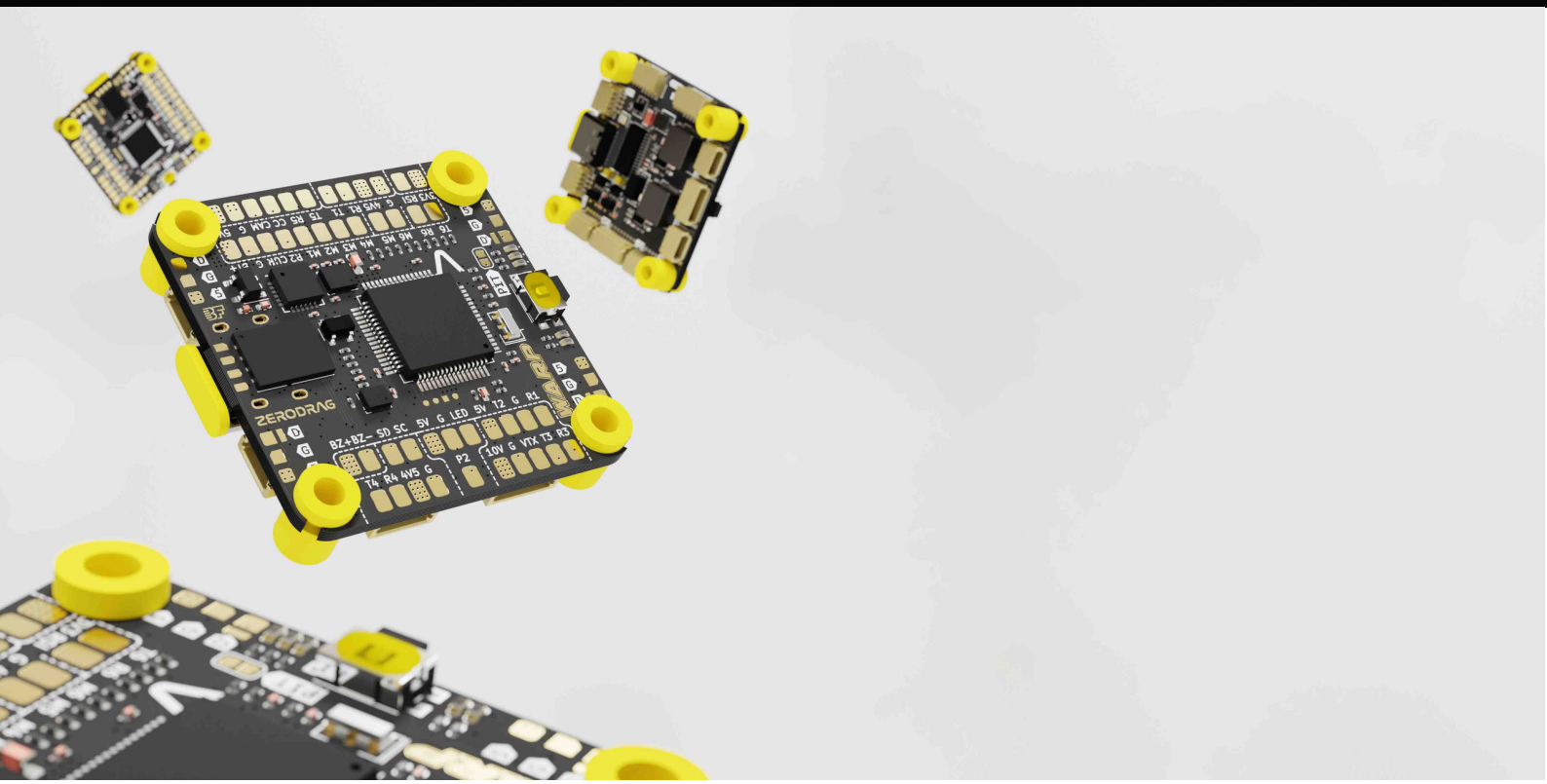
ZERODRAG

WARP F7



USER MANUAL

VERSION 1.0
01/07/2024

INDEX

1. Product Description

The ZERODRAG WARP F7 is a cutting-edge flight controller designed for UAVs. It offers advanced capabilities with robust performance powered by the STM32F722 microcontroller, two gyro options (ICM42688P and MPU6000), and an integrated BMP280 barometer. The controller supports a wide range of power inputs (3-6S LiPo) and features a compact form factor (37mm x 38.5mm x 7.1mm), making it an ideal choice for high-precision flight operations.

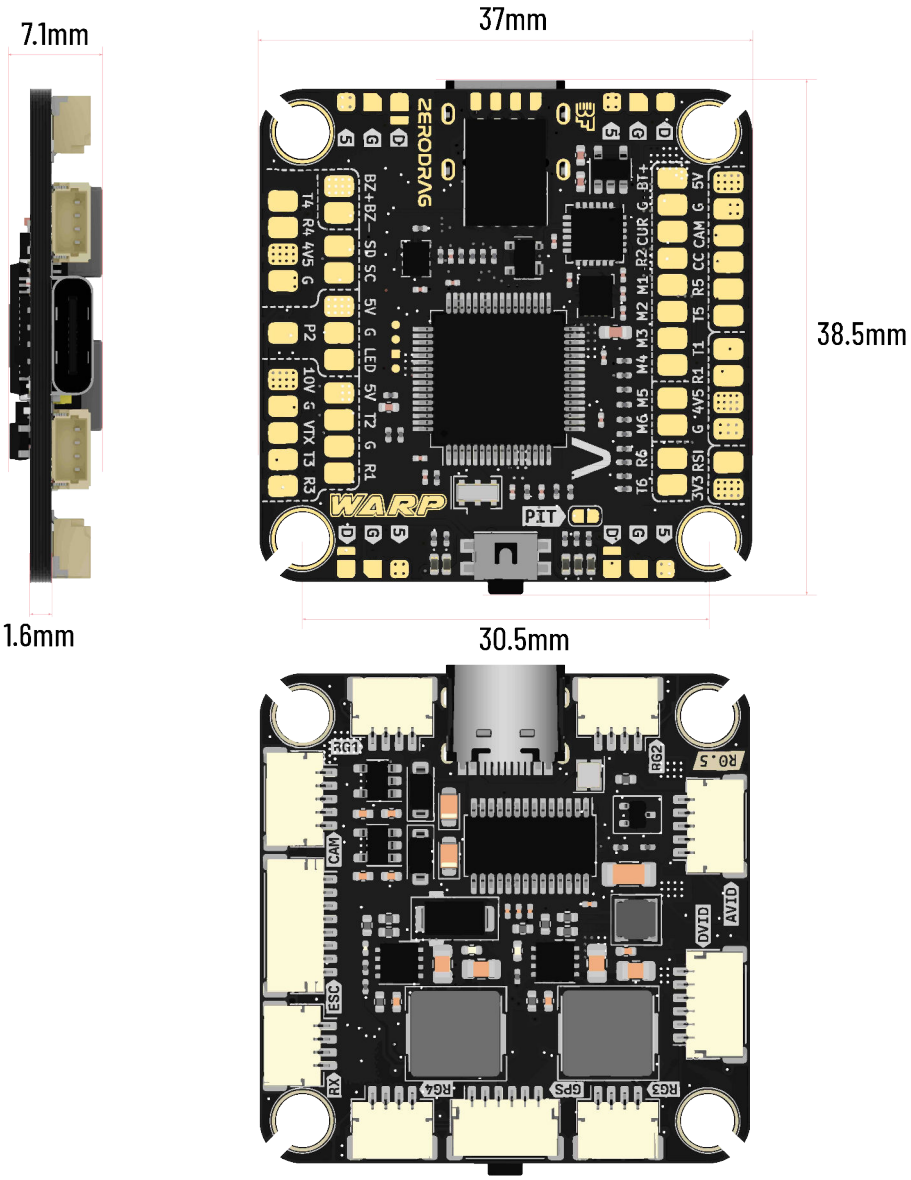
Enhanced with an AT7456E OSD chip, 32MB BlackBox-Flash for flight data logging, and multiple BEC outputs, the ZERODRAG WARP F7 ensures comprehensive functionality for various UAV applications. Its connectivity options include up to 6 UARTs, up to 8 Motor outputs, and I2C pads for additional sensors. The flight controller is optimized for Betaflight firmware and compatible with iNav, providing seamless integration and easy configuration for all your UAV needs.

2. Specification

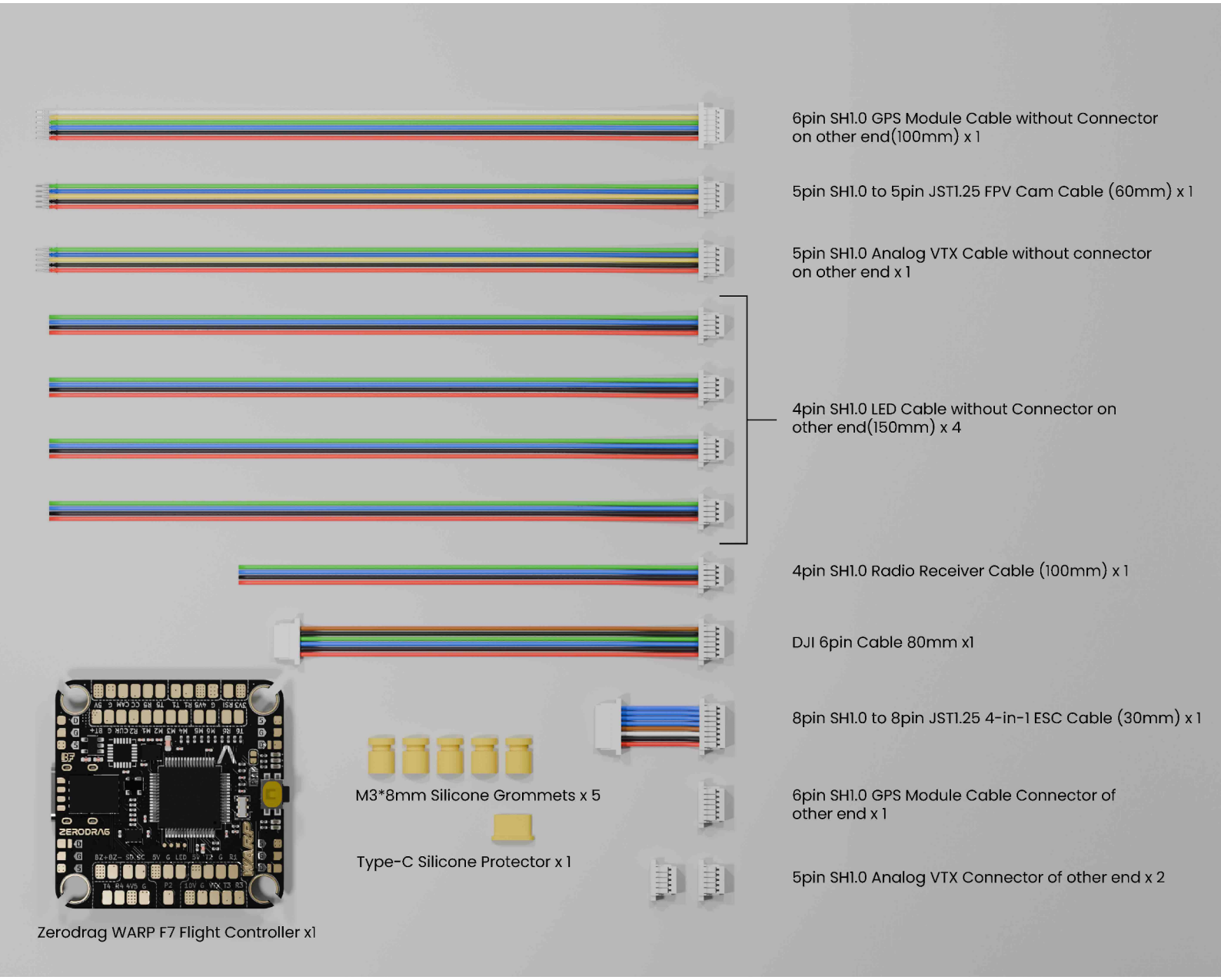
ZERODRAG WARP F7 Flight Controller

- **Product Name:** ZERODRAG WARP F7
- **Power Input:** 3-6S LiPo
- **Mounting:** 30.5 x 30.5mm (4mm hole size)
- **Dimension:** 37 x 38.5 x 7.1 mm
- **Weight:** 9.35g
- **MCU:** STM32F722
- **GYRO (IMU):** ICM42688P / MPU6000
- **Barometer:** BMP280
- **OSD Chip:** AT7456E
- **USB Port:** Type-C
- **BlackBox-Flash:** 32MB
- **Camera Control:** Pad
- **5V Bec:** 3 Amp
- **10V Bec:** 2.5 Amp
- **3.3V Regulator:** 500 mA
- **USB 4.5V:** For Receiver and GPS module
- **ESC Signal Pads:** M1 - M6 on top side and M7-M8 as T6 & R6
- **UARTs:** 6 UARTs with 6 motor pads / 5 UARTs with 8 motor pads

