



**MATEKSYS**

# **FLIGHT CONTROLLER F405-WSE**

## **QUICK START GUIDE**

MCU: 168MHz STM32F405RGT6 1MB Flash

IMU: MPU6000 (SPI1)

Baro: DPS310 (I2C1)

OSD: AT7456E (SPI2)

Blackbox: MicroSD socket (SPI3)

6x UARTs

1x Softserial\_Tx option

10x PWM outputs

2x I2C

3x ADC (VBAT, Current, RSSI)

1x SH1.0\_6pin connector (4V5/G/TX4/RX4/DA2/CL2) for GPS/compass

1x SH1.0\_6pin connector for external USB and buzzer

6~30V DC IN (2~6S LiPo)

132A high-precision Current Sense

BEC 5V 2A for FC & Peripherals

BEC Vx 5A for servos, 5V/ 6V option

BEC 8V 1.5A for VTX and camera

LDO 3.3V 200mA

INAV Target: MATEKF405SE

ArduPilot hwdef: MATEKF405WING

## LAYOUT

+ & - : Battery & ESC power pads, 6~30V DC(2~6S LIPO).

Battery Voltage Sensor: 1K:10K, Scale 1100(INAV)  
 Current Sensor: 132A, 3.3V ADC, Scale 250(INAV)  
 Current Sense resistor: 0.5mR, 60A continuous, 132A burst.

INAV Plane mixer  
 S1/S2: ESC signal  
 S3/S4/S5/S6/S7/S8/S9: Servo signal

ArduPilot  
 S1~S9: ESC or Servo

Vx: BEC 5V/6V for servos, 5A cont.  
 Default is 5V

**DO NOT connect the ESC onboard BEC output(Red wire) to Vx pad.**

LED: 2812 LED signal output  
 PWM10 with ArduPilot

VTx: Analog Video OUT to Video Transmitter  
 Cam: Camera video IN

8V: onboard BEC 8V 1.5A cont. Max.2A

Tx1/Rx1: UART1\_TX & RX  
 Tx3/Rx3: UART3\_TX & RX  
 Tx5/Rx5: UART5\_TX & RX  
 Tx6/Rx6: UART6\_TX & RX

Rx2: UART2\_RX, PPM share RX2 pad  
 Tx2: UART2\_TX

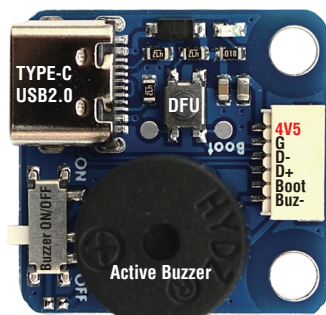
SBus: Uart2\_RX with inversion for SBUS receiver protocol  
 \*\*\* Softserial1\_TX is enabled on Tx2 pad by default in INAV

LED 3.3: Red, 3.3V Status  
 LED 0: Blue, FC Status  
 LED 1: Green, FC Status

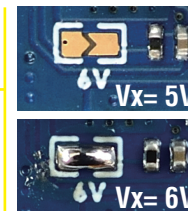
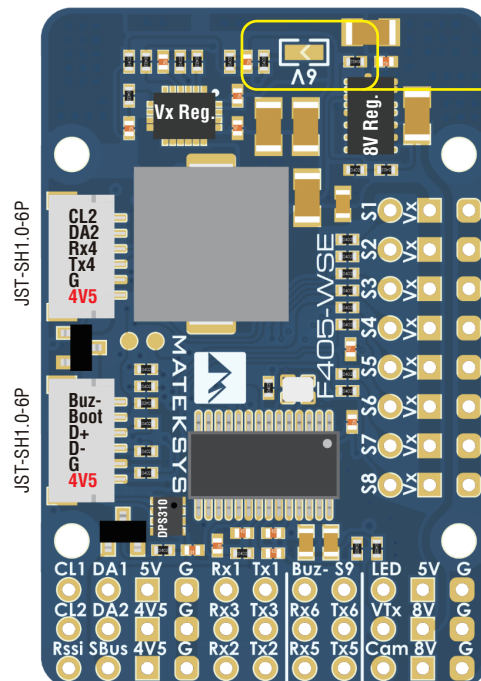
3V3: LD03.3V 200mA  
 5V: onboard BEC 5V 2A cont. Max.3A  
 4V5: 4.4~4.8V, Max.500mA  
 \*\*\* the voltage is also supplied when connecting via USB

