SpeedyBee Stack
F405 V3
BLS 50A 30x30

Contents (Click on any section to jump)

SpeedyBee®

F405 V3 BLS 50A 30x30 Stack

User Manual V1.0

Specs Overview

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

Φ4mm

1.6mm

39.4mm

5V G CAM CC RS 3V3 G 4V5 R2 T2
R3 T3 G M5 M6 M7 M8 TEL S9 SBUS

F405 V3

PWR

FC

BT

SpeedyBee

SDA SCL 5V G LED 5V BAT G 5V BZ+ BZ-
4V5 G T6 R6 9V VTX T1 R1 BAT

41.6mm

7.8mm

30.5mm

Φ4mm

1.6mm

44mm

SpeedyBee BLS 50A

④ ②

③ ①

− ▲ +

2512 2512

45.6mm

6.1mm

30.5mm

16.1mm
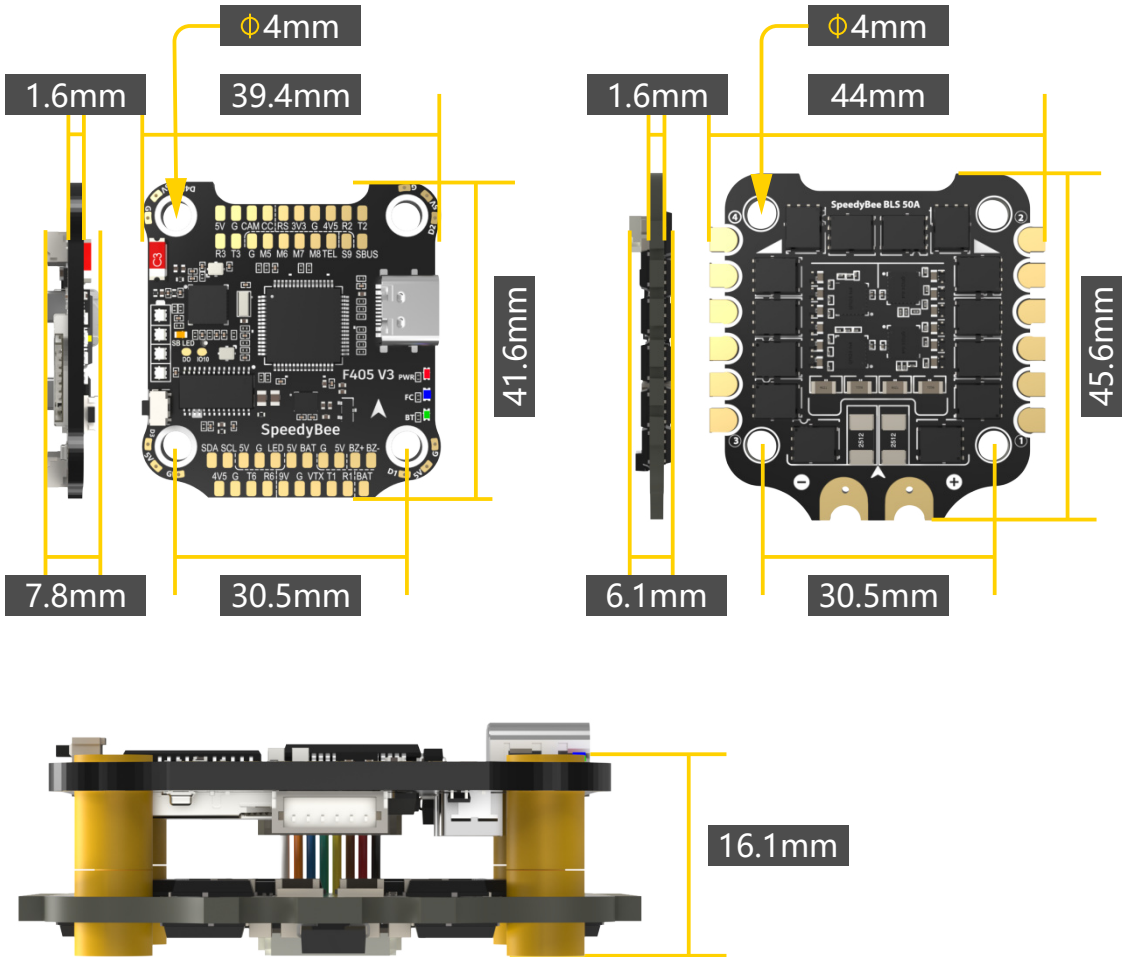
Option 1 - SpeedyBee F405 V3 50A 30x30 Stack
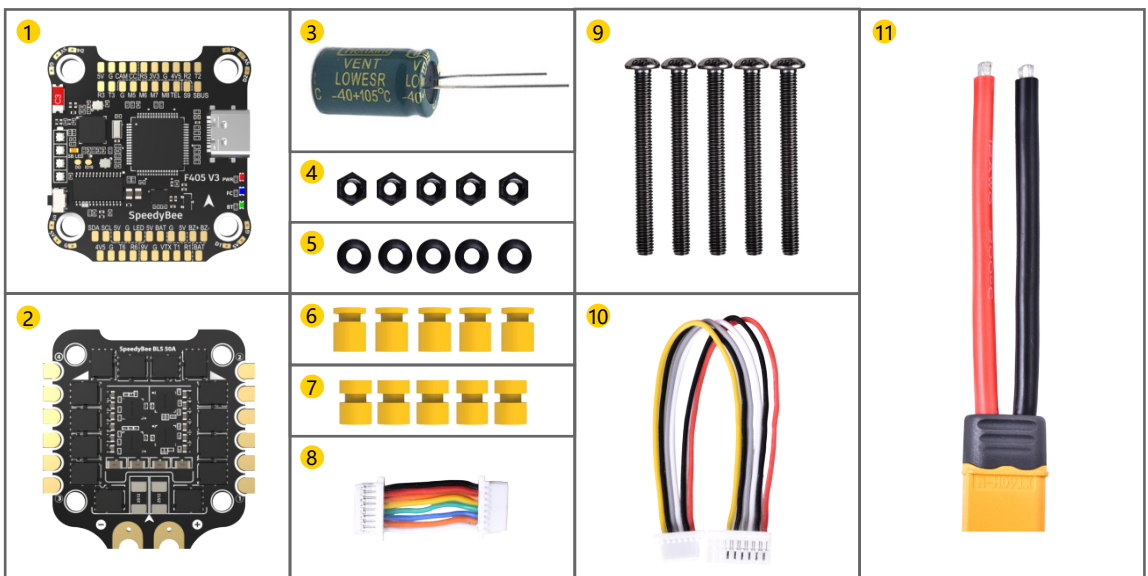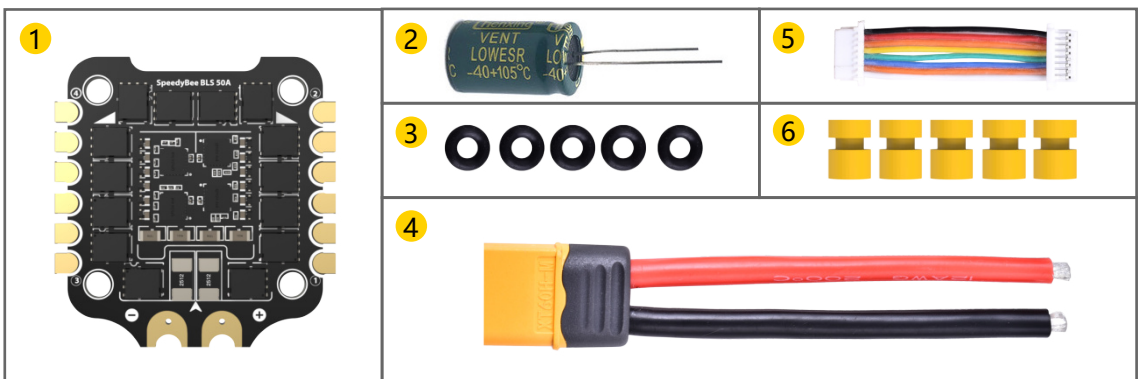

