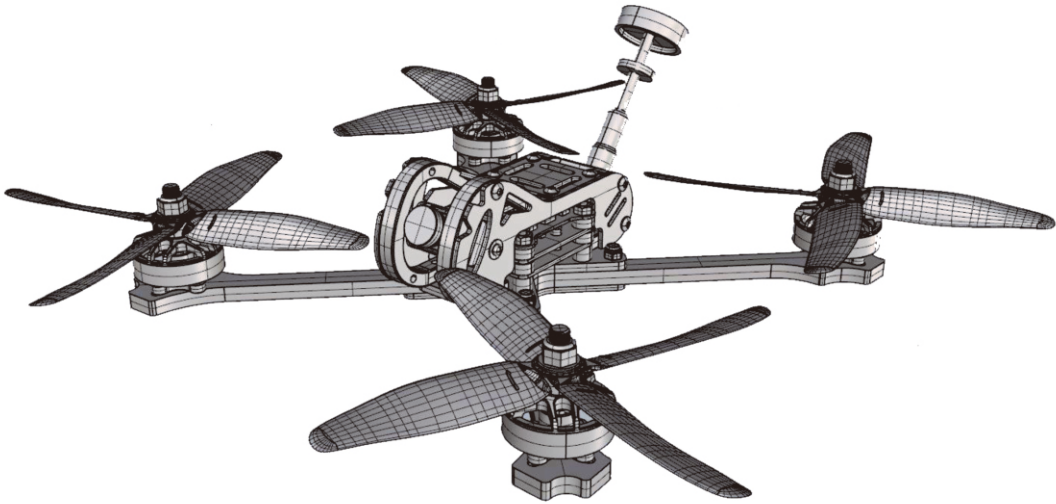


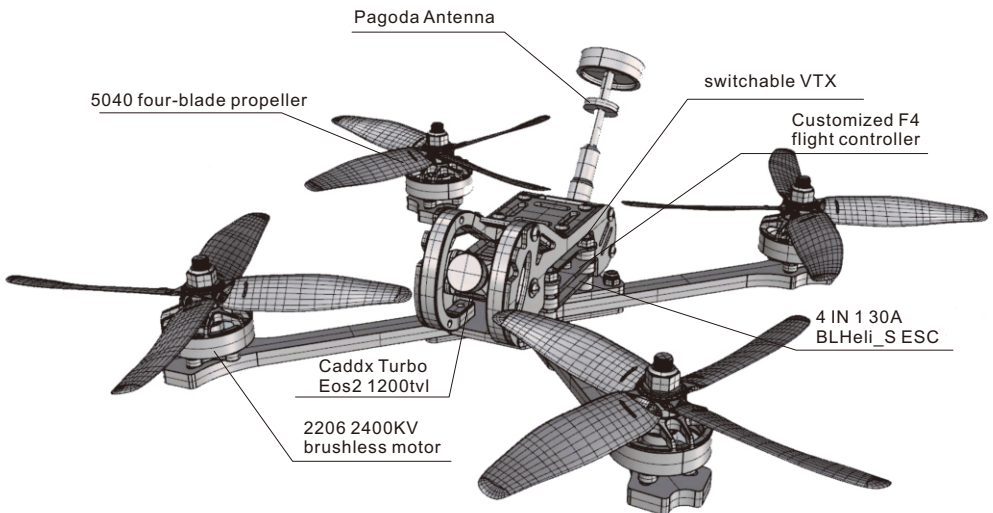
# TYRO 109

## QUICK START GUIDE (DIY)



Package Included:

- 1 x 210mm frame kit
- 2 x 2206 2400KV brushless motor CW
- 2 x 2206 2400KV brushless motor CCW
- 1 x 4 IN 1 30A BLHeli\_S ESC
- 1 x Customized F4 flight controller
- 1 x Caddx Turbo Eos2 1200tvl
- 1 x XF5804 5.8G 40CH 0mw/25mw/200mw/600mw switchable VTX
- 1xPagoda Antenna
- 2 x Battery strap
- 2x 5040 four-blade propeller CW
- 2x 5040 four-blade propeller CCW