CL1 & DA1: I2C1\_SCL & SDA  
 CL2 & DA2: I2C2\_SCL & SDA

Rssi: Analog RSSI IN



Φ3mm, 16mm mounting

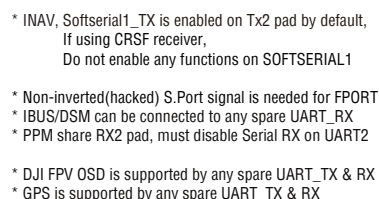


Size: 44x29x10mm  
 Weight: 20g w/ bottom plate & USB extender  
 Holes: Φ2mm, 25mm mounting

\*\*\* CLI defaults after reflashing

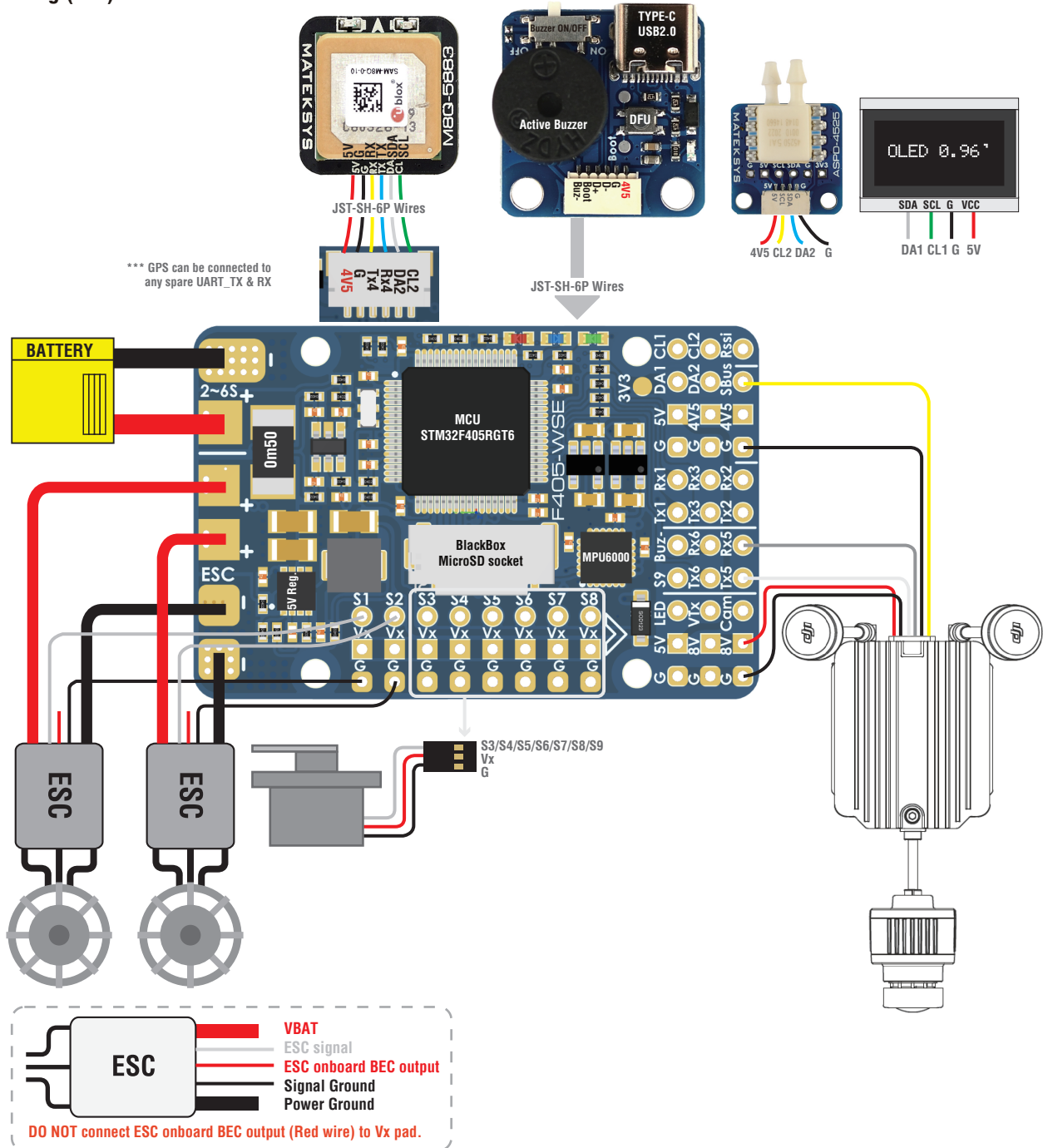
\*\*\* S1 & S2 for motors

\*\*\* S3 - S9 for servos



| Identifier  | Data         | Telemetry          | RX        | Sensors             | Peripherals              |
|-------------|--------------|--------------------|-----------|---------------------|--------------------------|
| USB VCP     | MSP 115200 ▾ | Disabled ▾ AUTO ▾  | Serial RX | Disabled ▾ 115200 ▾ | Disabled ▾ 115200 ▾      |
| UART1       | MSP 57600 ▾  | Disabled ▾ AUTO ▾  | Serial RX | Disabled ▾ 115200 ▾ | Disabled ▾ 115200 ▾      |
| UART2       | MSP 115200 ▾ | Disabled ▾ AUTO ▾  | Serial RX | Disabled ▾ 115200 ▾ | Disabled ▾ 115200 ▾      |
| UART3       | MSP 115200 ▾ | Disabled ▾ AUTO ▾  | Serial RX | Disabled ▾ 115200 ▾ | Disabled ▾ 115200 ▾      |
| UART4       | MSP 115200 ▾ | Disabled ▾ AUTO ▾  | Serial RX | GPS ▾ 115200 ▾      | Disabled ▾ 115200 ▾      |
| UART5       | MSP 115200 ▾ | Disabled ▾ AUTO ▾  | Serial RX | Disabled ▾ 115200 ▾ | RunCam Device ▾ 115200 ▾ |
| UART6       | MSP 115200 ▾ | Disabled ▾ AUTO ▾  | Serial RX | Disabled ▾ 115200 ▾ | IRC Tramp ▾ 115200 ▾     |
| SOFTSERIAL1 | MSP 115200 ▾ | SmartPort ▾ AUTO ▾ | Serial RX | Disabled ▾ 115200 ▾ | Disabled ▾ 115200 ▾      |

## Wiring (DJI)



| Identifier  | Data                                           | Telemetry     | RX                                            | Sensors         | Peripherals                                     | INAV   |