1. SpeedyBee F405 V3 Flight Controller x 1
2. SpeedyBee BLS 50A 4-in-1 ESC x 1
3. 35V 1500uF Low ESR Capacitor x 1
4. M3 Nylon Nut x 5
5. M3 silicone O Ring x 5
6. M3*8mm Silicone Grommets(for FC) x 5
7. M3*8.1mm Silicone Grommets(for ESC) x 5
8. SH 1.0mm 15mm-length 8pin Cable(for FC-ESC connection) x 1
9. M3*30mm Iner-hexagon Screws x 5
10. DJI 6pin Cable(80mm) x 1
11. XT60 Power Cable(70mm) x 1

Option 2 - SpeedyBee F405 V3 Flight Controller
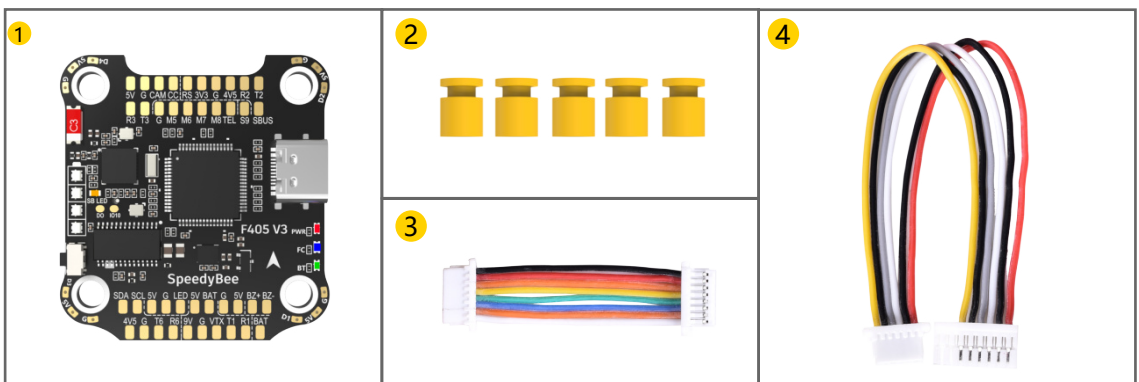
1. SpeedyBee F405 V3 Flight Controller x 1
2. M3*8mm Silicone Grommets(for FC) x 5
3. SH 1.0mm 30mm-length 8pin Cable(for FC-ESC connection) x 1
4. DJI 6pin Cable(80mm) x 1

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


1. SpeedyBee BLS 50A 4-in-1 ESC x 1
2. 35V 1500uF Low ESR Capacitor x 1
3. M3 silicone O Ring x 5
4. XT60 Power Cable(70mm) x 1
5. SH 1.0mm 30mm-length 8pin Cable(for FC-ESC connection) x 1
6. M3*8.1mm Silicone Grommets(for ESC) x 5

