

## Features

AIO 4IN1 Crazybee F4 Lite flight controller built-in 5.8G VTX
Extreme light 1S 65mm Brushless whoop only 20g
Runcam Nano3 The lightest 1/3 CMOS 800TVL Camera
Smooth and powerful
Compatible for 1S Lipo/LiHV
Camera Angle adjustable

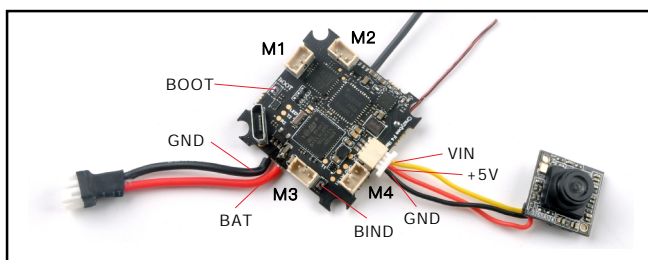
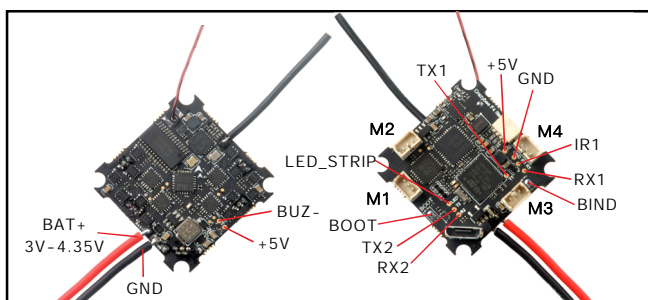
## Specifications

Brand Name: Happymodel
Item Name: Mobula6 1S 65mm Brushless whoop drone BNF version
Wheelbase: 65mm
Size: 80mm*80mm*37mm
Weight: 20g
Receiver option:
Internal SPI Frsky version (Compatible with ACCST D8/D16, Recommend D8 mode)
Internal SPI Flysky version(Compatible with AFHDS and AFHDS-2A Flysky transmitter)
Internal SPI ELRS 2.4Ghz version(Compatible with ExpressLRS V2.0 or latest TX module)
Motor speed option:
SE0802 KV25000(Race Edition)
SE0802 KV19000(Regular Edition)

## Package Includes

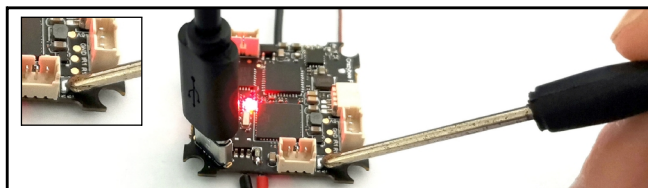
Item Name	Qty
Mobula6 1S 65mm whoop Drone Frame	1
SPI Receiver Option1: Crazybee F4 Lite FC built-in Frsky SPI D8 RX	1
SPI Receiver Option2: Crazybee F4 Lite FC built-in Flysky SPI RX	
SPI Receiver Option3: ELRS F4 2G4 V3.1 FC built-in ELRS 2.4Ghz v2.0 SPI RX	
SE0802 KV19000 or KV25000 brushless motor	4
Gemfan 1219-3 Propellers(4cw+4ccw)	1
Runcam Nano3 1/3 CMOS 800TVL camera	1
5.8G 0-400mw 48ch onboard Openvtx	4
1S 300mah 30C LiHV Battery	1
1S Lipo/LiHV USB Charger	1
Propeller disassemble tool	1

## Flight controller connection diagram



## Binding procedure

1. Powering the Mobula6 then the red LED at the bottom of the flight controller will blinking slowly. And then press the bind button, the red led will getting to be solid, this indicate the receiver is in bind mode.



Another simple way to get into Bind mode :

Plug the USB and go to the CLI command tab from Betaflight configurator then type "bind\_rx" or Go to Receiver tab from Betaflight configurator then hit "Bind Receiver", the red LED will getting to be solid, and it means the receiver is in bind mode.



