

# FlyTower F3 Instructions V1.0.1



## 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

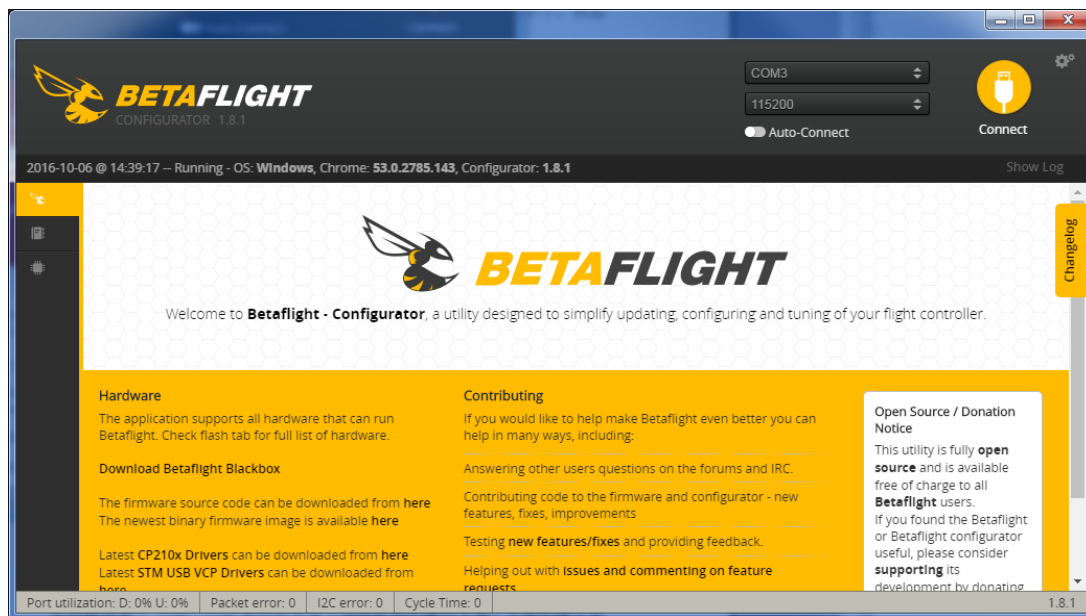
4 in 1 ESC	PDB	Integrated
	Battery Monitoring	Integrated
	FC Power	Integrated
	Operating Voltage	2-4S Lipo
	Maximum continuous operating current	4*30A
	Maximum instantaneous operating current	4*35A(10S)
	Oneshot 125/42/Dshot 150/300/600	YES
	BlheliSuite Configurable	YES
	Firmware Vision	BLHeli S/Dshot 150/300/600 16.5 (L_H_00)
	Board Size	36*36mm
	weight	10g
FC&VTX Board	Firmware Vision	BateFlight 3.1(OMNIBUS)
	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 F3	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 F3 board designed based OMNIBUS (BateFlight) FC and was highly integrated with OSD,BEC,4 in 1 BLHeli\_S 30A/DShot 30A 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 F303 MCU, Runs Betaflight firmware(supported from v3.0)
- ★ 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 4pins 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

