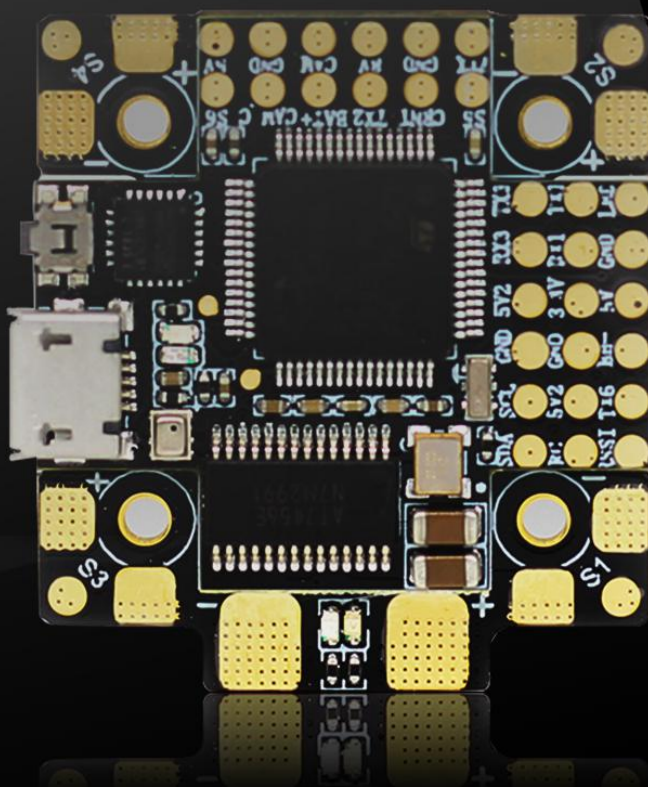


# Forward F4 AIO Flight Control

## Manual

### *FORWARD F4 AIO FC*



with STM32F405 ultra-high performance processor with built-in MPU6000 gyros and OSD  
Support 5V/3A, 8V/1.5A BEC



Power Input  
3-6S Lipo Power



Maximum current  
280A

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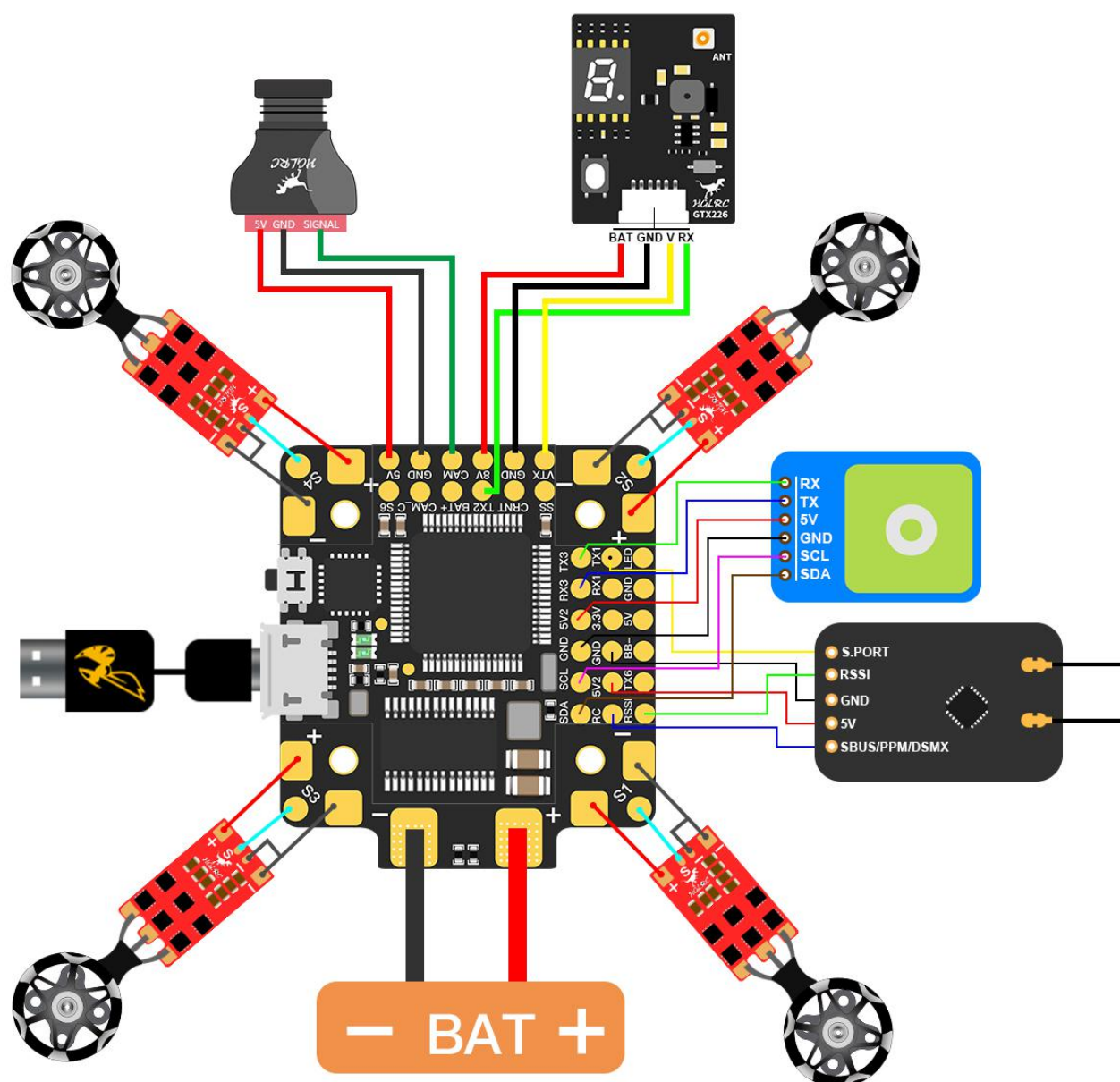
## Package Included

