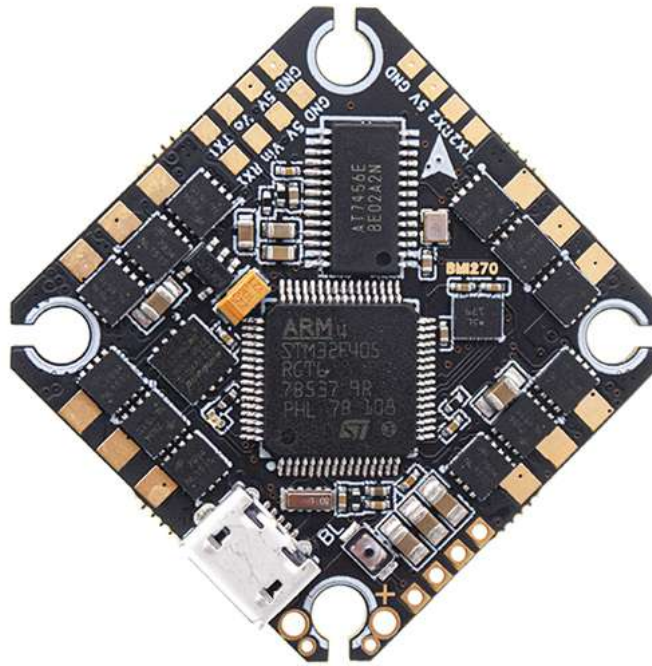# Poly F405 2S-4S AIO Manual

Overview & Setup Guide

OVERVIEW

The Goal of Making this Poly F405 AIO

This Poly F405 2S-4S AIO is designed for FPV micro community and it's made to be super versatile, so pilots can use this AIO board in different builds like agile toothpick or long range quad or creative X6/X8 quads. So this AIO board is integrated blackbox, current meter and features 5 UARTs to suit needs for different builds. Apart from versatility, we have made this AIO board high performance to make sure it could hold up well on powerful quads. To achieve this goal, this AIO board comes with powerful F405 chip and high quality 20A mosfets and excellent heat dissipation ability.

Specifications

Hardware Specs

- FC MCU: STM32F405RGT6(Cortex®-M4 168Mhz)
- Built-in OSD: AT7456E
- Built-in IMU: BMI270
- Built-in 4MByte Blackbox
- Built-in Current Meter
- ESC MCU: EFM8BB21 (8bit 50MHz)
- UART: UART1 (for VTX by default), UART2, UART3, UART4(supports SBUS), UART5
- Other interfaces: IIC (IIC2) , LED_Strip, Buzzer
- The through holes for power lead: big enough to fit 16AWG wire
- 8 Motor Outputs

Electronics Specs

- Input Voltage: 6.50-20.0V(2S-4S LIPO/LIHV)
- Power Output: 5V 2A
- Continuous Current: 20A
- Peak Current: 28A

Firmware

- FC Target: TUNERCF405
- ESC Firmware: Bluejay P-H-25

Motor Size Supported

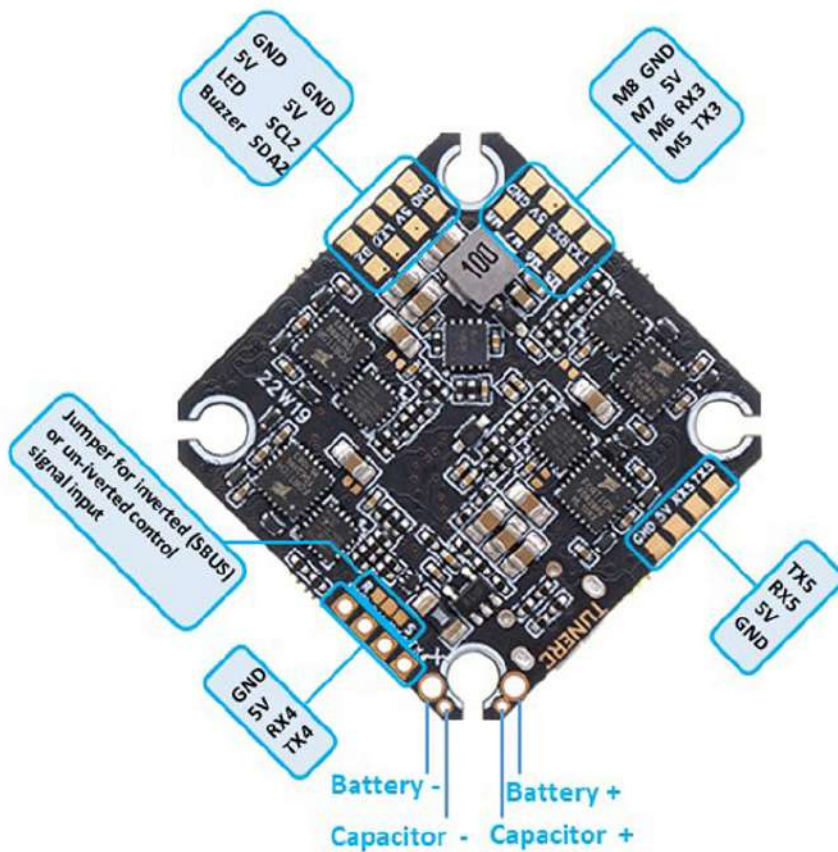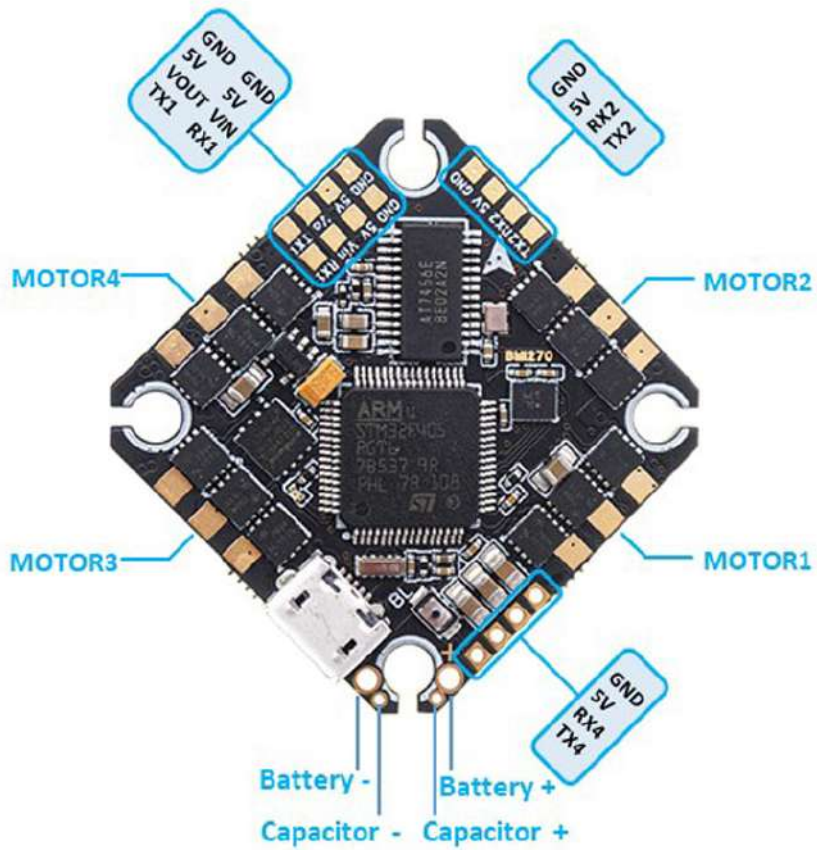- 11xx, 12xx, 13xx,14xx

