

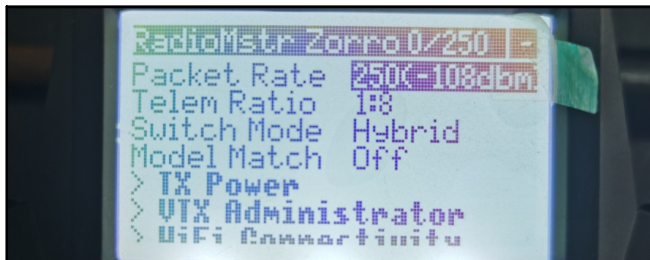
Features
Digital HD FPV experience
New CrazyF405 ELRS HD flight controller
Powerful and Smooth
UART ExpressLRS receiver
Built-in blackbox for Gyroflow and PID Tune
Battery tray size: Maximum support for batteries with a width of approximately 17mm and a height of approximately 13mm

Specifications
Brand Name: Happymodel
Item Name: Mobula8 2S 85mm Digital HD Micro FPV whoop built-in Walksnail or HDZERO VTX
Wheelbase: 85mm
Size: 120mm*120mm*48mm
Weight: HDZERO version 46.5gram Walksnail version 48gram

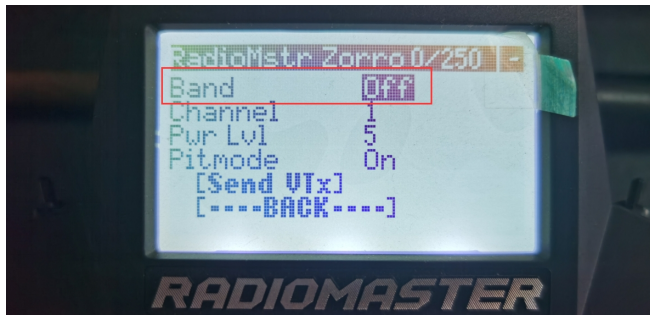
Package includes	Item Name	Qty
	Mobula8 Frame	1
	CrazyF4HD ELRS flight controller firmware target: BETAFLIGHTF4	1
	EX1103 KV11000 brushless motor	4
	Gemfan Hurricane 2023 tri-blade propellers(4cw+4ccw)	1
	Option1: Walksnail avatar HD Mini 1S lite kit	1
	Option2: HDZERO Whoop Lite bundle	1
	Canopy	1
	Screw driver	1

### BIND PROCEDURE

- Supply power to the flight controller by plug USB, wait until the Red LED on the FC is off, immediately turn off the power, and then repeat again the above steps. When the FC is powered on for the third time, the Red LED light will start to double-flash, which means that the RX enters the binding mode
- Please make sure your ExpressLRS tx module firmware is v3.x.x. And go to ExpressLRS.lua from "TOOLS" menu of your radio transmitter. Then hit [Bind] to binding with the onboard ExpressLRS receiver. The Red LED should blinking slowly first then turn to solid, that means binding was successfully. If the red LED got triple blinking and no rx input from receiver tab, please change Model Match tab value from "off" to "on" or from "on" to "off", then change back to "off", that would working normal.



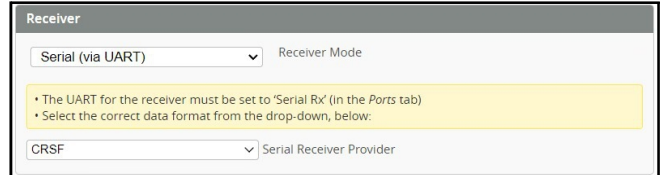
- Check the receiver channel map and channel value is correct after bind successful.



Make sure the VTX band is "OFF" from the vtx administrator, sometimes it would affect VTX.

