# Budget Costume Illumination

***How to make your costume glow and rotate without resorting to a soldering iron*...***

****(Unless you really want to)***

One of the nicer touches one can add to a science fiction or fantasy costume is illumination; glowing or flashing lights can lend a high-tech finish to your future fashion, or enhance you fantasy piece with an aura of starlight and magic. Until recently, illuminating your work required either skill with electronics or a patient friend with such skills. Fortunately, in the last few years, a number of inexpensive products have become available that make lighting a piece both simpler and affordable.

These products have two basic types (see figure). One uses light-emitting diodes (LEDs) for lamps, while the other uses miniature incandescent light bulbs (like small Christmas tree lights or even smaller *grain of wheat* bulbs) . LEDs have the advantage of requiring relatively little power, but only show light in one direction. Light bulbs are brighter and shine light in all directions, but require more power to operate.

**LED light kits**

LED lighting kits can be found in fabric and craft stores; they originally came out for illuminating novelty sweatshirts. "Light-ables" and "Fashion Lites" are two of the numerous brand names under which they've appeared.

You can find both musical and non-musical sets. They consist of a small package holding the batteries and drive electronics, with 10 or 12 LEDs on wires radiating out from the driver package (See figure 2). Each LED is mounted on a tiny piece of circuit board, then the board is "potted" with an epoxy after the wires are soldered in place (to help *strain relieve* the wires ... more about strain relief in a minute). The lights flash when the module is switched on; if a musical set, there's generally a small pressure switch that plays the tune and flashes the lights until it ends.

To mount the LEDs on your costume, you cut a small hole in the fabric, push the LED through from behind, then hold it in place by stretching a small rubber "O"-ring over the protruding lamp (see figure 3). Besides being easy, this method leaves the lamps removable, so the garment can be cleaned. You can also glue the lamps in place with epoxy, hot glue, or a non-solvent type adhesive like **E6000**. In headdresses, jewelry or other props, be sure to aim the LEDs so that the lighted portion is visible when switched on. The driver module usually comes with a piece of Velcro hooks attached to it and a matching piece of Velcro loops to put in the garment.



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However you mount the LEDs, it is essential that you protect the wiring from being snagged or pulled. While the potting on the circuit boards helps, it is inadequate against a strong pull. In addition, wires hanging loose inside your costume flex and move, and the repeated bending can break them. The simplest way to protect them is to sew a lining over the wired area, protecting the circuitry from being dragged and rubbed by your body or undergarments (Figure 4). It's a good idea to baste, snap, or Velcro at least one edge of the lining piece so you can remove the lamps for laundering or repair.

**Incandescent light kits**

One kind of incandescent light kits can be found in craft shops in the pre-Christmas craft season (like right now!). These miniature kits are often very inexpensive (a couple of dollars) and feature a dozen steady burning lights and a battery case for a couple of C-cells. The lights are wired in a string like Christmas tree lights.

Another kind is available year round from craft shops that carry dollhouse and miniature supplies. They run on AA cells, and come in both steady-burning and flashing sets. I have had very good success with kits under the *Miniature Collectibles* brand name, made by Mangelsen's of Omaha. Their multicolored flashing set features very bright, very small grain of wheat lamps and runs for several hours on a single set of AA cells.

The biggest drawback to incandescent kits is the weight of the battery pack. Put a pocket inside your costume to hold it, or cement it firmly in place. Do not let the pack dangle from the lamp wires. Many of the battery packs feature a combination cover/power switch; from experience I can warn you to ***never*** point this lid down; the batteries can and will work the cover off if you do any bouncing around.

Incandescent kits do not have the convenience of the o-ring mounting technique, but have the advantage of being visible from many angles. The lamps can get quite warm, so do not use hot- (or warm-) melt glue to hold them in place, or mount them in a base made of thermoplastic (like *Friendly Plastic),* as the heat of the lamps will soften the thermoplastic. Spending an hour getting your hair unimbedded from your overheated headdress is no fun! Use a compatible adhesive, or sew the base of the lamps in place. The mini-Christmas light sets feature replaceable bulbs, while the others generally have potted connections at the bulb end. Strain relief is as important with incandescents as it is with LEDs, especially for the very small grain-of-wheat lamps.

**General notes on layout and use of lamps**

Flashing sets can be set up to look random or sequenced. Turn on the set and start sorting out the lamps by when they flash. Most of these sets flash the lamps in pairs; if you want to achieve a chasing effect, line them up in your costume in order. For a random or twinkling effect, scatter the lamps out of sequence order.

If you need longer wires, you can splice additional wires into the leads provided. LEDs have a positive and negative side, so be very careful to not reverse the connections when you work on your wires. You can use twist-on wiring connectors to make the joints if you are absolutely unable to solder, but you will have a longer-lasting result if you solder the new wires in. Get some heat-shrink tubing from an electronics store to cover the splice (figure 5).




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## SOURCES

I have found LED light sets at CraftMart, LeeWards, New York Fabrics, and FabricLand. Musical LED kits (with a "Button" drive module) were available at those stores and at D&J Hobby in San Jose. What kits are available when has varied widely during the year (as, of course, has the existence of many of these outlets).