Recommended Capacitor

- A 35V 220uf capacitor is included. A 35v 220-470uf capacitor with low ESR is recommended if you want to swap the default one.

Dimensions

- Size: 33mm x 33mm
- Mounting Holes Pattern: 25.5 x 25.5mm   Room for M3.5 grommets to make M2 mount
- Weight: 5.8g

TUNERC

PINOUT DIAGRAM

Top View

GND GND
5V 5V
VOUT VIN
TX1 RX1

GND
5V
RX2
TX2

MOTOR4

MOTOR2

MOTOR3

MOTOR1

GND
5V
RX4
TX4

Battery -

Battery +

Capacitor -

Capacitor +

Bottom View

GND GND
5V 5V
LED SCL2
Buzzer SDA2

M8 GND
M7 5V
M6 RX3
M5 TX3

Jumper for inverted (SBUS) or un-iverted control signal input

TX5
RX5
5V
GND

GND
5V
RX4
TX4

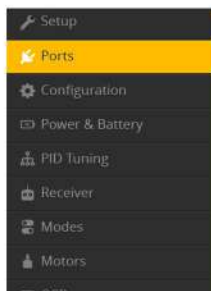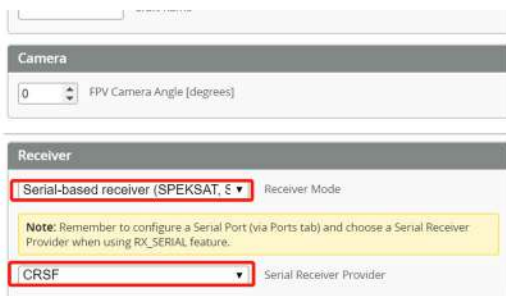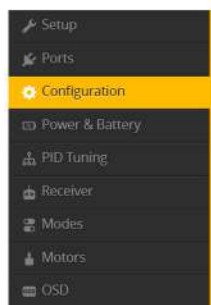Battery -

Battery +
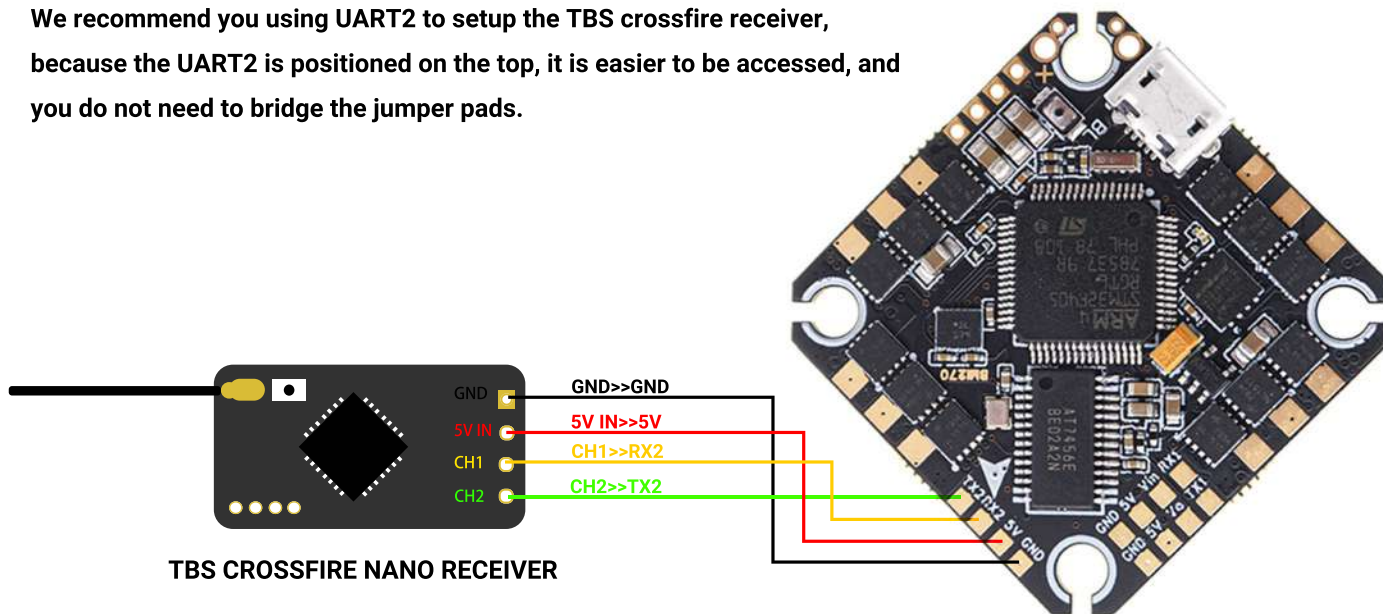
Capacitor -

Capacitor +

TUNERC

RECEIVER WIRING

We recommend you using UART2 to setup the expresslrs receiver,
because the UART2 is positioned on the top, it is easier to be accessed, and
you do not need to bridge the jumper pads.

