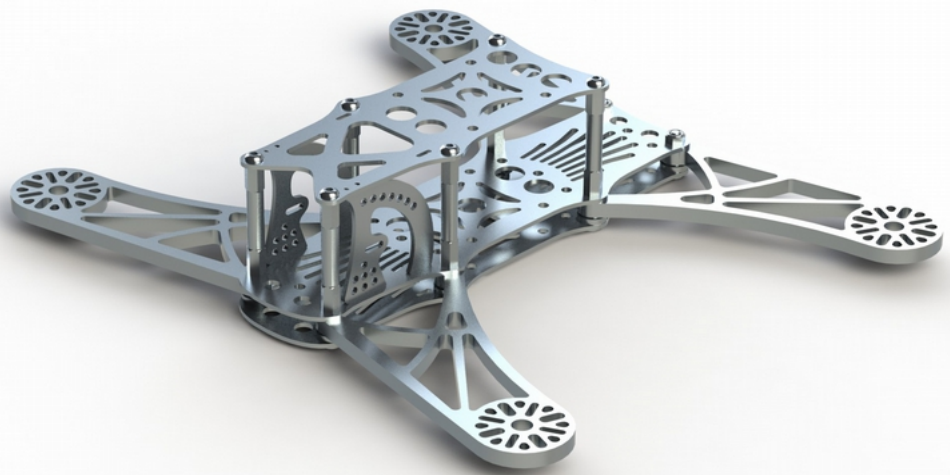


# Swift Blade 250

BY FLIGHTWORKS®



## FPV RACER

FRAME CLASS:	250
PROP. SIZE:	UP TO 6"
MOTOR SIZE:	M3 OR M2 ATTACHED MOTORS OF CHOICE
POWER:	UP TO 4S 1500 MAH HOUSED INSIDE FRAME AS OPTIMUM, DEPENDING ON BRAND
FLIGHT CAM:	TIE-STRAP SUSPENSION OR SCREW, TILT UP TO 45°+ ANGLE
MATERIAL:	7075T6 AEROSPACE ALUMINIUM

MADE IN SWEDEN

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## Introduction

Thank you for choosing the SwiftBlade 250 quad racer frame.

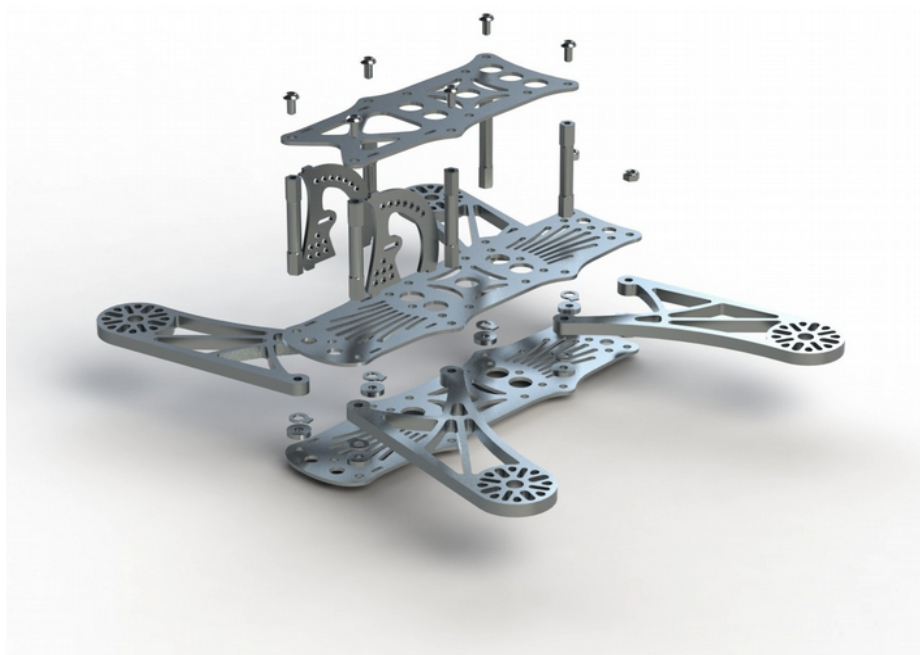
Great effort has been put into making the SwiftBlade 250 racer light, aerodynamically efficient with “transparent” arms, and able to withstand the impacts racing can result in. All of this at low cost *without comprising quality*.

