

Ironcore F4 Autopilot Flight Controller - Made in India

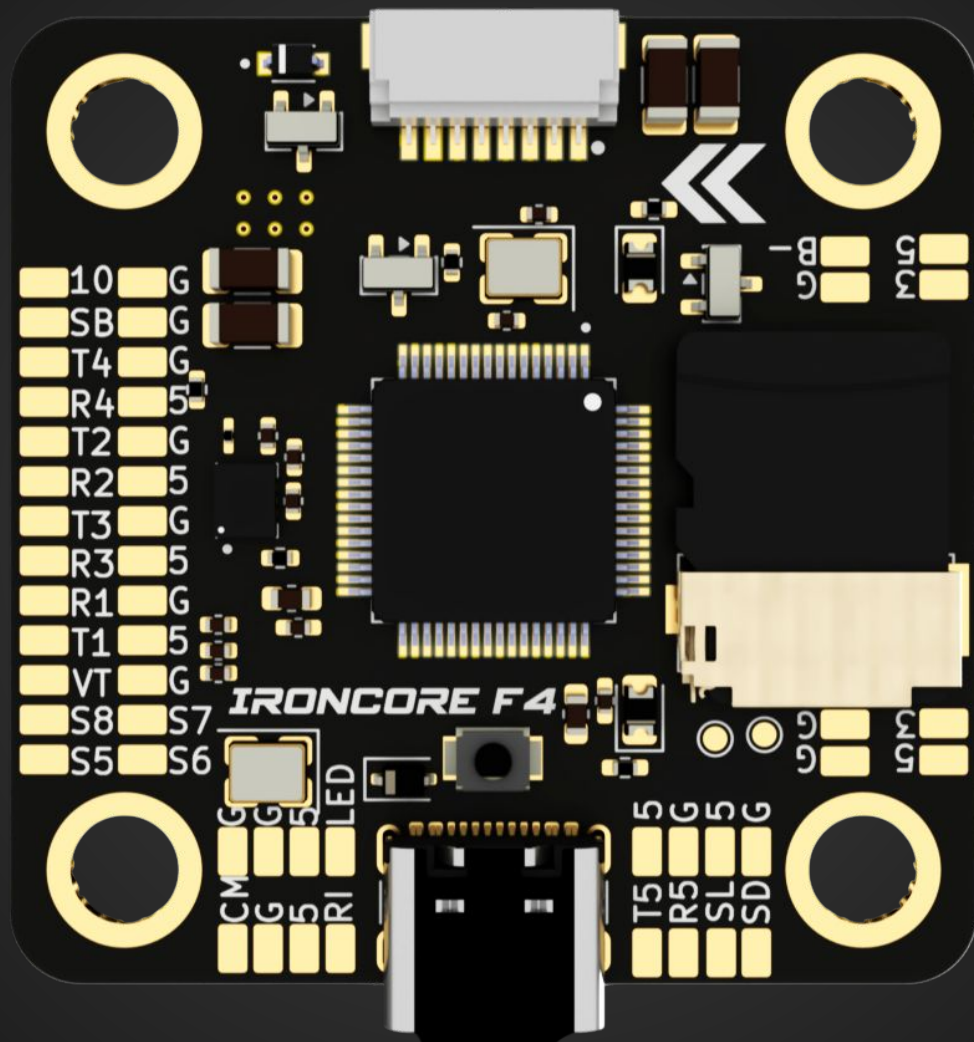
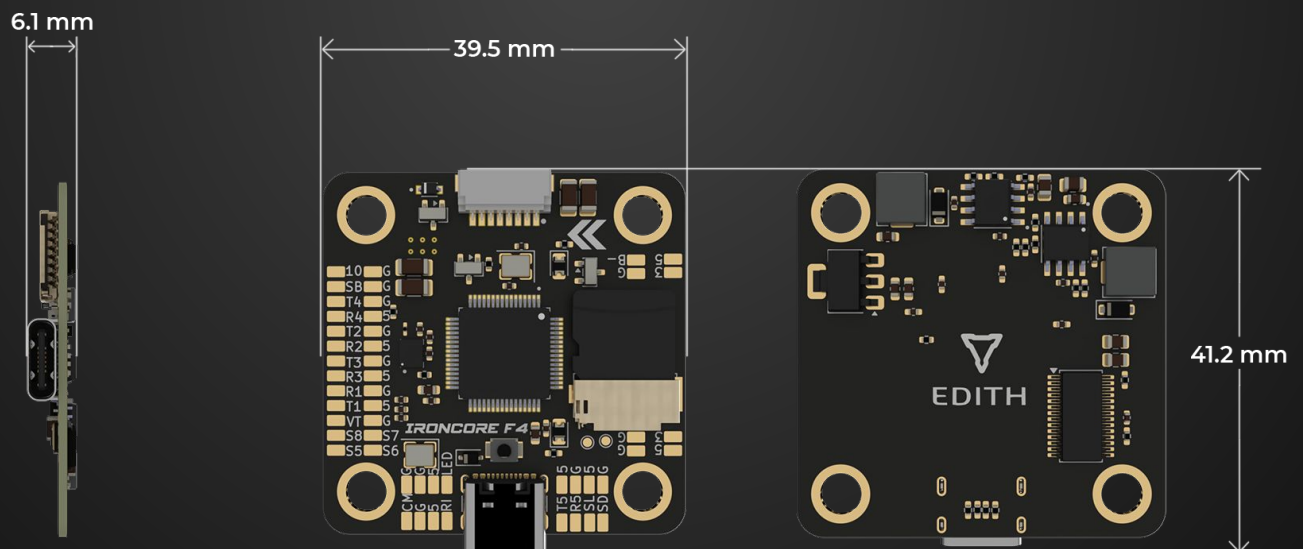


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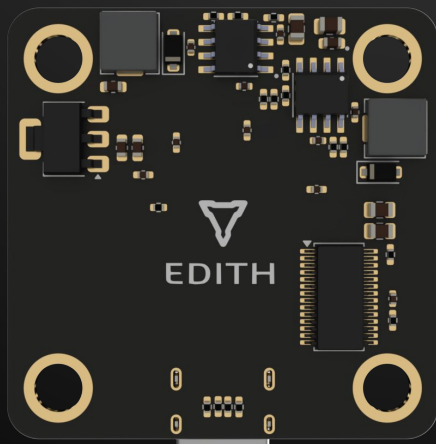
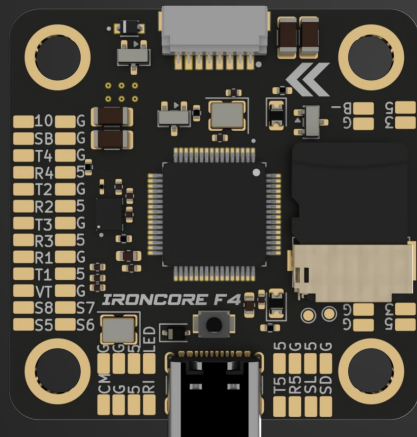
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ABOUT

The Ironcore F4 AutoPilot Flight Controller, proudly made in India, is built for reliable UAV and FPV applications. Powered by STM32F405 MCU, it delivered fast processing and stable flight control with BMP270 IMU, BMP280 barometer, and AT7456E OSD for accurate sensing and real-time flight data.

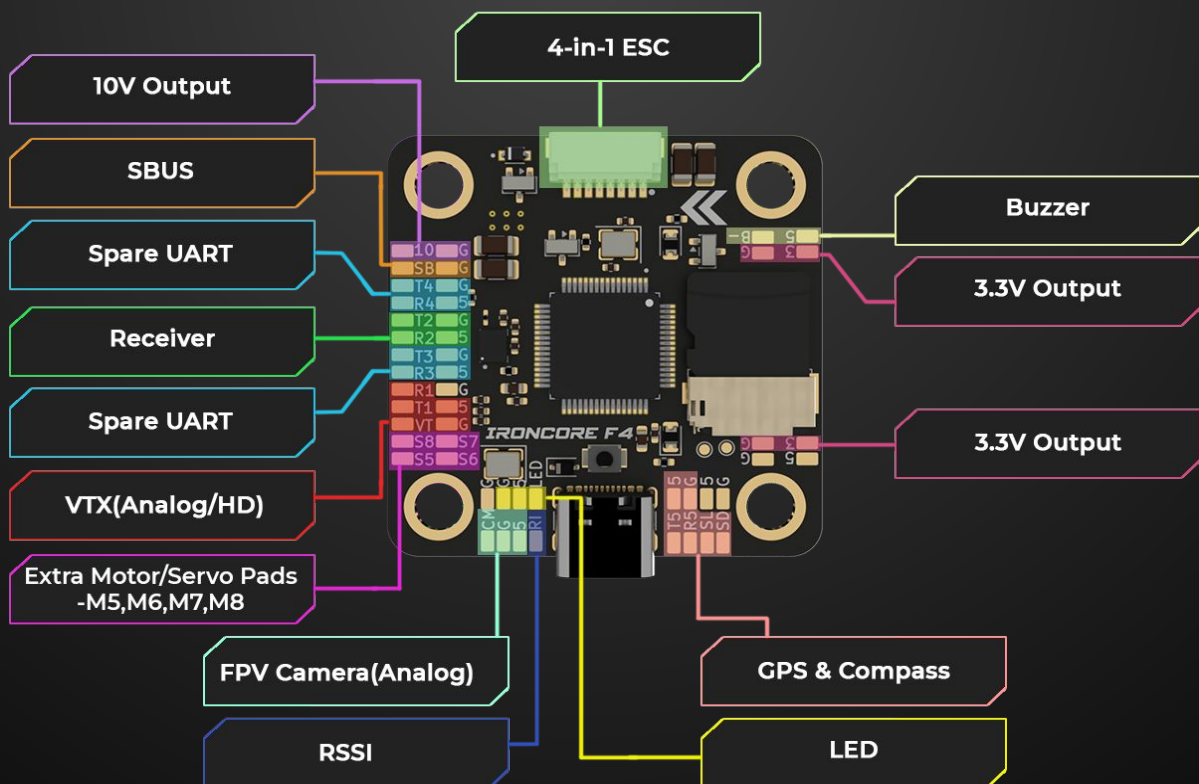
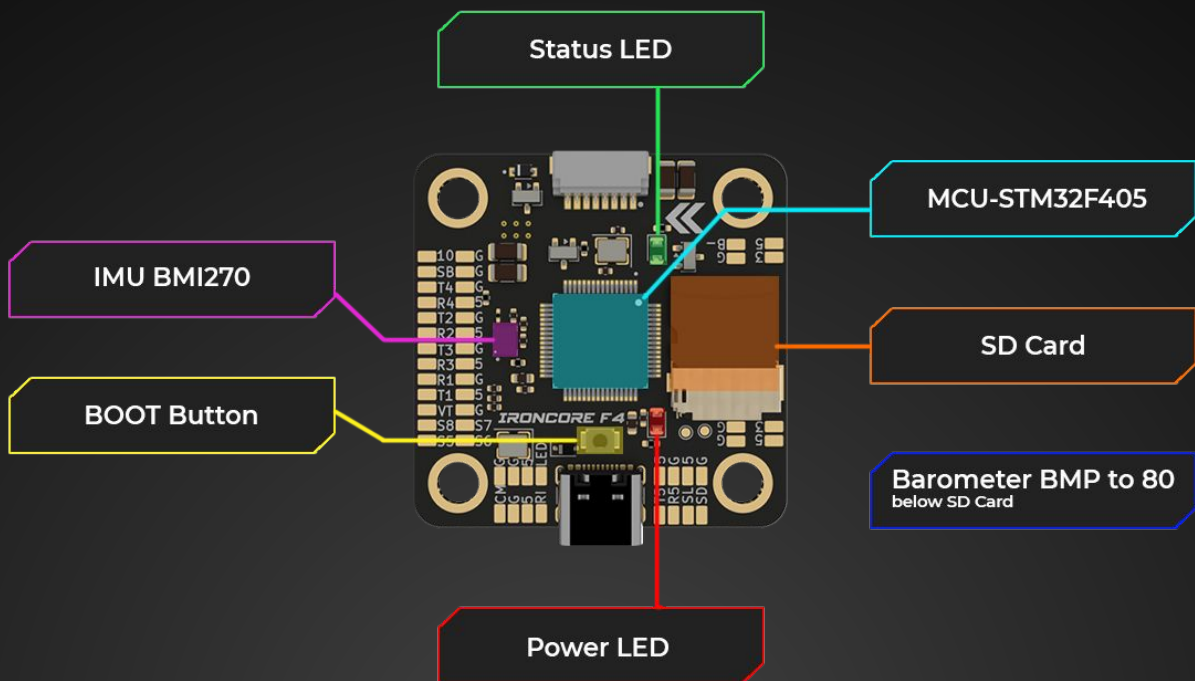
Supporting ArduPilot and BetaFlight, along with 4GB external BlackBox logging, 6 UARTs, 8 motor/servo outputs and 3-6S LiPo input, Ironcore F4 is designed for versatile and high-performance drone builds.