RX   RX>>TX2

TX   TX>>RX2

VCC   VCC>>5V

GND   GND>>GND

ExpressLRS Receiver
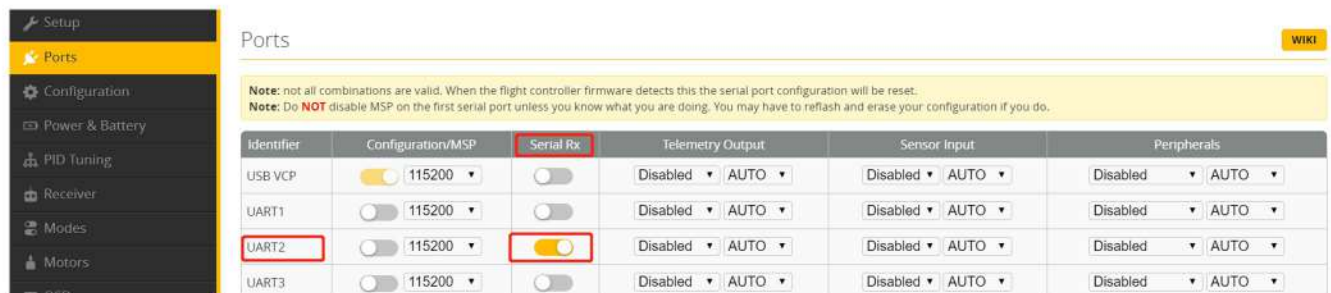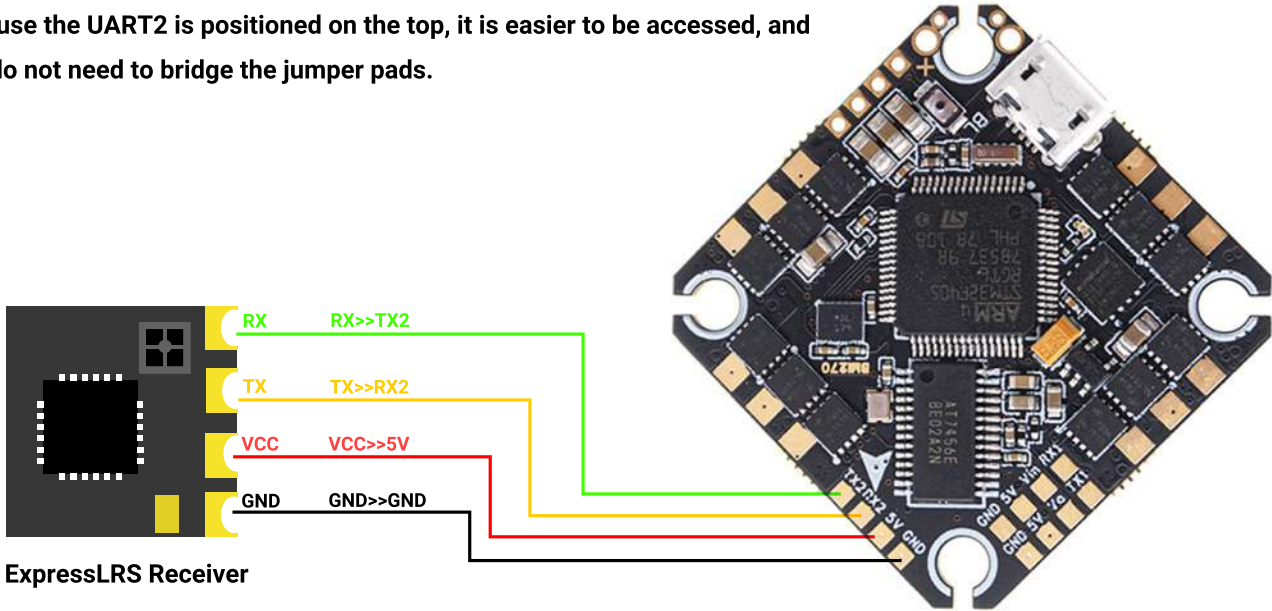
RECEIVER WIRING

We recommend you using UART2 to setup the TBS crossfire receiver, because the UART2 is positioned on the top, it is easier to be accessed, and you do not need to bridge the jumper pads.

GND	GND>>GND
5V IN	5V IN>>5V
CH1	CH1>>RX2
CH2	CH2>>TX2

TBS CROSSFIRE NANO RECEIVER

Configuration

Camera

0 FPV Camera Angle [degrees]

Receiver

Serial-based receiver (SPEKSAT, S ▾) Receiver Mode

Note: Remember to configure a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using RX_SERIAL feature.

CRSF ▾ Serial Receiver Provider

Ports

WIKI

Note: not all combinations are valid. When the flight controller firmware detects this the serial port configuration will be reset.
Note: Do **NOT** disable MSP on the first serial port unless you know what you are doing. You may have to reflash and erase your configuration if you do.

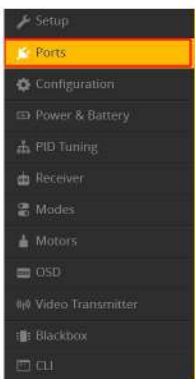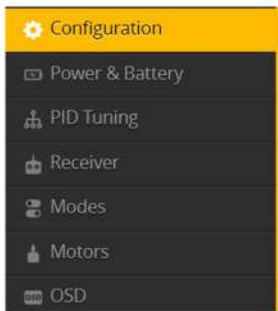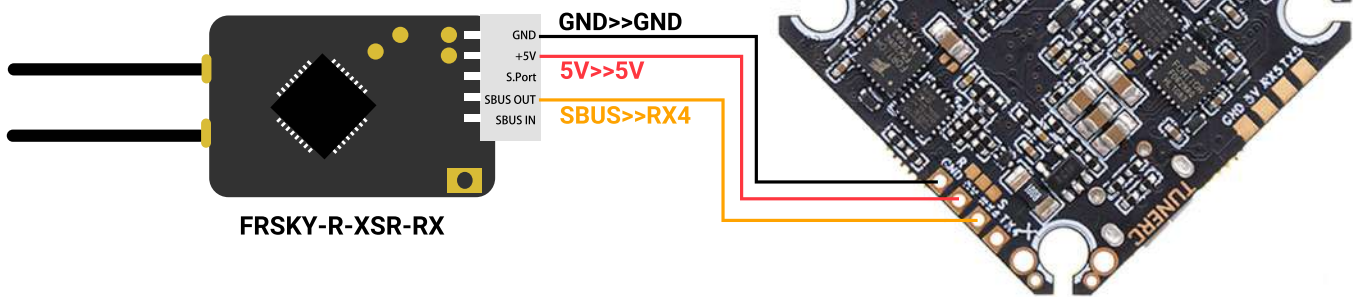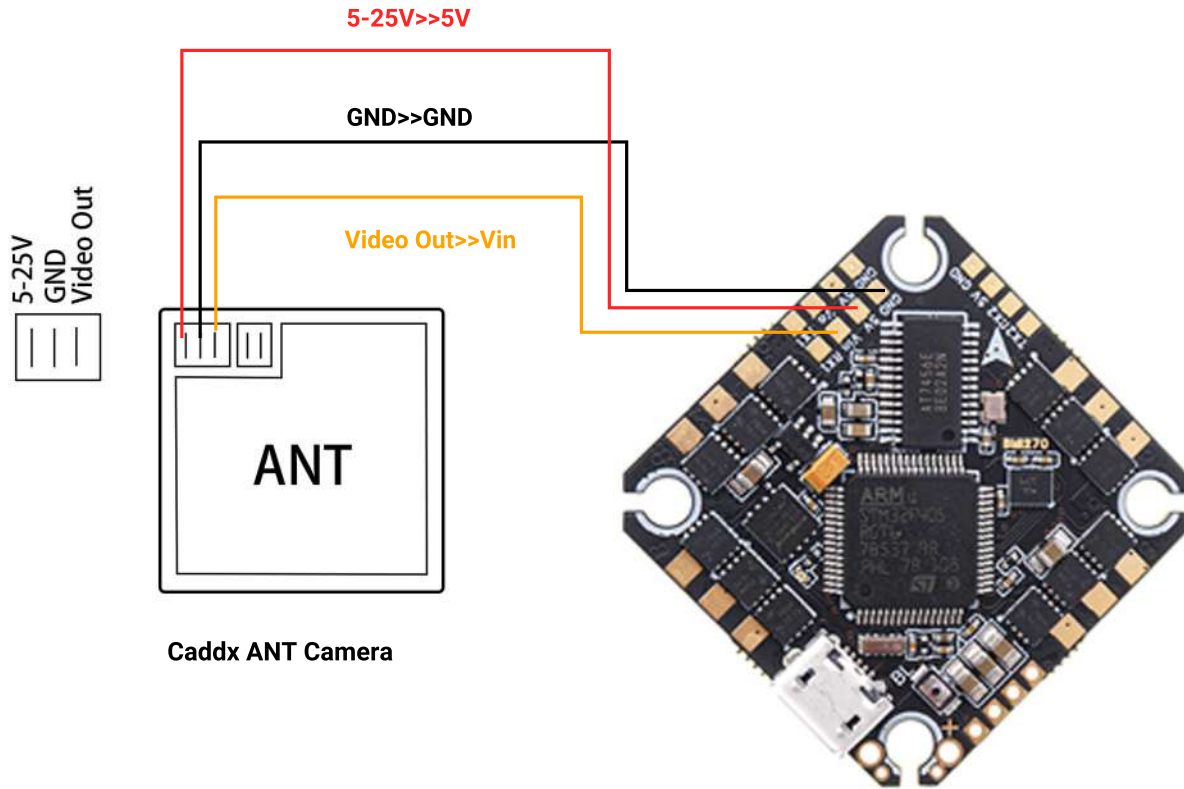| Identifier	Configuration/MSP	Serial Rx	Telemetry Output		Sensor Input		Peripherals	
USB VCP	115200 ▾		Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾
UART1	115200 ▾		Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾
UART2	115200 ▾		Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾
UART3	115200 ▾		Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾	Disabled ▾	AUTO ▾

