

DTFc Flight Controller



User Manual

2016-05-30

Betaflight releases are available here: <https://github.com/borisbstyle/betaflight/releases>

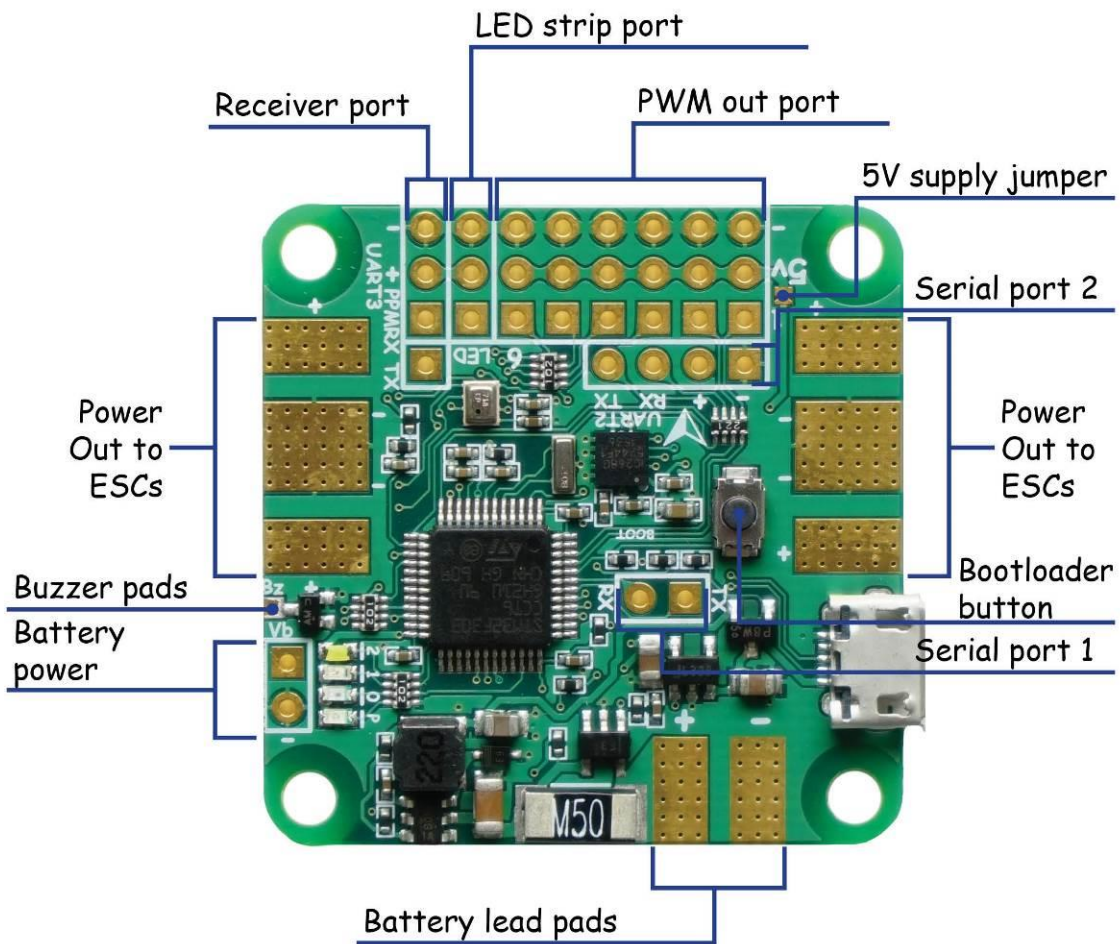


Warnings

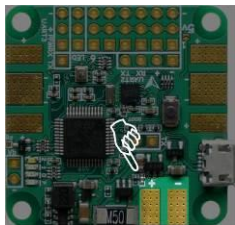
Use of this hardware requires soldering skills, general multicopter assembly skills, and computer skills. Don't use this hardware to do anything illegal and/or unsafe. DTF Air Inc. takes no responsibility for any injury or loss caused by or associated with this hardware or any related software. You are required to have as much fun as possible building, flying, crashing, and repairing your FPV craft.



Hardware Overview

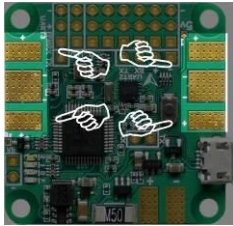


Battery connection



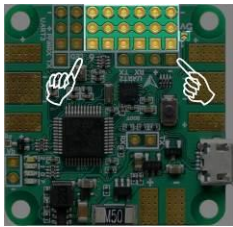
Solder your power cables on these pads to enable the PDB and onboard current sensor. This board is compatible with 2S up to 6S batteries.