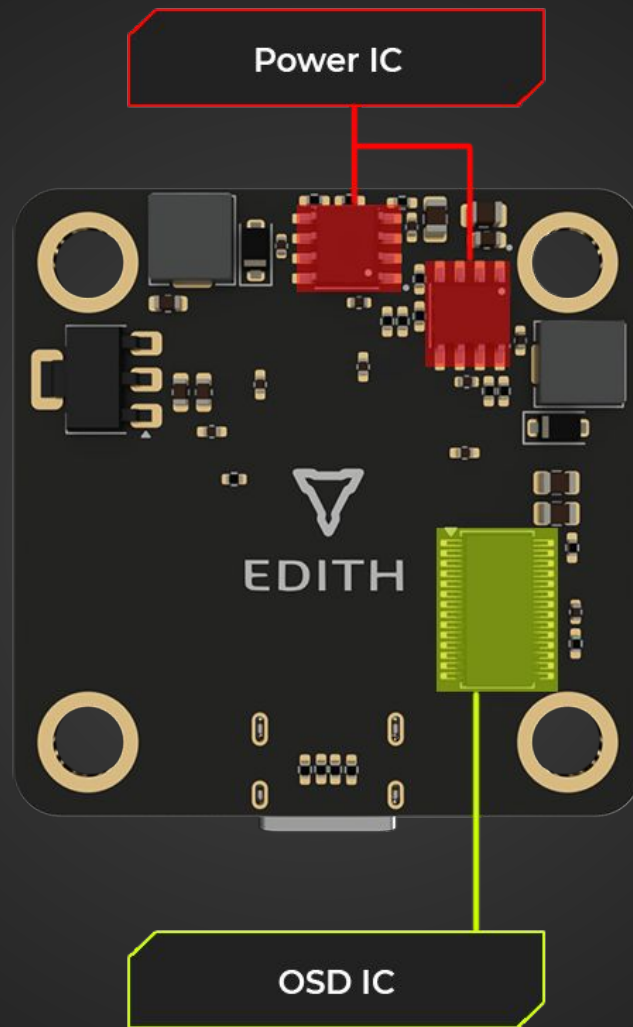
SPECIFICATIONS

MCU	STM32F405
GYRO (IMU)	BMP270
Barometer	BMP280
Power Input	3-6S LiPo
Motors Outputs	8 Motors
On Screen Display (OSD)	AT7456E
i2C	Available
RSSI	Available
UARTs	6 UART Ports are Available
Firmware Compatibility	Ardupilot, Betaflight
Mounting	30.5 x 30.5mm (M4)
Dimension	40 x 40mm
Weight	9g

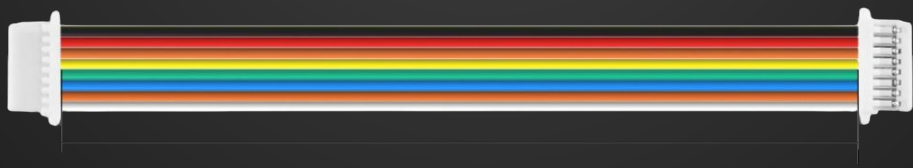
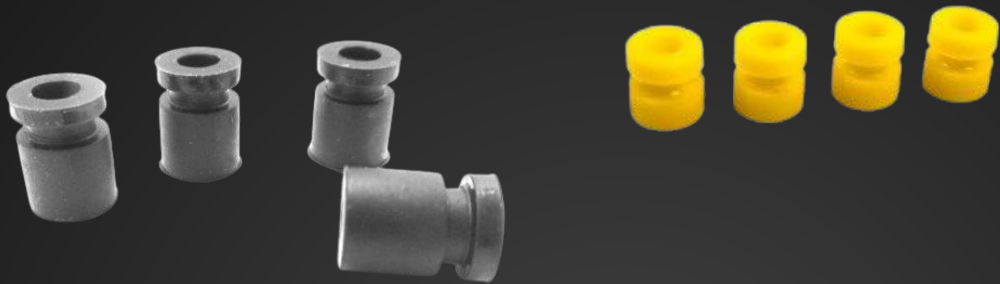
LAYOUT



BACK LAYOUT



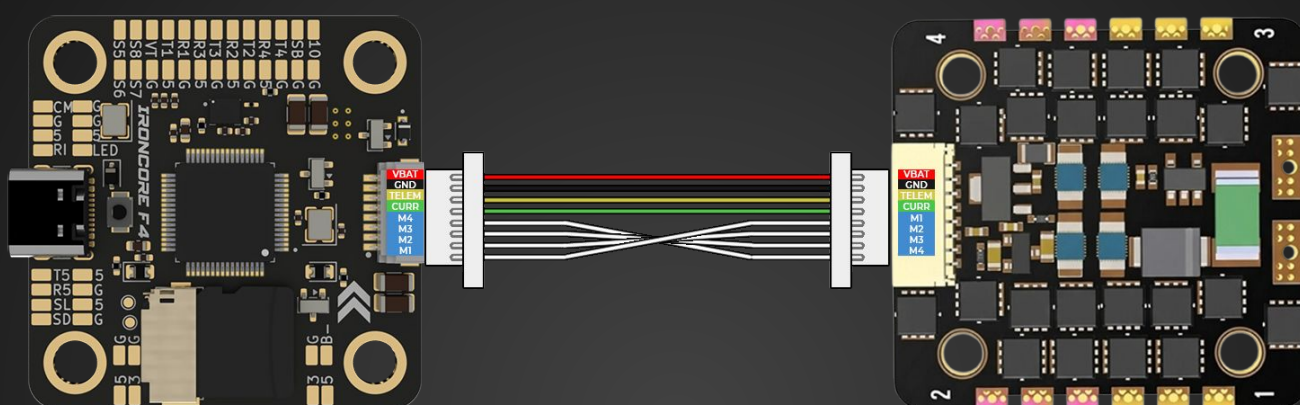
PACKAGE INCLUDE



40mm

CONNECTIONS

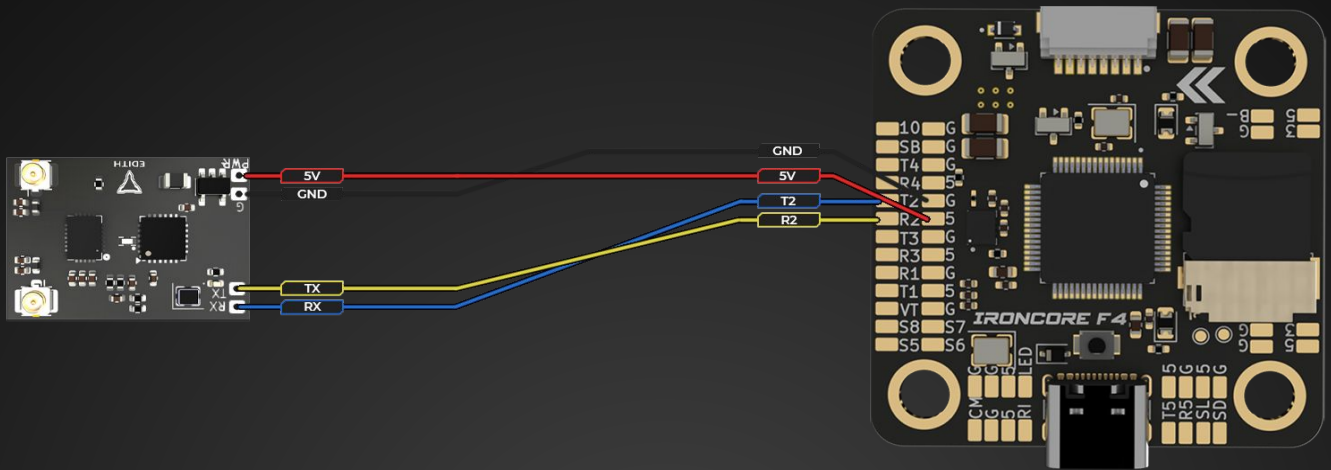
FLIGHT CONTROLLER TO ESC CONNECTIONS USING CONNECTOR



Connect the flight controller to the ESC using the provided multi-wire connector. This link carries throttle signals, telemetry, and power (if supported), ensuring clean and reliable communication between the FC and ESC.

Note: Ensure correct connector orientation and secure fit before powering the system.

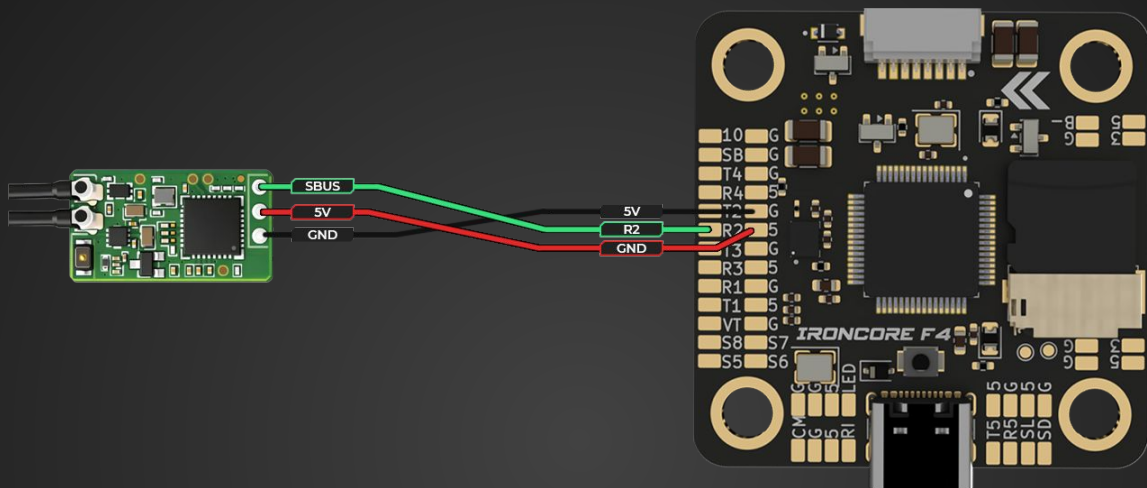
FLIGHT CONTROLLER TO ELRS CONNECTIONS



Connect the ELRS receiver to the flight controller using UART interface: 5V and GND for power, TX (receiver) to RX (FC), and RX (receiver) to TX (FC). This enables reliable control signal communication.

Note: Always cross TX ↔ RX lines and verify the correct UART port in firmware configuration.

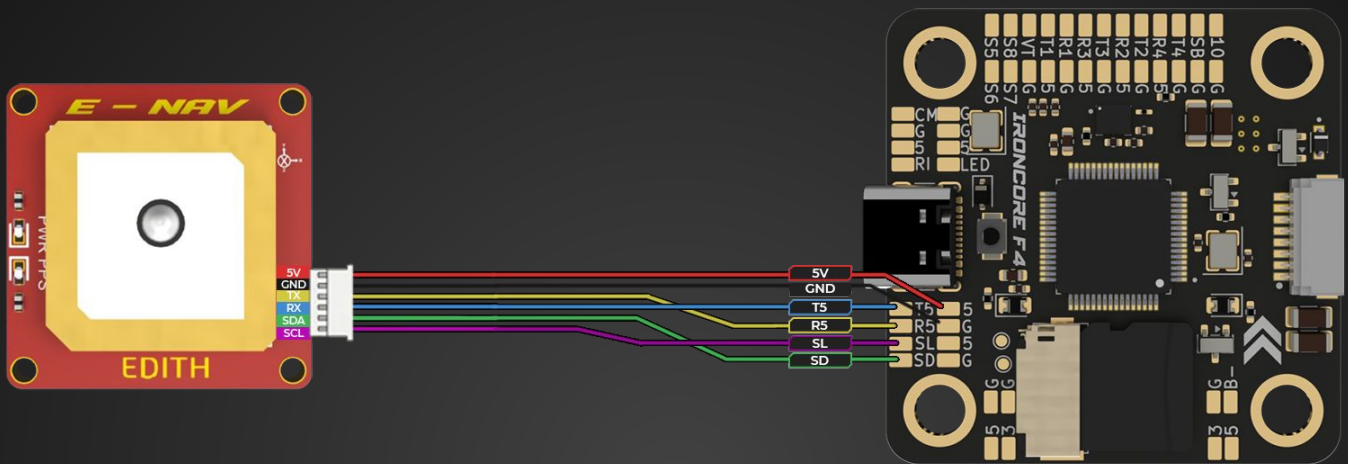
FLIGHT CONTROLLER SBUS CONNECTIONS



Connect the SBUS receiver to the dedicated SBUS input pin on the flight controller, along with 5V and GND for power. SBUS provides a single-wire digital signal for all control channels.

Note: Ensure the receiver signal wire is connected to the SBUS/RC input pad, not a standard UART RX pin (unless configured for SBUS).

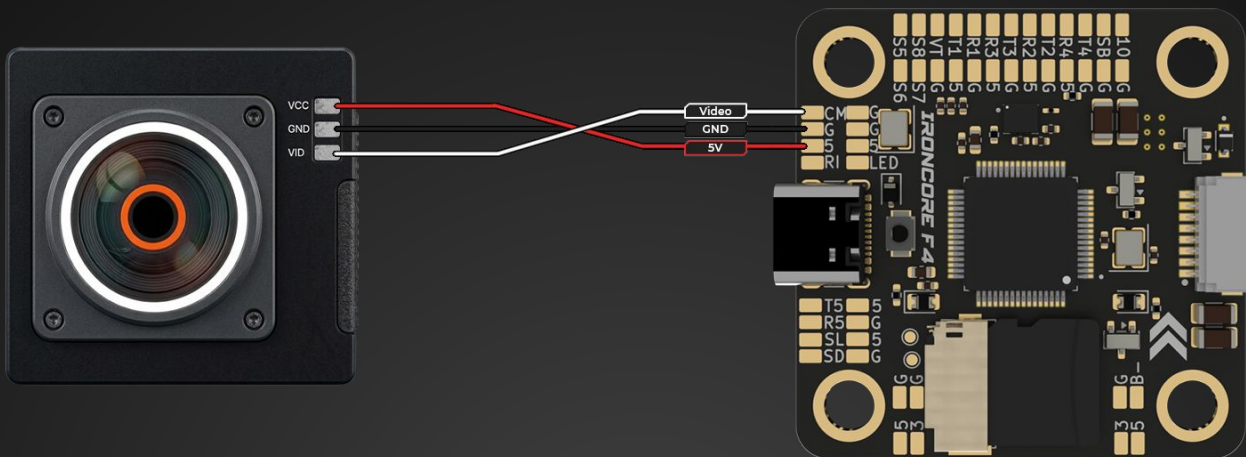
FLIGHT CONTROLLER GPS CONNECTIONS



Connect the GPS module to the flight controller using UART: 5V and GND for power, TX (GPS) to RX (FC), and RX (GPS) to TX (FC). Additional SDA/SCL lines are used for compass (I2C) communication if available.

Note: Mount the GPS module away from power electronics and ensure correct UART and I2C configuration in firmware.

