The Combo Light

Thank you for purchasing a Combo light from ***Flyleds***!

The Combo light may only be used in a **12 volt** electrical system.
The main light draws **~3 amps** for 3600 lumens of 5000k pure white light, plus another **1 amp** for 1200 lumens for the adjustable light.
Use 18AWG wire and protect the wiring with appropriate fuses or breakers.

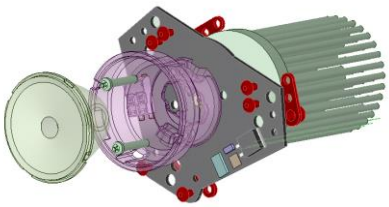
Each LED is fitted with a collimating lens to focus the light into an 8° beam, designed to throw the light as far forward as possible to light up the numbers early for landing. Fit the tilting (taxi) light with the 30° diffuser disc as required.

Landing Light components		
Triple LED PCB- Main	1	
Single LED PCB- Taxi	1	
Spotlight lens, 8° beam	4	
Spotlight lens holder	4	
Pin Heatsink, 40mm diameter 70mm high	4	

Assembly parts bag		
Double lug nutplate MS21047-L06	1	
Single lug nutplate MS21071-L06	2	
Universal head rivet AN470AD3-4	6	
14mm M2.5 Pan head stainless steel screw	8	
Heatsink paste tube	1	
Lens locator rings	4	
Diffuser disk, 30° beam	1	
1.5" 6-32 Pan head stainless steel screw	1	
3/4" 6-32 Pan head stainless steel screw	2	
1.5" 0.031" Compression spring	1	
3D printed ABS angled spacer tube	3	
Straight spacer tube (white)	3	

Light Module Assembly

Search YouTube for "Flyleds spotlight assembly" for a video guide to the following steps.

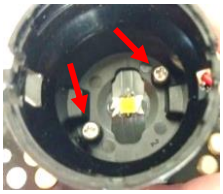


* Attach the nutplates to the single light board in the locations as shown at right, preferably using a pneumatic squeezer for fine control.
If your squeezer dies are too large then using just **one rivet** on the single lug nutplates is more than adequate in this application.
The light boards are made from 1.6mm thick (1/16th) aluminium and you may substitute pull/pop-rivets if needed.

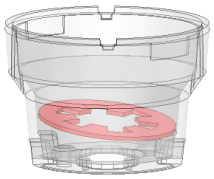
Have an assistant hold the board and **take extreme care not to damage the LED and other components!**

The small tube of heatsink paste contains enough product for more than eight heatsinks.
* Squeeze a ***small*** amount on the base of a heatsink and spread it out into a ***thin*** layer, like applying a film of oil rather than handfuls of grease! ***Less paste applied here really is more!***

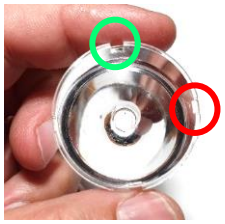
Note that the lens holders have two small pins in their base. These fit into the small holes beside the LED, and will help to locate the holder and collimating lens in the optimum focal point.



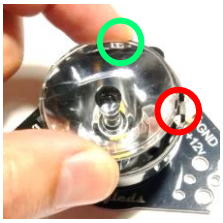
* Locate a heatsink behind the LED, lining up the screw holes in the heatsink with those on the PCB.
* Fit two M2.5 machine screws into the holes in the lens holder and attach the heatsink to the board.
The screws should be done up 'tight enough' (that's a technical term!) by hand.
Wait ten minutes or so. If any excess paste has oozed through the holes close to the LED, carefully scrape it away with a small screwdriver. Use less next time!



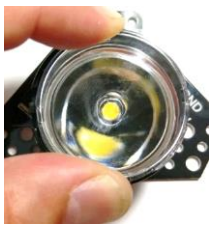
*** Place a lens locator ring inside the lens holder**, shown at left in red.
The ring is designed to flex and it will guide the lens into the correct position in the following steps, avoiding damage to the LED below.



The collimating 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 will lock the lens in place (red circle).



