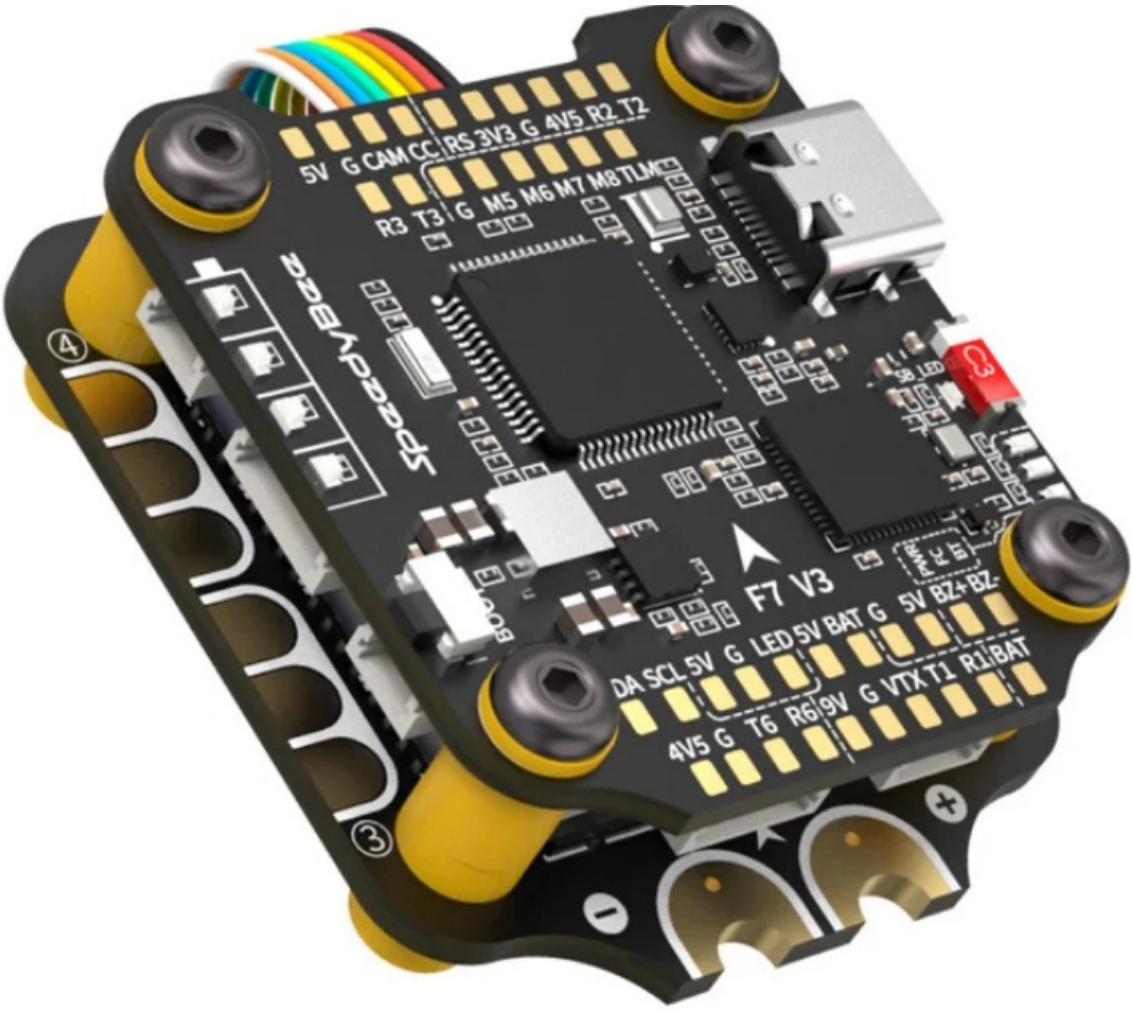
SpeedyBee F405 V3 ESC Stack For Drone User Manual

Contents

SpeedyBee F405 V3 ESC Stack For Drone



Specifications

- **Product Name:** SpeedyBee F405 V3 BLS 60A 30×30 Stack
- **Flight Controller:** SpeedyBee F405 V3
- **ESC:** SpeedyBee BLS 60A 4-in-1
- **Bluetooth Wireless:** Supported
- **FC Firmware Flashing:** Not Supported
- **Power Input:** 3-6S LiPo
- **Mounting Dimension:** 30.5 x 30.5mm, 4mm hole size
- **Weight:** 23.4g

Product Usage Instructions

FC & ESC Connection

Use the 8-pin cable provided in the package to connect the FC and the ESC. Alternatively, you can solder 8 wires directly to the 8 pads on each end.

Method 1 – Using an 8-pin cable

Use any end of the 8-pin JST cable to connect the FC to the ESC.

Method 2 – Direct Soldering

Solder 8 wires to the 8 pads on each end following the pad definition provided in the manual.

SpeedyBee F405 V3 Flight Controller

Detailed instructions on layout, connections, and firmware updates for the F405 V3 flight controller are provided in the manual. Make sure to follow the steps carefully for optimal performance.

SpeedyBee BLS 60A 4-in-1 ESC

The manual includes information on layout, motor connections, ESC configuration, and firmware updates for the BLS 60A ESC. Refer to these instructions when setting up the ESC.

FAQ

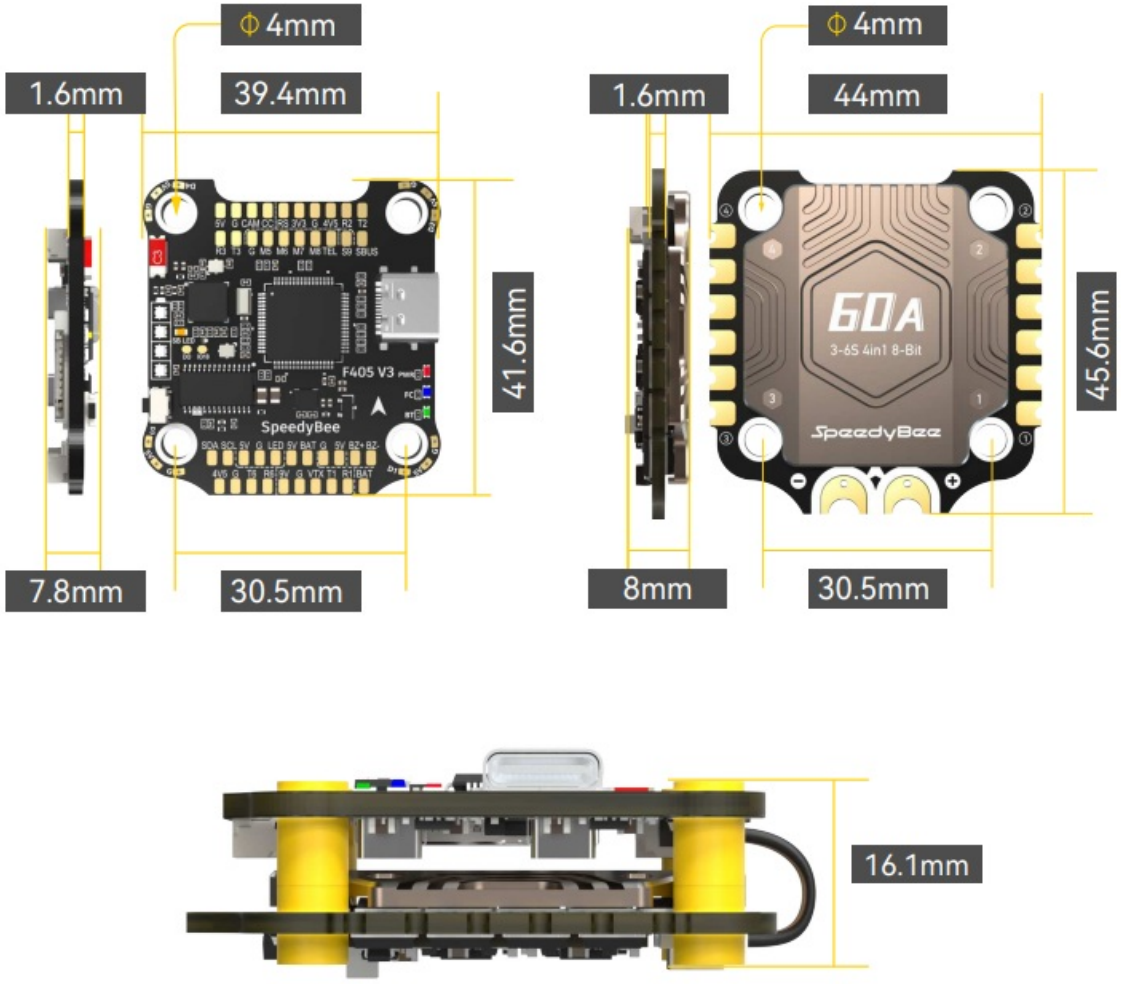
- **Q: Can I use a different power input other than 3-6S LiPo?**
  - A: No, it is recommended to use a 3-6S LiPo power input to ensure the proper functioning of the stack.
- **Q: How do I update the firmware for the Flight Controller?**
  - A: To update the firmware for the Flight Controller, follow the steps outlined in the manual under the “FC Firmware Update” section.