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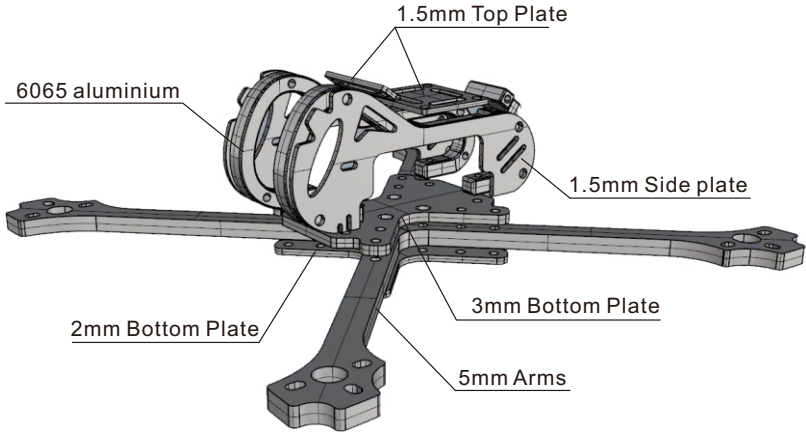
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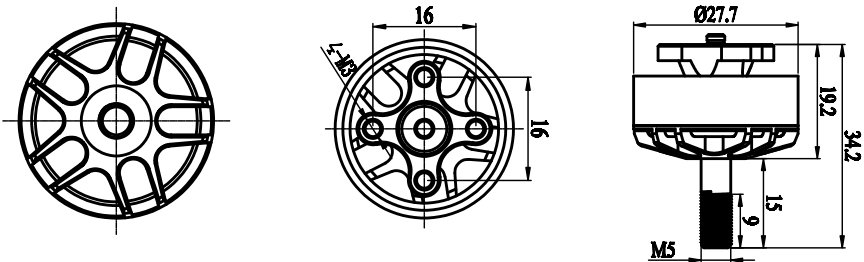
### 1.0 Frame kit

- Wheel base: 210mm
- Frame arm thickness: 5mm
- Bottom plate thickness: 2mm
- Side plate thickness: 2mm
- Frame kit material: 3K carbon fiber & 6065 aluminium



### 2.0 Motor

- |   |                              |
|---|------------------------------|
| KV: 2400KV                                | Stator diameter: 22mm        |
| Idle current (I <sub>0</sub> /10V): 1.35A | Stator thickness: 6mm        |
| Lipo cell: 3-5S                           | Motor diameter: 27.7mm       |
| Weight: 31g                               | Motor body length: 19.2mm    |
| Max continuous current: 35A               | Overall shaft length: 34.2mm |
| Max continuous power: 560W                | Prop adapter shaft: M5       |
| Max thrust: 1180g (4S/5")                 | Bolt holes spacing: 16mm     |
| Config-ration: 12N/14P                    | Bolt thread: M3              |
| Motor resistance (RM): 0.0536 Ω           | Propeller: 5-6 inch          |



### 3.0 ESC

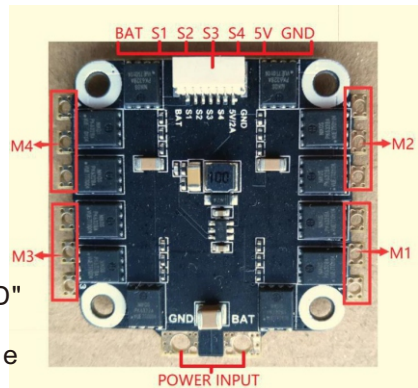
Continuous current: 30A  
 Peak Current: 40A(10S)  
 Input voltage: 2-5S  
 BEC: 5V 2A BEC  
 Main control chip: 48Mhz EFM8BB2  
 Firmware: BLHeli\_S supports Dshot600  
 MOS: 5\*6