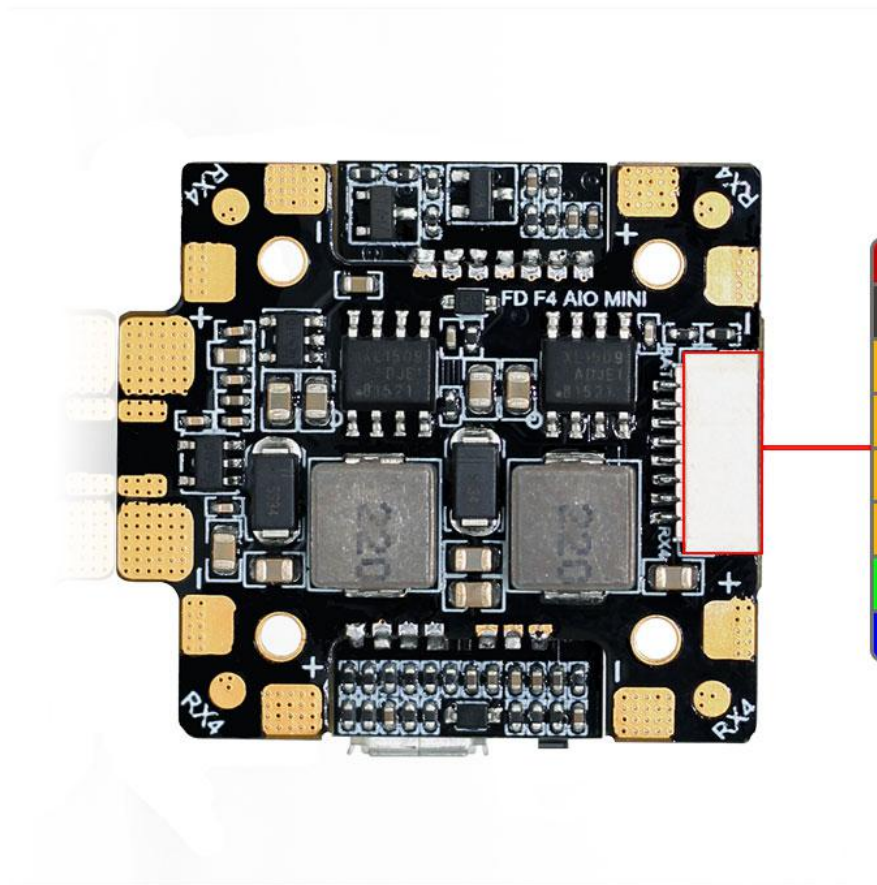
Forward F4 AIO Flight Control*1	Accessory Bag*1
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# 1.Product Specifications

Product parameters	
Model	Forward F4 AIO Flight Control
Weight	10.4g
Usage	for 110mm-1000mm Frame Kit
MPU	MPU6000-SPI
CPU	STM32F405RGT6, 8K
Firmware	Betaflight OMNIBUSF4V6
Black Box	No dataflash chip found
Support receiver	SBUS .PPM .DSMX
Copper foil thickness	3OZ * 6
Maximum current	280A
Input Voltage	3-6S Lipo
BEC Output	5V@3A. 8V@1.5A
Size	31.0x34.5mm board, 20.0mm mountingholes

## 2.Interface Description





BAT+
BAT-
S1
S2
S3
S4
CRNT
RX4

## 3. Check the flight control drive

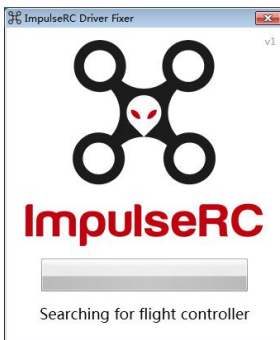
1. Long Press BOOT buttons.connect USB.The system automatically install the driver



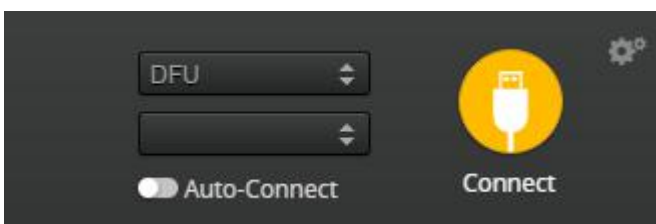
2.Driver cannot be installed, please download ImpulseRC\_Driver\_Fixer



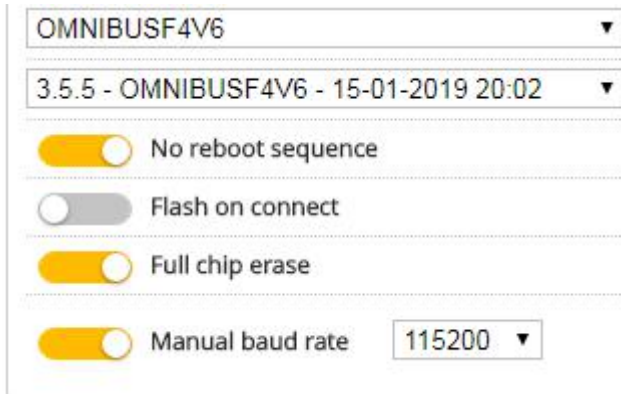
3.Double-click on the run(Plug in the flight controller to automatically install the driver)




4.open betafight configurator , enter DFU mode

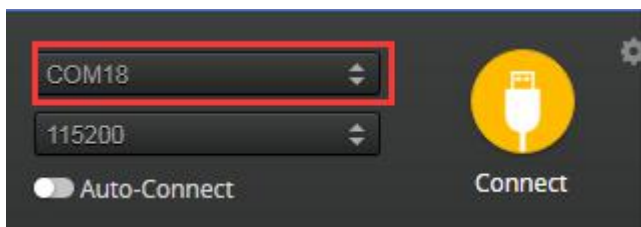


5. Click **Firmware Flasher** Select firmware version



6. Click **Load Firmware [Online]** Load firmware. **Flash Firmware** Waiting for completion **Erasing ...** It will be prompted upon completion. **Programming: SUCCESSFUL**


7. open betafight configurator  . Controller plugged into the computer. Betaflight Automatically assigned port, click “Connect” Enter setup interface (Different computer COM)