Overview

Specs Overview

Product Name	SpeedyBee F405 V3 BLS 60A 30x30 Stack
Flight Controller	SpeedyBee F405 V3 Flight Controller
ESC	SpeedyBee BLS 60A 4-in-1 ESC
Bluetooth	Supported. For FC & ESC parameter settings
Wireless FC Firmware Flashing	NOT Supported
Wireless Blackbox Dwonload & Analysis	NOT Supported
Power Input	3-6S LiPo
Mounting	30.5 x 30.5mm （4mm hole size ）
Dimension	45.6mm(L) x 44mm(W) x 18.3mm(H)
Weight	23.4g

Dimensions



Package

SpeedyBee F405 V3 60A 30×30 Stack

1. SpeedyBee F405 V3 Flight Controller x 1
2. SpeedyBee BLS 60A 4-in-1 ESC x 1
3. 35V 1000uF Low ESR Capacitor x 1
4. M3 Nylon Nut x 5

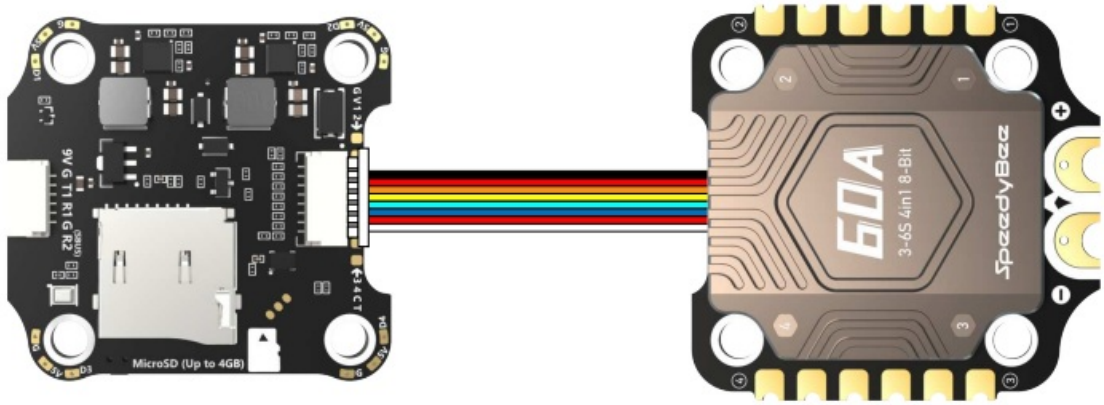
5. M3 silicone O Ring x 5
6. M3*8mm Silicone Grommets(for FC) x 1
7. M3*8.1mm Silicone Grommets(for ESC) x 1
8. SH 1.0mm 25mm-length 8pin Cable(for FC-ESC connection) x 1
9. M3*30mm Iner-hexagon Screws x 5
10. DJI 6pin Cable(80mm) x 1
11. XT60 Power Cable(100mm) x 1

FC & ESC Connection

Use the 8-pin cable in the package to connect the FC and the ESC. \Or solder 8 wires directly to the 8 pads on each end.

Method 1 – Using 8-pin cable

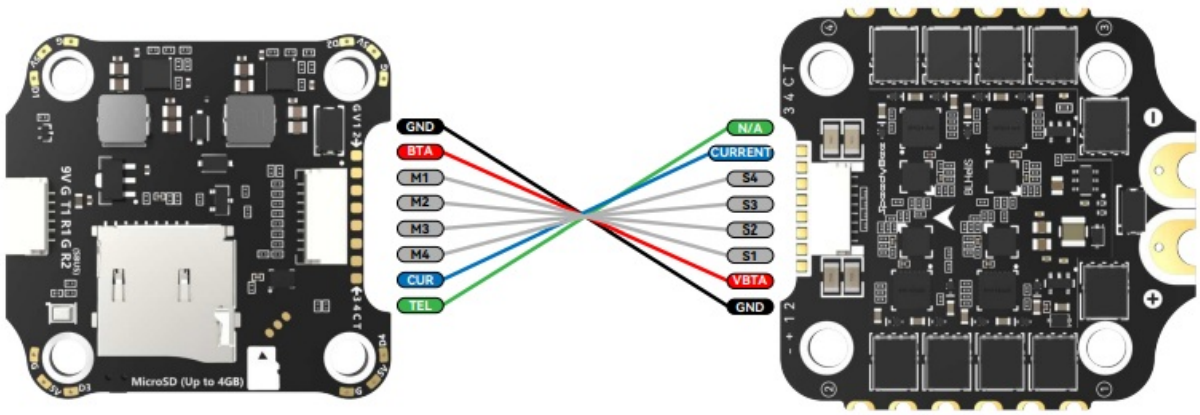
Use any end of the 8-pin JST cable to connect the FC to the ESC.



F405 V3 Flight Controller BLS 60A 4-in-1 ESC

Method 2 – Direct soldering

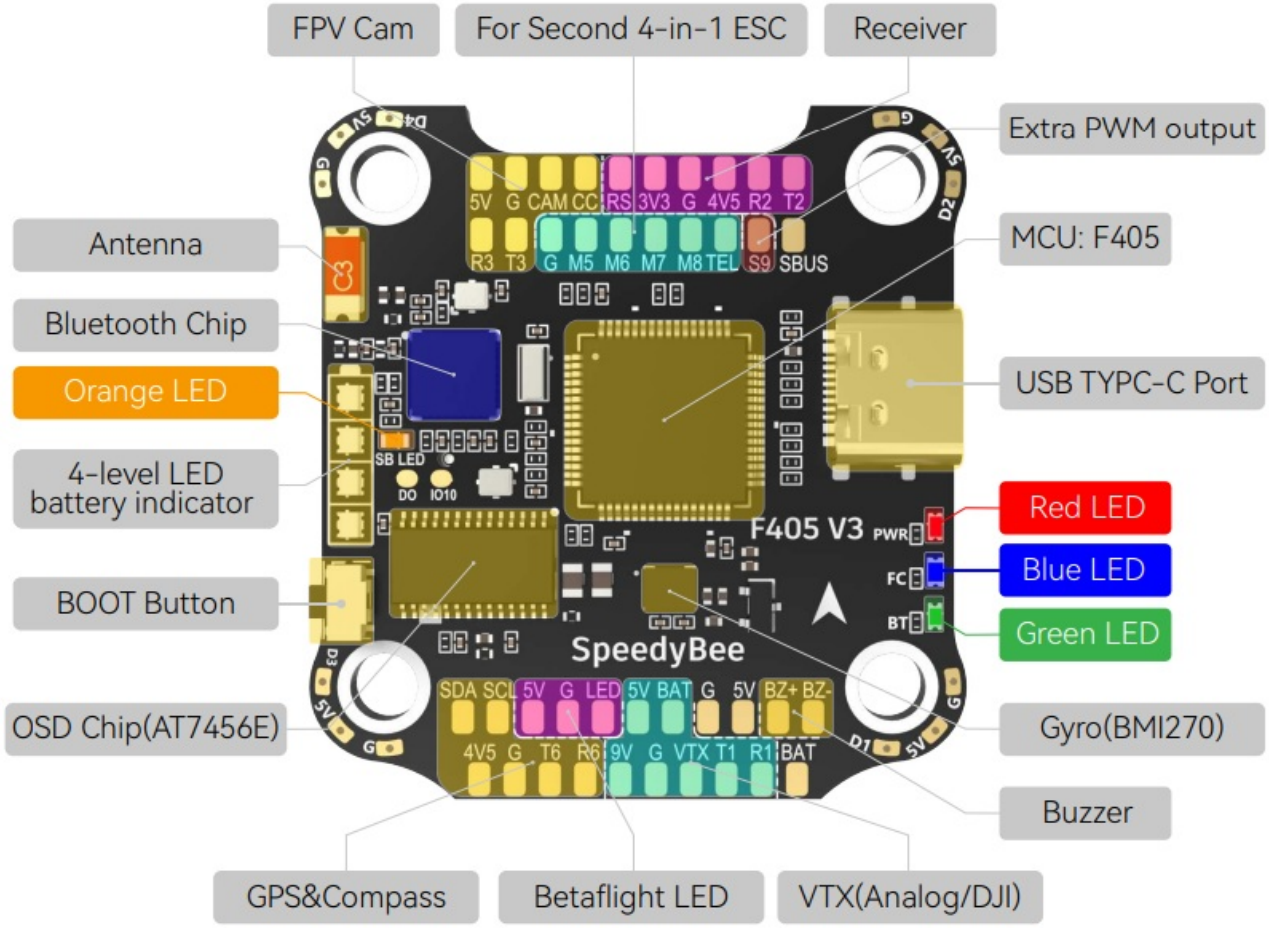
Solder 8 wires to the 8 pads on each end referring to the pad definition below.



