

LAYOUT

AirS: Analog Airspeed sensor (0–3.3V)
no voltage divider built-in
Rssi: Analog RSSI ADC, 0–3.3V

Tx1/Rx1: UART1_Tx/Rx

swd/swc: STM32F405RGTE debug pin

Rx2: UART2_RX for Serial_RX by default
*PPM is not supported by INAV

Tx2: UART2-TX
*softserial1_tx is an alternative on Tx2 pad in INAV

Sbus: UART2_RX + inverter for SBUS receiver

Tx3/Rx3: UART3_Tx/Rx

Tx5/Rx5: UART5_Tx/Rx

DA & CL: I2C_SDA, SCL, for compass/digital Airspeed

5V: onboard BEC 5V 2A cont.

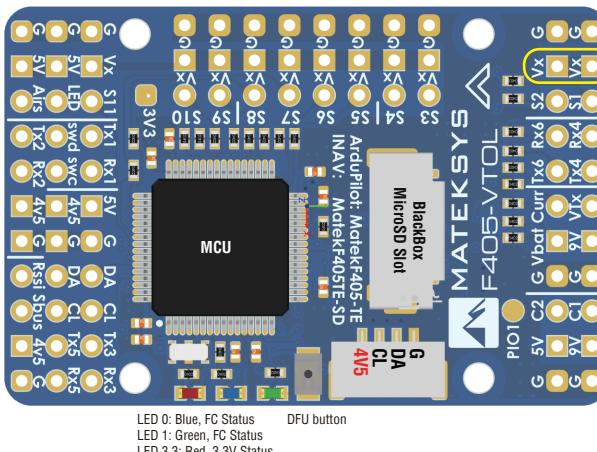
*** 5V is not supplied by USB

4V5: 4.4–4.8V, Max.800mA,

*** 4V5 is also supplied when connecting via USB.

G: Ground

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



DO NOT connect the ESC BEC output (Red wire in middle of connector) to Vx pad
If Vx rail is powered from bottom PDB.

TX6/RX6: UART6_Tx/Rx

TX4/RX4: UART4_Tx/Rx

Vbat: Battery voltage

onboard battery voltage sense: BATT_VOLT_PIN 14, BATT_VOLT_MULT 21

INAV scale 2100

Curr: Current signal (0–3.3V)

onboard current sense: BATT_CURR_PIN 15, BATT_AMP_PERVLT 66.7

INAV scale 150

9V: onboard BEC 5V 2A cont. Max.3A

9V will increase to 12V if "12V" jumper on bottom PDB is bridged.

5V: onboard BEC 5V 2A cont. Max.3A

G: Ground

VT: Video OUT for Video Transmitter

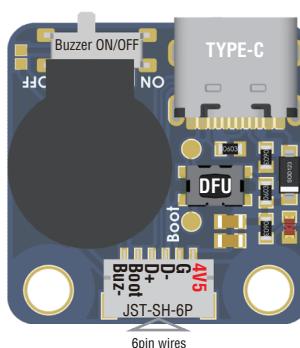
C1: Camera-1 video IN (Default)

C2: Camera-2 video IN

*** C1/C2 can be switched via ArduPilot Relay or Modes/USER2 (INAV)

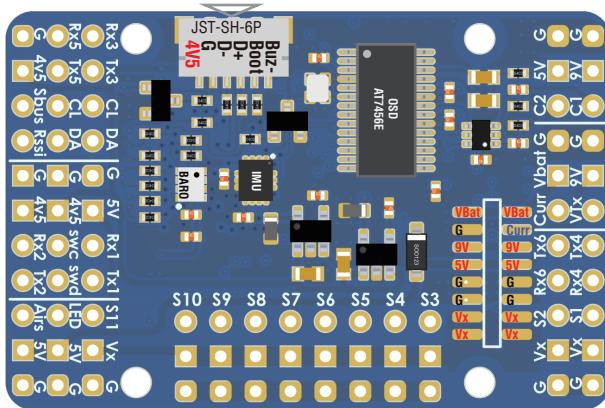
*** Two cameras should be set with identical video format, both PAL or both NTSC

