

Seven Stars Landing Light

Mk.III with single taxi light option

Parts list

Heatsink, 100mm diameter	1	
Seven Stars PCB, 150x116mm	1	
Spotlight lens, 8° beam	7	
Spotlight lens cups 38mm	7	
Lens holder frame	1	
PARTS BAG:		
14mm M3 pan head stainless steel screw	9	
30° beam diffuser disk	1	
(GD33) Thermal paste syringe	1	



Thank you for your purchase of our products! We're proud of the work that has gone into the design of the Seven Stars landing light, and we know you're going to be blown away by the amount of light it produces.

The Seven Stars light draws a maximum of **7.5 amps**, producing **9000 lumens** of white (5000K) light. The Seven Stars Landing light may only be used with a **12 volt** electrical system.

The individual Cree LEDs are driven by their own linear current regulator for simplicity and redundancy. Because they are not a 'switching' type regulator, by design there cannot be any intercom or radio noise. If the light is operated in hot ambient conditions the power supply will automatically reduce the amount of power drawn. Each LED is fitted with a collimator lens to focus the light into an 8° beam. A diffuser disk can also be fitted to the center lens to spread that beam to ~30°.

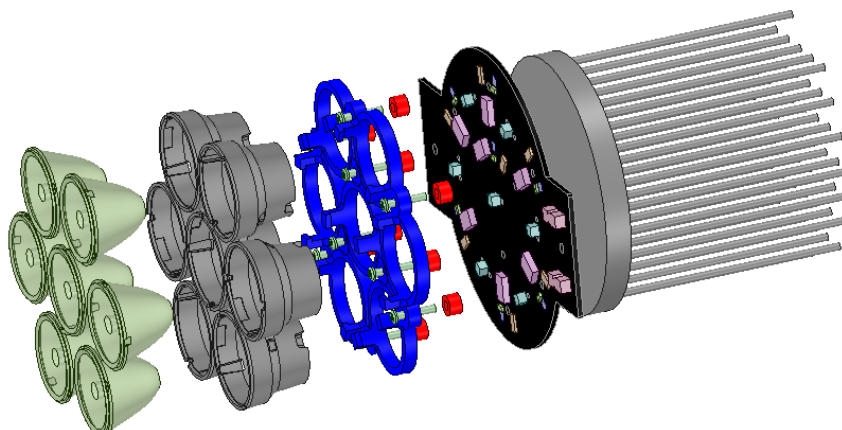


Mounting holes

Mounting holes have been provided at 5" spacing, which should line up with the nutplates in your existing Duckworks or Van's mounting plate.

Eight small additional holes have been provided to suit other mounting arrangements. Enlarge these as required. If you are replacing a rectangular halogen light in your existing mounting bracket in the wings, now is the time to remove the bracket and make a circular hole at least 4" in diameter to allow the heatsink through.

Exploded View



Assembly Instructions



Take extreme care not to damage the LEDs and other components on the boards!

In particular avoid touching the dome of the LEDs, as they are easily damaged. If this happens you will need to return the circuit board to us for repair as the LEDs require specialist processes to be replaced.



Please read through these instructions in their entirety before proceeding.



We have supplied a lens holder frame made from ABS using a 3D printer, as well as nine spacers that lift the frame off the light PCB. We tried to make the spacers to be a 'just enough' friction fit on the mounting screws, but there is always some variation between batches and within the group, so you may need to enlarge the holes with a 3mm or 1/8" drill to accommodate the screws.

The spacers need to be fitted to the underside of the frame. Applying **acetone** with a brush or rag to the faces of the two parts will allow the ABS parts to melt together. Superglue also works, however the vapour cures into white particles over the next *hour or more*, creating a mess on the frame that will need to be cleaned up afterwards.

A simpler alternative is to temporarily locate the spacers with a screw and then use a blob of hot melt glue to hold them in place.

Let the glue set and then remove the screws.



The next task is to fit the lens cups to the frame.