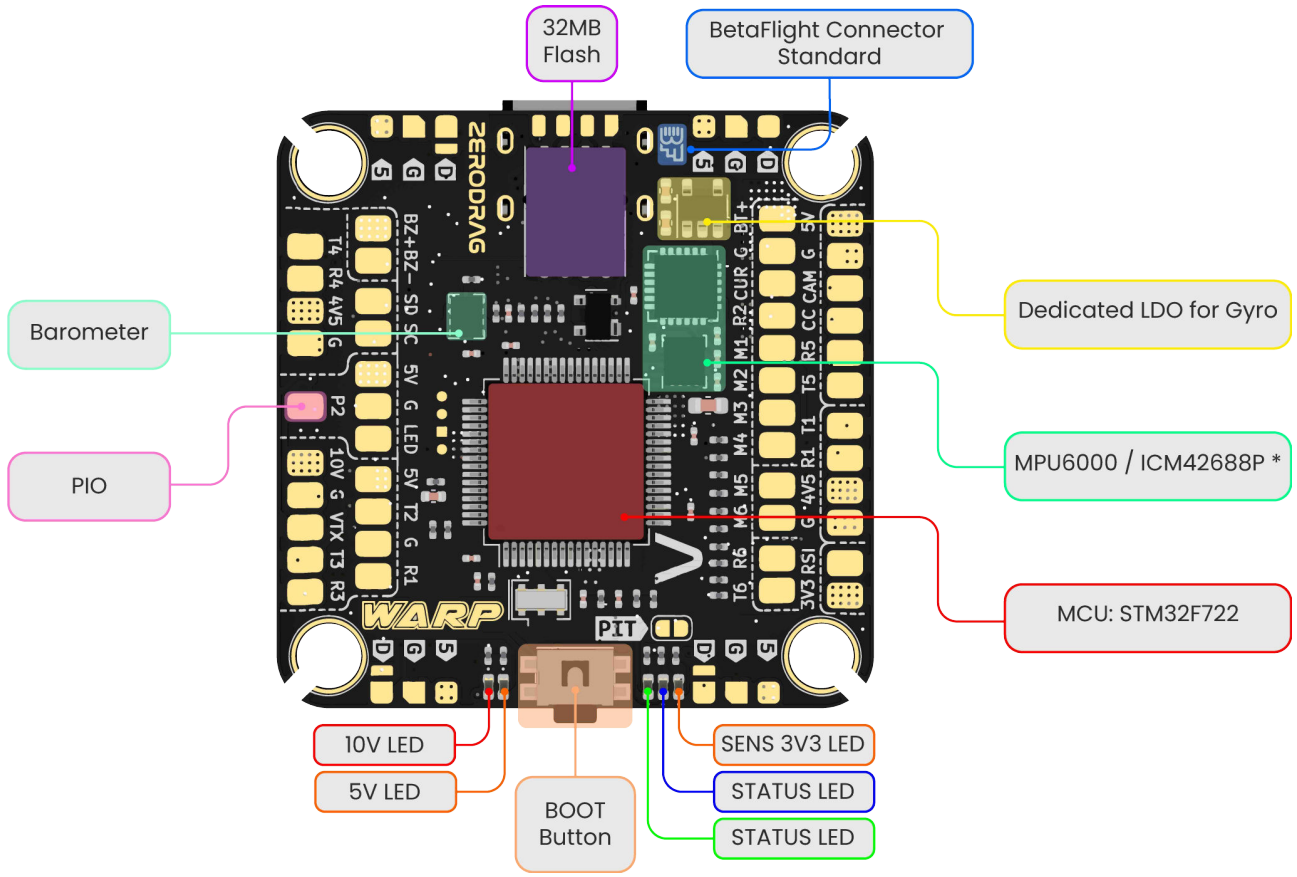
- **I2C Pads:** SDA & SCL Pads for sensors like Magnetometer, Sonar, etc.
- **Buzzer:** Used for 5V Buzzer
- **5 x LED Pad:** Supported by Betaflight firmware
- **RSSI:** RSI on the pad
- **Supported Firmware:** Betaflight and iNav
- **Target Name:** ZeroDrag WARP F7
- **BOOT Button:** Press boot button, then power FC to activate DFU mode for flashing.
- **Connector:** BetaFlight Standard

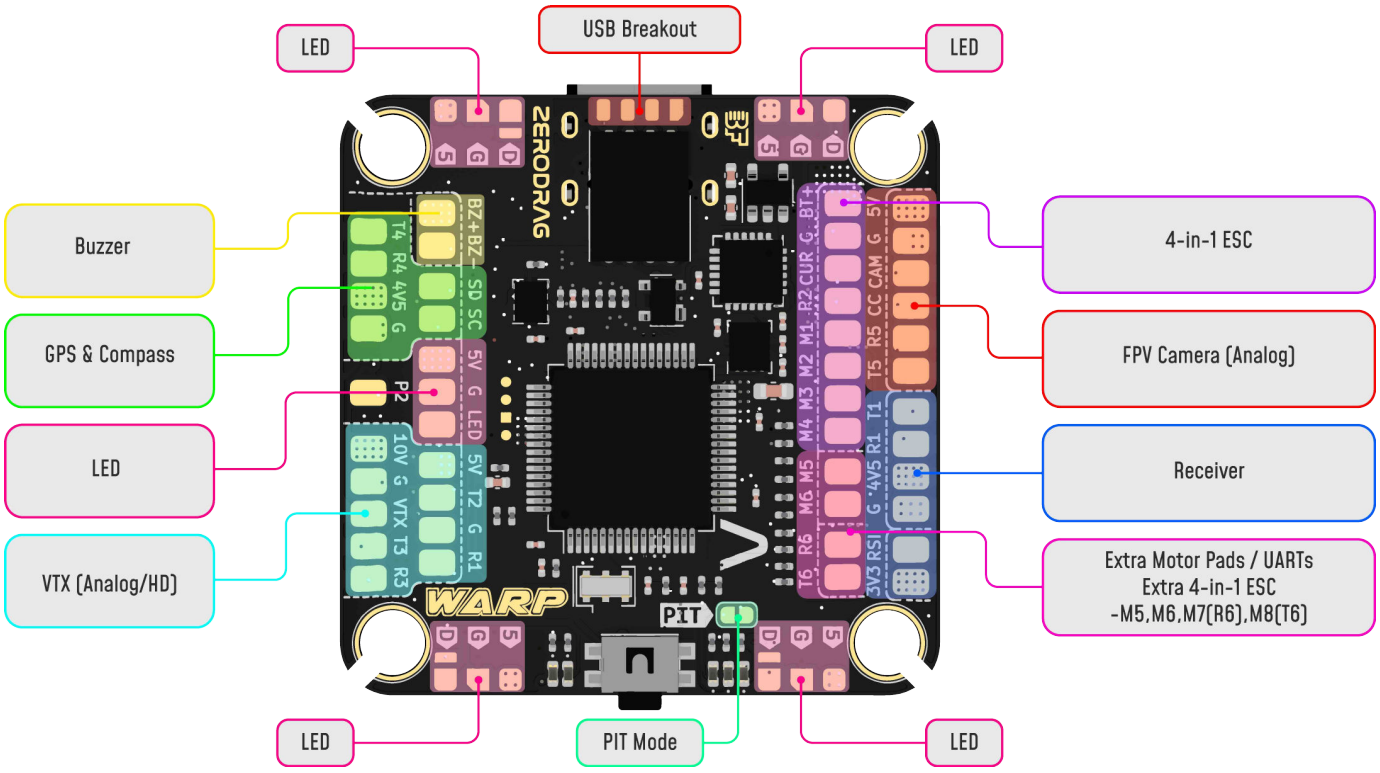


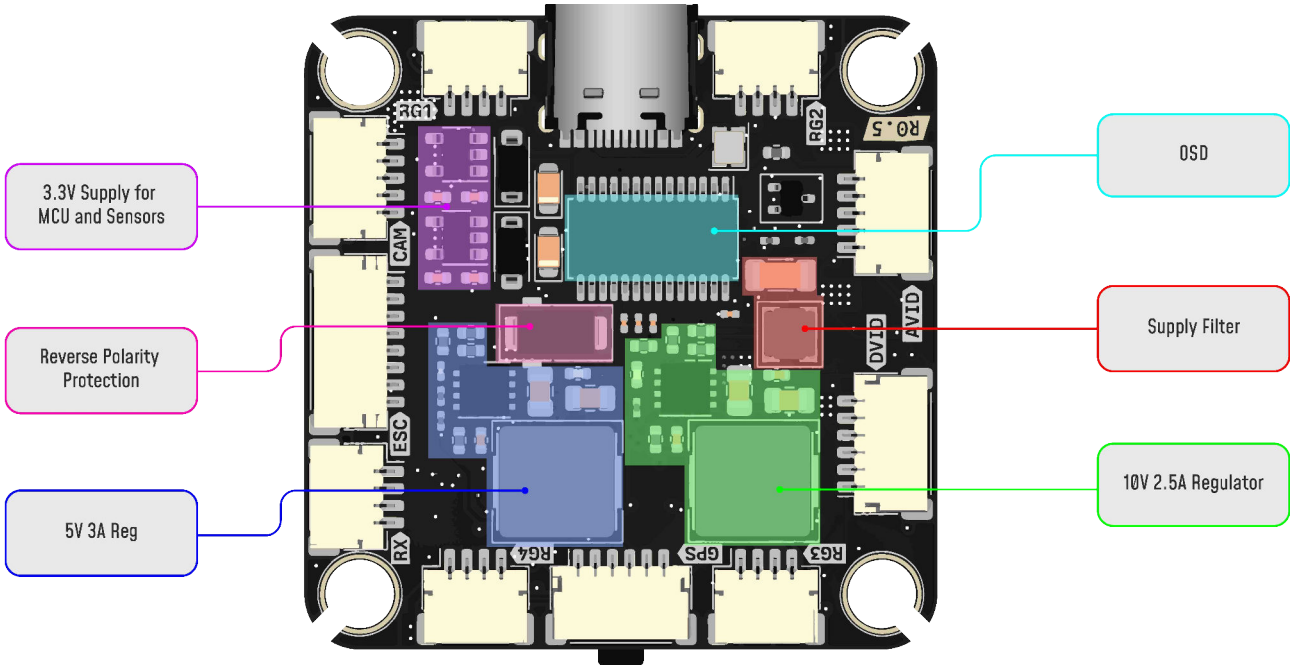
3. In The Box

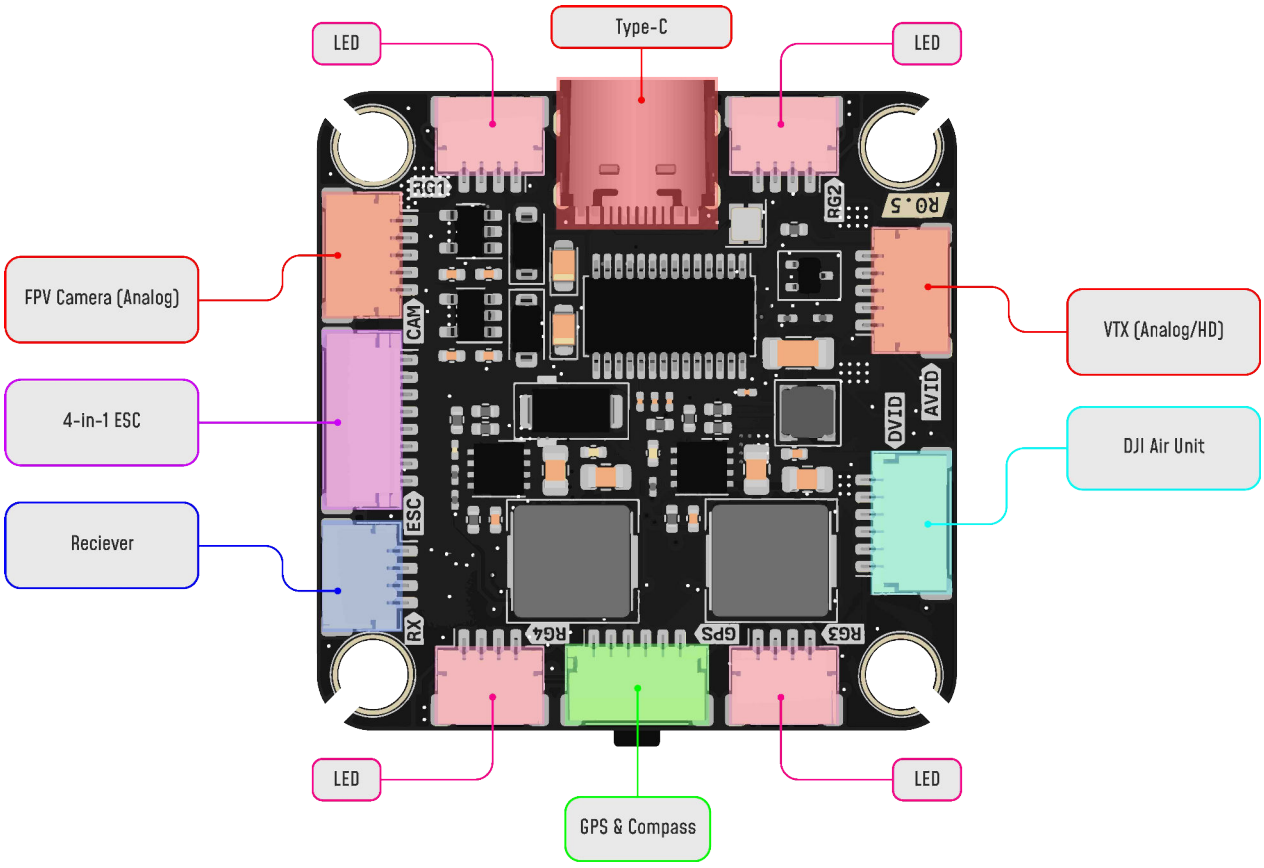

6pin SH1.0 GPS Module Cable without Connector on other end(100mm) x 1
5pin SH1.0 to 5pin JST1.25 FPV Cam Cable (60mm) x 1
5pin SH1.0 Analog VTX Cable without connector on other end x 1
4pin SH1.0 LED Cable without Connector on other end(150mm) x 4
4pin SH1.0 Radio Receiver Cable (100mm) x 1
DJI 6pin Cable 80mm x1
8pin SH1.0 to 8pin JST1.25 4-in-1 ESC Cable (30mm) x 1
M3*8mm Silicone Grommets x 5
6pin SH1.0 GPS Module Cable Connector of other end x 1
Type-C Silicone Protector x 1
5pin SH1.0 Analog VTX Connector of other end x 2
Zerodrag WARP F7 Flight Controller x1

4. Layout


32MB Flash
BetaFlight Connector Standard
Barometer
PIO
Dedicated LDO for Gyro
MPU6000 / ICM42688P *
MCU: STM32F722
10V LED
5V LED
BOOT Button
SENS 3V3 LED
STATUS LED
STATUS LED


LED
USB Breakout
LED
Buzzer
GPS & Compass
LED
VTX (Analog/HD)
4-in-1 ESC
FPV Camera (Analog)
Receiver
Extra Motor Pads / UARTs
Extra 4-in-1 ESC
-M5,M6,M7(R6),M8(T6)
LED
PIT Mode
LED


3.3V Supply for MCU and Sensors
Reverse Polarity Protection
5V 3A Reg
OSD
Supply Filter
10V 2.5A Regulator
RG1
RG2
R0.5
CAM
DVID
AVID
ESC
RX
RG4
GPS
RG3


LED
Type-C
LED
FPV Camera (Analog)
4-in-1 ESC
Reciever
VTX (Analog/HD)
DJI Air Unit
RG1
RG2
R0.5
CAM
DVID
AVID
ESC
RX
RG4
GPS
RG3
LED
GPS & Compass
LED

LED Indication

ORANGE LED 1 - Sensor 3.3 Voltage indication

BLUE LED - FC Status Light.

