

Part 4: The Works Kit System Installation

Power:

- 12 volt systems only.

Position LEDs:

- ~1 amp current draw per wing,
~2.5 amps total with tail light.

Strobe/WigWag LEDs:

- ~6 amps peak, 3 amps average strobe system current.

Landing lights:

- 1 amp per spotlight (3 amps per wingtip)
- 1200 lumens in an ~8° beam per spotlight.
(3600 lumens per wingtip)



Circuit Protection:

- Power for the **Strobe/Wigwag** circuit must be supplied to the controller board via a **7.5 or 10 amp** fuse or circuit breaker, using normal un-shielded 18-20 AWG wire.
- Power for the **Position/Navigation** circuit must be supplied to the controller board via a **5 amp** fuse or circuit breaker, using normal un-shielded 18-20 AWG wire.
The position lights may be grounded locally at the wingtip.
- Power for the **Landing light** circuit must be supplied by a **7.5 or 10 amp** fuse or circuit breaker, using normal un-shielded 18 AWG wire.



NOTE that the pinout diagrams shown for the D15 connector relate to the mating face of the female socket on the circuit board, and/or the back (wire) side of the male wiring harness plug.

Controller Board:

The controller board is sized to fit a **Hammond 1591XXSFL** box, available from Digikey or Mouser for example.

Most of our previous customers have chosen to use the supplied plastic stand-offs and simply mount the bare board out of the way somewhere, such as under a seat, behind the instrument panel, or in place of a conventional strobe pack behind the rear bulkhead. Before you mount it under a seat, please consider how much dismantling you will have to do if you want to check something!

The plastic standoffs supplied simply push and click into place, and can be squeezed to release the board. You need to drill 4.5mm or 3/16" holes in your metalwork to accommodate them.



*** The mounting holes in the corners of the controller board will need to be enlarged to 4mm or 5/32" to use the supplied plastic standoffs.**

Strobe Lights

The Strobe LED circuits will only work when *both* the **STROBE+** and **STROBE-** wires from each wing and the tail connect back to the Flyleds Control Board. +12 volts is sent out to the strobe LEDs whenever Strobe power is applied. The strobe LEDs are then flashed when the controller board switches the STROBE- wires to ground.

Note there is no wire at the wings called Strobe Ground! Do not make any extra ground connections to the strobes.

When strobed, each wing draws approximately 6 amps of current for the duration of each flash. This is a very fast rise- and fall-time current, which has a small potential to cause radio or intercom noise. To eliminate the possibility of noise, we recommend running the **Strobe** circuit to the wings and the tail using shielded wire.

18 to 22 AWG, 2 3 or 4 core shielded wire may be used. In this (current driven) application 22AWG works perfectly.

Position Lights

The Controller Board simply provides a convenient way to distribute +12v in from the panel switch out to each of the three position lights, by using the same shielded wires as the strobes.

If you already have un-shielded power wires for the position lights out to each wing, you may continue to use these, as the position lights will not generate any radio or intercom noise. The controller board will need to be connected to this circuit as well, so that it knows when to operate the tail light at reduced power in position mode.

The **Position-** connection at the wingtips *may* be grounded either locally at the wing, or via the controller board using the **L shield** (pin 2) and **R shield** (pin 14) connections, such as when using shielded cable for the strobes. (Normally the shield should not be used to carry any current, but in this application it works just fine.)

Tail light

The Kit version of the Tail Position/Strobe light shown at right **relies** on the large resistor on the Flyleds Controller Board for current limiting.



- **This model Tail Position/Strobe light *must only* have both + and – wires connected back to pins 15 and 8 of the Controller Board.**
- The Controller Board operates the tail light at ~20% power when the Position Light switch is on, and sends it 100% power for each strobe flash.

We leave the choice of a connector (or not!) at the tail light up to you. The shield in the cable to the tail light should be grounded at the controller board end only. **At the tail end insulate the shield and do not connect it to anything.**

PLEASE NOTE! Connecting this tail light to a 12 volt source, even for a 'quick test', will result in one brief flash of light followed by the total destruction of the device!