The lens cups slide into the lens frame and are held by the hooks on the arms. The arms are fairly rigid so there might be a little persuasion required to get the cup to slide into place, but nothing excessive is needed.

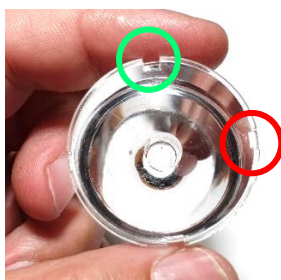
The lens cups will sit with some movement still possible.

Start with the centre lens cup, and then proceed to mount all of the other lens cups around the frame.



Give the collimating lenses a quick wipe on the conical part to remove any fingerprints or dust.

Dust won't affect the light in any way, but we'd very much prefer that you **do not remove individual lenses** in the future so now is the time! Removing the lens when the frame is fitted to the board *will* damage the LED below.



The lenses have four notches around their edges, but if you look and feel closely two of them are cut all the way through (green circle), while two of them have a tab that is used to lock the lens in place (red circle).

* Hold the lens with the 'cut through' slots under your finger and thumb.

* Locate the lens above the cup so that the locking tabs on the cup will engage with the lens.

* Push and click the lens into place.

Repeat for the rest of the lenses, giving each lens a quick clean before putting it in place.



The heatsink has been tapped with M3 threads.

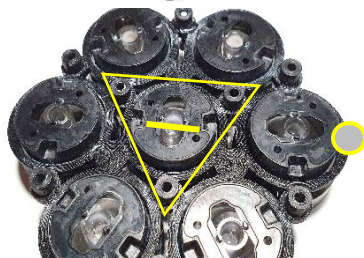
Lightly countersink these holes to remove any raised area created by the tapping process so as to make the surface of the heatsink flat again.

Apply a **small** amount of the heatsink compound to the heatsink. **A little bit goes a very long way!**

Note that only about 1/4 of the tube contents was applied here. Spread the paste around to cover the heatsink.

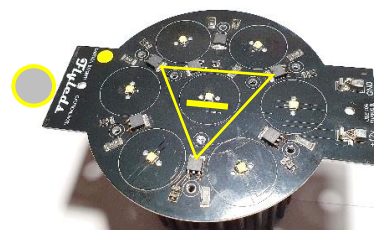



Lower the PCB onto the heatsink, perhaps using two screws inserted a few turns to locate the board in the correct position.



Important: Looking at the rear of the assembled lens frame, observe that the lens cups all have two small locating pins that will mate with the holes on either side of the LEDs, as called out by the horizontal line.

Because of these two pins *on the center lens cup* and the three central screw holes, the assembled frame can now actually fit to the PCB one way only!



We have placed a small silver pen mark on the lens frame, as called out by the  in the picture at left. This needs to be located closest to the Flyleds logo on the PCB.

Feed screws into the three central holes in the lens frame to use as guide pins. (You might need to use some fine point pliers to do this job.) Locate the lens frame assembly over the PCB and, double checking that your clocking of the center lens cup pins lines up, carefully lower it into position over the PCB.

Gently give all of the lens cups a wiggle and a press to seat their guide pins into their respective holes. The lens cups should now be sitting flat against the PCB.

The lenses will now all appear uniformly yellow from the LEDs below.

Place screws in the remaining holes in the lens frame and tighten them gradually in a rotating sequence around the frame. Tighten the central three screws as well. You're done!



Fitting the lights

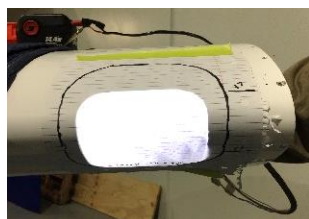
With the revised board design we're pretty sure that your light will fit straight in and you can ignore this whole section! There might be a few swear words directed our way when fitting this light, but we promise the results are worth it.

