

Notice: The HDZERO whoop lite vtx and nano lite camera can only working while battery was connected. USB couldn't supply for the whoop lite vtx module and nano lite camera.

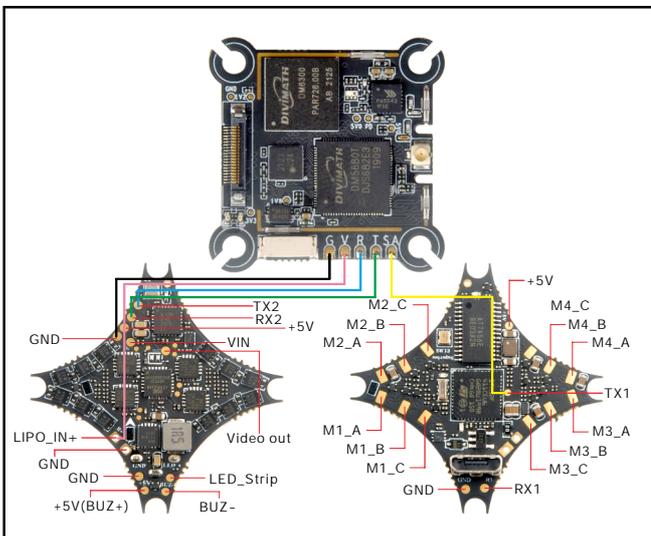
Specifications

Brand Name: HappyModel
Model: Mobula6 HDZERO
Frame wheelbase: 65mm
Weight: 23.5 gram without battery
Size: 80mm*80mm*50mm
Receiver option:
SPI ELRS 2.4Ghz
SPI FRISKY 2.4Ghz
Compatible with 1S Lipo battery or Lihv battery
Battery Plug: PH2.0

Package includes

Item Name	Qty
Mobula6 65mm frame+Canopy	1
SPI Receiver Option1: SuperbeeF4 Lite FC built-in ExpressLRS SPI RX	1
SPI Receiver Option2: SuperbeeF4 Lite FC built-in Frsky SPI RX	1
EX0802 KV19000 Unibell brushless motor	4
Gemfan 1210 31mm propeller(4cw+4ccw)	1
HDZero Nano Lite Camera	1
HDZero Whoop Lite VTX	1
Spare Canopy	1
Propeller disassemble tool	1
Screw driver	1

Flight controller connection diagram



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	VTX (TBS Sns) / AUTO
UART2	115200	Off	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO

TX1 pad was used for Smartaudio
TX2 and RX2 were used for MSP

Binding procedure

*Need to update ExpressLRS TX module firmware to v2.0 or v2.x version firmware before binding. Bind procedure video
<https://bit.ly/3NeL1hf>

1). Connect Mobula6 HDZERO with computer by Plug USB. Running Betaflight configurator and then move on Receiver tab then hit "Bind Receiver". Or use CLI mode code "bind_rx". The Red LED on the flight controller start blinking fast, it means onboard SPI ELRS receiver is in bind mode.

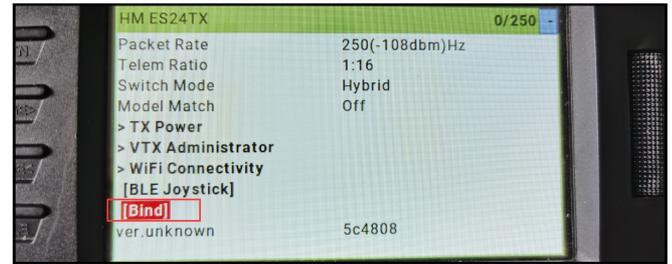
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Entering CLI Mode, type 'exit' to return, or 'help'

