MATEKSYS

FLIGHT CONTROLLER F765-WING

QUICK START GUIDE

MCU: STM32F765VIT6, 216MHz, 2MB Flash
IMU: MPU6000 (SPI1) & ICM20602 (SPI3)
Baro: BMP280 (I2C2)
OSD: AT7456E (SPI2)
Blackbox: MicroSD card slot (SDIO)

7x Uarts (1,2,3,4,6,7,8) with built-in inversion
1x Softserial1_Tx option (INAV)
12x PWM outputs (S1~S10 support Dshot)
2x I2C
6x ADC (VBAT, Current, RSSI, Analog AirSpeed, VB2, CU2)
1x SPI4 breakout

Switchable Dual Camera Inputs
Switchable 5V/9V(12V) for Camera/VTX

9~36V DC IN (3~8S LiPo)
High-precision Current Sense 132A Range
BEC 5V 2A for FC
BEC 9V 2A for camera/VTX, 12V option
BEC Vx 8A cont. 10A burst for servos, 5V, 6V or 7.2V option
LDO 3.3V 200mA

LAYOUT

	INAV Airplane	INAV Multirotor	ArduPilot
S1	Motor	Motor	TIM2
S2	Motor	Motor	
S3	Servo	Motor	TIM5
S4	Servo	Motor	
S5	Servo	Motor	TIM1
S6	Servo	Motor	
S7	Servo	Servo	TIM4
S8	Servo	Servo	
S9	Servo	Servo	
S10	Servo	Servo	
S11	Servo	Motor, No DMA	TIM9
S12	Servo	Motor, No DMA	NO DMA

Vx: BEC 5V/6V/7.2V for servos, Default is 5V
8A cont. Max.10A

DShot is not supported on S11 & S12

RX5: UART5_RX, No TX5 on this FC

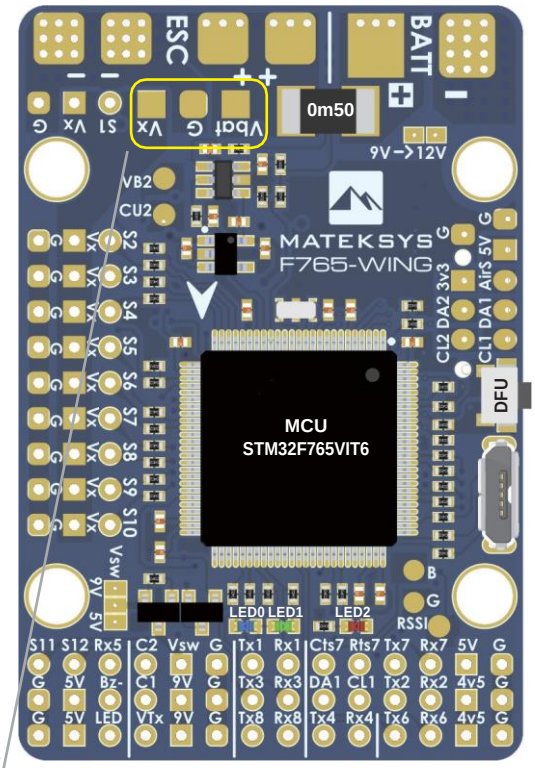
Bz- & 5V: General active 5V buzzer
Bz-, 5V & G: Matek Dbuz5V
LED: WS2812 LED signal output

Vsw= 9V Vsw= 5V

5V: onboard BEC 5V 2A cont. Max.3A
9V: onboard BEC 9V 2A cont. Max.3A,
*** 9V rise to 12V if "9V->12V" jumper is bridged.
G: Ground

+ & - : Battery & ESC power pads, 9~36V DC(3~8S LIPO).

