

Contents (Click on any section to jump)

Part 1 – OverView	
 Specs Overview 	1
 Dimensions 	2
 Package 	3
FC & ESC Connection	4
Part 2 – SpeedyBee F405 V3 Flight Controller	
 Layout 	5
 FC's Peripheral Connection 	6
App & FC Configuration	7
 FC Firmware Update 	8
 Specifications 	9
Part 3 - SpeedyBee BLS 60A 4-in-1 ESC	
 Layout 	10

- Connection with Motors & Power Cable
- ESC Configuration
- ESC Firmware Update
- Specifications





F405 V3 BLS 60A 30x30 Stack

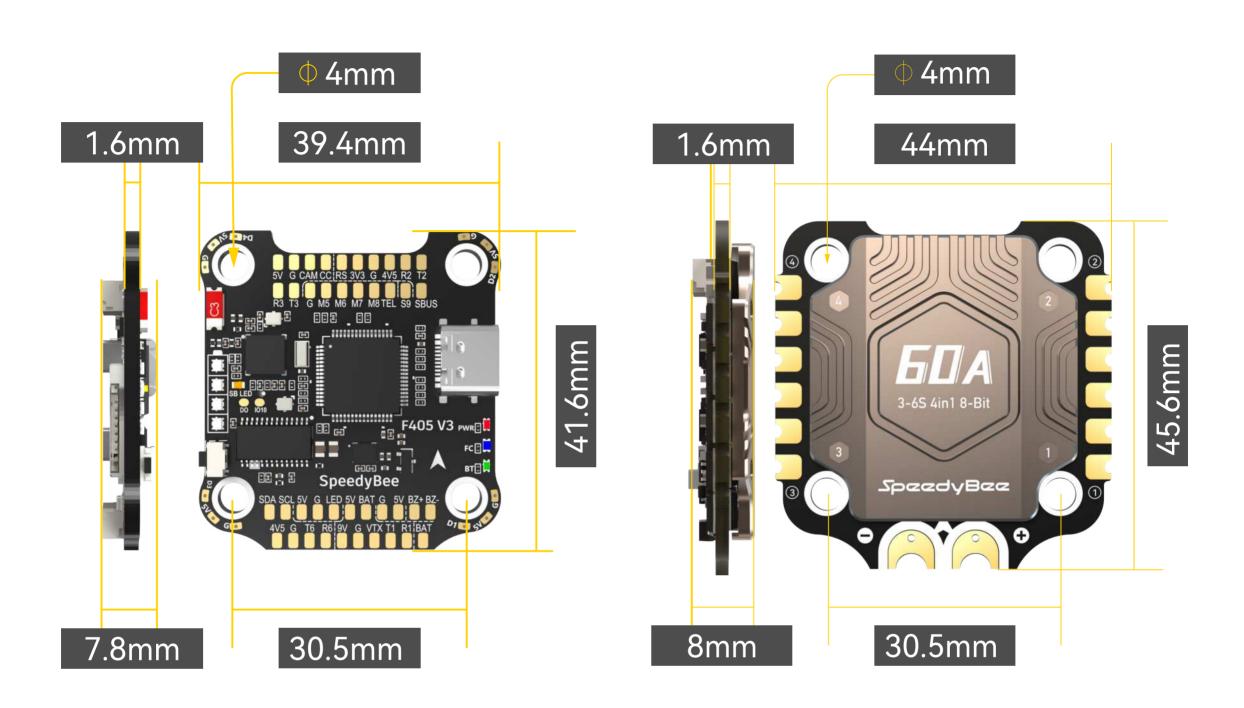
User Manual V1.0

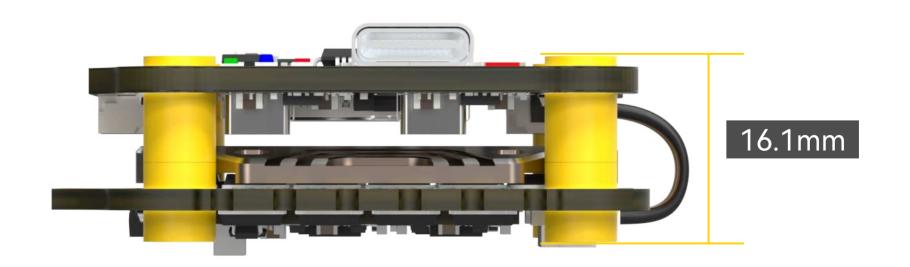
Part 1 – OverView

Specs Overview

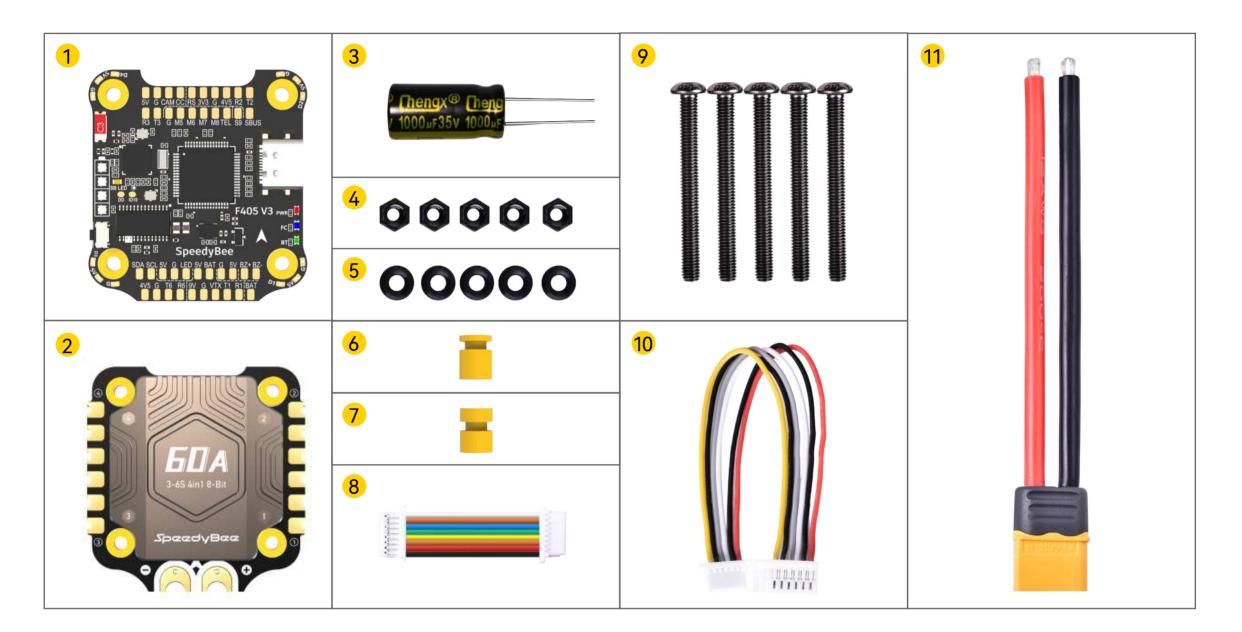
1/14

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	





SpeedyBee F405 V3 60A 30x30 Stack



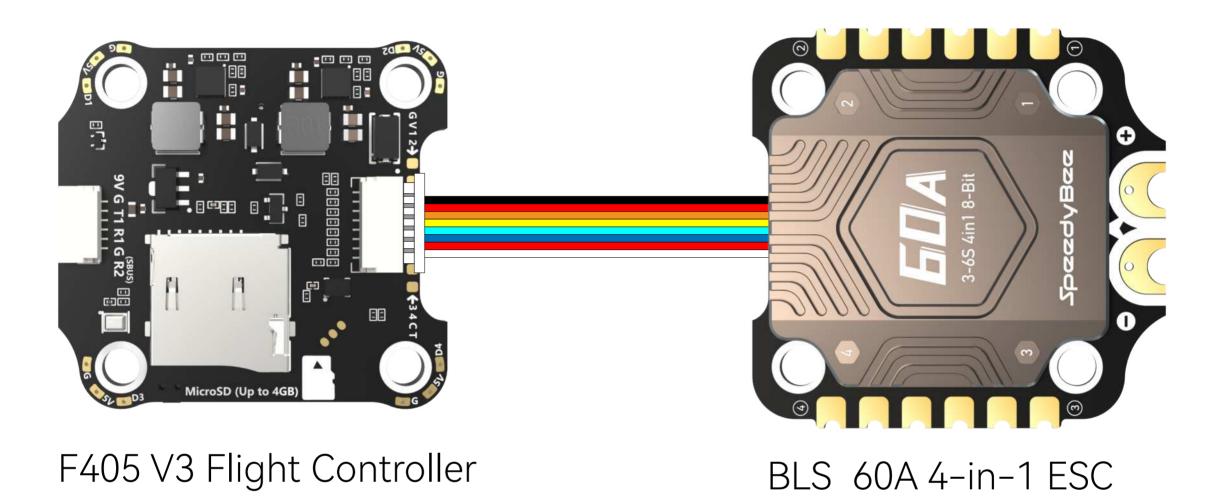
- **1** SpeedyBee F405 V3 Flight Controller x 1
- 2 SpeedyBee BLS 60A 4-in-1 ESC x 1
- 35V 1000uF Low ESR Capacitor x 1
- 4 M3 Nylon Nut x 5
- 5 M3 silicone O Ring x 5
- 6 M3*8mm Silicone Grommets(for FC) x 1