PIO1: Low/High level switchable via INAV Modes/USER1 or ArduPilot Relay



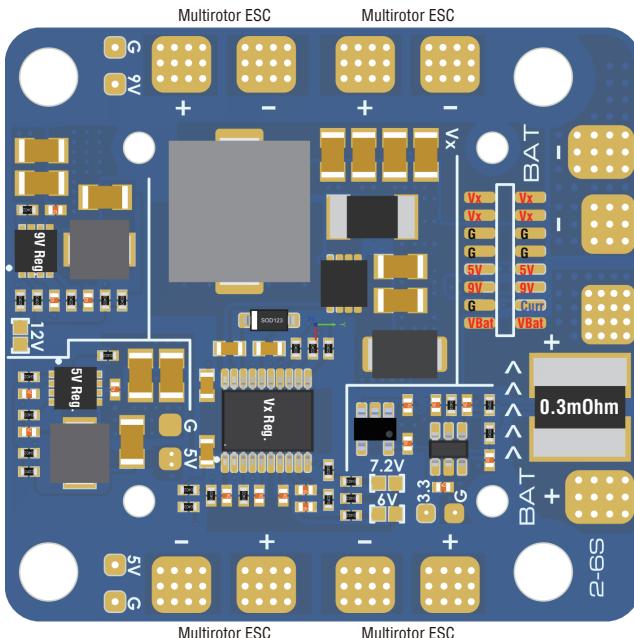
DFU Button: F405 DFU mode, same function as the button on FC board.
Connect USB to the PC While holding the boot button in.

Red LED, USB power indicator



	INAV AirPlane	INAV Multirotor	ArduPilot
S1	Motor	Motor	PWM1
S2	Motor	Motor	PWM2
S3	Servo	Motor	PWM3
S4	Servo	Motor	PWM4
S5	Servo	Motor	PWM5
S6	Servo	Motor	PWM6
S7	Servo	Motor	PWM7
S8	Servo	Motor	PWM8
S9	Servo	Servo	PWM9
S10	Servo	Servo	PWM10
S11	Servo	Servo	PWM11
LED	2812 LED	2812 LED	PWM12

Top FC board: 44x29mm, Holes: 25mm-Φ2mm
Bottom PDB: 45x42mm, Holes: 25mm-Φ2mm, 35mm-Φ4mm
Weight: 25g w/ USB extender



