, then attempt to connect it **without** the microSD card inserted.

## Step 2: Repairing the firmware via qFlipper

Once your Flipper Zero is connected to your computer as a DFU device, the qFlipper application automatically detects the device.

To repair the firmware:

- 1 Run the **qFlipper** application on your computer.
- 2 Connect your Flipper Zero to your computer as a DFU device.
- 3 On your computer, click the **Repair** button. The qFlipper application will perform a complete installation of the firmware.

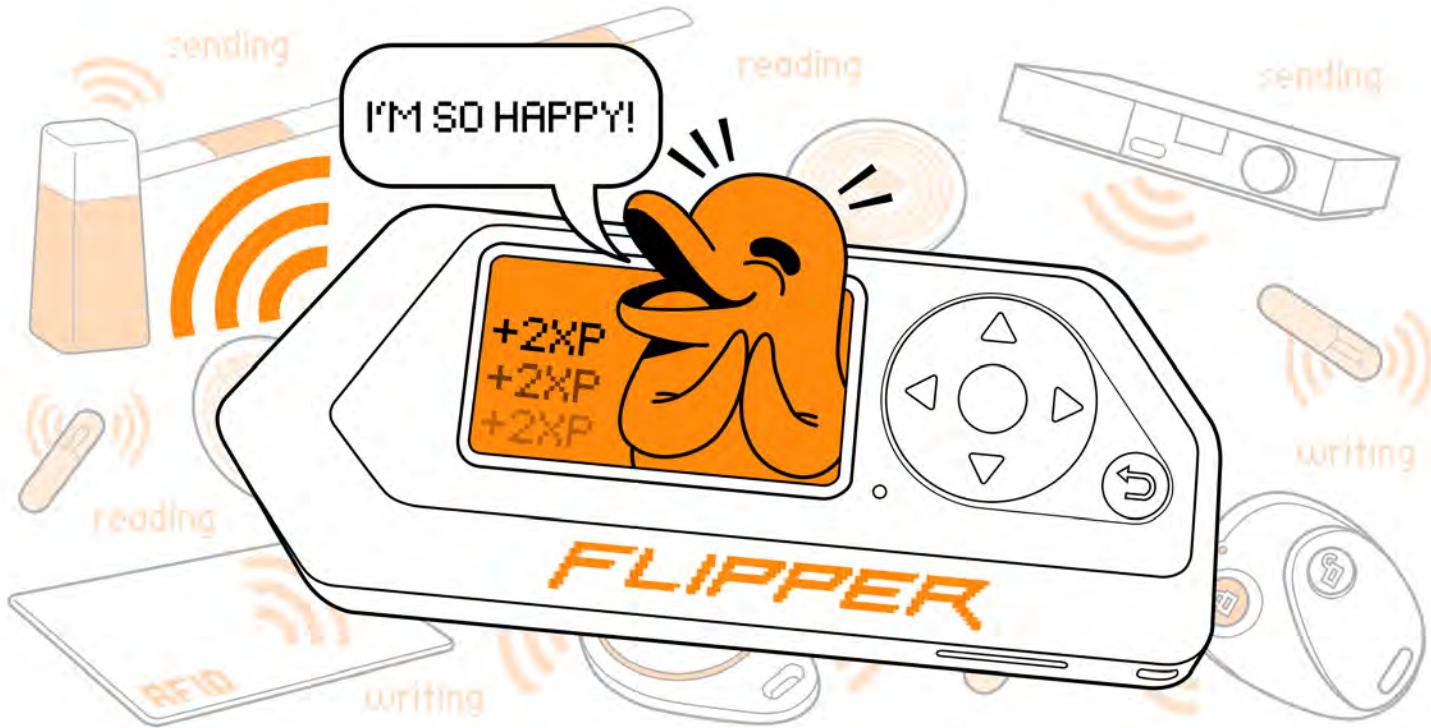


qFlipper automatically detects your Flipper Zero as a DFU device

## If qFlipper fails to repair the firmware

- Make sure the qFlipper application is installed on your computer correctly. -> [Installing qFlipper](#).
- Reboot your device by pressing and holding the **LEFT** and **BACK** buttons with a USB cable disconnected, then repeat the repair procedure.
- If qFlipper still fails to repair the firmware, make a hard reboot by pressing and holding the **BACK** button for 30 seconds with a USB cable disconnected, then repeat the repair procedure.
- Run the qFlipper application as an administrator.
- If possible, connect your Flipper Zero directly to a USB port on your computer's motherboard, avoiding the use of an adapter or hub.
- If you have issues on your Windows computer, visit the [Troubleshooting drivers on Windows](#) page.

# Pet dolphin



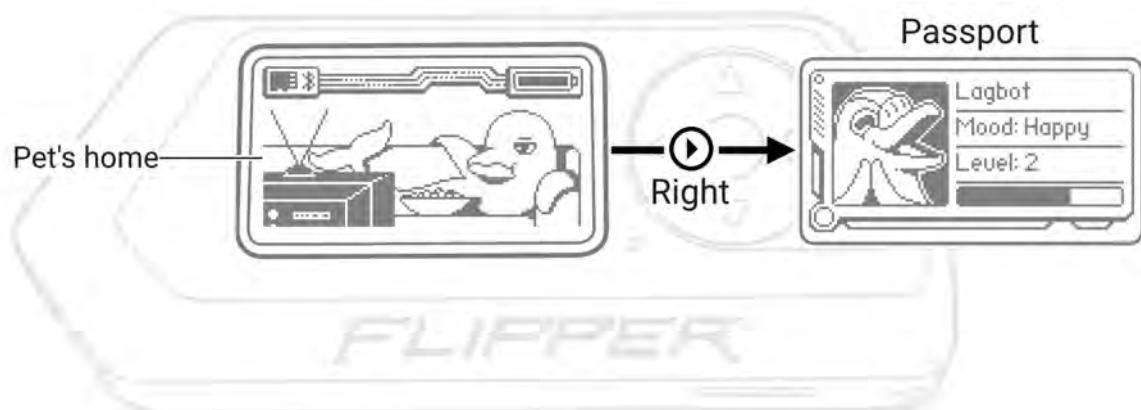
Introducing your very own digital dolphin companion living inside your Flipper Zero! The dolphin loves to engage with access control technologies like sub-1 GHz radio, RFID, NFC, Infrared, 1-Wire, BadUSB, and others, so use Flipper Zero regularly to make your digital friend happy. By frequently using the device, you can witness your digital pet's emotions, hobbies, and appearance evolve. Get ready for a journey to the world of technology with your interactive digital pet!

On this page, you'll learn how to see your digital pet's emotional state and progression, keep it happy, and help it grow.

## Meeting your digital pet

The Desktop serves as the home for your digital pet. It is also the place where it works, learns something new and rests. Here, you can observe its activities and emotions.

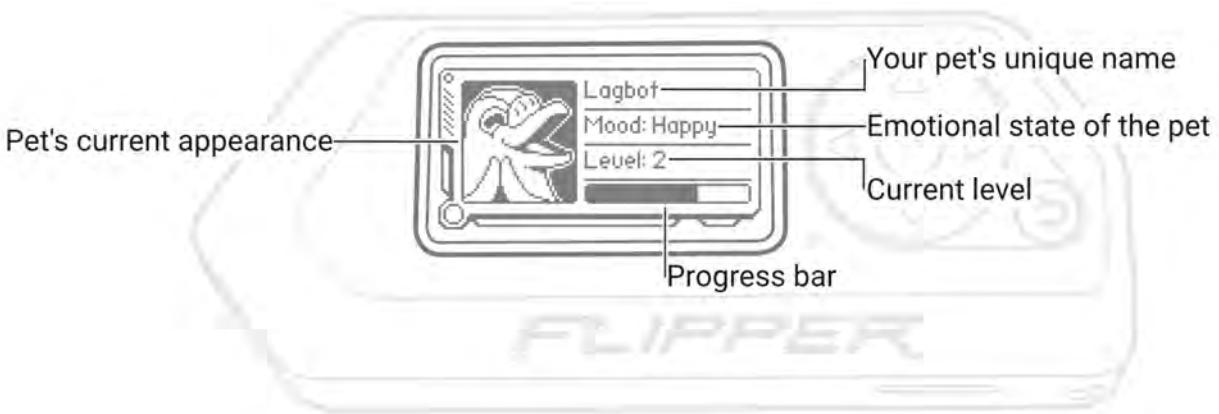
Your digital pet has its own passport, where you can view the pet's details. You can access the passport by pressing the **RIGHT** button while on the Desktop.



View your pet's details with a press of a button

Alternatively, you can access the passport by going to **Main Menu -> Settings -> Passport**.

In the passport, you can view the pet's details, such as its appearance, unique name, emotional state, level, and progress bar.



Learn more about your pet

## Keeping your pet happy

Your digital pet's mood will vary depending on how often you interact with your Flipper Zero. To keep your digital friend happy, use Flipper Zero applications and interact with access control systems by reading, saving, and emulating keys, cards, and remotes. You'll see if your pet is happy or not by animation on the Desktop. Some of the animations are shown below.

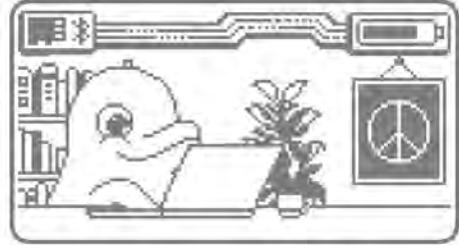
## When your pet is happy



Swimming



Coding



Working

## When your pet is unhappy



Crying



Mad



Leaving

Your digital pet is able to express various emotions

Don't forget to regularly update your Flipper Zero to discover the latest animations. We continuously introduce new animations, including seasonal ones that are displayed for a limited period of time.

## Leveling up your dolphin

Your digital dolphin has three levels of progression. As the pet advances through each level, it transforms its appearance and develops new interests and hobbies.



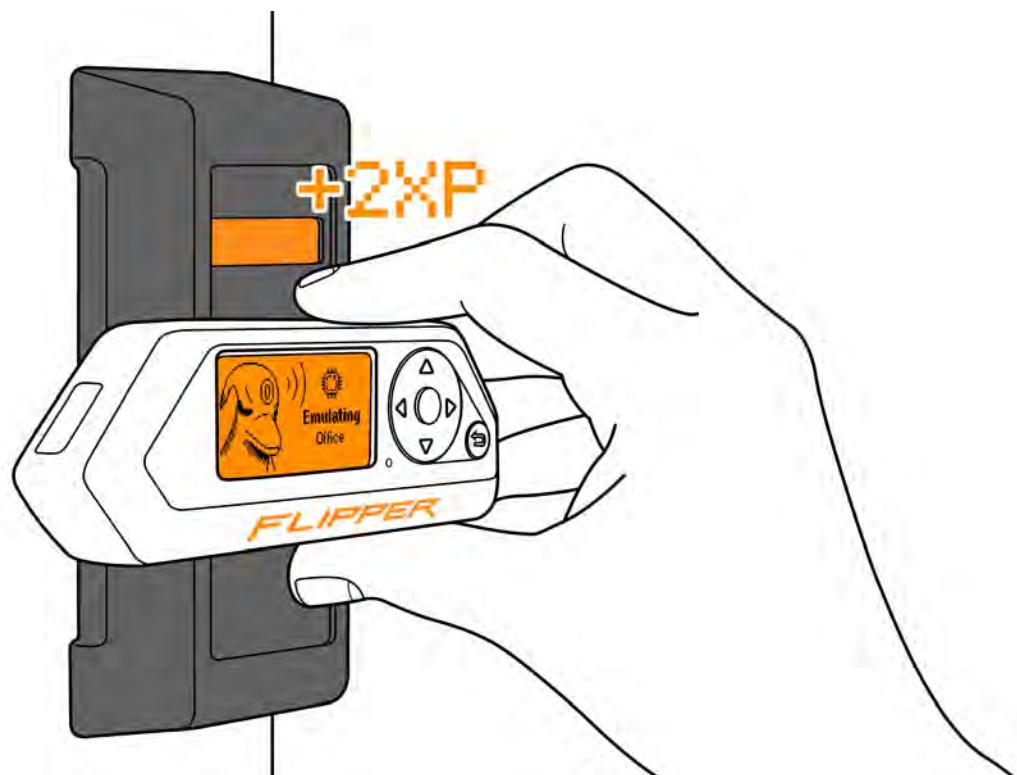
## Recording

## Soldering

## Researching

Start a journey alongside your digital pet as it explores the vast world of technologies

Collect XP to assist your digital pet in advancing and exploring technologies whenever you use your Flipper Zero.



Accumulate XP for your digital pet with each use of your device

Once you accumulate sufficient XP, your pet will progress to the next level.



You'll receive a notification when your pet advances to the next level

## How scoring works

Every time you use your Flipper Zero, your digital pet gathers XP based on the list below. However, please keep in mind that you can only collect a maximum of 20 XP per day for each application and a total of 140 XP overall per day. To reach the second level, you need to collect 300 XP, and to get to the third level, you need to gather 1800 XP.



- **Capture and view a signal:** 1 XP
- **Save a signal:** 3 XP
- **Record a RAW signal:** 1 XP
- **Save a RAW signal:** 3 XP
- **Add a signal manually:** 2 XP
- **Emulate a saved signal:** 2 XP
- **Use Frequency Analyzer:** 1 XP



- **Enter the Read screen (including Extra Actions):** 1 XP
- **Read success:** 3 XP
- **Add an RFID manually:** 2 XP
- **Save an RFID tag:** 3 XP
- **Emulate an RFID tag:** 2 XP



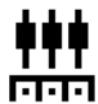
NFC

- Enter the Read screen (including Extra Actions): 1 XP
- Use Detect Reader: 1 XP
- Read success: 3 XP
- Save a card: 3 XP
- Add a card manually: 1 XP
- Add a key manually: 2 XP
- Emulate a saved card: 2 XP
- Emulate from Add Manually: 1 XP



Infrared

- Read success: 3 XP
- Save an IR signal: 3 XP
- Emulate an IR signal: 1 XP



GPIO

- Enter the USB-UART Bridge screen: 1 XP



iButton

- Enter the Read screen: 1 XP
- Read success: 3 XP
- Save an iButton key: 3 XP
- Add an iButton key manually: 2 XP
- Emulate an iButton key: 2 XP



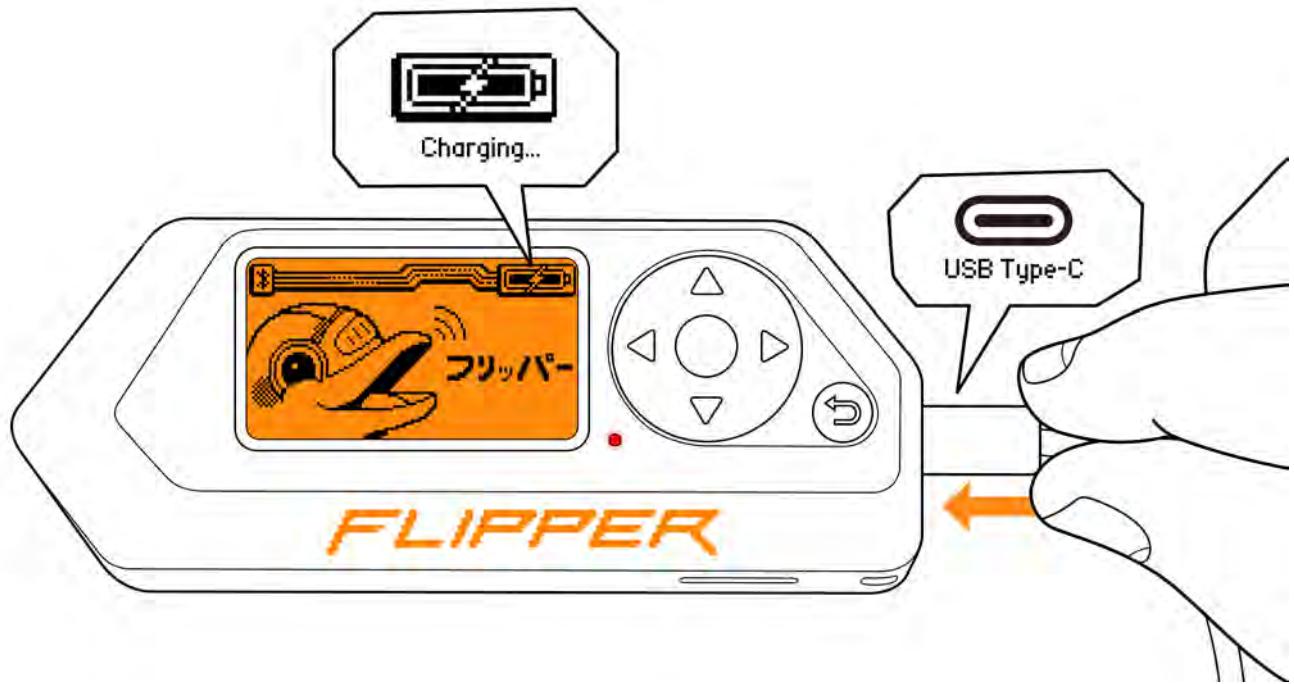
Bad USB

- Play a BadUSB script: 3 XP



- **Authorize with the device:** 3 XP

# Power



Flipper Zero is powered by an integrated lithium-ion polymer rechargeable battery. With a battery capacity of 2100 mAh, the device can operate for up to one month without recharging. The battery can be recharged using the provided USB Type-C cable.

On this page, you'll learn how to power on, power off, and charge your Flipper Zero, as well as learn about power modes and tips to maximize battery performance.

## Powering on

Power on your Flipper Zero by pressing and holding the BACK button for three seconds.

Power your Flipper Zero with a press of a button

## If your Flipper Zero doesn't power on

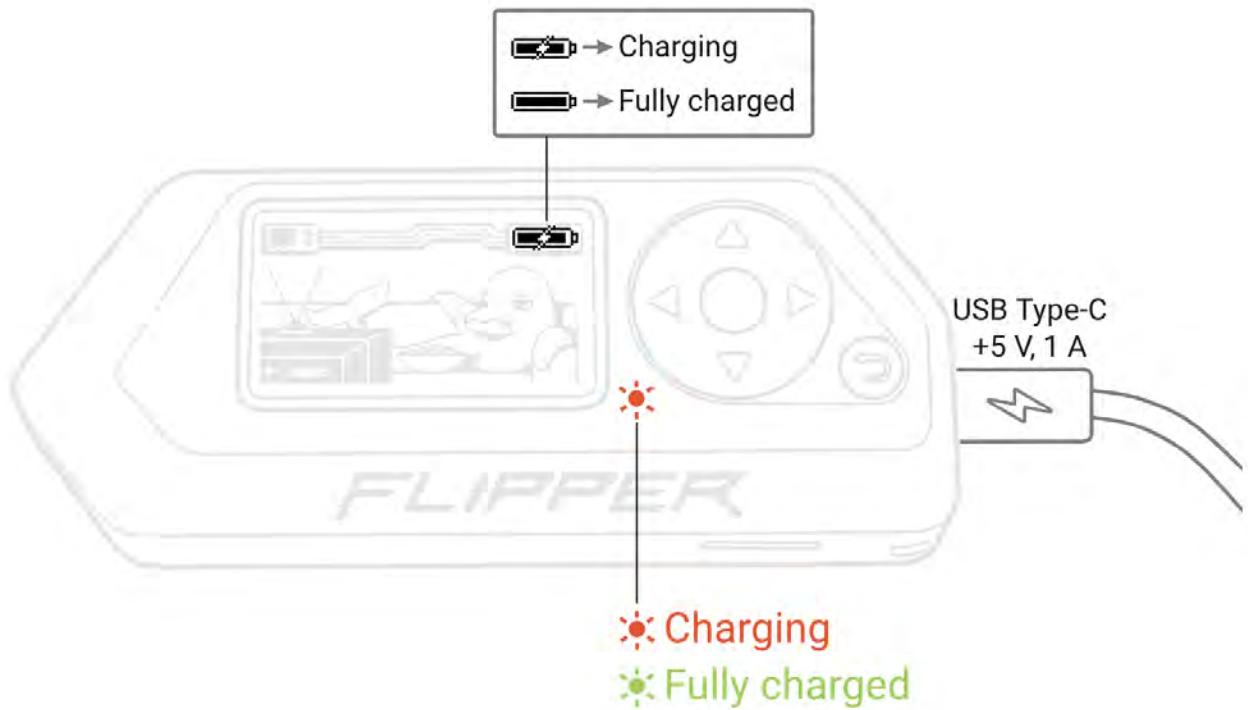
Your Flipper Zero may have a fully drained battery. To power it on, simply plug in the USB charging cable, and the device will turn on automatically.

In case your Flipper Zero fails to turn on even after charging, try pressing and holding the %left%LEFT and %back%BACK buttons.

If your Flipper Zero is still not turning on, follow the steps described in [Firmware recovery](#).

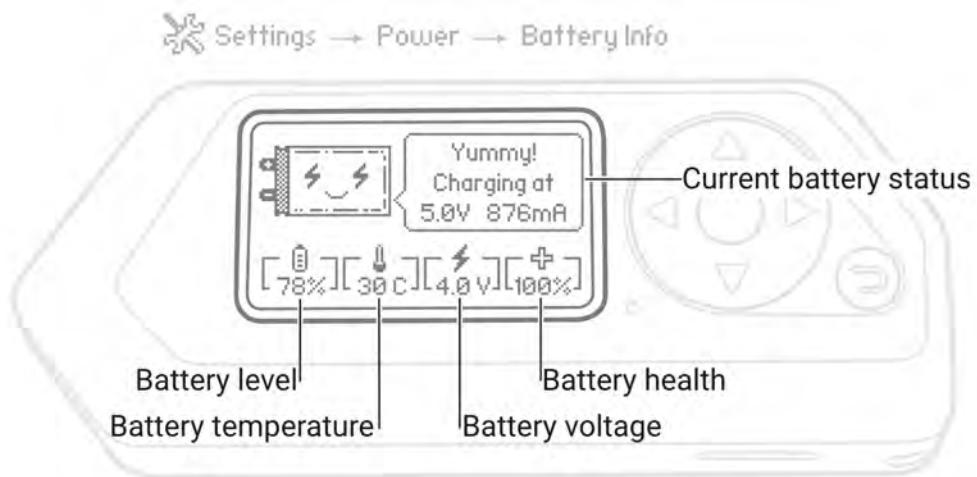
# Charging

To charge your Flipper Zero, plug the provided USB Type-C cable into the charging port and connect it to a power source. It takes around two hours to charge the device completely.



Charge your Flipper Zero with the included USB Type-C cable

To view information about the battery, go to **Main Menu -> Settings -> Power -> Battery Info.**



## Powering off

To power off your Flipper Zero, go to **Main Menu -> Settings -> Power -> Power OFF** and confirm the action by pressing the  **RIGHT** button.



Don't leave the device discharged for long

## Avoid leaving your Flipper Zero discharged for long periods

If you plan to keep your Flipper Zero turned off for an extended period of time, we recommend charging the device to around 50% before turning it off. Leaving your device discharged for an extended period can degrade the battery's health.

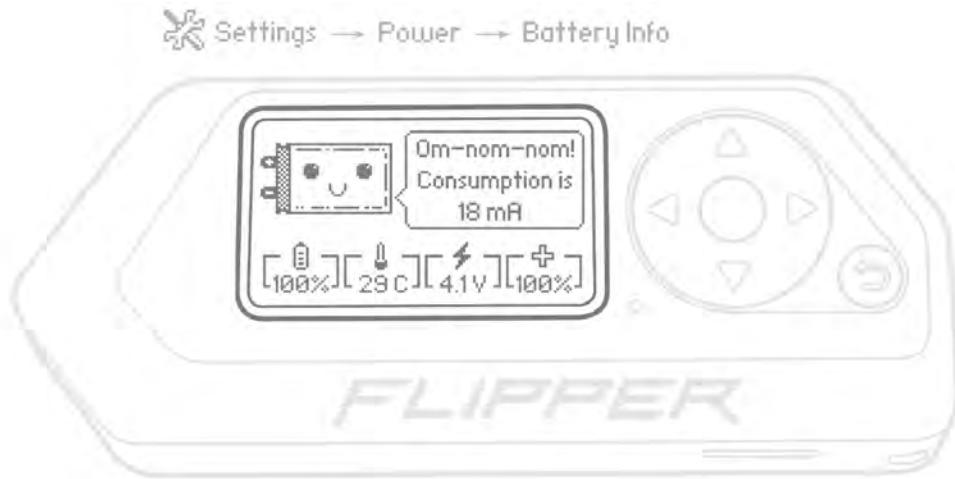
# Power modes

Flipper Zero has two operating modes: **Active** and **Sleep**. Each mode consumes power differently.

## Active mode

When Flipper Zero runs an application or connection established, the device enters Active mode, which consumes power up to 30 mA with a backlight. With an active transceiver, power

consumption can reach 400 mA, and even 2 A with an active transceiver and connected external module.



View real-time power consumption

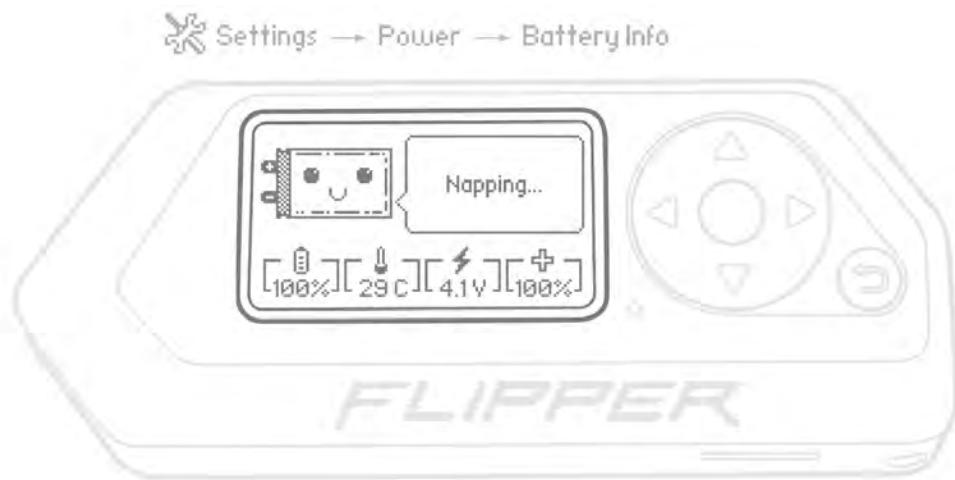
## Use a high-quality microSD card for longer battery life

When the display backlight is on, Flipper Zero's current consumption with a genuine branded microSD card is up to 30 mA. With a non-genuine microSD card, the overall current consumption may reach up to 50 mA leading to a shorter battery life of your device.

If the battery of your Flipper Zero is draining fast, check the current consumption: Main Menu -> Settings -> Power -> Battery Info.

## Sleep mode

When there are no running applications or connections established on your Flipper Zero, the device enters Sleep mode, which has a power consumption of around 1.5 mA.



In Sleep mode, the device consumes around 1.5 mA

### For Sleep mode to function properly, Debug mode must be disabled

You can disable Debug mode by going to Main Menu -> Settings -> System, selecting Debug, and setting it to OFF.

Two sleep modes are available for your Flipper Zero: **Default** and **Legacy**. The Default sleep mode has a power consumption of around 1.5 mA, resulting in a longer battery life. However, you may experience device crashes while using this mode. Legacy sleep mode has a power consumption of 9 mA leading to shorter battery life but also providing more stability to your device.

You can switch to Legacy sleep mode by going to **Main Menu -> Settings -> System** and setting **Sleep Method** to **Legacy**.

## Tips for maximizing battery performance

**Battery life** is the amount of time your Flipper Zero runs before it needs to be recharged.

**Battery lifespan** is the amount of time your battery lasts until it needs to be replaced.

# Long battery life

- Update to the latest firmware version. -> [Update your Flipper Zero](#) regularly since we constantly optimize the firmware and add new power-saving features.
- Optimize your settings. -> You can adjust parameters in the [Settings](#) application, such as Bluetooth, display, and system settings.

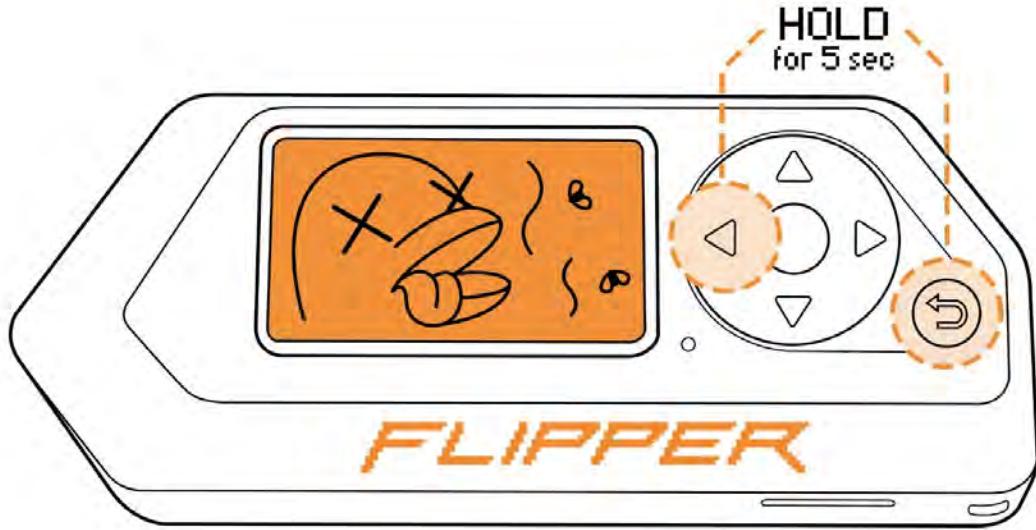
# Long battery lifespan

- Avoid extreme ambient temperatures. -> Flipper Zero is designed to operate within the temperature range of 0° to 40° C (32° to 104° F). Avoid exposing your device to ambient temperatures outside this specified range.
- Store the device half-charged when turned off for extended periods. -> Charge your Flipper Zero to around 50% before turning it off for a long period of time.

# Power system characteristics

Parameter	Value
Battery capacity	2100 mAh
Battery life	1 month
Charge time	2 hours
Power connector	USB Type-C
Charging voltage and current	5 V, 1 A
Battery operating voltage	3.3-4.2 V
Pin 1 voltage (Power is supplied directly from USB)	5 V
Maximum USB cable power supply current, including connected devices	3 A

# Reboot



We regularly update the firmware by adding new features. These updates improve the performance of the device, but there may be cases where your Flipper Zero becomes unresponsive or freezes after an update. In most cases, a normal reboot will fix the problem. However, in rare cases, you'll need to perform a hard reboot or switch your device to Recovery mode for the firmware repair.

On this page, you'll learn how to reboot your Flipper Zero normally, perform a hard reboot, or reboot to recovery mode.

## Normal reboot

You can reboot your Flipper Zero by using hotkeys, in Settings, and through the [Flipper Mobile App](#).

### Reboot with hotkeys

If your Flipper Zero freezes and fails to respond to button presses, reboot the device by pressing and holding the **LEFT** and **BACK** buttons for 5 seconds.

If your Flipper Zero freezes—reboot it

## Reboot in Settings

Rebooting your Flipper Zero in Settings can also be helpful when using [qFlipper](#) or the Flipper Mobile App screen streaming. The streaming feature enables you to control and reboot the device remotely.

To reboot the device, do the following:

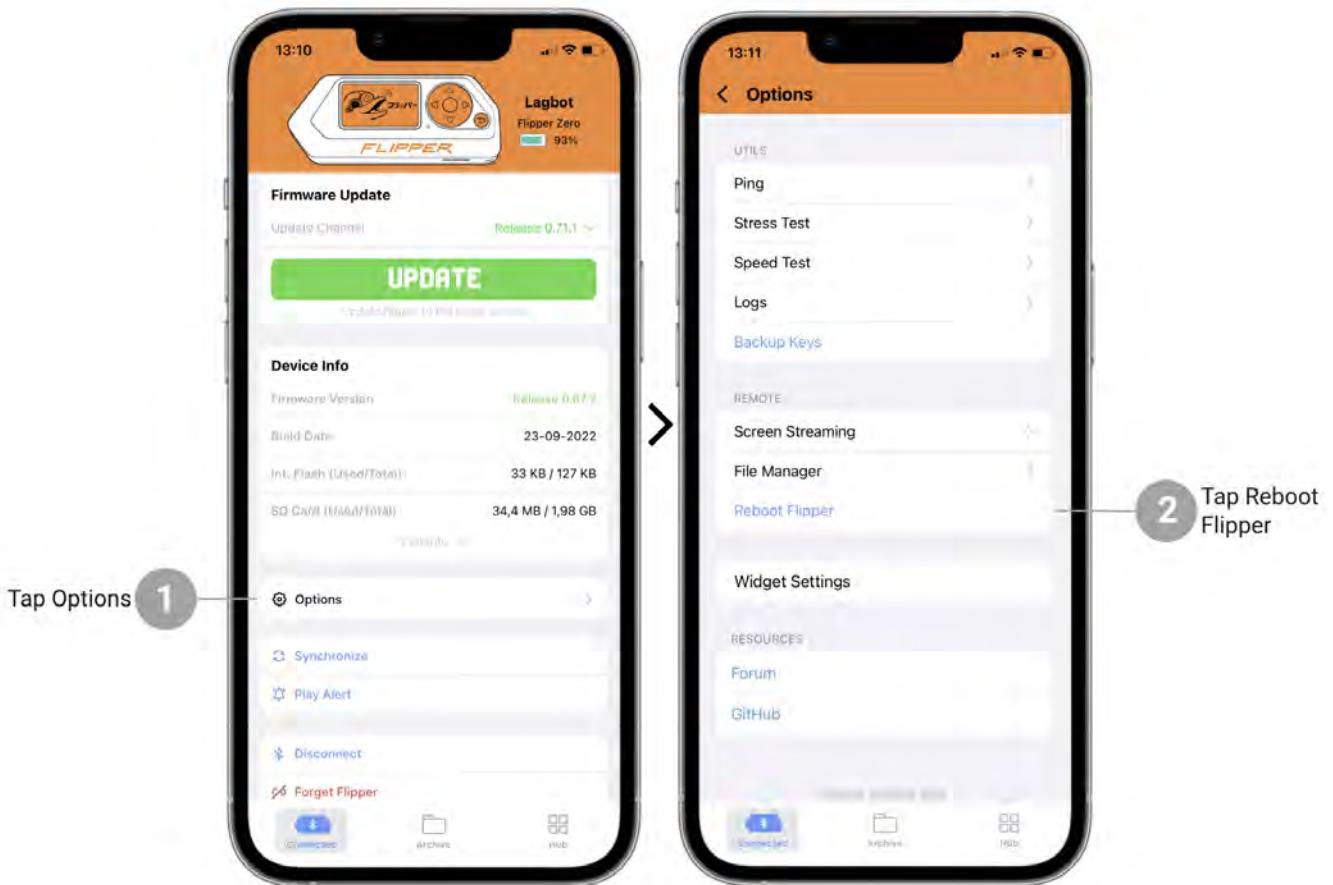
- 1 Go to **Main Menu -> Settings -> Power -> Reboot.**
- 2 Select the **Flipper OS** option and press the  **OK** button.

You can reboot your Flipper Zero via qFlipper screen streaming

## Reboot via Flipper Mobile App

To reboot your Flipper Zero via the Flipper Mobile App, do the following:

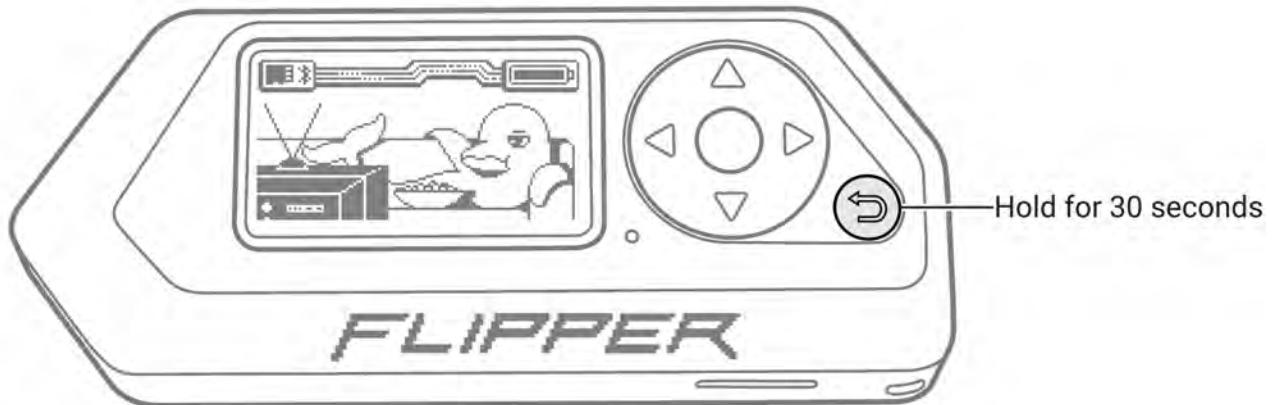
- 1 [Connect your phone to your Flipper Zero via Bluetooth.](#)
- 2 In the **Main Menu** tab, tap **Options**, then tap **Reboot Flipper**.



Reboot your Flipper Zero remotely via the Flipper Mobile App

## Hard reboot

If the device still freezes after a normal reboot, try performing a hard reboot by pressing and holding the BACK button for 30 seconds. This type of reboot resets the power circuit of your device.

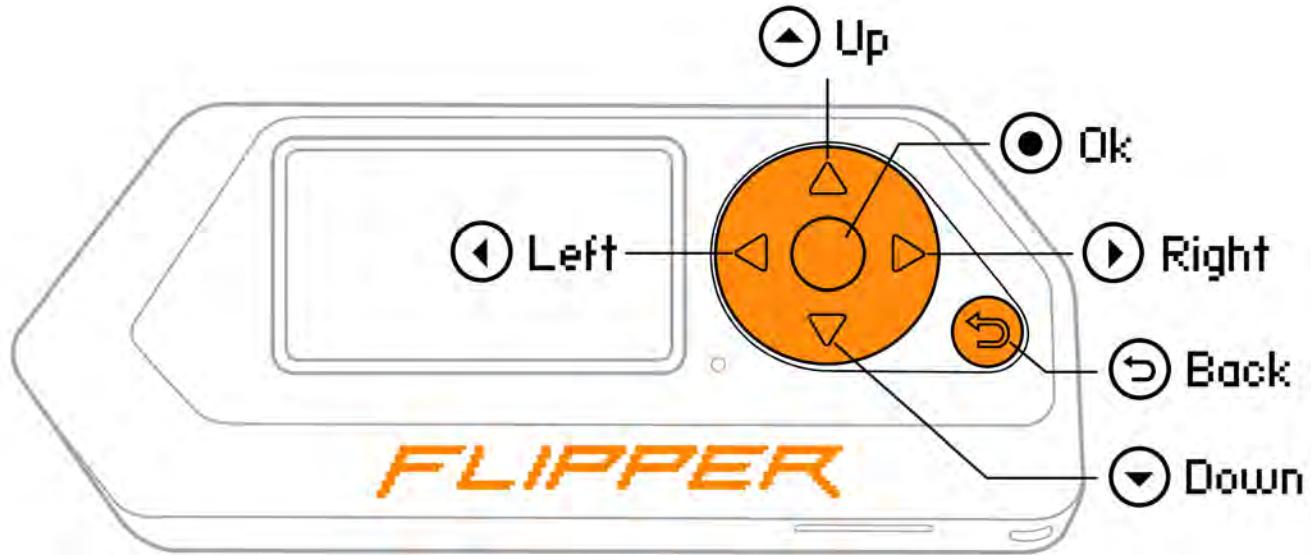


If a normal reboot fails to resolve your issue, perform a hard reboot

# Reboot to Recovery mode

Occasionally, your Flipper Zero may fail to update correctly, display images, or respond to button presses. These issues could be caused by corruption in the device's firmware. You can repair the corrupted firmware by rebooting your device to Recovery mode and running the qFlipper desktop application. To learn more about Recovery mode and repair procedure, visit [Firmware recovery](#).

# Controls

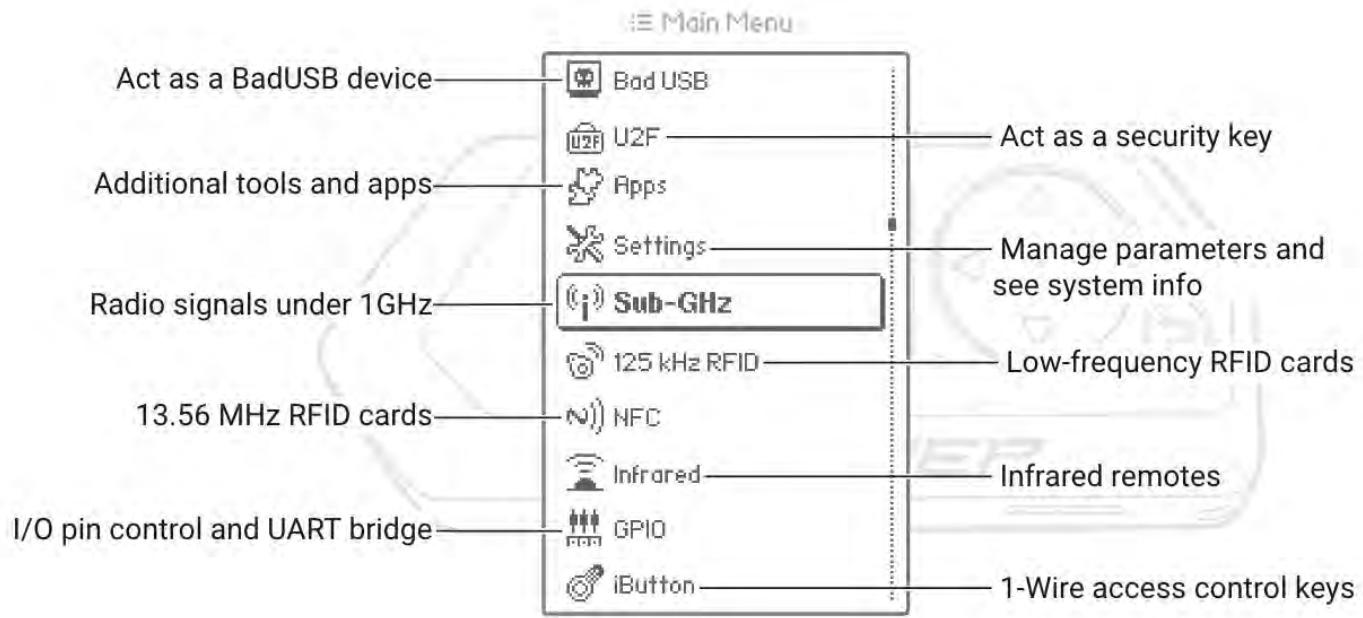


You can control your Flipper Zero using a directional pad consisting of four buttons (**Up**, **Down**, **Left**, and **Right**), the **OK** button located in the center of the pad, and the **BACK** button positioned beside the pad.

On this page, you'll learn about Flipper Zero controls, hotkeys, quick-access applications, and setting and resetting your PIN code.

## Main Menu

The Main Menu provides access to various features, settings, and apps. To access the Main Menu, press the **OK** button while on the Desktop.



Access apps in the Main Menu

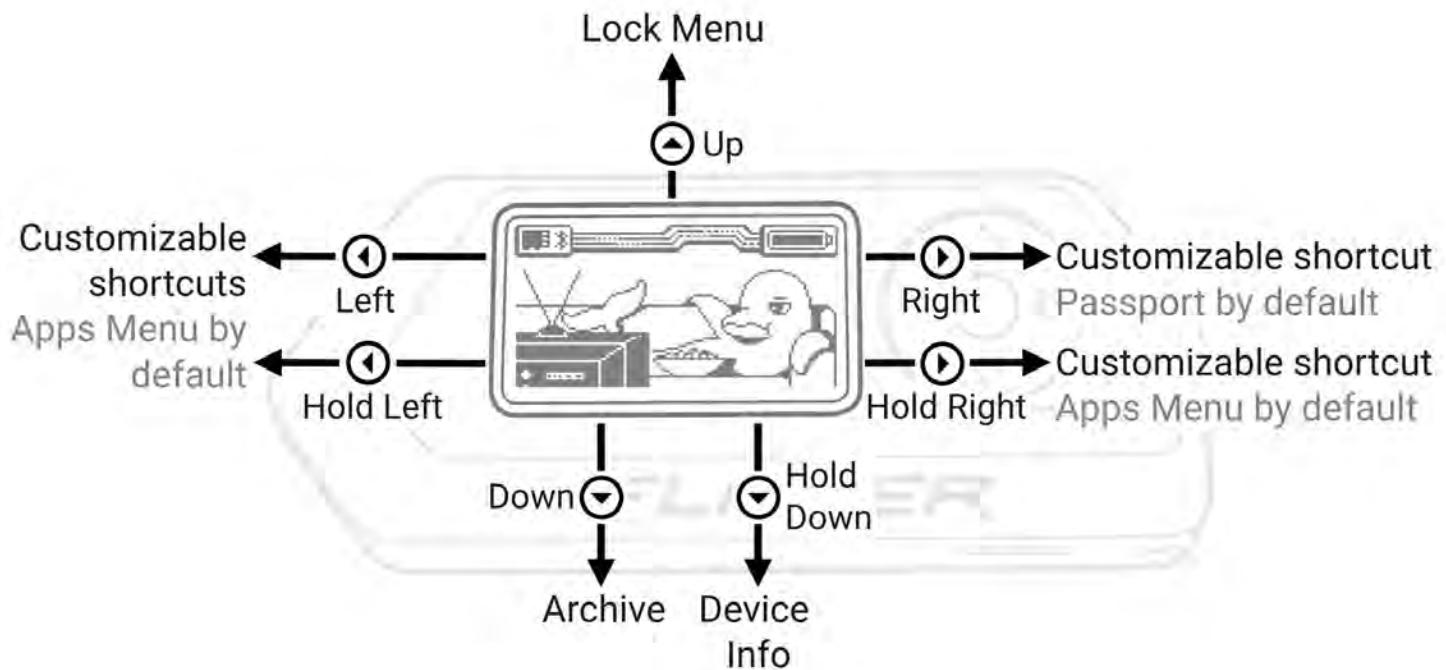
The following apps are available in the Main Menu:

- [\*\*Sub-GHz\*\*](#)
- [\*\*125 kHz RFID\*\*](#)
- [\*\*NFC\*\*](#)
- [\*\*Infrared\*\*](#)
- [\*\*GPIO\*\*](#)
- [\*\*iButton\*\*](#)
- [\*\*Bad USB\*\*](#)
- [\*\*U2F\*\*](#)
- [\*\*Apps\*\*](#)
- [\*\*Settings\*\*](#)

## Desktop

The Desktop is your digital pet's home. It's the place to see what your dolphin pet is doing and how it's feeling.

You can view different indicators at the top of the desktop, including battery level, charging status, Bluetooth connectivity, microSD card status, and others.



Your digital pet lives on the Desktop

From the Desktop, you can access various apps with a press of a button:

- Press **UP** to access the Lock Menu, where you can lock your Flipper Zero with and without a PIN code, and activate Dummy Mode.
- Press **RIGHT** to access your digital pet's details.

- Press **DOWN** to access Archive with stored data.

*or*

Press and hold **DOWN** to access information about the device.

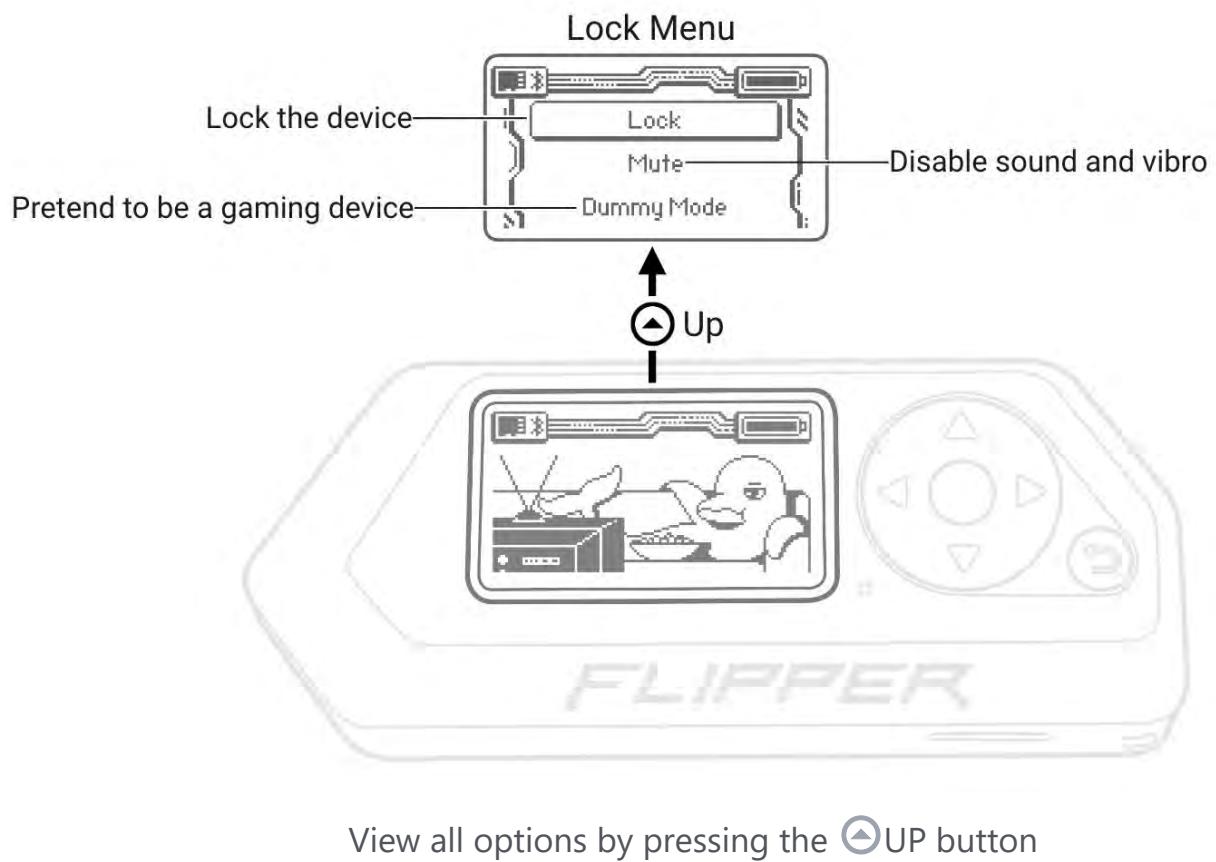
- Press **LEFT** or **RIGHT**

*or*

Press and hold **LEFT** or **RIGHT** to access your Favorite Apps.

## Lock Menu

In the Lock Menu, you can lock your Flipper Zero with and without a PIN code, activate Dummy Mode, and mute the device. To enter the Lock Menu, press **UP** while on the Desktop.



## Lock

By default, this option locks the controls of your Flipper Zero. To unlock the controls, press the **BACK** button three times.

To protect your device against unauthorized access, you can set a PIN code before using the Lock feature.

## How to set a PIN code

You can set a PIN code by doing the following:

- 1 Go to the **Main Menu -> Settings -> Desktop -> PIN Setup.**
- 2 Select **Set PIN.**

- 3 Follow the instructions on the screen.

After setting the PIN code, you can lock the device by doing the following:

- 1 Go to the Lock Menu by pressing the **UP** button while on the Desktop.
- 2 Select **Lock**.

## How to customize or disable your PIN code

If you want to change or disable your PIN code, go to **Main Menu -> Settings -> Desktop -> PIN Setup**.



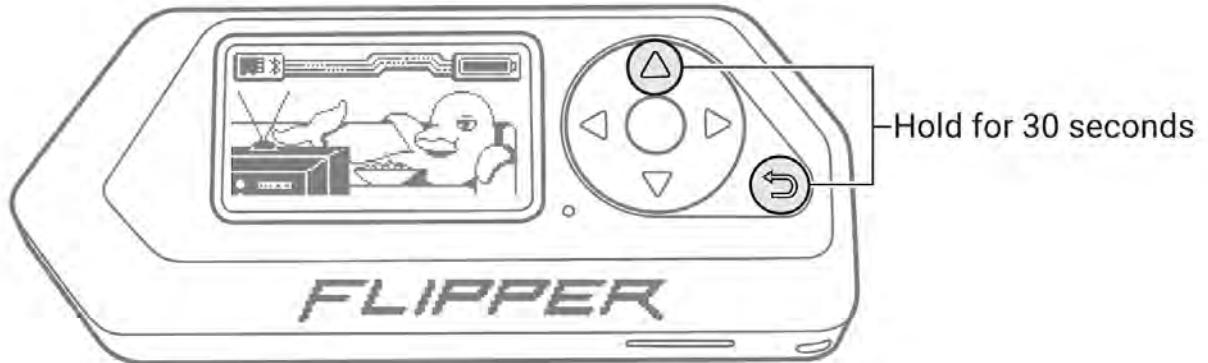
Customize your PIN code

## How to reset your PIN code

### All internal storage data will be erased

The dolphin's level, settings, and information about paired devices will be erased. **Data on the microSD card will be saved.**

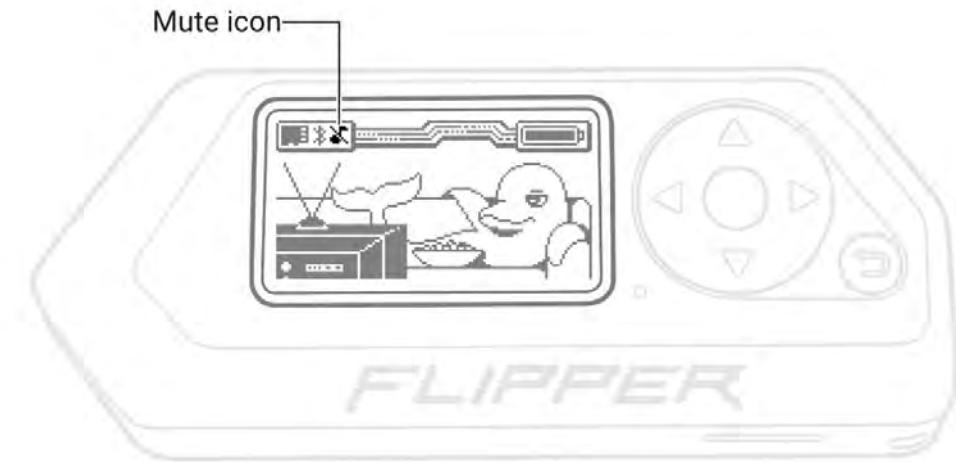
If you forgot your PIN and can't access your Flipper Zero, you can easily reset the PIN by holding the **UP** and **BACK** buttons for 30 seconds. After that, confirm the reset procedure by holding the **RIGHT** button—your device will be reset to the factory settings.



You can reset your PIN code even if your Flipper Zero is locked

## Mute

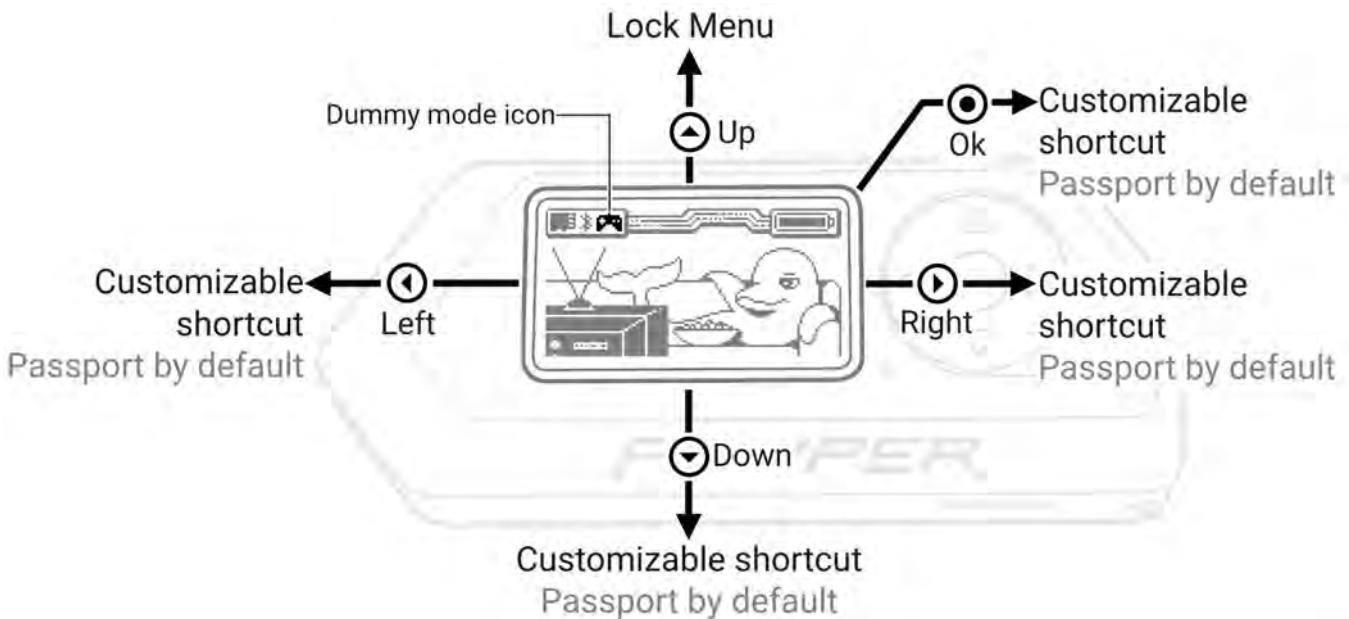
This function disables sound and vibro notifications on your Flipper Zero.



Check at a glance if your device is muted

## Dummy mode

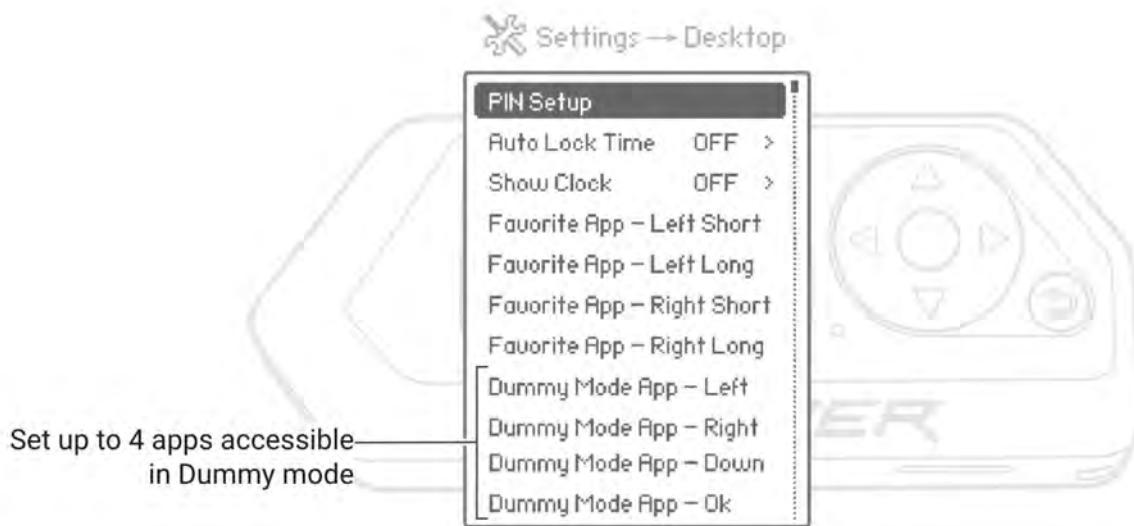
In this mode, Flipper Zero disables most of its functions. You can customize the controls by assigning quick-access apps of your choice to the **LEFT**, **RIGHT**, **DOWN**, and **OK** buttons.



In Dummy mode, your Flipper Zero turns into a gaming device

To set apps to be accessible in Dummy mode, do the following:

- 1 Go to **Main Menu -> Settings -> Desktop.**
- 2 Select a **Dummy Mode App** shortcut.



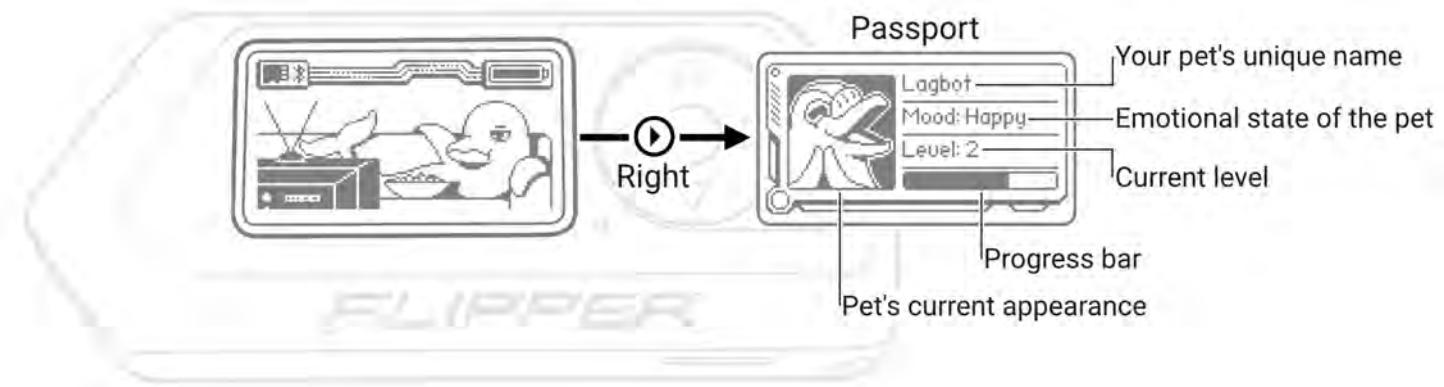
Set apps to access them from the Desktop in Dummy Mode

- 3 Select an app for quick access from the list and press the **OK** button.

To leave **Dummy mode**, press **UP** while on the Desktop and select **Default Mode**.

# Passport

Here, you can view your digital pet's profile for details such as the unique name, appearance, mood, level, and progress.



View your pet's details with a press of a button

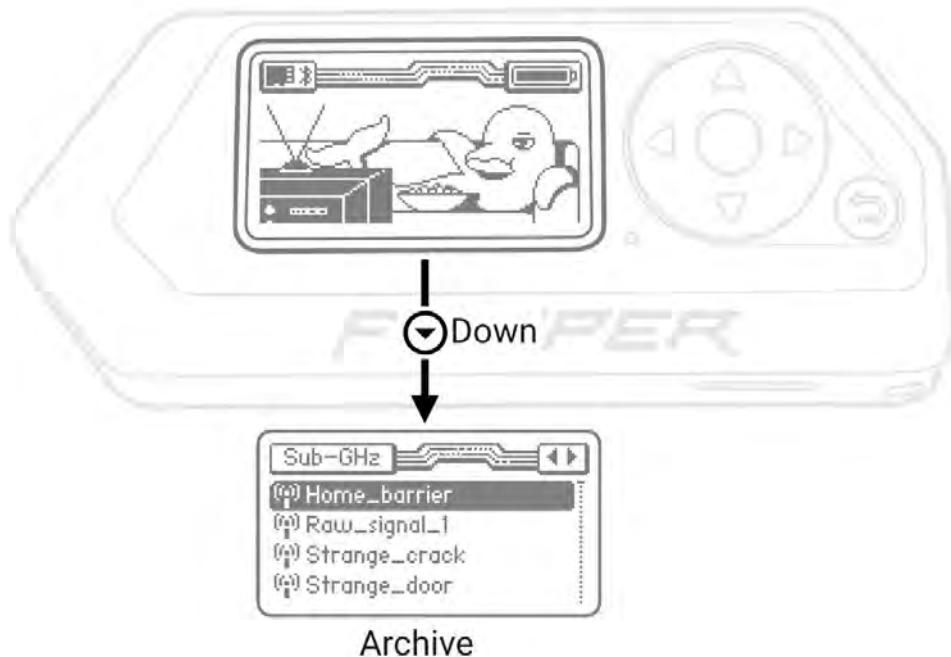
Use your Flipper Zero regularly to keep your pet happy!

Please note that this shortcut may be assigned to a different application. To learn more, visit the [\*\*Favorite App\*\*](#) section.

You can also access your digital pet's passport by going to **Main Menu -> Settings -> Passport**.

# Archive

The Archive app lets you quickly access and manage saved tags, keys, remotes, payloads, and other apps.



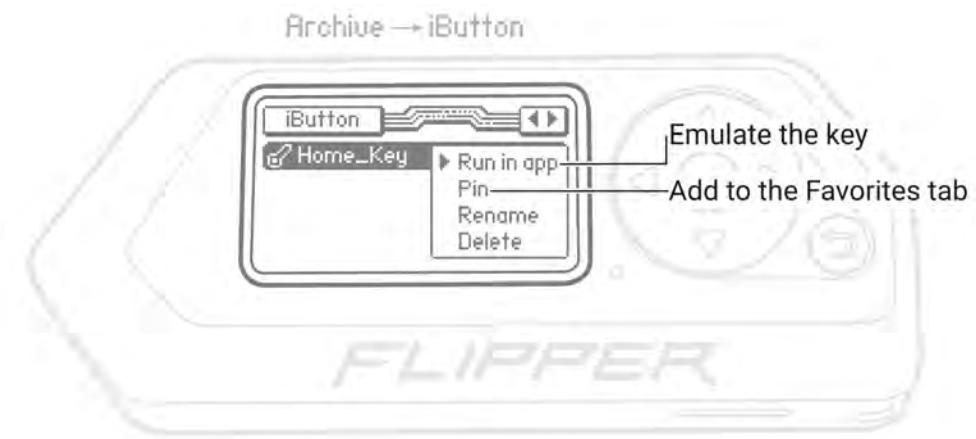
Easily access your tags, keys, and remotes from the Desktop

The Archive app consists of several tabs. You can navigate among them by pressing the ⏪ LEFT and ⏹ RIGHT buttons:

- **Sub-GHz**: sub-1 GHz radio remotes
- **RFID LF**: low-frequency RFID tags or keys
- **NFC**: high-frequency 13.56 MHz tags or keys
- **Infrared**: infrared remotes
- **iButton**: 1-Wire keys
- **Bad USB**: ducky script payloads
- **U2F**: universal 2nd factor token
- **Apps**: additional apps
- **Browser**: user and system files

Only tabs containing files are shown in Archive. Empty tabs are hidden.

By selecting a tag, key, or remote and pressing the **OK** button, you access the contextual menu, which allows you to emulate, add to the Favorites tab, rename, or delete the data.



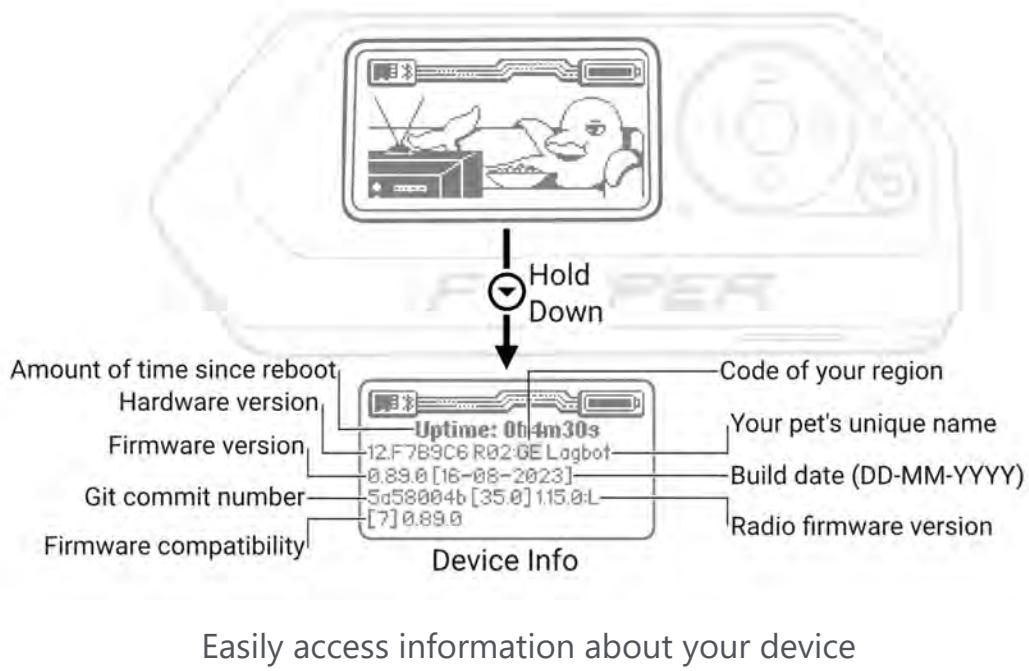
Access the contextual menu by pressing the **OK** button

To access the contextual menu in the Favorites tab, press and hold the **OK** button.

The contextual menu is available only for known file types. If you try to open an unknown file type in the browser tab, all the standard actions will be inaccessible.

# Device Info

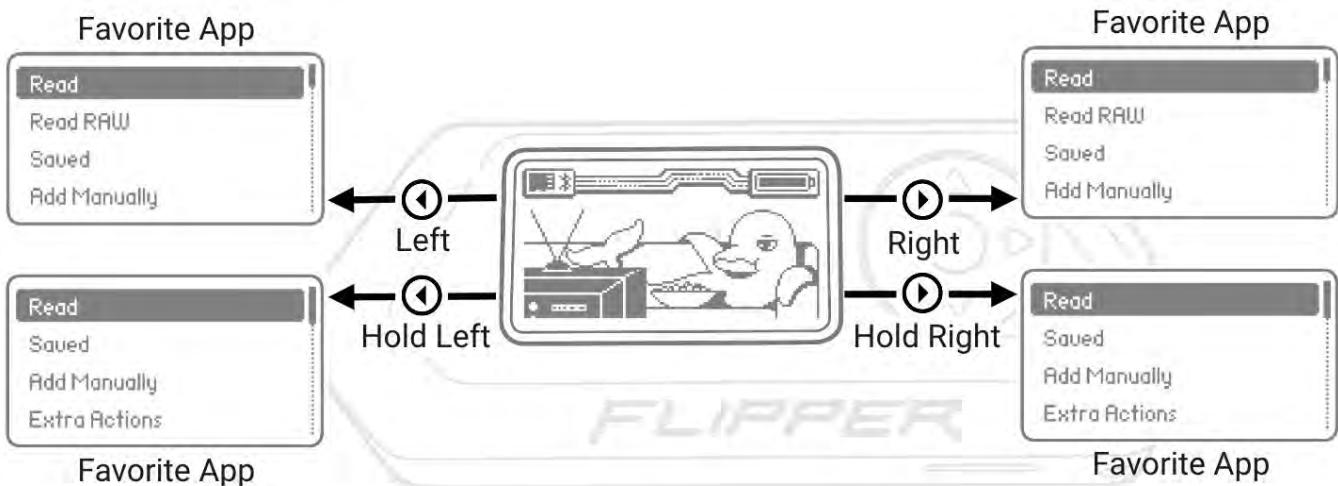
You can easily access information about your Flipper Zero firmware and hardware by pressing and holding the  **DOWN** button while on the Desktop.



# Favorite App

The Favorite App feature allows you to set up to 4 apps for quick access directly from the Desktop. After that, you will not need to look for them in the Main Menu whenever you want to

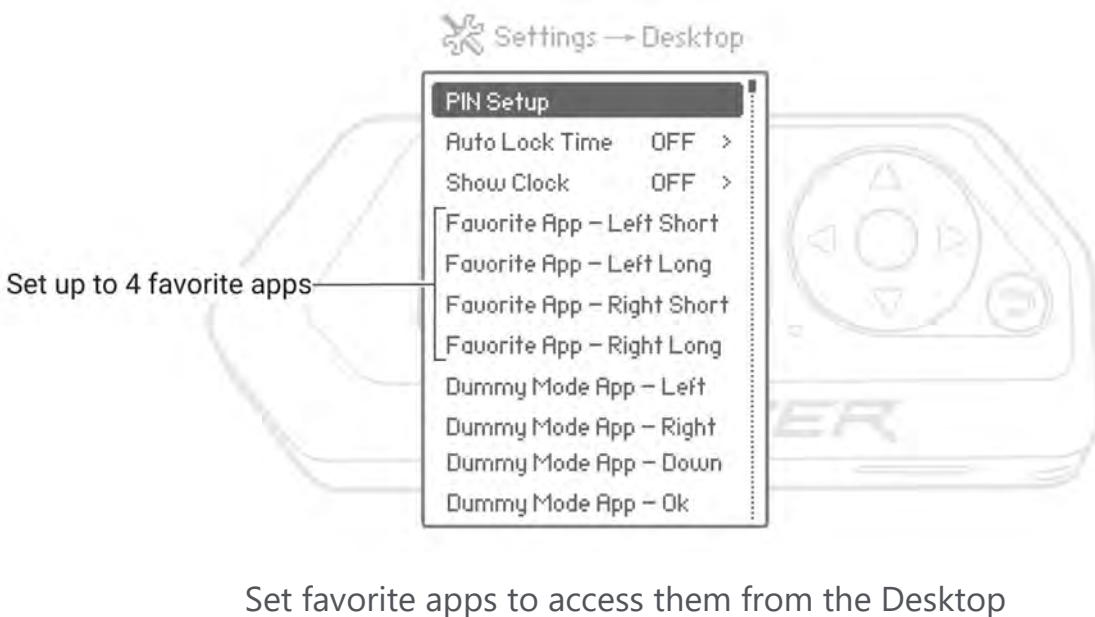
run them.



Access your favorite apps by pressing the ⚙️LEFT and ⚙️RIGHT buttons while on the Desktop

Before using this feature, you need to set apps as favorites by doing the following:

- 1 Go to **Main Menu -> Settings -> Desktop**.
- 2 Select a **Favorite App** shortcut.



Set favorite apps to access them from the Desktop

- 3 Select an app for quick access from the list and press the ⚙️OK button.

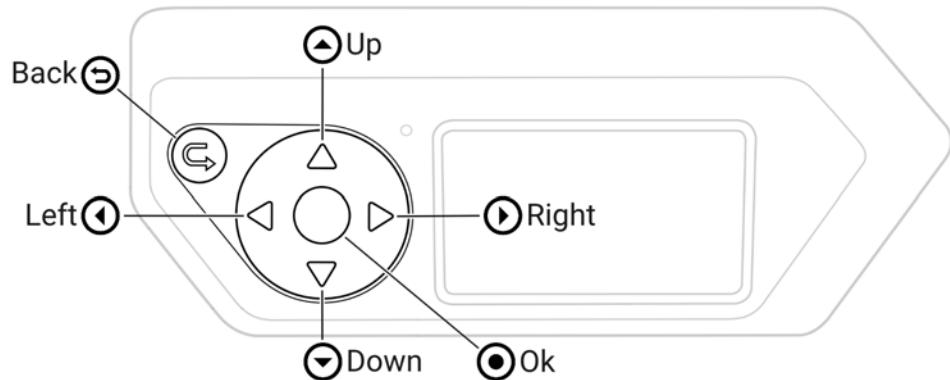
To run the selected **Favorite App** while on the Desktop, use the assigned shortcut.

# Controls in left-handed mode

You can activate left-handed mode on your Flipper Zero by doing the following:

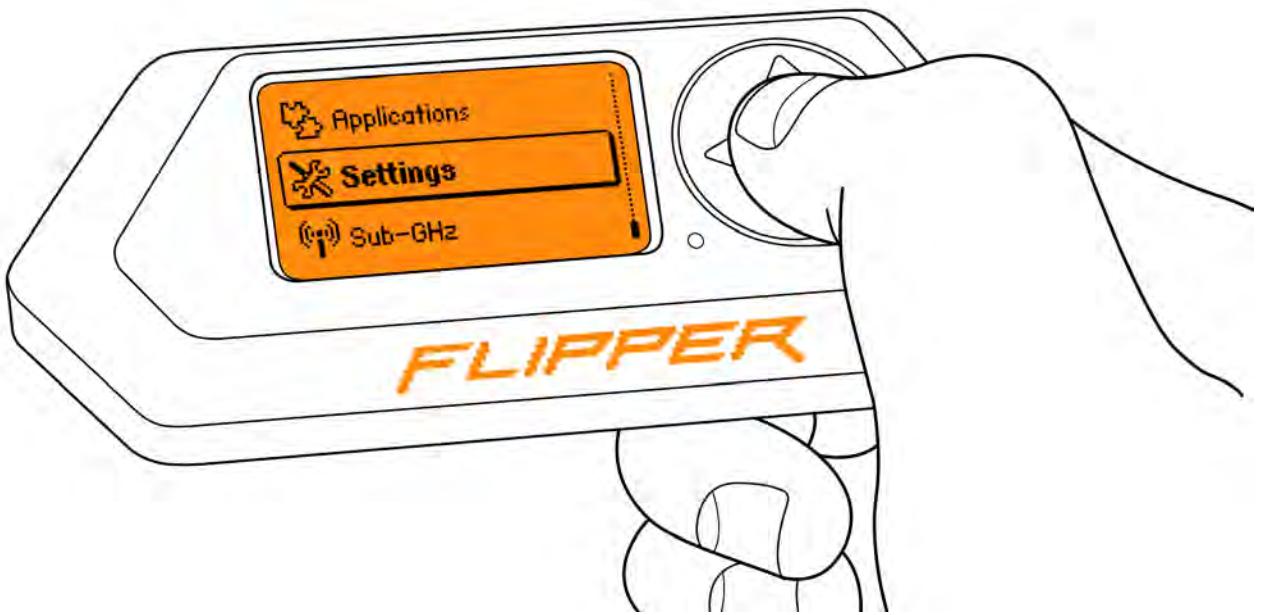
- 1 Go to **Main Menu -> Settings -> System**.
- 2 Set the **Hand Orient** option to **Lefty**.