Unlit: USB disconnected and disarmed,

Lit: USB disconnected and armed,

Flashing: USB connected and disarmed,

5x Rapid Flash then Flashing: USB connected and arming command prevented

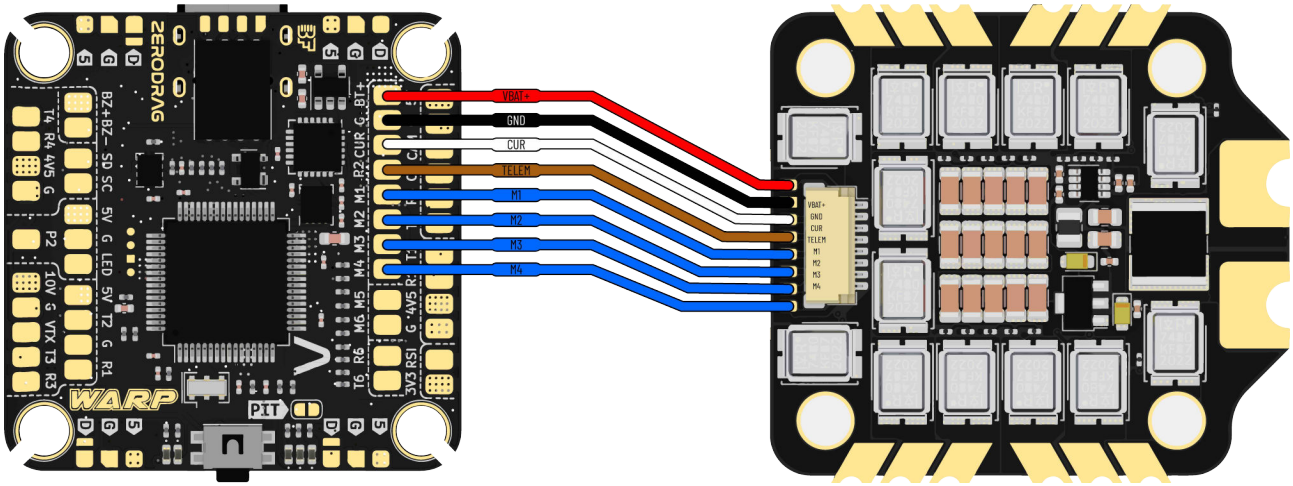
GREEN LED - FC Status Light

ORANGE LED 2 - 5V Power Indicator.

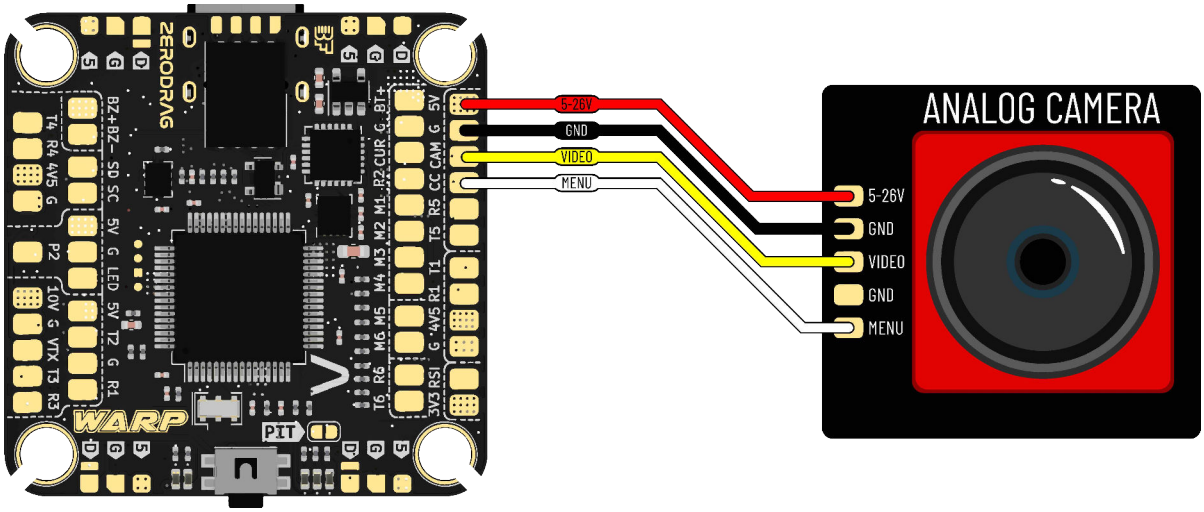
RED LED - 10V Power Indicator.

