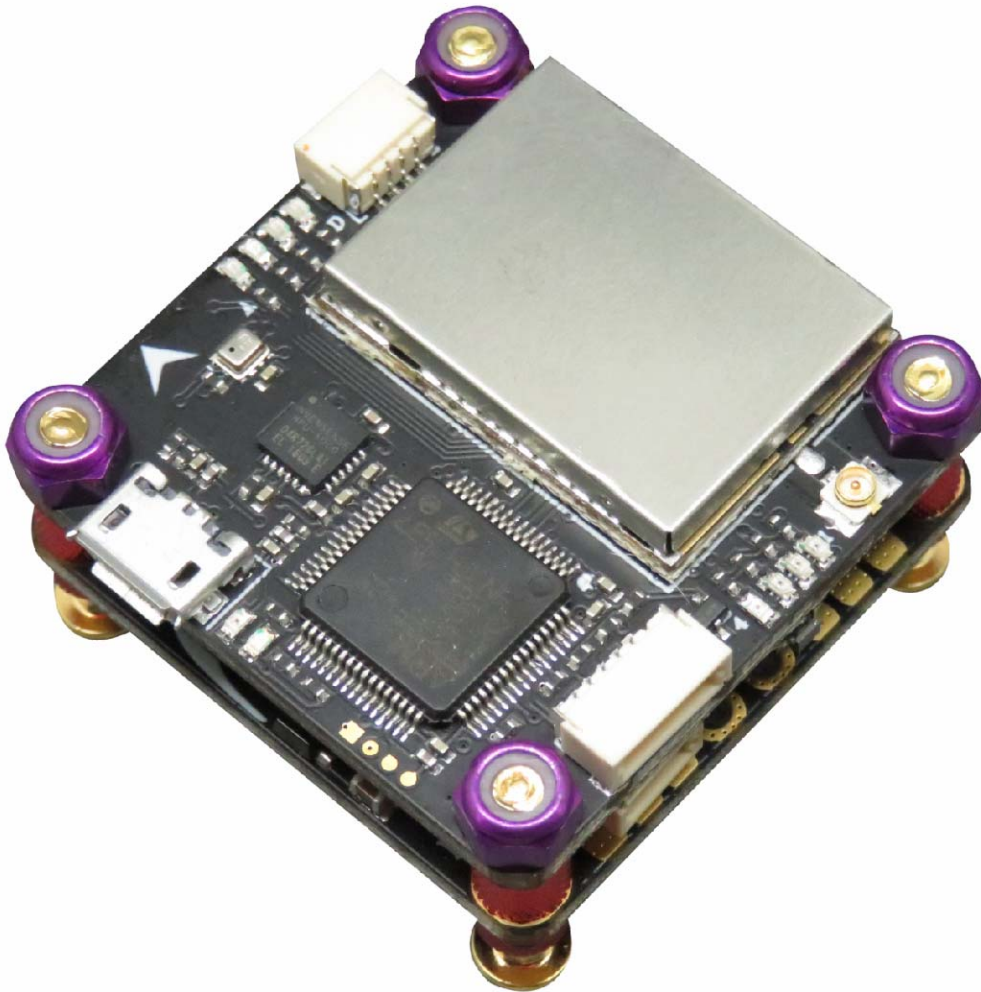


FlyTower F4 Instructions V1.0



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.

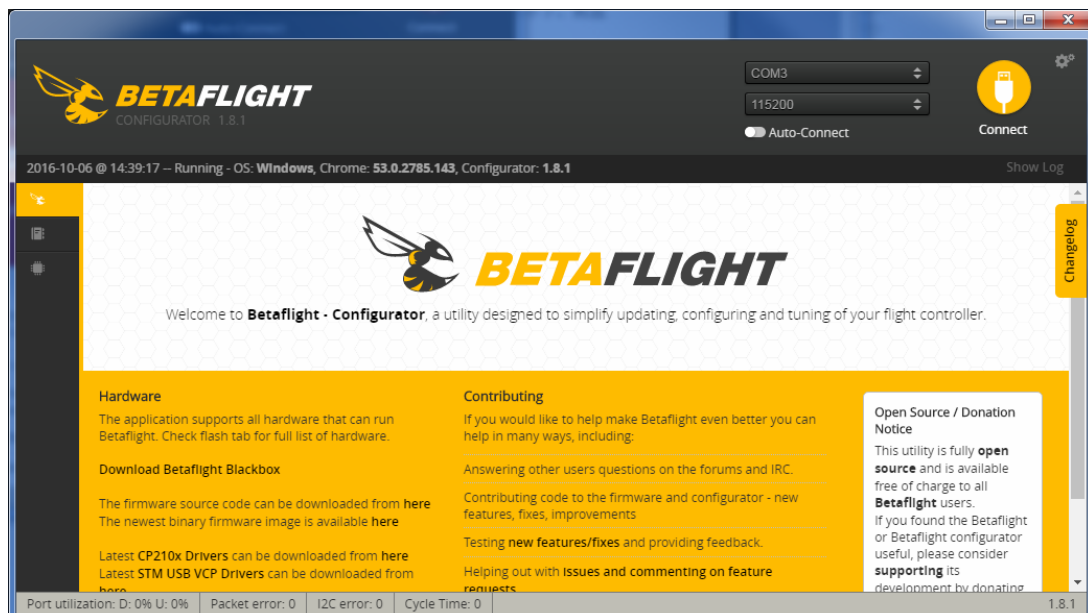
Product specifications

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)
	Oneshot 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

