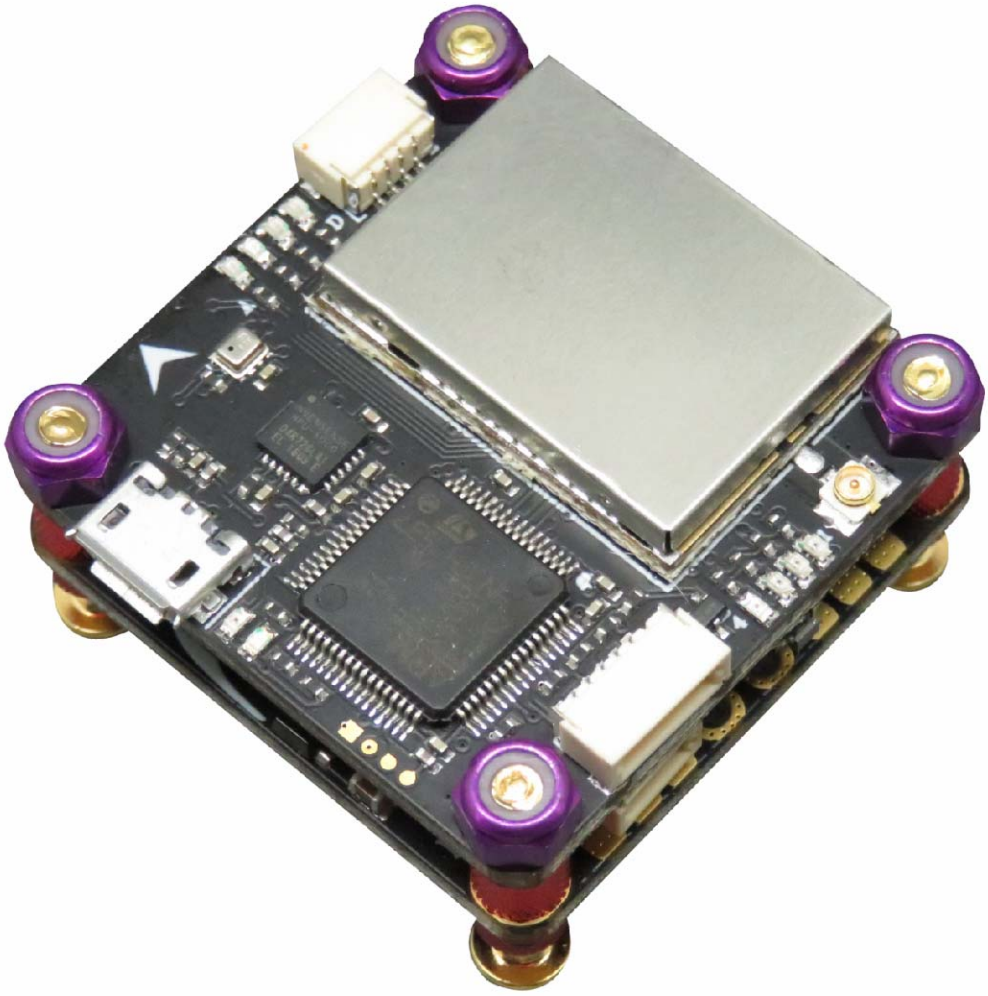
FlyTower F4 Instructions V1.0



Warning

Instructions for use

1, Please install ANT (must be DONE) before debugging or testing VTX (and OSD) , or lead to VTX not working properly.

2, Please use proper tools to install FlyTower .It is easy to damage the PCB components by using sharp tools. (warning: Bear in mind that screws do not install too tight between every layer, so as not to destroy the PCB and electronic components).

3,When debugging and testing flight control Please remove all the propeller; Try not to test indoors, So as not to cause safety accidents. Install the propeller before a test flight, please check again.

4,Please check and adjust ESC plate welding, thus brings all the losses and problems, or you

should face the consequences.

5,Please do not fly your drone near the crowd, for all the losses from the crashed aircraft, you should face the consequences.

6,For your safety, please do not use more than 4s battery, Using more than 4s battery would cause safety risk, we will not undertake any responsibility.

7, Before power on, please check the positive and negative pole again to make sure whether there is a short circuit .(you also have to check that whether there is a short circuit between your motor cables and you drone' s body).

8,Please use original screws and fixings to install FlyTower.

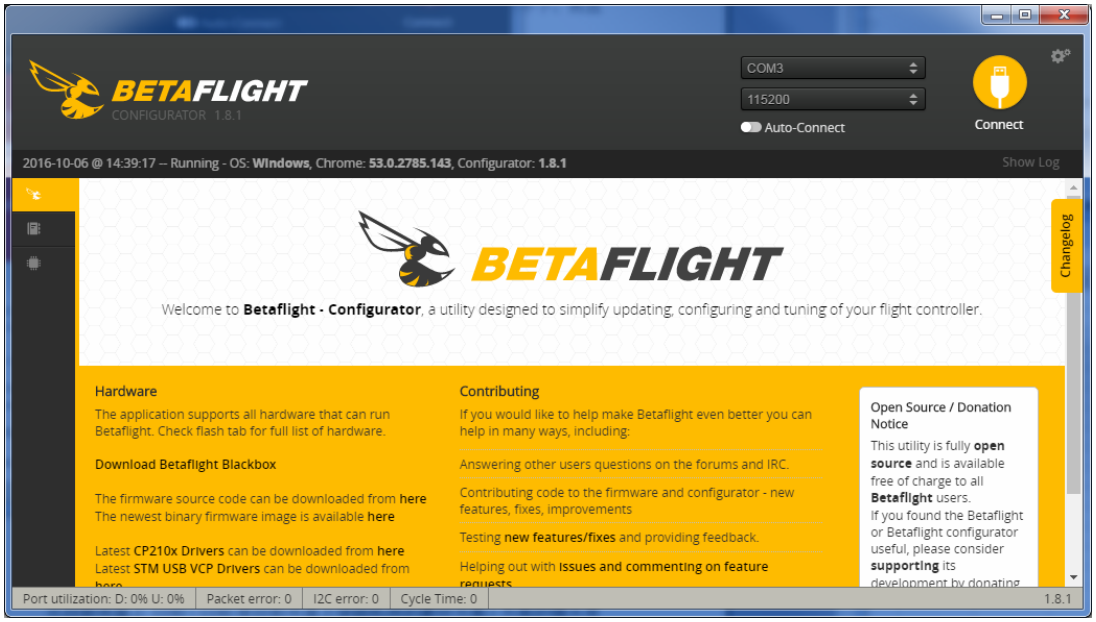
Product specifications

4 in 1 ESC	PDB	Integrated
	Battery Monitoring	Integrated
	FC Power	Integrated
	Operating Voltage	2-4S Lipo
	Maximum continuous operating current	4*40A
	Maximum instantaneous operating current	4*45A(5S)
	Oneshort 125/42/Dshot 150/300/600	YES
	BlheliSuite Configurable	YES
	Firmware Vision	BLHeli_S/Dshot 600 16.5(L_H_00)
	Board Size	36*36mm
	weight	10g
FC&VTX Board	Firmware Vision	BateFlight 3.1(OMNIBUS F4SD)
	Configure	BetaFlight
	VTX Power	25/200/400mW(MAX 800mW)
	CH	40CH
	OSD Firmware	Bateflight OSD
	Video Camera Voltage	Any stand by 5V Video Camera
	Board Size	36*36mm
	weight	11.4g
Black Ants FlyTower F4	Any Board weight	21.4g
	total weight	28.7g
	Installation height(Add air-cooling fin)	15mm/20mm
	Screws	M3*18mm
	Recommended Rack Plate Thickness	Not more than 3MM （3mm above the appropriate extension of the screw ）

The FlyTower F4 board designed based OMNIBUS (BateFlight) FC and was highly integrated with OSD,BEC,4 in 1 BLHeli_S/Dshot 600 ESC and VTX(25/200/400mW).It gives you all the features what you need in FPV, which makes you easily get into FPV Racing.