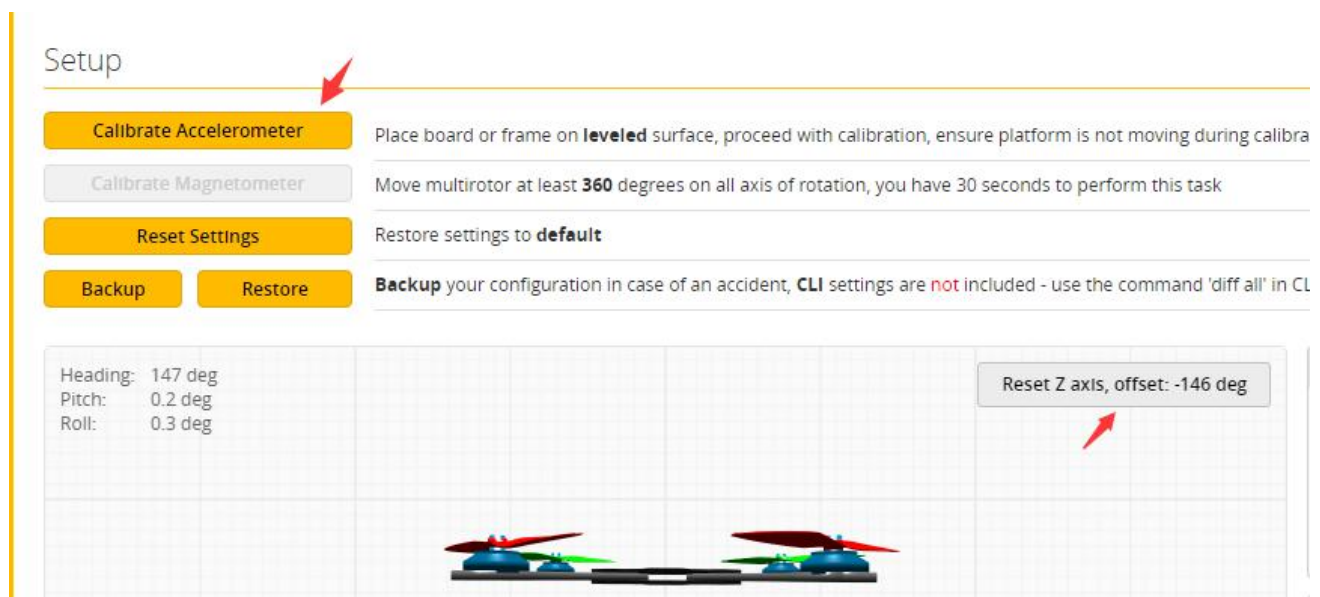




## 4. Calibration accelerometer

1. Put the aircraft horizontal and click “Reset Z axis”

Click again 



The screenshot shows the 'Setup' interface of the HGLRC system. On the left, there is a sidebar with four buttons: 'Calibrate Accelerometer' (highlighted in yellow), 'Calibrate Magnetometer' (greyed out), 'Reset Settings' (yellow), and 'Backup' and 'Restore' (yellow). To the right of these buttons are instructions: 'Place board or frame on **leveled** surface, proceed with calibration, ensure platform is not moving during calibra', 'Move multirotor at least **360** degrees on all axis of rotation, you have 30 seconds to perform this task', 'Restore settings to **default**', and '**Backup** your configuration in case of an accident, **CLI** settings are **not** included - use the command 'diff all' in CL'. Below the sidebar, there is a status box showing 'Heading: 147 deg', 'Pitch: 0.2 deg', and 'Roll: 0.3 deg'. In the center, there is a 3D model of a multirotor aircraft. On the right, there is a button labeled 'Reset Z axis, offset: -146 deg' with a red arrow pointing to it.