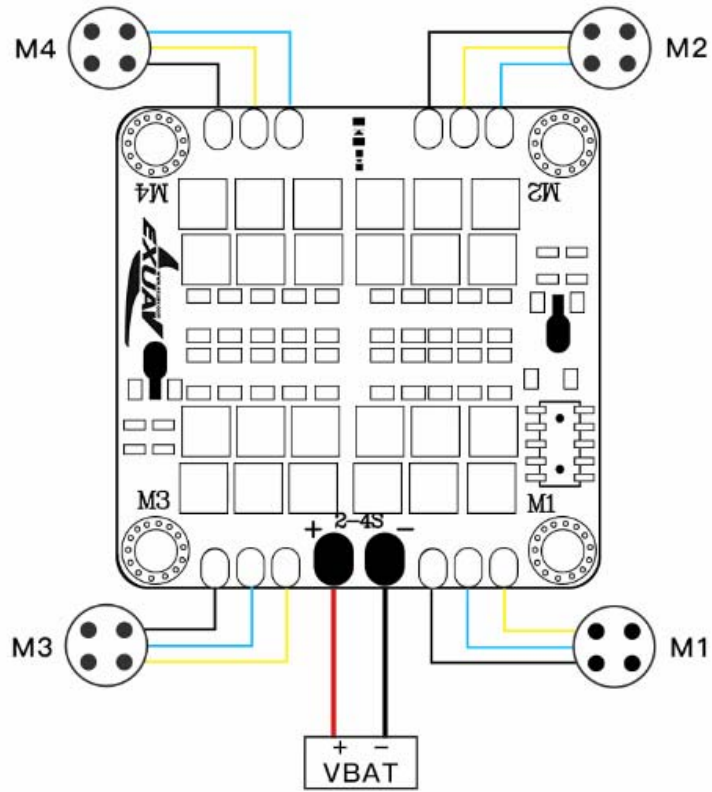
1,Betaflight



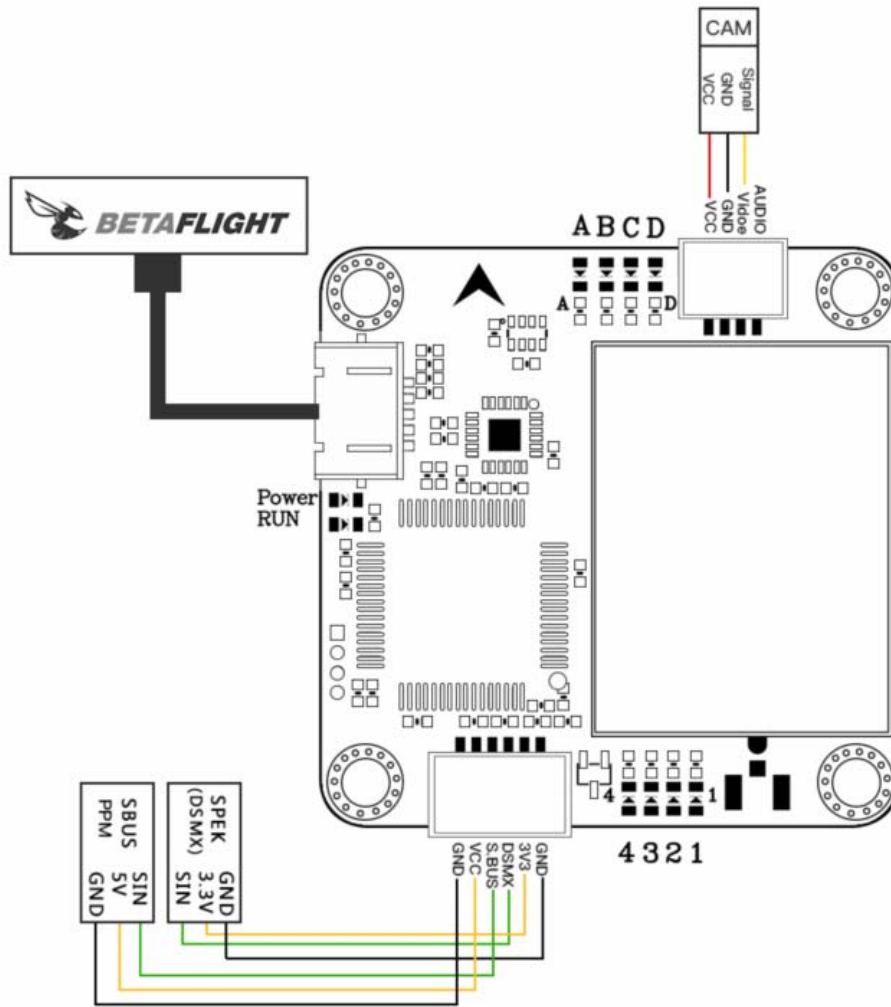
<https://github.com/Betaflight>

The hardware connection diagram

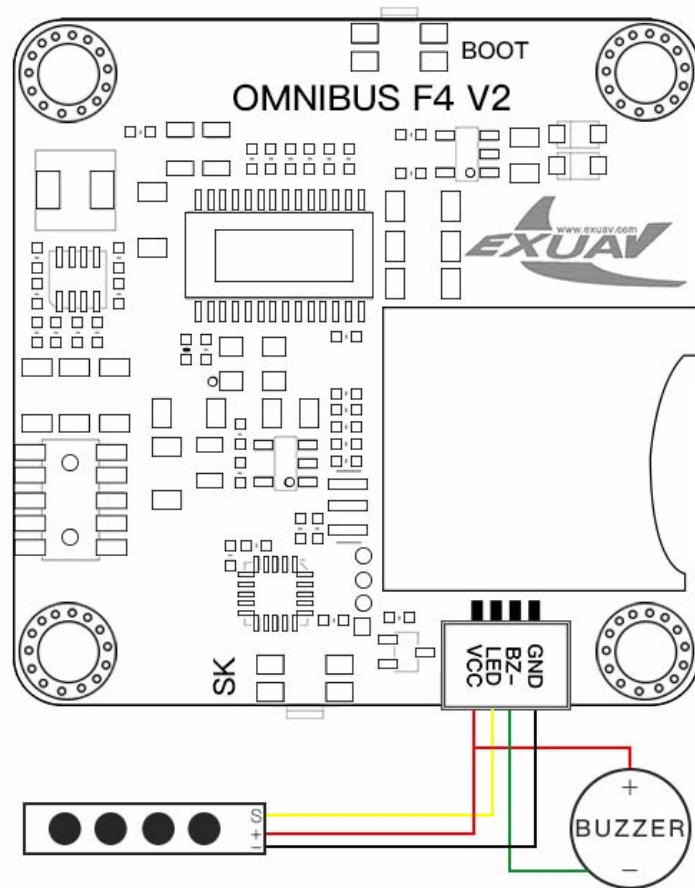
1,4 in 1 Board



2, FC board Top layer



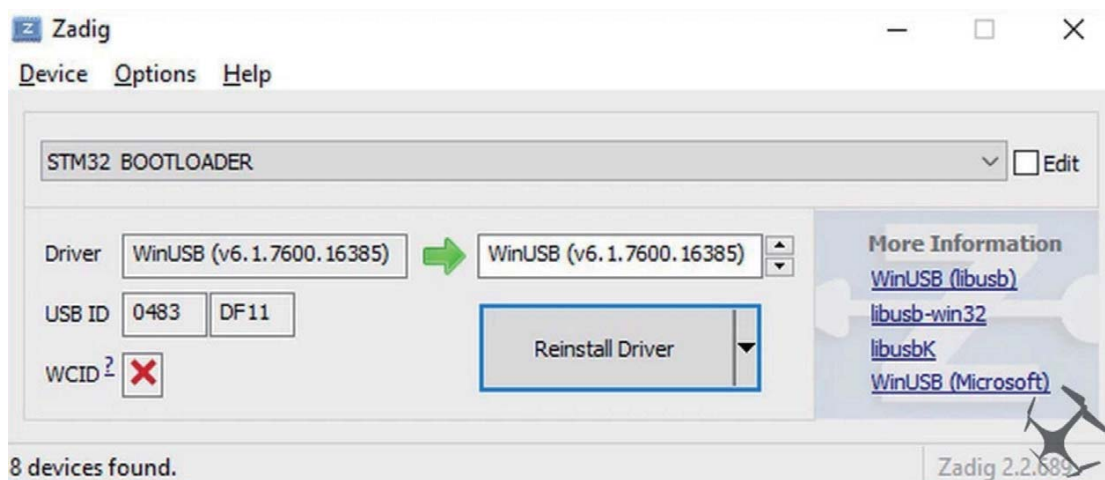
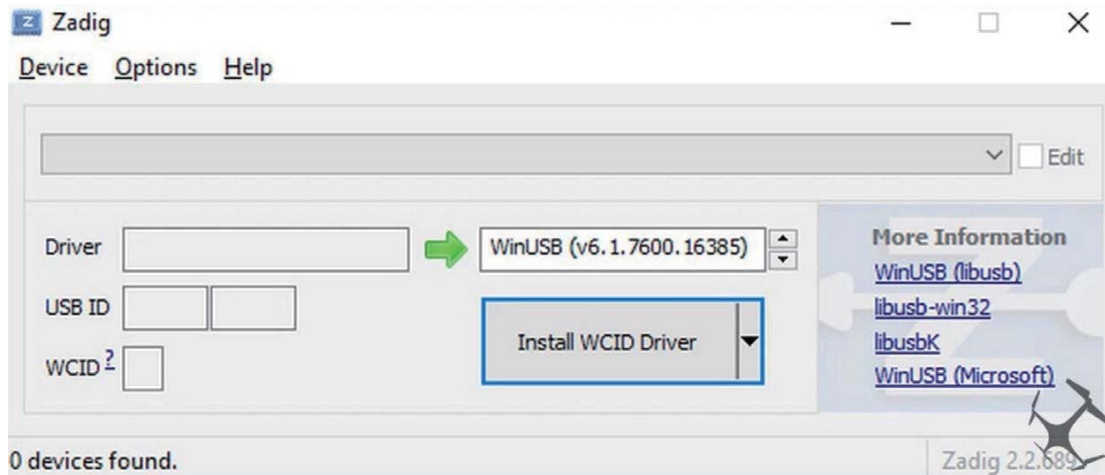
3, FC Bottom layer



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.

