



MATEKSYS

FLIGHT CONTROLLER F405-SE

QUICK START GUIDE

MCU: 168MHz STM32F405RET6
IMU: MPU6000
Baro: DPS310
OSD: AT7456E
Blackbox: MicroSD slot
6x Uarts
1x Softserial supported
9x PWM outputs
2x I2C
3x ADC (voltage, current, RSSI)
4x RX6 pad(one per corner) for BLheli32 ESC telemetry
4x individual ESC power/signal pads
1x Group of G/S1/S2/S3/S4 pads for 4in1 ESC Signal/GND

Vbat filtered output power for VTX
PWM Camera control
Smartaudio & Tramp VTX protocol
DJI FPV OSD protocol

Input: 6~36V (3~8S LiPo)
PDB: 4x35A (Max.4x46A)
BEC: 5V 2A cont. (Max.3A)
LDO 3.3V: Max.200mA
Current Sensor range 184A
Battery Voltage Sensor: 1K:10K

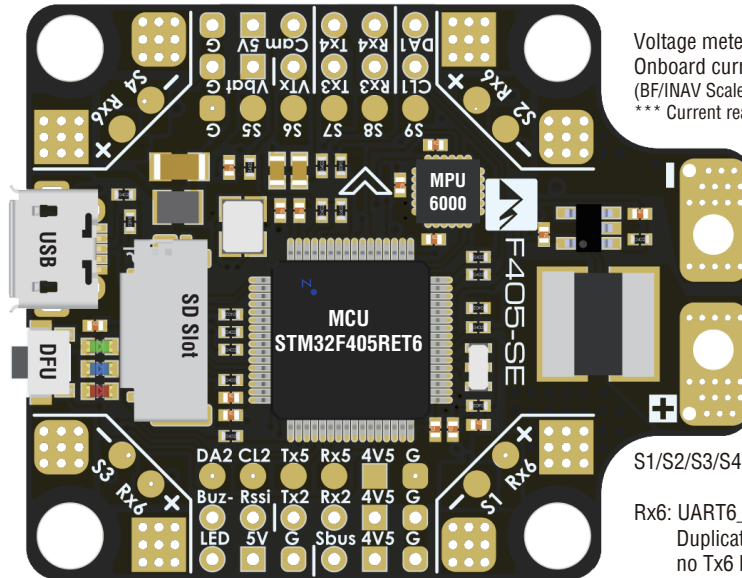
INAV Target: MATEKF405SE
BetaFlight Target: MATEKF405SE
ArduPilot hwdef: MATEKF405-WING

LAYOUT

Cam: Camera video IN
 VTX: Video OUT to Video Transmitter
 Vbat: Battery voltage filtered, Max.1A load on this pad.
 G: Ground
 *** S9 has 200ohm integrated in series, can be remapped as PWM camera control
 (CLI resource camera_control A08)

Rx3 & Tx3: UART3
 Rx4 & Tx4: UART4

CL1 & DA1: I2C1_SCL & SDA
 S5/S6/S7/S8/S9: PWM outputs (ESC, Servo)
 *** S7 & S8 don't support Dshot with Betaflight and INAV, Dshot compatible with ArduPilot.



Voltage meter scale: 110(BF), 1100(INAV) 11.0(AP)
 Onboard current sensor range: 184A
 (BF/INAV Scale 179, ArduPilot BATT_AMP_PERVLT 55.9)
 *** Current readout is not accurate when load <1A

+ & - : LiPO & ESC power pads
 6~36V (2~8S)
 *** 50V capacitor is required with 8S input

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

S1/S2/S3/S4: PWM outputs (ESC, Servo)

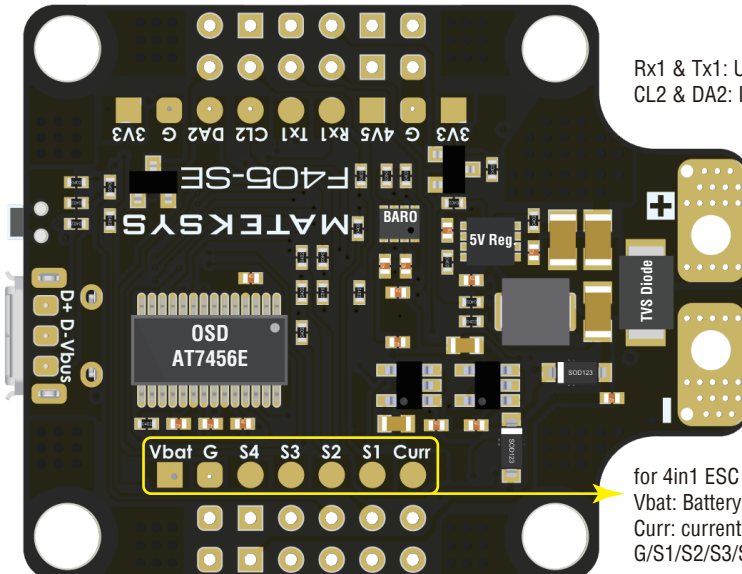
Rx6: UART6_RX, One per corner
 Duplicates of Rx6 pad for ESC Telemetry
 no Tx6 breakout

