



MATEKSYS

FLIGHT CONTROLLER F405-HDTE

QUICK START GUIDE

MCU: STM32F405RGT6, 168MHz , 1MB Flash

IMU: ICM42688-P

Baro: SPL06-001

OSD: Analog AT7456E, Digital DJI OSD

Blackbox: 16M Flash

6x UARTs, 1x Softserial1_Tx option(INAV/BF)

12x PWM outputs

1x I2C

4x ADC (VBAT, Current, RSSI, Airspeed)

2x SH1.0_8pin connector for PnP with 2x 4in1 ESC

1x SH1.0_6pin connector for PnP with HD System(Caddx Vista & Air Unit)

USB pin breakout for connecting to external USB adapter.

Dual Camera Inputs switch

9~16V(Vxs) for VTX power switch

9~60V DC IN (3~12S LiPo)

BEC 5V 1.5A for FC

BEC 9-16V/1-2A for Analog camera/VTX, Digital video systems

ArduPilot: MatekF405-TE

INAV: MATEKF405TE

BetaFlight: MATEKF405TE

LAYOUT

5V: onboard BEC 5V 1.5A cont.
 Vxs: onboard BEC 9~16V, Voltage=Vx
 *** Vxs ON/OFF can be switched via ArduPilot Relay or Modes/USER1 (BF/INAV) (Default ON)
 G: Ground

RX1 & TX1: UART1_RX & TX
 RX6 & TX6: UART6_RX & TX

LED: 2812 LED signal Out, PWM12 in ArduPilot fw

C1: Analog Camera-1 video IN (Default)
 C2: Analog Camera-2 video IN
 *** C1/C2 can be switched via ArduPilot Relay or Modes/USER2 (BF/INAV)
 *** 2 Cameras must be set with identical video format

VTX: Analog Video OUT for Analog Video Transmitter

D+ & D-: USB data
 VBUS: USB voltage
 USB shell: Ground

Buz- & 5V: Passive 5V buzzer
 Buz- /5V/G: Matek DBUZ5V

Boot: STM32F405 boot pin
 DFU mode: Bridge Boot to 3v3 while powering on

This side UP by default



If using non-DJI FPV remote controller, keep this pad unbridged



If using DJI FPV Remote Controller, Bridging this pad will link SBUS pin to DJI SBUS on SH1.0-6P connector

4V5: 4.4~4.8V, Max.800mA, the voltage is also supplied when connecting via USB
 3V3: LDO3.3V Max.200mA

SBUS: UART2_RX with inversion for SBUS receiver protocol
 Rx2: UART2_RX
 Tx2: UART2_TX
 *** Tx2 can be remapped to softserial_tx1 for Frsky SmartPort telemetry (BF CLI resource SERIAL_TX 11 A02, enabled CPU based serial port in INAV)
 *** Frsky FPort must be uninverted signal

ADC: Analog Airspeed sensor IN with INAV/ArduPilot (0~3.3V), spare ADC pin with BF fw
 Rssi: Analog RSSI IN (0~3.3V)

SCL & SDA: I2C1 Bus for Magnetometer/Digital airspeed sensor/OLED
 Tx5 & Rx5: UART5_TX & RX
 *** GPS can be connected to any spare UART_TX & RX



Vbat = 3S LIPO, Vx = 9V 2A



Vbat = 4S LIPO, Vx = 12V 2A
 Vbat = 6S LIPO, Vx = 12V 1.7A
 Vbat = 8S LIPO, Vx = 12V 1.5A