Voltage meter scale 1100 (INAV)
Current Sensor: 132A, Scale 250 (INAV)



Vsw: 5V/9V selection
*** ON/OFF can be switched via Modes/USER1 (INAV)
*** Max.1A load on this pad. (Default ON)
*** Vsw jumper one or the other must be bridged

C1: Camera-1 video IN (Default)

C2: Camera-2 video IN
*** C1/C2 can be switched via Modes/USER2 (INAV)

VTX: Video OUT for Video Transmitter

ArduPilot tips
on board battery voltage: BATT_VOLT_PIN 12, BATT_VOLT_MULT 11
on board current sensor: BATT_CURR_PIN 13, BATT_AMP_PERVLT 40

VB2: Voltage divider 1K:10K, Max.36V supported
BATT2_VOLT_PIN 4, BATT2_VOLT_MULT 11
CU2: for external current sensor, Max.3.3V
BATT2_CURR_PIN 15

*** No definitions for VB2 & CU2 in INAV target

9V rise to 12V

AirS: Analog Airspeed sensor (0~6.6V)
1:1 voltage divider built-in

DA2 & CL2: I2C2
DA1 & CL1: I2C1
3.3: LDO3.3V 200mA

INAV tips
I2C1 compass QMC5883 /MAG3110 /HMC5883 /IST8310/LIS3MDL
OLED 0.96"
I2C2 Barometer BMP280 / MS5611
Digital AirSpeed sensor Pitot_MS4525
Temperature sensor

Button: Boot(DFU) mode button

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

Rssi: Analog RSSI, RSSI_ANA_PIN 11 (ArduPilot)

4V5: 4.4~4.8V, Max.500mA
*** the voltage is also supplied when connecting via USB

TX1/RX1: UART1
TX3/RX3: UART3
TX8/RX8: UART8
TX4/RX4: UART4

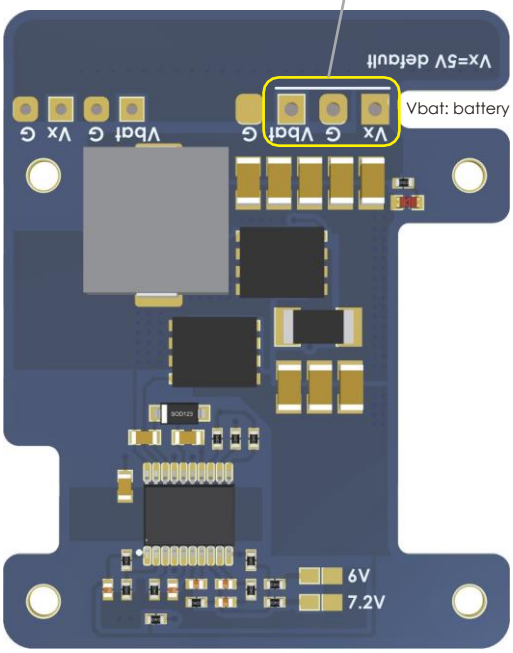
TX7/RX7: UART7
CTs7/Rts7: Uart7_CTS/RTS for ArduPilot Telem1

TX2/RX2: UART2
DA1 & CL1: I2C1, for compass

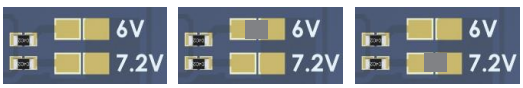
RX6: UART6-RX for Serial_RX by default
PPM share RX6 pad
TX6: UART6-TX w/o Softserial enabled
TX6: Softserial1_TX w/ CPU based serial ports enabled

INAV tips
****** F765 MCU has inner inversion, SBUS can be connected to any unused UART_RX.***
****** Frsky FPort, SmartPort, TR/SA VTX control can be connected to any unused UART_TX***
****** GPS can be connected to any unused UART_TX & RX***

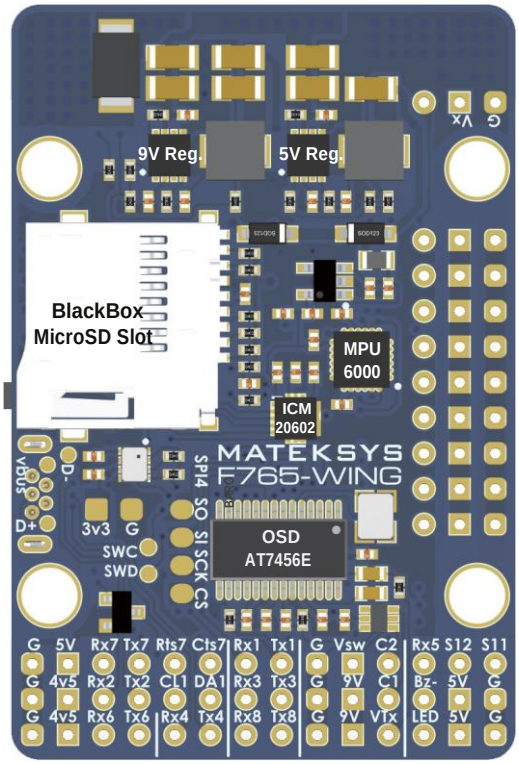
connection with silicon wires: 20~24 AWG



