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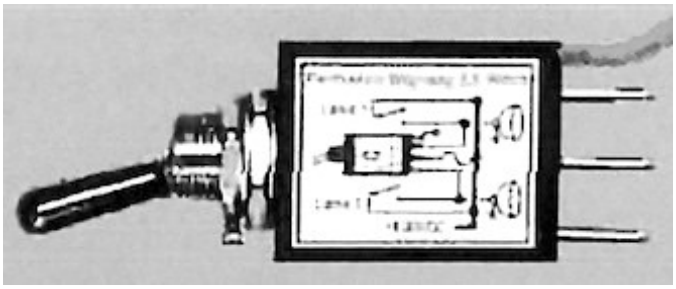
Wig-Wag (D) Light-Flasher Improves Aircraft Visibility

WARNING: Wig-wagging lamps larger than 85W, HID lamps, or LEDs without using a Surge Suppressor (See Manual) violates the warranty of this device. We can supply the Surge Suppressors (and for the HID lamps, an added High Voltage suppressor)

FOR EXPERIMENTAL AIRCRAFT USE ONLY.

Basic Specifications
Body Size: 1.00" x 1.25" x 0.60" (25 x 32 x 15 mm)
Weight: About 1.5 ounce (42.5 g)
Mounting: 12 mm threaded bushing
Connectors: 0.250" male Fastons® Input plus wire ground connection
Voltage = 10-18 VDC
60 VDC Load Dump Transient Capable
Maximum Switched Lamp Watts = 2 x 250 Watts (with proper surge suppression)
Flashing Speed 80 flashes per minute combined
(FAA timing spec.)
Toggle switch has gold contacts.

Appx. Actual Size:



US$99.00
Free Shipping to U.S.
Foreign USPS or FedEx at cost.

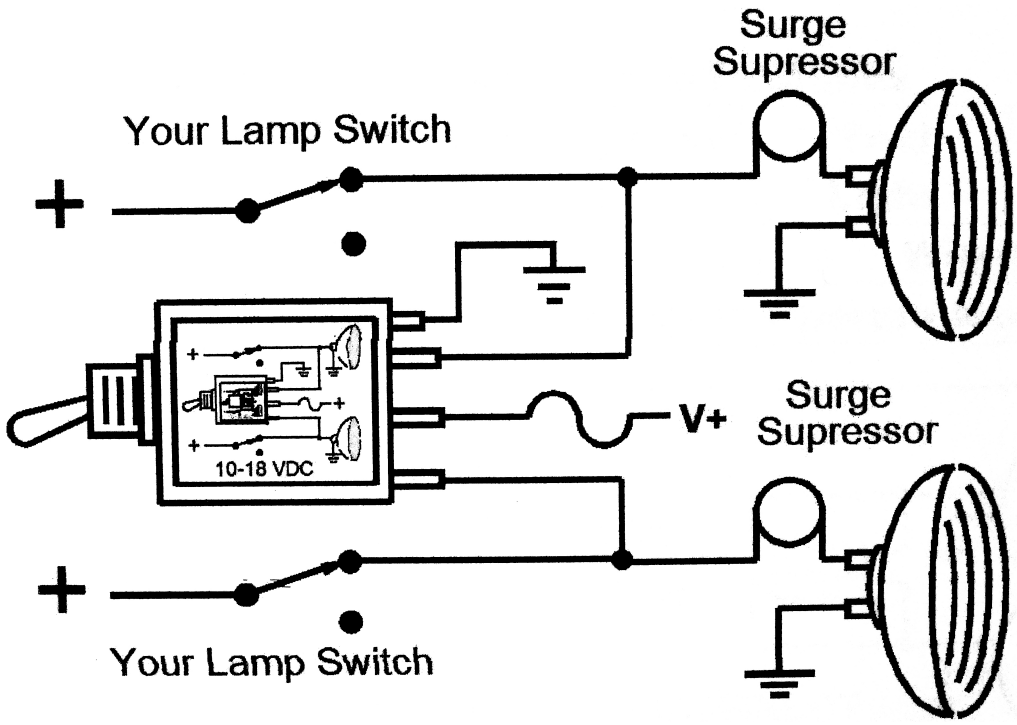
Late in World War II, the British and Americans tested anti-sub aircraft outfitted with forward facing bright lamps. A rear-facing photocell automatically adjusted the lamps to match the background sky's brightness. This would have been invisible to German U-boats which could not have seen an approaching attack bomber until it was far too late!