## 5.URAT serial port use

URAT1 uses receiver telemetry

UART2 uses VTX image transmission

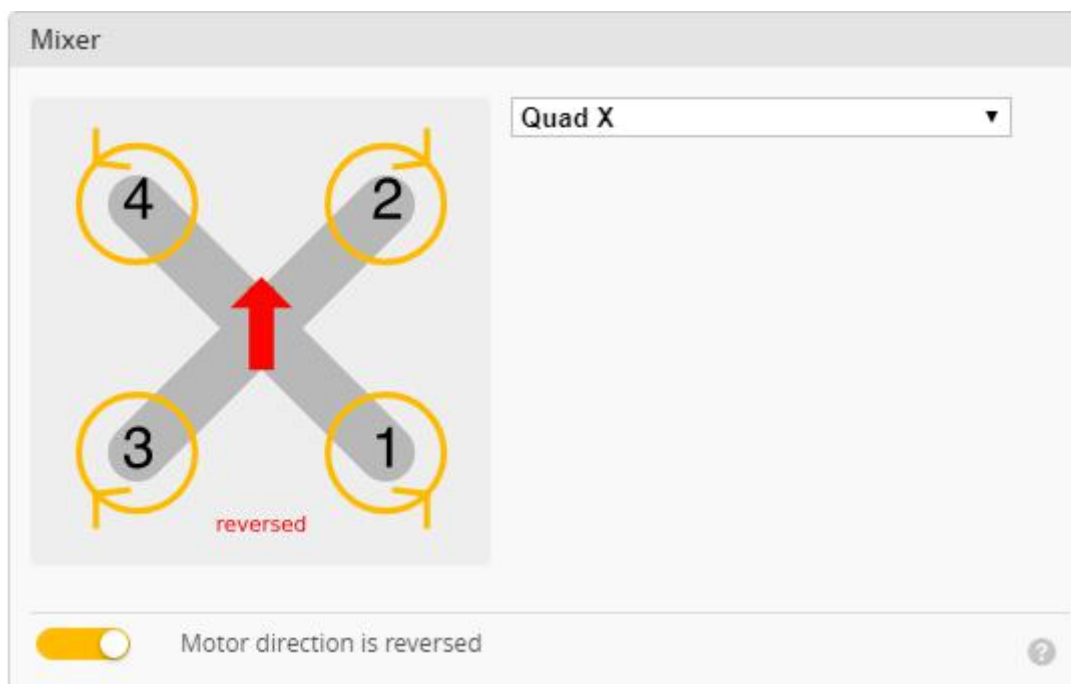
UART3 uses GPS


UART4 uses ESC telemetry

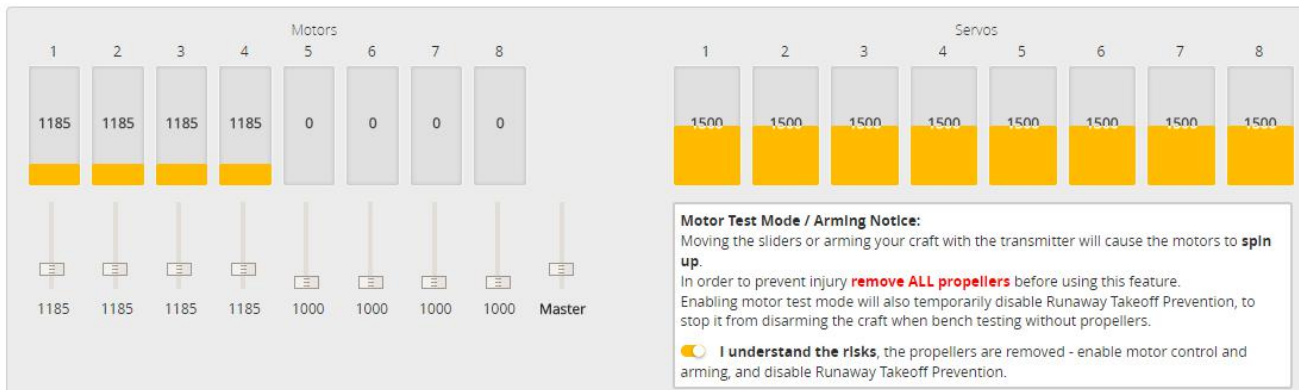
URAT6 uses the receiver

## 6.Select aircraft model

1.Click  Configuration Select model

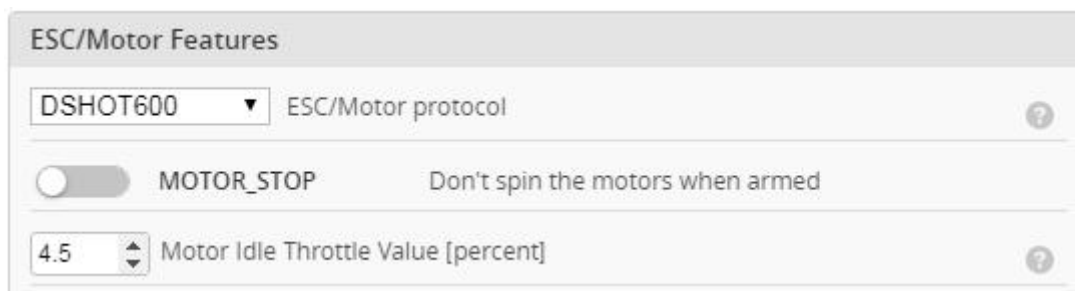


2. Click  **Motors** Click “**I understand the risks**” Push Master to check motor steering “**Master**” Steering can be changed at [BLHeliSuite](#)





## 7. Choose ESC protocol

1. Choose the right ESC protocol, the optional universal protocol DSHOT600.



## 8. Turn on ESC telemetry

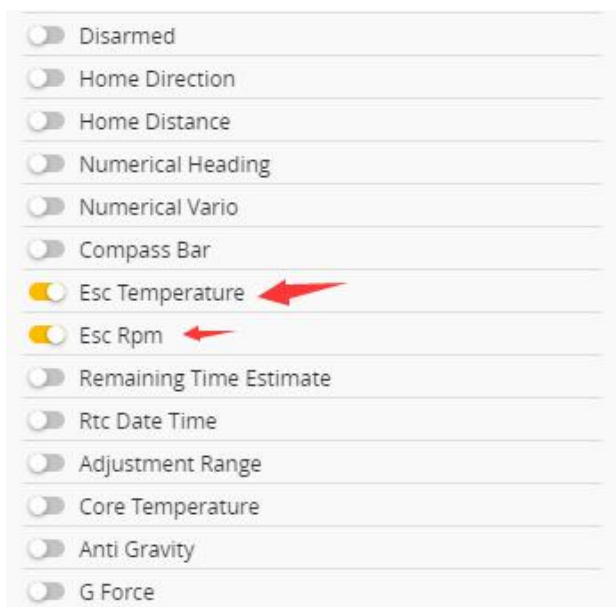
1. Open ESC telemetry serial port. TX on the ESC needs to be connected to the RX4 on the flight controller to use the ESC telemetry

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	 115200		Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART1	 115200		SmartPort   AUTO	Disabled   AUTO	Disabled   AUTO
UART2	 115200		Disabled   AUTO	Disabled   AUTO	IRC Tramp   AUTO
UART3	 115200		Disabled   AUTO	GPS   9600	Disabled   AUTO
UART4	 115200		Disabled   AUTO	<b>ESC   AUTO</b>	Disabled   AUTO
UART6	 115200		Disabled   AUTO	Disabled   AUTO	Disabled   AUTO

## 2. Use KISS/BLHeli\_32 ESC telemetry as sensor.



## 3. View telemetry data on OSD



# 9.Voltage and current parameters setting

1. Click  Power & Battery Setting parameters

Battery

Onboard ADC

Voltage Meter Source

Onboard ADC

Current Meter Source

3.3

Minimum Cell Voltage

4.3

Maximum Cell Voltage

3.5

Warning Cell Voltage

0

Capacity (mAh)

