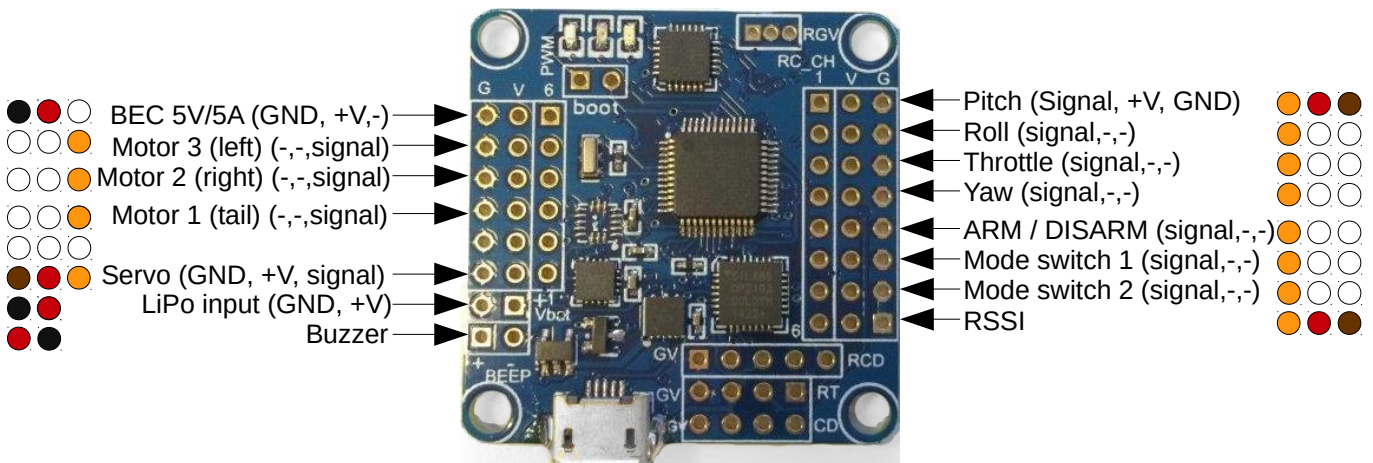


This guide specifically outlines how I set up my RCExplorer Tricopter V3. It is not an all covering definite guide to how you should set up your tricopter.

My setup looks like this (3S):

- FrSky Taranis X9D Transmitter
- FrSky X8R Receiver
- Flip32+ Rev. 2.3 controller board
- 3x NTM Prop Drive Series 28-30 1200kv motors
- 1x Afro Slim 20Amp Multi-rotor Motor Speed Controller (SimonK Firmware)
- 2x Afro ESC 30Amp Multi-rotor Motor Speed Controller (SimonK Firmware)
- A total of 4 meters (2 red, 2 black) AWG16 wires
- Turnigy 2200 mAh 40C LiPos
- Custom made distribution harness 1->3 wires for ESCs, with aux output for voltage monitoring, gimbal, BEC and FPV.
- Custom made 3D printed legs, controller board mount and antenna mounts.

The Flip32+ needs power both from the input side for the Rx, and from the output side for the servo. As the servo can draw as much as 750 mAH, and the Afro ESCs only supply 300mAH, I opted to let one ESC power the board and Rx (simply pulling the red and brown wires from the BEC enabled ESC out of the plug and connecting it to the pitch cable), and let a designated BEC power the output side.



The LiPo input accepts the 12v/15v from the LiPo without damaging the board. Can be taken from the balance plug or directly from the distribution wire harness/board. Feeding it through to the Tx via RSSI seems to require a CPPM setup, which I opted against since I need an external channel for gimbal operation.

I have set my FrSky Taranis up to use the following ports:

- 1 Pitch (Aleron)
- 2 Roll (Elevator)
- 3 Throttle (Throttle)
- 4 Yaw (Rudder)
- 5 ARM/DISARM (SF)
- 6 Mode switch 1 (SA)
- 7 Mode switch 2 (SD)
- 8 External gimbal control (left pot) (optional)

Since the standard arm/disarm procedure is not suitable for tricopters I have a designated switch (SF) set up on AUX1 to arm and disarm the motors. I have