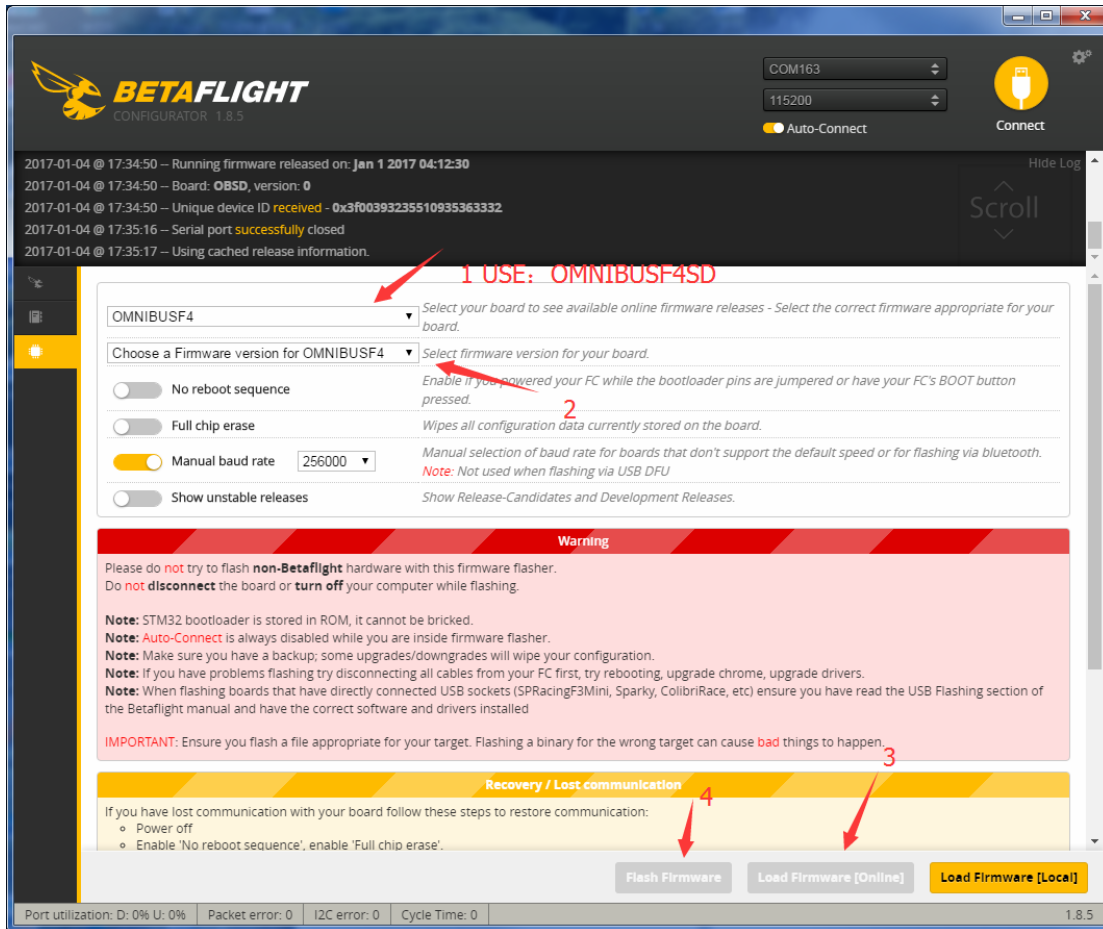
Down: <http://zadig.akeo.ie/>



- 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



2017-01-04 @ 17:34:50 – Running firmware released on: Jan 1 2017 04:12:30
 2017-01-04 @ 17:34:50 – Board: **OMNIBUSF4**, version: 0
 2017-01-04 @ 17:34:50 – Unique device ID received - 0x3f00393235510935363332
 2017-01-04 @ 17:35:16 – Serial port **successfully** closed
 2017-01-04 @ 17:35:17 – Using cached release information.

COM163
 115200
 Auto-Connect
 Connect

Hide Log
 Scroll

OMNIBUSF4
 Choose a Firmware version for OMNIBUSF4
 No reboot sequence
 Full chip erase
 Manual baud rate 256000
 Show unstable releases

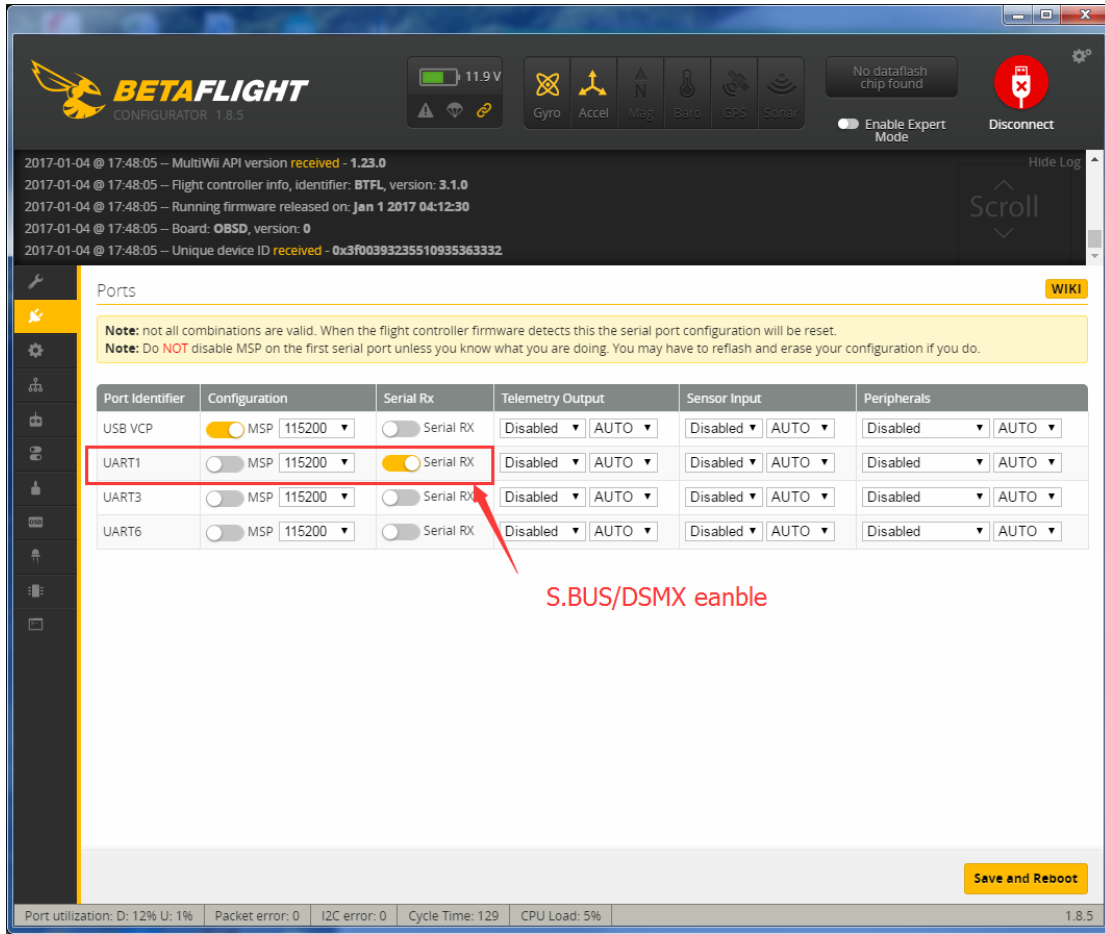
Warning
 Please do **not** try to flash **non-Betaflight** hardware with this firmware flasher.
 Do **not disconnect** the board or **turn off** your computer while flashing.
Note: STM32 bootloader is stored in ROM, it cannot be bricked.
Note: **Auto-Connect** is always disabled while you are inside firmware flasher.
Note: Make sure you have a backup; some upgrades/downgrades will wipe your configuration.
Note: If you have problems flashing try disconnecting all cables from your FC first, try rebooting, upgrade chrome, upgrade drivers.
Note: When flashing boards that have directly connected USB sockets (SPRacingF3Mini, Sparky, ColibriRace, etc) ensure you have read the USB Flashing section of the Betaflight manual and have the correct software and drivers installed
IMPORTANT: Ensure you flash a file appropriate for your target. Flashing a binary for the wrong target can cause **bad** things to happen.