### PORT AND RECEIVER SETTINGS

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	115200	Off	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO
UART1	115200	Off	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO
UART2	115200	On	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO
UART3	115200	Off	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO
UART6	115200	Off	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO



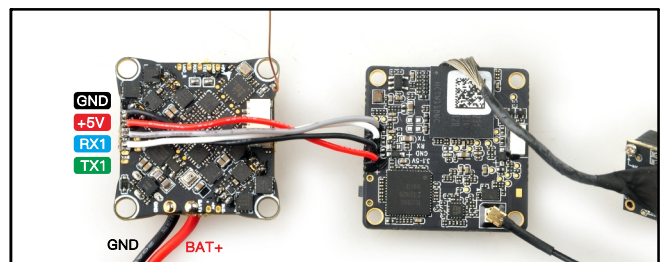
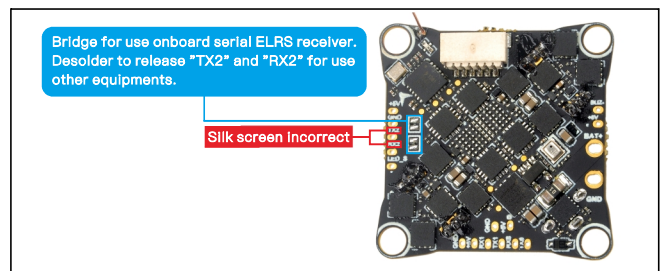
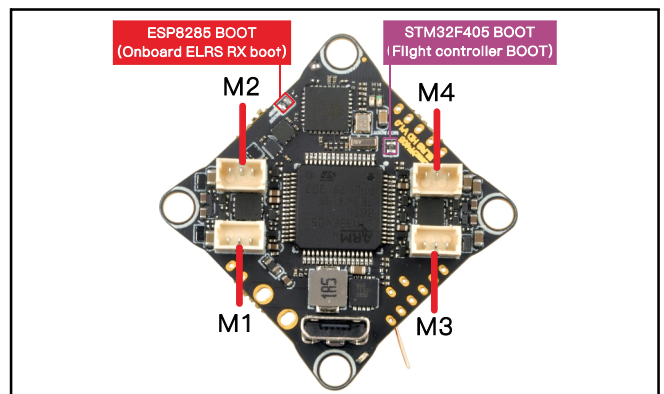
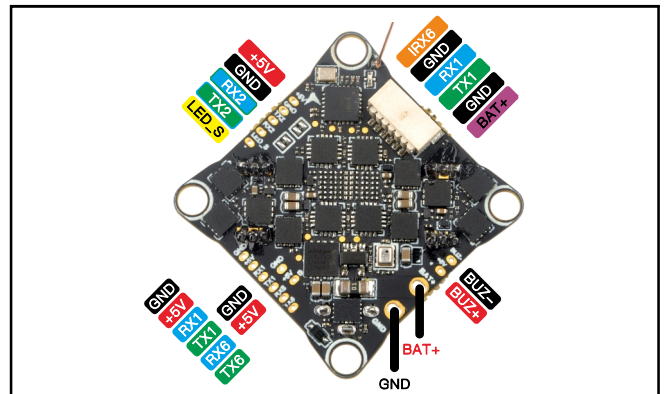
\*\*\*OSD display command for Walksnail UART ELRS version if you re-flashed firmware:

```
set osd_displayport_device = MSP
set displayport_msp_serial = 0
save
```

\*\*\*If you upgrade firmware to 4.4.x, then you should enable MSP for uart1 and VTX(MSP+Displayport) from Port setting of the betaflight configurator



### FLIGHT CONTROLLER CONNECTION DIAGRAM



### ARM/DISARM THE MOTOR

- For Walksnail version, please first link the VTX with goggles and match the channels
- Turn on your radio transmitter and connect the battery to the Mobula8 HD Walksnail. Then place Mobula8 HD horizontally on the ground.
- Toggle Aux1 switch to arm the motors, the Green LED at the bottom of the flight controller would get solid once armed, happy flying.