Up to 6” propellers can be mounted on any motor fitted with M2 and M3 bolts. The cage can house up to 1500mAh 4C batteries inside the cage, or any other power source on top of the cage.


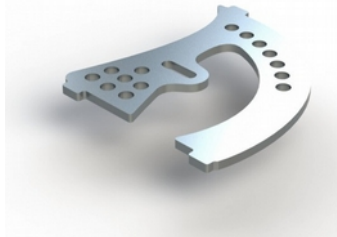


The volume between the two bottom 'Hull Boards' are intended to house the flight controller without pins, as well as the ESCs.

**Electronic ground is recommended within the frame via solder-able cable shoes distributed around the interior of the design.** Alternatively, M3 bolts and nuts can act as ground points (not supplied).

The 'Cam Rails', are intended for mounting a flight cam, providing the user a wide variety of angles and positions. The flight cam can be mounted in two ways depending on brand and configuration. It can be secured with four tie-straps for vibration dampening as well as break away capability, in the unlikely event of a direct hit on the camera in a crash. Alternatively, an encased flight cam with side-mounting screws can be mounted and adjusted in the slots on the 'Cam Rails'.



## Included

6x	M3x6 or M3x8 titanium hex bolt	(Shape and Colour may vary)
1x	Spacer Board	
2x	M3 steel lock nut	(Shape and Colour may vary)
2x	Cam Rail	
4x	Arm	
6x	37mm Standoff	(Shape and Colour may vary)
8x	Cable shoe	(Shape and Colour may vary)
8x	2mm Spacer	(Shape and Colour may vary)
2x	Hull Board	
8x	M3x14 steel hex bolt	(Shape and Colour may vary)

## Guidelines

The design of the SwiftBlade 250 has been optimised for all flight controller and ESCs that fit in between the two 'Hull Boards', separated by the arms, cable shoes and supplied spacers.

Equipment placement in, and on the frame, is up to the user! It is important to remember to centralise the mass and keep its centre of gravity in the middle of the quad. This is the ideal location for the flight controller for optimum performance and handling. Be mindful to house all electronics within the frame to minimise the risk of damage in the event of a crash.

**Electronic's ground is intended to go through the frame, as is standard within the automotive industry, to save weight and offer less cable routing without the need for a PCB<sup>1</sup>. See picture below for example of PCB free electric distribution.** Default ground points are provided (cut cable shoes on every arm fastening point) for easy ESCs mounting as well as for other electronics. Alternatively, two pre-drilled M3 bolt holes are located in the 'Hull Boards' to accommodate alternate ground points. Be mindful that this alternative would add weight and result in more complex maintenance.

The battery is preferably housed inside the frame for optimum mass centralisation, battery protection and lowering the inertia along the roll-axis. Alternate battery positions are also possible.

If the battery is housed inside the frame, it is advised to place a barrier between the forward camera compartment and the battery. In the event of a crash, the battery will force its way forward and may destroy the camera. It could also potentially cut off the cables routed up through one of the holes in the upper "Hull Board" to the upper level. An example barrier could be as simple as stretching a few tie-straps between the forward camera compartment and the battery.

Motor mounts are intended for both M3 and M2 attached motors.

The quad design is optimised for conventional pull-configuration with a camera optics groove in the forward part of the 'Spacer Board', accommodating adequate look-up angle for the flight cam while also providing adequate protection. If an inverted pusher configuration is desired for camera platform work with minimised prop wash induced vibration and slight improvement of propeller efficiency, then the 'Cam Rails' can be mounted upside down.

The flight cam is intended to be mounted to the 'Cam Rails' with four, 2mm width tie-straps. The cam angle to be set by the user. This provides vibration dampening as well as weak enough break away attachment which will save the camera if it gets hit in the event of a crash. The long holes are intended to replace the bracket that is normally supplied with many encased flight cams. Silicone tubing on the screws between camera house and "Cam Rail" can accommodate any difference in width. The distance between the 'Cam Rails' is 31.2mm. The 'Cam Rails' will need to be modified or removed if a larger camera is chosen. If using 6" propellers, ensure that nothing sticks out from the camera compartment (i.e. nothing should protrude the line between the first side-pairs of standoffs.)