F405 V3 Flight Controller BLS 60A 4-in-1 ESC

F405 V3 Flight Controller

Layout



LED Indicator Definition

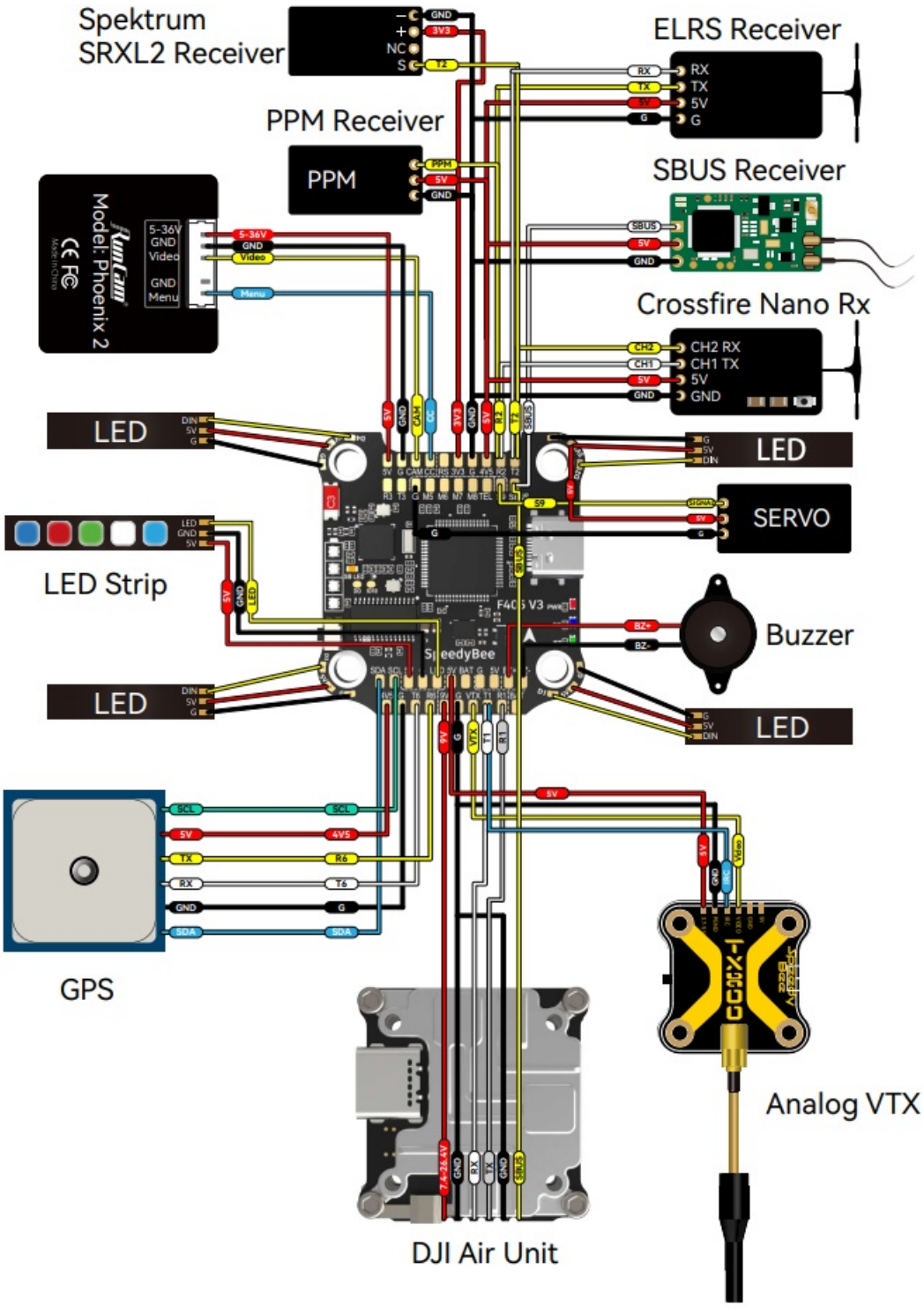
- RED LED – Power Indicator.Solid Red after powering up.
- GREEN LED – Bluetooth status light. Solid Green indicates Bluetooth is connected.
- BLUE LED – Flight controller status light which is controlled by the flight controller firmware.
- Orange LED – LED Control Mode Indicator. It indicates the 4 sets of LED strips connected to LED1-LED pads on the corners of the flight controller are controlled by Betaflight firmware(BF_LED mode) or the Bluetooth chip(SB_LED mode).
    - Solid Orange: indicates the 4 x LEDs are in SB_LED mode. In this mode, when the FC is powered on and in standby mode, press the BOOT button to cycle the display modes of the LEDs.
    - OFF: indicates the 4 x LEDs are controlled by Betaflight firmware. Long press the button for 3 seconds to switch the control modes between BF_LED mode and SB_LED mode.

BOOT Button

[AlOnly if the flight controller gets bricked and can’t power up, please follow these steps to re-flash firmware for it:

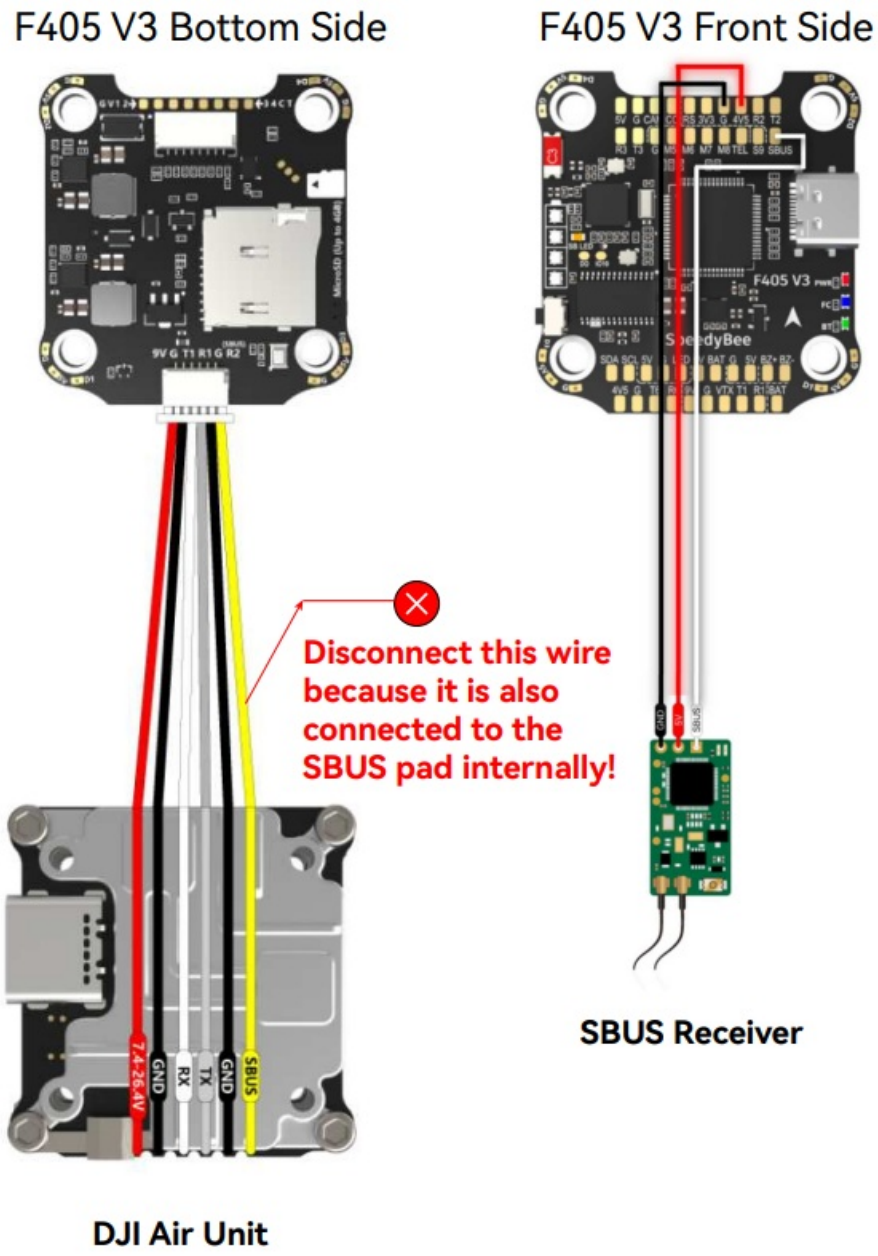
1. Insert a USB A to TYPE-C cable to your PC.
2. Press and hold the BOOT button, insert the USB cable into the flight controller, then release the BOOT button.
3. Open Betaflight/INAV configurator on the PC, go to the ‘Firmware Flashing’ page, choose the target ‘SPEEDYBEEF405V3’ and flash. [B]. When the FC is powered on and in standby mode, the BOOT button can be used to controller the LED strips connected to LED1-LED pads on the corners. By default, short-press the BOOT button to cycle the LED displaying mode. Long-press the BOOT button to switch between SpeedyBee-LED mode and BF-LED mode. Under BF-LED mode, all the LED1-LED4 strips will be controlled by the Betaflight firmware\