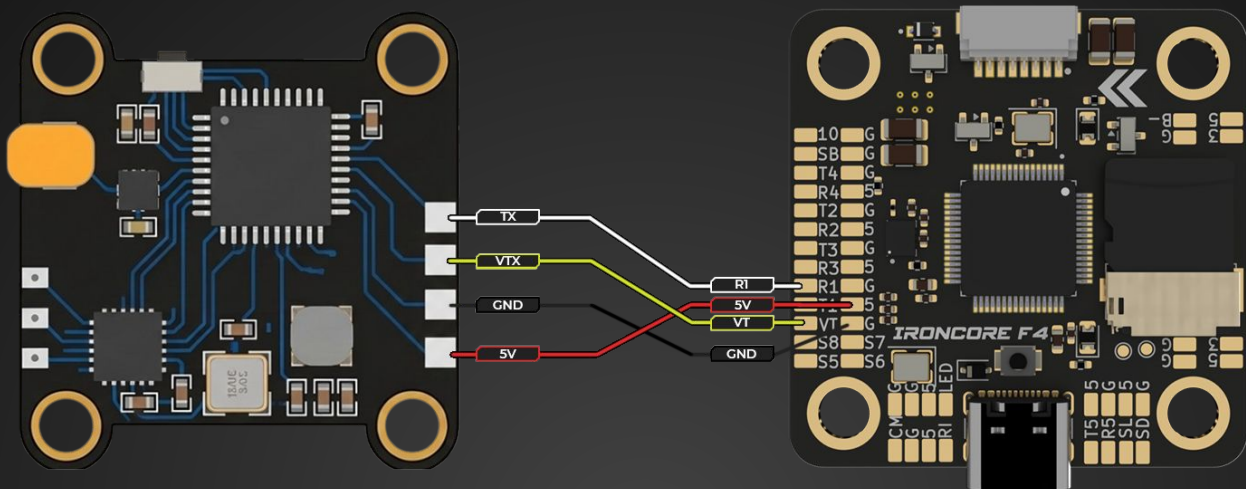
FLIGHT CONTROLLER CAM CONNECTIONS



To enable the FPV feed and On-Screen Display (OSD), connect the camera to the flight controller using the following three-wire configuration:

- VCC (Red): Connect to the 5V pad on the flight controller to provide power to the camera.
- GND (Black): Connect to the GND pad to complete the circuit.
- VID (White/Yellow): Connect to the CAM (Video In) pad. This allows the flight controller to overlay flight data onto your video signal before sending it to the VTX.

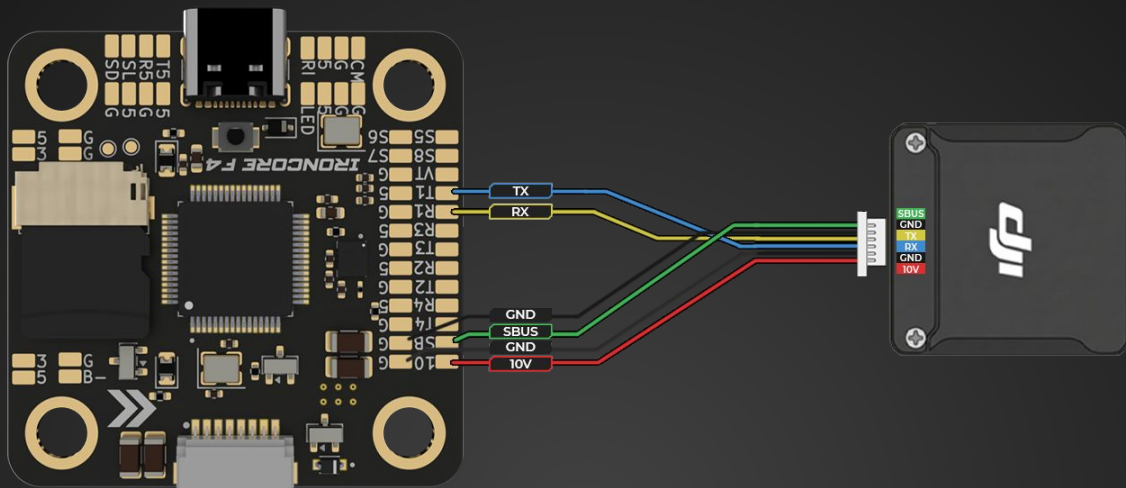
FLIGHT CONTROLLER VTX CONNECTIONS



This connection transmits the processed video signal (with OSD) from the flight controller to your Video Transmitter (VTX) for wireless broadcast.

- 5V (Red): Powers the VTX from the flight controller's 5V pad.
- GND (Black): Connects to the GND pad to complete the power circuit.
- VT (Yellow): Connects the VTX video input to the VT (Video Out) pad on the flight controller.
- TX (White): Connects to the R1 (UART1 Receive) pad. This enables SmartAudio or Tramp protocols, allowing you to change VTX channels and power levels via your radio sticks.

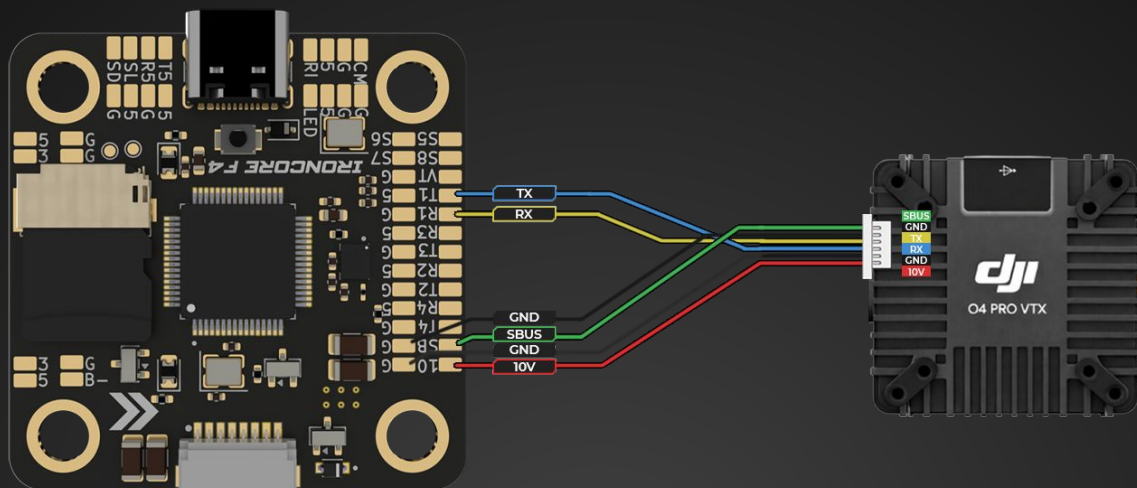
FLIGHT CONTROLLER DJI O3 CONNECTIONS



Connect the DJI O3 Air Unit to the flight controller via UART: power (5V/VBAT as required), GND, TX (FC) to RX (O3), and RX (FC) to TX (O3). The SBUS wire from the O3 can be connected to the FC's SBUS/RC input for direct receiver signal output.

Note: Enable MSP/OSD on the selected UART and configure SBUS input in firmware if using the O3's built-in receiver output.

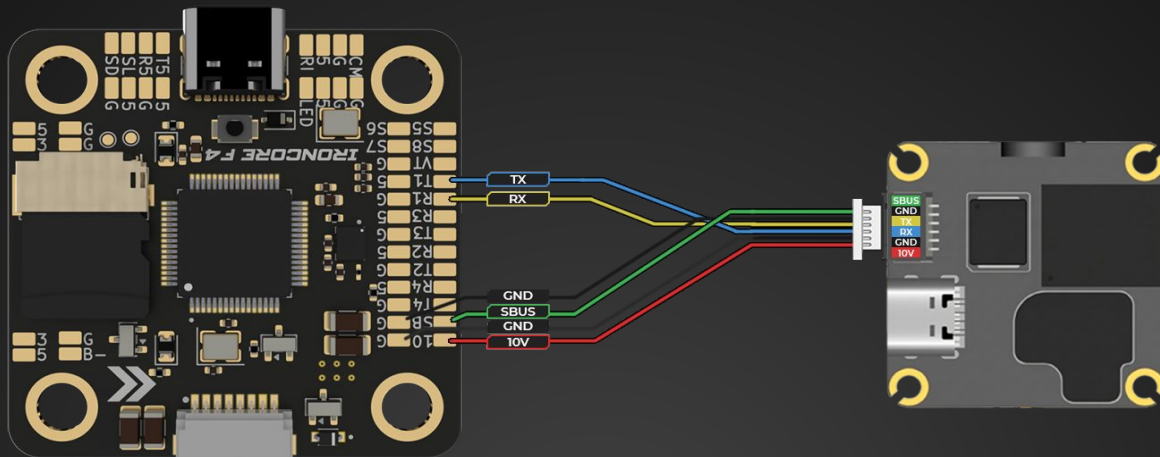
FLIGHT CONTROLLER DJI O4 PRO CONNECTIONS



Connect the DJI O4 Pro Air Unit to the flight controller via UART: power (5V/VBAT as required), GND, TX (FC) to RX (O4), and RX (FC) to TX (O4). The SBUS wire from the O4 Pro can be connected to the FC's SBUS/RC input for direct receiver signal output.

Note: Enable MSP/OSD on the selected UART and configure SBUS input in firmware if using the O4 Pro built-in receiver output.

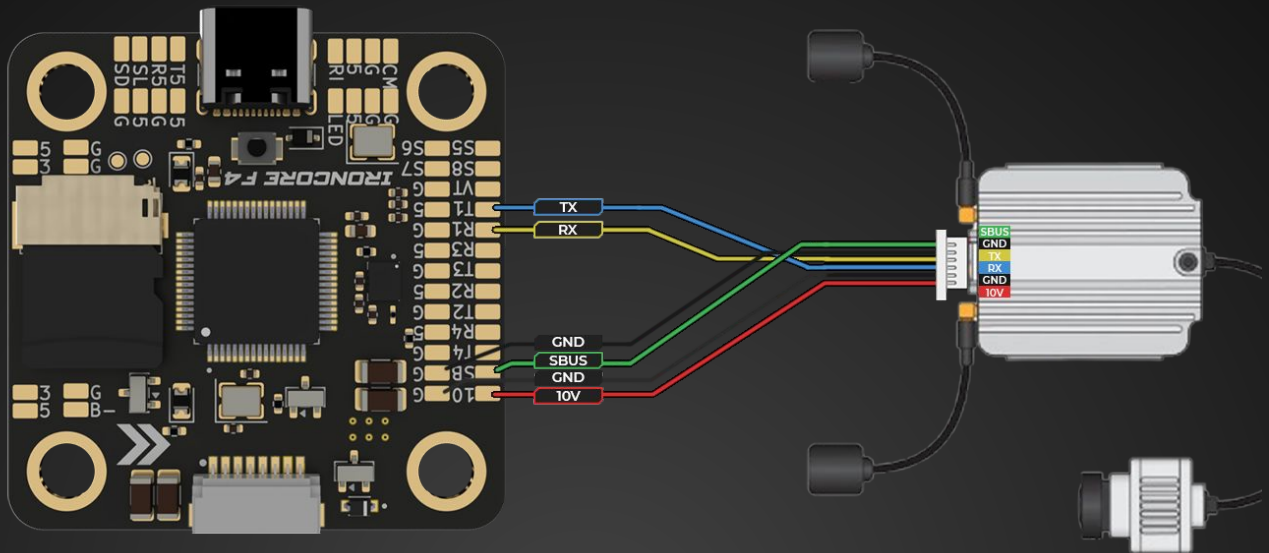
FLIGHT CONTROLLER DJI O4 LITE CONNECTIONS



Connect the DJI O4 Lite Air Unit to the flight controller via UART: power (5V/VBAT as required), GND, TX (FC) to RX (O4), and RX (FC) to TX (O4). The SBUS wire from the O4 Lite can be connected to the FC's SBUS/RC input for direct receiver signal output.

Note: Enable MSP/OSD on the selected UART and configure SBUS input in firmware if using the O4 Lite built-in receiver output.

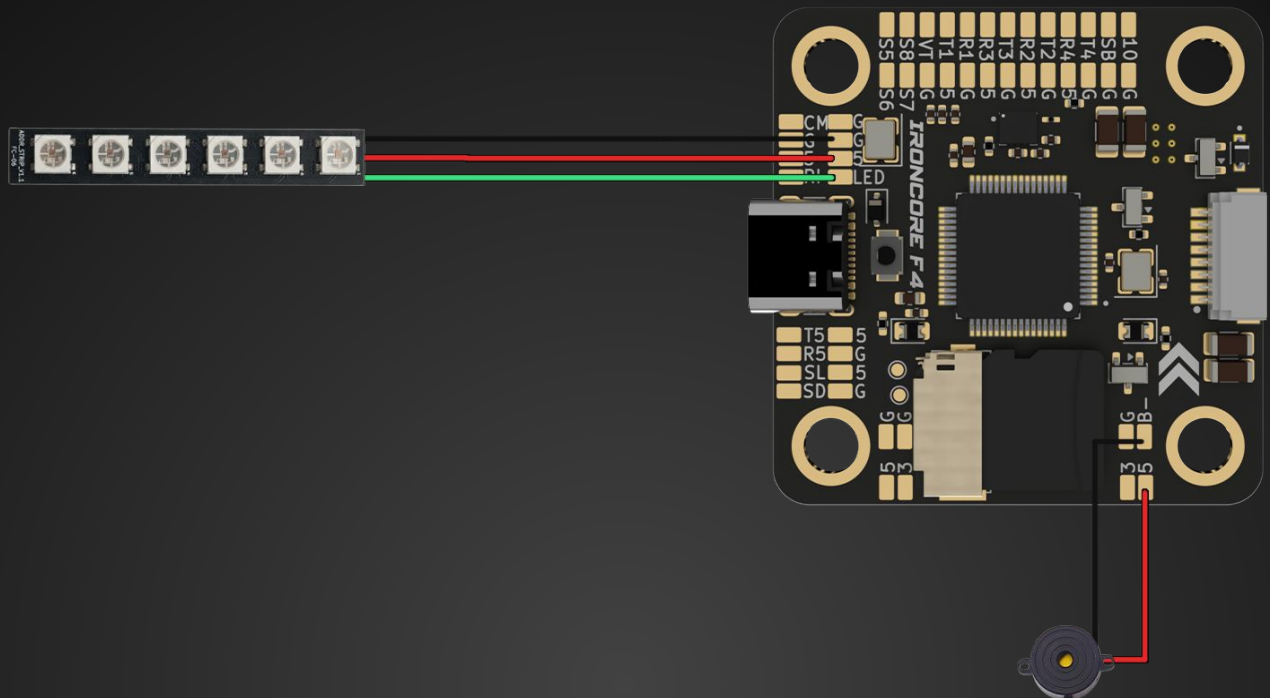
FLIGHT CONTROLLER DJI AIR UNIT CONNECTIONS



Connect the DJI Air Unit to the flight controller via UART: power (5V/VBAT as required), GND, TX (FC) to RX (Air Unit), and RX (FC) to TX (Air Unit). The SBUS wire from the Air Unit can be connected to the FC's SBUS/RC input for direct receiver signal output.

Note: Enable MSP/OSD on the selected UART and configure SBUS input in firmware if using the Air Unit built-in receiver output.

