

## Re: Simple circuit help...

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*Source:* <http://sci.tech-archive.net/Archive/sci.electronics.basics/2005-10/msg00159.html>

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- *From:* Bob Monsen <[rcsurname@xxxxxxxxxxx](mailto:rcsurname@xxxxxxxxxxx)>
  - *Date:* Wed, 05 Oct 2005 20:54:40 -0700
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On Mon, 03 Oct 2005 21:18:38 -0700, MacGyver wrote:

- > At least I think it is simple...
- >
- > I have 2 12v wingtip lights that I need to be able to control with
- > one switch and one wire running through a wing in an airplane.
- > This is for just one wing. That's the gist of it.
- >
- > I just bought piggyback strobes for the wingtips, but I don't want to
- > have them on all the time that I have the navigation lights on.
- >
- > I was thinking of a relay that has a remote control, or has a signal
- > run through the positive wire or could possibly have a low & high
- > setting and if we send 12 volts to the relay it trips, but it won't
- > trip at say 10 volts.
- >
- > Also was thinking about if I turn the switch on once just the light
- > comes on. Flip the switch off & on again in under 2 seconds and the
- > lights & strobes come on. Leave the switch off & everything turns off.
- >
- > I was thinking about relays with a capacitor to keep the line live for
- > 2 seconds to be able to flip another relay... but now I am confusing
- > myself again.
- >
- > Any Ideas???

Ah, the easiest and most reliable thing is to run another wire. You can use that wire to either switch a transistor, or to pass the current to the light.

If you can't do that, you can build a little circuit that will 'remember' how long ago the power was shut off, and turn on a circuit if it wasn't too long ago. Thus, you can flip the switch for a second, flip it off, then flip it on again, and the strobe will start.

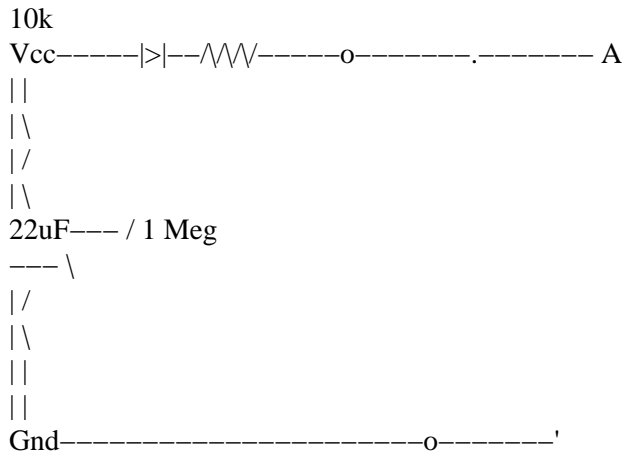
The basic memroy circuit is an RC node, A below. It charges slowly, and discharges even more slowly. If Vcc is dragged to ground (through the position light) the diode will keep it from draining.

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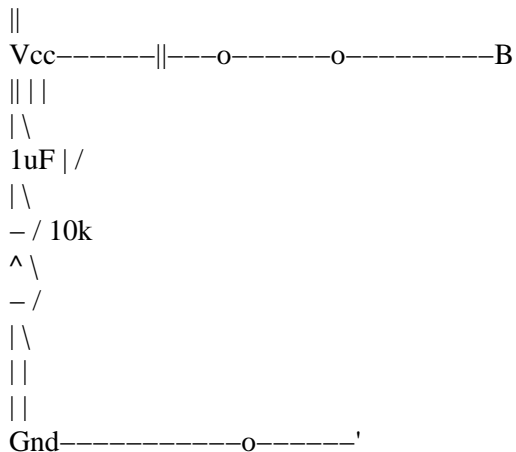
The voltage on this node can be compared against another node that charges up and drains quickly, B below. If both are charged up shortly after the power comes up, the circuit latches on. If either are low, the circuit does not latch.

The latching circuit is a simple "SCR" configuration, using mosfets.

A is pulled somewhat slowly up to 12V while the power is on, but decays very slowly back to ground when the power is off.



B creates a quick spike, which decays back to Gnd in few ms.