FC’s Peripheral Connection



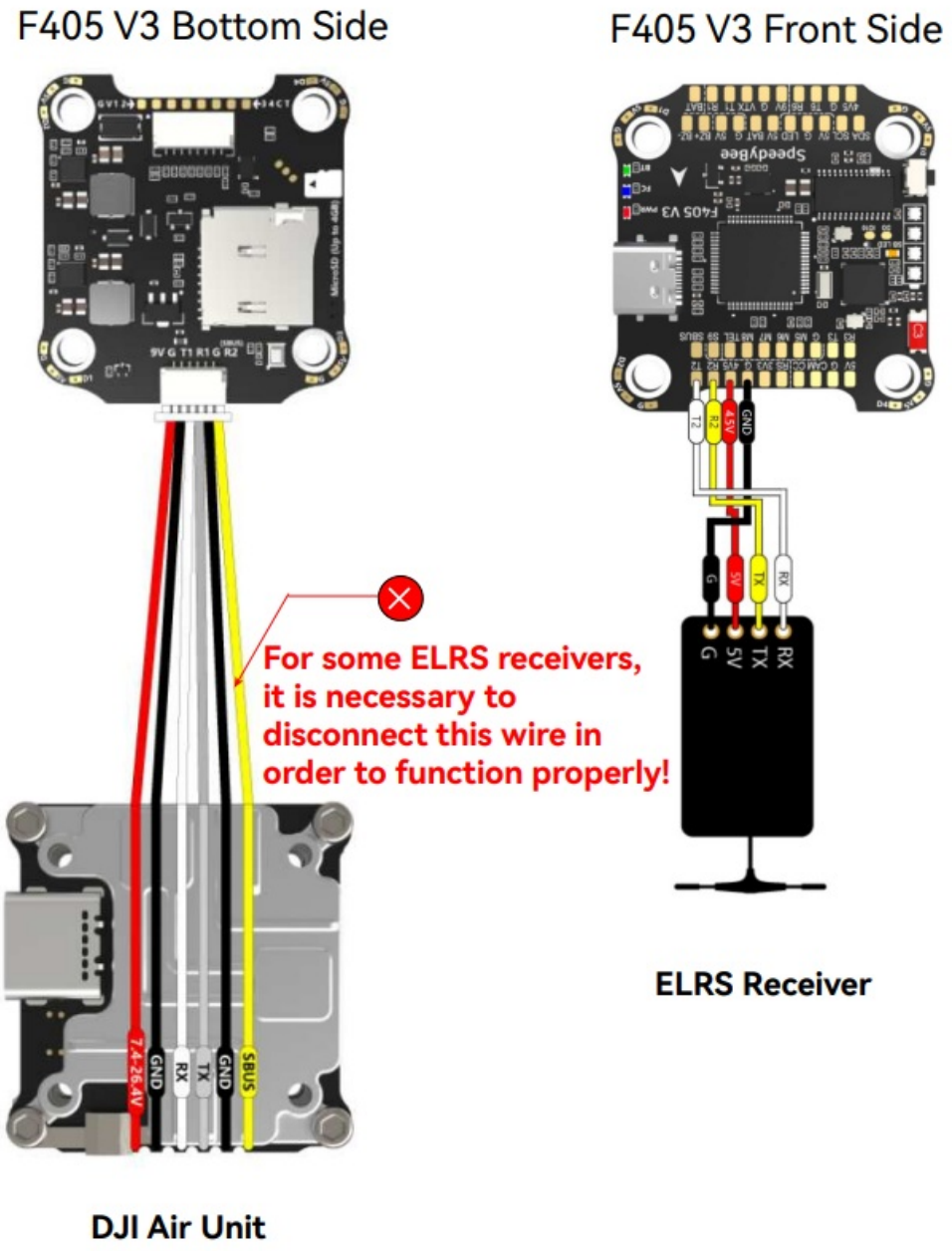
Importance notice for SBUS receiver

When using an SBUS receiver, the SBUS signal wire of the receiver must be connected to the SBUS pad on the front side of the flight controller (this pad internally uses UART2). If you are also using the DJI Air Unit and have connected it to the flight controller through the dedicated 6-pin harness on the back, you will need to disconnect the SBUS signal wire from the Air Unit harness. Failure to do so will prevent the SBUS receiver from being properly recognized by the flight controller. You can use tweezers to pick out the SBUS wire from the 6-pin harness connector (or directly cut this wire) and insulate the exposed part of the wire carefully.



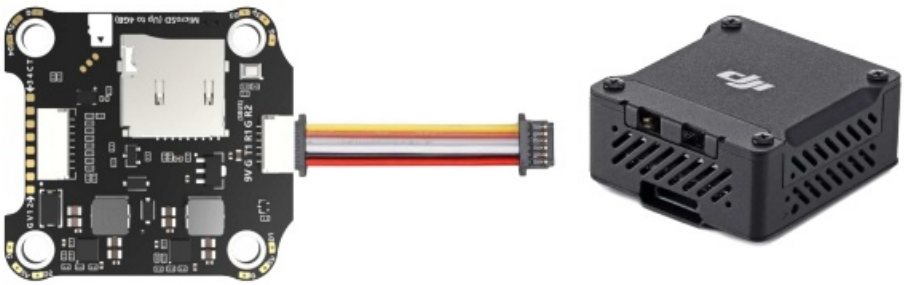
Importance notice for ELRS receiver

We recommend connecting the ELRS receiver's TX and RX to the T2 and R2 pads on the flight controller. However, when using the DJI Air Unit simultaneously, some ELRS receivers may not be recognized properly by the flight controller. If you encounter this issue, you need to disconnect the SBUS signal wire from the Air Unit harness. You can use tweezers to pick out the SBUS wire from the 6-pin harness connector (or directly cut this wire) and insulate the exposed part of the wire carefully.



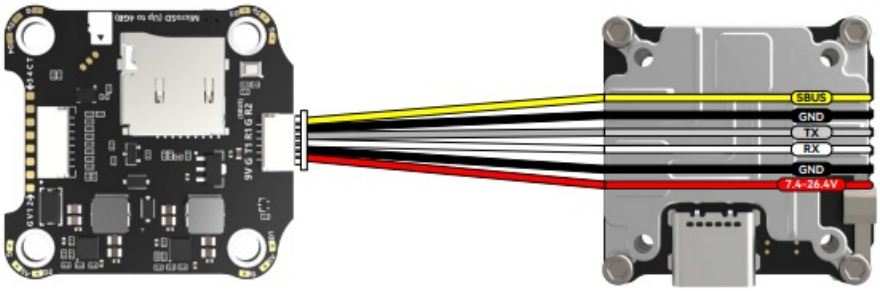
Cable Connection vs DJI 03 Air Unit

Use 6-pin cable comes with the 03 Air Unit



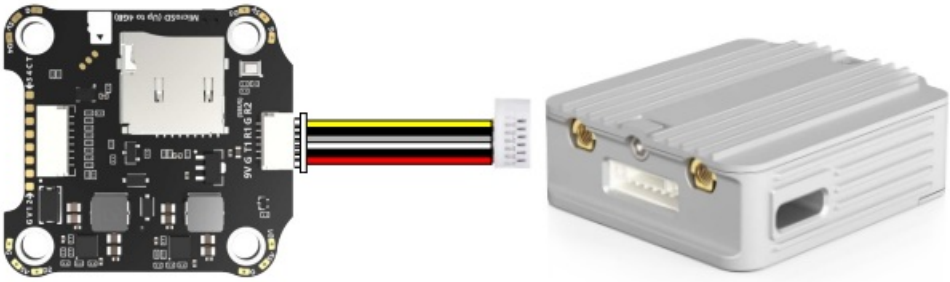
Cable Connection vs RunCam Link/ Caddx Vista Air Unit

Use 6-pin cable comes with the F405 V3 stack (See the accessory No.10 in the package section)



Cable Connection Vs DJI Air Unit V1

Use 6-pin cable comes with the F405 V3 stack (See the accessory No.10 in the package section)