Steady non-pulsed lights during the daytime *can actually make an approaching airplane harder to see!*

But wig-wags alternately flash the taxi and landing lights to improve your aircraft's visibility. Pilots are innately aware of motion, so this really gets their attention! Wig-wag lighting markedly improves flying safety, especially in airport traffic patterns and during limited visibility operations.

Bonus: Recent studies show that wig-wags light are the best way to avoid bird strikes.

Safety doesn't get any simpler...or smaller. This wig-wag is built into the switch and it will run on 10-18 VDC aircraft voltages.



Installation and mounting

The Wig-Wag (D) is designed to mount just like any other switch in your instrument panel. Wire as shown. Crimping two wires in the Fastons or using a Tee connector is allowed and will simplify the wiring. The ground connection is very low current BUT VERY IMPORTANT!

Fusing

The device can be protected by a slow-trip circuit breaker or slow-blow fuse rated at the current of the largest lamp and installed as shown on the + terminal. This is up to the user. Also remember that the turn-on surge of some lamps can be very large, typically 3X the steady state current. FAA regulations allow using an in-line fuse, since easy access and replacement of a wig-wag fuse is not required for the safe continuation of flight.

For most installations the module runs cool to the touch. An inrush current limiter (available through us) [should be] installed in series to prevent the initial turn-on surge from damaging the wig-wag device.

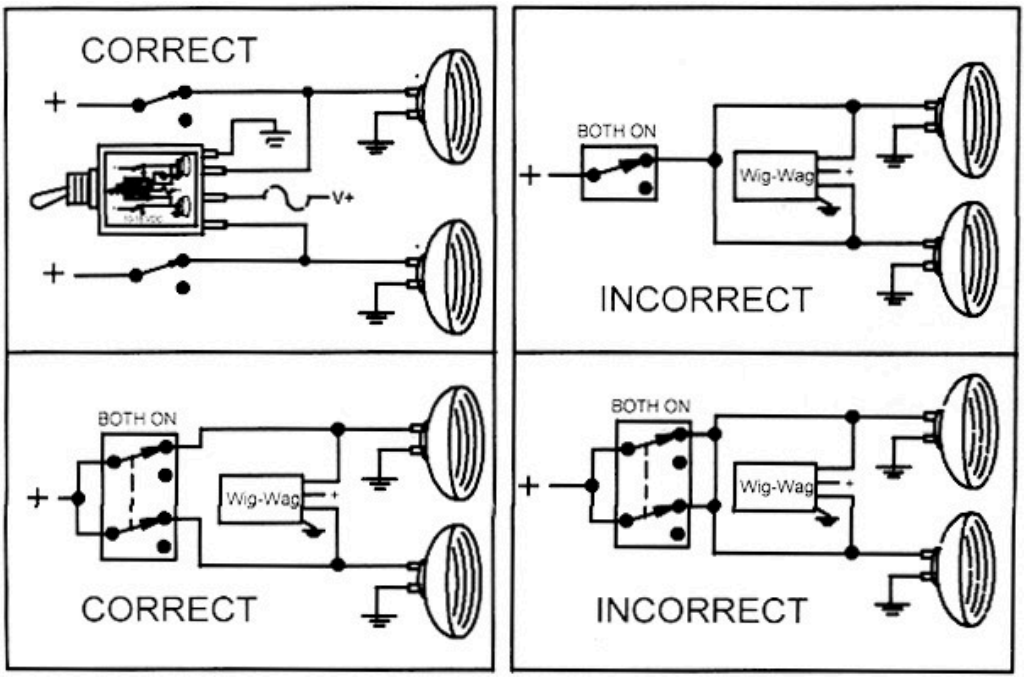
Notes

The device generates no EMI or RFI. The toggle switch threaded mounting bushing is 12 mm. The switch contacts are gold. The device is UL94 V-0 flammability rating. The device is not static sensitive. The pulse timing is about 750 milliseconds per-side alternating independent of lamp wattage or supply voltage. That's 80 flashes per minute--the FAA specified rate.

According to an Aviation Consumer article, some manufactures (and General Electric) claim that wig-wag pulsing of a lamp will extend the life of the lamp considerably.

