

# Contents (Click on any section to jump)

Part 1 - OverView	
<ul> <li>Specs Overview</li> </ul>	1
<ul> <li>Dimensions</li> </ul>	2
<ul> <li>Package</li> </ul>	3
FC & ESC Connection	4
Part 2 - SpeedyBee F405 V3 Flight Controller	
<ul> <li>Layout</li> </ul>	5
<ul> <li>Important Tips for Installing the Flight Stack</li> </ul>	6
<ul> <li>FC's Peripheral Connection</li> </ul>	7
App & FC Configuration	8
<ul> <li>FC Firmware Update</li> </ul>	9
<ul> <li>Specifications</li> </ul>	10
Part 3 - SpeedyBee BLS 50A 4-in-1 ESC	
<ul> <li>Layout</li> </ul>	11
<ul> <li>Connection with Motors &amp; Power Cable</li> </ul>	12
<ul> <li>ESC Configuration</li> </ul>	13
<ul> <li>ESC Firmware Update</li> </ul>	14
<ul> <li>Specifications</li> </ul>	15



F405 V3 BLS 50A 30x30 Stack

User Manual V1.0

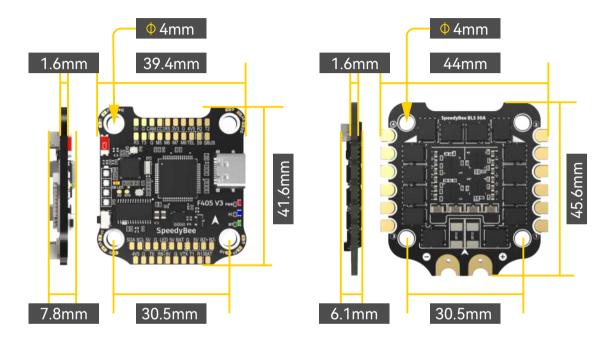
# Part 1 – OverView

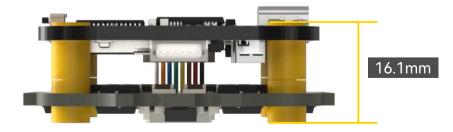
#### Specs Overview

1/15

Product Name	SpeedyBee F405 V3 BLS 50A 30x30 Stack		
Flight Controller	SpeedyBee F405 V3		
ESC	SpeedyBee BLS 50A 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



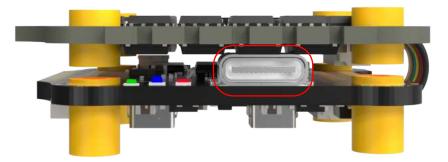


## Important Tips for Installing the Flight Stack

Please ensure that the Stack is installed in the standard manner, with the flight controller (FC) on top and the electronic speed controller (ESC) on the bottom. Any damage resulting from improper installation is not covered under our warranty.



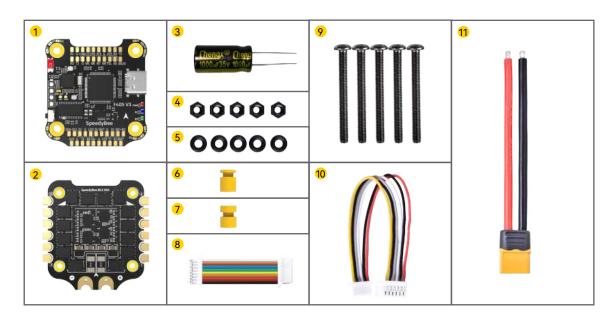
Standard Installation Manner



The installation method shown is incorrect and may cause direct contact between FC and ESC

