



Speedybee APP



Installation guide

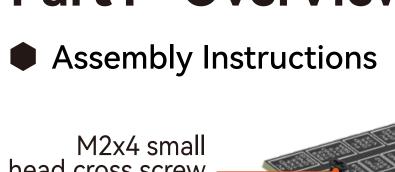


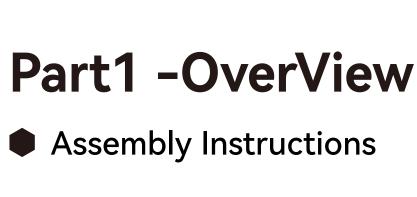
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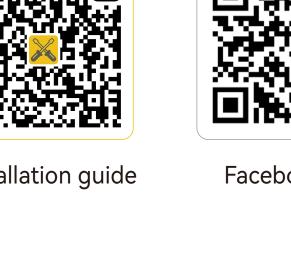
SpeedyBee F405 WING APP **Product Name TOP Board** SpeedyBee F405 WING Wireless Board SpeedyBee F405 WING FC Board FC Board SpeedyBee F405 WING PDB Board PDB Board SpeedyBee F405 WING USB extender USB extender Supported Wireless configuration Supported LED strip controller Supported Battery level indicator **INAV / Ardupilot** FC Firmware **Power Input** 2-6S LiPo

Specification overview

52 (L) x 32 (W) x 19 (H) mm Dimension 35g (with USB extender) Weight

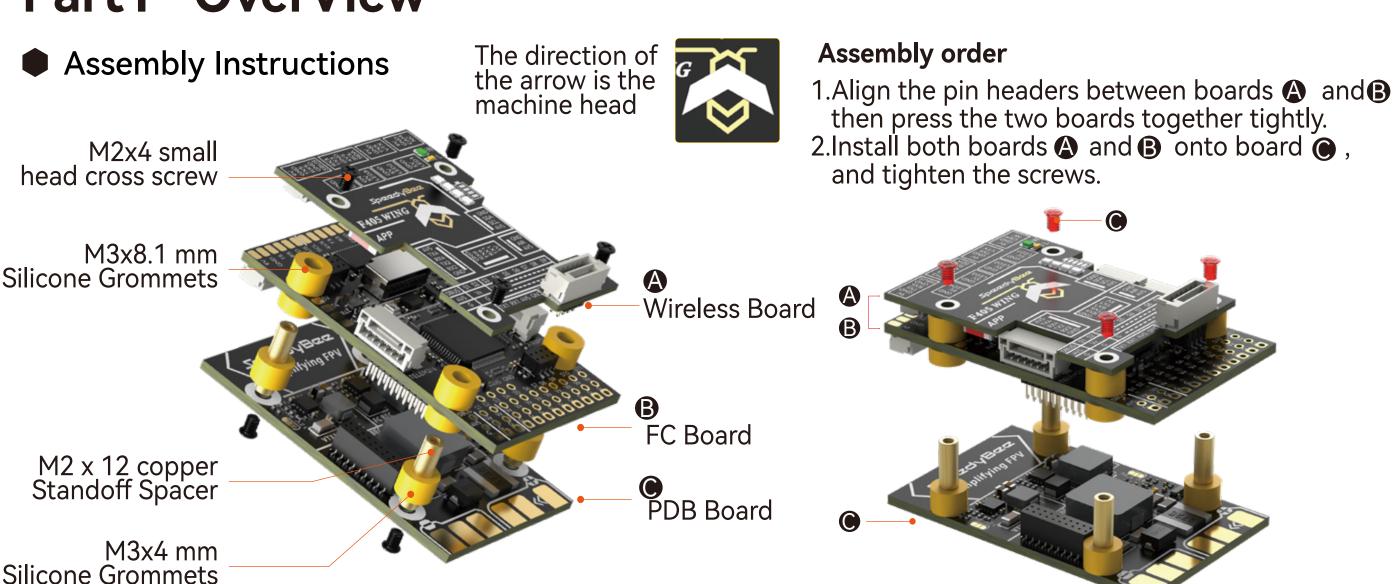












GPS module solder pads **Digital VTX** solder pads

Part2-hardware description

MicroSD card slot

Layout

FC Board Front

Telemetry module solder páds R4 and T4 signals are the same asthe Telemetry module connector