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

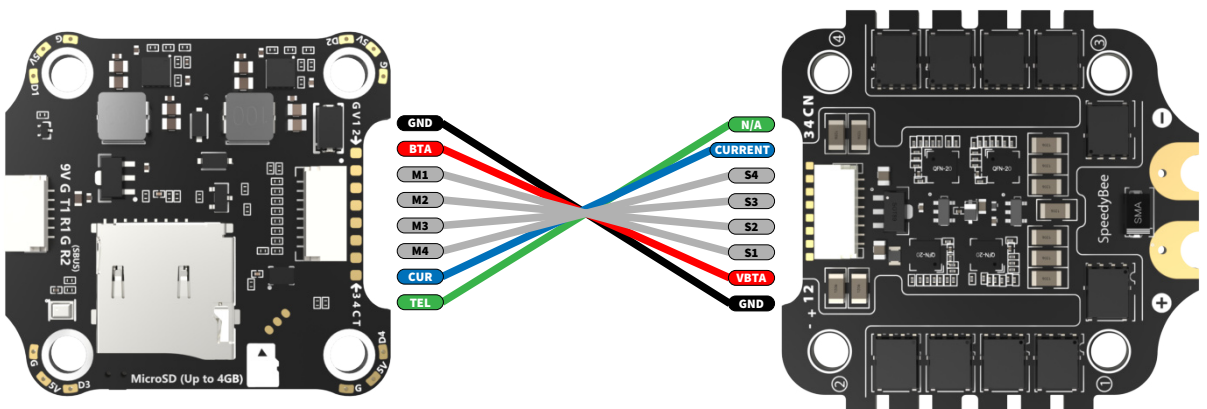Use any end of the 8-pin JST cable to connect the FC to the ESC.
