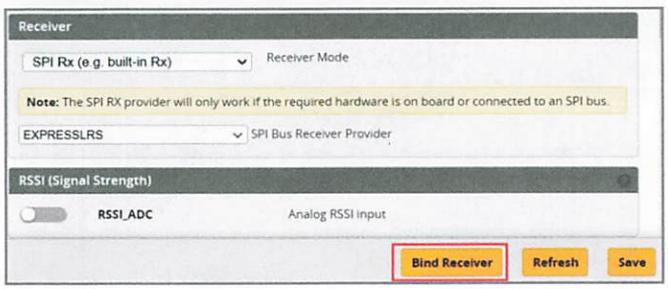
Features
X12 5-IN-1 AIO flight controller built-in 2.4G ELRS V2.0 and Openvtx
VTX Power up to 400mw
ELRS V2.0 Support
NEW RS0802 KV20000 motors
Runcam Nano3 The lightest 1/3 CMOS 800TVL Camera
Smooth and powerful
Compatible for 1S Lipo/LIHV
Recommend 1S 450mah/550mah/650mah battery(Not include)

Specifications
Brand Name: Happymodel
Item Name: Mobula7 1S 75mm Micro FPV whoop drone
Wheelbase: 75mm
Size: 99mm*99mm*40mm
Weight: 24g

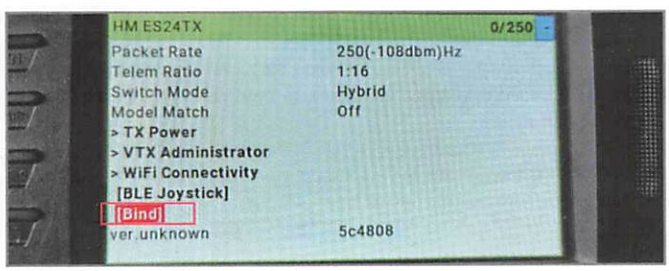
Package includes	
Item Name	Qty
Mobula7 1S 75mm whoop Drone Frame (Mobula7 v4 frame)	1
Option1: X12 ELRS V1.0 flight controller built-in SPI ELRS 2.4G receiver	1
Option2: X12 Frsky V1.0 flight controller built-in SPI Frsky 2.4G receiver	
Option3: X12 Flysky V1.0 flight controller built-in SPI Flysky 2.4G receiver	
Option4: X12 PNP V1.0 flight controller without onboard receiver	
RS0802 KV20000 brushless motor	4
Gemfan 1610-2 bi-blade propellers(4cw+4ccw)	1
Runcam Nano3 1/3 CMOS 800TVL camera	1
Onboard 5.8G Openvtx 0mw~400mw VTX	1
1S parallel charging board	1
Propeller disassemble tool	1
Extra camera canopy	1

Bind Procedure

*Need to update ExpressLRS TX module firmware to v2.0 before binding.
Bind procedure video
https://bit.ly/3nJFyoR
1). Connect Mobula7 1S ELRS with computer by Plug USB. Running Betaflight configurator and then move on Receiver tab then hit "Bind Receiver". The Green LED on the flight controller start blinking fast, it means onboard SPI ELRS receiver is in bind mode.

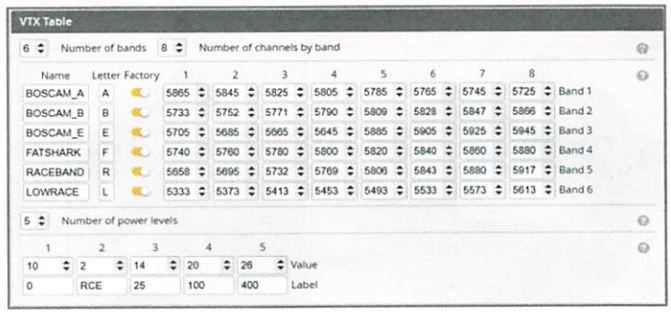


2). Turn on your radio transmitter and running ELRS.LUA v2 version, scroll down the menu and hit [Bind]. The Green LED on the flight controller would get solid first and then start to blinking slowly. It means bind successfully. Re-connect the USB and then you will find link was established.



