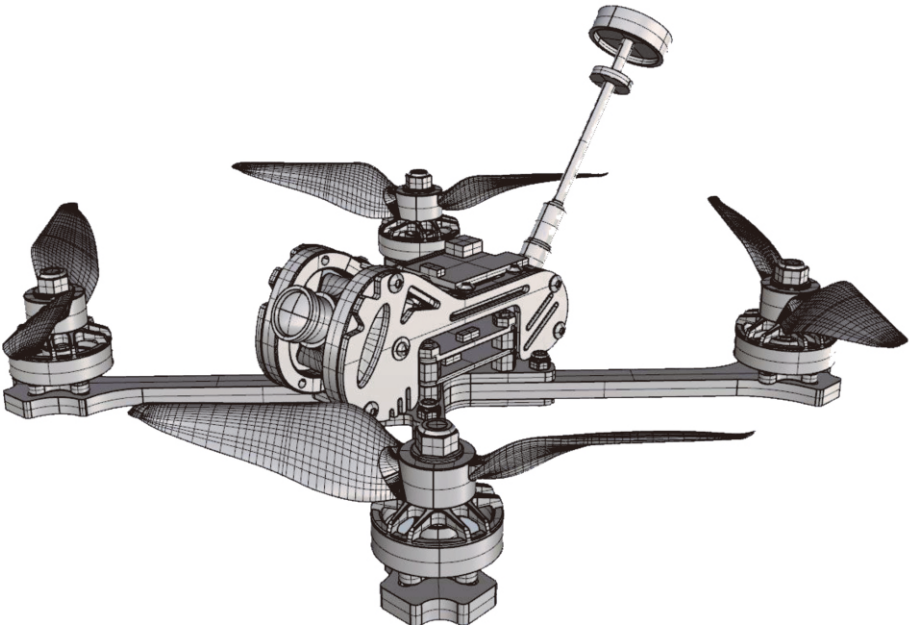
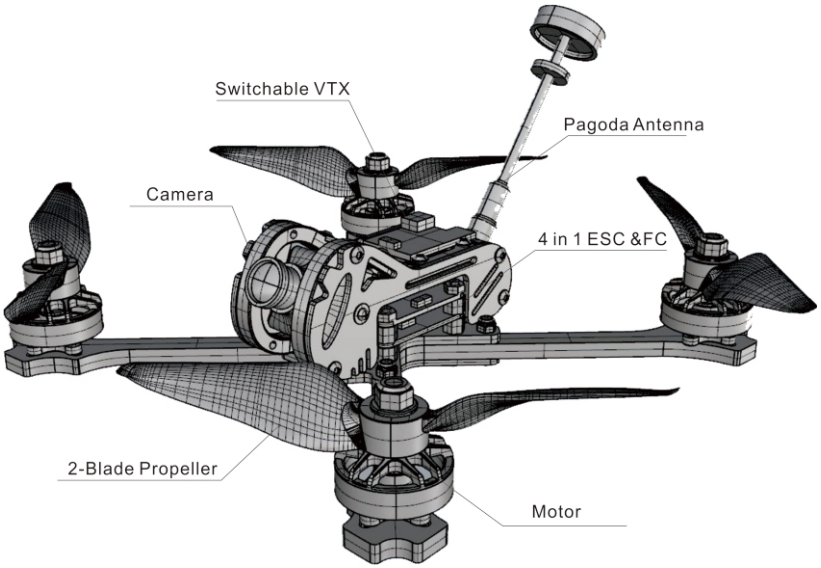
# TYRO99