connector **RSSI** solder pads Analog RSSI signal input, supports

up to 3.3V

Telemetry module

SBUS input pin headers With inversion circuit, connected to RX2

FC Board Back Analog camera connector

GH1.25 6P TELEM2/4 2302_{RS} AIRSPEED T4 R1 4V5 GND VX VX VX VX VX VX VX VX VX G G G G G G

Analog VTX connector GPS module connector

-1 1 1 1 1 1 -

SH1.0 6P

S D D D D D D

SSXXSS

SH1.0 4P | SH1.0 4P | SH1.0 6P

Analog VTX solder pads The default power supply is 9V. If the VTX can only be powered by

5V, please change the PDB board's VTX BEC to output 5V. Analog camera solder pads The default power supply is 9V. If the camera can only be powered by 5V, please connect the power supply to the 5V solder pad. Digital airspeed sensor connector

Analog airspeed sensor connector Built-in voltage divider circuit,

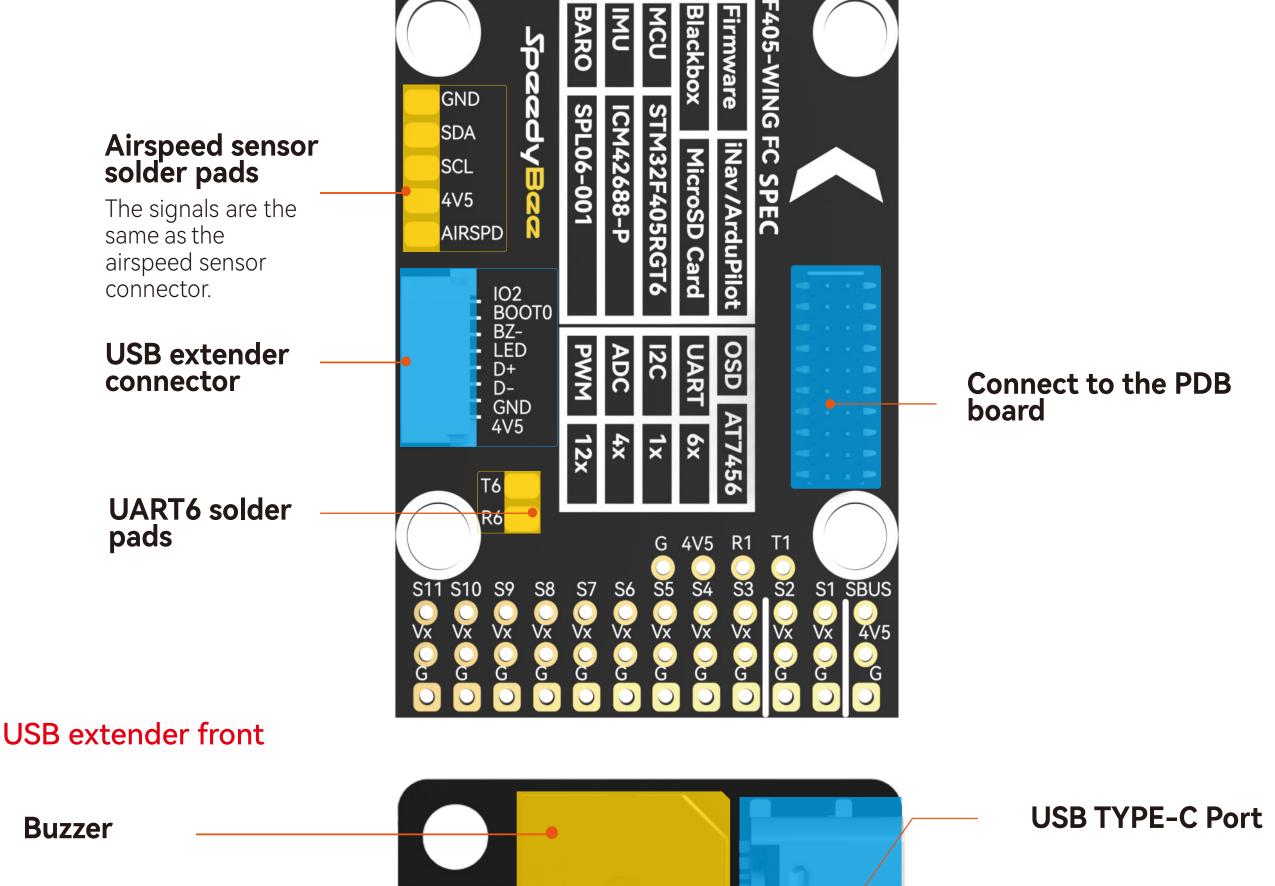
supports up to 6.6V.