**BOARD AND SENSOR ALIGNMENT AND FREQUENCY SETTINGS**

**Board and Sensor Alignment**

Roll Degrees: 0 Pitch Degrees: 0 Yaw Degrees: 0

First: **GYRO/ACCEL** CW 0° First GYRO

Default: **MAG Alignment**

**3.20 kHz** Gyro update frequency

3.20 kHz PID loop frequency

**MOTORS AND ESC SETTINGS**

**Mixer**

Quad X

**PROP OUT :**  
Mount 2023 propeller on #1 and 4# motors,  
Mount 2023R propeller on #2 and 3# motors

Motor direction is reversed

**ESC/Motor Features**

DSHOT300 ESC/Motor protocol

MOTOR\_STOP Don't spin the motors when armed

ESC\_SENSOR Use KISS/BLHeli\_32 ESC telemetry **over a separate wire**

Bidirectional DShot (requires supported ESC firmware)

12 Motor poles (number of magnets on the motor bell)

10 Motor Idle (% , static)

**DEFAULT PID AND FILTER SETTINGS**

	Proportional	Integral	D Max	Derivative	Feedforward
<b>Basic/Acro</b>					
<b>ROLL</b>	59	95	46	34	0
<b>PITCH</b>	62	99	55	41	0
<b>YAW</b>	59	95	0	0	0

Mode:	RPY	Low	Default	High
Damping: D Gains	1	[Slider]		
Tracking: P & I Gains	1.15	[Slider]		
Stick Response: FF Gains	0	[Slider]		
Dynamic Damping: D Max	1	[Slider]		
Drift - Wobble: I Gains	0.9	[Slider]		
Pitch Damping: Pitch:Roll D	1.05	[Slider]		
Pitch Tracking: Pitch:Roll P, I & FF	1	[Slider]		
Master Multiplier:	1.15	[Slider]		

**Throttle and Motor Settings**

5 Throttle Boost

100 Motor Output Limit

0 Dynamic Idle Value [\* 100 RPM]

Vbat Sag Compensation 100 %

Thrust Linearization 20 %

**Miscellaneous Settings**

Disable Cell Count - for auto Profile switching

20 Acro Trainer Angle Limit

Integrated Yaw

0 Absolute Control

Angle/Horizon	Strength	Transition
Angle	50	
Horizon	50	75
	Angle Limit	
	55	

**PID Controller Settings**

Feed-forward: 9 Jitter Reduction, 65 Smoothness, 2 Point Averaging, 15 Boost, 90 Max Rate Limit, 0.00 Transition

I Term Relax: RP Axes, Setpoint Type, 15 Cutoff

Anti Gravity: Permanently enable, Smooth Mode, 3.5 Gain, 250 Threshold

I Term Rotation

Dynamic Damping: 37 Gain, 20 Advance

**VOLTAGE AND CURRENTS METER SETTINGS**

**Voltage Meter**

Battery: 0.6 V

110 Scale, 10 Divider Value, 1 Multiplier Value

**Amperage Meter**

Battery: 0.00 A

470 Scale [1/10th mA/A], 0 Offset [mA]

**ESC SETTINGS**

Silabs ESC Setup ESC overview Motors Make interfaces

ESC# 1 - Name: Z-H-30 for Multicopter Motors BLHeli\_5 Revision: 0.19

Bluejay

Startup Power: 0.50

Temperature Protection: 140

Low RPM Power Protect: On

Motor Direction: Normal

Demag Compensation: Low

Motor Timing: MediumHigh

PPM Min Throttle: 2020

PPM Max Throttle: 2020

PPM Center Throttle: 2020

Startup Beep Volume: 40

Beacon Volume: 80

Beacon Delay: 3 minutes

Brake On Stop: Off

Read Setup Write Setup Flash BLHeli Flash Other

Port: COM 3 Baud: 115200 Disconnect Multiple ESC / Master#1 1 2 3 4 Check

Found Multiple ESC: ESC#1 :ESC#2 :ESC#3 :ESC#4 :

**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 "BetaflightF4", 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.



Firmware and diff download