Battery & ESC -



ESC +



Current Sense resistor
100A continuous
220A peak

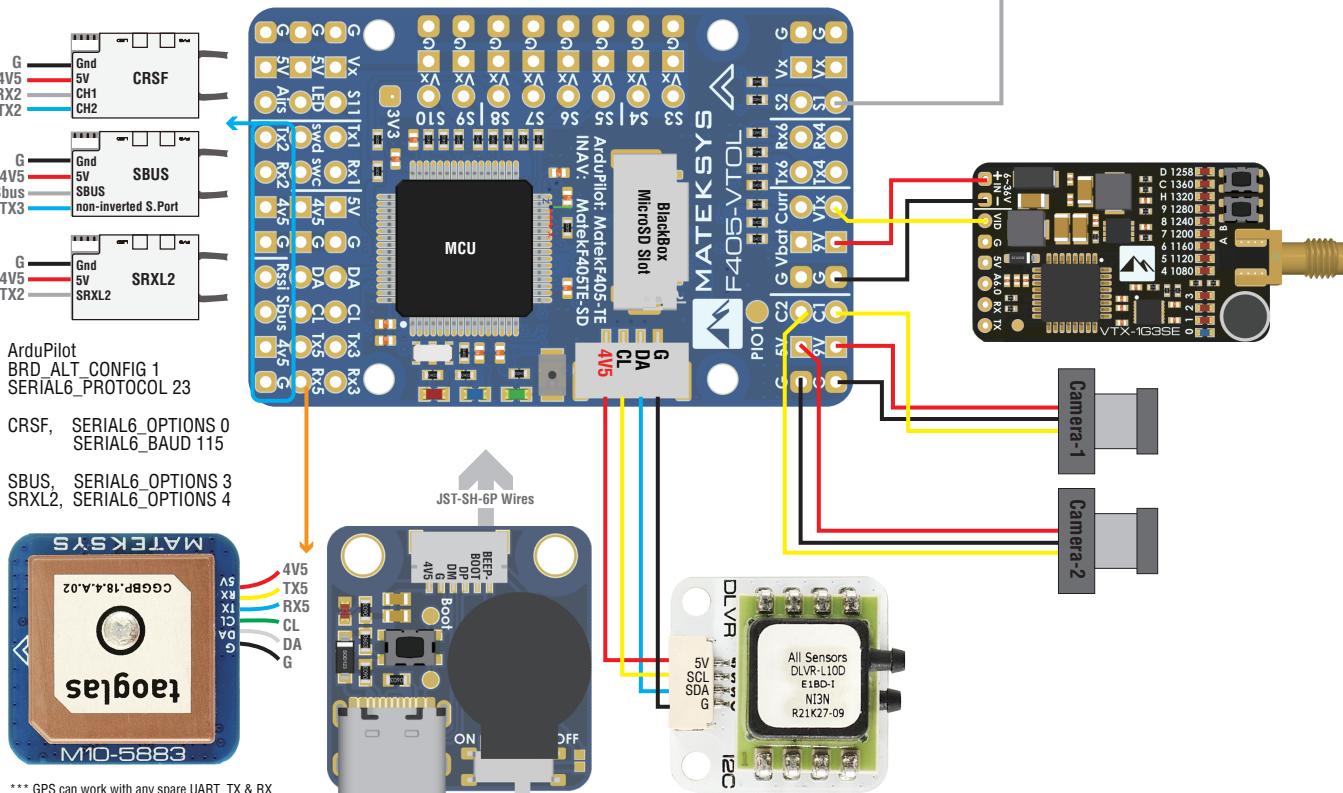
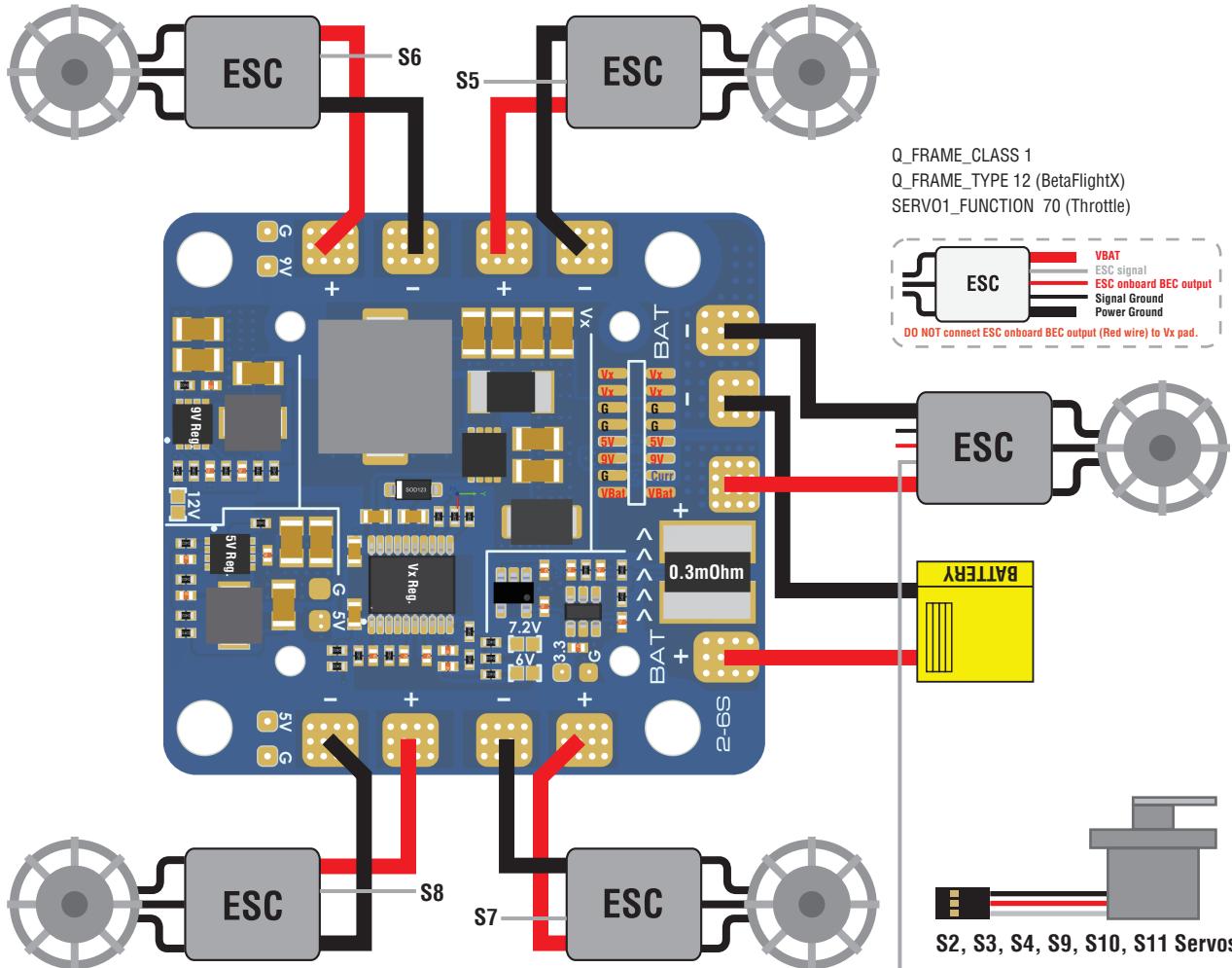
Battery + 6.8V-30V