After switching to left-handed mode, the controls change as follows:



Control your Flipper Zero in left-handed mode

# Settings

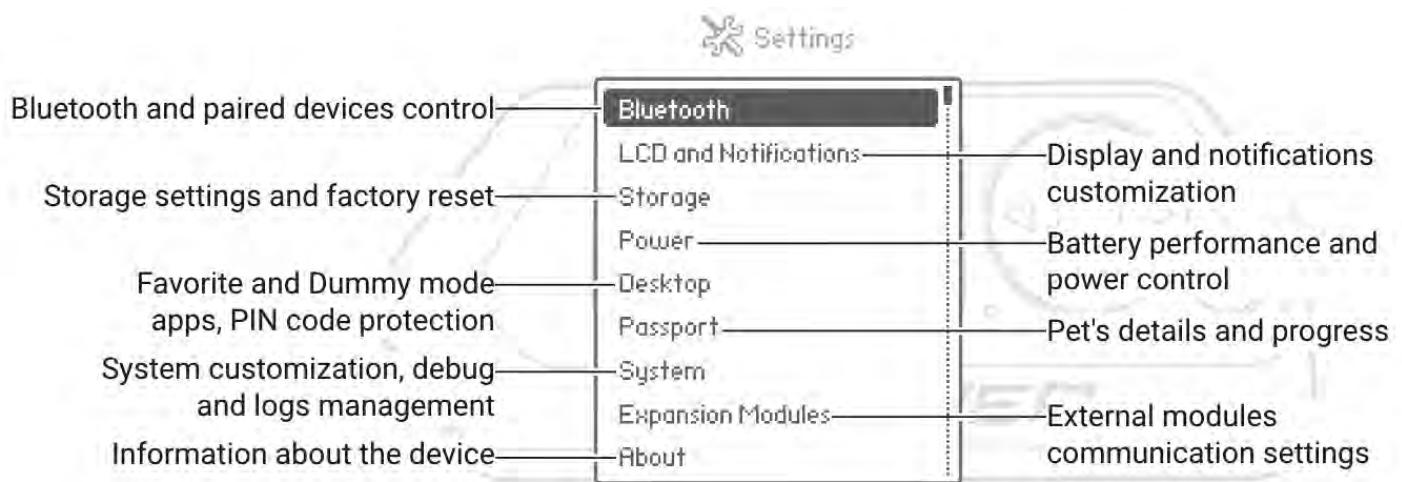


The **Settings** application allows you to manage various parameters of your Flipper Zero. With this application, you can customize settings such as the Bluetooth connection, screen brightness, storage, and power management, as well as secure your device by setting a PIN code. Additionally, the Settings application provides you with detailed information about your device and digital pet.

On this page, you'll learn about the main features of the Settings application.

## Settings Menu

You can access the Settings application by going to **Main Menu -> Settings**.

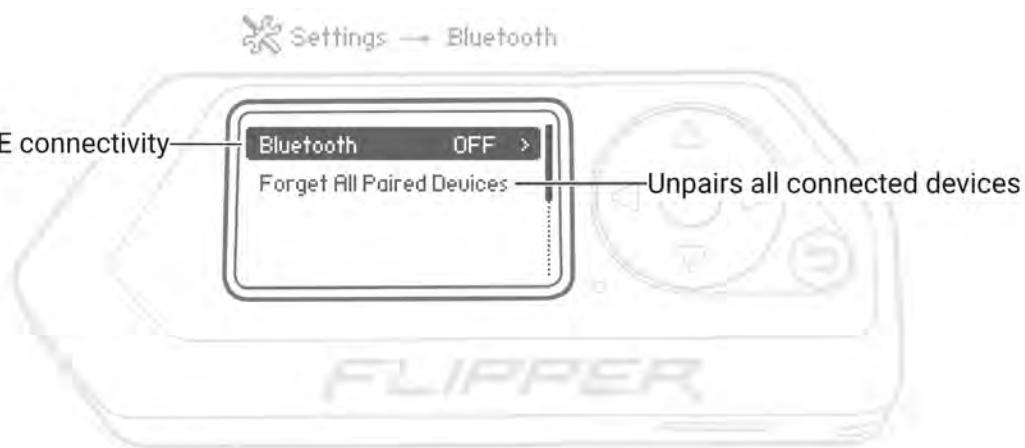


Select the parameter you want to customize

Let's have a look at the Settings Menu options below.

## Bluetooth

The Bluetooth LE connectivity feature allows you to pair the device with your phone with the help of the [Flipper Mobile App](#). You can also connect your Flipper Zero to a smartphone or computer as a [remote](#).

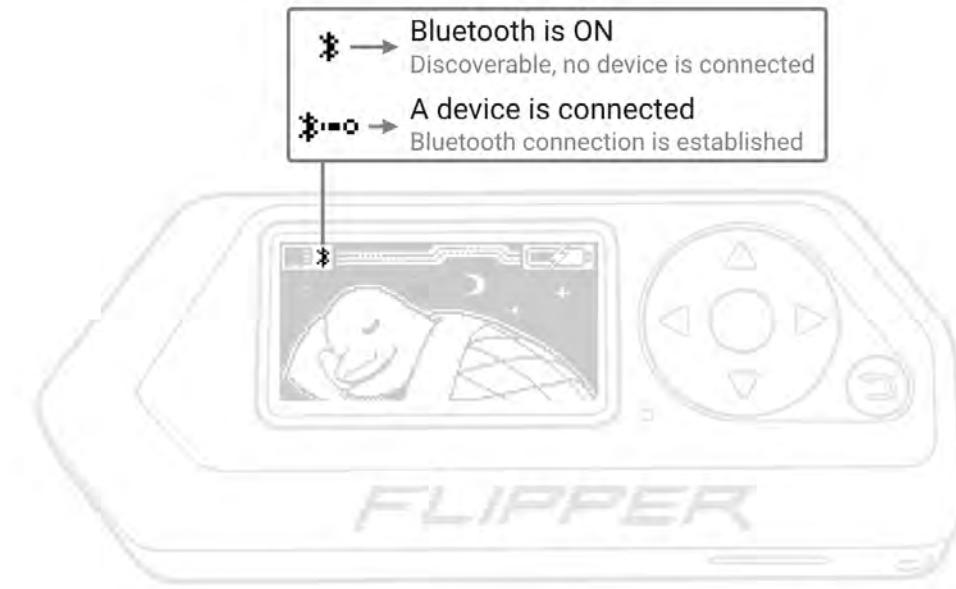


Activate Bluetooth on your Flipper Zero

After using the Forget All Paired Devices option, all previously connected

devices will need to be paired again.

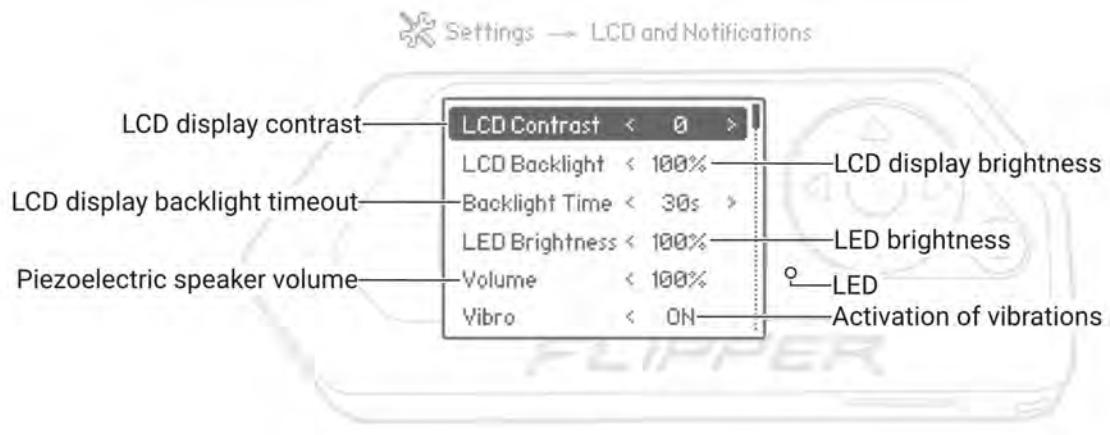
The Bluetooth icon helps you check the current Bluetooth connection status. The Bluetooth icon is displayed in the upper-left corner of the screen.



Check the Bluetooth connection of your Flipper Zero

## LCD and Notifications

You can manage LCD display settings, LED brightness, sound volume, and vibrations by pressing the **LEFT** and **RIGHT** buttons.

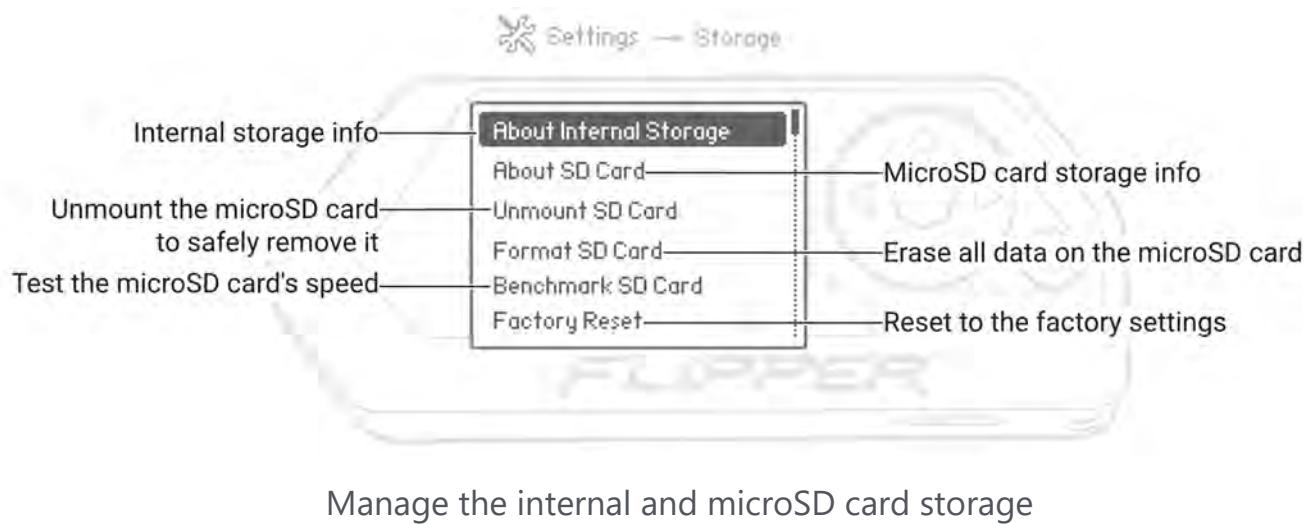


Configure display settings and notifications

# Storage

Here, you can see the used and total space of the internal storage and microSD card, unmount and format the microSD card, run a benchmark to assess the microSD card's performance, and reset your Flipper Zero to the factory settings.

For additional information on microSD storage, visit [MicroSD card setup](#).

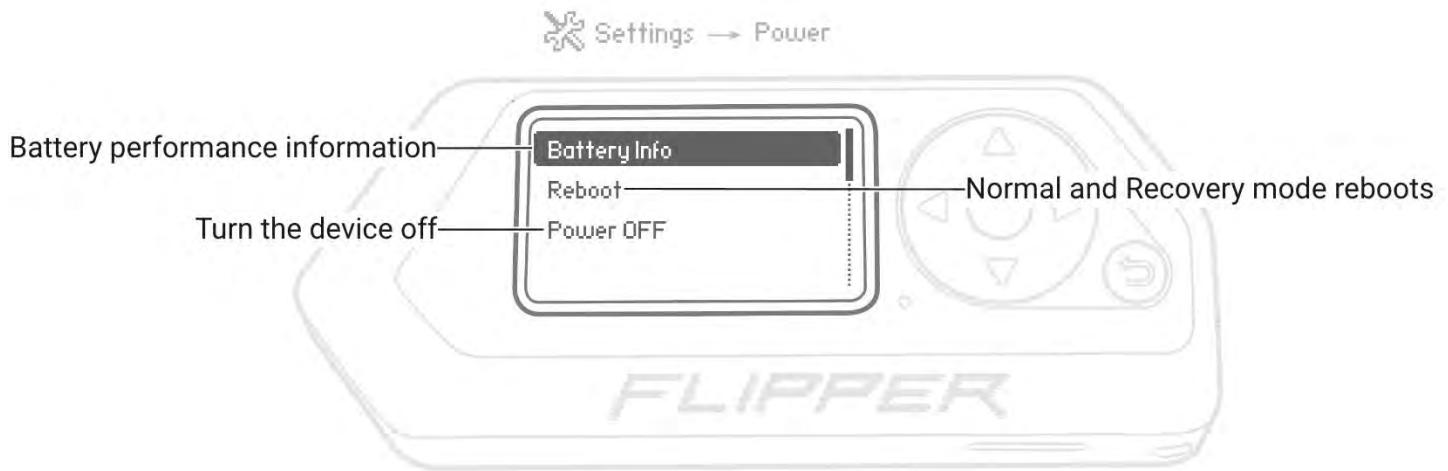


## The Factory Reset option erases all internal storage data

The dolphin's level, settings, and information about paired devices will be erased. **Data on the microSD card will be saved.**

# Power

In Power, you can see battery performance information, reboot your Flipper Zero in normal or Recovery mode, and turn your device off.

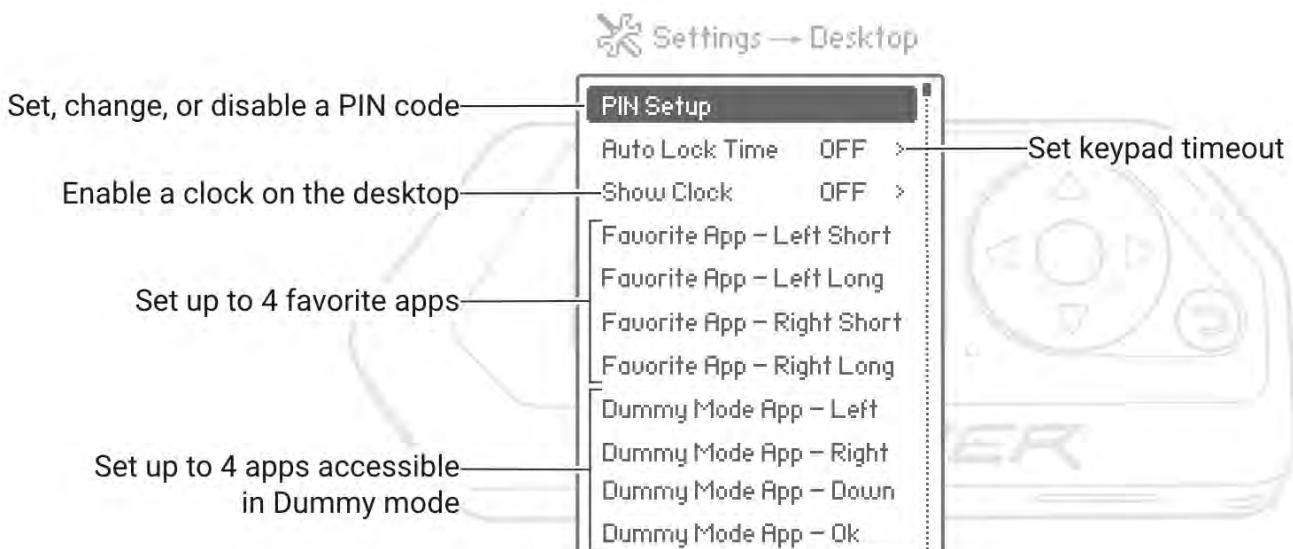


### Manage power of your Flipper Zero

For additional information regarding battery performance, visit [Power](#). To learn more about the various types of reboot, visit [Reboot](#).

## Desktop

You can set quick-access applications, set a PIN code to protect your device, set keypad timeout, and enable a clock.



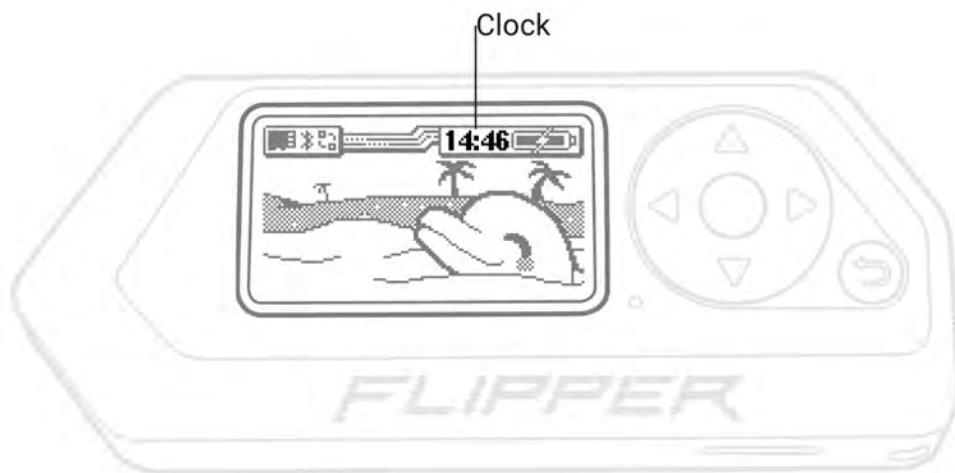
Set your favorite and Dummy mode apps and protect your device in Desktop settings

You can set up to 4 favorite apps for quick access right from the Desktop. To learn additional details about the **Favorite App** feature, visit [this page](#).

You can set up to 4 quick-access apps for **Dummy mode** as well. To find out more about Dummy mode, go to [this page](#).

For further information on securing your Flipper Zero using a **PIN code**, refer to [this page](#).

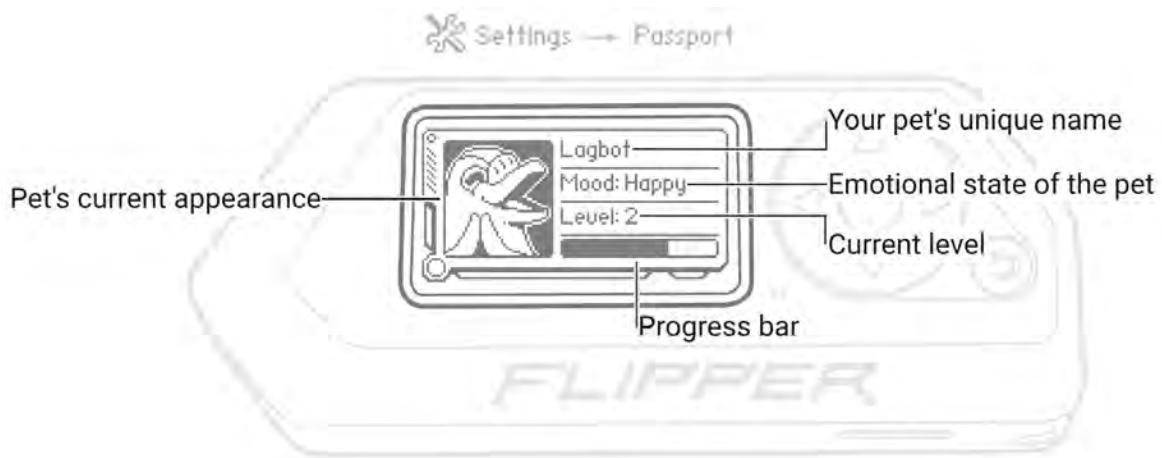
The enable clock is displayed on the Desktop:



You can change the time format in Settings -> System -> Time Format

## Passport

Here, you can view your digital pet's profile for details such as the unique name, appearance, mood, level, and progress.



Your pet's mood depends on how often you use your Flipper Zero

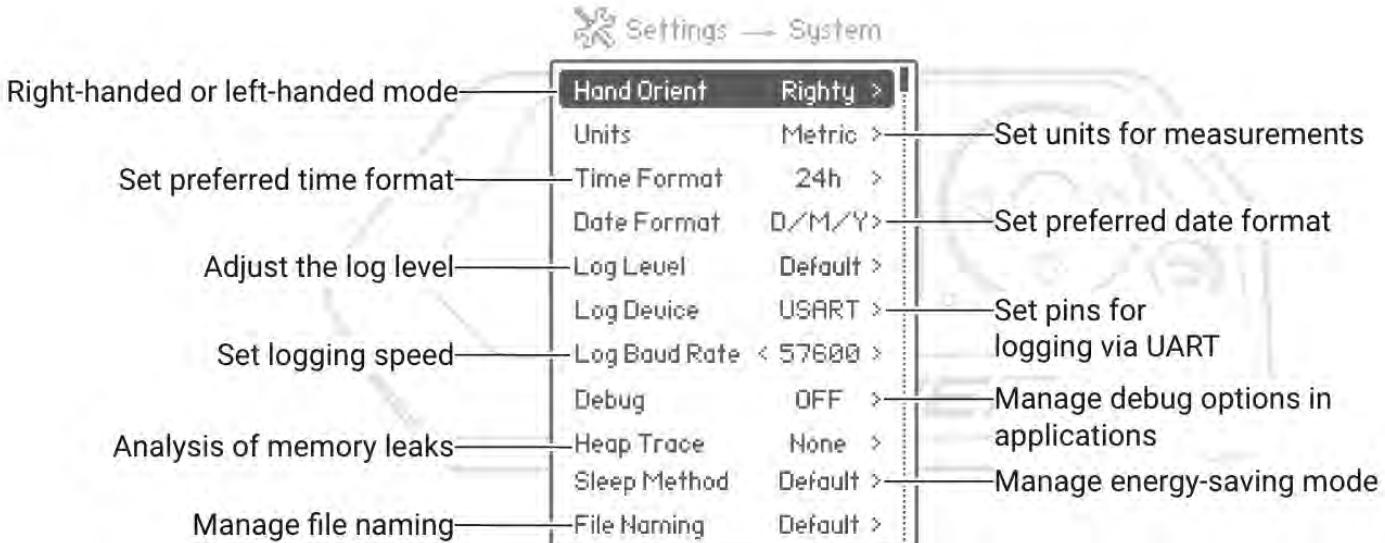
Use your Flipper Zero regularly to keep your pet happy!

You can also access your digital pet's passport by pressing the **RIGHT** button while on the Desktop.

# System

Customize your Flipper Zero system settings:

- Switch between right-handed and left-handed modes.
- Set your preferred units for measurements.
- Choose your time and date formats.
- Adjust how much detail is shown in logs.
- Enable advanced features like Debug mode and memory leak analysis.
- Disable power-saving mode, which is set as default.
- Enable detailed naming of new files with file type, date, and time stamps included by default.



Customize your Flipper Zero system settings

Two sleep modes are available for your Flipper Zero: **Default** and **Legacy**. The Default sleep mode has a power consumption of around 1.5 mA, resulting in a longer battery life. However, you may experience device crashes while using this mode. Legacy sleep mode has a power consumption of 9 mA, leading to shorter battery life but also providing more stability to your device.

You can switch to Legacy sleep mode by setting **Sleep Method** to **Legacy**.

To learn more, visit the [Power modes section](#).

## Log levels

You can filter and prioritize log messages based on their severity, making it easier to identify and address issues that may arise in your Flipper Zero. Starting with the Error log level, each log level adds more messages to be logged. Log messages are printed to the console via [UART](#) and can also be printed to the command-line interface (CLI) with the help of the `log` command.

The following log level options are available:

- **Default:** equivalent to the Info log level.
- **None:** no events are logged.
- **Error:** only errors are logged.
- **Warning:** errors and warnings are logged.

- **Info:** errors, warnings, and info messages are logged.
- **Debug:** errors, warnings, info, and debug messages are logged.
- **Trace:** errors, warnings, info, and debug messages are logged, as well as tracing information from various subsystems.

## As the level of logging increases, the device's stability decreases

To maintain stability and prevent performance degradation and a slow user interface, we recommend setting the log level only when required, as the device logs more events with each level.

## Log Device

You can select which UART pins will be used for logging. The **Log Device** setting has the following options:

- **USART:** uses pins 13 and 14. This option is set by default.
- **LPUART:** pins 15 and 16.
- **None:** disables logging via UART.

## Debug mode

Enabling Debug mode provides additional debugging functionality in Sub-GHz, 125 kHz RFID, NFC, and Infrared applications, as well as new commands in CLI. For example, you can read low-frequency RFID card's RAW data by going to Main Menu -> 125 kHz RFID -> Extra Actions -> Read RAW RFID data.

Debug mode also provides access to the [Serial Wire Debug \(SWD\) interface](#). If you disable Debug mode on your Flipper Zero, the SWD interface will become unavailable.

### The device is less stable in Debug mode

Enable this mode only when necessary, as the mode disables power-saving features and introduces logging for various functions.

Consequently, the device's performance may degrade, leading to a slower user interface and reduced stability.

## Heap Trace

A heap trace is a log of memory allocations and deallocations that occur in your Flipper Zero. The heap trace records information about each allocation, including the size of the block of memory allocated, the address of the block of memory, and the time at which it was allocated. Heap traces are useful for debugging memory-related issues, such as memory leaks. Heap Trace log messages are printed to the console via [UART](#).

# Expansion Modules

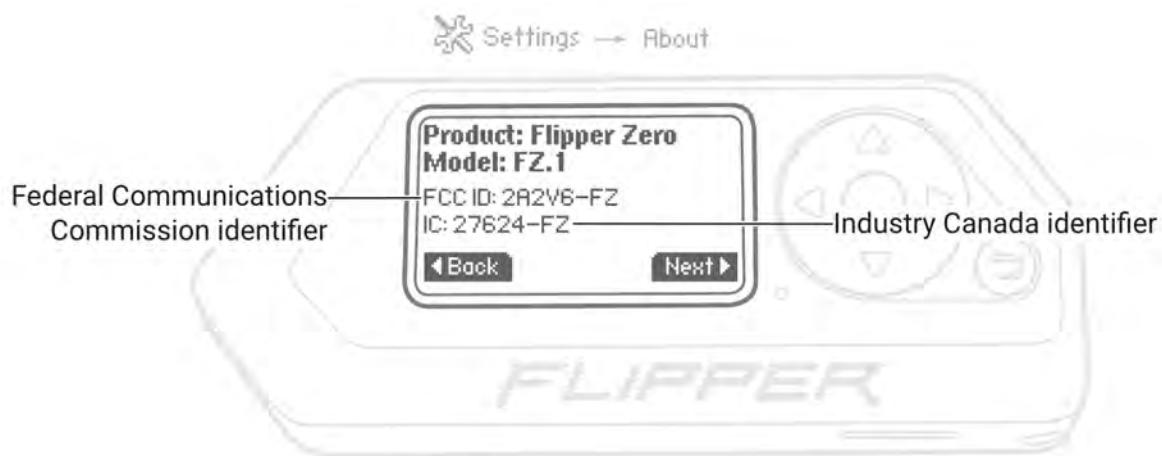
You can select which UART hardware will be used to communicate with external modules that support the standard expansion module protocol.

The **Listen UART** setting has the following options:

- **USART**: uses pins 13 and 14. This option is set by default.
- **LPUART**: pins 15 and 16.
- **None**: disables expansion module support.

# About

Here, you can find general information about your device and unique identifier numbers used to certify that this electronic device meets the technical standards and regulations set by the Federal Communications Commission in the United States and Innovation, Science and Economic Development Canada.



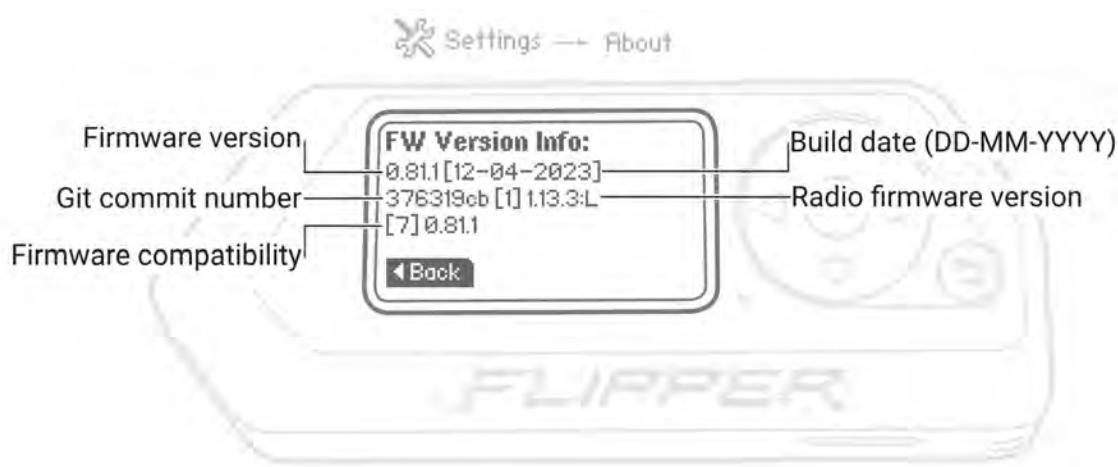
This information might be useful for customs clearance

You can also find information about the hardware of your Flipper Zero and your region.



View information about the hardware

Here, you can find information about the firmware.



View detailed information about the installed firmware

# Sub-GHz



Flipper Zero can receive and transmit radio frequencies in the range of 300-928 MHz with its built-in module, which can read, save, and emulate remote controls. These controls are used for interaction with gates, barriers, radio locks, remote control switches, wireless doorbells, smart lights, and more. Flipper Zero can help you to learn if your security is compromised.

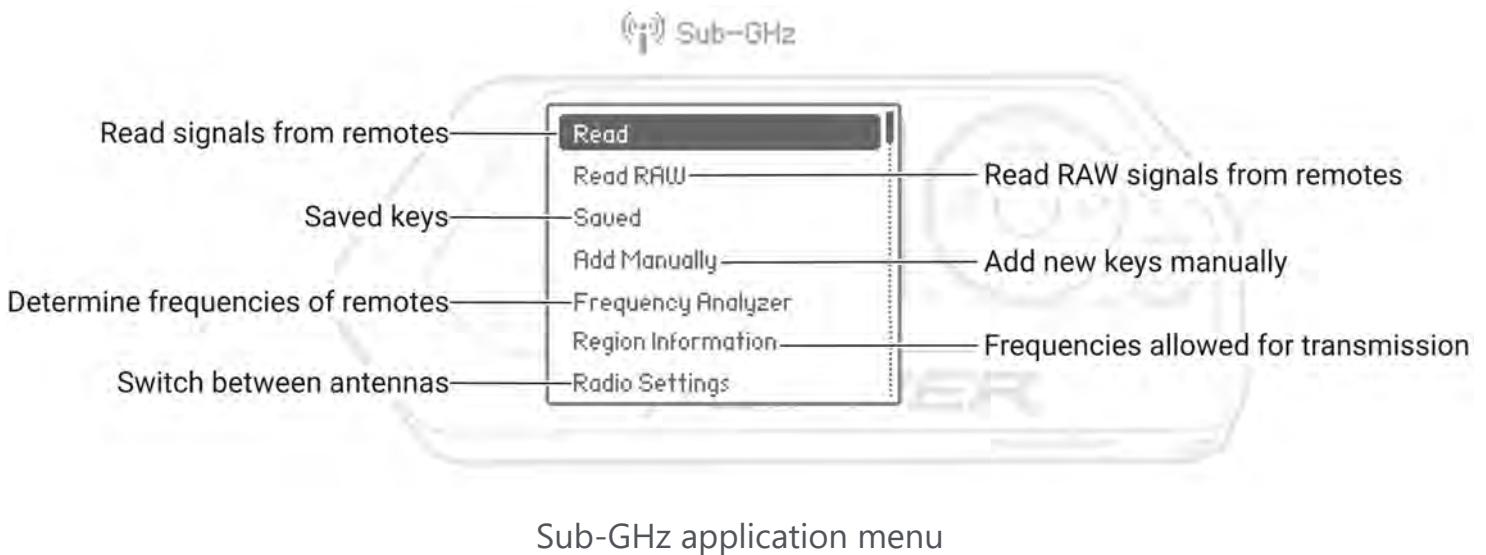
## Insert a microSD card to use the Sub-GHz app

Before using the Sub-GHz app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

On this page, you'll find an overview of the Sub-GHz application, and learn more about the hardware behind the sub-1 GHz module.

# Sub-GHz menu

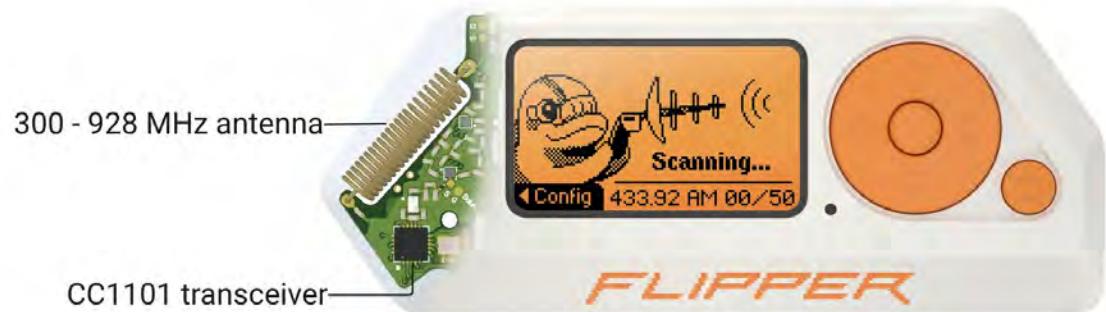
You can access the Sub-GHz application from the Main Menu. In the application, you can read and emulate remote controls, add controls manually, and determine the remote's frequency.



- **Read:** reads and decodes signals based on known protocols. If the protocol is static, Flipper Zero saves the signal.
- **Read RAW:** reads and saves signals in a raw format, including signals from remotes with unknown protocols.
- **Saved:** lists saved signals, which can be emulated and renamed.
- **Add Manually:** creates a virtual remote control that can be paired with a reader.
- **Frequency Analyzer:** determines frequencies at which the signal is sent by the remote.
- **Region Information:** provides information about your region and lists frequencies allowed for transmission. For more information about regions, visit [Frequencies](#).
- **Radio Settings:** enables switching between the internal antenna and the external antenna if connected.

# Sub-GHz hardware

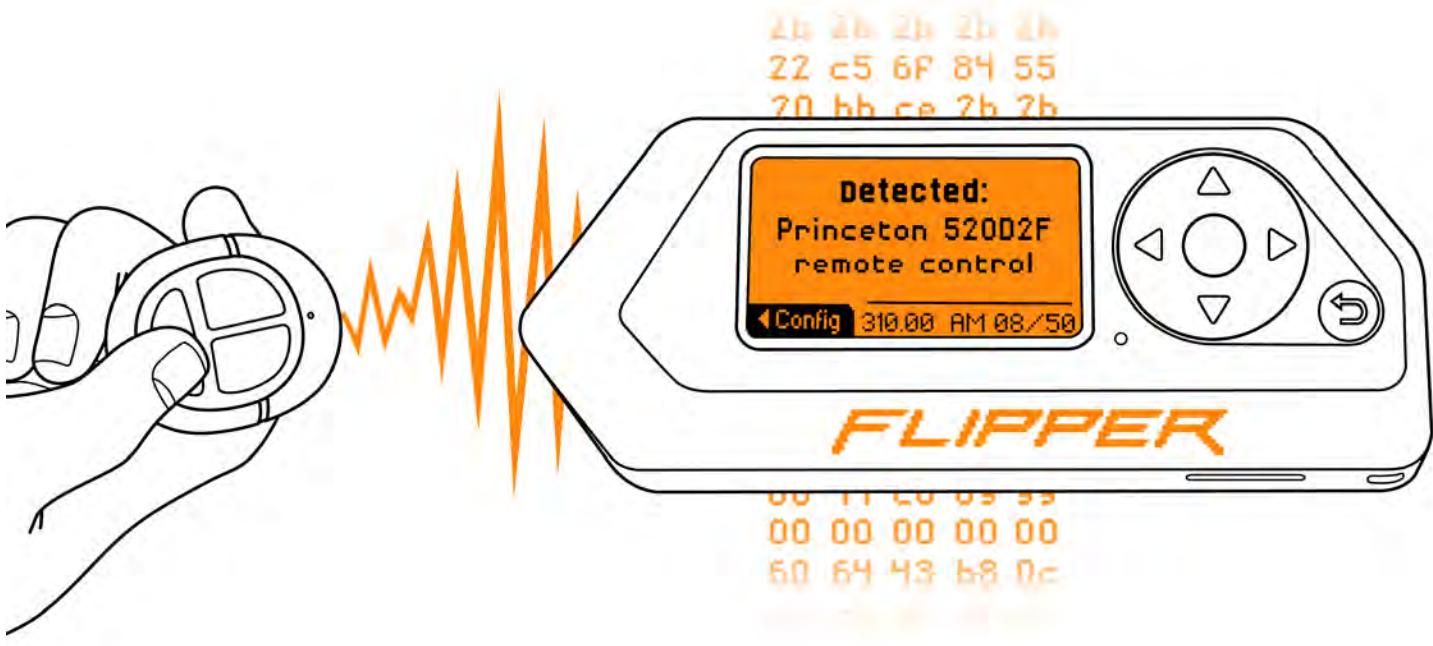
Flipper Zero has a built-in sub-1 GHz module based on a [CC1101 transceiver](#) and a radio antenna (the maximum range is 50 meters). Both the CC1101 chip and the antenna are designed to operate at frequencies in the 300-348 MHz, 387-464 MHz, and 779-928 MHz bands.



Sub-GHz hardware

The Sub-GHz application supports external radio modules based on the CC1101 transceiver. For more information, visit [this page](#).

# Reading signals



With your Flipper Zero, you can read, save, and emulate different types of remote controls with known protocols.

There are remote controls that work on protocols that Flipper Zero doesn't know yet. Signals from these remotes can be recorded in raw format, saved, and replayed with the [Read RAW](#) function.

We constantly update and improve the Flipper Zero firmware with the help of our community. To make your contribution to helping Flipper Zero support more remotes, you can leave information about your remote on the [forum](#).

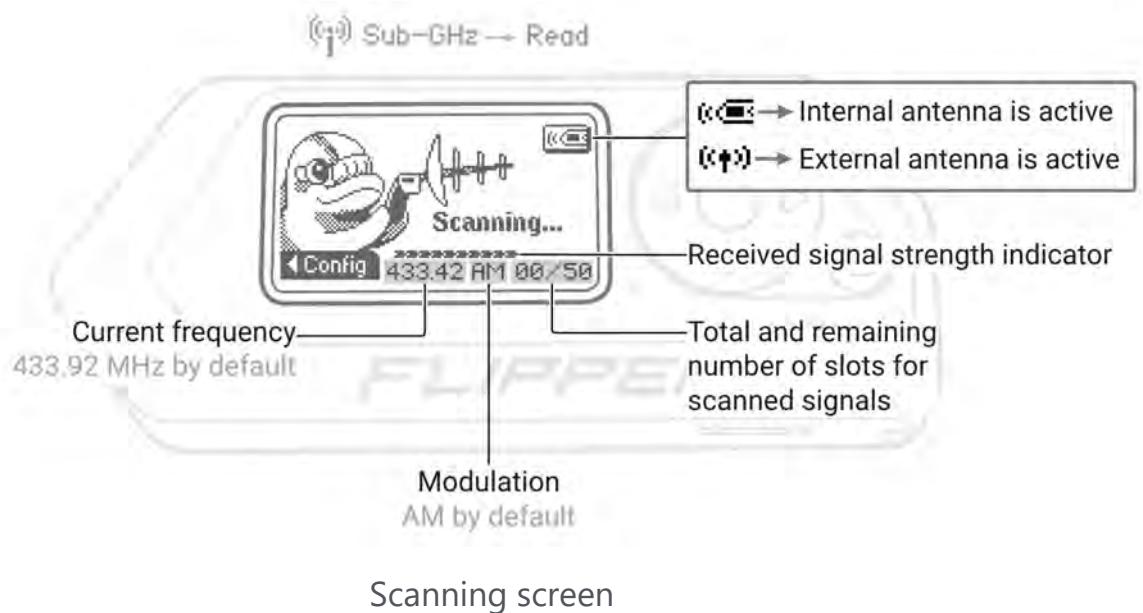
On this page, you'll learn how to read and emulate remote controls, determine a remote's frequency, and receive signals at unknown frequencies. This article also explains what to do if Flipper Zero is unable to read the signal with default settings and provides an overview of the Bin\_RAW and Lock Keyboard features.

# Reading procedure

In Read mode, Flipper Zero reads and decodes demodulated signals from remote controls based on known protocols. If the remote's protocol is static, Flipper Zero can save and send the signal.

To read and save the signal from your remote control, do the following:

- 1 Go to **Main Menu -> Sub-GHz**.
- 2 Press **Read**, then press the button on the remote control you want to read.



- 3 When the signal is captured, press **OK**, then press **Save**.



Types of captured signals

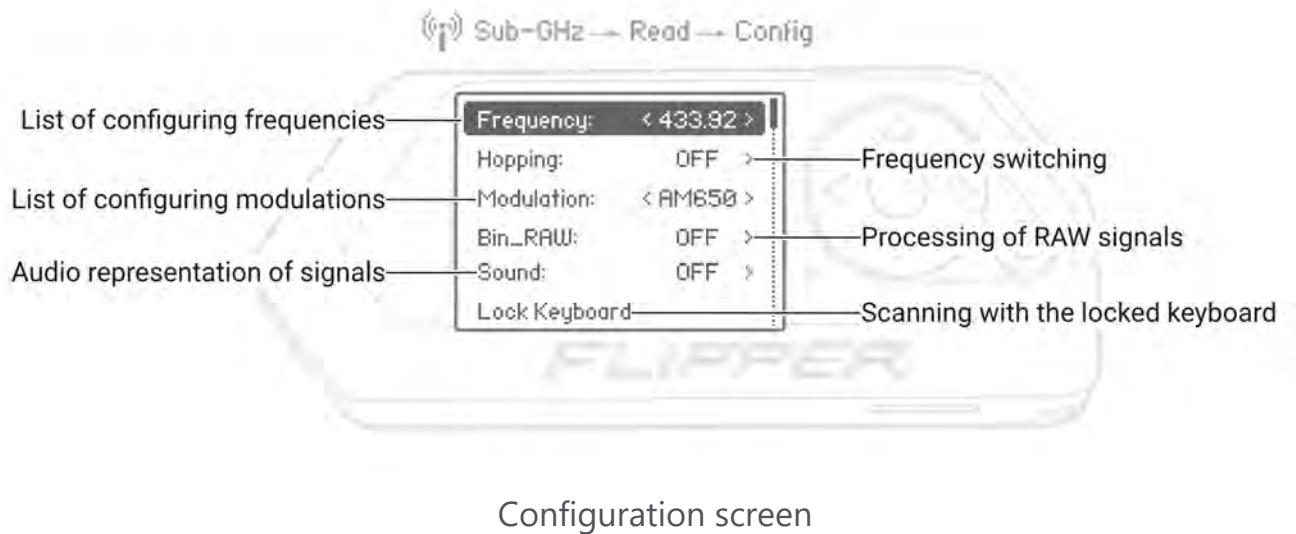
- 4 Name the captured signal, then press **Save**.

### Remotes have different frequencies and modulations

To read signals correctly, you need to know the remote control's parameters and configure your Flipper Zero accordingly. If Flipper Zero is unable to read the signal with the default settings, you will need to interact with Frequency and Modulation parameters in the Configuration Menu.

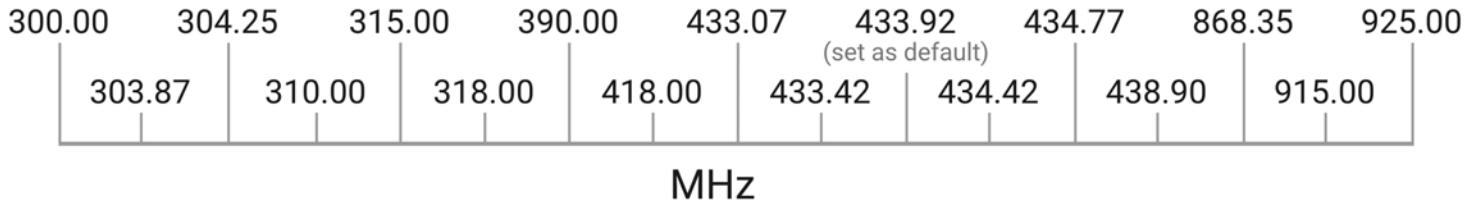
## Configuration Menu

In this menu, you can switch frequencies manually and in Hopping mode, switch modulations manually, and lock the keypad while scanning for signals. To open the Configuration Menu, on the scanning screen, press **Config**. You will see the following:



## Frequency configuration

You can switch frequencies at which Flipper Zero receives signals. In the **Configuration Menu**, by pressing **LEFT** or **RIGHT** you can manually set frequencies from the list:



List of configuring frequencies

To read the signal correctly, it is necessary to determine the frequency of the remote. For that, you can use the Frequency Analyzer feature.

## Frequency Analyzer

When analyzing, Flipper Zero is scanning signals strength at all the frequencies available in the Configuration Menu. Flipper Zero displays the frequency with the highest received signal strength indicator (RSSI) value, with signal strength higher than -90 **dBm**.

To determine the remote's frequency, do the following:

- 1 Place the remote control very close to the left of your Flipper Zero.



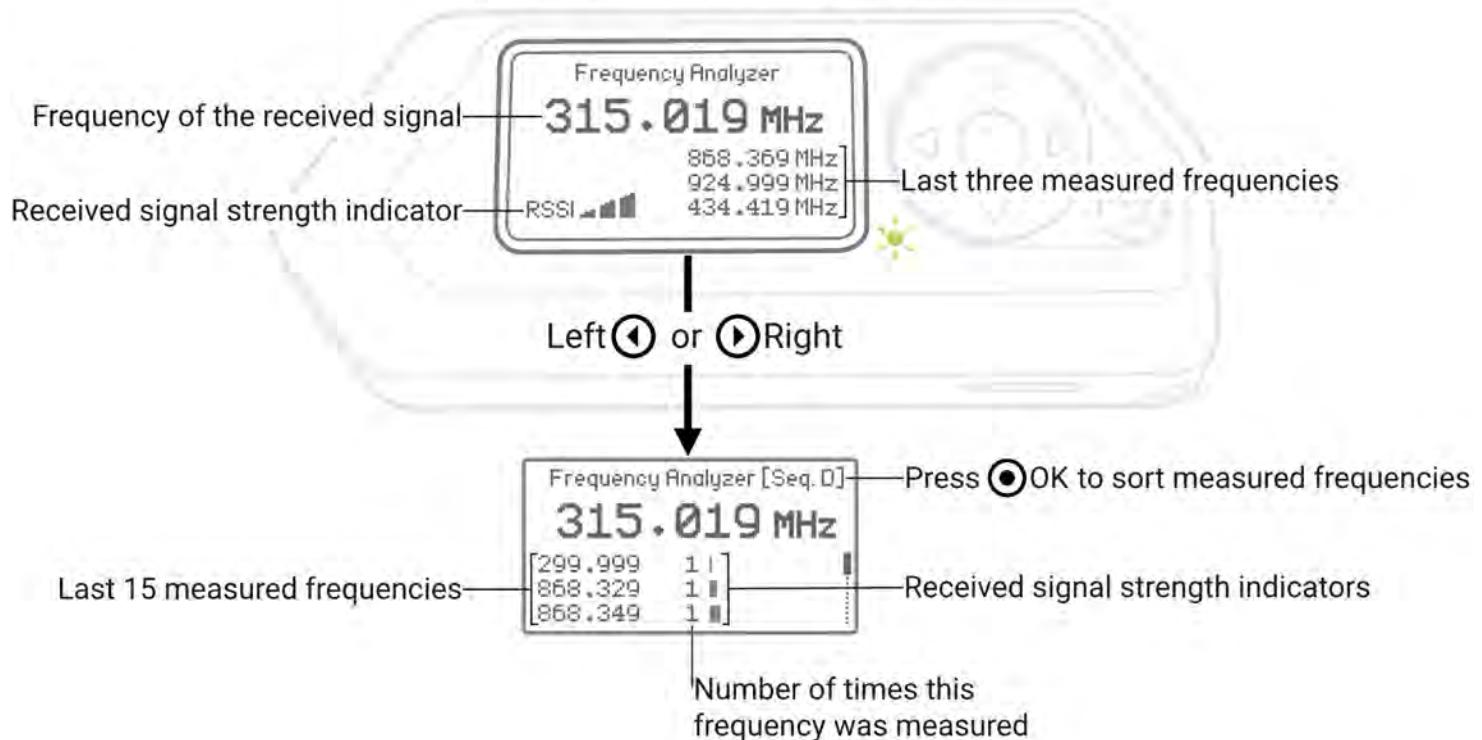
Place the remote to the left of your Flipper Zero

It is important to place the remote very close to your Flipper Zero to avoid analyzing signals from other devices.

- 2 Go to **Main Menu -> Sub-GHz -> Frequency Analyzer**.
- 3 On your remote control, press and hold the button you want to analyze.
- 4 Review the measured frequency value on the screen.

By pressing the **LEFT** or **RIGHT** button, you can go to the second screen that shows up to 15 measured frequencies. On the second screen, you can sort measured frequencies by pressing the **OK** button.

### Sub-GHz → Frequency Analyzer



The Frequency Analyzer feature has two screens

### The analysis results can be approximate

Flipper Zero displays values that can help you to determine the frequency band in which the signal is sent. In most cases, the signals are sent at frequencies in 315, 433, and 868 MHz bands.

## Hopping between frequencies

To receive a signal at an unknown frequency, use Hopping mode. In this mode, Flipper Zero switches quickly between the available frequencies and measures the signal strength. Once the signal strength exceeds -90 dBm, switching stops and Flipper Zero receives the signal at that frequency for one second, then switching between frequencies resumes.

To scan for signals in Hopping mode, in the **Configuration Menu**, set **Hopping** to **ON**.

Switching between frequencies takes some time, therefore signals transmitted at the time of switching can be missed. For better signal reception, set a fixed frequency determined by Frequency Analyzer.

In Hopping mode, you can also manually switch modulations.

## Modulation configuration

To capture the signal from the remote control, you need to configure the correct modulation settings on your Flipper Zero. Because Flipper Zero is not a software-defined radio, you need to configure the right modulation before scanning the signal, otherwise, you will not receive the correct data.

Flipper Zero supports **Amplitude (AM)** and **Frequency (FM)** signal modulations. In the **Configuration Menu**, by pressing **LEFT** or **RIGHT**, you can manually set signal modulations from the list:

- **AM270**: amplitude modulation with the bandwidth of 270 kHz.
- **AM650**: amplitude modulation with the bandwidth of 650 kHz (set as default).
- **FM238**: frequency modulation with the bandwidth of 270 kHz and the **deviation** of 2.380371 kHz.
- **FM476**: frequency modulation with the bandwidth of 270 kHz and the deviation of 47.60742 kHz.

## Bin\_RAW

This option allows the processing of RAW signals that weren't decoded during the reading process. The processing involves eliminating background noise, removing repeating signal segments, and correcting timing errors.

To use this feature, you need to enable the Bin\_RAW option manually. Additionally, it is important to verify that the frequency and modulation parameters align with your remote control for optimal functionality.

## Lock Keyboard

This function allows you to lock the keypad while your Flipper Zero is scanning for signals. To lock the keypad, in the **Configuration Menu**, select **Lock Keyboard** and press .

## Sending signals

Flipper Zero can send saved signals that are recorded at frequencies that are allowed for transmission in your region.

To send a saved signal with Flipper Zero, do the following:

- 1 Go to **Main Menu -> Sub-GHz -> Saved**.
- 2 Select the signal, then press **Emulate**.
- 3 Press **Send** to send the saved signal.

**Some frequencies can be blocked for transmission in your region**

Flipper Zero can receive signals at all frequencies in the operational bands. However, Flipper Zero can transmit signals only at frequencies that are allowed for transmission in your region.

To learn more about regions and allowed transmitting frequencies, visit the [\*\*Frequencies\*\*](#) page.

# Reading RAW signals



Flipper Zero can record signals from radio remotes in RAW format without decoding, similar to how a dictaphone records sound. The signals are demodulated in accordance with modulation settings. You can use the **Read RAW** function for recording signals with known and unknown protocols for later playback and analysis.

We constantly update and improve the Flipper Zero firmware with the help of our community. If your radio remote can't be decoded with the [Read](#) function, you can help add the remote to the list of supported devices. You can leave information about your remote on the [forum](#) for analysis with our community.

On this page, you'll learn how to record and play back RAW signals with your Flipper Zero. This article also explains what to do if Flipper Zero is unable to read the signal with default settings.

**Don't use the Read RAW feature with your car key fob!**

Modern car central locking systems use rolling codes, which means that every time you use your key fob, it generates a unique code. This code is based on a sequence known by the central locking system and is used to unlock a car. If you capture the key fob's signal and replay it back to your car, **you risk de-syncing the original key, making it unusable.**

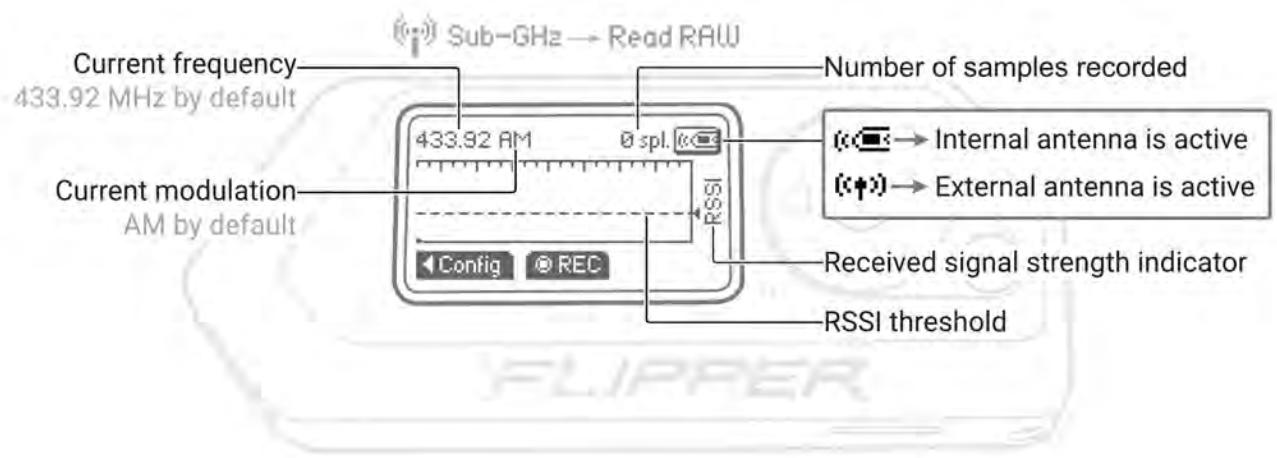
- › If you disabled your key fob after using the Read RAW feature

## Reading RAW signals procedure

In Read RAW mode, Flipper Zero records demodulated signals from remotes in a RAW format.

To read and save the signal from the remote control in a RAW format, do the following:

- 1 Go to **Main Menu -> Sub-GHz.**
- 2 Select **Read RAW**, then press **REC** to start the recording process.



Read RAW scanning screen

- 3 Press the button on the remote control you want to record in a RAW format.

After recording a RAW sample, press **Stop**, then press **Save**.

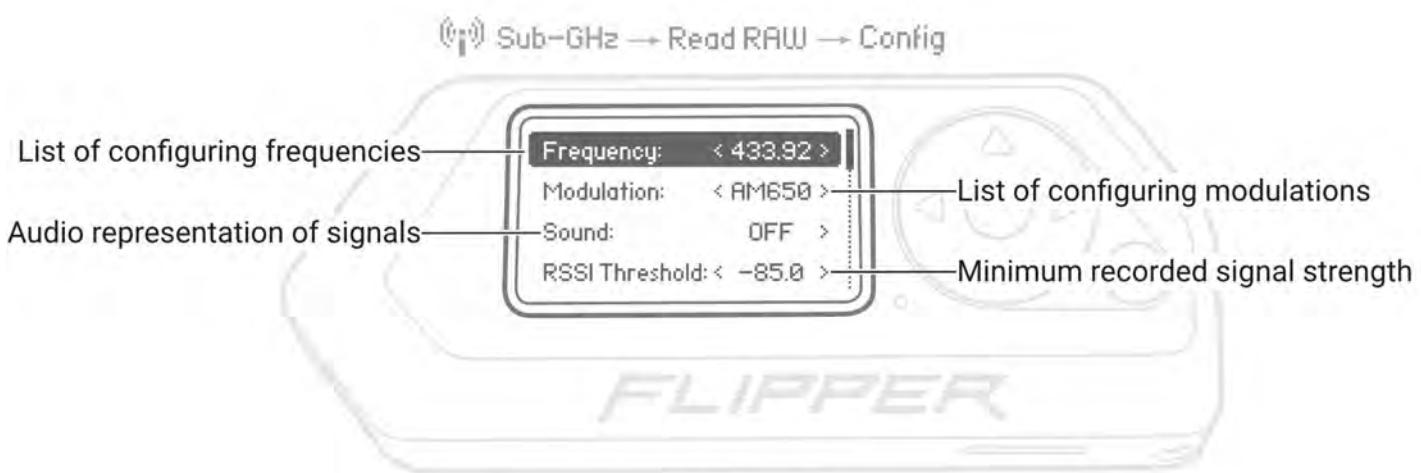
- 5 Name the recorded signal, then press **Save**.

## Remotes have different frequencies and modulations

In the sub-1 GHz range, data is transmitted at various frequencies and modulations. In order to demodulate a signal correctly, Frequency and Modulation parameters have to be set in the configuration menu. Usually, these parameters are shown on remote controls or in documentation.

## Read RAW configuration menu

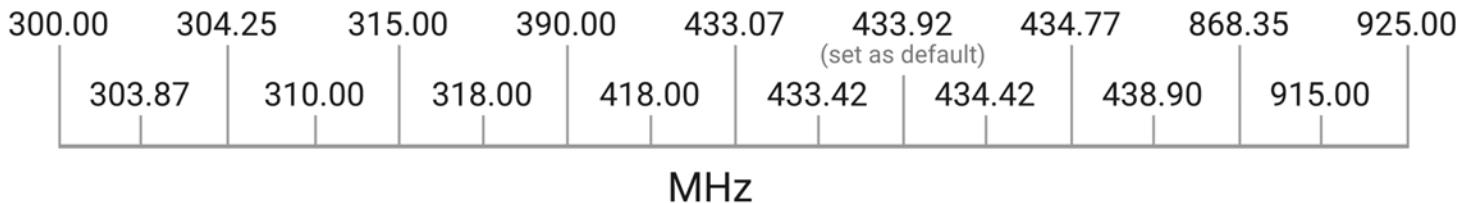
You can manually switch frequencies and modulations in this menu and set the minimum recorded signal strength. To open the Configuration Menu, on the scanning screen, press **Config**. You'll see the following:



Read RAW configuration screen

# Frequency configuration

You can switch frequencies at which Flipper Zero receives signals. In the Configuration Menu, by pressing ⏪LEFT or ⏪RIGHT you can manually set frequencies from the list:



List of configuring frequencies

To read the signal correctly, it is necessary to determine the frequency of the remote. For that, you can use the [Frequency Analyzer](#) feature.

# Modulation configuration

To capture the signal from the remote control, you need to configure the correct modulation settings on Flipper Zero. Because Flipper Zero is not a software-defined radio, you need to configure the correct modulation before scanning the signal. Otherwise, Flipper Zero will not demodulate and record data correctly.

Flipper Zero supports [Amplitude \(AM\)](#) and [Frequency \(FM\)](#) signal modulations. In the **Configuration Menu**, by pressing ⏪LEFT or ⏪RIGHT you can manually set signal modulations from the list:

- **AM270:** amplitude modulation with the bandwidth of 270 kHz.
- **AM650:** amplitude modulation with the bandwidth of 650 kHz (set as default).
- **FM238:** frequency modulation with the bandwidth of 270 kHz and the [deviation](#) of 2.380371 kHz.

- **FM476:** frequency modulation with the bandwidth of 270 kHz and the deviation of 47.60742 kHz.

## RSSI Threshold configuration

You can record high-strength signals in a RAW format and avoid recording low-strength signals by setting the signal strength sensitivity in units of **dBm**. Once the signal strength drops below the selected minimum RSSI value, Flipper Zero will continue recording for one more second and then pause recording. The recording process will resume once the signal strength exceeds the selected minimum RSSI value.

## Sending RAW signals

Flipper Zero can send RAW signals at frequencies that are allowed for transmission in your region. To send a saved RAW signal with your Flipper Zero, do the following:

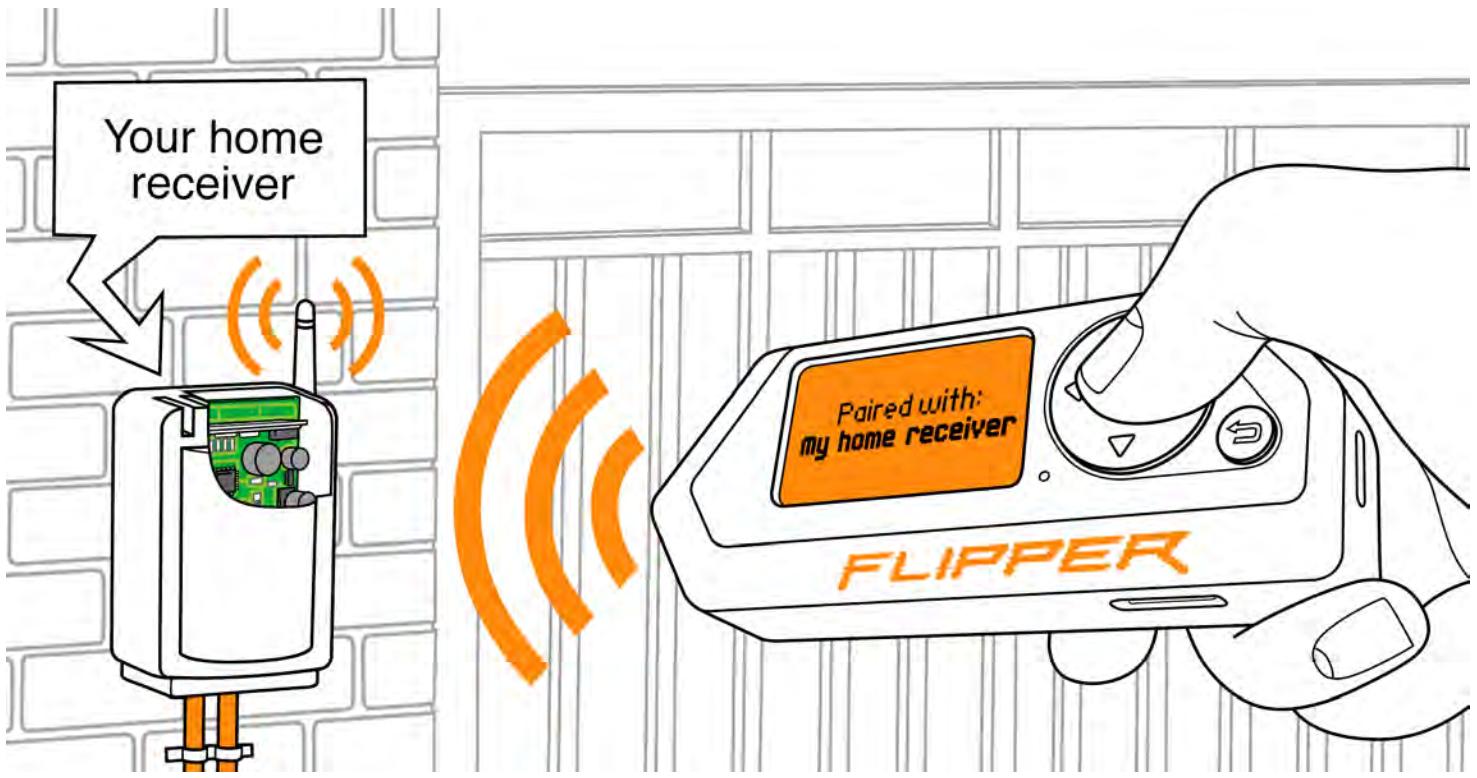
- 1 Go to **Main Menu -> Sub-GHz -> Saved**.
- 2 Select the signal.
- 3 Press **Send** to send the saved RAW signal once.

### Some frequencies can be blocked for transmission in your region

Flipper Zero can receive signals at all frequencies in the operational bands. However, Flipper Zero can transmit signals only at frequencies that are allowed for transmission in your region.

To learn more about regions and allowed transmitting frequencies, visit the [Frequencies](#) page.

# Adding new remotes



In case your radio remote is lost, or you want to have one more remote, you can pair Flipper Zero with your receiver as a remote. The **Add Manually** feature allows you to create a virtual radio remote of the same type as a receiver. You can then pair your Flipper Zero with your receiver as a remote by emulating the created virtual remote.

On this page, you'll learn how to add a new remote and pair it with your receiver.

## Adding procedure

Before using Flipper Zero as a radio remote, you need to create a virtual remote manually by following these steps:

- 1 Go to **Main Menu -> Sub-GHz -> Add Manually**.
- 2 Select a protocol from the list, then press **OK**.

- 3** Name the remote, then press **Save**.

## List of supported protocols

Protocol name	Transmitting frequency, MHz	Code type
Princeton_433 (works with the majority of static code systems)	433.92	Static
Nice Flo 12bit_433	433.92	Static
Nice Flo 24bit_433	433.92	Static
CAME 12bit_433	433.92	Static
CAME 24bit_433	433.92	Static
Linear_300	300.00	Static
CAME TWEE	433.92	Static
Gate TX_433	433.92	Static
DoorHan_315	315.00	Dynamic
DoorHan_433	433.92	Dynamic
LiftMaster_315	315.00	Dynamic
LiftMaster_390	390.00	Dynamic
Security+2.0_310	310.00	Dynamic
Security+2.0_315	315.00	Dynamic
Security+2.0_390	390.00	Dynamic

## Pairing procedure

After the remote was added from the list and saved, you can pair Flipper Zero with your receiver as a radio remote. To pair, you need to activate the pairing mode on your receiver and send a signal from Flipper Zero in accordance with your receiver's instructions.

## **Read receiver's instructions before pairing**

Receivers have different pairing procedures, so read instructions before pairing Flipper Zero with your receiver.

Here you can see the demonstration of a simple pairing procedure:

# Supported Sub-GHz vendors



Flipper Zero can work with radio remotes from various vendors presented in the table below. If your radio remote is not supported, you can help to add the remote to the list of supported devices. You can leave information about your remote on the [forum](#) for analysis with our community.

On this page, you'll find a list of radio remotes your Flipper Zero can interact with and whether you can save the signal.

Encryption protocol legend:

-  **Static** - not encrypted protocol. Flipper Zero can decode, save, and playback signals from these radio remotes.
-  **Dynamic** - encrypted protocol. Flipper Zero can decode signals from these radio remotes. For security reasons, the save function is disabled.

<b>Vendors and devices</b>	<b>Encryption protocol</b>	<b>Frequency &amp; modulation</b> (proven compatibility)
<b>Airforce</b>	 Static	433.92 AM
<b>A.P.S</b> 2300, 2500, 2000, 1500, 1000, 500, 300 0, 2550, 2450	 Dynamic	433.92 AM
<b>Alligator</b> D-810, D-930, L330, M-550, M-50 0, NS-105, NS-205, NS-305, NS-405, NS-505, NS-605, S-275, S-750RS	 Dynamic	433.92 AM
<b>Allmatic</b>	 Dynamic	433.92 AM
<b>Alutech</b> AT-4N	 Dynamic	433.92 AM
<b>AM-Motors</b>	 Dynamic	433.92 AM
<b>Ansonic</b>	 Static	433.92 AM
<b>Beninca</b>	 Dynamic	433.92 AM
<b>BERNER</b>	 Static	433.92 AM
<b>Bytec</b> (Princeton)	 Static	433.92 AM
<b>CAME</b> 12bit, 24bit	 Static	433.92 AM
<b>CAME</b> ATOMO, TOP44r, TWIN, Space	 Dynamic	433.92 AM
<b>Cenmax</b> A-900, ST-5A, Vigilant V-5A, ST-7A, Vigilant V-7A	 Dynamic	433.92 AM
<b>Chamberlain</b> (before 2004)	 Dynamic	310.00, 315.00, 390.00 AM
<b>Chamberlain</b> (after 2004)	 Dynamic	310.00, 315.00, 390.00 AM
<b>Chamberlain</b> 7-Code	 Static	390.00 AM
<b>Chamberlain</b> 8-Code	 Static	390.00 AM
<b>Chamberlain</b> 9-Code	 Static	390.00 AM
<b>Clemsa</b>	 Static	433.92 AM

<b>Clemsa Mutancode</b>	 Dynamic	433.92 AM
<b>Comunelo</b>	 Dynamic	433.92 AM
<b>DEA</b>	 Dynamic	433.92 AM
<b>Doitrand</b>	 Static	433.92 AM
<b>Dooya</b>	 Static	433.92 AM
<b>DoorHan</b>	 Dynamic	433.92 AM
<b>DTM</b>	 Dynamic	433.92 AM
<b>EcoStar</b>	 Dynamic	433.92 AM
<b>Elimes</b>	 Dynamic	433.92 AM
<b>ELKA</b>	 Static	433.92 AM
<b>FAAC RC</b>	 Dynamic	433.92 AM
<b>FAAC XT</b>	 Dynamic	433.92 AM
<b>FAAC SLH</b>	 Dynamic	433.92 AM
<b>Faraon</b>	 Dynamic	433.92 AM
<b>Firefly</b>	 Static	300.00 AM
<b>Gate-TX</b>	 Static	433.92 AM
<b>Genius</b>	 Dynamic	433.92 AM
<b>GIBIDI</b>	 Dynamic	433.92 AM
<b>GSN</b>	 Dynamic	433.92 AM
<b>GSN (Princeton)</b>	 Static	433.92 AM
<b>Guard RF-311A</b>	 Dynamic	433.92 AM
<b>Harpoon BS-2000</b>	 Dynamic	433.92 AM
<b>Holtek</b>	 Static	418.00 AM

<b>Holtek</b> HT12x	 Static	433.92 AM
<b>Honeywell</b> WBD	 Static	433.92 AM
<b>HORMANN</b> HSM	 Static	433.92 AM
<b>iDo 117/111</b> (PT4301-X)	 Dynamic	433.92 AM
<b>Intertechno</b> V3	 Static	433.92 AM
<b>IronLogic</b>	 Dynamic	433.92 AM
<b>Jaguar</b> EZ-Beta, JX-1000, XS-2700	 Dynamic	433.92 AM
<b>JCM Tech</b>	 Dynamic	433.92 AM
<b>KEY</b>	 Dynamic	433.92 AM
<b>KGB</b> FX-1, FX-5	 Dynamic	433.92 AM
<b>KingGates</b> Stylo 4K	 Dynamic	433.92, 868.35 AM
<b>Leopard</b> LS50/10	 Dynamic	433.92 AM
<b>Linear</b>	 Static	300.00 AM
<b>Linear</b> Delta 3	 Static	318.00 AM
<b>Linear</b> MegaCode	 Static	318.00 AM
<b>LifeMaster</b>	 Static	310.00, 318.00, 390.00 AM
<b>Magellen</b>	 Static	433.92 AM
<b>Marantec</b>	 Static	433.92 AM
<b>Mongoose</b> 7000 RF, AMG-850C, 800C, IQ-2 15	 Dynamic	433.92 AM
<b>Nero</b> Radio	 Static	434.42 AM
<b>Nero</b> Sketch	 Static	433.92 AM
<b>Nice</b> FLO 12bit/24bit,	 Static	433.92 AM
<b>Nice</b> FLOR-S	 Dynamic	433.92 AM

<b>Nice</b> Mhouse	 Dynamic	433.92 AM
<b>Nice</b> One	 Dynamic	433.92 AM
<b>Nice</b> Smilo	 Dynamic	433.92 AM
<b>Normstahl</b>	 Dynamic	433.92 AM
<b>Pantera</b> CL-500, CL400, CL600, CLK-355, SLK -2i, SLK-2i/3i/4i/5i/7i, SLK-25SC, SLR-5100, XS-1500, XS-2000, XS-1000, XS-1700, XS-100, XS-2600, XS-2700	 Dynamic	433.92 AM
<b>Partisan</b> RX-1	 Dynamic	433.92 AM
<b>Phoenix</b> V2	 Static	433.92 AM
<b>Phox</b>	 Static	433.92 AM
<b>Prastel</b>	 Static	433.92 AM
<b>Princeton</b>	 Static	315.00, 433.92, 868.35 AM
<b>Reef</b>	 Dynamic	433.92 AM
<b>Scher-Khan</b> III, IV, V (Magic Dynamic Code 5 1bit)	 Dynamic	433.92 AM
<b>Sheriff</b> APS-2400, APS-25 PRO, APS-35 PRO, ZX-925, ZX-900, ZX-910, APS-75, ZX-600	 Dynamic	433.92 AM
<b>SMC</b> 5326	 Static	315.00, 318.00, 433.42 AM
<b>Somfy</b> Keytis RTS	 Dynamic	433.42 AM
<b>Somfy</b> Telis RTS	 Dynamic	433.42 AM
<b>Sommer</b>	 Dynamic	433.92 AM
<b>StarLine</b> A1, A2, A4, A6, A7, A8, A9, Moto V 7, B6, B9 (for additional control)	 Dynamic	433.92 AM
<b>Stilmatic</b> HCS101	 Dynamic	433.92 AM
<b>Tantos-Proteus</b> (Princeton)	 Static	433.92 AM

<b>TEDSEN</b>	 Static	433.92 AM
<b>TELEASTER</b>	 Static	433.92 AM
<b>Tomahawk</b> 9010, TW-9000, TW-9010, TW-7000, LR-950, TZ-9010, SL-950, D-700, D-900, S-700, 9030, TW-9030, TW-7010, TW-9020, TZ-7010, TZ-9020, TZ-9030, H1, H2, Z5, Z3, X3, X5	 Dynamic	433.92 AM
<b>Unilarm</b>	 Static	315.00, 318.00, 433.42 AM
<b>Wisniowski MIDO</b>	 Dynamic	433.92 AM

# Frequencies

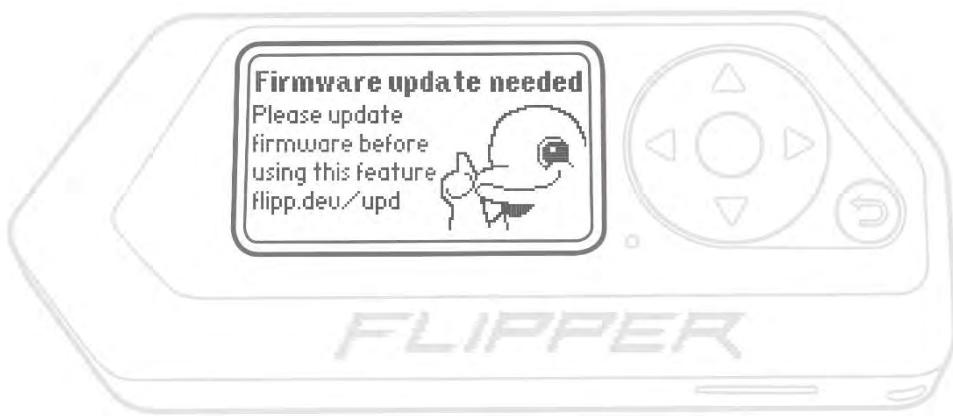


Flipper Zero's sub-1 GHz module is capable of receiving signals at all frequencies in the 300-348 MHz, 387-464 MHz, and 779-928 MHz operational bands. However, **Flipper Zero transmits signals only at frequencies that are allowed for civilian use.**

On this page, you'll learn more about how signal transmission works in your Flipper Zero, and find a list of frequencies allowed for civilian use in particular regions.