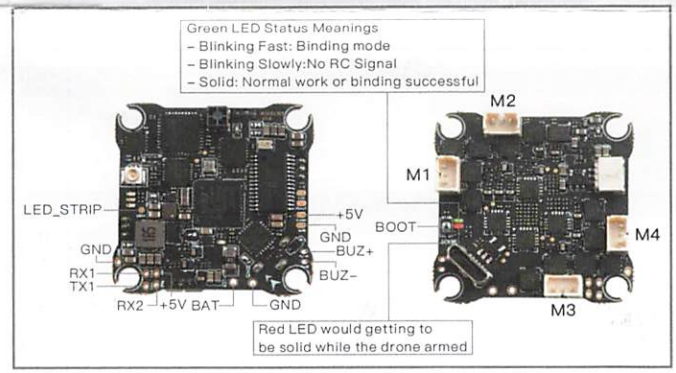
Arm/Disarm the Motor

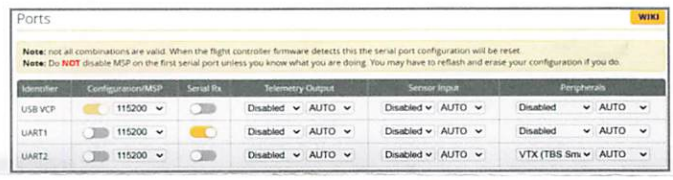
1)Turn on your radio transmitter and connect the battery to the Mobula7 1S ELRS. Then place Mobula7 1s ELRS horizontally on the ground.
2)Prepare your goggles, and match the channel with the VTX_table



3)Toggle Aux1 switch to arm the motors, the Red LED at the bottom of the flight controller would get solid once armed, happy flying.

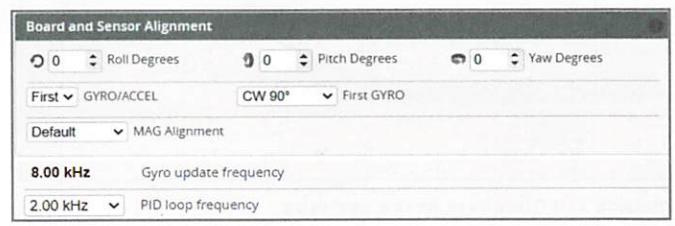
Flight Controller Connection Diagram





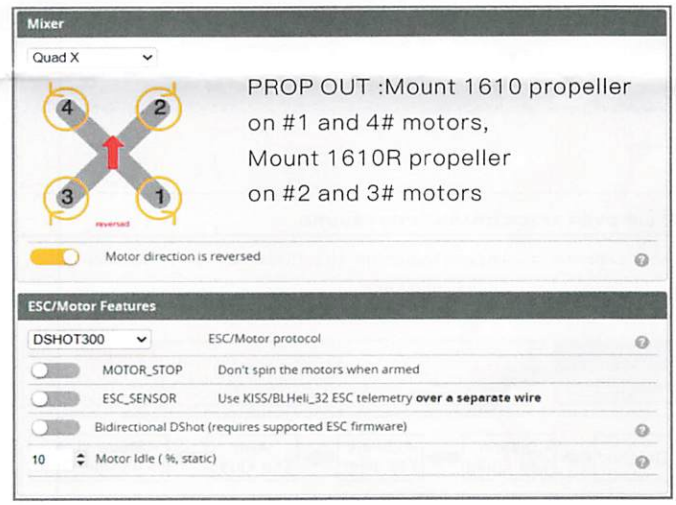
*RX1/TX1/+5V/GND pads could be used for External Serial Based RX like TBS Tracer or CRSF Nano
*Only Enabled Serial RX for UART1 when use external Serial Based RX and choose correct receiver provider based on your receiver description.

Board and Sensor Alignment and Frequency Settings

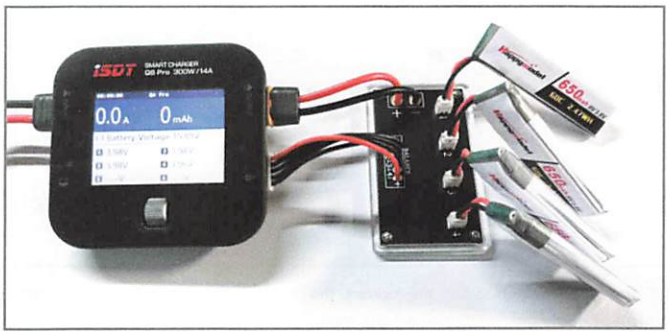


We highly recommend 2.0kHZ for the pid loop frequency for a better experience.