- 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

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

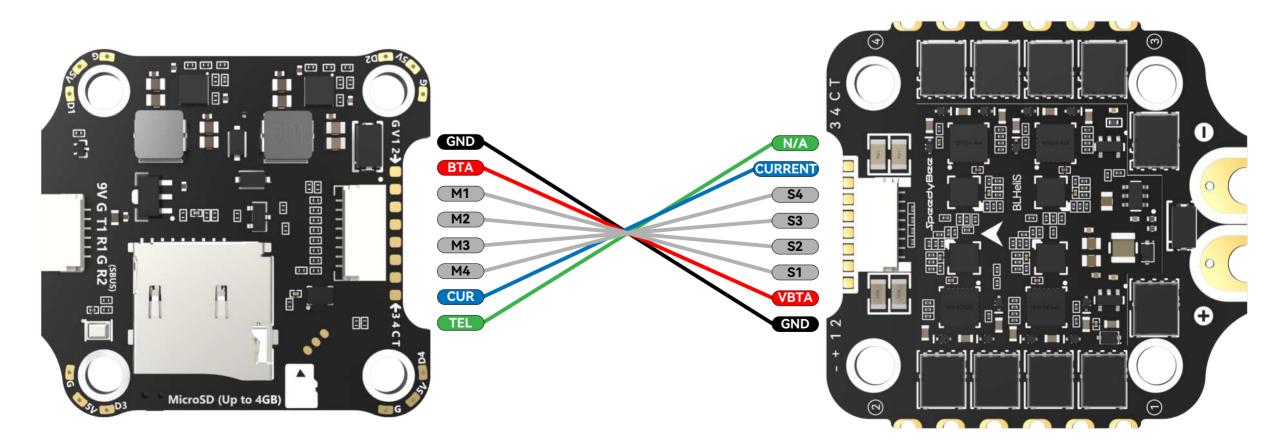
Use any end of the 8-pin JST cable to connect the FC to the ESC.



Method 2 - Direct soldering

Solder 8 wires to the 8 pads on each end referring to the

pad definition below.