## QUICK START GUIDE (DIY)



EACHINE

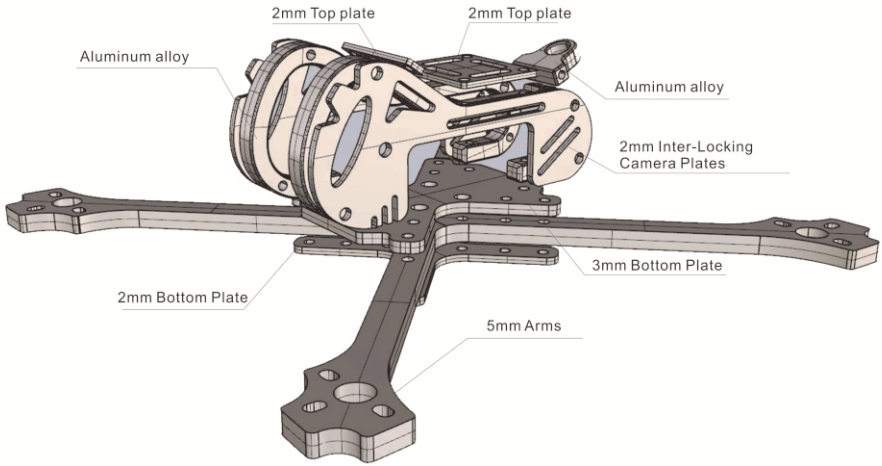
Package included:
1 x 210mm frame kit
2 x 2206 2150KV brushless motor CW
2 x 2206 2150KV brushless motor CCW
1 x 4 IN 1 30A BLHeli_S ESC
1 x Customized F4 flight controller
1 x 700TVL COMS camera
1 x 5.8G 40CH 0mw/25mw/200mw/600mw switchable VTX
1 x Pagoda Antenna
2 x Battery strap
10 x Racerstar 5038 2 blade propeller CW
10 x Racerstar 5038 2 blade propeller CCW




EACHINE

## 1.0 Frame kit

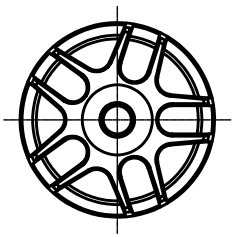
Wheel base: 210mm
Frame arm thickness: 5mm
Bottom plate thickness: 2mm
Side plate thickness: 2mm
Frame kit material: 3K carbon fiber & 6065 aluminium

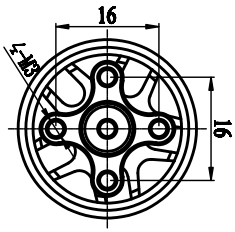


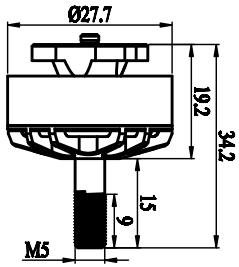

## 2.0 Motor

Motor KV: 2150RPM/V
Idle current (Io/10V): 1.26A
Lipo cell: 3-5S
Weight: 31g
Max continuous current: 31A
Max continuous power: 496W
Max thrust: 1050g (4S/5")
Configu-ration: 12N/14P
Motor resistance (RM): 0.0572 Ω

Stator diameter: 22mm
Stator thickness: 6mm
Motor diameter: 27.7mm
Motor body length: 19.2mm
Overall shaft length: 34.2mm
Prop adapter shaft: M5
Bolt holes spacing: 16mm
Bolt thread: M3
Propeller: 5-6 inch





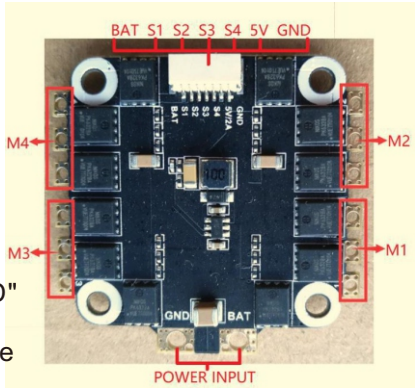
## 3.0 ESC

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 completeThe 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:

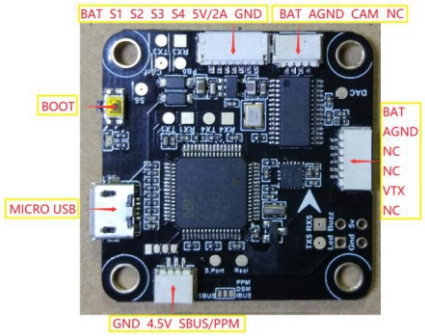
BAT: power positive electrode;
GND: power negative electrode;
5V:5V regulated power supply output interface,maximum current 2A;
S1-4: throttle signal input interface, S1 corresponds to M1.S2 corresponds to M2, S3 corresponds to M3, S4 corresponds to M4.Number electric adjustment;
POWER INPUT: power line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

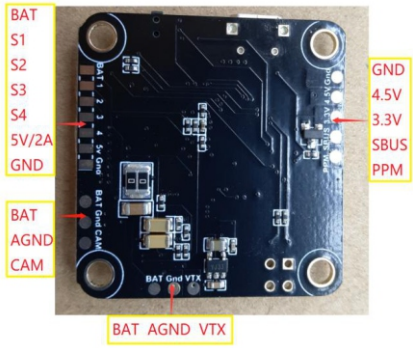


## 4.0 Flight controller

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 to32KHz);Flight control board OSD chip, supporting DMA mode (using F4 MCU to control OSD), can use Beta Flight tuning softwarePart adjustment parameters; Supporting BetaFlight firmware, you can use BetaFlight tuning software to easily adjust various parameters, more suitable for FPV flyingRow and competition;Support various types of receivers (such as: SBUS, SUMH, SUMD, 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:



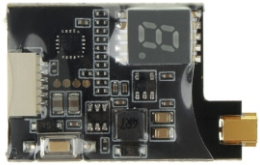



## 5.0 Camera

Case size: 25mm*25mm
Weight: 9.5g
Total pixels: PAL: 1020H×596V (0.61MP);
NTSC: 1020H×508V (0.52MP)
Effective pixels: PAL: 976H×582V (0.57MP);
NTSC: 976H×494V (0.48MP)
Signal system: PAL/NTSC switchable
Resolution ratio(horizontal center): 700TVL
Video output: 1.0Vp-p/75Ω
Automatic gain control: 0.25/0.50/0.75/1.00, up to 55dB
White balance: on/off optional
Exposure mode: electron exposure
Electronic shutter: 1/50(1/60) - 1/100000 S
Gamma correction: 0.45/1.0
Synchronization method: inter-sync
Camera lens: standard 2.8mm
Lens operating voltage: DC12V (wide voltage,
measured can work normally at 7.5-13V)
Working current: 70mA (low power consumption)
Working temperature: -20*C-60*C
Humidity: 0%~98%

## 6.0 Switchable VTX

Output power & transmission distance:
⩾0.5km@25mW, ⩾1km@200mW, ⩾2km@600mW
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: ⩽7g(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)