Recovery / Lost communication
 If you have lost communication with your board follow these steps to restore communication:
 • Power off
 • Enable 'No reboot sequence', enable 'Full chip erase'.

Flash Firmware Load Firmware [Online] Load Firmware [Local]

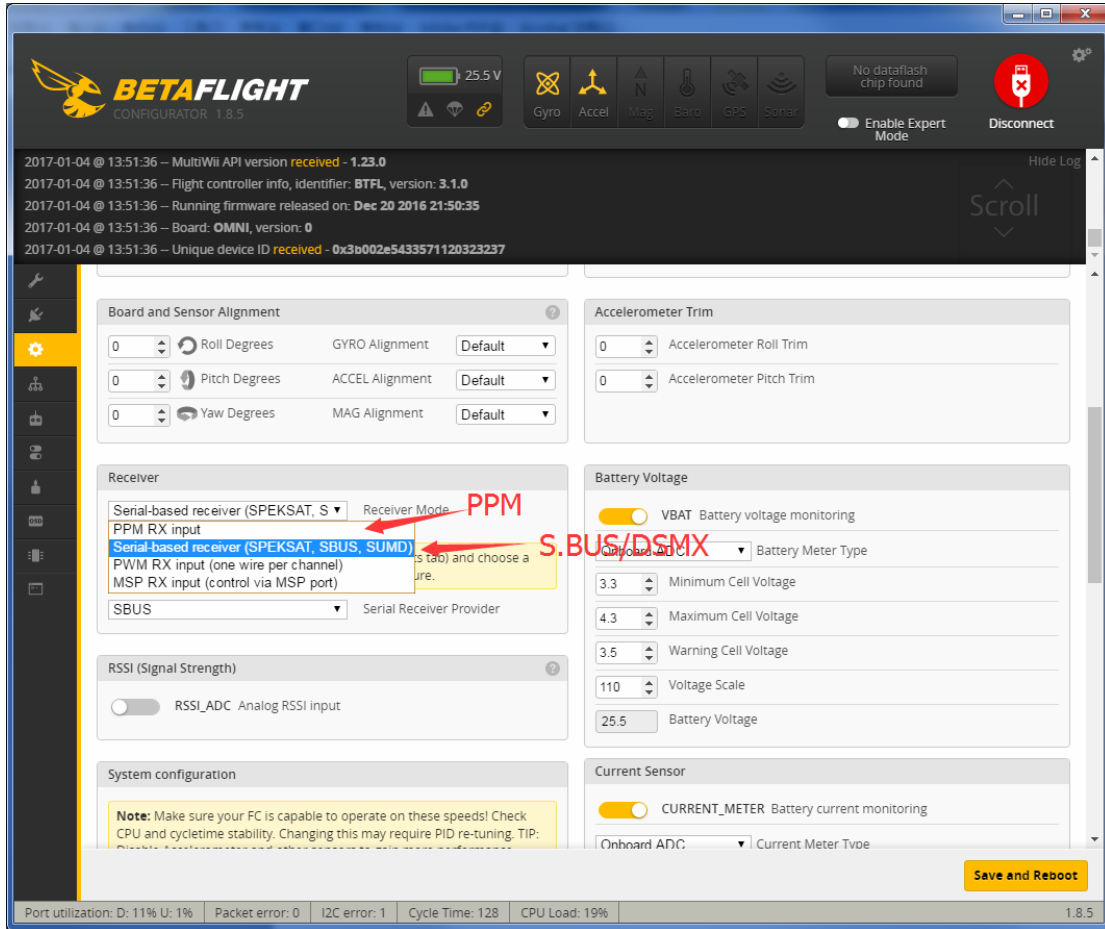
Port utilization: D: 0% U: 0% Packet error: 0 I2C error: 0 Cycle Time: 0 1.8.5

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



The screenshot shows the Betaflight Configurator 1.8.5 interface. At the top, there is a battery level indicator at 11.9V and various sensor status icons (Gyro, Accel, Mag, Baro, GPS, Sonar). A log window displays system messages, including "MultiWii API version received - 1.23.0" and "Flight controller info, identifier: BTFL, version: 3.1.0". The main configuration area is titled "Ports" and contains a table of serial port settings. A red box highlights the "UART1" row, and a red arrow points to the "Serial RX" toggle, which is currently turned on. Below the table, the text "S.BUS/DSMX enable" is written in red. At the bottom of the interface, there is a "Save and Reboot" button and a status bar showing system metrics like "Port utilization: D: 12% U: 1%", "Packet error: 0", "I2C error: 0", "Cycle Time: 129", and "CPU Load: 5%".

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 type="checkbox"/> MSP 115200	<input checked="" type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO
UART3	<input type="checkbox"/> MSP 115200	<input type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO
UART6	<input type="checkbox"/> MSP 115200	<input type="checkbox"/> Serial RX	Disabled AUTO	Disabled AUTO	Disabled AUTO