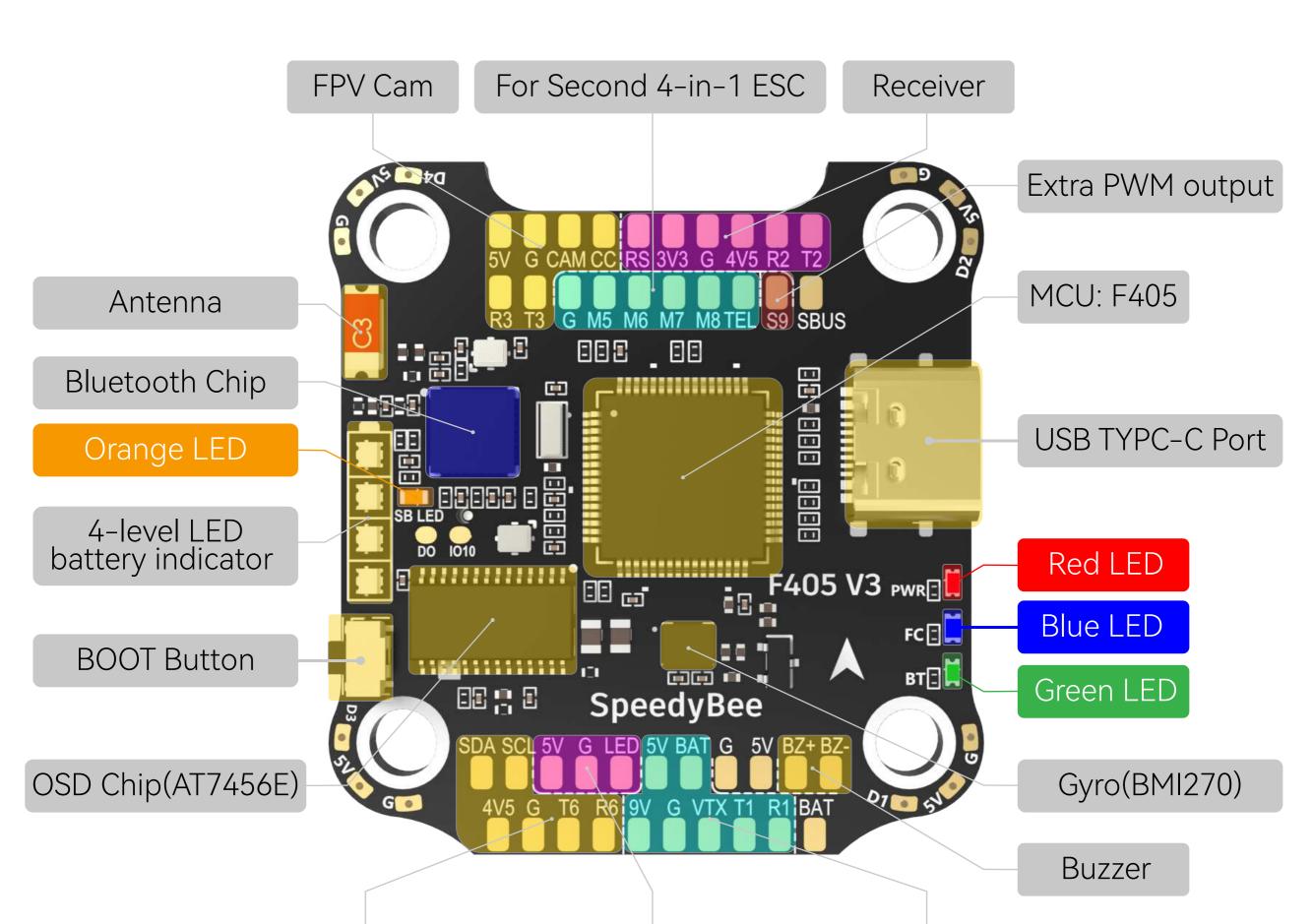
F405 V3 Flight Controller

BLS 60A 4-in-1 ESC

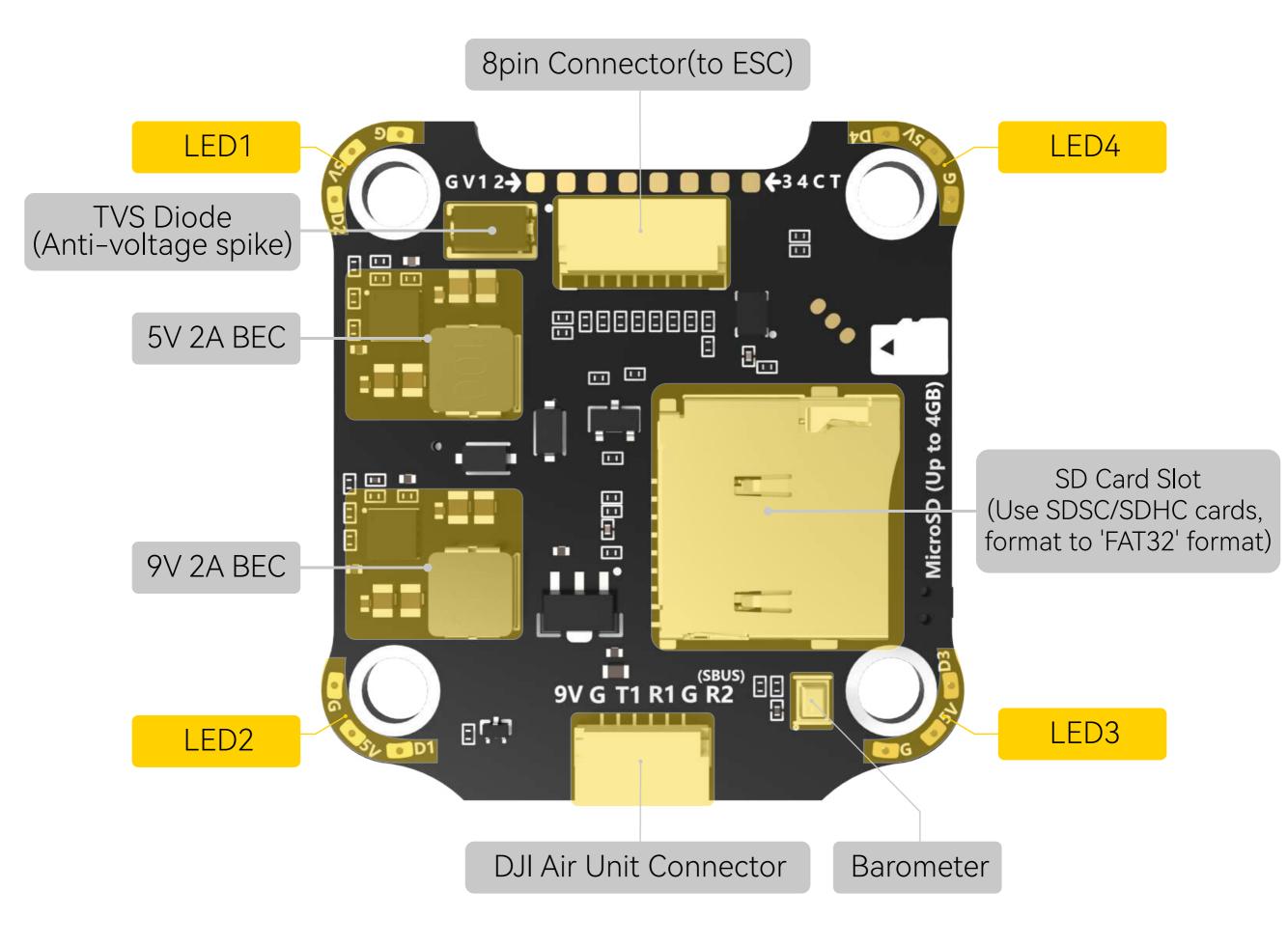
Part 2 – F405 V3 Flight Controller

Layout

5/14



GPS&Compass Betaflight LED VTX(Analog/DJI)



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-LED4 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** : tindicates 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

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

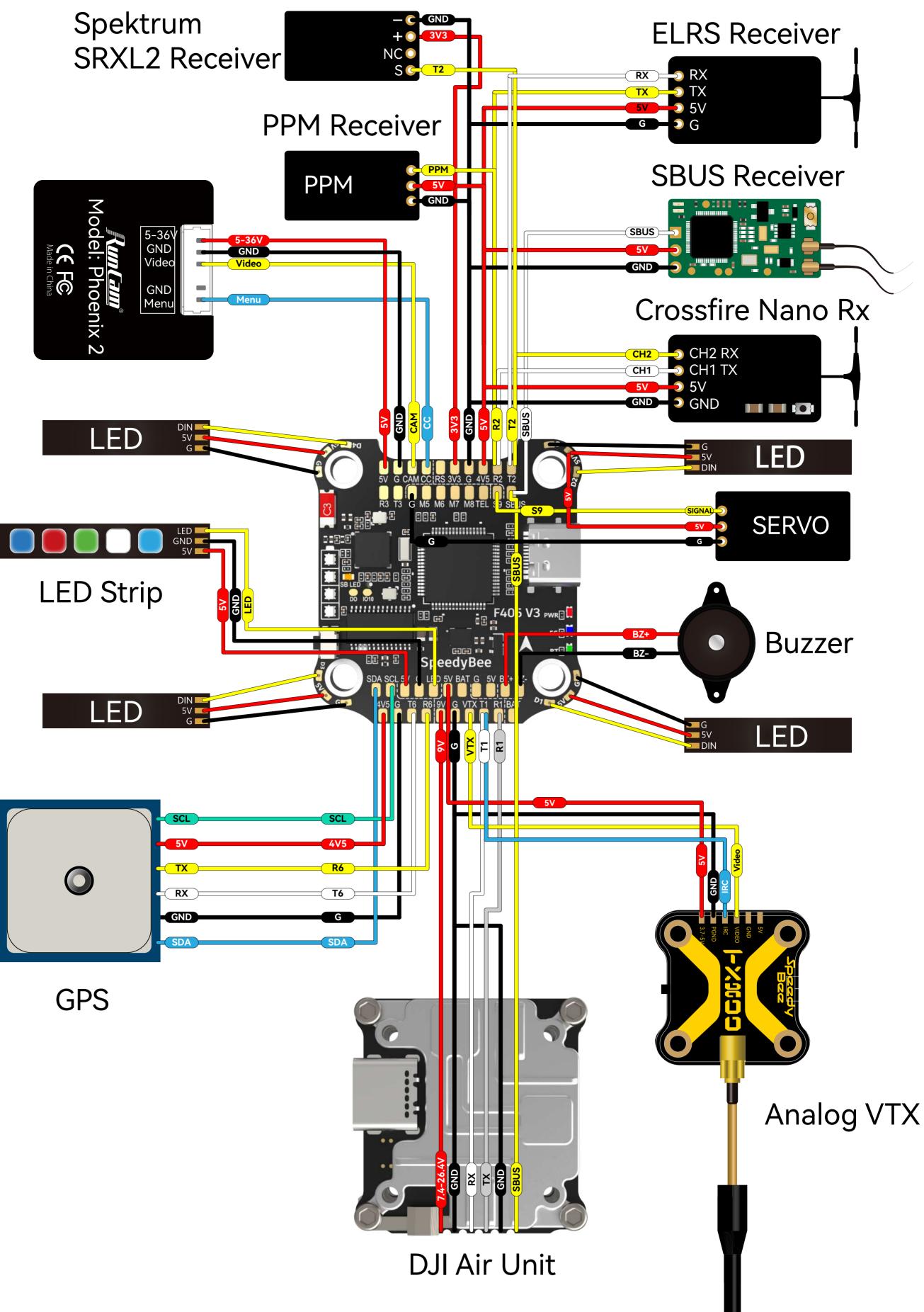
① Insert a USB A to TYPE-C cable to your PC.

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-LED4 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