ESC power connections



You can solder your ESCs to the four positive and four ground pads available on the side of the board. How much current can they take? A lot.

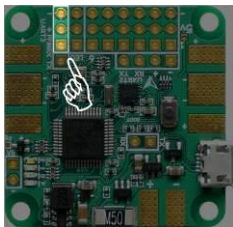
PWM Out ports



Up to 6 outputs are available. You must connect the signal wires of your ESCs here. You can connect the power and ground leads as well. Since your ESCs are grounded to the board already via the large power pads, the second, smaller ground lead can sometimes be left off, depending on your ESCs.

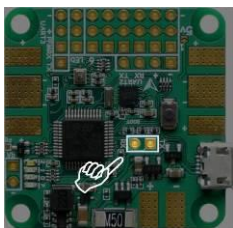
The +5v pins on the PWM Out header are not connected to the +5v board supply, but they are connected to the other PWM Out +5v pins. DTFc can supply +5v to these pins (when the board is powered by battery or USB) by placing a small solder blob over the V-shaped supply jumper, located next to the row of +5V pins.

Receiver Port



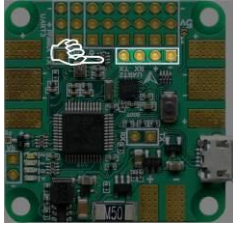
This port can be connected directly to a PPM, SBUS, SUMD, etc. receiver without any additional jumpers or inverting hardware. +5v is provided on the + pin. The 4th pin is the Uart3 TX pin which can be used for telemetry modes. Be sure to configure your receiver type and serial port (Uart3) properly.

Uart1



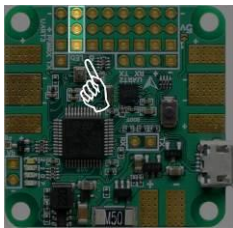
TX/RX pads are located in the middle of the board for compatibility with OSDoge. Battery power is available on a pin pair off to the side, near the indicator LEDs. You can also use this serial port with other compatible serial devices. Be sure to configure this port properly in your flight control software.

Uart2



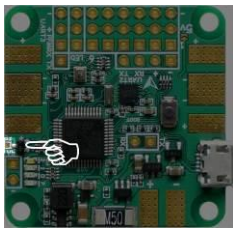
4-pin serial header with +5v supply. Connect your serial device here and configure it in your flight control software.

LED strip port



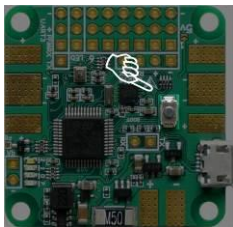
Betaflight supports WS2812B strips. (dRonin support is coming.) This port can drive those leds and provides a +5v supply to power them.

Buzzer output



If connecting a buzzer, the positive lead should be connected to the rated voltage of the buzzer. If using a 5V buzzer, there is a +5V pad available on the bottom of the DTFc, on the opposite side of the buzzer pad. Connect the negative lead of your buzzer to the Bz pad. Don't forget to configure your flight software accordingly.

DFU Button / Firmware Updates



Betaflight updates may be applied using the Betaflight configurator. Mac and Linux users will find no drivers are needed. Windows users will need to download ZADIG drivers from <http://zadig.akeo.ie/> and install them, replacing the STM32 Bootloader driver included with Windows. (Betaflight configurator does not currently support the drivers included with Windows, why is why ZADIG must be installed.)

dRonin firmware updates are done through the PC ground control software. dRonin's special software bootloader is used to apply updates, so DFU mode is not needed after the initial flash.

When switching between betaflight and dRonin, or if you are experiencing severe firmware problems, this handy button makes it easy to enter the chip's DFU firmware upgrading system. Simply hold down



the button while applying power to the board (i.e. plug in USB). The board will enter DFU mode to allow easy firmware updates.

Current/Voltage Sensor

The current sensor outputs a signal of 40.08 A/V or 24.95 mV/A. Betaflight users should set `current_meter_scale` to 250. dRonin users have this calibration set automatically.

The battery voltage sensor outputs a signal of 11 V/V, which matches the default Betaflight value of 110 so this setting should not need to be changed.

Software Functionality

Betaflight

Gyro/accel/baro are available with refresh rate up to the maximum supported by software. Standard peripherals such as WS2812B, BLHeli 4-way, etc. are available. An SPI port is reserved for BMP280 barometer / flash / external magnetometer.

Betaflight releases: <https://github.com/borisbstyle/betaflight/releases>

dRonin

Gyro/accel are available with refresh rate up to 1000Hz on gyro. WS2812B support is in the works. Features and flight modes available on other F3 processors are available.

DTFc is not yet available in the main dRonin project.

Working repo: <https://github.com/DTFUHF/dronin/tree/DTFc>