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<sup>1</sup> Printed Circuit Board

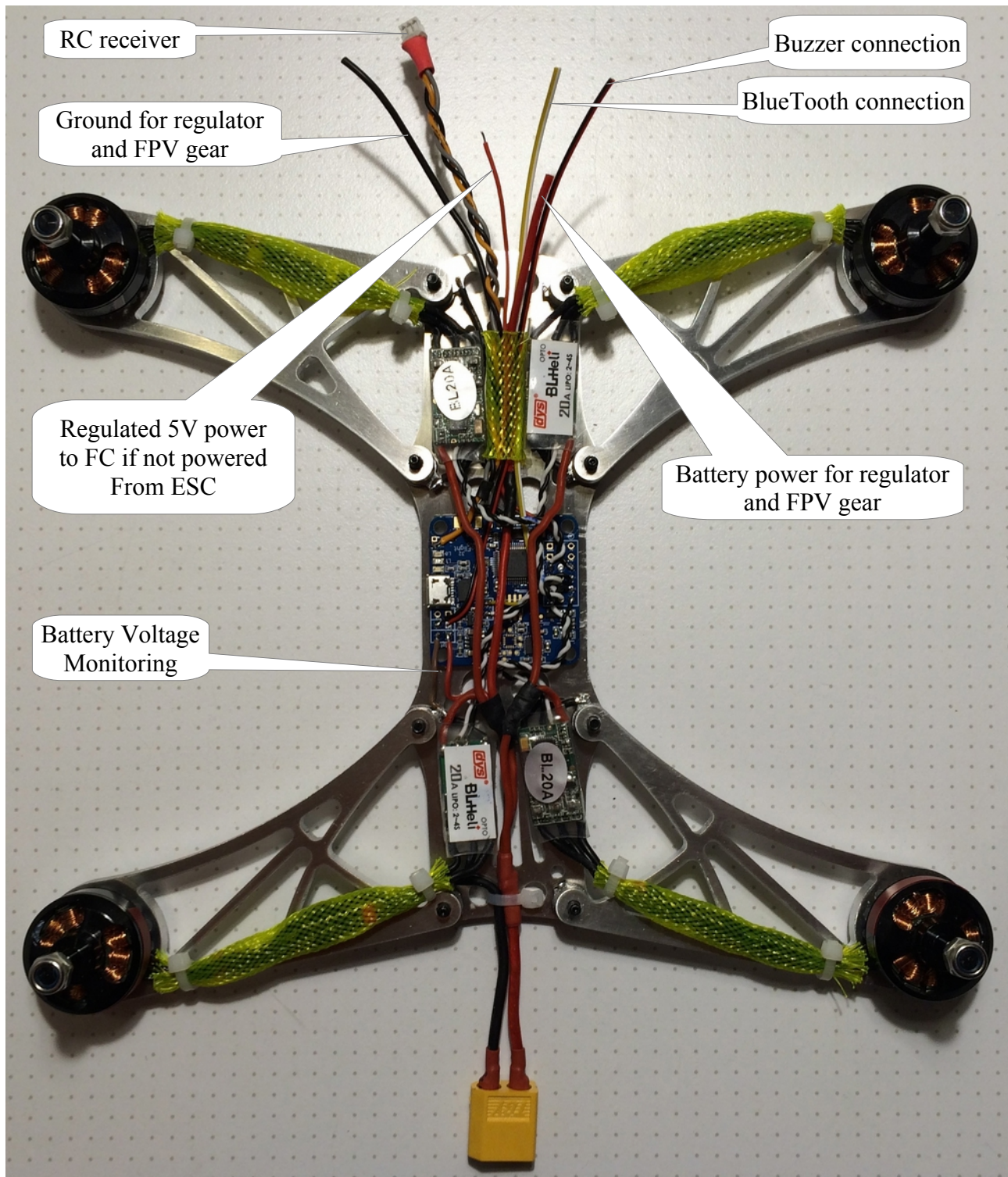
## Suggested build sequence

1. Place one "Hull Board" on your working surface with all eight M3x14 bolts facing head down.
2. Cut away the plastic covered part of all cable shoes *leaving a few millimetres of metal protruding* from the circular part of the cable shoe.
3. Add one spacer and one cut cable shoe to every M3 bolt protruding through the 'Hull Board'.
4. Place the arms. Forward arm's straight side facing the front of the racer, and aft arm's straight side facing backwards.
5. Fasten your fully soldered and prepared flight controller board on the bottom Hull Plate with foam tape. (Important: Cover entire underside of your flight controller to avoid any short circuit with the frame!) Use some M3 bolts to align your flight controller with the pre-drilled holes in the 'Hull Board' while taping it, to avoid any mounting angle errors. *Ensure the USB receptacle is facing toward the side of the Hull Board. Also, ensure all your soldering is done underneath the Flight Controller.*
6. Lay out the ESCs according the picture in the figure below and mount your motors. Measure and cut all wires carefully to and proceed to solder all cables *Important: Don't shrink wrap the solder point yet, as they might need re-soldering after step 11.*
7. Attach all other peripheral connections to your flight controller and power-train.
8. Place the second 'Hull Board' on top of the arms and attach the standoffs with thread lock. Here it is advisable to route all cables through one hole in such a way that the 'Hull Board' is not fixed in place by any soldered cable loops. *Important: Ensure nothing becomes squeezed in this step, and that **no short circuit is created**. Check also that the flight controller is free of any forced contact with nearby cables. If the flight controller is in any way jammed or restricted in movement provided by the foam tape, transmitted vibrations could severely hamper flight characteristics!*
