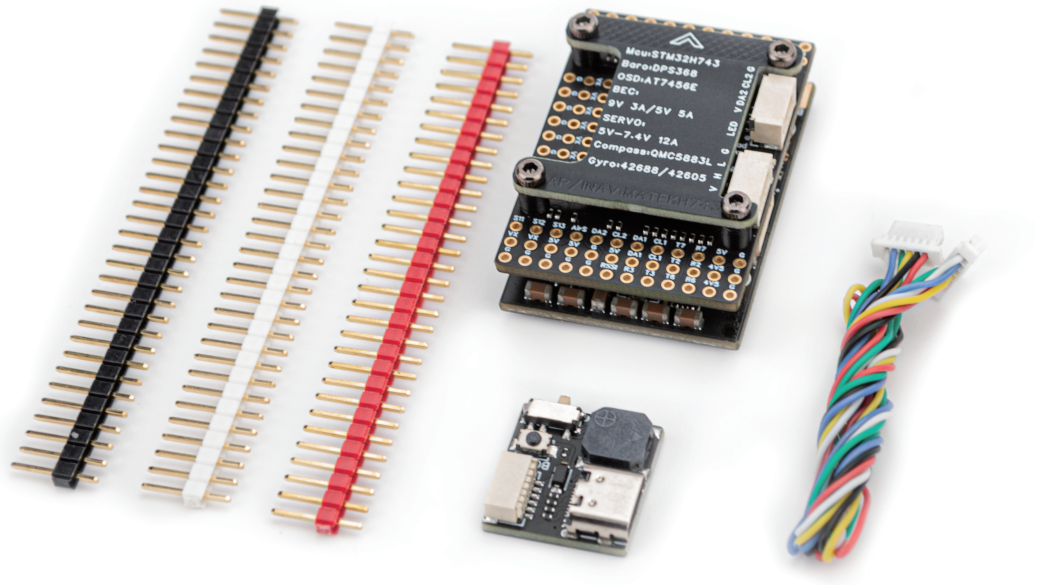
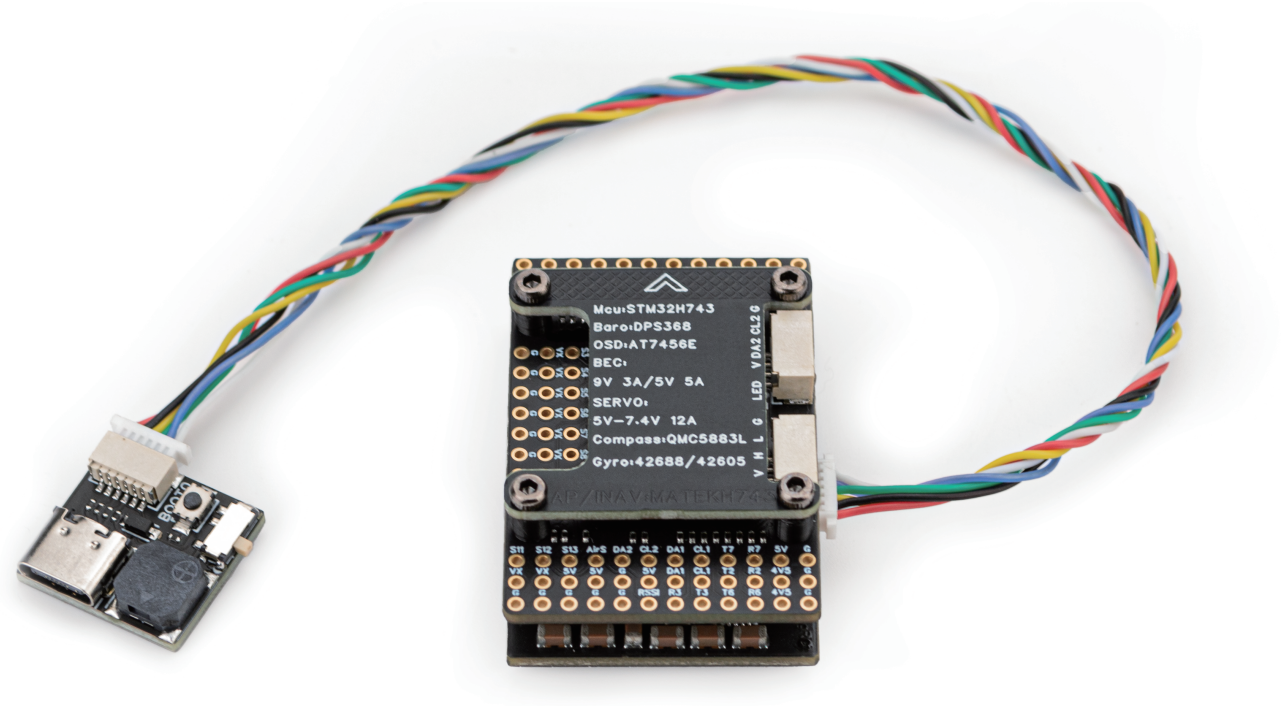
H743-WING FC user manual



