HowlHaunter's Workshop

http://home.comcast.net/~pumpkin1000/props/lightningsim1.htm

Lightning Light Box (LLB)

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2005 Halloween Update on the LLB: All I can say is WOW! Did this work great! I set it up with three 100 Watt white flood lamps pointing up at the front of my house haunt. I set it to flash about every 15 seconds. It only triggered when my infrared motion detector picked up the TOTs arriving at the front door.

You'll see plenty of DIY home haunter's lighting devices out on the Web. I created something a little different.

My requirements: I wanted something to simulate lightning in a big way outdoors. Not with the dinky lightning simulators you can buy at Halloween stores. I wanted it to be cheap. That rules out buying high powered photographic flash lamps. I didn't want to drive it with speakers to simulate lightning AND thunder—like some hobbyists have built—even though that's really a great setup.

I already have outdoor speakers for my home haunt where I play Halloween sounds, so I didn't want to clash with that. I wanted to be able to vary the time between lightning "bursts". In nature, lightning rarely flashes like a regular strobe light! It varies randomly with the burst rate, burst duration, and delay between bursts. One design tradeoff I made was to have a set delay (I picked 1 minute), but still get the random burst. And of course, I wanted the thing to just keep flashing over and over--- and be reliable.

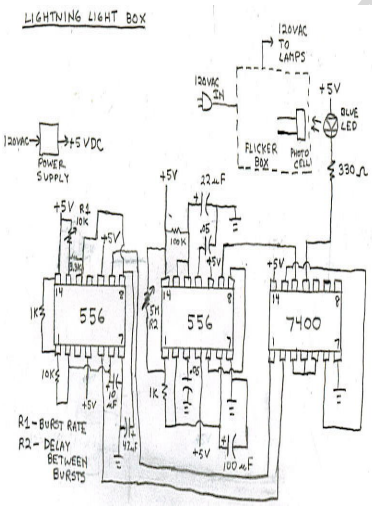
With this circuit, I used the commonly available light dimmers (I used a $7 one) to achieve 600 watts of lighting capacity modified per the flicker box method. However, instead of driving the photocell with a flicker bulb, I drove it with a high intensity blue LED ($3 at Radio Shack) to get sharp light bursts to simulate lightning. A single 150 Watt white flood lamp can light up your graveyard setup, or in my case…the front of my house.

The LED is driven by a relatively simple circuit that uses only one +5 volt power supply. All the electronics and the dimmer can be housed in one plastic hobby box (readily available at Radio Shack). Of course, don't leave this outdoors in the rain unless you can make it watertight! Electricity and water don't mix! You could safely put the box indoors and run an extension cord out to the outdoor light fixture. Of course, all your outdoor electrical items should be run off GFCI protected outlets. Your risk and your responsibility!

I chose the 7400 TTL chip because you can drive the LED directly from its output…and get good intensity from the LED. TTL requires a +5 volt supply. The two 556 timer chips can be driven with 5 to 15 volts, so +5 works fine. These chips (about a dollar apiece) are readily available at Radio Shack or tons of other places. If you've read this far, you're an electronic hobbyist …and know how to create a simple +5 volt supply with a small transformer, rectifier, capacitor, and 7805 chip already. About $9 in parts. I've leave that to you.

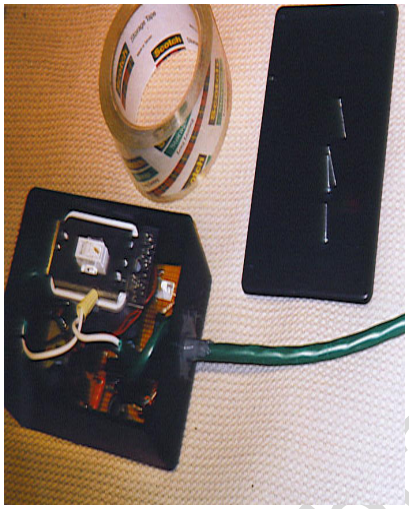
If you want to delete the lamp dimmer circuit entirely, you can use the high intensity LED itself to light up props outdoors (or indoors if you like). These new blue high intensity LEDs just put out an amazing bunch of light--even driven by the little 7400 chip. The blue light flashing on a "cheesecloth ghost" would probably be quite awesome!

This schematic is a bit rough, but it is accurate to what I built! It works!



You can play with the bursting patterns of light by varying R1. The first 556 chip drives two "conflicting" pulses...that when combined in a NAND gate on the 7400 chip...can flash like "random" lightning. Their output is further NAND combined with a enabled "window" output from the second 556 chip. This chip allows you to vary the delay between bursts (with R2)---from a few seconds to over 3 minutes. If you want to vary the burst DURATION, you can vary the 100K resistor. The 100K gives a nice 4 second burst.