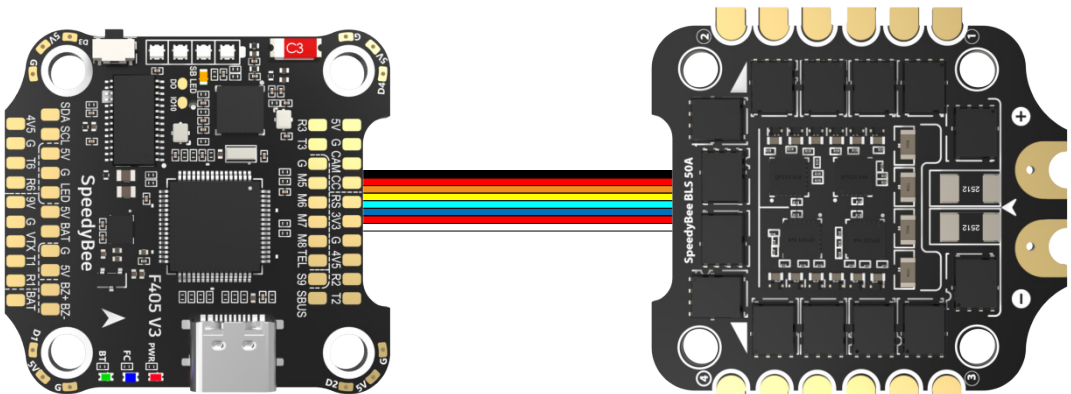
F7 V3 Flight Controller   BL32 50A 4-in-1 ESC
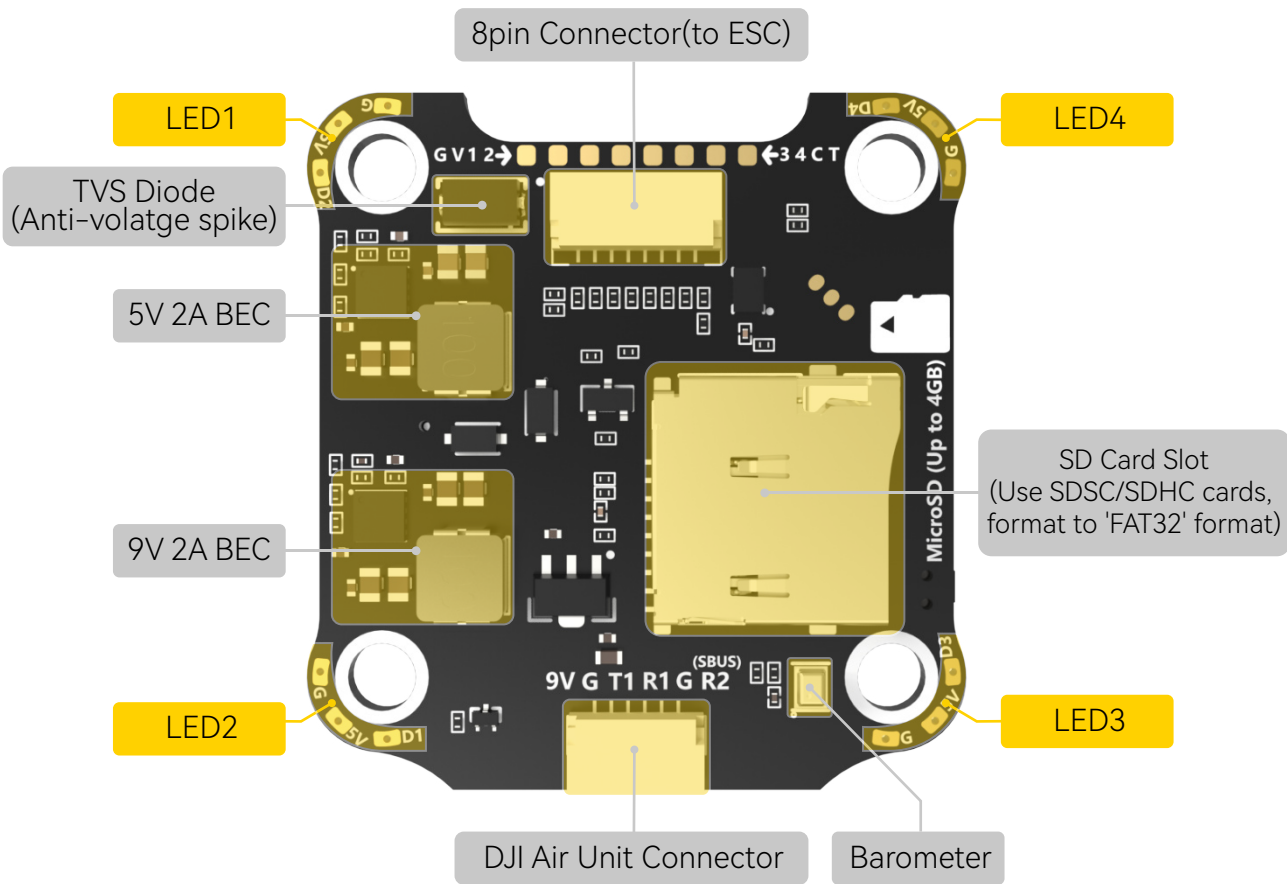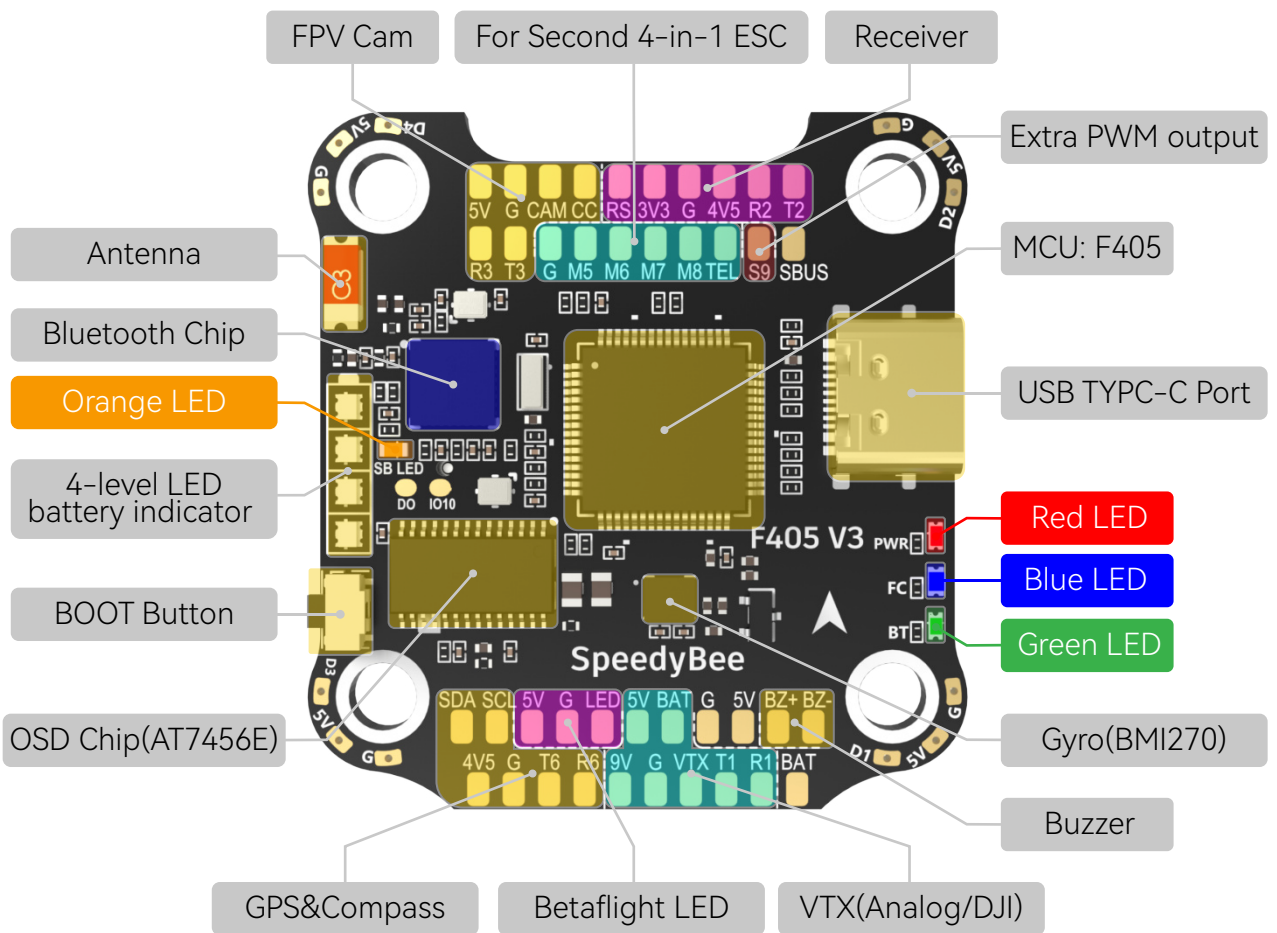
Method 2 - Direct soldering