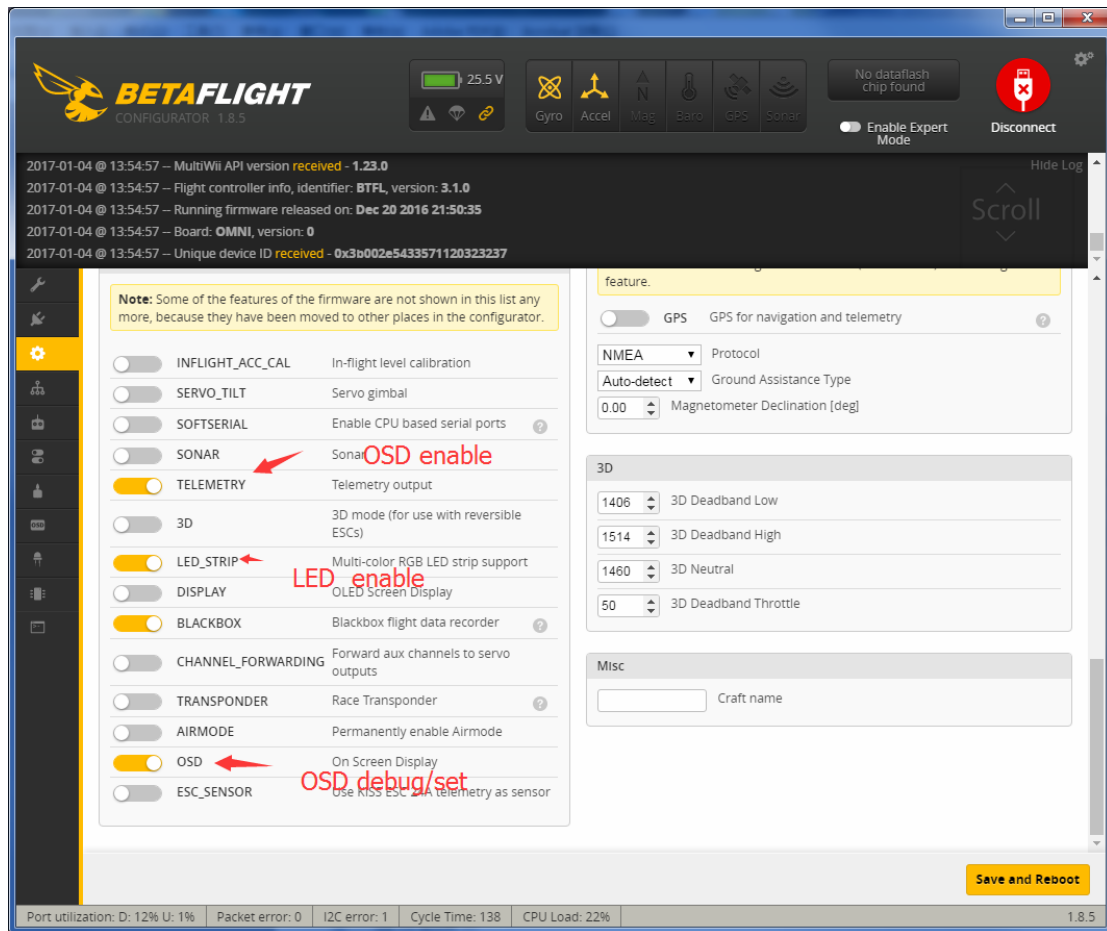


The screenshot shows the Betaflight configurator interface. At the top, there's a status bar with a battery icon showing 25.5V and various sensor status icons (Gyro, Accel, Mag, Baro, GPS, Sonar). A log window displays system messages: "2017-01-04 @ 13:51:36 - MultiWii API version received - 1.23.0", "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:** Includes Roll Degrees, Pitch Degrees, and Yaw Degrees, each with a corresponding alignment dropdown (GYRO, ACCEL, MAG) set to Default.
- Accelerometer Trim:** Includes Accelerometer Roll Trim and Accelerometer Pitch Trim, both set to 0.
- Receiver:** The "Receiver Mode" dropdown is set to "PPM". A red arrow points to this dropdown with the text "PPM". Below it, the "Serial Receiver Provider" dropdown is set to "SBUS". A red arrow points to this dropdown with the text "S.BUS/DSMX".
- Battery Voltage:** Includes a "VBAT Battery voltage monitoring" toggle (checked), "Battery Meter Type" set to "Onboard ADC", and various voltage settings: Minimum Cell Voltage (3.3), Maximum Cell Voltage (4.3), Warning Cell Voltage (3.5), Voltage Scale (110), and Battery Voltage (25.5).
- Current Sensor:** Includes a "CURRENT_METER Battery current monitoring" toggle (checked) and "Current Meter Type" set to "Onboard ADC".

At the bottom right, there is a yellow "Save and Reboot" button. The bottom status bar shows: "Port utilization: D: 11% U: 1% Packet error: 0 I2C error: 1 Cycle Time: 128 CPU Load: 19% 1.8.5".



BETAFLIGHT
CONFIGURATOR 1.8.5

25.5 V

No dataflash chip found

Enable Expert Mode

Disconnect

2017-01-04 @ 13:54:57 - MultiWii API version received - 1.23.0
2017-01-04 @ 13:54:57 - Flight controller info, identifier: BTFL, version: 3.1.0
2017-01-04 @ 13:54:57 - Running firmware released on: Dec 20 2016 21:50:35
2017-01-04 @ 13:54:57 - Board: OMNI, version: 0
2017-01-04 @ 13:54:57 - Unique device ID received - 0x3b002e5433571120323237

Note: Some of the features of the firmware are not shown in this list any more, because they have been moved to other places in the configurator.

- INFLIGHT_ACC_CAL In-flight level calibration
- SERVO_TILT Servo gimbal
- SOFTSERIAL Enable CPU based serial ports
- SONAR Sonar **OSD enable**
- TELEMETRY Telemetry output
- 3D 3D mode (for use with reversible ESCs)
- LED_STRIP Multi-color RGB LED strip support **LED enable**
- DISPLAY OLED Screen Display
- BLACKBOX Blackbox flight data recorder
- CHANNEL_FORWARDING Forward aux channels to servo outputs
- TRANSPONDER Race Transponder
- AIRMODE Permanently enable Airmode
- OSD On Screen Display **OSD debug/set**
- ESC_SENSOR Use Kiss ESC 24A telemetry as sensor

feature:

- GPS GPS for navigation and telemetry

NMEA Protocol

Auto-detect Ground Assistance Type

0.00 Magnetometer Declination [deg]

3D

- 1406 3D Deadband Low
- 1514 3D Deadband High
- 1460 3D Neutral
- 50 3D Deadband Throttle

