



Thank you for using our product. Any Improper operation may cause personal injury or damage to the product and related equipments. This high power system for RC model can be dangerous, we strongly recommend reading the user manual carefully and completely. We will not assume any responsibility for any losses caused by unauthorized modifications to our product. We have the right to change the design, appearance, performance and usage requirements of the product unannounced.

01 Main features

- ARM 32-bit Cortex MCU STM32G071, frequency up to 64 MHZ, 25% higher than the previous generation of MCU.
- PWM frequency up to 128k, high frequency for higher throttle makes running smoother.
- Compared with the previous generation of ESC, the ESC firmware is optimized, makes the throttle linearity smoother and the response faster.
- Compared with the previous generation of ESC, it has better routing and component layout.
- Supports regular 1-2ms pulse width input, as well as Oneshot125 (125-250us), Oneshot42 (41.7-83.3us) and Multishot (5- 25us). The input signal is automatically detected by the ESC upon power up.
- All Dshot and Proshot signals are supported .
- Damped light does regenerative braking, causing very fast motor retardation, and inherently also does active freewheeling.
- Supports higher power load, more suitable for violent flight of racing drone.

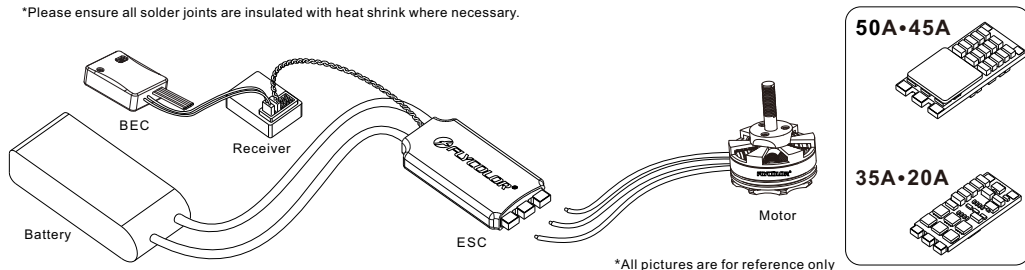
02 Specifications

Model	Con. Current	Burst Current (10S)	BEC	LiPo	Weight (For reference)	Size (For reference)	LED	Typical Applications (For reference)
Raptor 5 -20A	20A	25A	No	3-6S	6.5g	29x14x6mm	Red Led	170-450 Multi
Raptor 5 -35A	35A	40A	No	3-6S	6.5g	29x14x6mm	Red Led	170-450 Multi
Raptor 5 -45A	45A	55A	No	3-6S	10.2g	33x16x6mm	Red Led	170-450 Multi
Raptor 5 -50A	50A	60A	No	3-6S	10.2g	33x16x6mm	Red Led	170-450 Multi

Firmware: **Flycolor_Raptor_5**

03 Wiring diagram

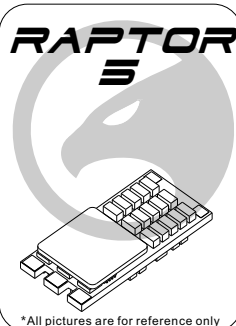
*Please ensure all solder joints are insulated with heat shrink where necessary.



04 Programming parameter

Programming parameters below can be accessed from the configuration software (BLHeliSuite32):

- Rampup power:** Rampup power can be set to relative values from 3% to 150%. This is the maximum power that is allowed when ramping up at low rpms and during startup. For low rpms, the maximum power to the motor is limited, in order to facilitate detection of low BEMF voltages. Rampup power also affects bidirectional operation, as the parameter is used to limit the power applied during direction reversal. During startup, the actual applied power depends on throttle input, and can be lower than the maximum level set by the rampup power parameter, but the minimum level is a quarter of the maximum level.
- Motor timing:** Motor timing can be set between approximately 1° and approximately 31° in approximately 1° increments (actual accurate values here are 15/16ths of a degree). Typically a medium setting will work fine, but if the motor stutters it can be beneficial to increase timing. Some motors with high inductance can have a very long commutation demagnetization time. This can result in motor stop or stutter upon quick throttle increase, particularly when running at a low rpm. Setting timing to high will allow more time for demagnetization, and often helps. Motor timing can also be set to Auto.
- PWM frequency:** Motor pwm frequency can be programmed in a range. Support variable pwm frequency where the pwm frequency is controlled by motor RPM. -Low frequency for low throttle gives good active braking where it is most needed. -High frequency for higher throttle makes running smoother
- Demag compensation:** It is a feature to protect from motor stalls caused by long winding demagnetization time after commutation. The typical symptom is motor stop or stutter upon quick throttle increase, particularly when running at a low rpm. As mentioned above, setting high commutation timing normally helps, but at the cost of efficiency. Generally, a higher value of the compensation parameter gives better protection. If demag compensation is set too high, maximum power can be somewhat reduced.
- Sine Modulation Mode:** Sine modulation mode can give a few percent more efficient running & smoother running. Note: if sine mode is chosen, then variable pwm frequency is disabled.
- Maximum Acceleration:** Maximum acceleration can be set between 0.1%/ms and 25.5%/ms. It can also be set to maximum, in which case acceleration is not limited. Limiting acceleration is primarily intended as a backup parameter that can be used in cases where too hard acceleration gives desyncs. When setting to e.g. 10%/ms, it means that the power applied to the motor is not allowed to increase by more than 10% per millisecond.
- Motor Direction:** Motor direction can be set to fwd/rev/bidirectional 3D/bidirectional 3D rev/bidirectional soft and bidirectional soft rev. In bidirectional mode, center throttle is zero and above is fwd rotation and below is reverse rotation. When bidirectional operation is selected, throttle calibration is disabled.