Parameters：

- MCU:STM32H743VIH6
- Gyroscope: ICM-42688-P + ICM-42605 dual
- Barometer: DPS368
- Compass: QMC5883L
- OSD:Analog/HD OSD
- 7xUARTs, 13xPWMs, 2xI2C, 1xCAN, 4xADC (VLT2, CURR2, ASPD, RSSI),
- On-Board 9V BEC
- Video switch: On-Board Dual CAM Switch PinIO
- BLACKBOX：on board TF card slot, maximum storage 32GB
- Input Voltage: 12~28V DC(3~6S LiPo)
- BEC: 5V/6.2V/7.4V 12A (servo) & 5V 5A (other equipment) & 9V 3A (VTX and camera)
- Firmware: INAV: MATEKH743 Ardupilot: MATEKH743
- Dimensions and weight: 30.5mm*44.5mm*7.5mm
- Weight: 27g



Features:

- STM32H743VIH6 MCU with 2MB Flash and 1MB RAM.The working frequency is 480MHz, strong performance, BGA encapsulation.
- ICM-42688-P & ICM-42605, dual Invense 3-generation (latest) gyros, both optimised for UAVs.
- DPS368 Barometer, Infineon Semiconductor's latest generation barometer, IPx8 waterproof (barometer sensor only), far more accurate than other barometer models (average accuracy >100% over DPS310).
- The strongest performance in the same volume (including arithmetic power, sensor capability, on-board BEC with load capability).
- Optimised size, smaller flight control suitable for use in various size carriers.
- 13 PWM output ports are also more than enough, you can use the CAN bus expansion board to extend the PWM additionally.

• Full pin design, ESC, servo, receiver, GPS, analog mapping, analog camera, HD mapping, LED strip can be connected to the flight control through the row of pins, or choose to directly solder to the row of pin pads, one more option.

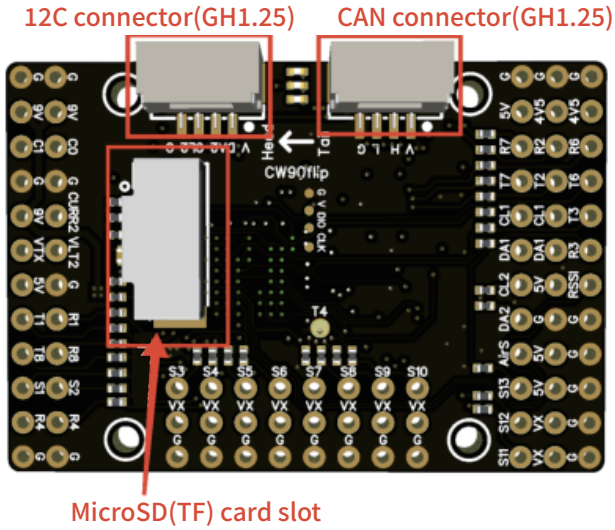
• uses dual high-precision gyroscopes and high-precision barometers, compared with the stability of the same type of flight control greatly improved (the effect is obvious when using AP firmware).

• has the strongest BEC current output capability (up to 130W total output from three on-board buck supplies) among flight controllers of the same size.