I have found some incandescent kits at the fabric stores, but my best source has been the craft/dollhouse department at D & J Hobby, especially for flashing lights. Right now, you may be able to get cheap steady-burning sets at the party/craft shops like Michael's, since they are already gearing up for Christmas Crafts.

**Addendum July 2000**:

*The "fashion lite" LED kits are much harder to find these days; in December of 1999 the Hanes T-shirt website suggested "craft stores or from Cybercraft" but I have been unable to locate Cybercraft. Some of the craft chains mentioned in this article don't exist any more. D&J Hobby does mail and web ordering now, via* ***www.djhobby.com***

*Dollhouse and hobby shops are still a good source for the flashing miniature incandescent sets. Another source for the steady-burning "Christmas" style light strings is MacFrugal's or similar close-out shops.*

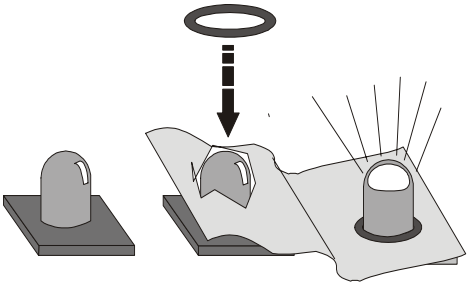

Figure 3: Poke LED through fabric from behind, then hold in place with miniature "O"-ring.

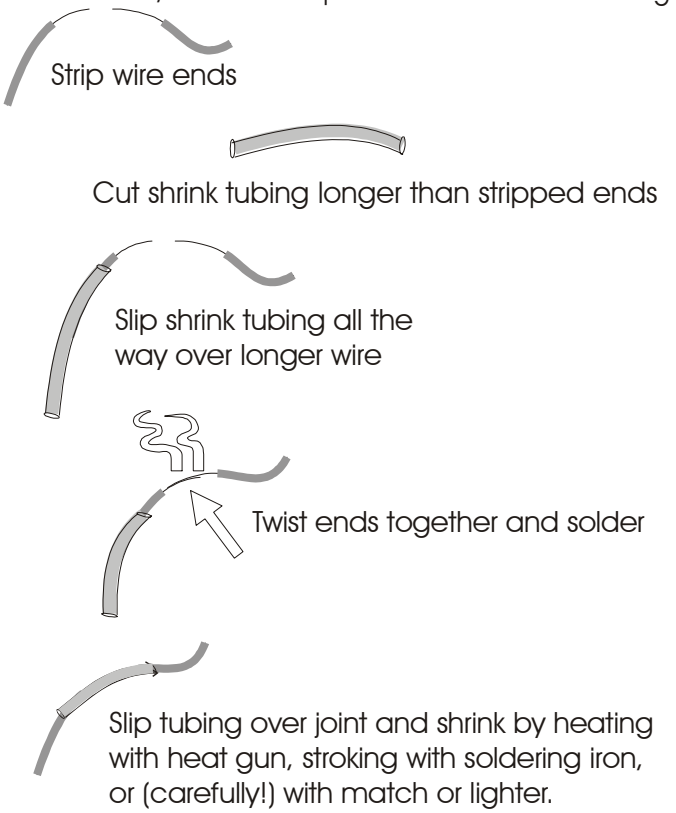


Figure 5: Splicing with heat shrink tubing




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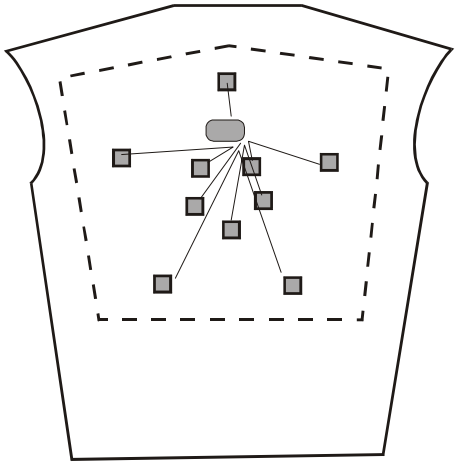
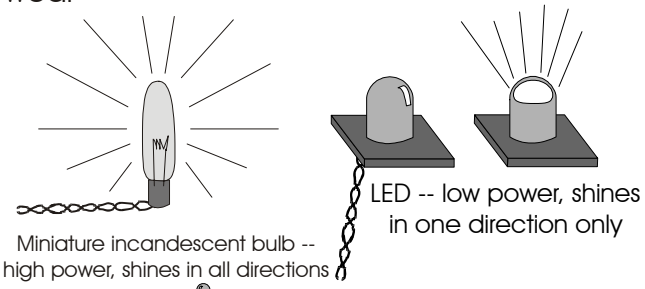


Figure 4: Apply a lining (dotted lines) over your wires to protect them from excessive wear



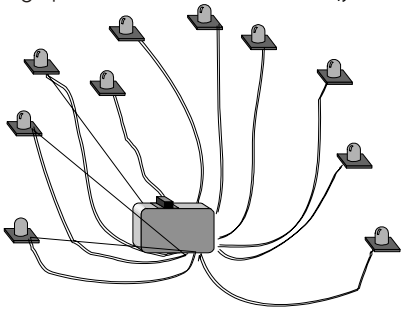



Figure 2: Driver Module and LEDs

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