## 6.0 Switchable VTX

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 |

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

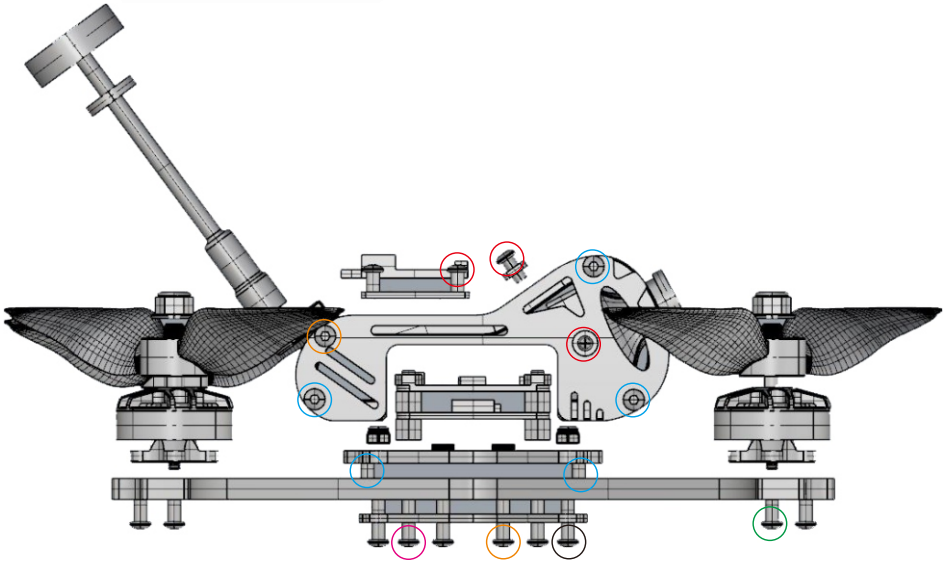
Gain: 5dBi
Max. Power: 50w
Connector: RP-SMA
Color: Black
Weight: 8.6g
Length: 78±3mm
Max. Dia.: 22.4±1mm
Min. Dia.: 11.8±1mm
Frequency: 5.8G
Impedance: 50Ω
VSWR: <1.5:1
Polarization: Circular Polarized
Radiation: Omni

Features :
Omni-directional, no dead corner
High gain, more stable.
Less flash, stonger siginal

## 8.0 Propeller

Material: PC
Mounting hole: 5mm
Center thickness: 8mm
Quantity: 10 pairs
Color: blue, red, yellow, purple, white
Weight: 7.25G a pair
Delivery color randomly (10 pairs of propellers are the same color)