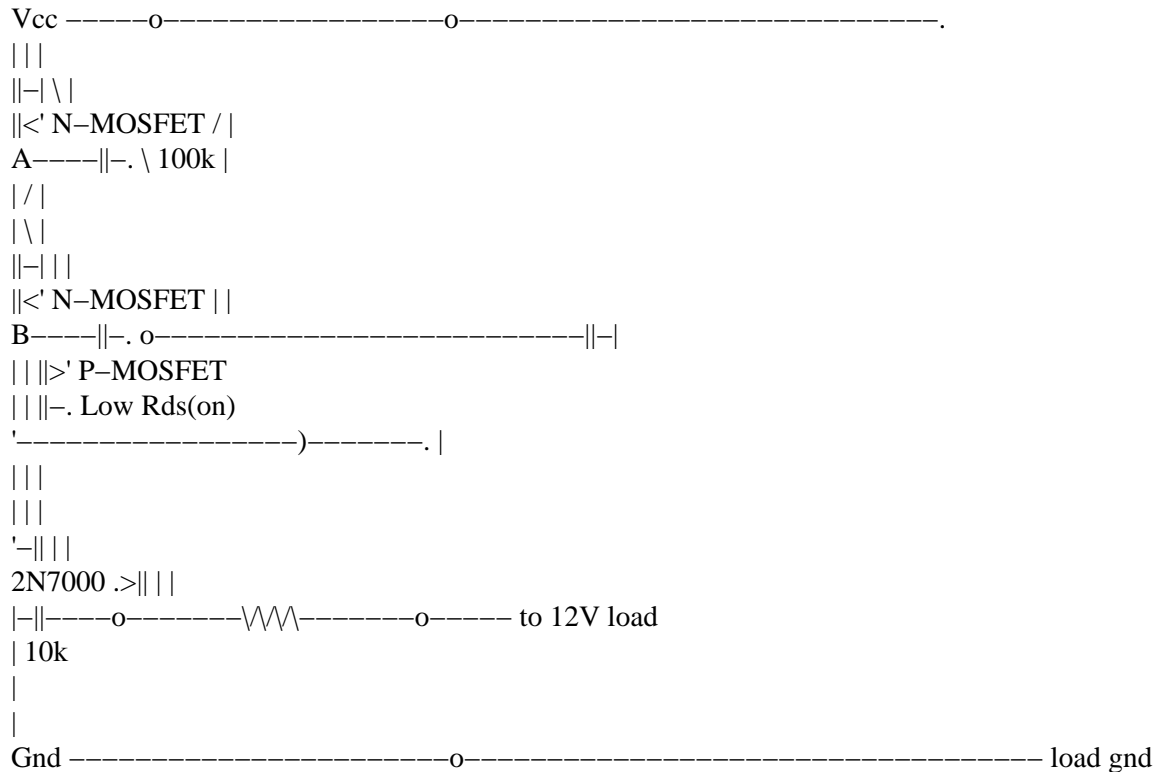


Here is the main switch. When the power comes on, A will start to charge up with an RC constant of about 1/5 of a second. B will spike up immediately, then drain in about 1/20 second. So, the first time, one will be low, the other will be high. Thus, one of the N-MOSFETs below will be off, and no current will flow through them. Because of this, 2N7000 will never be turned on, and the P-MOSFET will also never be turned on.

However, after a second, A will be charged up to nearly 12V. If the power is then turned off, it'll slowly drain down to ground, taking

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about 100 seconds to get all the way down. Thus, if within about 10 seconds, the power is restored, both mosfets will be on briefly, causing the gate of the 2N7000 to be pulled up to 12V. This will turn it on, causing current through the 100k resistor to bring the gate voltage of the P-MOSFET down, turning it on. Once it's on, it'll keep the gate of the 2N27000 high, so the load will have power until the 12V supply goes away.



Use a big P-MOSFET with low Rds(on), because that will dissipate almost no power, so it won't get hot, or lower the voltage too much.

You may want to put a resistor from the load output to ground, perhaps 10k. That will ensure that it won't turn on incorrectly when the power comes up if there isn't a load pulling the drain of the P-MOSFET to ground.

There may be gotchas in this circuit, and I haven't built it, so ymmv.

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 Regards,  
 Bob Monsen

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