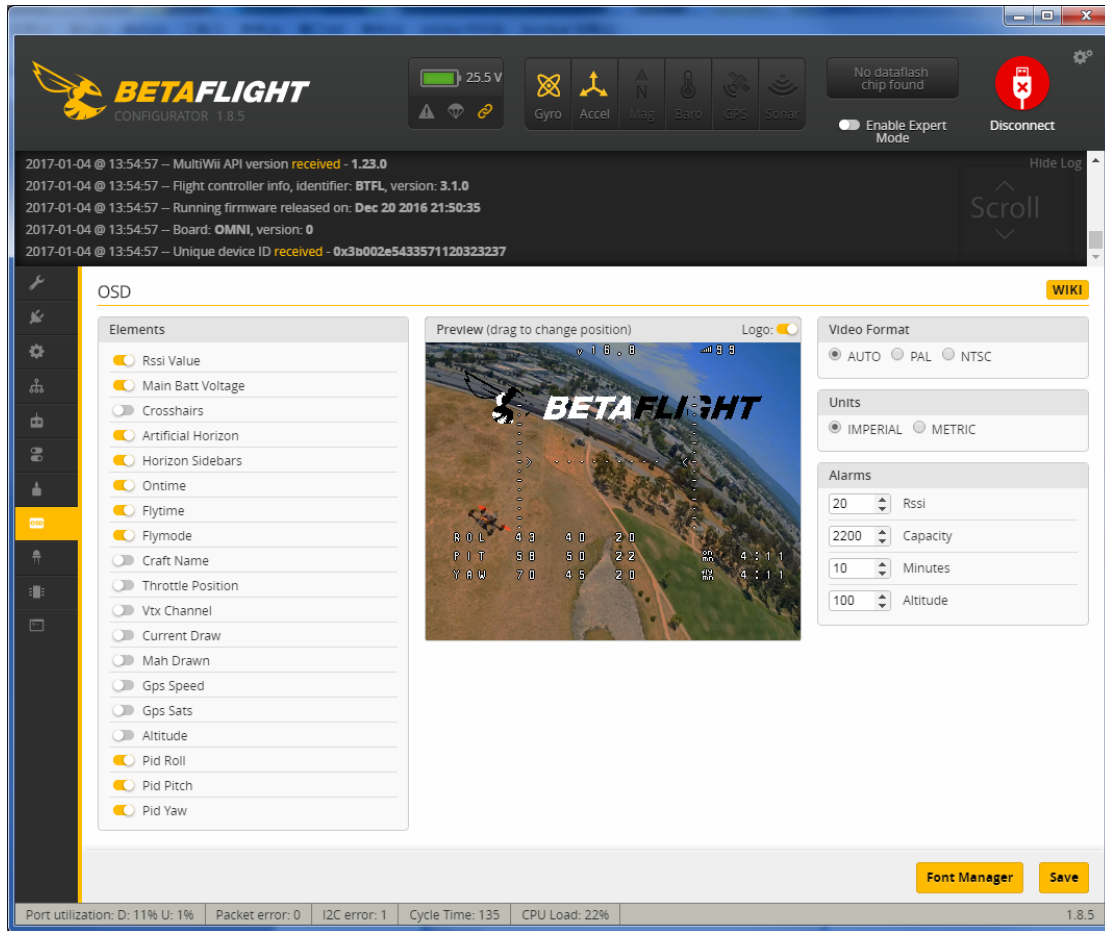
Misc

Craft name

Save and Reboot

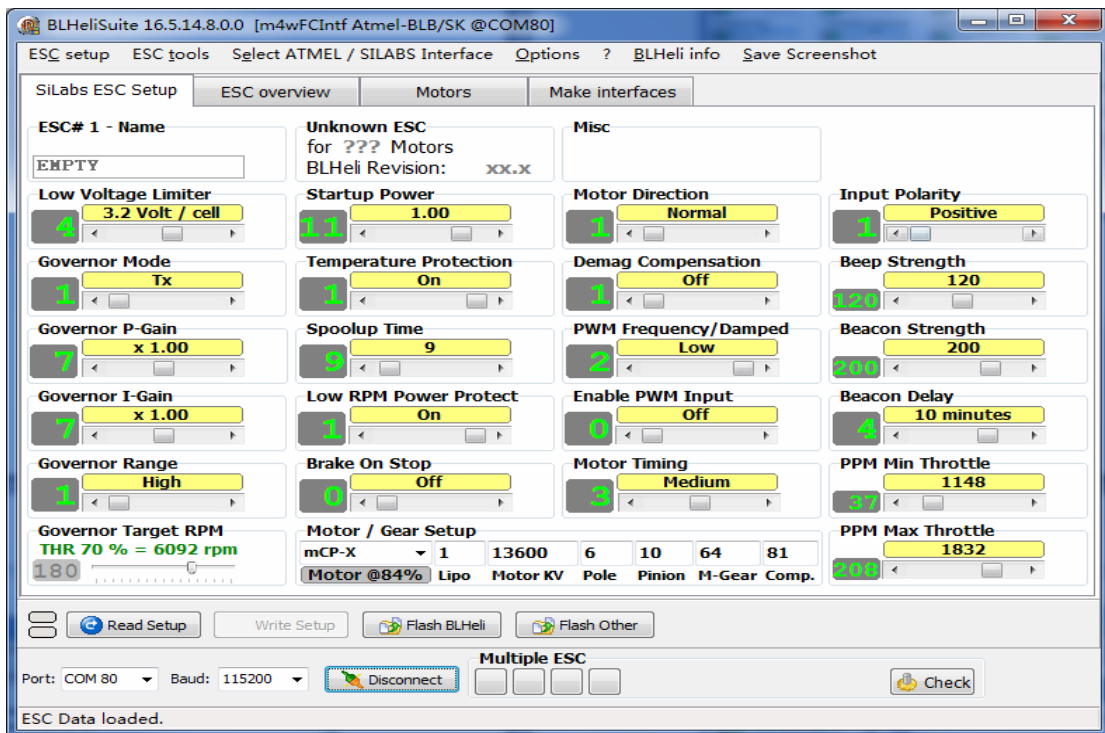
Port utilization: D: 12% U: 1% Packet error: 0 I2C error: 1 Cycle Time: 138 CPU Load: 22% 1.8.5