the ELRS/TBS receiver. Motor and servo output pin headers PWM1-11

ELRS receiver pin headers Use these pin headers to connect

Digital VTX connector

VTX **GPS** DJI CAM



BOOT button Press and hold the BOOT button

FC board connector

controlling other functions of the wireless board. PDB board Front

operating state, the BOOT button is also used for

while powering on to enter DFU mode for firmware flashing. When the FC is powered on and in

VTX BEC voltage selection jumper Default 9V output 12V output 5V output Note: TX800 requires 5V power supply.

Connect as shown

in the diagram

Wireless board Front

F405 WING

TX4

RX4

RX2

UART6 jumper

APP

SpeedyBee

099EL

RXXXXX

TX6 RX6. TX1 RX1 shares the same signal

as the ELRS/TBS receiver pin header.

GND SDA

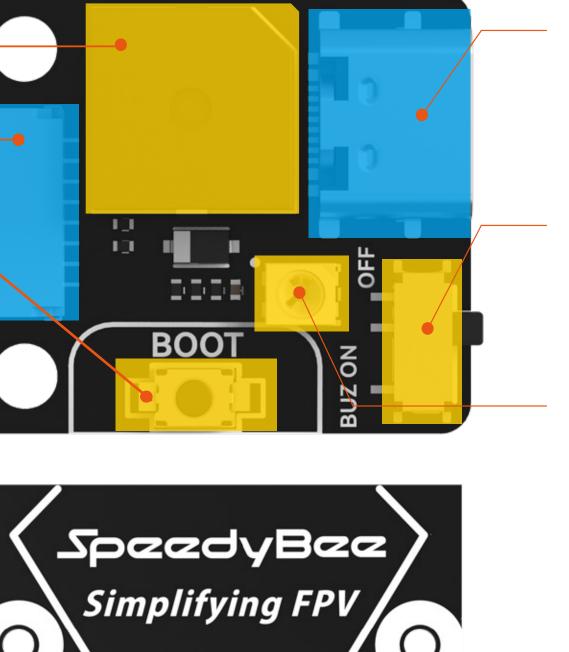
SCL

■ GND

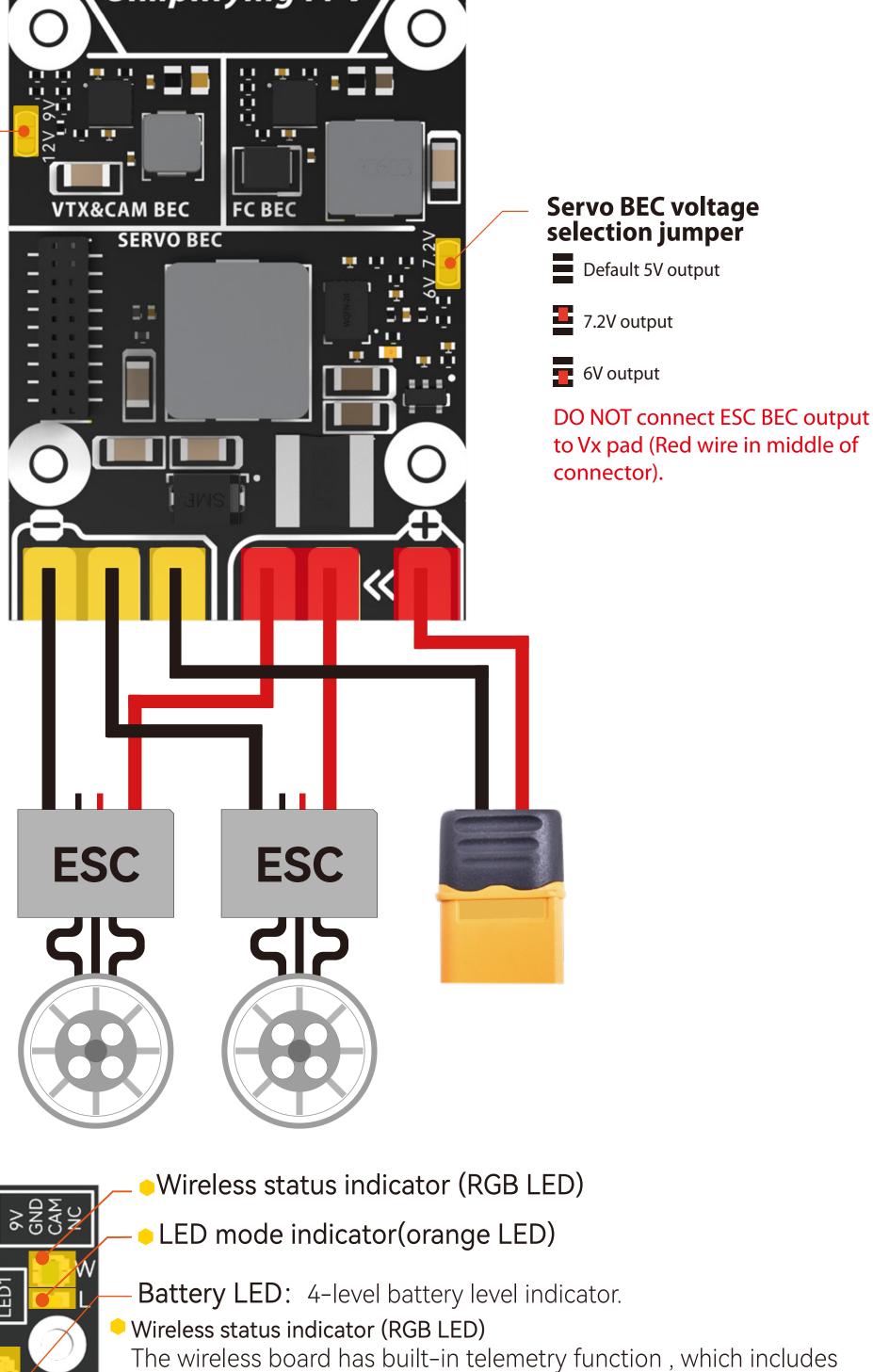
4V5

ss M<mark>ode:</mark> Wi-Fi, BT classic, RF OFF.

nin.