9. Place the two 'Cam Rails' with the curved section facing rearwards/upwards into the matching grooves. The tabs on the 'Cam Rails' and the grooves in the 'Hull- and Spacer Boards' are tight by design. *File gently on the base of the tabs if required, Important: be **very careful to not file away too much** aluminium, otherwise the fit will be loose. Suggestion: Rocking the 'Cam Rails' back and forth, working their way down the groove will provide a good fit.*
10. Position and fasten a camera with tie straps or screws, depending on the camera model.
11. Perform a power-up and confirm the motor rotation (if not already contained within the software control of the flight controller.) Re-solder motor connections as needed.
12. Place the Spacer Board and attach the thread locked M3 titanium bolts.
13. It's recommended to attach the RCRX and VTX underneath the 'Spacer Board' with contacts, so that any maintenance may be performed easily by simply removing the 'Spacer board'.
14. **CHECK:** MAKE SURE NO +CABLES OR +SOLDERING POINTS WILL SHORTCIRCUIT WITH THE ALUMINIUM FRAME. THIS COULD INSTANTLY DAMAGE ELECTRONICS AND MAY EVEN RESULT IN FIRE!!



## ***Suggested electronics layout in between 'Hull Boards'***

See Appendix 1 and 2 for electrics schematic.



ENJOY YOUR FLIGHTS!

## **General advice**

This product can be a danger to yourself and others, including property, if not used carefully. It is strongly advised for spectators (especially children) to wear safety glasses in close proximity of the flying site. Any child (user or spectator) should be supervised by adults at all times.

ADHERE TO YOUR COUNTRY'S RULES AND REGULATIONS FOR RADIO CONTROLLED FLIGHT.