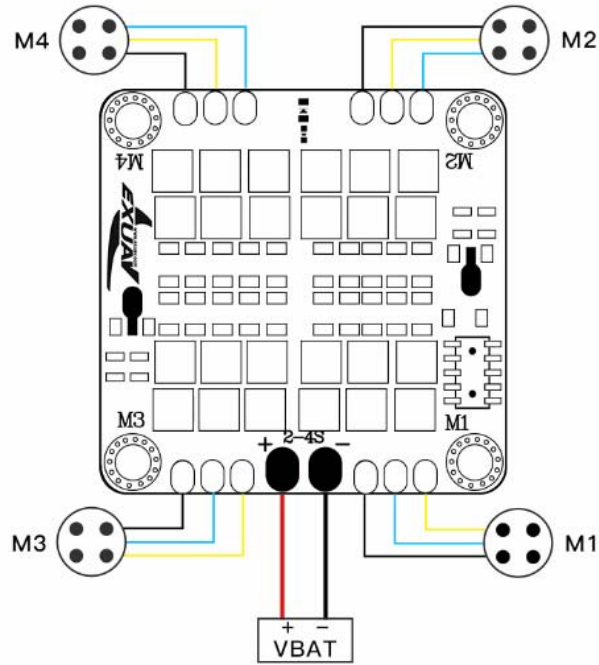
## 1,Betaflight



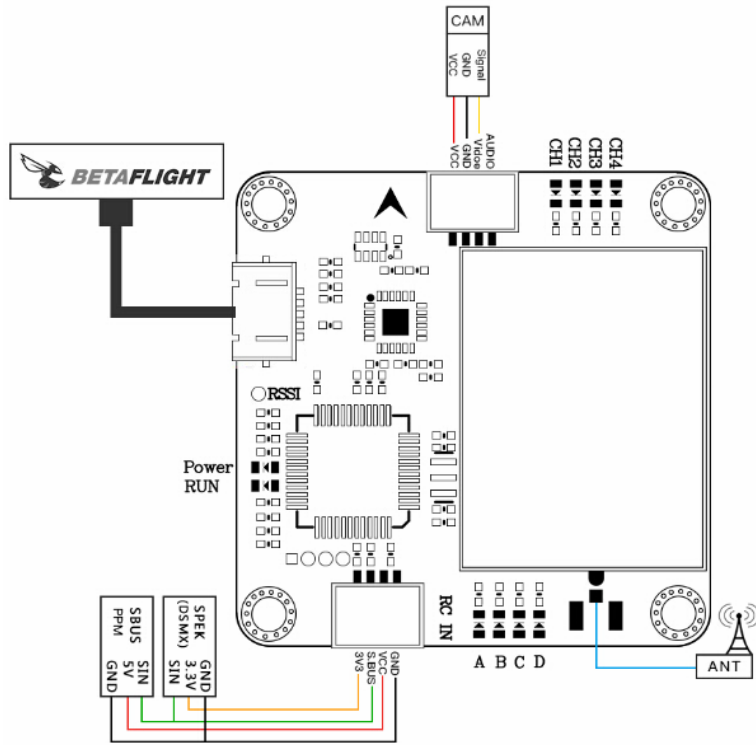
<https://github.com/Betaflight>

## The hardware connection diagram

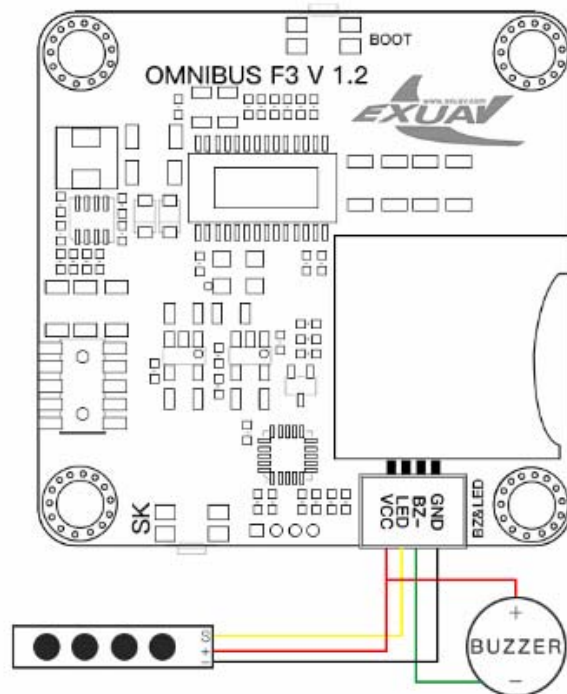
1,4 in 1 Board



2, FC board Top layer



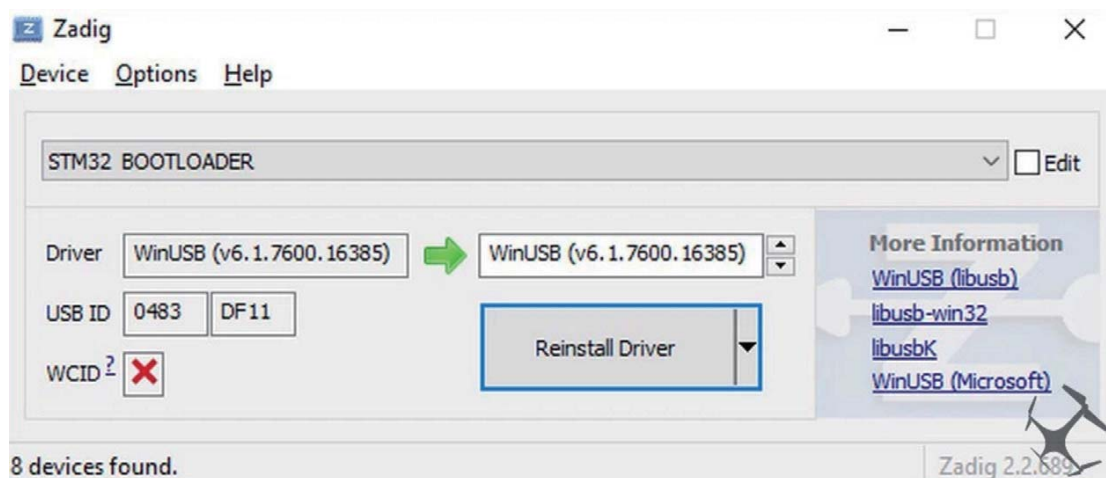
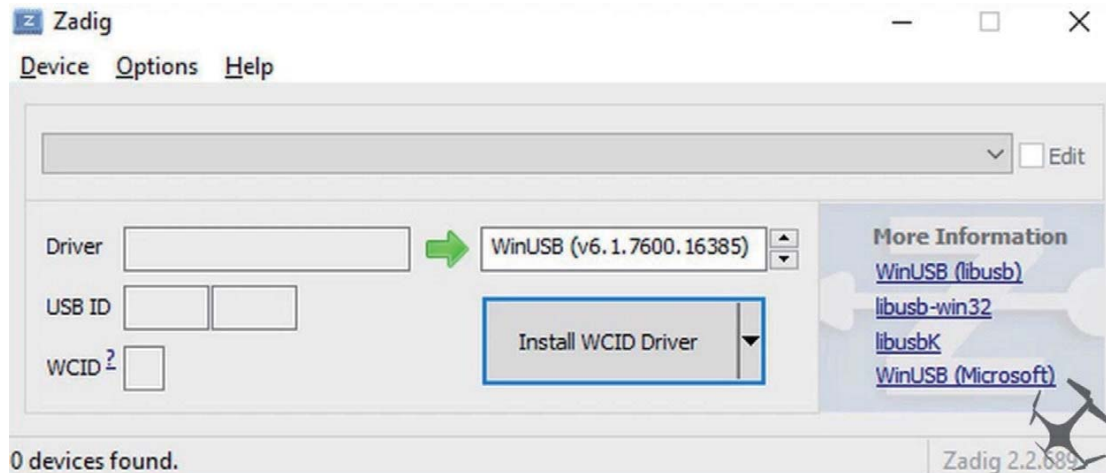
### 3, FC Bottom layer