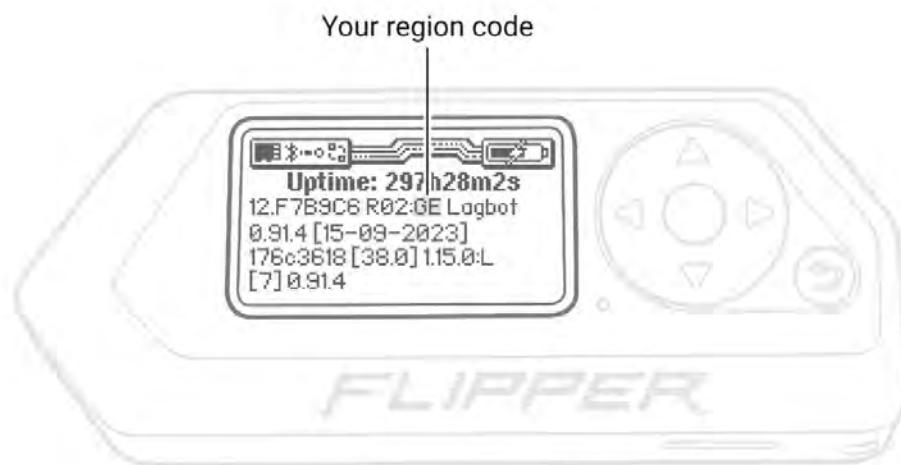
## How to determine your region and allowed frequencies

Flipper Zero has the send function disabled out of the box until the device is updated either via the **Flipper Mobile App** or **qFlipper** with a microSD card inserted. If you try to use the Sub-GHz function before updating Flipper Zero, you will see the following message: **Firmware update needed. Update the firmware before using this feature flipp.dev/upd.**



You need to update the device to use all Sub-GHz functions

While updating Flipper Zero, the region where the device is located is determined and frequencies allowed for transmission in that region are unlocked. To see your region's code in the **ISO format** while on the Desktop, **press and hold** the **DOWN** button.



On the Device Info screen, you can see your region code in the ISO format

To learn more about regions and frequencies allowed for civilian use, see the table below:

<b>Flipper Zero transmits signals in frequency bands:</b>	<b>In regions:</b>
433.05 - 434.79 MHz	European Union, United Kingdom, Russia, Ukraine, Belarus, Bosnia and Herzegovina, French Polynesia, Holy See, Iceland, Kazakhstan, Liechtenstein, Moldova, North Macedonia, Norway, Serbia, Switzerland, Turkey, Jersey, Montenegro, Albania, Kosovo, Armenia, Georgia, Azerbaijan, Algeria, Lebanon, Syria, Egypt, Libya, Tunisia, Morocco, Jordan, Palestine, Réunion, Andorra, Kyrgyzstan, Uzbekistan
868.15 - 868.55 MHz	
304.10 - 321.95 MHz	United States of America, Canada, Australia, New Zealand, Mexico, Brazil, Chile, Argentina, United States Minor Outlying Islands, Puerto Rico, Colombia, Peru, Bolivia
433.05 - 434.79 MHz	
915.00 - 928.00 MHz	
420.00 - 440.00 MHz	United Arab Emirates
304.50 - 321.95 MHz	Taiwan
433.075 - 434.775 MHz	
915.00 - 927.95 MHz	
300.00 - 300.30 MHz	Singapore
312.00 - 316.00 MHz	
433.50 - 434.79 MHz	
444.40 - 444.80 MHz	
433.05 - 434.79 MHz	Israel
430.00 - 440.00 MHz	Philippines
433.05 - 434.79 MHz	India
314.00 - 316.00 MHz	China
430.00 - 432.00 MHz	
433.05 - 434.79 MHz	

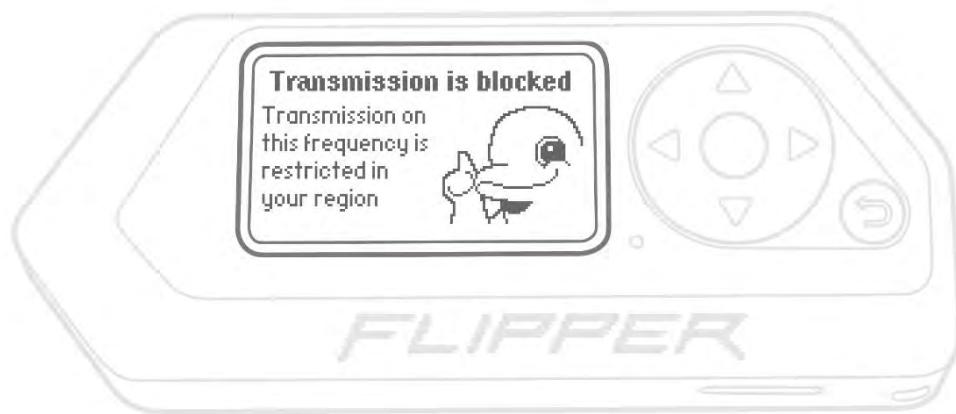
312.00 - 315.25 MHz 920.50

- 923.50 MHz

The rest of the world

To find out what frequency your remote control works at, use [\*\*Frequency Analyzer\*\*](#).

If you try to send recorded signals at frequencies that are prohibited for civilian use in your region, you will see the following message: **Transmission is blocked. Transmission on this frequency is restricted in your region.**



Flipper Zero can transmit only at frequencies allowed for civilian use

# 125 kHz RFID



Flipper Zero supports low-frequency (LF) radio frequency identification (RFID) technology that is implemented in access control systems, animal chips, and supply chain tracking systems. Unlike NFC cards, LF RFID cards usually do not provide high levels of security. This technology comes in many form-factors, such as plastic cards, key fobs, tags, wristbands, and animal microchips. Flipper Zero has a low-frequency RFID module capable of reading, saving, emulating, and writing LF RFID cards.

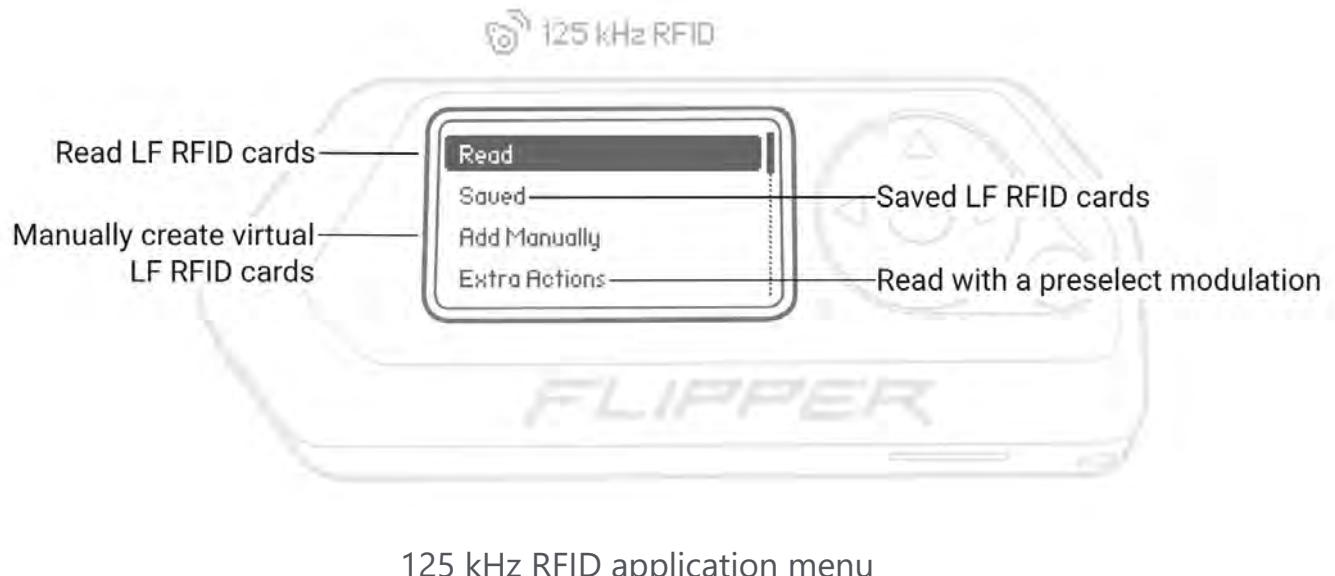
## Insert a microSD card to use the 125 kHz RFID app

Before using the 125 kHz RFID app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

On this page, you'll find an overview of the 125 kHz RFID application, and learn more about the hardware behind the 125 kHz RFID module.

# 125 kHz RFID menu

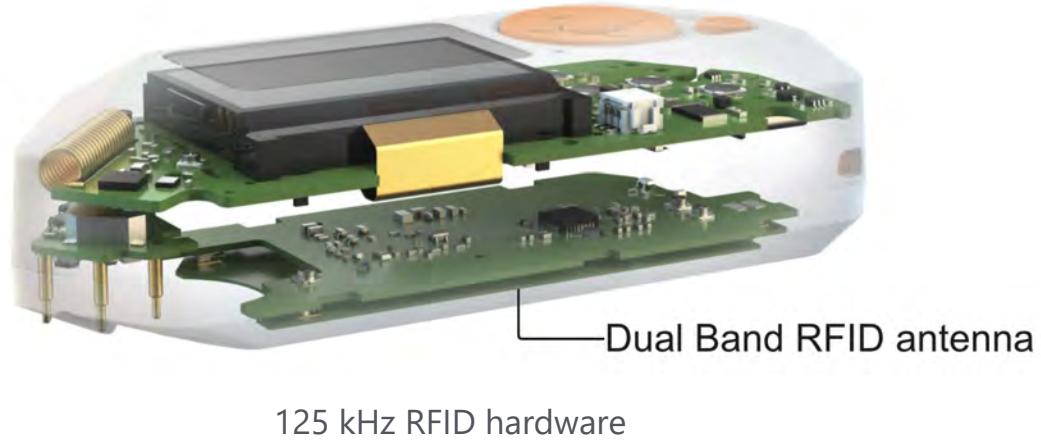
You can access the 125 kHz RFID application from the Main Menu. In the application, you can read, save, emulate, write, and generate new LF RFID cards.



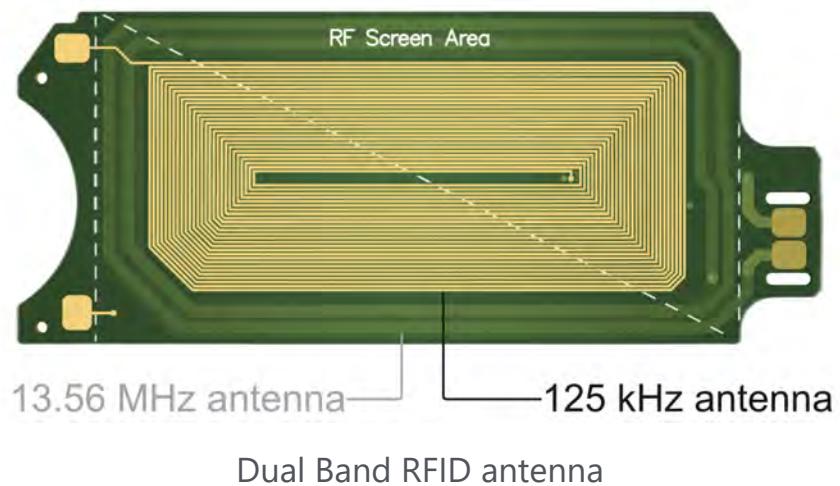
- **Read:** reads and saves LF RFID cards.
- **Saved:** lists saved cards that can be **emulated** and **written** to a rewritable card.
- **Add Manually:** generates new virtual LF RFID cards by entering the cards' ID.
- **Extra Actions:** allows to read LF RFID cards with the preselected ASK or PSK coding.

# 125 kHz RFID hardware

Flipper Zero has a built-in RFID support with a low-frequency antenna located at the back of Flipper Zero. The STM32WB55 microcontroller unit is used for the 125 kHz RFID functionality.



The low-frequency 125 kHz antenna is placed on the Dual Band RFID antenna next to the high-frequency 13.56 MHz antenna.



# Reading 125 kHz RFID cards



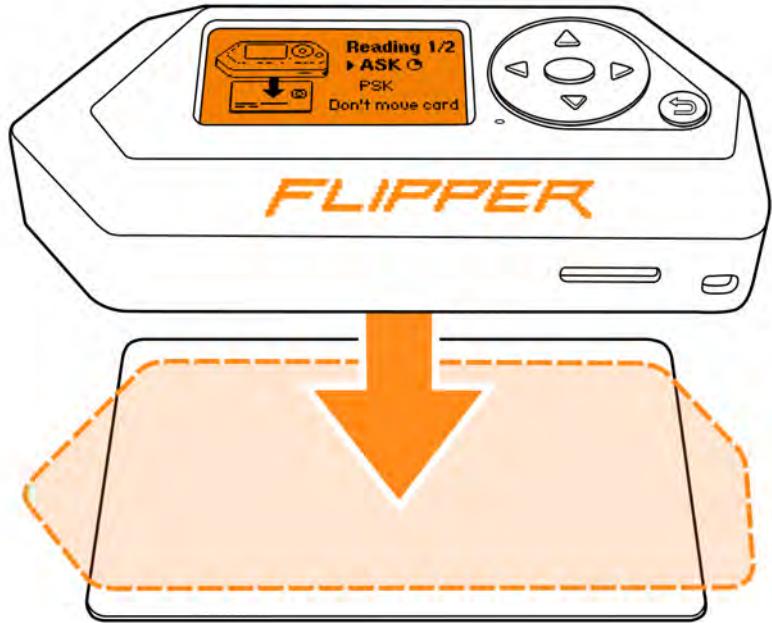
Flipper Zero allows you to read, save, and emulate 125 kHz RFID cards. A 125 kHz RFID card is a **transponder** that stores a unique identification number. When scanned with a reader, a 125 kHz card transmits its ID number. If the card has the supported protocol, Flipper Zero can read and save the ID number.

On this page, you'll learn how to read, save, and emulate 125 kHz RFID cards with your Flipper Zero.

## Reading procedure

To read and save the 125 kHz card's data, do the following:

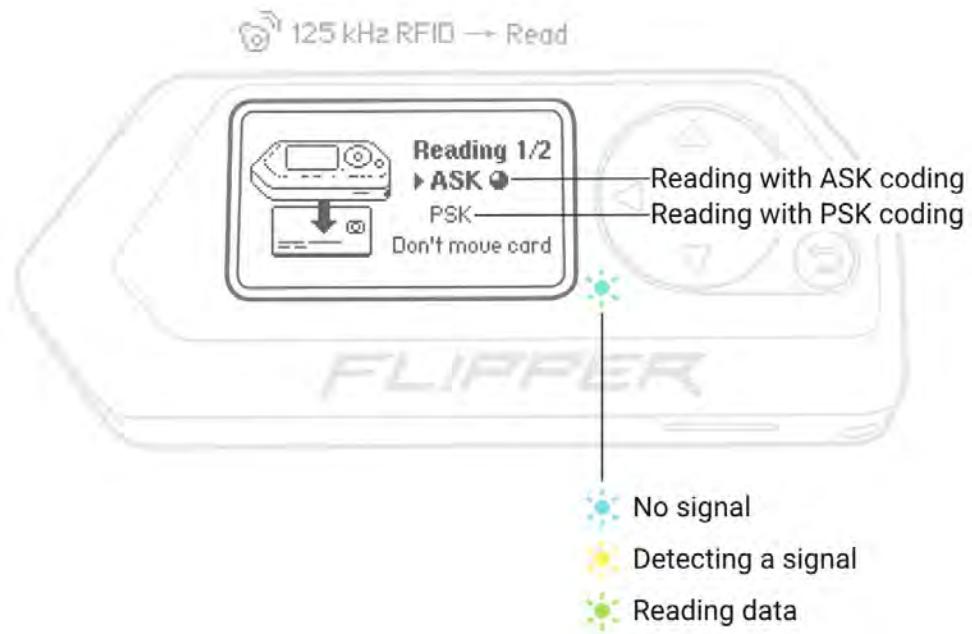
- 1 Go to **Main Menu -> 125 kHz RFID**.
- 2 Press **Read**, then hold the card near your Flipper Zero's back.



Hold the card in the center of your Flipper Zero's back

Don't move the card while reading. The reading process might take up to several seconds because Flipper Zero switches codings and tries to match the card's protocol with the list of supported protocols.

While reading, Flipper Zero switches between ASK and PSK codings every three seconds to read data from the 125 kHz RFID card.



Flipper Zero switches codings every three seconds

- 3 Once the reading is finished, review the card's data.



The captured data is displayed on the screen

- 4 To save the card, go to **More -> Save**.
- 5 Name the card, then press **Save**.

## If reading failed

- The card might be using NFC technology. -> Read the card with the [\*\*NFC application\*\*](#).
- Flipper Zero switches codings every three seconds. Some cards might not be read because it might require up to 10 seconds to read data. -> [\*\*Read the card with the preselected ASK or PSK coding\*\*](#).

## Reading with a preselected coding

Flipper Zero allows you to read 125 kHz RFID cards with the preselected ASK or PSK coding.

To read and save the 125 kHz card's data with a preselected coding, do the following:

- 1 Go to **Main Menu** -> **125 kHz RFID** -> **Extra Actions**.
- 2 Select **Read ASK** or **Read PSK**.
- 3 Hold the card near your Flipper Zero's back.
- 4 After reading, go to **More** -> **Save**.
- 5 Name the card, then press **Save**.

## Emulating 125 kHz RFID cards

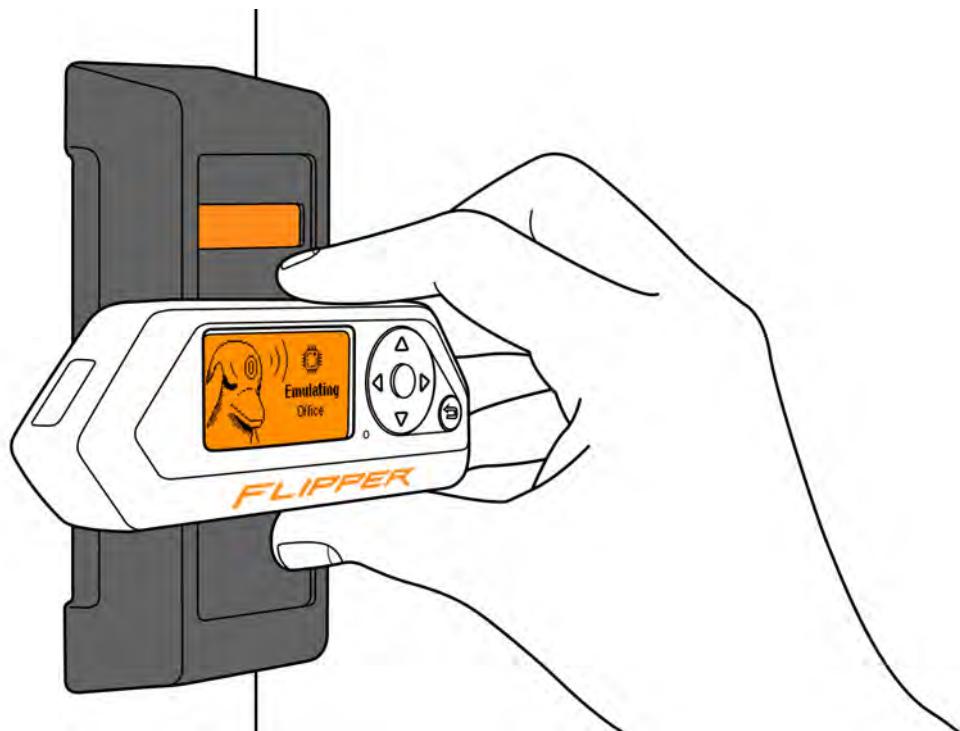
Flipper Zero can emulate saved 125 kHz RFID cards by doing the following:

- 1 Go to **Main Menu** -> **125 kHz RFID** -> **Saved**.
- 2 Select the card you want to emulate, then press **Emulate**.



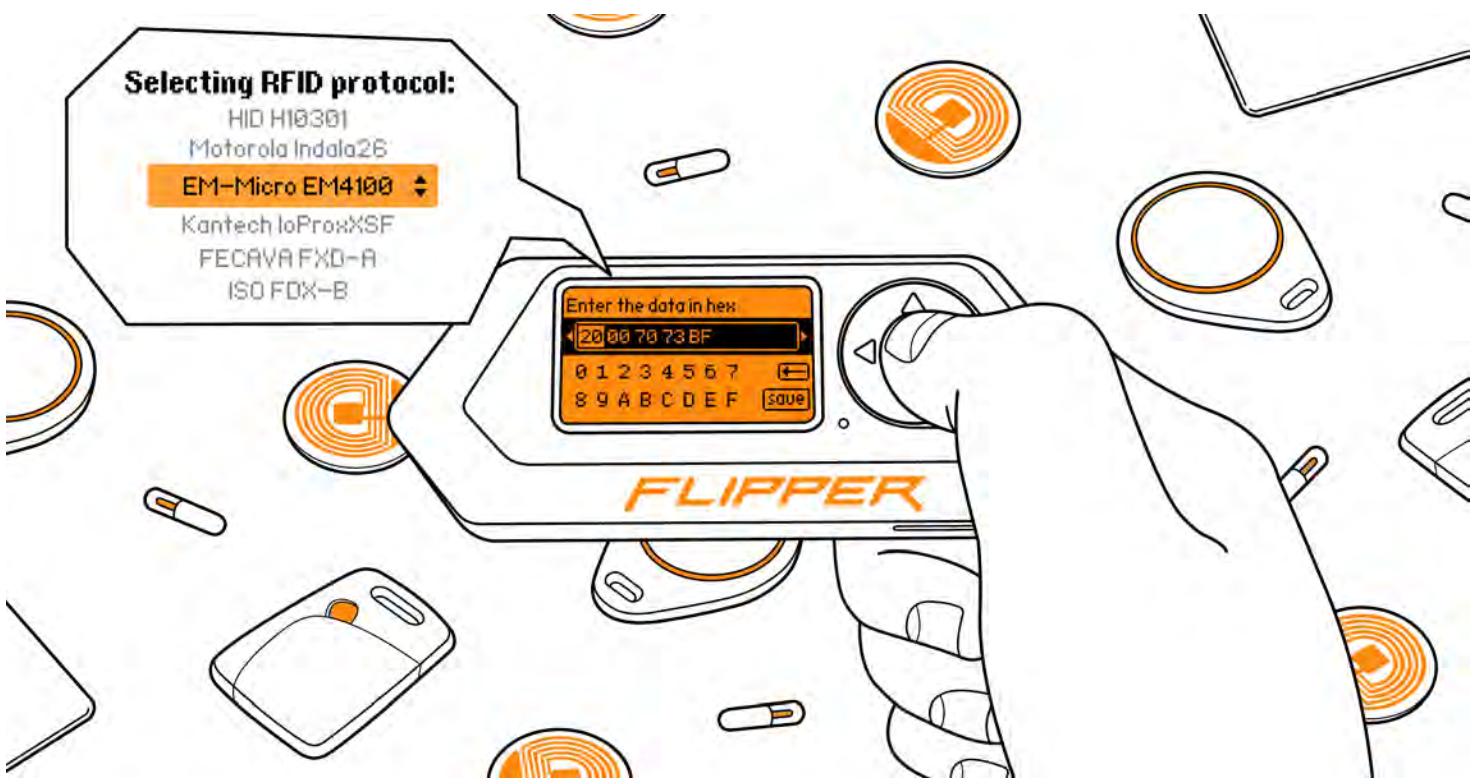
With Flipper Zero, you can emulate saved 125 kHz cards

- 3 Hold your Flipper Zero near the reader, the device's back facing the reader.



While emulating the 125 kHz card, hold your Flipper Zero near the reader

# Adding 125 kHz cards manually



You can save new cards to your Flipper Zero without reading a physical card. All you need to do is select a protocol and manually enter the card's data. The added card can be emulated or [written](#) to a T5577 blank card.

On this page, you'll learn how to add a new card and edit a saved or added card.

## Generating 125 kHz RFID cards

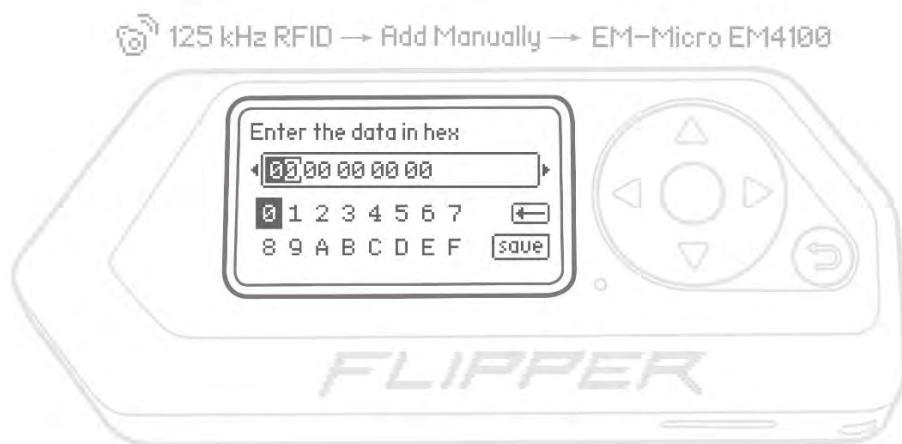
You can manually generate virtual cards with the following protocols:

- EM-Micro EM4100
- HID H10301
- IDTECK Idteck
- Motorola Indala 26
- Kantech IoProx XSF

- AWID
- FECAVA FDX-A
- ISO FDX-B
- Generic HID Prox
- Generic HID Ext
- Farpointe Pyramid
- Viking
- Jablotron
- Paradox
- PAC Stanley
- Keri
- Gallagher
- Honeywell Nexwatch

To generate a virtual card, do the following:

- 1 Go to **Main Menu -> 125 kHz RFID -> Add Manually.**
- 2 Select the protocol you want to use and press **OK**.
- 3 Enter the card's data in hexadecimal, then press **Save**.



Enter the card's data manually

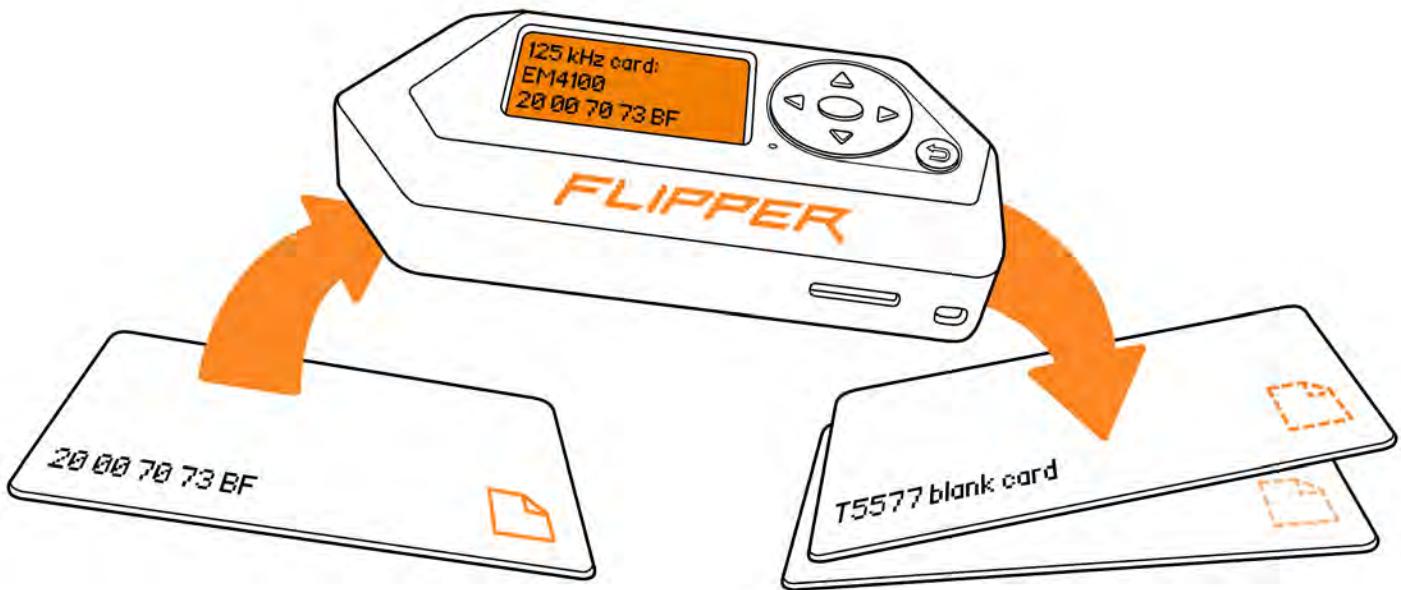
- 4 Name the card, then press **Save**.

# Editing 125 kHz RFID cards

You can also edit data of saved and manually added cards by following these steps:

- 1 Go to **Main Menu -> 125 kHz RFID -> Saved.**
- 2 Select the saved card you want to edit by pressing  **OK**, then press **Edit**.
- 3 Enter new data in hexadecimal, then press **Save**.
- 4 Enter the new name of the card, then press **Save**.

# Writing data to T5577 cards

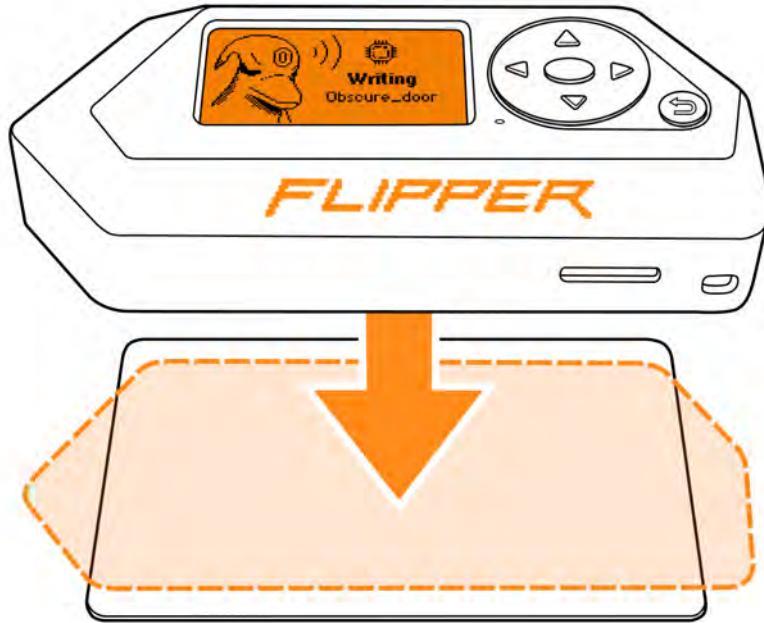


You can write saved and manually added 125 kHz cards to a T5577 rewritable blank card, which can be programmed to emulate cards with various low-frequency RFID protocols. The T5577 blanks may come in different forms and shapes, such as cards, keyfobs, stickers, and animal microchips. Flipper Zero is capable of writing data with all the supported low-frequency RFID protocols.

On this page, you'll learn how to write data to T5577 blank cards and what you can do if the procedure fails.

To write data to the card, do the following:

- 1 Go to **Main Menu -> 125 kHz RFID -> Saved**.
- 2 Select the card you want to write, then press **Write**.
- 3 Hold your Flipper Zero near the T5577 blank card, the device's back facing the card.



Hold the card in the center of your Flipper Zero's back

- 4 After writing data to the blank card, the device will display the message **Successfully written**.



The data has been successfully written to the T5577 blank card

Please note that your Flipper Zero may display the **Successfully written** message when writing to a read-only card. This may happen if the same data is already present on the read-only card.

## If writing failed

- The T5577 blank card might be protected with a password.
- You are trying to write to a read-only RFID card, not a T5577 blank card.



Not all cards are rewritable

# Animal microchips



A **microchip** is a radio-frequency identification (RFID) **transponder** that stores a unique identification number and is roughly the size of a grain of rice. The microchip is implanted under the animal's skin. When scanned with a reader, the microchip transmits its ID number. This ID number can help you find information about the animal and its owner if added to a database.

Flipper Zero allows you to read animal microchips thanks to its low-frequency RFID antenna. The Flipper Zero antenna was designed to operate at 125 kHz, while most animal microchips operate at 134.2 kHz. Support for reading 134.2 kHz microchips was implemented as an additional feature. To read microchip data, hold your Flipper Zero for three seconds over the microchip of the animal you want to identify. Otherwise, Flipper Zero will not detect the microchip.

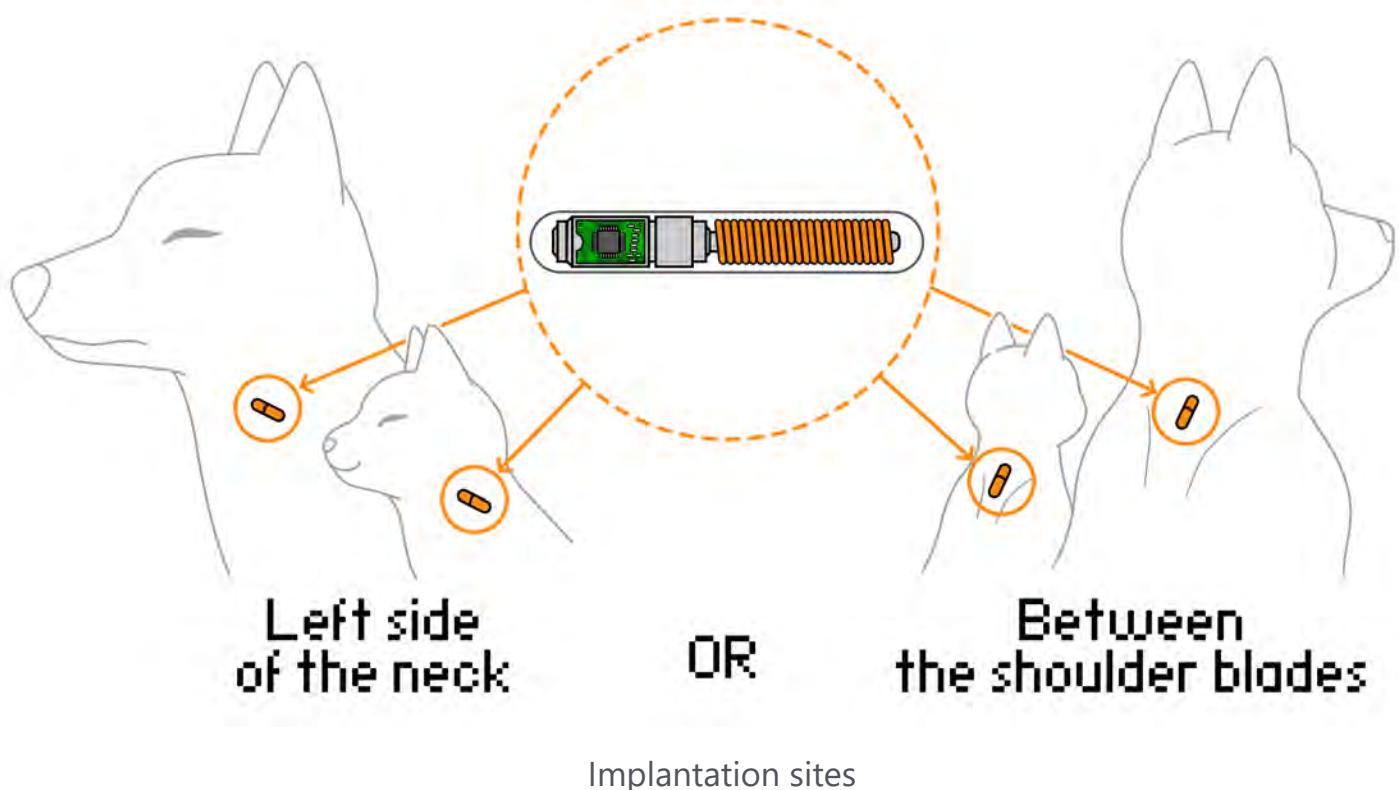
On this page, you'll learn how to locate and read animal microchips as well as find information about the animal in online pet recovery services.

# Animal RFID microchips supported by Flipper Zero

- **Compatible microchips:** [FDX-B](#) (15-digit, ISO-compliant, including thermo microchips), FDX-A (10-digit, not ISO-compliant), and other chips supported by Flipper Zero in the form factor of an animal microchip.
- **Reading frequency:** 125 kHz. Flipper Zero can also read microchips in the 110-140 kHz range but with a shorter reading distance.
- **Reading distance:** 10 mm (0.39 inch).

## Reading animal microchips

Animal microchips can be located at [different sites](#). In dogs and cats, one microchip is usually inserted under the skin at the back of the neck **between the shoulder blades** on the dorsal midline. Continental European pets get a microchip **in the midway region of the left neck**.

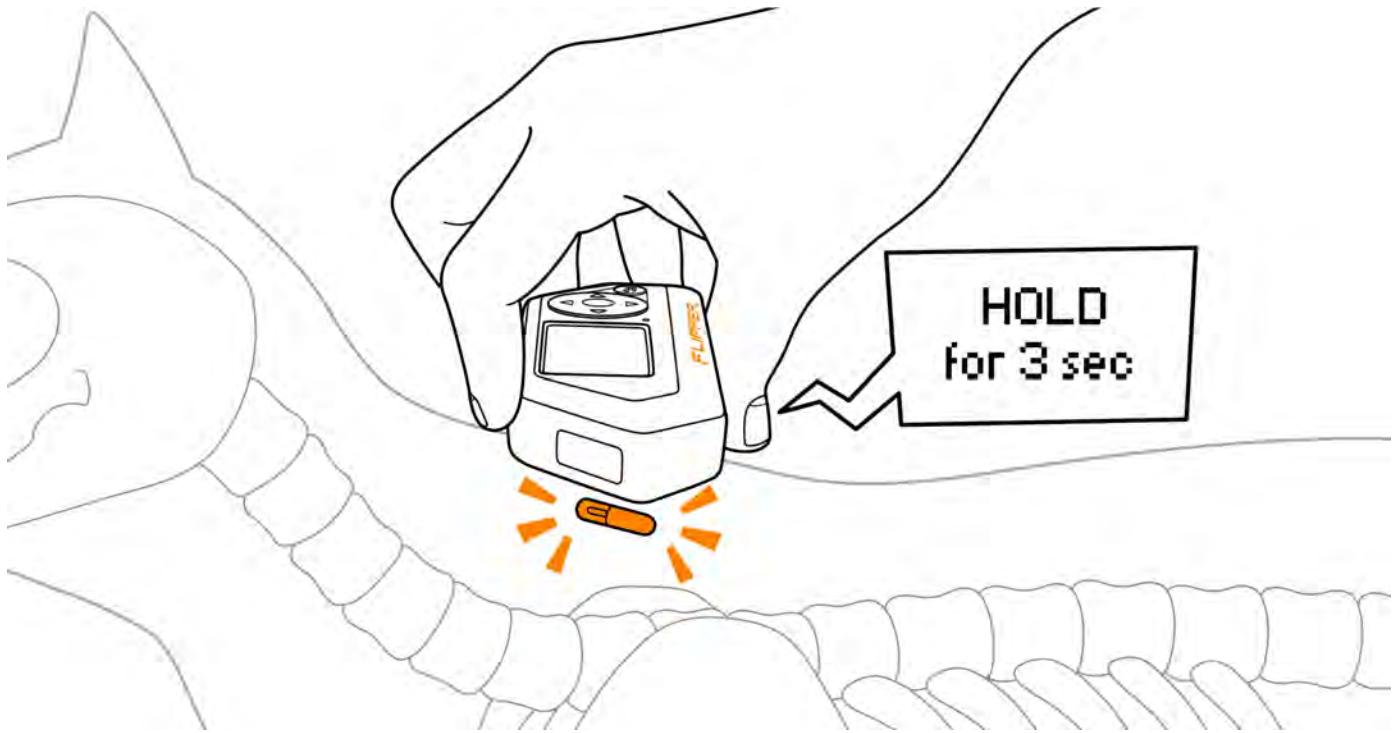


## Method 1. Locating the microchip with your fingers

We recommend to first locate the animal microchip with your fingers and then read it with your Flipper Zero. Move your fingertips over the pet's skin between the shoulder blades and the midway region of the left neck. Apply gentle pressure to see if you can detect a solid rice-grain-sized object just under the skin. Mind that animal microchips might migrate slightly from the original location.

Once you've located the microchip, scan it with your Flipper Zero using the ASK coding:

- 1 Go to **Main Menu -> 125 kHz RFID -> Extra Actions.**
- 2 Select **Read ASK** and press .
- 3 Hold your Flipper Zero as close as possible to the microchip, and don't move the device for three seconds.



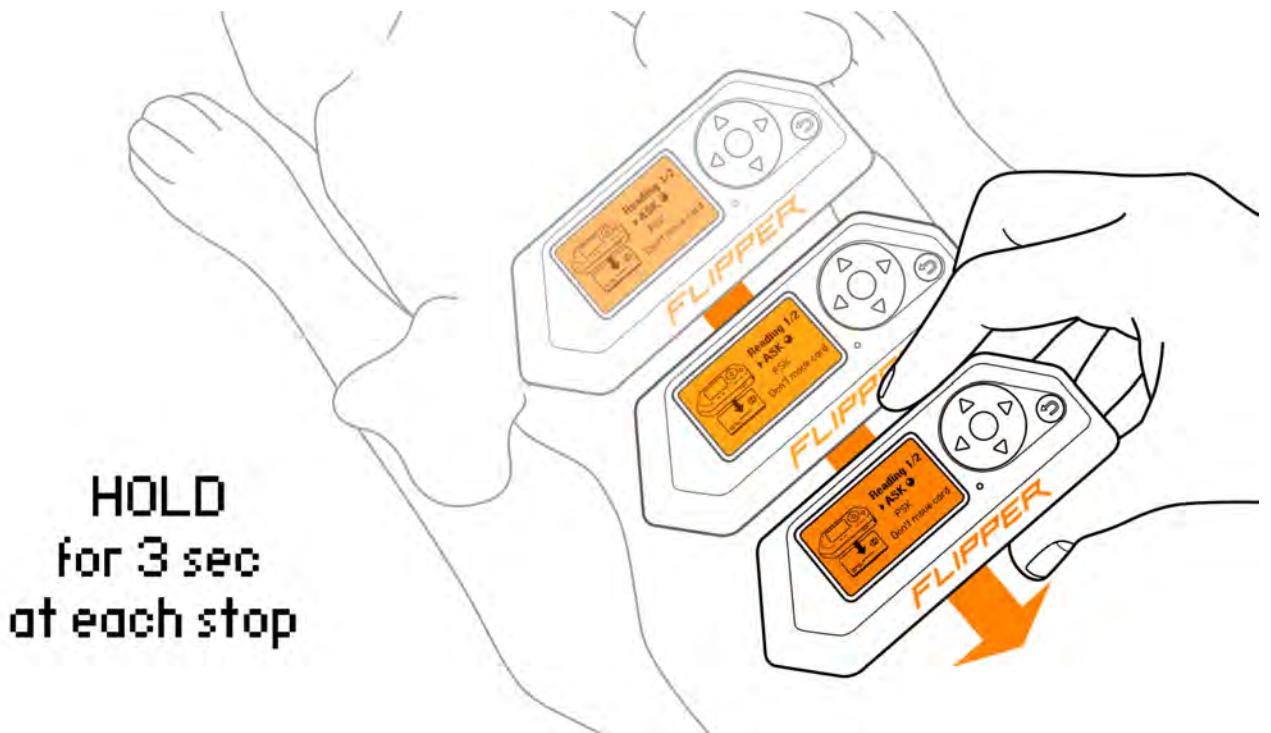
Hold your Flipper Zero so that the microchip is in the center of the device's back

## **Method 2. Locating the microchip with your Flipper Zero**

To locate and read the animal microchip, you need to position your Flipper Zero precisely atop the microchip as close as possible and wait for three seconds. To increase the chance of

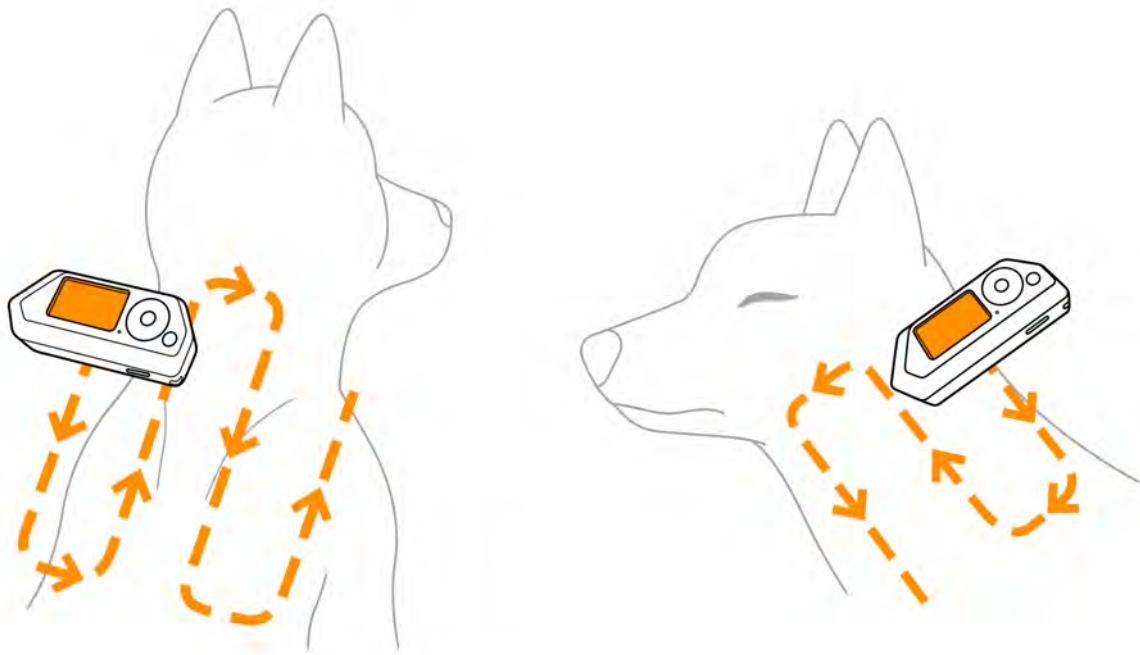
detecting the animal microchip, we recommend reading in the ASK coding mode:

- 1 Go to **Main Menu -> 125 kHz RFID -> Extra Action.**
- 2 Select **Read ASK** and press  **OK**.
- 3 Move your Flipper Zero as close as possible to the pet's skin (the device's back facing the animal's skin) and move the device step by step, holding it for three seconds at each location.



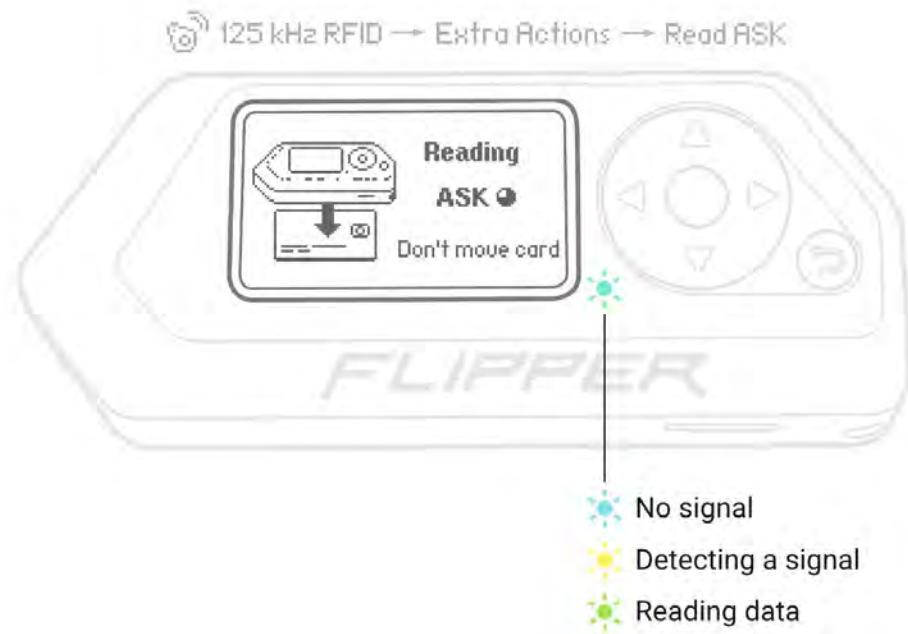
It is important to keep your Flipper Zero still for three seconds at every stop

Move your Flipper Zero in the pattern shown below until the microchip is detected.



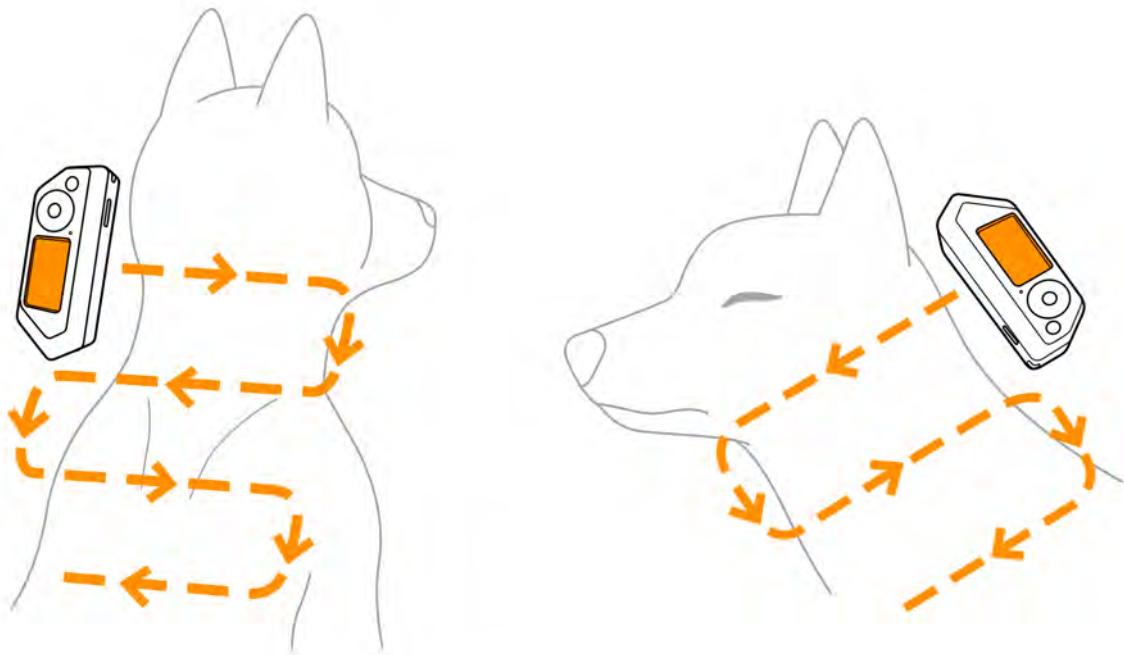
Front-to-back scanning pattern in the area between the shoulder blades and the left side of the neck

Pay attention to the LED indication on your Flipper Zero:



LED indication will help you to locate the microchip

If the microchip wasn't detected, rotate your Flipper Zero 90° and repeat the scanning procedure as shown below.



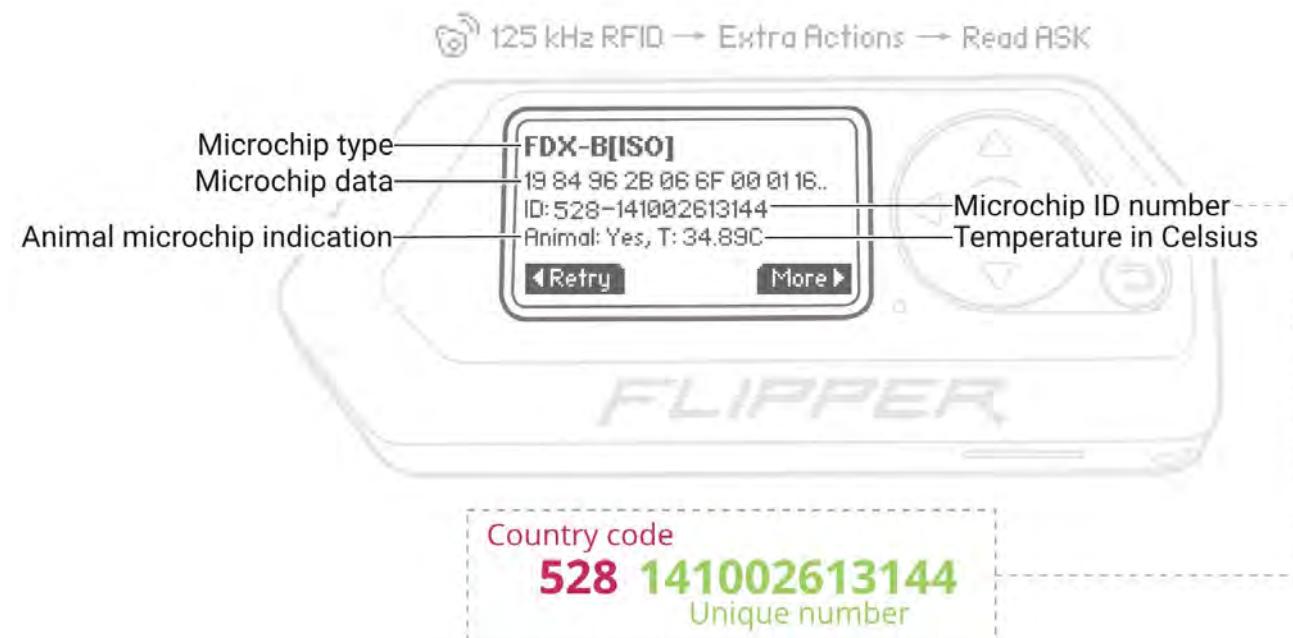
Side-to-side scanning pattern in the area between the shoulder blades and the left side of the neck

## If your Flipper Zero doesn't detect the microchip

- The microchip may be out of range. -> Try to move your Flipper Zero in the patterns shown above with smaller steps and hold the device at each stop a bit longer.
- The microchip might migrate from the original location. -> Try to cover a larger area with your Flipper Zero.
- Metal objects and electronic equipment may affect the detection of the microchip. -> Try to scan the animal away from these objects.
- The animal might have a high-frequency RFID microchip. -> Try to scan it [using the NFC application](#).
- The animal might have an unsupported type of microchip. -> Contact your local veterinary clinic to scan the animal with their equipment.

# Animal RFID microchip data structure

After you capture the microchip data, Flipper Zero will display the information about the animal: microchip type, ID number, microchip data, and animal temperature (if the microchip can measure it).



Data structure of an ISO-compliant FDX-B microchip

ISO-compliant animal microchips have 15-digit ID numbers. The first three digits represent an [ISO 3166-1 numeric](#) country code or a [manufacturer code](#). The remaining 12 digits represent the unique microchip number.

## Always use diagnostic thermometers for accurate temperature measurements

Flipper Zero can read the temperature measured by microchips. Even though it's a non-invasive way of frequently measuring a pet's temperature, microchip temperature isn't a replacement for a certified thermometer.

# Search for microchip ID info in animal databases

Once you know the animal ID number, you can find the information about the animal in pet recovery services by entering the ID number:



[American Animal Hospital Association](#)

United States and Canada



[Europetnet](#)

Europe

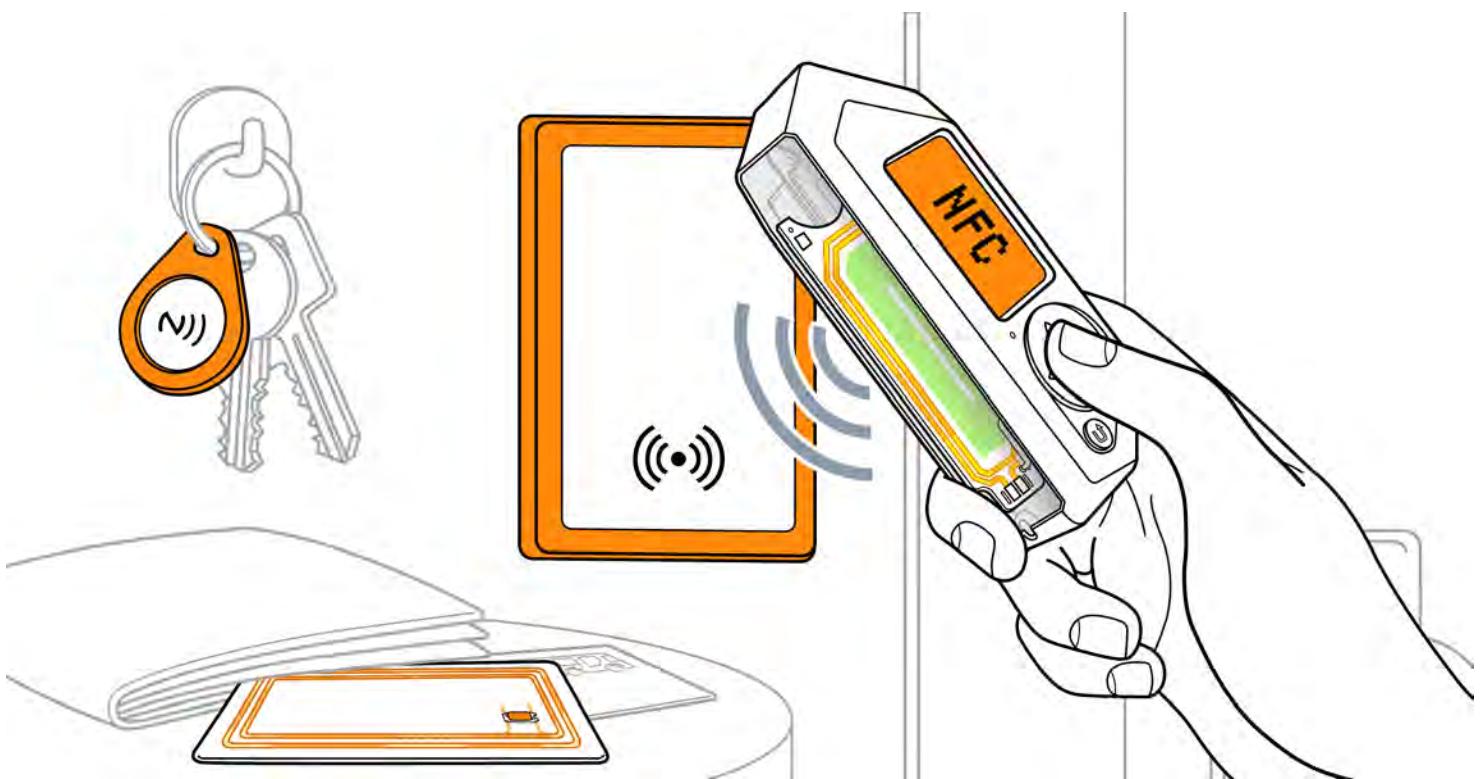


[PETMAXX](#)

Worldwide

If you didn't find information about the animal in the services above, try using your local pet recovery service.

# NFC



Flipper Zero supports NFC technology, which is implemented in public transport smart cards, access cards or tags, and digital business cards. These cards have complex protocols and support encryption, authentication, and full-fledged two-way data transfer. Flipper Zero has a built-in 13.56 MHz NFC module capable of reading, saving, and emulating NFC cards.

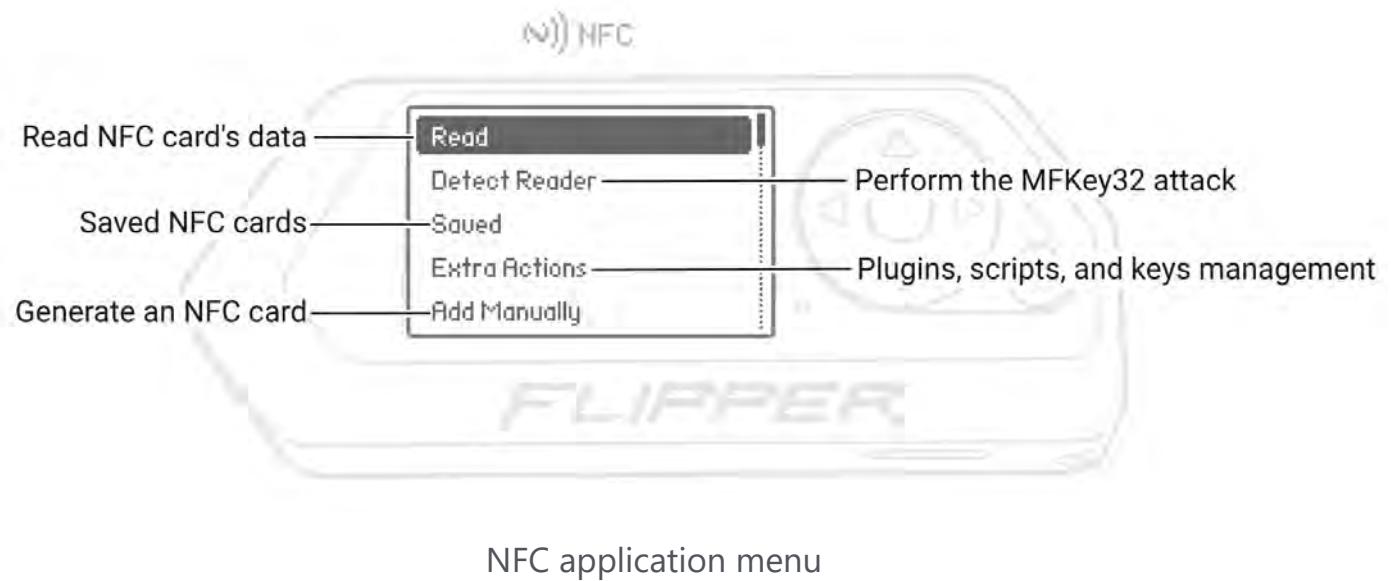
## Insert a microSD card to use the NFC app

Before using the NFC app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

On this page, you'll find an overview of the NFC application, and learn more about the hardware behind the NFC module.

# NFC menu

You can access the NFC application from the Main Menu. In the application, you can interact with NFC cards, analyze readers, and generate NFC cards.

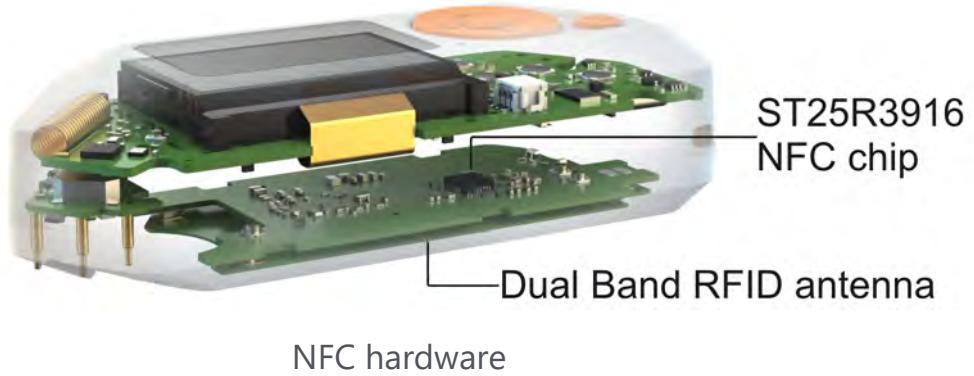


NFC application menu

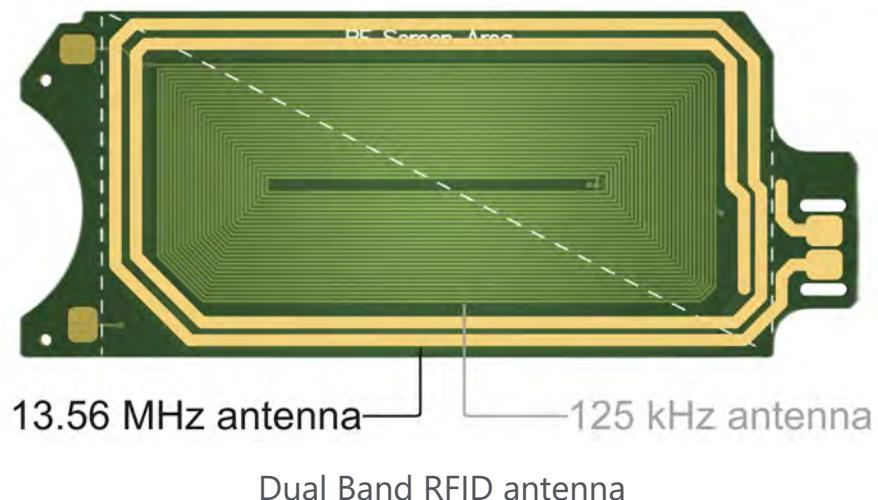
- **Read**: reads and saves NFC card's data such as UID, SAK, ATQA, and stored data.
- **Detect Reader**: emulates an NFC card to collect data (**nonces**) used to calculate keys attempted by a reader.
- **Saved**: lists saved NFC cards, which can be emulated and renamed.
- **Extra Actions**: additional reading scripts, plugins, keys management, and etc.
- **Add Manually**: generates new virtual NFC cards by manually entering card's data.

# NFC hardware

Flipper Zero has a built-in NFC module based on a [ST25R3916 NFC chip](#) and a 13.56 MHz high-frequency antenna. The chip is used for high-frequency protocols and is responsible for reading and emulation of cards.



The high-frequency 13.56 MHz antenna is placed on the Dual Band RFID antenna next to the low-frequency 125 kHz antenna.



# Recovering keys with MFKey32



If you couldn't read all the MIFARE Classic® card's sectors with the [Read](#) function or the sectors you read aren't enough to get access, try to use the [Detect Reader](#) function. The Detect Reader function performs the MFKey32 attack, which [exploits weaknesses](#) in the [Crypto-1](#) encryption algorithm. MFKey32 is the name of a tool/algorithm to recover the MIFARE Classic keys from the reader's Crypto-1 [nonce](#) pairs. It works by recovering the initial state of the Crypto-1 [Linear Feedback Shift Register](#), which contains the key.

On this page, you'll learn how to conduct the MFKey32 attack if you have access to the card and what you can do if you don't have access to the card.

## If you have access to the card

The best way to conduct the MFKey32 attack is to have access to the card, even if not all sectors were read. By getting the reader's key, you can read more sectors of the card, which might be enough to open the door.

To get the reader's keys and read the MIFARE Classic card, do the following:

- 1 **Read and save the card** with your Flipper Zero.
- 2 Go to **Main Menu -> NFC -> Saved -> Name of the saved card -> Detect reader**.  
Flipper Zero will emulate this card for the MFKey32 attack.



Your Flipper Zero is ready to collect the reader's nonces

- 3 **Tap the reader** with your Flipper Zero, as shown below. When near the reader, your Flipper Zero will collect the reader's nonces. Depending on the reader, you may need to tap the reader with your Flipper Zero up to 10 times in order to simulate several card authentications.

On your Flipper Zero's screen, the number of collected nonce pairs should increase with each new tap of the reader. If the number of nonce pairs doesn't increase, the reader is not trying to authenticate the card emulated by your Flipper Zero.



To collect nonces, tap the reader with your Flipper Zero

- 4 Press **OK** to save the collected nonce pairs to the microSD card. Once the required number of nonce pairs is collected, the screen will display a **Completed** message. After that, you can press the **OK** button to view the captured data, including the sector and key from which it was obtained.



Once nonces are collected, you can save them onto the microSD card

- 5 **Recover keys** from the collected nonces. You can do it via:

**Flipper Mobile App**

1. On your phone, run [\*\*Flipper Mobile App\*\*](#) and synchronize it with your Flipper Zero.
2. Go to **Hub -> NFC tools -> Mfkey32 (Detect Reader)**.

## Flipper Lab

1. Connect your Flipper Zero to your computer via a USB-C cable.
2. On your computer, go to [\*\*lab.flipper.net\*\*](#).
3. Go to **NFC tools**, then click the **GIVE ME THE KEYS** button.

## Mfkey32 app

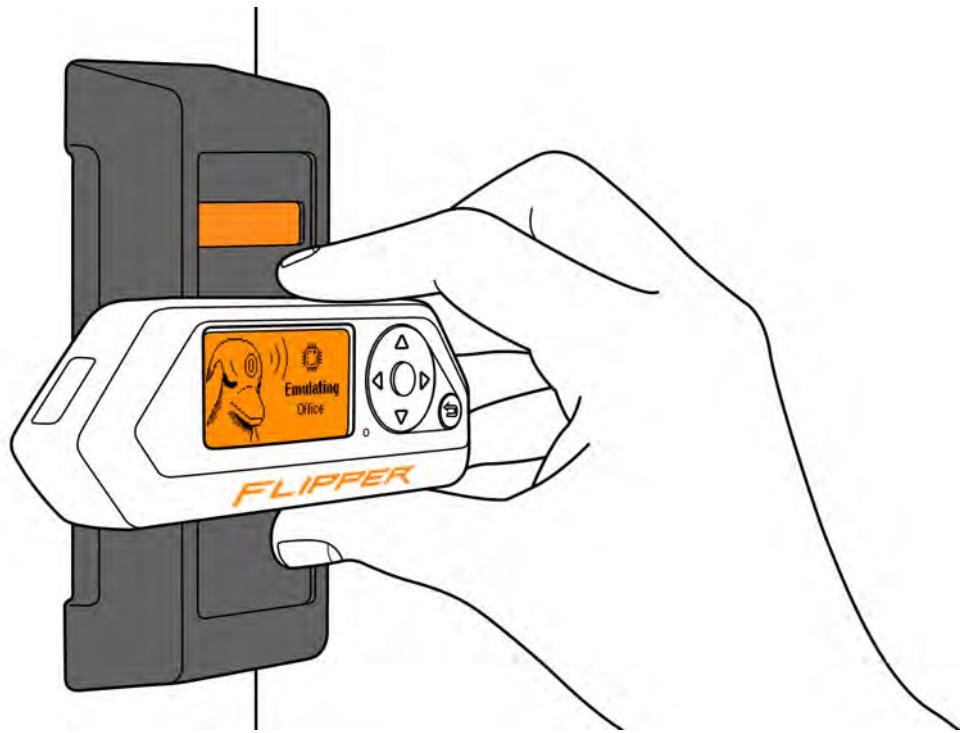
To use this feature, you need to download the [\*\*Mfkey32\*\*](#) app to your Flipper Zero from [Apps](#).

If you don't have access to a smartphone or computer, you can recover keys from the collected nonces using only your Flipper Zero. Keep in mind that it takes several minutes to recover the keys due to the limited computing power of the device.

1. On your Flipper Zero, go to **Main Menu -> Apps -> NFC**.
2. Run the **Mfkey32** app and press the  **OK** button.

The recovered keys will be displayed on the screen. After that, they can be added to the **User dictionary**. In some cases, the keys can't be recovered from the nonces due to the reader not recognizing your Flipper Zero's emulation properly.

- 6 Once new keys are added to the User dictionary, **read the card again**. The number of found keys and read sectors may increase, which indicates that necessary data is collected.
- 7 **Emulate the card** and hold your Flipper Zero near the reader to get access.



While emulating the NFC card, hold your Flipper Zero near the reader

If the emulated card doesn't open the door, try to do steps 1 through 6 again in case your reader reads multiple sectors sequentially.

If, after repeating steps 1 through 6, the number of the card's keys and sectors read by your Flipper Zero didn't increase, then the reader and the card aren't in the same system, or the reader isn't vulnerable to the MFKey32 attack.

## If you don't have access to the card

Even if you don't have access to the card, you can try to get the reader's keys and then add them to the **User dictionary** to expand it.

To get and save the reader's keys, do the following:

Go to **Main Menu -> NFC -> Detect reader**. Flipper Zero will emulate an NFC card for the MFKey32 attack.



Your Flipper Zero is ready to collect the reader's nonces

- 2 **Tap the reader** with your Flipper Zero as shown below. When near the reader, your Flipper Zero will collect the reader's nonces. Depending on the reader, you may need to tap the reader with your Flipper Zero up to 10 times in order to simulate several card authentications.

On your Flipper Zero's screen, the number of collected nonce pairs should increase with each new tap of the reader. If the number of nonce pairs doesn't increase, the reader is not trying to authenticate the card emulated by your Flipper Zero.



To collect nonces, tap the reader with your Flipper Zero

- 3 Press  **OK** to save the collected nonce pairs to the microSD card. Once the required number of nonce pairs is collected, the screen will display a **Completed** message. After that, you can press the  **OK** button to view the captured data, including the sector and key from which it was obtained.



Once nonces are collected, you can save them onto the microSD card

- 4 **Recover keys** from the collected nonces. You can do it via:

## Flipper Mobile App

1. On your phone, run [\*\*Flipper Mobile App\*\*](#) and synchronize it with your Flipper Zero.
2. Go to **Hub -> NFC tools -> Mfkey32 (Detect Reader)**.

## Flipper Lab

1. Connect your Flipper Zero to your computer via a USB-C cable.
2. On your computer, go to [\*\*lab.flipper.net\*\*](#).
3. Go to **NFC tools**, then click the **GIVE ME THE KEYS** button.

## Mfkey32 app

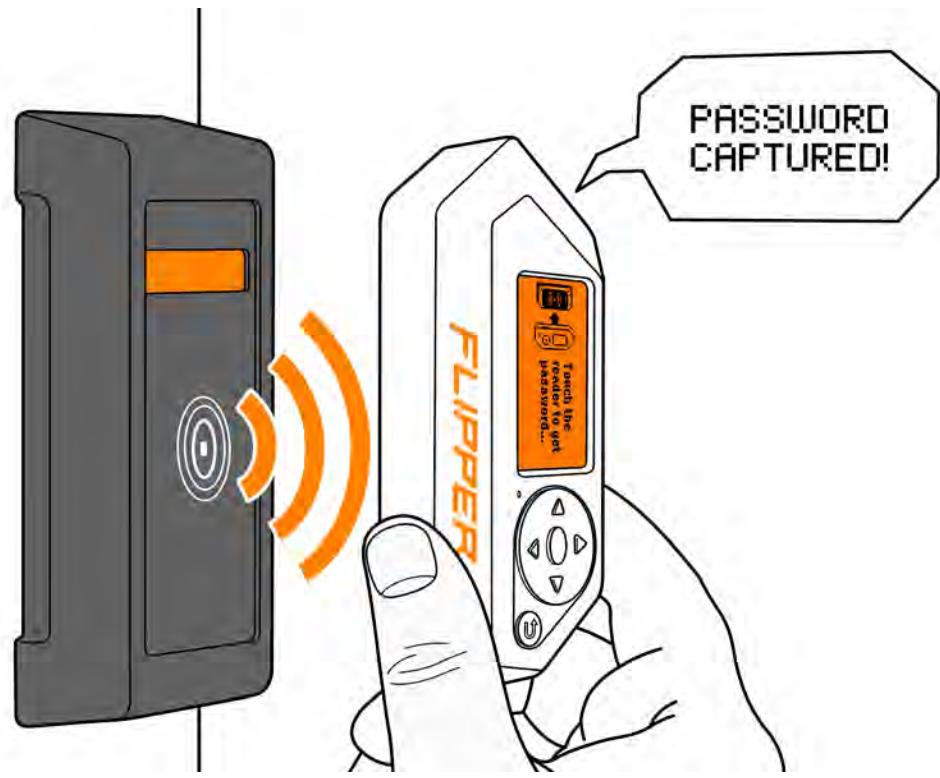
To use this feature, you need to download the [Mfkey32](#) app to your Flipper Zero from [Apps](#).

If you don't have access to a smartphone or computer, you can recover keys from the collected nonces using only your Flipper Zero. Keep in mind that it takes several minutes to recover the keys due to the limited computing power of the device.

1. On your Flipper Zero, go to **Main Menu -> Apps -> NFC**.
2. Run the **Mfkey32** app and press the  **OK** button.

The recovered keys and sector numbers will be displayed on the screen. After that, they can be added to the **User dictionary**. In some cases, the keys can't be recovered from the nonces due to the reader not recognizing your Flipper Zero's emulation properly.

# Unlocking cards with passwords



There are NFC cards that have data organized in pages, such as MIFARE Ultralight® and NTAG® cards. If you can't read all the NFC card's pages with the [Read](#) function, the card might be protected with a password. To unlock the protected card, you can enter the password manually, generate the password to unlock the pages, or extract the password from the reader.

## Using these functions might block your card

Some cards have a security feature that blocks the card after several authentications with an incorrect password.

On this page, you'll learn how to capture the password sent by the reader, generate passwords for supported types of cards, and unlock cards by entering passwords manually.

# Extracting the password from the reader

If you have access to the reader and the card, try to extract the password from the reader by emulating the captured card's data. The reader might authenticate the card with a password, which can be captured and saved by your Flipper Zero. After that, you can read the data on the card's remaining pages.

To extract the password and unlock the card, do the following:

- 1 [Read and save](#) the card.
- 2 Go to **Main Menu -> NFC -> Saved -> Card's name**.
- 3 Select **Unlock With Reader**, then tap the reader with your Flipper Zero.