★ Practical - Easy to access connectors
★ Configurable - Choose to use connectors
★ Stackable - Mount our 4 in 1 ESC
★ Compact - Only 36x36x15mm.(Add air-cooling fin MAX 36*36*20MM)
★ Weight - 28.7 grams and 2 stack boards
★ Professional - Symmetrical, Neat and Tidy and Easy to install in any racing drone
★ 36x36mm board with 30.5mm mounting holes
★ STM32 F405 MCU, Runs Betaflight firmware(supported from v3.0)
★ Barometer BMP280 (Optional)
★ SD card slot
★ Use MPU6000 as Acc & gyro Over SPI Bus
★ STM32 controls OSD chip over SPI in DMA mode, less CPU using, faster rate
★ Micro USB socket
★ 1x 6pins JST-SH sockets (PPM, PWM, SERIAL RX, GPIO, ADC, 3V, 5V, GND)
★ The on-board pins are easily connected to our next 4 in 1 ESC &PDB board
★ Internal VTX (40CH) (25/200 / 400MW adjustable power video transmission)
★ 1x 4pins JST-SH sockets with BUZZER & WS2811 RGB LED
★ 1x 4pins JST-SH socket for Video & Audio transmission
★ 1 IPX sockets easy connect the external antenna
★ 4x 3 Pads for motor output
★ 1x2 Pads for batter in easy solder