FLIGHT CONTROLLER LED CONNECTIONS



These components provide visual and audible feedback for flight status, battery warnings, and lost-model recovery.

- **LED Strip:**

- **5V (Red)** : Connects to the 5V pad for power.
- **GND (Black)**: Connects to the G (Ground) pad.
- **LD (Green)**: Connects to the LED pad on the flight controller to control color and patterns.

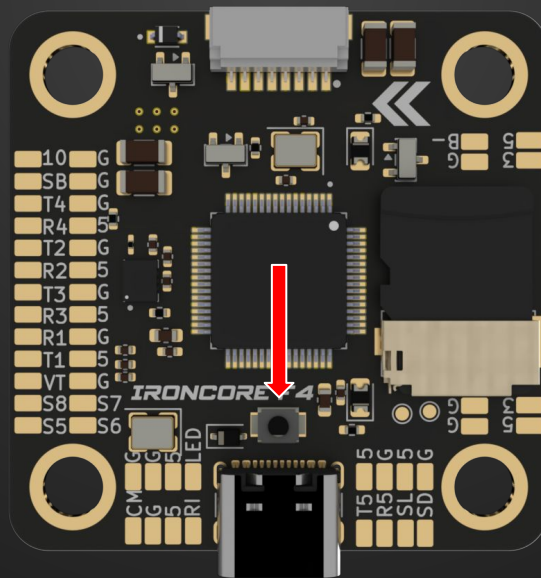
- **Buzzer:**

- **B+ (Red)**: Connects to the 5V pad.
- **B- (Black)** : Connects to the B- pad. The flight controller toggles this ground connection to trigger the alarm.

ARDUPILOT FIRMWARE FLASHING

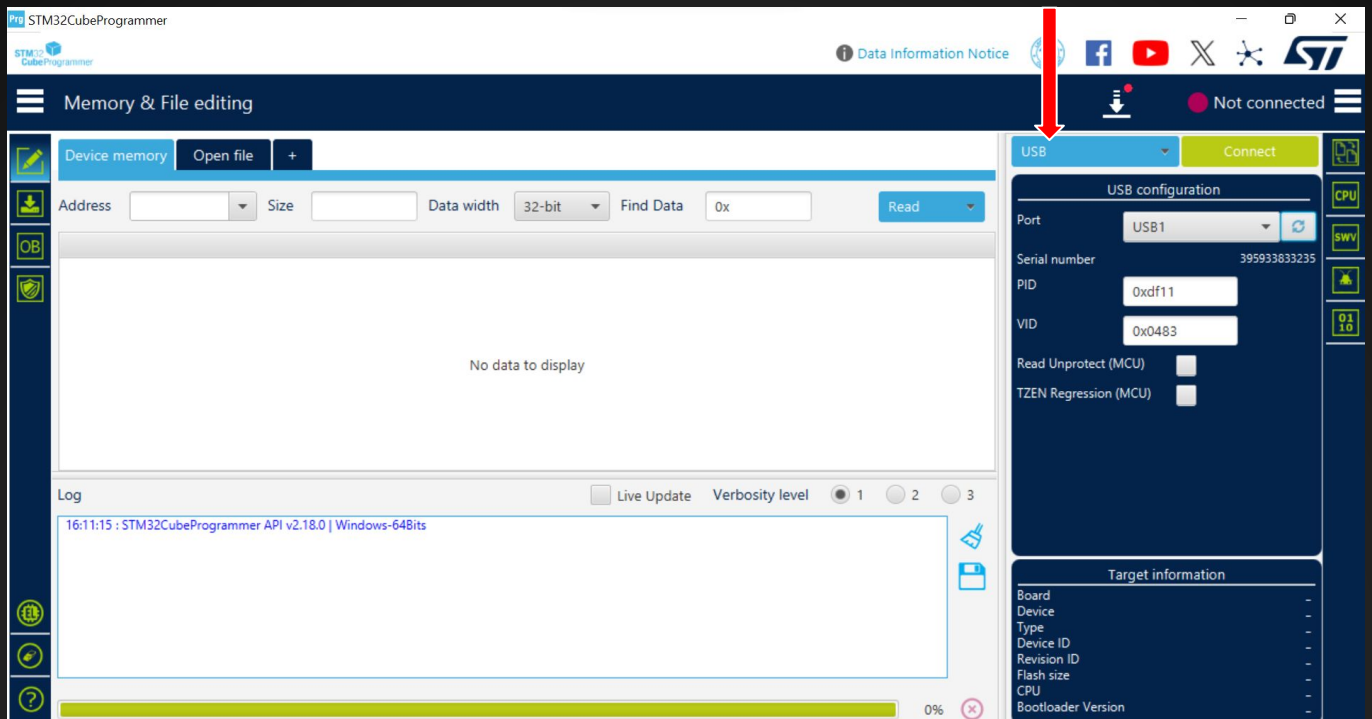
Step 1: Enter Bootloader (DFU) Mode

- Press and hold the physical **BOOT** button on the flight controller.
- While holding the button, connect the FC to your PC via a **USB Data Cable** (avoid "charge-only" cables).
- Release the button once connected; the board is now in Device Firmware Update (DFU) mode.

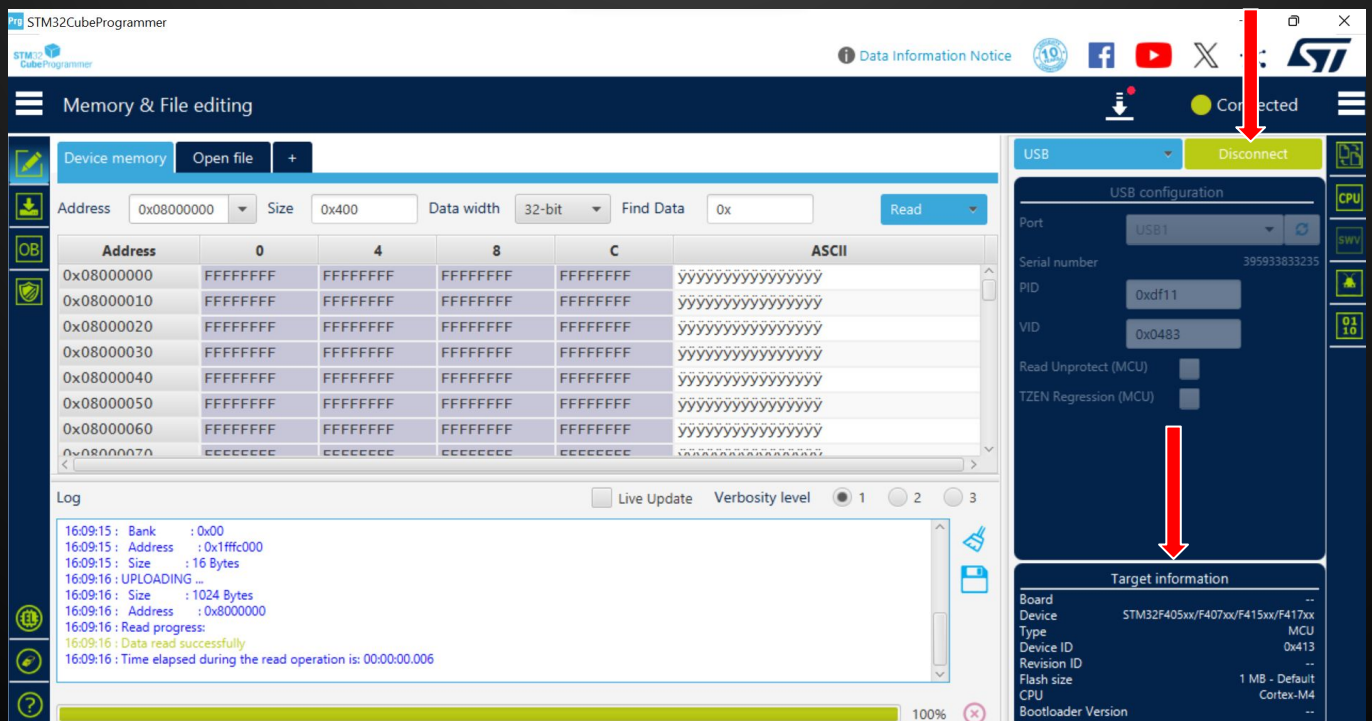


Step 2: Establish Connection

In the software, select **USB** from the interface dropdown menu on the right.



Click the Connect button. Ensure the Serial Number field populates, confirming the FC is recognized.



Step 3: Access Erasing & Programming

Once connected, click on the **second icon** in the left-hand sidebar menu (the green arrow icon) to open the "Erasing & Programming" section.

The screenshot shows the STM32CubeProgrammer interface with the "Memory & File editing" section active. The "Device memory" tab is selected, and the "Address" field is set to 0x08000000. The "Size" is 0x400, and the "Data width" is 32-bit. The "Find Data" field is set to 0x. The "Read" button is visible. The main area displays a table of memory addresses and their corresponding data. A red arrow points to the "Address" field.

Address	0	4	8	C	ASCII
0x08000000	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000010	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000020	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000030	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000040	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000050	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000060	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy
0x08000070	FFFFFFFF	FFFFFFFF	FFFFFFFF	FFFFFFFF	yyyyyyyyyyyyyy

The log window shows the following messages:

```
16:09:15 : Bank : 0x00
16:09:15 : Address : 0x1ffc000
16:09:15 : Size : 16 Bytes
16:09:16 : UPLOADING ...
16:09:16 : Size : 1024 Bytes
16:09:16 : Address : 0x8000000
16:09:16 : Read progress:
16:09:16 : Data read successfully
16:09:16 : Time elapsed during the read operation is: 00:00:00.006
```

The screenshot shows the STM32CubeProgrammer interface with the "Erasing & Programming" section active. The "Erase flash memory" tab is selected. The "File path" is set to C:\Users\SpiderByte-03\Downloads\arducopter. The "Start address" field is empty. The "Skip flash erase before programming" checkbox is unchecked. The "Verify programming" checkbox is checked. The "Full Flash memory checksum" checkbox is unchecked. The "Run after programming" checkbox is checked. The "Start Programming" button is visible. The main area displays a table of memory addresses and their corresponding data. A red arrow points to the "Address" field.

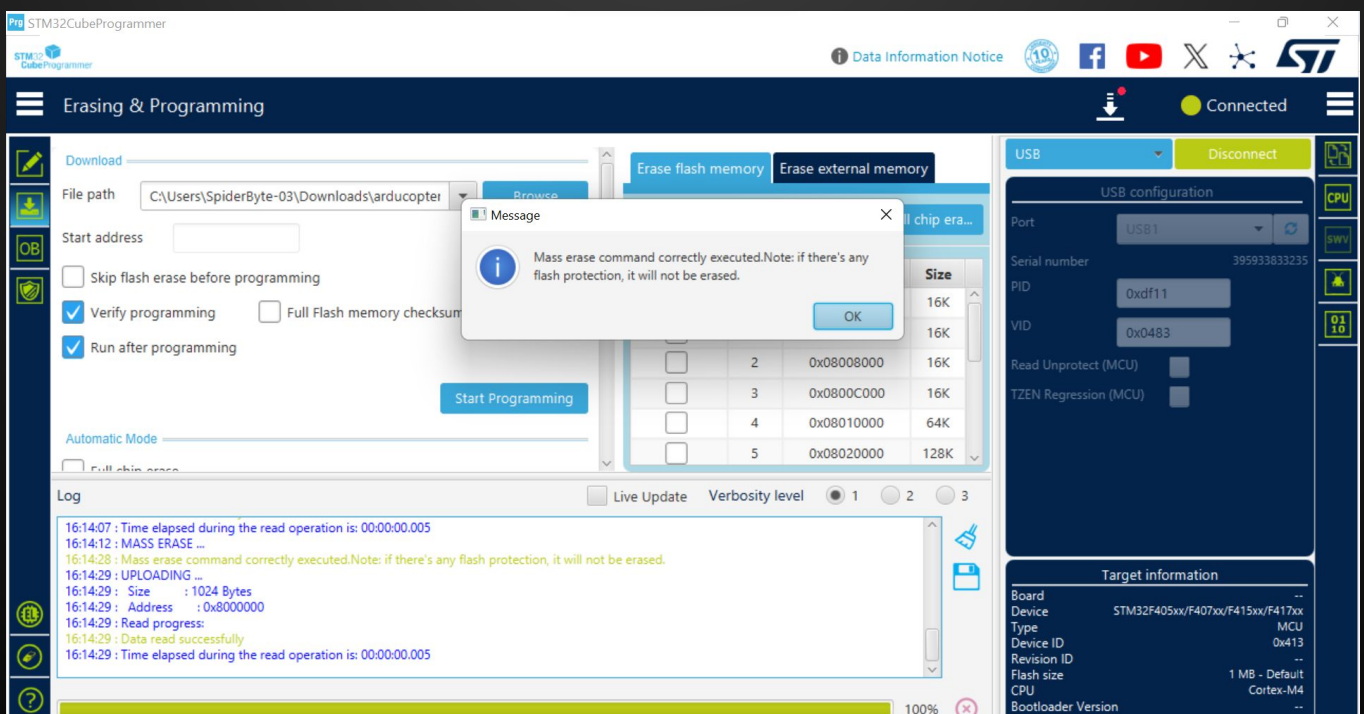
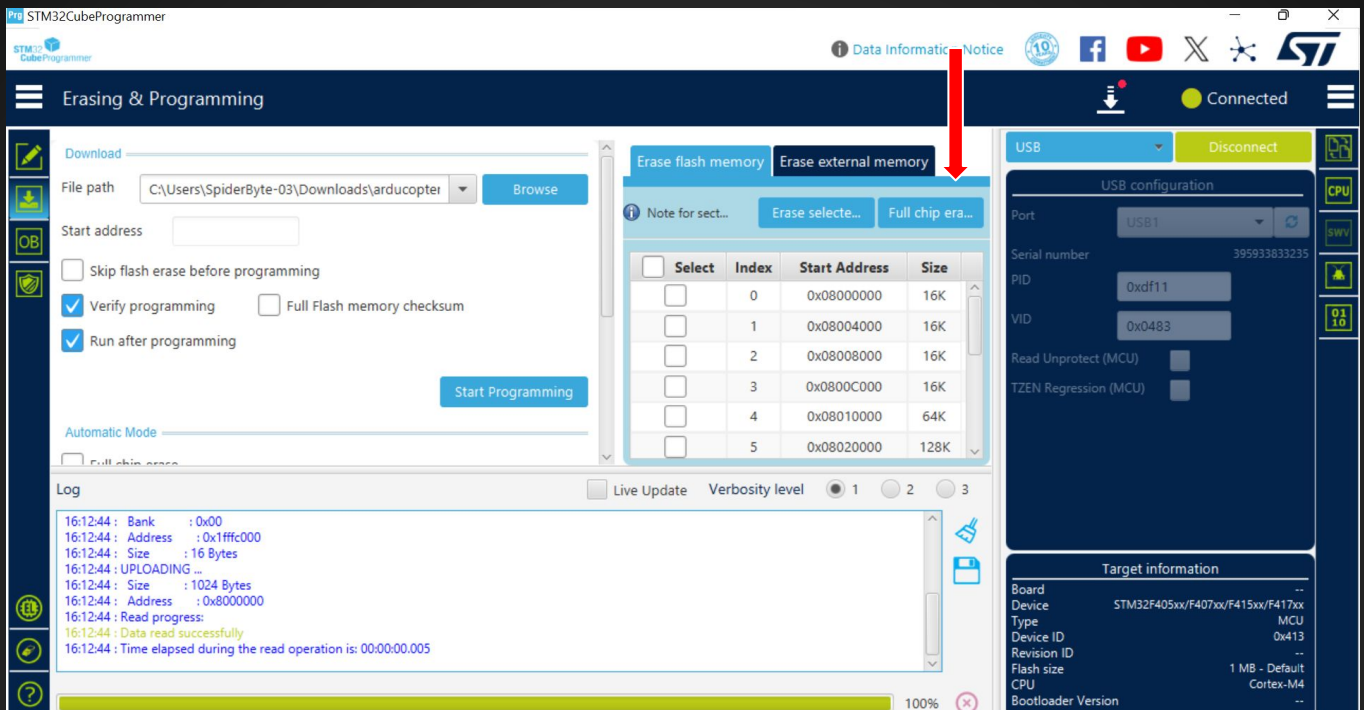
Select	Index	Start Address	Size
☐	0	0x08000000	16K
☐	1	0x08004000	16K
☐	2	0x08008000	16K
☐	3	0x0800C000	16K
☐	4	0x08010000	64K
☐	5	0x08020000	128K