Buzzer mute switch FC RGB status indicator



4 RF modes: Bluetooth BLE, Wi-Fi, classic Bluetooth SPP, and

Pressing the BOOT button for 6 seconds can switch between the 4

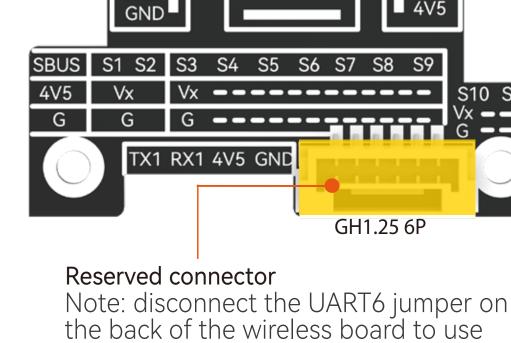
wireless modes. When the yellow LED flashes rapidly and the board

Orange light always on: Solid orange LED means the 4 sets of LED

Press and hold the BOOT button for 3 seconds to switch between

Blue slow flashing: Classic Bluetooth SPP not connected

Blue Solid: Classic Bluetooth SPP not connected



Wiring Diagram Method 1: Plug and play

GND

Video Menu

Analog VTX

Anglog Cam

MS4525DO

airspeed sensor

Method 2, Direct soldering.

USB extender

strips are in SB_LED mode, controlled by the wireless chip. A short press of the BOOT button cycles through different display effects when the FC is operating normally. Orange light is off - Off orange LED indicates FC_LED mode, where

the FC controls the 4 sets of LED strips directly.

automatically restarts, the switch is successful.

Green slow flashing: BLE not connected

Green solid:BLE connected successfully

White slow flashing: Wi-Fi not connected

White Solid: Wi-Fi connected successfully

RGB LED off: Wireless module turned off

LED mode indicator(orange LED):

FC_LED mode and SB_LED mode.

wireless off mode.

SH1.0 3P LED strip connector The maximum power supply for the LED connector is about 5.2V 1.3A. SH1.0 When the power exceeds the limit, the resettable fuse will cut off the 3P SH1.0 power supply. Please reduce the number of light beads appropriately

3P

SH1.0

<u>3</u>P

The GPS solder pad definition doesn't fully correspond to the GPS connector definition

Digital VTX ELRS/Crossfire reciever

when the power exceeds the limit.

2812 Arm LED strips as an example,

Taking SpeedyBee Programable

a total of 17 LED strips can be

68 light beads.

PS

CH2 RX CH1 TX

SBUS reciever

BN-880 GPS

ーンパロコ

GPS module

Analog VTX

controller

Wireless board

5V GND

installed, including approximately

GPS module

DJI Air Unit Anglog Cam **ELRS/Crossfire reciever** CH2 RX CH1 TX **5V CND** GND SDA SDA < ■ TOS SCL 4V5 SBUS reciever AIRSPD MS4525DO airspeed sensor Power supply The power distribution logic for the F405 WING APP is as follows: **LED Connector 9V Pads VTX&CAM BEC** 9V 1.8A **Reverse Protection** 5V/12V optional **5V Pads** Resettable Fuse 1.3A Max **FC BEC** 5.2V 2.4A Wireless Diode2A 4V5 Pads

Max

Vx Pads

FC board

3. The default voltage for the FC BEC is 5.2V, with power output divided into three directions:

·The third path outputs to the LED connector through a self-recovering fuse and reverse connection

Please note that the FC BEC can provide a continuous current of 2.4-2.5A and a peak current

less than 0.1A, and the wireless controller requires 0.1A.If the LED connector uses a maximum

The limit for the LED connector power supply is approximately 68 pieces of SpeedyBee 5050 LED strip

of 3A. The onboard chip requires less than 1A of power, GPS and receivers generally require

of 1.3A, the 5V pad will have no remaining capacity. If the LED connector is not used, the 5V

·The second path outputs to the onboard chip and 4V5 pad through a diode.

1. The 9V pad uses a VTX&CAM BEC for power supply. When the VTX&CAM BEC switches to another voltage through the pad jumper, the 9V pad will output the corresponding voltage.

SERVO BEC

5V 5A

6V/7.2V optional

PDB board

protection circuit.

pad will have a 1.3A surplus.

number of LED beads.