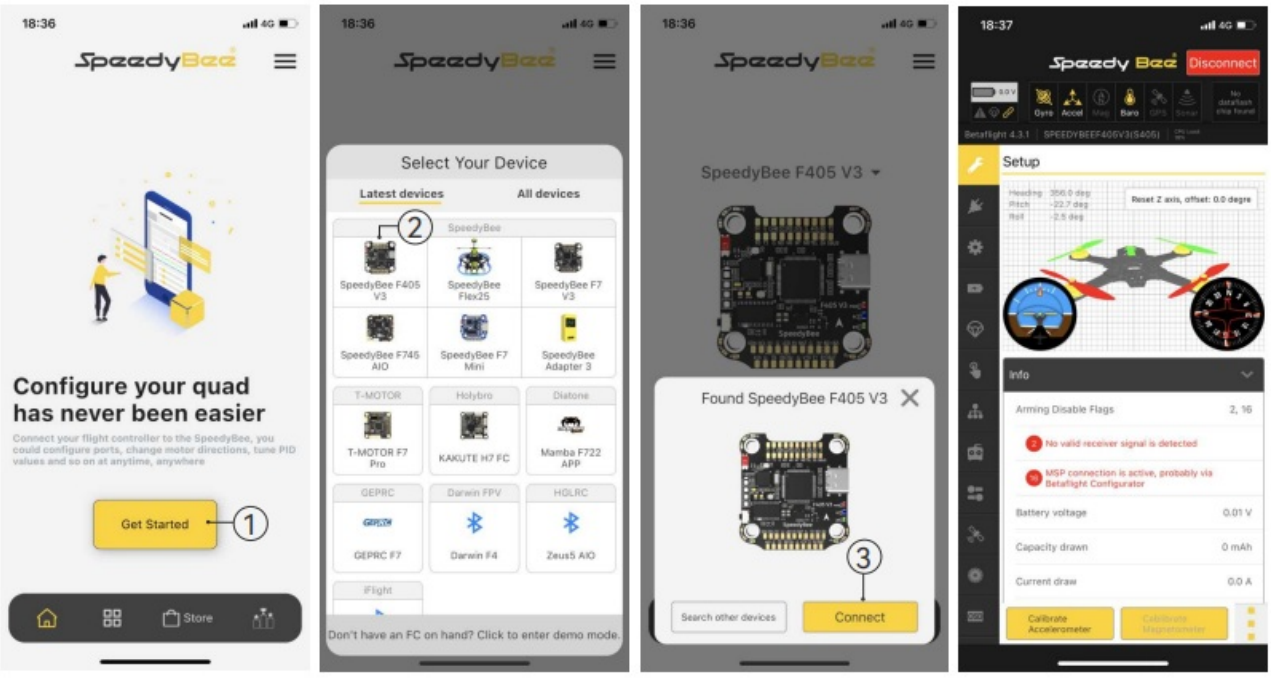


App & FC Configuration

Get the SpeedyBee App

Search ‘SpeedyBee’ on Google Play or App Store. Or download the Android .apk file on our website: https://www.speedybee.com/download.

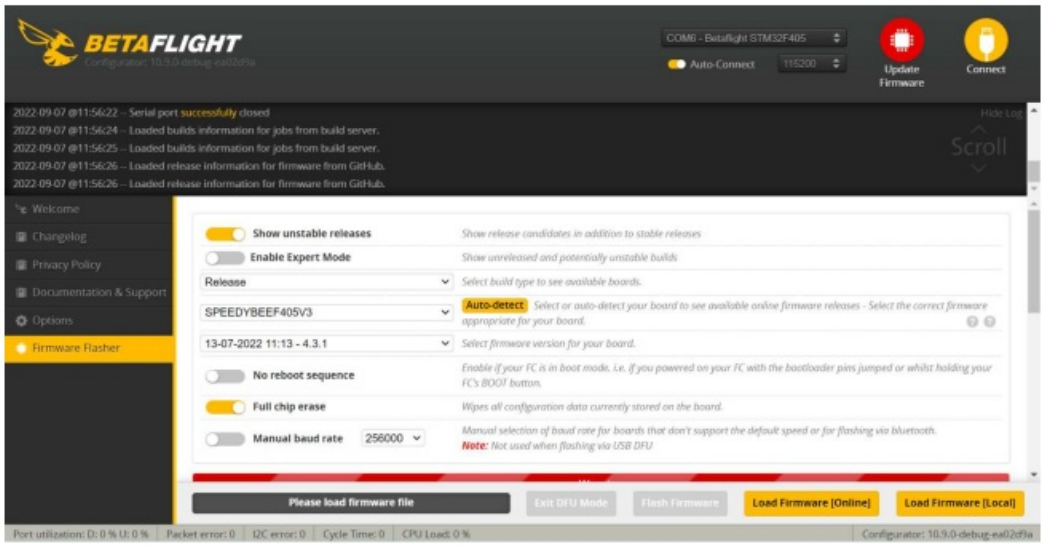
FC Configuration



FC Firmware Update

SpeedyBee F405 V3 flight controller does not support wireless firmware flashing, so please flash firmware for it on your PC following the steps below:

1. Connect the flight controller to the PC with a USB cable
2. Open the Betafight/ INAV configurator on your PC. Take the Betaflight configurator as an example, go to the ‘Firmware Flashing’ page, choose the target ‘SPEEDYBEEF405V3’, and flash.