5V: onboard BEC 5V 2A cont. Max.3A
 4V5: 4.4~4.8V, Max.500mA, the voltage is also supplied when connecting via USB
 3V3: LDO3.3V Max.200mA
 G: Ground

Rx5 & Tx5: UART5
 CL2 & DA2: I2C2_SCL & SDA

Rx2: UART2_RX, PPM share RX2 pad
 Tx2: UART2_TX
 Sbus: Uart2_RX with inversion for SBUS receiver protocol
 *** TX2 can be remapped as softserial_tx1 for Frsky SmartPort in BetaFlight
 (CLI resource SERIAL_TX 11 A02)
 *** Softserial1_TX is enabled on Tx2 pad by default in INAV

Rssi: Analog RSSI IN
 LED: 2812 LED signal
 Buz- & 5V: General active 5V buzzer
 Buz- /5V/G: for MATEKSYS DBU25V



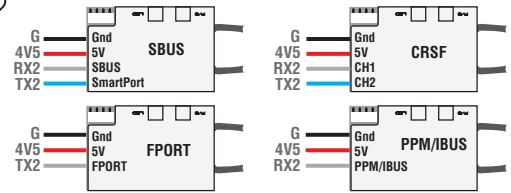
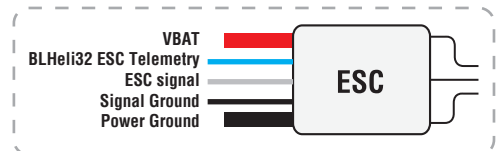
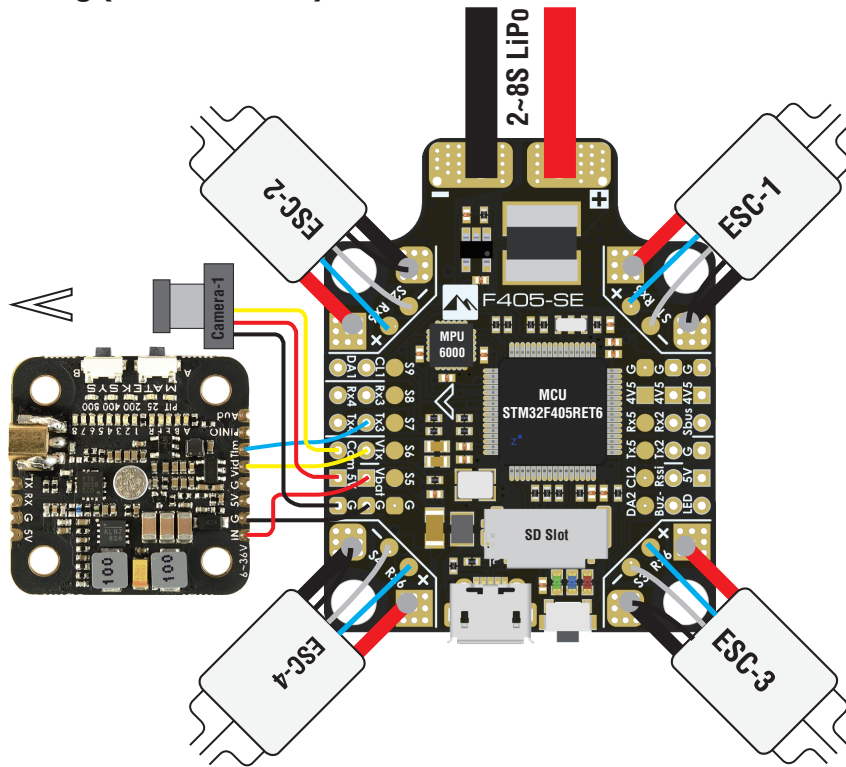
Rx1 & Tx1: UART1
 CL2 & DA2: I2C2_SCL & SDA