OSD setting and ubgrade firmware

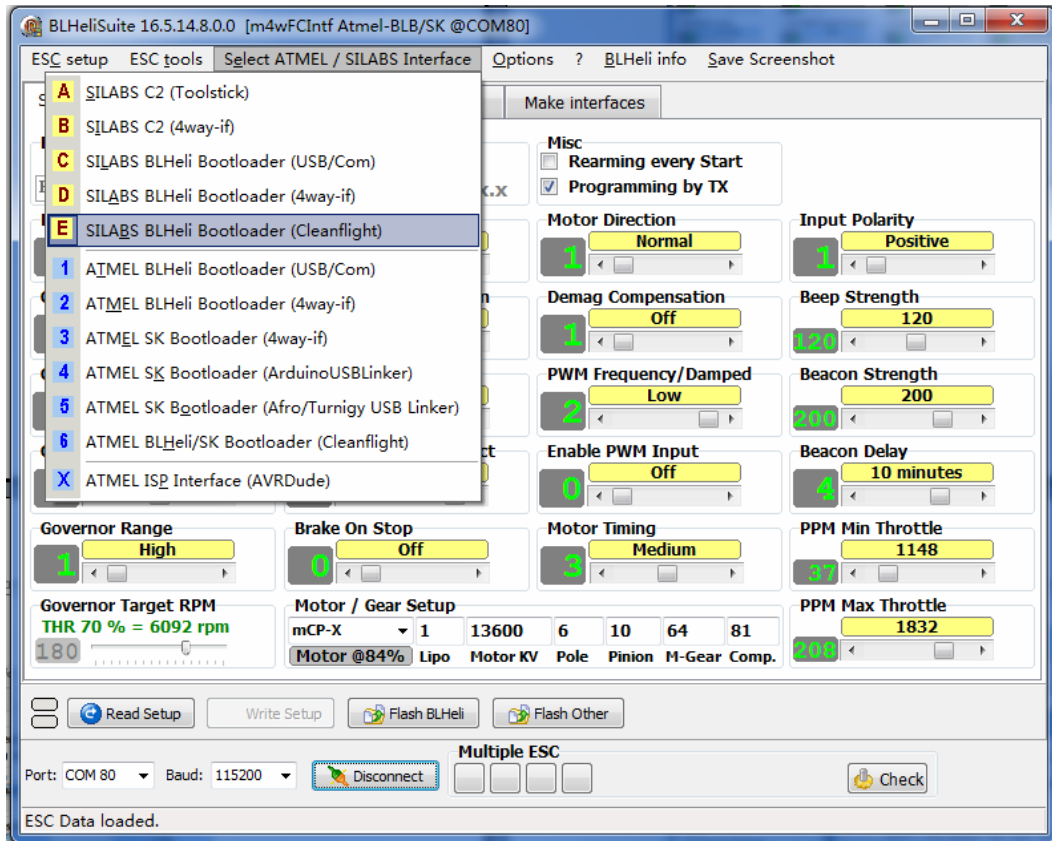


ESC use and upgrade firmware

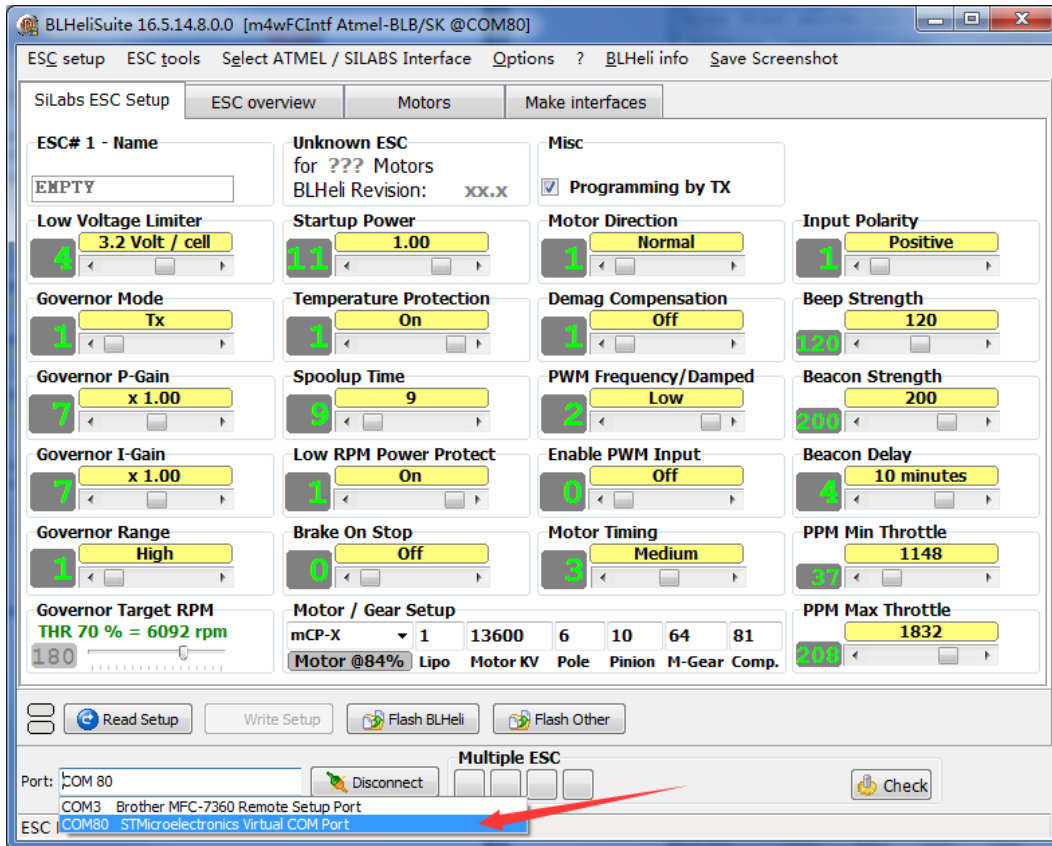
1. Open



2, Choose



3, Choose a port



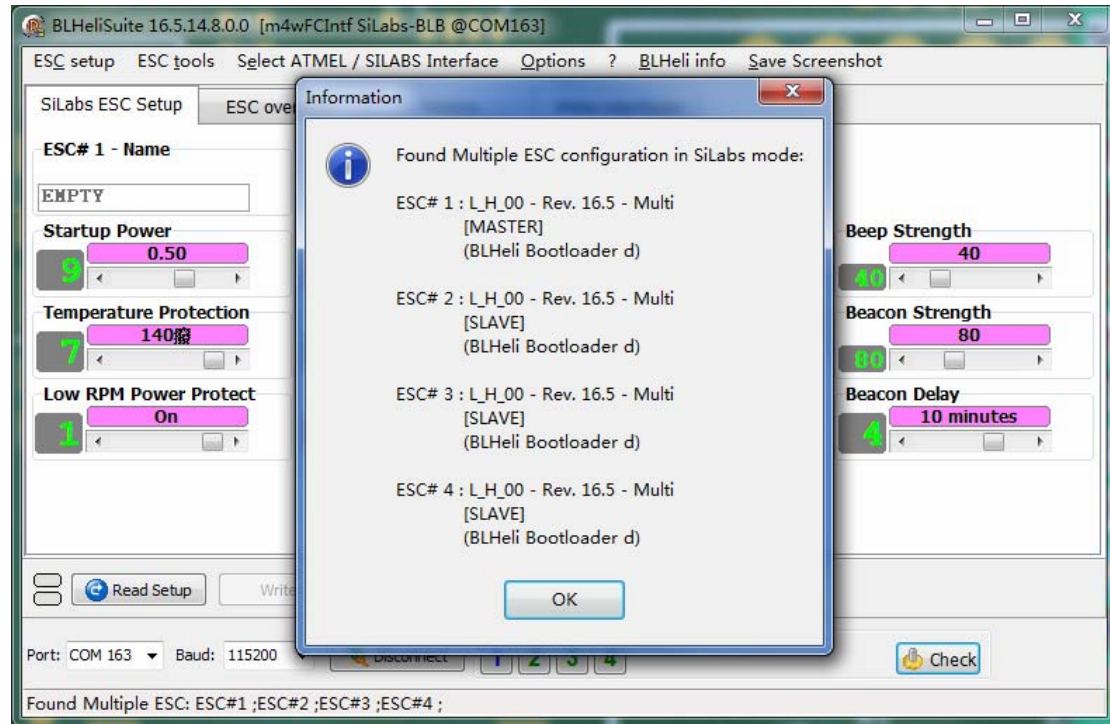
4, Connet USB cable to FlyTower F1 FC Board