Voltage Meter

Battery

0 V

110

Scale

10

Divider Value

1

Multiplier Value

Amperage Meter

Battery

0.00 A

179

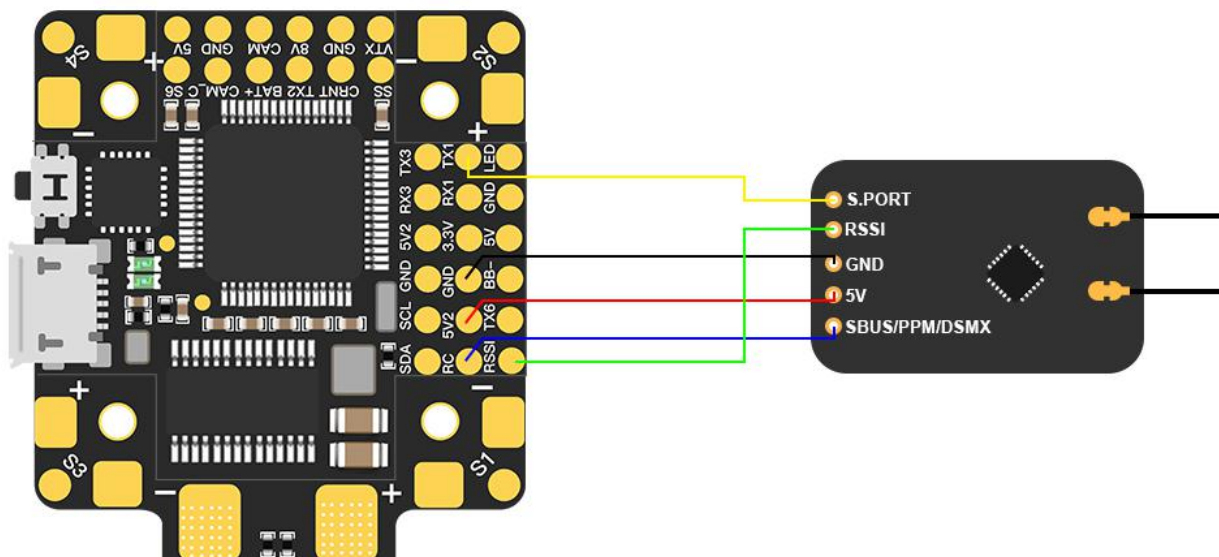
Scale [1/10th mV/A]

0













Offset [mA]

# 10. Setting up the receiver

## 1.Receiver connection diagram



## 2.Click Ports have found “UART6” Open the receiver serial port

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	 115200 ▾		Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾
UART1	 115200 ▾		SmartPort ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾
UART2	 115200 ▾		Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	IRC Tramp ▾ AUTO ▾
UART3	 115200 ▾		Disabled ▾ AUTO ▾	GPS ▾ 9600 ▾	Disabled ▾ AUTO ▾
UART4	 115200 ▾		Disabled ▾ AUTO ▾	ESC ▾ AUTO ▾	Disabled ▾ AUTO ▾
UART6	 115200 ▾		Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾

### 3.Set the SBUS receiver

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.

SBUS ▼ Serial Receiver Provider

### 4.Set the PPM receiver

Receiver

PPM RX input ▼ Receiver Mode

### 5.Set the DSMX receiver

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.

SPEKTRUM2048 ▼ Serial Receiver Provider

### 6.Turn on the receiver telemetry serial port Function on

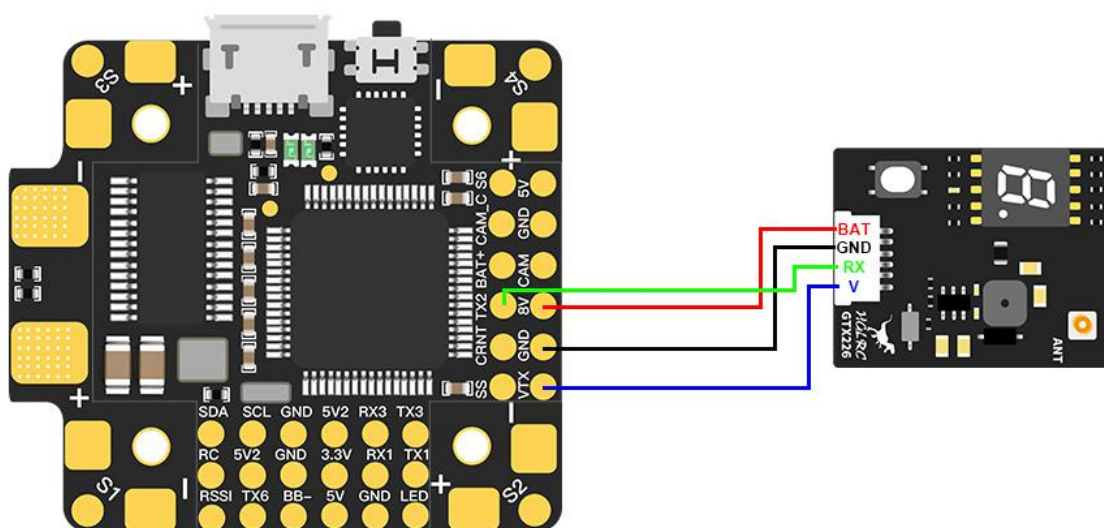
Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART1	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	SmartPort ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART2	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	IRC Tramp ▼ AUTO ▼
UART3	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	GPS ▼ 9600 ▼	Disabled ▼ AUTO ▼
UART4	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	ESC ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART6	<input type="checkbox"/> 115200 ▼	<input checked="" type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼

☒ TELEMETRY Telemetry output



# 11.VTX serial port use. VTX uses OSD smart audio

## 1.VTX connection diagram



2.VTX serial port opens. The protocol is selected according to its own VTX protocol.