5. Connections

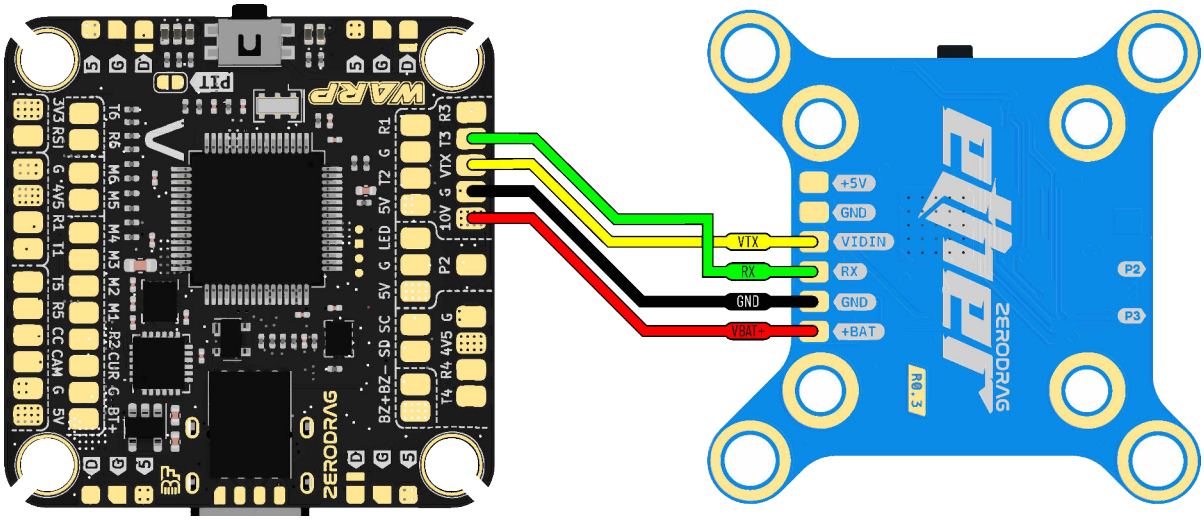
Method 1 - Direct Soldering



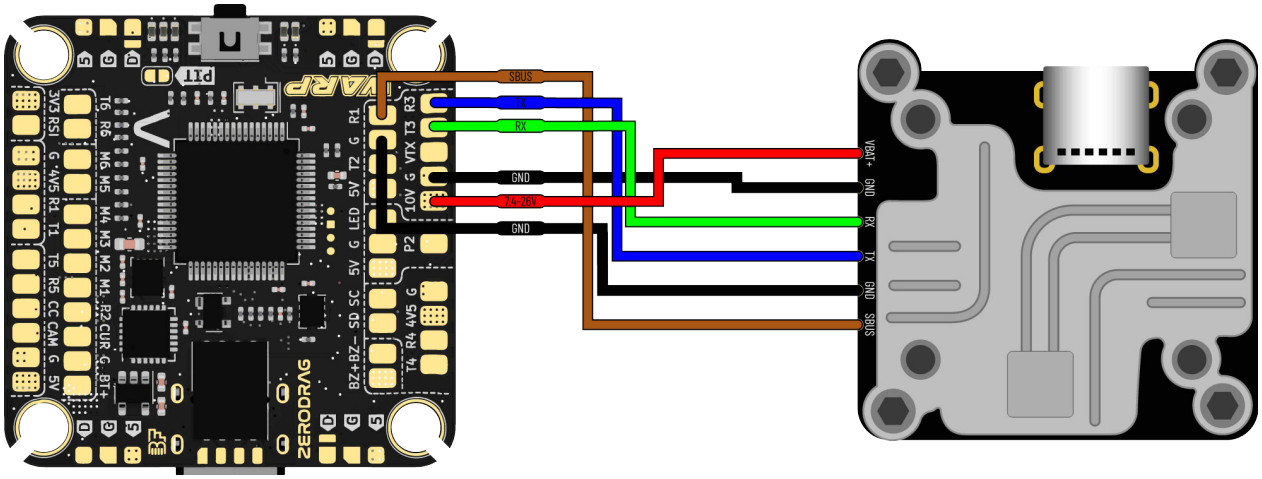
FC-ESC


5-26V
GND
VIDEO
MENU
ANALOG CAMERA
5-26V
GND
VIDEO
GND
MENU

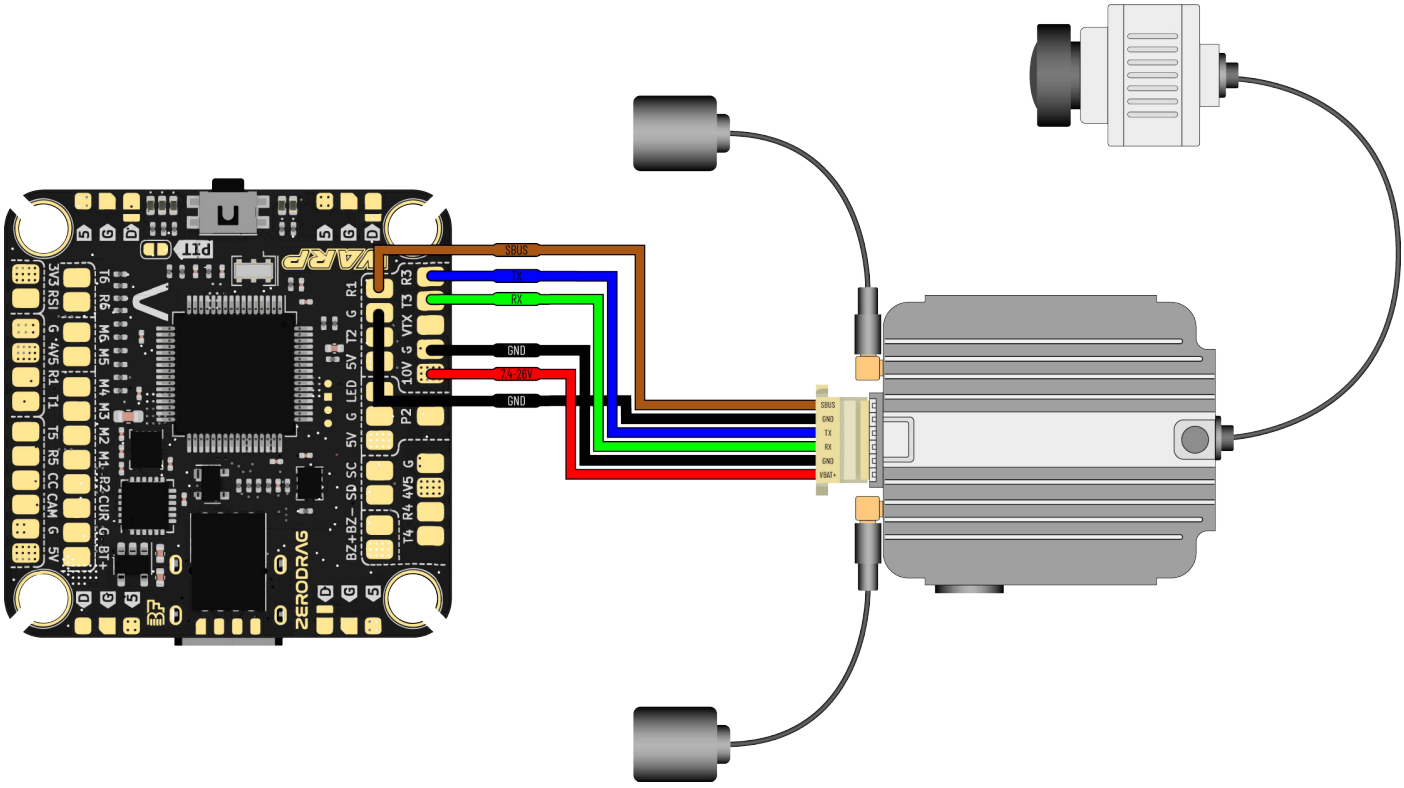
FC-CAM


VTX
RX
GND
VBAT+
+5V
GND
VIDIN
RX
GND
+BAT
P2
P3
ZERODRAG
R0.3

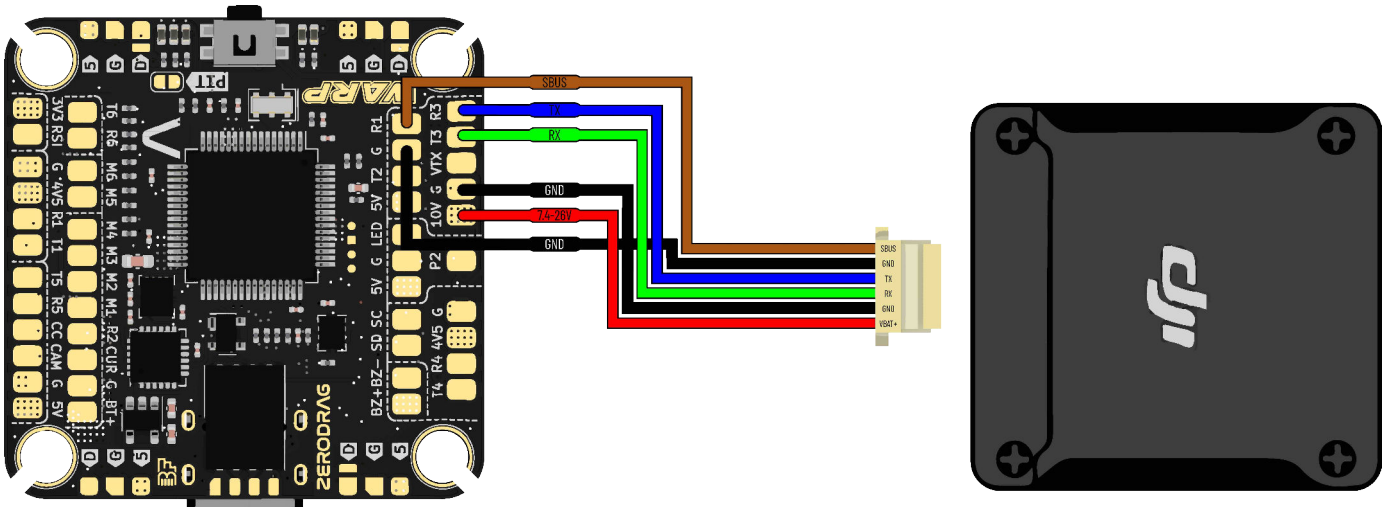
FC-VTX



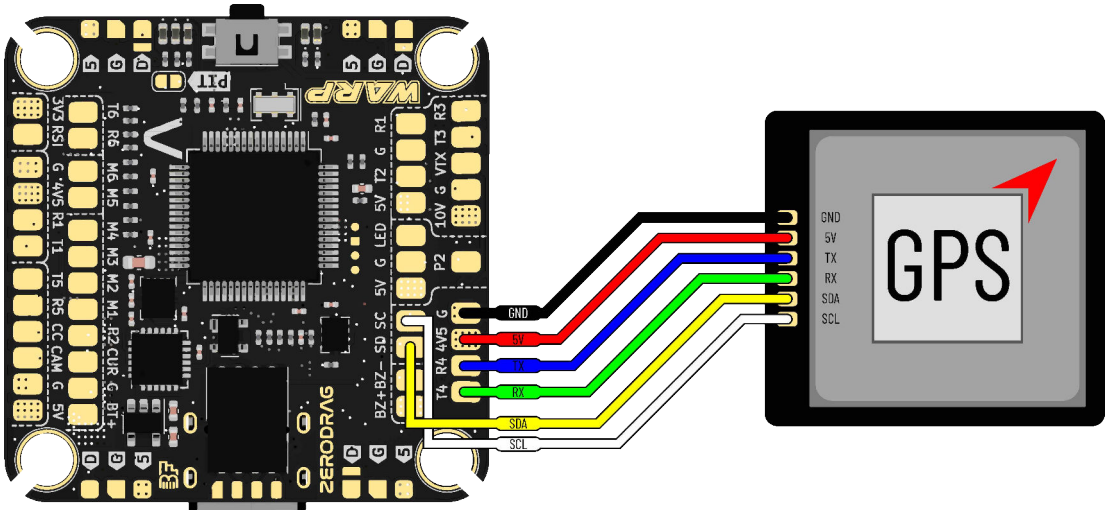
FC-Caddx Vista



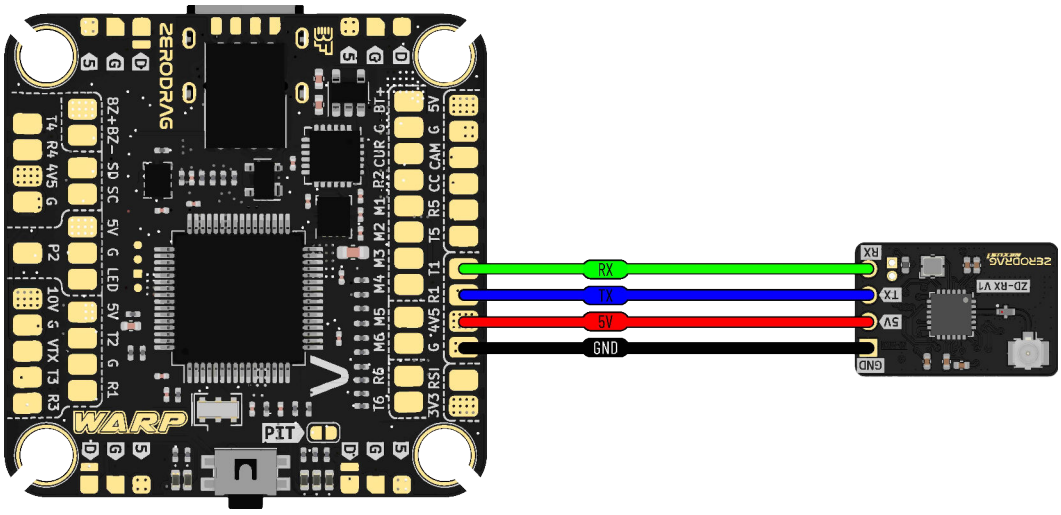
FC-DJI AirUnit



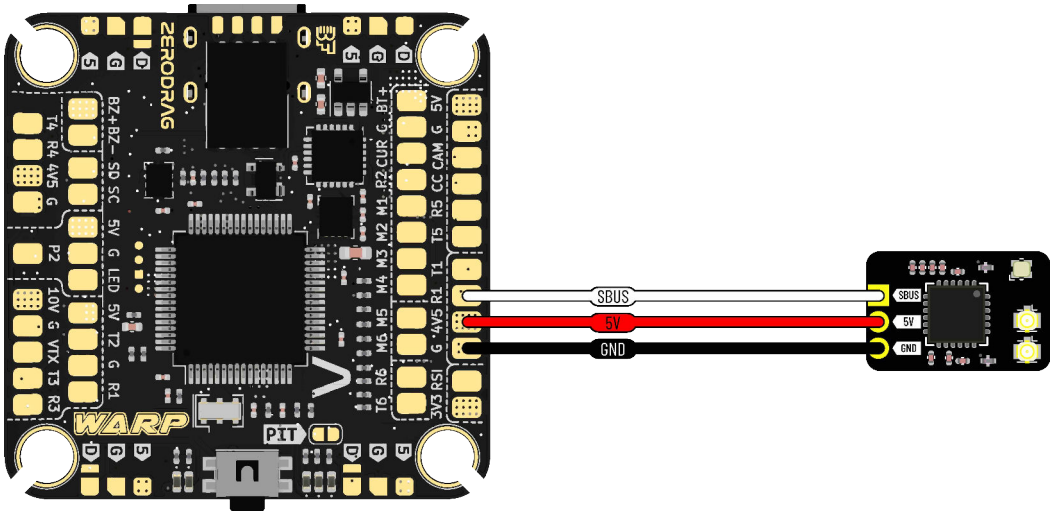
FC-DJI 03



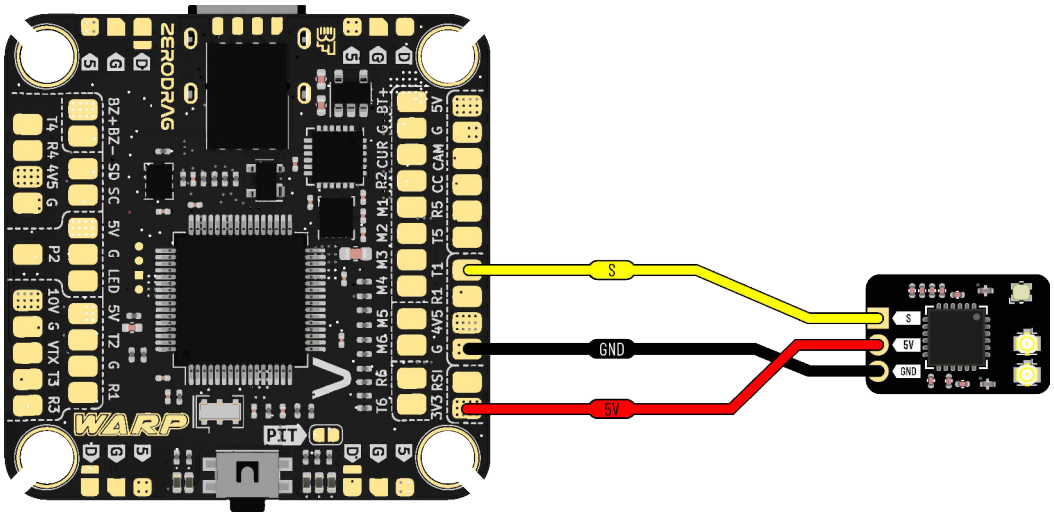
FC-GPS



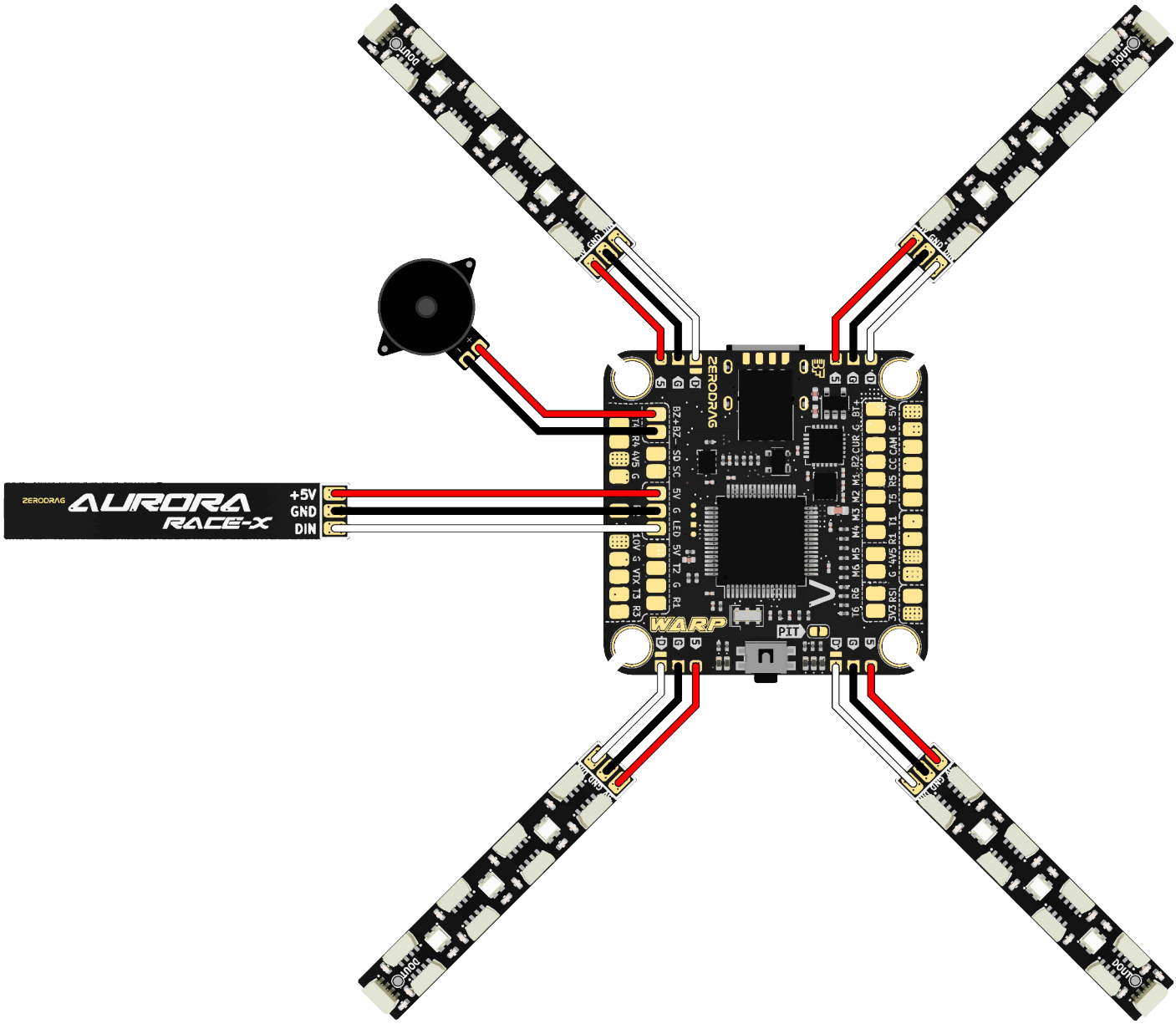
FC-ELRS/CRSF Receiver



FC-SBUS

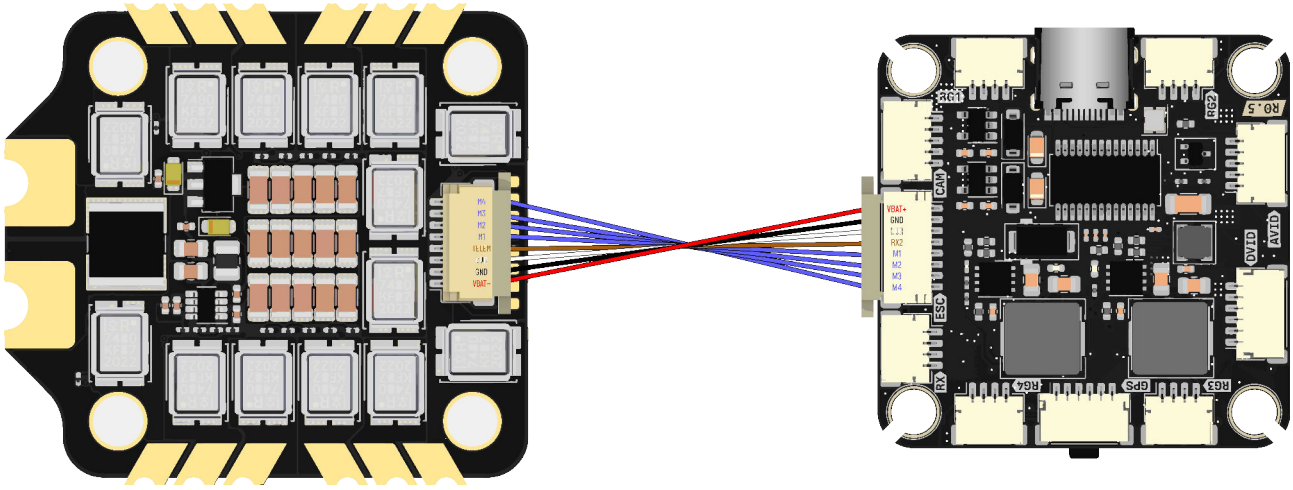


FC-Spectrum

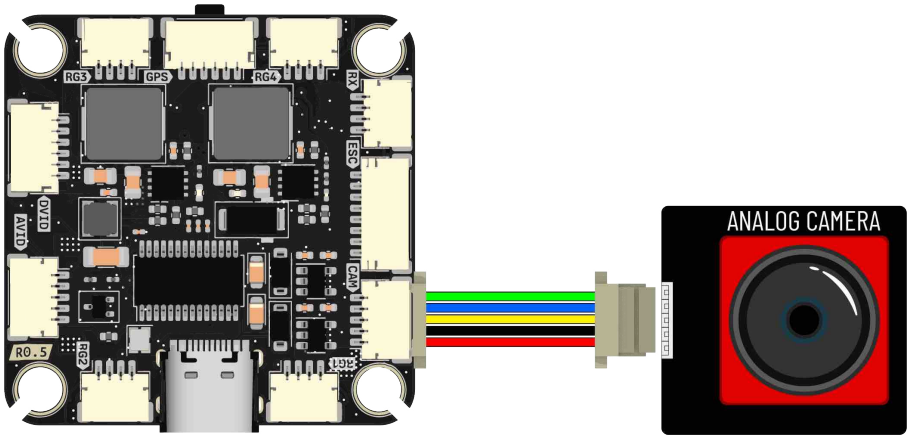