5, Connect

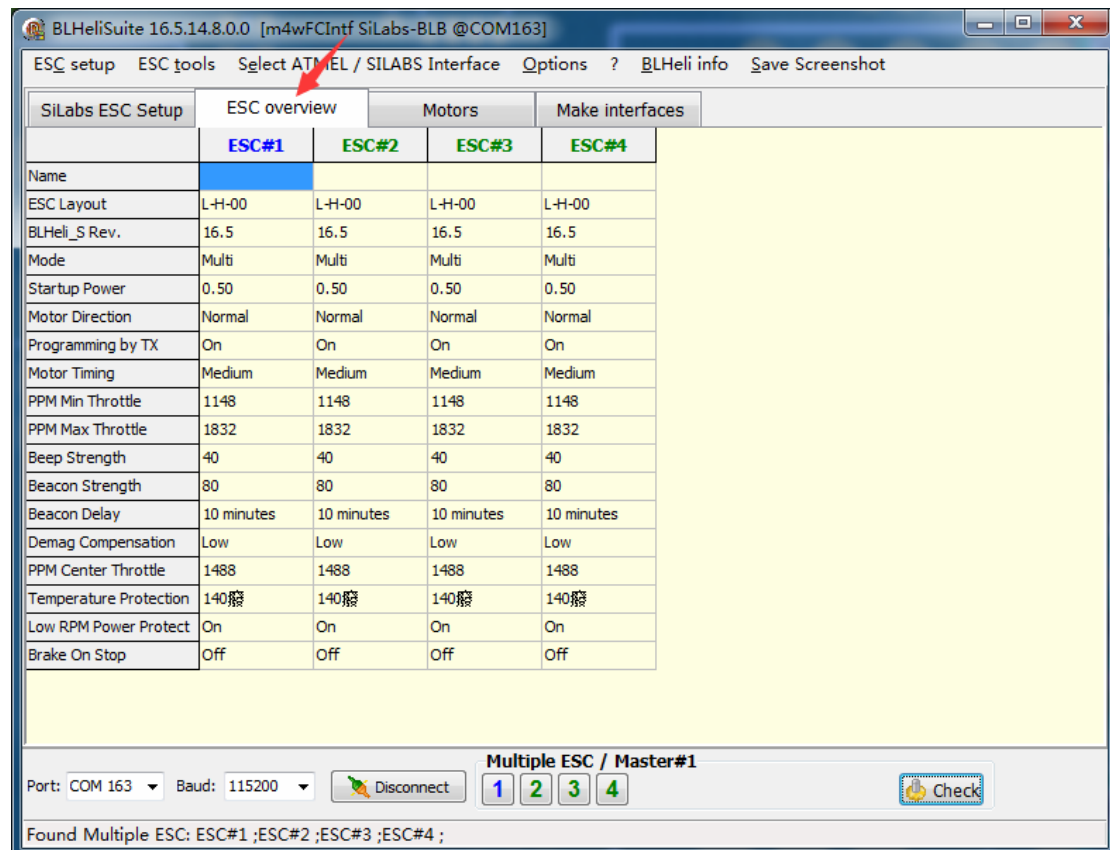
6, Connet BAT Power to ESC board

7, Check ESC Information

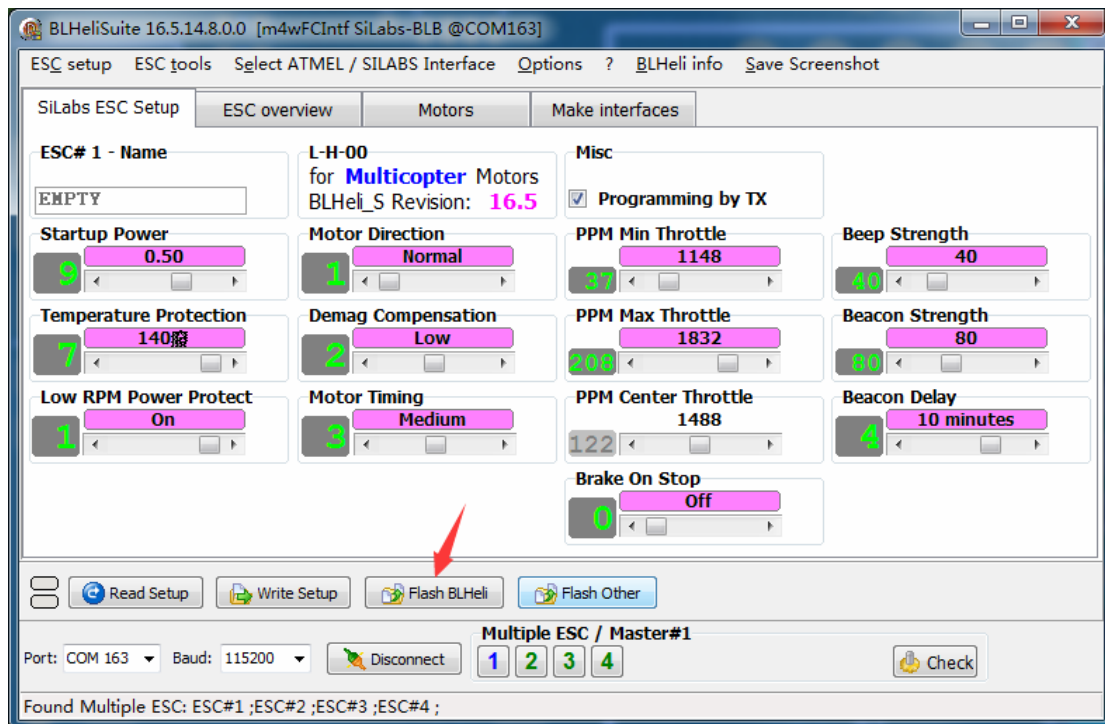
8, Check Flash Show



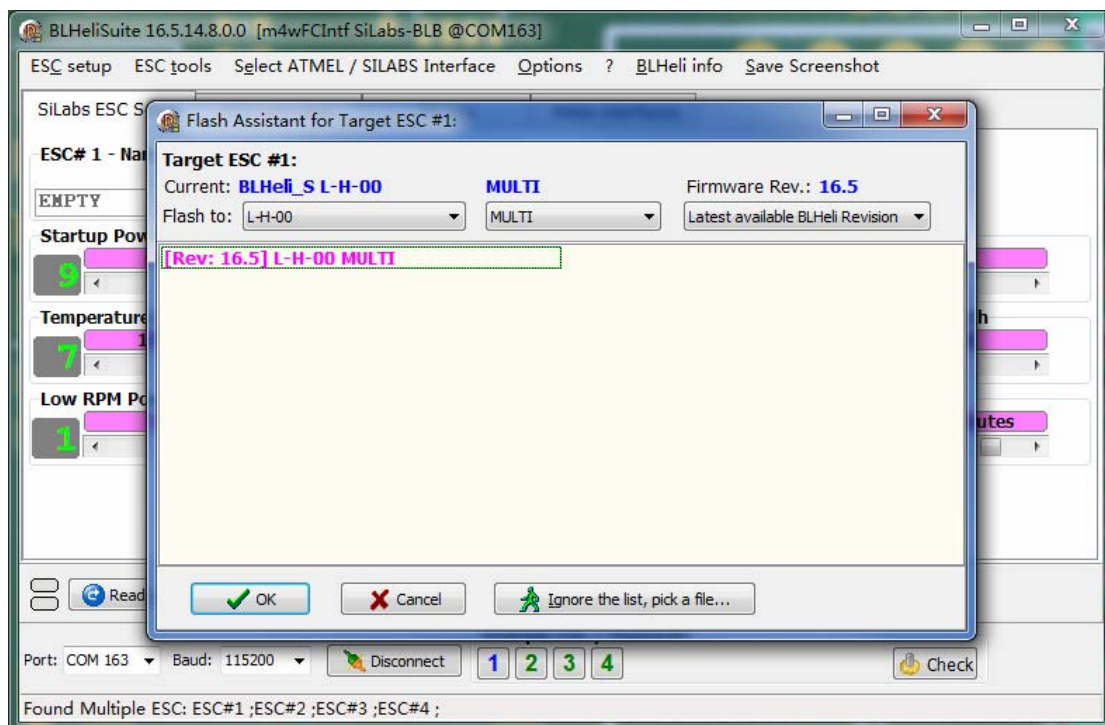
9, For more information view



10, Upgrade Flash for ESC



11, Choose ESC Firmware and upgrade



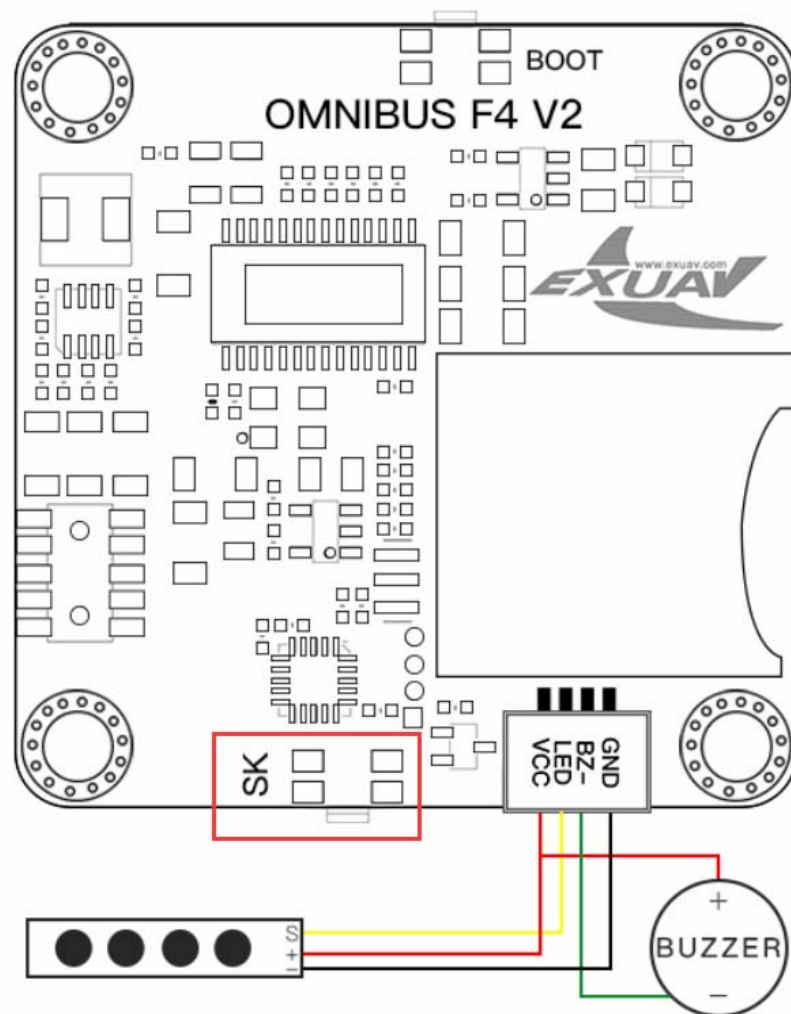
VTX use and settings

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 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			