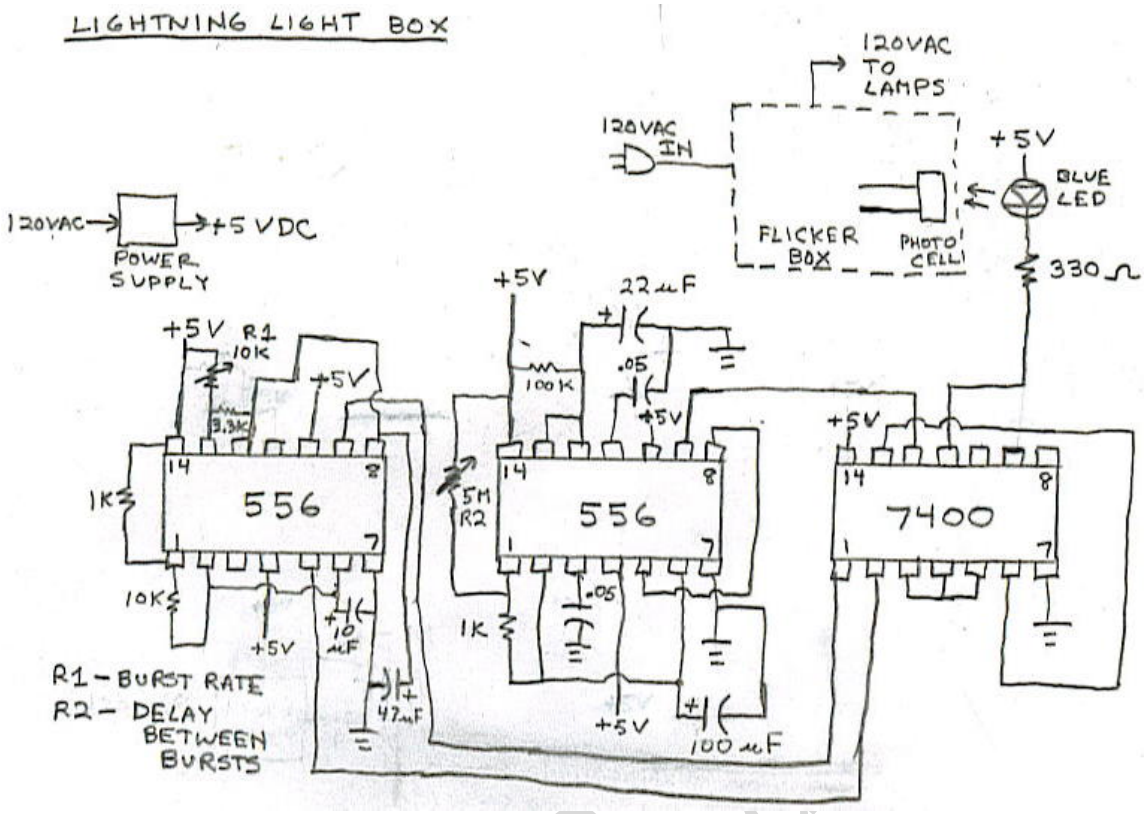
Here's the LLB under construction. Note that I fit the entire dimmer box inside the project box. It's neatly laid on top of the perf board mounted electronics shown in schematics. I had to shear off the dimmer light switch to get it to fit in the project box, but no matter...no one is going to need it. I just moved it to the full "on" position. With the photocell to regulate the output through the triac gate, this works great!



Here's the LLB completed with the top off the project box. Note the JB Weld epoxy around the extension cord hole in the side of the box. As an additional measure, I always put a knot in the cord just inside the box as strain relief in case it accidentally gets yanked. Finally, I use clear package storage tape to seal the box after the top is screwed on. Four pieces of tape to cover the small gap around the edge.

When I tested this out the first time in my darkened workshop with a 150W flood light, I was amazed how close it was to the real thing!

HAPPY HAUNTING!



Light Flicker Box

This project box will flicker up to 600W of lighting, to simulate problems with the wiring or the possibility that the power is going to go out. If you don't use the exact dimmer specified here, the wattage handling capacity of this circuit may vary.