To capture the password, tap the reader with your Flipper Zero

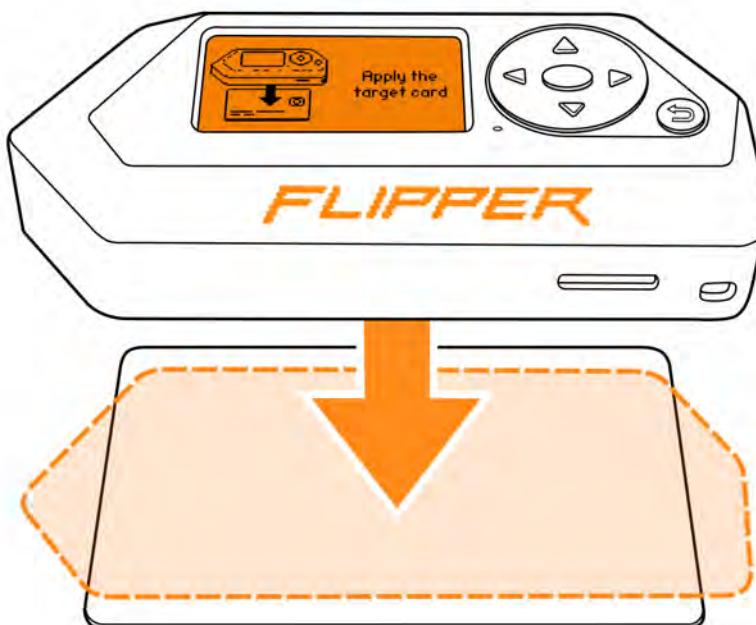
- 4 When the password is captured, press **Continue**.

N) NFC → Saved → Card's name → Unlock With Reader



The captured password is displayed on the screen

- 5 Read the card by holding the card near your Flipper Zero's back.



Hold the card in the center of your Flipper Zero's back

- 6 Once pages are unlocked, press **Save**.



The number of read paged is displayed on the screen

- 7 Name the card, then press **Save**.

## If unlocking failed

- The card might be connected to another reader.

## Generating the password

Using your Flipper Zero, you can generate the password for toys-to-life NFC technology and Xiaomi Air Purifier. When the card is near, Flipper Zero generates the password from the card's UID.

To generate the password and unlock the card, do the following:

- 1 Go to **Main Menu -> NFC -> Extra Actions -> Unlock NTAG/Ultralight**.
- 2 Select the card type, then hold the card near your Flipper Zero's back.
- 3 Once pages are unlocked, press **Save**.
- 4 Name the card, then press **Save**.

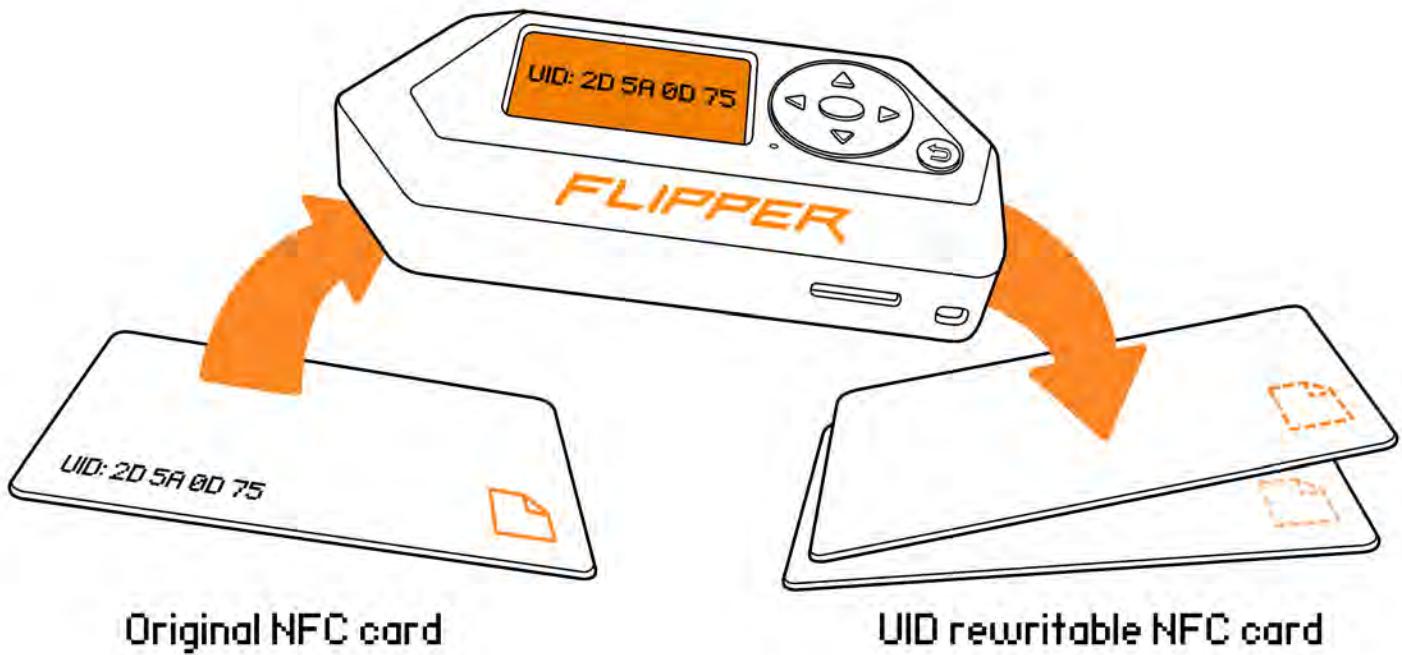
# Entering the password manually

If you know the password, you can enter it manually and unlock the card by doing the following:

- 1 **Read and save** the card.
- 2 Go to **Main Menu -> NFC -> Saved**.
- 3 Select the saved card.
- 4 Then go to **Unlock with Password -> Enter Password Manually**.
- 5 Enter the password in hexadecimal, then press **Save**.
- 6 To unlock the card with the entered password, hold the card near your Flipper Zero's back.
- 7 Once pages are unlocked, press **Save**.
- 8 Name the card, then press **Save**.

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# Writing data to magic cards



Standard NFC cards have unique identifier (UID) numbers assigned by the manufacturer. These numbers can't be changed. **NFC magic** or **UID rewritable** are special cards that can change their UIDs. That makes magic cards more powerful—they can copy the UID and data of an original card. There are [different generations](#) of magic cards.

On this page, you'll learn about supported magic cards and how to write the UID and data from an original card to an NFC magic card.

To use this feature, you need to download the [NFC Magic](#) app to your Flipper Zero from [Apps](#).

## Writing card data

Flipper Zero can write data to **Gen1** and **Gen4** magic cards.

**Gen1 magic cards** can be configured as the following card type:

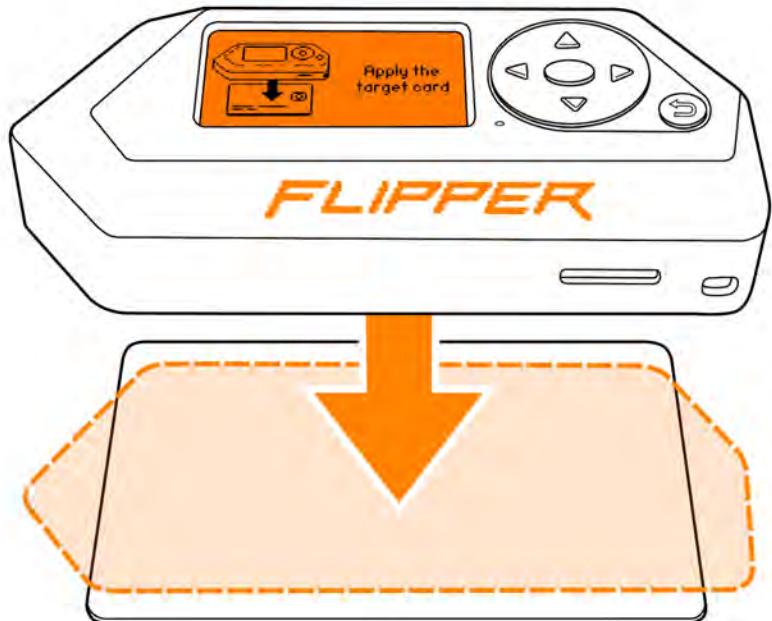
- MIFARE Classic® 1K

**Gen4 (Ultimate) magic cards** can be configured as the following card types:

- Any MIFARE Classic®
- MIFARE Ultralight® EV1
- MIFARE Ultralight® EV2
- NTAG® 203
- NTAG® 213
- NTAG® 215
- NTAG® 216

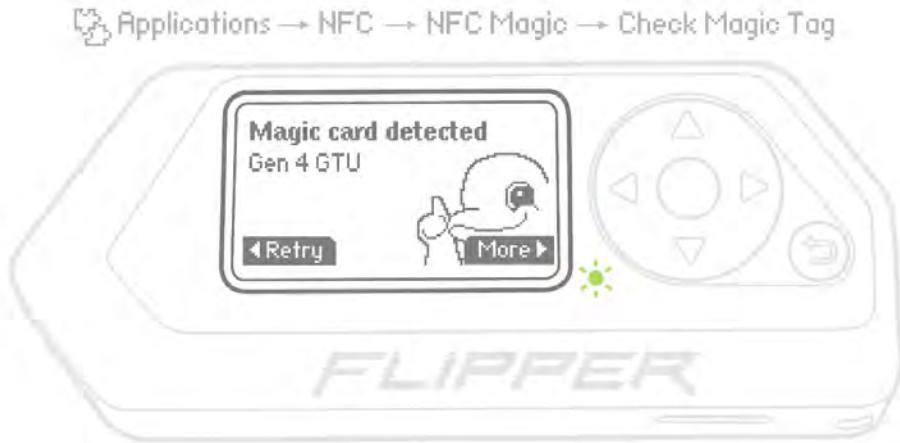
To copy the original NFC card, you need to write the original UID and data to the NFC magic card by doing the following:

- 1 **Read and save the original card.** Make sure that your Flipper Zero reads all sectors or pages of the original card!
- 2 Go to **Main Menu -> Apps -> NFC -> NFC Magic.**
- 3 Check if you have a compatible Gen1 or Gen4 magic card by using the **Check Magic Tag** option and holding the magic card near the back of your Flipper Zero.  
*or*  
If you have a password-protected Gen4 card, use the **Authenticate Gen4** option to enter the password manually.



Hold the card near the back of your Flipper Zero

- 4 If the magic card is supported, you'll see the message below, otherwise your Flipper Zero will keep trying to determine the card type.



Your Flipper Zero will let you know if you have the magic card

- 5 Go to **More** to see options for this type of magic card.
- 6 To write the UID and data of the original card, use the **Write** option.
- 7 Select the original card in the browser and hold the magic card near the back of your Flipper Zero.

- 8** Once your Flipper Zero writes data to the magic card, you'll see the message below.

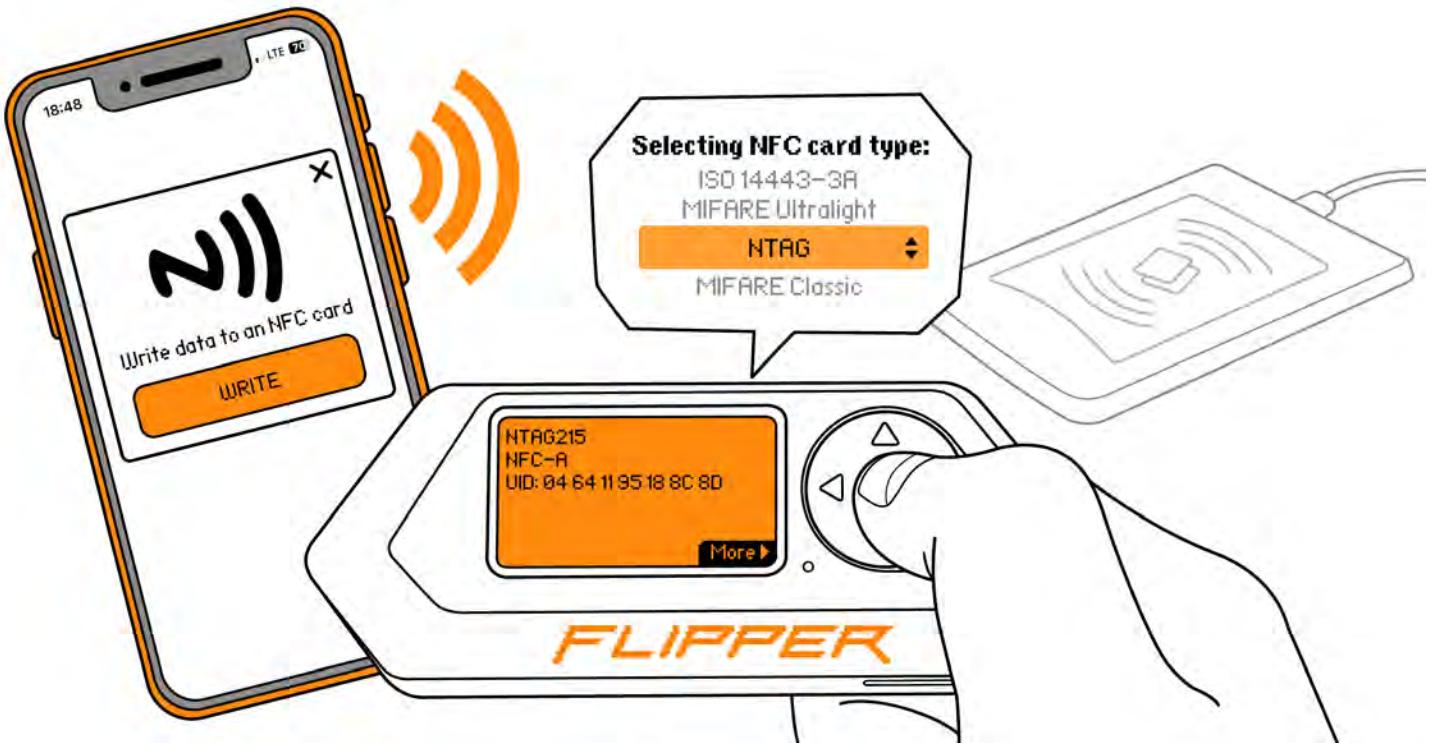


The data of the original card is written to the magic card

You can also format the magic card by using the **Wipe** option—the UID will be reset to the default and data in sectors or pages will be deleted.

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# Adding new NFC cards



With your Flipper Zero, you can generate various NFC cards that can be programmed as keys in access control systems or write various data onto them using your smartphone, such as links to your personal website, resume, or business card. You no longer need to purchase new physical NFC cards, as you can program your Flipper Zero to act as a key instead.

On this page, you'll learn how to manually add a virtual NFC card and explore available card types.

## Creating NFC cards

There are two ways to create NFC cards, depending on your needs:

- Generating an NFC card from the list of available standard card types with a random UID.
- Manually create an NFC-A card by entering the UID, ATQA, and SAK values that might work with simple access control systems that use the card's UID to authenticate users.

Let's go through both of these options.

## Generating a specific NFC card type

You can create virtual NFC cards with the same data organization as the following NFC cards:

- MIFARE Ultralight®
- MIFARE Ultralight® EV1 11
- MIFARE Ultralight® EV1 H11
- MIFARE Ultralight® EV1 21
- MIFARE Ultralight® EV1 H21
- NTAG® 203
- NTAG® 213
- NTAG® 215
- NTAG® 216
- NTAG® I2C 1K
- NTAG® I2C 2K
- NTAG® I2C Plus 1K
- NTAG® I2C Plus 2K
- MIFARE Mini®
- MIFARE Classic® 1K with a 4-byte UID
- MIFARE Classic® 1K with a 7-byte UID
- MIFARE Classic® 4K with a 4-byte UID
- MIFARE Classic® 4K with a 7-byte UID

If you want to use the created NFC card with your smartphone, NTAG 216 should work in most cases. However, the type of card you should use varies depending on your requirements. Please refer to the documentation of the application or device you're planning to use it with.

The virtual NFC card will have a random UID and default data values, similar to a new empty physical NFC card.

To generate a card, do the following:

- 1** Go to **Main Menu -> NFC -> Add manually.**
- 2** Select the NFC card type you need.
- 3** Review the data, then select **More**.
- 4** Enter the name of the card, then select **Save**.

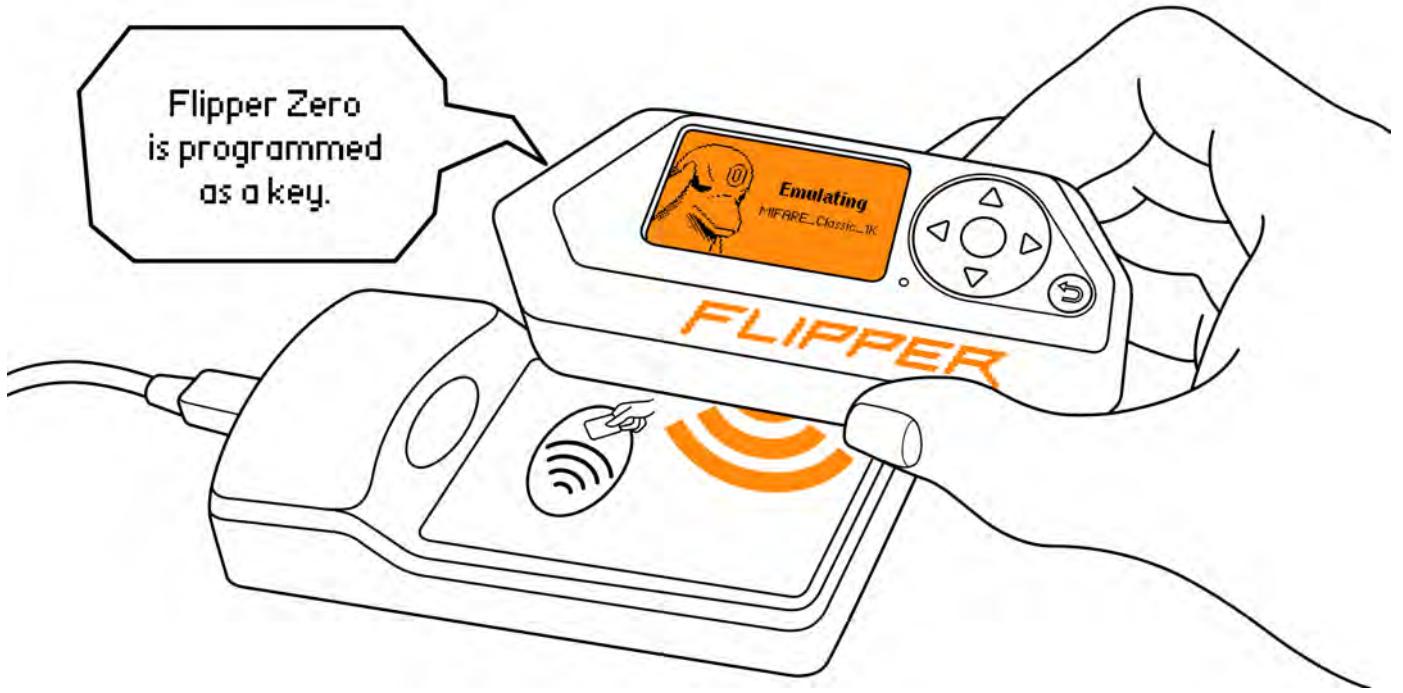
Once you have saved the card, it can be programmed to function as an access key or store data, such as a URL that leads to a website.

Different access control systems and mobile applications have varying procedures for programming. Check the documentation of your access control system or application for instructions and supported card types.

Before programming the created virtual NFC card, you must emulate it to be recognized by a reader as a physical NFC card.

Follow these steps:

- 1** Go to **Main Menu -> NFC -> Saved.**
- 2** Select the added card and press **Emulate**.
- 3** Hold your Flipper Zero near the reader or smartphone to program it.



You need to emulate the saved card for Flipper Zero to act as a physical card

## Creating an NFC card manually

Some access control systems use the UID, ATQA, and SAK data to grant access. If you know these values, you can enter them manually to create a needed NFC card:

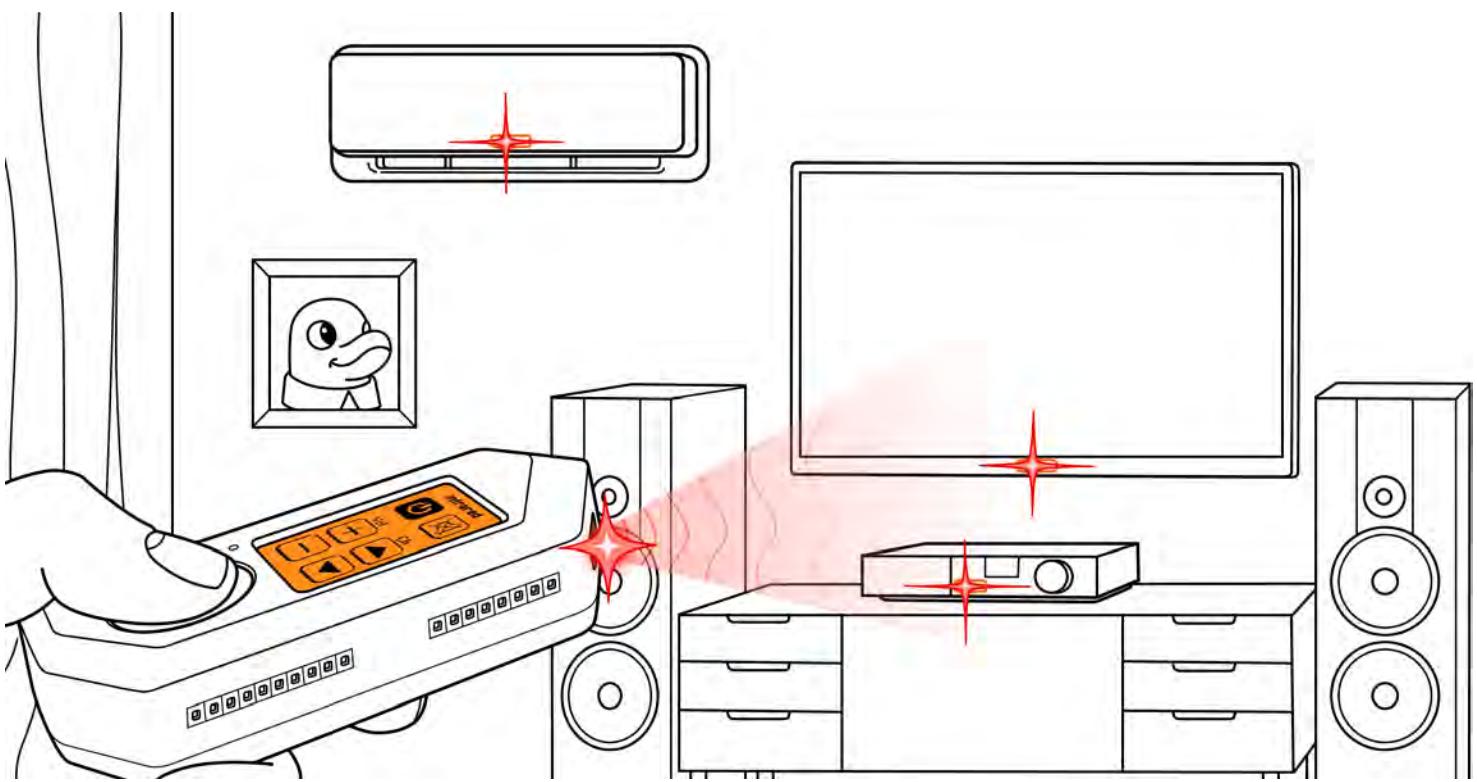
- 1 Go to **Main Menu -> NFC -> Add manually.**
- 2 Select the needed NFC card type depending on the UID size:
  - NFC-A 7-byte UID  
*or*
  - NFC-A 4-byte UID
- 3 Enter the known **SAK** value in hexadecimal, then select **Save**.
- 4 Enter the known **ATQA** value in hexadecimal, then select **Save**.
- 5 Enter the known **UID** value in hexadecimal, then select **Save**.
- 6

Enter the name of the card, then select **Save**.

Once you have saved the card with the known values, you can use it as an access key.

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# Infrared



Flipper Zero can interact with devices that use infrared (IR) light to send commands, such as TVs, air conditioners, multimedia systems, etc. With its built-in infrared module, Flipper Zero can learn and save infrared remotes and use its own universal remotes to control other devices.

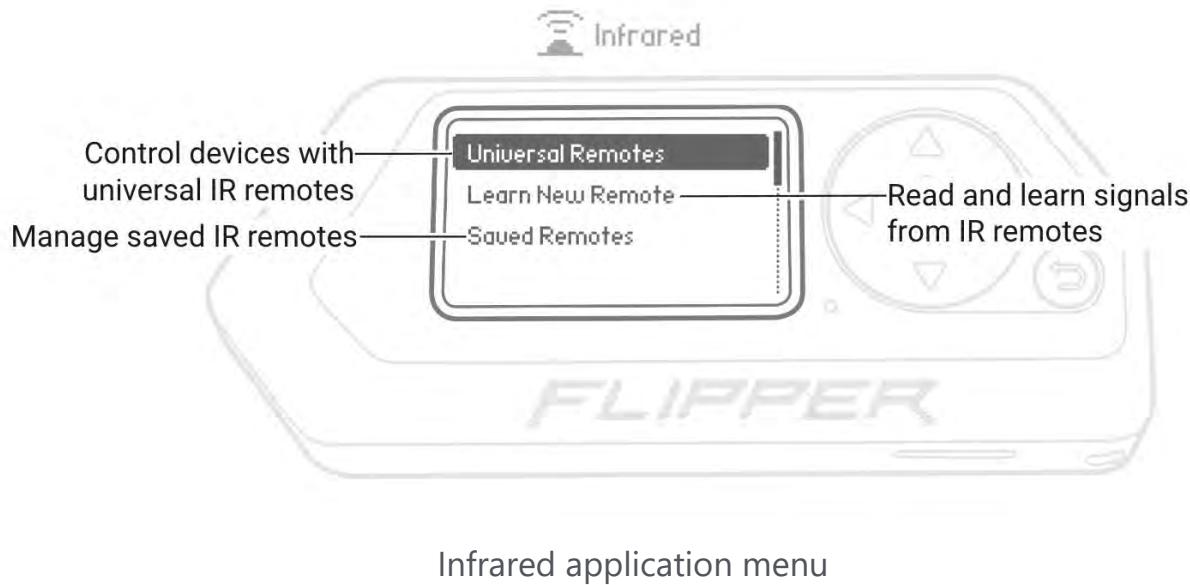
## Insert a microSD card to use the Infrared app

Before using the Infrared app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

On this page, you'll find an overview of the Infrared application, and learn more about the hardware behind the IR module.

# Infrared menu

You can access the Infrared application from the Main Menu. In the application, you can use universal remotes to control other devices, learn new remotes, and manage saved remotes.

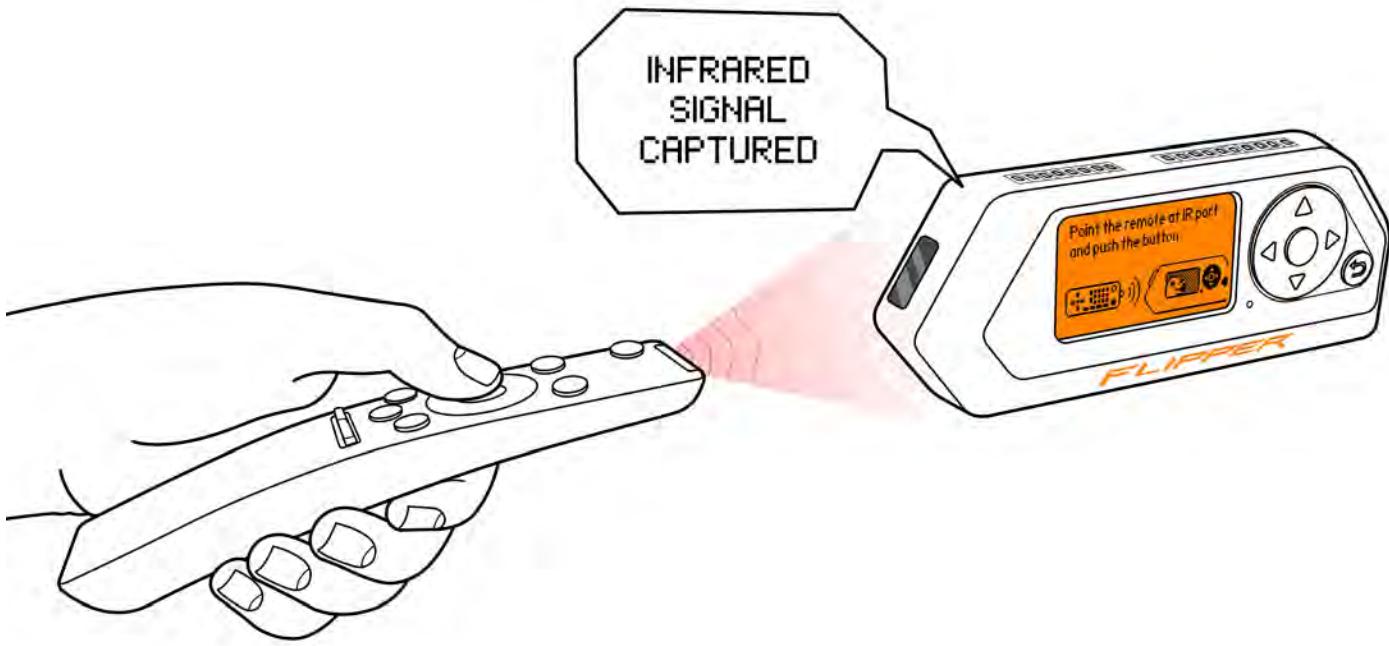


- **Universal Remotes:** iterates over a dictionary of known protocols and sends the same command for all supported models. The dictionary is stored on the microSD card. This is also known as a brute force attack. Because Flipper Zero iterates over an entire dictionary, the process of sending signals takes few seconds.
- **Learn New Remote:** reads and saves signals from infrared remotes. Each button of a remote is saved separately.
- **Saved Remotes:** lists saved remotes, which can be edited and played back.

# Infrared hardware

Flipper Zero has a built-in Infrared module consisting of an IR light transparent plastic window, three transmitting infrared LEDs, and a [TSOP-75338TR](#) infrared receiver.

# Reading infrared signals



With Flipper Zero, you can capture and save [infrared](#) (IR) signals from IR remotes. Such remotes are used to control TVs, air conditioners, projectors, audio systems, and more. The saved signals can be played back to send commands instead of the original remote.

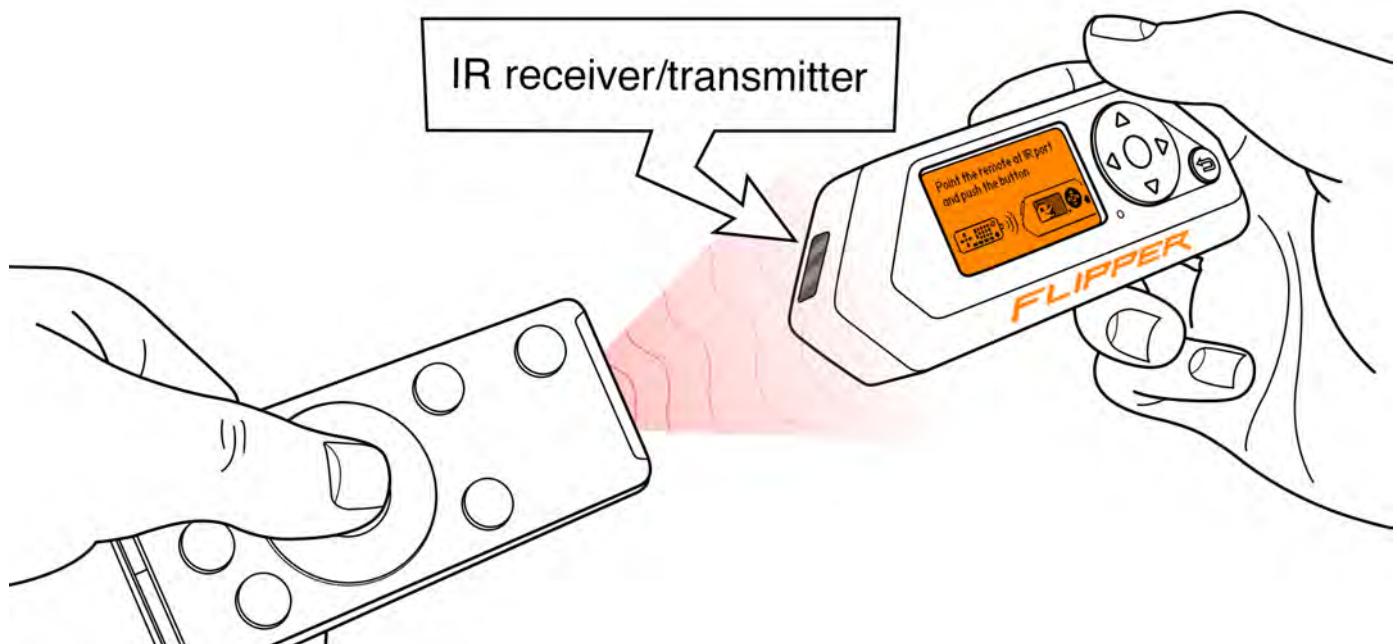
On this page, you'll learn how to read, save, and emulate IR signals with your Flipper Zero.

## Capturing infrared signals

Flipper Zero captures and demodulates IR signals with a carrier frequency of 38 kHz with its [built-in IR receiver](#). For remotes with known protocols, Flipper Zero automatically decodes IR signals. If the protocol of the remote is unknown, Flipper Zero will record the signal in RAW format. To capture and save a signal, do the following:

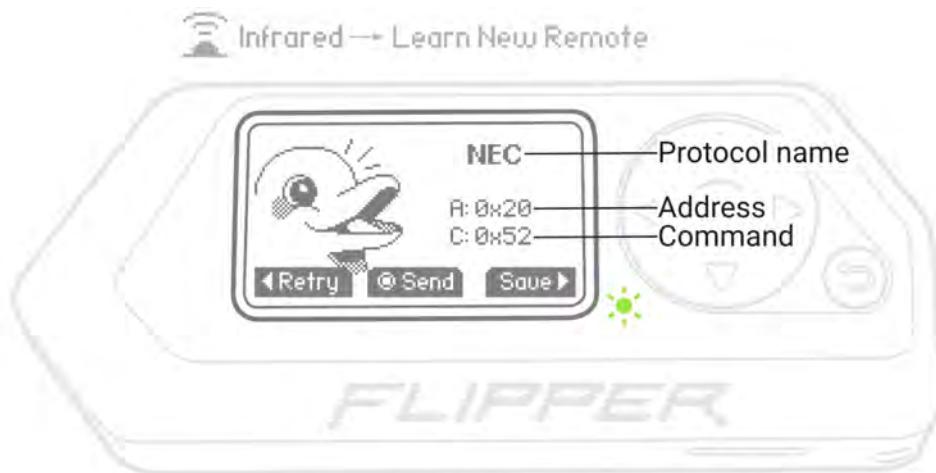
- 1 Go to **Main Menu -> Infrared -> Learn New Remote**.

- 2 Position your IR remote in the line of sight of the IR receiver of your Flipper Zero.
- 3 On your IR remote, press the button you want to be recorded by your Flipper Zero.



Keep your remote in the line of sight of the IR receiver

- 4 Once the signal is captured, you'll see the remote protocol name on the screen of your Flipper Zero.



The captured data is displayed on the screen

- 5 To save the captured signal, press **Save**, name the button, and press **Save** again.

- 6 After saving the first button, Flipper Zero creates a virtual remote with the new button. You can add a new button to the remote by selecting **+**.

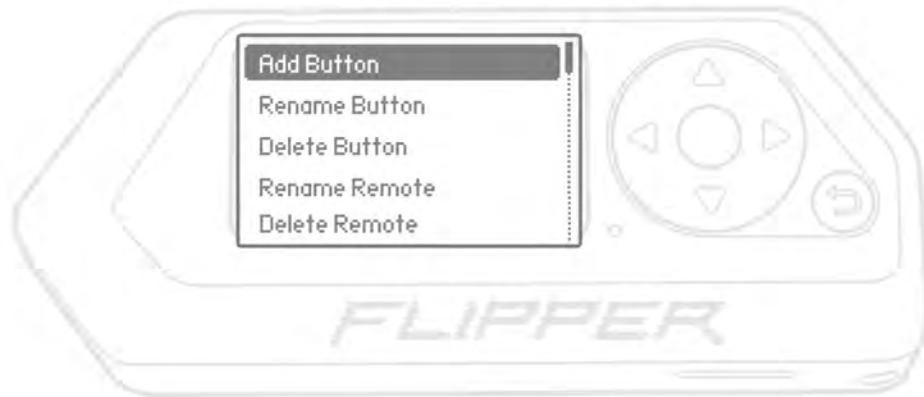
Infrared → Learn New Remote → Save



Add new signals to the virtual remote

- 7 To customize or delete the virtual remote, select **Edit**.

Infrared → Learn New Remote → Edit



Customize your virtual remotes

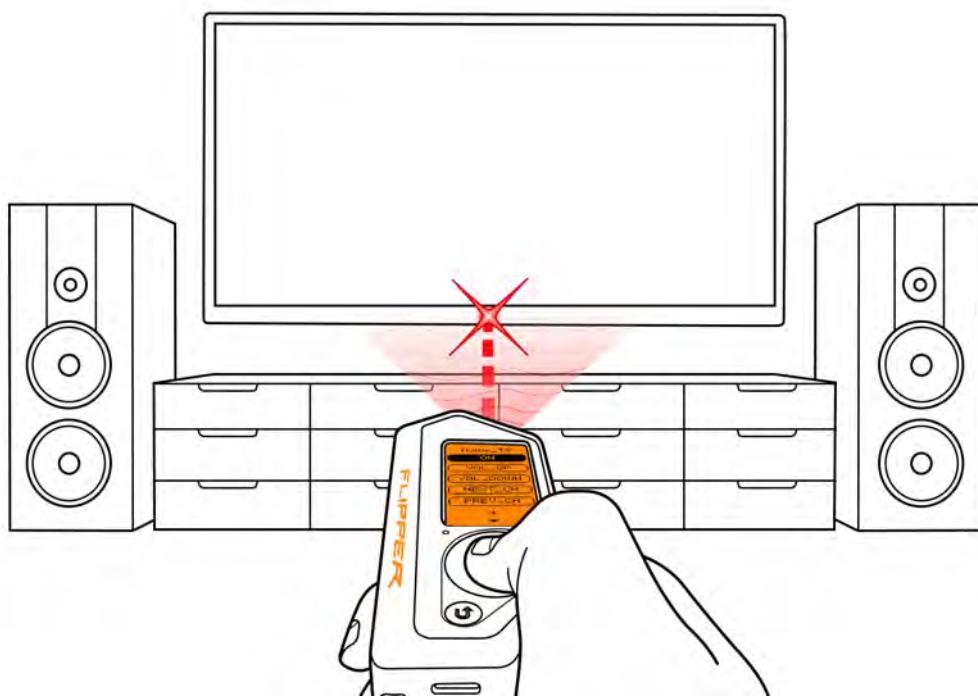
You can also customize saved remotes by going to **Main Menu -> Infrared -> Saved Remotes**.

Mind that Flipper Zero can capture IR light from the Sun or a home bulb while trying to capture a signal from a remote.

## Emulating infrared signals

With its built-in [IR transmitter](#), Flipper Zero can send saved signals to TVs, air conditioners, projectors, sound systems, and more. To send a signal, do the following:

- 1 Go to **Main Menu -> Infrared -> Saved Remotes**.
- 2 Select the saved remote from the list of remotes.
- 3 Point your Flipper Zero at the device you want to control. Make sure that the IR transmitter of your Flipper Zero is facing the device.
- 4 To send the command, select the button you want to emulate and press the  **OK** button.



To send a signal, point your Flipper Zero at the device and press the OK button

# Using universal remotes



Flipper Zero allows you to control various devices without copying their original infrared (IR) remotes. With the help of the **Universal Remotes** feature, you can use your Flipper Zero as a universal IR remote for sending commands to TVs, sound systems, projectors, and air conditioners. This feature sends commands from the built-in dictionary of IR remote protocols. Major electronics brands use those protocols to control their devices with IR remotes.

On this page, you'll learn about the types of universal IR remotes Flipper Zero has and their commands.

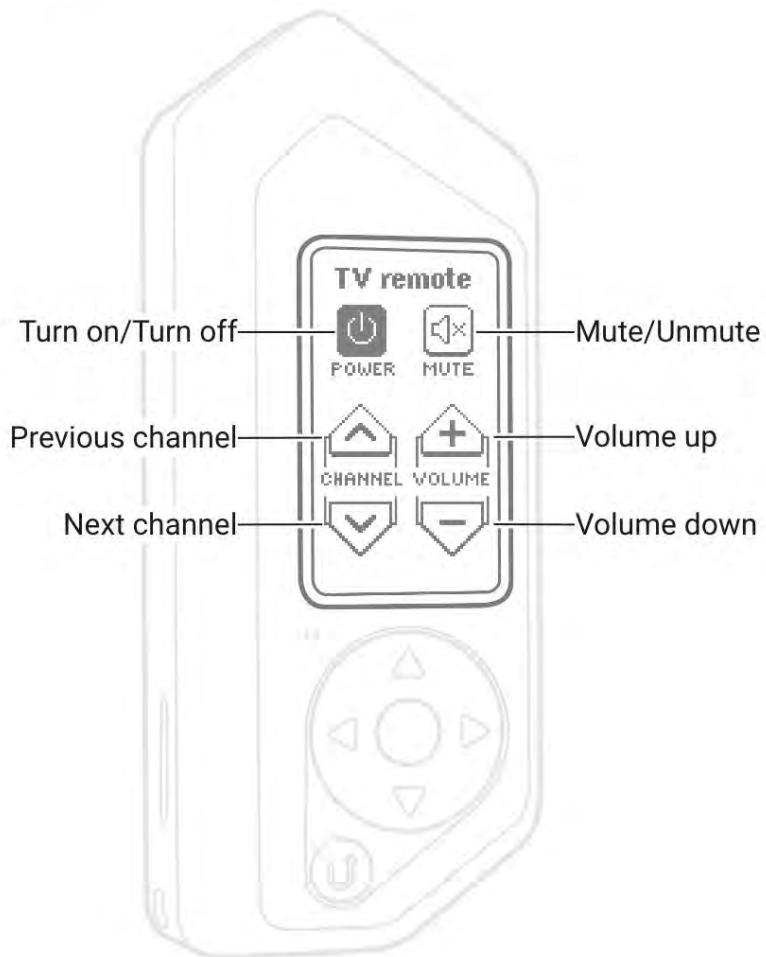
## Universal remotes overview

Flipper Zero has built-in universal remotes, such as a TV remote, audio system remote, projector remote, and air conditioner remote. The universal remotes can be accessed by going to **Main Menu -> Infrared -> Universal Remotes**.

## TV remote

The TV universal remote allows you to control power, set sound volume, switch channels, and mute your TV.

Infrared → Universal Remotes → TVs

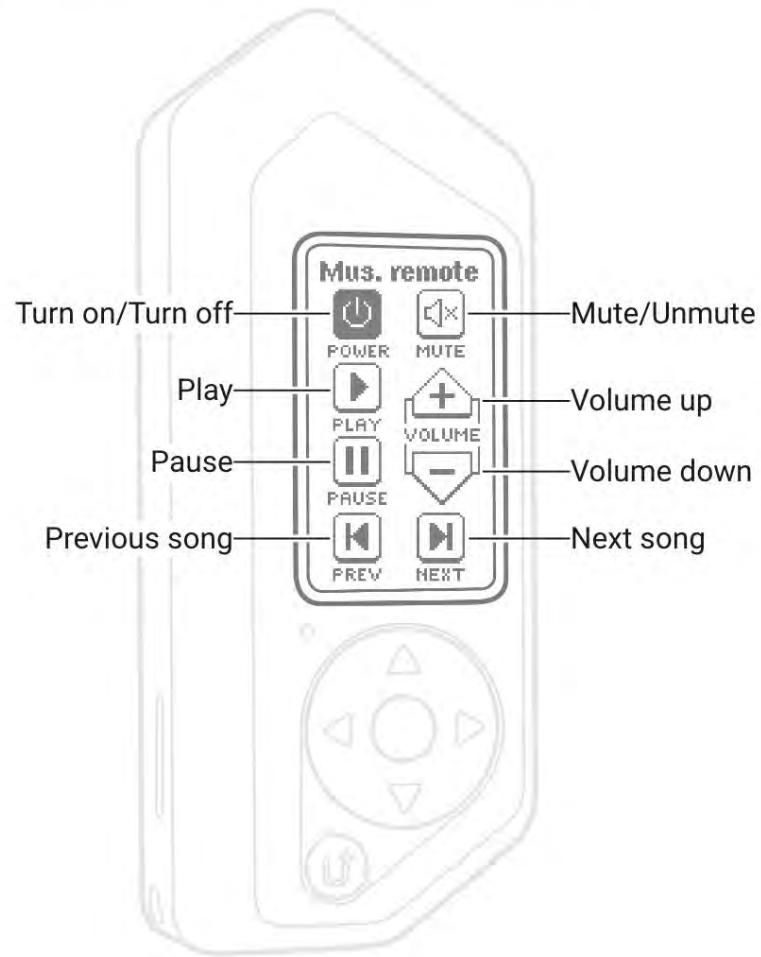


Control your TV even without the original IR remote

## Audio system remote

The Audio system remote allows you to control power, play and pause songs, switch songs, set sound volume, and mute your audio system.

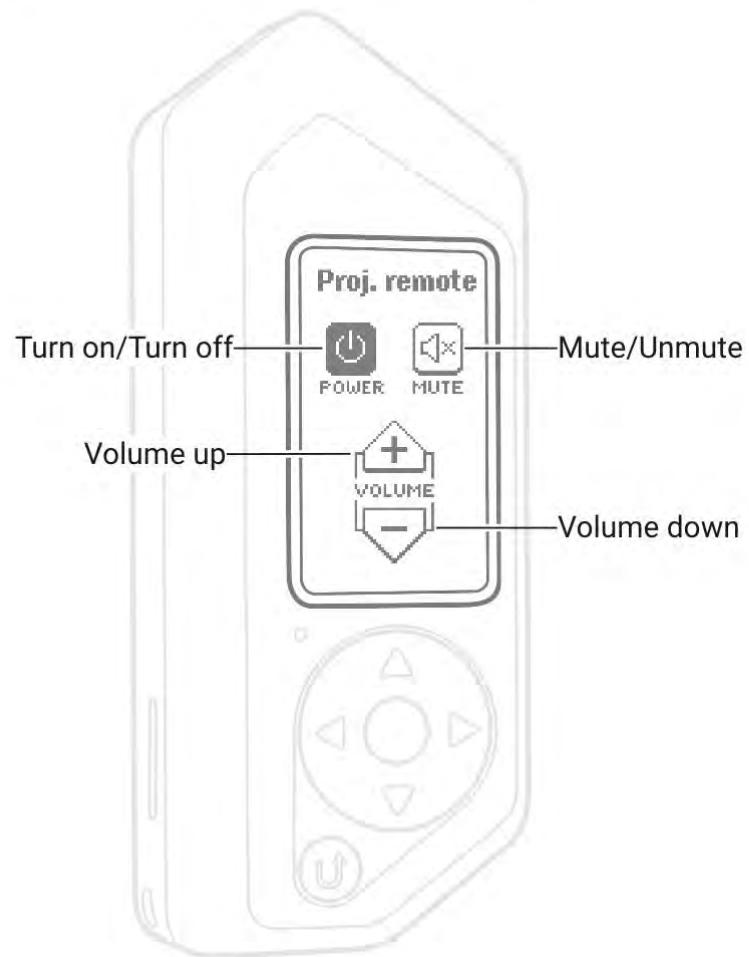
 Infrared → Universal Remotes → Audio Players



Use your Flipper Zero to control your audio system

## Projector remote

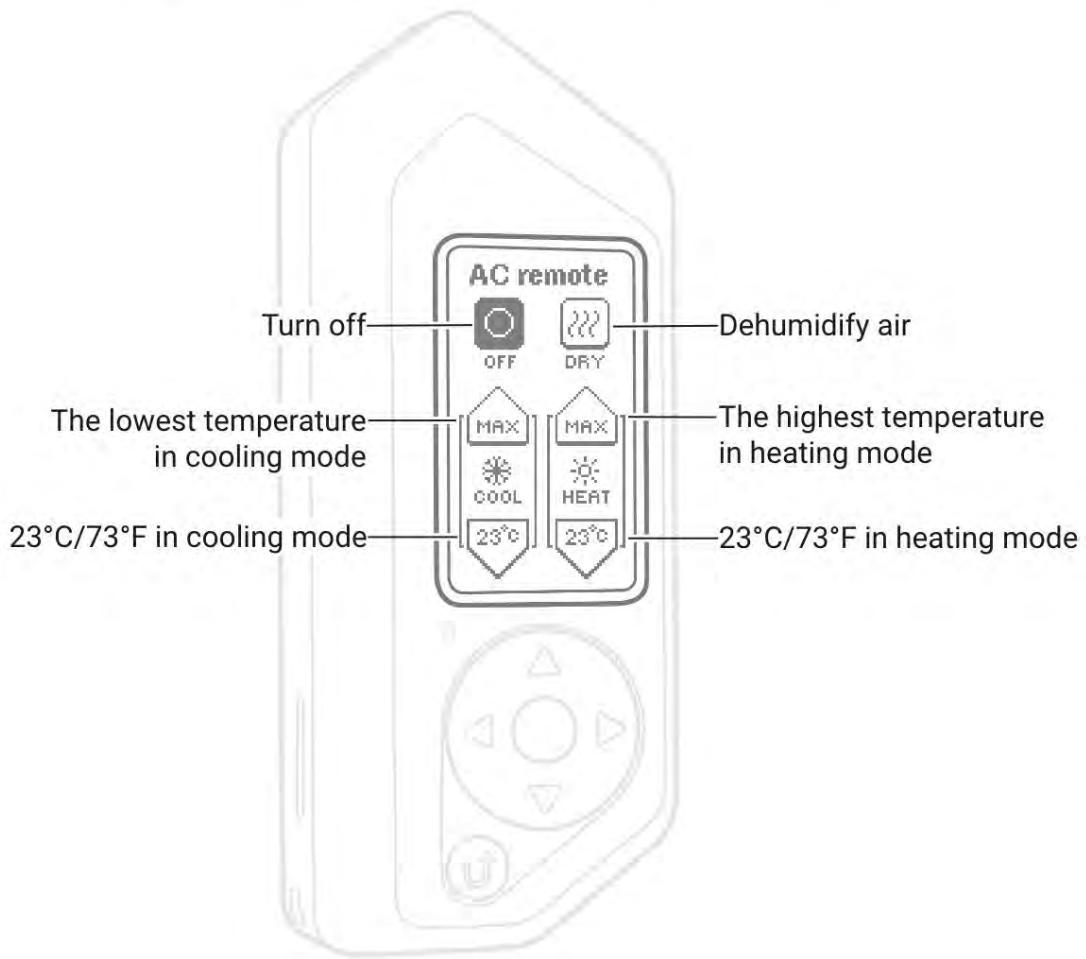
The Projector universal remote allows you to control power, set sound volume, and mute your projector.



Send commands to your projector with the Projector remote

## Air conditioner remote

The Air conditioner universal remote allows you to control power, activate an air dehumidifier mode, and set the temperature in cooling or heating modes. Mind that the **OFF** button only turns off an air conditioner. To turn on your air conditioner, press any other button of the Air conditioner universal remote.



Take control of your air conditioner without the original IR remote

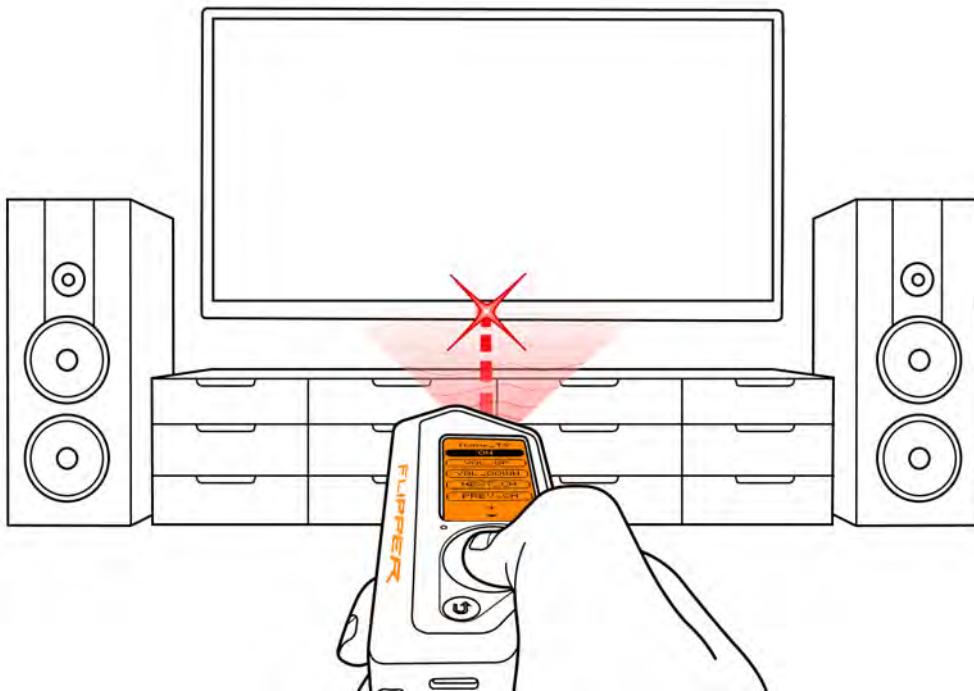
## Sending commands

While sending commands, Flipper Zero emulates an entire dictionary of protocols used by IR remotes. When the protocol sent by your Flipper Zero matches the protocol used by the device you want to control, the device executes the command.

To send a command, do the following:

- 1 Go to **Main Menu -> Infrared -> Universal Remotes**.
- 2 Select the universal remote depending on the device you want to control.

- 3** Select the button/command you want to send.
- 4** Point your Flipper Zero at the device and press the **OK** button—your Flipper Zero starts sending the command using protocols from the dictionary.



Point your Flipper Zero at the TV, send the command, and wait until the TV executes the command

- 5** Keep pointing your Flipper Zero at the device until the device executes the command or until the entire dictionary is played back.

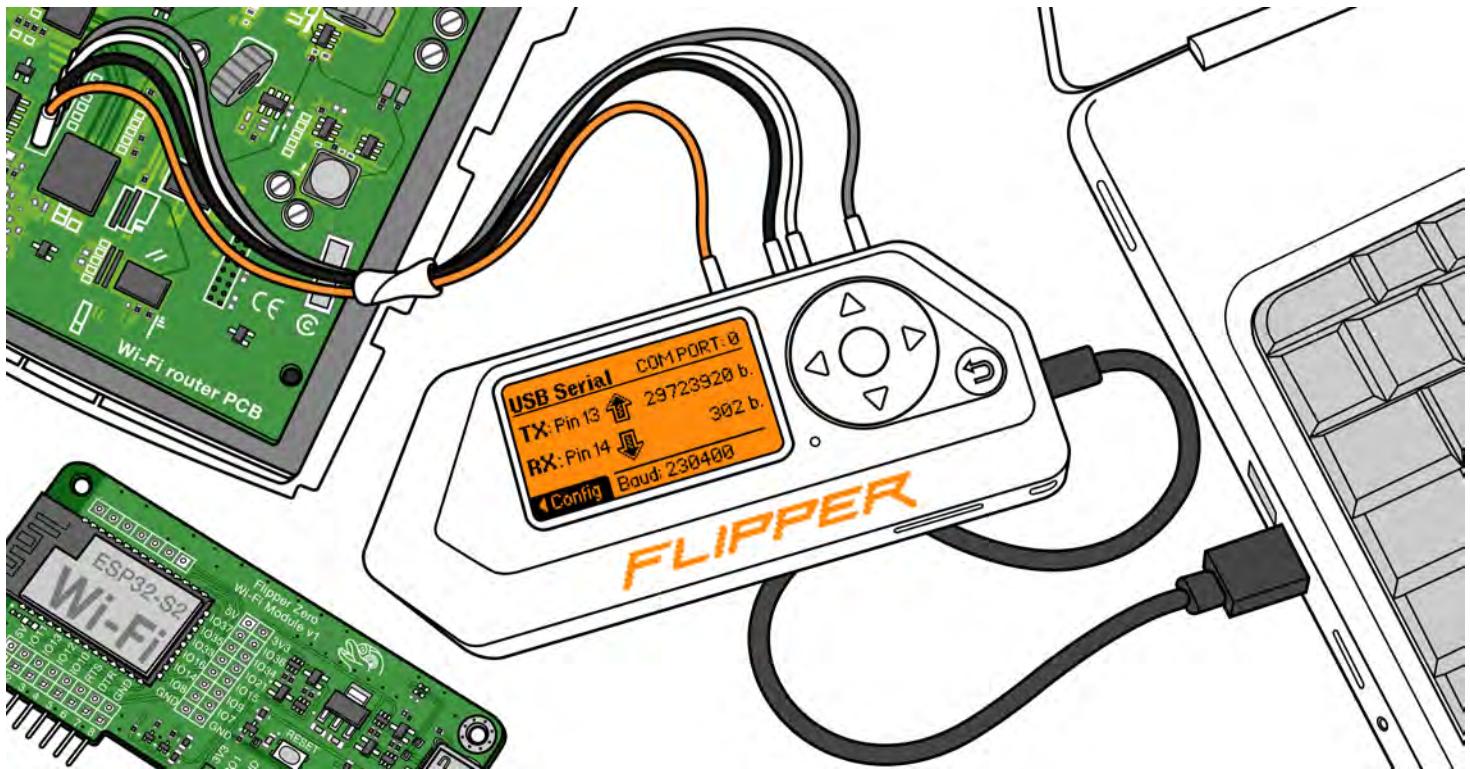
Mind that it might take up to two minutes to emulate the entire dictionary of supported IR remotes.

Sending the command using protocols from the dictionary

## If command execution failed

- The protocol of your original remote isn't in the Flipper Zero dictionary. -> If you have access to the original remote, try [\*\*reading\*\*](#) commands from it or [\*\*adding\*\*](#) commands to the universal remotes dictionary.

# GPIO & modules



You can use your Flipper Zero for hardware exploration, firmware flashing, debugging, and fuzzing. Flipper Zero can be connected to hardware using its built-in GPIO pins, control hardware with buttons, run your code, and show debug messages on the screen. Flipper Zero can also be used as a USB to UART/SPI/I2C converter.

## Insert a microSD card to use the GPIO app

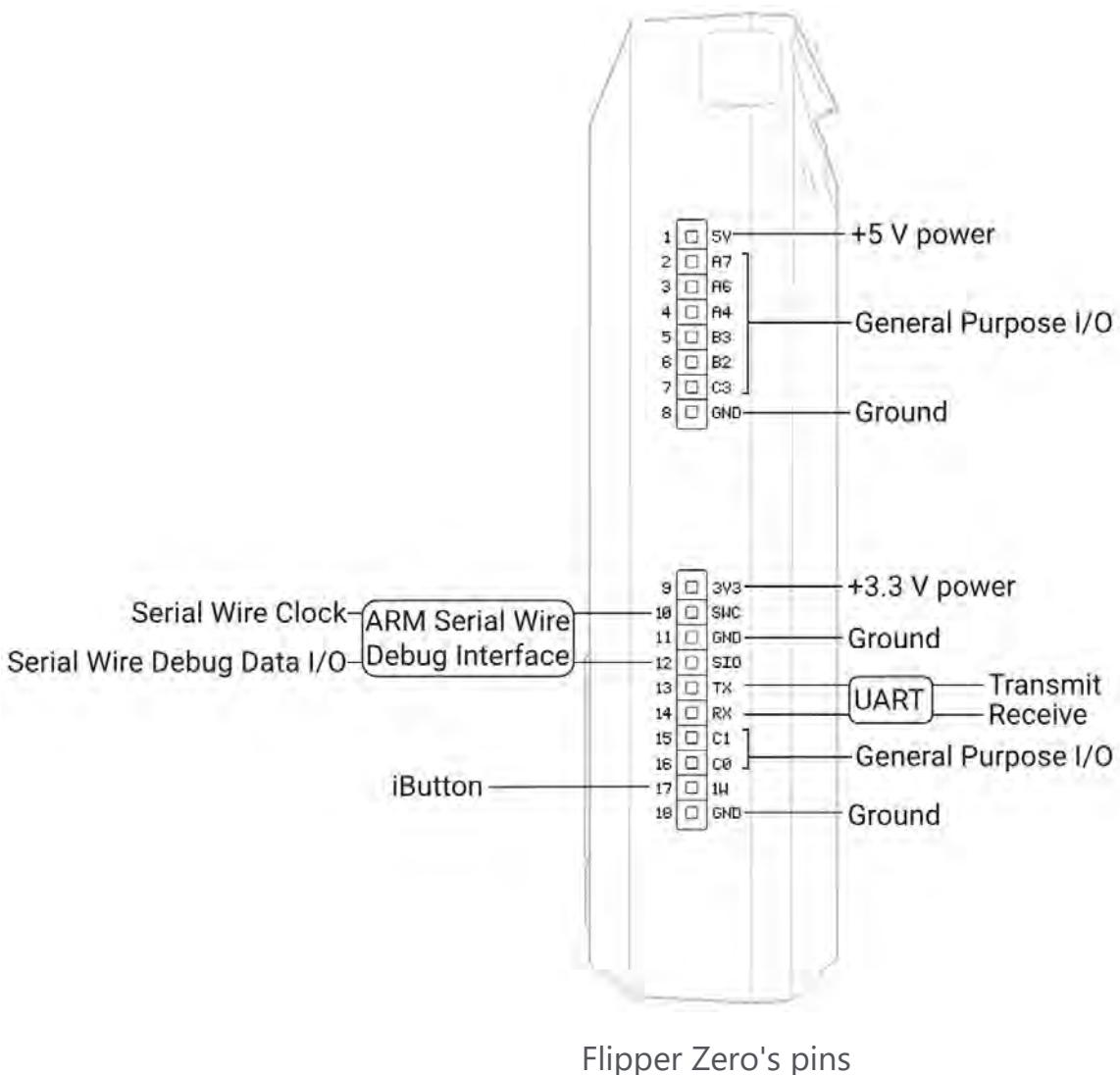
Before using the GPIO app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

This page will walk you through your Flipper Zero's GPIO pinout and provide more info about the GPIO application. You'll also learn how to install the modules correctly into GPIO pin holes.

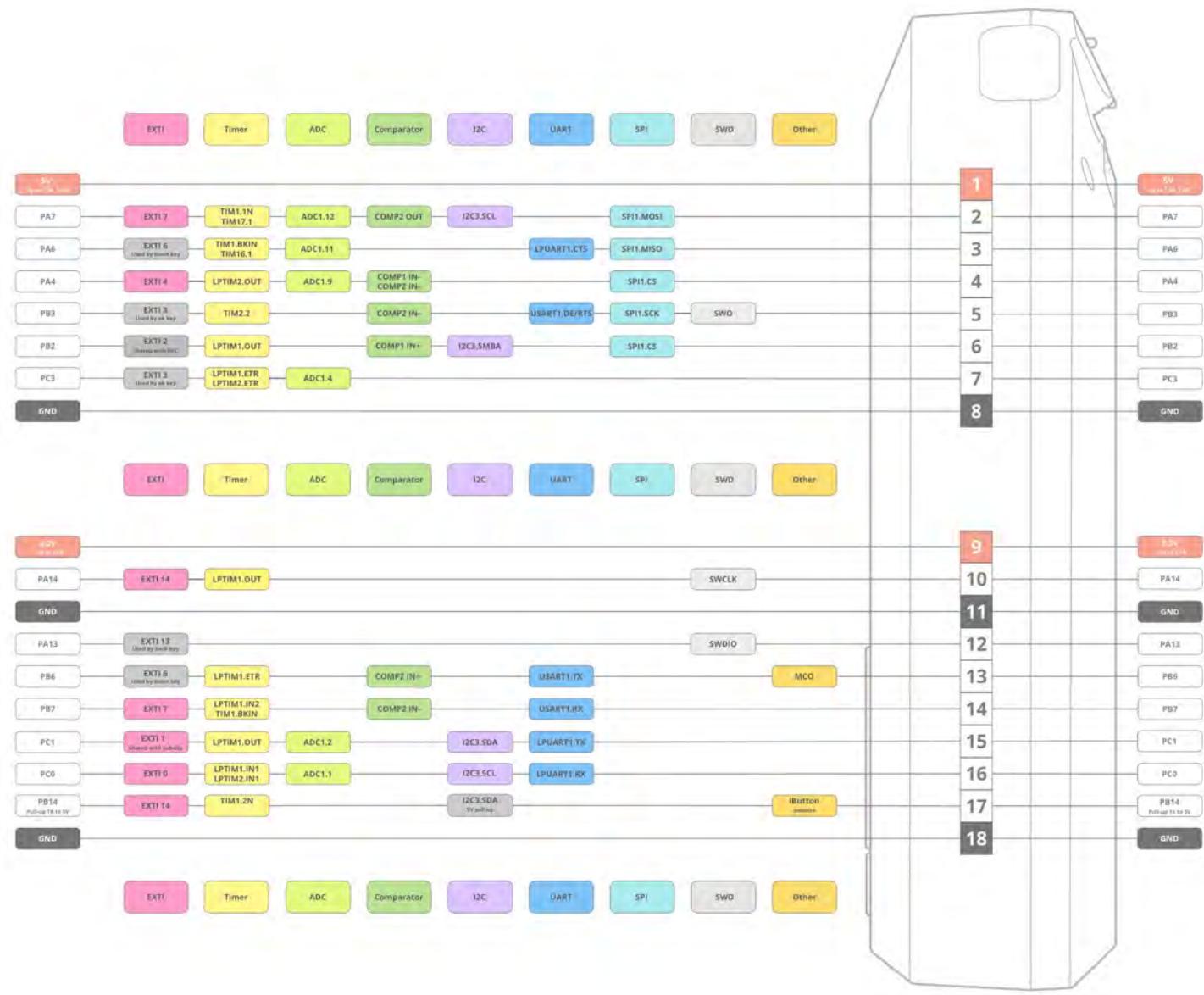
# GPIO pinout

Flipper Zero has 18 pins on the top side, consisting of power supply pins and I/O pins. **Power supply pins** can be used to power your external modules. **Input/output (I/O) pins** are +3.3 V tolerant for input and output. For more information, see [3.3 V and 5 V tolerance](#).

I/O pins connect external modules to the I/O pins of the [STM32WB55](#) microcontroller through 51 Ohm resistors. All pins are electrostatic discharge (ESD) protected. For information on the basic functionality of Flipper Zero pins, see the picture below.



Detailed information on the pinout and functionality of the pins can be found in the picture below.



Flipper Zero GPIO pinout

[Flipper Zero GPIO pinout \(12.F7B9C6\).pdf](#)



## I/O pins change their state in DFU mode

When Flipper is in DFU mode, the microcontroller I/O pins, except for pin 17, change their state according to the table below.

## > Table: Configuration in DFU mode (expandable)

### +3.3 V power (pin 9)

- The output is enabled by default.
- The maximum load is 1.2 A.
- Flipper Zero's microSD card is powered by +3.3 V. During firmware updates and microSD card mounting, the power supply to pin 9 is temporarily disabled.

Connect external modules with large capacitive load only when Flipper Zero is powered off. Otherwise, data on the microSD card can be corrupted.

### +5 V power (pin 1)

Pin 1 can be supplied with power by the built-in battery or a USB cable.

When Flipper Zero is connected to a USB cable, then the power to pin 1 is supplied directly from USB. Never exceed the maximum current of 1.2 A.

When Flipper Zero is powered by the built-in battery:

- The output is not enabled by default. To enable power supply to pin 1, do the following:
  1. In the **Main Menu**, go to **GPIO**.

2. Select **5V on GPIO** and set it to **ON**.

- The maximum load is 1.2 A.

## Input/output pins

Total power consumption from I/O pins must not exceed 5 W, otherwise, the battery might switch to the protection mode and Flipper Zero might shut down. Each pin can source up to 20 mA.

## 3.3 V and 5 V tolerance

The I/O interface of modern CMOS chips is designed to operate in a specific voltage range. In the case of Flipper Zero's STM32WB55 MCU, the I/O interface is designed to operate with a voltage of 3.3 V.

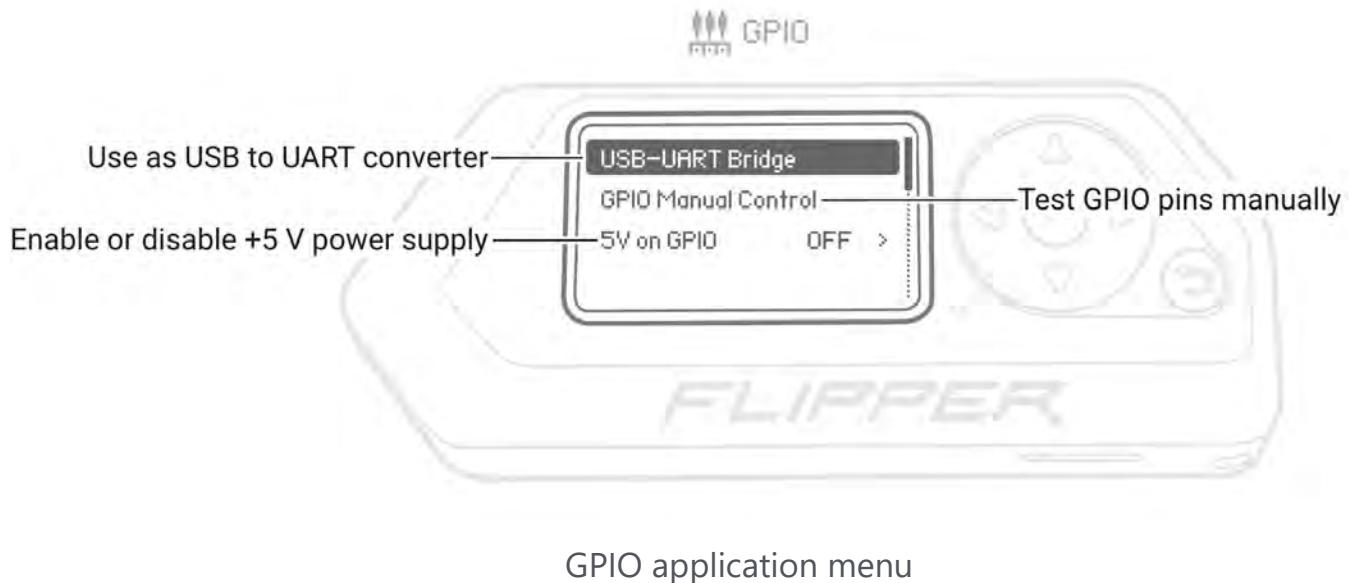
### Avoid connecting 5 V I/O peripherals to your Flipper Zero to prevent potential damage

The only exception is when a specific GPIO pin is configured for input, then it becomes 5 V tolerant. When the GPIO pin is configured for output, it is no longer 5 V tolerant.

For more information, see [AN4899 Application note](#).

## GPIO menu

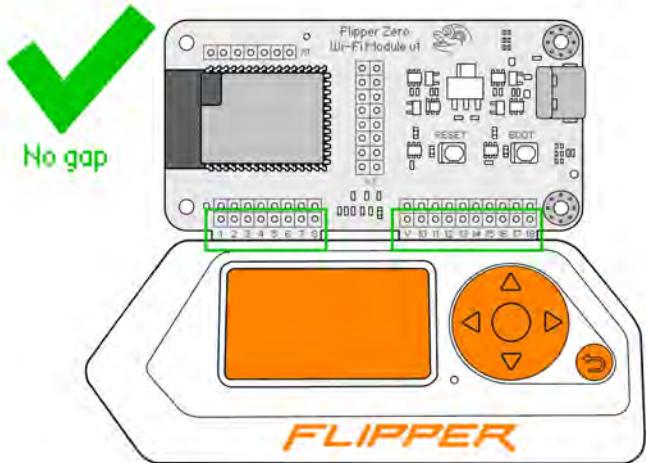
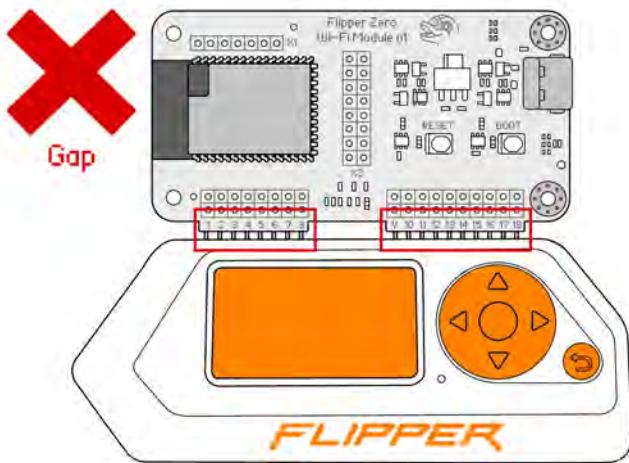
You can access the GPIO application from the Main Menu. In the application, you can configure USB-UART functionality, test pins separately, and enable/disable the +5 V power supply to pin 1.



- **USB-UART Bridge:** Flipper Zero acts as a USB to Serial UART converter.
- **GPIO Manual Control:** test output of individual or all GPIO pins by pressing . Available configuring options: PA7 (pin 2), PA6 (pin 3), PA4 (pin 4), PB3 (pin 5), PB2 (pin 6), PC3 (pin 7), PC1 (pin 15), PC0 (pin 16), and ALL.
- **5V on GPIO:** enable/disable +5 V power supply to pin 1. See [this section](#) for more information.

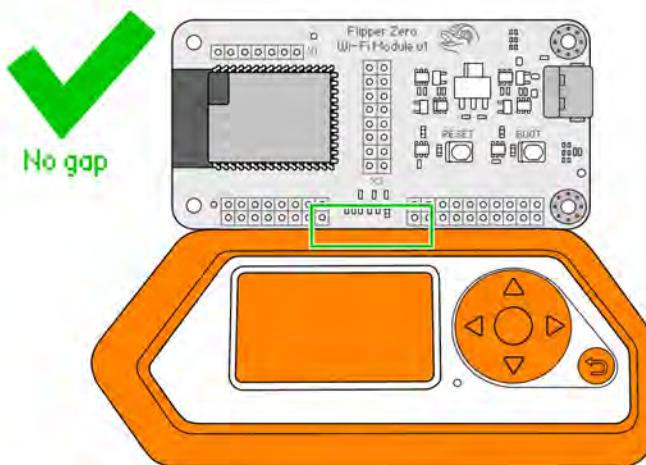
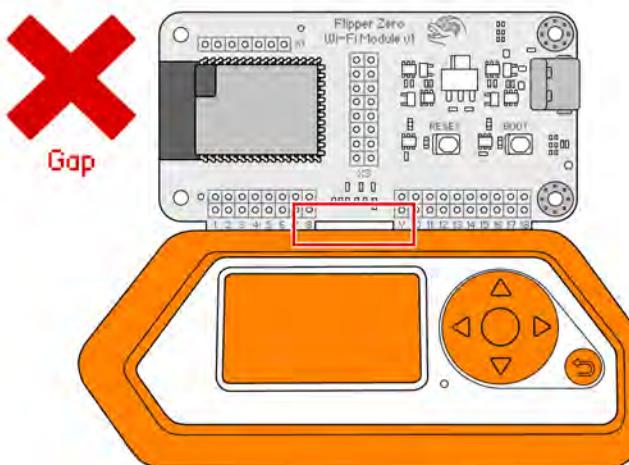
## Inserting an external module

It's important to insert the external module into your Flipper Zero's GPIO pin holes correctly. If your **Flipper Zero isn't in a silicone case**, insert the module all the way in, so there is no gap between your Flipper Zero and the module. You may need to apply more force to insert it completely.