#
# Building AutoComplete Cache ... Done!
#
# bind_rx
Binding...
    
```

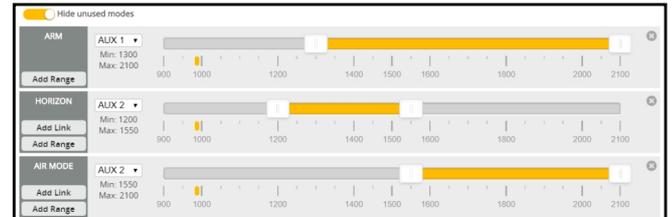
Threshold	Stick Center	'Stick High' Threshold
1050	1500	1900
nd	Yaw Deadband	3D Throttle Deadband
0	0	50
<input type="button" value="Bind Receiver"/> <input type="button" value="Refresh"/> <input type="button" value="Save"/>		

2). Turn on your radio transmitter and running ELRS.LUA v2 version, scroll down the menu and hit [Bind]. The red LED on the flight controller would get to be solid. It means bind successfully. Re-connect the USB and then you will find link was established.

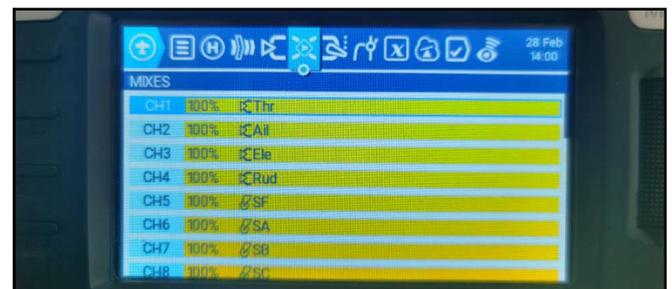


Arm/Disarm the Motor

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



2. Turn on the Radio transmitter with ELRS TX module installed(Use TX16S as an example) and move to the MIXES interface, Set CH5 channel to "SF" or other aux channel to ARM/DISARM the motor



3. The default channel map for Mobula6 HDZERO version is TAER1234. Please make sure your transmitter is matched, otherwise it wouldn'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" notice displayed on your FPV Goggles or the FPV Monitor. Please make sure keep the Mobula6 HDZERO level before arming. Be careful and Happy flying!



Receiver configuration

The following settings are reserved from out of factory. Sometimes maybe you need it after you updated firmware. Please set Receiver mode to be SPI RX Support from the Configuration tab of the Betaflight Configurator, then select EXPRESSLRS from the SPI Bus Receiver Provider list. Don't enable Serial RX since the Superbee F4 ELRS Flight controller is integrated SPI Receiver.

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	VTX (TBS Sns) / AUTO
UART2	115200	Off	Disabled / AUTO	Disabled / AUTO	Disabled / AUTO

Receiver	
SPI Rx (e.g. built-in Rx)	Receiver Mode
Note: The SPI RX provider will only work if the required hardware is on board or connected to an SPI bus.	
EXPRESSLRS	SPI Bus Receiver Provider
RSSI (Signal Strength)	
<input type="checkbox"/> RSSI_ADC	Analog RSSI input
Channel Map	
TAER1234	RSSI Channel
	Disabled

Mixer type and ESC/motor protocol

Mixer

Quad X

Props Out

Fix the CW propeller onto the M2 and M3 motor (CW motors)
Fix the CCW propellers onto the M1 and M4 motor (CCW 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)

6 Motor Idle (% , static)

Default PID setting

	Proportional	Integral	D Max	Derivative	Feedforward
Basic/Acro					
ROLL	67	78	60	60	162
PITCH	66	77	61	61	160
YAW	67	78	0	0	162

Mod: OFF

Damping: 2

Tracking: 1.5

Stick Response: 1.35

Dynamic: 0

Drift: 0.65

Wobble: 0.9

Pitch Damping: 0.95

Pitch Roll & Pitch Tracking: 1.2

Master Multiplier: 1.2

Note: Sliders are disabled because current values are outside the Basic Mode adjustment range. Switch to Expert Mode to make changes.

Board and Sensor Alignment

0 Roll Degrees

0 Pitch Degrees

0 Yaw Degrees

First: GYRO/ACCEL

CW 0°

First GYRO

Default MAG Alignment

VTX Bands and Channels setup

VTX Table

6 Number of bands

8 Number of channels by band

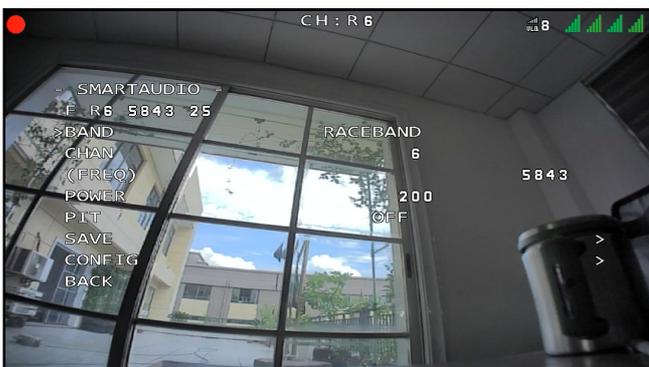
Name	Letter	Factory	1	2	3	4	5	6	7	8	Band
BOSCAM_A	A		0	0	0	0	0	0	0	0	Band 1
BOSCAM_B	B		0	0	0	0	0	0	0	0	Band 2
BOSCAM_E	E		0	0	0	0	0	0	0	0	Band 3
FATSHARK	F		0	5780	0	5800	0	0	0	0	Band 4
RACEBAND	R		5658	5695	5732	5769	5806	5843	5880	5917	Band 5
IMD6	I		0	0	0	0	0	0	0	0	Band 6

3 Number of power levels

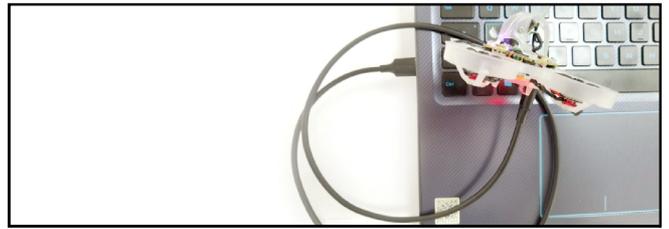
1	2	3	Value
14	23	0	
25	200	0	Label

There are 2 ways to switch the vtx channels:

1. Connect battery for Mobula6 HDZERO then plug USB, go to Video Transmitter tab and select band and channel then hit "save"
2. Disarm the Mobula6 HDZERO 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


ESC Check and Flash firmware

1. Download New release BLHeliSuite from: <https://www.mediafire.com/folder/dx6kfaasyo24i/BLHeliSuite>
2. Plug the usb and connect the flight controller to computer

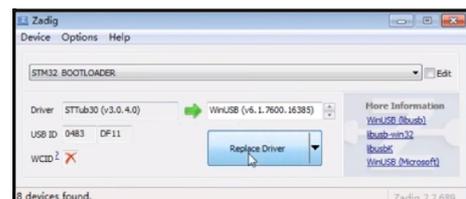


3. Open the Device Manager of your computer, find the Ports, please make sure the Com port Serial Number is under 255, otherwise it will can't connect to the BLHELISUITE. You can change the port serial number like the following step :

4. Open the BLHELISUITE, Select SILABS BLHeli 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 BLHeli_s firmware via the BLHELISUITE, the firmware Target is "S-H-50"
- Notes: RPM Filter has been enabled for the Mobula6 HDZERO, so the ESC firmware is from JazzMaveric (16.80 BLS) Link : <https://bit.ly/3A1sgU>

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 "CRAZYBEEF4X1280", 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)