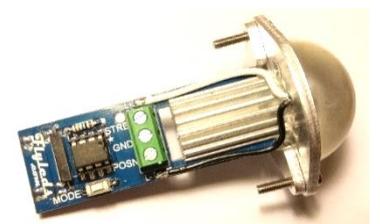
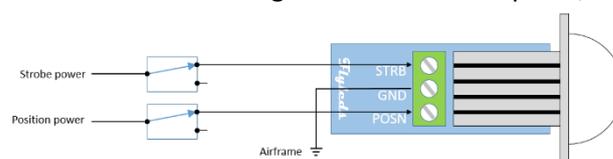
You *may* use a square 9 volt battery to test the Kit Tail light and/or the wiring to it, as this type of battery can only deliver a limited amount of current.



Stand-alone Tail Light

If you have purchased our Stand-Alone Tail Light with the integrated circuit board, wire it directly to your Strobe and Position light switches on the panel, and ground it locally at the tail. Do not connect it to the Controller Board.

Yes, you can test this one with 12 volts!



Operating modes

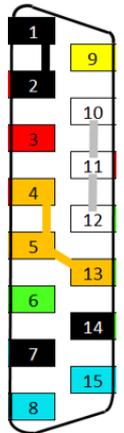
Position (Nav) lights

Applying 12 volt power to **Pin 5 Position +IN** connects power back out to the left and right wingtips on Pin 4 and 13 respectively, providing a convenient place to terminate all of the wing position wires for new wire runs.

The orange **Position LED** and the yellow **Tail LED** illuminates.

If you have existing wiring out to your position lights, feel free to reuse that wiring by connecting those wires directly to the wing boards, and ignore the connections on Pin 4 and 13 of the controller.

Pin 5 of the control board will need to be connected to the Position light circuit so that it knows to illuminate the tail strobe at low power as a position light.



Strobe lights

Applying 12 volt power to **Pin 10 STROBE+** activates the strobe function.

The **Left**, **Right** and **Tail LEDs** display the flash pattern selected.

The red switches on the controller board change the configuration of the flash pattern:

Switch 1 2/4 Flash selects whether the wing strobes flash two or four times each.

Switch 2 Slo/Fast changes the speed of the flash pattern.

Switch 3 selects a *chase* or an *alternate* flash pattern.

Try switch 1 and 3 both on for a unique landing light wigwag pattern.

Switch 4 selects a *single long flash* mode for the wingtip strobes.

- Switch 2 alters the flash duration.
- Switch 3 selects whether each strobe flash is on the same wingtip or the opposite wingtip to the landing light wigwag function.



There's hours of fun to be had choosing a pattern!

Flood Mode

Applying power to **Pin 9 FLOOD+** energises the *strobe* LEDs continuously at 33% power.

We envisage you would use this feature in addition to separately wired taxi lights such as the single spotlight in each wingtip for normal forward illumination. See the wiring diagram on Page 5.

That's around 2000 lumens of extra light from the wingtips and tail that should enable you to clearly see the taxiway edges and any mobile hazards such as deer or kangaroos, depending on which continent you live.

Beginning with controller board version 2.5 (Aug 2020), **the Strobe function takes priority** over the Flood function if both panel switches are turned on.

(For earlier version kits the Flood function had priority.)

Landing Lights

Applying 12 volt power to green plug terminal **LNDG +12v** energises the L and R landing light output terminals. Each output can supply 10 amps maximum.

The individual spotlights in the Works kit draw one amp each, so that's a load of three amps per wingtip if they are all wired together.