TUNERC

RECEIVER WIRING

"R" for "RX"   "S" for "SBUS"

This is jumper for inverted (SBUS) or un-inverted control signal input.

The RX4 has a hardware inverter, which can be selected by jumper.

Please bridge the RIGHT TWO jumper pads for the receiver pad to work

if you use inverted (SBUS) control signal input.

GND	GND>>GND
+5V	5V>>5V
S.Port	
SBUS OUT	SBUS>>RX4
SBUS IN	

FRSKY-R-XSR-RX

CAMERA WIRING

5-25V>>5V

GND>>GND

Video Out>>Vin

5-25V
GND
Video Out

ANT

Caddx ANT Camera

VTX WIRING

GND>>GND

3-13V IN>>5V

VIDEO>>VO

Signal>>TX1

3-13V IN
GND
3-13V OUT
GND
VIDEO
SIGNAL (Smart Audio / CRSF)

TBS UNIFY PRO32 NANO 5G8 V1.1

Setup
Ports
Configuration
Power & Battery
PID Tuning
Receiver
Modes
Motors
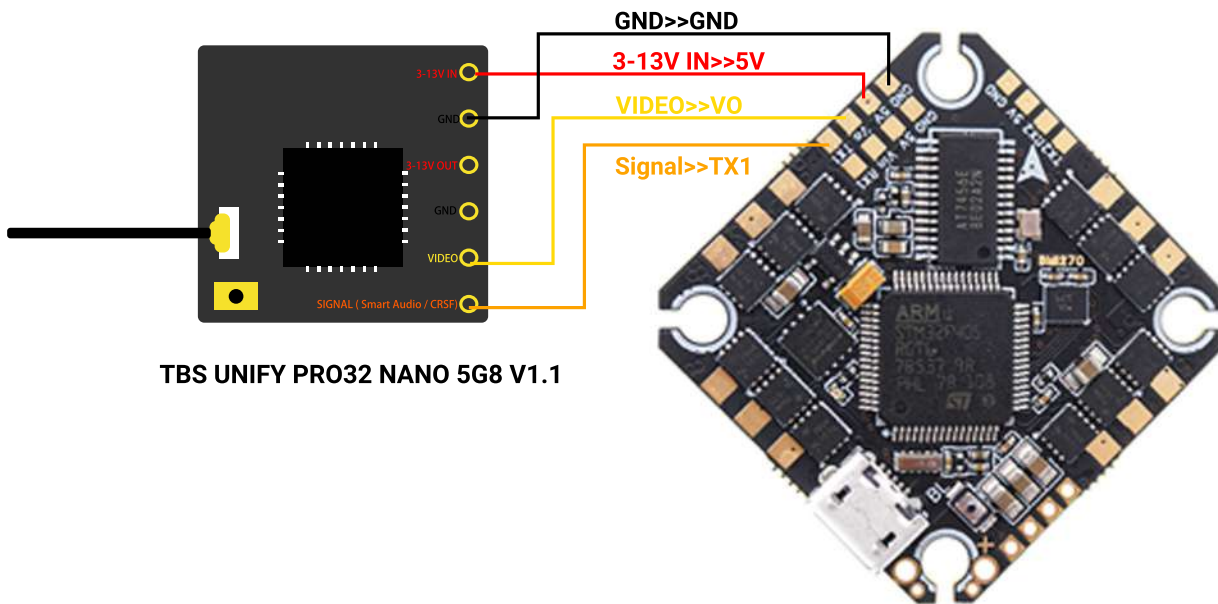
Ports

WIKI

Note: not all combinations are valid. When the flight controller firmware detects this the serial port configuration will be reset.
Note: Do **NOT** disable MSP on the first serial port unless you know what you are doing. You may have to reflash and erase your configuration if you do.

WARNING: The VTX table has not been set up correctly and without it VTX control will not be possible. Please set up the VTX table in Video Transmitter tab.