Here is a list of the parts that you need:

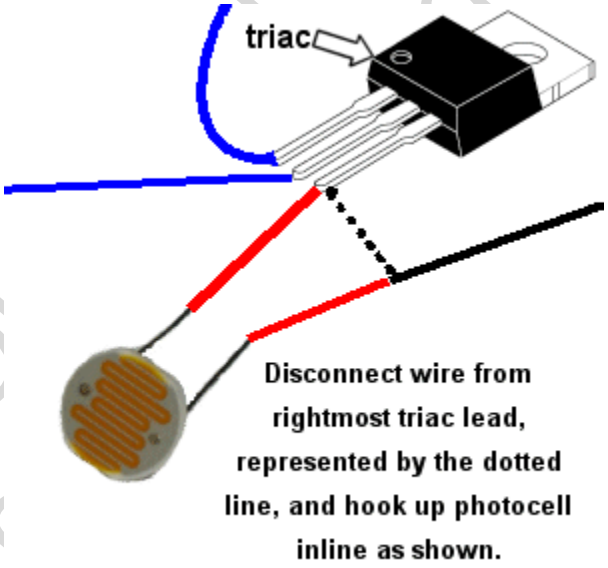
- Lutron 600W Dimmer Switch DNG-600PH-WH (or any standard single pole dimmer switch)
- Standard Wall Socket
- Westinghouse 3W Flicker Flame Bulb (#03761 or equivalent)
- Standard 120V Candelabra Socket
- Cadmium Sulfide Photocells (Radio Shack 276-1657)
- 7" x 5" x 3" Project Box (Radio Shack 270-1807)
- Assorted Hardware / Wires

1) Remove the back cover of the Dimmer Switch:

The first thing you will need to do is remove the plastic cover off the back of the dimmer switch, so you can access the parts inside. You can do this by drilling out the rivets that hold the cover on the back of the dimmer. Once the plastic cover is off the back of the dimmer, it will look like this.

2) Hook up the Photocell wires to the Dimmer Switch:

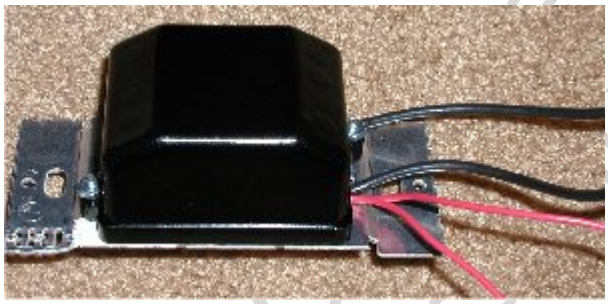
Find the triac inside the dimmer switch (shown in the illustration below) and unsolder the wire from rightmost triac lead. Solder a wire (about 8" long) to the wire you just unsoldered. Solder another 8" wire to the rightmost lead of the triac (as shown below). These 2 wires you have just soldered into place will be connected to the photocell later.



After you have done this, your connections should look something like this:

3) Put cover back on Dimmer Switch:

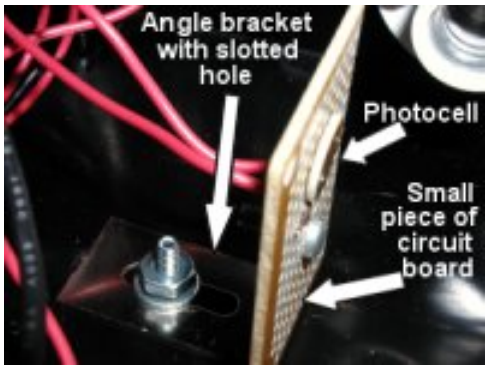
Next, be sure to tape up the wires so they don't short out to any other connections or the case of the dimmer switch. Now you can route the wires neatly and put the plastic cover back on the dimmer switch. Since you drilled out the rivets that held the plastic cover to the dimmer switch plate, you will need to hold the dimmer and cover together with a couple of small screws and nuts. After you have done this, your assembly should look like this:



Be sure to clearly mark the wires that you added, because they will have to be connected to the photocell eventually.