## 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.

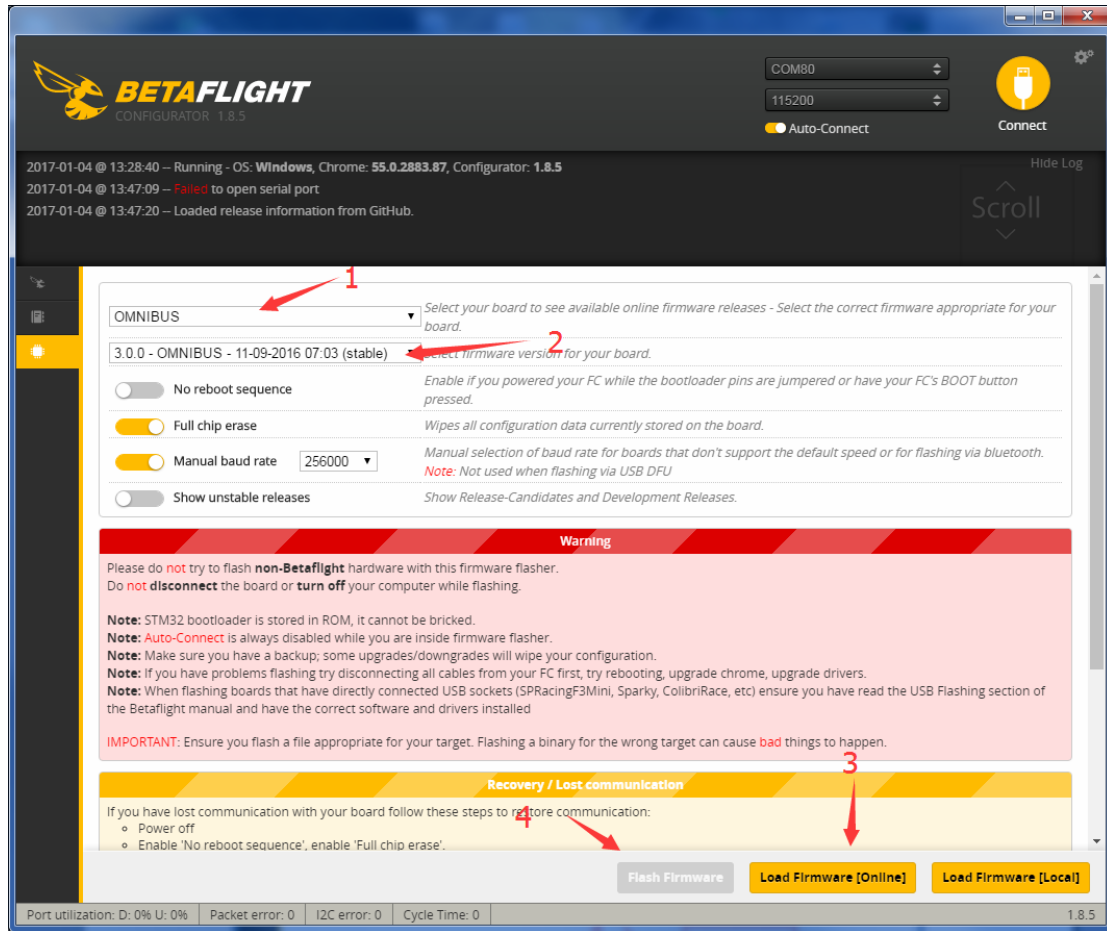
Down: <http://zadig.akeo.ie/>



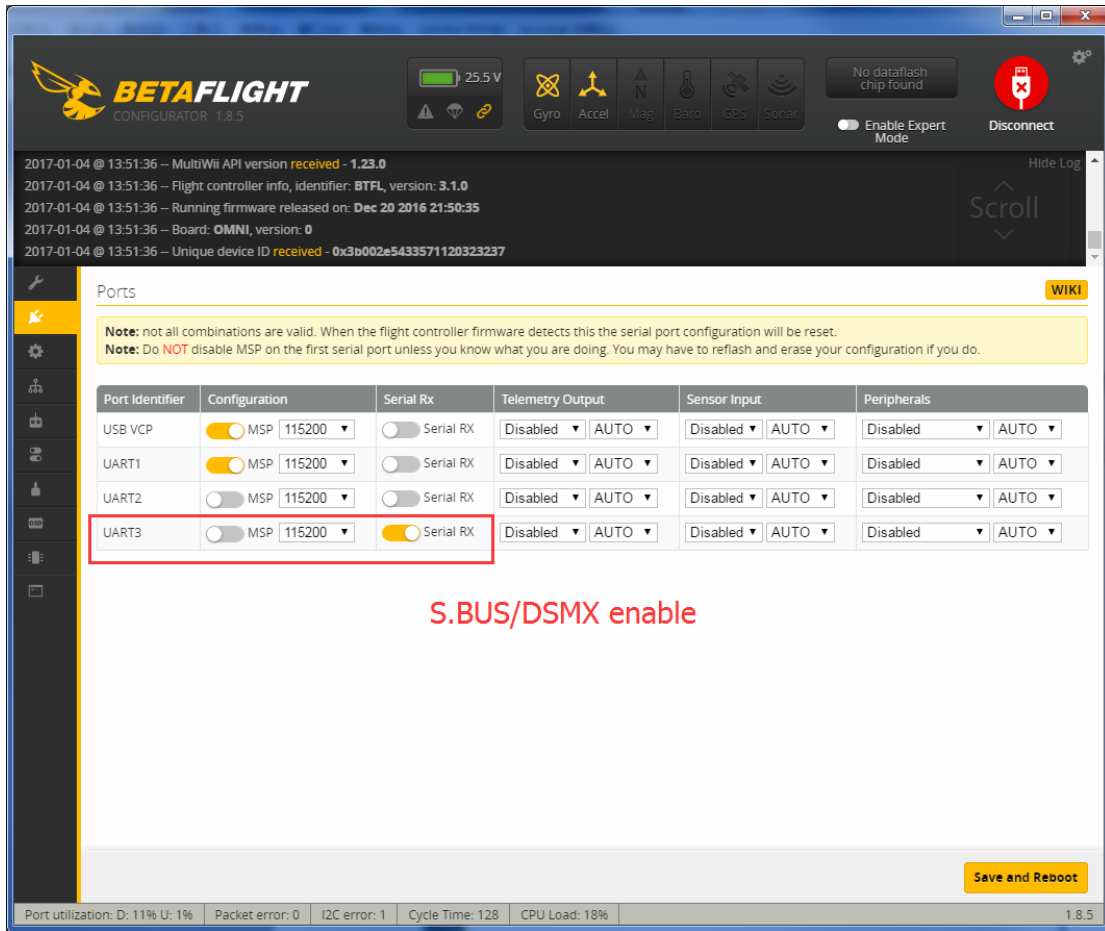
- Push BOOT button on the flight controller.
- Plug-in the USB cable (the red LED should not be as bright as normally).
- Fire up Zadig and hit "Options" and then "List All Devices" .
- From the list choose "STM32 BOOTLOADER" .
- Under "Driver" choose "WinUSB" on the right and hit "Reinstall Driver" .
- 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

25.5 V

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

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.