Identifier	Configuration/MSP	Serial Rx	Telemetry Output		Sensor Input		Peripherals	
USB VCP	115200		Disabled	AUTO	Disabled	AUTO	Disabled	AUTO
UART1	115200		Disabled	AUTO	Disabled	AUTO	VTX (TBS Sma	AUTO

TUNERC

HDZero Whoop Lite Wiring

G-GND
V-5V
R-TX1
T-RX1
SA-TX4
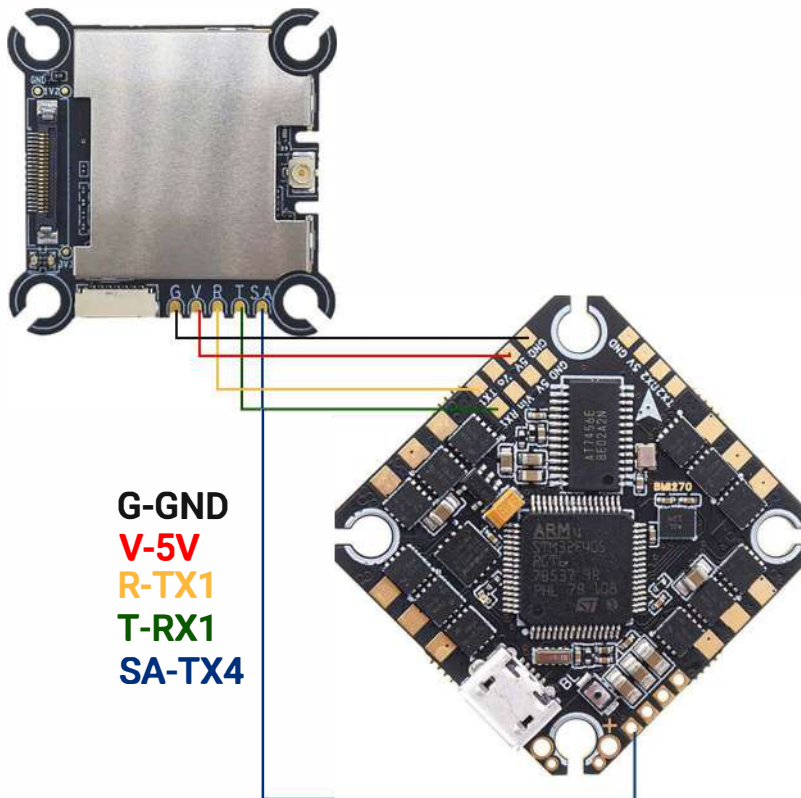
Actually, you can wire HDZero Whoop Lite VTX to any sapre UART pads on Poly F405 board. The following wiring diagram is only for reference.

You just need to make sure the "R" pad is wired to spare TX pad on the Poly board and "i" pad is soldered to spare RX pad on the FC board.
And wire the "SA" pad to any spare TX pad on the Poly.

HDZero Whoop Lite Betaflight Setup

1. In Betaflight 4.4, please enable "Configuration MSP" and choose "VTX (MSP + Displayport)" for corresponding uart under "Ports" tab.

2. To setup smart audio in Betaflight 4.4, please choose "VTX (Smartaudio)" under "Peripherals" for the corresponding uart in the "Ports" tab.