The white **Landing LED** shows multiple states:

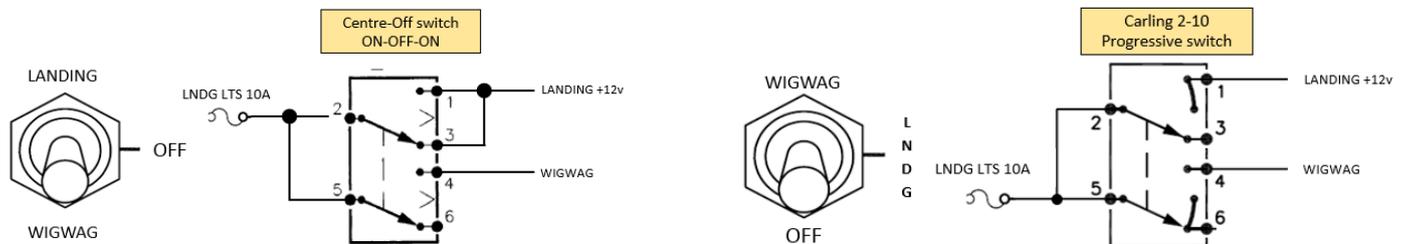
On bright: Landing lights both on.

Alternate dim/medium: Wigwag mode, representing left/right landing lights active.

Wigwag mode

Applying 12 volt power to *both* the green plug terminals **LNDG +12v** and **WIGWAG** activates the wigwag function for the **landing lights**. The cycle time will vary between 24 and 40 flashes/min depending on how Switch 1, 2 and 3 are set.

The diagrams below show two examples of how you could combine the wigwag function onto one panel switch. See the diagram on page 5 for a two switch solution.

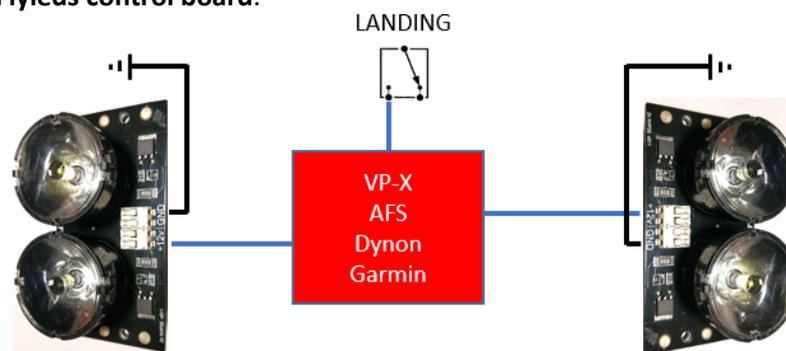


External WigWag

Power control systems available from AFS/Advanced Flight Systems/Dynon, Vertical Power and Garmin (with a GAD27 module) will automatically switch your landing lights to wigwag mode above a set airspeed.

If you have one of these external lighting controller systems in your plane then please use it instead!

Wire the Flyleds landing lights directly to these controllers following their instructions, **completely bypassing the green terminals on the Flyleds control board.**



Landing light grounding

Flyleds landing lights should be grounded locally at the wingtip. There is no need to run this ground back to your firewall common ground point. Flyleds lights do not generate any headset noise!

By exception, if you have a Garmin magnetometer in a wingtip, 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 happy.