#### Product characteristics:

The high performance EFM8BB21F16G microprocessor is used to run up to 48MHz. The high quality 5 \* 6 package MOSFET is more reliable than the 3 \* 3 package MOSFET. 6 layers of high TG 3OZ copper thick PCB sheet, greatly reduce heating and efficiency. Using the BLHeli\_S open source program, you can upgrade the firmware or change the tuning parameters through the throttle signal line to support the BLHeli\_S complete The function of the Department; It can support DShot150/300/600 digital throttle mode and common PWM, OneShot125, OneShot42. MultShot throttle mode; The built-in 5V@2A BEC can provide power for flight control, camera, picture transmission, LED lamp and other devices.

#### Interface definition chart:

BAT: power positive electrode;  
 GND: power negative electrode;  
 5V: 5V regulated power supply output interface, maximum current 2A;  
 S1-4: throttle signal input interface, S1 corresponds to M1, S2 corresponds to M2, S3 corresponds to M3, S4 corresponds to M4. Number electric adjustment;  
 POWER INPUT: power line pads, "GND" corresponding power supply. The line negative pole, "BAT" corresponds to the positive pole of the power supply line.

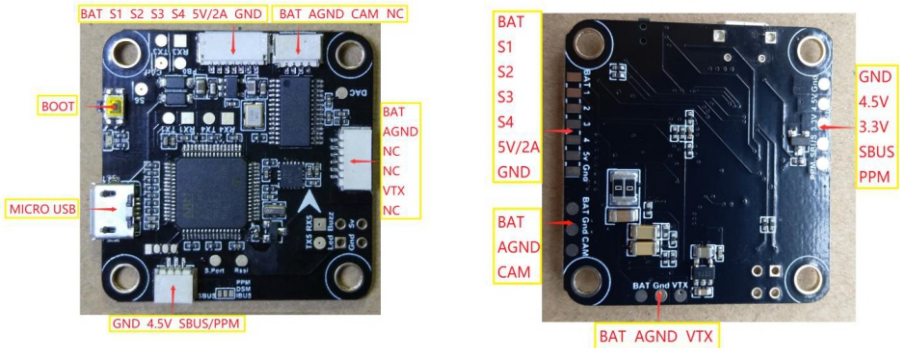


### 4.0 Flight controller

**Product characteristics:**

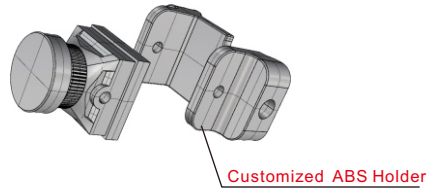
The STM32 F405 master chip can run higher PID cycle time and gyroscope. Integrating accelerometers and gyroscopes using an ICM20602 chip with SPI bus (the highest operating frequency of the gyroscope can be set to 32KHz); Flight control board OSD chip, supporting DMA mode (using F4 MCU to control OSD), can use Beta Flight tuning software Part adjustment parameters; Supporting BetaFlight firmware, you can use BetaFlight tuning software to easily adjust various parameters, more suitable for FPV flying Row and competition; Support various types of receivers (such as: SBUS, SUMH, SUND, SPEKTRUM1024/2048, XBUS, PPM, etc.) Type of receiver; With LED programmable signal output port, support programmable LED lamp strip, can adjust lamp strip color and flash mode through flight control; Has a voltage monitoring port (BAT) and a current monitoring port (CRT) to monitor battery voltage and current (requiring additional electricity Flow meter); It has a buzzer output port and supports an external alarm buzzer for voice warning or flight status notification. It has Micro USB interface to facilitate users to connect computers.