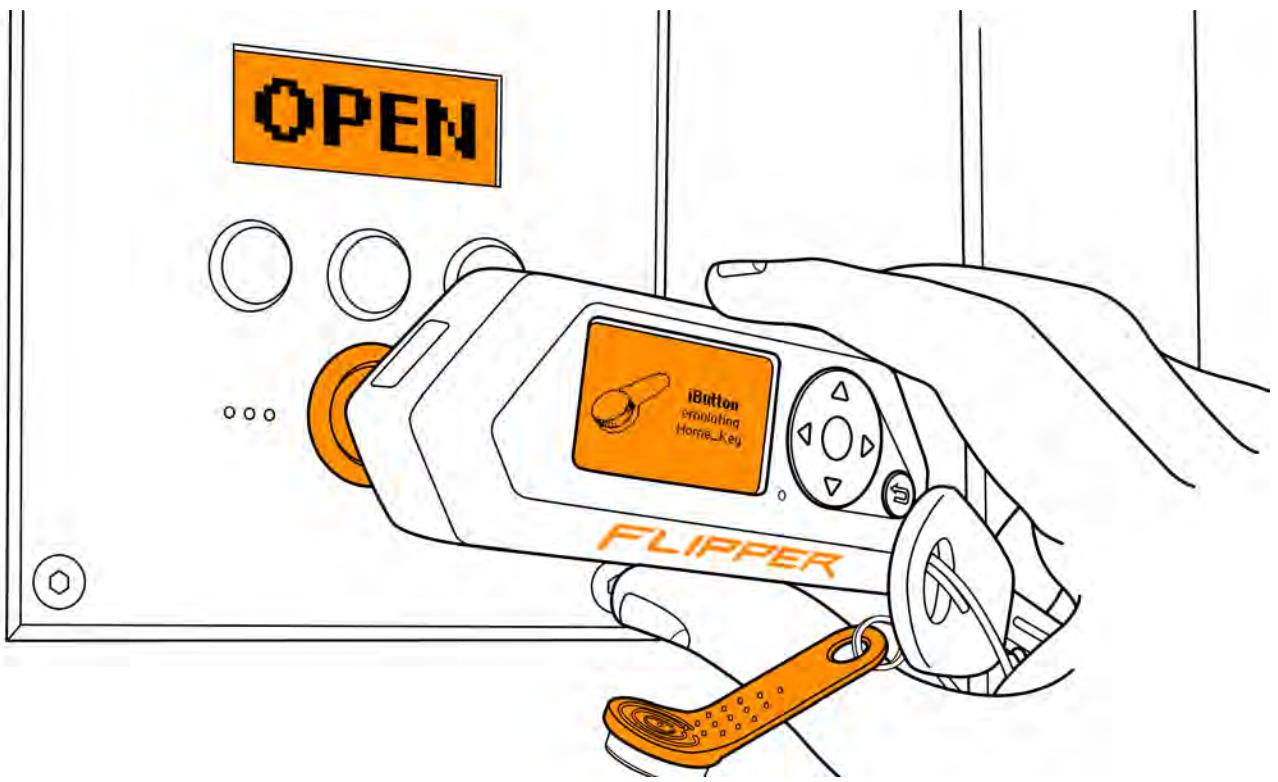
Make sure the module's GPIO pins aren't visible

If your **Flipper Zero** is in a **silicone case**, insert the module all the way in, so there is no gap in the middle between the silicone case and the module.



Make sure there is no gap in the middle

# iButton



Flipper Zero supports a 1-Wire device communication protocol, which is implemented in small electronic keys known as iButton keys. These keys are used for access control, temperature measurements, humidity measurements, storing cryptographic keys, etc.

Flipper Zero can read, write, and emulate iButton access control keys with its built-in iButton module, which supports Dallas, Cyfral, and Metakom key protocols.

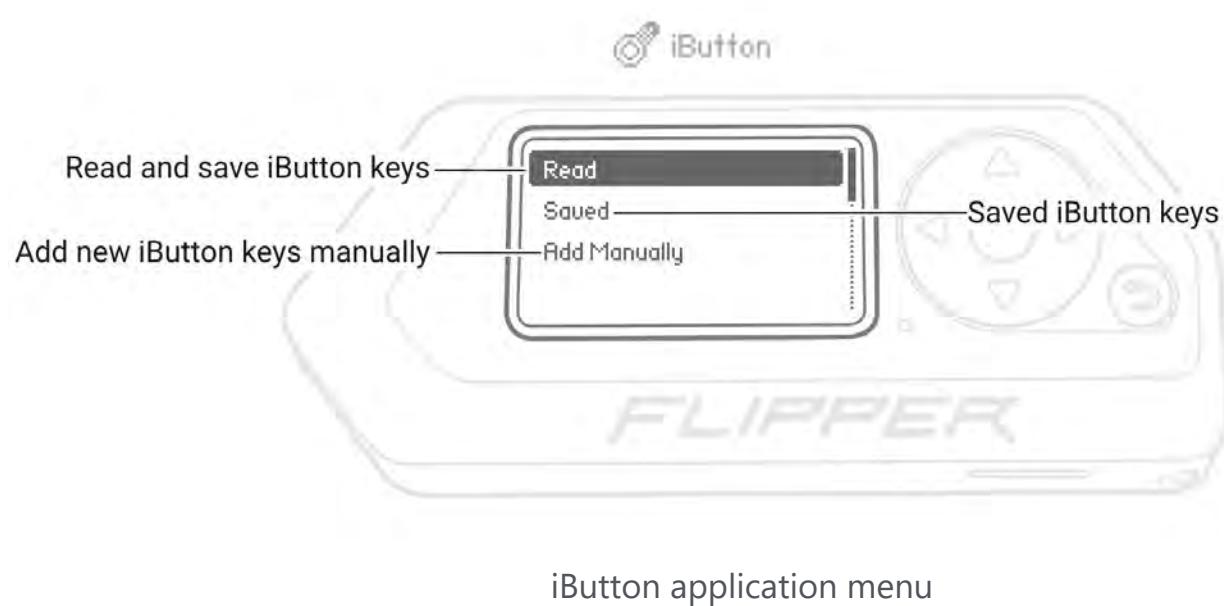
## Insert a microSD card to use the iButton app

Before using the iButton app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

On this page, you'll find an overview of the iButton application and learn more about the hardware behind the iButton module.

# iButton menu

You can access the iButton application from the Main Menu. In the application, you can read, save, edit, write, and emulate iButton keys.



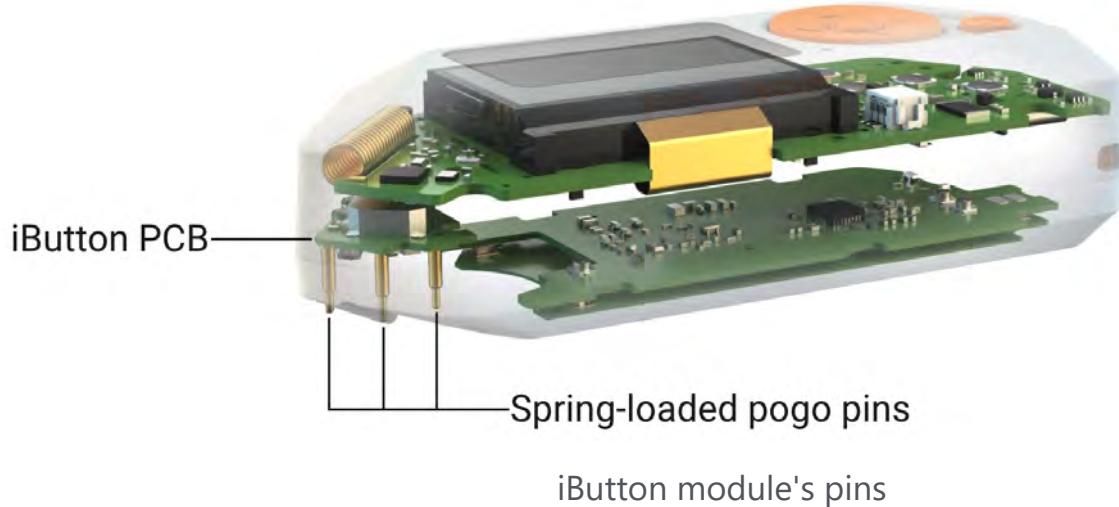
- **Read:** detects key's type, reads and saves key's unique number.
- **Saved:** emulates, edits, and writes saved keys.
- **Add manually:** generates keys with unique numbers that can be emulated.

# iButton hardware

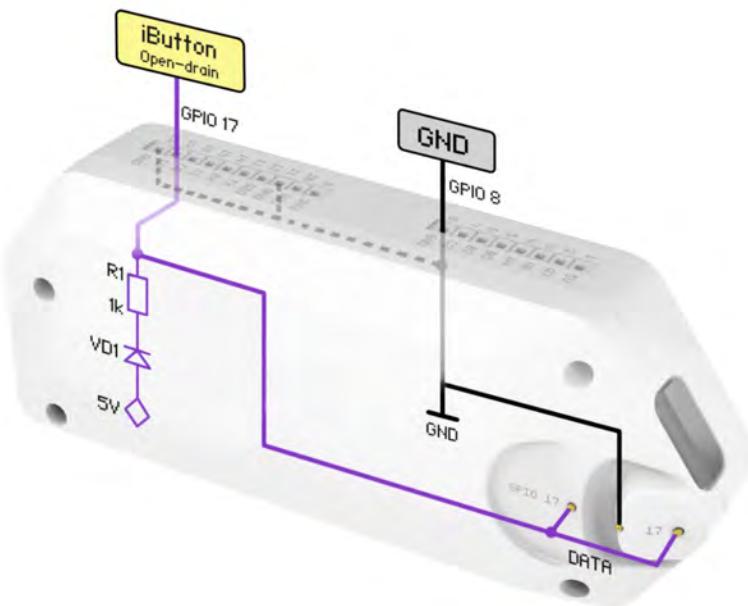
**Not all iButton devices can be detected by Flipper Zero**

Various iButton devices may have the same form factor, however, only access control keys can be detected by Flipper Zero.

Flipper Zero has a built-in iButton module consisting of an iButton pad and three [spring-loaded pogo pins](#) that are located on the iButton PCB.

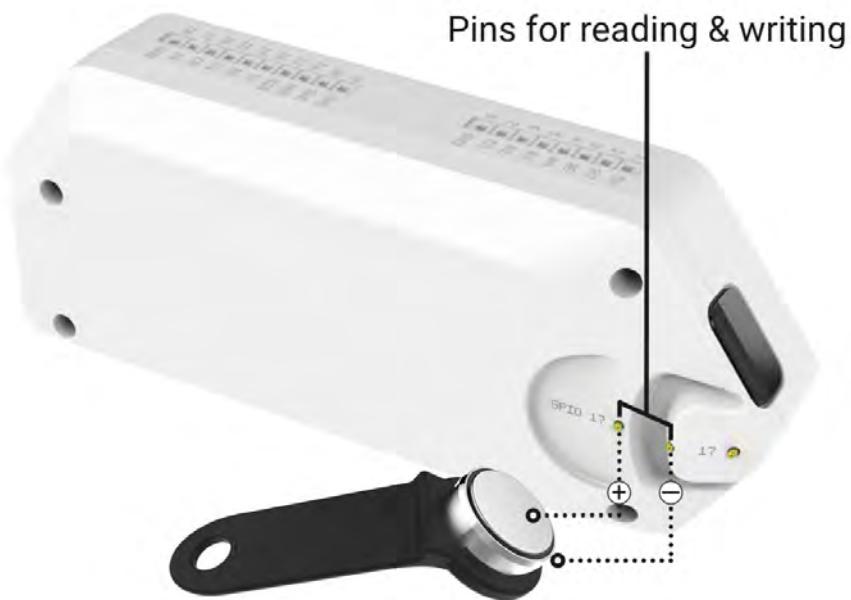


Two pins are assigned to data transfer and have output to the GPIO pin 17. The remaining middle pin is ground.



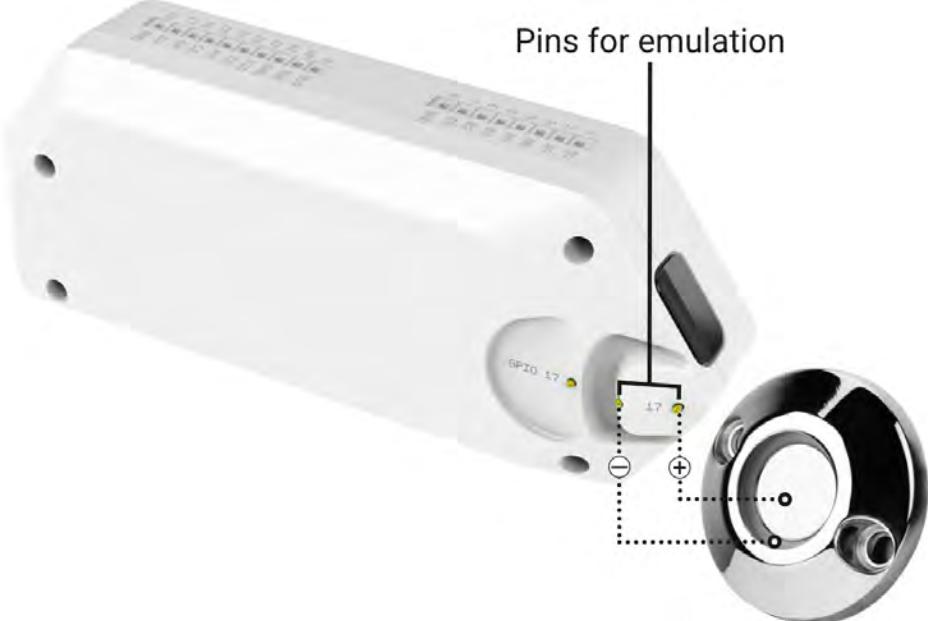
iButton data pins have output to the GPIO pin 17

The flat part of the pad allows connecting an iButton key (Slave) with Flipper Zero (Master). The left data pin and the middle ground pin are used for reading and writing iButton keys.



Pins used for reading and writing

The protruding part of the pad allows connecting Flipper Zero (Slave) with an iButton reader (Master). The right data pin and the middle ground pin are used for emulation of iButton keys.



Pins used for emulation

# Bad USB



Flipper Zero can act as a **BadUSB device**, recognized by computers as a **Human Interface Device** (HID), such as a keyboard. A BadUSB device can change system settings, open backdoors, retrieve data, initiate reverse shells, or do anything that can be achieved with physical access. It is done by executing a set of commands written in the Rubber Ducky Scripting Language, also known as DuckyScript. This set of commands is also called a payload.

## Insert a microSD card to use the Bad USB app

Before using the Bad USB app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update page](#).

On this page, you'll learn about how BadUSB devices work and how to use your Flipper Zero as one.

# Flipper Zero scripting language

Before using your Flipper Zero as a BadUSB device, you need to write a payload in the `.txt` format in any common ASCII text editor using the scripting language. Flipper Zero can execute extended Rubber Ducky script syntax. The syntax is compatible with the classic [Rubber Ducky Scripting Language 1.0](#) but provides additional commands and features, such as the ALT+Numpad input method, SysRq command, and more.

Both `\n` and `\r\n` line endings are supported. Empty lines are allowed, as well as spaces or tabs for line indentation. The Bad USB application can execute only scripts in the `.txt` format. No compilation is required.

Below you can find the commands Flipper Zero can execute in addition to the Rubber Ducky Scripting Language 1.0 syntax.

## Modifier keys

Command	Notes
CTRL-ALT	CTRL+ALT
CTRL-SHIFT	CTRL+SHIFT
ALT-SHIFT	ALT+SHIFT
ALT-GUI	ALT+WIN
GUI-SHIFT	WIN+SHIFT

## ALT+Numpad input

On Windows, you can input characters by pressing the ALT key and entering its code on the Numpad.

Command	Parameters	Notes
ALTCHAR	Character code	Print single character
ALTSTRING	Text string	Print text string using ALT+Numpad method
ALTCODE	Text string	Same as ALTSTRING, presented in some Ducky Script implementations

## Magic SysRq key

On Linux, you can execute commands using the [Magic SysRq Key](#).

Command	Parameters
SYSRQ	Single character

# Uploading new payloads to your Flipper Zero

Once the payload is created, you can upload it to your Flipper Zero via [qFlipper](#) or [Flipper Mobile App](#) to the `SD Card/badusb/` folder. The new payloads will be available in the Bad USB application.

When uploading, files with the same names will be overwritten without warning.

# Using your Flipper Zero as a BadUSB device

To use your Flipper Zero as a BadUSB device, do the following:

- 1 If the qFlipper application is running on your computer, close the application.
- 2 On your Flipper Zero, go to **Main Menu -> Bad USB**.
- 3 Select the payload and press the **OK** button.
- 4 Modify the keyboard layout by pressing the **LEFT** button, if necessary. The default configuration is the US English keyboard layout.
- 5 Connect your Flipper Zero to the computer via a USB cable.
- 6 Press **Run** to execute the payload on the computer.

Run your payloads with the help of Flipper Zero



# U2F (Universal 2nd Factor)



Flipper Zero can act as a USB **universal 2nd-factor** (U2F) authentication token or security key that can be used as the second authentication factor when signing in to web accounts. A security key is a small device that helps computers verify that it is you when signing in to an account. The use of this feature increases the security of your accounts.

## Insert a microSD card to use the U2F app

Before using the U2F app, make sure to update your Flipper Zero firmware with a microSD card inserted since Flipper Zero stores databases on a microSD card. For more information about the update process, visit the [Firmware update](#) page.

To learn more about websites that support two-factor authentication, visit the [\*\*USB-Dongle Authentication\*\*](#) website.

On this page, you'll learn how to turn your Flipper Zero into a security key and use the device as the second authentication factor.

# Setting up your Flipper Zero as a security key

## For security-sensitive websites, use certified U2F security keys

Flipper Zero U2F function is only implemented in software. For financial services and other security-sensitive websites, we recommend using hardware-backed certified U2F devices.

Before using the U2F feature, you need to register your Flipper Zero as a security key for two-factor authentication of a user on your web accounts.

To add the device as a security key to your account, do the following:

- 1 If the qFlipper application is running on your computer, close the application.
- 2 Connect your Flipper Zero to the computer via a USB cable.
- 3 On your Flipper Zero, go to **Main Menu -> U2F** and make sure that **Connected** is displayed on the screen.
- 4 In your web account, activate the two-factor authentication of a user by following the website's instructions. Websites such as [Google](#), [X](#), [Facebook](#), [GitHub](#), and others have different procedures for adding security keys.
- 5 Choose a security key as the 2nd verification step.

On your Flipper Zero, press **OK** to confirm the registration of Flipper Zero as a security key.



Register as a security key

## **Do not delete, edit, or move U2F files to another Flipper Zero**

Each Flipper Zero has a unique cryptographic key that generates unique encrypted U2F files. If you reinsert your microSD card with U2F files into another Flipper Zero, you'll not be able to sign in to your web accounts with the new device.

If you delete U2F files, edit U2F files, or insert a new microSD card into your Flipper Zero, the device will generate a new set of U2F files. In this case, you'll be required to re-register Flipper Zero as a security key in all of your web accounts.

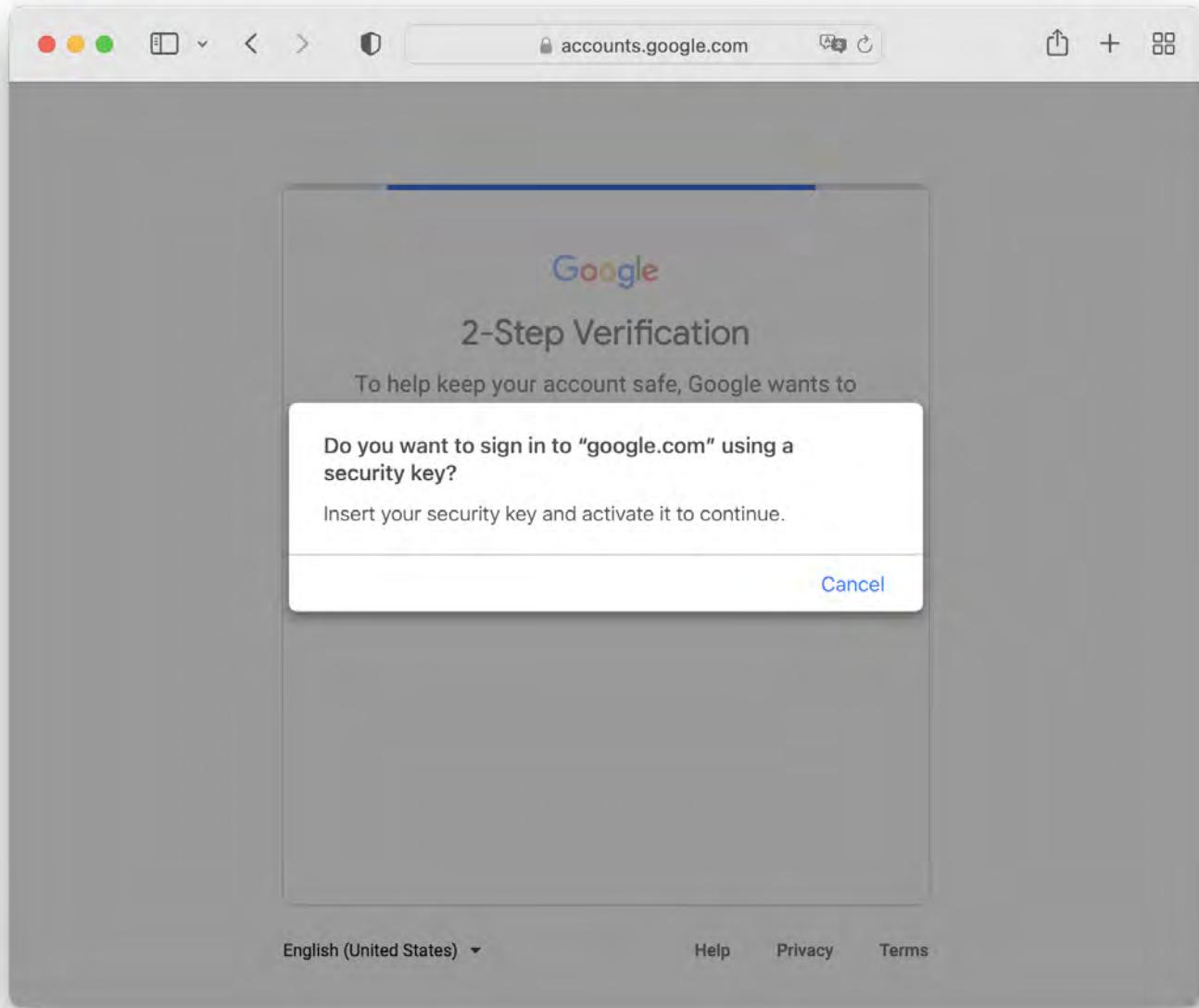
If you delete the `u2f/assets` folder or the `u2f` folder entirely, your Flipper Zero will not be able to use the U2F application, as the `assets` folder contains the cryptographic certificate that is used for registration and authentication. You can restore this folder by updating your Flipper Zero's firmware.

# Signing in with your Flipper Zero

Once you've added your Flipper Zero to your account as a security key, you can use the device as the 2nd factor.

To sign in to your account with Flipper Zero, do the following:

- 1 If the qFlipper application is running on your computer, close the application.
- 2 Connect your Flipper Zero to your computer via a USB cable.
- 3 On your Flipper Zero, go to **Main Menu -> U2F** and make sure that **Connected** is displayed on the screen.
- 4 While signing in your web account, complete the 1st verification step in your account by entering the password.
- 5 Once the request for the security key is displayed, on Flipper Zero, press  **OK** to confirm that it is you.



An example of Google's 2nd step verification message

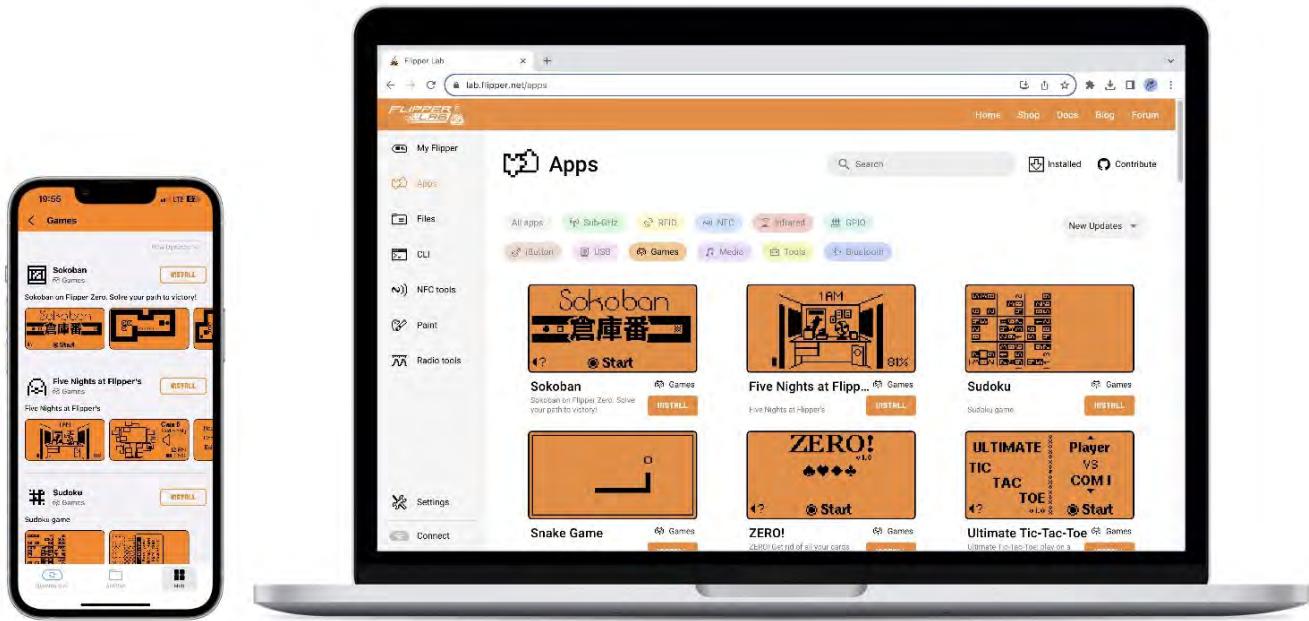
# Apps



**Apps** is a catalog that hosts tools and games developed by the Flipper Zero community. These apps expand the functionality of your Flipper Zero even further and make your interaction with the device even more enjoyable.

This page will provide an overview of the Apps catalog. You'll also learn how to install and manage apps on your Flipper Zero.

You can access Apps via the [Flipper Mobile App](#) and [Flipper Lab](#) (supported by Google Chrome, Microsoft Edge, and other Chromium-based browsers with Web Serial API support).



The Apps main page on mobile and desktop

You can explore apps in various categories to find the ones that suit your needs.



Categories available in Apps

Some apps require hardware modules to work with.

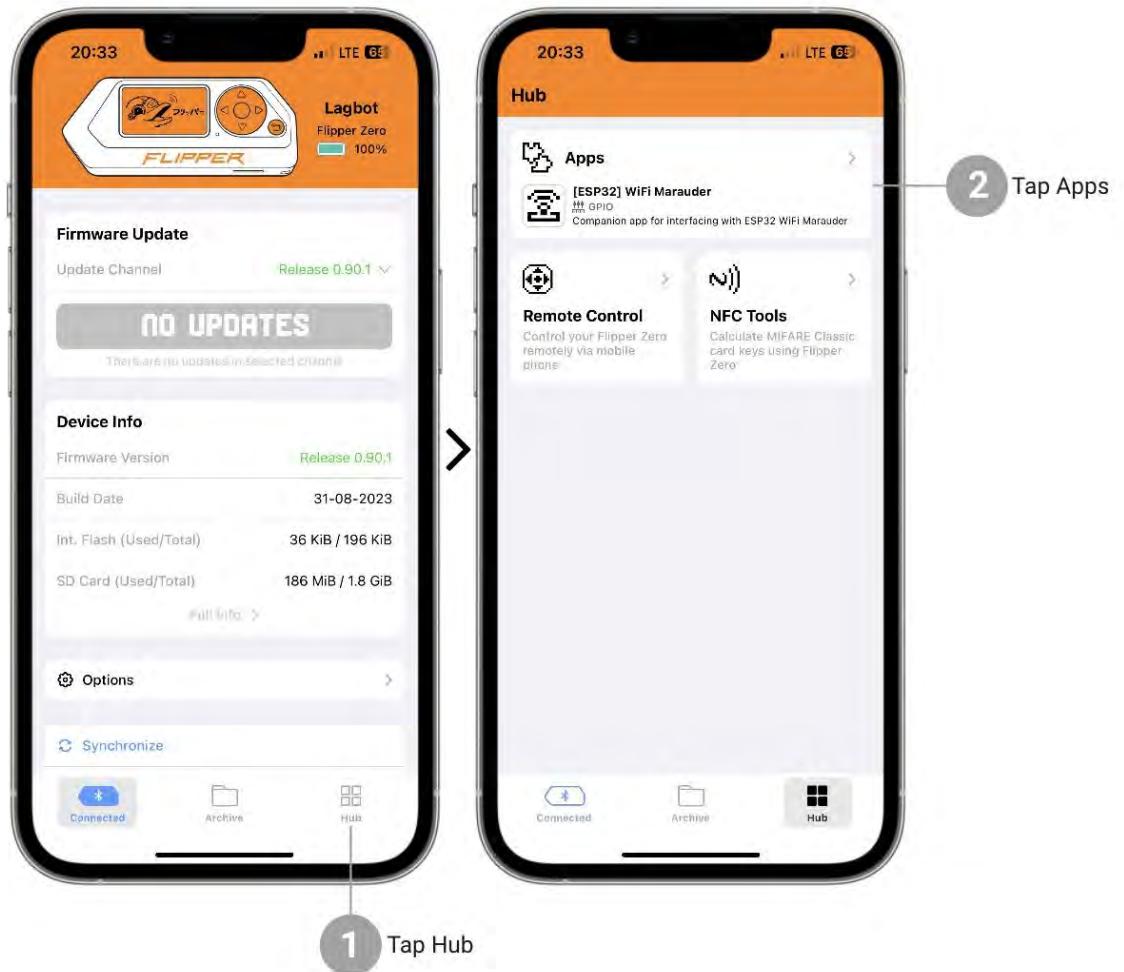
## Apps catalog

Before you can explore and install apps on your device, you need to access the Apps catalog via the Flipper Mobile App or Flipper Lab.

- 1 Download the **Flipper Mobile App** on your iOS or Android device:

- 2 **Connect your smartphone to your Flipper Zero via Bluetooth.**

- 3 Go to the **Hub** tab, then tap **Apps**.



Easily view Apps via your smartphone

# Browsing apps

For a better user experience, we recommend updating your Flipper Zero firmware from the **Release** update channel. For more information, see the [Firmware update](#) page.

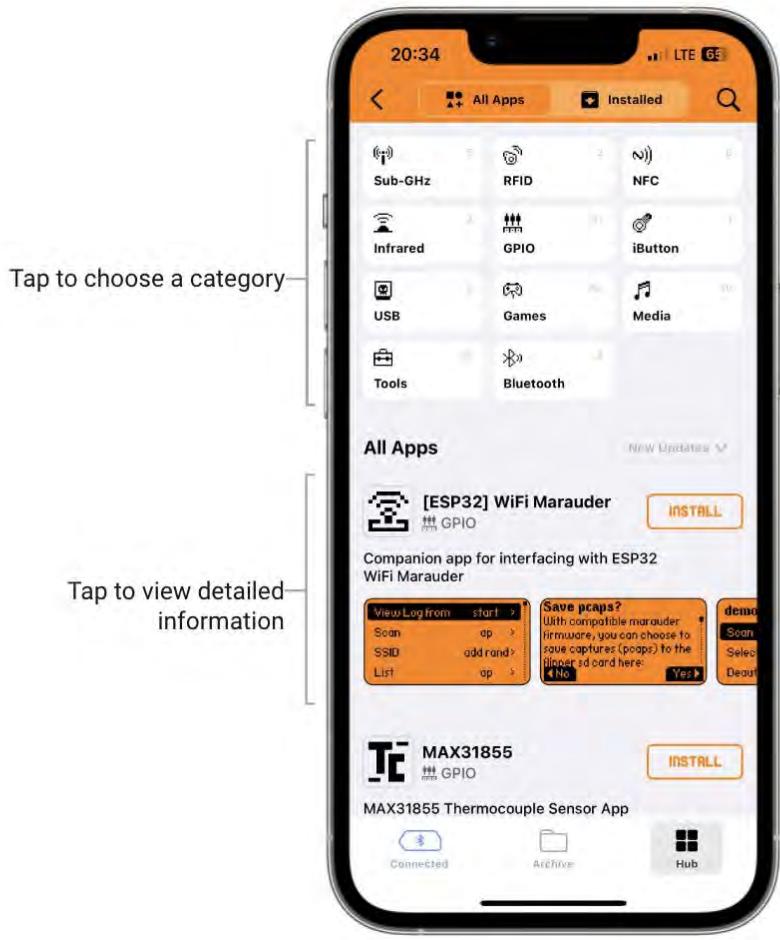
Otherwise, you may only see some of the apps in the list. Additionally, if your Flipper Zero has the firmware from the Development update channel, you'll not see any apps.

Let's take a look at the main Apps page.

 [Flipper Mobile App](#)

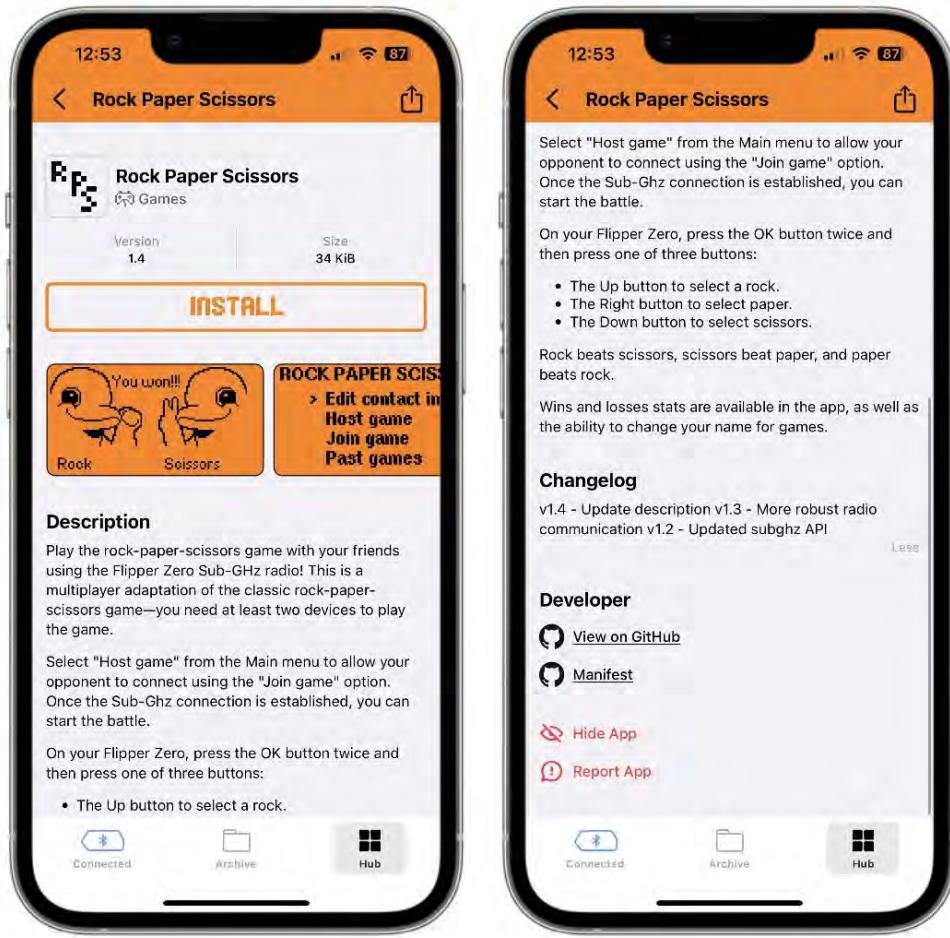
 [Flipper Lab](#)

Once you enter the Apps section, you will see a list of available apps. You can sort apps by category, filter and search for specific apps, preview them, and install them onto your Flipper Zero.



Choose among categories and access app details

After tapping the desired app, you can access additional information, including a detailed app description, its size, and release version. Additionally, you can view the changelog, access the developer's manifest and repository, and report any bugs or inappropriate content you may encounter. Please note that hiding an app is only possible on mobile devices and not available on desktops.



## Report bugs to the app's Git repository

Use the **Report App** feature to inform us about inappropriate app content. Any bugs should be reported to the developer of the app by creating an issue in the app's Git repository.

# Managing apps

In Apps, you can install apps on your Flipper Zero as well as update or delete them.

## Installing apps

- 1 On your smartphone or computer, go to **Apps**.
- 2 Find the app you need.
- 3 On the app's preview, click or tap the **Install** button.

*or*

Go to the app's page and click or tap the **Install** button.

- 4 Wait until the app uploads to your Flipper Zero.

After installing the app, you can access it on your Flipper Zero by going to **Main Menu -> Apps -> App's category**.



View installed apps on your Flipper Zero

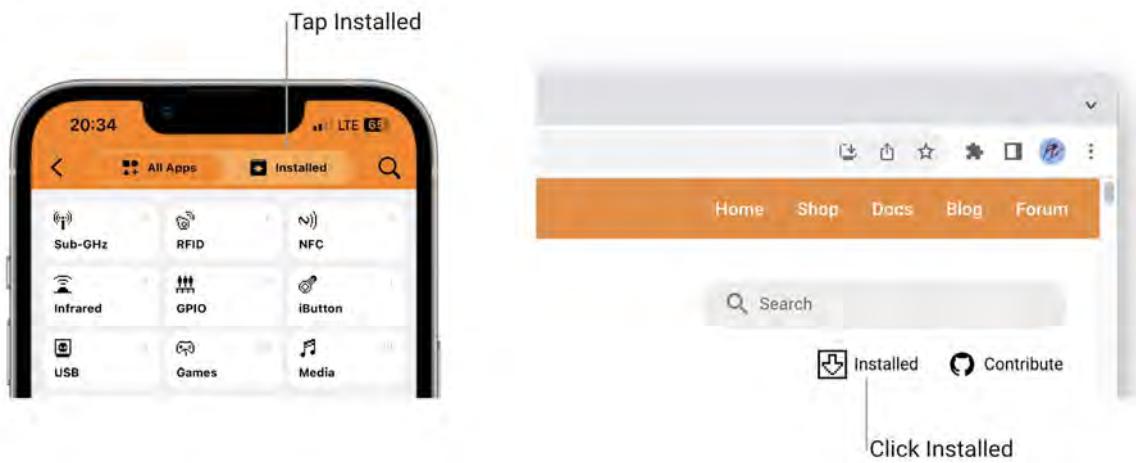
## If installation failed

- Your Flipper Zero might not be connected to your device. -> [\*\*Connect it again\*\*](#).
- There might be no free space on your microSD card. -> Go to [\*\*Archive\*\*](#) to clear space on your device.
- The firmware version of your Flipper Zero might be outdated. -> [\*\*Update\*\*](#) it to the latest version from the Release Channel.

- The app might be outdated. -> Contact the app developer via GitHub for further assistance.

## Updating apps

- 1 On your smartphone or computer, go to **Apps**.
- 2 Click or tap **Installed**.



- 3 Find the app you want to update.
- 4 Click or tap the **Update** button.

## Deleting apps

- 1 On your smartphone or computer, go to **Apps**.
- 2 Click or tap **Installed**.
- 3 Find the app you want to delete.
- 4 Click or tap the  icon.

# Submitting your app

Do you want to share your app with the Flipper Zero community and make it available from Apps? Follow the steps in the [\*\*Contribution Guide\*\*](#).

# HID controllers



The **Remote** app allows you to use your Flipper Zero as a Human Interface Device (HID) controller for interaction with your computer or phone. Your Flipper Zero can remotely control presentations, emulate a keyboard, control media players on your computer, emulate a mouse, and more.

On this page, you'll learn how to connect your Flipper Zero as a remote and see what types of remotes Flipper Zero can replace.

## Pairing Flipper Zero as a remote

You can pair your Flipper Zero with other devices via [Bluetooth Low Energy](#) (LE) or a USB-C cable.

### Via Bluetooth LE

To pair your Flipper Zero with your computer or phone via Bluetooth LE:

- 1 Activate Bluetooth on your computer or phone.
- 2 Activate Bluetooth on your Flipper Zero:
  - 1) Go to **Main Menu -> Settings -> Bluetooth**.
  - 2) Set **Bluetooth** to **ON**.
- 3 On your Flipper Zero, go to **Main Menu -> Apps -> Bluetooth -> Remote**.
- 4 On your computer, open Bluetooth settings and connect to **Control [device name]**.

*or*

On your phone, open Bluetooth settings, connect to **Control [device name]**, and tap **Pair**.

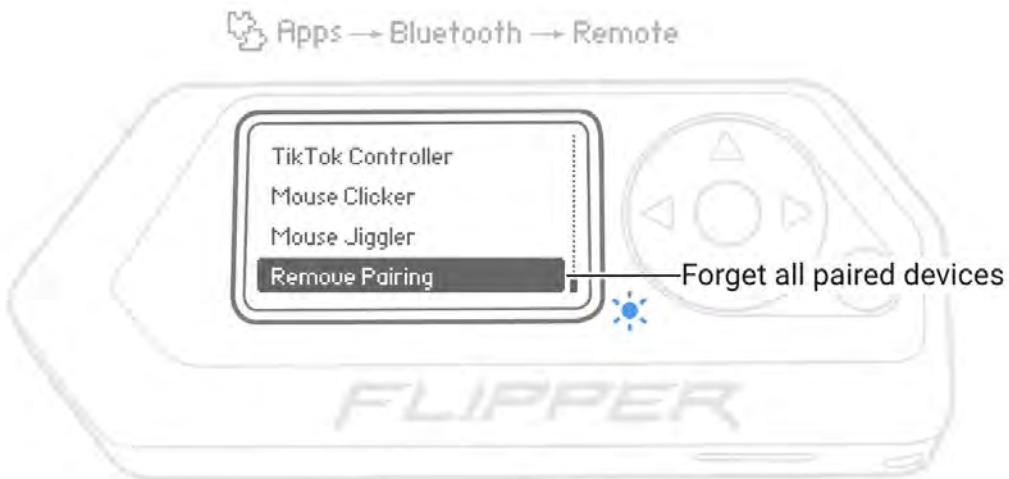
- 5 On your Flipper Zero, press  **OK** to finish pairing.

## If pairing failed

- Make sure you've turned on Bluetooth on your Flipper Zero. -> [\*\*How to turn on Bluetooth on Flipper Zero\*\*](#)
- Check the Bluetooth connection on your computer or phone.
- Reboot your Flipper Zero by pressing and holding the  **LEFT** and  **BACK** buttons for 5 seconds.
- Disconnect Flipper Zero from other devices. -> [\*\*How to forget all paired devices on Flipper Zero\*\*](#)
- Update Flipper Zero to the latest firmware version. It's important to update your Flipper Zero regularly. -> [\*\*How to update the firmware on Flipper Zero\*\*](#)

## If you want to unpair all connected devices

- Go to **Main Menu -> Apps -> Bluetooth -> Remote** and select **Remove Pairing**.



Unpair all connected devices with the press of a button

## Via a USB cable

To pair, connect your Flipper Zero to your computer via a USB cable, then go to **Main Menu -> Apps -> USB -> Remote**.

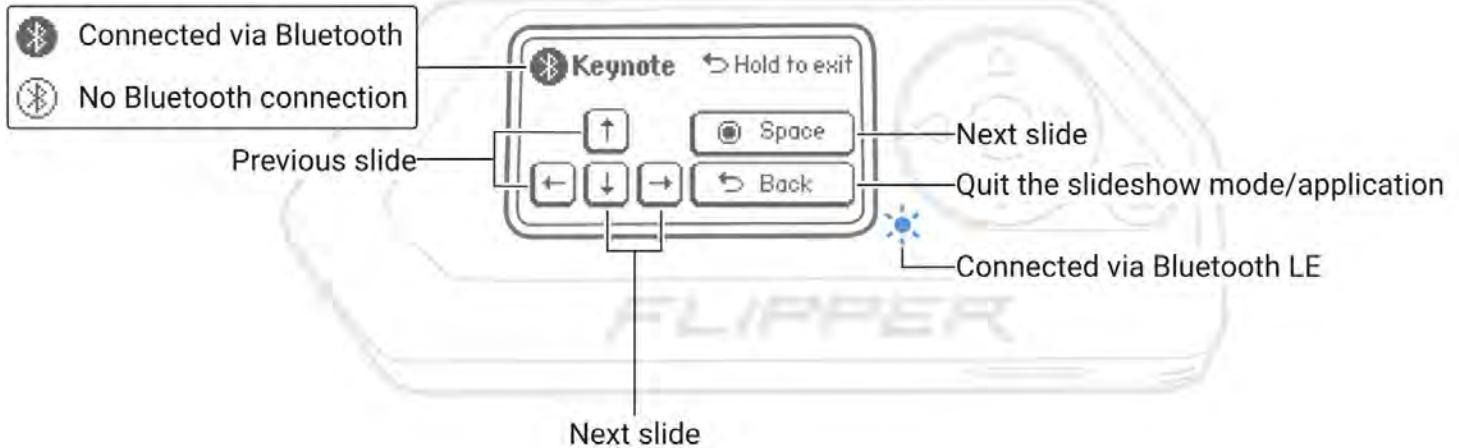
## Controlling presentations

Run the **Keynote** app on your Flipper Zero to use it as a presentation clicker to navigate through your presentations.

- Go to the next slide by pressing the **DOWN**, **RIGHT**, or **OK** button.
- Go to the previous slide by pressing the **UP** or **LEFT** button.

- Quit the slideshow mode by pressing the  BACK button.
- Quit the app by pressing and holding the  BACK button.

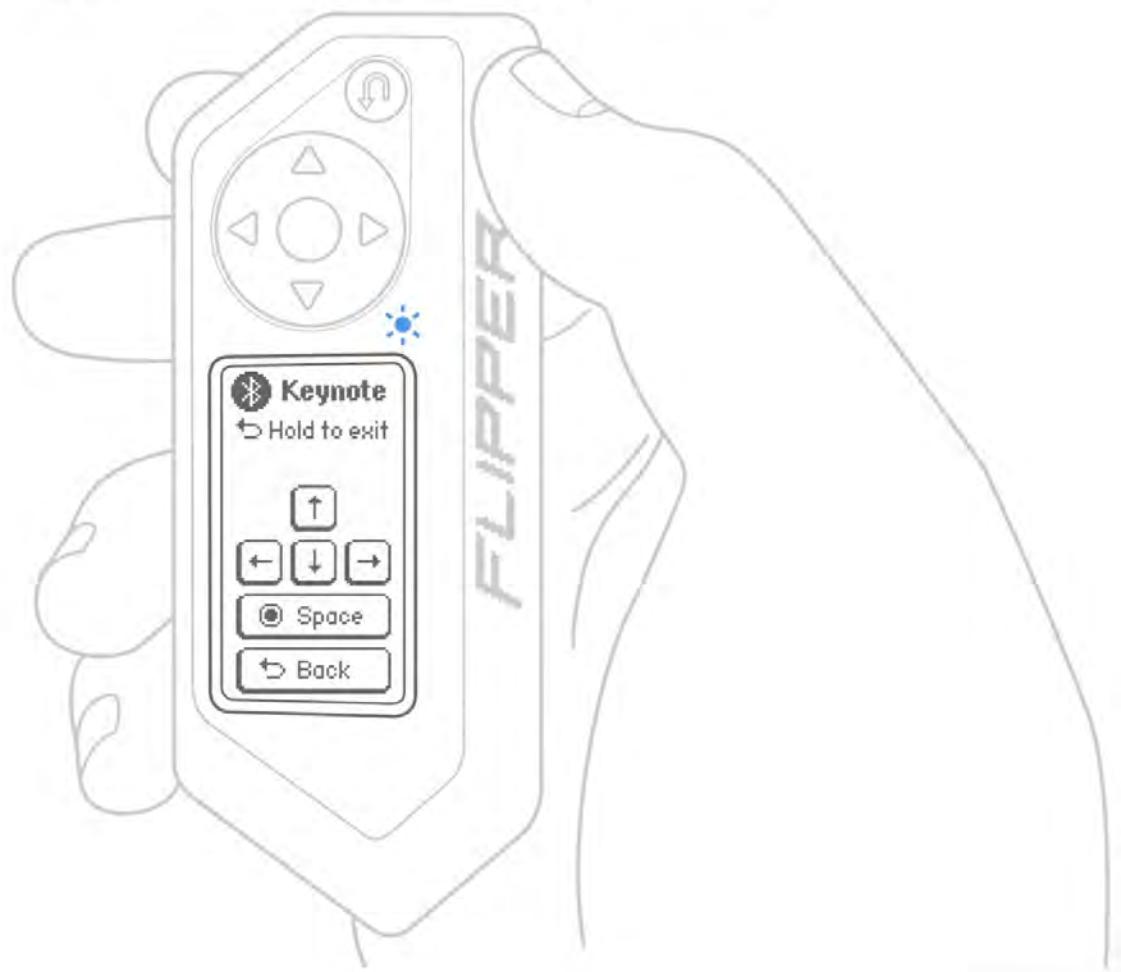
 Apps → Bluetooth → Remote → Keynote



Navigate through presentations with your Flipper Zero

Alternatively, you can run the **Keynote Vertical** app to hold your Flipper Zero vertically while navigating through your presentations.

↳ Apps → Bluetooth → Remote → Keynote Vertical

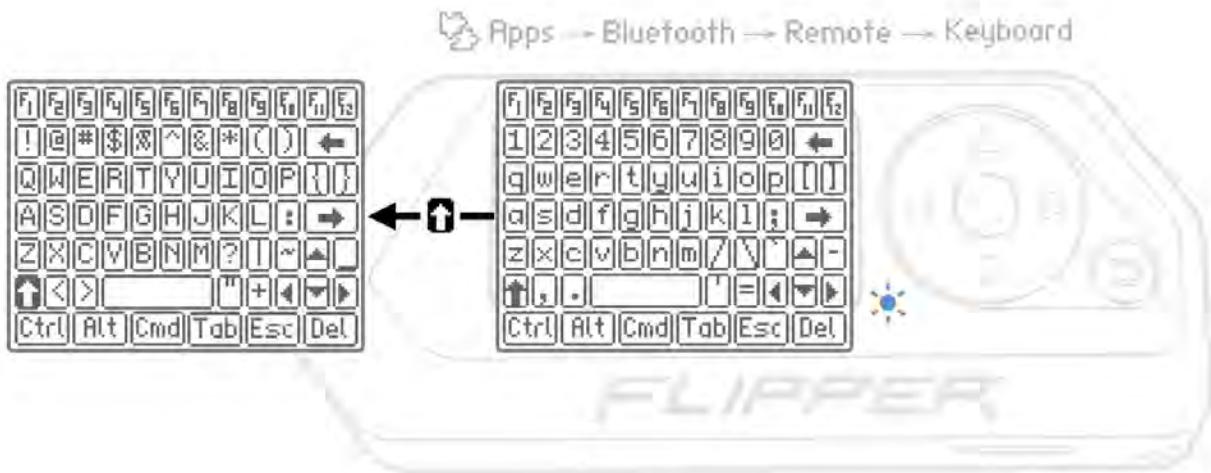


Make the use of your Flipper Zero as a presentation clicker even more convenient

## Emulating a keyboard

With the **Keyboard** app, you can emulate a keyboard and type text on your computer.

- Type a symbol with your Flipper Zero by selecting it and pressing the **OK** button.
- See additional symbols by selecting the **↑** symbol and pressing the **OK** button.
- Enter a shortcut by selecting and pressing a modifier key (Ctrl, Alt, or Cmd), then selecting and pressing the necessary key(s).
- Quit the app by pressing and holding the **BACK** button.



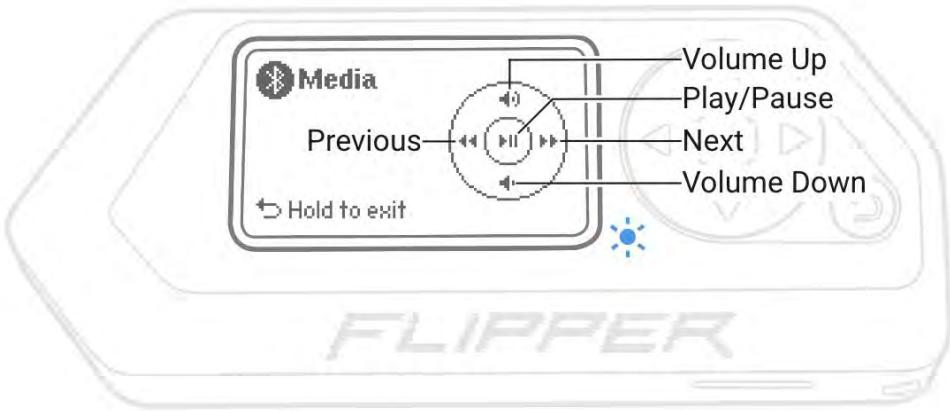
Type text on your computer with an emulated keyboard

## Controlling media players

Run the **Media** app to control media players on your computer with your Flipper Zero.

- Play or pause media files by pressing the **OK** button.
- Go to the next or previous media file by pressing the **LEFT** or **RIGHT** button respectively.
- Adjust volume with the **UP** and **DOWN** buttons.
- Quit the app by pressing and holding the **BACK** button.

\_apps → Bluetooth → Remote → Media

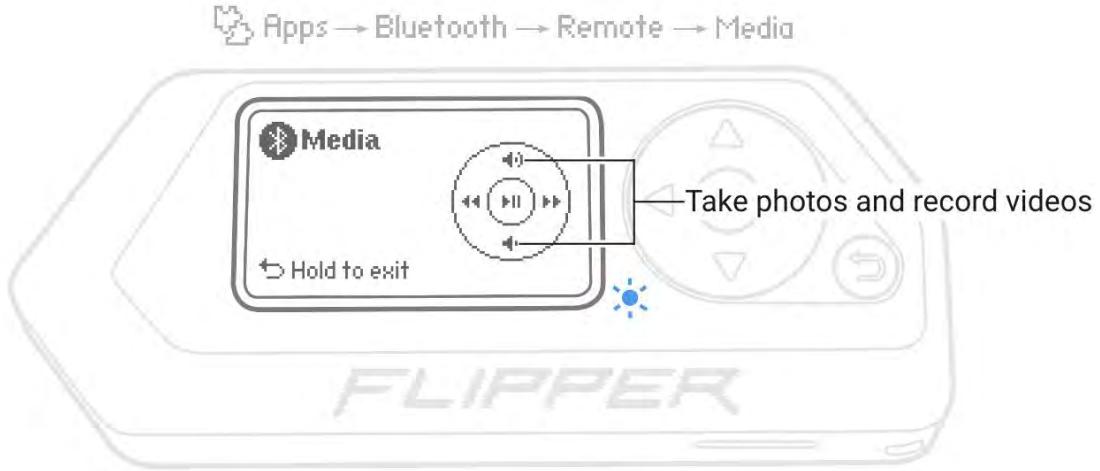


Use your Flipper Zero as a remote controller for your computer

## Taking photos and recording videos

You can also use the **Media** app to connect your Flipper Zero as a camera remote control for your phone.

- Shoot a photo or video on your phone by pressing the **UP** or **DOWN** button on your Flipper Zero.
- Stop the video recording by pressing the **UP** or **DOWN** button once again.
- Quit the app by pressing and holding the **BACK** button.

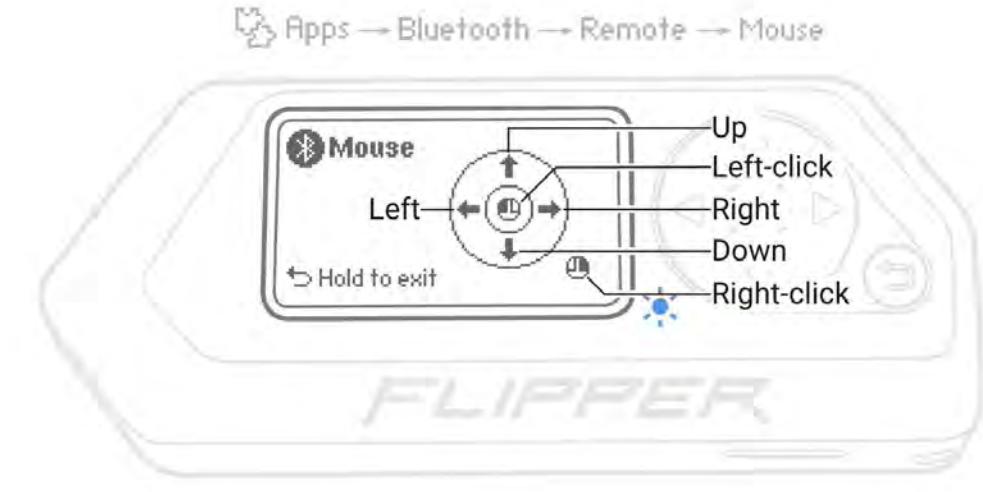


Flipper Zero allows you to remotely shoot photos and videos with your phone

## Emulating a computer mouse

Use the **Mouse** app to emulate a computer mouse.

- Move the mouse cursor on your computer screen by pressing the **UP**, **DOWN**, **LEFT**, and **RIGHT** buttons.
- Left-click by pressing the **OK** button.
- Hold down the left mouse button by pressing the **OK** button and holding it for one second.
- Right-click by pressing the **BACK** button.
- Quit the app by pressing and holding the **BACK** button.

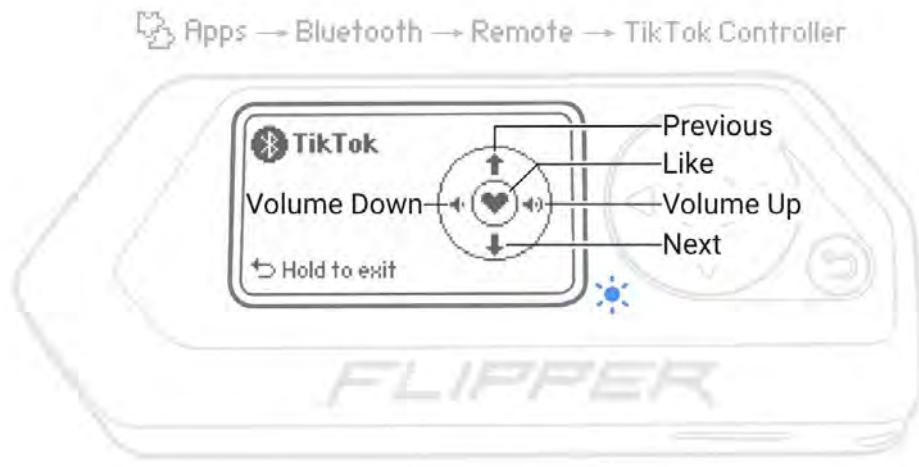


Emulate a computer mouse with your Flipper Zero

## Controlling the TikTok application

You can even use your Flipper Zero to control TikTok on your phone with the **TikTok Controller** app.

- Go to the next or previous video by pressing the **DOWN** or **UP** button respectively.
- Like videos by pressing the **OK** button.
- Adjust volume with the **LEFT** and **RIGHT** buttons.
- Quit the app by pressing and holding the **BACK** button.



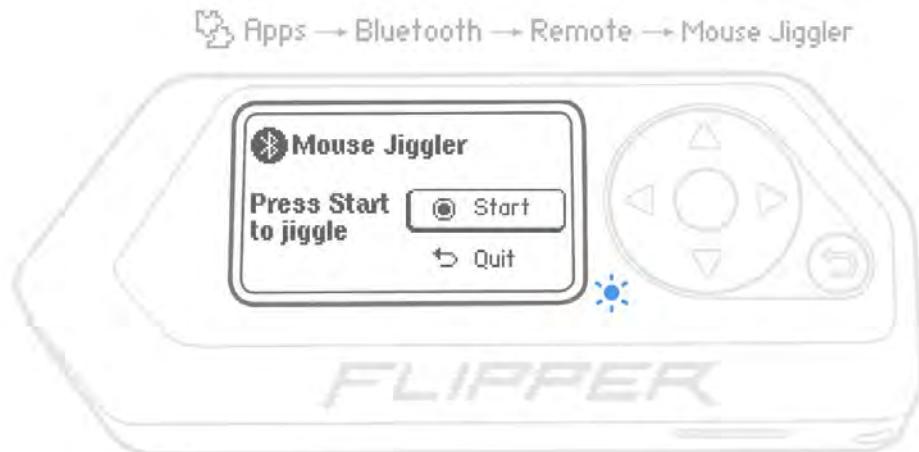
Remotely control TikTok on your phone with Flipper Zero

## Keeping your computer from sleeping

The **Mouse Jiggler** and **Mouse Clicker** apps can simulate the movement or clicking of your mouse to prevent your computer from going into sleep mode when you are away.

### Mouse Jiggler

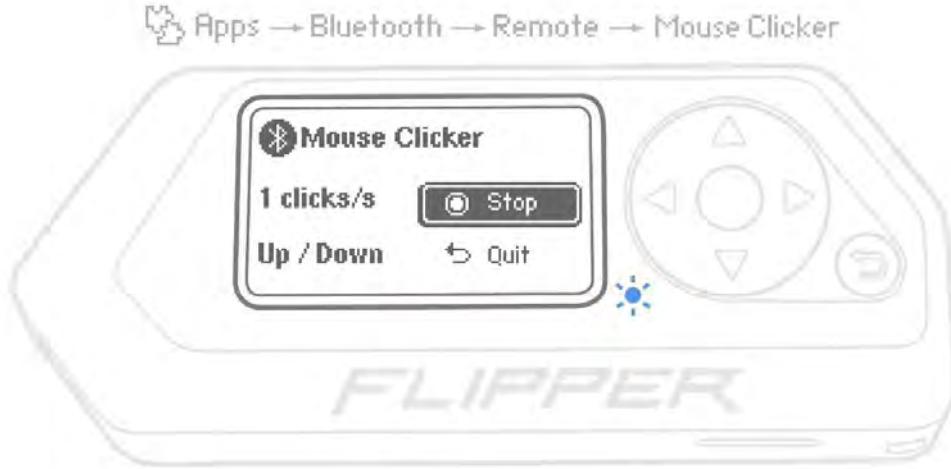
- Start or stop mouse jiggling by pressing the **OK** button.
- Quit the app by pressing the **BACK** button.



Display the Active status on your computer even when you are away

## Mouse Clicker

Mouse Clicker is another app that prevents your computer from going into sleep mode or turning off.



Mouse Clicker allows to keep your PC on

- Start or stop mouse clicking by pressing the **OK** button.
- Set the number of clicks per second by using the **UP** and **DOWN** buttons. You can set up to 60 clicks per second.
- Quit the app by holding the **BACK** button.

# Flipper Mobile App



With the **Flipper Mobile App**, you can remotely control and update your Flipper Zero, share saved keys, manage and edit data, and more. The Flipper Mobile App supplements many features, making using your Flipper Zero even more convenient.

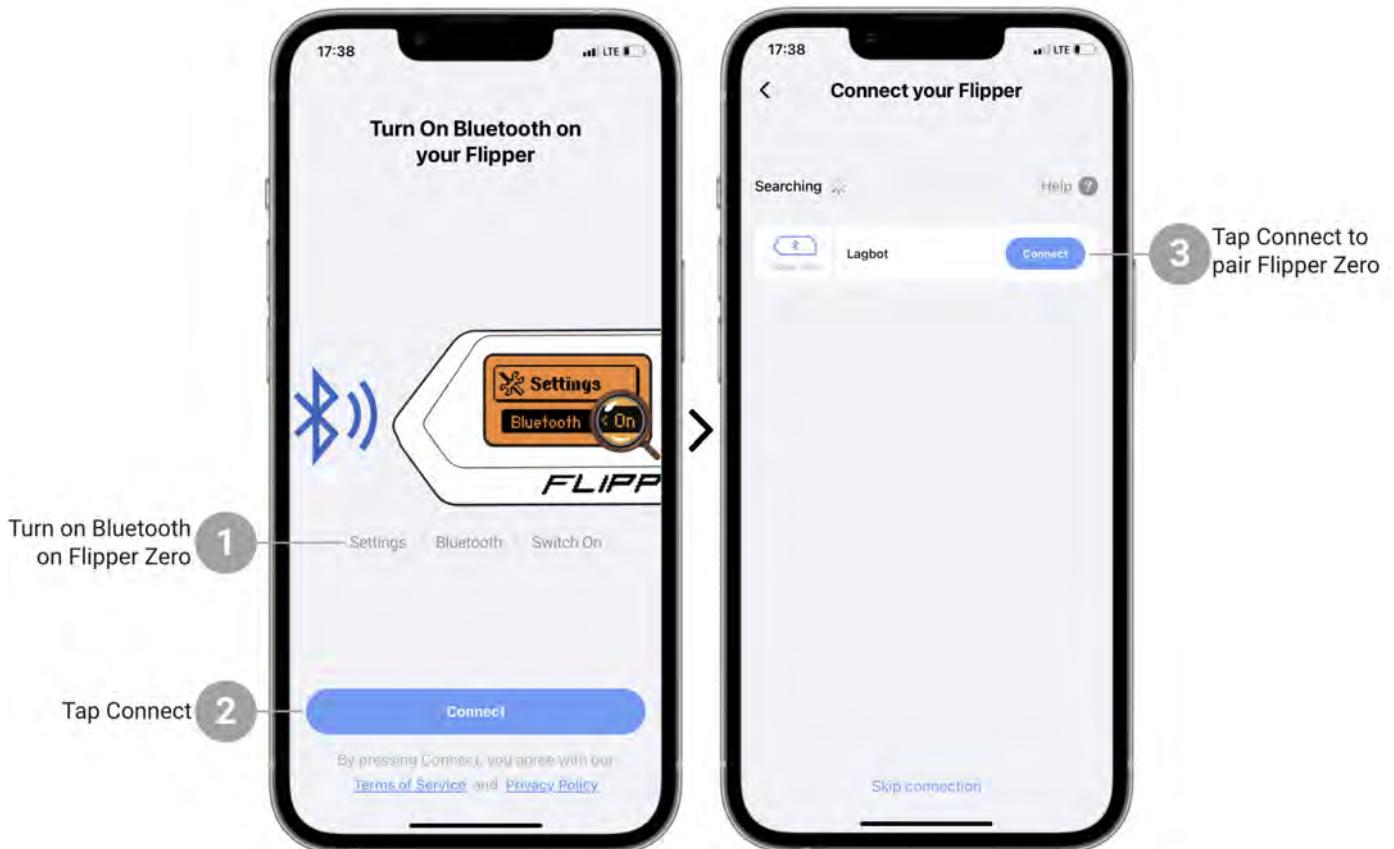
The application is available on iOS and Android:

On this page, you'll learn how to connect the mobile application to your Flipper Zero and what to do if the procedure fails. You'll also find the app overview and instructions on adding the app's widget on your smartphone's Home screen. A short guide to updating your Flipper Zero via the Flipper Mobile App can also be found in this article.

# Connecting to Flipper Zero

After you downloaded the Flipper Mobile App and activated Bluetooth on your phone, you need to connect the mobile application to your Flipper Zero:

- 1 Activate Bluetooth on your Flipper Zero by following these steps:
  - 1) Go to **Main Menu -> Settings -> Bluetooth**.
  - 2) Set **Bluetooth** to **ON**.
- 2 In the Flipper Mobile App, tap **Connect**.
- 3 On the next page, next to the detected Flipper Zero's name, tap **Connect**.



You can connect Flipper Zero to your phone via Bluetooth LE

- 4 In the Flipper Mobile App, **enter the pairing code** displayed on the Flipper Zero screen.
- 5 Tap **Pair** to finalize pairing.

- 6** Wait until the Flipper Mobile App is done synchronizing with your Flipper Zero.

## If your Flipper Zero is not detected

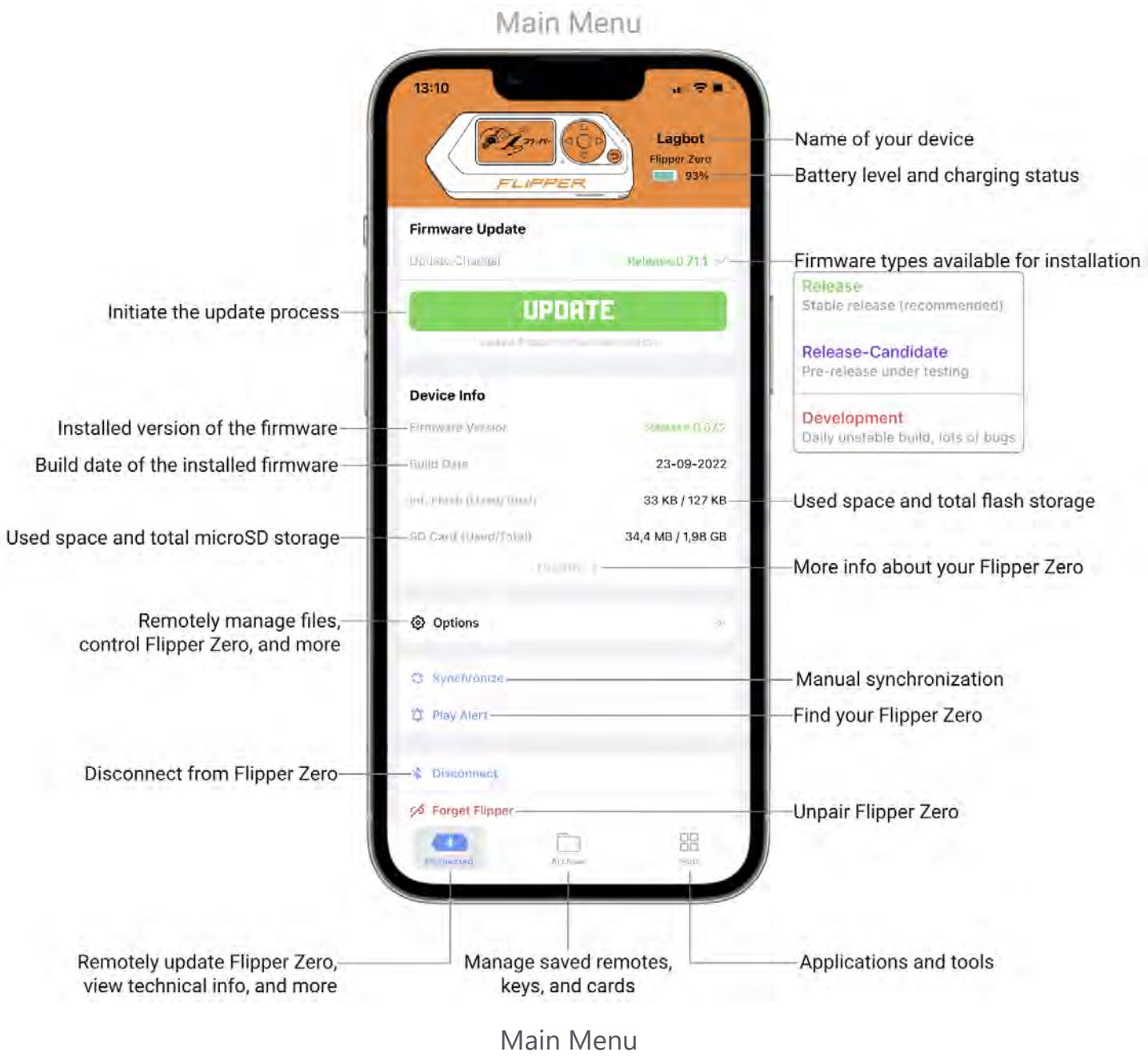
- Make sure Bluetooth is activated on your Flipper Zero. -> [\*\*How to turn on Bluetooth on Flipper Zero.\*\*](#)
- Check the Bluetooth connection on your phone.
- Disconnect Flipper Zero from other devices. -> [\*\*How to forget all paired devices on Flipper Zero.\*\*](#)
- Update Flipper Zero to the latest firmware version. It is important to update your Flipper Zero regularly. -> [\*\*How to update the firmware on Flipper Zero.\*\*](#)
- Check if the latest version of the Flipper Mobile App is installed on your phone. -> [\*\*App Store\*\*](#) or [\*\*Google Play\*\*](#).
- Reboot your Flipper Zero by pressing and holding the  LEFT and  BACK buttons for 5 seconds.

## If the Flipper Mobile App fails to synchronize with your Flipper Zero

- Unpair the devices and then pair them again. -> To unpair the devices, go to **Main Menu** -> **Settings** -> **Bluetooth** -> **Forget All Paired Devices**.
- Restart your Flipper Zero. -> Press and hold the  LEFT and  BACK buttons.
- Restart your smartphone.
- Disable Sleep mode on your Flipper Zero. -> Go to **Main Menu** -> **Settings** -> **System** and set **Sleep Method** to **Legacy**.

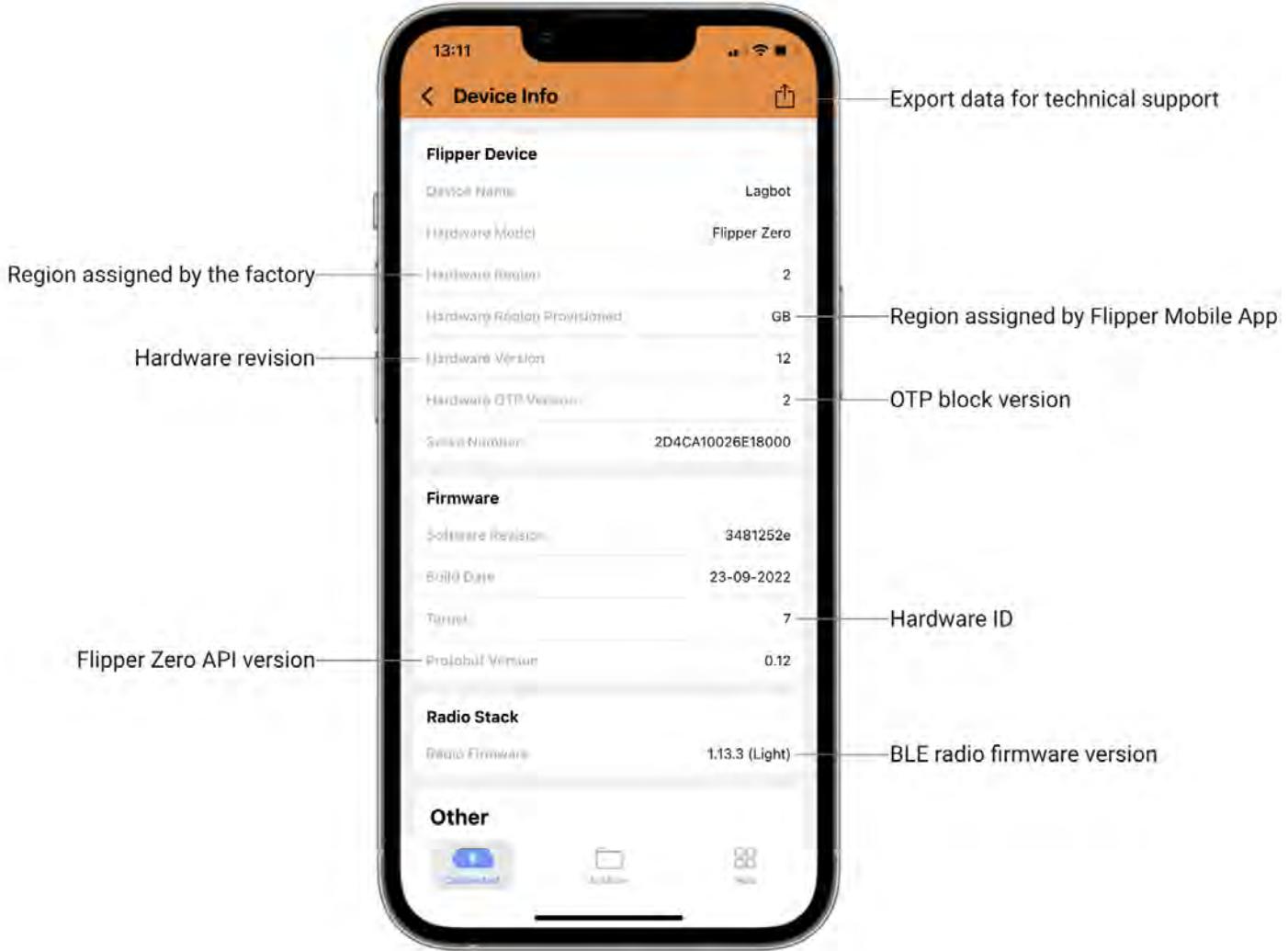
# Flipper Mobile App overview

After Flipper Zero is connected to the Flipper Mobile App, you'll see the **Main Menu** tab. In this tab, you can update your Flipper Zero via Bluetooth, see additional options, manually synchronize, play sound on your Flipper Zero, and more.



In **Full info**, you can see detailed information about Flipper Zero's hardware and firmware.