FC-LED's/Buzzer

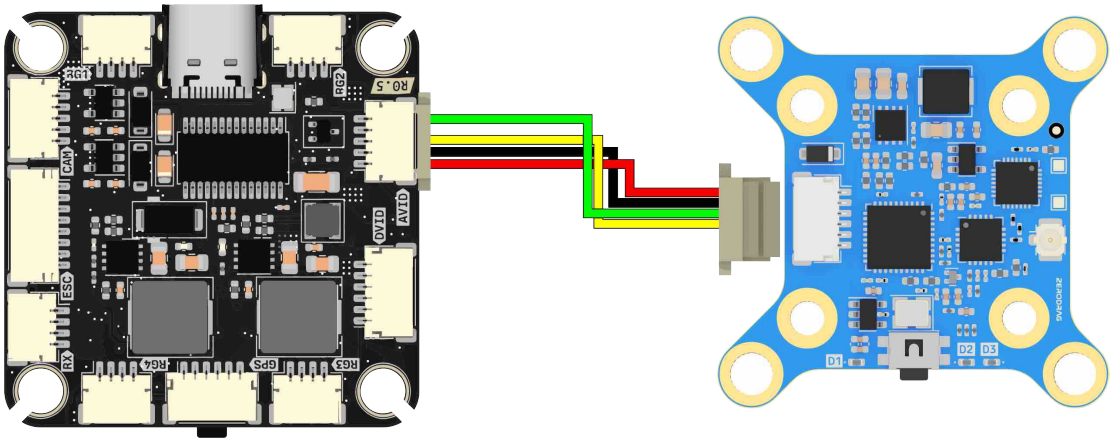
Method 2 - Direct Connector wiring.



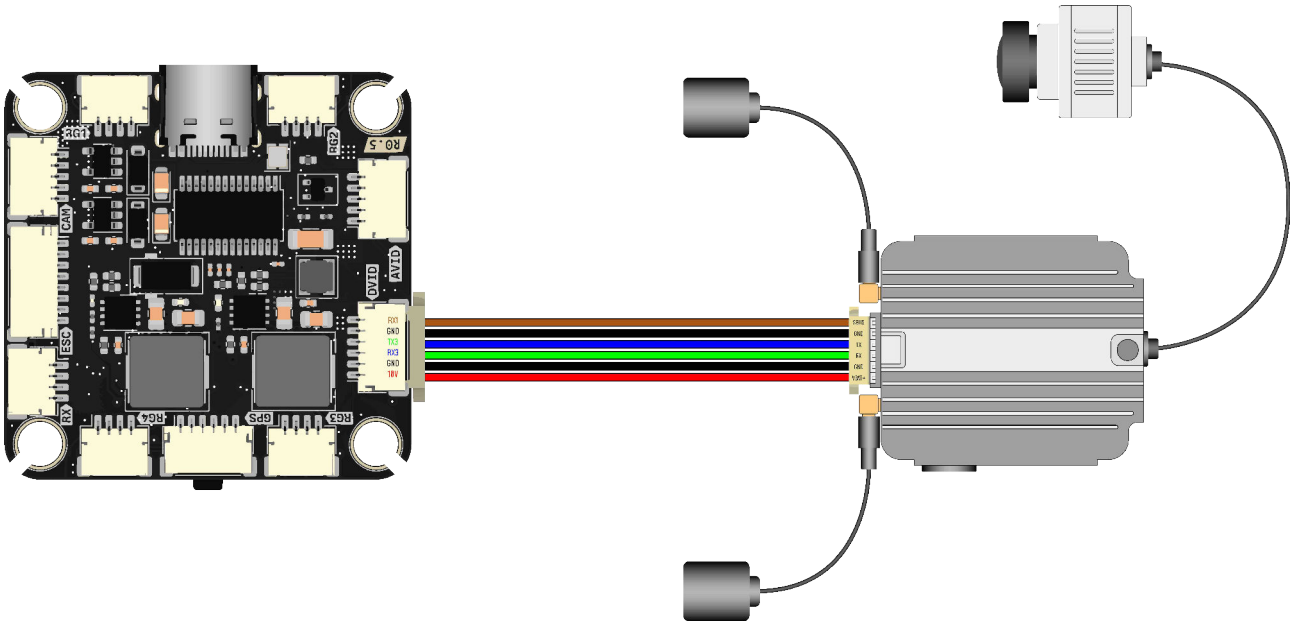
FC-ESC



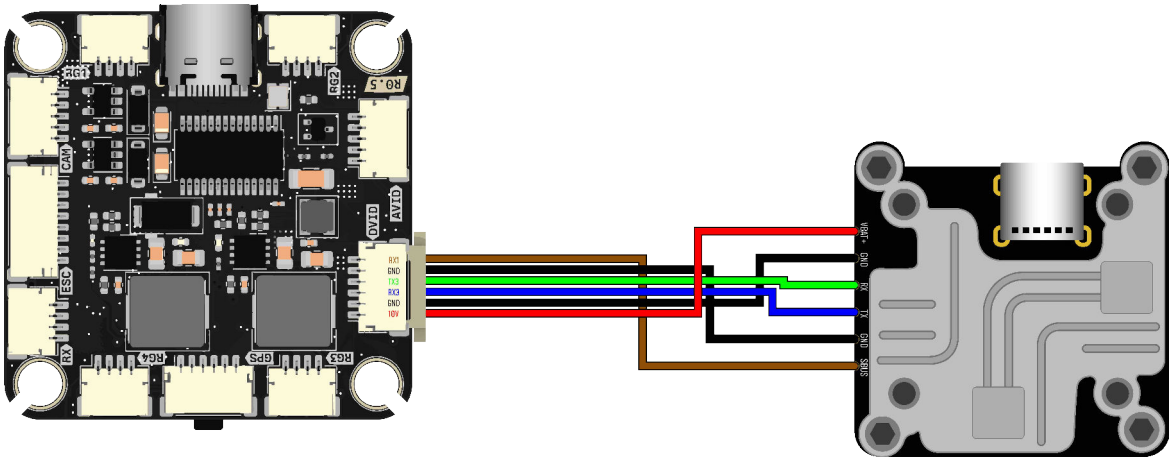
FC-CAM



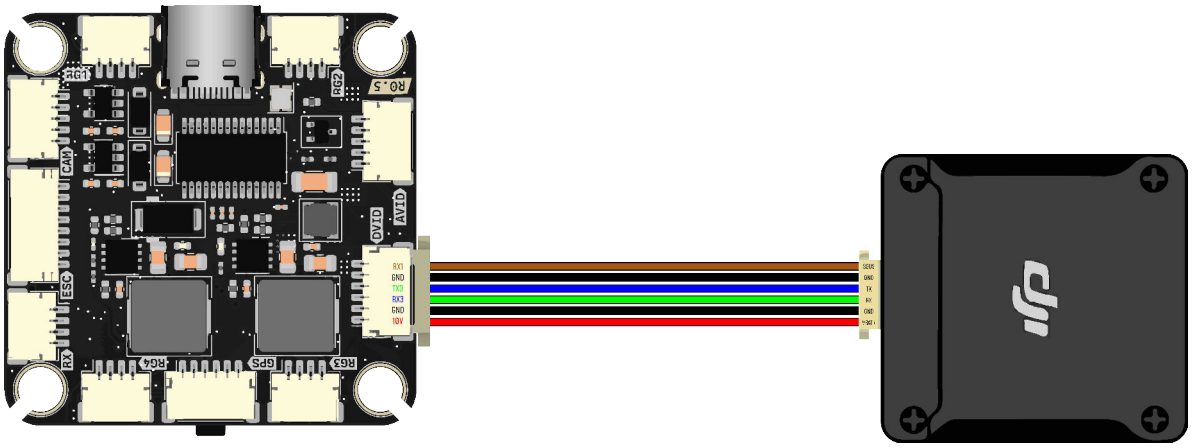
FC-VTX



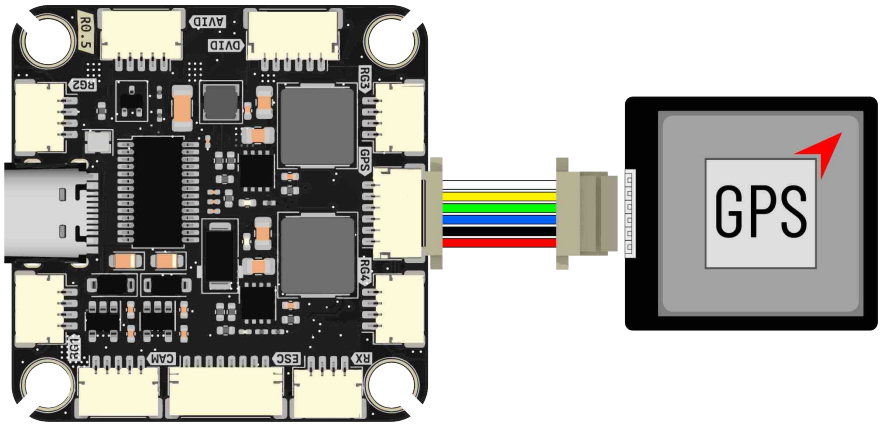
FC-DJI AirUnit



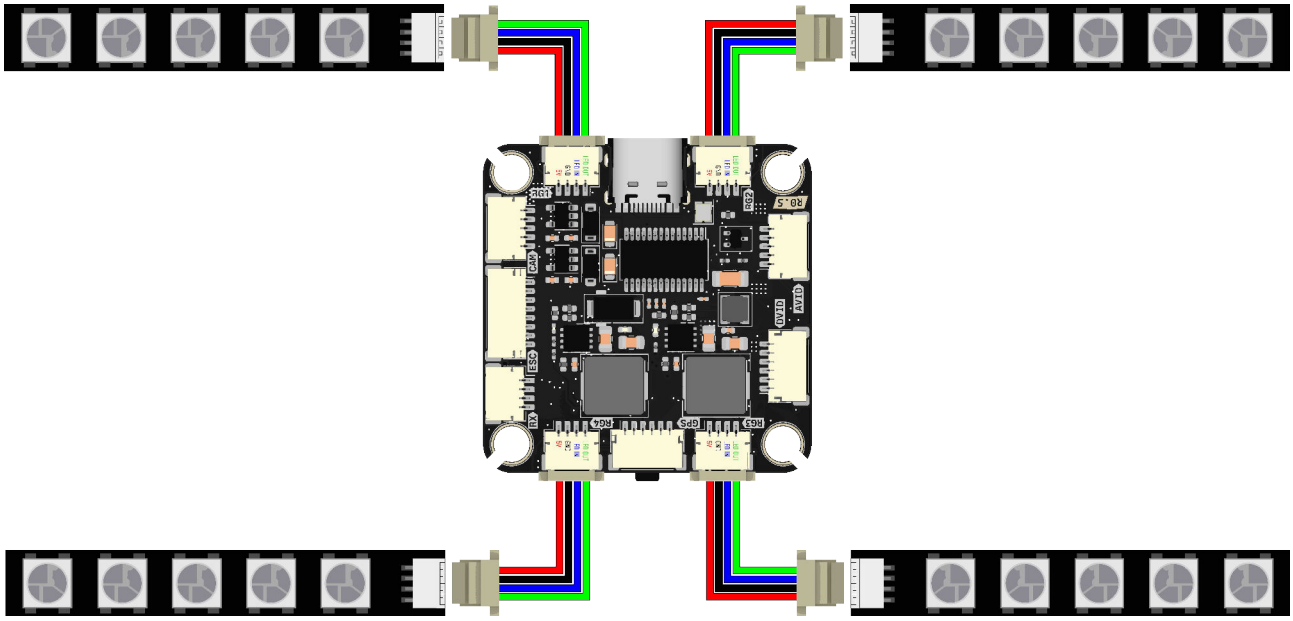
FC-Caddx Vista



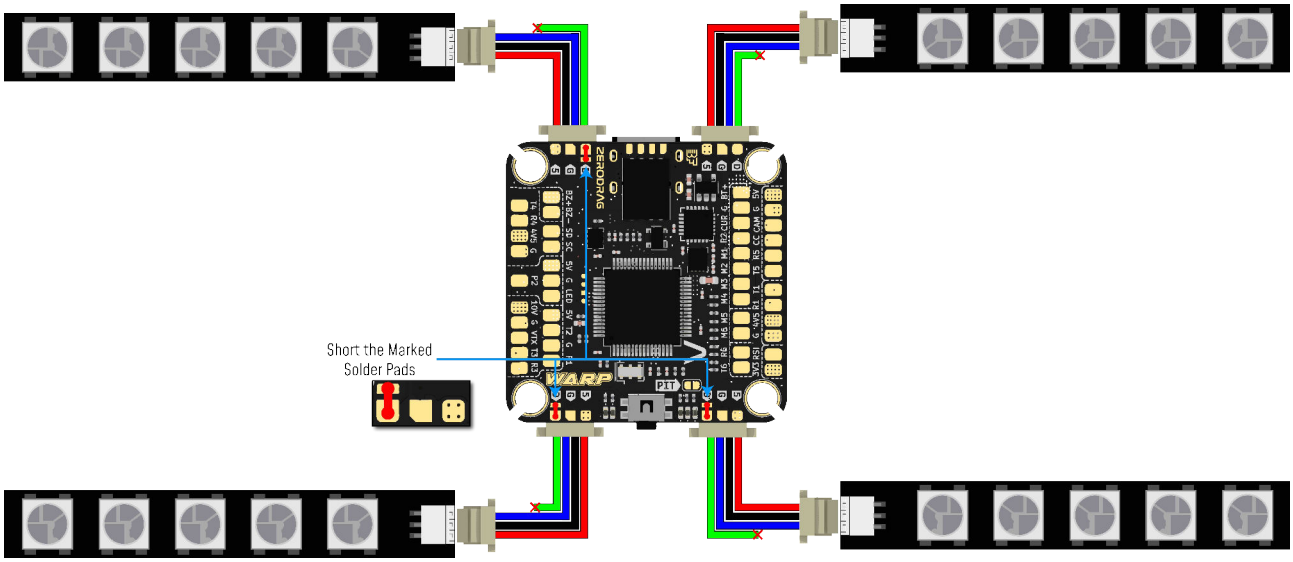
FC-DJI O3



FC-GPS



FC-4pin LED's



FC-Standard LED's

LED Connection Options:

You have two options for connecting LEDs to your flight controller:

1. **Soldering:**
   - Use the three solder pads: 5V, Ground, and Signal.
2. **Connector:**
   - Use the 4-pin connector with pins for 5V, Ground, Signal In, and Signal Out.