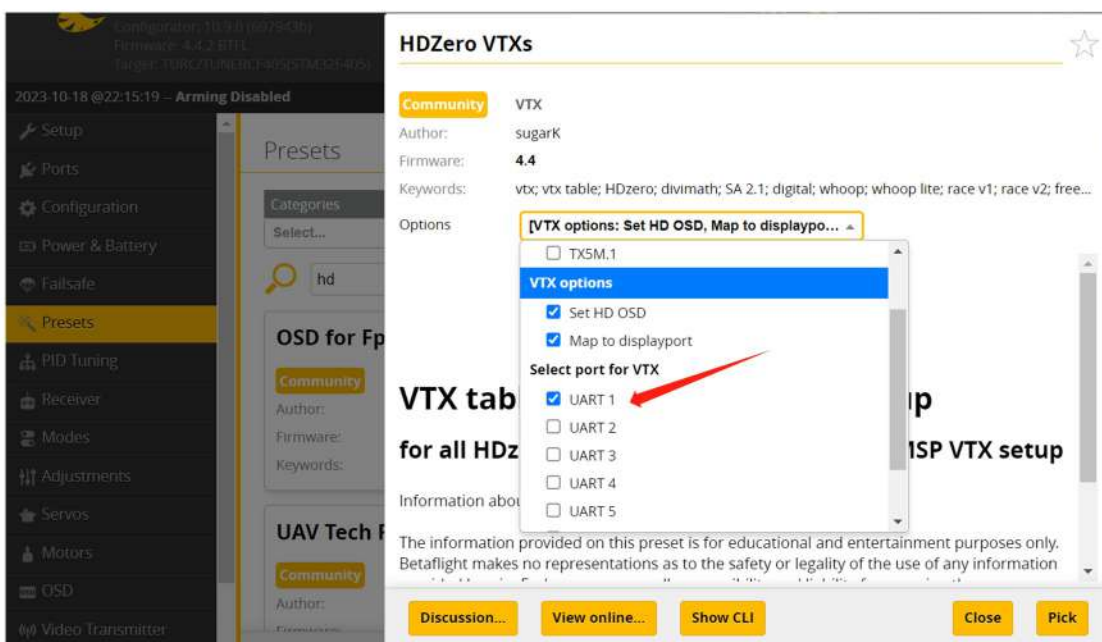TUNERC

HDZero Whoop Lite Betaflight Setup

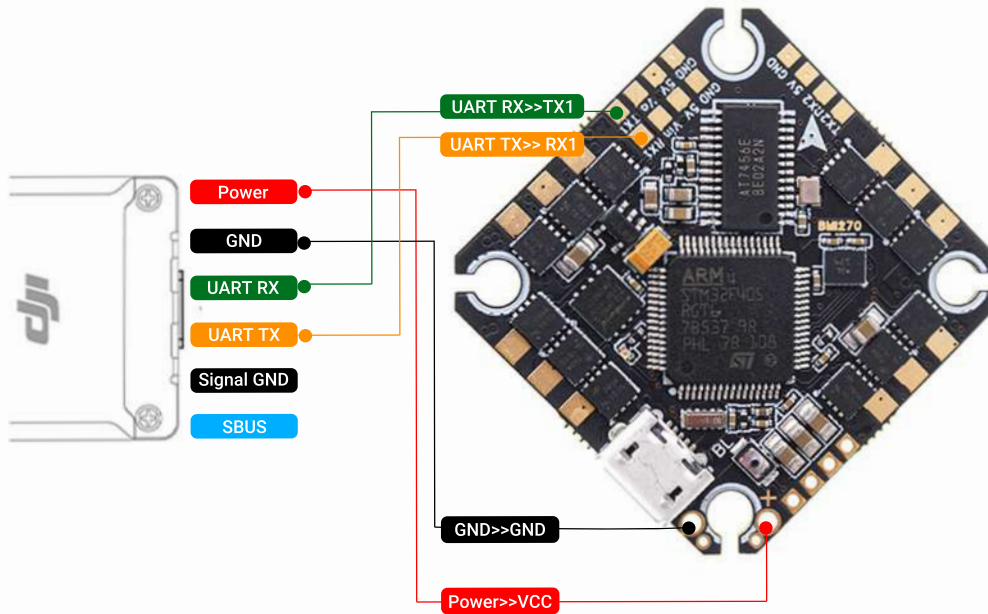### 3. Enable "OSD" feature under "Configuration" tab.
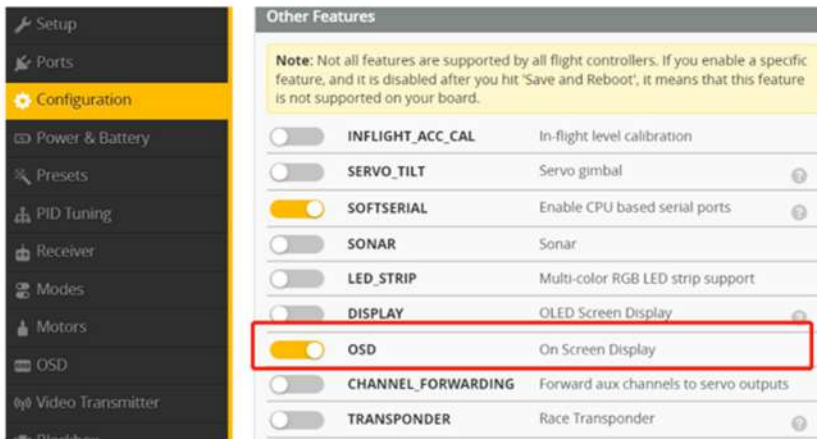
4. Enable "TELEMETRY" feature under "Receiver" tab.

5. Under "Presets" tab, search "HDZero VTXs "and select the corresponding uart you set for the HDZero VTX under "Options", finally click "Pick"

DJI O3 WIRING

In general. you can wire the DJI O3 unit to any free UART on the Poly board.

For users that don't use DJI radio controller, please refer to the diagram above.

You don't need to wire the "Signal GND" and "SBUS" wire from the DJI VTX plug.

DJI O3 WIRING

Bridge those two jumper pads near "S" silkscreen as the picture shows, so as to make the SBUS signal work.
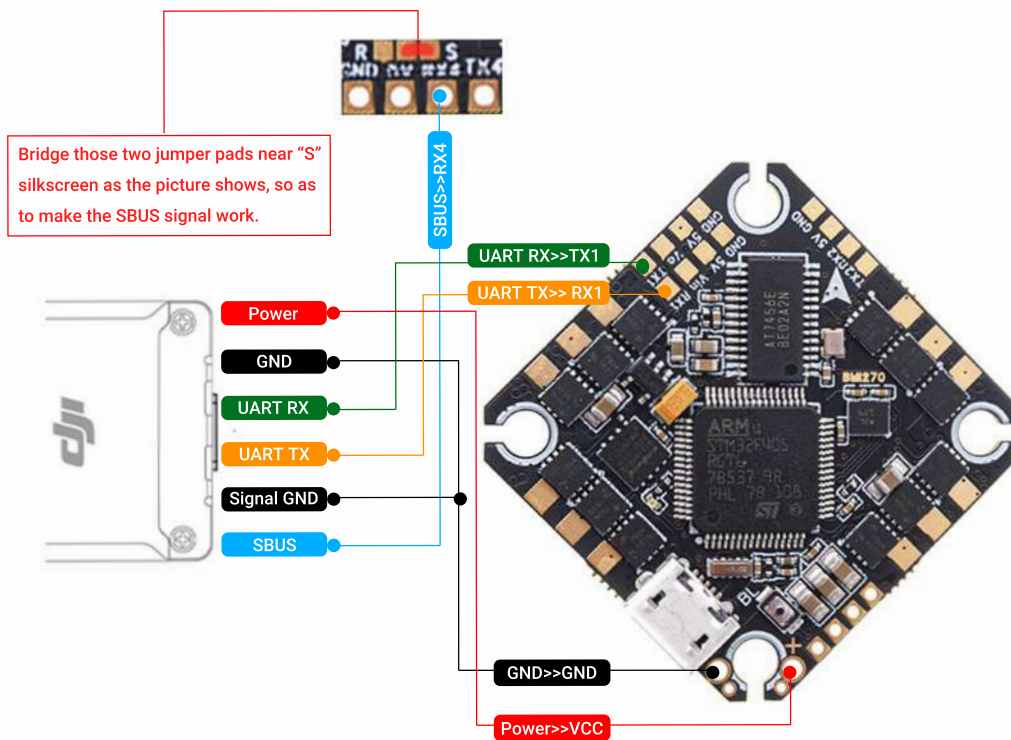
For users that use DJI radio controller, please refer to the diagram above.

You need to brige the two jumper pads near silkscreen "S"to enable SBUS signal.

TUNERC

DJI O3 WIRING

Power

GND

UART RX

UART TX

Signal GND

SBUS

GND>>GND

Power>>VCC

UART RX>>TX4

UART TX>>RX4
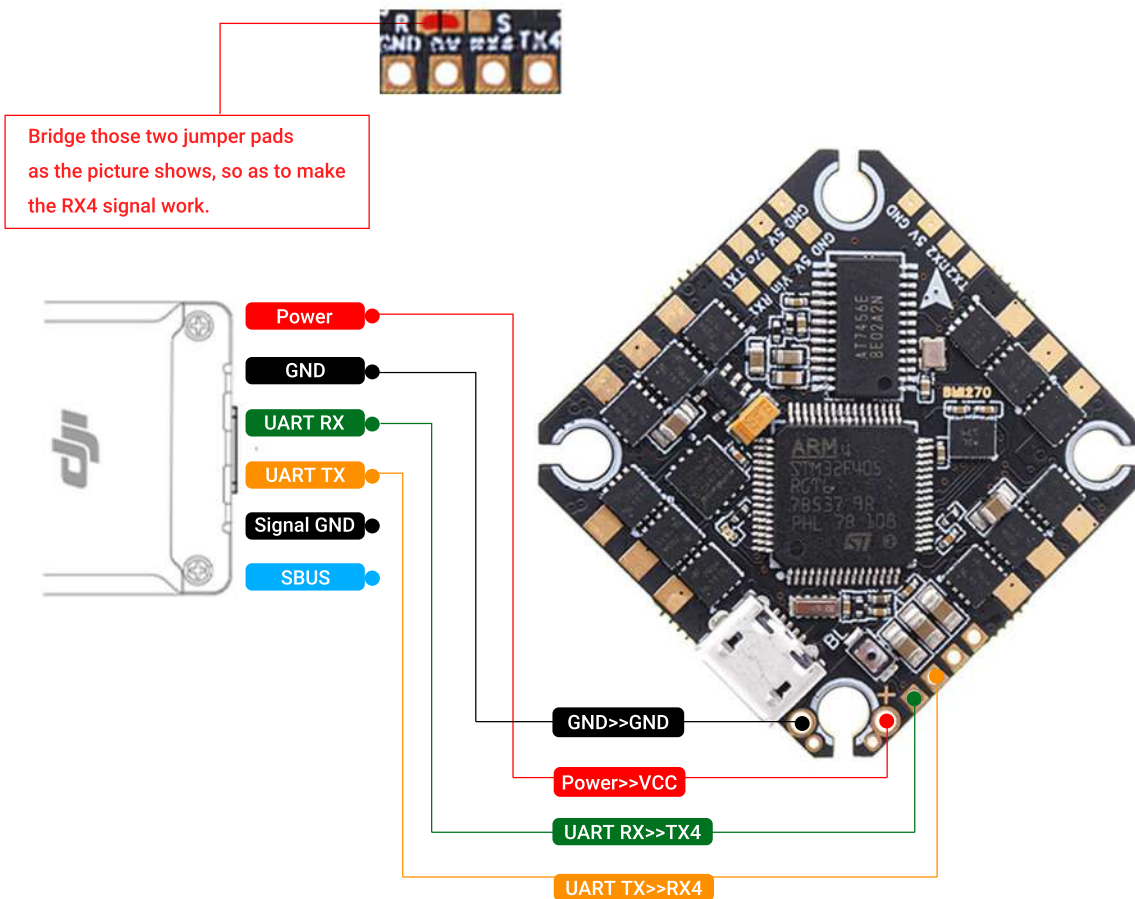
Please note that if you wire the DJI O3 unit to the UART4 on the FC, you need to bridge the two jumpers near silkscreen "R" to enable RX4.