The log window shows the following messages:

```
16:12:44 : Bank : 0x00
16:12:44 : Address : 0x1ffc000
16:12:44 : Size : 16 Bytes
16:12:44 : UPLOADING ...
16:12:44 : Size : 1024 Bytes
16:12:44 : Address : 0x8000000
16:12:44 : Read progress:
16:12:44 : Data read successfully
16:12:44 : Time elapsed during the read operation is: 00:00:00.005
```

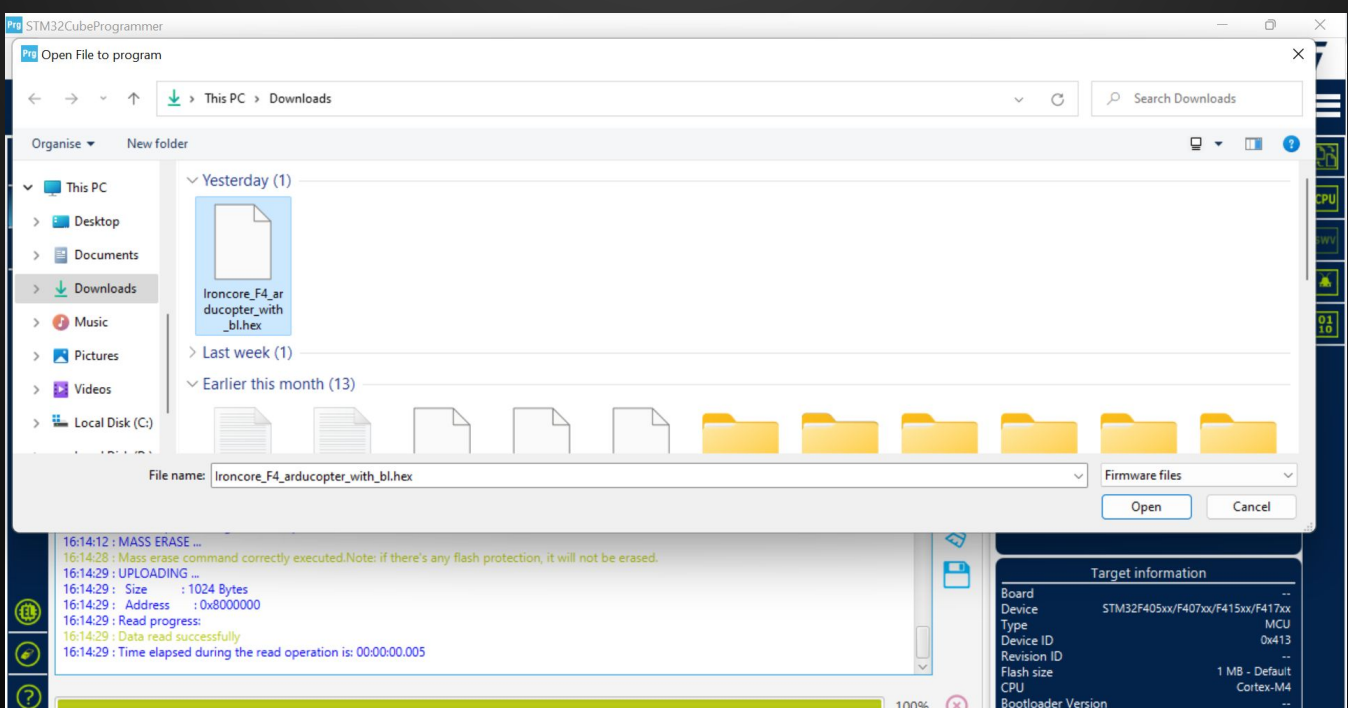
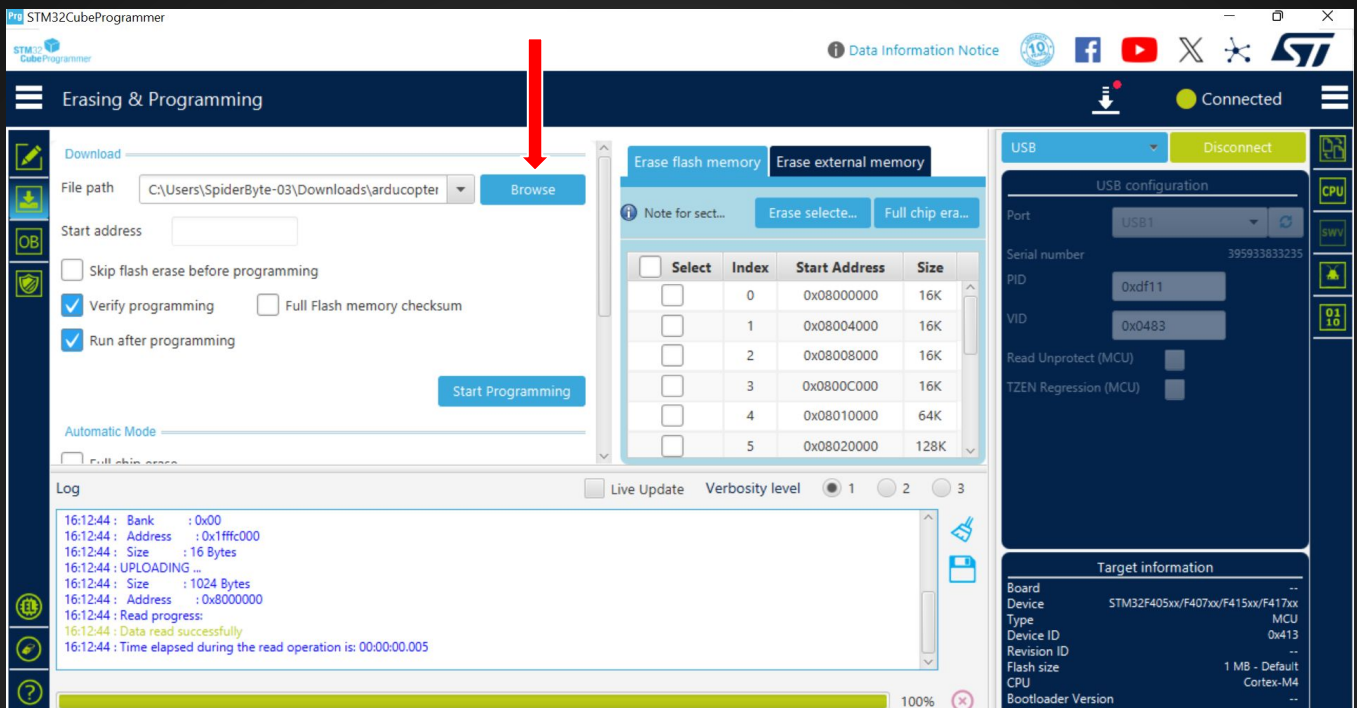
Step 4: Full Chip Erase

Before flashing new firmware, it is critical to wipe the existing data. Click **Full chip erase** and wait for the confirmation log to appear. Do not disconnect the device during this process.



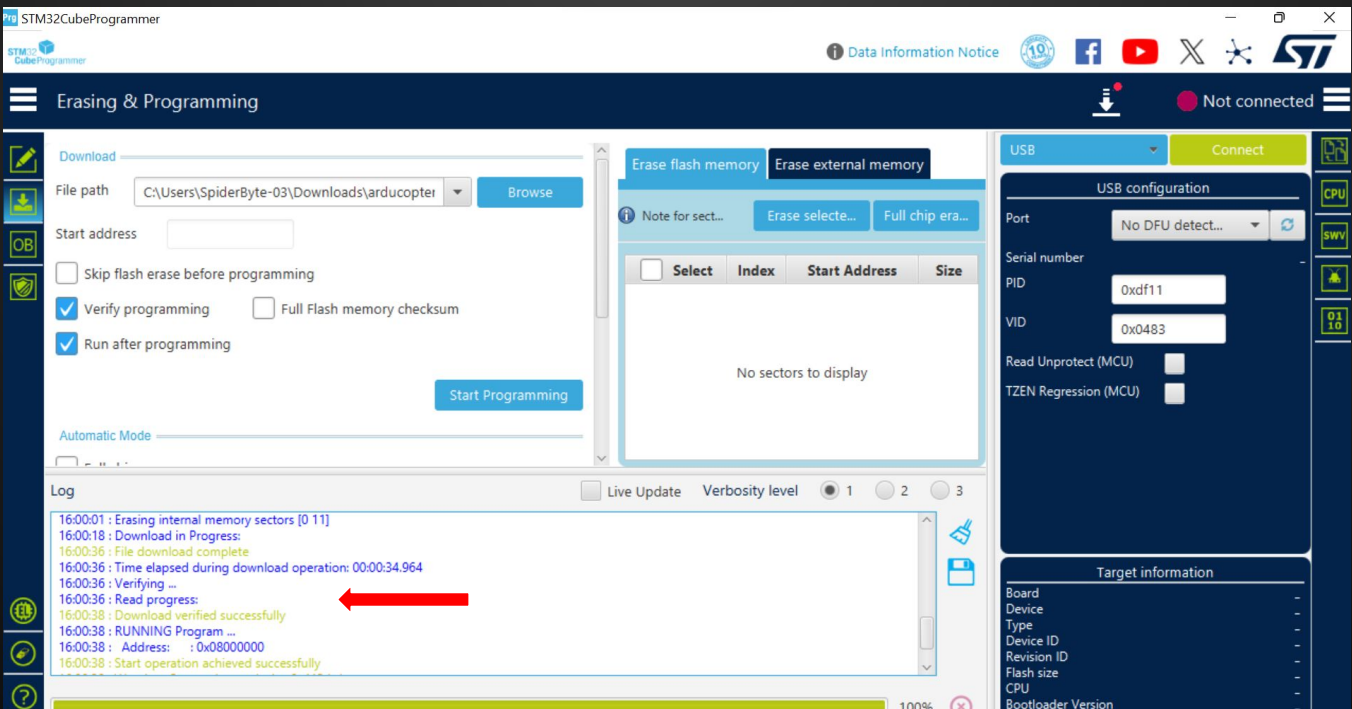
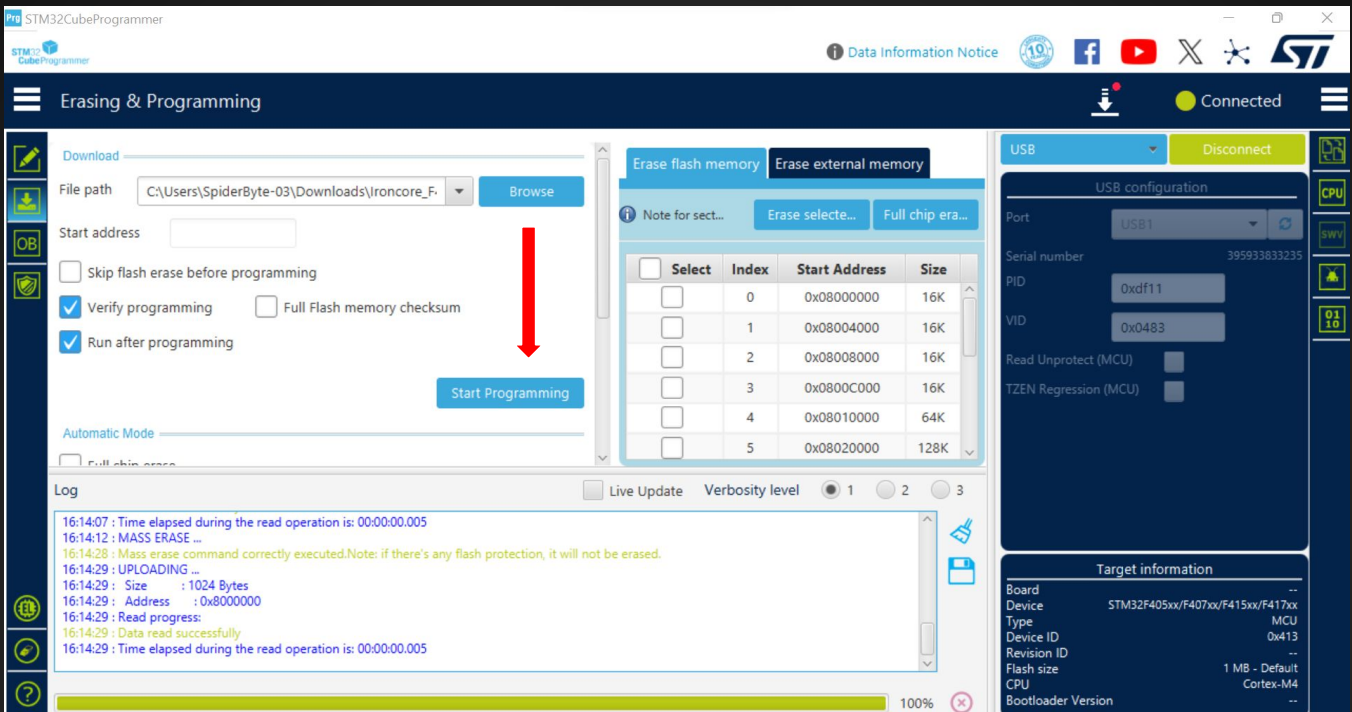
Step 6: Load Firmware File

Now click **Browse**. Browse your computer to select the firmware file you downloaded and click on open button (Please find the link below to download the latest Arducopter firmware)



Step 7: Execute Download

Once the file path is loaded, click the **Start Programming** button. Monitor the progress bar at the bottom and wait for the "File download complete" message before disconnecting your flight controller.