Vbat: battery voltage



Vx= 5V (default) Vx= 6V Vx= 7.2V



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

SPI4 breakout

SWC & SWD: STlink

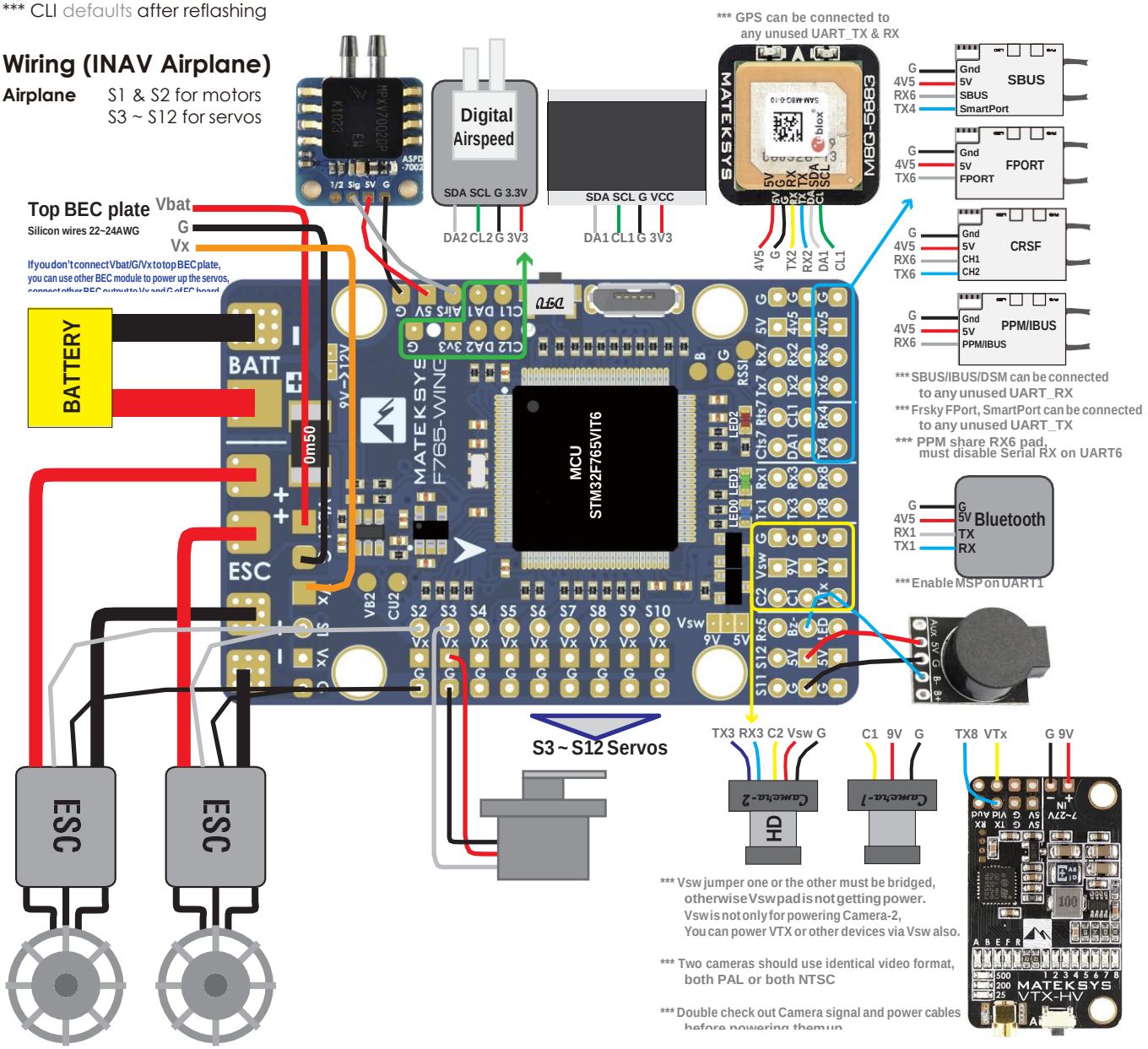
Size: 54x36x13mm
Weight: 26g w/ top and bottom plate
Holes: Φ4mm, 30.5mm mounting
M3 Silicon Grommets included