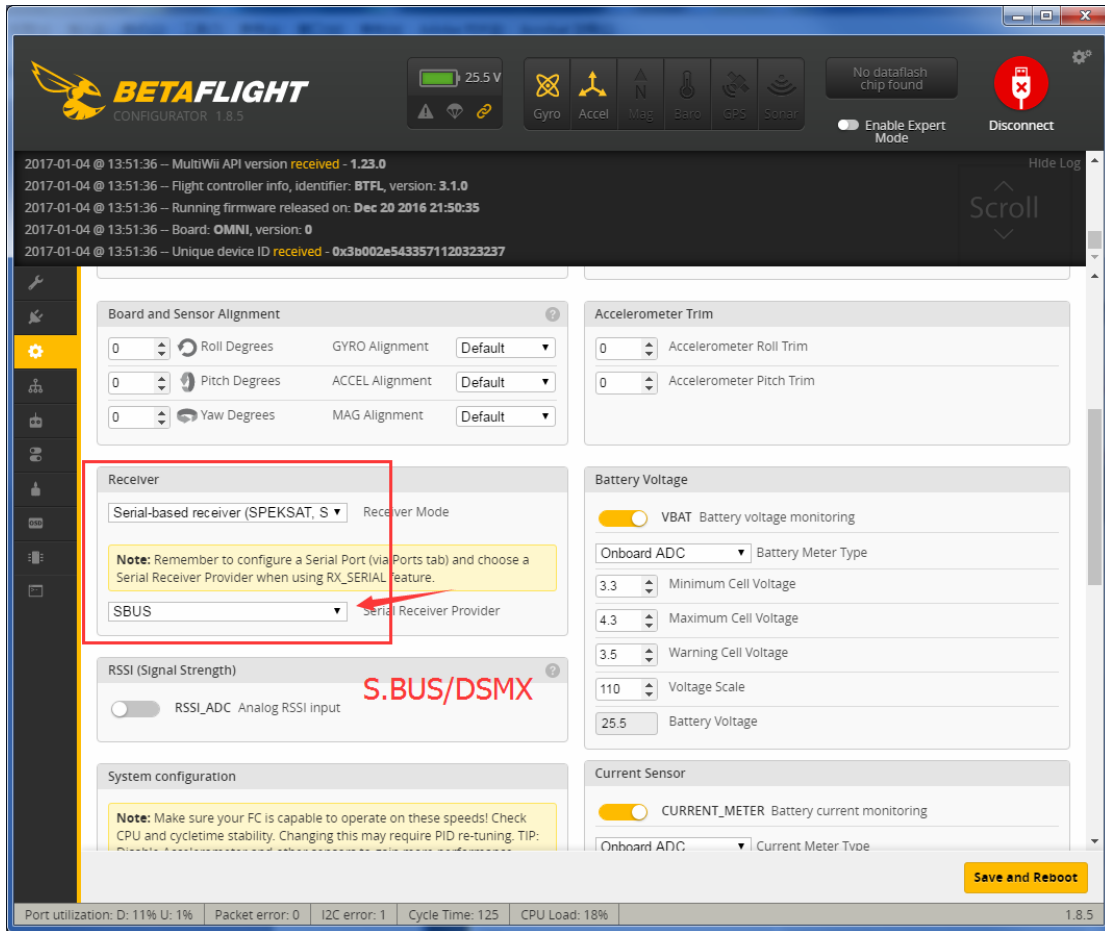
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> MSP 115200	<input type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO
UART1	<input checked="" type="checkbox"/> MSP 115200	<input type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO
UART2	<input type="checkbox"/> MSP 115200	<input type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO
UART3	<input type="checkbox"/> MSP 115200	<input checked="" type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO

S.BUS/DSMX enable

Save and Reboot

Port utilization: D: 11% U: 1% Packet error: 0 I2C error: 1 Cycle Time: 128 CPU Load: 18% 1.8.5





The screenshot shows the Betaflight configurator interface. At the top, there's a status bar with a battery icon showing 25.5 V, a 'No dataflash chip found' warning, and a 'Disconnect' button. Below this is a log window with several entries: '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', and '2017-01-04 @ 13:51:36 - Unique device ID received - 0x3b002e5433571120323237'. The main configuration area is divided into several sections: 'Board and Sensor Alignment' with Roll, Pitch, and Yaw Degrees; 'Accelerometer Trim' with Roll and Pitch Trim; 'Receiver' where 'Serial-based receiver (SPEKSAT, S)' is selected and 'SBUS' is chosen as the 'Serial Receiver Provider'; 'RSSI (Signal Strength)' with 'S.BUS/DSMX' selected; 'Battery Voltage' with 'VBAT' monitoring and various voltage thresholds; and 'Current Sensor' with 'CURRENT\_METER' monitoring. A 'Save and Reboot' button is at the bottom right. A red box highlights the Receiver section, and a red arrow points to the 'SBUS' dropdown. The bottom status bar shows 'Port utilization: D: 11% U: 1% Packet error: 0 I2C error: 1 Cycle Time: 125 CPU Load: 18%' and the version '1.8.5'.

**BETAFLIGHT CONFIGURATOR 1.8.5**

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**

25.5 V

Gyro Accel Mag Baro GPS Sonar

No dataflash chip found

Enable Expert Mode Disconnect

Hide Log

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**

PPM RX input

**Serial-based receiver (SPEKSAT, SBUS, SUMD)** **S.BUS/DSMX**

PWM RX input (one wire per channel)

MSP RX input (control via MSP port)

SBUS Serial Receiver Provider

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 cyclotime stability. Changing this may require PID re-tuning. TIP:

Battery Voltage

VBAT Battery voltage monitoring

Battery Meter Type

Minimum Cell Voltage

Maximum Cell Voltage

Warning Cell Voltage

Voltage Scale

Battery Voltage

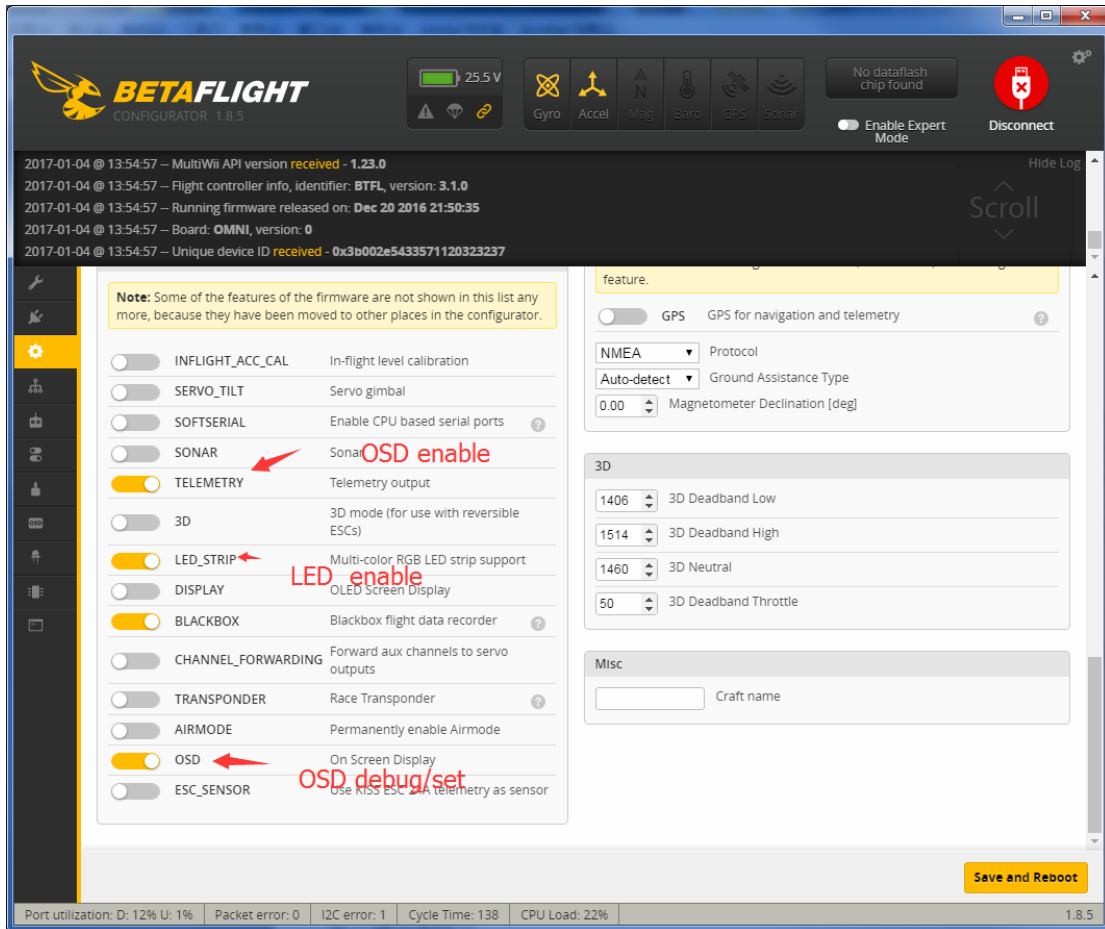
Current Sensor

CURRENT\_METER Battery current monitoring

Onboard ADC Current Meter Type

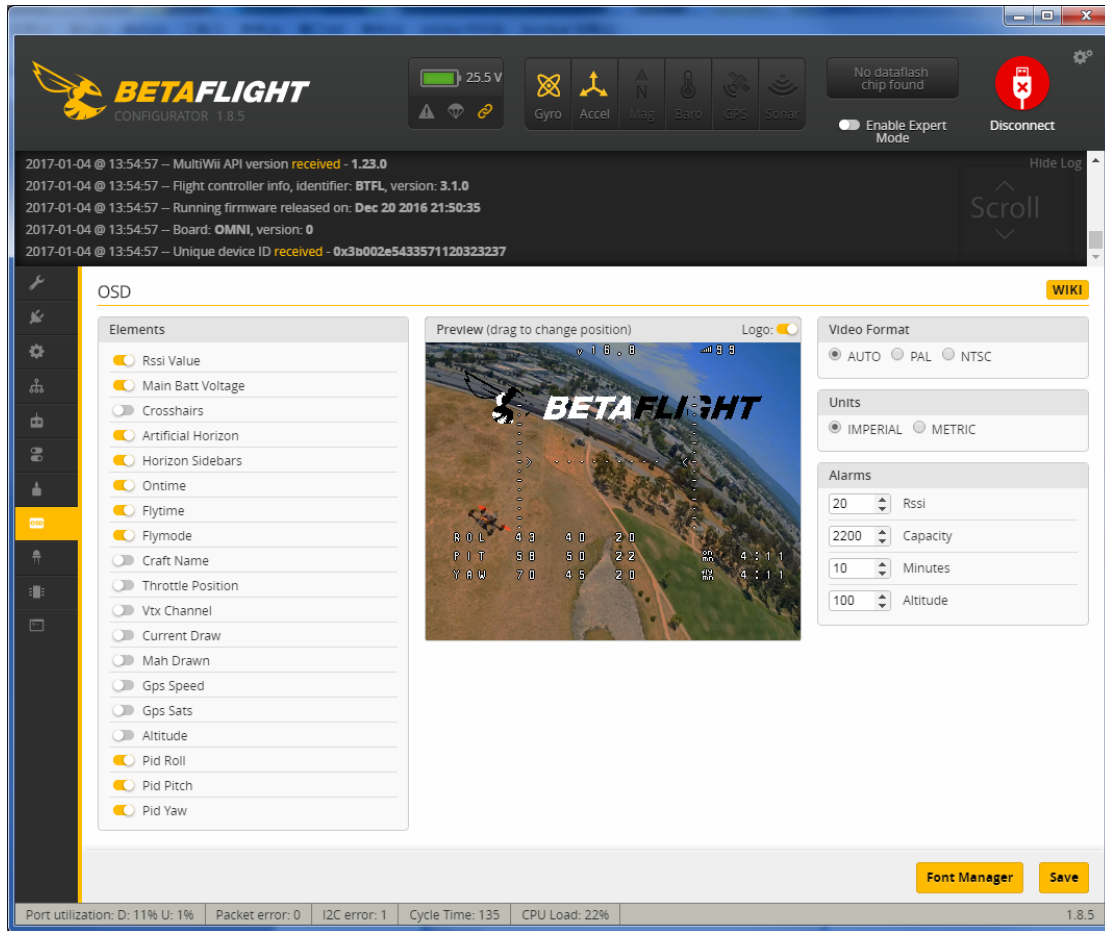
Save and Reboot

Port utilization: D: 11% U: 1% Packet error: 0 I2C error: 1 Cycle Time: 128 CPU Load: 19%



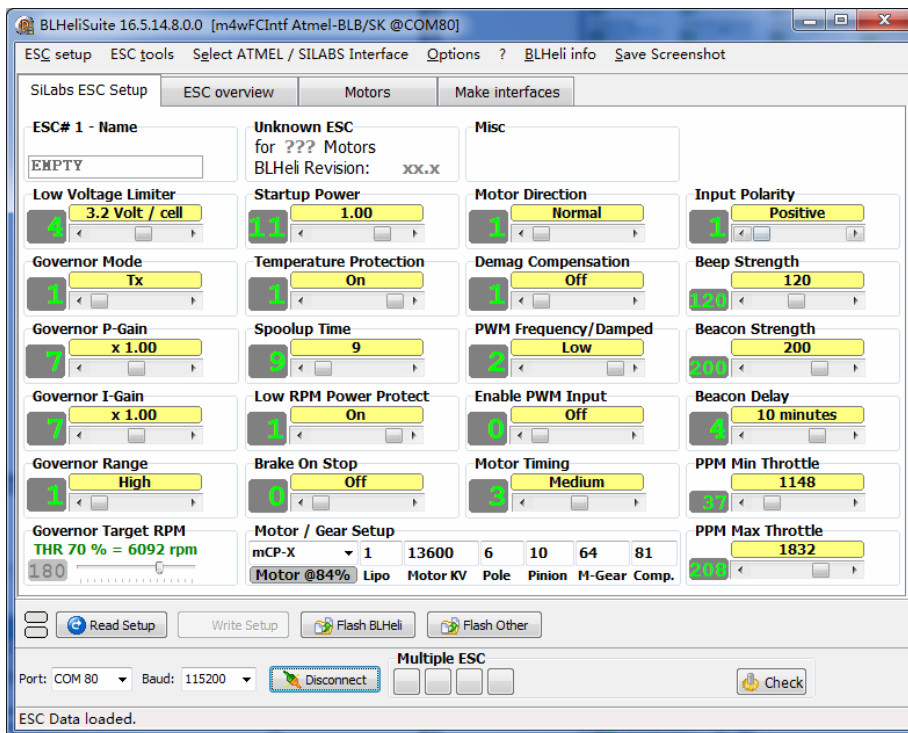
The screenshot shows the Betaflight configurator interface. At the top, there's a header with the Betaflight logo and version 1.8.5. Below that, a status bar shows system information like battery voltage (25.5V) and various sensors (Gyro, Accel, Mag, Baro, GPS, Sonar). A log window displays recent system messages. The main area is divided into two columns of settings. The left column lists various features with toggle switches, including INFLIGHT\_ACC\_CAL, SERVO\_TILT, SOFTSERIAL, SONAR, TELEMETRY, 3D, LED\_STRIP, DISPLAY, BLACKBOX, CHANNEL\_FORWARDING, TRANSPONDER, AIRMODE, OSD, and ESC\_SENSOR. The right column shows detailed settings for selected features like GPS, NMEA protocol, and 3D deadband values. Red arrows and text annotations highlight specific settings: 'SONAR' is annotated with 'OSD enable', 'LED\_STRIP' with 'LED enable', and 'OSD' with 'OSD debug/set'. A 'Save and Reboot' button is located at the bottom right. The bottom status bar shows system metrics like port utilization, packet error, I2C error, cycle time, and CPU load.