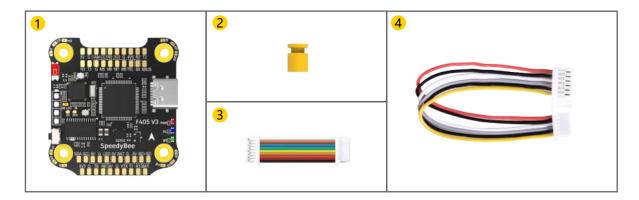
#### Package

# Option 1 – SpeedyBee F405 V3 50A 30x30 Stack



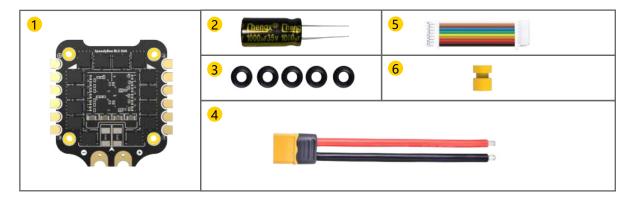
- 1 SpeedyBee F405 V3 Flight Controller x 1
- 2 SpeedyBee BLS 50A 4-in-1 ESC x 1
- 35V 1000uF Low ESR Capacitor x 1
- 4 M3 Nylon Nut x 5
- 5 M3 silicone O Ring x 5
- 6 M3\*8mm Silicone Grommets(for FC) x 1
- 7 M3\*8.1mm Silicone Grommets(for ESC) x 1
- 8 SH 1.0mm 25mm-length 8pin Cable(for FC-ESC connection) x 1
- 9 M3\*30mm Iner-hexagon Screws x 5
- 10 DJI 6pin Cable(80mm) x 1
- 11 XT60 Power Cable(100mm) x 1

### Option 2 - SpeedyBee F405 V3 Flight Controller



- 1 SpeedyBee F405 V3 Flight Controller x 1
- 2 M3\*8mm Silicone Grommets(for FC) x 1
- 3 SH 1.0mm 25mm-length 8pin Cable(for FC-ESC connection) x 1
- 4 DJI 6pin Cable(80mm) x 1

#### Option 3 - SpeedyBee BLS 50A 4-in-1 ESC



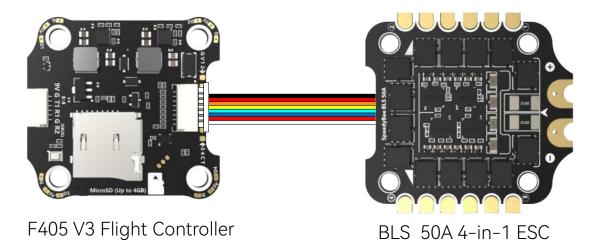
- 1 SpeedyBee BLS 50A 4-in-1 ESC x 1
- 2 35V 1000uF Low ESR Capacitor x 1
- 3 M3 silicone O Ring x 5
- 4 XT60 Power Cable(100mm) x 1
- 5 SH 1.0mm 25mm-length 8pin Cable(for FC-ESC connection) x 1
- 6 M3\*8.1mm Silicone Grommets(for ESC) x 1