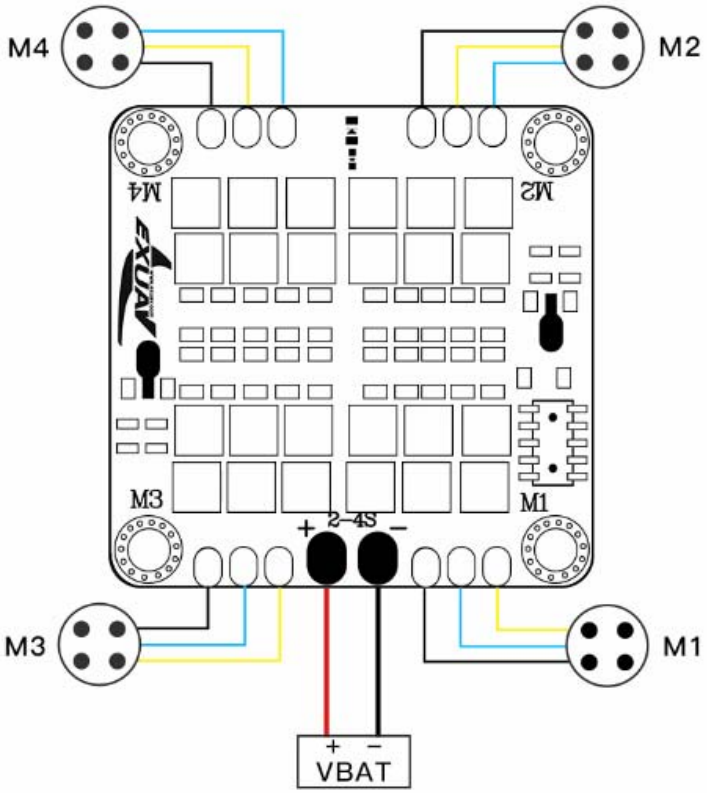
1,Betaflight



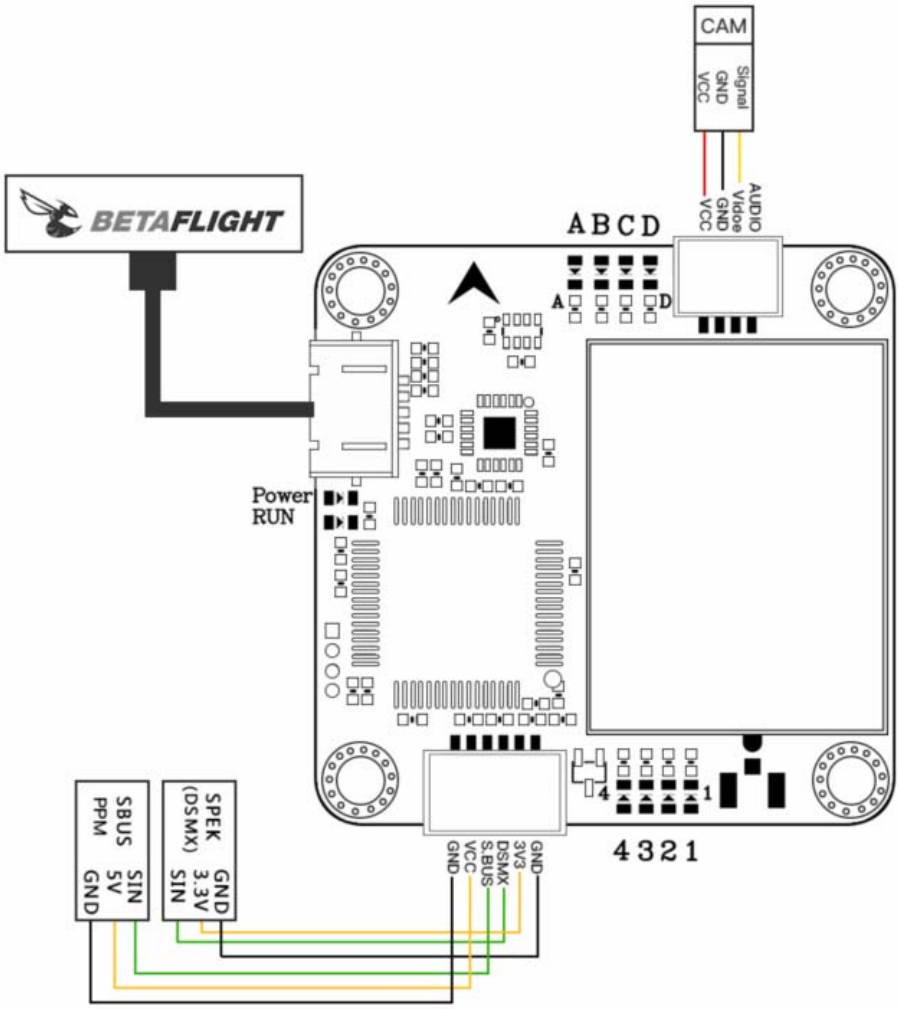
https://github.com/Betaflight

The hardware connection diagram

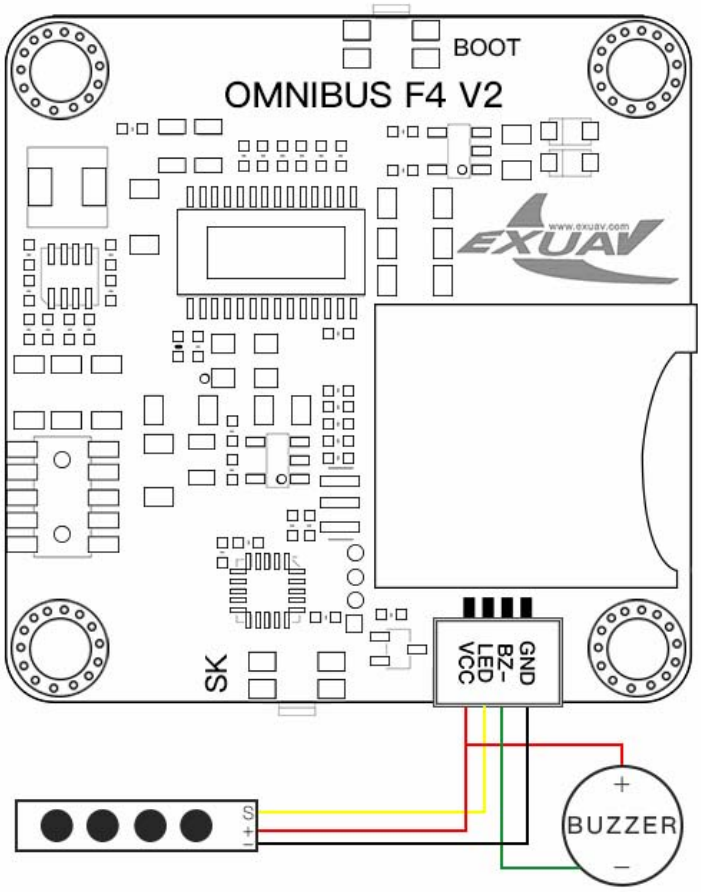
1,4 in 1 Board



2, FC board Top layer



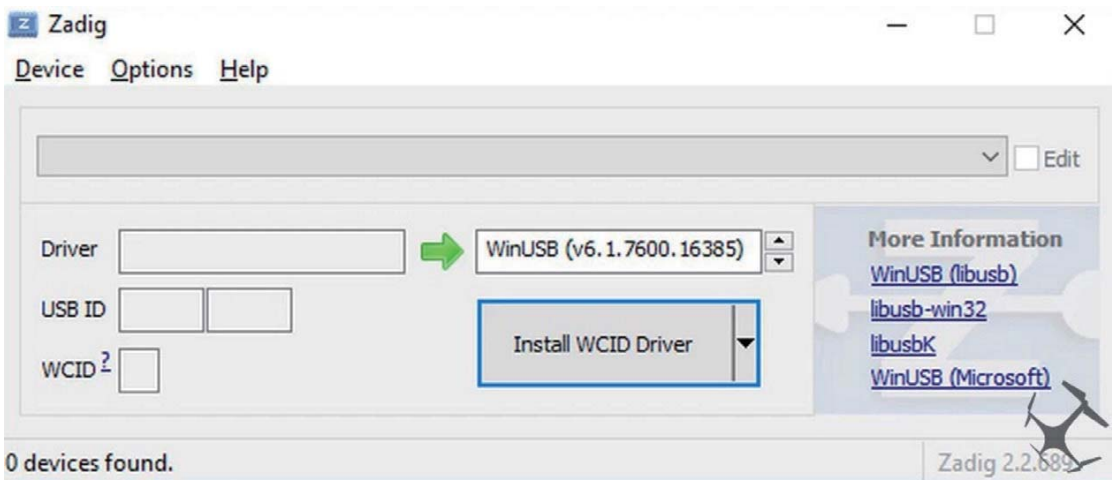
3, FC Bottom layer

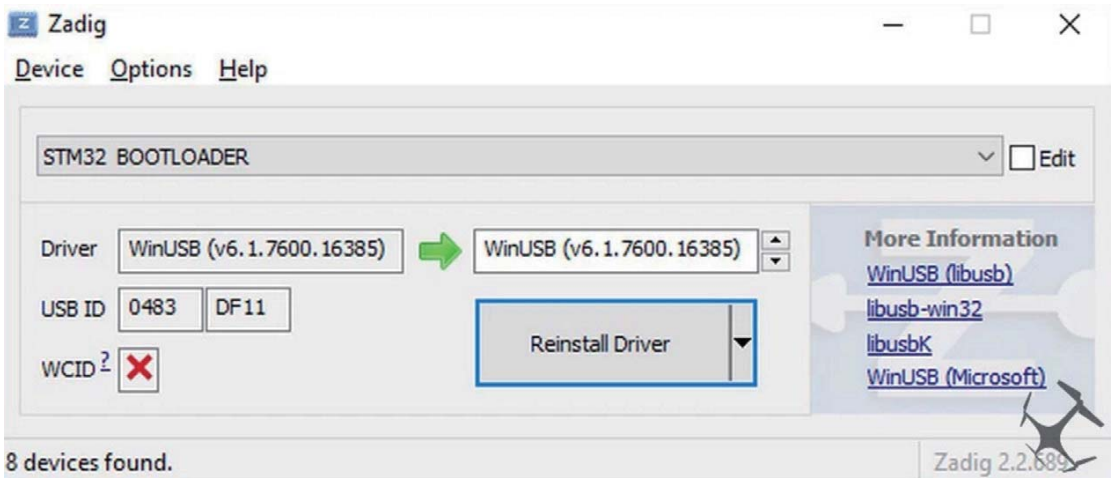


How to use the onboard USB port updated firmware in GUI on windows

To flash the firmware you have to enter the so called DFU mode. On Windows 10 I had to use a tool called Zadig (download and start it) to be able to switch drivers for DFU mode to work. In order to switch drivers you have to take the following steps.