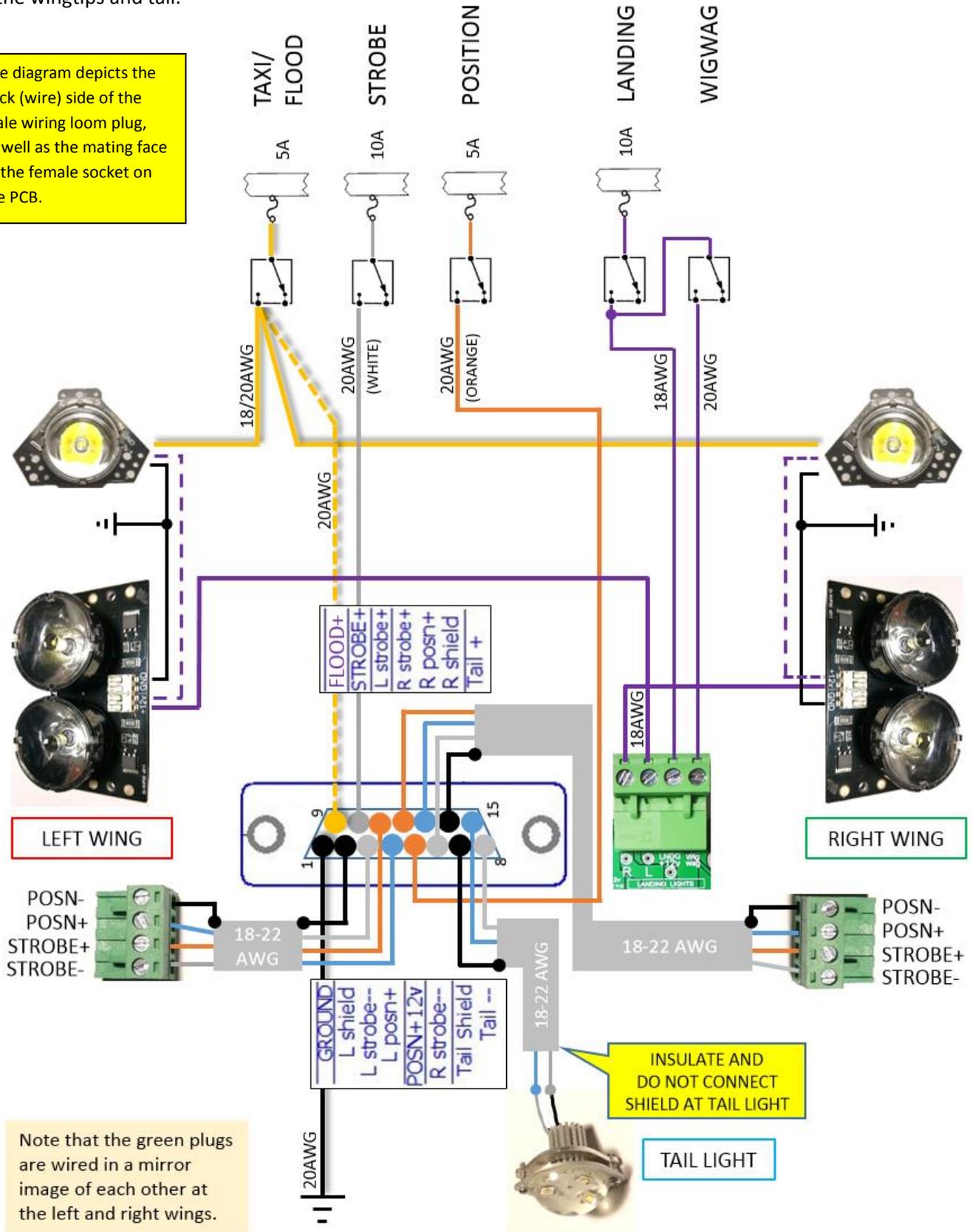
SYSTEM WIRING DIAGRAM- New wiring

The single spotlights can be wired in parallel with the double spotlights, as per the purple dashed lines.

The single spotlights may also be wired separately as Taxi lights, as per the yellow lines. Choose one method only!

The Flood function on pin 9 (yellow dashed line) is optional and operates the *strobe* LEDs for additional area lighting off the wingtips and tail.

The diagram depicts the back (wire) side of the male wiring loom plug, as well as the mating face of the female socket on the PCB.



Note that the green plugs are wired in a mirror image of each other at the left and right wings.

SYSTEM WIRING DIAGRAM- reusing existing wiring

This diagram shows how you can re-use the existing wiring in your aircraft. If you are replacing a conventional xenon strobe system you can reuse the existing shielded wires, as well as the standard unshielded Position/Nav light wires represented by the yellow lines below.

* The position lights (only) may be grounded locally at the wingtip.

* In order to fit crimp pin connectors, peel a few strands off 18AWG wire to reduce its size.

Note that we now sell a plug and play adapter kit to facilitate retrofitting a Whelen strobe power supply with the Flyleds controller board.



* The controller board also needs to be connected to the position light circuit so it can energise the tail strobe to act as a position light. This can be achieved by running a wire directly from the NAV/POSN panel switch to the controller Pin 5 (POSN +12v) or, the existing position light +12v power out at the tail or a wingtip could be sent back to the controller board via a spare wire within the shielded cable, as shown by the white wire from the tail light to Pin 5.