## Main Menu → Full info

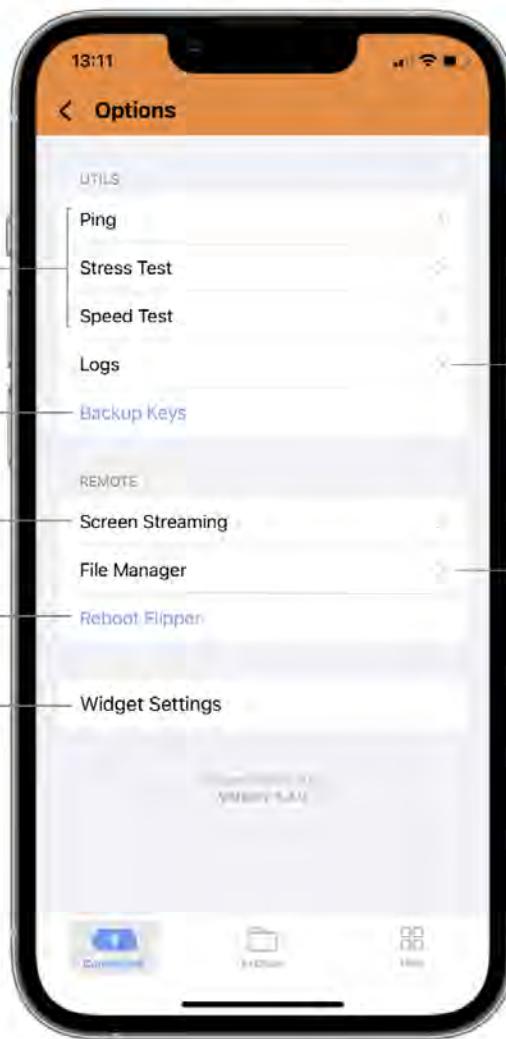


Full Flipper Zero info

In **Options**, depending on the operating system, you can find the backup function, saved logs, remote control, file manager, reboot function, and bug report function.



Main Menu → Options

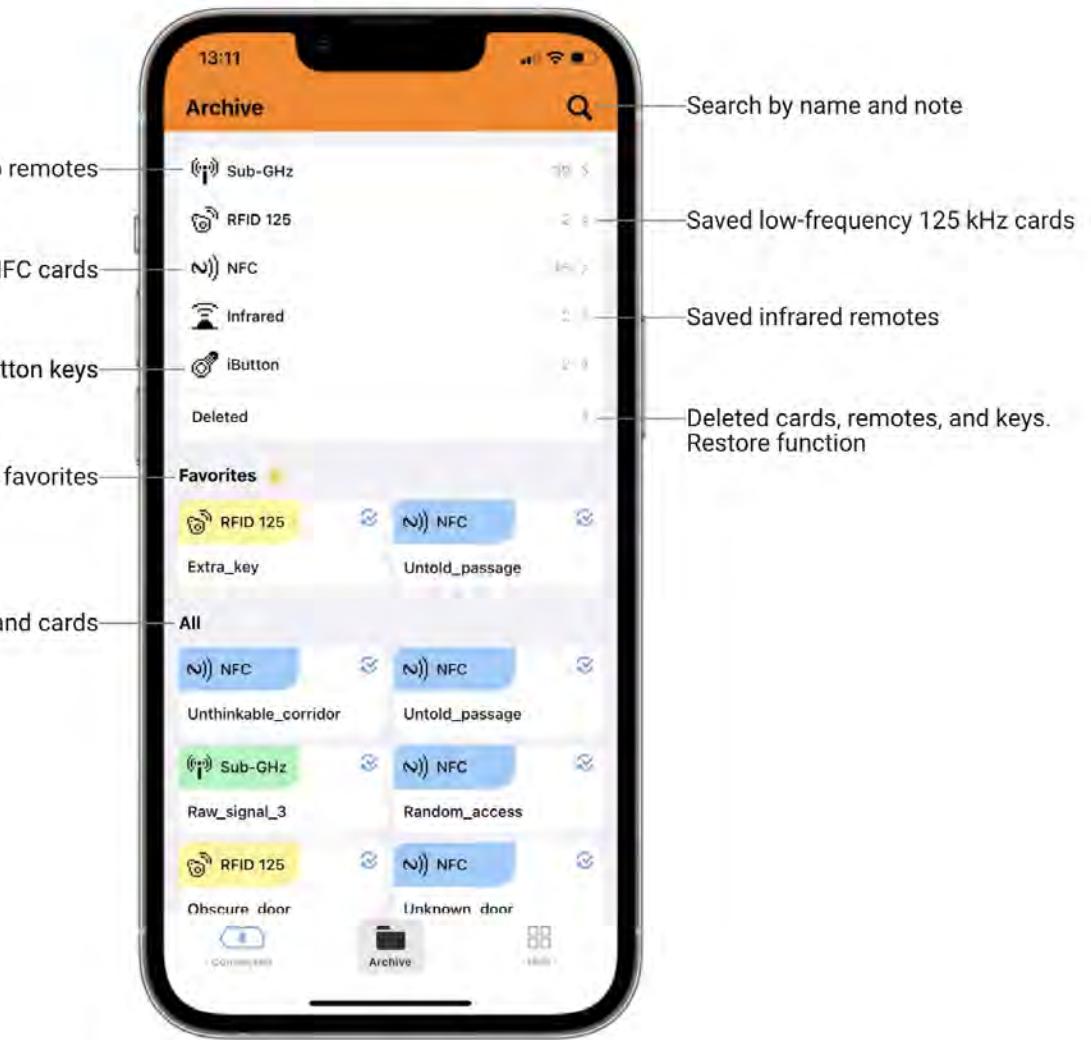


- Mobile app performance testing
  - Manually back up saved keys
  - Remotely control Flipper Zero
  - Remotely reboot Flipper Zero
  - Add widgets for remote emulation
- Saved logs
  - Backup Keys
  - Screen Streaming
  - File Manager
  - Reboot Flipper
  - Widget Settings
- Remote Emulation

Options on iOS

The **Archive** tab lists all the saved remotes, keys, and cards. In this tab, you can see favorites, search through the list, and restore deleted remotes, keys, and cards.

## Archive



Saved remotes, keys, and cards

To see detailed information, tap one item from the list. In **Key Info**, you can emulate or play back saved keys, add to favorites, rename, add notes, review technical information, delete, and share keys with others.

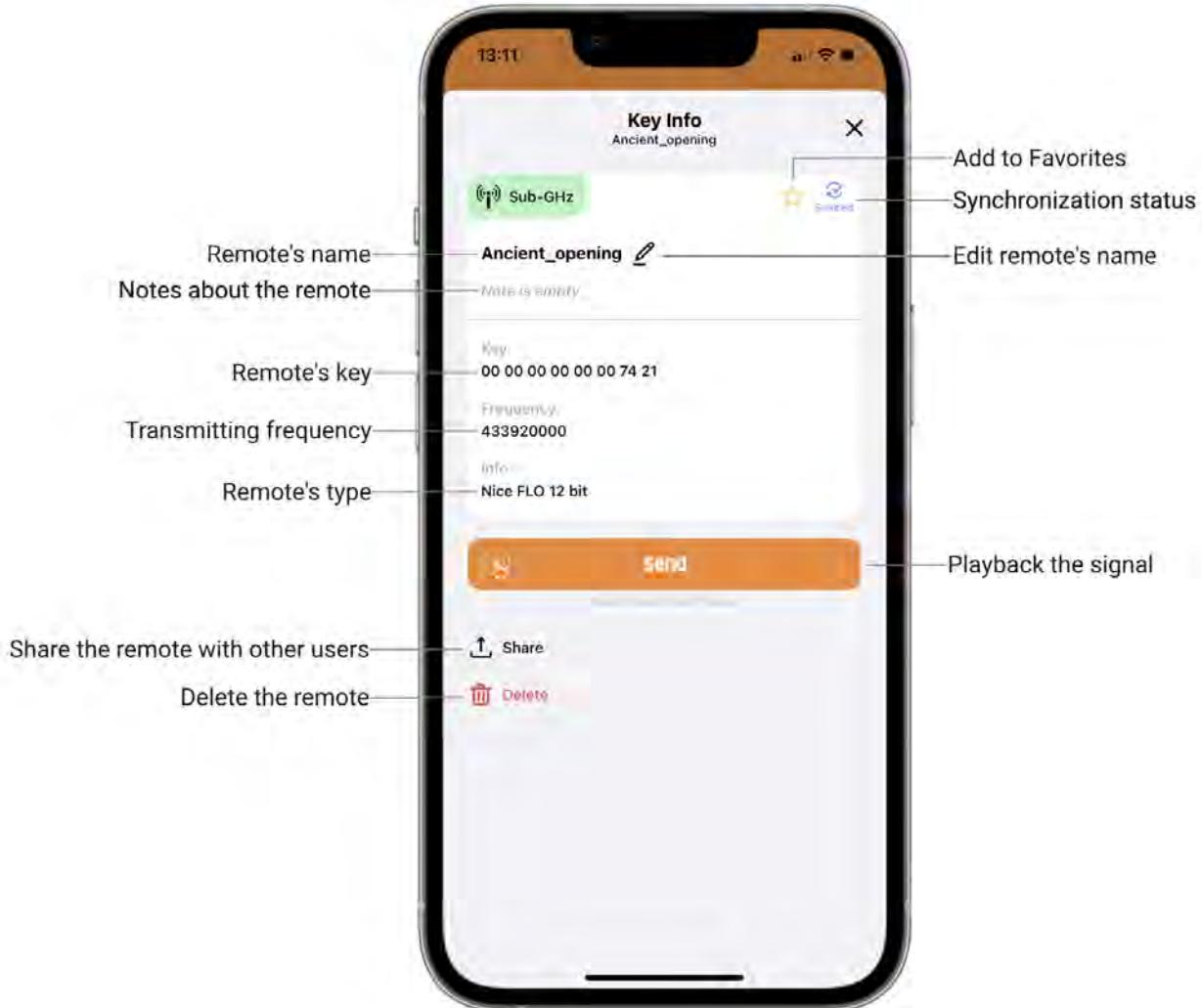
Sub-GHz

RFID 125

NFC

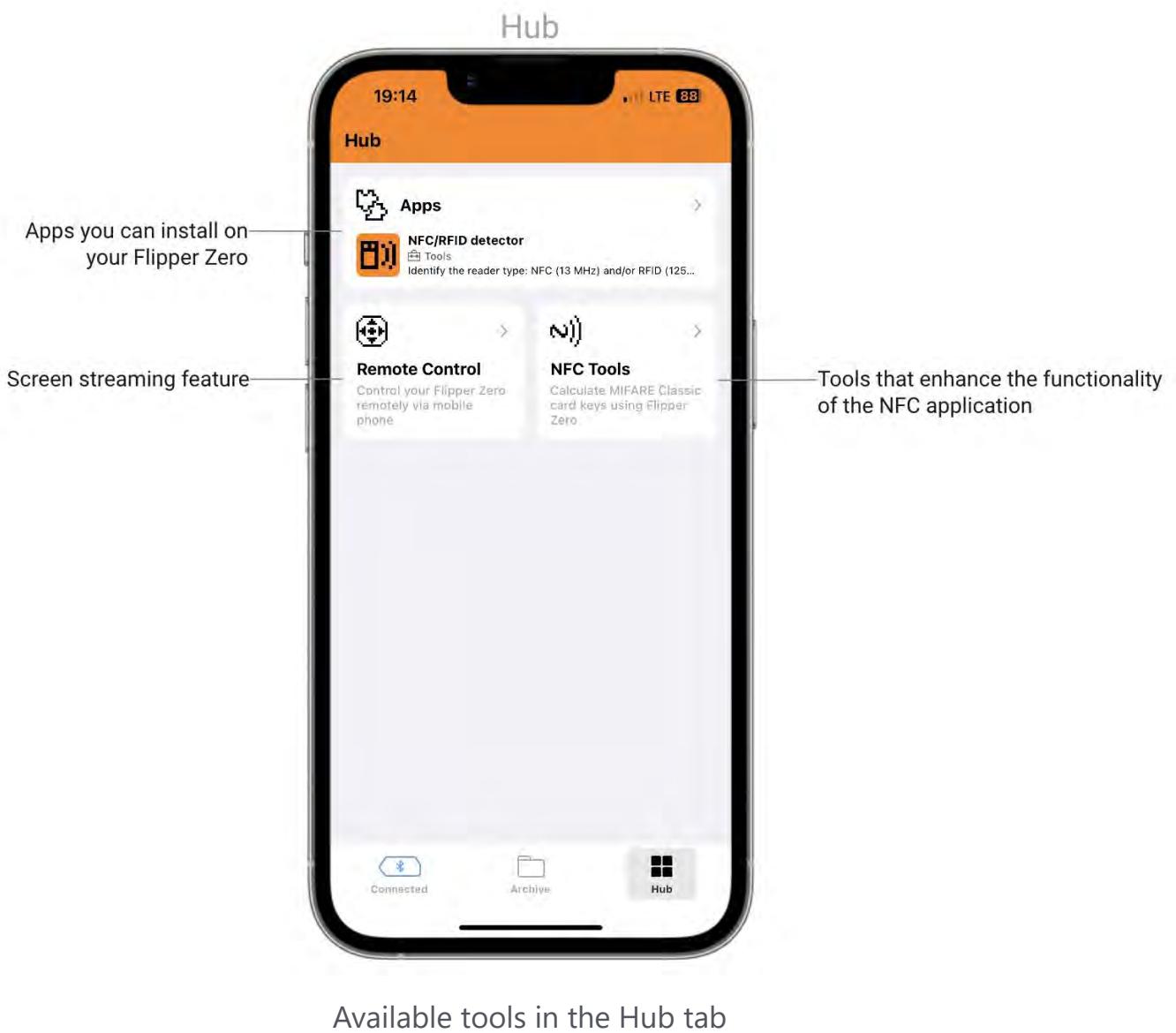
Infrared

## Archive → Ancient\_opening



Saved Sub-GHz remote

In the **Hub** tab, you can find apps for your Flipper Zero, remote control feature, and NFC application tools.



Available tools in the Hub tab

To learn how to report bugs, visit the [Reporting Mobile App bugs](#) page.

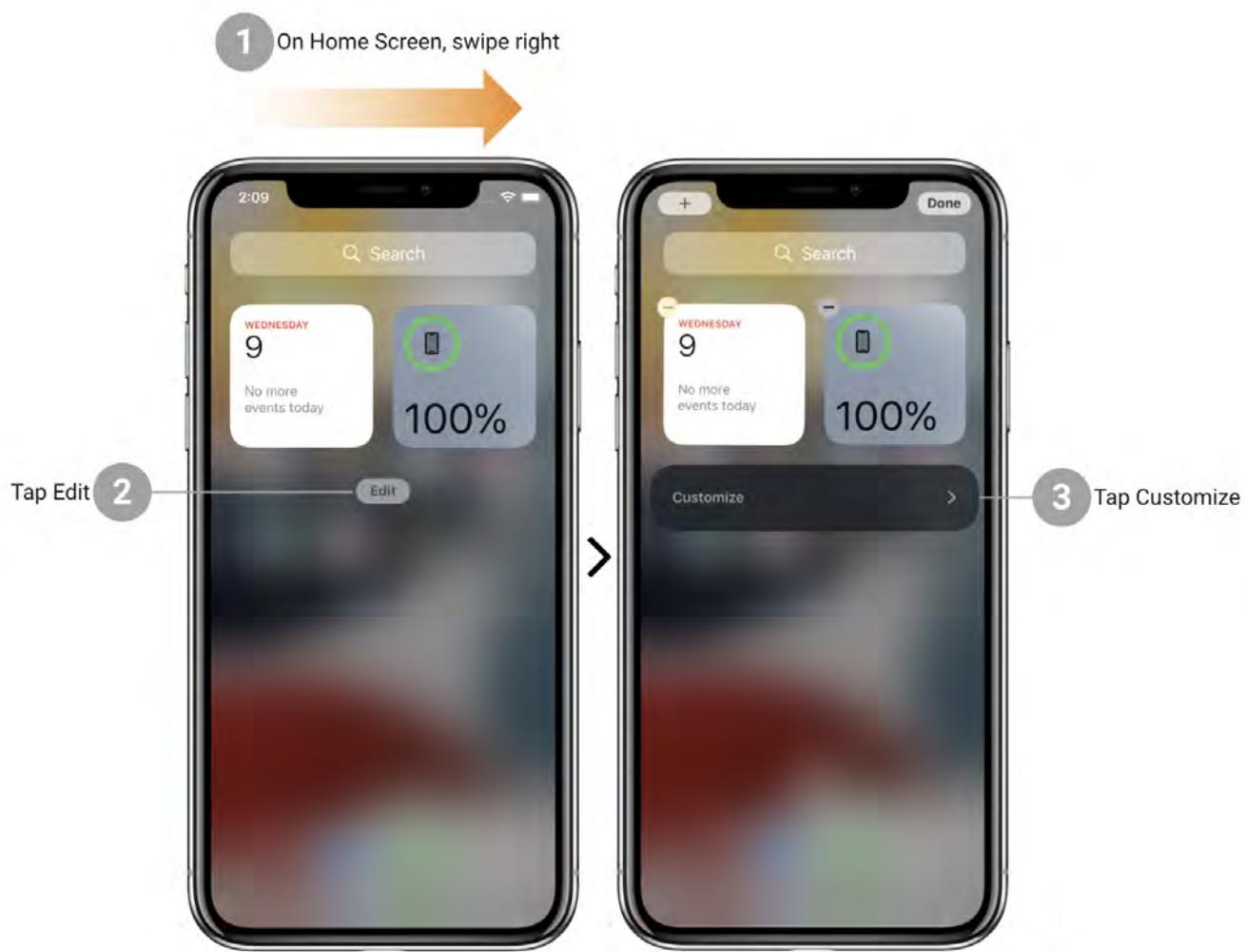
## Adding the Flipper Mobile App widget

With the Flipper Mobile App widget, you can quickly emulate saved remotes and cards on your Flipper Zero without opening the Flipper Mobile App on your phone.

### Adding the widget on iOS

On iOS devices, you need to add the Flipper Mobile App widget to the Today View screen by doing the following:

- 1 On your **Home Screen**, swipe right to open the **Today View** screen.
- 2 Scroll down to the bottom and tap **Edit**.
- 3 Tap the **Customize** button at the end of the widget list.

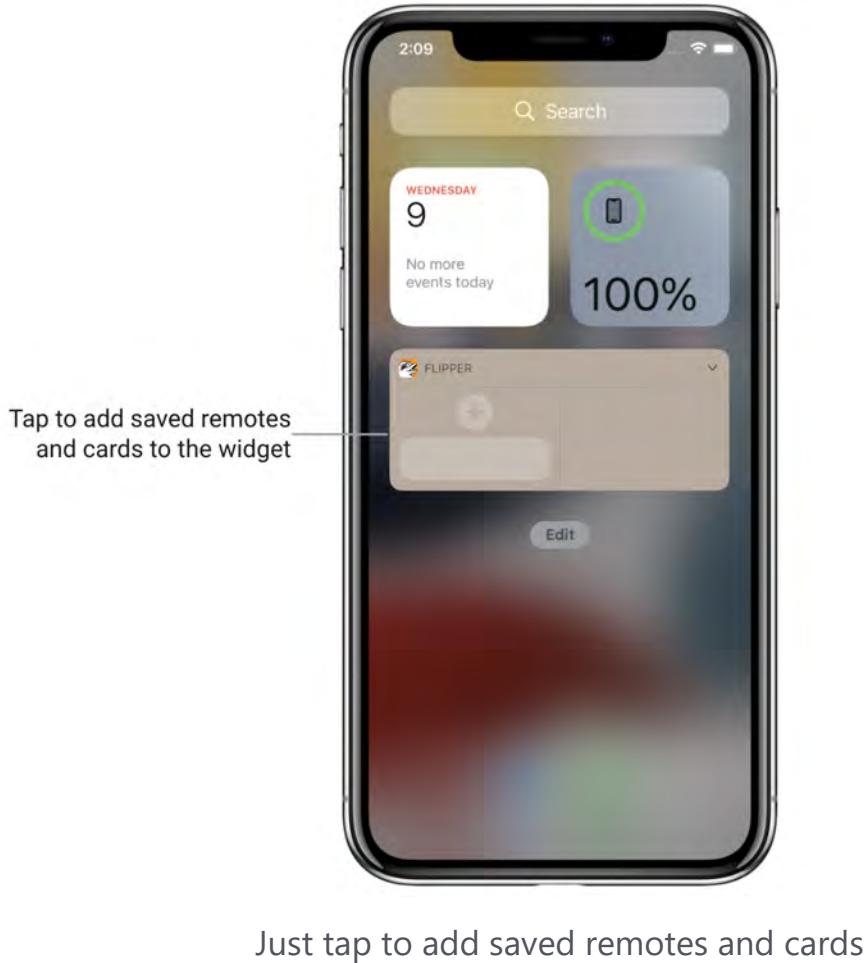


You need to add the Flipper Mobile App widget to the Today View screen

- 4 Find and add the **Flipper Mobile App** to the list of widgets, then tap **Done**.
- 5 Tap **Done** in the upper right corner after adding the widget to the screen.

Now, you can add saved remotes and cards to the Flipper Mobile App widget by customizing the widget itself or by going to **Main Menu -> Options -> Widget Settings** in the Flipper

Mobile App.



## Adding the widget on Android

On Android devices, add the widget [on a Home screen](#), then tap the added widget to customize it.

## Updating Flipper Zero

You can update your Flipper Zero with the Flipper Mobile App via Bluetooth. Similar to [qFlipper](#), the Flipper Mobile App has three firmware update channels:

- **DEVELOPMENT (Dev):** the ongoing development is constantly building a new version of the firmware with every new commit, often multiple times per day. This Development version includes all the latest features, but it may be unstable, cause freezing or corruption

of your data, or fail to function altogether.

- **RELEASE-CANDIDATE (RC):** the version submitted for validation testing to the QA department. If any bugs are detected during the testing phase, the version is revised, and a new Release candidate is issued. Once the release candidate successfully passes all tests, it becomes the Release version.
- **RELEASE:** the stable version of the firmware is extensively tested to ensure its reliability and is therefore recommended for general use.

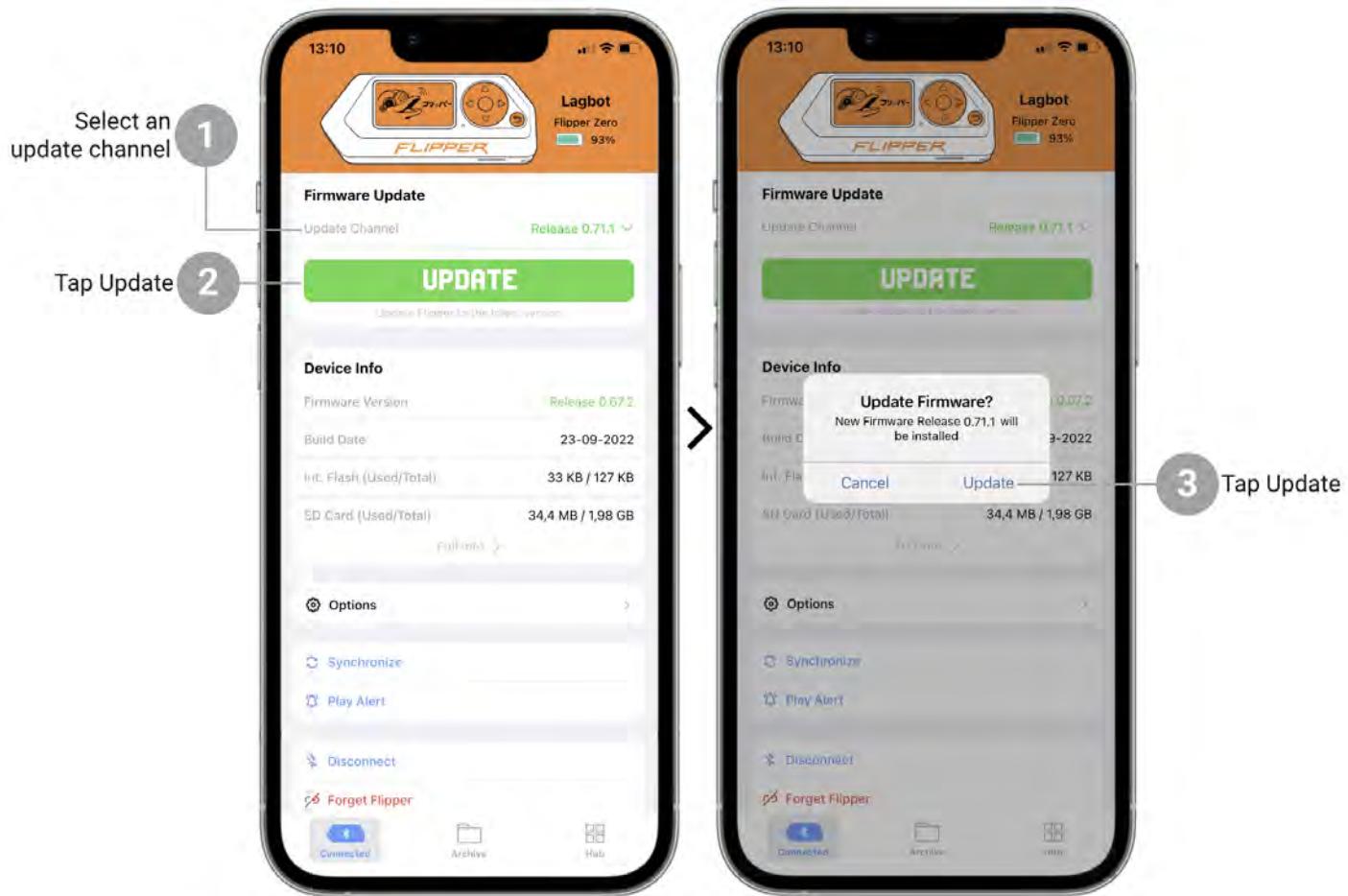
## Insert a microSD card before updating your Flipper Zero

A microSD card must be inserted into your Flipper Zero to properly update the firmware. Flipper Zero databases are stored on the microSD card. To learn more, see [MicroSD card setup](#).

To update your Flipper Zero via the Flipper Mobile App, do the following:

- 1 In the Main Menu tab, tap **Update Channel** and select a firmware (**Release is recommended**).
- 2 Tap the **Update** button.
- 3 Tap the **Update** button to confirm the action.

The update process via the Flipper Mobile App **usually takes 2-3 minutes**.



You can update your Flipper Zero via the Flipper Mobile App

## If Flipper Zero update failed

- Check the Bluetooth connection with your Flipper Zero.
- Make sure your Flipper Zero is turned on.
- If your Flipper Zero doesn't respond, reboot it. -> [\*\*How to reboot Flipper Zero.\*\*](#)
- Restart firmware update.
- If you still can't update your Flipper Zero with the Flipper Mobile App, full or broken internal storage might be the cause. To resolve this issue, follow the steps described on the [\*\*Internal storage repair\*\*](#) page.

# Reporting Mobile App bugs



We regularly update our Flipper Mobile App to enhance performance and introduce new features. These updates improve the overall user experience, but you may encounter bugs while using the application. We greatly appreciate your support in addressing these issues by sharing relevant information through the bug report feature.

## Make sure your Flipper Mobile App is up to date

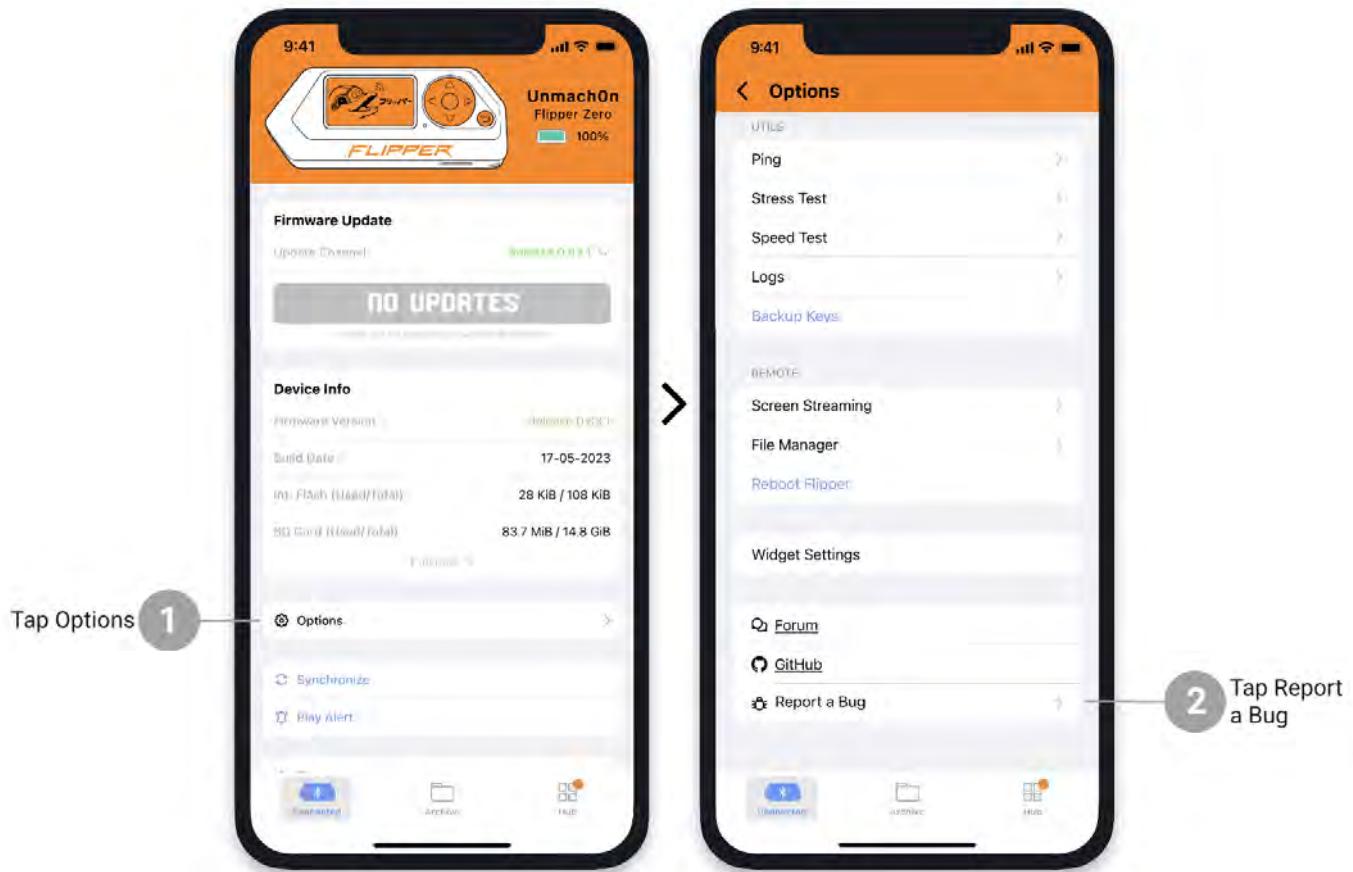
Before submitting a bug report, make sure that you're using the latest version of the mobile application.

This page will walk you through the necessary steps to submit a bug report via the mobile application and forum.

## Submitting a bug report via Flipper Mobile App

If you experience issues with the Flipper Mobile App, you can submit a bug report directly from the application by doing the following:

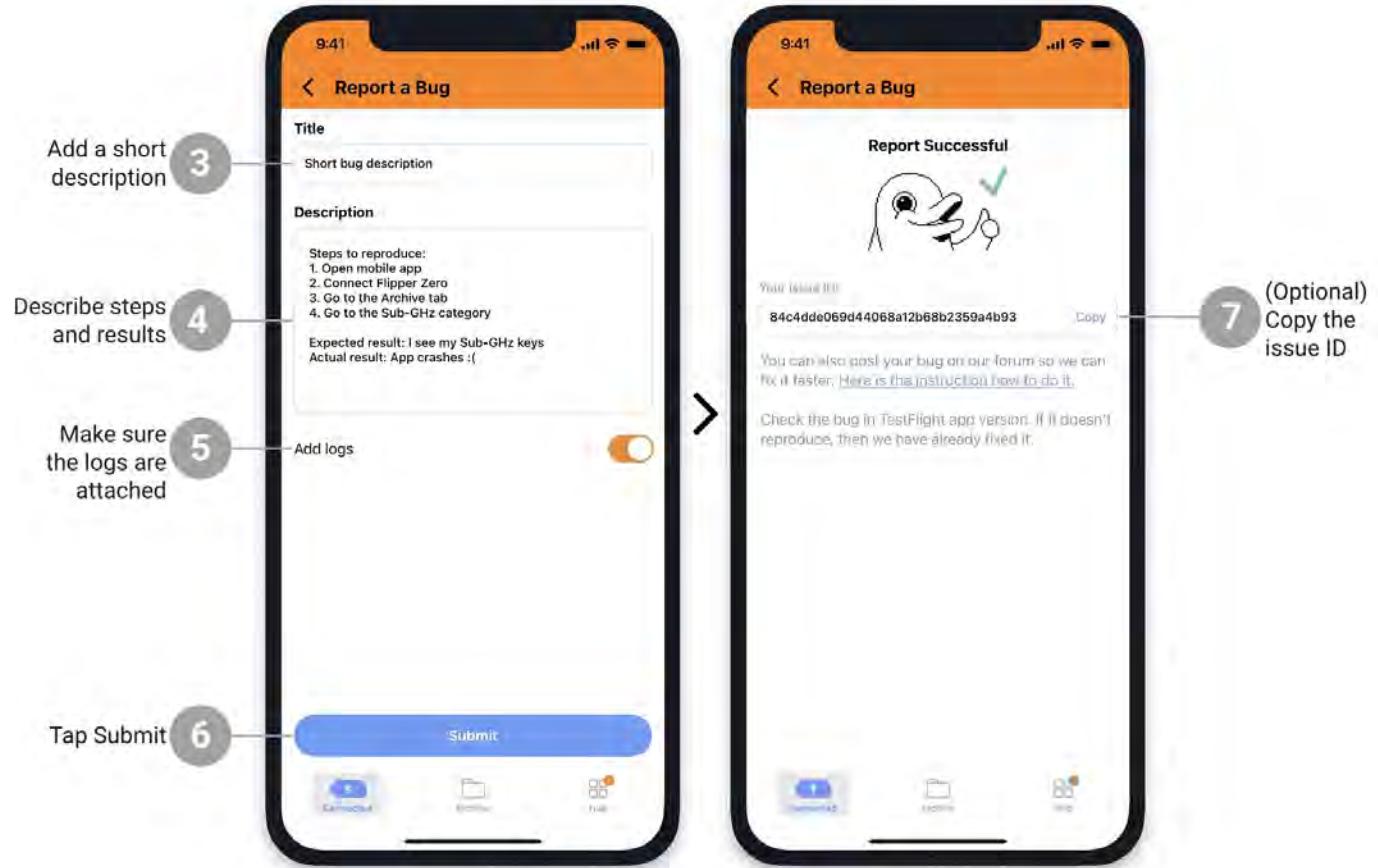
- 1 In the **Main Menu** tab, go to **Options**.
- 2 Tap **Report a Bug**.



The mobile application has the Report a Bug feature

- 3 In the **Title** field, enter a short description of the issue.
- 4 In the **Description** field, enter the steps that led to the issue, as well as expected and actual results.
- 5 Make sure that Flipper Mobile App logs are attached to the report.
- 6 Tap **Submit** to share the bug report with developers.
- 7 (Optional) Copy the issue ID to submit it on the forum.

If you want the issue to be addressed sooner or you're experiencing a problem that affects your Flipper Zero, we recommend creating a post on the forum with the issue ID attached.

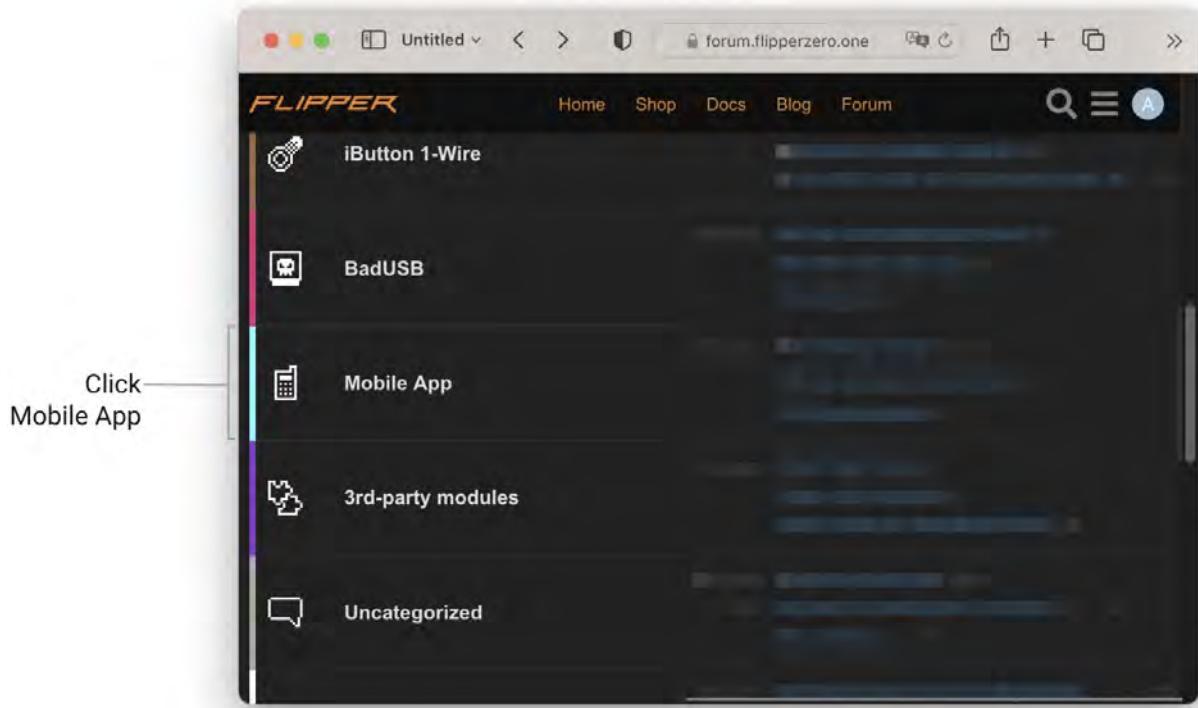


You can easily create and submit a bug report via the Flipper Mobile App

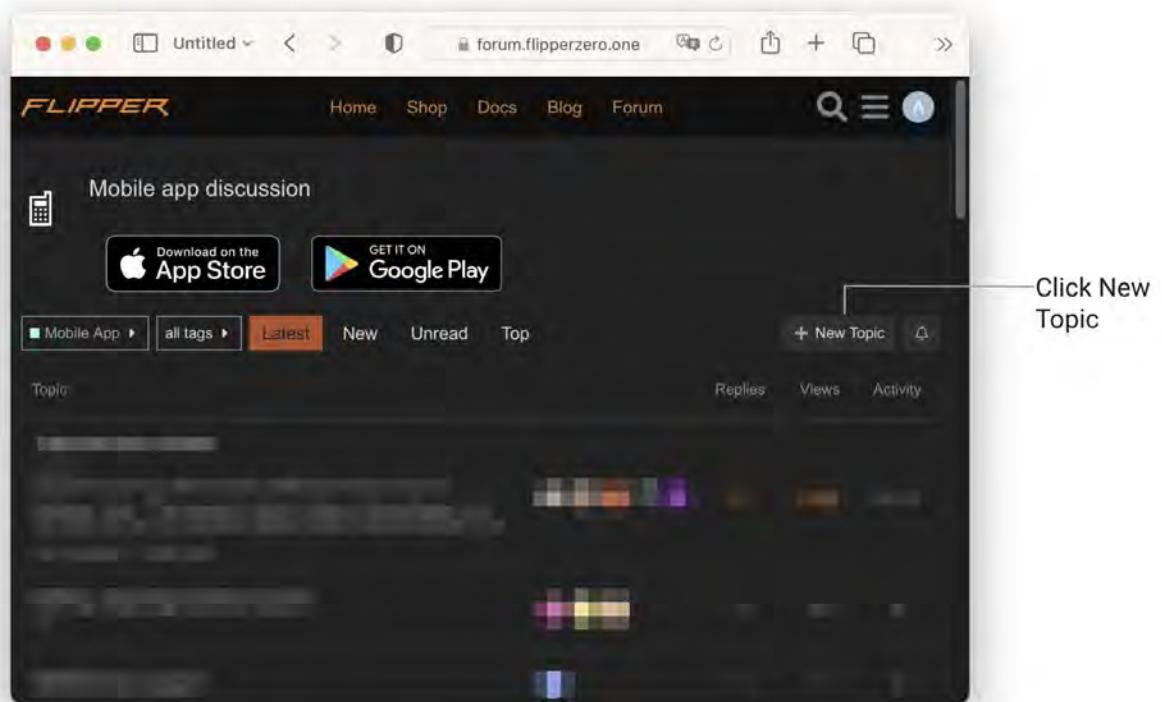
## Submitting a bug report via the forum

If you want the developers to address the issue you submitted via the Flipper Mobile App sooner, or if you think the bug affects your Flipper Zero, you can share the information about the issue on the forum.

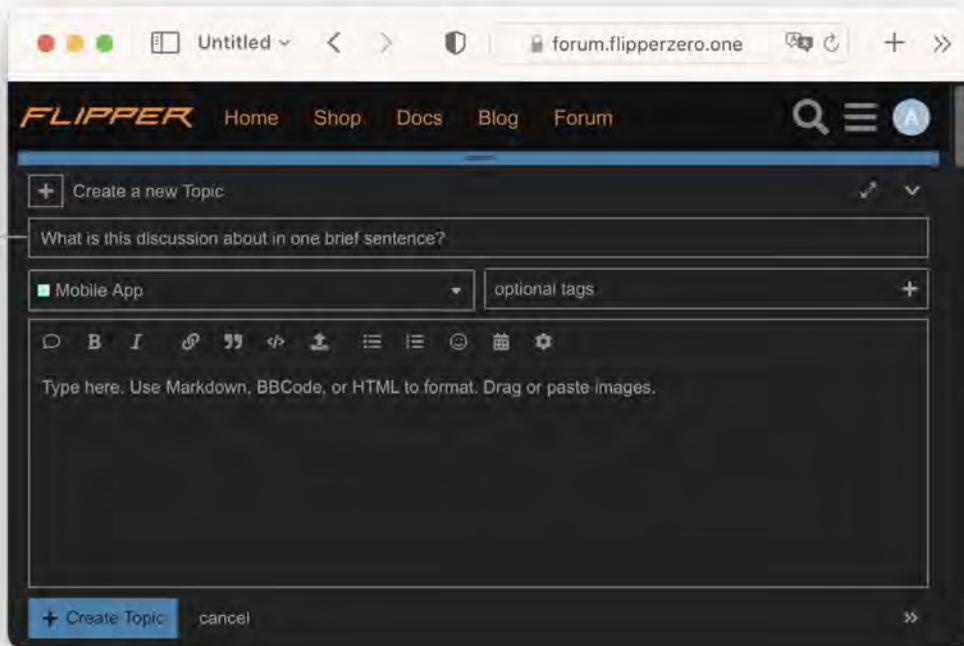
- 1 On [forum.flipperzero.one](https://forum.flipperzero.one), go to the **Mobile App** section.



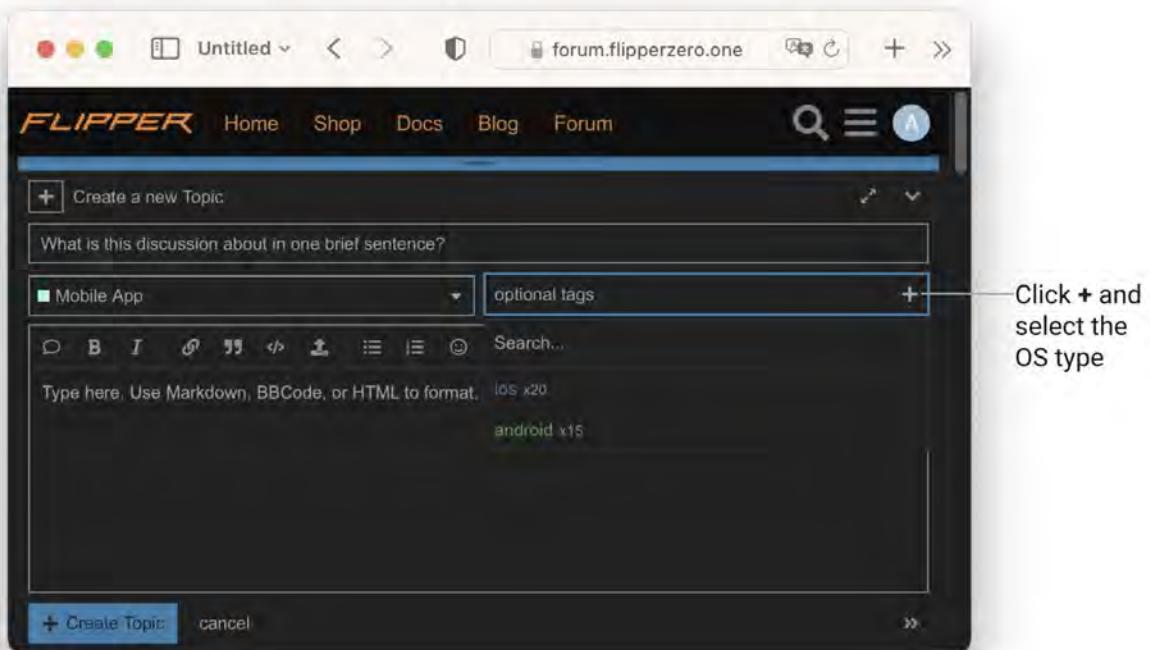
- 2 Read the latest topics to make sure that this issue hasn't been submitted before.
- 3 If it hasn't, create a new topic by clicking the **New Topic** button.



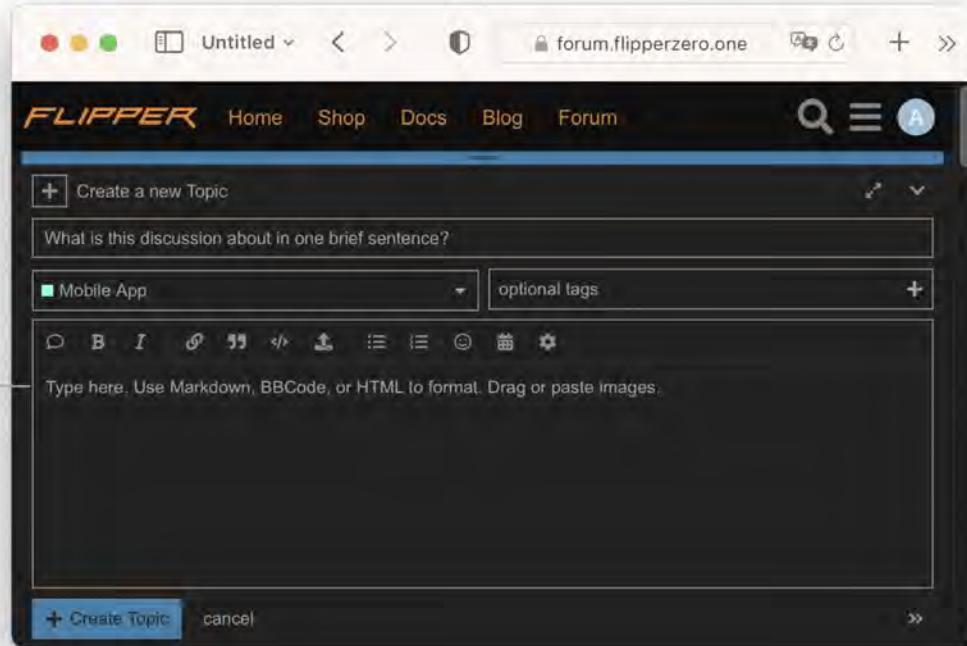
- 4 Enter a short description of the issue in the topic name field.



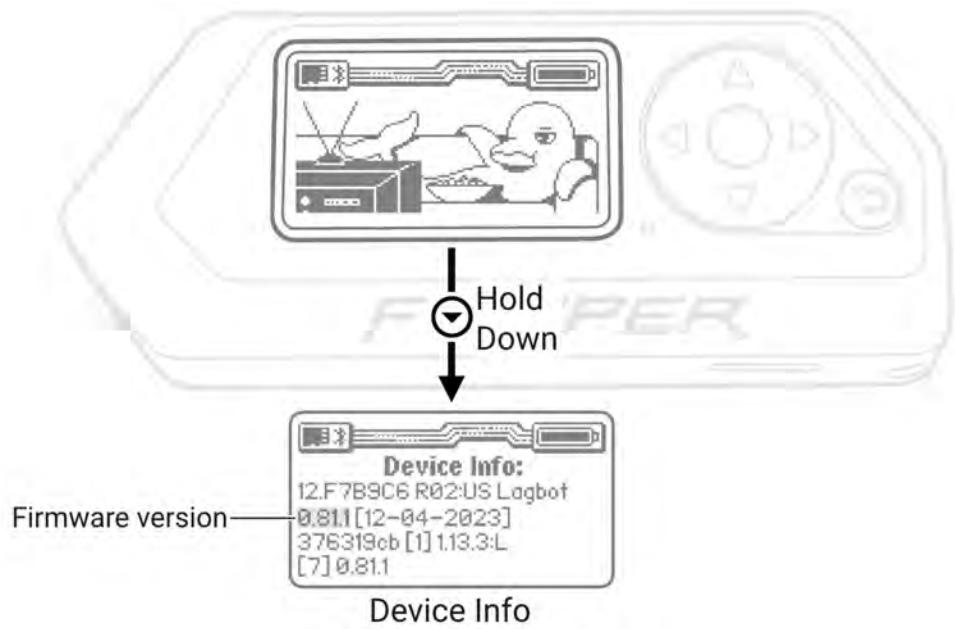
- 5 Click the + icon and select your mobile operating system tag.



- 6 Describe the steps that led to this issue, as well as expected and actual results.



- 7 Enter info about the firmware version of your Flipper Zero.

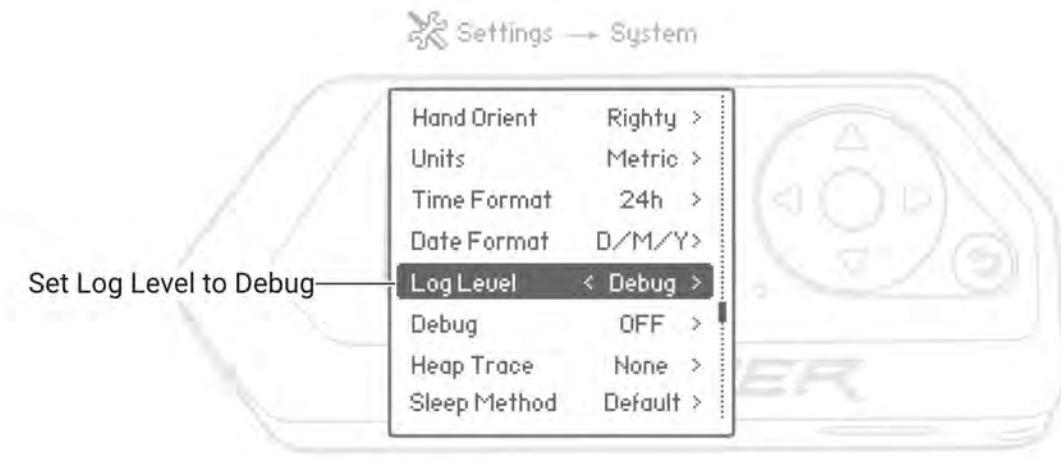


To access Device Info, press and hold the ⚡DOWN button while on the Desktop

- 8 Enter the issue ID from the Flipper Mobile App.
- 9 (Optional) Collect Flipper Zero logs and device info if you think the bug affects the device.

9.1. On your Flipper Zero, go to **Main Menu -> Settings -> System**.

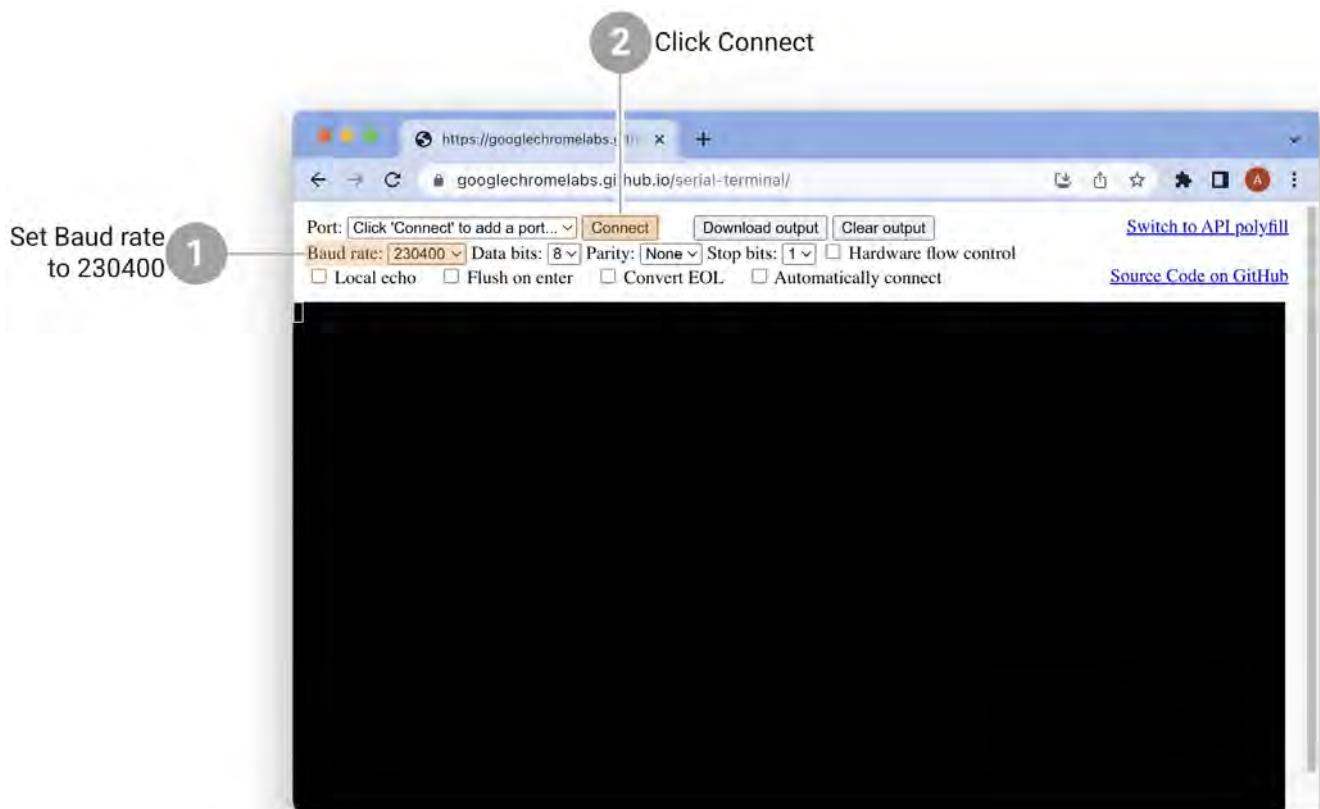
9.2. Set **Log Level** to **Debug**.



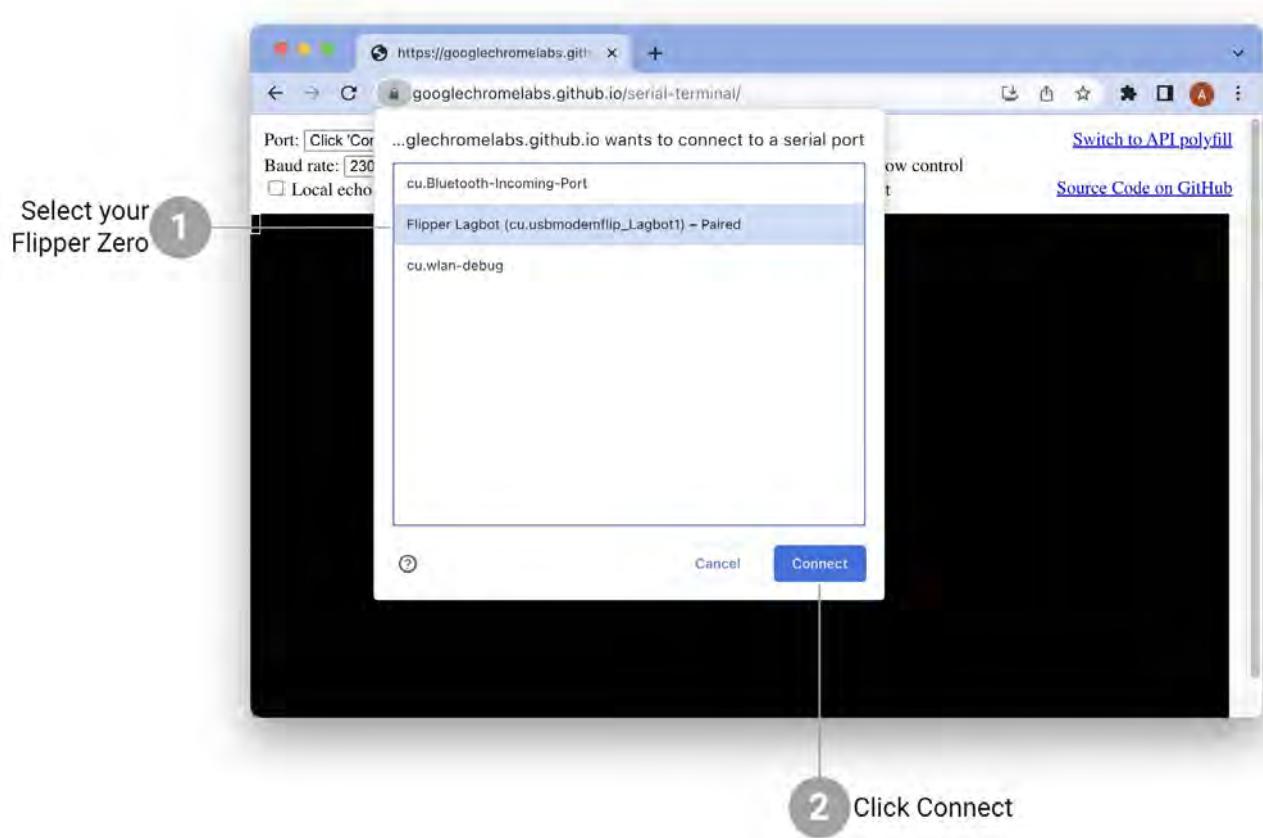
9.3. Connect your Flipper Zero to your computer via a USB cable.

9.4. On your computer, run **Google Chrome** or another Chromium-based browser and go to [the online terminal](#).

9.5. In the online terminal, set the **Baud rate** parameter to **230400** and click **Connect**.



9.6. Select your Flipper Zero from the list of devices and click **Connect**.



9.7. In the opened Flipper Zero CLI, enter the `info device` command and press Return.

Port: Port 1      Disconnect      Download output      Clear output      Switch to API polyfill  
Baud rate: 115200      Data bits: 8      Parity: None      Stop bits: 1      Hardware flow control  
Local echo      Flush on enter      Convert EOL      Automatically connect      Source Code on GitHub

<CONNECTED>

Welcome to Flipper Zero Command Line Interface!  
Read Manual <https://docs.flipperzero.one>  
Firmware version: 0.84.2 0.84.2 (406cb8b7 built on 02-06-2023)

>: info device

Enter the `info device` command

9.8. After getting the device info, enter the `log` command and press Return.

9.9. In the Flipper Mobile App, repeat the steps leading to the bug that affected your Flipper Zero.

9.10. Download the file with device data and logs by clicking the **Download output** button.

Click Download output

```

>: log
Press CTRL+C to stop...
610359793 [I][BtGap] Connection parameters: Connection Interval: 24 (30 ms), Slave Latency: 0,
Supervision Timeout: 72
610359887 [U][BtGap] Slave security initiated
610359978 [I][BtGap] Pairing complete
610359983 [I][BtSrv] Open RPC connection
610359990 [D][RpcSrv] Session started
610359994 [D][BtBatterySvc] Updating battery level characteristic
610360428 [I][BtGap] Rx MTU size: 185
610362049 [D][BtSerialSvc] Received 57 bytes
610362052 [D][BtSerialSvc] Available buff size: 967
610362055 [D][RpcStorage] Stat
610362107 [D][RpcStorage] Read
610362167 [D][RpcStorage] Info
610362226 [D][BtSerialSvc] Received 12 bytes
610362228 [D][BtSerialSvc] Available buff size: 1012
610362231 [D][RpcStorage] Info
610362314 [D][BtSerialSvc] Received 23 bytes
610362316 [D][BtSerialSvc] Available buff size: 1001
610362319 [D][NfcSystem] SetDatetime
610362373 [D][BtSerialSvc] Received 29 bytes
610362375 [D][BtSerialSvc] Available buff size: 995
610362378 [D][BtSerialSvc] Stat

```

9.11. Open the file in a text editor and delete data in the `hardware.uid` and `hardware.name` lines for privacy reasons.

**Delete data** →

```

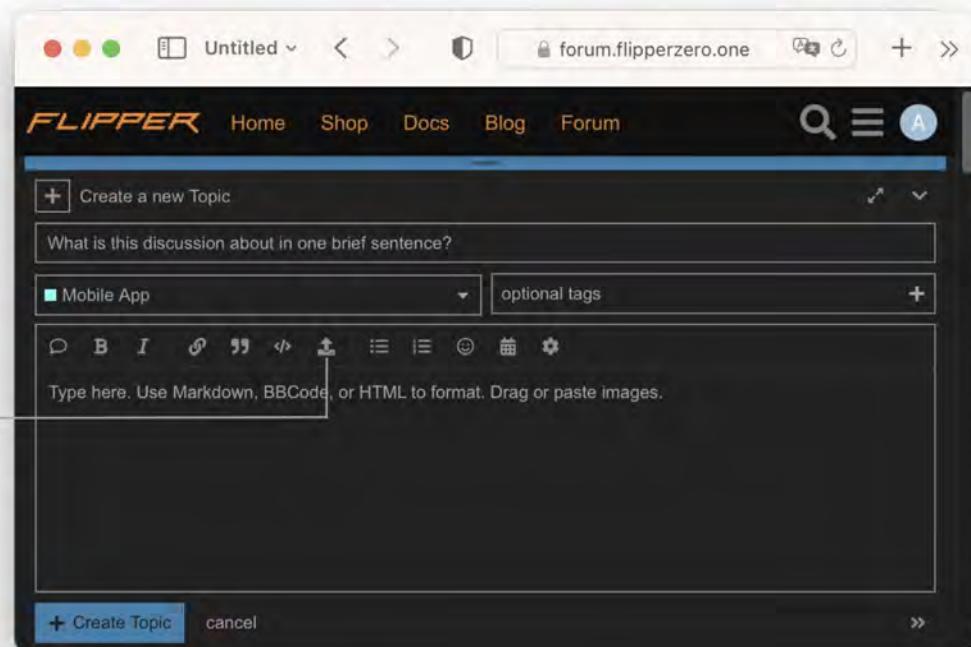
Welcome to Flipper Zero Command Line Interface!
Read Manual https://docs.flipperzero.one

Firmware version: 0.84.2 0.84.2 (406cb8b7 built on 02-06-2023)

>: info device
format.major           : 3
format.minor           : 1
hardware.model         : Flipper Zero
hardware.uid           : 204CA10026E18000
hardware.otp.ver       : 2
hardware.timestamp     : 1646971850
hardware.ver           : 12
hardware.target         : 7
hardware.body          : 9
hardware.connect        : 6
hardware.display        : 1
hardware.color          : 2
hardware.region.builtin : 2
hardware.region.provisioned : GE
hardware.name           : Lagbot
firmware.commit.hash    : 406cb8b7
firmware.commit.dirty   : false
firmware.branch.name    : 0.84.2
firmware.branch.num      : 0
firmware.version         : 0.84.2
firmware.build.date      : 02-06-2023
firmware.target          : 7
firmware.api.major       : 28
firmware.api.minor       : 2
firmware.origin.fork     : Official

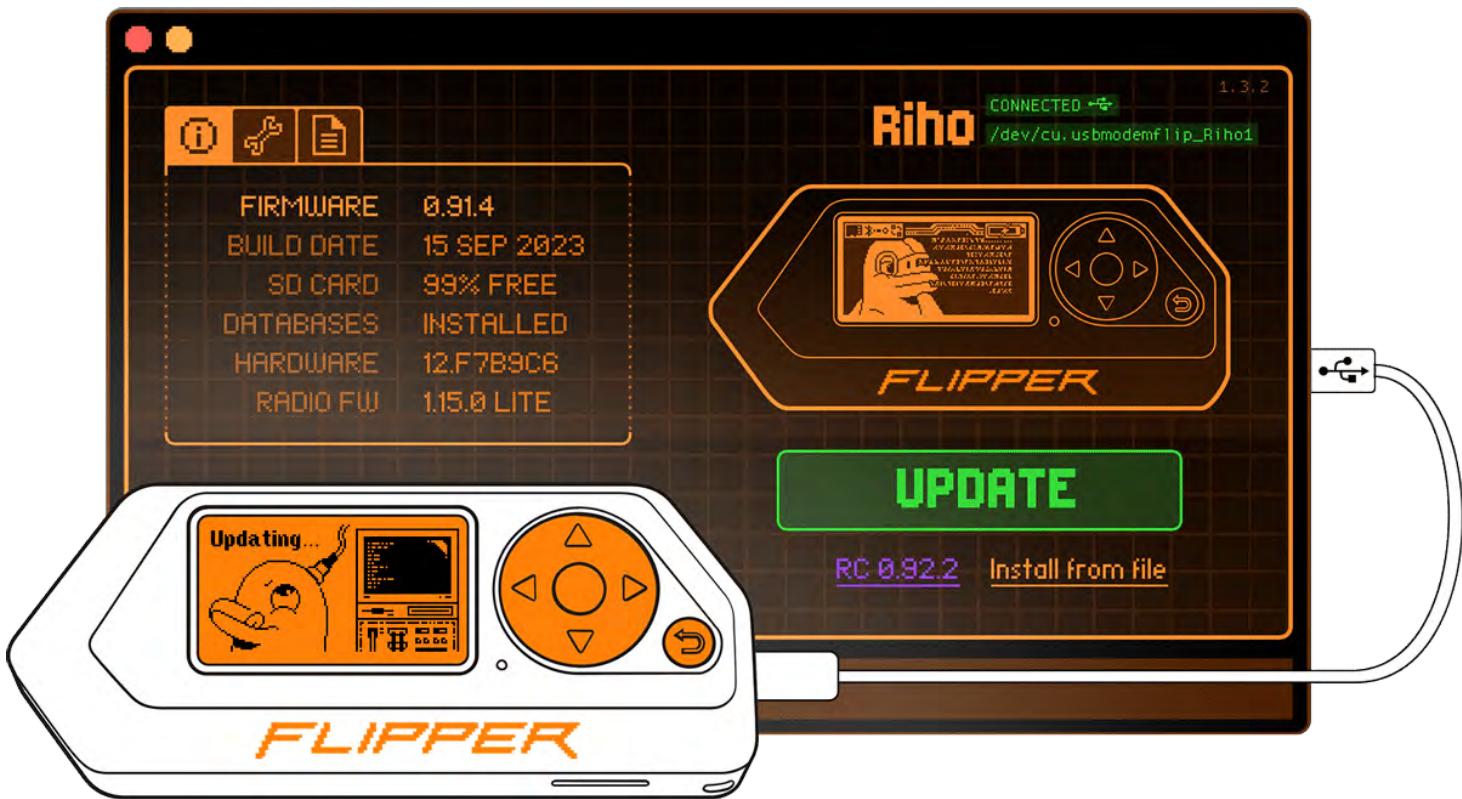
```

9.12. Attach the edited file to the topic by clicking the **Upload** icon.



- 10 Click the **Create Topic** button to publish the information on the forum.

# qFlipper



**qFlipper** is a desktop application for updating Flipper Zero firmware and databases, as well as managing files on the microSD card, and repairing corrupted firmware. The qFlipper application is available on Windows, macOS, and Linux.

On this page, you'll find an overview of the application and learn how to install it on your PC. You'll also learn how to update and control your Flipper Zero and report qFlipper issues.

## Installing qFlipper

To install the qFlipper application on your computer, do the following:

- 1 Download the qFlipper installation file for your operating system.

[Download qFlipper](#)

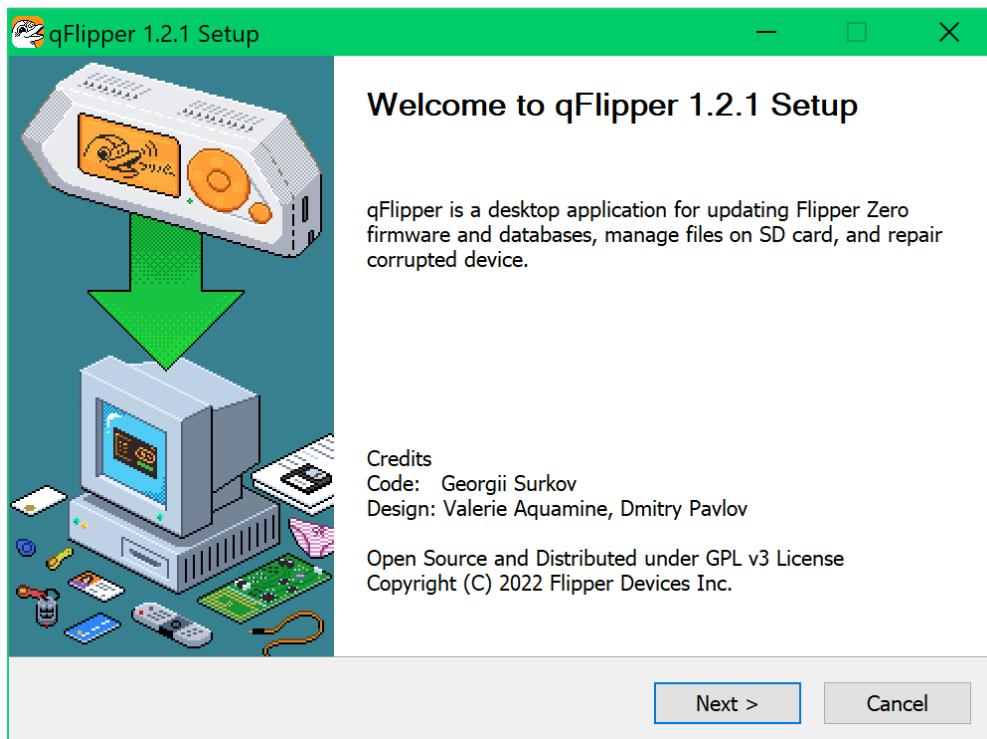
for Windows

You can also download qFlipper on the [Fliper Zero Firmware update](#) page.

- 2 Run the downloaded file and follow the instructions for your operating system.



For Windows, the qFlipper application is compatible with **Windows 10 and 11 only**.

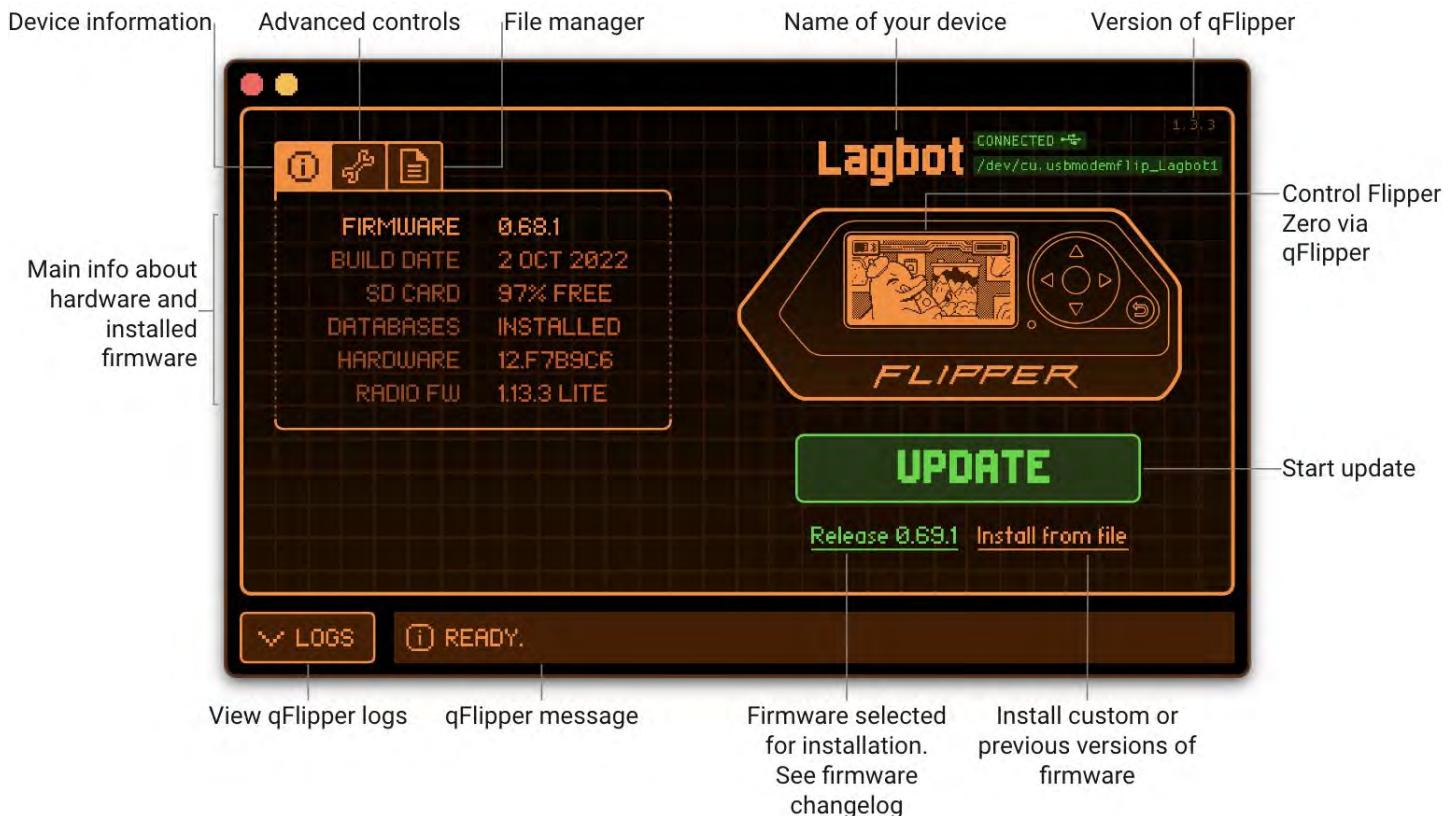


qFlipper is available on Windows

## qFlipper overview

After you've installed the qFlipper application on your computer, **connect your Flipper Zero (with an inserted microSD card) to your computer via a USB cable**.

In the **Device information** tab, you can view the main information about Flipper Zero hardware and installed firmware, [update the device](#), and [control it remotely](#).



The device information tab gives an overview of the main characteristics

In the **Advanced control** tab, you can back up, restore, and reset your Flipper Zero, as well as choose firmware to install on the device. Similar to the Device information tab, you can control your Flipper Zero and initiate the update procedure. See [Internal storage repair](#) to learn more about backup and restoration procedures.