Our RV-10 was originally fitted with HID lights in a Duckworksav.com mounting frame kit. The Seven Stars spotlight may be just a bit too big to fit straight through the window already cut into the leading edge of the wing. An alternative is to insert the light through the outboard wing rib instead. We unscrewed the Duckworks mounting frame from the ribs and then screwed the landing light in to the frame whilst it was still located in the wing, and then reattached the assembly to the ribs. With the wingtips off we had lots of access to the whole assembly.



An RV-6 customer let us know that if the typical Duckworks bracket is unscrewed from the ribs first and left inside the wing then the light will fit through the leading edge. With a bit of juggling the bracket can then be put back into place and the light attached to it. If you have the wingtips off as per the picture below this will be an easy task.

Plan B could simply be to use a dremel to enlarge the hole in the leading edge, as there is usually lots of overlap from the clear lens.



Another RV-10 customer chose to fit Van's light bay kits (**LL LENS KIT RV-10**) at the same time as he installed the Seven Stars landing light. This picture shows the template for the new light bay overlaid over the existing leading edge aperture. He had previously observed from the ground that an RV-14 (which has the same light bay hardware) had a better off-axis light spread than his neighbour's RV-10.

Note the window size difference shown here. Your RV-14 light installation should take five minutes!



Wiring the landing lights

Due to the 7.5 amps or so of current drawn by the K.I.S.S. (and noiseless) design of the LED current regulators, voltage drop over the long wire run out to the Seven Stars light becomes significant.

14AWG standard (unshielded) wire is preferred for the entire run if you are wiring from new and have the choice.

16AWG wire will be OK to use if you already have it installed in your wing. Use M22759/16 or /32 or similar.

18AWG wire is recommended for the Taxi light circuit, however 20AWG will also suffice.

Ground the landing light locally at the wingtip using the same 14 or 16 gauge wire. There is no need to run another ground wire back to the firewall ground point, in fact we specifically recommend against it due to the extra voltage losses incurred.

By exception, if you have a magnetometer in one wing, ground the landing lights for that wing at the wing root instead. The magnetic fields* generated in the power and ground wires will cancel each other out, keeping the magnetometer oblivious and happy.

*Note that magnetic fields generated in wires is a different thing to switching noise...

Main lights

* Applying power to the main **+12v** power input will illuminate **all seven** spotlights.

The Seven Stars light is equipped with push-in power connectors. Strip ¼" of insulation from the wire and simply push the wire home into the socket. It might appear flimsy at first glance, but it is a firm and positive connection and the wire is not coming out!

These connectors are not designed for repeated connection and disconnection cycles, however once the light is installed in the plane it shouldn't need to come out again.

To remove the wire from the terminal, gently twist the wire along its axis in one direction and pull the wire free. If this proves difficult then the wire jaws can be *gently* prised apart using a small screwdriver to reduce their grip on the wire.

* Provide additional mechanical support for the wires nearby using a clamp or cable ties.

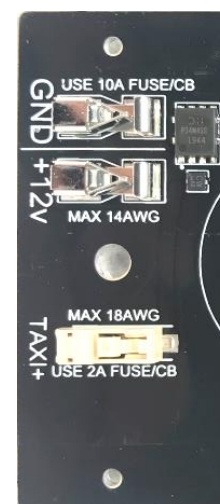
If you feel the need an additional plug/socket of your choice may be used in the power wires. Select one rated at 10 amps, such as one using simple spade/fast-on contacts.

Taxi light

* The centre spotlight has an additional power input. This gives you the option to use it separately as a taxi light and not blind others when you're on the ground.

The **TAXI+** input will accept a maximum of 18AWG wire and it will draw 1 amp.

The centre taxi light shares its ground connection with the main power input.



The supplied diffuser disk can be fitted to the middle (Taxi) light in order to widen the beam width. This clips into place via the 'cut through' slots that are located at the north and south edges of the collimating lens.

We'd love to hear your feedback and flying reports. Your hero shots are also most welcome!