2. The Vx pin headers use a Servo BEC for power supply. When the Servo BEC switches to another voltage through the pad jumper, the Vx pin headers will output the corresponding voltage. Note: If your ESC supports BEC output, do not connect the ESC BEC red wire to the Vx pin headers, as this may burn the ESC or Servo BEC.

·The first path directly outputs to the 5V pad.

Part3-Firmware upgrade and APP connection

beads. Do not exceed this limit. To test if other brands of LED strips meet the power requirements, you can take the following steps: ·After connecting the LED strip, let the flight controller be powered and idle for 10 minutes. Observe if the color of the LED strip suddenly dims and feel the wireless board with your hand. If it feels very hot, the power supply is insufficient, and you need to reduce the number of LED beads.

·You can also use a multimeter to test the voltage of the 5V pad or the LED strip power pad. If the

voltage is below 5V, it indicates that the power supply is insufficient, and you need to reduce the

APP connection Firmware upgrade Connecting Ardupilot firmware to QGroundControl app. SpeedyBee F405 WING APP not supporting wireless firmware flashing, please update the firmware on a computer. Follow these steps: Check the color of the wireless status indicator. If it's not flashing white, press the BOOT button for 6 seconds to switch to white. Then connect to the "Speedybee F405Wing" Wi-Fi and open QGroundControl, it will automatically connect. ①Press and hold the BOOT button, and

USB cable. 2 Open the INAV Configurator on your computer, go to the "Firmware Flasher" page, select the flight controller target as "SPEEDYBEEF405WING", and then flash the firmware.

Search

Store

3 To flash Ardupilot firmware, follow the same steps as above, select "Load Firmware [local]", and then flash

the firmware. APP Connection

Check the color of the wireless status indicator. If it's slow flashing green, open the SpeedyBee app and follow the steps to connect to the

Connecting INAV Firmware to

Speedybee APP.

corresponding product.

-- m →0.0 m/s SpeedyBee SpeedyBee SpeedyBee F405 Wing ▼

Identifiable devices

Connect

connect the FC to the computer via Click anywhere to hide **1** -0.1 m ↑-0.1 m/s AirSpd 0.1 m/s ◊ 00:00:00

> SpeedyBee F405 Wing ▼ Reset Z axis, offset: 0.0 deg Pre-arming checks Found 123F405Wing-BLE-BLE X Quick Access 12.54 V 97 % NA Battery remaining capacity Name false 0.35 A 4.38 W

> > 64 mAh

0.810 Wh

Reset Settings

GPS Fix type:

Downloading

Suitable for different flight control firmware and Configurator. The supported apps are listed in the following table. It is recommended to use Bluetooth BLE mode for iNav and WiFi mode for Ardupilot.

	Bluetooth BLE	WiFi(UDP)	Classic Bluetooth SPP
RF Output Power	9dBm	19.5dBm	9dBm
Support Firmware	INAV	INAV/ArduPilot	ArduPilot
Support APP	SpeedyBee APP (IOS& Android)	SpeedyBee APP (IOS& Android) MissionPlanner Android QGroundControl (Android&IOS)	QGroundControl (Android)
Support PC Configurator	iNav Configurator	MissionPlanner QGroundControl	MissionPlanner QGroundControl
Range	10~20m	3~10m	10~20m

STM32F405,168MHz,1MB Flash

SpeedyBee F405 WING FC board

MCU

IMU(Gyro&Accelerometer)	ICM-42688-P		
Barometer	SPL006-001		
OSD Chip	AT7456E		
Blackbox	MicroSD Card Slot		
UART	6 sets(USART1, USART2, USART3, UART4, UART5, UART6 (Dedicated for Wireless board Telemetry connection))		
I2C	1x Used for magnetometer, digital airspeed sensor		
ADC	4x (VBAT, Current, RSSI, Analog AirSpeed)		
PWM	12x (11+1"LED"pad)		
ELRS/CRSF receiver	Supported,connected to UART1		
SBUS	Built in inverter for SBUS input (UART2-RX)		
LED	3x LEDs for FC STATUS (Blue, Green) and 3.3V indicator(Red) 1x RGB		
RSSI	Supported,Named as RS .		
Supported FC Firmware	INAV:SpeedyBeeF405WING(default)ArduPilot: SpeedyBeeF405WING		
SpeedyBee F405 WING PDB board			
Input voltage range	7~36V (2~6S LiPo)		
Battery Voltage Sensor	Connect to FC board VBAT, 1K:10K (Scale 1100 in iNav, BATT_VOLT_MULT 11.0 in ArduPilot)		