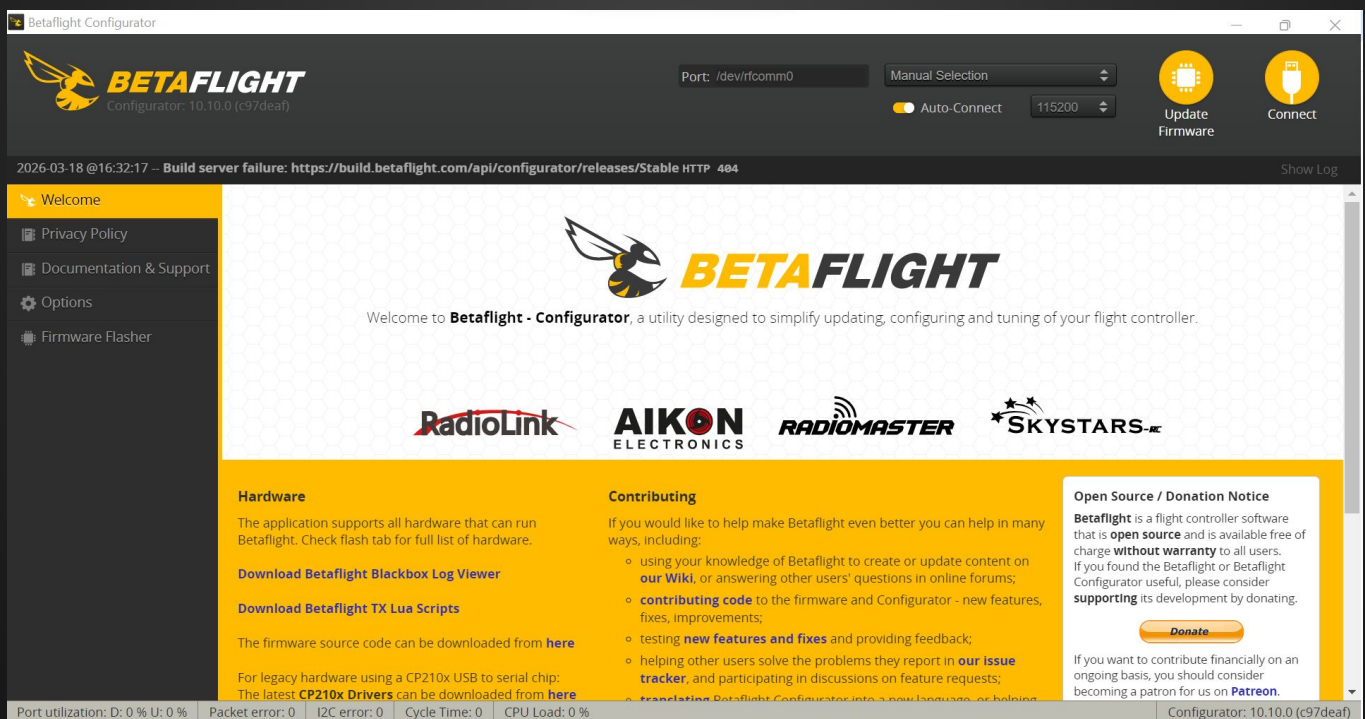


Now after powering cycle the Flight controller and can connect the FC with GCS software (Mission Planner, QGroundControl)

FLASHING BETAFLIGHT FIRMWARE

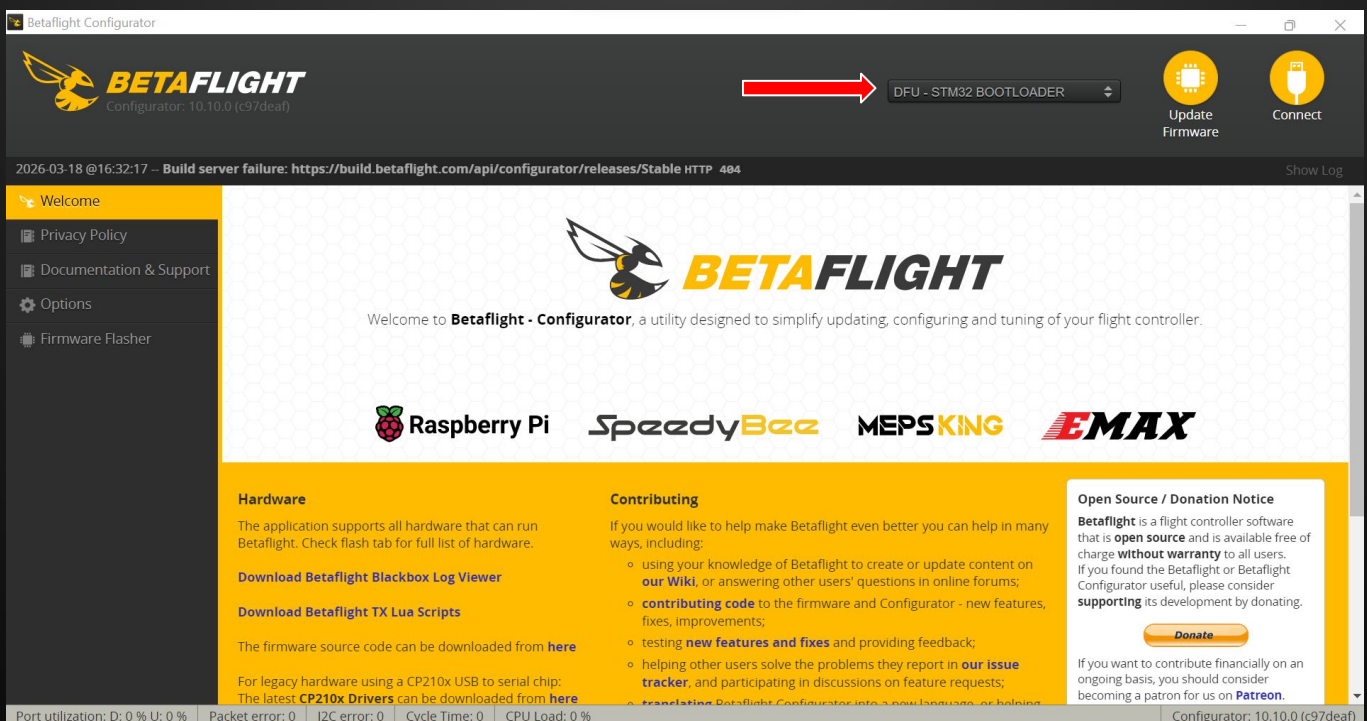
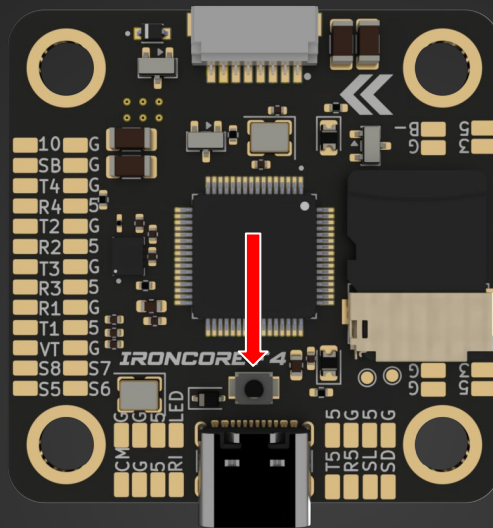
Step 1: Install Betaflight Configurator

- Download the latest version of Betaflight Configurator from the official Betaflight GitHub repository.
- Install the appropriate version based on your operating system (Windows, macOS, or Linux).



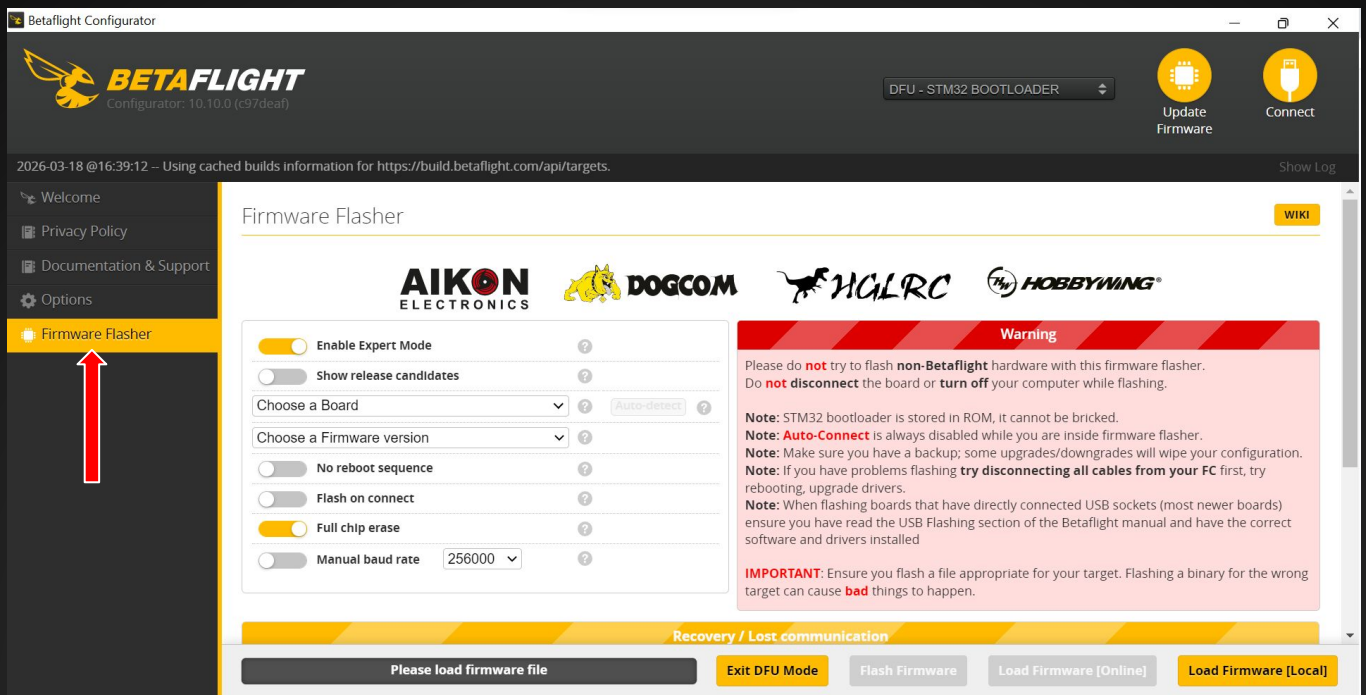
Step 2: Enter Bootloader (DFU) Mode

- Press and hold the physical **BOOT** button on the flight controller.
- While holding the button, connect the FC to your PC via a **USB Data Cable** (avoid "charge-only" cables).
- Release the button once connected; the board is now in Device Firmware Update (DFU) mode.