Motors and ESC Settings

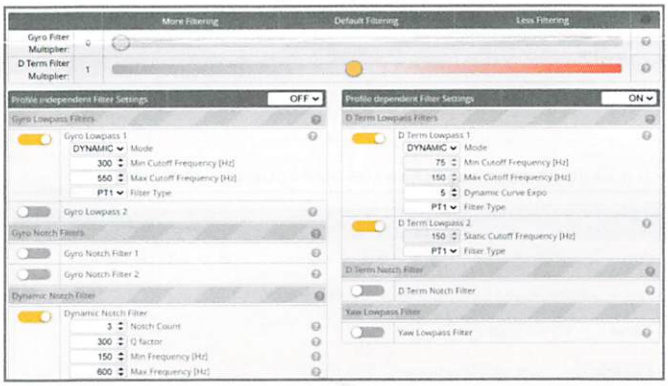


1 S PARALLEL CHARGING BOARD CONNECTION DIAGRAM

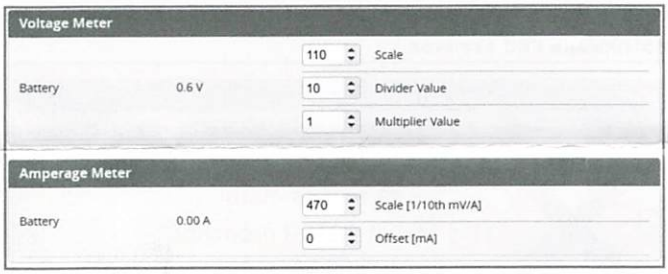


Note: 4 batteries must be used at the same time, we recommended that the voltage difference between the 4 batteries should not be too big

DEFAULT PID AND FILTER SETTINGS

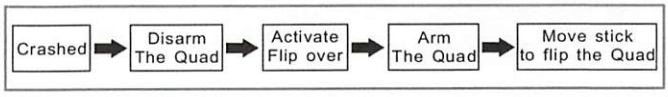


VOLTAGE AND CURRENTS METER SETTINGS



"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 AUX3(Channel7)



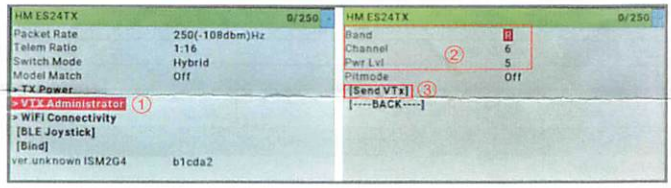
VTX BANDS AND CHANNELS SETUP

Frequency and channel frequency table:

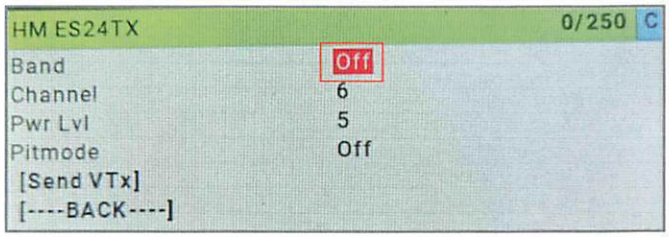
FR \ CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
BOSCAM_A	5865M	5845M	5825M	5805M	5785M	5765M	5745M	5725M
BOSCAM_B	5733M	5752M	5771M	5790M	5809M	5828M	5847M	5866M
BOSCAM_E	5705M	5685M	5665M	5645M	5885M	5905M	5925M	5945M
FATSHARK	5740M	5760M	5780M	5800M	5820M	5840M	5860M	5880M
RACEBAND	5658M	5695M	5732M	5769M	5806M	5843M	5880M	5917M
LOWRACE	5333M	5373M	5413M	5453M	5493M	5533M	5573M	5613M

There are 2 ways to switch the vtx channels:

1)Run ExpressLRS.lua ,click VTX administrator then choose the Band Channel that you needed , and then click [Send VTX]



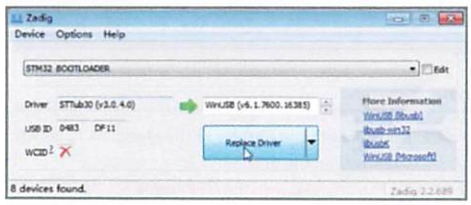
2)Use smart audio to change the vtx . First you should turn off band for vtx administrator from ExpressLRS.lua and then choose the belowing method:



1. Plug USB to Mobula7 1s ELRS then we should Go to Betaflight CLI type the command
Set vtx_band=3
Set vtx_channel=1
save
This command will change the vtx channel to 5705
2.Disarm the Mobula7 1S ELRS 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

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 F4SX1280", 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