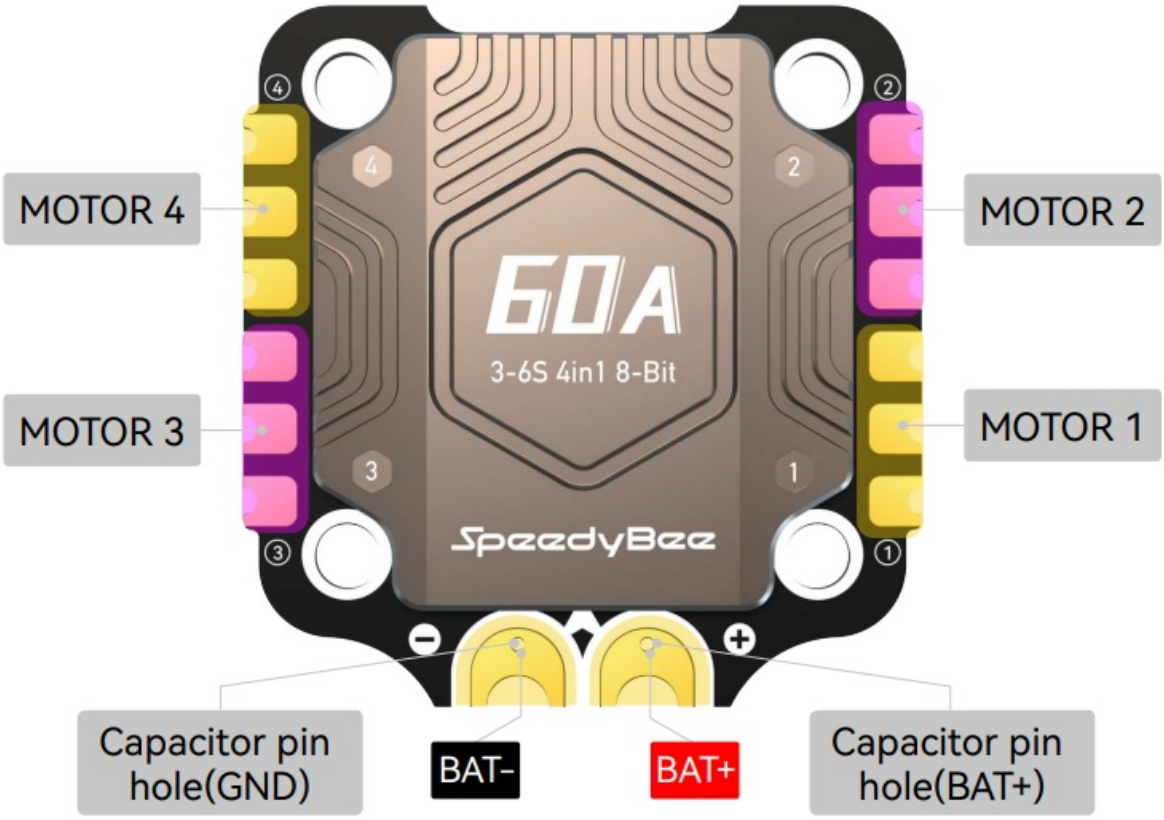
Specifications

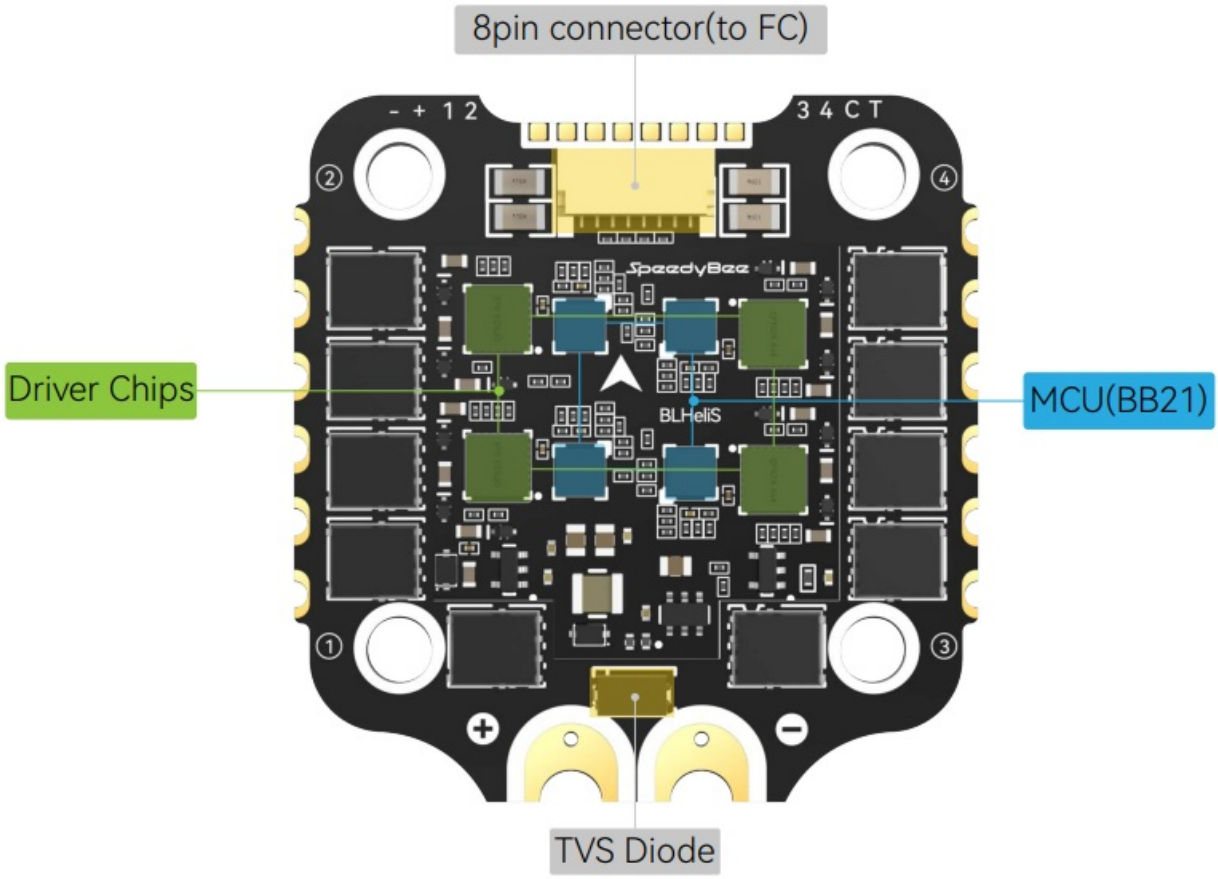
Product Name	SpeedyBee F405 V3 30x30 Flight Controller
MCU	STM32F405
IMU(Gyro)	BMI270
USB Port Type	Type-C
Barometer	Built-in
OSD Chip	AT7456E chip
BLE Bluetooth	Supported. Used to connect with the SpeedyBee App for flight controller and ESC parameter configuration. Please make sure the MSP switch on UART 4 is turned on and set to a baud rate of 115200, otherwise Bluetoothfunctionality will not be available.
WIFI	Not supported
DJI Air Unit Connection Way	Two ways supported: 6-pin connector or direct soldering.
6-pin DJI Air Unit Plug	Supported. Completely compatible with DJI O3/RunCam Link/Caddx Vista/DJI Air Unit V1, no wire is needed to be changed.
Blackbox MicroSD Card Slot	*Betaflight firmware requires the type of the microSD card to be either Standard (SDSC) or High capacity (SDHC), so extended capacity cards (SDXC) are not supported(Many high-speed U3 cards are SDXC). Also the card MUST be formatted with the FAT16 or FAT32 (recommended) filesystems. So, you could use any SD card less than 32GB, but the Betaflight can only recognize 4GB maximum. We suggest you use this 3rd party formatting tool and choose 'Overwrite format' then format your card. Also check out here for the recommended SD cards or buy the tested cards from our store.
Current Sensor Input	Supported. For SpeedyBee BLS 60A ESC, please set scale = 400 and Offset = 0.
Power Input	3-6S LiPo. The flight controller is powered through the G, V wires of the 8pin cable or G, V pads from the bottom side of the flight controller.
5V Output	9 groups of 5V output, four +5V pads and 1 BZ+ pad(used for Buzzer) on front side, and 4x LED 5V pads. The total current load is 2A.
9V Output	2 groups of 9V output, one +9V pad on front side and other included in a connector on bottom side. The total current load is 2A.
3.3V Output	Supported. Designed for 3.3V-input receivers. Up to 500mA current load.
4.5V Output	Supported. Designed for receiver and GPS module even when the FC is powered through the USB port. Up to 1A current load.

ESC Signal	M1 - M4 on bottom side and M5-M8 on front side.
UART	6 sets(UART1, UART2, UART3, UART4(Dedicated for Bluetooth connection)), UART5(Dedicated for ESC telemetry),UART6
ESC Telemetry	UART R5
I2C	Supported. SDA & SCL pads on front side. Used for magnetometer, sonar, etc.
Traditional Betaflight LED Pad	Supported. 5V, G and LED pads on bottom of the front side. Used for WS2812 LED controlled by Betaflight firmware.
Buzzer	BZ+ and BZ- pad used for 5V Buzzer
BOOT Button	Supported. [A]. Press and hold BOOT button and power the FC on at the same time will force the FC to enter DFU mode, this is for firmware flashing when the FC gets bricked. [B]. When the FC is powered on and in standby mode, the BOOT button can be used to controller the LED strips connected to LED1-LED4 connectors on the bottom side. By default, short-press the BOOT button to cycle the LED displaying mode. Long-press the BOOT button to switch between SpeedyBee-LED mode and BF-LED mode. Under BF-LED mode, all the LED1-LED4 strips will be controlled by Betaflight firmware.
RSSI Input	Supported. Named as RS on the front side.
Smart Port / F.Port	Not supported
Supported Flight Controller Firmware	BetaFlight(Default), INAV (INAV firmware can only use Multishot (recommended) and OneShot125. Please note that DShot is not supported.)
Firmware Target Name	SPEEDYBEEF405V3
Mounting	30.5 x 30.5mm(4mm hole diameter)
Dimension	41.6(L) x 39.4(W) x 7.8(H)mm
Weight	9.6g