Operational Chart: Switch Positions

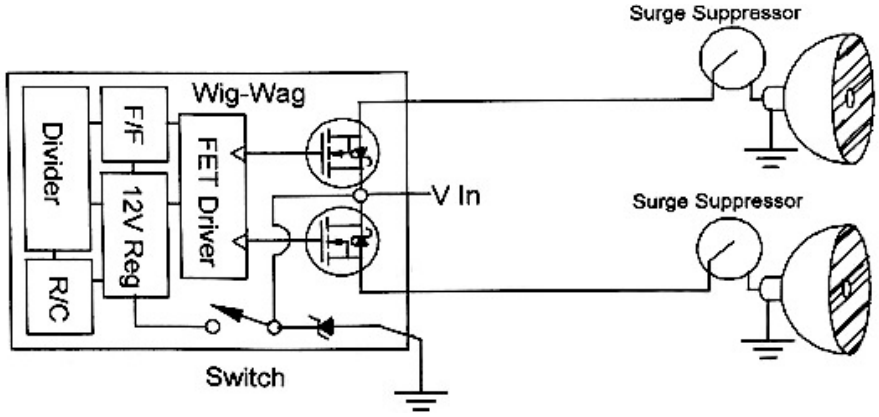
Wig-Wag Switch	Taxi-Light Switch	Landing-Light Switch	Taxi Light	Landing Light
ON	OFF		Wig-Wag	
OFF	Taxi and Landing Lights operate normally			



Note: Occasionally someone calls because their installation doesn't work, usually because the installer neglected to make sure that each lamp CAN operate independently so that it can be wig-wagged. Often a landing and taxi light are wired to operate together. This can be done several ways. So be sure that each lamp can operate independent of the other.

Using surge suppressors with the Perihelion Design Wig-Wag Lamp Flasher

Eric M. Jones 08AUG09

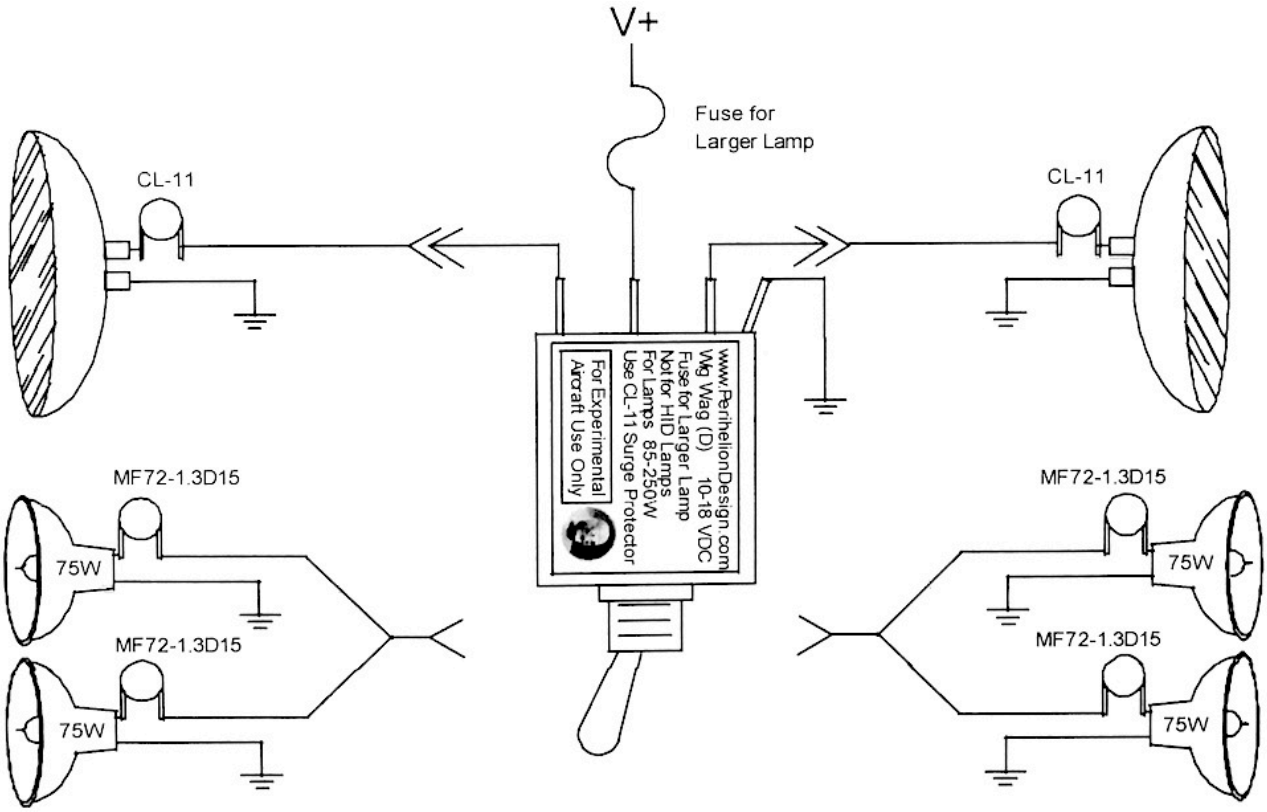


As the wattage of the lamps increase, more care has to be taken to keep the current through the Mosfets inside the Wig-Wag within operational limits.