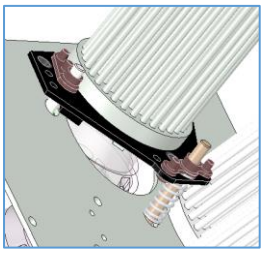
* Give the body of the lens a quick wipe to remove dust and fingerprints.
Dust marks or fingerprints will make no difference to the light output but now is your chance!
* Rotate the PCB assembly so that the locking hooks on the black lens holders are at the **east** and **west** positions.
* Hold the lens with the 'cut through' slots under your finger and thumb.
* Orient the lens directly above the holder, with your finger and thumb at the **north** and **south** positions.
* As you lower the lens straight down into the holder you will observe the centre of the lens begin to change colour to yellow from the LED below. This indicates that the LED and lens are in alignment.
Using even pressure from two fingers from your other hand on the east and west sides of the lens, push the lens in gently until it clicks into place under the tabs at the left and right of the holder. Simple!



Use the same process to assemble the three heatsinks and lenses to the main Combo board.

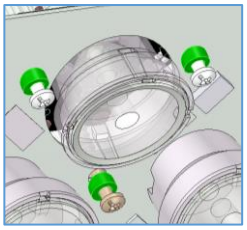
Assembling the Combo light

Note: The following steps may need to be performed (again) when installing the light into the wing.



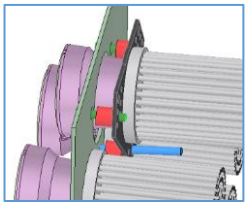
* Fit the longer 1 ½" screw with an angled spacer (shown in green at right), flat side of the spacer closest to the head of the screw.
* Insert the screw through the hole in the middle of the main board.
* Fit the compression spring and screw it into the nutplate in the taxi light.
* Fit spacers to the two ¾" screws. These are located in the top two screw holes and mate with the single lug nutplates.

Leave these screws loose until you get the whole assembly into the wing!



Optional:

For nose wheelers the independent spotlight can be mounted at the same angle as the other three main lights. For this case we have supplied three small ABS plastic spacers that you can use in place of the spring, and in the same location on the other screws. Omit the angled spacers at the front of the light.



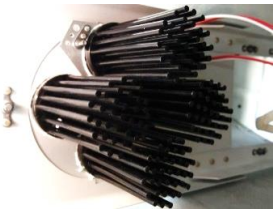
Light board modification

Held at an angle to the light, you will observe that the main circuit board copper traces form a 100mm/4" diameter circle around the lights, while the rest of the perimeter of the board is vacant. Feel free to trim, drill or otherwise modify the outside area of the board if you feel the need, again taking extreme care not to damage the electronic components on the board.

Fitting the lights

By now you may have realised that this light might not simply "drop in" to place and that your mounting brackets may need to be modified. We promise you that the small amount of pain will be worth it for the huge amount of light you're installing!

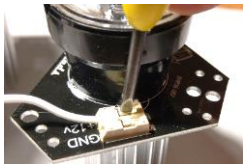
We replaced the HID lights in our RV-10 by removing the wingtips to provide easy access to both sides of the light.
We attached the independent taxi light *after* the main board was fitted to the original landing light mounting plate. This meant we didn't have to make any modifications to the existing metalwork or to the Combo light itself.



If you have the option to do this, removing the wingtip is 15 minutes well spent and will make life much easier.

Wiring the landing lights

The light boards have easy to use push-fit power connectors on them. Strip ¼" of insulation from the wire and simply push the wire home into the socket. It's not coming out!



* Provide additional mechanical strain relief to the wires nearby.
* Should you need to release the wire, push down on the tab above the wire using a small screwdriver and the wire can be gently pulled from the socket.

* The power connectors are not designed for repeated use. If felt necessary we suggest adding an inline power connector of your choice. Suitable connectors can be found in the aviation electrical aisle of your nearest auto parts store.

Note: The power connectors are suited for, and we recommend using, **18 AWG wire**.
If you have 16 or 14AWG wire already in your plane, splice a short (eg 8") length of 18 or 20 AWG to the end of your wire run to reduce its diameter, or use the plug and socket suggested above to change the wire size.

* Ground the lights locally at the wing. There is no need to run a ground wire back to the front of the plane, and these lights do not need the extra voltage drop that an additional long wire run would add.
Our power supply design is inherently noise free. There will be no headset or RF noise from your Flyleds light. Guaranteed!
* 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. (The same rule would also apply to any other high current devices in that wing.)

We love hearing (and seeing) your feedback! Please send us an email with your comments and/or pictures.