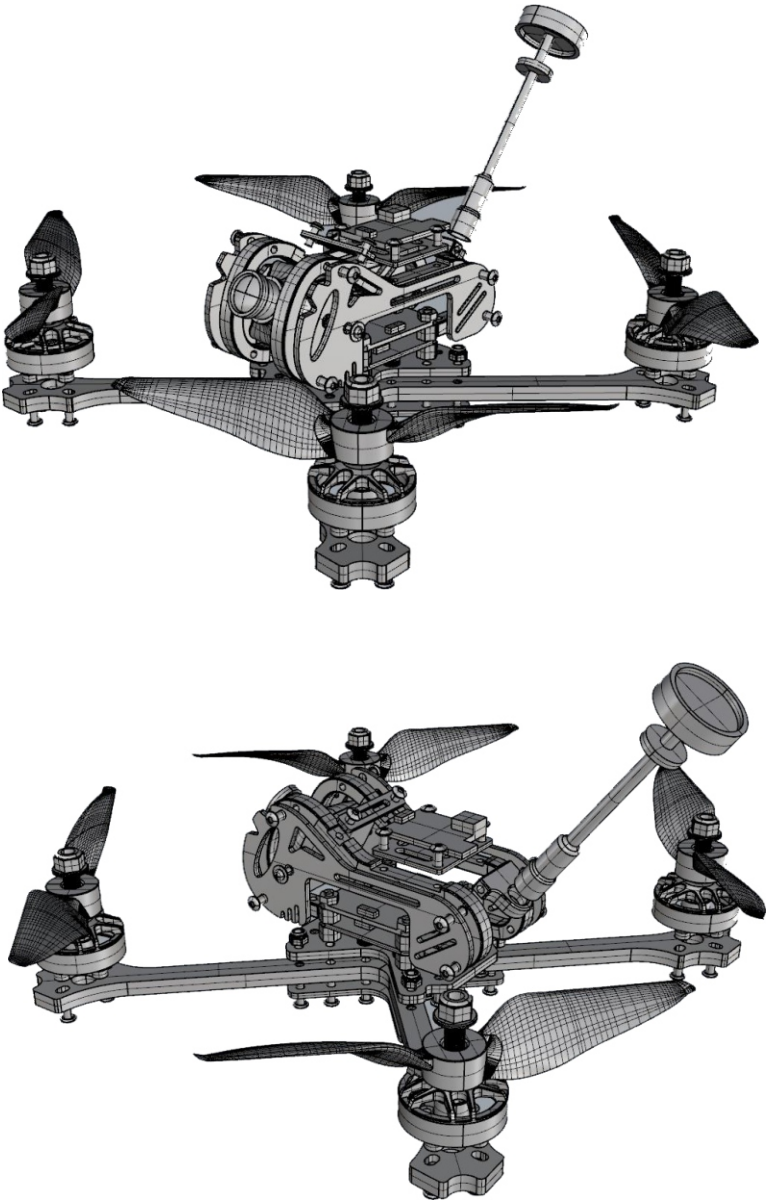
## 9.0 Screws



7xM3*4 11xM3*6 16xM3*8

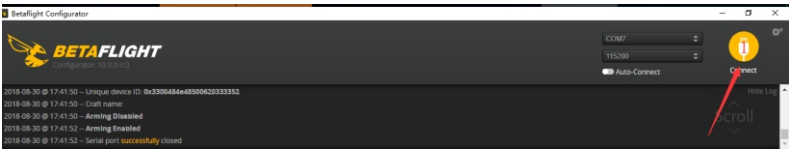
7xM3*12 5xM3*14 5xM3*16

## 10.Exploded view

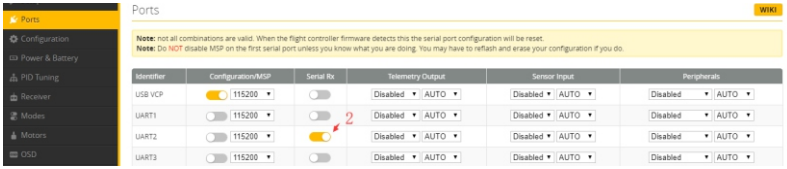


## 11.Adjusting parameter

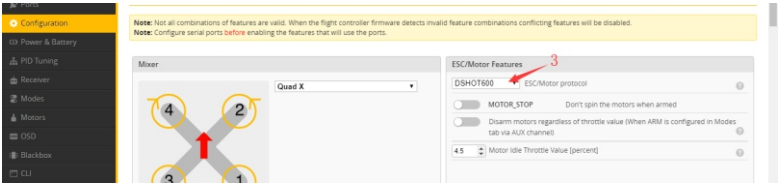
### 1.Click connect connection



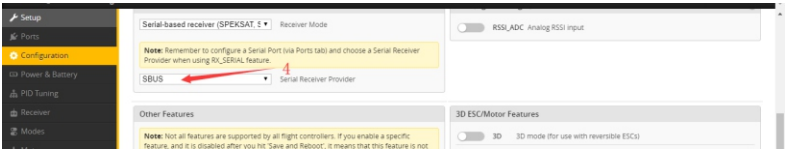

### 2: Click the RX interface under UART2 under the ports option, as shown in the figure.




### 3: Click CONFIGURATIN to change to dshot600.




### 4: Click CONFIGURATIN; change to SBUs

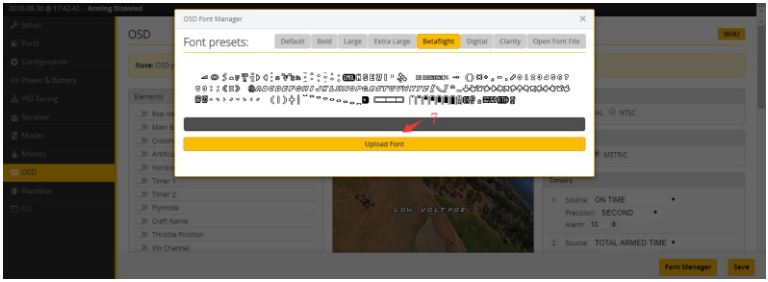



### 5: Click modes, add arm and angle, drag the slider between 1300 and 1700, and set arm to AUX1 and angle to aux2

## 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 betaflight, click upload font




8: Click setup, calibrate accelerometer