The Mosfets are Fairchild Trenchfets, FDD8444 that have no problem with currents as high as 76 amps and even 100 amps in some applications, but they are limited in how long they can do this. For the long "ON" time of 750 mS, the Mosfet can only survive currents of 26 amps.

But the problem is that cold lamp filaments (especially in large lamps) or in LED (or other) power supplies with capacitors, have a tiny resistance, and thus a huge inrush current. Thermistors have a larger resistance when cold and an insignificantly small resistance when hot. Thus the initial inrush current can be controlled while the lamp output is essentially unaffected. For example, if the cold lamp (and all associated wiring and connections) has a resistance of 0.2 Ohms, the initial current will be I = V/R or 14/0.2 = 70 amps. This current will fall to the normal DC operating current of the lamp (perhaps 8 amps), in a matter of milliseconds when the lamp filament heats up and the resistance increases.

Installation: Locate the surge suppressor as close to the back of the lamp as possible, but protected from the airflow. Surge suppressors are designed to run hot and MUST NOT BE COOLED excessively. Use crimp connectors if possible, or twist and solder. Use high temperature tape or TFE for insulation. Avoid covering the body of the surge suppressor, as this will cause it to change its characteristics.



Our WW (D) has a standard 12 mm bushing toggle switch. If you prefer to use your own rocker switch, or want to do more complex switching, then please see our WW (C). Same basic circuitry, but you use your own switch, which allows significant changes to the circuitry.

Eric M. Jones 10-DEC-2019

Addendum on LED lighting

I have promoted and encouraged the introduction of LEDs to lighting uses for years. One often unstated reason is that the physics of light degradation is known for almost any light source. But an LED is simply a bandaid between a P and N semiconductor that emits photons when electrons cross it. The physics of LED degradation is almost, but not quite, zero. Heat is nearly the only issue. Unfortunately economics dictate that nobody wants million-hour LEDs, preferring instead LED that efficiently light up something and have an acceptably long lifetime.

Unfortunately the physics of degradation for almost everything else in an LED circuit is much larger than the LED.

Example 1: The LED lamp socket contacts, heat up and cool down when the lamp power is cycled, so they change shape, mechanically erode, and adsorb contaminants. Each following cycle is a little worse. The socket develops resistance from corrosion, the resistance causes heat, the heat causes more corrosion and more change-of-shape, etc. Indeed, it makes more sense to wire an LED into a circuit than introduce a socket into the circuit.

Example 2: The voltage, frequency and current requirements of the LED might not be simple. For nearly every LED above a few watts, some sort of power supply gets introduced. Because of size and cost limitations, the power supply is usually far more troublesome than the LED. In this writer's personal experience, the problem has nearly always been the power supply.

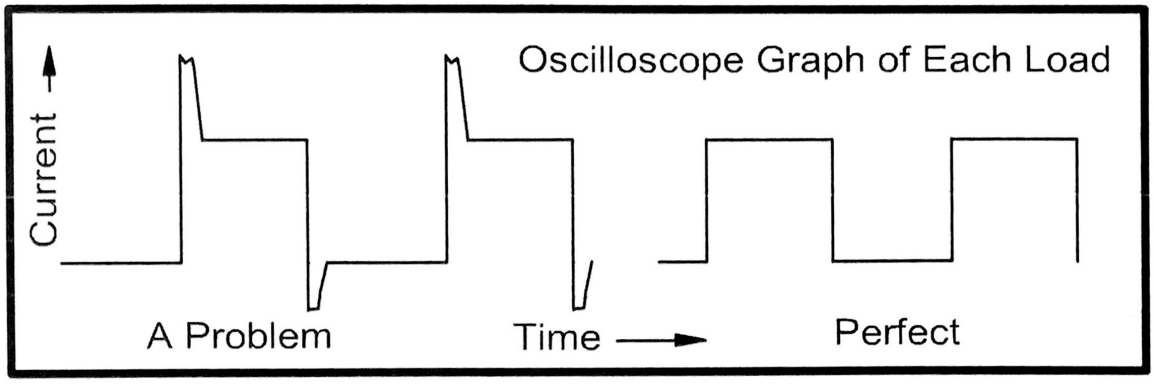
The LED might be rated at 50,000 hours, but the power supply will only last 10% as long...or so...