**Interface definition chart:**



### 5.0 Camera

Model: Turbo EOS1  
 Image Sensor: 1/3" CMOS Sensor  
 Horizontal Resolution: 1200 TVL  
 TV System: NTSC / PAL option  
 IMAGE: 4:3  
 Synchronization: Internal  
 Electronic Shutter: PAL: 1/50~100,000; NTSC: 1/60~100,000  
 S/N Ratio: >52dB (AGC OFF)  
 Video Output: CVBS  
 Lens: 2.1mm  
 Min. Illumination: 0.001Lux@F1.2  
 Auto Gain Control: YES  
 BLC: YES  
 WDR: Global WDR  
 DNR: 2 DNR  
 Dimensions: 14mm\*14mm\*16mm  
 Wide Power Input: DC 3.3-6V  
 Work Temperature: -20℃~+60℃



### 6.0 Switchable VTX

Output power & transmission distance:  $\geq 0.5\text{km}@25\text{mW}$ ,  
 $\geq 1\text{km}@200\text{mW}$ ,  $\geq 2\text{km}@600\text{mW}$   
 Transmitting power: 0mW/25mW/200mW/600mW  
 Full video format: NTSC /PAL  
 Input voltage & power dissipation: 7V~24V, +12V/260mA@600mW  
 Size: 20\*30\*9mm  
 Weight:  $\leq 7\text{g}$ (except antenna)  
 With output power self-check function.  
 Nixie tube SCAN: frequency point (1-8), frequency band (A-E),  
 power (1-3, 0=0mw, 1=25mw, 2=200mw, 3=600mw)

Frequency control method:

Button frequency control (1-8): press the button for 2 seconds to enter the frequency setting, and press the button to change the frequency CH1-8. Change the frequency band (A-E), set the frequency, press the button for 2 seconds, then press the button to change the frequency group FR (A-E).

Band	1	2	3	4	5	6	7	8
A	5865	5845	5825	5805	5785	5765	5745	5725
B	5733	5752	5771	5790	5809	5828	5847	5866
C	5705	5685	5665	5665	5885	5905	5905	5905
D	5740	5760	5780	5800	5820	5840	5860	5880
E	5658	5695	5732	5769	5806	5843	5880	5917

## 6.0 Switchable VTX

Points for attention:

The antenna is installed at the output terminal before power up, so as not to damage internal components. Note that the input voltage is within the specified range and is positive or negative, so as not to damage internal components. If the antenna is replaced, choose a standing wave and a good gain antenna to obtain a longer transmission distance. Attention should be paid to electrostatic protection during transportation and installation.

## 7.0 Pagoda Antenna

Gain: 5dBi  
 Max. Power: 50w  
 Connector: RP-SMA  
 Color: Black  
 Weight: 8.6g  
 Length: 78±3mm  
 Max. Dia.: 22.4±1mm  
 Min. Dia.: 11.8±1mm  
 Frequency: 5.8G  
 Impedance: 50Ω  
 VSWR: <1.5:1  
 Polarization: Circular Polarized  
 Radiation: Omni

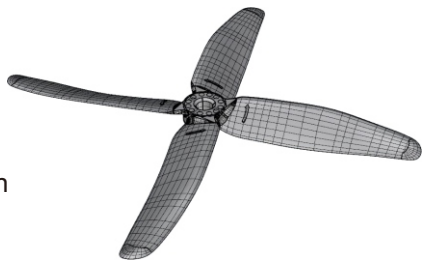


Features :

Omni-directional, no dead corner  
 High gain, more stable.  
 Less flash, stonger signal