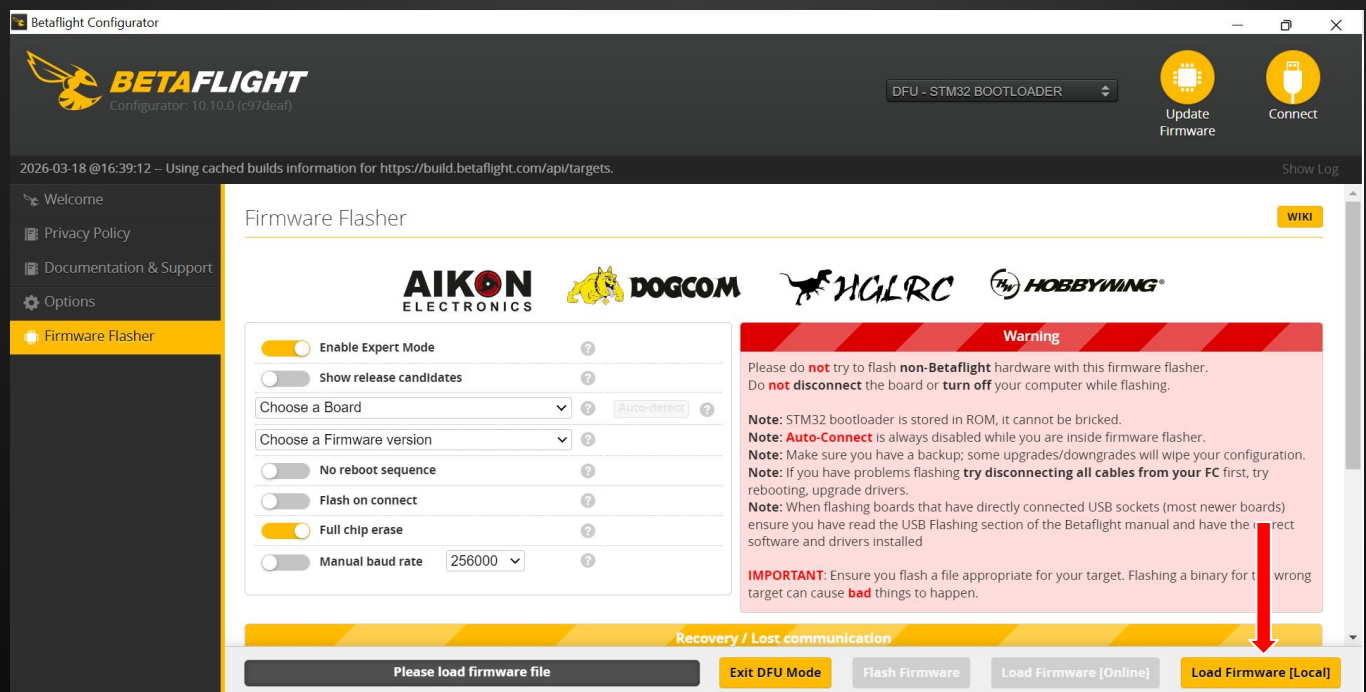


Step 3: Flashing Firmware

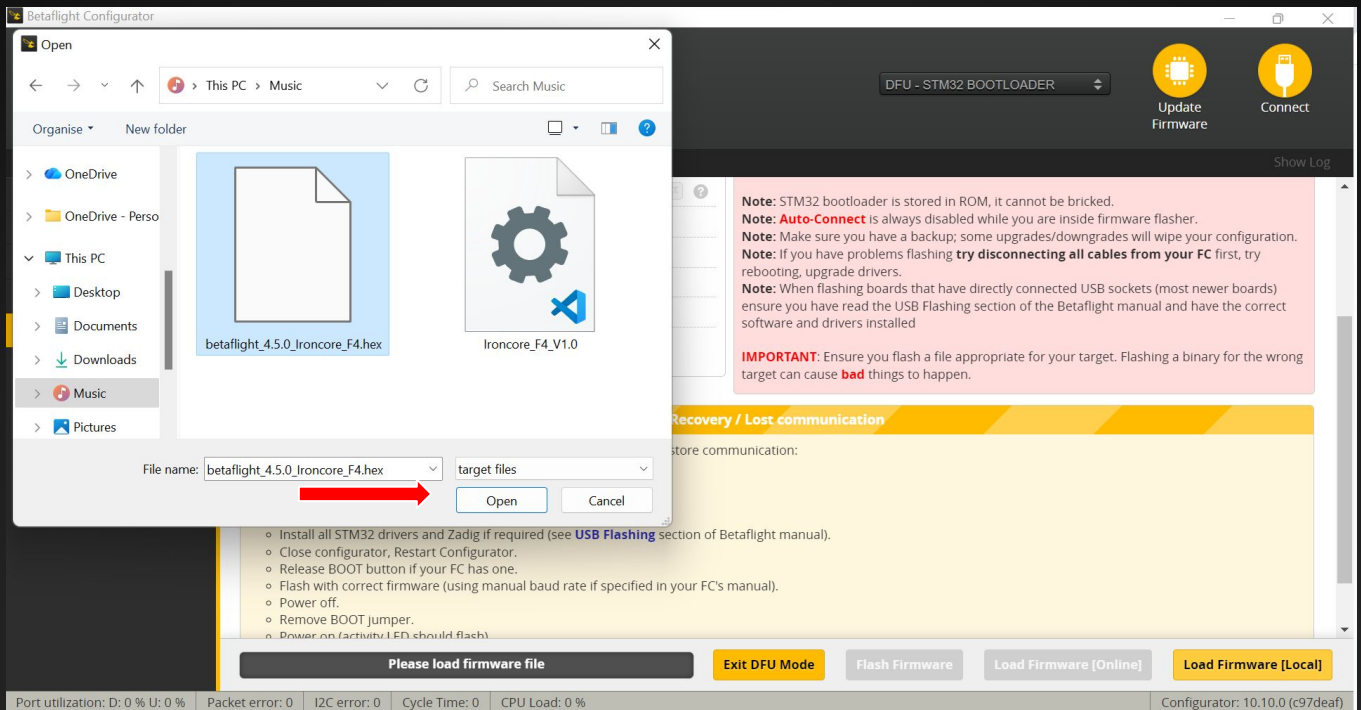
- Now click on **Firmware Flasher** in left side menu



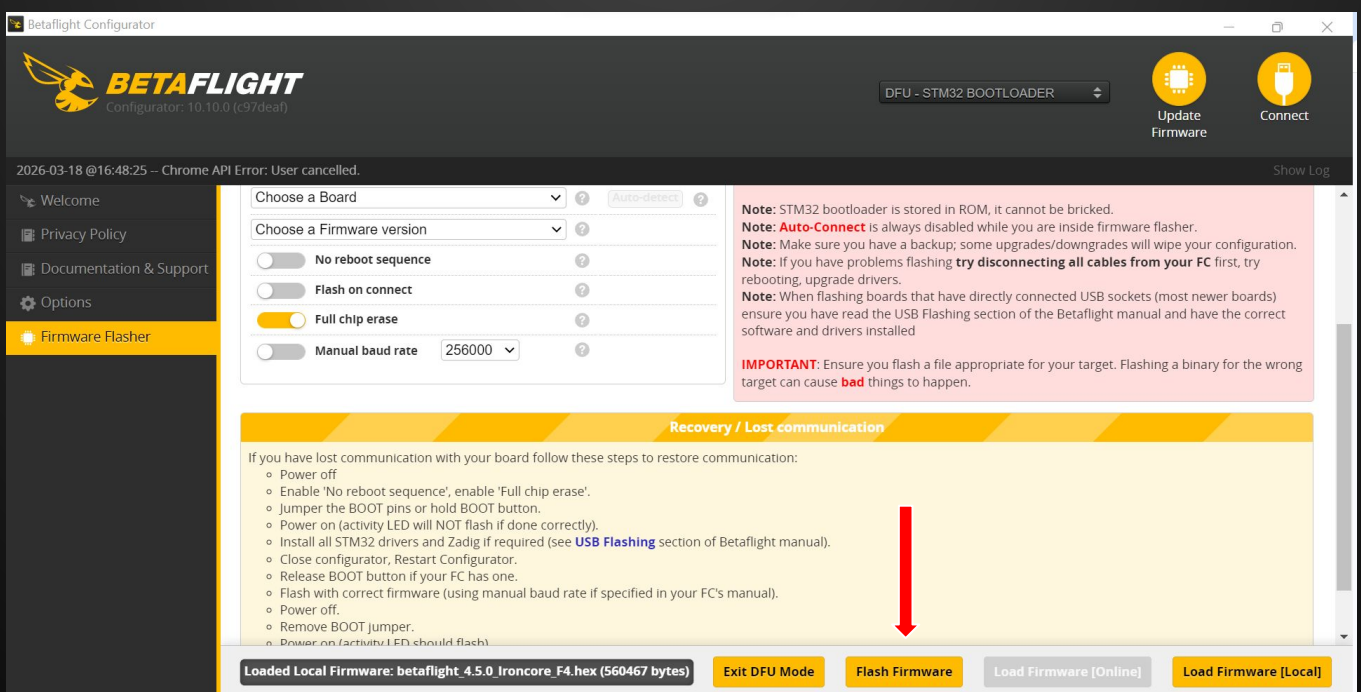
- Now click on **Load Firmware (Local)** in right bottom side



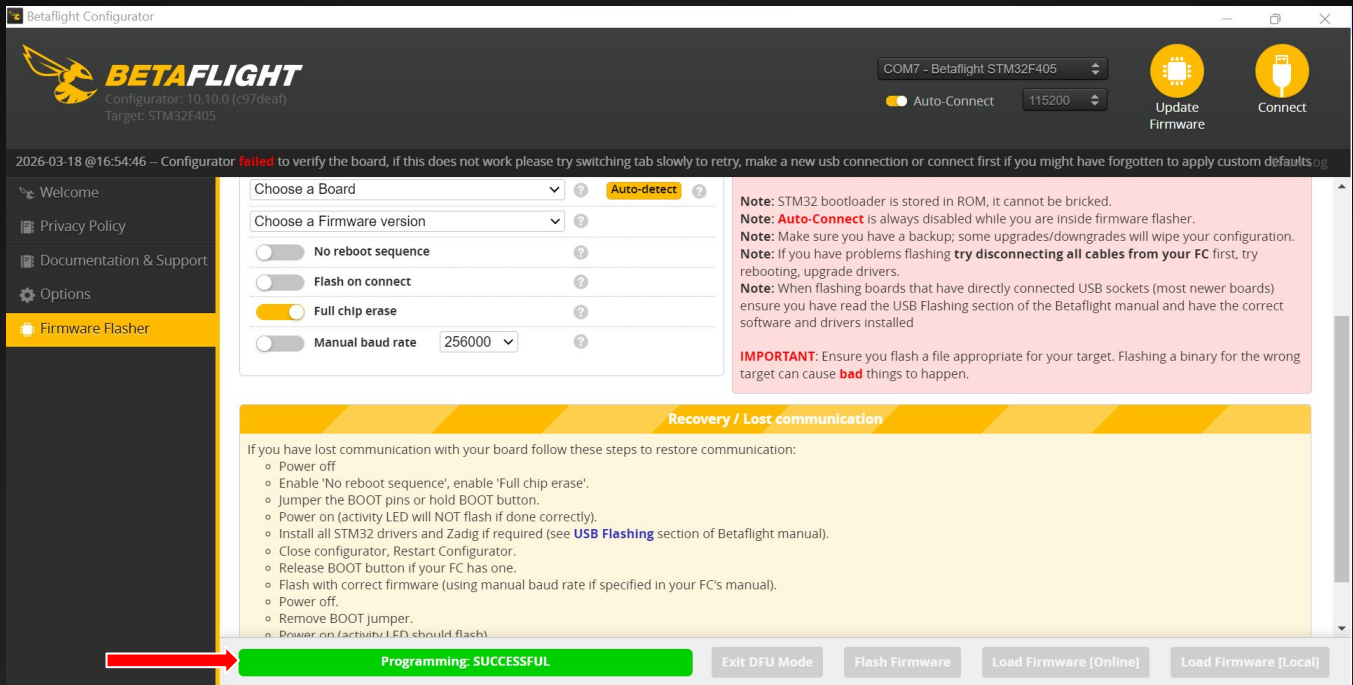
- Now select the betafirmware which you downloaded (please find the link below to download the betafirmware) and click on open.