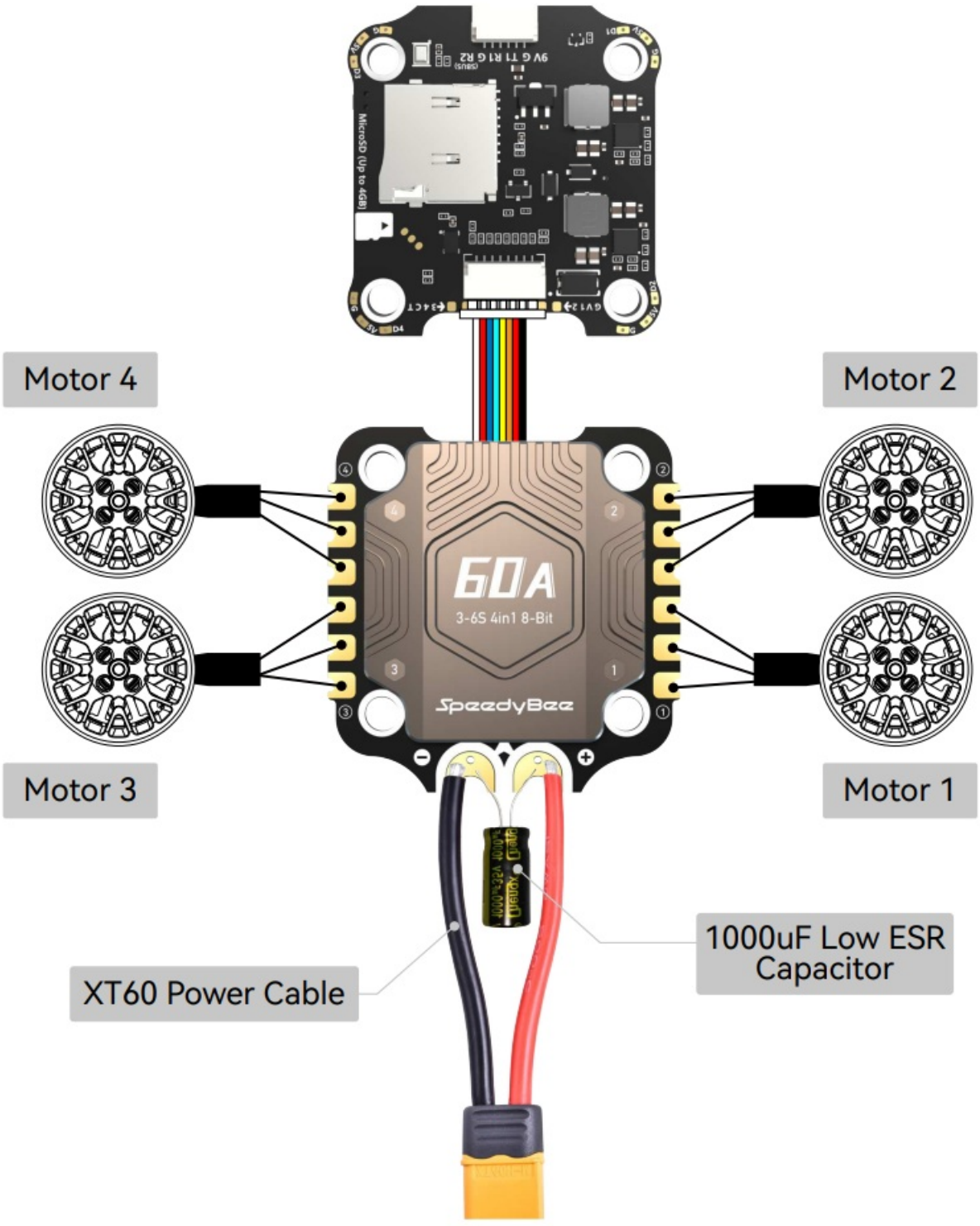
SpeedyBee BLS 60A 4-in-1 ESC

Layout

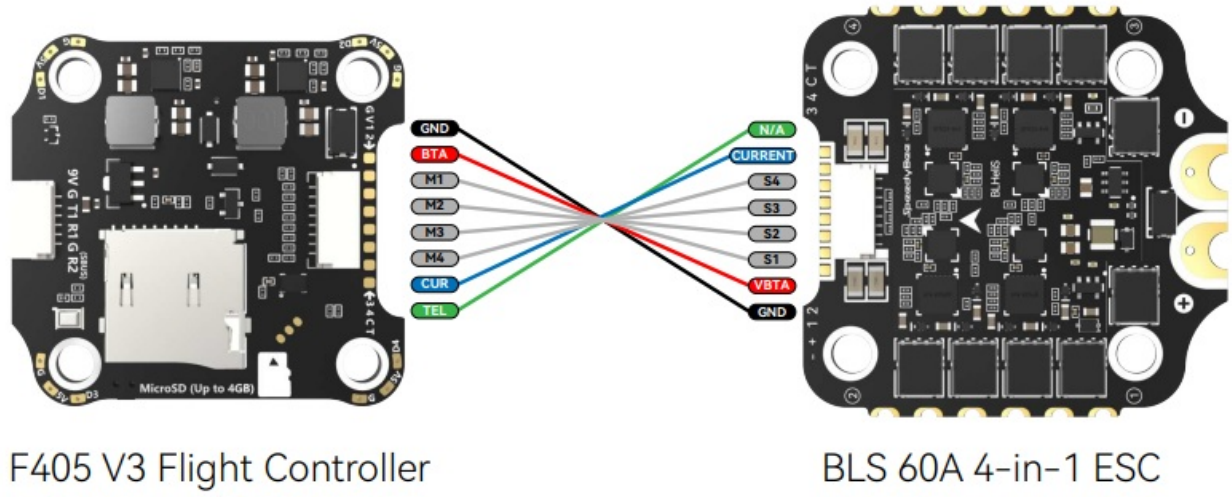




Connection with Motors & Power Cable

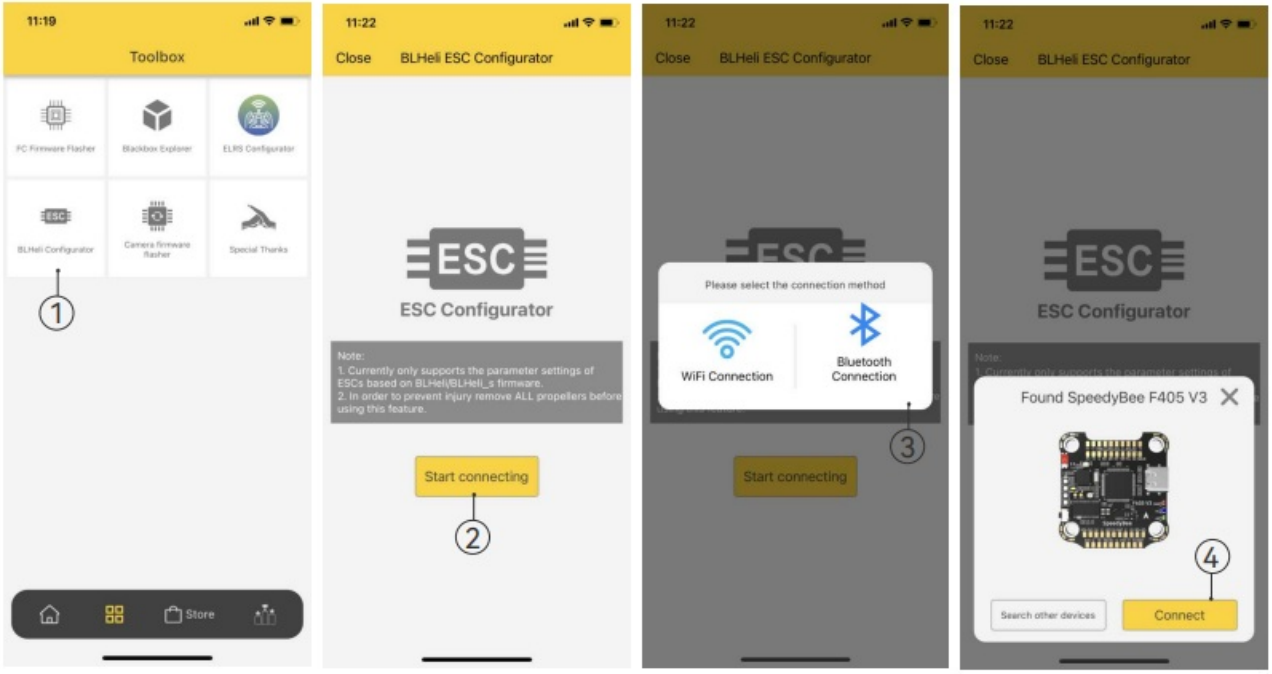


Note1: In order to prevent the stack from being burnt out by voltage spikes on powering up, it is strongly recommended to use the Low ESR capacitor in the package.
Note2: The FC and ESC can also connected via direct soldering. Soldering pads definition is as follows.



ESC Configuration

You could use SpeedyBee app to completely configure this 8-bit ESC. T he steps are as follows:



You could also use PC configurators to configure this ESC. We recommend the ESC Configurator. Please use Google Chrome browser and visist:
http://www.esc-configurator.com

ESC Firmware Update

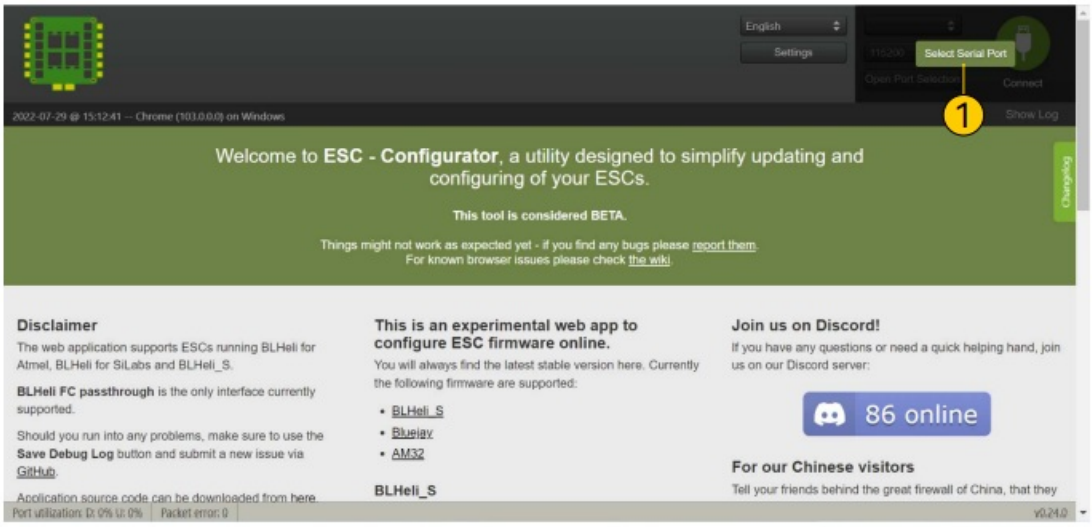
- This 8-bit 60A ESC can run BLHeliS or Bluejay firmware. It is loaded with BLHeliS firmware by default. You could also flash it to Bluejay firmware which can support RPM filtering and Bi-directional Dhsot.

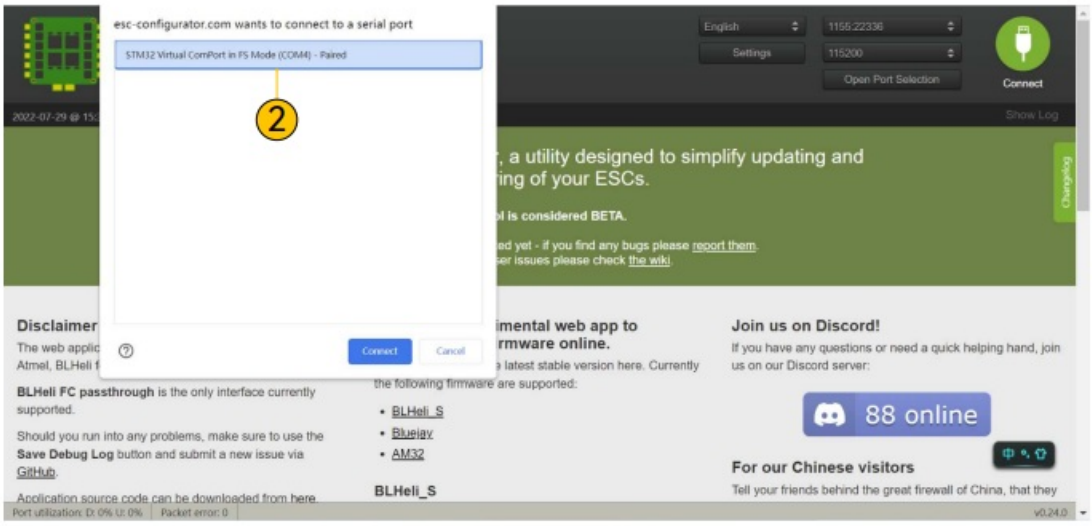
Firmware flashing steps are as follows:

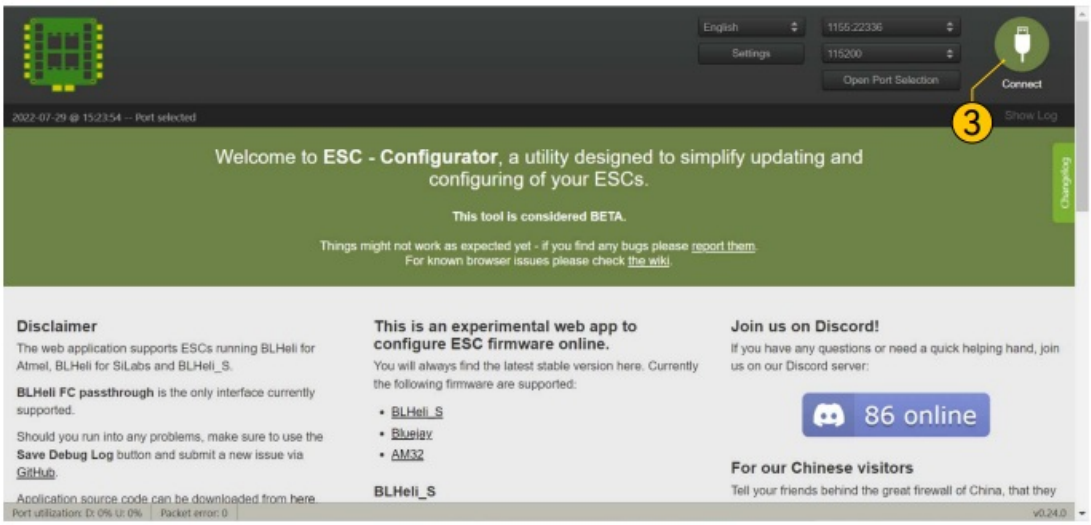
- Remove all the propellers from your drone.
- Ensure that the flight controller is connected properly to the ESC, then power up the drone. This step ensures

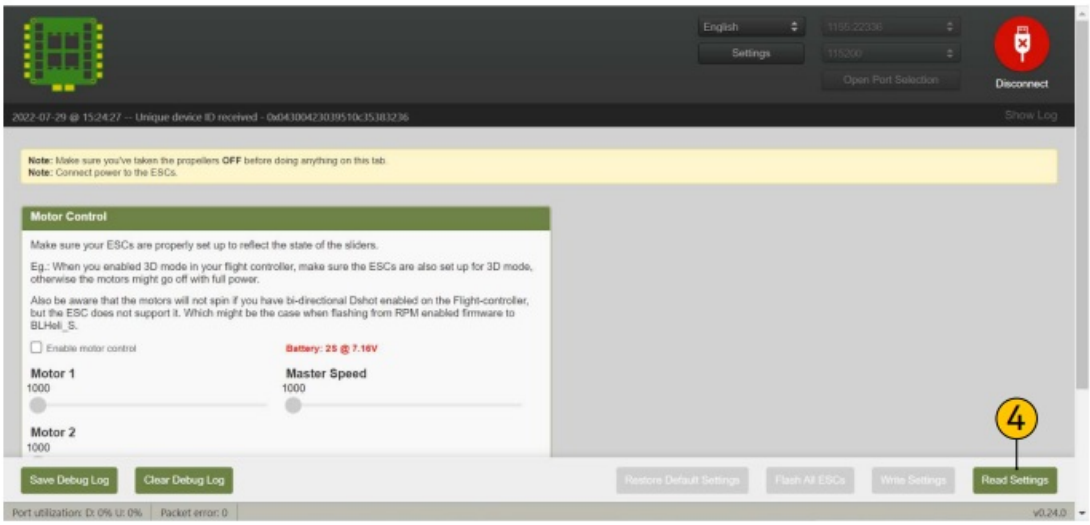
that the ESC starts up correctly.

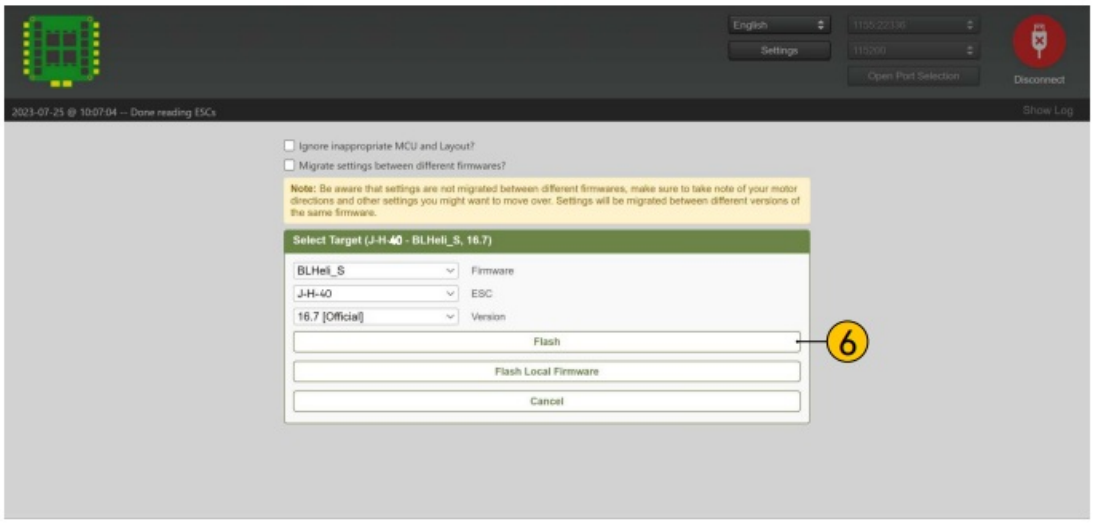
- Connect the flight controller to the computer using a USB Type-C cable.
- Open the Chrome browser and visit the following website:
  https://www.esc-configurator.com/
- Follow the firmware flashing steps as shown in the screenshots below.
  Important note: On the 6th interface, the “ESC” type must be selected as “J-H-40.”






English
Settings
1155:22336
115200
Open Port Selection
Connect
3
2022-07-29 @ 15:23:54 -- Port selected
Show Log
Welcome to ESC - Configurator, a utility designed to simplify updating and configuring of your ESCs.
This tool is considered BETA.
Things might not work as expected yet - if you find any bugs please report them.
For known browser issues please check the wiki.
Changelog
Disclaimer
The web application supports ESCs running BLHeli for Atmel, BLHeli for SiLabs and BLHeli_S.
BLHeli FC passthrough is the only interface currently supported.
Should you run into any problems, make sure to use the Save Debug Log button and submit a new issue via GitHub.
Application source code can be downloaded from here
This is an experimental web app to configure ESC firmware online.
You will always find the latest stable version here. Currently the following firmware are supported:
BLHeli_S
Bluejay
AM32
BLHeli_S
Join us on Discord!
If you have any questions or need a quick helping hand, join us on our Discord server:
86 online
For our Chinese visitors
Tell your friends behind the great firewall of China, that they
Port utilization: D: 0% U: 0%
Packet error: 0
v0.24.0


English
Settings
Open Port Selection
Disconnect
2022-07-29 @ 15:24:27 -- Unique device ID received - 0x043004230395 10c35383236
Show Log
Note: Make sure you've taken the propellers OFF before doing anything on this tab
Note: Connect power to the ESCs.
Motor Control
Make sure your ESCs are properly set up to reflect the state of the sliders.
Eg.: When you enabled 3D mode in your flight controller, make sure the ESCs are also set up for 3D mode, otherwise the motors might go off with full power.
Also be aware that the motors will not spin if you have bi-directional Dshot enabled on the Flight-controller, but the ESC does not support it. Which might be the case when flashing from RPM enabled firmware to BLHeli_S.
Enable motor control
Battery: 25 @ 7.16V
Motor 1
1000
Master Speed
1000
Motor 2
1000
4
Save Debug Log
Clear Debug Log
Restore Default Settings
Flash All ESCs
Write Settings
Read Settings
Port utilization: D: 0% U: 0%
Packet error: 0
v0.24.0



Specifications

Product Name	SpeedyBee BLS 60A 30x30 4-in-1 ESC
Firmware	BLHeli_S J-H-40
PC Configurator Download Link	https://esc-configurator.com/
Continuous Current	60A * 4
Burst Current	80A(10sec)
TVS Protective diode	Yes
External Capacitor	1000uF Low ESR Capacitor(In the package)
ESC Protocol	DSHOT300/600
Power Input	3-6S LiPo
Power Output	VBAT
Current Sensor	Support (Scale=400 Offset=0)
ESC Telemetry	Not supported
Mounting	30.5 x 30.5mm(4mm hole diameter)
Dimension	45.6(L) * 44(W) *8mm(H)
Weight	23.5g

- **https://esc-configurator.com/**

Documents / Resources

	SpeedyBee F405 V3 ESC Stack For Drone [pdf] User Manual F405 V3, BLS 60A, F405 V3 ESC Stack For Drone, F405 V3, ESC Stack For Drone, Stack For Drone, Drone

References

- download
- User Manual