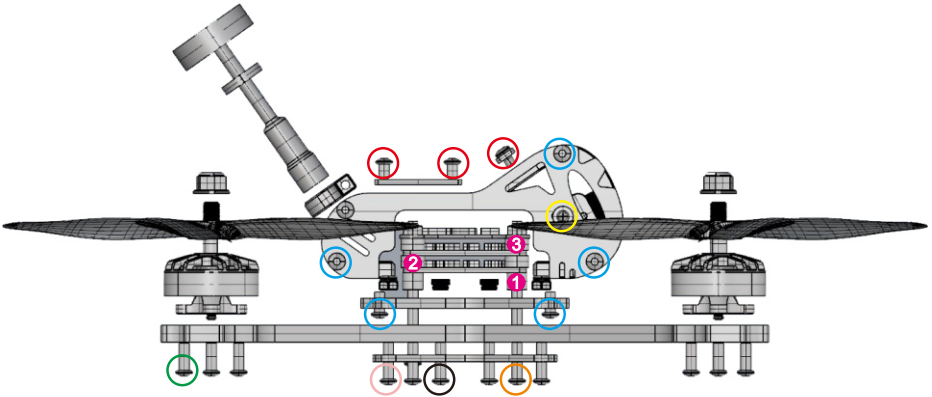
## 8.0 Propeller

Material: PC  
 Mounting hole: 5mm  
 Center thickness: 8mm  
 Color: Green & Yellow &  
 Red and Transparent White  
 Color :Green & Yellow & Red an  
 Transparent White  
 Quantity: 2 CW + 2 CCW  
 ( One Pair in each color)





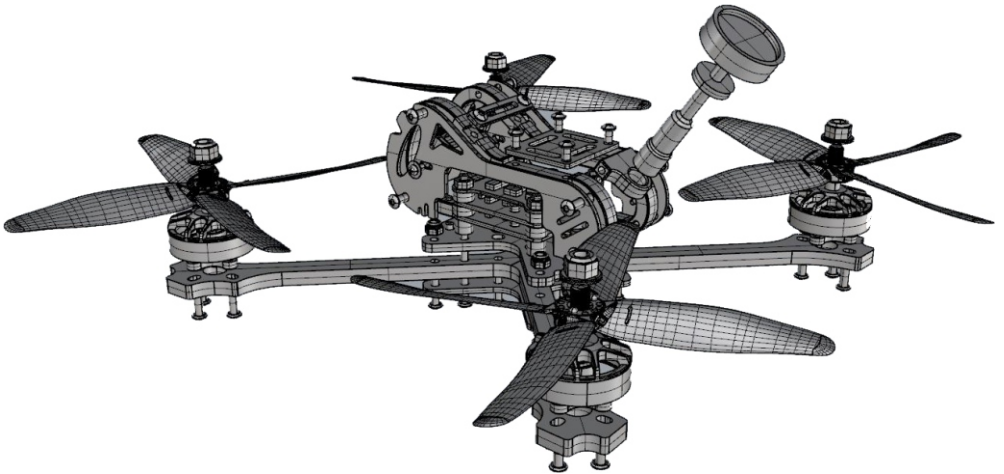
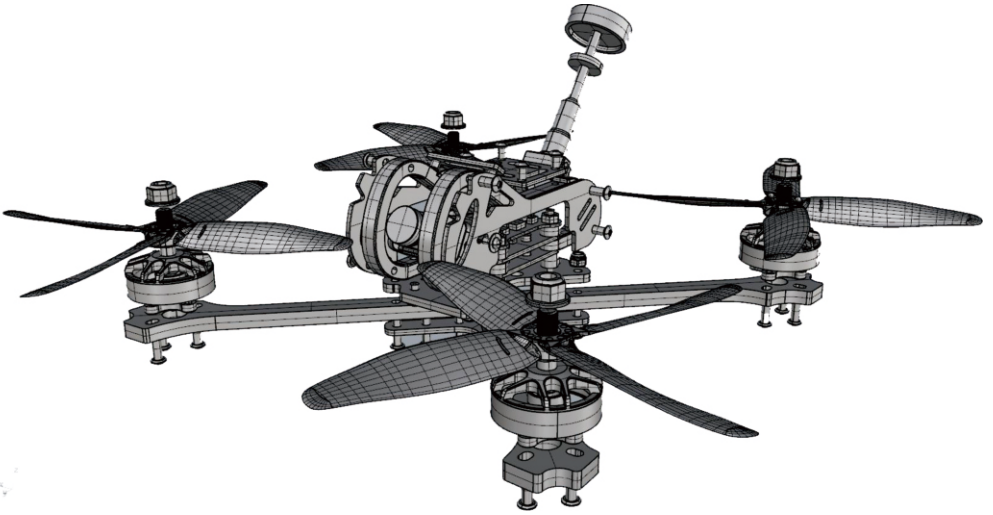
## 9.0 Screws