## 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.

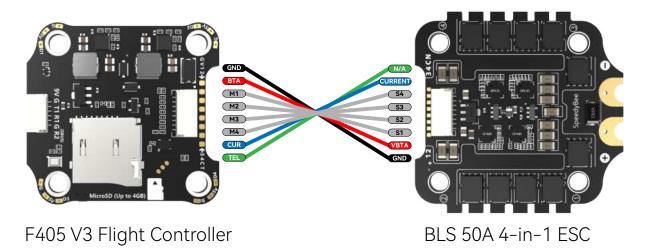
#### Method 1 - Using 8-pin cable

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



#### Method 2 - Direct soldering

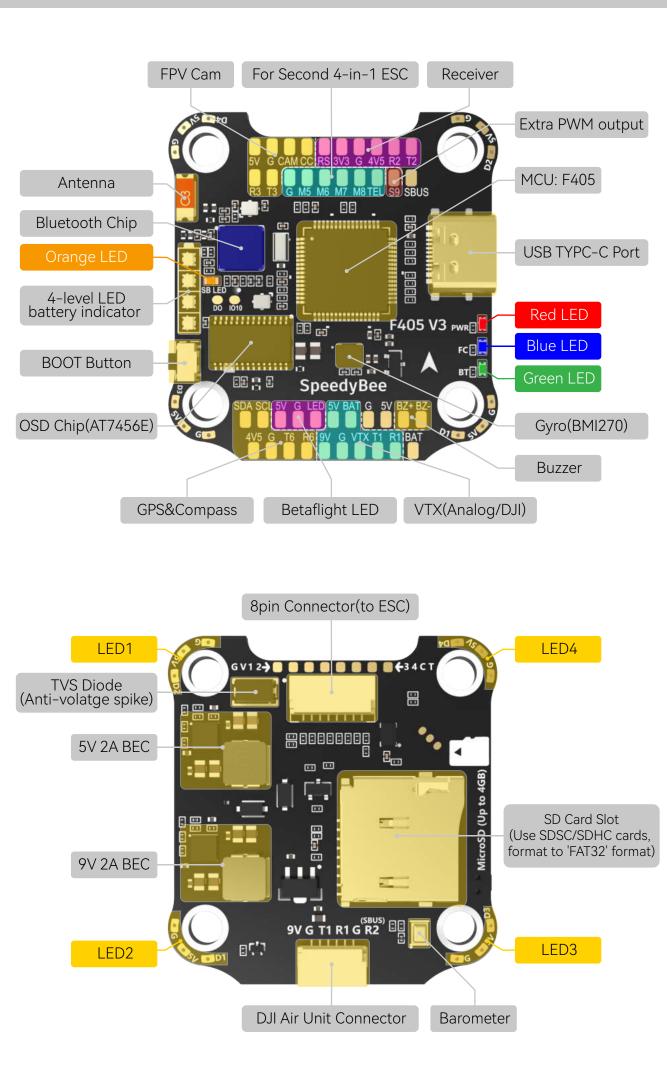
Solder 8 wires to the 8 pads on each end referring to the pad definition below.



# Part 2 – F405 V3 Flight Controller

#### Layout

6/15



# 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.

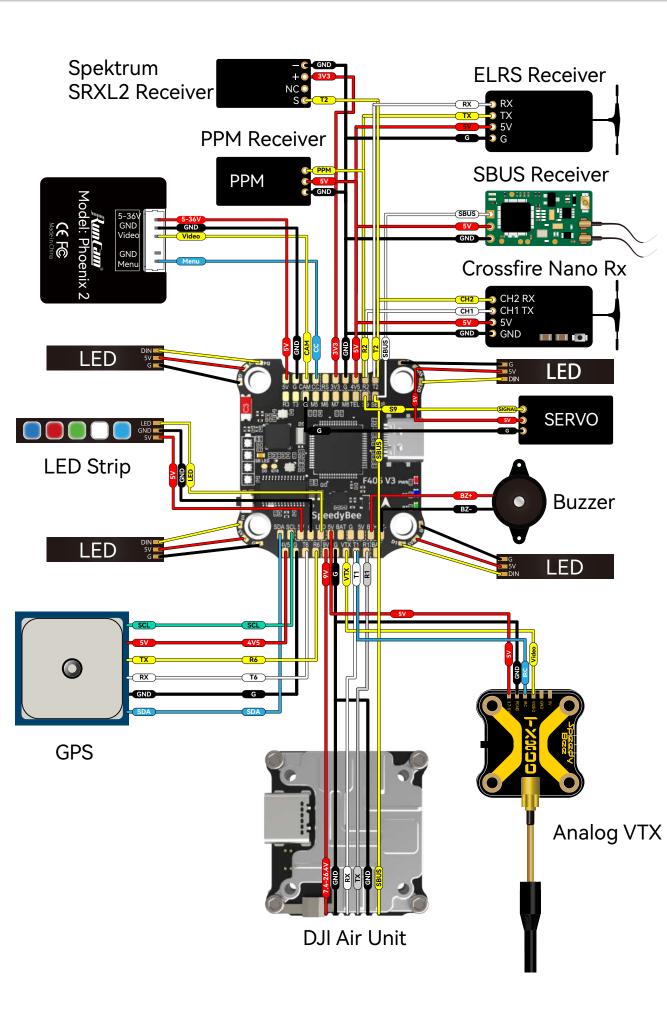
# BOOT Button

[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.