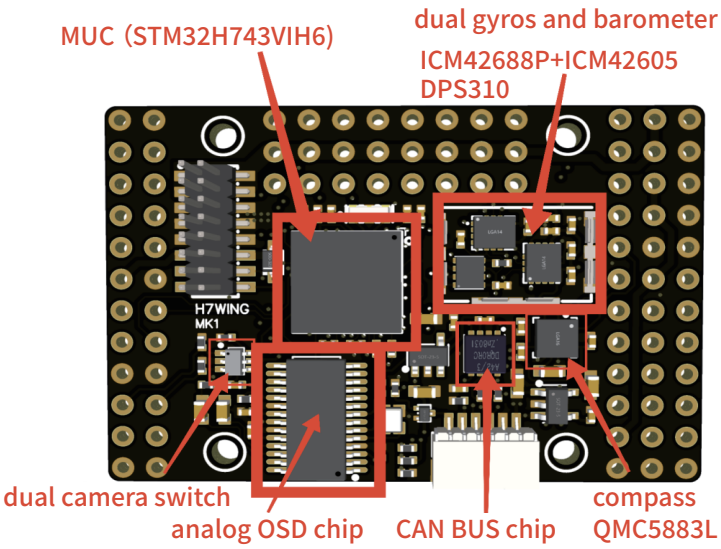
• on-board 9V BEC can be switched by PINIO1 (User1 in BF firmware), no need to worry about overheating and burnt out of the VTX during ground debugging.

• onboard TF card slot, SDIO bus connection, high rate, maximum support for 32GB, storage capacity without worrying about, can save multiple flight data.

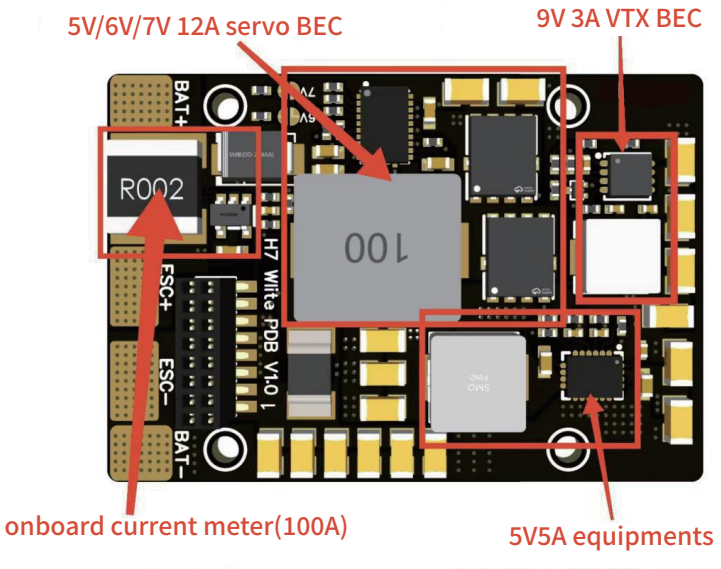
Board layout:



FC board(top layer)
layout diagram

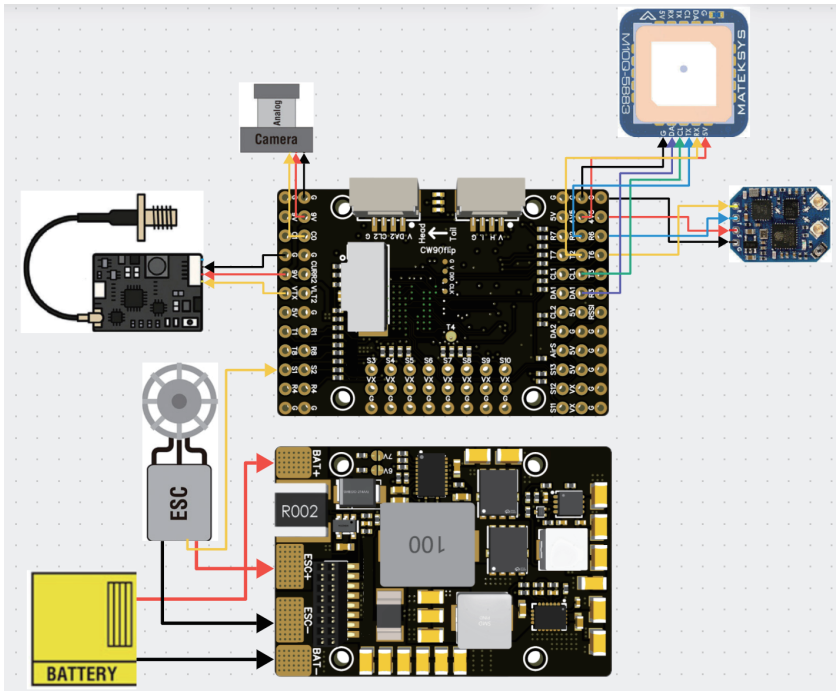


FC board(bottom layer) layout diagram



Power board layout diagram

Wiring diagram：



Flight Control Ports/Ports:

PWM	S1	PB0	5 V tolerant I/O	PWM1 GPIO50	TIM8_CH2N	Group1
	S2	PB1	3.3 V tolerant I/O	PWM2 GPIO51	TIM8_CH3N	
	S3	PA0	5 V tolerant I/O	PWM3 GPIO52	TIM5_CH1	Group2
	S4	PA1	5 V tolerant I/O	PWM4 GPIO53	TIM5_CH2	
	S5	PA2	5 V tolerant I/O	PWM5 GPIO54	TIM5_CH3	
	S6	PA3	5 V tolerant I/O	PWM6 GPIO55	TIM5_CH4	
	S7	PD12	5 V tolerant I/O	PWM7 GPIO56	TIM4_CH1	Gourp3
	S8	PD13	5 V tolerant I/O	PWM8 GPIO57	TIM4_CH2	
	S9	PD14	5 V tolerant I/O	PWM9 GPIO58	TIM4_CH3	
	S10	PD15	5 V tolerant I/O	PWM10 GPIO59	TIM4_CH4	
	S11	PE5	5 V tolerant I/O	PWM11 GPIO60	TIM15_CH1	Group4
	S12	PE6	5 V tolerant I/O	PWM12 GPIO61	TIM15_CH2	
	LED	PA8	5 V tolerant I/O	PWM13 GPIO62	TIM1_CH1	Group5
				SERVO13_FUNCTION 120, NTF_LED_TYPES neopixel		
PWM1~PWM13 are Dshot and PWM capable. However, mixing Dshot and normal PWM operation for outputs is restricted into groups. That is to say, 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. That is to say. If servo supports Max. 50Hz, ESC must run at 50Hz in this group.						

PWM Output Correspondence Table

Attention! The PWM ports of the same TIM can't be used for Dshot protocol & PWM protocol at the same time, it is recommended that S1&S2 use Dshot protocol to connect to ESC, and the rest of the ports use PWM to connect to servo.

UART	USB	PA11/PA12	5 V tolerant I/O	USB	console	SERIAL0
	RX7 TX7 RTS7 CTS7	PE7/8/9/10	3.3 V tolerant I/O	UART7	telem1	SERIAL1
	TX1 RX1	PA9/PA10	5 V tolerant I/O	USART1	telem2	SERIAL2
	TX2 RX2	PD5/PD6	5 V tolerant I/O	USART2	GPS1	SERIAL3
	TX3 RX3	PD8/PD9	5 V tolerant I/O	USART3	GPS2	SERIAL4
	TX8 RX8	PE1/PE0	5 V tolerant I/O	UART8	USER	SERIAL5
	TX4 RX4	PB9/PB8	5 V tolerant I/O	UART4	USER	SERIAL6
	TX6 RX6	PC6/PC7	5 V tolerant I/O	USART6	RC input/Receiver	SERIAL7
				RX6	SBUS/IBUS/DSM/PPM	
				TX6	FPORT/SRXL2	

UART Serial Port Correspondence Table and Default Functions

Attention!The number of UART ports in AP firmware ≠ the number of Serial ports, e.g. R7, T7 corresponds to Serial1 instead of Serial7.

I2C	I2C1 CL1/DA1	PB6/PB7	5 V tolerant I/O	Compass	COMPASS_AUTODEC	1
	I2C2 CL2/DA2 on JST-GH-4P	PB10/PB11	5 V tolerant I/O	on board Baro DPS310	Address	0x76
				Digital Airspeed I2C MS4525 DLVR-L10D	ARSPD_BUS ARSPD_TYPE ARSPD_TYPE	0 1 9
CAN	CAN1	PD0/PD1	5 V tolerant I/O	CAN Node	CAN_D1_PROTOCOL CAN_P1_DRIVER	1 1
				CAN GPS CAN Compass CAN Airspeed sensor	GPS_TYPE COMPASS_TYPEMASK ARSPD_TYPE	9 0 8

I2C & CAN bus parameter setting table

Attention! The on-board QMC5883L compass is connected to I2C2, if you need an external compass of the same quality, please connect it to I2C1 port.

AP firmware other parameter settings:

BATT_VOLT_MULT 21

BATT_AMP_PERVLT 80

Firmware Flashing:

AP Firmware: Arduplane 4.5.4

INAV Firmware: INAV7.1.2