TUNERC

DJI O3 Betaflight Setup
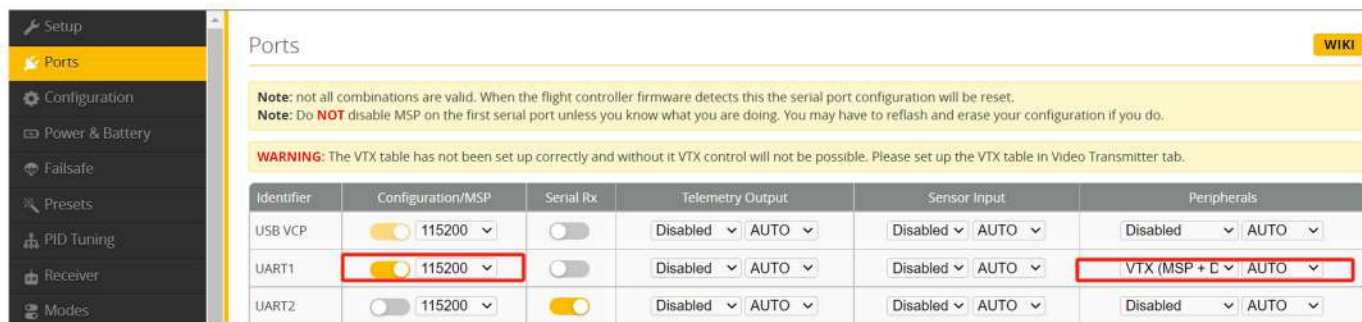
1. In Betaflight 4.4, please enable "Configuration MSP" and choose
"VTX (MSP + Displayport)" for corresponding UART you set for DJI VTX
under "Ports" tab.
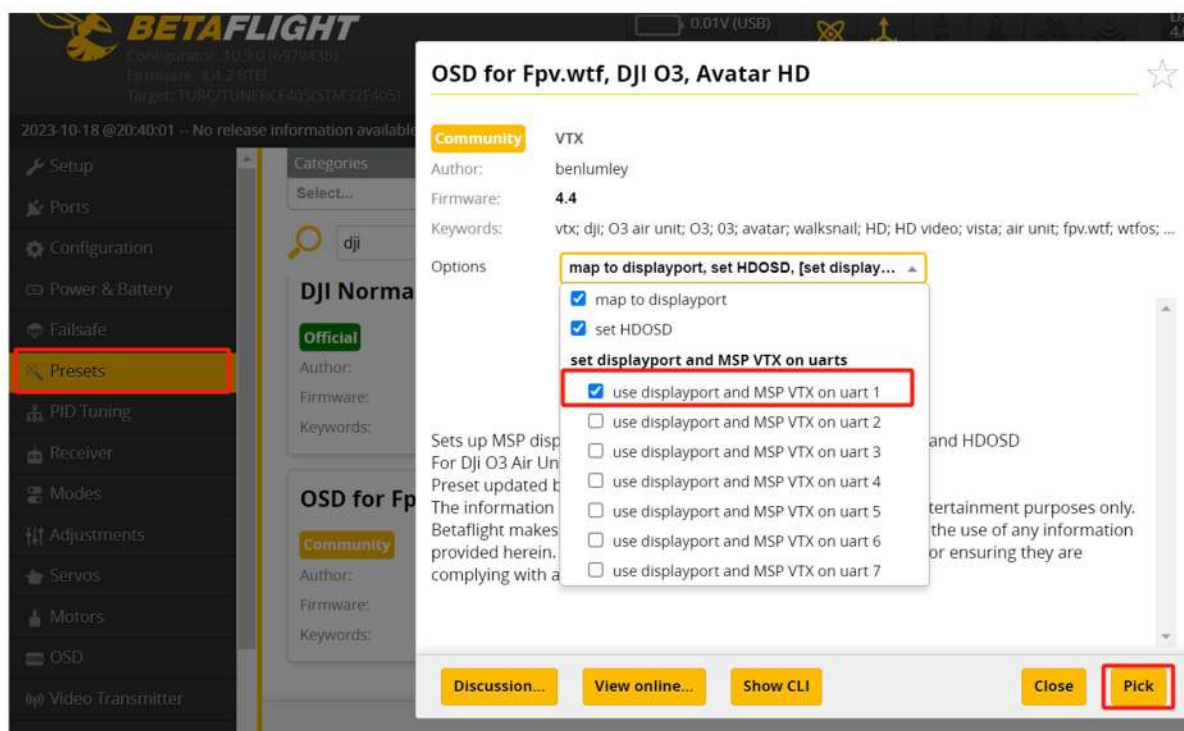
2. Search DJI OSD under "Presets" tab,
select "OSD for Fpv.wtf, DJI 03, Avatar HD "and select the corresponding uart
you set for the DJI VTX under "Options", finally click "Pick"