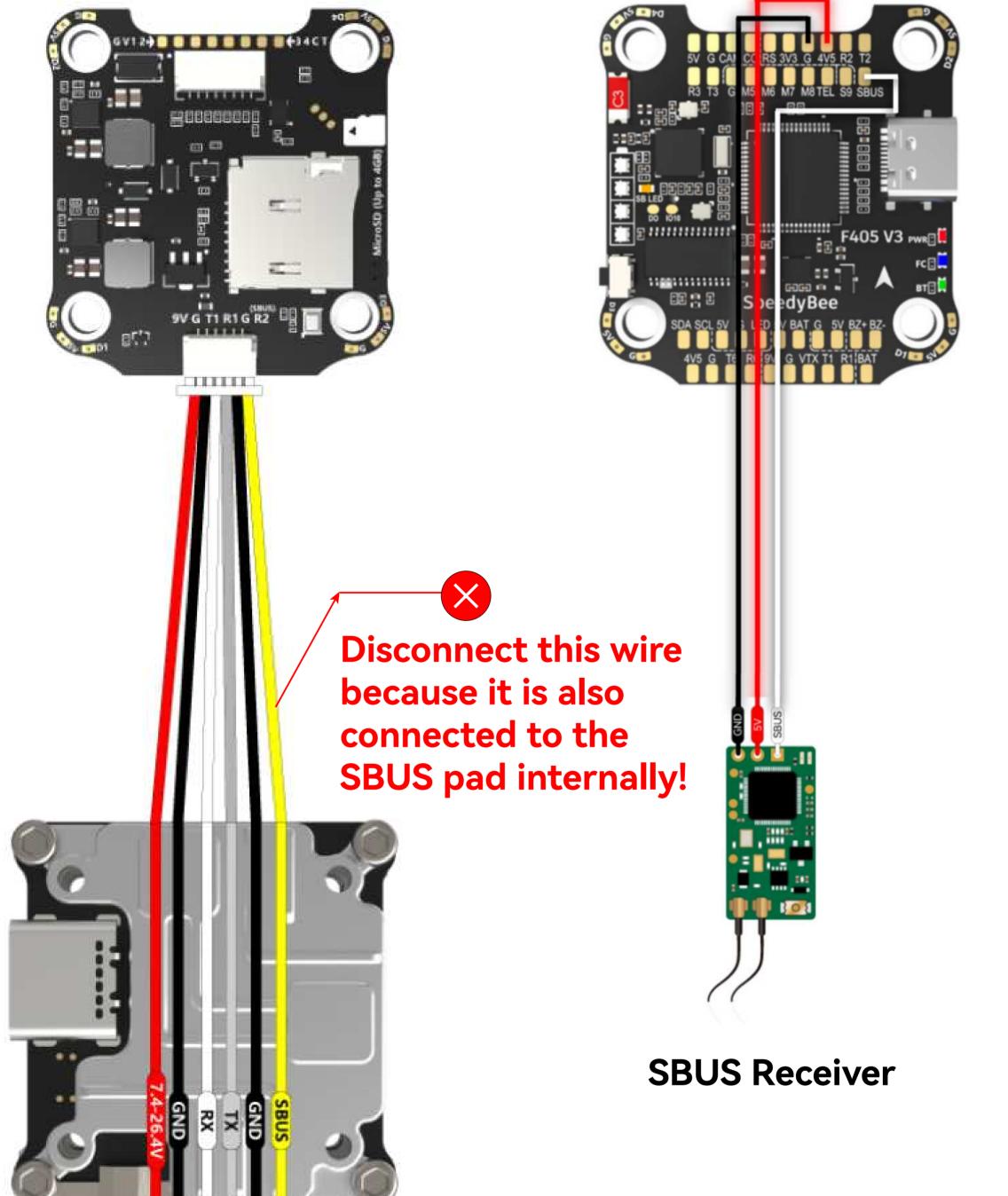


Importance notice for SBUS receiver

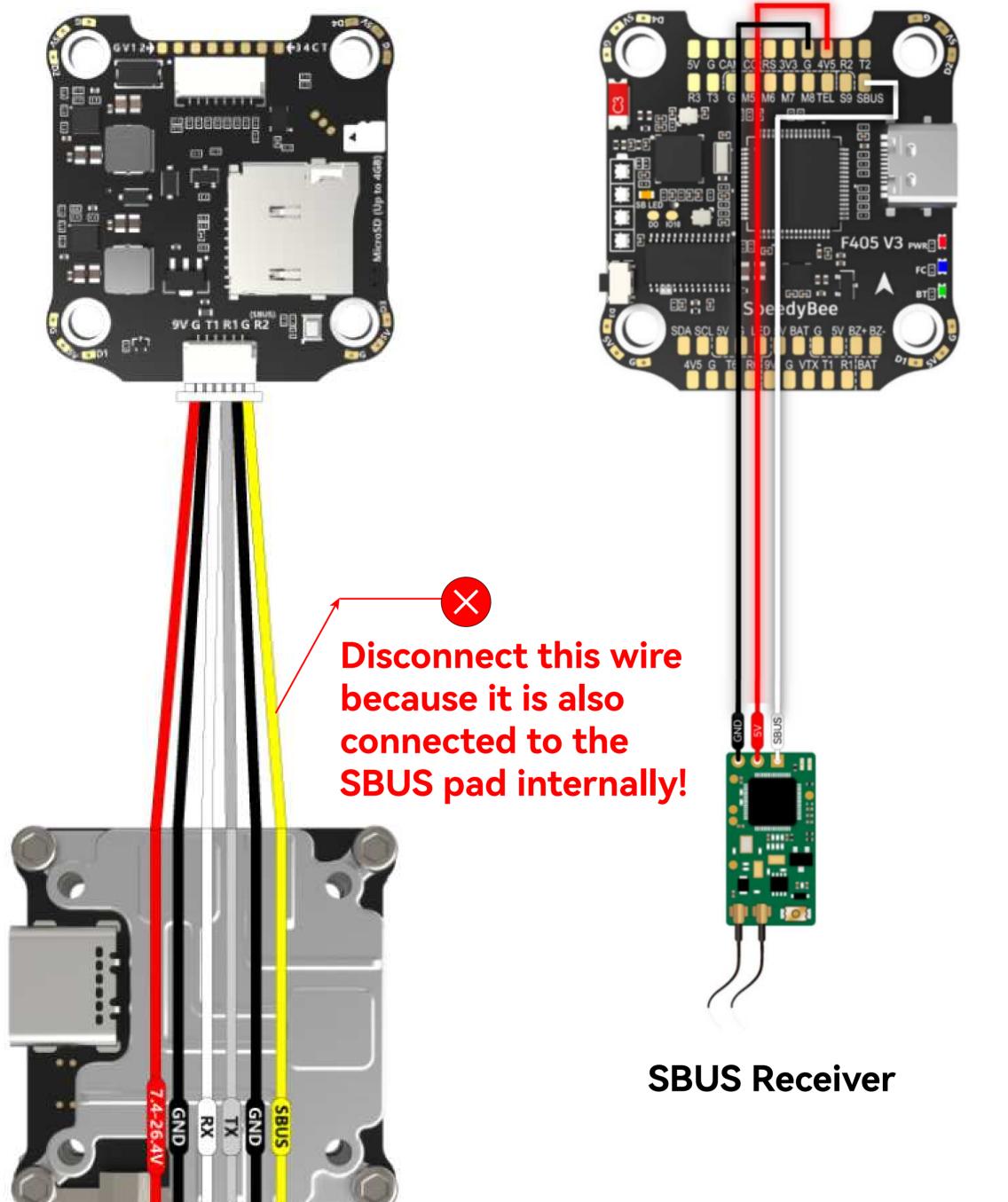
When using an SBUS receiver, the SBUS signal wire of the receiver must be connected to the SBUS pad on the front side of the flight controller (this pad internally uses UART2).

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.

F405 V3 Bottom Side



F405 V3 Front Side



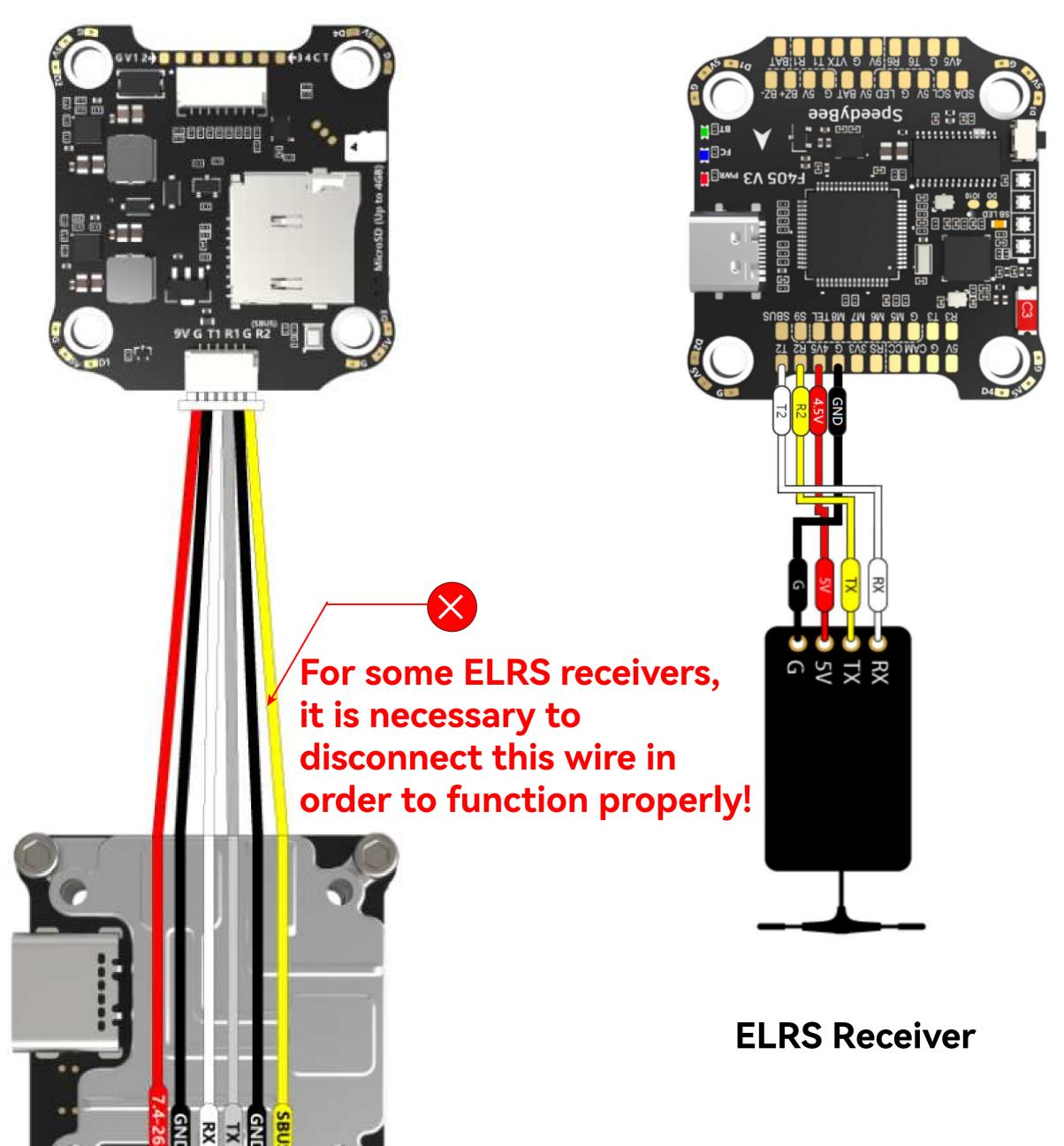
DJI Air Unit

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.

