Introduction

“Easy EL Wire Projects” gives you the complete step-by-step instructions for 10 different projects to light up your wardrobe. Easily make your own electroluminescent hat, backpack, costume and much more. All projects come from Instructables.com, are written by our creative community, and contain pictures for each step so you can easily make these yourself.

Instructables is the most popular project-sharing community on the Internet. We provide easy publishing tools to enable passionate, creative people like you to share their most innovative projects, recipes, skills, and ideas. Instructables has over 40,000 projects covering all subjects, including crafts, art, electronics, kids, home improvement, pets, outdoors, reuse, bikes, cars, robotics, food, decorating, woodworking, costuming, games, and more. Check it out today!

Laura Khalil
Editor, Instructables.com
Table of Contents

Introduction ........................................................................................................................................... 1

Author and Copyright Notices .................................................................................................................. 5

Disclaimer ............................................................................................................................................... 6

Light Up Costume .................................................................................................................................... 7

Intro: Light Up Costume ......................................................................................................................... 7

Step 1: Planning ......................................................................................................................................... 7

Step 2: Mock-Up ........................................................................................................................................ 8

Step 3: Layout .......................................................................................................................................... 9

Step 4: Securing the EL Wire ..................................................................................................................... 10

Step 5: Details ......................................................................................................................................... 12

Step 6: Turn me on .................................................................................................................................... 14

Related Instructables ............................................................................................................................... 15

how to add EL wire to a coat or other garment ....................................................................................... 16

Intro: How to add EL wire to a coat or other garment ........................................................................... 16

Step 1: List of materials ............................................................................................................................ 16

Step 2: Choose garment to light up .......................................................................................................... 17

Step 3: Plan the light layout ..................................................................................................................... 22

Step 4: Select and order the EL wire and inverter .................................................................................... 22

Step 5: Cut, strip and solder the EL wire junctions .................................................................................. 23

Step 6: Attach the EL wire ....................................................................................................................... 24

Step 7: Finishing steps ............................................................................................................................. 25

Step 8: Other examples: EL wire logos and shapes ................................................................................ 26

Step 9: Other examples: EL wire suits ..................................................................................................... 29

Step 10: Other examples: EL wire hats and helmets .............................................................................. 32

Related Instructables ............................................................................................................................... 34

EL Wire Fairy Wings ................................................................................................................................. 35

Intro: EL Wire Fairy Wings ...................................................................................................................... 35

Step 1: Choosing Your Path ..................................................................................................................... 36

Step 2: Tools and Stuff ........................................................................................................................... 36

Step 3: Plan Your Design ....................................................................................................................... 37

Step 4: Print Out Your Design ............................................................................................................... 38

Step 5: Take Measurements .................................................................................................................... 39

Step 6: Bend Your Hangers .................................................................................................................... 40

Step 7: Attach Your Hangers ................................................................................................................... 41

Step 8: Strengthen Your Skeleton ......................................................................................................... 43

Step 9: Grind and Tape The Epoxy ......................................................................................................... 43

Step 10: Cutting the Fabric ..................................................................................................................... 44

Step 11: Pin It Down and Sew ................................................................................................................ 45

Step 12: Final Fabric Fixes .................................................................................................................... 45

Step 13: Hanger Adjustment ................................................................................................................... 46

Step 14: Join the Fabric .......................................................................................................................... 46

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Disclaimer
All do-it-yourself activities involve risk, and your safety is your own responsibility, including proper use of equipment and safety gear, and determining whether you have adequate skill and experience. Some of the resources used for these projects are dangerous unless used properly and with adequate precautions, including safety gear. Some illustrative photos do not depict safety precautions or equipment, in order to show the project steps more clearly. The projects are not intended for use by children.

Many projects on Instructables are user-submitted, and appearance of a project in this format does not indicate it has been checked for safety or functionality. Use of the instructions and suggestions is at your own risk. Instructables, Inc. disclaims all responsibility for any resulting damage, injury, or expense. It is your responsibility to make sure that your activities comply with all applicable laws.
Light Up Costume
by scoochmaroo on January 12, 2010

Editor of the Food and Living channels. If you like what you see, subscribe to me!

Intro: Light Up Costume
This brief tutorial will walk you through how to make a light up costume using electroluminescent wire (el wire). This costume in particular was custom made for DJ performing around the world. I worked closely with the designer and the el wire supplier to produce this piece in about two weeks' time. With these simple steps, you too can customize your costume with el wire to light up the night! Built in 2007 (my first el wire project ever!) , it’s still in use today.

Step 1: Planning
Since this was my first foray into the world of el wire, I had no supplies in stock, and no idea what exactly I would need. I did extensive research to determine the most cost-effective way to achieve the design, and decided to go with thatcoolwire.com, whose products were both affordable and well-reviewed.