OSD setting and upgrade firmware

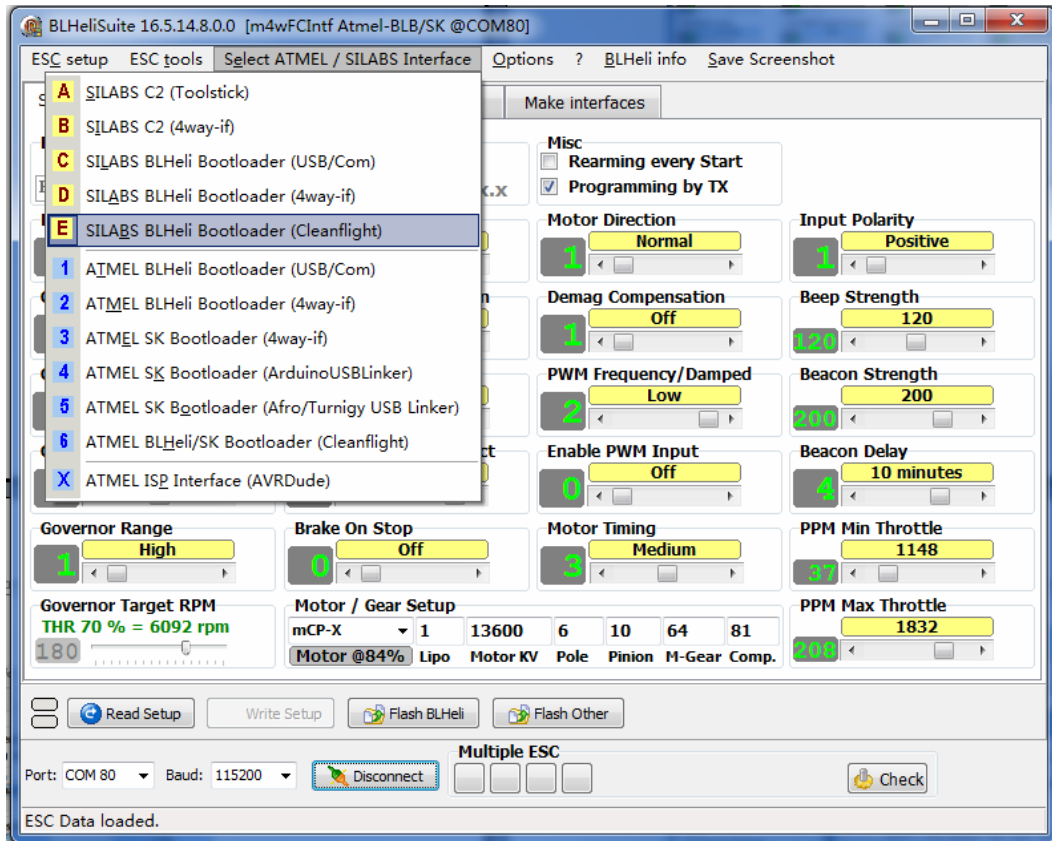


## ESC use and upgrade firmware

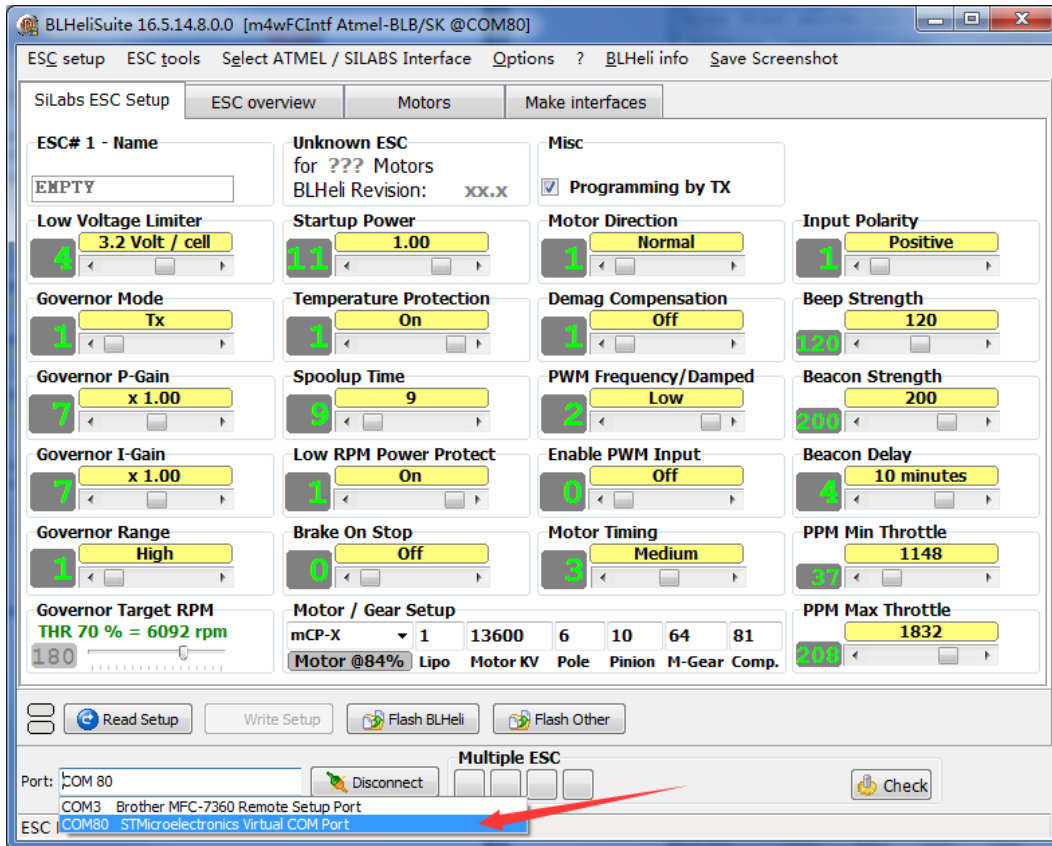
1. Open



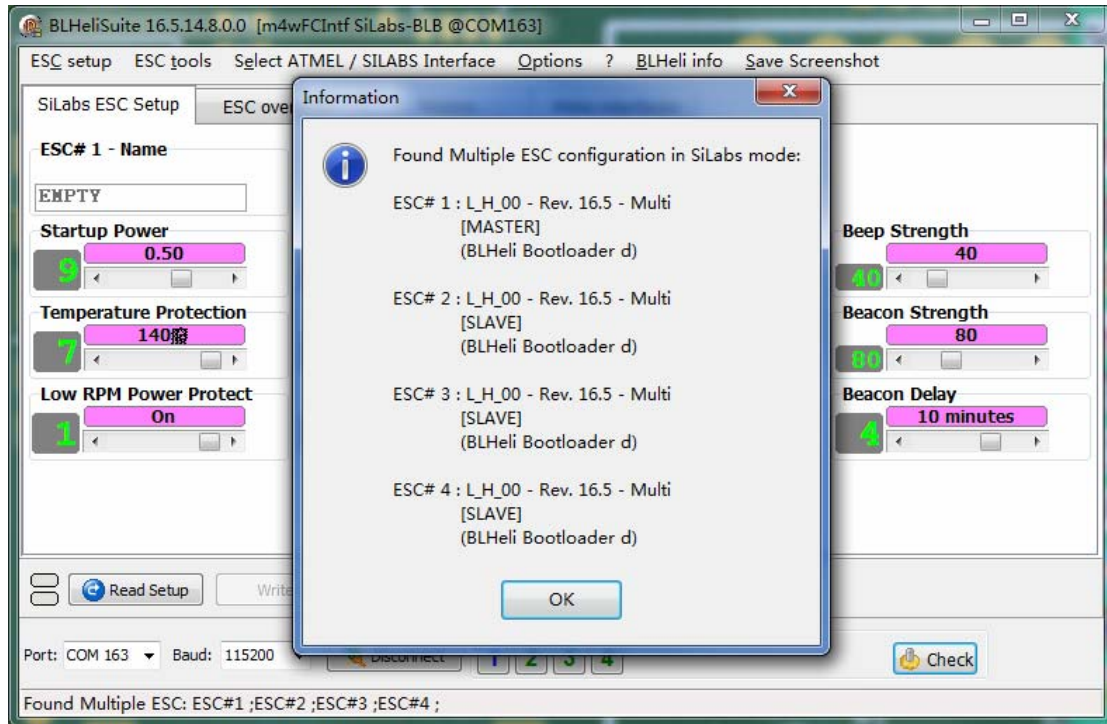
2, Choose



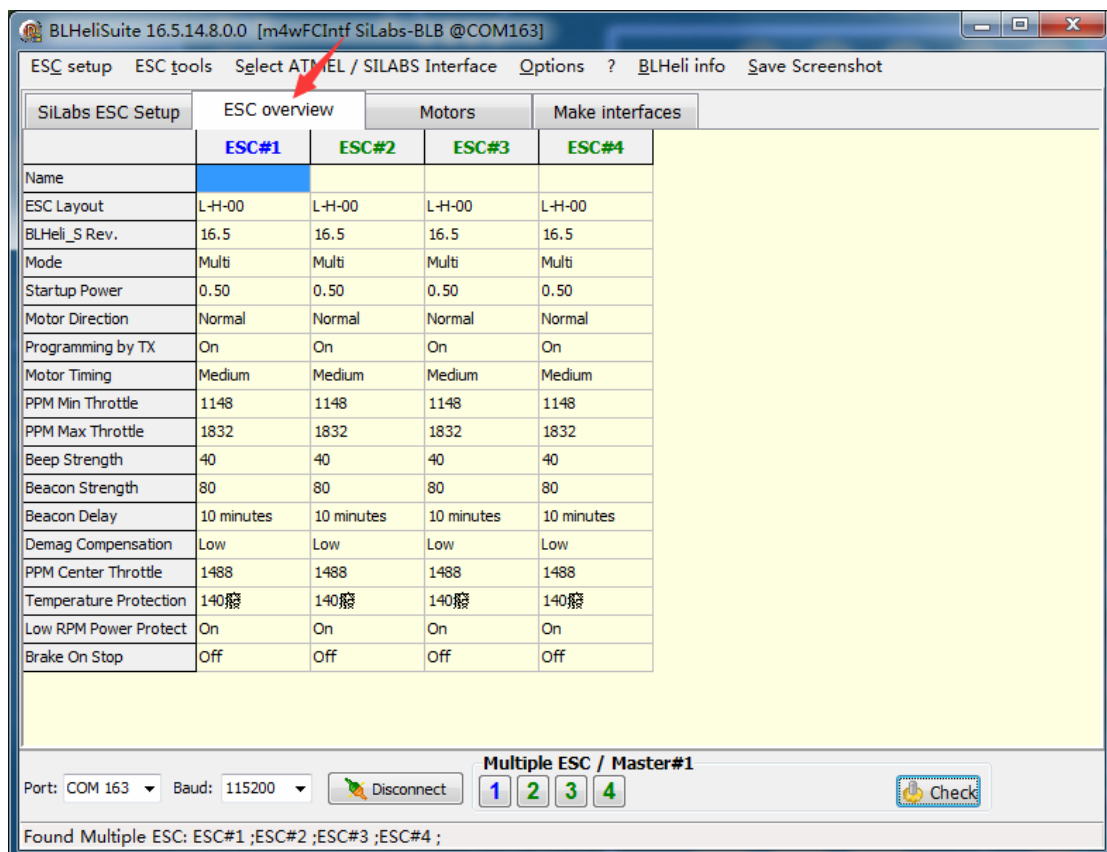
3, Choose a port



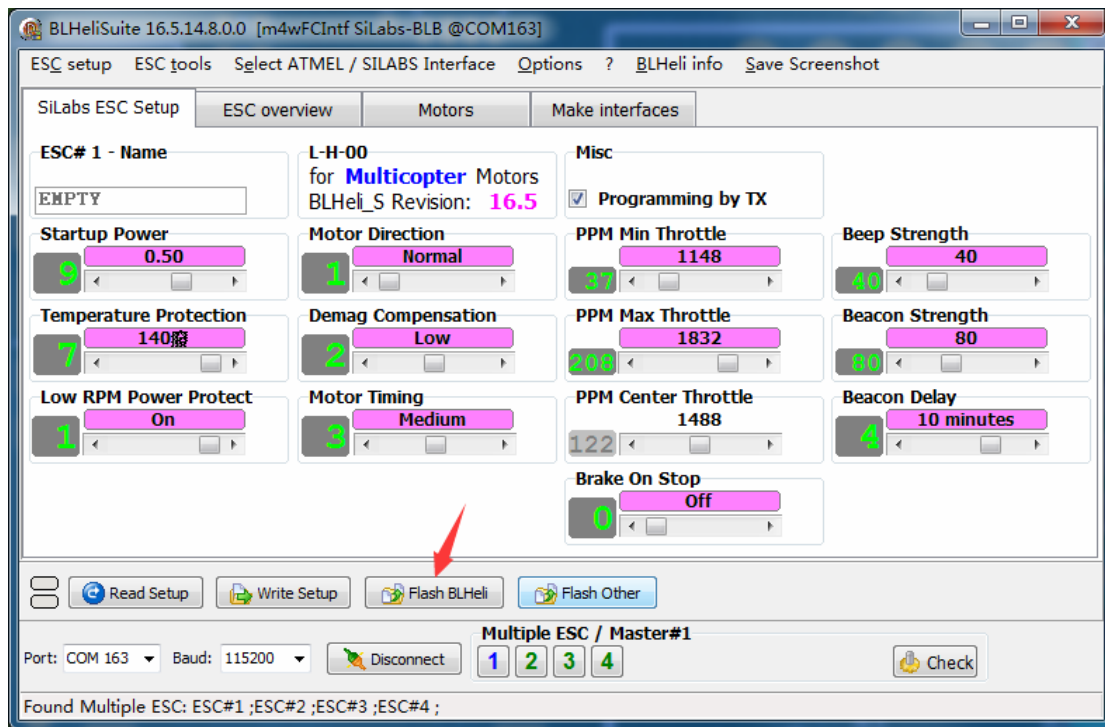
- 4, Connet USB cable to FlyTower F1 FC Board
- 5, Connect
- 6, Connet BAT Power to ESC board
- 7, Check ESC Information