Size & Weight: 36x46mm /10g
 Holes: Φ4mm, 30.5mm mounting
 M3 Silicon Grommets included

D+ & D-: USB data
 VBus: USB voltage

for 4in1 ESC
 Vbat: Battery voltage
 Curr: current sensor signal IN or OUT
 G/S1/S2/S3/S4

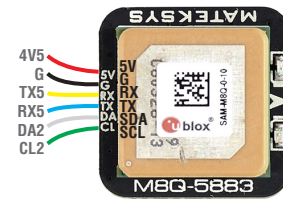
Wiring (Individual ESC)



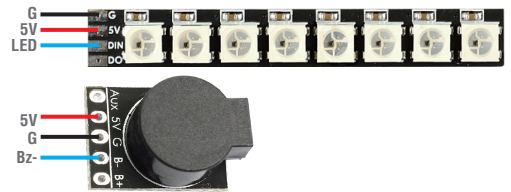
* BF, Type CLI resource serial_tx 11 A02 to get Softserial1_TX on Tx2 pad
 * INAV, Softserial1_TX is enabled on Tx2 pad by default,
 If using CRSF receiver, Do not enable any functions on SOFTSERIAL1

* Non-inverted(hacked) S.Port signal is needed for FPOR protocol
 * IBUS/DSM can be connected to any unused UART_RX
 * PPM share RX2 pad, must disable Serial RX on UART2

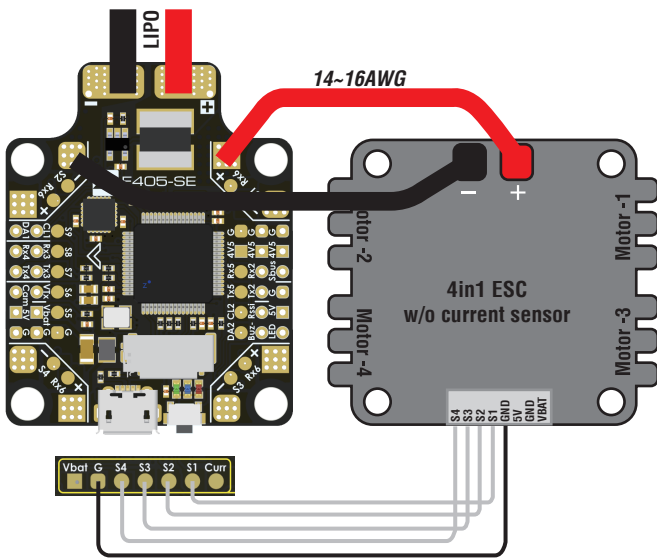
* DJI FPV OSD is supported on any unused UART_TX & RX
 * GPS is supported on any unused UART_TX & RX



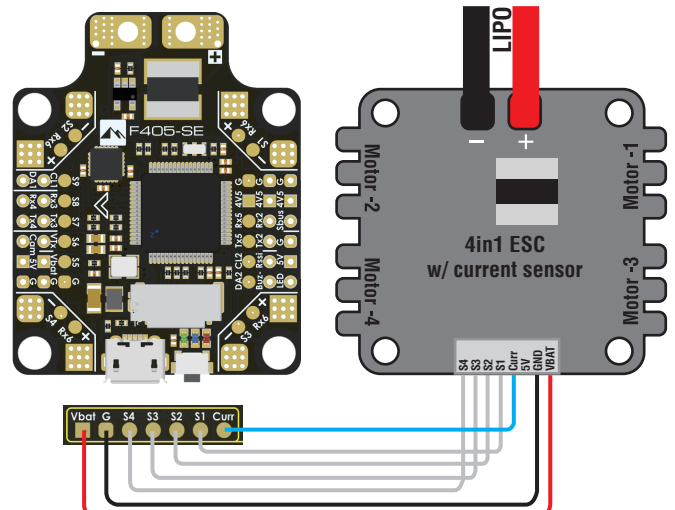
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	<input checked="" type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART1	<input type="checkbox"/> MSP 57600	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART2	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input checked="" type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART3	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	IRC Tramp 115200
UART4	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART5	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	GPS 115200	Disabled 115200
UART6	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
SOFTSERIAL1	<input type="checkbox"/> MSP 115200	SmartPort AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200



Wiring (4in1 ESC)



current sensor scale 179



Use 4in1 ESC current sensor scale