F405 V3 Bottom Side

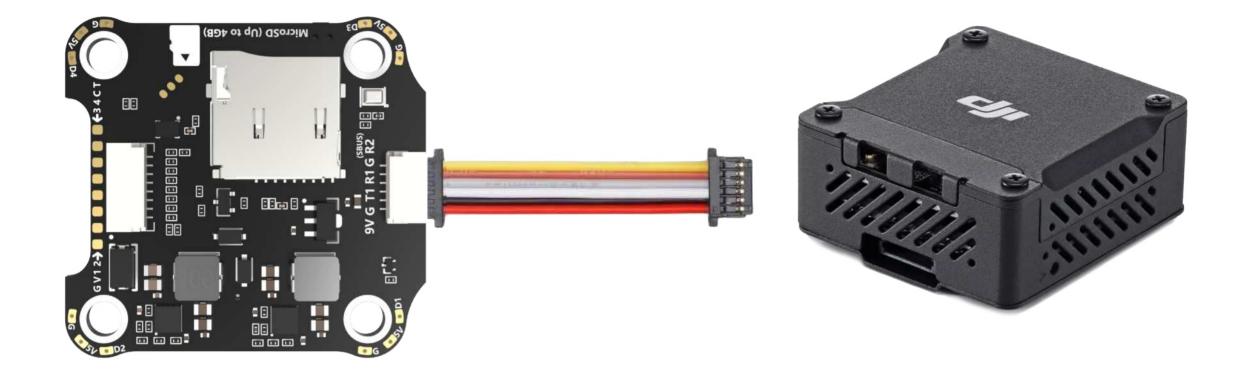
F405 V3 Front Side



DJI Air Unit

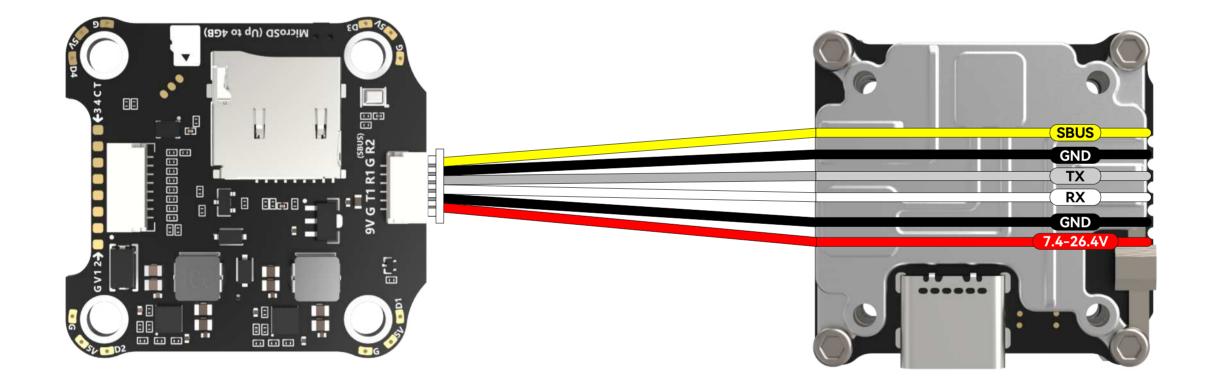
Cable Connection vs DJI O3 Air Unit

Use 6-pin cable comes with the O3 Air Unit



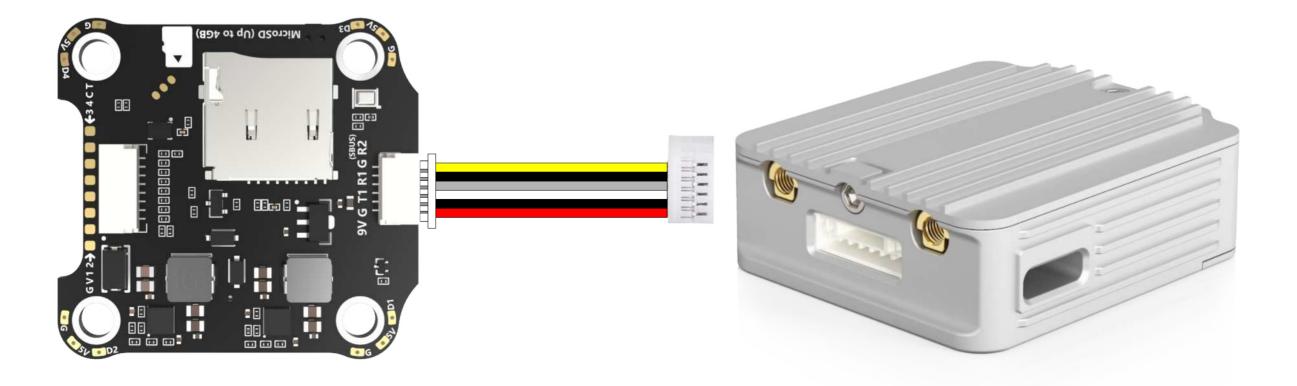
Cable Connection vs RunCam Link/ Caddx Vista Air Unit

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)

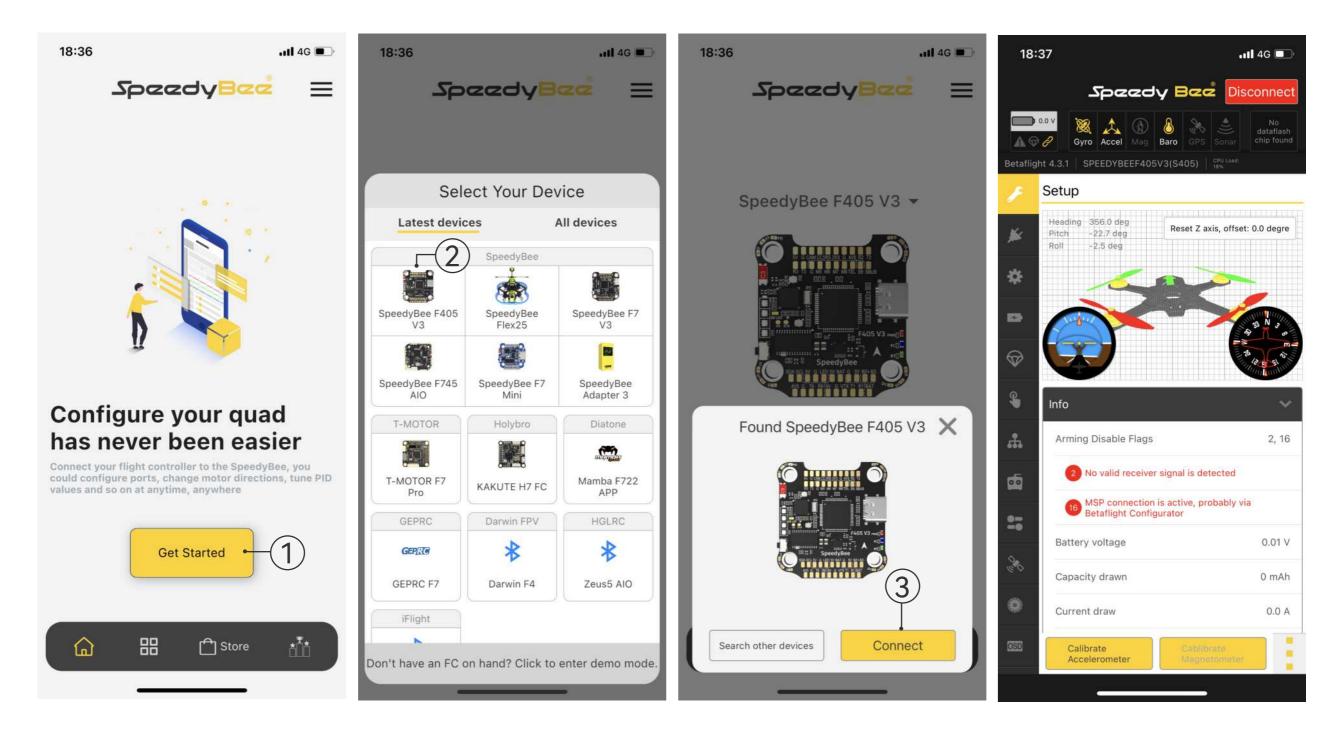


App & FC Configuration

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 Betafight/ INAV configurator on your PC. Take Betaflight

configurator as an example, go to the 'Firmware Flashing' page, choose the target '**SPEEDYBEEF405V3**' and flash.