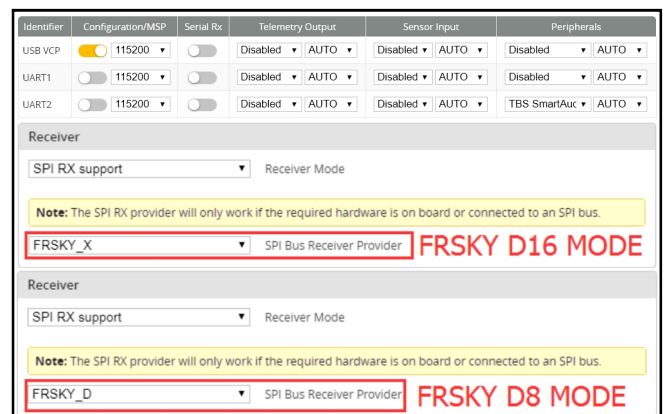
2. Turn on your Frsky Taranis transmitter, and move to BIND OPTION from SETUP MENU, Choose receiver mode D16 or D8 according to your Betaflight receiver configuration (Frsky\_X = D16 mode, Frsky\_D=D8 mode)we recommend use D8 mode



3. ENT [Bind] to binding with the Mobula6, the red LED at the bottom of the flight controller will blinking slowly, this indicate binding successfully, and then exist binding mode of your Frsky transmitter, the red LED at the bottom of the flight controller will getting to be solid again, this indicate working normal.

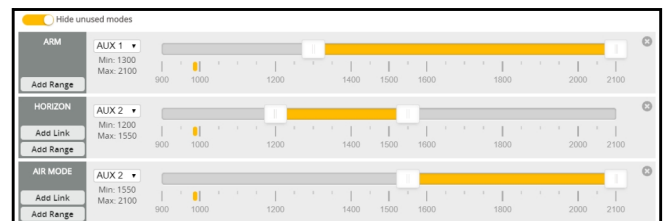
## Receiver configuration

Please set Receiver mode to be SPI RX Support from the Configuration tab of the Betaflight Configurator, then select FRSKY\_X Provider for FRSKY D16 MODE or Select FRSKY\_D Provider for FRSKY D8 MODE, don't enable Serial RX since the CRAZYBEE Flight controller is integrated SPI BUS Receiver



## Arm/Disarm the Motor

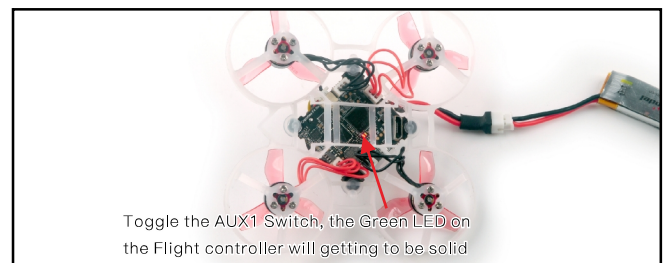
1. The Default Arm/Disarm switch for Mobula6 is AUX1(Channel 5), and you can also customize it with Betaflight Configurator.



2. Turn on the Frsky transmitter (Use X9D+ as an example) and move to the MIXER interface, Set "SA" or "SB" switch etc. for Ch5 to ARM/DISARM the motor.



3. The default channel map for Mobula6 Frsky version is TAER1234, please make sure your transmitter is matched, otherwise it will can't be armed. Toggle the AUX1 Switch, the Green LED on the flight controller will getting to be solid, this indicates the motor was armed. And also you can found "Armed" displayed on your FPV Goggles or the FPV Monitor. Please make sure keep the Mobula6 level before arming. Be careful and enjoy your flight now !



## VTX Bands and Channels setup

**VTX Table**

6 Number of bands 8 Number of channels by band

Name	Letter	Factory	1	2	3	4	5	6	7	8	
BOSCAM_A	A		5865	5845	5825	5805	5785	5765	5745	5725	Band 1
BOSCAM_B	B		5733	5752	5771	5790	5809	5828	5847	5866	Band 2
BOSCAM_E	E		5705	5685	5665	5645	5625	5605	5585	5565	Band 3
FATSHARK	F		5740	5760	5780	5800	5820	5840	5860	5880	Band 4
RACEBAND	R		5658	5695	5732	5769	5806	5843	5880	5917	Band 5
LOWRACE	L		5333	5373	5413	5453	5493	5533	5573	5613	Band 6

5 Number of power levels

1	2	3	4	5	Value	Label
10	2	14	20	26		
0	RCE	25	100	400		

There are 2 ways to switch the vtx channels:

1.If we need to use Channel 5769 then we should Go to Betaflight CLI,type the command:

Set VTX\_band=5

Set VTX\_channel=4

save

2.Disarm the Mobula6 and then move the stick of the transmitter(THR MID+YAW LEFT+PITCH UP)to enter OSD Menu,Enter to Features,then enter to VTX SA to set VTX Band and channel

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"/>	Disabled AUTO	Disabled AUTO	Disabled AUTO
UART2	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled AUTO	Disabled AUTO	TBS SmartAuc AUTO



## Mixer type and ESC/motor protocol

**Mixer**

Quad X

Props Out

reversed

Motor direction is reversed

**ESC/Motor Features**

DSHOT600 ESC/Motor protocol

☒ MOTOR\_STOP Don't spin the motors when armed

☒ Disarm motors regardless of throttle value (When ARM is configured in Modes tab via AUX channel)