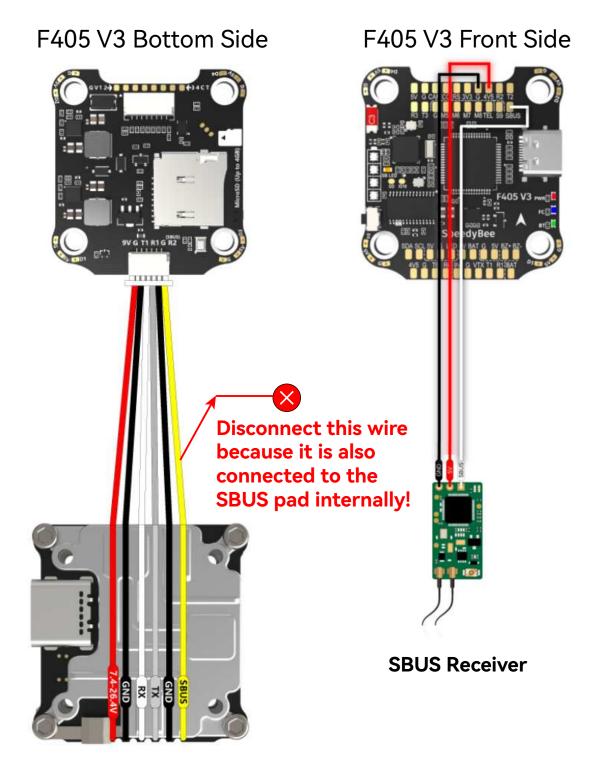
## FC's Peripheral Connection



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).

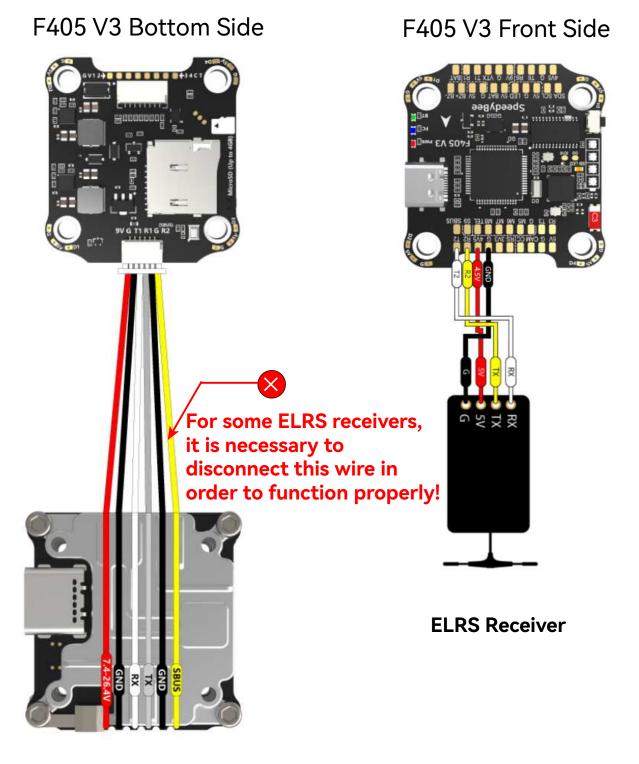
If you are also using the DJI Air Unit and have connected it to the flight controller through the dedicated 6-pin harness on the back, you will need to disconnect the SBUS signal wire from the Air Unit harness. Failure to do so will prevent the SBUS receiver from being properly recognized by the flight 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.



DJI Air Unit

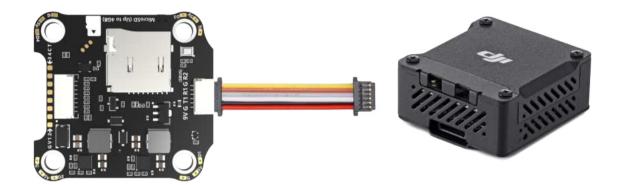
Importance notice for ELRS receiver

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.