BETAFLIC Configurator: 10.9.0-de	GHT bug-ea02d9a		COM6 - Betaflight STM32F405 Auto-Connect 115200 Update Firmware			
2022-09-07 @11:56:25 Loaded build: 2022-09-07 @11:56:26 Loaded relea:	ccessfully closed s information for jobs from build server. s information for jobs from build server. se information for firmware from GitHub. se information for firmware from GitHub.		Hide Log Scroll			
S≱ Welcome						
📓 Changelog	Show unstable releases		Show release candidates in addition to stable releases			
📓 Privacy Policy	Enable Expert Mode		Show unreleased and potentially unstable builds			
Documentation & Support	Release	~	Select build type to see available boards.			
Options	SPEEDYBEEF405V3	•	Auto-detect Select or auto-detect your board to see available online firmware releases - Select the correct firmware appropriate for your board.			
Firmware Flasher	13-07-2022 11:13 - 4.3.1	~	Select firmware version for your board.			
	No reboot sequence Enable if your FC is in boot mode. i.e. if you powered on your FC with the bootloader pins jumped or whilst holding your FC's BOOT button.					
	Full chip erase Wipes all configuration data currently stored on the board.		Wipes all configuration data currently stored on the board.			
Manual baud rate 256000 V Manual selection of baud rate for boards that don't support the default speed or for flashing via bluetooth. Note: Not used when flashing via USB DFU						
	Please load firmware file		Exit DFU Mode Flash Firmware Load Firmware [Online] Load Firmware [Local]			
Port utilization: D: 0 % U: 0 % Packe	et error: 0 12C error: 0 Cycle Time: 0 CPU Loa	ad: 0	0 % Configurator: 10.9.0-debug-ea02d9			

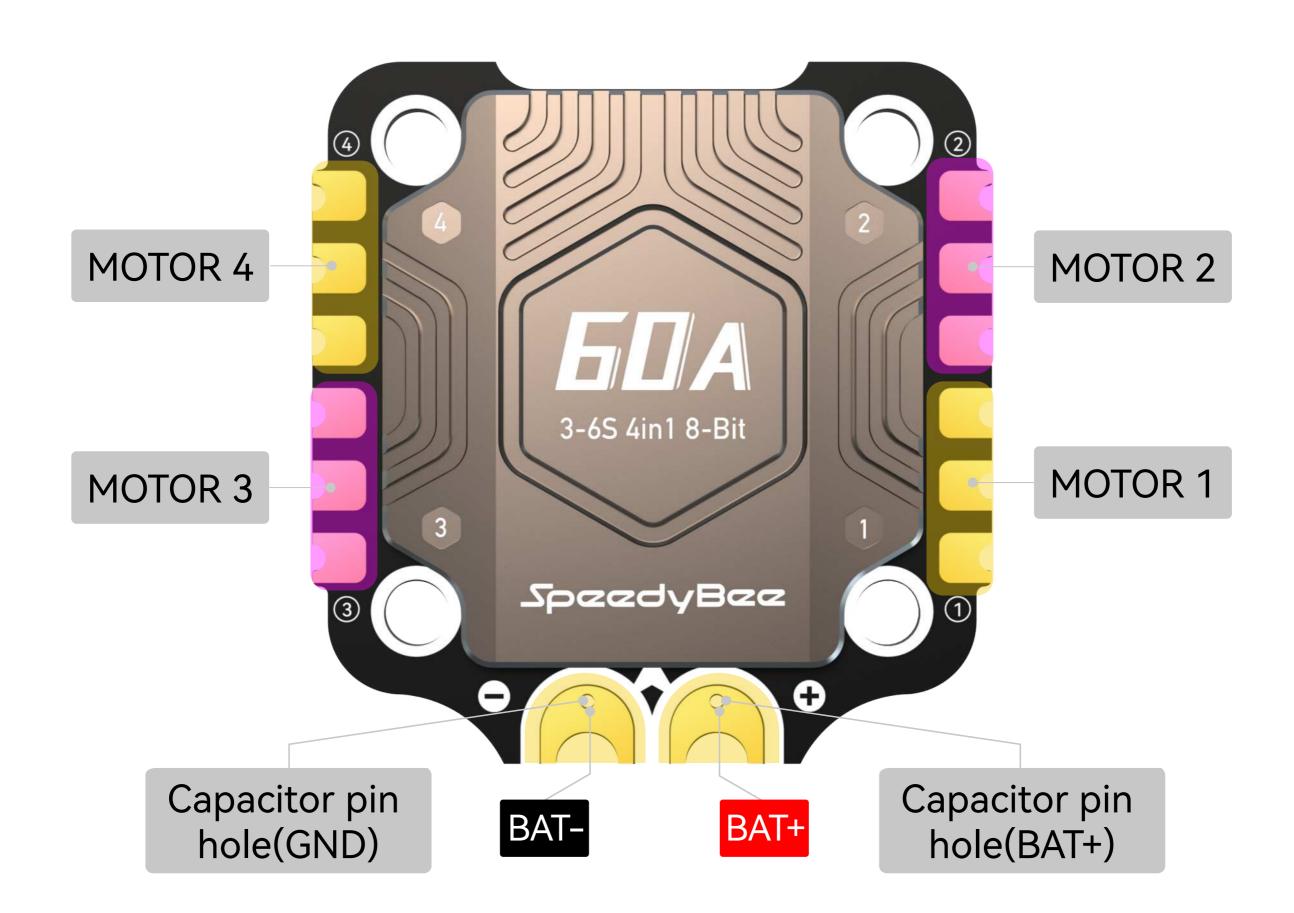
Specifications

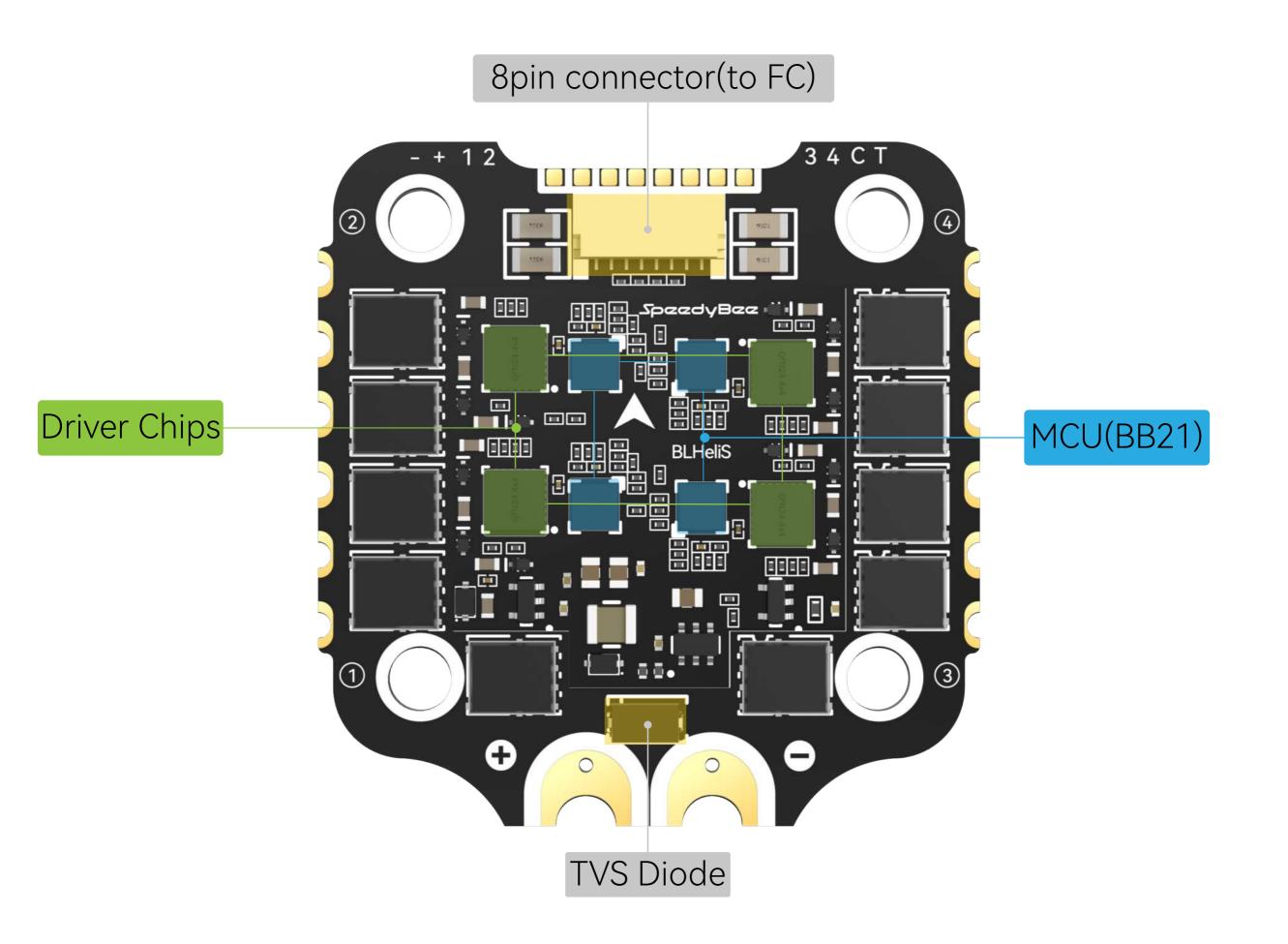
Product Name	SpeedyBee F405 V3 30x30 Flight Controller		
MCU	STM32F405		
IMU(Gyro)	BMI270		
USB Port Type	Туре-С		
Barometer	Built-in		
OSD Chip	AT7456E chip		
BLE Bluetooth	Supported. Used to connect with the SpeedyBee App for flight controller and ESC parameter configuration. Please make sure the MSP 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 <u>here</u> for the recommended SD cards or buy the <u>tested cards</u> 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		