After securing a supplier, I needed to determine just what and how much el wire I would need. I went with 4.0mm el wire for the main body and 2.2mm el wire for the glove details, both in 'Power Green'. You'll find that different suppliers stock different weights and colors of el wire, so it's worth doing the research to find exactly what you need.

This design required too much wire to be lit by a single battery pack that the performer could wear, which meant that I needed to cleverly design a lay out that would neither exceed the capacity of each battery pack, nor be disruptive to the designer's vision or the DJ's performance.

I started by roughly pinning out the design with yarn onto my old beat-up male dress form. By no means accurate, it was a good way for me to figure out which wires would connect, where to place battery packs, and how many I would need. Talking with the el wire supplier on the phone about the capacity of the different battery packs apropos the lengths of wire I would need was extremely helpful.
Step 2: Mock-Up

To get a more accurate idea of what supplies I would need, I applied the layout I'd created to the actual garments.

I chose a black jumpsuit (which had to be significantly modified*), black carpenter kneepads, a helmet with face cage which I covered in black stretch fabric, large headphones, and gloves to act as the base of the costume.

With the help of my trusty assistant, I was able to put the base garments on a body and mark out a second rough draft of where the wires would go. After doing this to each piece of the costume, I was able to call my supplier back and let him know exactly what I would need.

He was able to work with his team to put together a package of el wire cut to the lengths I needed and attached to the connectors for the battery packs, saving me the precious time it would take to learn how to customize them myself (which I later learned with the help of this diagram).

*modifications included sewing the front of the suit closed, sewing the collar closed in a standing position, adding a full length zipper to the back, adding spats to cover the shoes, and attaching the kneepads
Step 3: Layout

After the wire configuration was mocked-up with rope, I used chalk to outline the traces.

Next, I put it back on the form and began laying on the el wire and taping it in place. This allowed me plenty of wiggle room to change my layout or tweak the design.

Once I was pleased with it all, I was ready to sew it down.
Step 4: Securing the El Wire

I used a variety of things to secure the el wire to the different elements of the costume.

For the main body (jumpsuit and gloves), I hand-sewed the wire (way too thick to go under my machine!) using a whipstitch with quadrupled thread (meaning it ran through the eye of the needle four times instead of just one) in a light color so that the weight of the thread would not interfere with the line when the wire was lit. It’s essential when doing a project as large as this to knot off the thread every few inches. The reason for this is that if one area breaks or snags, you don’t want it to affect the rest of the costume!

For the helmet, I sewed the wire onto the black stretch knit fabric which I used to cover it. Since the fabric was a sports mesh, it was easy to see through, but impossible to see into.

The headphones were glued onto the helmet, and the wire glued to the headphones with Krazy Glue. I tried several different epoxies and adhesives, and Krazy Glue came out to be the clear winner.
http://www.instructables.com/id/Easy-EL-Wire-Projects/
Step 5: Details

I blacked out certain areas of the wire with matte black tape, since that provided less interference than running the wire inside the costume. I needed to make this suit as user-friendly as possible.

The helmet was set up to have its own battery pack.

The gloves were laid out so that the wires would run off the edge of the gloves and join to connector wires on the sleeves.

The battery packs were secured to the back of the suit in a surprisingly easy manner - I simply cut slits in the fabric and hooked the clips of the battery packs into the slits.

It was essential that the battery packs be on the outside of the costume for a few reasons. They needed to be hidden from the front view, they needed to be accessible by the techs who would turn them all on before the show, and to facilitate the necessary battery changes between shows.

Of course, I finished it off with a custom label I made with an iron-on printer transfer.

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Image Notes
1. battery pack clips inserted into slits made in the suit fabric
Step 6: Turn me on
The only thing left is to connect all the wires, turn it on, and hope it works!

Oh yeah, and dance.
Related Instructables

MickeyTron Lunacy: Homemade EL-Wire Costumes (video) by ABOMIBOT

how to add EL wire to a coat or other garment by enlightened

Tron Legacy Costume by arphoto

The Full "How To" Manual For EL (Electroluminescent Wire) by Pyrotect

3 Ways to Use EL Wire by scoochmaroo

EL wire eye candy by guerroloco

Unicycle pimpin' :) by LostRite

Fire Skirt! by la

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Intro: How to add EL wire to a coat or other garment

As a lighted costume designer, I get a lot of questions from people who want to know how to make their own EL wire costumes. I don't have time to help everyone individually, so I thought I'd consolidate my advice into one instructable. Hopefully this will help you understand the steps involved in this labor-intensive process, and get you started with your own lighted clothing projects.