Down: http://zadig.akeo.ie/

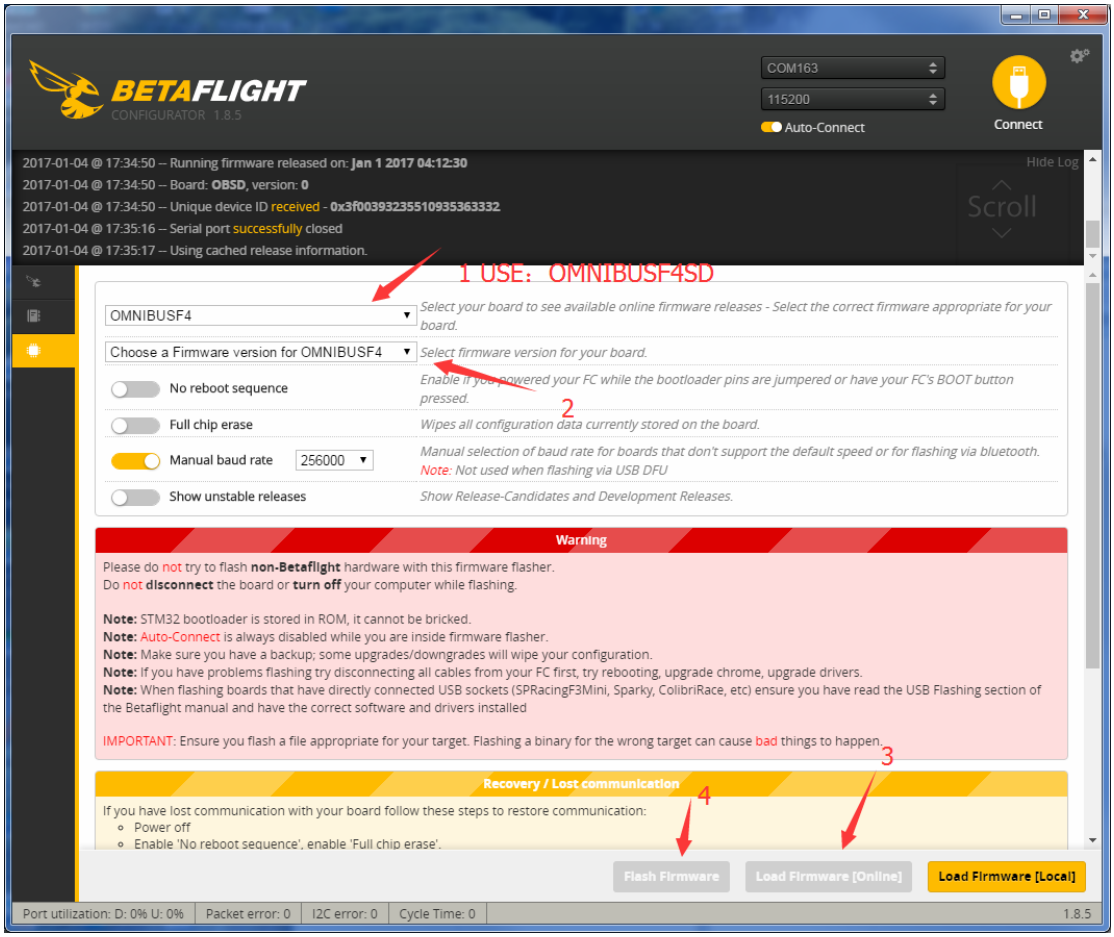




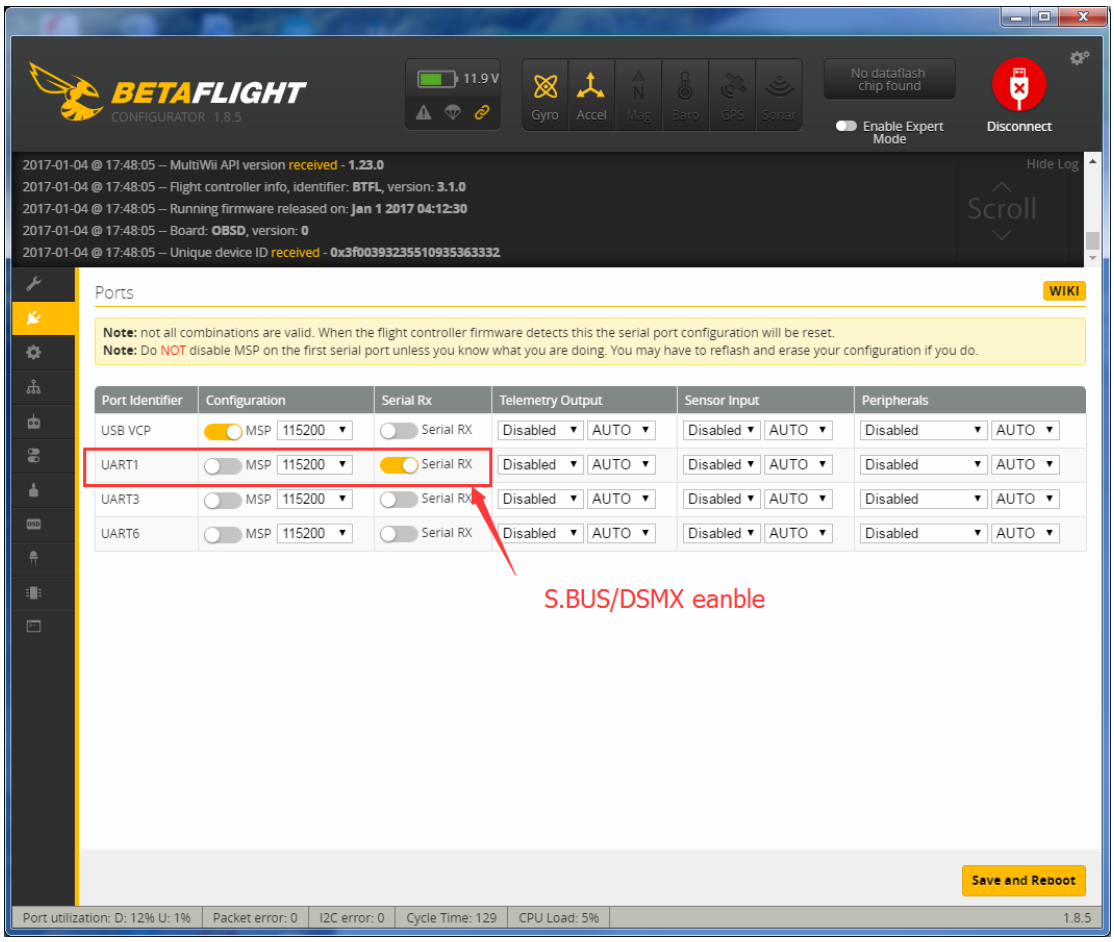
- Push BOOT button on the flight controller.
- Plug-in the USB cable (the red LED should not be as bright as normally).
- Fire up Zadig and hit “Options” and then “List All Devices”.
- From the list choose “STM32 BOOTLOADER”.
- Under “Driver” choose “WinUSB” on the right and hit “Reinstall Driver”.
- Close Zadig, disconnect the flight controller, close all Google Chrome instances.