|-------------|------------------------------------------------|---------------|-----------------------------------------------|-----------------|-------------------------------------------------|--------|
| USB VCP     | <input checked="" type="checkbox"/> MSP 115200 | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | Disabled 115200                                 | 115200 |
| UART1       | <input checked="" type="checkbox"/> MSP 57600  | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | Disabled 115200                                 | 115200 |
| UART2       | <input type="checkbox"/> MSP 115200            | Disabled AUTO | <input checked="" type="checkbox"/> Serial RX | Disabled 115200 | Disabled 115200                                 | 115200 |
| UART3       | <input type="checkbox"/> MSP 115200            | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | Disabled 115200                                 | 115200 |
| UART4       | <input type="checkbox"/> MSP 115200            | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | Disabled 115200                                 | 115200 |
| UART5       | <input type="checkbox"/> MSP 115200            | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | <input checked="" type="checkbox"/> DJI FPV VTX | 115200 |
| UART6       | <input type="checkbox"/> MSP 115200            | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | Disabled 115200                                 | 115200 |
| SOFTSERIAL1 | <input type="checkbox"/> MSP 115200            | Disabled AUTO | <input type="checkbox"/> Serial RX            | Disabled 115200 | Disabled 115200                                 | 115200 |

ArduPilot 4.1

OSD\_TYPE = 3  
 SERIAL5\_PROTOCOL = 33  
 MSP\_OPTIONS = 0 (polling mode)