Daisy Chain Feature:

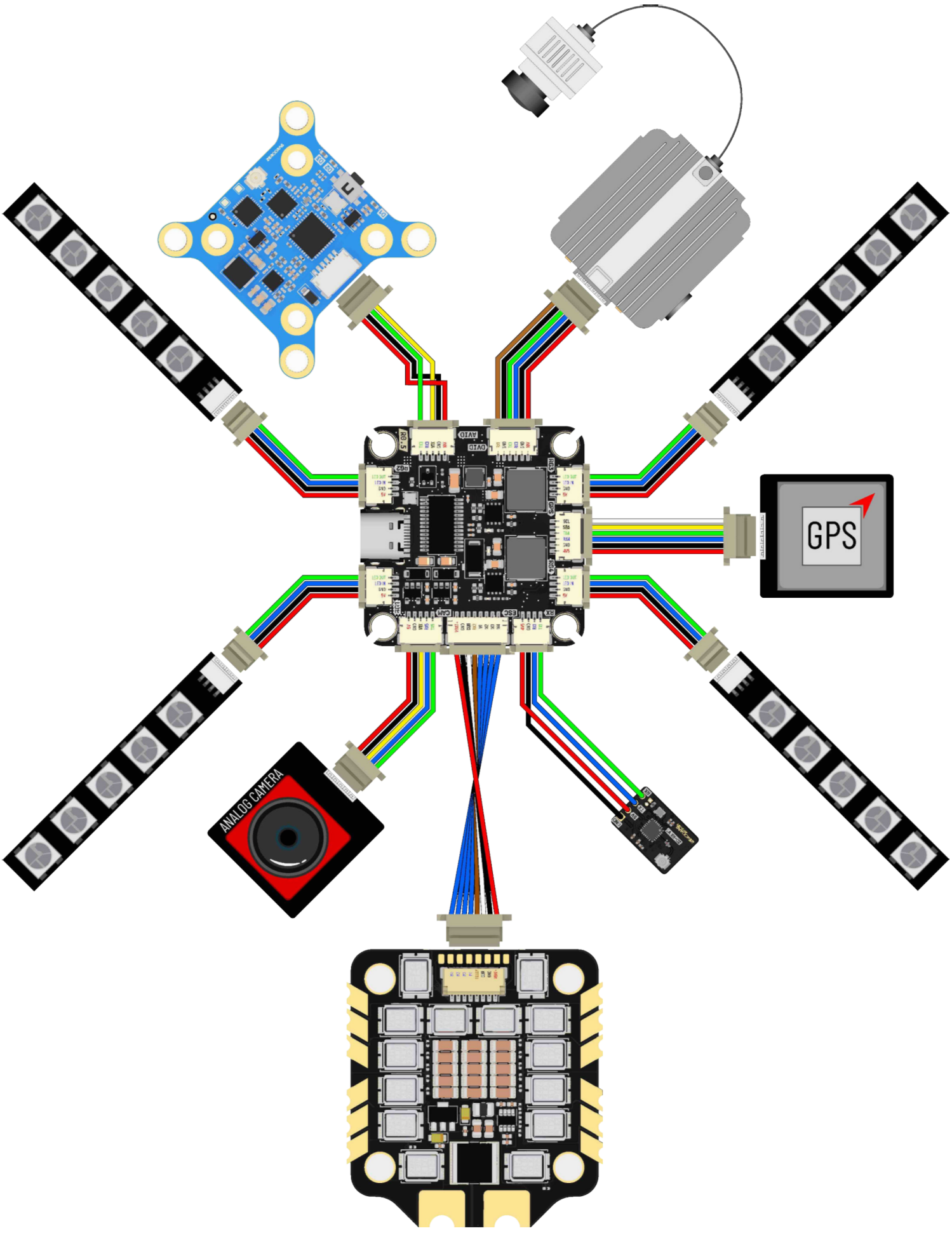
- By default, the connectors are daisy-chained, meaning each connector can control LEDs independently.
- If you prefer to use standard LEDs and control all connectors simultaneously, follow these steps:

Steps to Use Standard LEDs in Parallel:

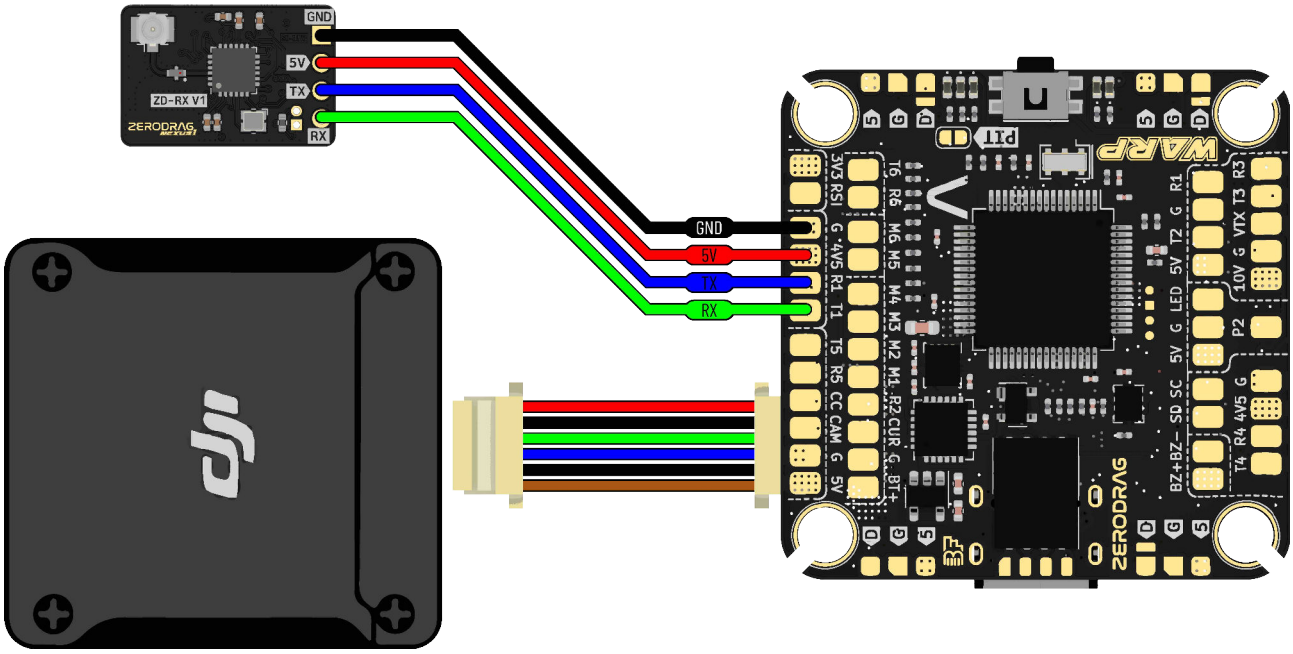
1. On each of the three connectors (except the first one), cut the Signal Out wire.
2. Bridge the small pad next to the Signal pad on the flight controller.
3. This will set all connectors to use the same signal, allowing them to operate in parallel.

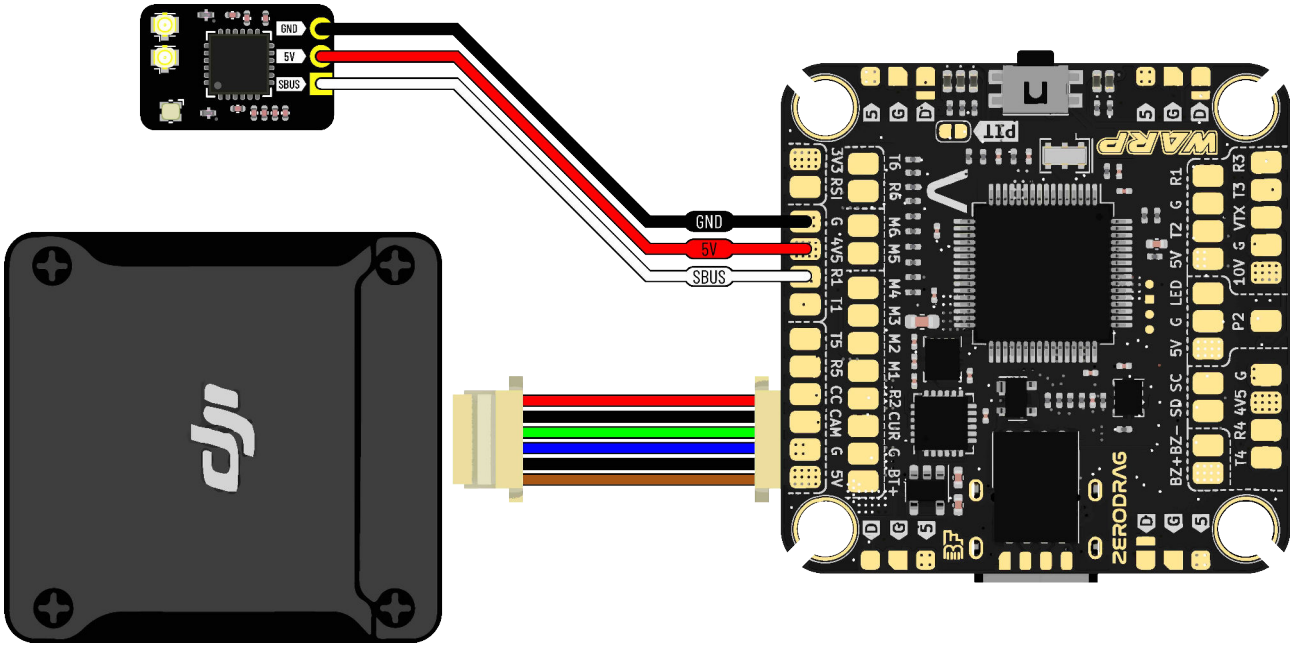
Important:

- You only need to do this on three connectors, as the first connector already provides the signal.

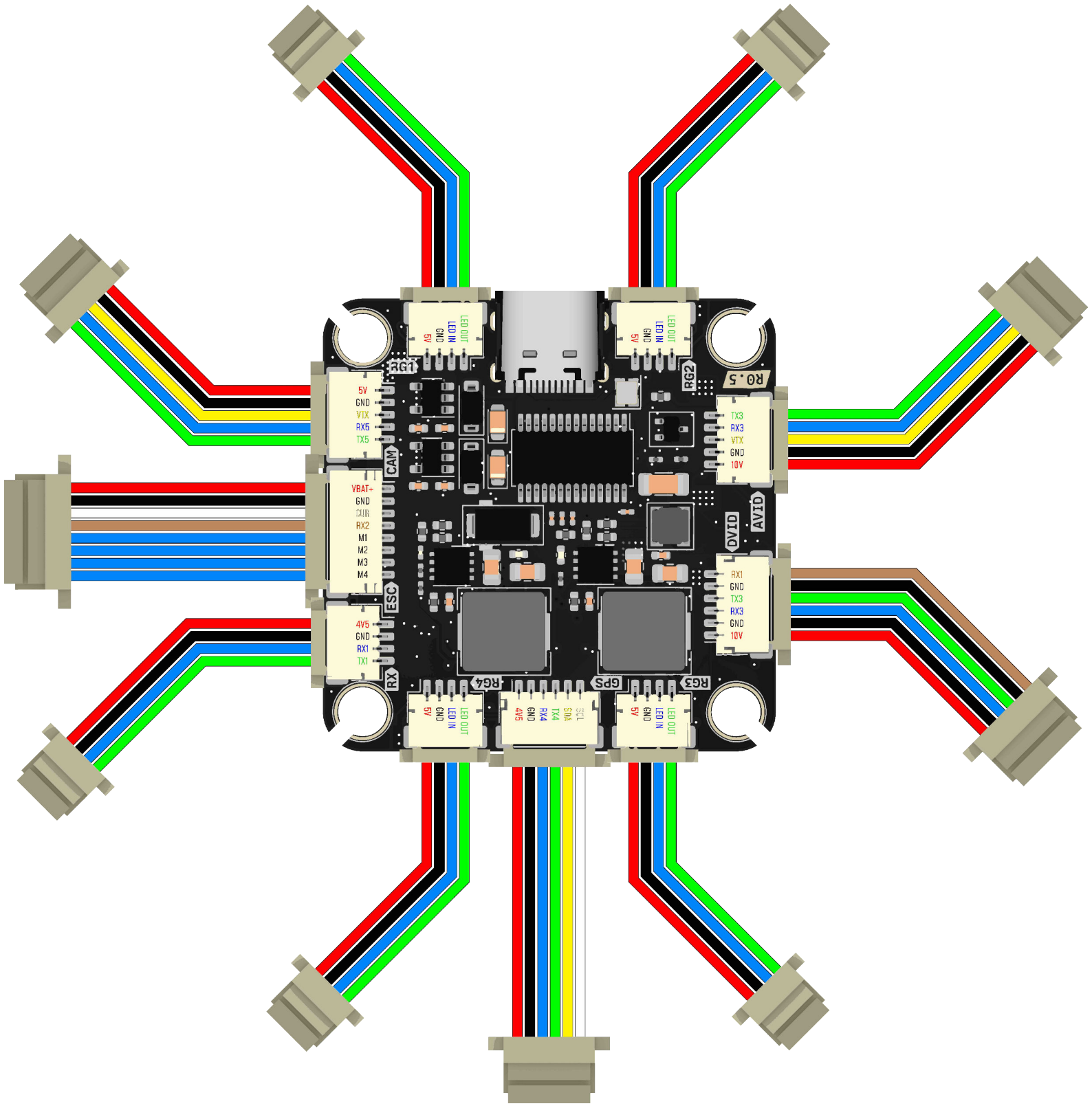

GPS
ANALOG CAMERA

Avoid Sbus or RX use with DJI or Vice versa.