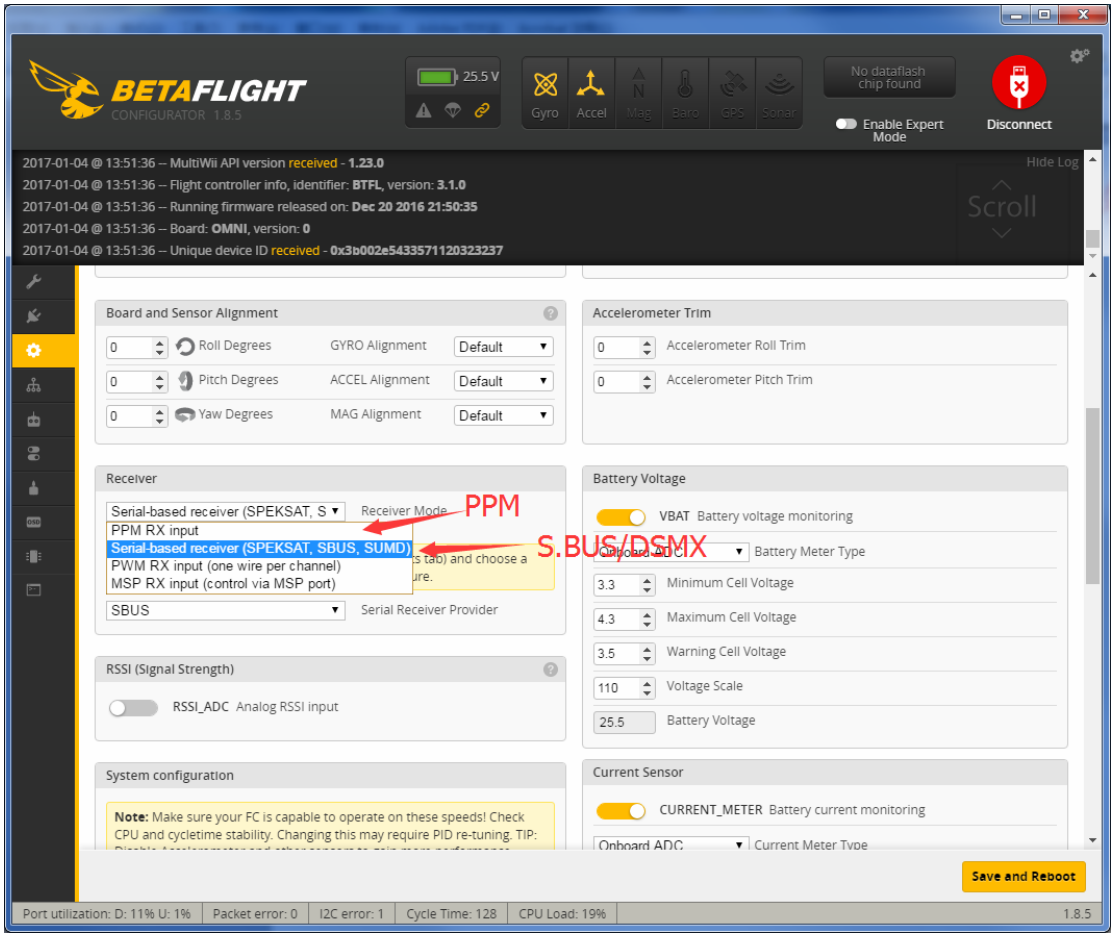
Schematic drawing software settings

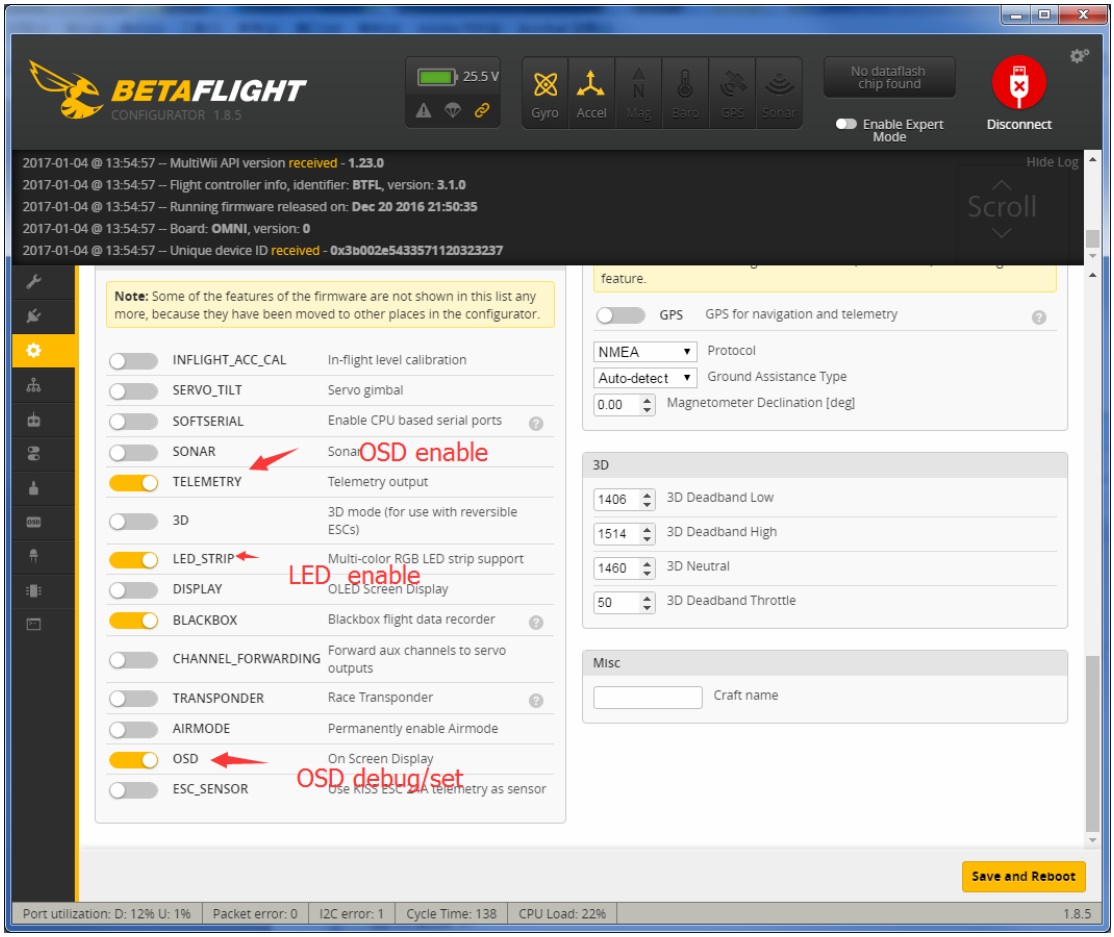
How to use and upgrade FC firmware



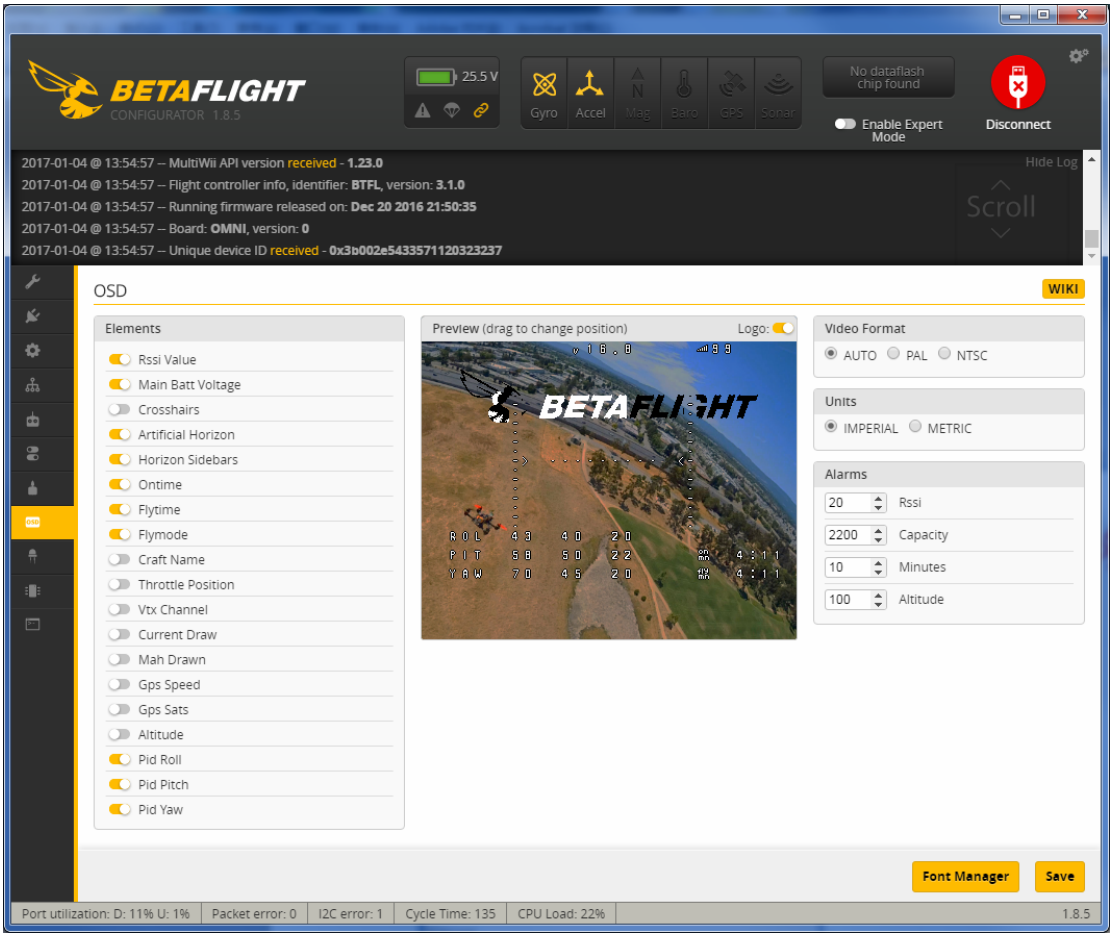
How to set S.BUS/PPM/DSMX RC IN


BETAFLIGHT
CONFIGURATOR 1.8.5
11.9 V
Gyro
Accel
Mag
Baro
GPS
Sonar
No dataflash chip found
Enable Expert Mode
Disconnect
2017-01-04 @ 17:48:05 -- MultiWii API version received - 1.23.0
2017-01-04 @ 17:48:05 -- Flight controller info, identifier: BTFL, version: 3.1.0
2017-01-04 @ 17:48:05 -- Running firmware released on: Jan 1 2017 04:12:30
2017-01-04 @ 17:48:05 -- Board: OBSD, version: 0
2017-01-04 @ 17:48:05 -- Unique device ID received - 0x3f00393235510935363332
Hide Log
Scroll
Ports
WIKI
Note: not all combinations are valid. When the flight controller firmware detects this the serial port configuration will be reset.
Note: Do NOT disable MSP on the first serial port unless you know what you are doing. You may have to reflash and erase your configuration if you do.
Port Identifier
Configuration
Serial Rx
Telemetry Output
Sensor Input
Peripherals
USB VCP
UART1
UART3
UART6
MSP
115200
Serial RX
Disabled
AUTO
S.BUS/DSMX eanble
Save and Reboot
Port utilization: D: 12% U: 1%
Packet error: 0
I2C error: 0
Cycle Time: 129
CPU Load: 5%
1.8.5


BETAFLIGHT
CONFIGURATOR 1.8.5
25.5 V
Gyro
Accel
Mag
Baro
GPS
Sonar
No dataflash chip found
Enable Expert Mode
Disconnect
2017-01-04 @ 13:51:36 -- MultiWii API version received - 1.23.0
2017-01-04 @ 13:51:36 -- Flight controller info, identifier: BTFL, version: 3.1.0
2017-01-04 @ 13:51:36 -- Running firmware released on: Dec 20 2016 21:50:35
2017-01-04 @ 13:51:36 -- Board: OMNI, version: 0
2017-01-04 @ 13:51:36 -- Unique device ID received - 0x3b002e5433571120323237
Hide Log
Scroll
Board and Sensor Alignment
Roll Degrees
GYRO Alignment
Default
Pitch Degrees
ACCEL Alignment
Default
Yaw Degrees
MAG Alignment
Default
Accelerometer Trim
Accelerometer Roll Trim
Accelerometer Pitch Trim
Receiver
Serial-based receiver (SPEKSAT, S
Receiver Mode
PPM RX input
Serial-based receiver (SPEKSAT, SBUS, SUMD)
PWM RX input (one wire per channel)
MSP RX input (control via MSP port)
SBUS
Serial Receiver Provider
PPM
S.BUS/DSMX
Battery Voltage
VBAT Battery voltage monitoring
Onboard ADC
Battery Meter Type
Minimum Cell Voltage
Maximum Cell Voltage
Warning Cell Voltage
Voltage Scale
Battery Voltage
RSSI (Signal Strength)
RSSI_ADC Analog RSSI input
System configuration
Note: Make sure your FC is capable to operate on these speeds! Check CPU and cycletime stability. Changing this may require PID re-tuning. TIP:
Current Sensor
CURRENT_METER Battery current monitoring
Onboard ADC
Current Meter Type
Save and Reboot
Port utilization: D: 11% U: 1%
Packet error: 0
I2C error: 1
Cycle Time: 128
CPU Load: 19%
1.8.5