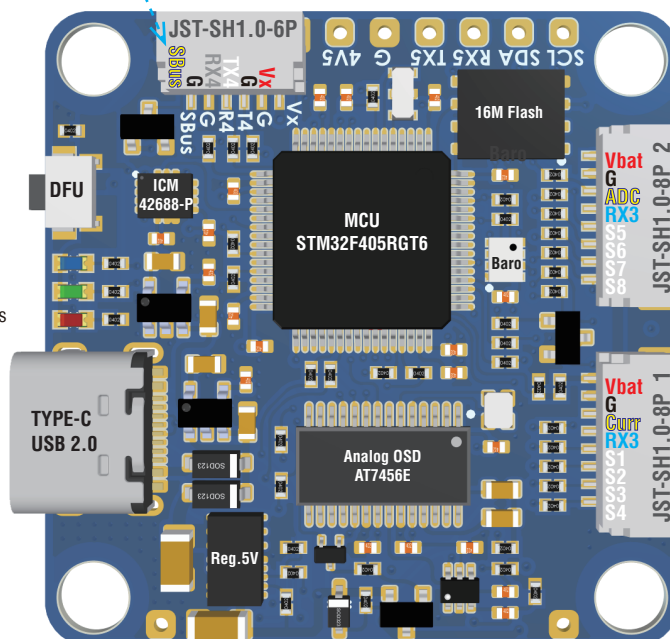


Vbat = 6S LIPO, Vx = 16V 2A
 Vbat = 8S LIPO, Vx = 16V 1.5A
 Vbat = 12S LIPO, Vx = 16V 1A

S1~S11: PWM outputs
 S1~S8 support DSHOT with ArduPilot/BF fw

Cur: current sensor signal IN (0~3.3V)
 Rx3 & Tx3: UART3_RX & TX

Vbat: Battery voltage, 9~60V DC IN (3~12S LIPO)
 G: Ground



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

SH1.0-8P_2 Sequence
 --Vbat: Battery voltage, 9~60V DC IN
 --G: Ground
 --ADC: can be remapped as current sense ADC
 ***Ardu: BATT_CURR2_PIN = 10
 (ArduPilot support 2x Current readout)
 ***INAV: set current_adc_channel = 4
 ***BF: resource ADC_CURR 1 C00
 --Rx3: UART3_RX, for BLHeli32 ESC Telemetry
 --S5/S6/S7/S8: DShot/PWM outputs

SH1.0-8P_1 Sequence
 --Vbat: Battery voltage, 9~60V DC IN
 --G: Ground
 --Curr: current sensor signal IN
 --Rx3: UART3_RX, for BLHeli32 ESC Telemetry
 --S1/S2/S3/S4: DShot/PWM outputs

Size & Weight: 36x36mm /7g
 Holes: Φ4mm, 30.5mm x 30.5mm

Packing
 1x F405-HDTE
 1x JST-SH1.0_8P cable 5cm
 2x JST-SH1.0_8P connector
 6x M3 Silicon Grommets
 1x JST-SH1.0_6P to JST-GH1.25_8P 8cm for DJI air unit

Wiring (Multirotors)