Rather than describe how to make a single specific design, I am trying to make these instructions fairly general so you can create your own EL wire layout for almost any type of clothing, although many of my example photos refer to lighted coats. Also, since EL wire is very fragile in situations where it is flexed repeatedly, a lot of these tips will focus on methods for improving durability and getting the longest possible life out of the garment.

UPDATE: I never intended this to be a tutorial for copying other people’s work, but it seems that some clarification might be useful. It's great to be inspired, but I'd like to encourage this community to take things a step further and use these techniques to create their own original designs.

Image Notes
1. leather jackets make a good base for an EL wire design (though it does make the sewing more difficult)

Step 1: List of materials

piece of clothing to light up (see guidelines in that step)

sewing supplies:
needle, clear thread, scissors

EL wire (can be a single color or a mix of colors)
EL wire driver/inverter matched to the total length of glowing wire used in the design
battery holder and switch (if not included with driver)

If you are soldering:
soldering iron
solder
wire strippers
wire cutters
heat-shrink tubing, heat gun

optional:
glue, pins, clamps
Step 2: Choose garment to light up

Some types of clothing are better-suited for EL wire installation than others. It is usually easier to get good results when the stiffness of the wire is similar to the stiffness of the base fabric, and the garment does not stretch or flex too much in the areas where the EL wire is installed.

**recommended:**
- leather, suede, vinyl, various forms of imitation leather
- denim, thick cotton/polyester blends, velvet (non-stretch), faux fur
- quilted/padded jackets (like a parka)
- any medium to heavyweight fabric that does not stretch

**not recommended:**
- lightweight fabrics
- stretch fabrics

In most cases, you don't want the EL wire to be significantly stiffer than the fabric, or the wire will dominate the drape of the garment. (one exception would be a ruffled edge on a tutu, for example). Also, if you bend or fold part of the wire when you wear it or store it, it will retain some of the bend in that location when you want to straighten it out. Over time, these areas are more likely to break.

If you are working with a lined piece of clothing, open up the lining by gently snipping the stitches in an inner seam. Open it enough so that you can access all the places where you will put EL wire.
1. Leather jackets make a good base for an EL wire design (though it does make the sewing more difficult).

1. EL wire on a suit jacket: limiting the installation to the lapels is a good idea, that part does not flex as much.
1. Create a lighted cuff with a short piece of EL wire, connected to the rest of the system by a (non-glowing) double strand of ribbon cable that can handle the flex of the elbow.

2. The long piece in the front is continuous with the loops around the collar and the lines on the shoulders. This jacket should be transported and stored with the front piece flat, if possible.

3. Front pocket outlines are made from separate pieces of EL wire, joined to the driver with double-stranded ribbon cable.

4. Piece 1: A loop of EL wire around the front flap
5. Piece 2: Side stripe
6. Piece 3: Other side flap
7. Piece 4: Right arm
8. Piece 5: Left arm

This jacket is relatively lightweight, and the shape is dominated by the stiffness of the EL wire. It should be transported or stored without folding or creasing the long lines on the front and arms.
Image Notes
1. this corset has EL wire installed on the reinforced boning - a good choice, since it does not flex there.

1. hats do not flex while you wear them, another good choice for EL wire. this black fedora is decorated with red EL wire.

Image Notes
1. EL wire added to a bra with a pre-formed foam cup (which does not flex much). The most fragile part of this design would be in the center of the bra.
Image Notes
1. denim coveralls provide a good fabric weight, but the EL wire in this piece will
Step 3: Plan the light layout
Adding EL wire to clothing can be a good project for a beginner who has limited experience with electronics or sewing. However, you should be aware of the limitations of EL wire when you plan your design.

The center core of EL wire is made of solid copper, and like any solid wire it will break due to fatigue damage after repeated bending. On the human body, the elbows, knees, shoulders, and hips undergo the most movement. You can make the electronics last longer by mounting EL on areas that don’t flex as much, and using stranded insulated connector wire (which can flex) to join the glowing pieces together inside the garment.

Plan the placement of EL wire with temporary markers like pieces of string, pins, or stickers, or make a sketch on a digital photo of the garment. You can follow the seams, or add extra lines as desired. Decide which sections can be lit up with a single continuous piece of EL wire, and which will require multiple pieces.

Then, decide what path the wire will take for each section, and mark the entry and exit points. To make sharp “T” shaped junctions, you may need to run the wire inside the jacket at some locations.

Step 4: Select and order the EL wire and inverter
Measure the total length of EL wire that you will need, taking into account parts that will be hidden behind the fabric, and add at least 2-3 inches at the end of each piece to allow for stripping and soldering the ends (or sealing the un-soldered ends). If you are not experienced with soldering EL wire, order extra so you can practice. You may need to cut and re-strip the ends multiple times.