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

F405 V3 Flight Controller   BLS 50A 4-in-1 ESC

Labels around the first board diagram:

- FPV Cam
- For Second 4-in-1 ESC
- Receiver
- Extra PWM output
- Antenna
- MCU: F405
- Bluetooth Chip
- Orange LED
- USB TYPC-C Port
- 4-level LED battery indicator
- Red LED
- Blue LED
- Green LED
- BOOT Button
- OSD Chip(AT7456E)
- Gyro(BMI270)
- Buzzer
- GPS&Compass
- Betaflight LED
- VTX(Analog/DJI)

Board silk text: 5V G CAM CC RS 3V3 G 4V5 R2 T2 / R3 T3 G M5 M6 M7 M8 TEL S9 SBUS / F405 V3 PWR FC BT / SpeedyBee / SDA SCL 5V G LED 5V BAT G 5V BZ+ BZ- / 4V5 G T6 R6 9V G VTX T1 R1 BAT

Labels around the second board diagram:

- 8pin Connector(to ESC)
- LED1
- LED4
- TVS Diode (Anti-volatge spike)
- 5V 2A BEC
- 9V 2A BEC
- SD Card Slot (Use SDSC/SDHC cards, format to 'FAT32' format)
- LED2
- LED3
- DJI Air Unit Connector
- Barometer

Board silk text: G V1 2 / 3 4 C T / MicroSD (Up to 4GB) / 9V G T1 R1 G R2 (SBUS)

■ 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. You could also change modes in the app wirelessly.

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/Emuflight/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.

PPM Receiver

Reciever

PPM

Model: Phoenix 2
RunCam
Made in China
CE FC

5-36V
GND
Video

GND
Menu

5-36V
GND
Video

Menu

SBUS

5V

GND

PPM
5V
G

CH2 RX
CH1 TX
5V
GND

CH2
CH1
5V
GND

Crossfire Nano Rx

LED

LED

DIN
5V
G

5V
GND
CAM
CC

GND
5V
R2
T2
SBUS

G
5V
DIN

5V G CAM CC RS 3V3 G 4V5 T2
R3 T3   G M5 M6 M7 M8 TEL S9

S9

SIGNAL
5V
G

SERVO

LED Strip

LED
GND
5V

LED
GND
5V

5V
GND
LED

F405 V3 PWR

BZ+
BZ-

Buzzer

SpeedBee

SDA SCL 5V LED 5V BAT 5V B+
4V5 G T6 R6 9V G VTX T1 R1 BAT

LED

DIN
5V
G

SDA
SCL
5V
DIN

9V
G
VTX
T1
R1

G
5V
DIN

LED

5V

GPS

SCL
5V
TX
RX
GND
SDA

SCL
4V5
R6
T6
G
SDA

5V
GND
IRC
Video

Analog VTX

7.4-26.4V
GND
RX
TX
GND
SBUS

DJI Air Unit

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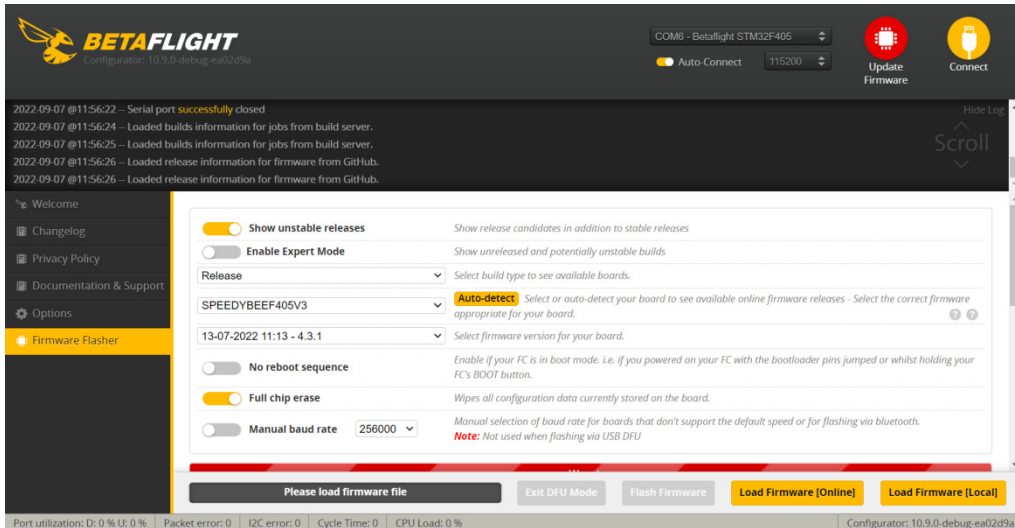
■ FC Configuration
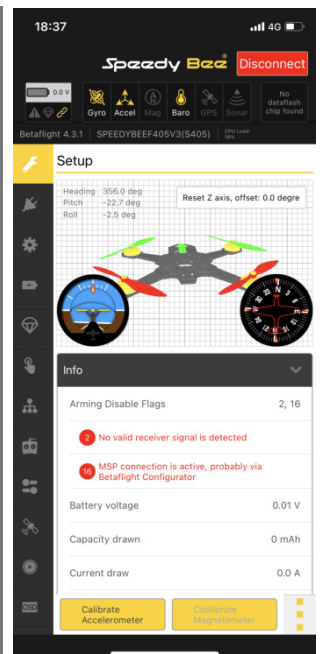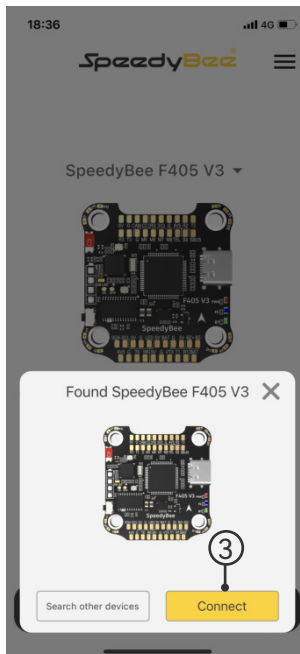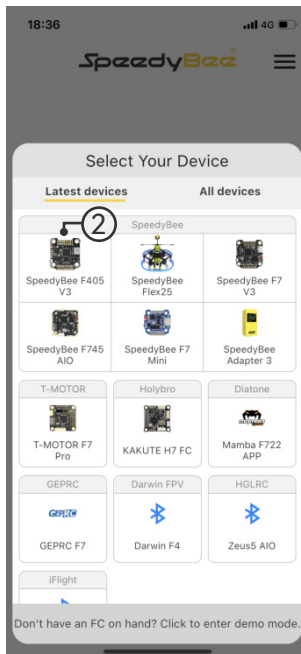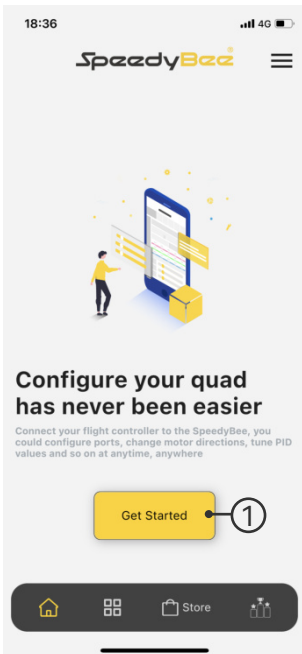
SpeedyBee F405 V3 flight controller does not support wireless firmware flashing, so please flash firmware for it on your PC following the steps below:

① Connect the flight controller to the PC with a USB cable

② Open Betafight/Emuflight/INAV configurator on your PC. Take Betaflight configurator as an example, go to the 'Firmware Flashing' page, choose the target '**SPEEDYBEEF405V3**' and flash.
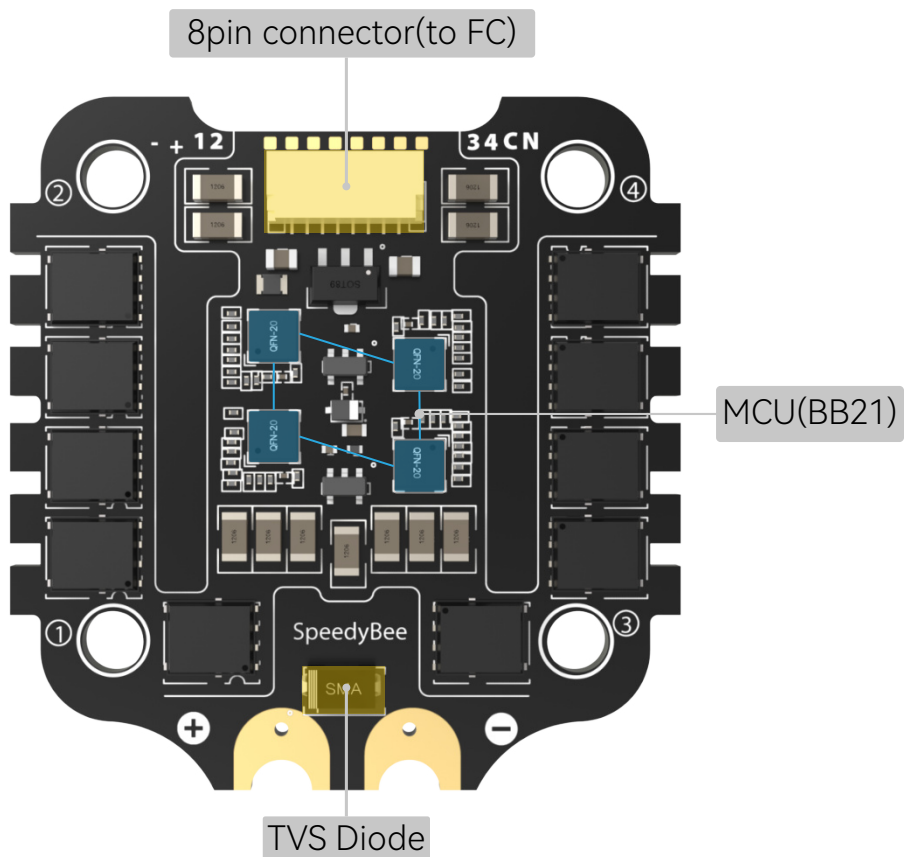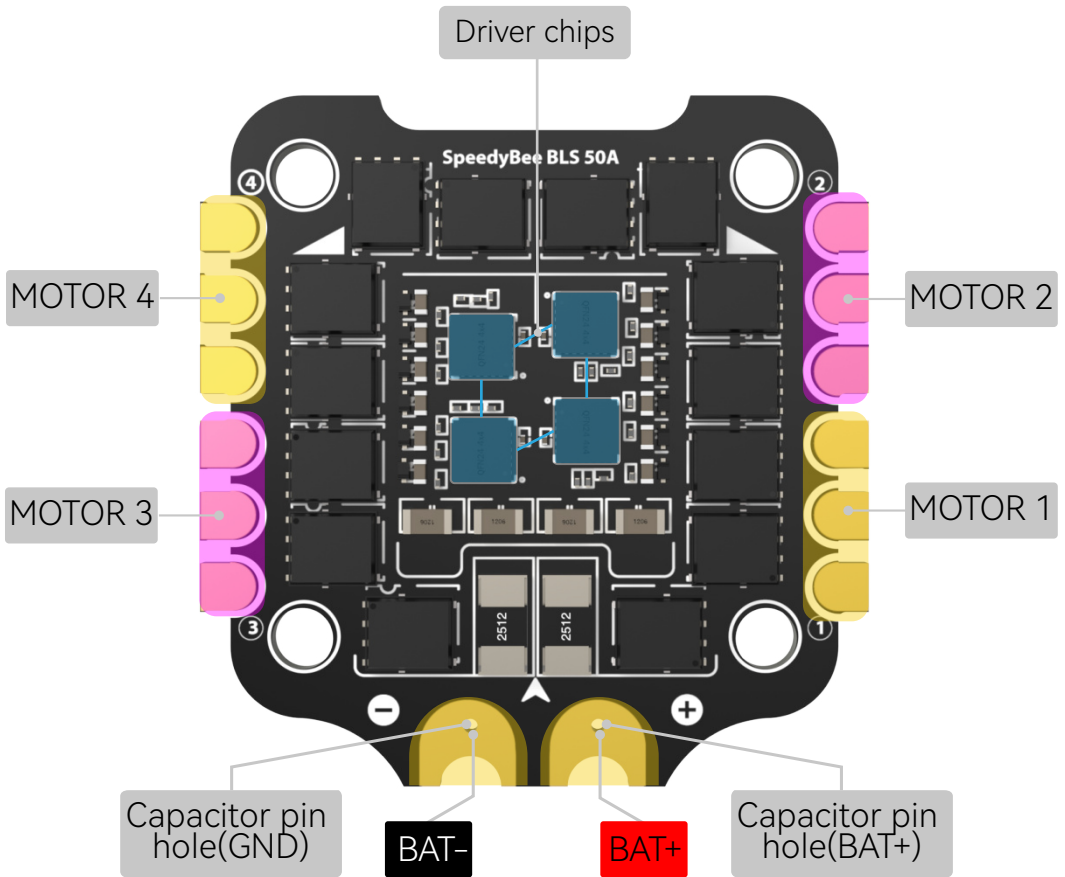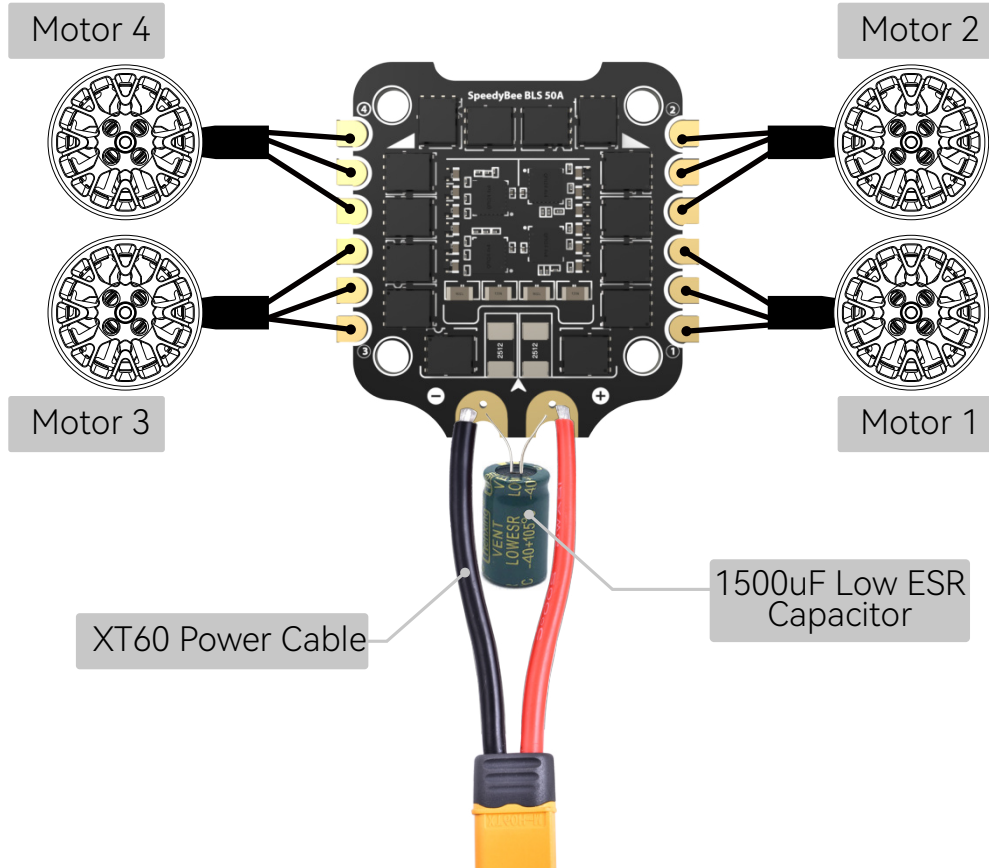
Product Name	SpeedyBee F405 V3 30x30 Flight Controller
MCU	STM32F405
IMU(Gyro)	BMI270
USB Port Type	Type-C
Barometer	Built-in
OSD Chip	AT7456E chip
BLE Bluetooth	Supported. Used for Flight Controller configuration
DJI Air Unit Connection Way	Two ways supported: 6-pin connector or direct soldering.
Blackbox MicroSD Card Slot	Supported. Please use ≤4GB SDSC/SDHC microSD card and should be formatted to FAT16/FAT32 format. Don't use SDXC cards. Note: Betaflight can only recognize 4GB max.
BetaFlight Camera Control Pad	Yes(CC pad on the front side)
Current Sensor Input	Supported. For SpeedyBee BLS 50A ESC, please set scale = 386 and Offset = 0.
Power Input	3S - 6S Lipo(Through G, BAT pins/pads from the 8-pin connector or 8-pads on the bottom side)
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	5 sets(UART1, UART2, UART3, UART4(For ESC Telemetry), UART6)
ESC Telemetry UART	R4(UART4)
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.
SmartPort	Use any TX pad of UART for the SmartPort feature.
Supported Flight Controller Firmware	BetaFlight(Default), EMUFlight, INAV
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