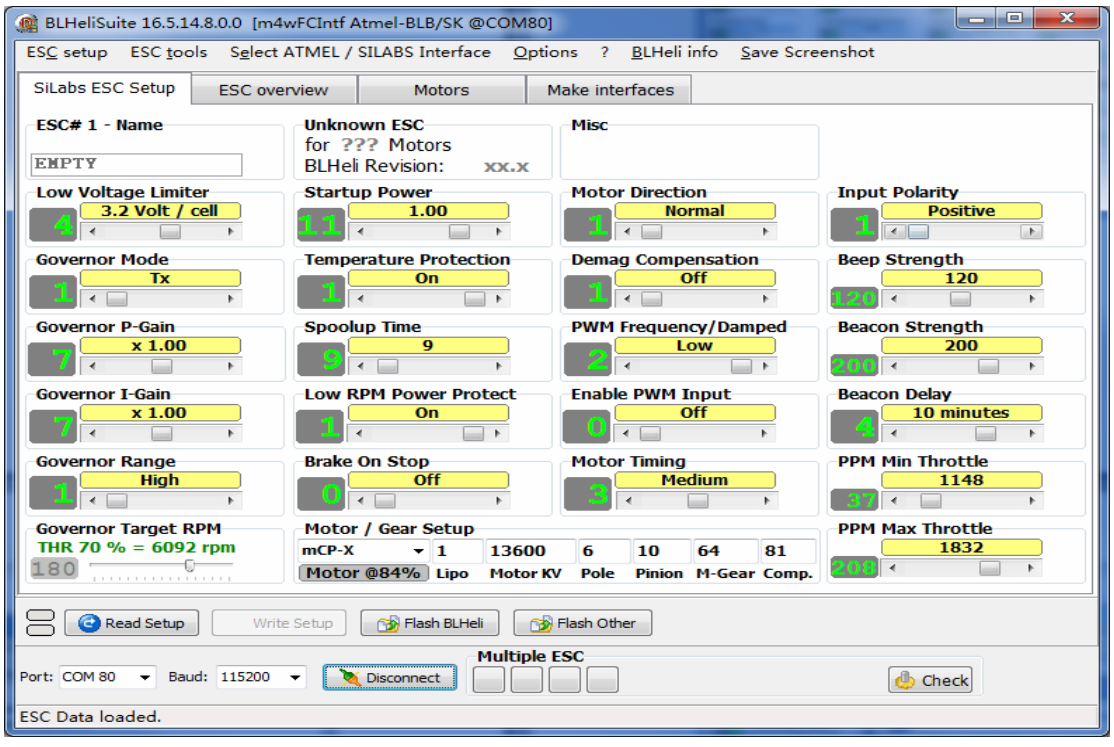


OSD setting and ubgrade firmware

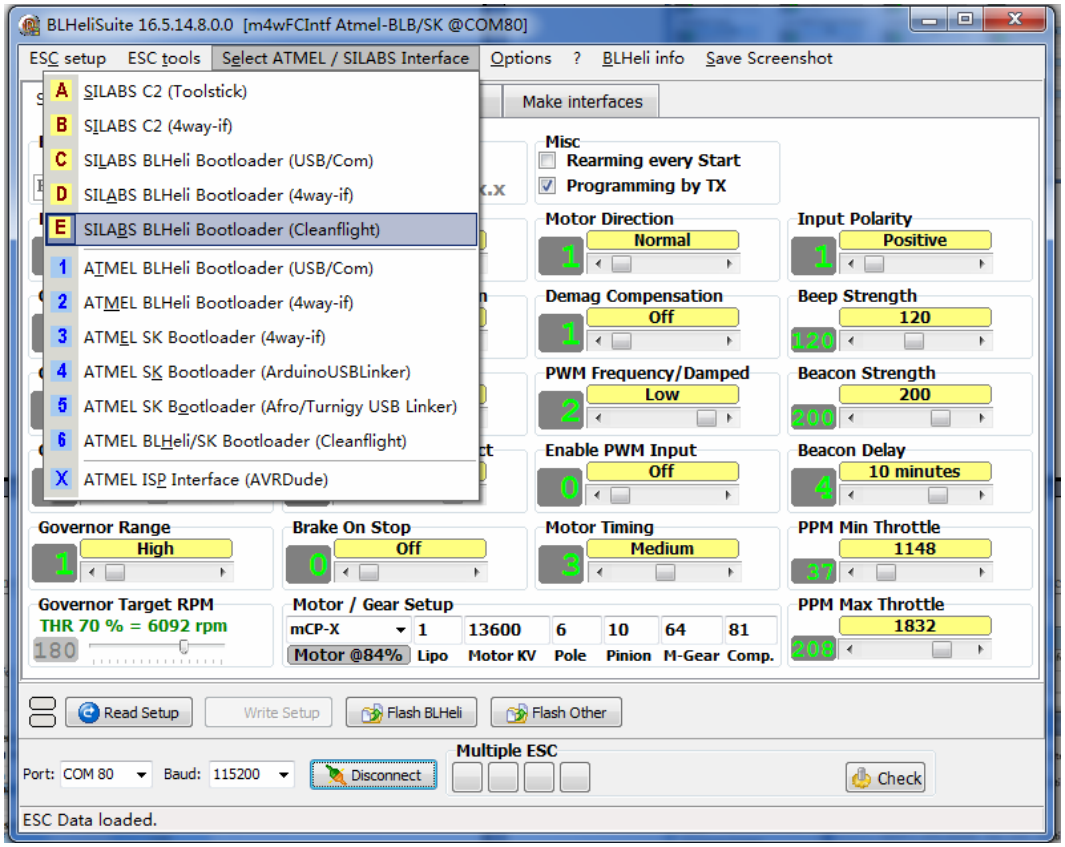


ESC use and upgrade firmware

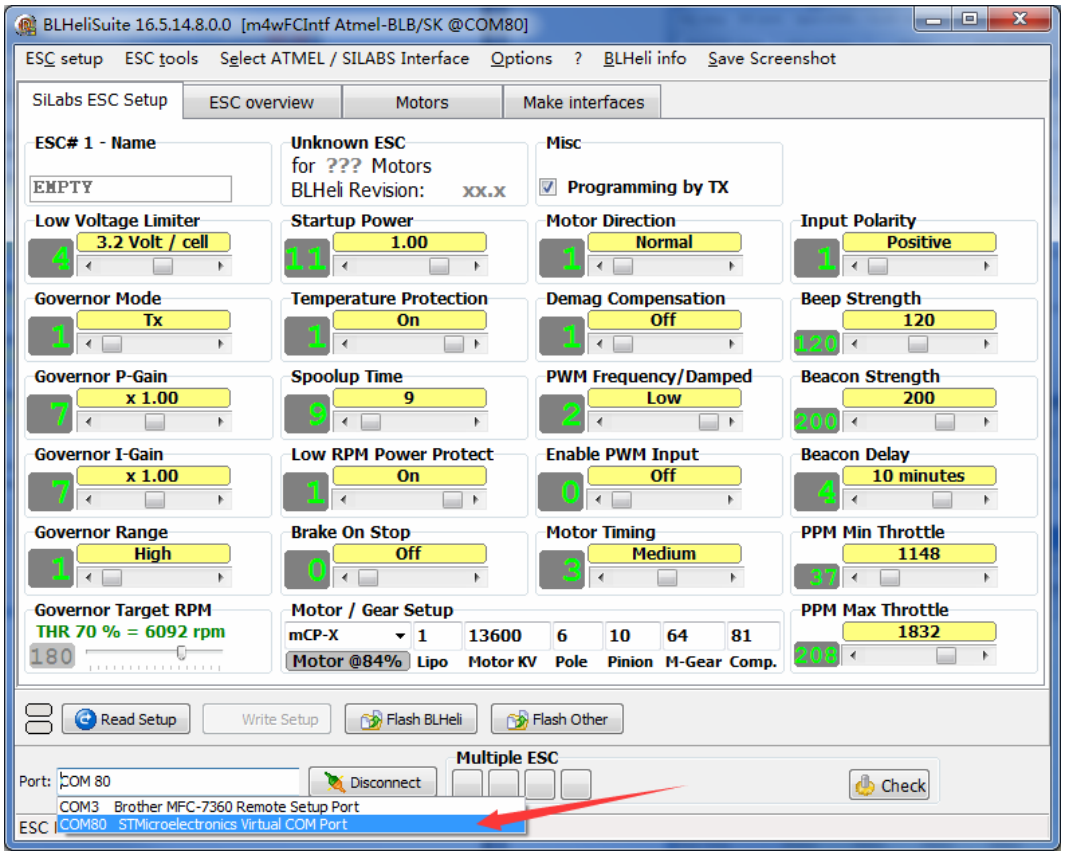
1.Open



2, Choose



3, Choose a port



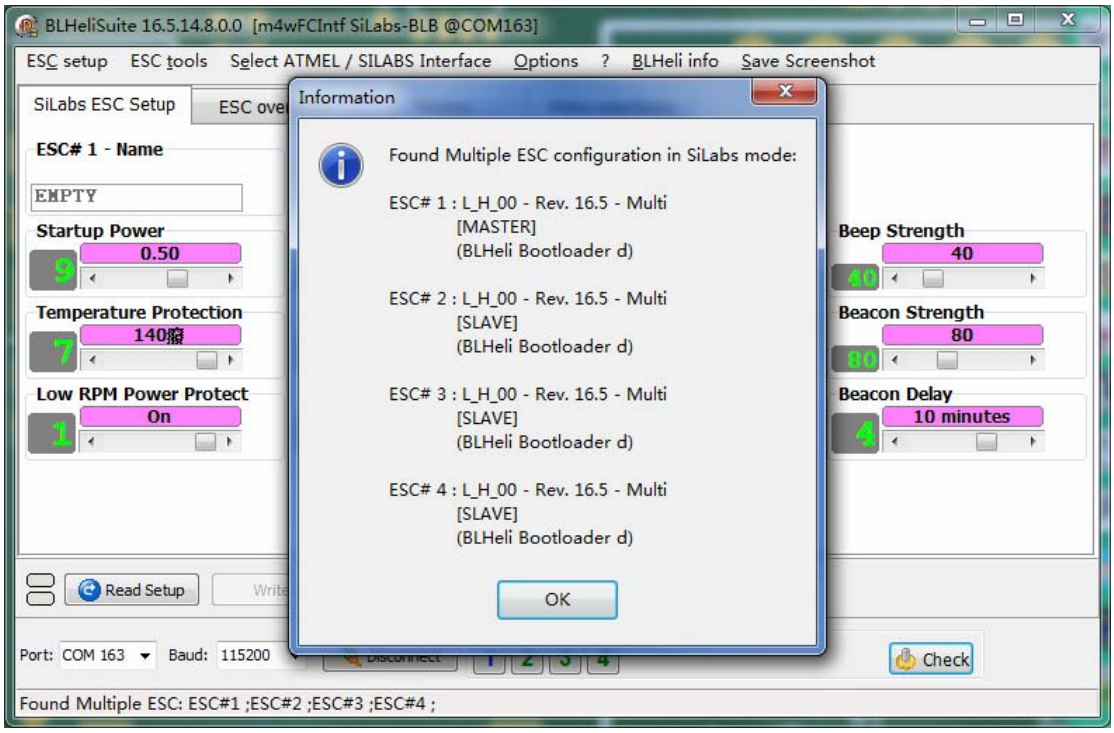
4, Connent USB cable to FlyTower F1 FC Board