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART1	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	SmartPort ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART2	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART3	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	GPS ▼ 9600 ▼	Disabled ▼ AUTO ▼
UART4	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	ESC ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART6	<input type="checkbox"/> 115200 ▼	<input checked="" type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼

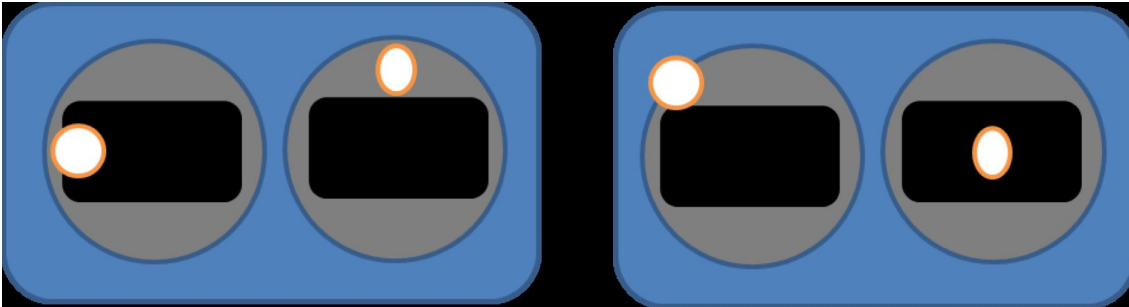


### 3. Use OSD to adjust VTX

which displays information like battery voltage and mAh consumed while you fly. In addition, the Betaflight OSD can be used to configure the quadcopter, making in-field adjustments and tuning more convenient.

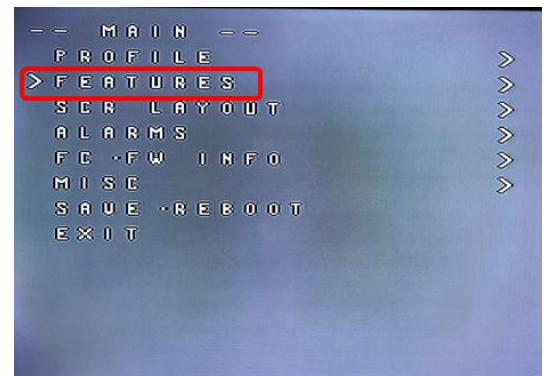
MODE2

MODE1



The graphics above show the stick command to bring up the OSD menu. The stick command is: throttle centered, yaw left, pitch forward. The exact stick command therefore depends on which mode your transmitter sticks are in.

In the OSD menu, use pitch up/down to move the cursor between menu items. When a menu option has a > symbol to the right of it, this indicates that it contains a sub-menu. Roll-right will enter the sub-menu. For example, in the screen to the right, moving the cursor to “Features” and then moving the roll stick to the right will enter the “Features” sub-menu.

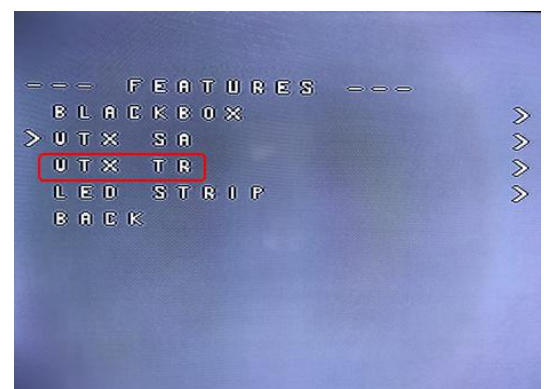


If you are using a video transmitter that supports remote configuration, enter the “Features” menu to configure the vTX. From there, enter either “VTX SA” if you are using SmartAudio (TBS Unify) or “VTX TR” if you are using IRC Tramp Telemetry.

To adjust PIDs, rates, and other tuning-related parameters, enter the “Profile” sub-menu.

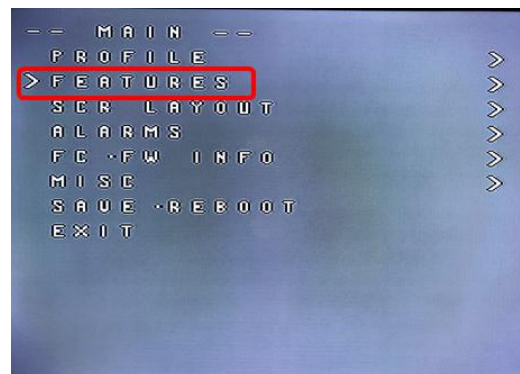
In the “Scr Layout” sub-menu, you can move the OSD elements (like battery voltage, mAh, and so forth) around on the screen.

The “Alarms” sub-menu lets you control when the OSD will try to alert you that battery voltage is too low or mAh consumed is too high.



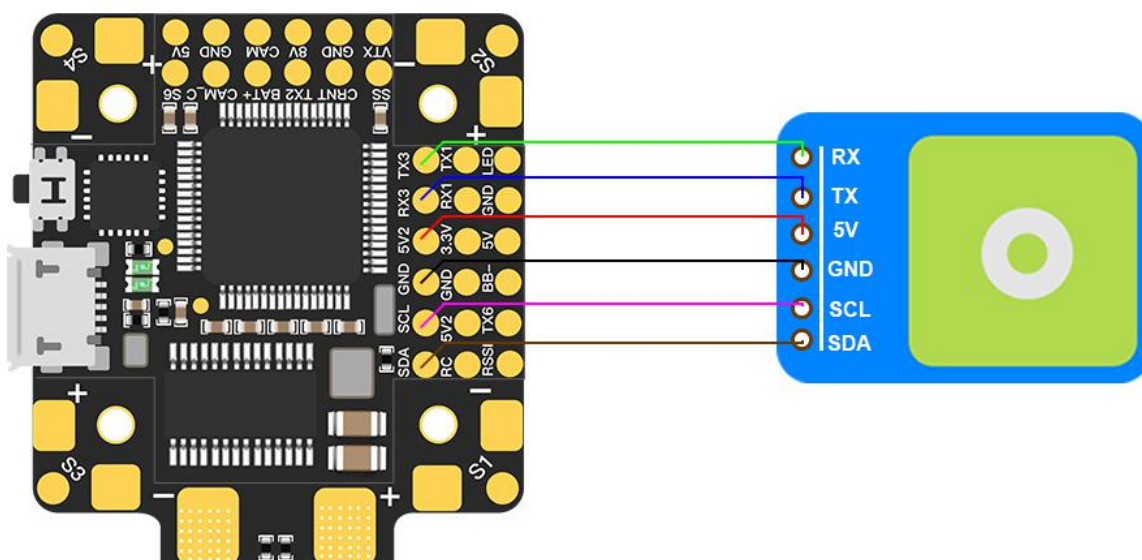
When a parameter can be modified, the parameter's current value will be shown on the right-hand side of the screen. In this case, roll left/right will adjust the parameter up and down.