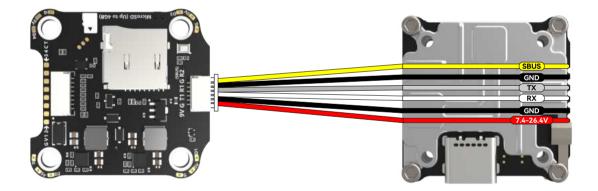
DJI Air Unit

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)

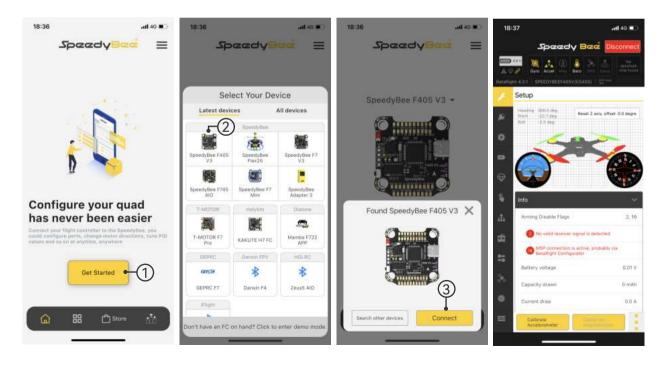


#### App & FC Configuration

## 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.

BETAFLI	GHT		CC0M0 - Brindinger STMXDF405	Update Firmware	Connecs		
2022 09 07 @11:56:25 - Loaded build 2022 09 07 @11:56:26 - Loaded relea 2022 09 07 @11:56:26 - Loaded relea	creatingly closed information for jobs from build server. is information to jobs from build server. se information for firmware from GitHub. ae information for firmware from GitHub.				Scroll		
™ Welcome	Show unstable releases		Show release candidates in addition to statile releases				
Changelog			some revenue communica in invanion in scalar revenues Show invelleusial and potentially invitable builds				
Privacy Policy			period of the set				
Documentation & Support	Release	Y					
O Options	SPEEDYBEEF405V3	~	Auto-detect Select an auto-detect your board to see available online firmware plea appropriate for jour board.	ies - Select the surrest	Dimbuter D D		
Eirmware Basher	13-07-2022 11:13 - 4.3.1	~	Select firmware version for your board.				
	No reboot sequence		Emilder (Fyour FC is in haot mode, i.e. if you powered on your FC with the bootloader po FC's BOOT hutters.	is jumped or whilst ho	iding your		
	Full chip erase		Wipes all configuration data currently stored on the board.				
	Manual baud rate 256000 v		Manual selection of boud rate for boards that don't support the default speed or for fit <b>Note:</b> Not used when flading via USB DFU	nning via bluenaoth.			
Port utilization: D: 0 % U: 0 % Packs	Please load firmware file		Load Firmware [On	iline] Load Fin	mware [Local]		