INAV Target: MATEKF765

*** CLI defaults after reflashing

Wiring (INAV Airplane)

Airplane S1 & S2 for motors
S3 ~ S12 for servos



Check and swap the Gyros (INAV)

CLI status

```
# status
System Uptime: 52 seconds
Current Time: 2041-06-28T01:04:00.000+00:00
Voltage: 0.39V (1S battery - NOT PRESENT)
CPU Clock=216MHz, GYRO=MPU6000, ACC=MPU6000, BARO=BMP280, PITOT=ADC
```

CLI get gyro_to_use
0 = MPU6000 by default
1 = ICM20602

```
# get gyro_to_use
gyro_to_use = 0
Allowed range: 0 - 1
```

CLI get acc_hardware

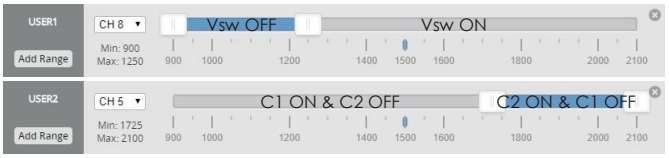
```
acc_hardware = MPU6000
Allowed values: NONE, AUTO, ADXL345, MPU6050, MMA845x, BMA280, LSM303DLHC, MPU6000, MPU6500,
```

Select ICM20602
CLI set gyro_to_use = 1
set acc_hardware = MPU6500
save

```
# set gyro_to_use = 1
gyro_to_use set to 1
# set acc_hardware = MPU6500
acc_hardware set to MPU6500
```

Vsw Power / Camera switcher

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



ArduPilot Target: MATEKF765-WING

Mapping

PWM Motor can't share same TIM with servo.	S1	Group1	TIM2
	S2		
	S3	Group2	TIM5
	S4		
	S5	Group3	TIM1
	S6		
	S7	Group4	TIM4
	S8		
	S9		
	S10		
	S11	Group5	TIM9 NO DMA
	S12		

ADC	No pad	on board battery voltage	BATT_VOLT_PIN	12
		on board battery voltage	BATT_VOLT_MULT	11.0
	No pad	on board current sensor	BATT_CURR_PIN	13
		on board current sensor	BATT_AMP_PERVLT	40
	VB2 Pad	VB2 ADC	BATT2_VOLT_PIN	4
		VB2 voltage divider	BATT2_VOLT_MULT	11.0
	CU2 Pad	CU2 ADC	BATT2_CURR_PIN	15
		external currenr sensor scale	BATT2_AMP_PERVLT	/
	RSSI Pad	RSSI ADC	RSSI_ANA_PIN	11
		Analog RSSI	RSSI_TYPE	1
	AirS Pad	AirS ADC	ARSPD_PIN	10
		Analog Airspeed	ARSPD_TYPE	2

I 2C	I2C1 or I2C2	Digital Airspeed I 2C	ARSPD_BUS	1
		Digital Airspeed	ARSPD_TYPE	1
	I2C1 or I2C2	Compass	COMPASS_AUTODEC	1
	I 2C2	on board BMP280		

UART	USB	console	SERIAL0
	UART7	telem1	SERIAL1
	USART1	telem2	SERIAL2
	USART2	GPS1	SERIAL3
	USART3	GPS2	SERIAL4
	UART8	USER	SERIAL5
	UART4	USER	SERIAL6
	UART5	not supported for now	
	USART6	RC input/Receiver	
	RX6	SBUS	
	RX6	PPM	