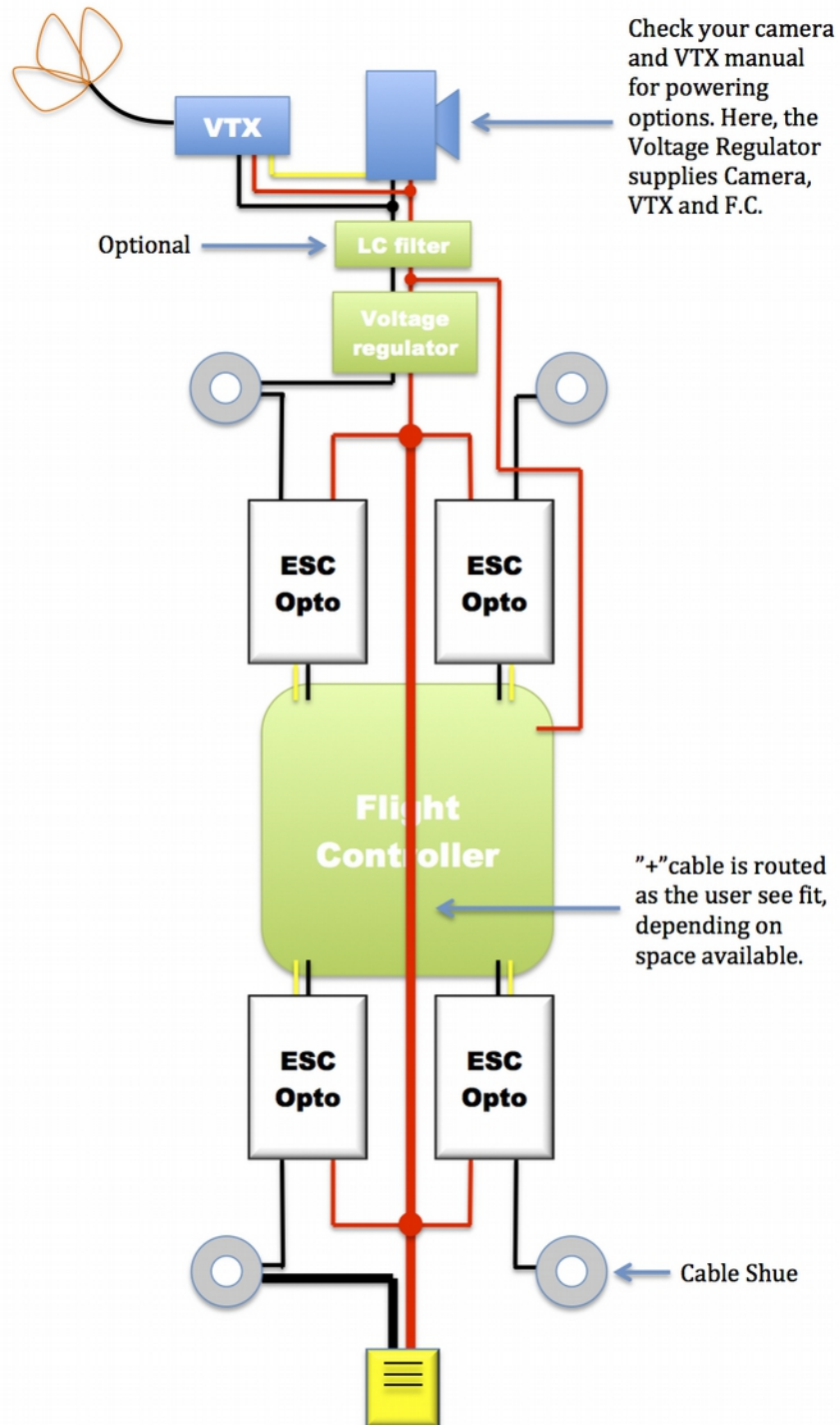
USE COMMON SENSE, DO NOT FLY CLOSE TO ANY HUMANS, ANIMALS, POWER LINES, BUILDINGS OR OTHER PROPERTIES NOT ALLOWED FOR RC ACTIVITIES. DO NOT FLY INTO CONTROLLED AIRSPACE AROUND AIRPORTS AND HELIPADS CLOSE TO INSTITUTIONS SUCH AS HOSPITALS, POLICE AND MILITARY INSTALLATIONS.

Remember, multi rotor hobbies are expanding rapidly. Keeping the public and officials on side by showing respect and responsible piloting, will allow all the freedom to conduct this awesome hobby long into the future.

## **Limitation of Liability**

The purchaser bears all risk in the product upon purchase from FlightWorks™, including the purchaser's ability or competence to use the product. In no event, under any circumstances shall FlightWorks™ be liable for any direct, indirect, incidental, punitive or consequential damages of any kind caused by the operation of the product by the purchaser that results in damage to property and/or person(s) and/or legal charges. This applies whether arising due to an accident or bad judgement, lawful or unlawful use of the product or tort including negligence.

## Appendix 1: Electronics layout ESC Opto





## Appendix 2: Electronics layout ESC with BEC