When using an SBUS receiver, connect its SBUS signal wire to the SBUS pad on the front side of the flight controller, utilizing UART2 internally. If employing the DJI Air Unit (O3/Link/Vista/Air Unit V1), disconnect the SBUS signal wire from the Air Unit harness to ensure proper recognition by the flight controller. Use tweezers to remove or cut this wire from the 6-pin harness connector, and insulate the exposed part meticulously. Similarly, when utilizing ELRS receivers, connect their TX and RX to the T2 and R2 pads on the flight controller. However, in case of recognition issues with ELRS receivers when using the DJI Air Unit simultaneously, repeat the process of disconnecting the SBUS signal wire from the Air Unit harness to resolve the issue.


LED OUT
5V
GND
LED IN
RG1
RG2
R0.5
5V
GND
VTX
RX5
TX5
TX3
RX3
VTX
GND
10V
CAM
VBAT+
GND
CUR
RX2
M1
M2
M3
M4
DVID
AVID
ESC
RX1
GND
TX3
RX3
GND
10V
4V5
GND
RX1
TX1
RX
RG4
GPS
RG3
5V
GND
LED IN
LED OUT
4V5
GND
RX4
TX4
SDA
SCL
5V
GND
LED IN
LED OUT

6. Firmware Update

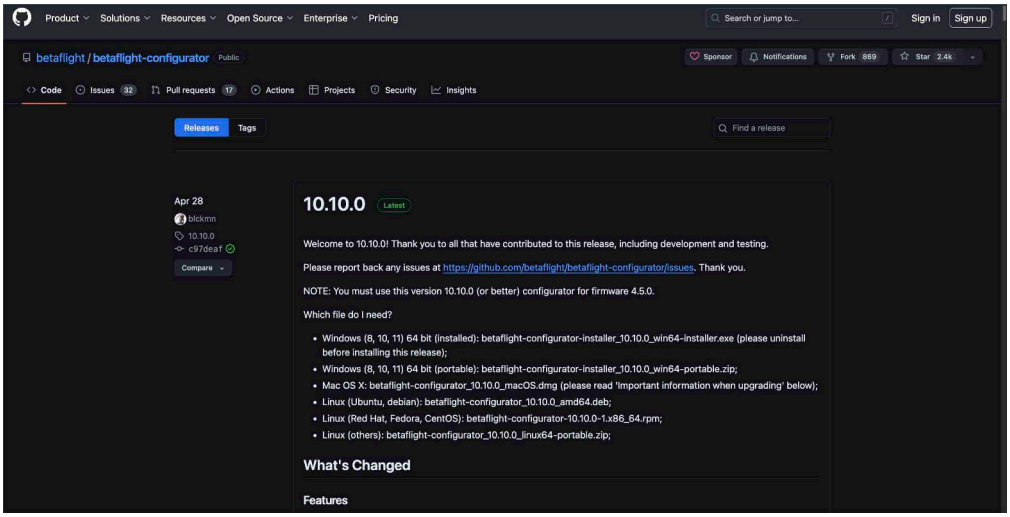
Step-by-Step Guide to Flash WARP F7 Firmware in Betaflight

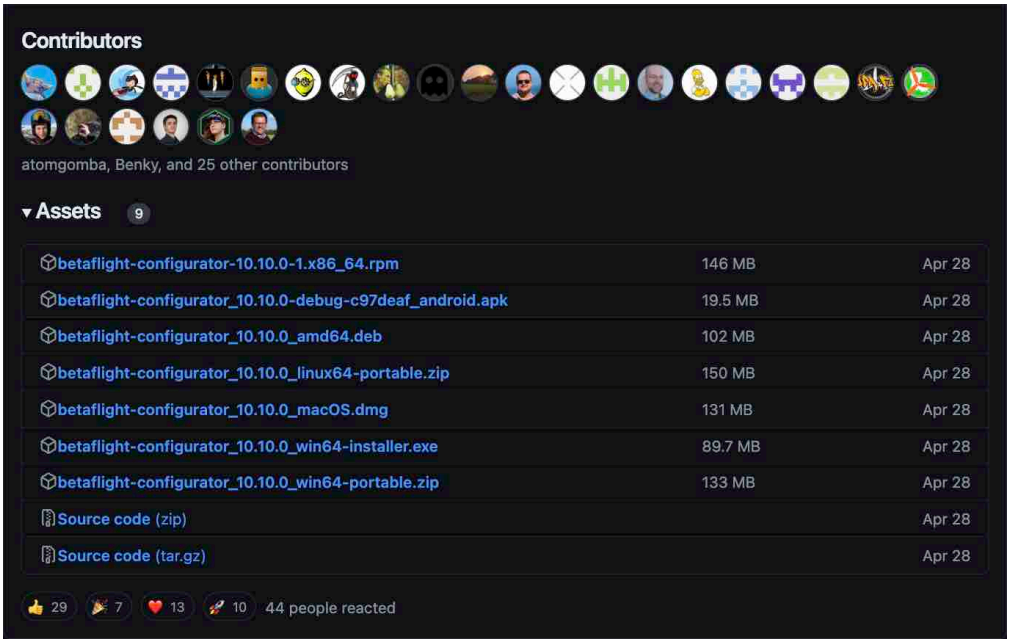
Requirements:

1. WARP F7 Flight Controller
2. USB Type-C Cable
3. Computer with Betaflight Configurator installed
4. WARP F7 Firmware file

Step 1: Install Betaflight Configurator

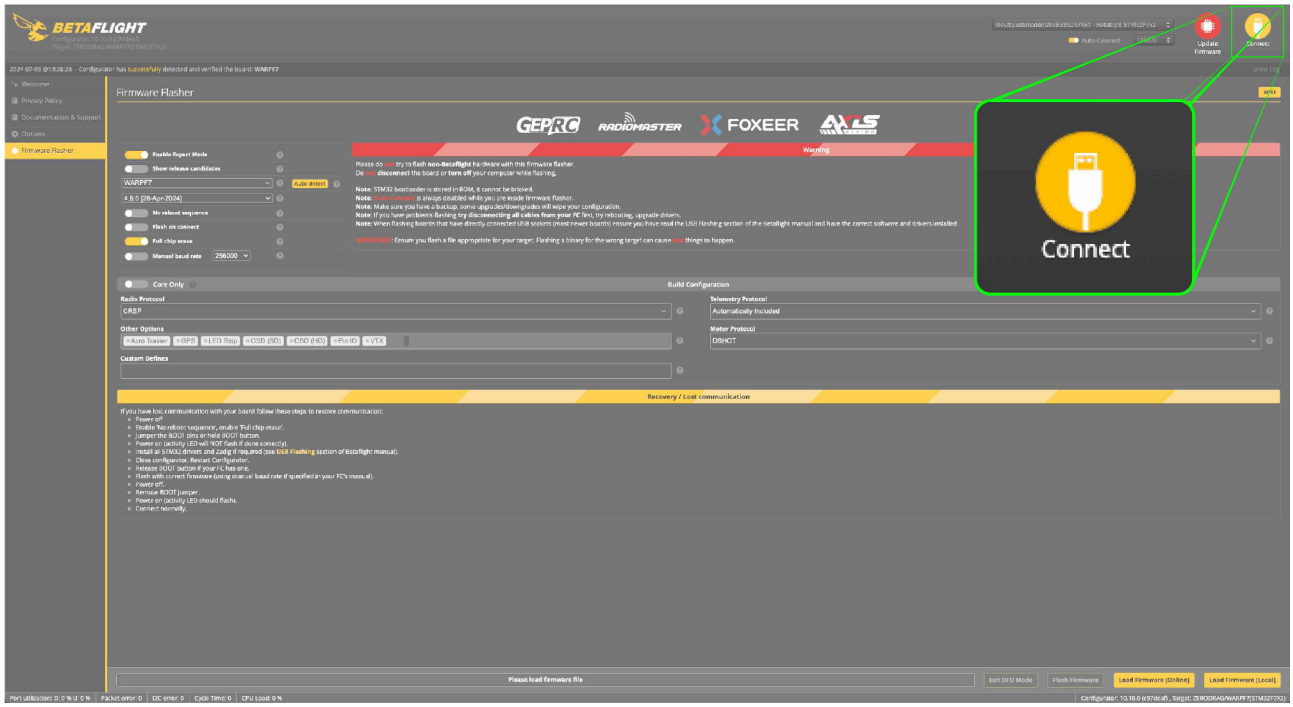
1. Download and install the Betaflight Configurator from the official Betaflight GitHub repository.





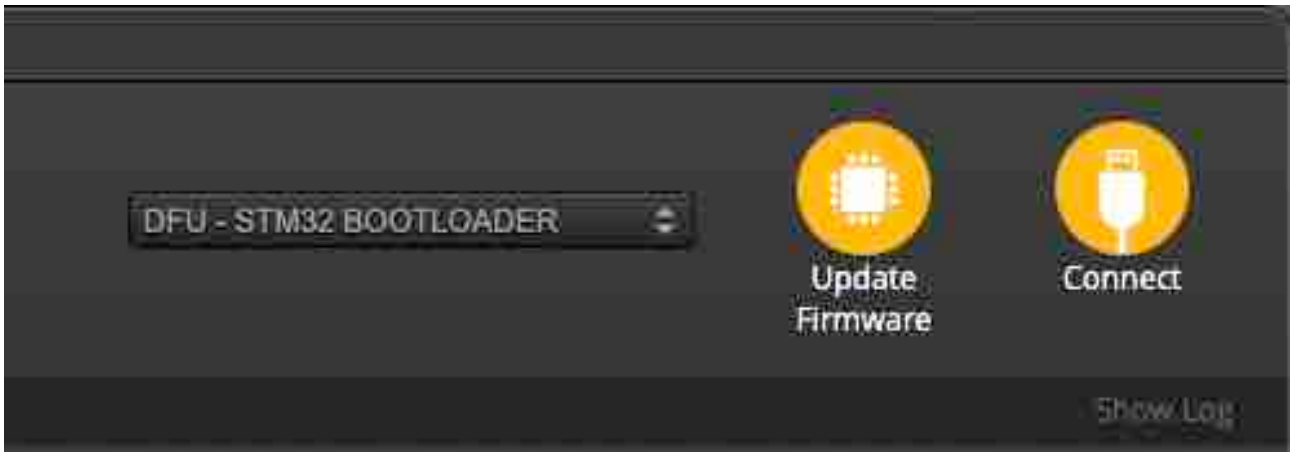
Step 2: Connect the Flight Controller

1. Use a USB Type-C cable to connect the WARP F7 flight controller to your computer.
2. Open Betaflight Configurator.



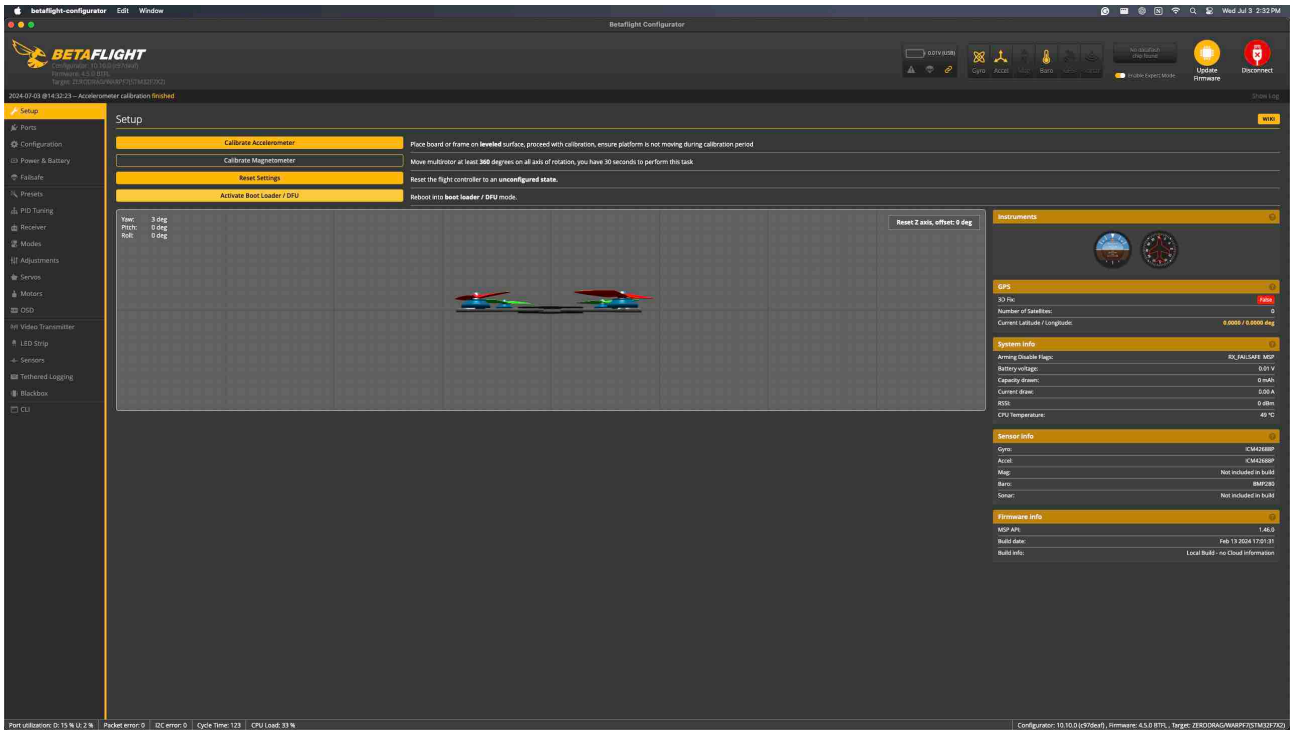
Step 3: Enter Bootloader Mode

1. Locate the **BOOT** button on the WARP F7 flight controller.
2. Press and hold the BOOT button, then connect the USB cable to power up the flight controller. This will put the flight controller in DFU (Device Firmware Upgrade) mode.