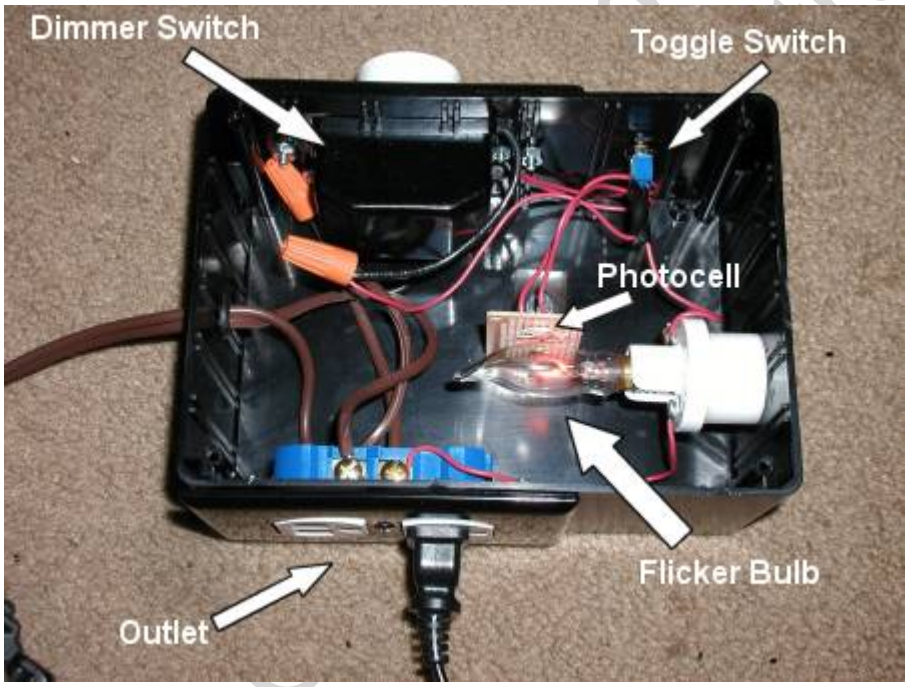
4) Prepare the Photocell Mounting:

First, solder the photocell to a small piece of circuit board. Then solder the wires you added to the dimmer switch, to the leads of the photocell (polarity is NOT important). Be sure to tape up the connections of the photocell; you don't want to get shocked when you adjust the photocell later. Next, you will want to make an angle bracket to hold the circuit board in place (see picture below). I put a slotted hole in the bottom of the bracket, so the photocell can be adjusted back and forth, after it is mounted to the bottom of the box.



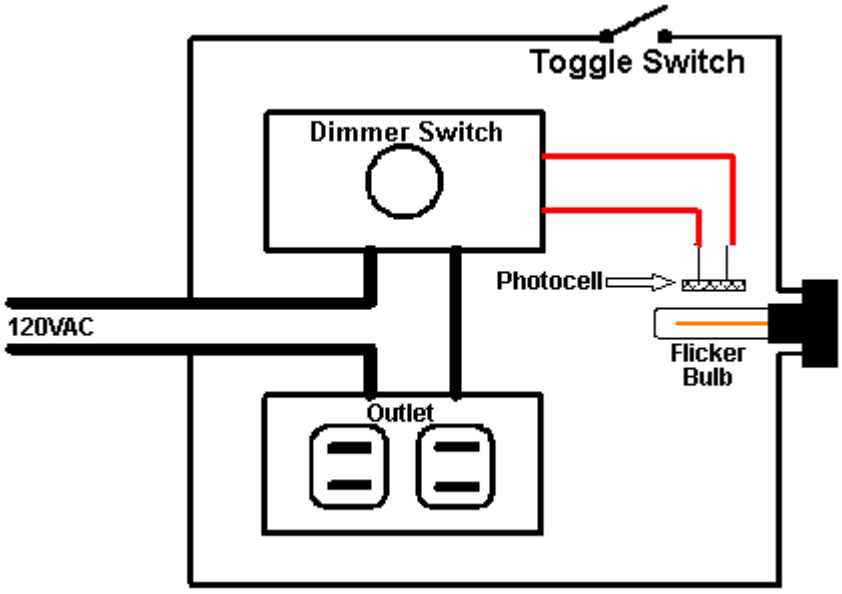
5) Mount Hardware in Project Box:

The next part of the project is the most time-consuming, mounting all of the hardware inside the project box. You will need to cut holes in the box to accommodate the dimmer switch, outlet and toggle switch. Below is a picture of how I laid out all of the parts inside of the box. Because of how tall the Flicker Flame bulb is, it will have to be mounted to one of the sides of the box, not the bottom. Mount the flicker bulb at the proper height, so that it will line up with the photocell, when it is assembled.



6) Wire all the components according to the schematic below:

Hook up the wiring as shown below.



7) Test the circuit:

To conduct this test, you will need to be in a dark or very dimly lit environment. External light will interfere with the operation of the Flicker Box. Plug in the Flicker Box. Be VERY CAREFUL. You will be working with 120 Volts! Don't touch any of the live connections. Flip the toggle switch to the "on" position, turn on the dimmer switch and turn the knob all the way clockwise. Plug a floodlight into the outlet. Your flicker bulb should be "flickering" and the floodlight brightness should vary with the flickering of the flicker bulb. If the floodlight isn't lighting up, double check that you have turned on the dimmer switch. At this point, if the floodlight still isn't working, you may have to adjust the distance between the photocell and the flicker bulb (mine seemed to work the best with the photocell only 1/4" away from the flicker bulb). After you have adjusted it properly, screw the top on the box and you are done!!!