- Now click on **Flash Firmware**

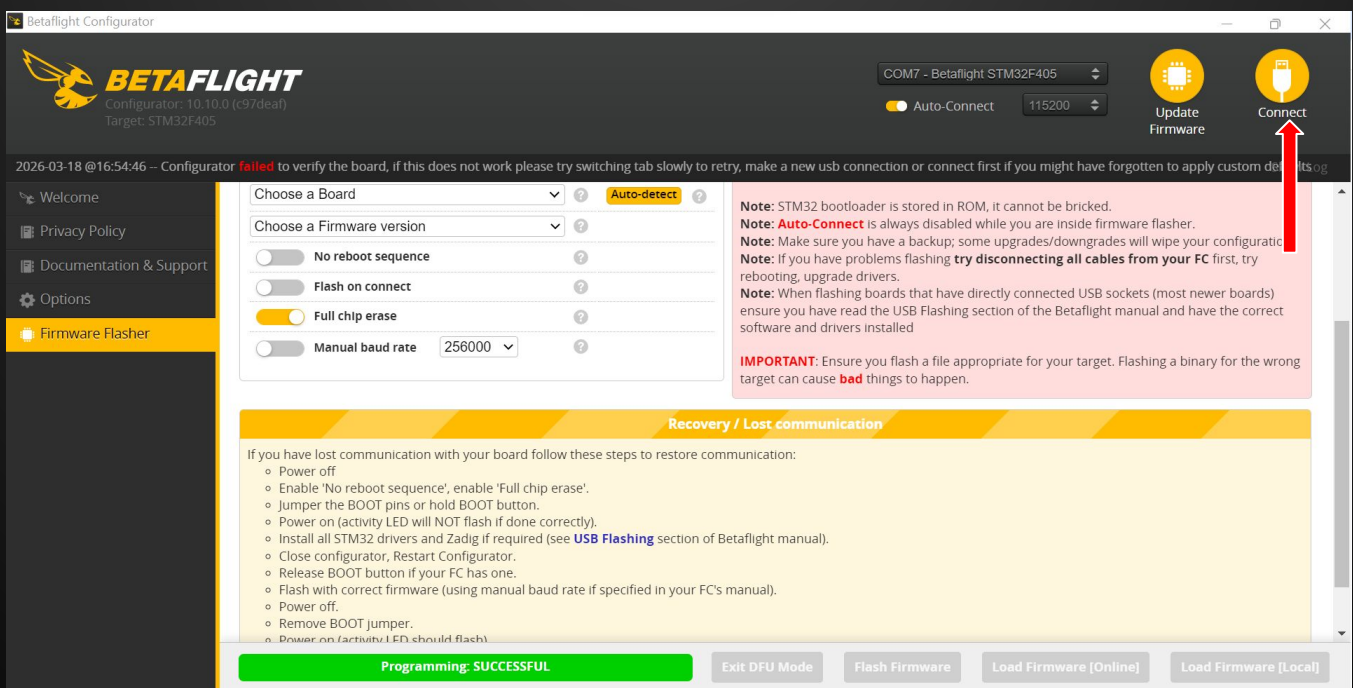


- After flashing is successful you should see **Programming: SUCCESSFUL**

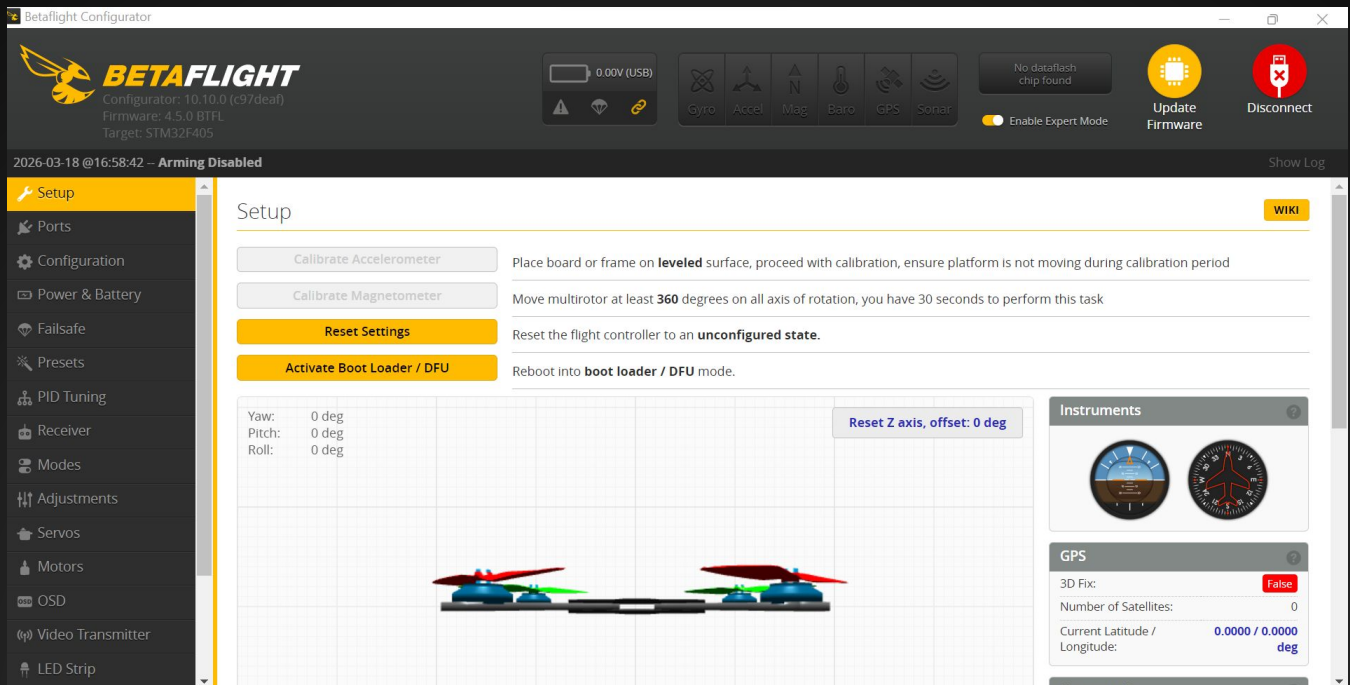


Step 4: Loading Configuration File

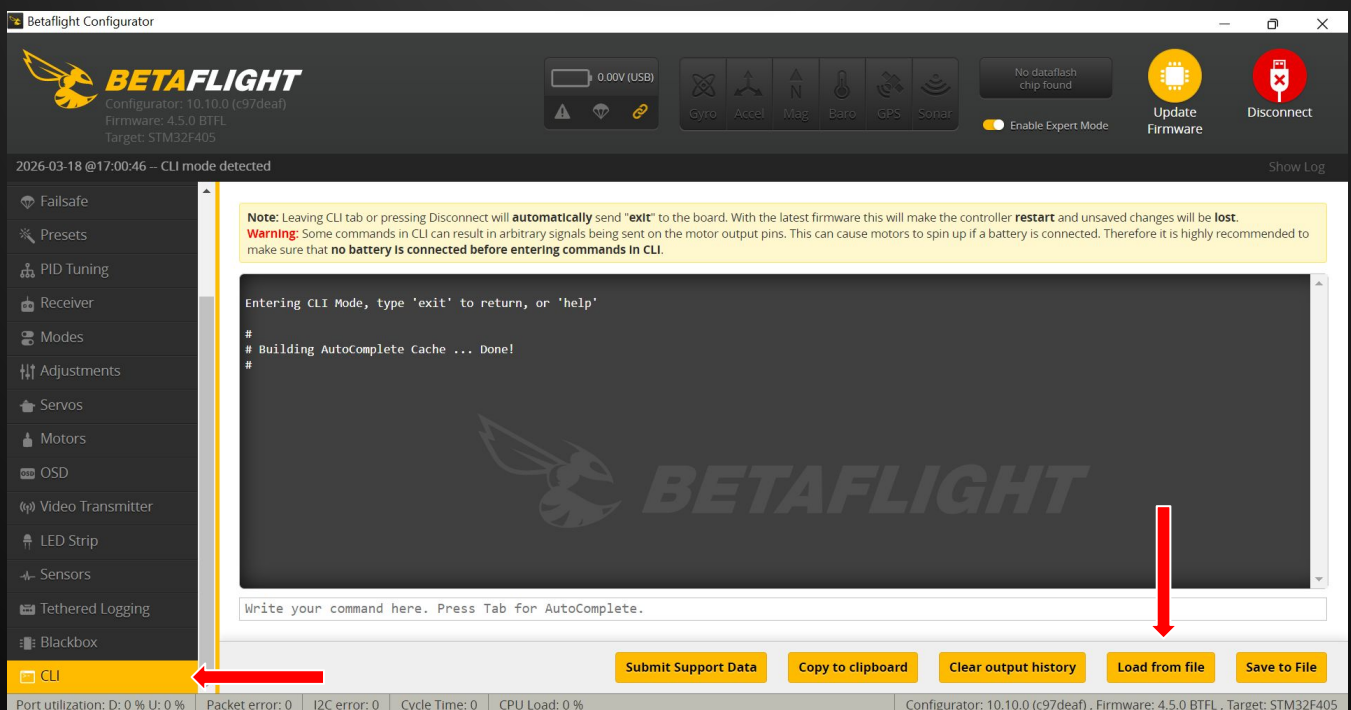
- Now Click on **Connect** Button on top right corner



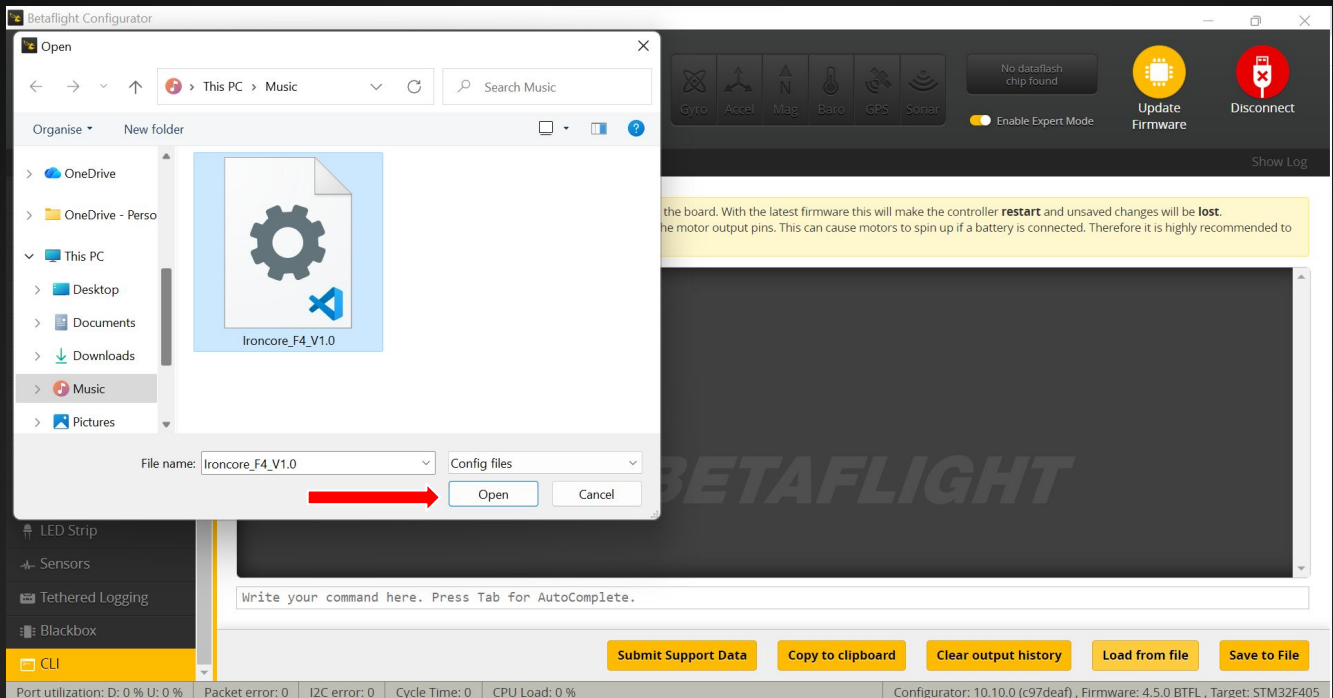
- Now you can see the Betaflight Dashboard, shows FC is connected with software.



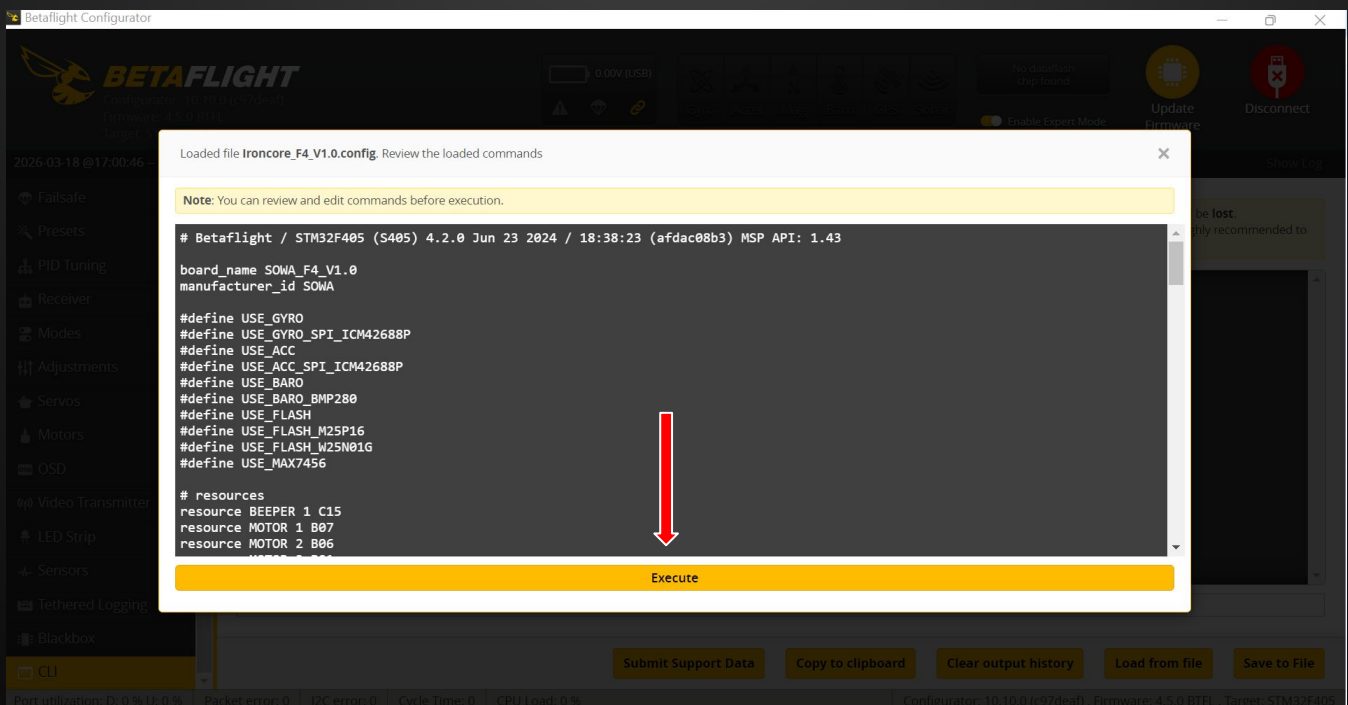
- Now on **CLI** tab in left side menu then click on **Load From File** in bottom left side menu



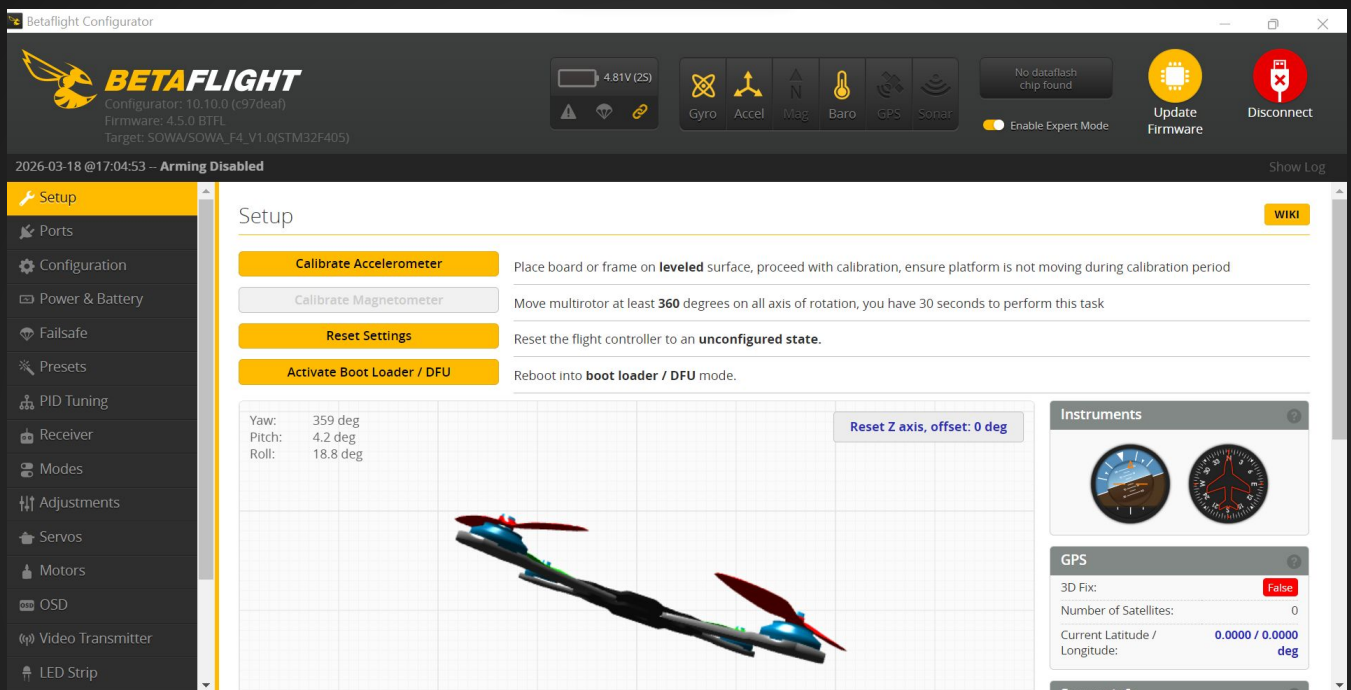
- Now load the downloaded config file (please find the link below to download the config file) and click on open.



- Once config file is loaded lick on **Execute**



- Once file is executed now you can connect the FC with software and can do the setup as required normally.



Let's Connect

Email us at: contact@edsystems.in

Website: www.edsystems.in