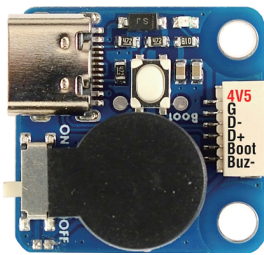
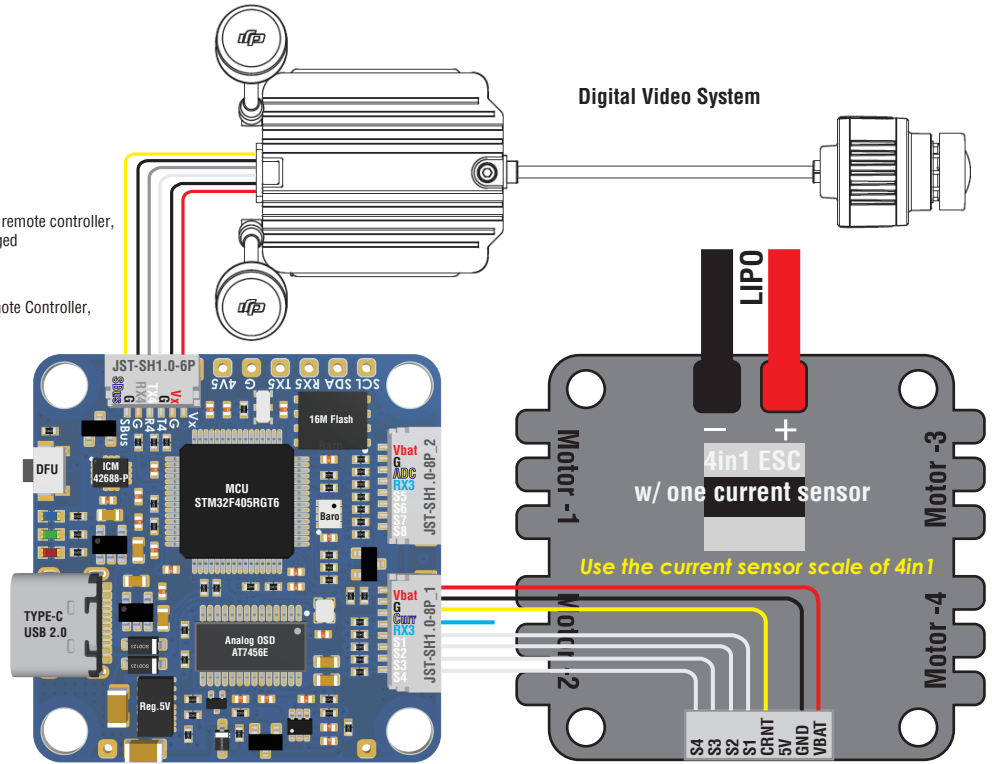
Ardupilot MATEKF405-TE
INAV MATEKF405TE
BetaFlight MATEKF405TE



If using non-DJI FPV remote controller, keep this pad unbridged

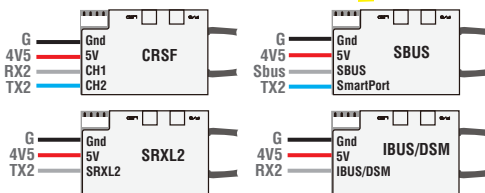


If using DJI FPV Remote Controller, Bridge this pad



*** USB / Beeper extension board is not included in F405-HDTE packing

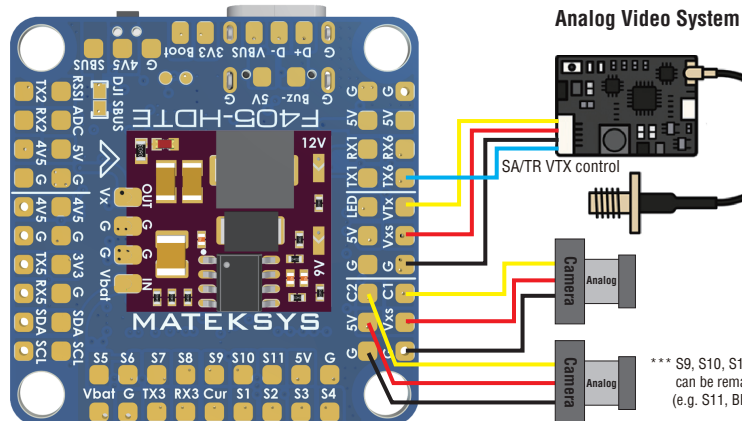
Passive Buzzer
BF CLI "set beeper_frequency = 2500"



*** Tx2 can be remapped to softserial_tx1 for Frsky SmartPort telemetry
BF, CLI resource SERIAL_TX 11 A02.
INAV, Softserial1_Tx is an alternative on Tx2 pad by checking "Enable CPU based serial ports"
* IBUS/DSM can be connected to any spare UART_RX
* PPM is not supported by INAV4.1 or newer.
* STM32F405 UART_TX only work with **Non-inverted(hacked) S.Port/F.Port** signal