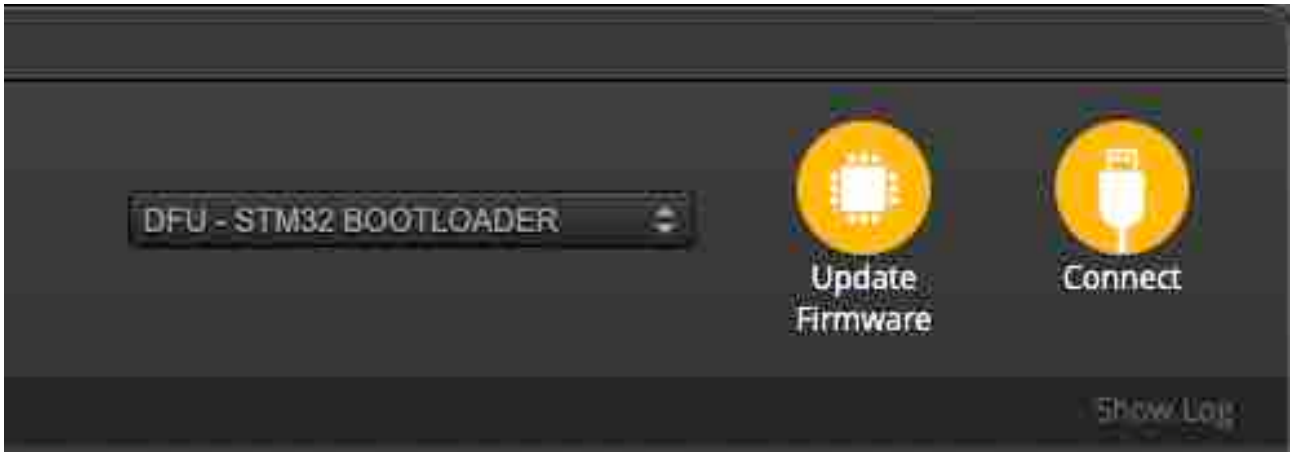


Step 4: Select DFU Mode in Betaflight Configurator

1. In the Betaflight Configurator, look for the **“Manual Bootloader (DFU)”** option under the **“Ports”** section.

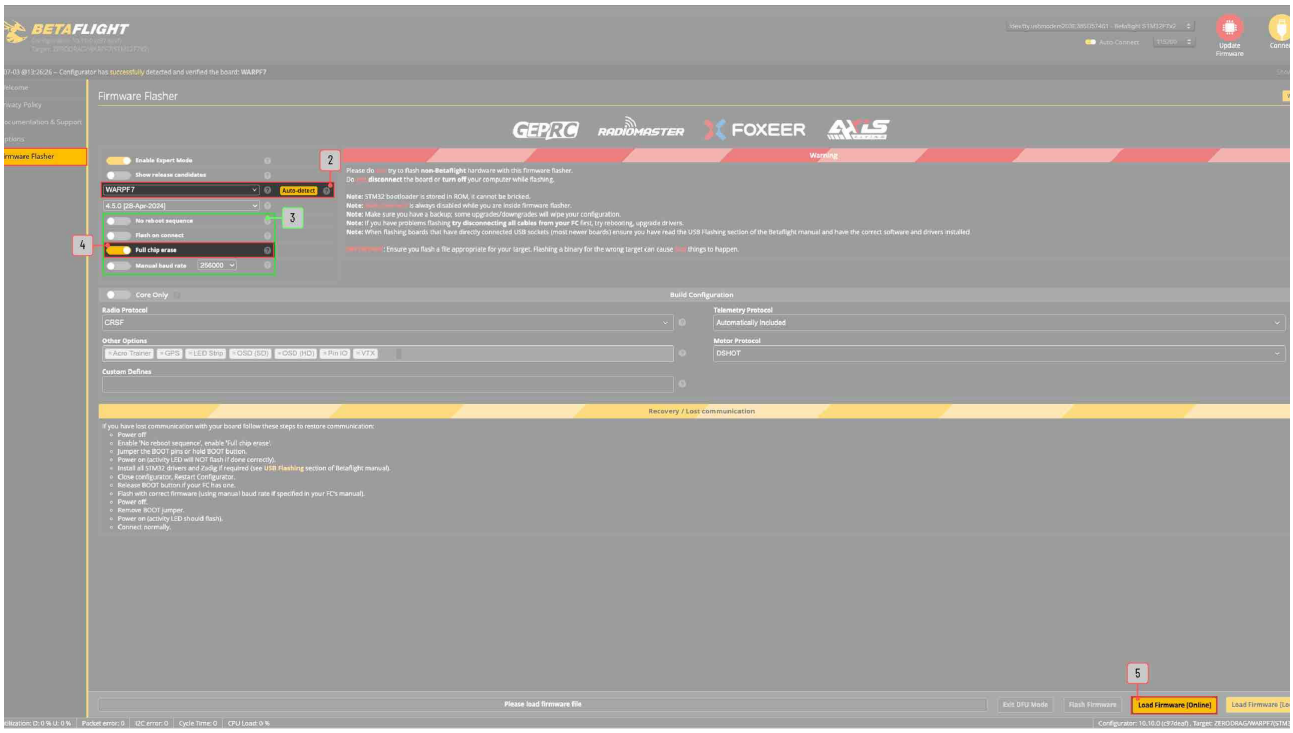


2. Ensure the configurator recognizes the flight controller in DFU mode (you should see “DFU” in the top right corner).



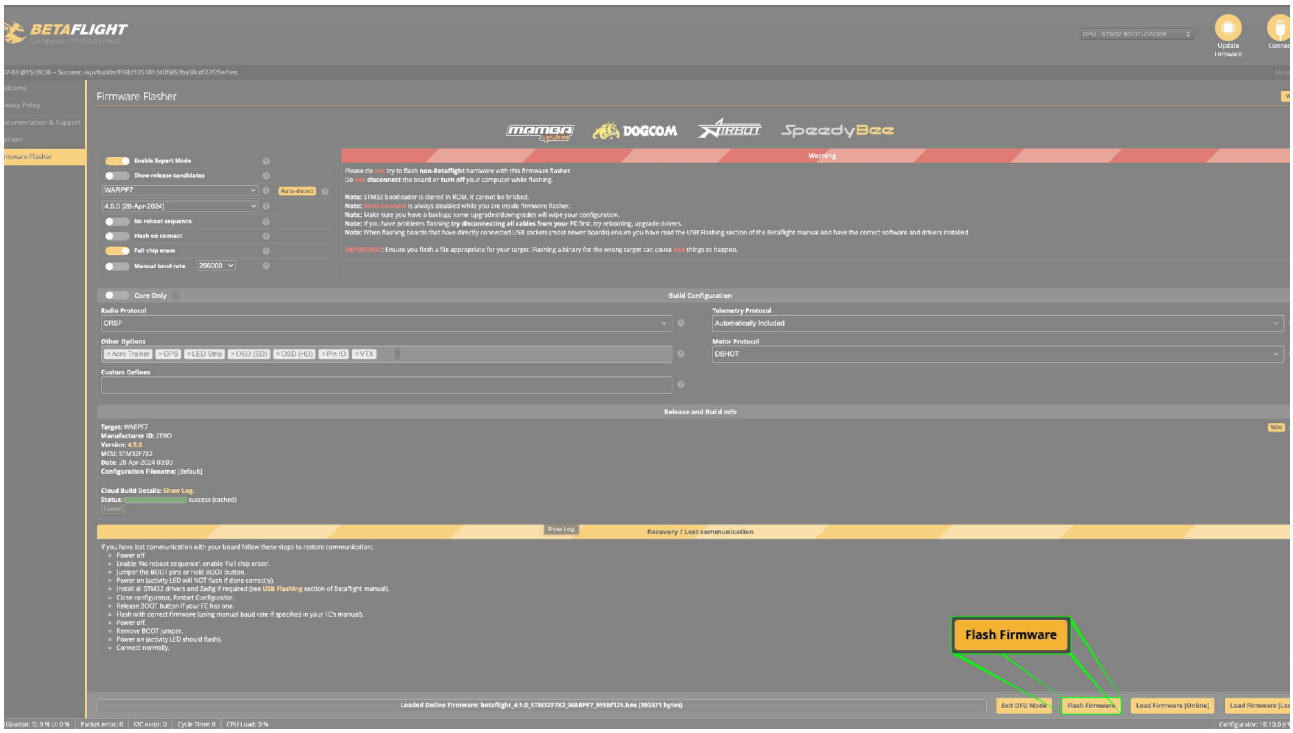
Step 5: Load Firmware

1. Go to the **"Firmware Flasher"** tab in Betaflight Configurator.
2. Under "Choose a board", select "WARP F7".
3. Under **"Choose a firmware version"**, select the desired firmware version.
4. Enable the option **"Full chip erase"** to ensure a clean installation.
5. Click on **"Load Firmware (Online)"** to download the firmware from the internet, or **"Load Firmware (Local)"** if you have the firmware file saved on your computer.



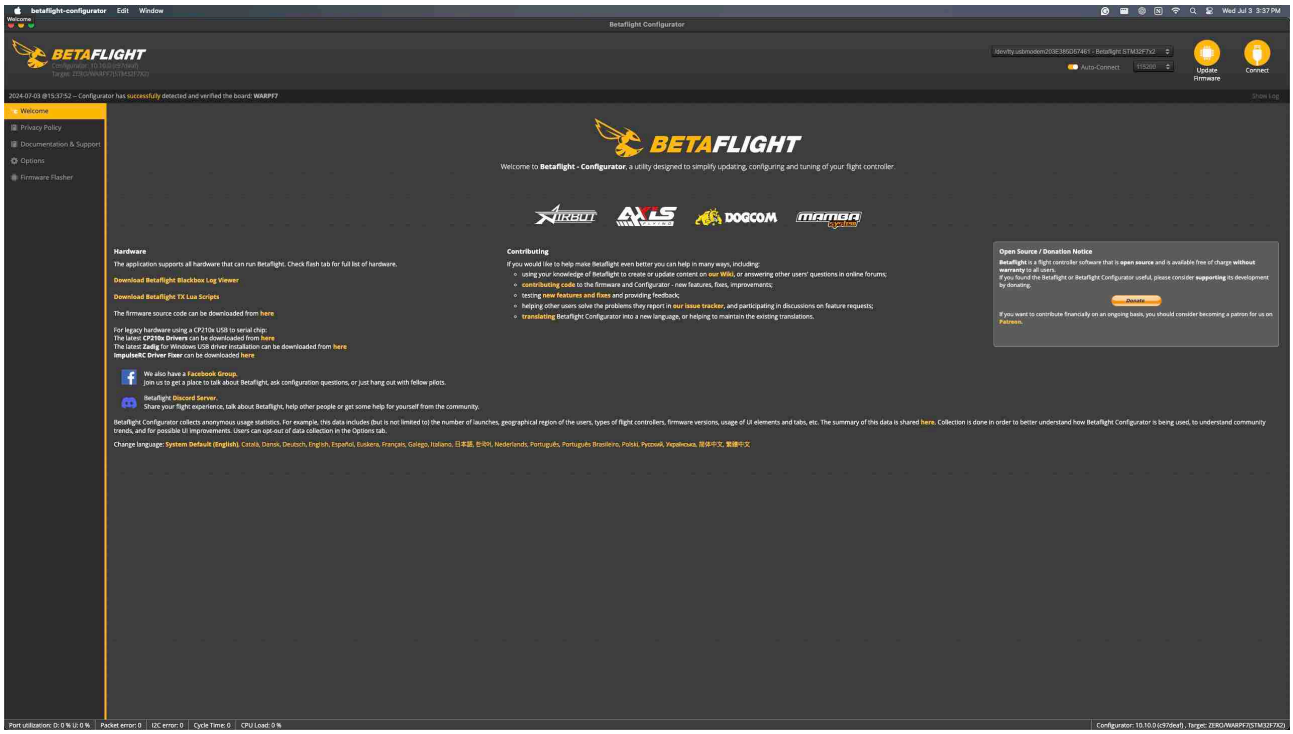
Step 6: Flash Firmware

1. Once the firmware is loaded, click on **"Flash Firmware"**.
2. The flashing process will begin, and you will see a progress bar indicating the status.
3. Wait for the flashing process to complete. You will see a confirmation message once it's done.



Step 7: Reconnect and Configure

1. After flashing, disconnect and reconnect the USB cable to restart the flight controller.
2. Betaflight Configurator should now recognize the WARP F7 flight controller.
3. Proceed with the initial setup and configuration of your flight controller in Betaflight.



Step 8: Verify the Firmware

1. Go to the **"Setup"** tab in Betaflight Configurator.
2. Verify that the correct firmware version is installed and that all sensors and peripherals are functioning correctly.

7. Contact

Website: https://zerodrag.in/
Instagram: https://www.instagram.com/zerodrag.in/
LinkedIn: https://www.linkedin.com/company/zerodrag/
WhatsApp: https://wa.me/9821734544