90A continuous, 215A peak Connect to FC board Current

Output 5.2V +/- 0.1V DC Continuous current 2.4 Amps, 3A Peak

Output 9V +/- 0.1V DC Continuous current 1.8 Amps, 2.3A Peak

Designed for FC, Receiver, GPS module, AirSpeed module,

(Scale 195 in iNav, 50 A/V in ArduPilot)

Telemetry module, WS2812 LED_Strip

Yes

5V tolerant I/O

1K:10K divider builtin

10K:10K divider builtin

0~30V

0~3.3V

0~6.6V

Battery Current Sensor

TVS Protective diode

FC BEC output

UART

USB

TX1 RX1

TX2 RX2

TX3 RX3

TX5 RX5

TX6 RX6

S10

S11

LED

ADC

VBAT

CURR

AIRSPD

TX2 RX2

SBUS

SBUS

VTX BEC output Output	Voltage adjustable, 9V Default, 12V or 5V via jumper Designed for Analog Video Transmitter, Digital Video Transmitter, Camera.
Servo BEC output	Output 4.9V +/- 0.1V DC Continuous current 4.5 Amps, 5.5A Peak Voltage adjustable, 4.9V Default, 6V or 7.2V via jumper Designed for Servos.
SpeedyBee F405 WING Wire	less board
	BLE mode, connect to Speedybee APP
Wireless Configuration (long press BOOT button for	Wi-Fi mode, connect to QGroundControl APP, Speedybee APP, MissionPlanner, etc.
6 seconds to switch modes)	Classic Bluetooth SPP mode, connect to QGroundControl APP, MissionPlanner
LED strip controller (short press BOOT button to switch effects, long press 3 seconds	4x WS2812 LED strip connectors, adjustable colors and flashing modes
to switch modes)	Max 5.2V 1.3A, supports around 68pcs 5050 WS2812 LED beads
On-board battery level indicator	4x RGB indicator LED for battery level display by number of lights
Part5-pin mapp	ing
■ INAV mapping	

GPS 5V tolerant I/O TX4 RX4 UART4 USER

ELRS/TBS receiver

SmartPort

DJI OSD/VTX

Onboard wireless controller

INAV Plane

Servo

Servo

WS2812LED

SBUS receiver, SBUS pad = RX2 with inverter

Telemetry, enable Softserial_Tx2

INAV MultiRotor

Servo

Servo

WS2812LED

voltage scale 1100

Current scale 195

Analog Airspeed

SBUS receiver,

IBUS/DSM/PPM

SBUS pad = RX2 with inverter

USB

UART1

TX2

UART3

UART5

UART6

TIMER

SBUS pad

PWM

		111 121 (11 (7 () 1 1 () 1 ()	TI W (V I TOITEII (O COT
S1	5V tolerant I/O	TIM4_CH2	Motor	Motor
S2	5V tolerant I/O	TIM4_CH1	Motor	Motor
S3	5V tolerant I/O	TIM3_CH3	Servo	Motor
S4	5V tolerant I/O	TIM3_CH4	Servo	Motor
S5	5V tolerant I/O	TIM8_CH3	Servo	Motor
S6	5V tolerant I/O	TIM8_CH4	Servo	Motor
S7	5V tolerant I/O	TIM8_CH2N	Servo	Servo
S8	5V tolerant I/O	TIM2_CH	Servo	Servo
S9	5V tolerant I/O	TIM2_CH4	Servo	Servo