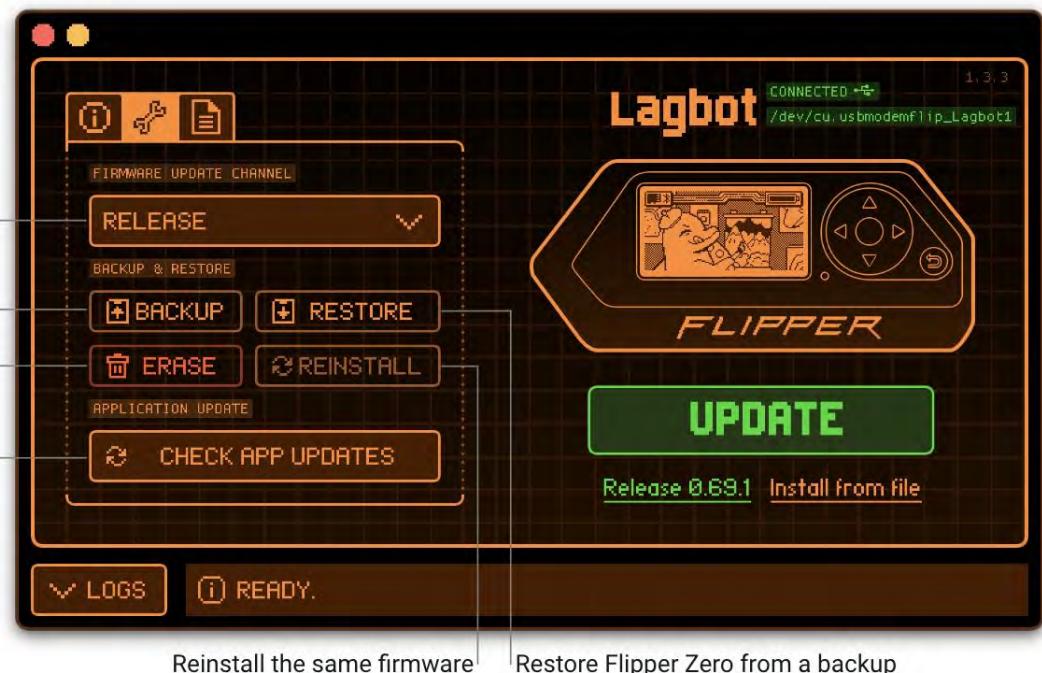
Firmware version selected for installation

- Release  
Stable release (recommended)
- Release-Candidate  
Pre-release under testing
- Development  
Daily unstable build, lots of bugs

Back up Flipper Zero data

Reset Flipper Zero to factory settings

Check for qFlipper updates

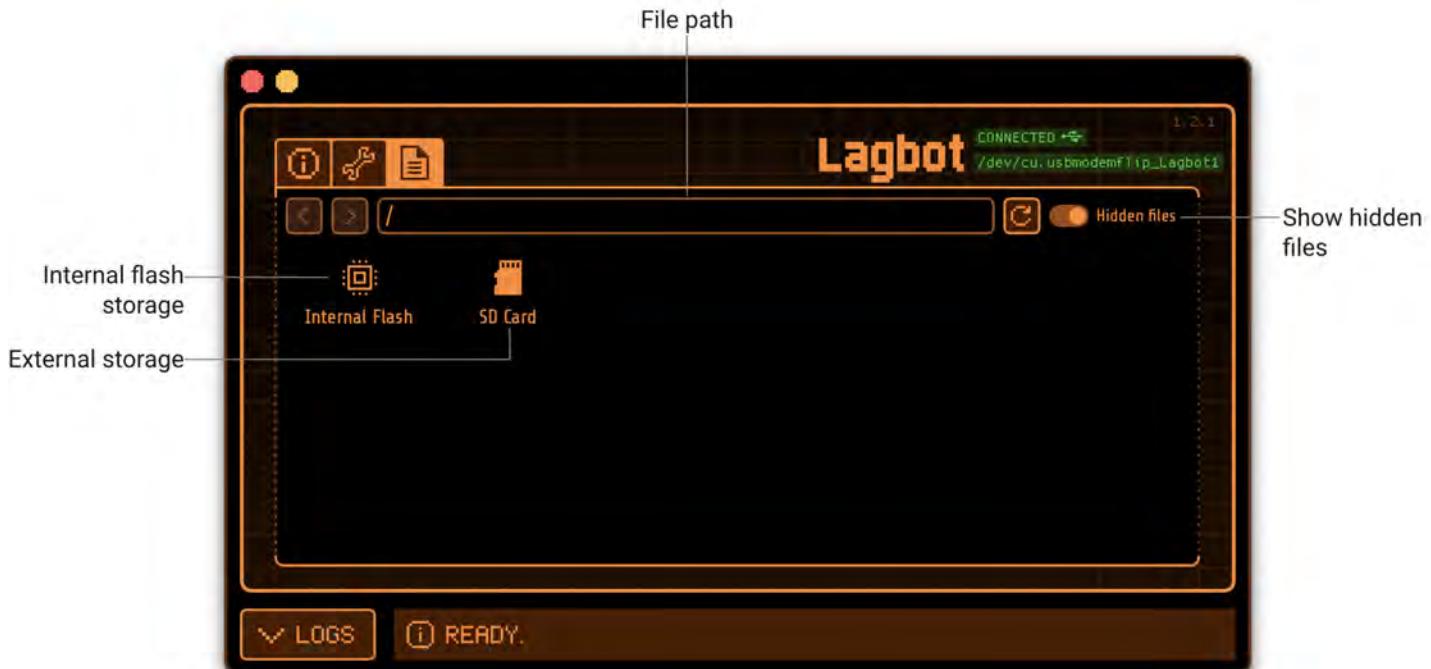


Reinstall the same firmware

Restore Flipper Zero from a backup

The advanced controls tab gives you access to update, erase, and restore functions

In the **File manager** tab, you can delete, rename, and upload files to Flipper Zero. You can easily navigate through files with the keyboard arrow keys.



You can manage Flipper Zero files in the qFlipper application

To upload files in the **File manager** tab, drag and drop files to the desired folder or right-click the required folder and click **Upload here**.

When uploading, files with the same names will be overwritten without warning.

You can easily navigate in the File manager tab using only a keyboard:

Command	Keys on  Windows and  Linux	Keys on  macOS
Enter	Return	Return
Back	Backspace	Backspace
Upload	Ctrl+L	Command+L
Download	Ctrl+D	Command+D
Delete	Delete	Fn+Backspace
Delete immediately	Shift+Delete	Shift+Fn+Backspace
New folder	Ctrl+N	Command+N
Rename	Ctrl+E	Command+E
Refresh view	Ctrl+G	Command+G

# Updating your Flipper Zero via qFlipper

The qFlipper application has three firmware update channels:

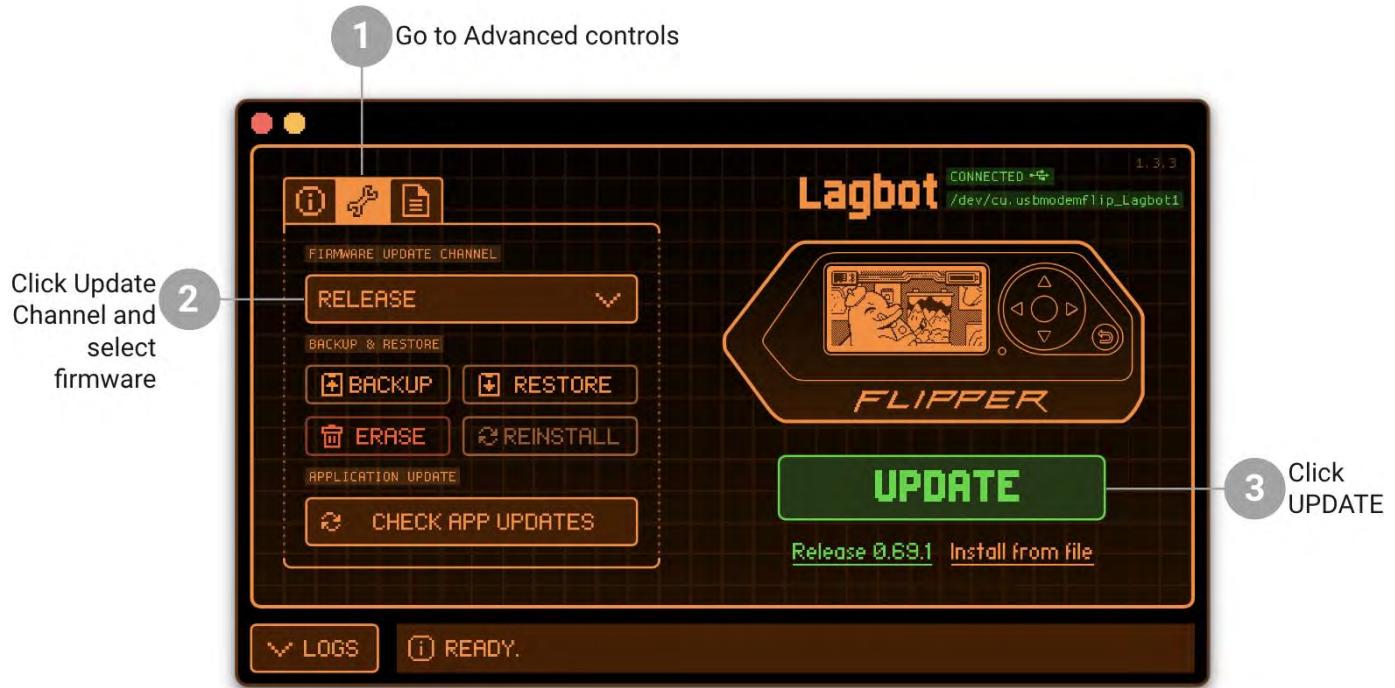
- **DEVELOPMENT (Dev):** the ongoing development is constantly building a new version of the firmware with every new commit, often multiple times per day. This Development version includes all the latest features, but it may be unstable, cause freezing or corruption of your data, or fail to function altogether.
- **RELEASE-CANDIDATE (RC):** the version submitted for validation testing to the QA department. If any bugs are detected during the testing phase, the version is revised, and a new Release candidate is issued. Once the release candidate successfully passes all tests, it becomes the Release version.
- **RELEASE:** the stable version of the firmware is extensively tested to ensure its reliability and is therefore recommended for general use.

## Insert a microSD card before the update procedure

A microSD card must be inserted into your Flipper Zero to update the firmware correctly. Flipper Zero databases are stored on a microSD card. To learn more, see [MicroSD card setup](#).

To update your Flipper Zero via the qFlipper application, do the following:

- 1 Connect your Flipper Zero to your computer via a USB cable.
- 2 On your computer, run the **qFlipper** application.
- 3 In the qFlipper application, go to the **Advanced controls** tab.
- 4 Click **Update Channel** and select a firmware version from the drop-down list (**Release is recommended**).
- 5 Click **Update** to start the update process.



Update your Flipper Zero via qFlipper

## Controlling Flipper Zero via qFlipper

You can also control your Flipper Zero remotely via the qFlipper application by doing the following:

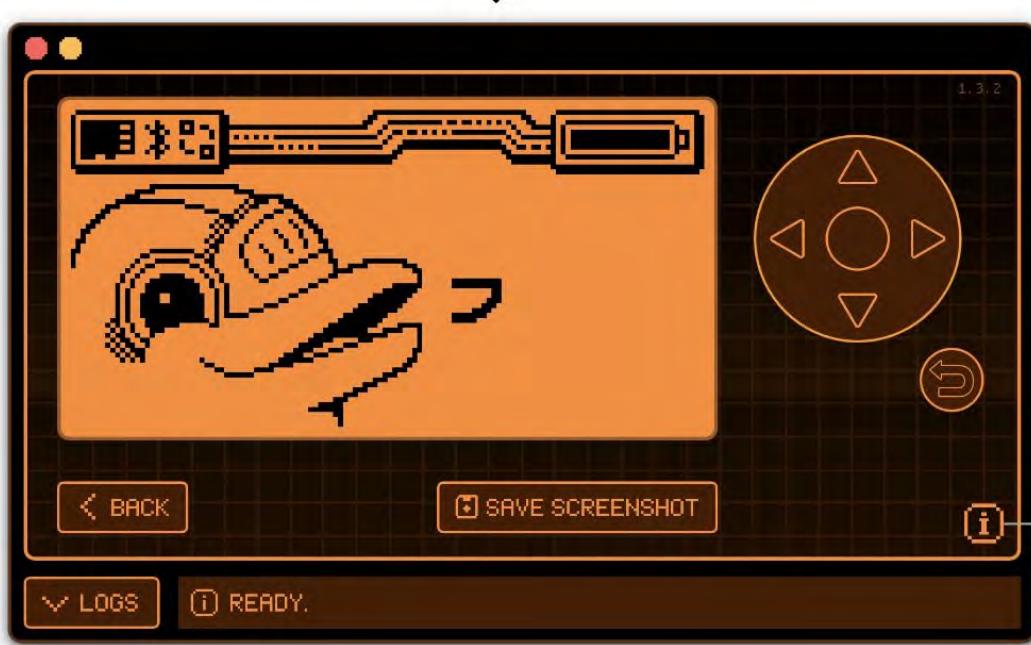
- 1 In the Device information tab, click the Flipper Zero image.
- 2 Click the buttons on the screen

or

Use your keyboard to control your Flipper Zero remotely. Click to learn more about keyboard controls.



- 1 Click the Flipper Zero image



- 2 Click the buttons to control the device or  
Use your keyboard

Screen stream and control your Flipper Zero remotely

Additionally, you can capture screenshots from your Flipper Zero device and save them directly to your computer by clicking the **SAVE SCREENSHOT** button.

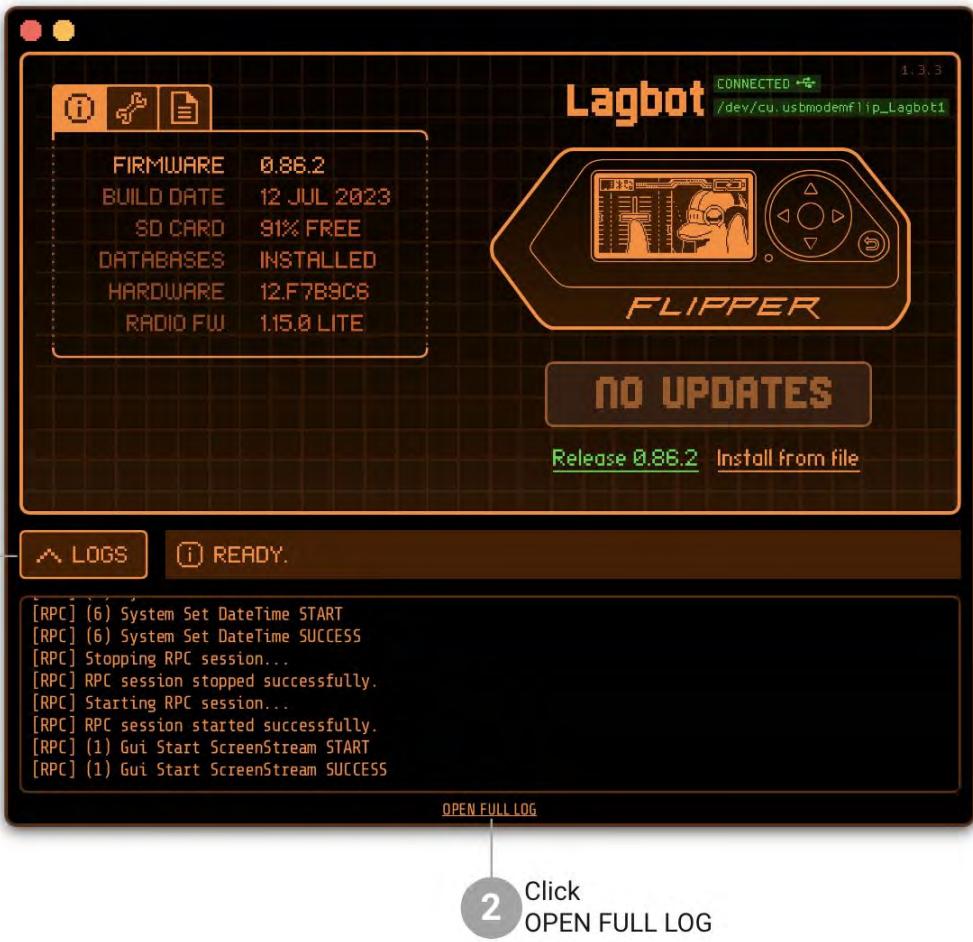
## Reporting qFlipper issues

If an error occurs during the update process, it is important for us that you describe the issue in detail. Since we don't collect any usage data and statistics from your computer, you'll have to report the issue yourself on the forum:

- 1 On the [forum.flipperzero.one](https://forum.flipperzero.one) website, go to the **Firmware update / qFlipper** section.
- 2 Read topics and check if this issue was already addressed in the previous topics.
- 3 If the issue hasn't been mentioned earlier, create a new topic by clicking the **New Topic** button.
- 4 In the new topic, describe your issue with steps that led to the issue.
- 5 Attach qFlipper logs in the `.txt` format and click the **Create Topic** button.

To get qFlipper logs for the current session, do the following:

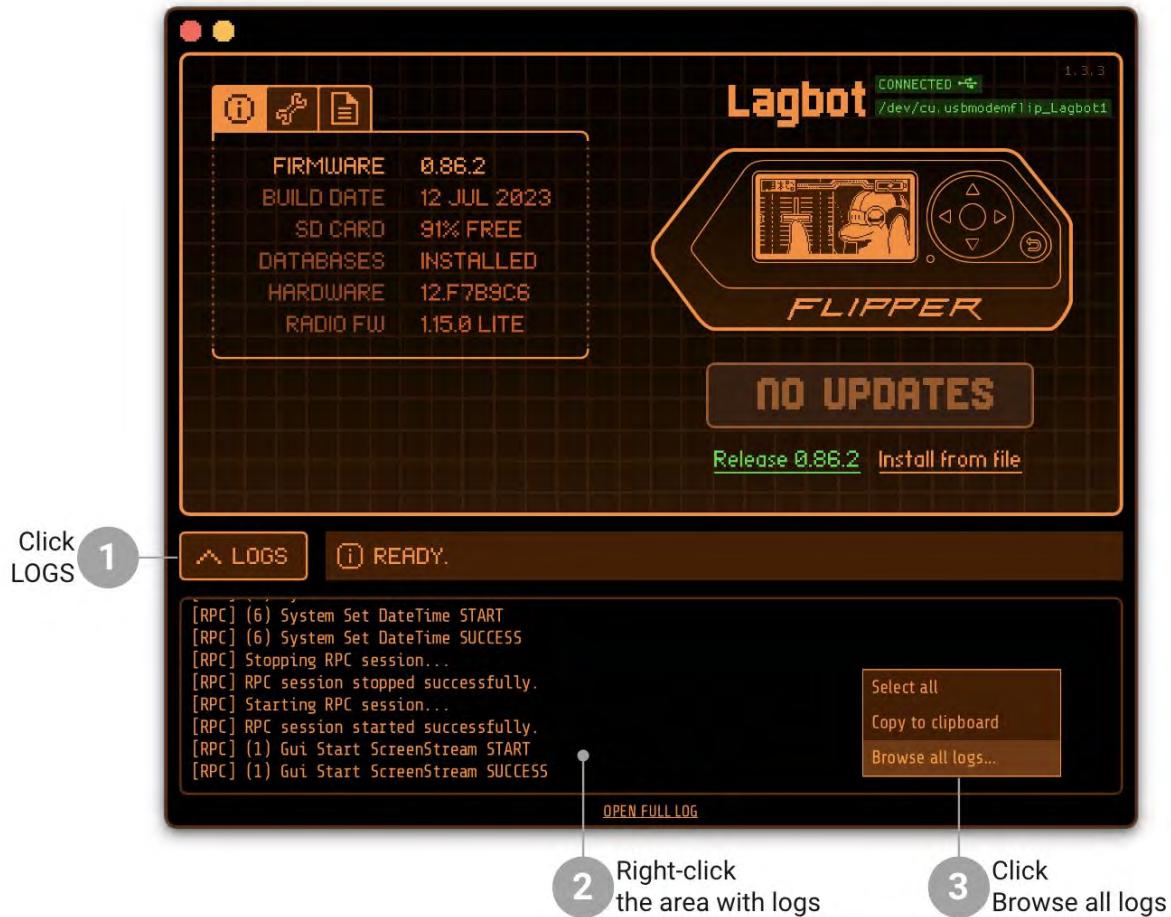
- 1 In the qFlipper application, click **LOGS**.
- 2 Click **OPEN FULL LOG** and save the opened file to your computer in the `.txt` format.



You can get full qFlipper logs in the application

qFlipper saves logs for 100 last sessions on your computer, ensuring easy access to past issue records. To retrieve the qFlipper logs for the previous session, do the following:

- 1 In the qFlipper application, click **LOGS**.
- 2 Right-click the area where the current session logs are shown.
- 3 In the opened context menu, click **Browse all logs**.



You can get full qFlipper logs even for the previous sessions

- 4 In the opened folder, select the log file you need, paying close attention to the timestamp indicated in its name.

# Troubleshooting drivers on Windows



If you're having trouble updating your Flipper Zero via the qFlipper desktop application on your Windows computer, follow this guide to ensure your computer is configured correctly for a successful update.

## Installing qFlipper from the official sources

When you install the qFlipper application, the required drivers are installed along with the application. Installing qFlipper from official sources, such as the [Flipper Zero Firmware Update](#) page and [Official documentation](#), is important.

The qFlipper application is compatible with Windows 10 and 11 only.

# Updating qFlipper

Make sure the qFlipper application is up to date by doing the following:

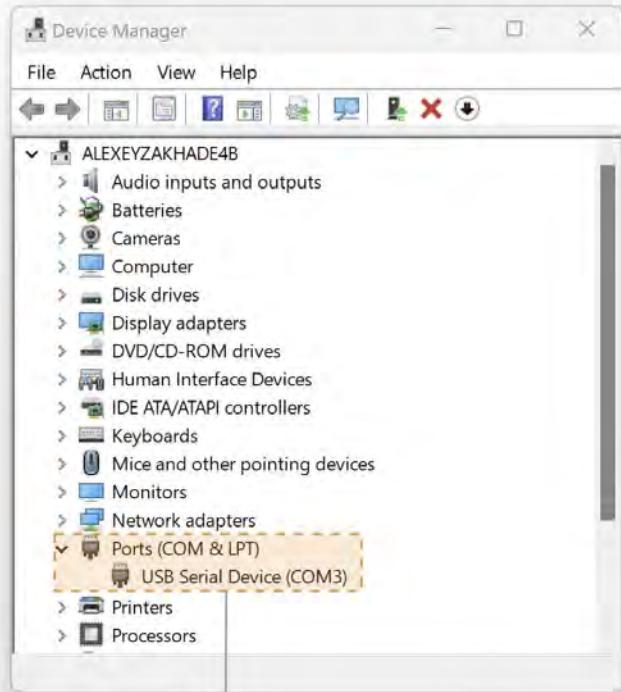
- 1 Connect your Flipper Zero to your computer via a USB-C cable.
- 2 Run qFlipper and go to the **Advanced controls** tab.
- 3 Click **CHECK APP UPDATES**.



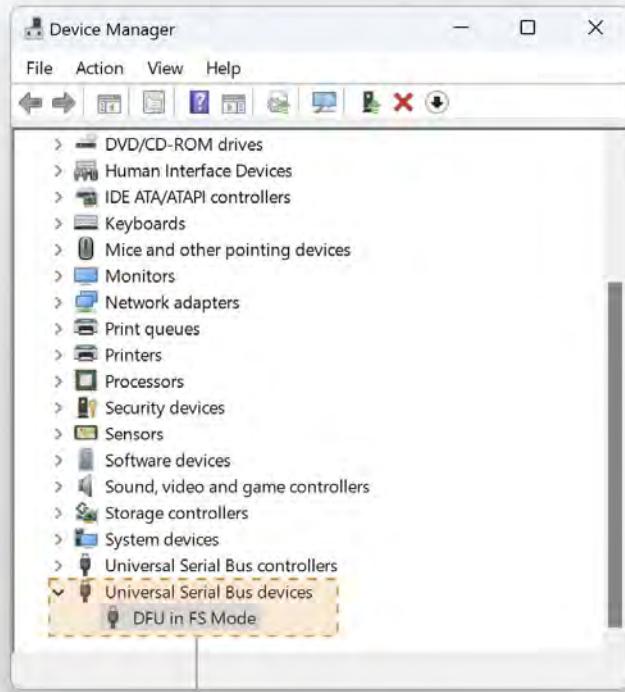
You can easily update qFlipper

## Checking if the correct drivers are installed

Depending on the mode in which you connect your Flipper Zero to a computer, the device can be defined by Windows as a **Serial device** or **DFU device**. We recommend checking drivers for both cases.



Connected as a Serial device

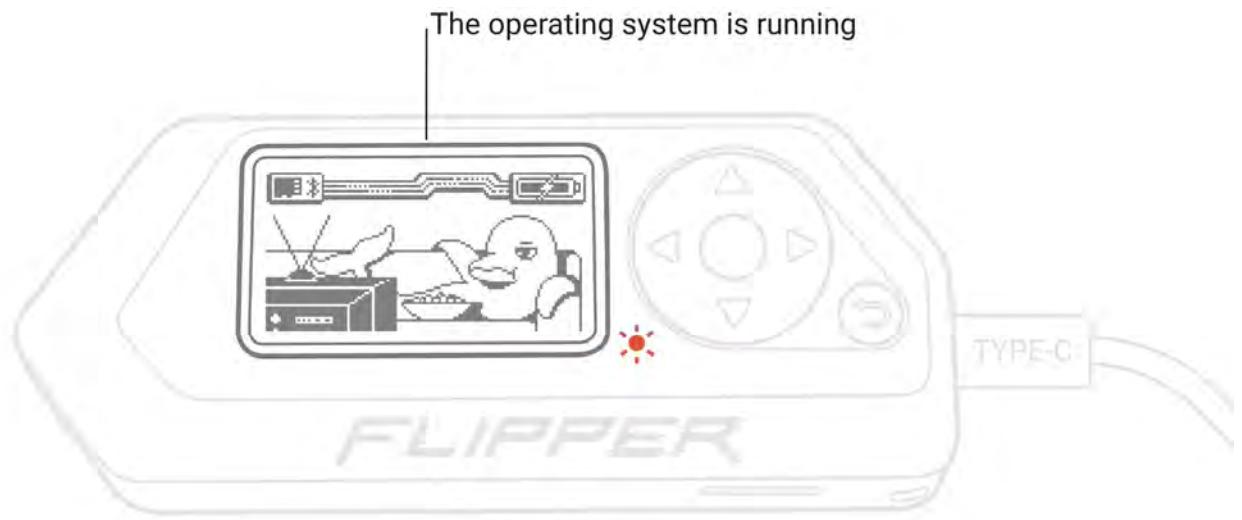


Connected as a DFU device

Your computer recognizes your Flipper Zero differently

## Checking the Serial device driver

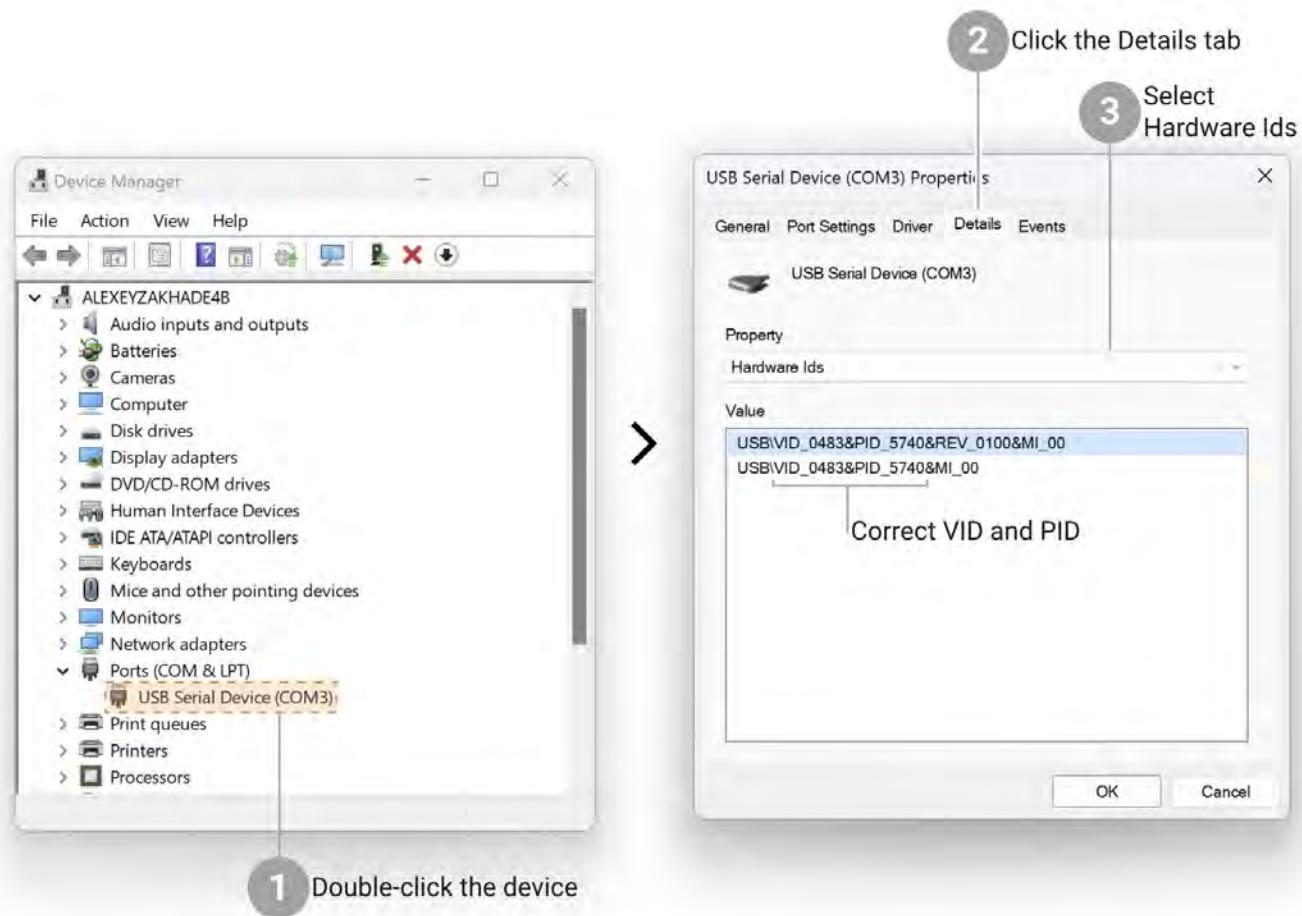
When the device is connected to a computer in **Normal mode** (with the running operating system), the device is recognized as a **Serial device**.



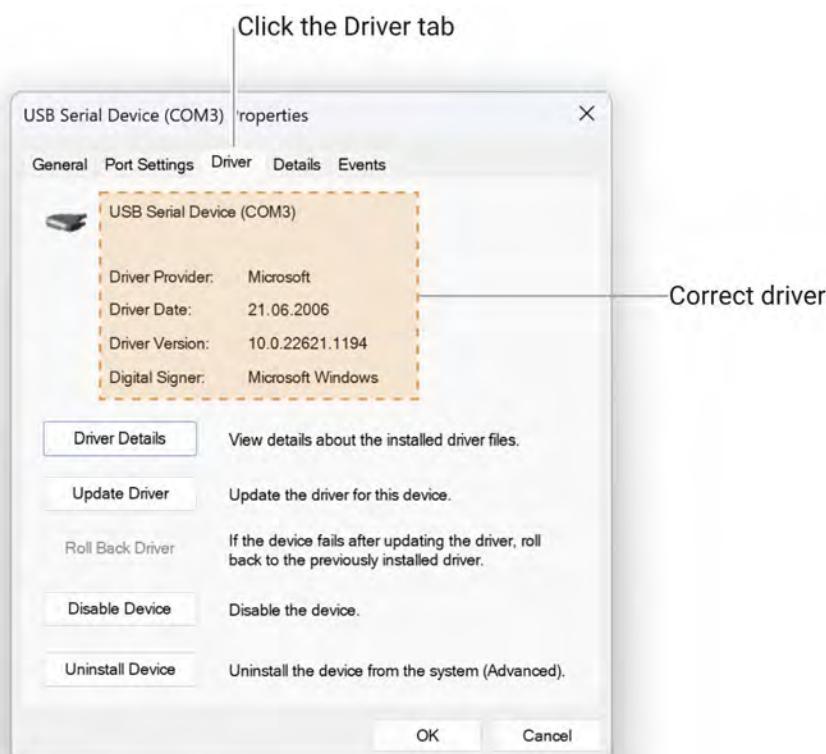
The Flipper Zero with the active operating system

To check if the correct Serial device driver is installed, do the following:

- 1 On your computer, close the **qFlipper** application if running.
- 2 Connect your Flipper Zero to the computer via a USB-C cable.
- 3 Go to **Device Manager -> Ports (COM & LPT)**.
- 4 If there are multiple devices, make sure the detected **USB Serial Device** is your Flipper Zero:
  1. Double-click the **USB Serial Device** and go to the **Details** tab.
  2. Set **Property** to **Hardware Ids**.
  3. Check if the **Vendor ID (VID)** is **0483** and **Product ID (PID)** is **5740**.



5 Go to the **Driver** tab and ensure that the default **Microsoft** driver is installed.



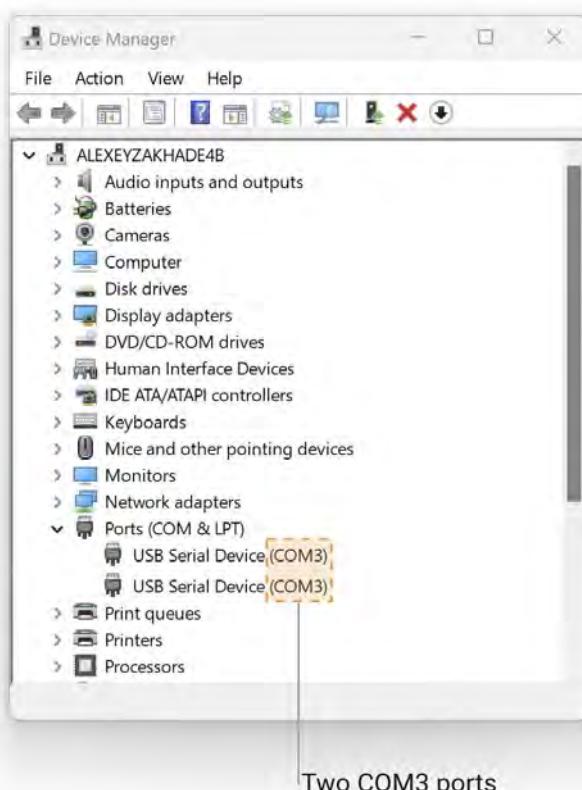
- 6 If there is a different driver, uninstall it and reconnect your Flipper Zero to the computer: the Microsoft driver installs automatically.

## Checking for COM port conflicts

There is a bug in the Windows operating system that occurs when two different Serial devices bind to the same port number.

To check for conflicts, do the following:

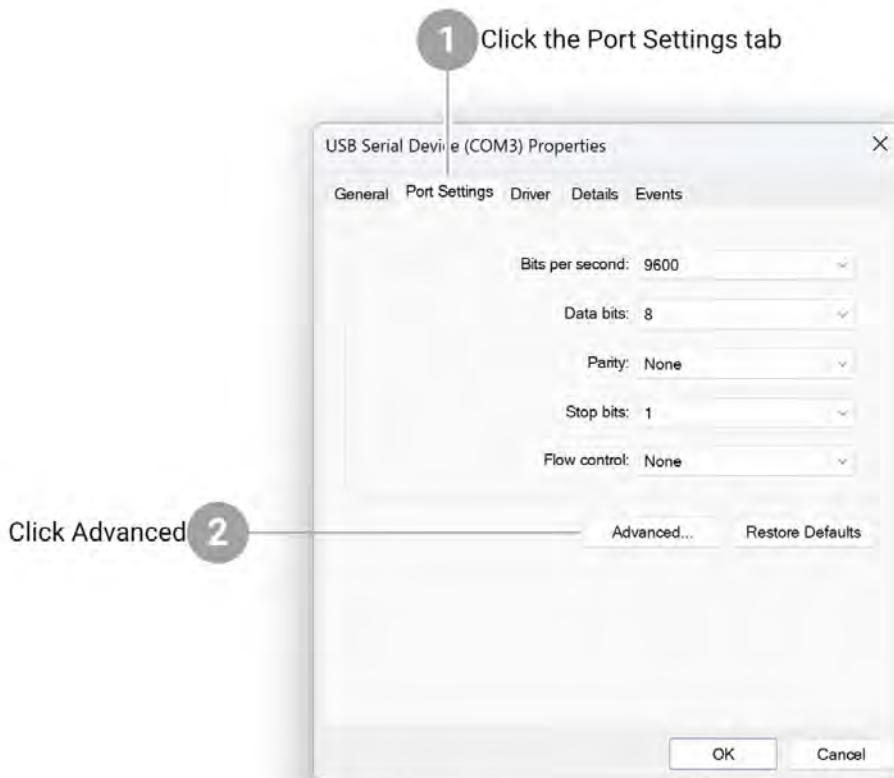
- 1 On your computer, close the **qFlipper** application if running.
- 2 Connect your Flipper Zero to the computer via a USB-C cable.
- 3 Go to **Device Manager -> Ports (COM & LPT)**.
- 4 Check if you have Serial devices with the same COM port number.



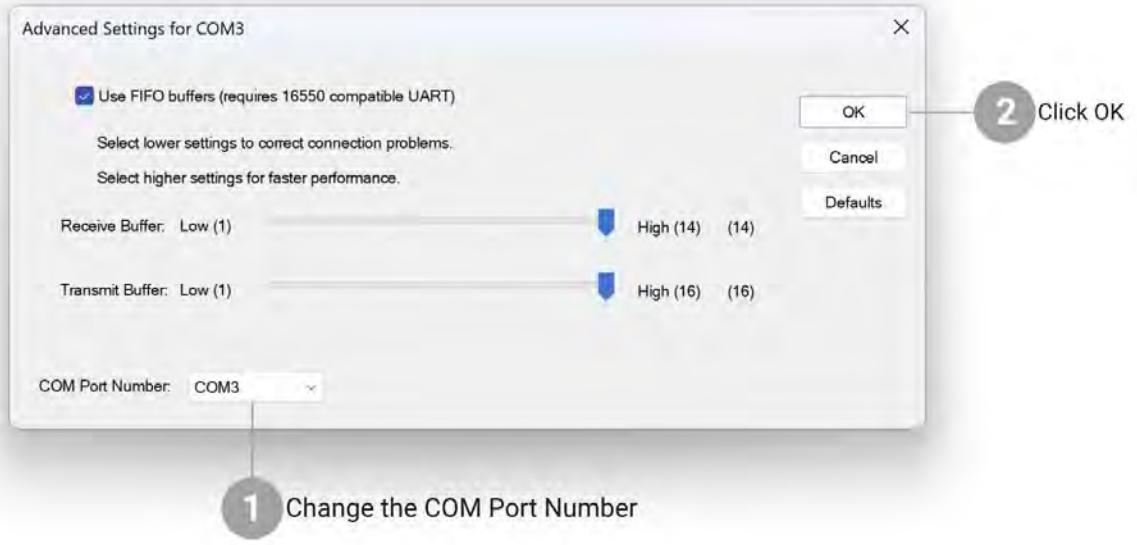
Check if you have two USB Serial devices with the same COM port number

If you have a COM port conflict, do the following:

- 1 Double-click one of the devices.
- 2 Go to **Port Settings -> Advanced**.



- 3 Assign a **COM Port Number** that is currently not in use and click **OK**.



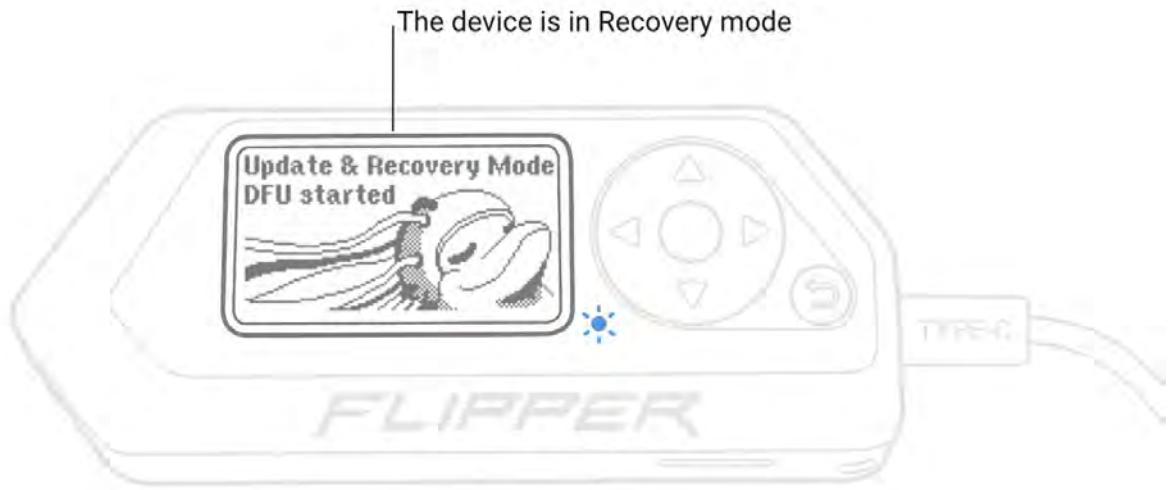
## Check the DFU device driver

When the device is connected to a computer in **Recovery mode** (the operating system isn't running), the device is recognized as a **DFU device**.

To check if the correct DFU device driver is installed, do the following:

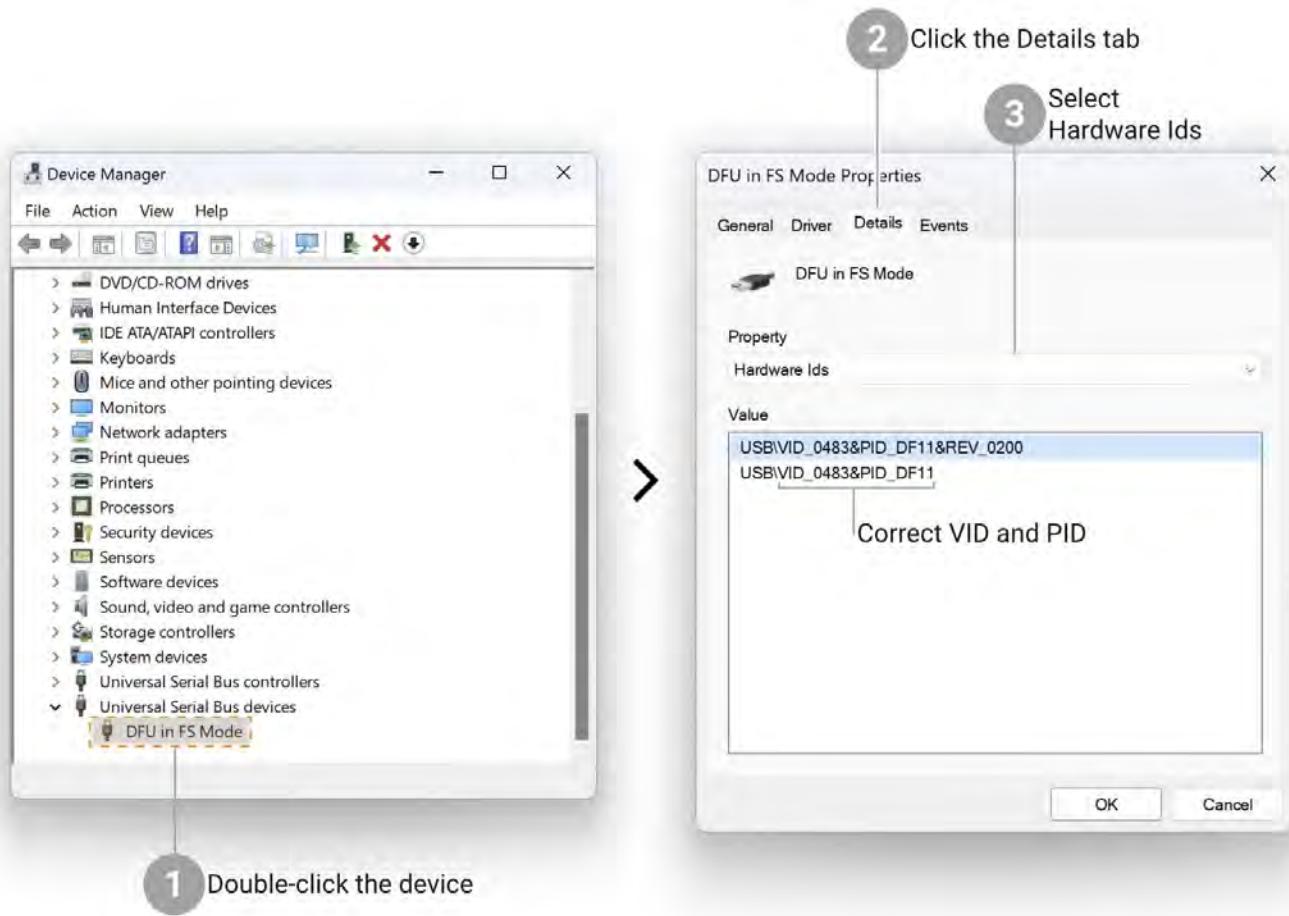
### 1 Reboot your Flipper Zero to Recovery mode:

1. Press and hold the **LEFT** and **BACK** buttons simultaneously.
2. Release the **BACK** button, but don't release the **LEFT** button until the blue LED lights up.

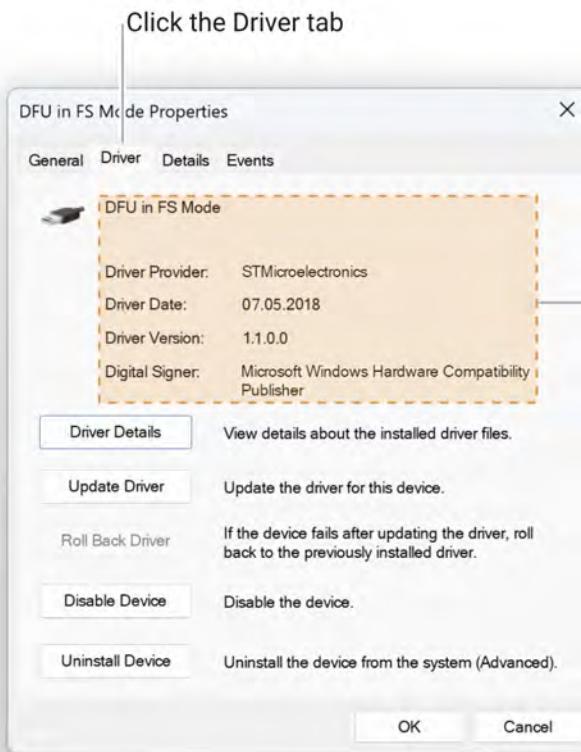


The Flipper Zero in Recovery mode

- 2 On your computer, close the **qFlipper** application if running.
- 3 Connect your Flipper Zero to the computer via a USB Type-C cable.
- 4 Go to **Device Manager -> Universal Serial Bus devices**.
- 5 Make sure that the connected device has the name: **DFU in FS Mode**.
- 6 If there are multiple devices, make sure the detected **DFU in FS Mode** device is your Flipper Zero:
  1. Double-click the **DFU in FS Mode** device and go to the **Details** tab.
  2. Set **Property** to **Hardware Ids**.
  3. Check if the **Vendor ID (VID)** is **0483** and **Product ID (PID)** is **DF11**.



- 7 Go to the **Driver** tab and make sure that the driver's name is **STMicroelectronics**.



## If you couldn't find the DFU device

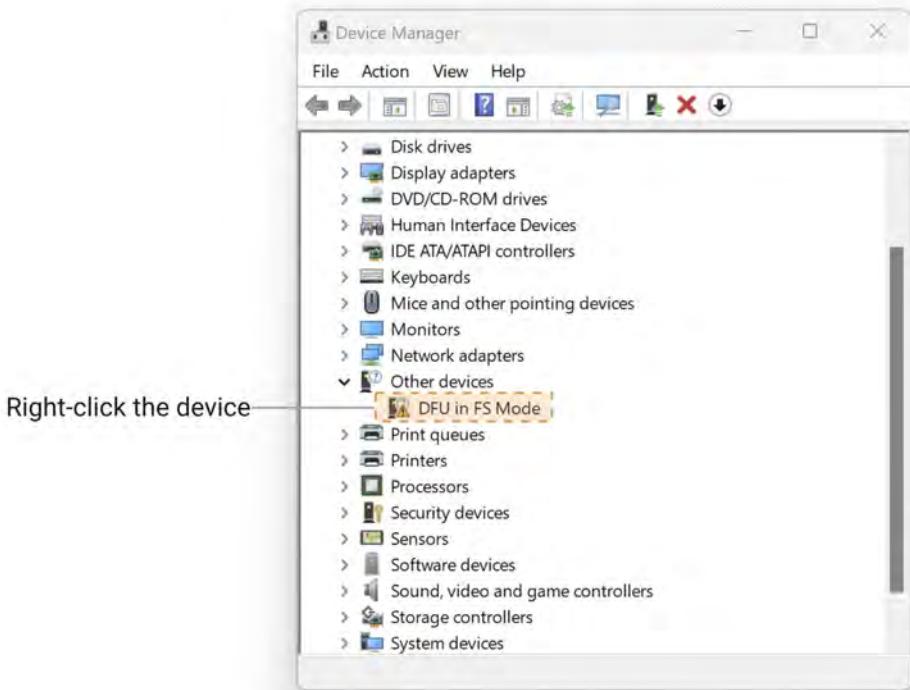
If you couldn't find the DFU device in **Device Manager -> Universal Serial Bus devices**, it means that the incorrect driver is installed or missing DFU device driver.

You can resolve the wrong driver issue by doing the following:

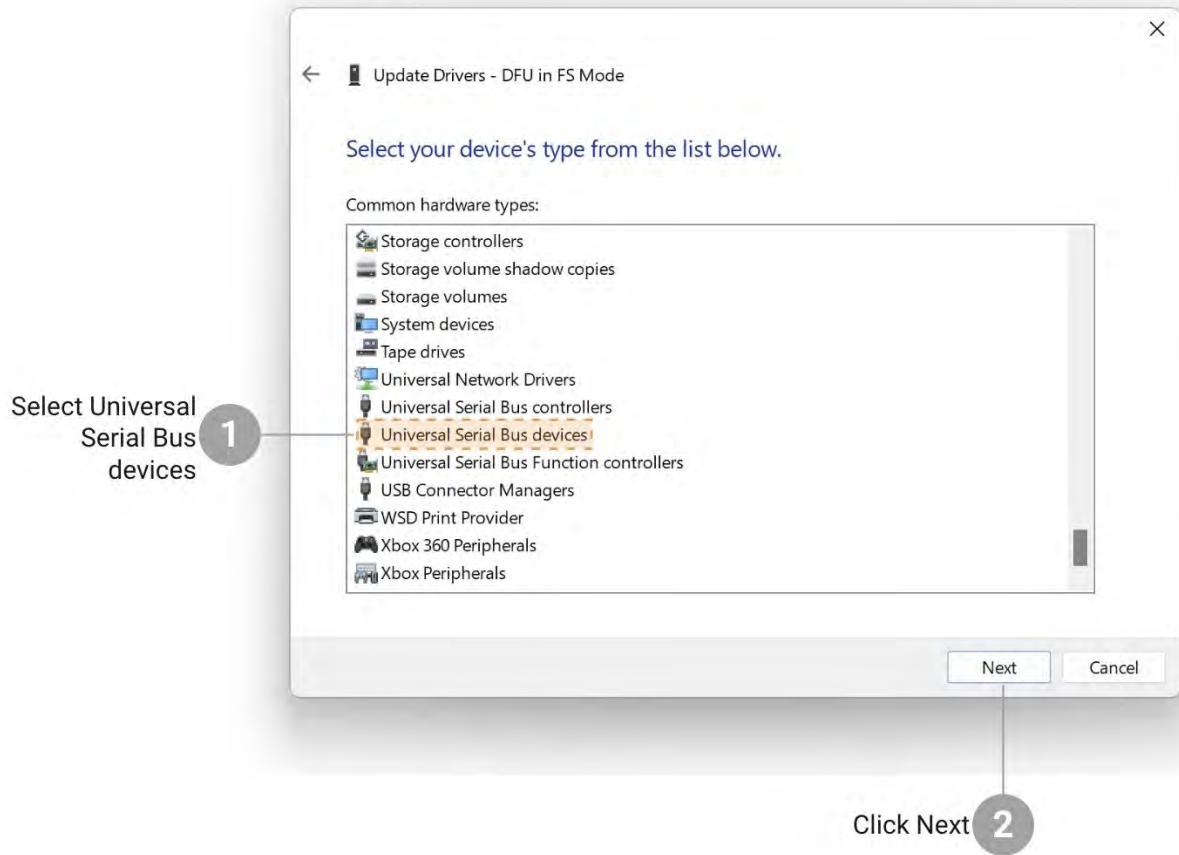
- 1 Go to **Device Manager -> Universal Serial Bus controllers**.
- 2 Look for the **STM Device in DFU mode** (this is the wrong driver).
- 3 If you found it, uninstall the **qFlipper** application in **Apps & features**.
- 4 Download the **qFlipper installer** from [\*\*the official sources\*\*](#) and reinstall the application.
- 5 Check if the **DFU device** appeared in the **Universal Serial Bus devices** section, then check the driver.

If there's no such a device, manually install the missing device by doing the following:

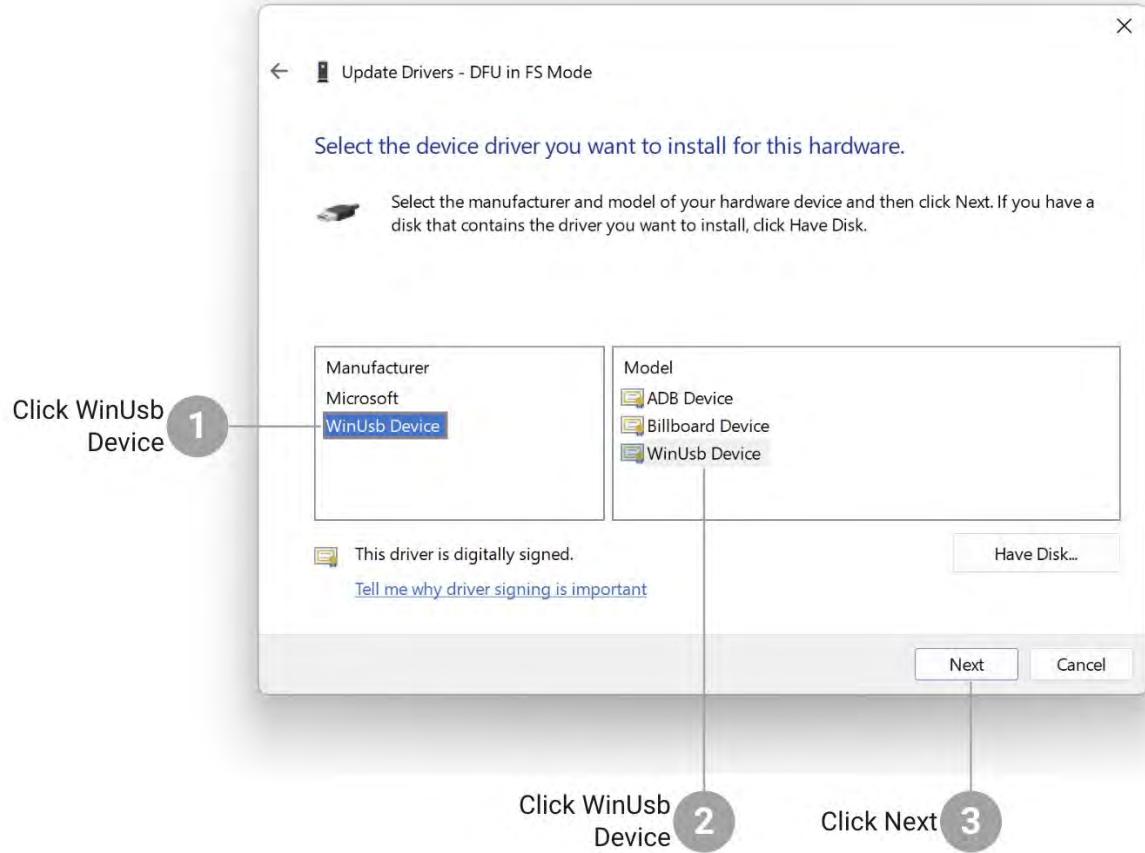
- 1 Go to **Device Manager -> Other devices**.
- 2 Look for the **DFU in FS Mode** with an exclamation sign and right-click it.



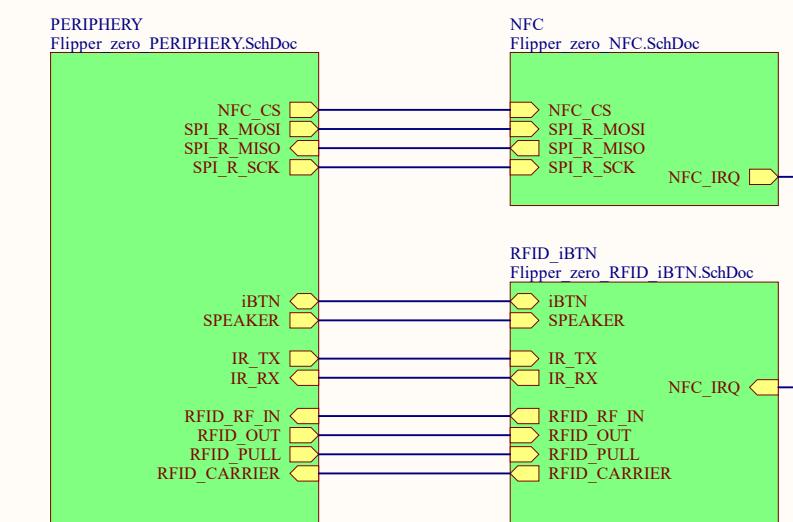
- 3 Go to **Update driver -> Browse my computer for drivers -> Let me pick from a list of available drivers**.
- 4 Select **Universal serial bus devices** and click **Next**.

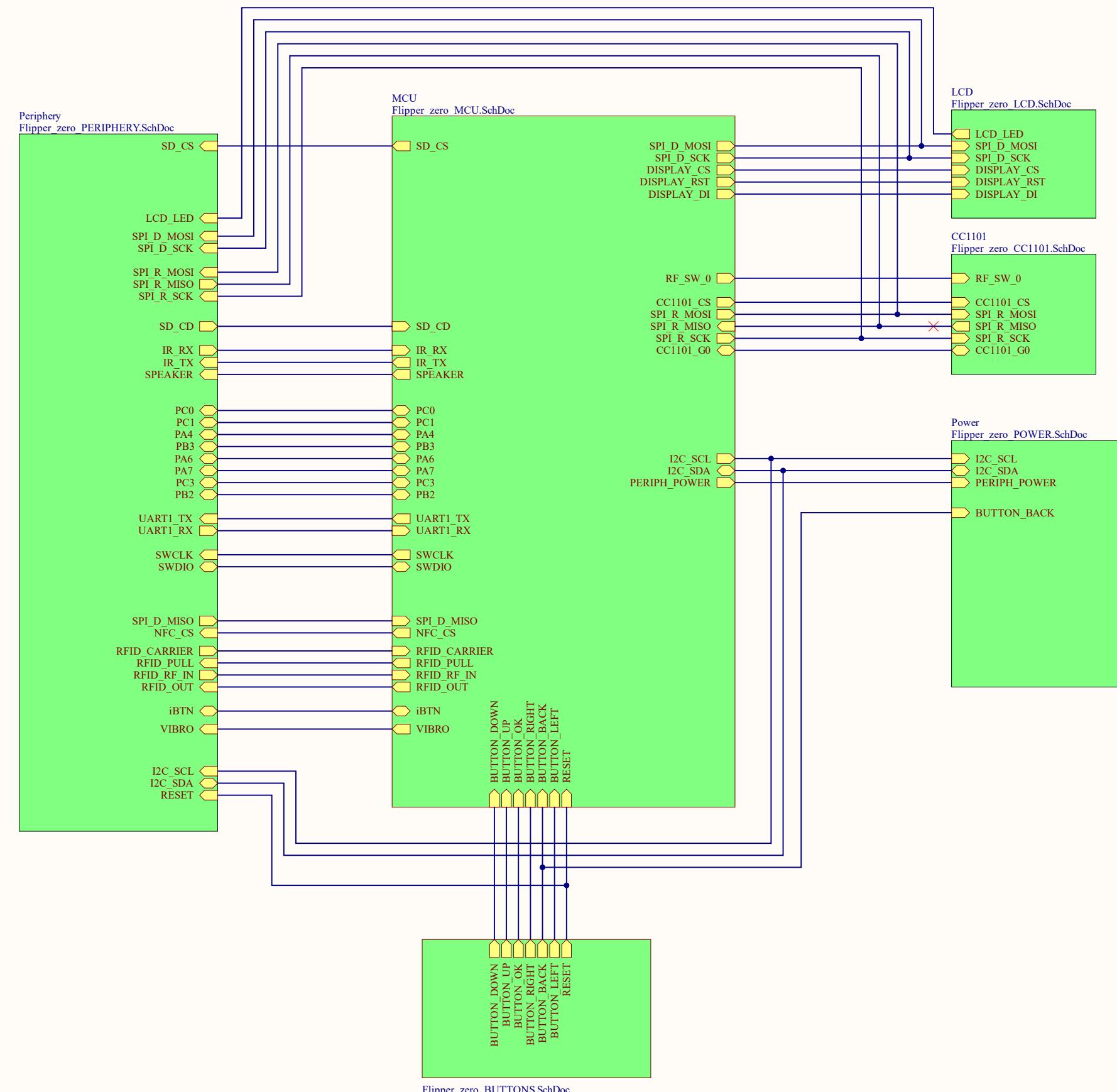


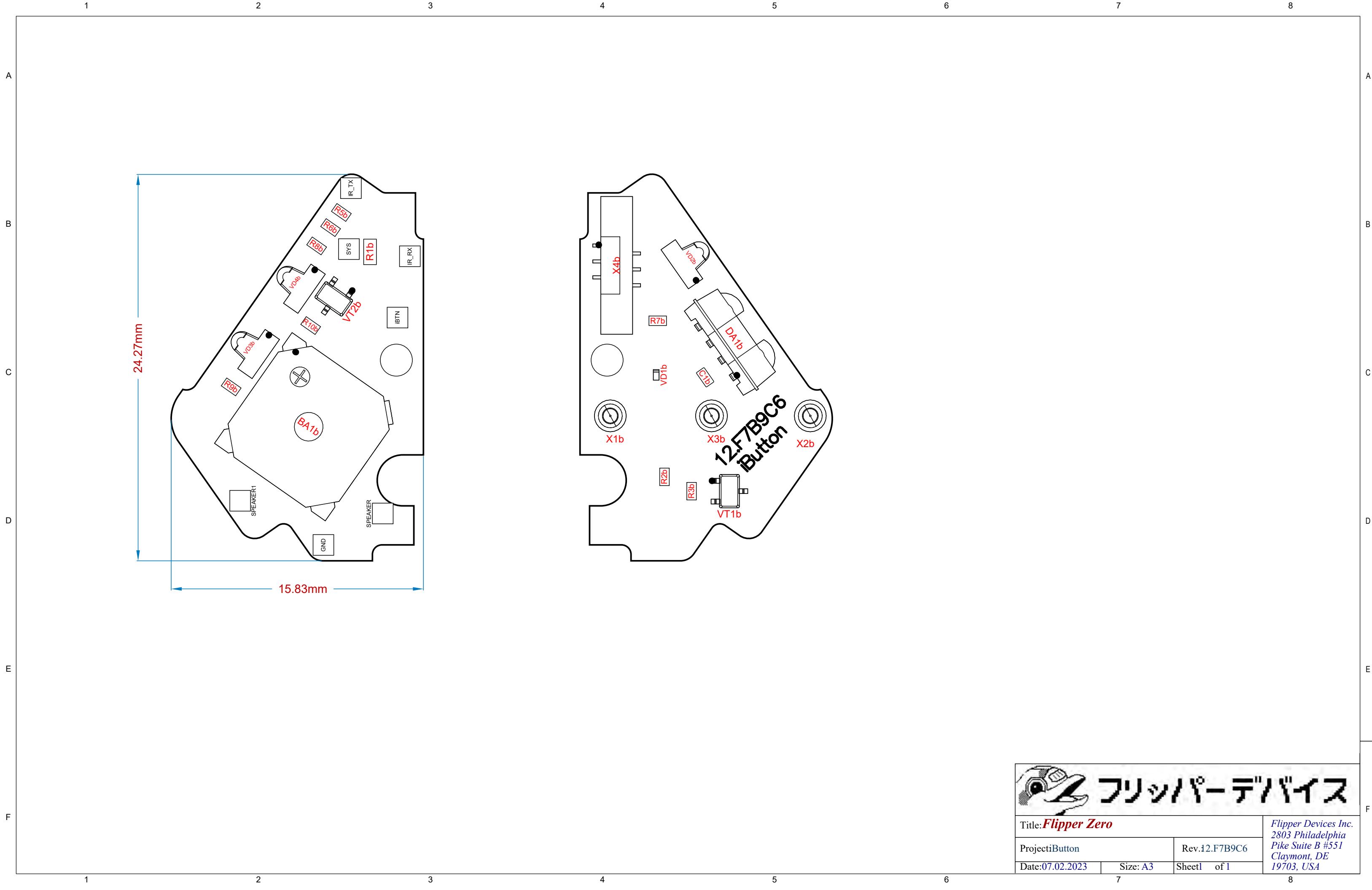
5 Select **WinUsb Device** -> **WinUsb Device** and click **Next**.

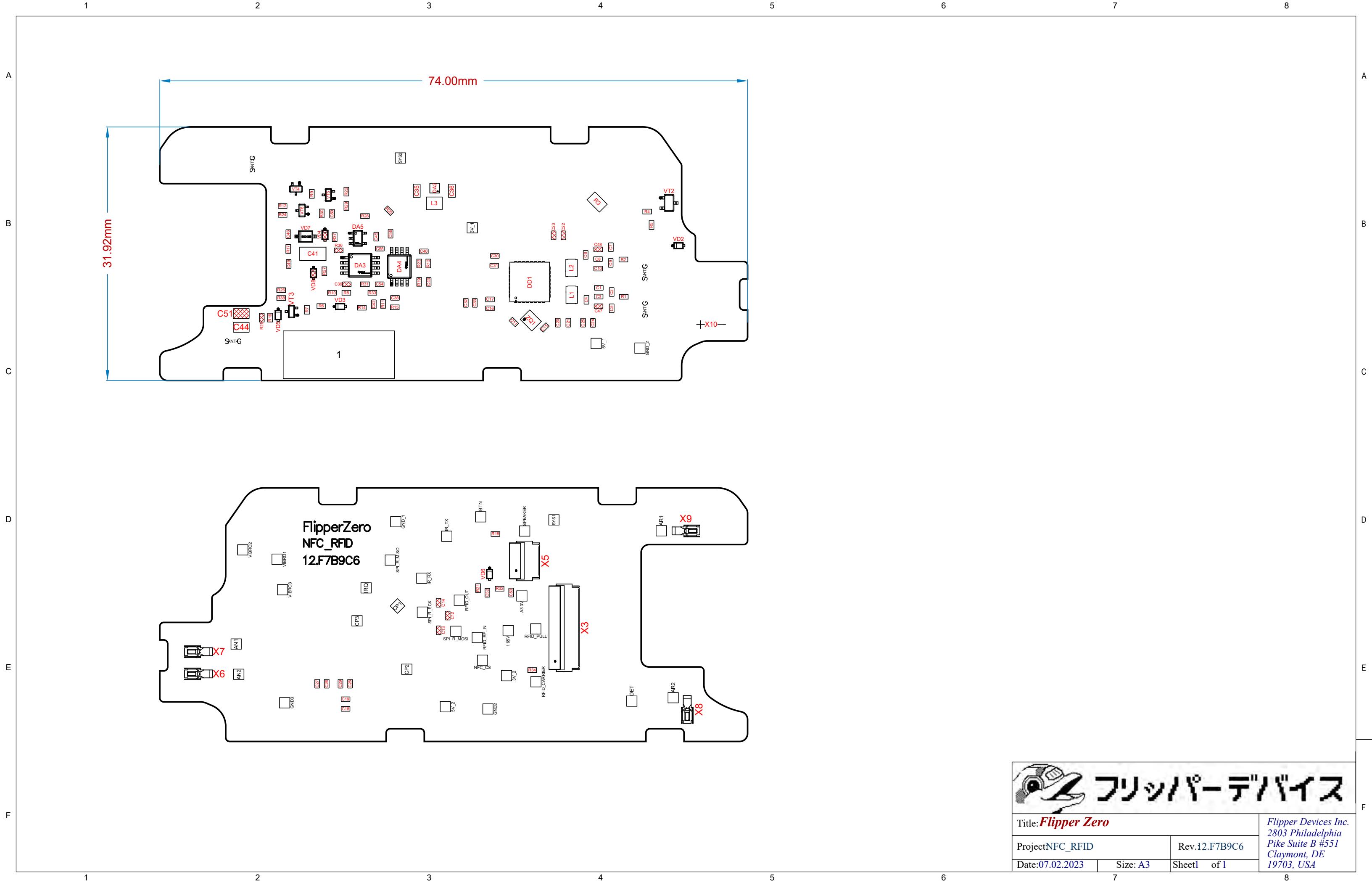


- 6 Check if the **DFU device** appeared in the **Universal Serial Bus devices** section, then check the driver.

A  
B  
C  
D  
E  
F

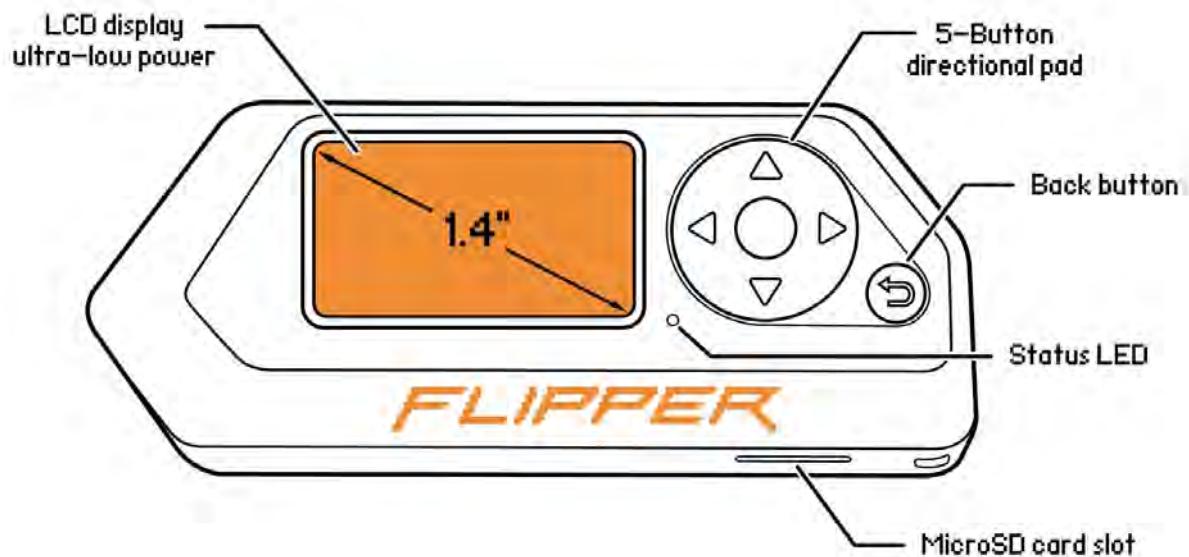






	フリッパー・テクノロジーズ	
Title: <b>Flipper Zero</b>		Flipper Devices Inc. 2803 Philadelphia Pike Suite B #551 Claymont, DE 19703, USA
ProjectNFC_RFID	Rev.12.F7B9C6	
Date: 07.02.2023	Size: A3	Sheet 1 of 1

# Flipper Zero tech specs



Take a closer look at the tech specs of your Flipper Zero and explore its hardware capabilities.

## Body



Flipper Zero



Flipper Zero Black  
Kickstarter backer edition



Flipper Zero Transparent  
Limited edition

**Materials:** PC, ABS, PMMA

## Size and weight



**Height:** 40.1 mm (1.58 inches)

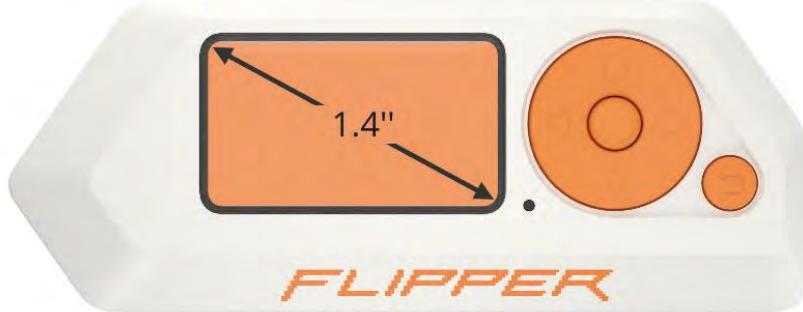
**Width:** 100.3 mm (3.95 inches)



**Depth:** 25.6 mm (1.01 inches)

**Weight:** 102 grams (3.6 ounces)

## Display



**Type:** Monochrome LCD

**Resolution:** 128x64 pixels

**Controller:** ST7567

**Interface:** SPI

**Diagonal size:** 1.4"

## Buttons and connectors



## Microcontroller unit

**Model:** [STM32WB55RG](#)

**Application processor:** ARM Cortex-M4 32-bit 64 MHz

**Radio processor:** ARM Cortex-M0+ 32-bit 32 MHz

**Radio:** Bluetooth LE 5.4, 802.15.4, and proprietary

**Flash:** 1024 KB (shared between application and radio)

**SRAM:** 256 KB (shared between application and radio)

## Sub-1 GHz module

**Transceiver:** [CC1101](#)

**TX power:** -20 dBm max

**Frequency bands (depends on your region):**

- 315 MHz
- 433 MHz
- 868 MHz
- 915 MHz

## NFC

**Transceiver:** [ST25R3916](#)

**Frequency:** 13.56 MHz

**Supported cards:**

- ISO-14443A/B
- NXP MIFARE Classic®, Ultralight®, DESFire®, etc.
- FeliCa™
- HID iClass (Picopass)
- NFC Forum protocols

## RFID 125 kHz

**Frequency:** 125 KHz

**Modulation:** AM, OOK

**Coding:** ASK, PSK

### **Supported cards:**

- EM400x, EM410x, EM420x
- HID
- Indala
- FDX (A & B)
- Pyramid
- AWID
- Viking
- Jablotron
- Paradox
- PAC Stanley
- Keri
- Gallagher
- Nexwatch

## **GPIO**

13 I/O pins available to user on external 2.54 connectors

3.3 V CMOS Level

Input 5 V tolerant (See [AN4899](#))

Up to 20 mA per digital pin

## **Infrared**

**RX wavelength:** 950 nm ( $\pm 100$  nm)

**RX carrier:** 38 KHz (+/-5%)

**TX wavelength:** 940 nm

**TX carrier:** 0-2 MHz

**TX power:** 300 mW

#### **Supported protocols:**

- NEC family
- Kaseikyo
- RCA
- RC5, RC6
- Samsung
- SIRC

## iButton 1-Wire

#### **Supported protocols:**

- Dallas DS199x, DS1971
- CYFRAL
- Metakom
- TM2004
- RW1990

## Battery

**Battery type:** Lithium polymer battery (LiPo)

**Battery capacity:** 2100 mAh

**Battery life:** up to 28 days

**Operating temperature:** 0° to 40° C (32° to 104° F)

## MicroSD card

**Maximum capacity:** up to 256 GB

**Recommended capacity:** 2-32 GB

**Interface type:** SPI

**Read/Write speed:** up to 5 Mbps

## USB

**Connector type:** Type-C

**Standard:** USB 2.0

**Data transfer speed:** 12 Mbps

**Maximum charging current:** 1 A

## Bluetooth LE 5.4

**TX power:** 4 dBm max

**RX sensitivity:** -96 dBm

**Data rate:** 2 Mbps

## Buzzer

**Frequency:** 100-2500 Hz

**Sound output:** 87 dB

**Type:** Coin

## Vibration motor

**Force value:** 30 N

**Speed:** 13500 rpm

## In the box

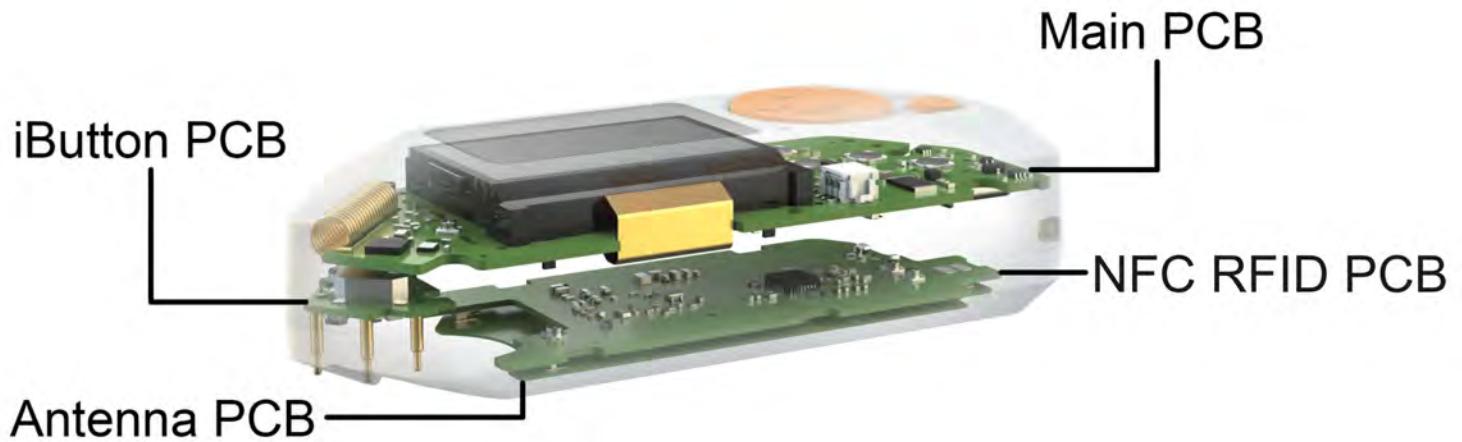
- Flipper Zero
- USB-C to USB-A cable
- Documentation
- Sticker

Flipper Zero doesn't come with a microSD card, so you'll need to purchase one separately.