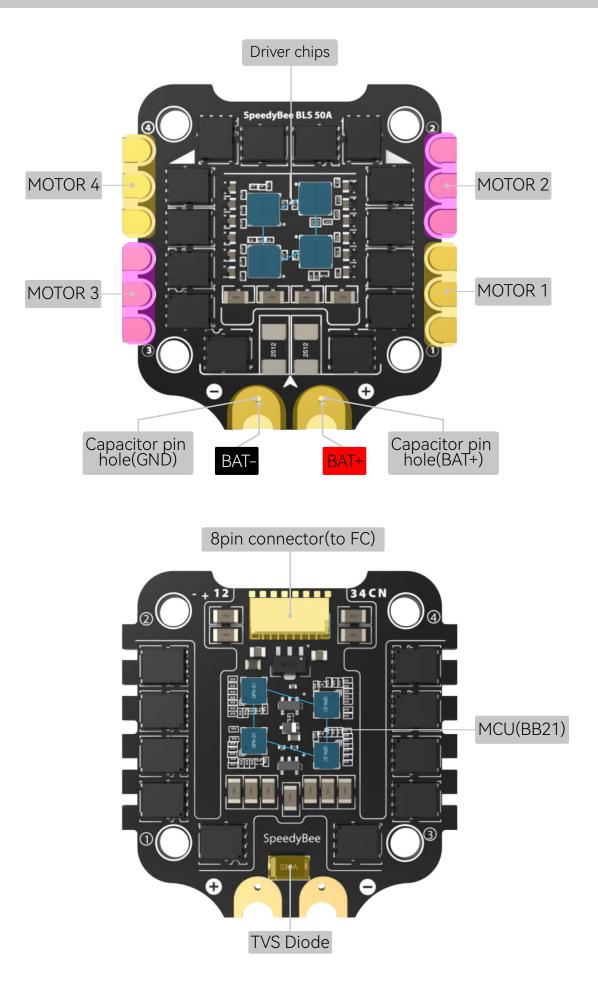
# Specifications

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 50A ESC, please set scale = 386 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(UART5)
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	<ul> <li>Supported.</li> <li>[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.</li> <li>[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.</li> </ul>
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

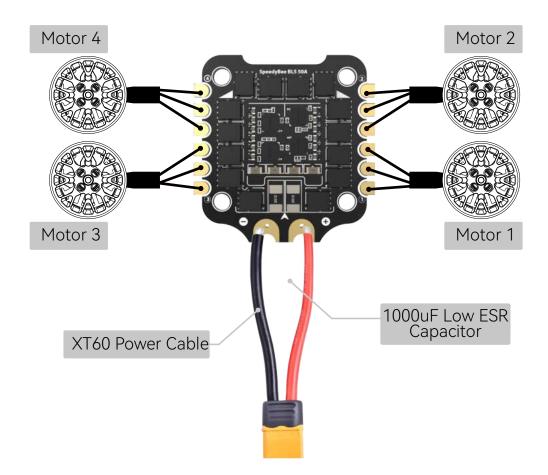
# Part 3 – SpeedyBee BLS 50A 4-in-1 ESC

#### Layout

11/15



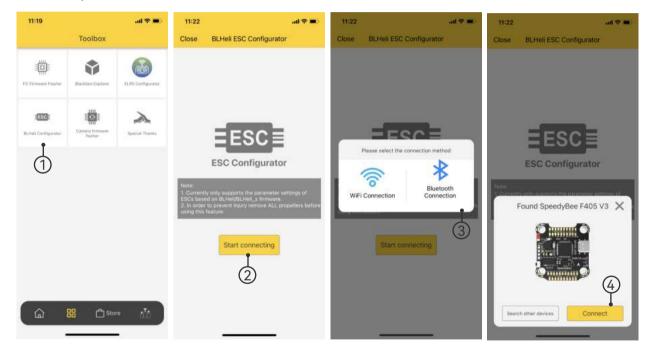
#### **Connection with Motors & Power Cable**



Note: 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.

### 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.

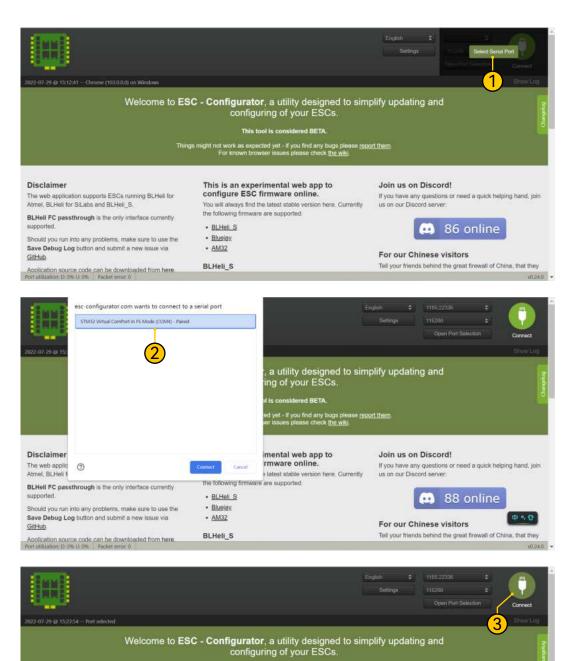
#### ESC Firmware Update

This 8-bit 50A 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-50."