5, Connect

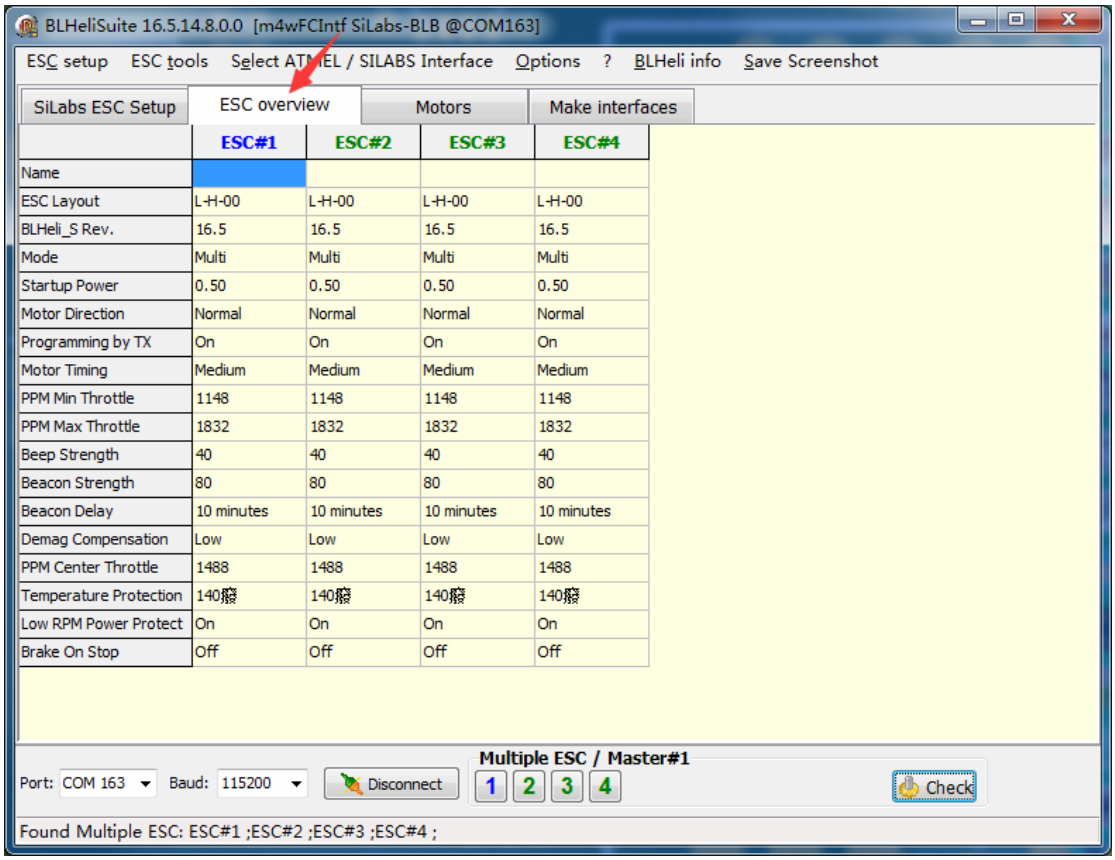
6, Connet BAT Power to ESC board

7, Check ESC Information

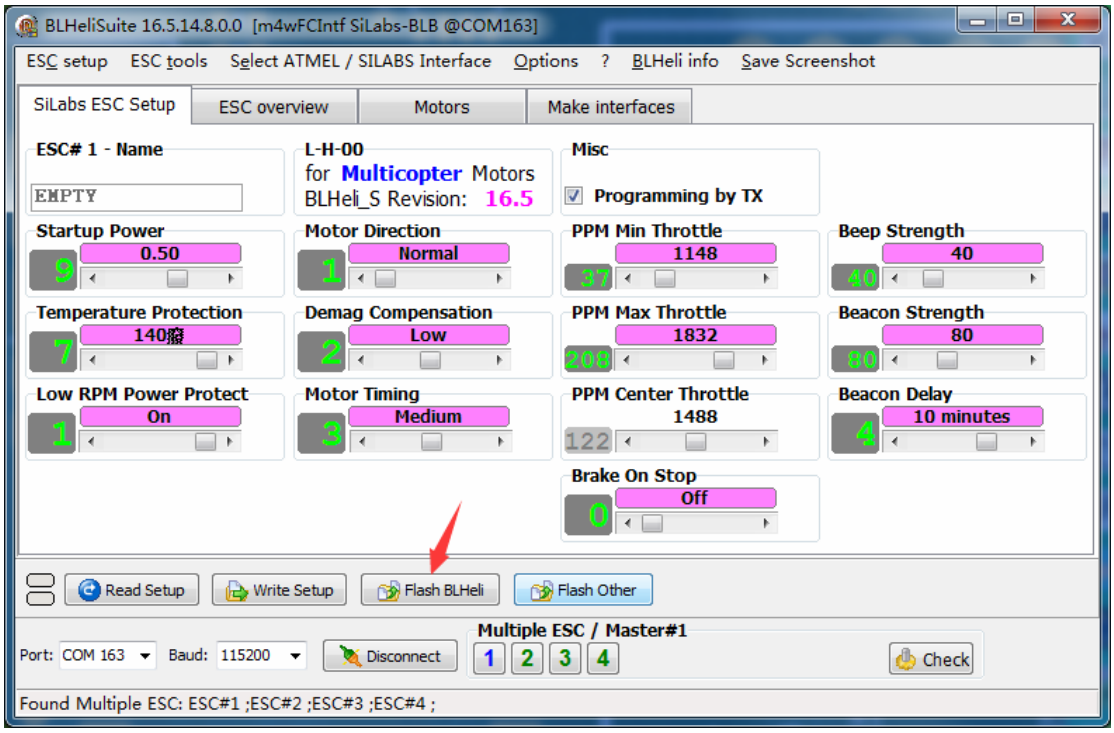
8, Check Flash Show



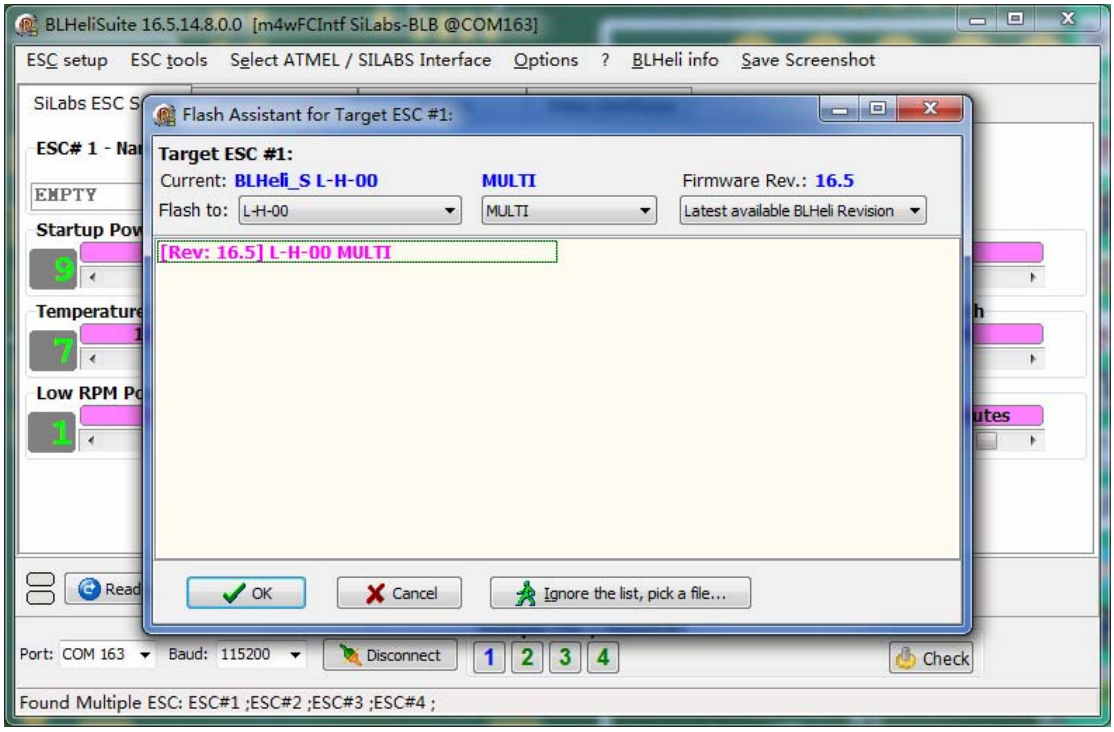
9,For more information view



10,Upgrade Flash for ESC



11, Choose ESC Firmware and upgrade



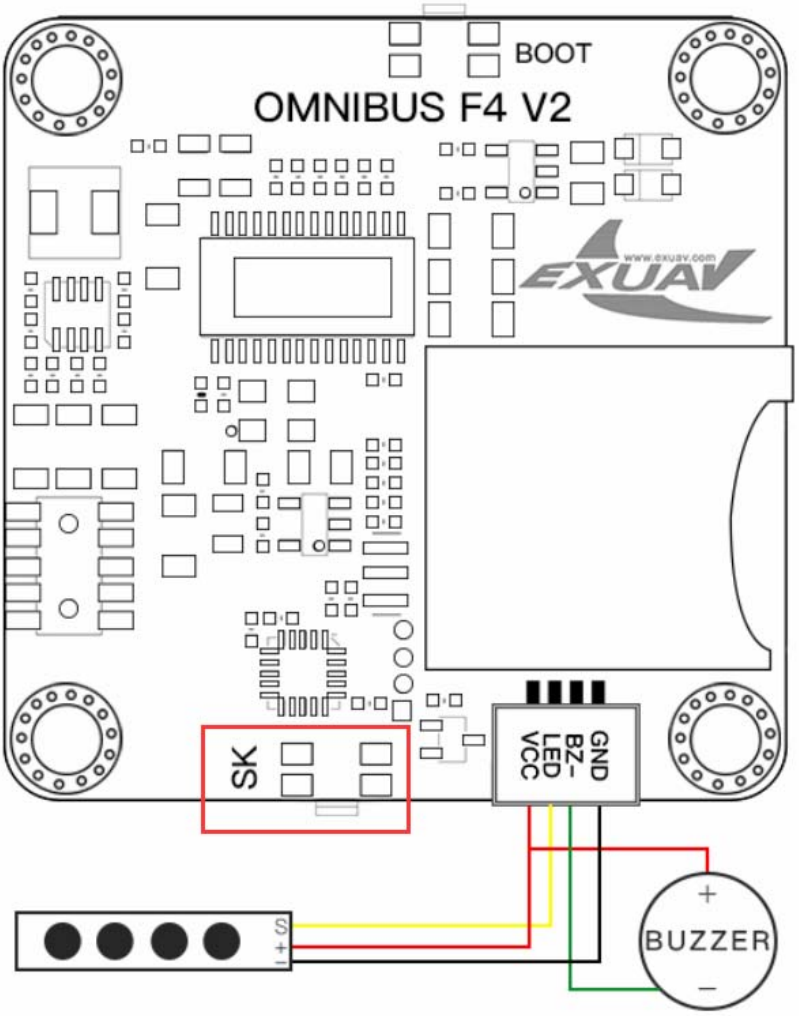
VTX use and settings

1,VTX key switch Instructions (print on VTX on FC and VTX board has a small error),just follow this picture:

2, Channel switch: short press SK, CH1-CH8 in there group, the current channel lights flash 1HZ , and short click to jump to the next CH. For example, the current state of CH1, short press SK, CH1 flash. And then press SK, jump to CH2 flash, continue to press SK, CH3 flash. This process to do the cycle of CH1-CH8 (4 lights show the 8 CH channels, detailed description of the following table). 5 seconds later the setting will exit without touching SK.

3, Frequency group switch: long press 2 seconds SK, A-E where the band group slow flash 1HZ, and then click on the SK for a long time, after the release will jump to the next group. For example, the current working state is A group CH1 status. Long press SK two seconds and release the A slow flash 1HZ, and then long by two seconds SK release, jump to B slow flash 1HZ. The second process is same as above. Do A-E polling, note here: (A-B-C-D to indicate that the E band, A-B 2 lights all bright). Similarly, do not touch the SK, 5 seconds after the automatic exit settings. Follow up will launch 60 channel BC, CD, AC, AD, BD channels, etc.