The screen to the right shows the current vTX settings. From here, you can change the frequency band, channel, and power level of the video transmitter. After making the changes, move the cursor to "Set" and press roll-right to confirm the settings.



## 12.GPS parameters setting

### 1. GPS connection diagram



## 2. Open the GPS serial port

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART1	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	SmartPort ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART2	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	IRC Tramp ▼ AUTO ▼
UART3	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	GPS ▼ 9600 ▼	Disabled ▼ AUTO ▼
UART4	<input type="checkbox"/> 115200 ▼	<input type="checkbox"/>	Disabled ▼ AUTO ▼	ESC ▼ AUTO ▼	Disabled ▼ AUTO ▼
UART6	<input type="checkbox"/> 115200 ▼	<input checked="" type="checkbox"/>	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼	Disabled ▼ AUTO ▼

3. When using the GPS function, remember to configure the serial port (via the Ports tab).

GPS

☒ GPS
GPS for navigation and telemetry

**Note:** Remember to configure a Serial Port (via Ports tab) when using GPS feature.

UBLOX ▼ Protocol

☐ Auto Baud

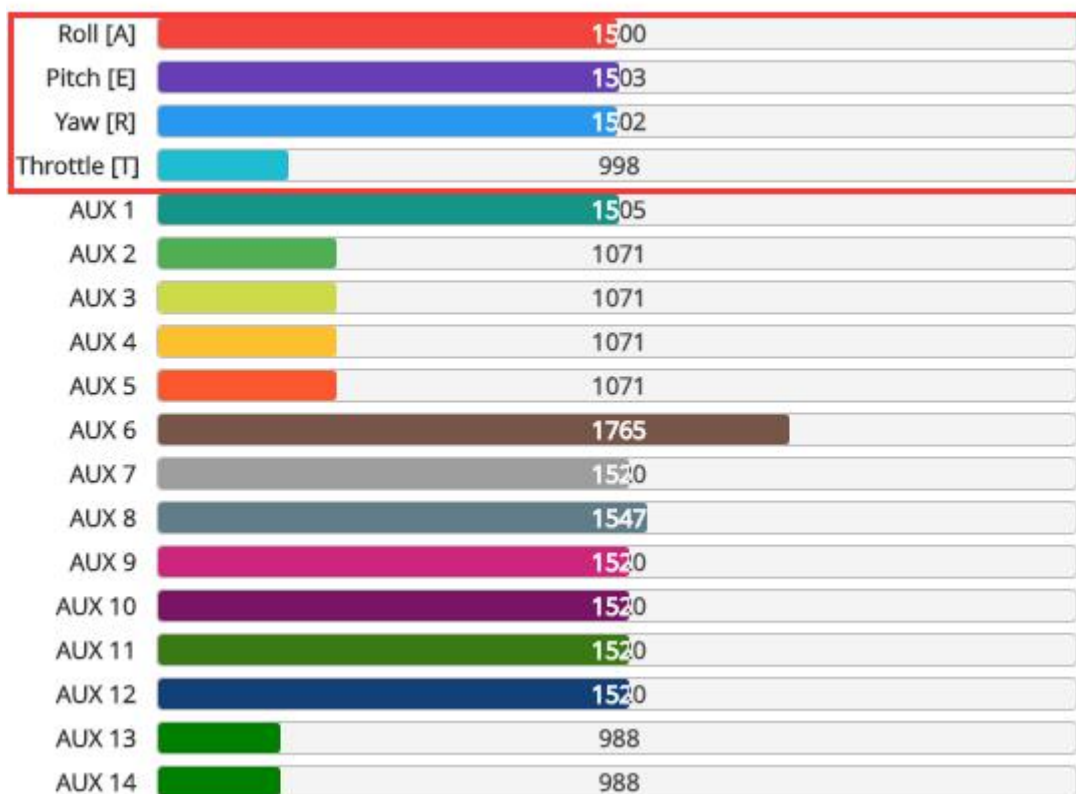
☒ Auto Config

Auto-detect ▼ Ground Assistance Type


0.00 ▼ Magnetometer Declination [deg]

# 13. Check receiver signal

1. Click  Receiver Check the remote control output signal



# 14. Select flight mode startup mode

1. Click  Modes set up the function of remote control switch across the channel (below are for reference only)

Modes
WIKI

Use ranges to define the switches on your transmitter and corresponding mode assignments. A receiver channel that gives a reading between a range min/max will activate the mode. Remember to save your settings using the Save button.

☐ Show/hide unused modes

ARM
Add Range

AUX 1
Min: 1300
Max: 2100


900 1000 1200 1400 1500 1600 1800 2000 2100

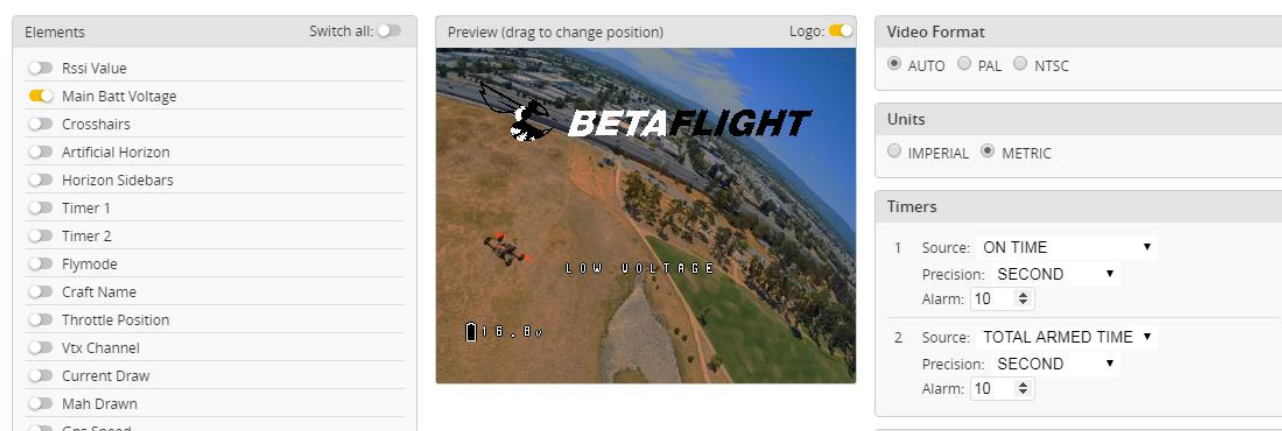
ANGLE
Add Range

AUX 1
Min: 1300
Max: 2100

900 1000 1200 1400 1500 1600 1800 2000 2100

# 15. OSD settings

1. Click  the OSD Settings, according to the need to choose, drag the OSD schematic diagram of the parameters can be adjusted.