TUNERC

LED & Barometer WIRING

GND>>GND
5V>>5V
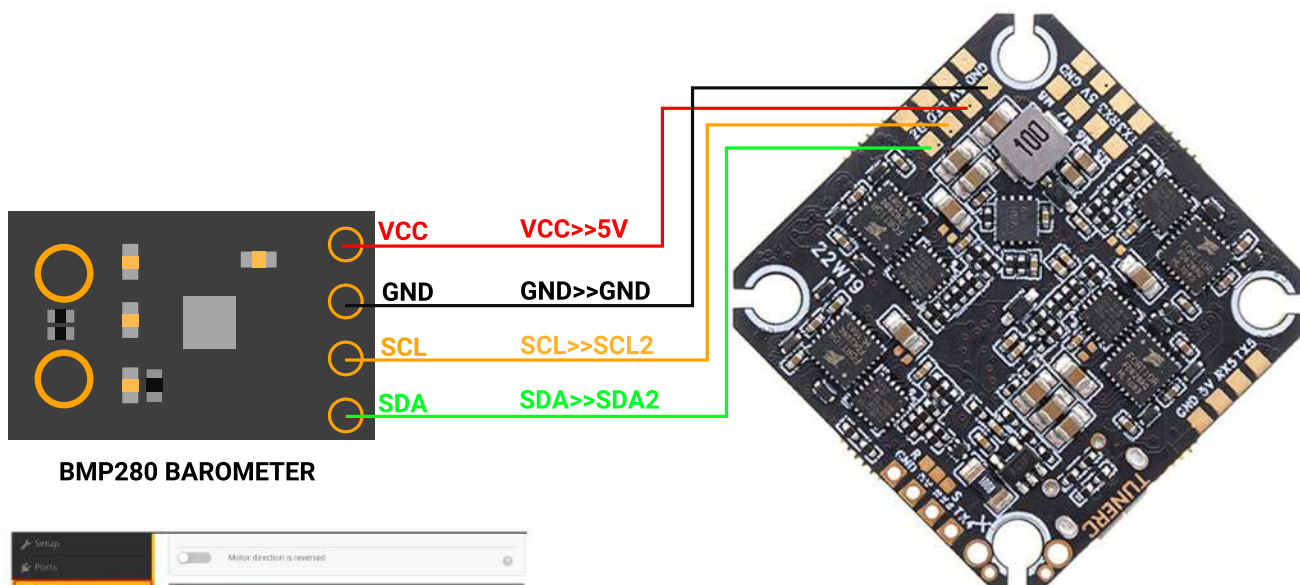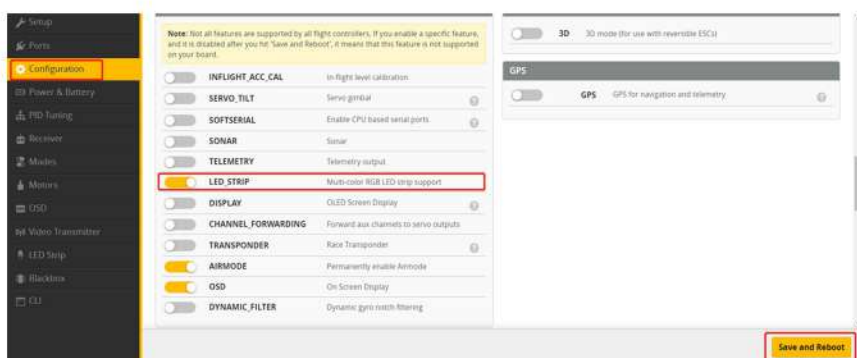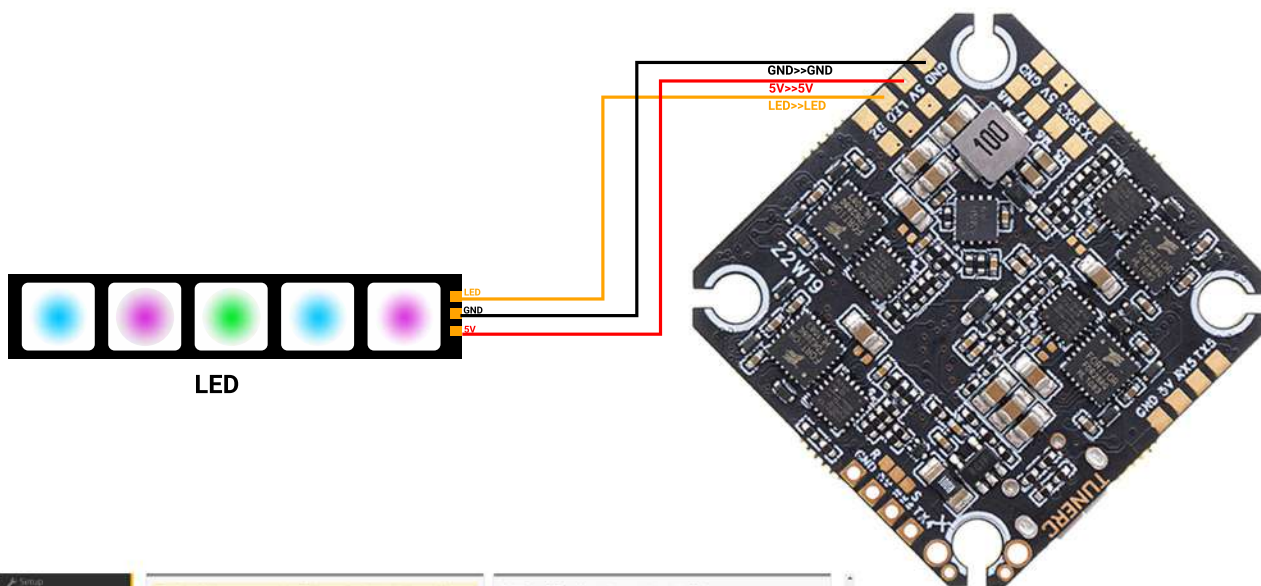LED>>LED

LED
GND
5V

LED

	INFLIGHT_ACC_CAL	In-flight level calibration	
	SERVO_TILT	Servo gimbal	
	SOFTSERIAL	Enable CPU based serial ports.	
	SONAR	Sonar	
	TELEMETRY	Telemetry output	
	LED_STRIP	Multi-color RGB LED strip support	
	DISPLAY	OLED Screen Display	
	CHANNEL_FORWARDING	Forward aux channels to servo outputs	
	TRANSPONDER	Race Transponder	
	AIRMODE	Permanently enable Airmode	
	OSD	On Screen Display	
	DYNAMIC_FILTER	Dynamic gyro notch filtering	

VCC — VCC>>5V

GND — GND>>GND

SCL — SCL>>SCL2

SDA — SDA>>SDA2

BMP280 BAROMETER

3.20 kHz	Gyro update frequency
3.20 kHz	PID loop frequency
	Accelerometer
	Barometer (if supported)
	Magnetometer (if supported)

TUNERC