When I was a student in college, small transistor radios were popular, as were tiny power supplies that looked like 9V batteries that plugged into the wall. These were not the UL/CSA/ETL approved "wall- warts" that were common later, but death-defying circuits of directly connected high-voltage to the DC circuitry of the radio. One can figure there was at least one diode, one resistor, and one big electrolytic capacitor, and not much else. You can bet it buzzed like a bunch of angry bees. But has this Frankenstein circuit come back from the dead? The cheap circuits inside household LED lamps are probably close to it.

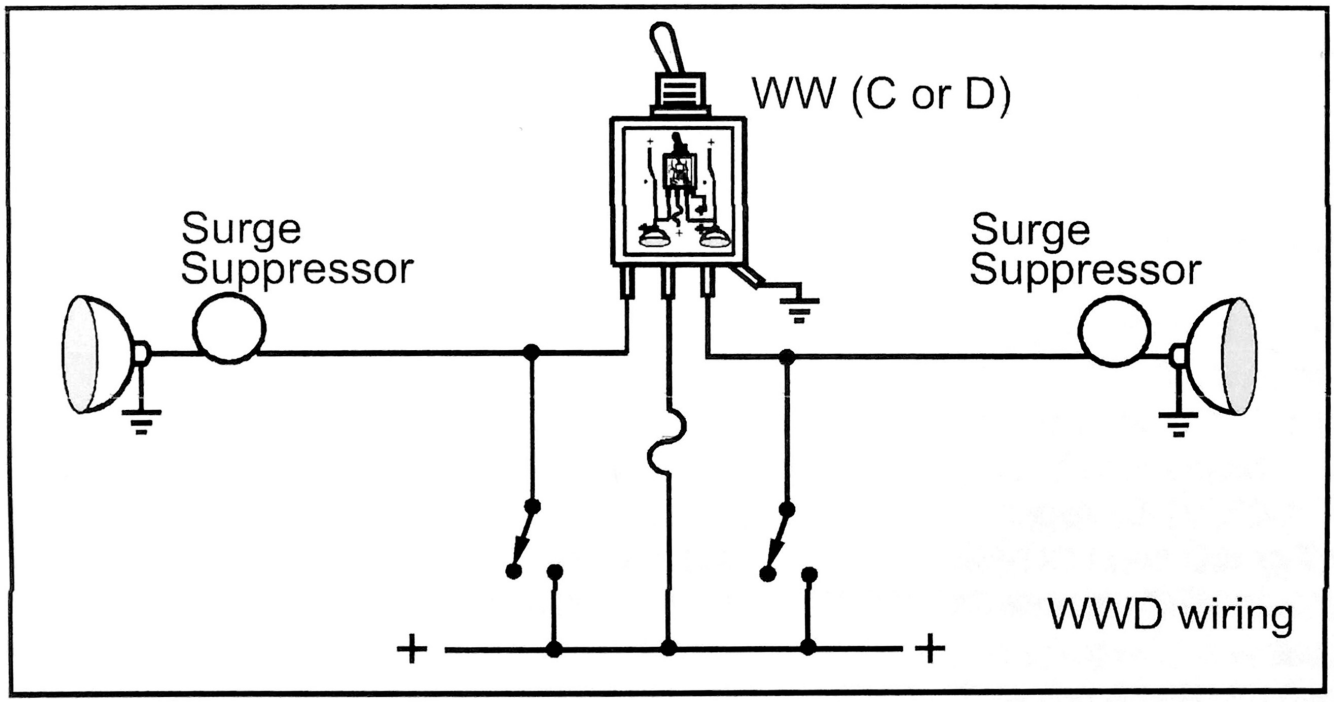
Recently I went through an experience with a Luxdrive "PowerPuck". Disassembling the epoxy potted device disclosed a very poor design. I have to say that I hope they got better, but I had severe EMI/ RFI problems. Some users tried to fix the part. I chose to use something else.

In using the Perihelion Wigwag, some users of LEDs have had difficulty because of the problematic power supplies used in LEDs. The continuous current of the LED was often quite small, perhaps only a few amps, but the initial current when the lamp was first started at the beginning of a pulse was anyone's guess.

Ideally, the square wave pulse to the lamp is pretty square. The peak current is very flat. But with a cheap power supply powering the lamps, there can be a current surge of several times the constant current.



So two surge suppressors (supplied) should be installed near the LED lamps in the same manner as used with HID lamps.



This should prevent the high current surges from problematic power supplies.

If you have some failure associated with the LEDs, please supply the LED manufacturer's product number and I will investigate.

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