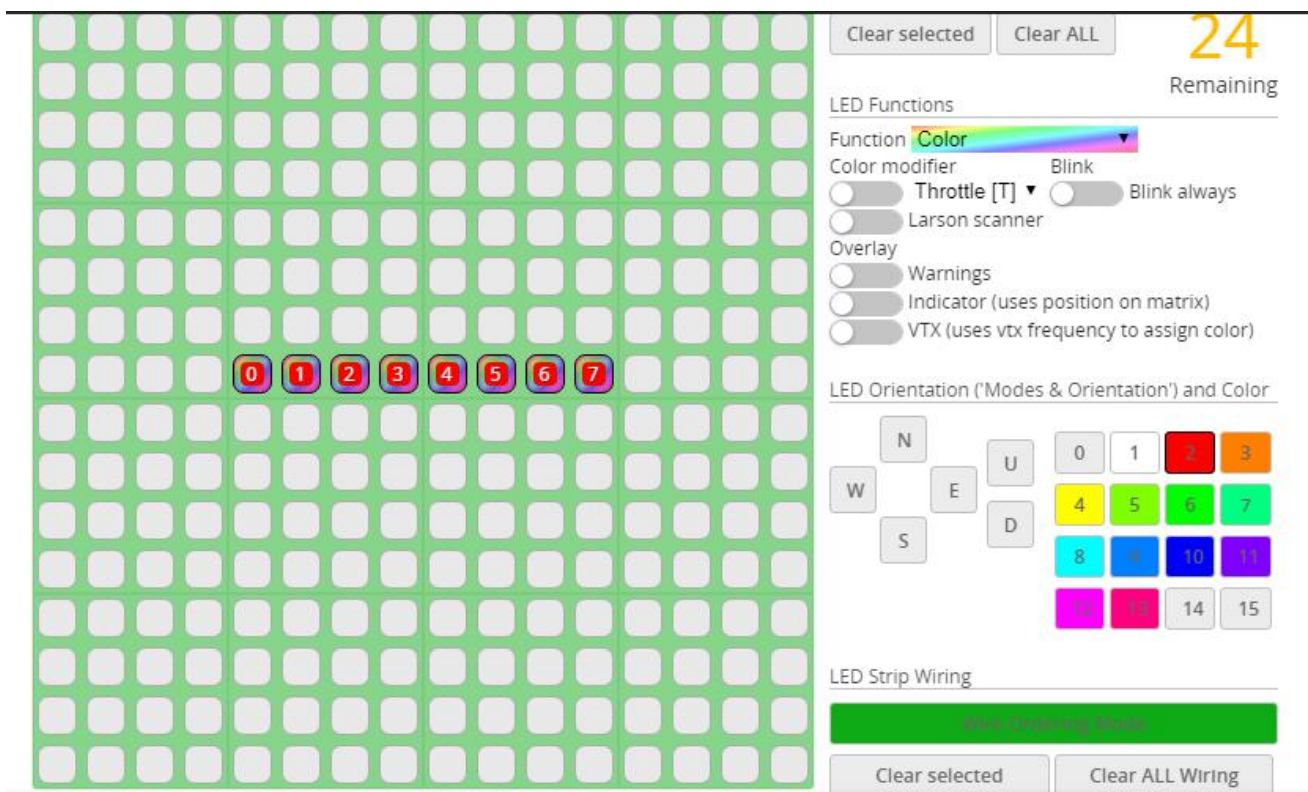


# 16. LED settings

1. Click **Configuration** Turn on LED support



2. Click **LED Strip**. Click **Wire Ordering Mode** set according to need



Clear selected Clear ALL **24** Remaining

LED Functions

Function **Color** Color modifier Blink

☐ Throttle [T] ☐ Blink always

☐ Larson scanner

Overlay

☐ Warnings

☐ Indicator (uses position on matrix)

☐ VTX (uses vtx frequency to assign color)

LED Orientation ('Modes & Orientation') and Color

N U 0 1 2 3

W E 4 5 6 7

S D 8 9 10 11

12 13 14 15

LED Strip Wiring

**Wire Ordering Mode**

Clear selected Clear ALL Wiring

# 18.Troubleshooting

## Warning:

Please read the cautions as follows, otherwise stability of your flight controller cannot be ensured, your flight controller will even get damaged.

- Keep focus on the polarity. Check carefully before power supply.
- Cut off the power when you connect, plug and pull anything.
- The refresh rate of PID and Gyroscope is up to 32K/16K.

## after sales question:

1. After receiving the goods, it is found that the product can not be used normally. If the return to the factory is a quality problem, the repair service will be provided free of charge.
2. If the product is damaged due to improper operation, the repair service may be provided under the condition that the inspection can be repaired.
3. For domestic customers, please contact the after-sales service personnel. For overseas customers, please contact the official website for after-sales service.



# Product daily problems

## 1.OSD garbled:

If you find garbled characters, please open Betaflight, click “OSD” .and click “Font Manager” clicks on “Upload Font” to update

1. When plugged in the battery, the aircraft does not pass the self-test without "BBB" sound. There is only one sound.

Please check if the ESC agreement is correct

## 3.The spin of the aircraft keeps spinning

1. Please check if the propeller is correct
2. Please check if the motor direction is correct