TIM2_CH1

TIM12_CH2

TIM1_CH1

VBAT ADC

ADC_CHANNEL_1

ADC_CHANNEL_2

ADC_CHANNEL_3

AIRSPEED ADC

CURRENT_METER ADC

RSSI	0~3.3V		RSSI ADC ADC_CHANNEL_	_4	Analog RSSI	
I2C						
		onboard Barometer		SPL06-001		
I2C1 5V tolera	5V tolerant I/O	Compass		QMC5883 / HMC5883 / MAG3110 / LIS3MDL		
		Digital Airspeed sensor		MS4525		
		OLED		0.96"		
♠ ArduPilot mapping						
USB	USB SE		RIALO	Console		
TX1 RX1	USART1(With DMA) SE		RIAL1	ELRS/TE Serial Ro	3S receiver C input	

SBUS pad

RX2

USART2 BRD_ALT_CONFIG 1 SERIAL2 USER		
TX3 RX3 USART3 SERIAL3 GPS1		
TX4 RX4 UART4 SERIAL4 USER	USER	
TX5 RX5 UART5 SERIAL5 DJI OSD/VTX	DJI OSD/VTX	
TX6 RX6 USART6 SERIAL6 Telem1		
*If sending highspeed serial data (eg. 921600 baud) to the board, use USART1(Serial1).		
PWM TIMER		
S1 PWM1 GPIO50 TIM4_CH2 PWM/DShot(DMA)		
S2 PWM2 GPIO51 TIM4_CH1 PWM/DShot(DMA)	Group1	
S3 PWM3 GPIO52 TIM3_CH3 PWM/DShot(DMA)	Group?	

BRD_ALT_CONFIG 0

Default

PWM		TIMER		
S1	PWM1 GPIO50	TIM4_CH2	PWM/DShot(DMA)	
S2	PWM2 GPIO51	TIM4_CH1	PWM/DShot(DMA)	Group1
S3	PWM3 GPIO52	TIM3_CH3	PWM/DShot(DMA)	
S4	PWM4 GPIO53	TIM3_CH4	PWM/DShot(DMA)	Group2
S5	PWM5 GPIO54	TIM8_CH3	PWM/DShot(DMA)	
S6	PWM6 GPIO55	TIM8_CH4	PWM/DShot(DMA)	Group3
S7	PWM7 GPIO56	TIM8_CH2N	PWM/DShot(DMA)	
S8	PWM8 GPI057	TIM2_CH3	PWM/DShot(DMA)	
S9	PWM9 GPIO58	TIM2_CH4	PWM/DShot(DMA)	Group4
S10	PWM10 GPIO59	TIM2_CH1	PWM/DShot(DMA)	
S11	PWM11 GPIO60	TIM1_CH3N	PWM/DShot(DMA)	- Group5
LED	PWM12 GPIO61	TIM1_CH1	PWM/DShot(DMA)	Groups

ADC						
VBAT 1K:10K divider builtin		Battery voltage	BATT_VOLT_PIN	10		
	0~30V		BATT_VOLT_MULT	11.05		
CURR 0~3.3V		Current sense	BATT_CURR_PIN	11		
CONT		Current sense	BATT_AMP_PERVLT	50		
AIRSPD	10K:10K divider builtin	Λ., . l Λ.;	ARSPD_ANA_PIN	15		
AIRSPU	0~6.6V	Analog Airspeed	ARSPD_TYPE	2		
DCCI	0~3.3V	A I DCCI	RSSI_ANA_PIN	14		
RSSI	U-3.3V	Analog RSSI	RSSI_TYPE	2		

I2C					
		onboard Barometer	SPL06-001		
I2C1 5V tolerant I/O	Compass	COMPASS_AUTODEC			
	Digital Airspeed sensor	ARSPD_BUS	0		
		MS4525	ARSPD_TYPE	1	
		ASP5033	ARSPD_TYPE	15	

Part7-Package