The screenshot displays the Betaflight configurator interface. At the top, the status bar shows the device path, baud rate (115200), and connection status (Disconnect, Auto-Connect). The main menu includes Setup, Configuration, PID Tuning, Receiver, Mode Selection, Servos, GPS, Motor Testing, Raw Sensor Data, Logging, and CLI. The Configuration tab is active, showing various settings for a Tricopter. The Mixer section features a diagram of three motors (1, 2, 3) and a switch (S1) on AUX1. The Throttle section includes sliders for Minimum Throttle (1064), Middle Throttle (1500), Maximum Throttle (1864), Failsafe Throttle (1050), and Minimum Command (1000). The Serial Receiver is set to SPEKTRUM1024. The Battery Voltage section has sliders for Minimum Cell Voltage (3.3), Maximum Cell Voltage (4.3), and Voltage Scale (110). The Board Alignment section shows Roll, Pitch, and Yaw Adjustments all set to 0. The Features section has several options checked, including 'Enable Battery voltage monitoring', 'Don't spin the motors when armed', 'Enable failsafe settings on PPM/PWM signal loss', and 'Enable FrSky-compatible telemetry output'. The Accelerometer & Magnetometer section shows zero values for Roll Trim, Pitch Trim, and Declination. The GPS section shows NMEA Type, 115200 Baudrate, and Auto-detect Ground Assistance Type. The Current Sensor section shows a scale of 400 mA/V, an offset of 0 mV, and the legacy support option unchecked. A Save button is visible at the bottom right. The status bar at the bottom shows port utilization, packet error, I2C error, cycle time, and version 0.56.

The “Minimum Throttle” and “Maximum Throttle” settings are specific to the Afro ESCs.

My failsafe is set to 1050. Which means motors off in case of loss of signal. To set this value, tick the “Enable failsafe settings on PPM/PWM signal loss” and set the “Failsafe Throttle” to 1050 and click “Save”.

TAB “PID Tuning” - So far everything standard



## FLIGHT MODES:

### ARM

- Used to arm and disarm the Tricopter from a designated switch instead of using throttle/yaw combination. Extremely useful for tricopters.

### Manual mode

- The default mode when no switches are activated
- Allows for flips and extreme angles
- Only uses the gyros to help the pilot with handling interference from wind
- The pilot is in full control

### ANGLE:

- Sometimes called Self Leveling mode or Auto Level mode
- Does not allow for flips or extreme angles
- Uses gyros and accelerometers to keep the tricopter as level as possible
- The pilot is in full control except when sticks are released
- Must be activated with a switch

### HORIZON:

- Combination of MANUAL mode and ANGLE mode
- Allows for both auto/level flying and flying at extreme angles
- When transmitter sticks are at center, ANGLE mode is enabled
- When transmitter sticks are towards their outer edges, MANUAL mode is enabled
- Must be activated with a switch

### BARO:

- Sometimes called Altitude Hold mode
- Allows for level flight within a few meters up/down based on barometric pressure
- Must be activated with a switch when throttle is at midpoint (50%) and the tricopter is armed

### MAG:

- Sometimes called Heading Hold mode
- Locks the tricopter in the direction it was going before activating
- Must be activated with a switch when the tricopter is flying straight with no yaw input

### HEADFREE:

- Sometimes called Care Free mode or Super Simple mode
- Useful when having issues with the tricopters orientation
- Uses the magnetometer (compass) and last known position
- Controls the multirotor left/right or forward/back direction regardless of orientation, i.e. the front of the multirotor is facing you instead of away from you
- Left/right stick movement will always move the multirotor left/right
- Forward/back stick movement will always move the multirotor forward/back
- Requires that the magnetometer (compass) be mounted in such a way to reduce magnetic interference from multirotor motors, ESCs or anything that can cause interference.
- Must be activated with a switch

### HEADADJ:

- Allows you to adjust the locked heading position while flying in MAG mode
- Requires activation via a switch

### TAB “Servos” - Everything standard

Model: TRI

Change Direction in TX To Match												
Name	MID	MIN	MAX	CH-1	CH-2	CH-3	CH-4	AUX1	AUX2	AUX3	AUX4	Direction
Yaw Servo	1500	1020	2000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Gyroscope / Accelerometer Direction	
Name	Direction
YAW	Normal

Enable Live mode:

### TAB “GPS” not configured

Accelerometer - [Reset]

Refresh: 20 ms  
Scale: 2

X: 0.00 (0.01)  
Y: 0.00 (0.02)  
Z: -0.00 (-0.01)

**Motors**

1	2	3	4	5	6	7	8
1000	1000	1000	0	0	0	0	0

**Servos**

1	2	3	4	5	6	7	8
1500	1500	1498	1500	1500	1500	1500	1500

**Motor Test Mode Notice:**  
Moving the sliders will cause the motors to spin up. In order to prevent injury remove ALL propellers before using this feature. If you understand these instructions check the box below to enable motor test.

Check

### TAB “Motor testing” - Motors 1, 2 and 3 active

Use the “Motor testing “ TAB to balance your motors/ESC's. REMOVE your propellers (The motors WILL spin up). The motors should all spin up at about 1063. Use the arrow keys to precisely control the master lever.

TAB “Raw Sensor Data” - Not configured

TAB “Logging” - Not configured

TAB “CLI” - Not configured