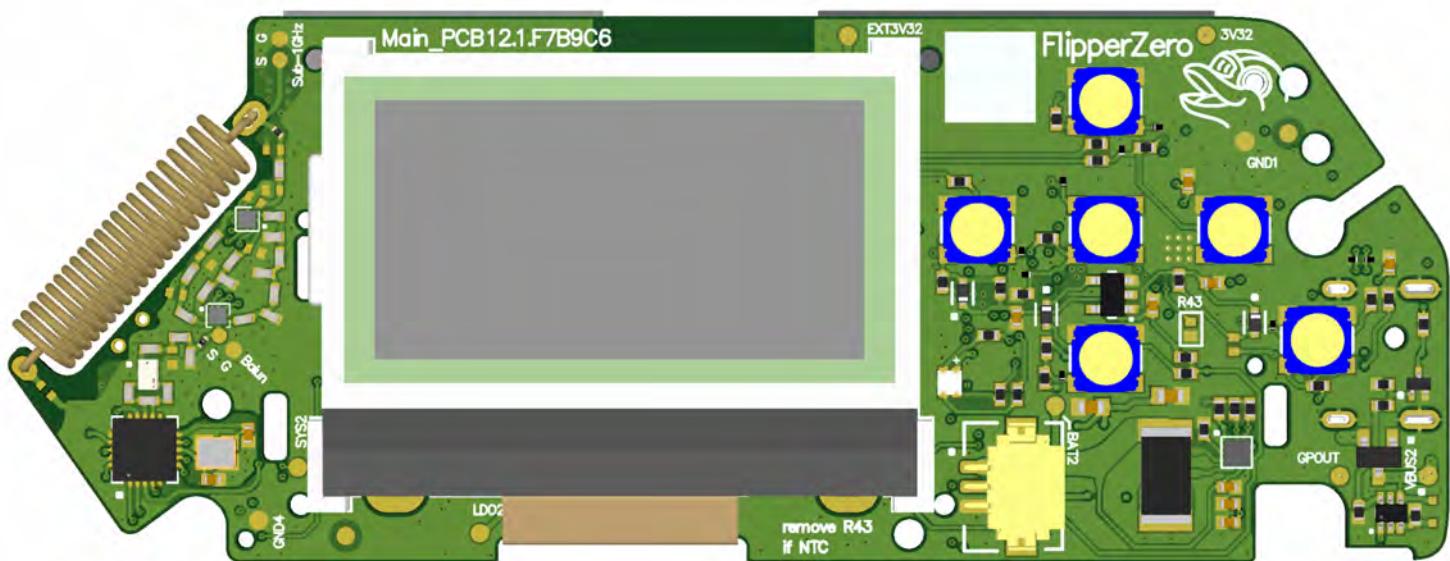
MIFARE, MIFARE Ultralight, MIFARE Classic, and DESFire are registered trademarks of NXP B.V.

# Flipper Zero schematics

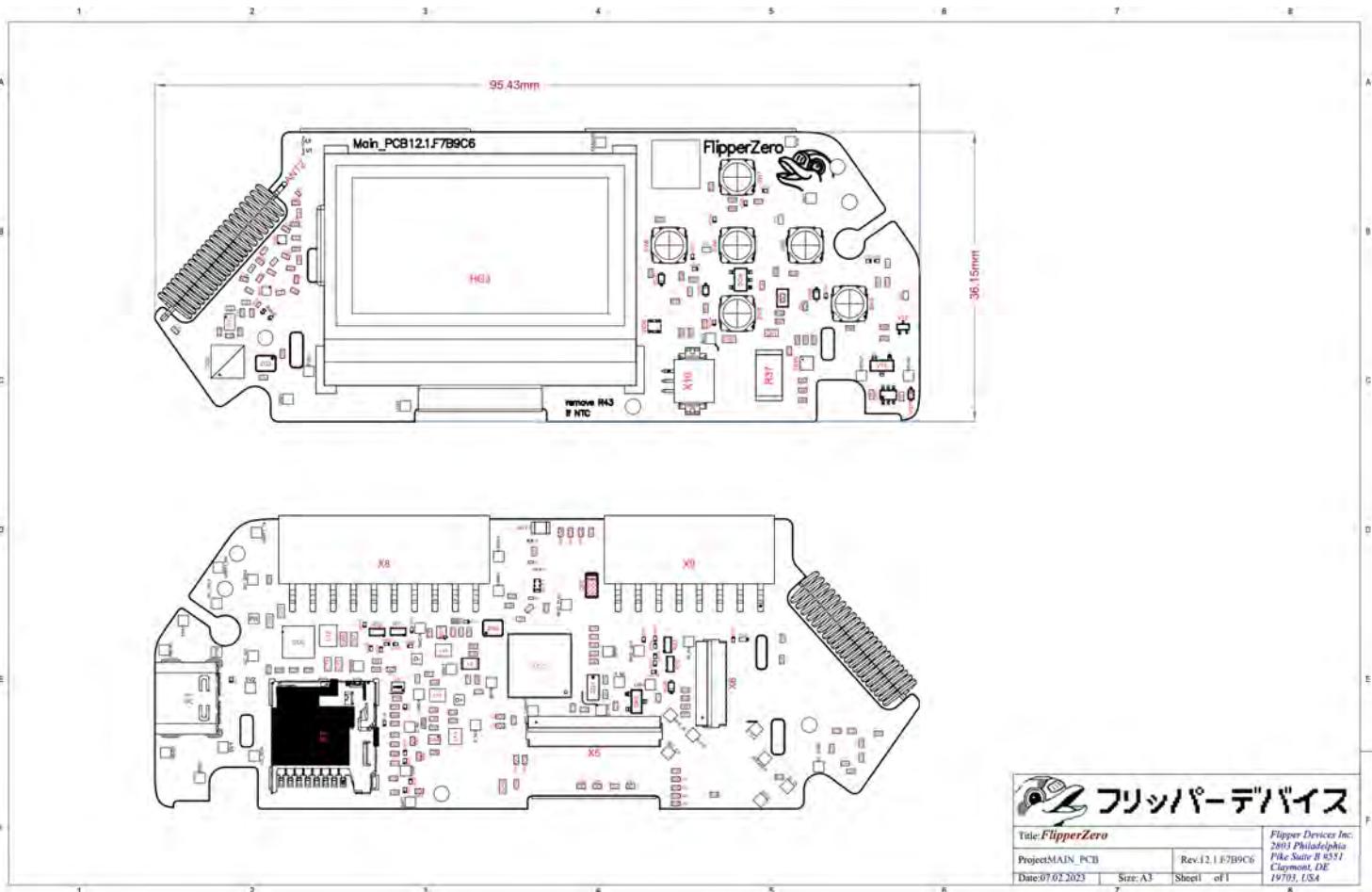


These are schematics of all Flipper Zero PCBs. They could be useful for hardware module development and low-level debugging. These schematics are for educational purposes only.

## Main PCB



# Main PCB assembly drawing



[MAIN\\_PCB\\_12.1.F7B9C6\\_Assembly.pdf](#)

## Main blocks overview

Every block is shown in detail as a separate document below.

 **Main PCB\_main blocks.pdf**



## Power

Power management system for all components.

 Power schematic.pdf



## Peripherals

 Peripherals schematic.pdf



## MCU STM32WB55

 **MCU STM32WB55 schematic.pdf** 

## LCD display

 **LCD display schematic.pdf**



## Sub-1 GHz CC1101

 **Sub-1 GHz CC1101 schematic.pdf**

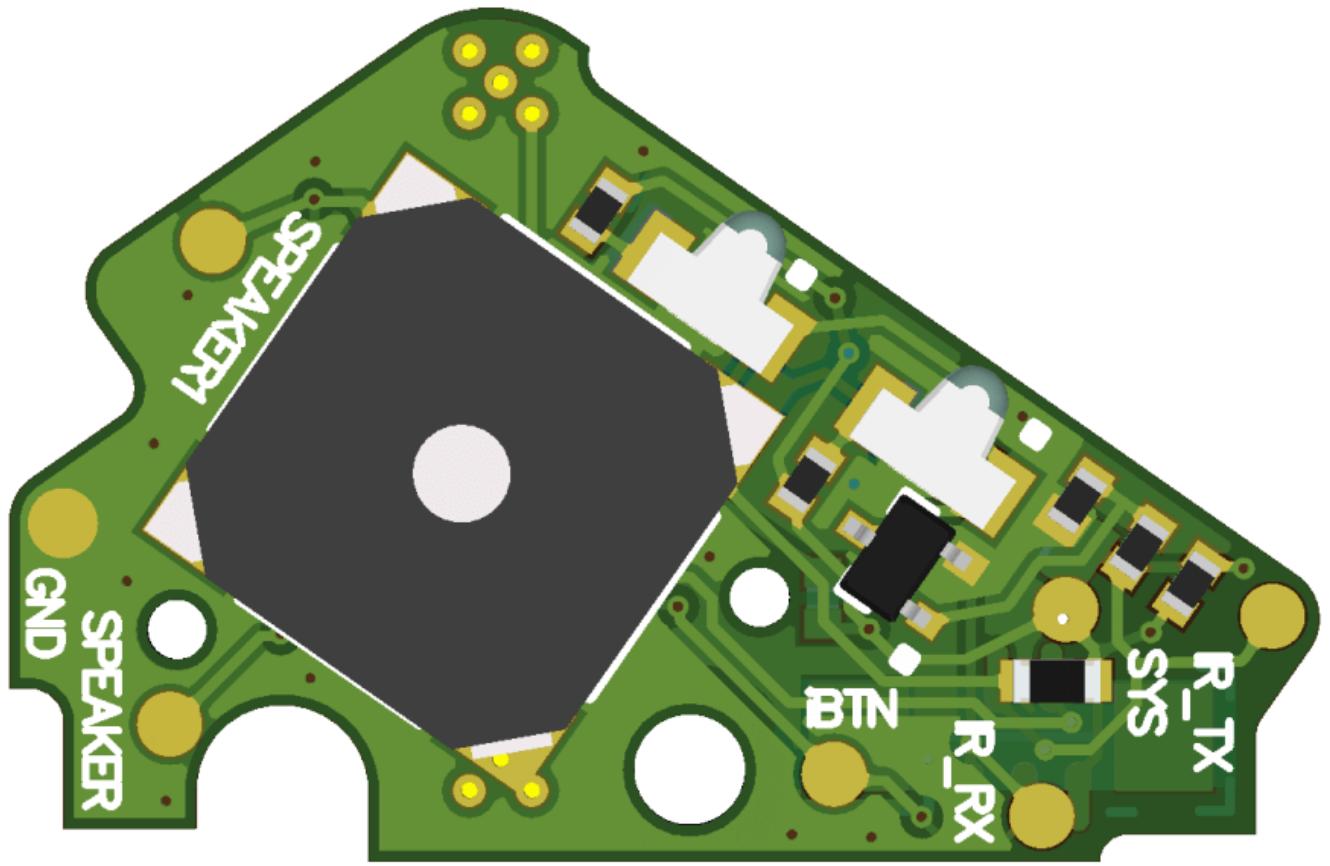


## Buttons

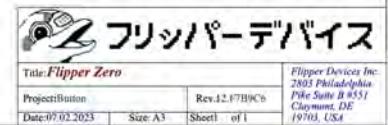
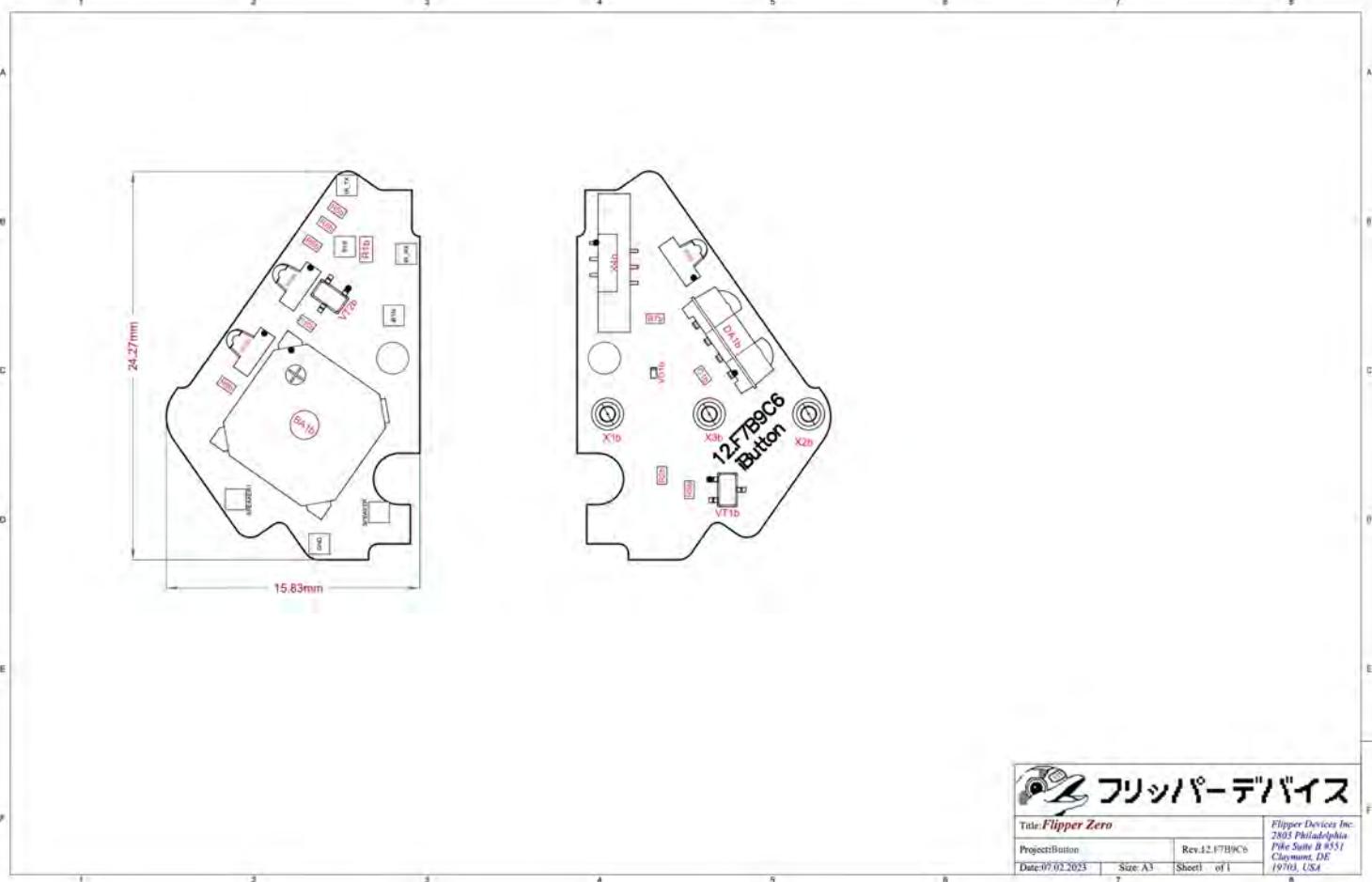
 [Buttons schematic.pdf](#) 

## iButton PCB

Piezo speaker and IR are also placed on this PCB.



iButton PCB assembly drawing



[iButton\\_PCB\\_12.F7B9C6-Assembly.pdf](#)



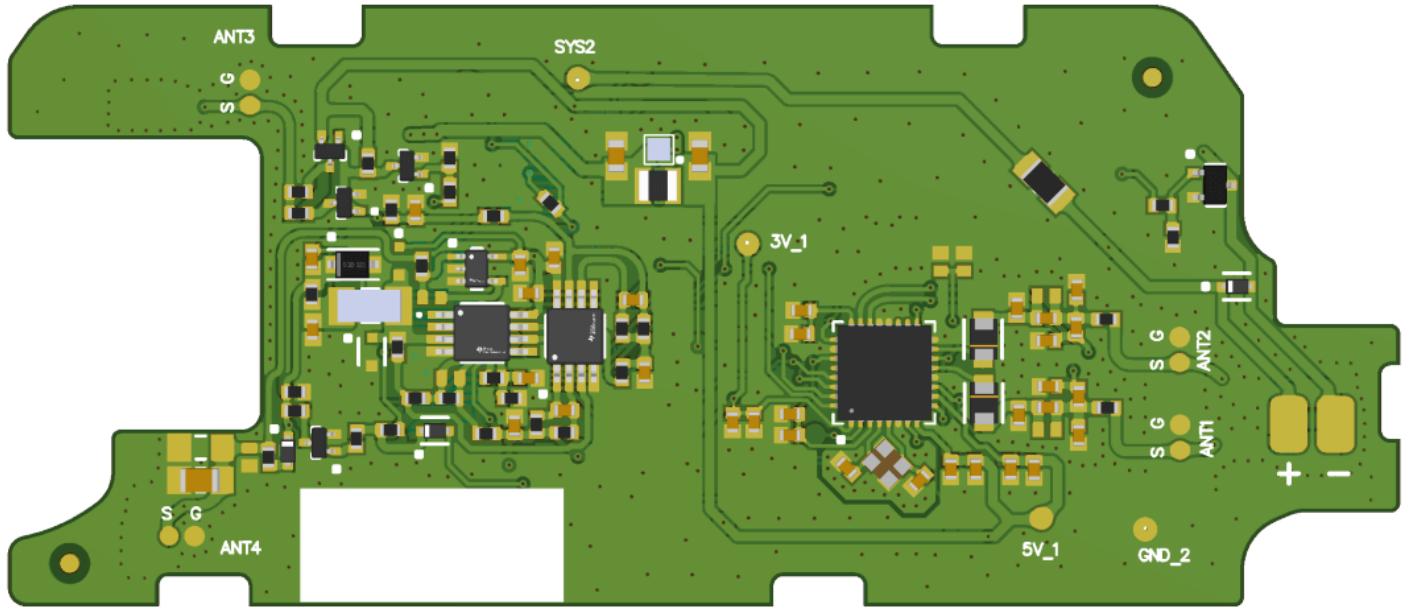
 [iButton schematic.pdf](#)



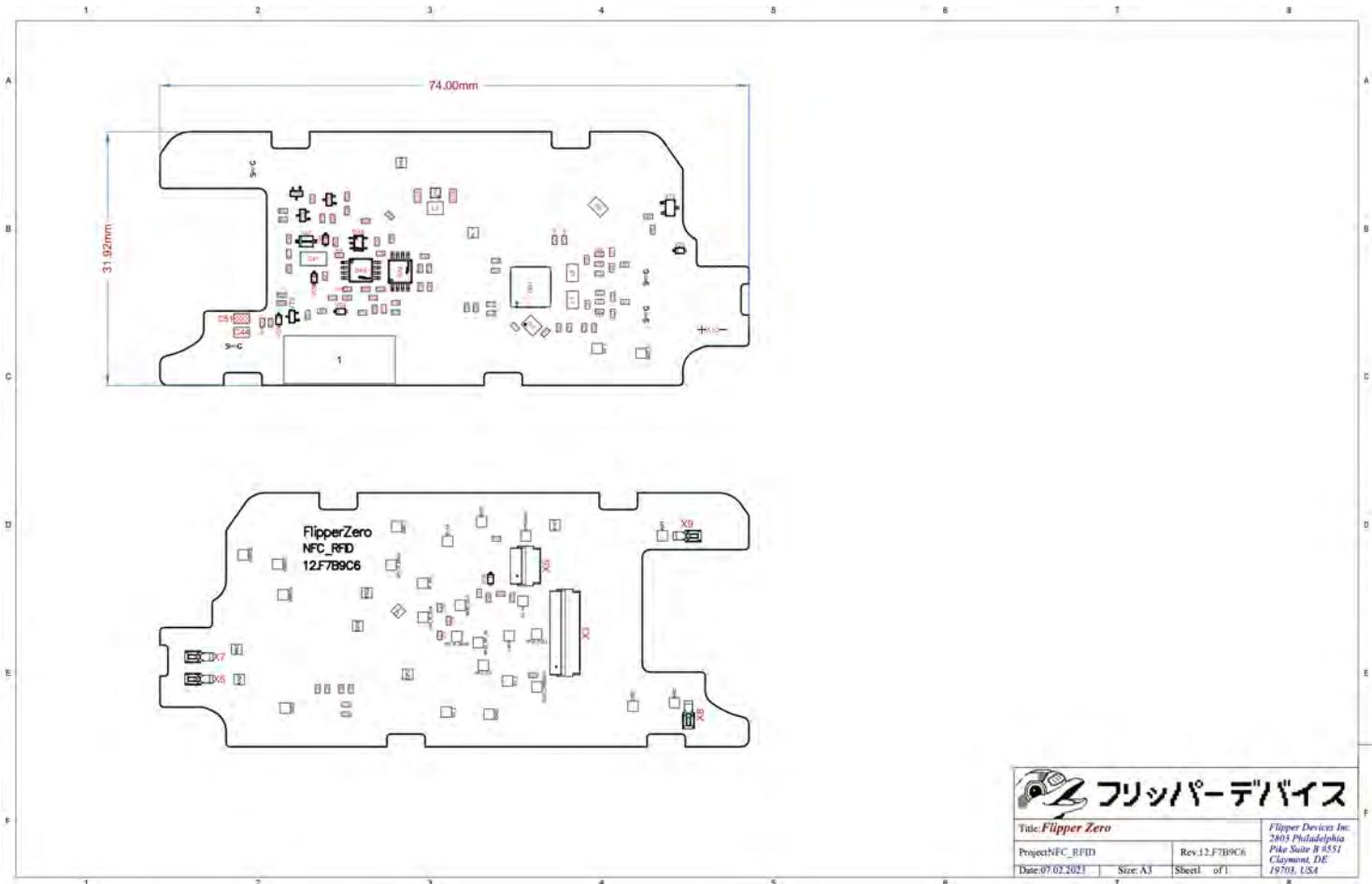
In the 13.F7B9C6 version of the iButton PCB, the pogo pin footprints were changed due to the implementation of through-hole pogo pins instead of SMD pogo pins. The footprint diameters are the same as in the 12.F7B9C6 version.

## NFC RFID PCB

This PCB contains RFID 125 KHz and NFC modules.



## NFC RFID PCB assembly drawing



## NFC blocks overview

 NFC blocks.pdf



NFC

 NFC schematic.pdf



## Power and vibro

 Power and vibro schematic.pdf



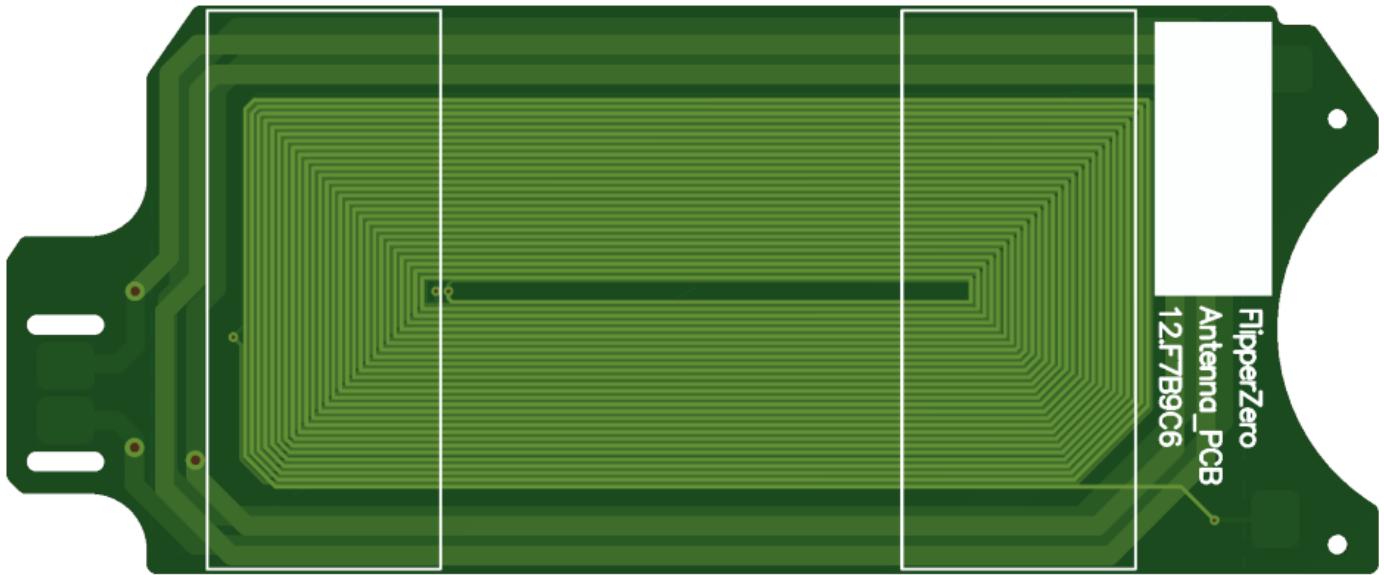
## RFID

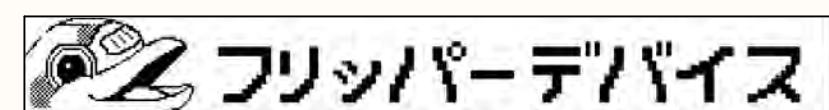
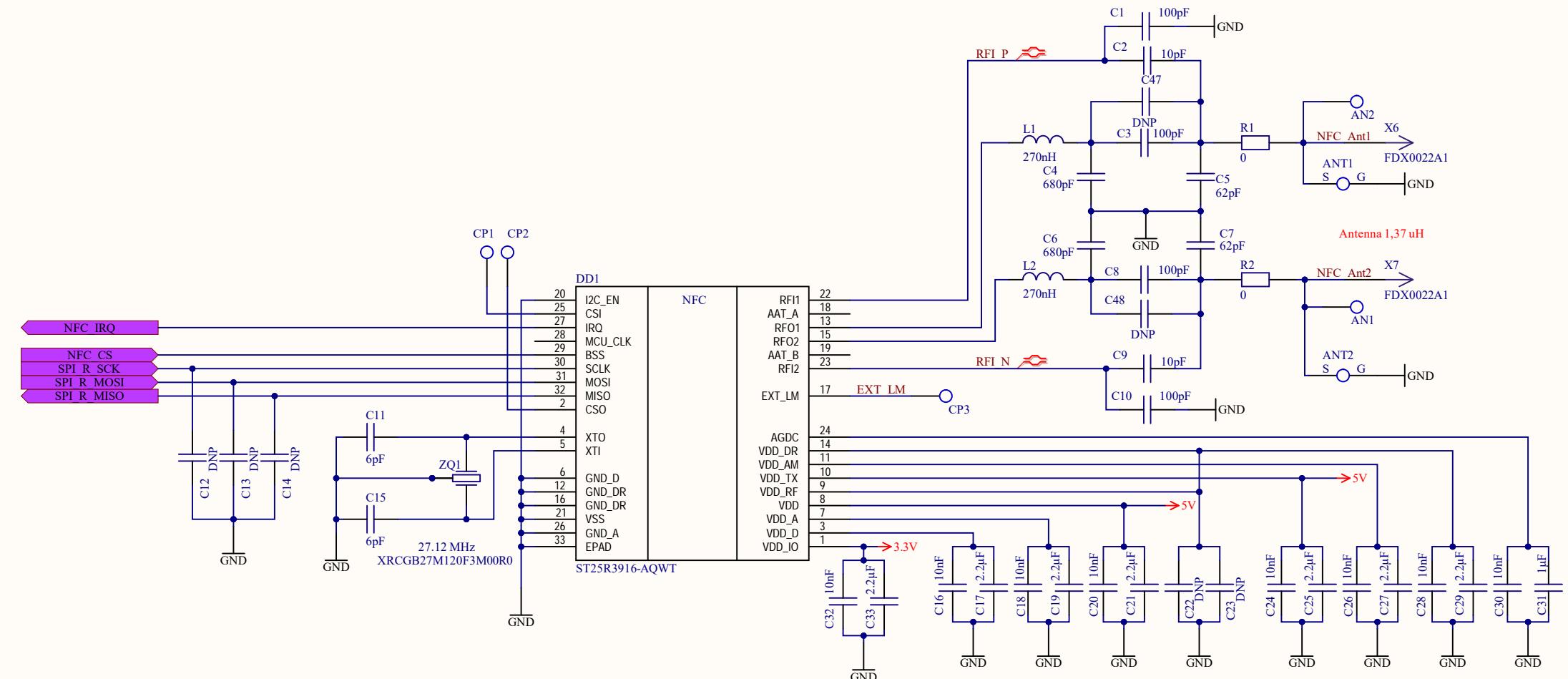


RFID schematic.pdf



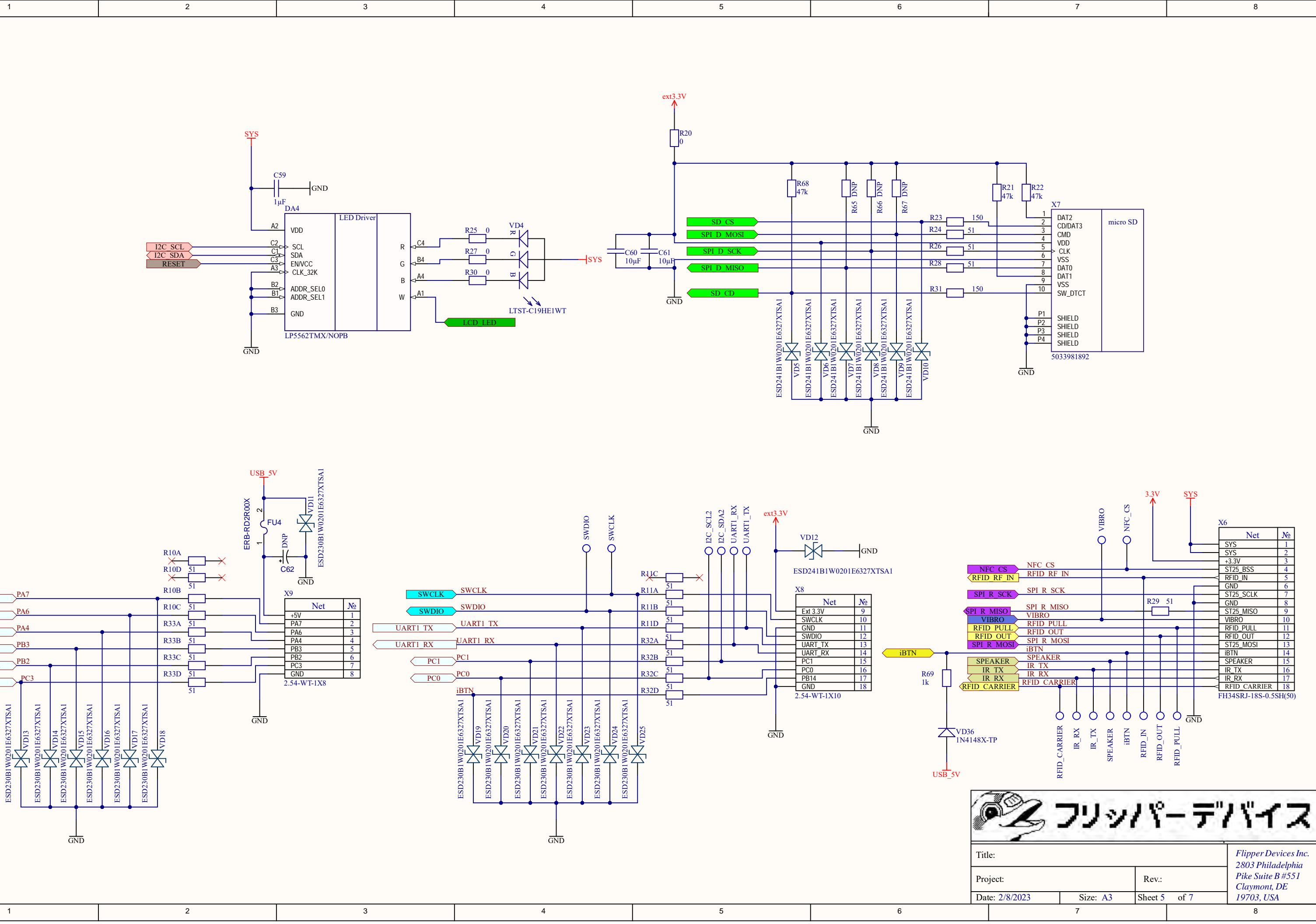
## Antenna PCB

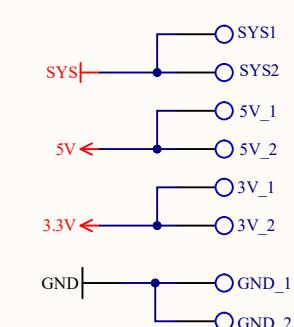
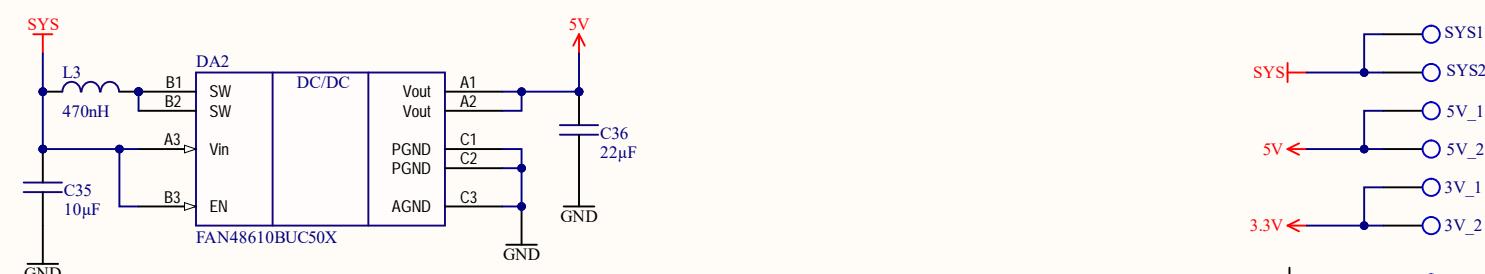
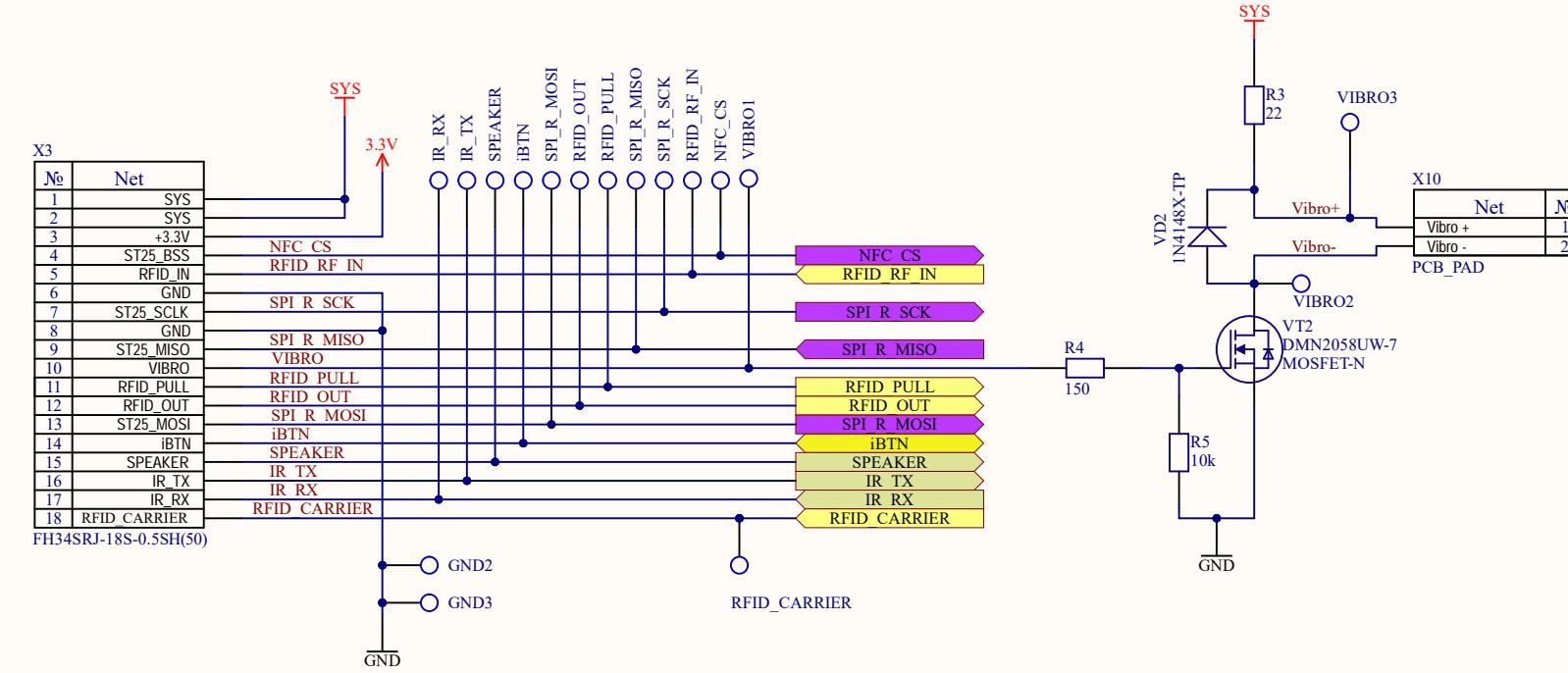


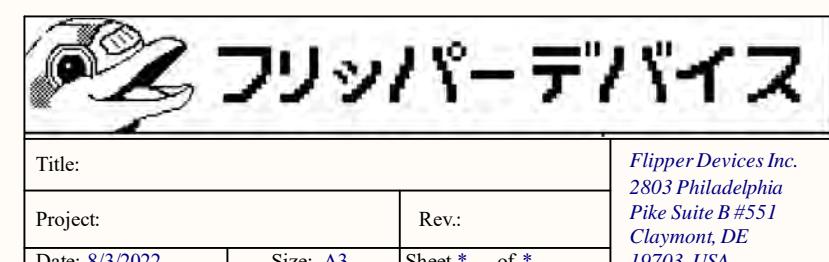
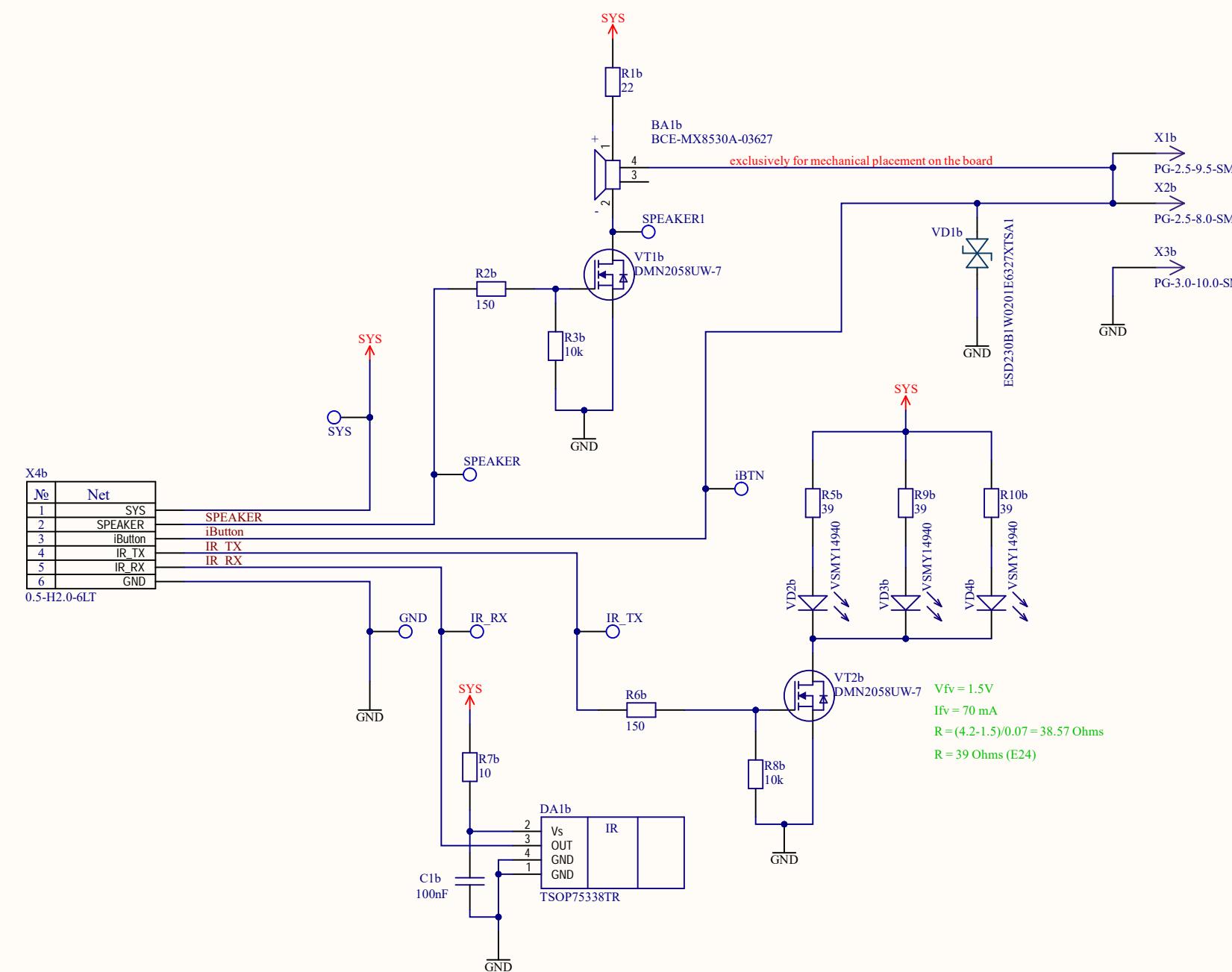


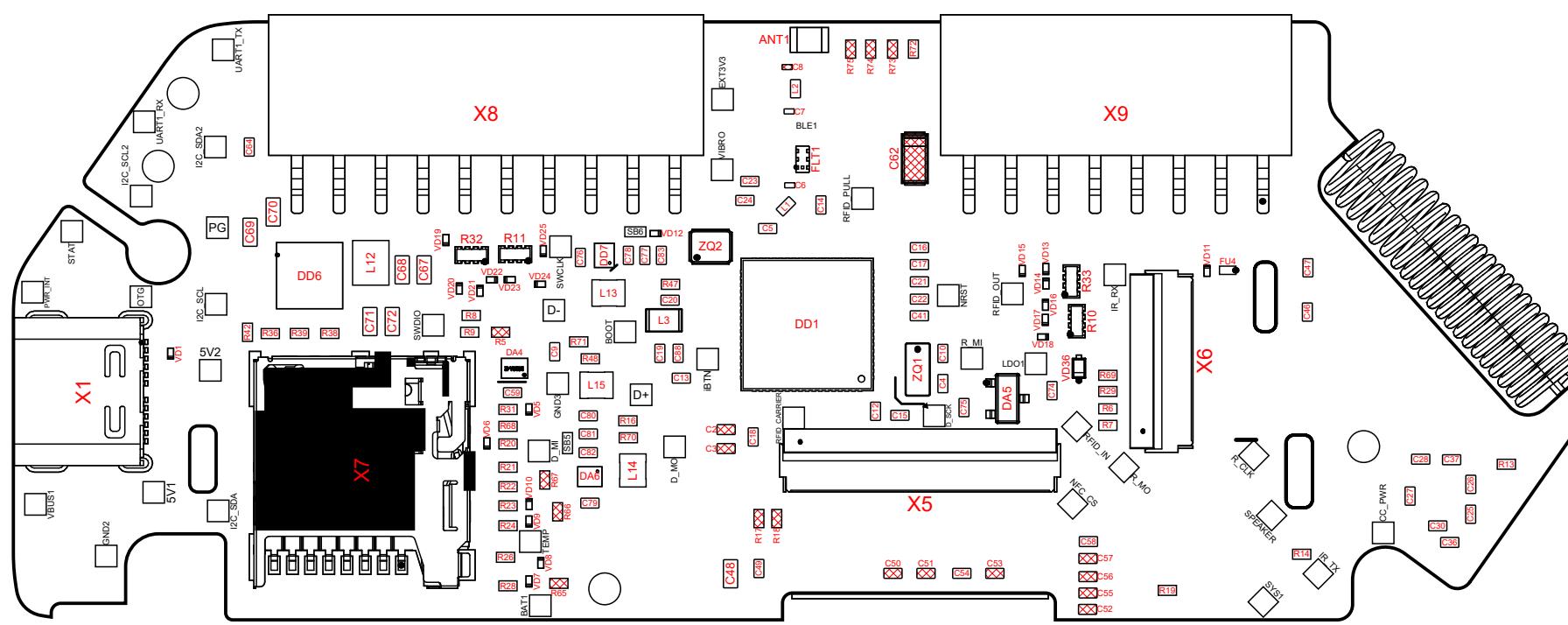
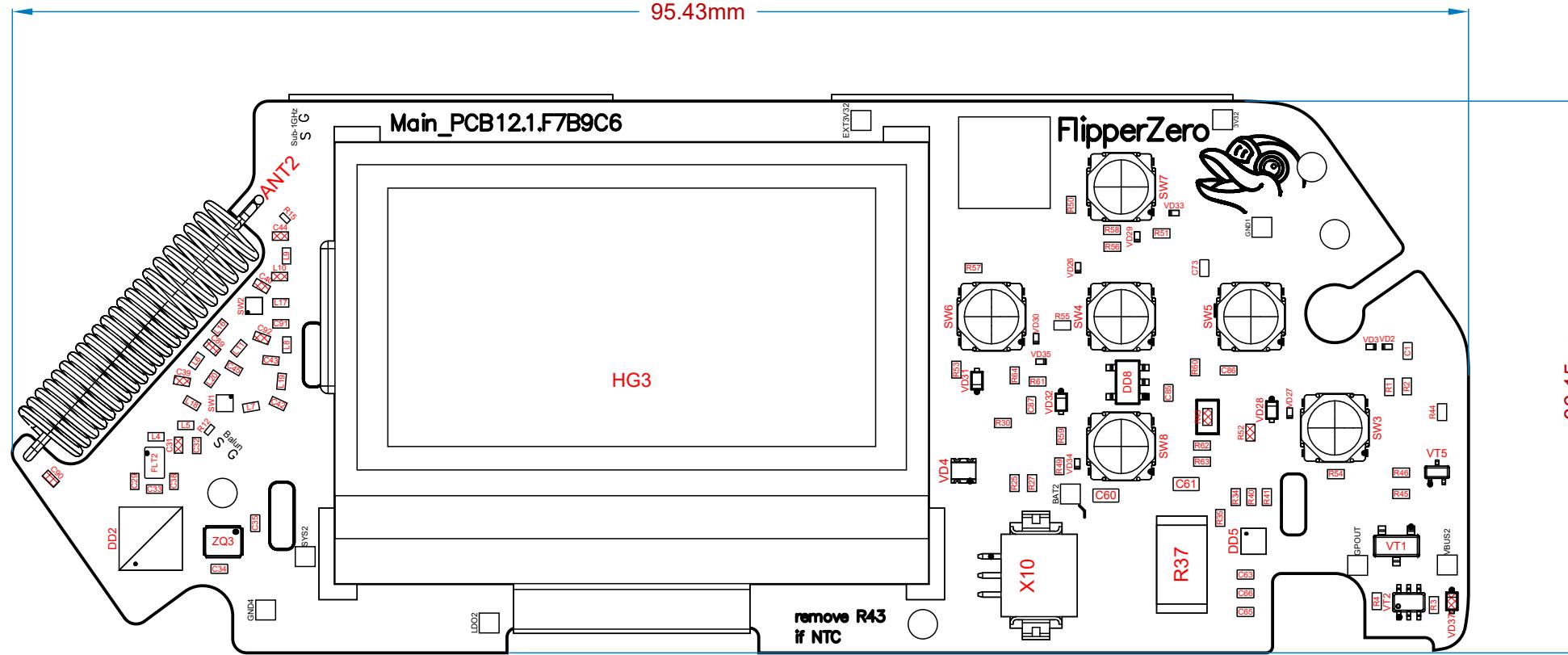
Title:			Flipper Devices Inc.
Project:			2803 Philadelphia
Date: 8/3/2022	Size: A3	Rev.: Claymont, DE	Sheet 3 of 4

Pike Suite B#551  
Claymont, DE  
19703, USA



A A  
B B  
C C  
D D  
E E  
F F

A  
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D  
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F



 フリッパー・ゼロ

Title: <b>FlipperZero</b>		Flipper Devices Inc. 2803 Philadelphia Pike Suite B #551 Claymont, DE 19703, USA
ProjectMAIN_PCB	Rev.12.1.F7B9C6	
Date: 07.02.2023	Size: A3	Sheet 1 of 1

A

A

B

B

C

C

D

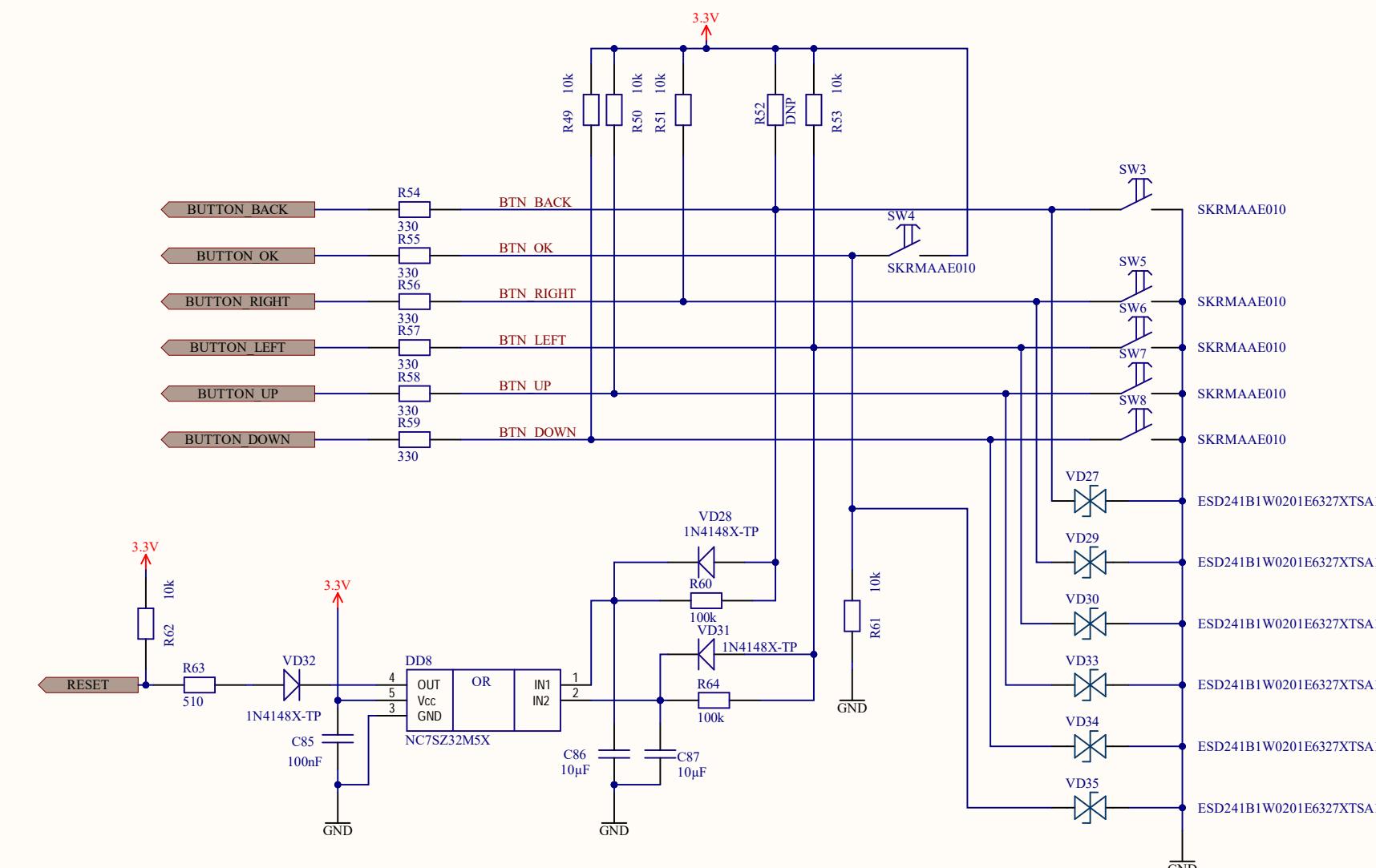
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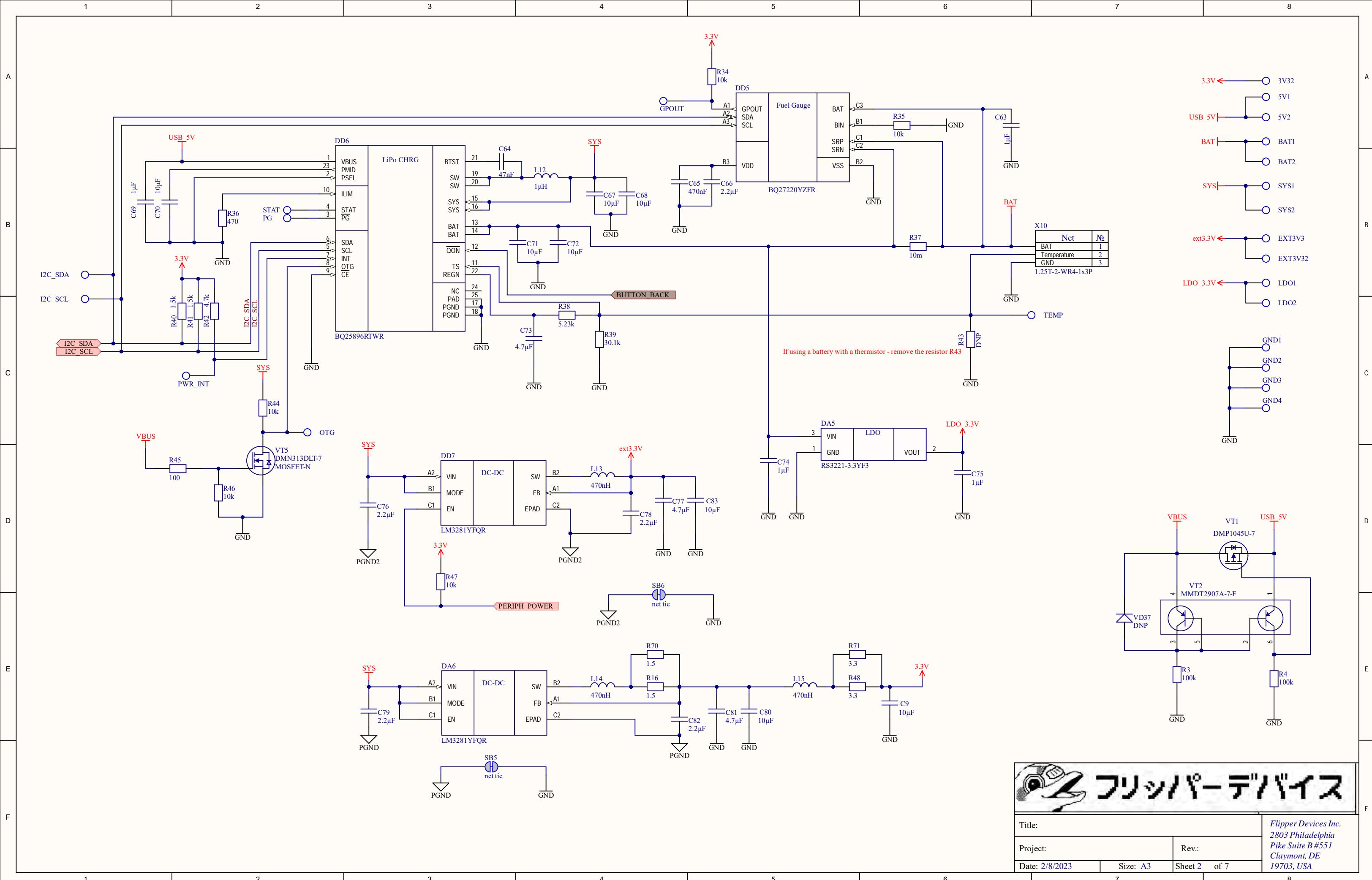
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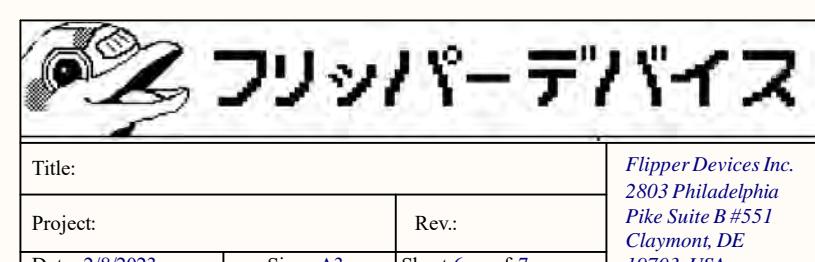
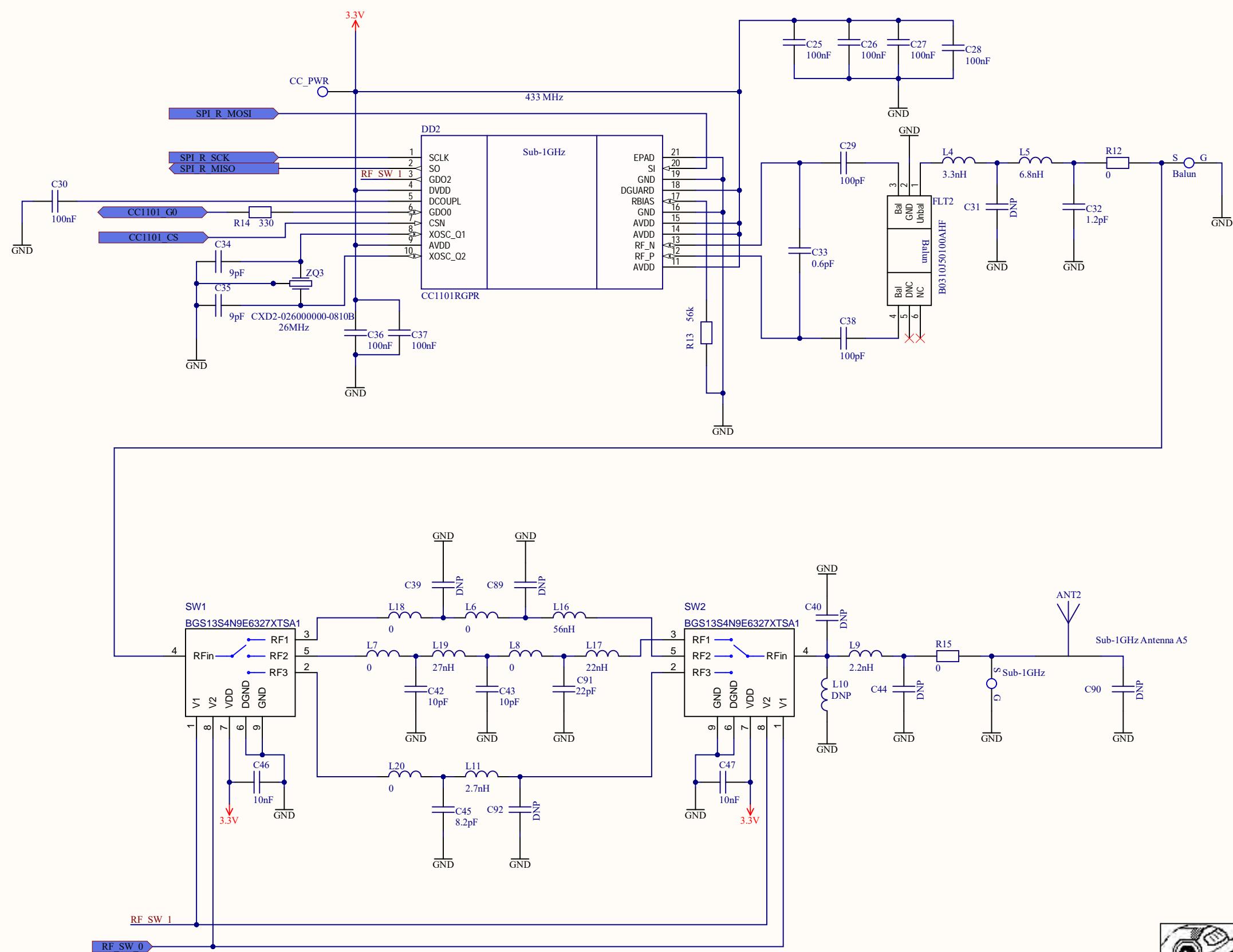
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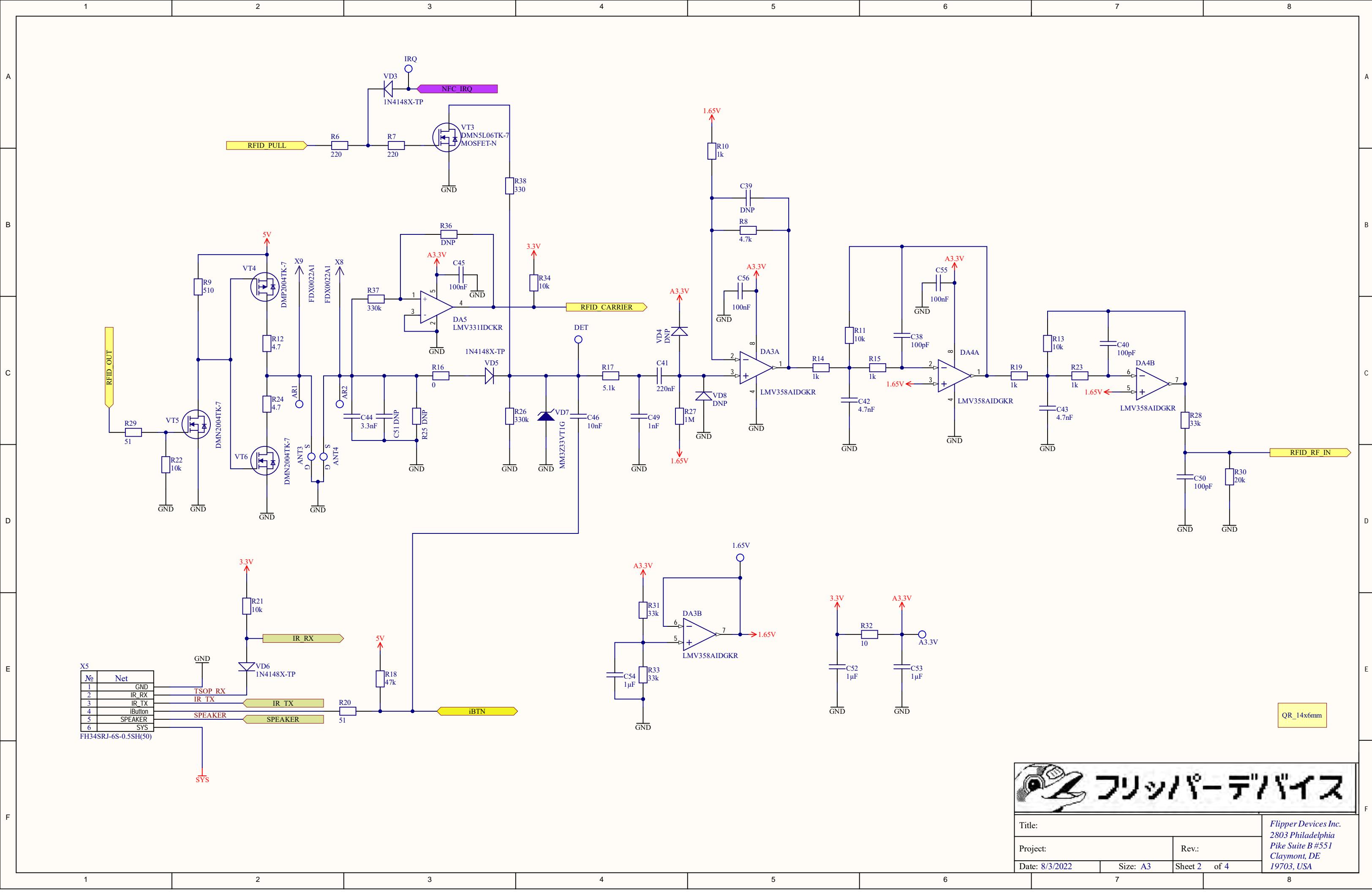
F





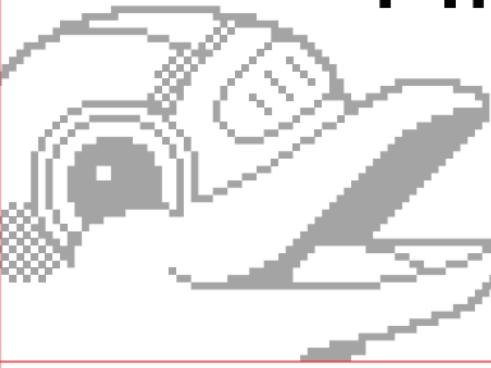


Title:		
Project:		Rev.:
Date: 2/8/2023	Size: A3	Sheet 6 of 7

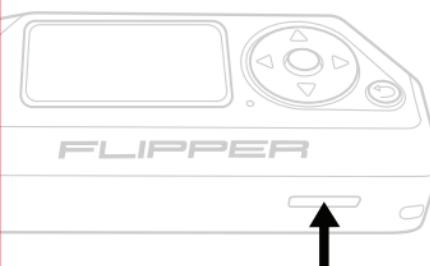


# Flipper Zero

## Quick Start

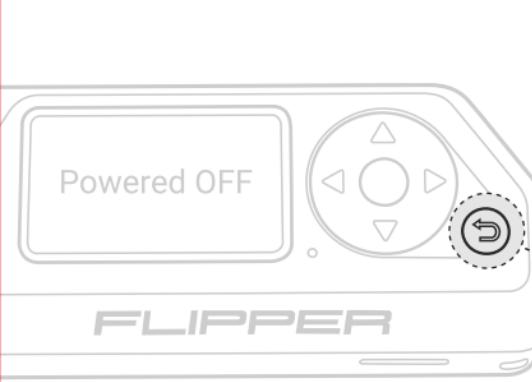


Read full manual here  
<https://docs.flipperzero.one>



Install SD-card in the correct position. Flipper Zero supports cards up to 256GB but 16GB is enough. You can format SD-card filesystem from Flipper's menu or format on PC to exFAT or FAT32 filesystem.

Flipper Zero connects to SD-card in slow mode.  
Only original SD-cards support this mode correctly.  
Recommended SD-cards:  
<https://docs.flipperzero.one/basics/sd-card>



Hold Back for 3 sec. to power ON.

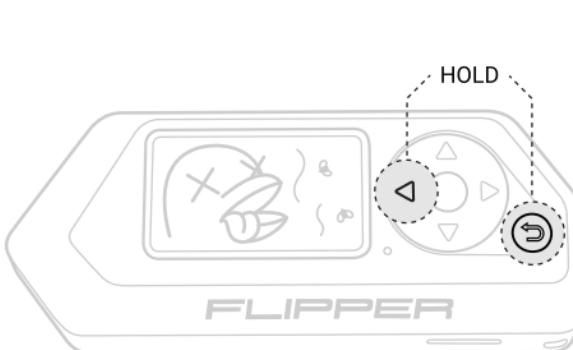
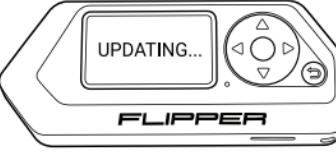
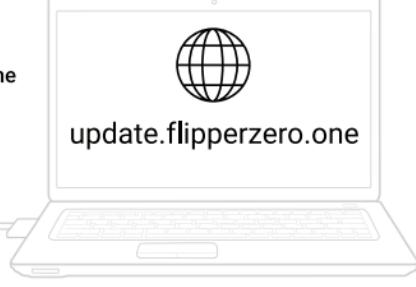
If Flipper Zero is not turning ON, charge the battery.

HOLD 3 sec.

## Firmware Update

It is very important to regularly update the firmware, as updates and bug fixes are constantly being released.

To update the firmware go to <https://update.flipperzero.one>



Since firmware is in beta version, it may freeze. In such case reboot device.

Hold Left + Back to reboot.

## Links

- Read the Documentation: [docs.flipperzero.one](https://docs.flipperzero.one)
- Talk with us in Discord: [flipp.dev/discord](https://flipp.dev/discord)
- Discuss features on Forum: [forum.flipperzero.one](https://forum.flipperzero.one)
- Check out Firmware Sources: [github.com/flipperdevices](https://github.com/flipperdevices)
- Report bugs: [flipp.dev/bug](https://flipp.dev/bug)

## Flipper Zero Safety and User Guide

Designed and distributed by  
**Flipper Devices Inc**  
 Suite B #551  
 2803 Philadelphia Pike  
 Claymont, DE 19707, USA  
[www.flipperdevices.com](http://www.flipperdevices.com)  
[support@flipperdevices.com](mailto:support@flipperdevices.com)

Designed and distributed by  
**Flipper Devices Inc**  
 Suite B #551  
 2803 Philadelphia Pike  
 Claymont, DE 19707, USA  
[www.flipperdevices.com](http://www.flipperdevices.com)  
[support@flipperdevices.com](mailto:support@flipperdevices.com)

## WARNING

### ES ADVERTENCIA

- Do not expose this product to water, moisture or heat.
- It is designed for reliable operation at normal room temperatures and humidity.
- Any peripheral or equipment used with the Flipper Zero should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met.
- Any external power supply used with the product shall comply with relevant regulations and standards applicable in the country of intended use. The power supply should provide 5V DC and a minimum rated current of 0.5A.
- Any changes or modifications to the product that are not expressly approved by Flipper Devices Inc may void the user's authority to operate the equipment and your warranty.

For all compliance certificates and numbers, please visit:  
[www.flipp.dev/compliance](http://www.flipp.dev/compliance).

## WARNING

### GE ADVERTENCIA

- Do not expose this product to water, moisture or heat.
- It is designed for reliable operation at normal room temperatures and humidity.
- Any peripheral or equipment used with the Flipper Zero should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met.
- Any external power supply used with the product shall comply with relevant regulations and standards applicable in the country of intended use. The power supply should provide 5V DC and a minimum rated current of 0.5A.
- Any changes or modifications to the product that are not expressly approved by Flipper Devices Inc may void the user's authority to operate the equipment and your warranty.

For all compliance certificates and numbers, please visit:  
[www.flipp.dev/compliance](http://www.flipp.dev/compliance).

## WARNING

### EN

For all compliance certificates and numbers, please visit:  
[www.flipp.dev/compliance](http://www.flipp.dev/compliance).

## COMPLIANCE

### FCC COMPLIANCE

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may

cause undesired operation. This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However,

## COMPLIANCE

### CE COMPLIANCE

- Maximum radio frequency power transmitted in the frequency bands in which the radio equipment operates: The maximum power for **all** bands is less than the highest limit value specified in the related Harmonized Standard. The frequency bands and transmitting power (radiated and/or conducted) nominal limits applicable to this radio equipment are as follows: XX dBm. Gekennzeichnet sein, um sicherzustellen, dass die Sicherheits- und Leistungsanforderungen erfüllt werden.

Jede mit dem Produkt verwendete externe Stromversorgung muss den einschlägigen Vorschriften und Normen entsprechen, die im Land der

## RoHS&WEEE COMPLIANCE

### EN

For all compliance certificates and numbers, please visit:  
[www.flipp.dev/compliance](http://www.flipp.dev/compliance).

## ВНИМАНИЕ

### RU

Para obtener todos los certificados y números de cumplimiento, visite [www.flipp.dev/compliance](http://www.flipp.dev/compliance).

**ATTENTION**

Alle Konformitätszertifikate und -nummern finden Sie unter [www.flipp.dev/compliance](http://www.flipp.dev/compliance).

**JP**

**警告**

この製品を水、湿気、または熱にさらさないでください。通常の室温と湿度で信頼性の高い動作を実現するように設計されています。

FlipperZeroで使用される周辺機器または機器は、使用国の関連規格に準拠し、それに応じてマークを付けて安全性とハーフォンスの要件が満たされていることを確認する必要があります。

製品で使用される外部電源は、適用目的の国で適用される規制基準に準拠している必要があります。電源装置は、5V DCおよび0.5Aの最小定格電流を提供する必要があります。

FlipperDevices Inc.によって明示的に承認されていない製品の変更または修正を行うと、機器を操作するユーザーの権限と保証が無効になる場合があります。

**FR**

**Ne posez pas ce produit à l'eau, à l'humidité ou à la chaleur. Il est conçu pour un fonctionnement fiable à des températures et humidité ambiantes normales.**

Tout périphérique ou équipement utilisé avec le Flipper Zero doit être conforme aux normes en vigueur dans le pays d'utilisation et être marqué en conséquence pour garantir que les exigences de sécurité et de performance sont respectées.

Tout alimentation ou autre utilisation avec le produit doit être conforme aux réglementations et normes applicables dans le pays d'utilisation prévu.

L'alimentation doit fournir 5 V CC et un courant nominal minimum de 0,5 A.

Tout changement ou modification apporté au produit qui n'est pas expressément approuvé par Flipper Devices Inc. peut annuler le droit de l'utilisateur à utiliser l'équipement et votre garantie.

Pour tous les certificats et numéros de conformité, veuillez visiter [www.flipp.dev/compliance](http://www.flipp.dev/compliance).

**DE**

**WEEE Directive:** This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling. Note: A full environmental copy of this Declaration can be found at [www.flipp.dev/compliance](http://www.flipp.dev/compliance).

**EN**

**WEEE Directive:** This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling. Note: A full environmental copy of this Declaration can be found at [www.flipp.dev/compliance](http://www.flipp.dev/compliance).

**IC**

**COMPLIANCE**

This device complies with Industry Canada licence-exempt RSS standards(s). Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

**CE**

**COMPLIANCE**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may

cause undesired operation. This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However,

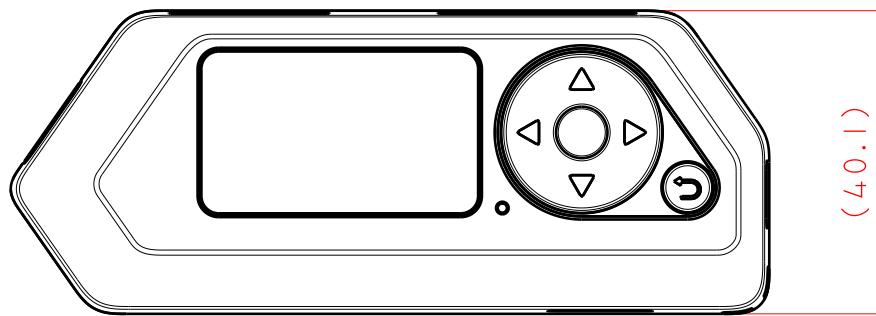
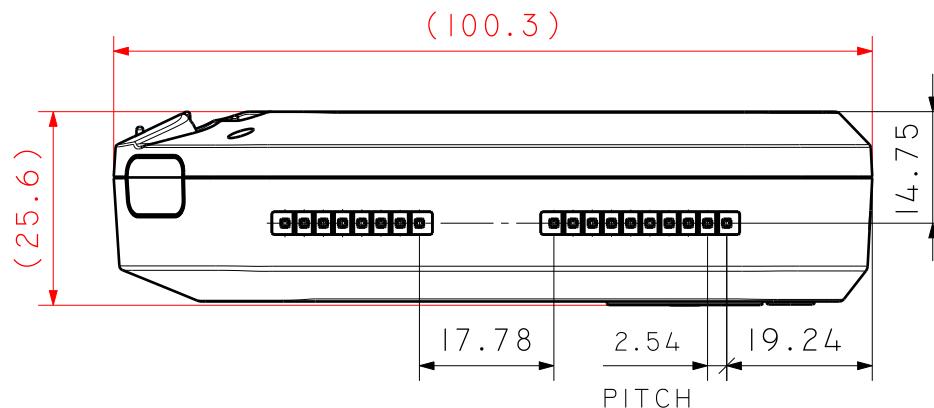
**WEEE Directive:** This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling. Note: A full environmental copy of this Declaration can be found at [www.flipp.dev/compliance](http://www.flipp.dev/compliance).

**RoHS:** Flipper Zero complies with the relevant provisions of the RoHS Directive for the European Union.

**EN**

**RoHS&WEEE COMPLIANCE**

Flipper Devices Inc hereby declares that this Flipper Zero is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. This product is allowed to be used in all EU member states.



<input type="checkbox"/> = CRITICAL DIM	MATERIAL: -	FLIPPER DEVICES	
<input type="circle"/> = TOOLING DIM	FINISH: -		
<input type="triangle"/> = PROCESS DIM (CPK)	SCALE 1:1	APPROVED BY:	DRAWN BY:
MAT'L. : SEE NOTES	DATE: 24.II.2021		REVIEWED BY:
(XX) = DIMENSION ID	TITLE: FLIPPER ZERO (B9C6)	DRAWING NUMBER: FLIPPER ZERO (B9C6)	SHEET 1 OF 1