This tool is considered BETA

	Things might not work as expected yet - It For known browser issues	f you find any bugs please <u>rep</u> g s please check <u>the wiki</u>	ri.lhem		
Disclaimer The web application supports ESCs running BLHell for Atmel, BLHell for SLabs and BLHell_S. BLHell 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 Giffub Application source code can be downloaded from here. Particulation: Di OK LOKektet emat. 0	This is an experimental configure ESC firmware You wil always find the latest st the following firmware are support BLHell_S BLHell_S BLHell_S	e online. table version here. Currently	us on our Discord	estions or need a quick h server: 3 86 online	
2022-07-29 @ 15.24.27 - Linique device ID received - 0.0430042	01991033382236	In	rginti Ə Settings	1993 2000 🔹	Disconnect Show Log
Note: Make sure you've taken the propeities OFF before doing anyt Note: Context power to the ESCs. Motor Control	ting on this lab.	1			
Make sure your ESCs are properly set up to reflect the state on Eq: "When you enabled 3D mode in your flight centroller, make otherwise the motors might go off with full power. Also be aware that the motors will not spin if you have bi-direc but the ESC does not support it. Which might be the case whe BUHell S. Einstein motor control Battery:	e sure the ESCs are also set up for 3D mode, .				
	r Speed				4
Savé Debug Log Clear Debug Log Port utilization: Di 0% U: 0%, Packet error: 0		Hasten District Se	Think At ES	Ka Webs Settings	Read Settings v0.24.0
			alish ÷	1153 22238 🔹	Disconnect
2022-07-29 @ 1528-01 — Done reading ESCs . Note: Make sure you've taken the propellers OFF before doing anylf Note: Connect power in the ESCs.	ting on this tab.	ESC 1: J-H-45 - BLHeli .3, 16.	75		
Common Parameters Programming by TX 0.50 Startup Power @ 140 C Tempendure Protection Low RPM Power Protect D Brake m stop. @	17-11 (Jan 1997)	ESC 1: J-H-45 - BLHell 5, 16 Reversed 1148 ps 1832 ps Off	Motor Direction     PPM Mirr Throate     PPM Mox Throate     LED Configuration		
Low Denag Compensation ( Medium > Motor Timing ?	2	Plash Firmware to th			

			Englisti Settings	•	ristana + Trasi + Oper Pol Selector	Deconvect
2023-07-25 @ 10:07:04 Done reading ESCs						Show Log
	Igroum Hoppropriate MCU and Layo     Migrate settings between different     More: Be awaye hard settings between different     More: Be awaye that settings are not     deschors and other settings you migr     be series fitmaser     Select Turget (J.H.SD - B.LHell, S     BLHell, S     JAH-50     V     16.7 [Official]	innwares? nagralied between different firmwares, make sure to take is I want to move over. Settings will be migrated between diff	ate of your motor terent versions of			
		Flash		+(	<mark>6)</mark>	
		Flash Local Firmware				
		Cancel				
				8		

Reversed

Save Debug Log

Mater Director
 P
 Mater Director
 P
 Restore Default Settings
 Plash All ESCs
 Write Settings
 Resd Setting

# Specifications

Product Name	SpeedyBee BLS 50A 30x30 4-in-1 ESC
Firmware	BLHeli_S JH50
Wireless Configuration	Full Configuration Supported in the SpeedyBee app
PC Configurator Download Link	https://esc-configurat@om/
Continuous Current	50A * 4
Burst Current	55A(5S)
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=386 Offset=0)
Mounting	30.5 x 30.5mm( 4mm hole diameter)
Dimension	45.6(L) * 44(W) * 6.1mm(H)
Weight	13.8g