5 Disarm motors after set delay [seconds] (Requires MOTOR\_STOP feature)

4.5 Motor Idle Throttle Value [percent]

## Default PID settings for Betaflight 4.3.0

	Proportional	Integral	D Max	Derivative	Feedforward
Basic/Acro					
ROLL	85	100	85	30	140
PITCH	80	100	85	34	140
YAW	120	100	0	0	140

Mode: OFF Low Default High

**PID Controller Settings**

Feed-forward

7 Jitter Reduction

25 Smoothness

OFF Averaging

15 Boost

90 Max Rate Limit

0.21 Transition

☒ I Term Relax

RPY Axes

Setpoint Type

15 Cutoff

☒ Anti Gravity

Smooth Mode

3.5 Gain

☐ I Term Rotation

Dynamic Damping

37 Gain

20 Advance

## ESC Check and Flash firmware

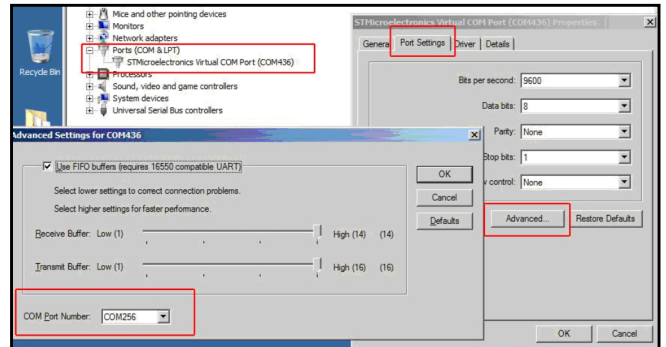
1.Download New release BHelisuite from:

<https://www.mediafire.com/folder/dx6kfaasyo24i/BLHelisuite>

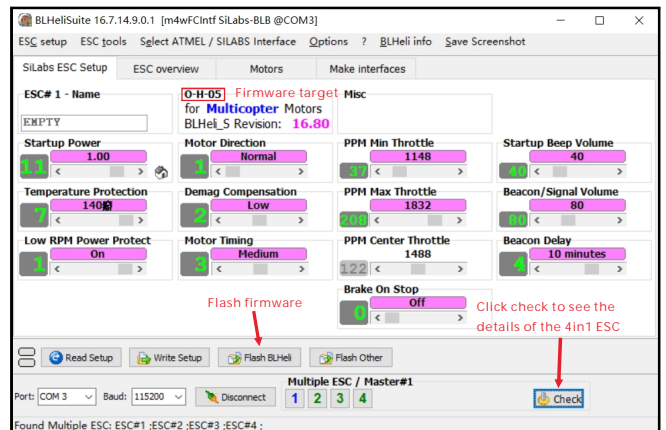
2.Plug the usb and connect the flight controller to computer



3.Open the Device Manager of your computer, find the Ports, please make sure the Com port Serial Number is under 255, otherwise it will can't connect to the BLHELISUITE. You can change the port serial number like the following step :



4.Open the BLHELISUITE, Select SILABS BLHel Bootloader (Cleanflight) from the third tab on the top side. Then Select the right Serial com port and Click connect. You can also Flash the new release BLHel\_s firmware via the BLHELISUITE, the firmware Target is "O-H-05"



## Flight controller firmware update

1.Install latest STM32 Virtual COM Port Driver

<http://www.st.com/web/en/catalog/tools/PF257938>

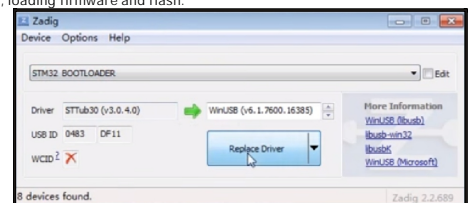
2.Install STM BOOTLOAD Driver (STM Device in DFU MODE)

3.Open Betaflight configurator and choose firmware target "Crazybee F4 FR",then select the firmware version.

4.There are 2 ways to get in DFU Mode: 1). solder the boot pad and then plug USB to computer 2). loading betaflight firmware and hit "flash", then it will getting into DFU Mode automatically.

5.Open Zadig tools to replace the drivers from STM32 Bootloader to WinUSB Driver.

6.Reconnect the flight controller to the computer after replace driver done , and open Betaflight Configurator, loading firmware and flash.



## "Flip over after crash" procedure

Set one channel of your radio transmitter to activate the Flip over function in the Mode tab of Betaflight configurator.

The default Switch for Activate "Flip" is AUX4(Channel8)