*All pictures are for reference only

8. Startup Beep Volume: Sets the volume of beeps during powerup.

9. Beacon/Signal Volume:

These the volume of beeps when beeping beacon beeps. The ESC will start beeping beacon beeps if the throttle signal has been zero for a given time. Note that setting a high beacon strength can cause hot motors or ESCs!

10. Beacon delay: Beacon delay sets the delay before beacon beeping starts.

11. Throttle Cal Enable:

If disabled, throttle calibration is disabled.

12. Min throttle, max throttle and center throttle:

These settings set the throttle range of the ESC. Center throttle is only used for bidirectional operation. The values given for these settings are for a normal 1000us to 2000us input signal, and for the other input signals, the values must be scaled. For Dshot input signal, these settings have no effect.

13. Temperature protection:

Temperature protection can be enabled or disabled. And the temperature threshold can be programmed The programmable threshold is primarily meant as a support for hardware manufacturers to use, as different hardwares can have different tolerances on the max temperatures of the various components used.

14. Low RPM power protect:

Power limiting for low RPMs can be enabled, disabled or on adaptive. Disabling it can be necessary in order to achieve full power on some low kV motors running on a low supply voltage. However, disabling it increases the risk of sync loss, with the possibility of toasting motor or ESC.

15. Low Voltage Protection:

Low voltage protection can be set between 2.5V and 4.0V per lipo cell. Or it can be disabled. When enabled, it will limit power applied to the motor if the battery voltage drops below the programmed threshold. This feature is primarily intended for fixed wing crafts.

16. Current Protection: Some ESCs do not support this function, For these ESC, the settings have no effect.

17. Brake on stop: Brake on stop can be set between 1% and 100%, or disabled. When not disabled, brake will be applied when throttle is zero. For nonzero throttle, this setting has no effect.

18. Auto Telemetry: When it is enabled, the ESC will autonomously output telemetry at 32ms intervals, regardless of whether or not there are telemetry requests from the input signal.

19. LED Control: LEDs can be controlled on ESCs that support it.

20. Stall protection: It can be set to normal or relaxed. Relaxed increases the risk of damage to ESC or motor but can recover faster when props hit obstacles.

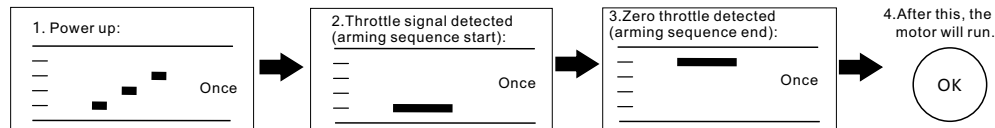
21. Non Damped Mode: Damped light mode is implemented by doing regenerative braking, and inherently active freewheeling is also implemented. Then losses due to braking are counteracted by the reduced losses of active freewheeling. **OFF** - Damped light is available ; **ON** - No Damped light.

22. S.BUS: If a valid S.BUS channel (0 to 16) is selected, then the input signal will be interpreted as S.BUS.

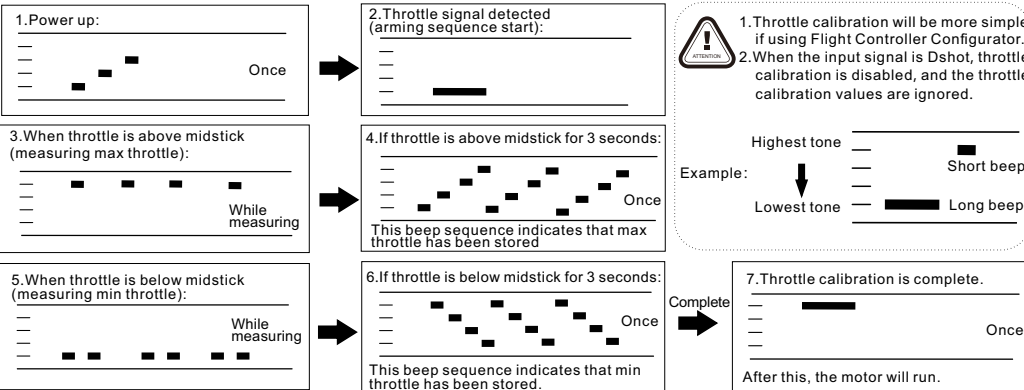
23. S.PORT: If a valid S.PORT physical ID (1 to 28) is selected, then the telemetry format will be S.PORT. Note that only ESCs that use USART1 (port PB6) for telemetry support S.PORT. If the "S.PORT Physical ID" programming parameter shows up in BLHeliSuite32, then your ESC supports it.

24. Music Note Config: Set up personalized music.

05 Beeps-Normal operation



06 Beeps - Throttle calibration



07 Attention

- ESC will automatically detect the input throttle signals every time as soon as it powered on, and then execute the corresponding signal-receiving mode.
- User need to calibrate the throttle range when starting to use a new ESC or another transmitter. When the input signal is Dshot, throttle calibration is disabled.
- It is suggested that keep the ground wire in the original signal wire connecting well.
- Please don't flash any other firmware except "Flycolor_Raptor_5".
- When some abnormality occurs in ESC driving the motor or need the motor to reach a higher RPM, user can try to change the timing.
- Please use a PDB or Flight Control with currentmeter if OSD is required to display the current.
- Observe polarity at all times. Double check before applying power.
- Power off before unplugging, plugging in or making any connections.
- Please do not exceed the current & voltage range.
- All welding requires good welding technology, short circuit between the element or the wire should be avoided at any time.
- Please ensure that all wires and connecting parts are well insulated to avoid product damage due to short circuit.
- Never use this product in harsh environments such as humidity, high temperature, and so on to avoid product damage.
- Please contact Flycolor sales or technical support for more information.