4, Power switch: fast short press SK two, then A-E frequency group under the condition of full bright light, quick press at two under SK, then began to switch power, the corresponding power is 25mW 200mW 400mW frequency light: bright 1 is the minimum power, bright 2 is a medium power, the 3 is bright the maximum power.



Detail channel and frequency table ：

Band A A bright lights	CH1 1 bright lights	5865	Band B B bright lights	CH1 1 bright lights	5733
	CH2 2 bright lights	5845		CH2 2 bright lights	5752
	CH3 3 bright lights	5825		CH3 3 bright lights	5771
	CH4 4 bright lights	5805		CH4 4 bright lights	5790
	CH5 1 , 2 brights light	5785		CH5 1 , 2 brights light	5809
	CH6 2 , 3 brights light	5765		CH6 2 , 3 brights light	5828
	CH7 3 , 4 brights light	5745		CH7 3 , 4 brights light	5847
	CH8 1 , 2 , 3 , 4 brights light	5725		CH8 1 , 2 , 3 , 4 brights light	5866
Band C C bright lights	CH1 1 bright lights	5705	Band D D bright lights	CH1 1 bright lights	5740
	CH2 2 bright lights	5685		CH2 2 bright lights	5760
	CH3 3 bright lights	5665		CH3 3 bright lights	5780
	CH4 4 bright lights	5645		CH4 4 bright lights	5800
	CH5 1 , 2 brights light	5885		CH5 1 , 2 brights light	5820
	CH6 2 , 3 brights light	5905		CH6 2 , 3 brights light	5840
	CH7 3 , 4 brights light	5925		CH7 3 , 4 brights light	5860
	CH8 1 , 2 , 3 , 4 brights light	5945		CH8 1 , 2 , 3 , 4 brights light	5880
Band E AB bright lights	CH1 1 bright lights	5658			
	CH2 2 bright lights	5695			
	CH3 3 bright lights	5732			
	CH4 4 bright lights	5769			
	CH5 1 , 2 brights light	5806			
	CH6 2 , 3 brights light	5843			
	CH7 3 , 4 brights light	5880			
	CH8 1 , 2 , 3 , 4 brights light	5917			