Part 3 - SpeedyBee BLS 60A 4-in-1 ESC

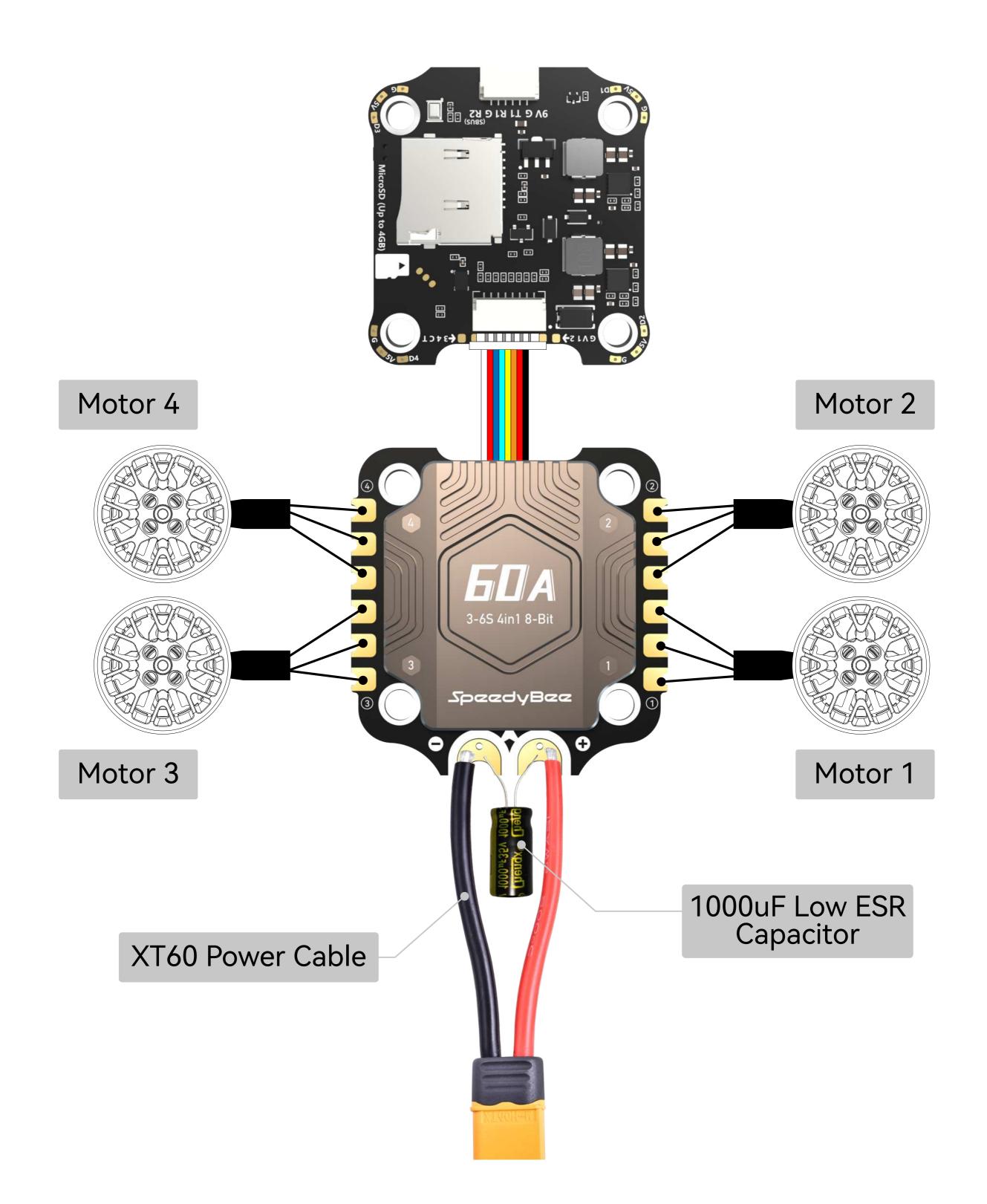
Layout

10/14



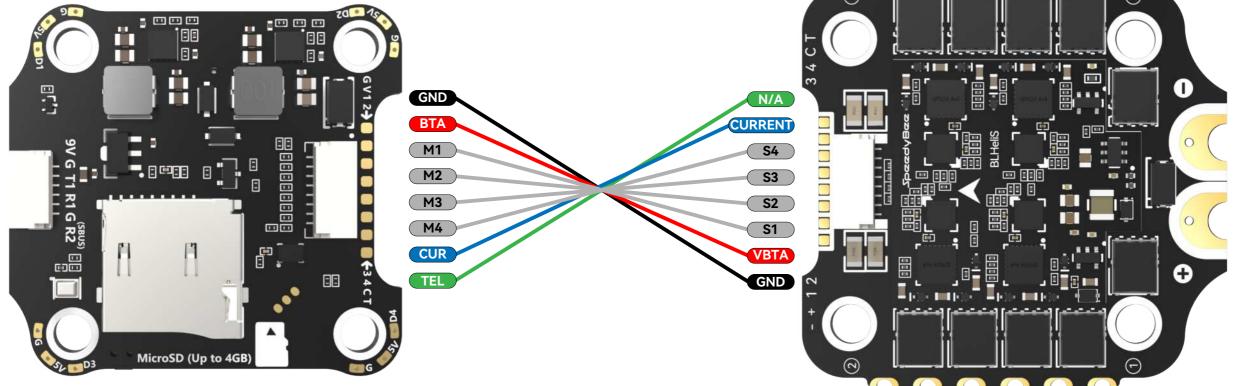


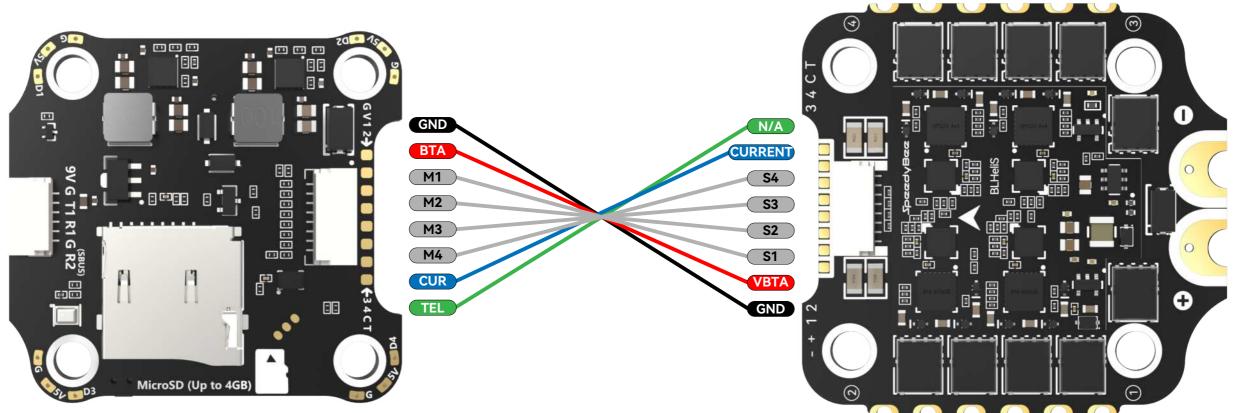
Connection with Motors & Power Cable



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.