Vx= 7.2V

Wiring

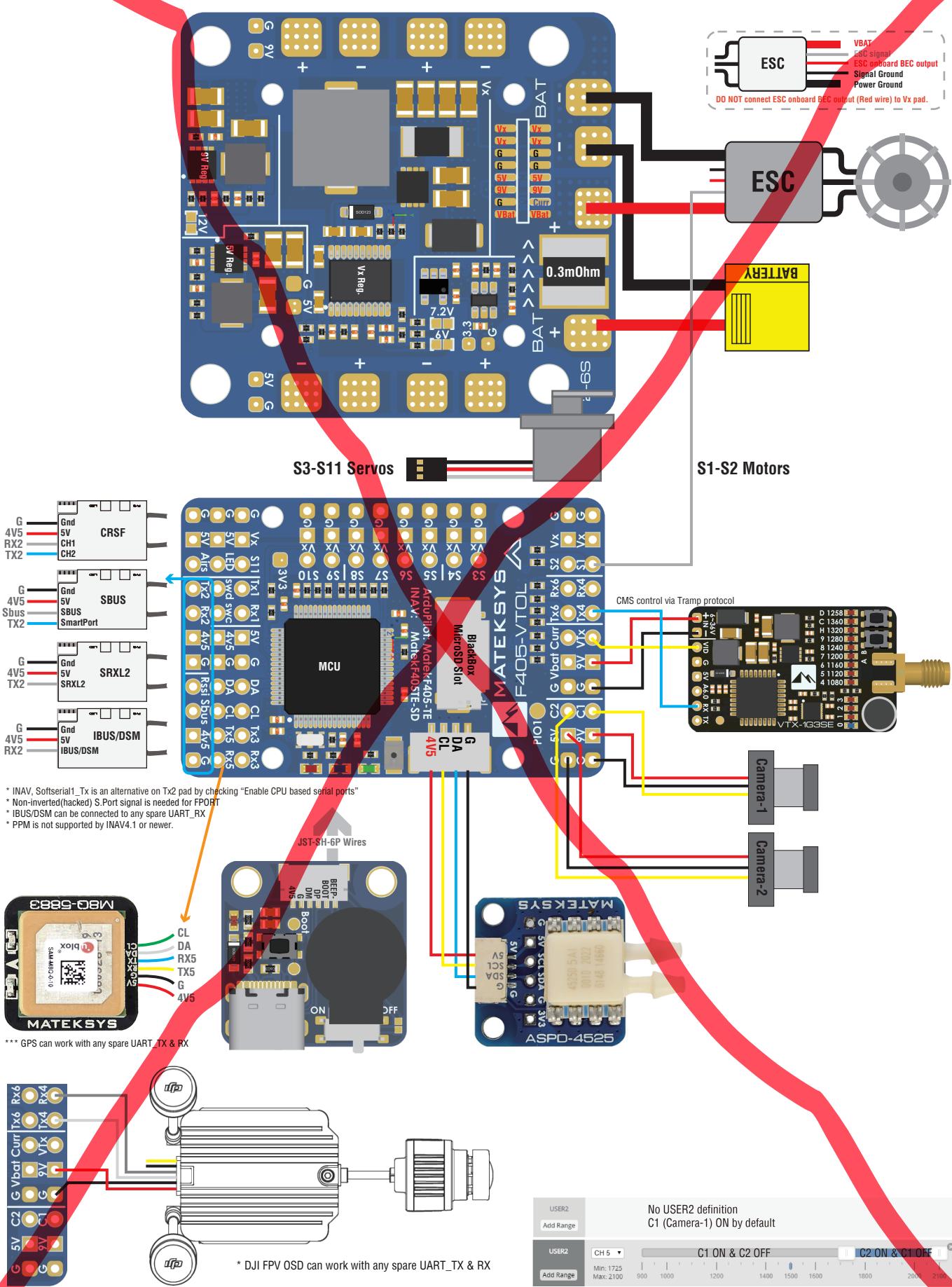
ArduPlane fw: MATEKF405-TE



Wiring

INAV fw: MATEKF405TE_SD

* INAV doesn't support VTOL, F405-VTOL can be used as a normal fixed-wing flight controller



I/O Mapping

ArduPilot					
PWM 5V tolerant I/O	S1	PWM1 GPIO50	TIM8 CH4	DMA/DShot	Group1
	S2	PWM2 GPIO51	TIM8 CH3	DMA/DShot	
	S3	PWM3 GPIO52	TIM1 CH3N	DMA/DShot	Group2
	S4	PWM4 GPIO53	TIM1 CH1	DMA/DShot	
	S5	PWM5 GPIO54	TIM2 CH4	DMA/DShot	
	S6	PWM6 GPIO55	TIM2 CH3	DMA/DShot	Gourp3
	S7	PWM7 GPIO56	TIM2 CH2	DMA/DShot	
	S8	PWM8 GPIO57	TIM2 CH1	DMA/DShot	
	S9	PWM9 GPIO58	TIM12 CH1	NO DMA	Gourp4
	S10	PWM10 GPIO59	TIM13 CH1	NO DMA	Gourp5
	S11	PWM11 GPIO60	TIM4 CH1	NO DMA	Gourp6
	LED pad	PWM12 GPIO61	TIM3 CH4	DMA/DShot	Gourp7
SERVO12_FUNCTION 120, NTF LED TYPES neopixel					

Mixing Dshot and normal PWM operation for outputs is restricted into groups, ie. enabling Dshot for an output in a group requires that ALL outputs in that group be configured and used as Dshot, rather than PWM outputs.

If servo and motor are mixed in same group, make sure this group run lowest PWM frequency according to the servo specification. ie. Servo supports Max. 50Hz, ESC must run at 50Hz in this group.