*** GPS can work with any spare UART_TX & RX
*** 4V5 is also supplied when connecting via USB only



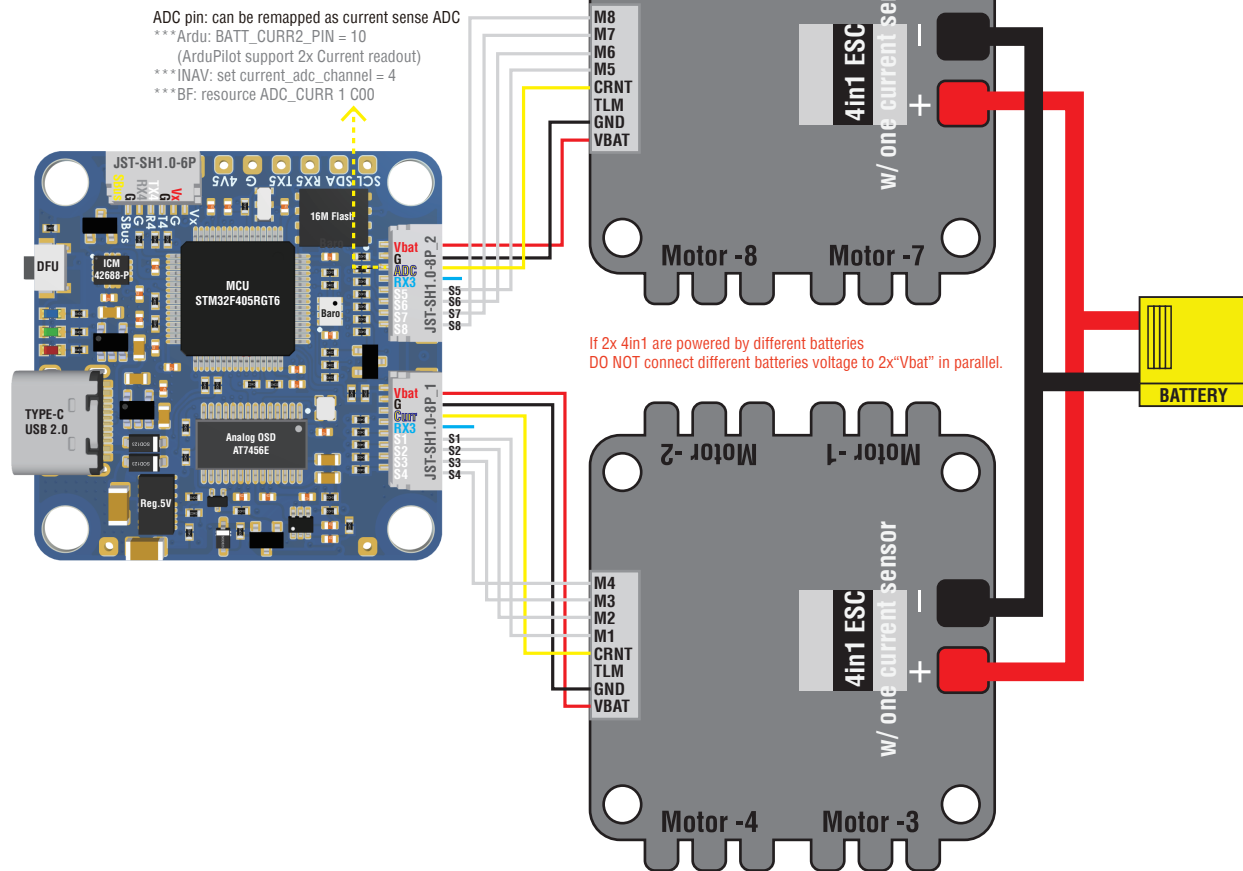
*** S9, S10, S11 have 200ohm built-in, can be remapped to PWM camera control in BF fw (e.g. S11, BF CLI resource camera_control 1 B06)

Wiring (Octocopter)

Ardupilot MATEKF405-TE

INAV MATEKF405TE

BetaFlight MATEKF405TE



Vxs Power / Camera switch

USER1	No USER1 definition Vxs ON by default
Add Range	
USER2	No USER2 definition C1 (Camera-1) ON by default
Add Range	