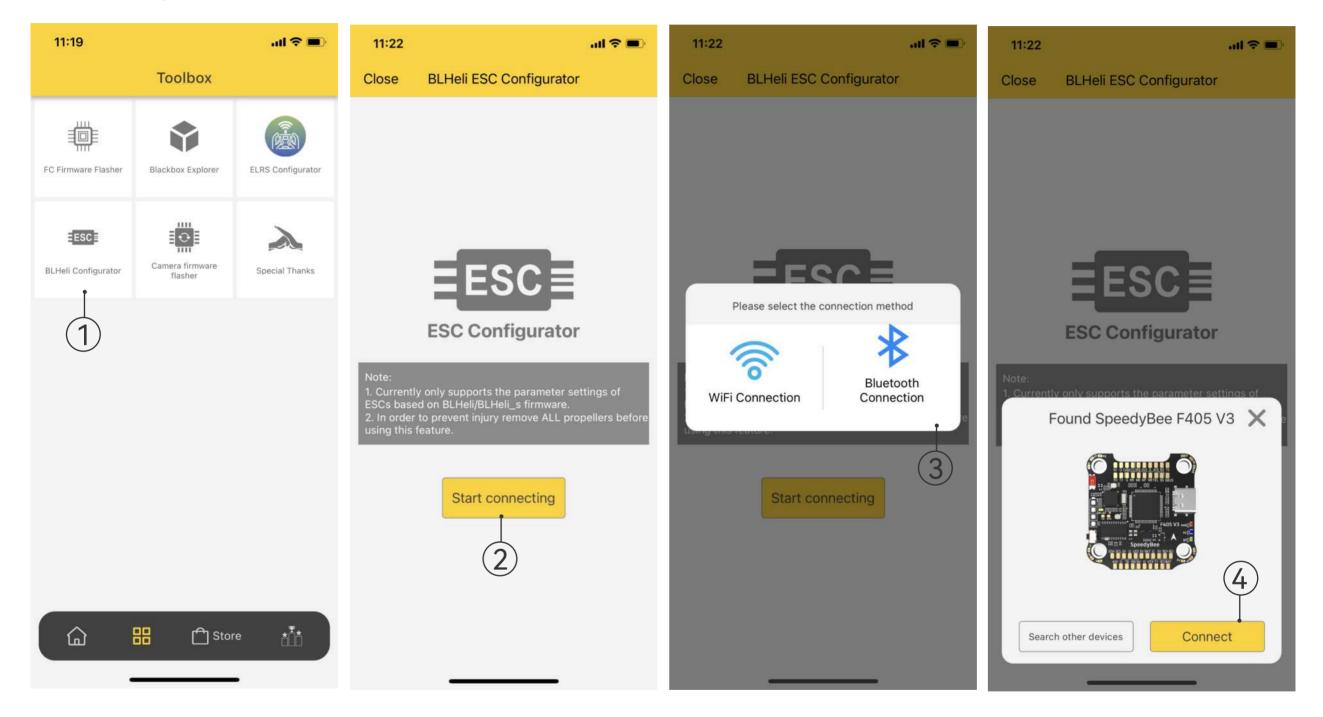


F405 V3 Flight Controller

BLS 60A 4-in-1 ESC

ESC Configuration

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

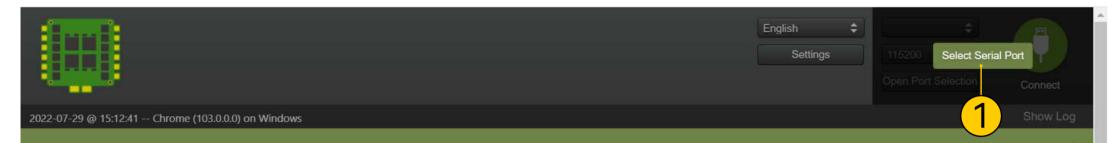


You could also use PC configurators to configure this ESC. We recommend the ESC Configurator. Please use Google Chrome browser and visist: http://www.esc-configurator.com. This 8-bit 60A ESC can run BLHeliS or Bluejay firmware. It is loaded with BLHeliS firmware by default. You could also flash it to 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."



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.

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. Port utilization: D: 0% U: 0% Packet error: 0

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
- <u>Bluejay</u>
- <u>AM32</u>

BLHeli_S

Join us on Discord!

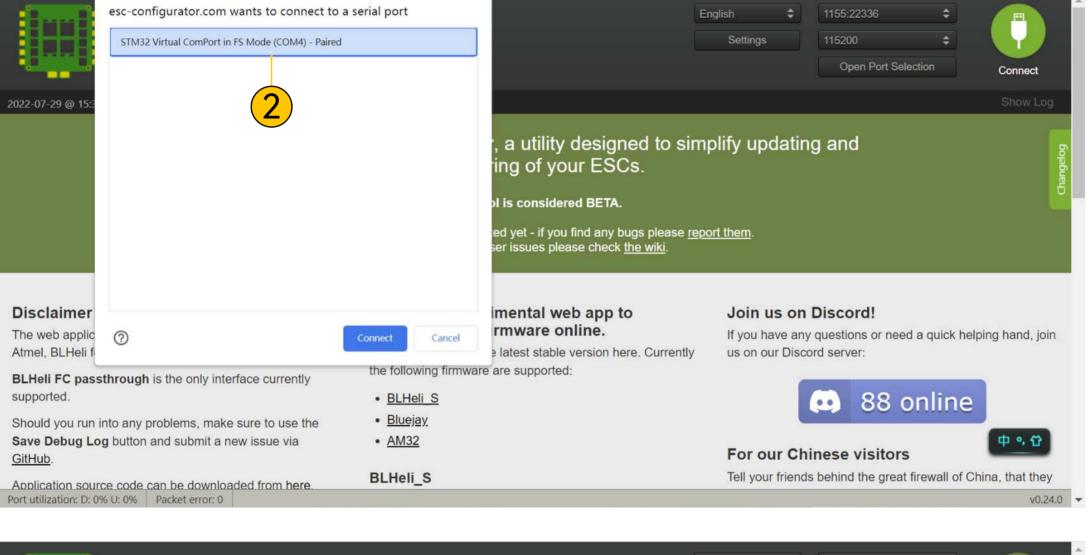
If you have any questions or need a quick helping hand, join us on our Discord server:

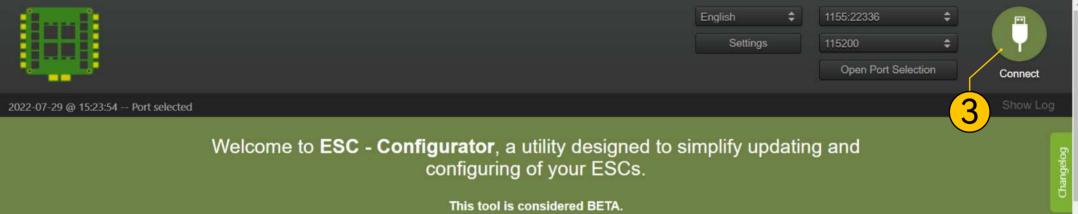


For our Chinese visitors

Tell your friends behind the great firewall of China, that they

v0.24.0





Things might not work as expected yet - if you find any bugs please report them. For known browser issues please check the wiki.

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. Port utilization: D: 0% U: 0% Packet error: 0

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
- <u>Bluejay</u>
- <u>AM32</u>

BLHeli_S

Join us on Discord!

If you have any questions or need a quick helping hand, join us on our Discord server:



For our Chinese visitors

Tell your friends behind the great firewall of China, that they

v0.24.0 -



		Settings	ų (t
			Disconnec
07-29 @ 15:24:27 Unique device ID) received - 0x04300423039510c35383236		Show L
ote: Make sure you've taken the propeller	rs OFF before doing anything on this tab.		
otor Control			
ake 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.			
so be aware that the motors will not s at the ESC does not support it. Which _Heli_S.	pin if you have bi-directional Dshot enabled on the Flight-controller, might be the case when flashing from RPM enabled firmware to		
Enable motor control	Battery: 2S @ 7.16V		
lotor 1	Master Speed		
otor 2 00			4
ave Debug Log	og		Read Setting
tilization: D: 0% U: 0% Packet erro	r: 0		VO

			English 🗢 Settings	1155:22336 115200 Open Port Selection	×
2022-07-29 @ 15:24:41 Done reading	g ESCs		_		Show Log
Note: Make sure you've taken the prop Note: Connect power to the ESCs.	pellers OFF before doing anything on this tab.				
Common Parameters		ESC 1: J-H-40 - BLHeli_	S, 16.7		
	Programming by TX	Reversed	✓ Motor Direction	?	
0.50	Startup Power ?	1148 µs	PPM Min Thrott	le le	
140 C	Temperature Protection ?	1832		10	
	Low RPM Power Protection		PPM Max Throt	tie	
	Brake on stop ?	Off	✓ LED Configuration	ion	
Low	Demag Compensation ?	Flash Firmware	e to this ESC		
Medium	✓ Motor Timing ?				
40		ESC 2: J-H-40 - BLHeli_	s, 16.7	<mark>)</mark>	
	Beep Strength ?	Reversed	✓ Motor Direction	3	
Save Debug Log Clear Debu	ug Log	Restore Defa	ult Settings Flash A	II ESCs Write Settings	Read Settings
Port utilization: D: 0% U: 0% Packet	error: 0				v0.24.0 -

			English 🗘	1155:22336 \$ 115200 \$ Open Port Selection	Disconnect
023-07-25 @ 10:07:04 Done reading ESCs					Show Log
	 Ignore inappropriate MCU and Layo Migrate settings between different f Note: Be aware that settings are not r directions and other settings you migh the same firmware. Select Target (J-H-40 - BLHeli_S) 	irmwares? nigrated between different firmwares, make sure to take no it want to move over. Settings will be migrated between diff	ote of your motor ferent versions of		
	BLHeli_S ~	Firmware			
	[J-H-40 ~]	ESC			
	16.7 [Official]	Version		\frown	
		Flash	•	<mark>(6</mark>)	
		Flash Local Firmware			
		Cancel			

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