- 6xM3\*4      ○ 10xM3\*6      ○ 16xM3\*8
- 4xM3\*12    ○ 4xM3\*16      ○ 4xM3\*30
- 2xM2\*4

- ① M3\*5mm ABS Round Isolation Column
- ② M3\*3.5mm Rubber Shock Absorber
- ③ M3\*3.5mm Rubber Shock Absorber

10. Exploded view

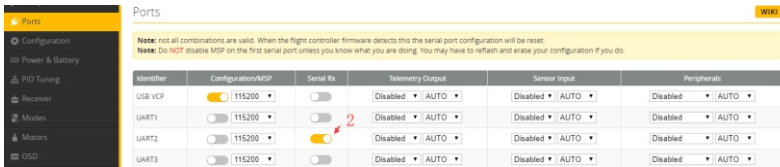


## 11. Adjusting parameter

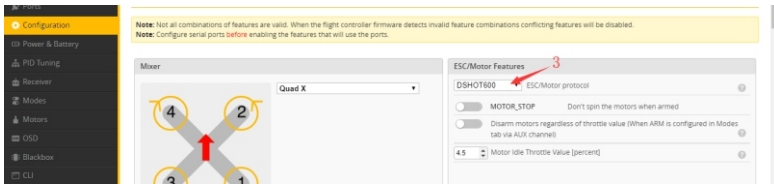
### 1. Click connect connection



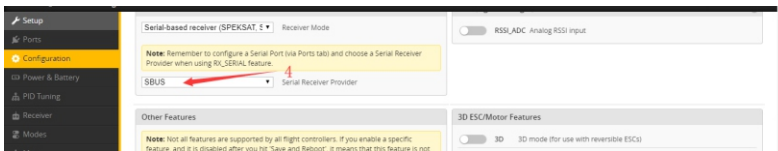
2: Click the RX interface under UART2 under the ports option, as shown in the figure.



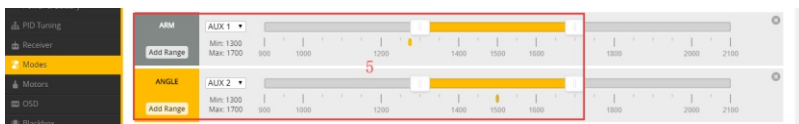
3: Click CONFIGURATIN to change to dshot600.



4: Click CONFIGURATIN; change to SBUS



5: Click modes, add arm and angle, drag the slider between 1300 and 1700, and set arm to AUX1 and angle to aux2

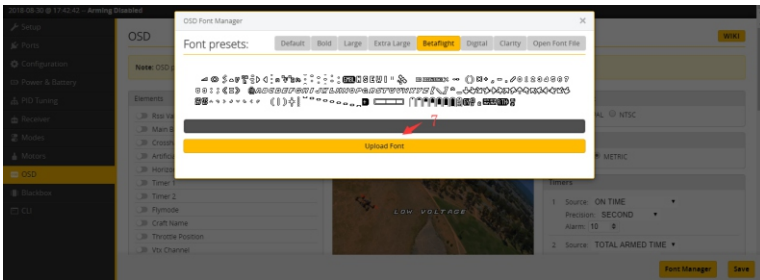


## 11. Adjusting parameter

6: Push the slider to test the positive and negative rotation of the motor, such as error,



7: Click font manager, select betafight, click upload font



8: Click setup, calibrate accelerometer