- 8, Check Flash Show



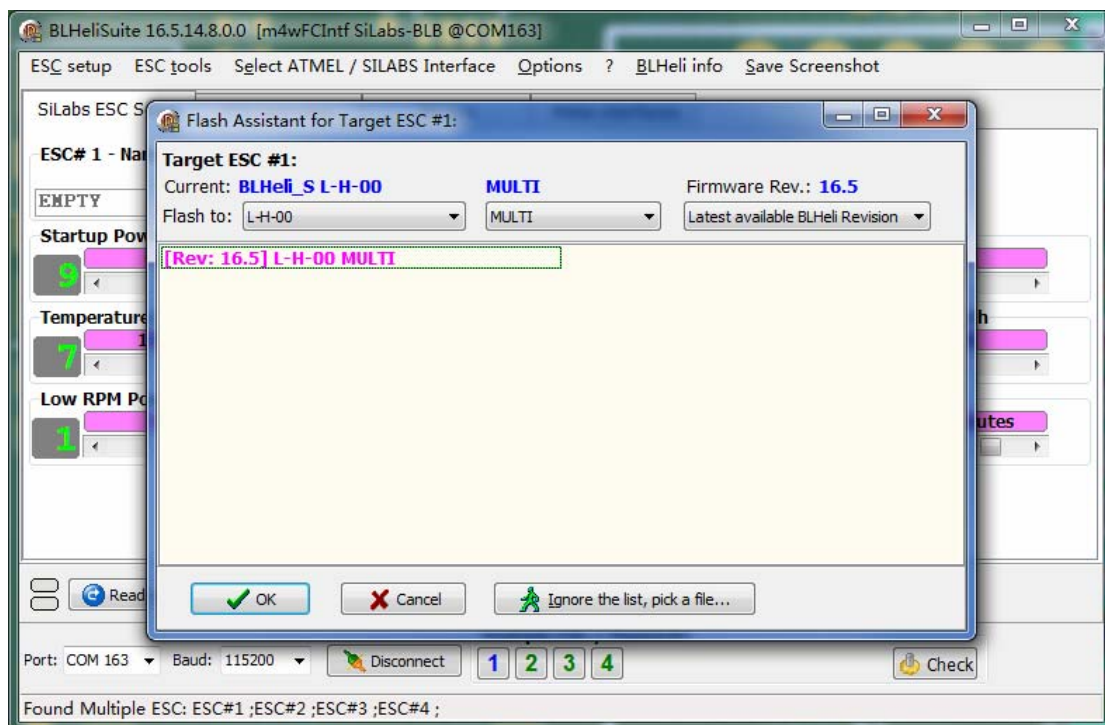
- 9, For more information view



## 10, Upgrade Flash for ESC



## 11, Choose ESC Firmware and upgrade



## VTX use and settings

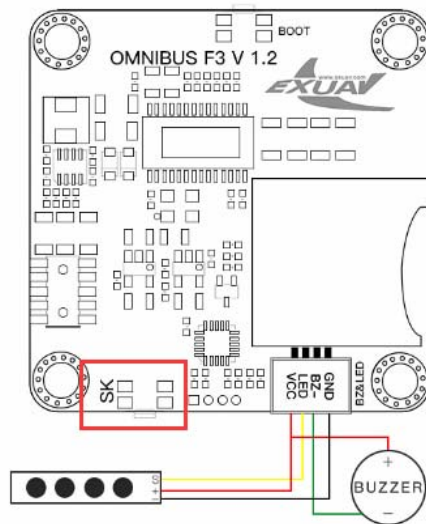
1, VTX key switch Instructions (print on VTX on FC and VTX board has a small error), just follow this picture:

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 500mW 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	
	CH2 2 bright lights	5845		CH2 2 bright lights	
	CH3 3 bright lights	5825		CH3 3 bright lights	
	CH4 4 bright lights	5805		CH4 4 bright lights	
	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	CH1 1 bright lights	5705	Band D D bright	CH1 1 bright lights	5740
	CH2 2 bright lights	5685		CH2 2 bright lights	5760



lights	CH3 3 bright lights	5665	lights	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			