ADC	Vbat Pad	1K:20K divider builtin 0~30V	Vbat ADC onboard battery voltage	BATT_VOLT_PIN	14
	Curr pad	0~3.3V	current sensor ADC onboard current sense	BATT_CURR_PIN	21.0
	RSSI Pad	0~3.3V	RSSI ADC Analog RSSI	RSSI_ANA_PIN	15
	AirS /PC0 Pad	no divider builtin 0~3.3V	AirS ADC Analog Airspeed	ARSPD_PIN	66.7
				RSSI_TYPE	2
				ARSPD_TYPE	2
				ARSPD_TYPE	10
				ARSPD_TYPE	2

I2C	I2C1	5V tolerant I/O	Compass	COMPASS_AUTODEC	1
			onboard Baro SPL06-001	Address	0x76
			Digital Airspeed I2C	ARSPD_BUS	1
			MS4525	ARSPD_TYPE	1
			DLVR-L10D	ARSPD_TYPE	9

UART 5V tolerant I/O	USB	USB	console	SERIAL0	
	TX1 RX1	USART1	with DMA	telem1	SERIAL1
	TX3 RX3	USART3	NO DMA	telem2	SERIAL2
	TX5 RX5	UART5	NO DMA	GPS1	SERIAL3
	TX4 RX4	UART4	NO DMA	GPS2/DJI OSD	SERIAL4
	TX6 RX6	USART6	TX6 with DMA	USER	SERIAL5
	TX2 RX2 SBUS	USART2	with DMA	RC input/Receiver	SERIAL6
		RX2	IBUS/DSM/PPM	BRD_ALT_CONFIG 0	
		Sbus pad	SBUS	Default	
	TX2 & RX2	CRSF			SERIAL6_OPTIONS 0
	TX2	uninverted FPort (hacked)		BRD_ALT_CONFIG 1	SERIAL6_OPTIONS 4
	TX2	SRXL2		SERIAL6_PROTOCOL 23	SERIAL6_OPTIONS 4

INAV			INAV MultiRotor	INAV Plane
PWM	S1	5 V tolerant I/O	TIM8 CH4	Motor
	S2	5 V tolerant I/O	TIM8 CH3	Motor
	S3	5 V tolerant I/O	TIM1 CH3N	Servo
	S4	5 V tolerant I/O	TIM1 CH1	Servo
	S5	5 V tolerant I/O	TIM2 CH4	Servo
	S6	5 V tolerant I/O	TIM2 CH3	Servo
	S7	5 V tolerant I/O	TIM2 CH2	Servo
	S8	5 V tolerant I/O	TIM2 CH1	Servo
	S9	5 V tolerant I/O	TIM12 CH1	Servo
	S10	5 V tolerant I/O	TIM13 CH1	Servo
	S11	5 V tolerant I/O	TIM4 CH1	Servo
	LED	5 V tolerant I/O	TIM3 CH4	2812LED
				2812LED

ADC	Vbat Pad	1K:20K divider builtin 0~30V	Vbat ADC ADC CHANNEL 1	BF scale 210, INAV scale 2100
	Curr pad	0~3.3V	Current ADC ADC CHANNEL 2	scale 150
	RSSI Pad	0~3.3V	RSSI ADC ADC CHANNEL 3	Analog RSSI
	AirS /PC0 Pad	no divider builtin 0~3.3V	AirS ADC ADC CHANNEL 4	Analog Airspeed

I2C	I2C1	5V tolerant I/O	Compass	QMC5883 / HMC5883 / MAG3110 / LIS3MDL
			OLED	0.96"
			onboard Barometer	SPL06-001
			Digital Airspeed sensor	MS4525
			Temperature sensor	

UART 5V tolerant I/O	USB	USB		
	TX1 RX1	UART1	USER	
	TX3 RX3	UART3	USER	
	TX4 RX4	UART4	USER	
	TX5 RX5	UART5	USER	
	TX6 RX6	UART6	USER	
	TX2 RX2 SBUS	UART2	RC input/Receiver	
		Sbus pad	for SBUS receiver, Sbus pad = RX2+inverter	
		RX2 pad	IBUS/DSM	
		TX2 & RX2	CRSF	
		TX2 pad	SmartPort Telemetry	enable Softserial Tx1
		TX2 pad	uninverted FPort (hacked)	
		TX2 pad	SRXL2	