Driver chips

SpeedyBee BLS 50A

MOTOR 4

MOTOR 2

MOTOR 3

MOTOR 1

2512 2512

Capacitor pin hole(GND)

BAT-

BAT+

Capacitor pin hole(BAT+)

8pin connector(to FC)

- + 12

34CN

②

④

①

③

SpeedyBee

MCU(BB21)

TVS Diode

Motor 4

Motor 2

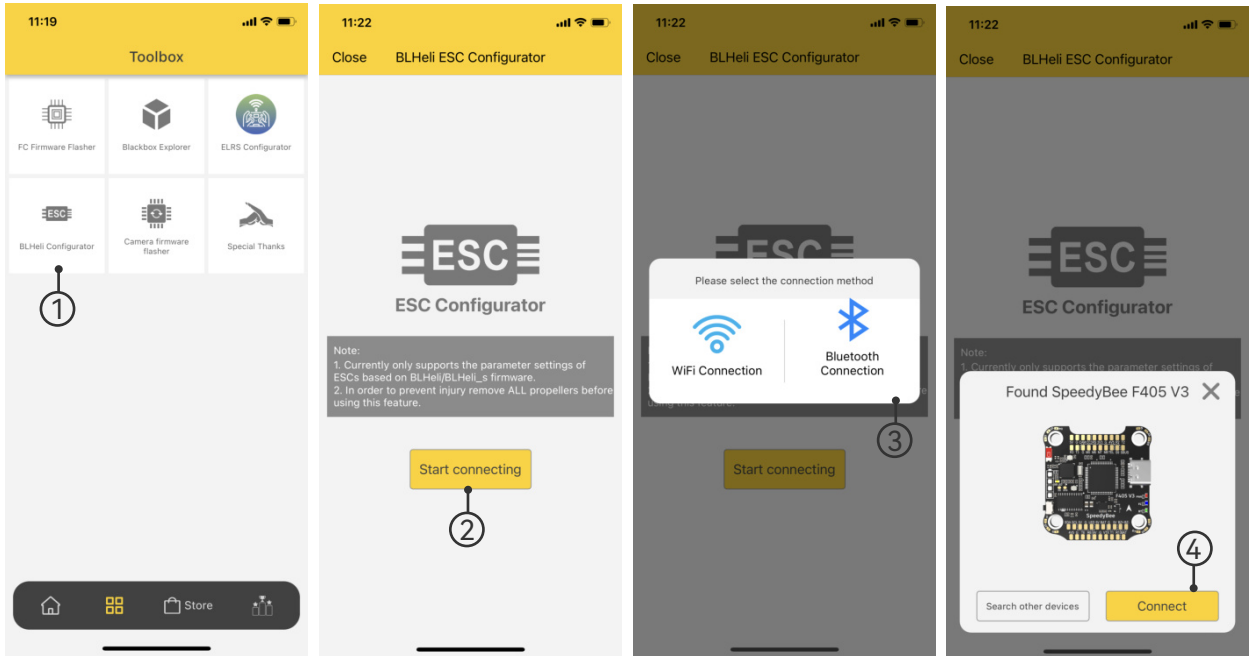SpeedyBee BLS 50A
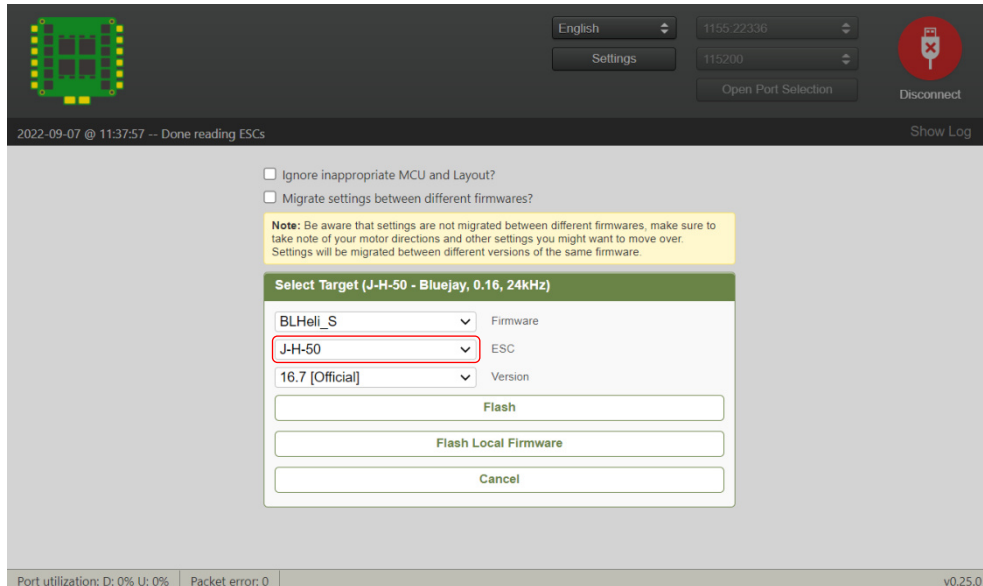
Motor 3

Motor 1

1500uF Low ESR Capacitor

XT60 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.

■ If you'd like to use a PC configurator, we recommend the ESC Configurator.

ESC Firmware Update

- We recommend using the ESC Configurator on your PC to update firmware for this ESC. Please make sure to select 'JH-50' as the ESC type for either BLHeli_S or Bluejay.

Specifications 14/14

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-configurator.com/
Continuous Current	50A * 4
Burst Current	55A(5S)
TVS Protective diode	Yes
External Capacitor	1500uF 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