There are many sources for buying EL wire online, such as coolneon.com and worldaglow.com

Thicknesses:
thin (angel hair)
normal thickness (2.3 mm diameter)
extra thick/phat (3.2mm or 5mm diameter)

I prefer normal thickness, high brightness wire for most applications. The thin wire can be bent into finer shapes, but it is more fragile (better suited for a hat or a tiara, for example). The thick wire is more durable, being protected by a thicker outer plastic core, but it cannot be bent as tightly and may not be suitable for designs with fine details or sharp bends.

Colors:
There are two standard phosphor colors for EL wire: aqua blue (which is white with a clear sheath when off), and white (which is pink when off, due to the addition of a red phosphor in the mix). The other colors (pink, red, orange, yellow, lime green, dark green, dark blue, and violet) are achieved by filtering the aqua light through a tinted outer sheath. Aqua tends to be the brightest, although the brightness can be adjusted when you select your driver.

EL Drivers:
EL wire uses a high voltage and high frequency alternating current to activate the phosphor. An EL driver, also known as an inverter, is required to convert your low voltage DC power from the battery into a high voltage AC source. The length rating of the EL driver should be matched to the total length of glowing wire that you want to illuminate, regardless of whether it is wired in series or in parallel.

Some drivers will produce a steady glow in your EL wire, others have built-in options for blinking and sound reactivity.
Step 5: Cut, strip and solder the EL wire junctions

You can order the EL wire pieces pre-soldered if your design is relatively simple, and you want to skip this step.

The sketch below illustrates the method I use to solder EL wire. If you'd like more detail, you can get directions from the places that sell EL wire, or see this instructable: http://www.instructables.com/id/How-to-Solder-EL-Electroluminescent-Wire/

For each piece of EL wire in your design, cut the proper length (with at least a few extra inches at each end), and solder the end of each piece to a connector, or to a double-conductor piece of ribbon cable that is long enough to reach the driver. The polarity does not matter - either wire can be connected to the center core or the outer wires. There are many methods for soldering EL wire, for any of these you should end up with a reinforced region with heat shrink tubing covering the junction.

I strongly recommend that you test the wire at this stage, joining the two conductors to an inverter, before it is attached to the garment. This is also a good time to join the pieces together to test the overall brightness, and decide whether you’d like to use a stronger inverter. You can achieve a higher level of brightness by overdriving the wire (e.g., attaching a short length of wire to one that is designed for a longer piece). It will burn out the phosphor on the wire faster, but that might not be important for some applications. Under normal usage, EL wire should have 3000 to 5000 hours of glowing life before the phosphor fades to 1/2 of its normal brightness.

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Step 6: Attach the EL wire

For most projects, the best approach is to hand-sew the wire to the fabric with clear monofilament thread (fishing line). Look for the basic clear kind, in one of the lower weights. I typically use the 6lb type, but 4lb and 8lb will also work reasonably well. You can also use standard thread, if you don't mind that it will block light from the EL wherever you make a stitch.

Make a hole in the fabric where you want to have an entry point. With the connector wires on the inside, pull the EL wire through the hole. When you get to the solder junction and shrink tubing, leave that part inside the garment and position it in a way that can be reinforced. For example, you may want to sew it to the inside of a seam, or add glue. It is most important that the area inside the shrink tubing is not going to bend repeatedly - this is the most fragile part of the wire.

If you are doing the type of installation where you are running one long piece along an arm or leg, or another line that is going to extend when you flex, then it is better to mount the EL wire in a way that allows the end to slide slightly in and out of the hole.

To sew the wire in place: use a needle that is appropriate for the garment fabric (leather needles have a special piercing point at the end). Thread the needle. As a rule of thumb, a good amount of thread to use is the distance between your hands when your arms are spread out. Shorter pieces will require frequent re-threading, longer pieces tend to get tangled and caught on things. I like to sew with a double strand of thread - meaning the needle is positioned at the halfway point on the piece of fishing line, and the two ends are tied together. A double knot is a good idea.

When you start sewing, run the needle between the two threads after the first stitch, to make a better anchor to the knot. This ensures the the knot will not pull through the hole in the fabric.

Sew along the length of the EL wire with a diagonal whip stitch, using whatever spacing is needed to hold the wire in the proper shape. If the fabric is especially thick or difficult to sew through, you can use a line of topstitching as your anchor.

Tie an extra knot in the fishing line periodically (every 5-6 inches), so that if part of it breaks it will not undo the rest of the stitching.

For some materials, a strong flexible glue may be a better choice. For example, EL wire can be mounted to a plastic surface (such as a helmet) by hot glue, E6000, or 3M Super Strength Adhesive.

Another method for attaching EL wire to clothing is to make a casing or channel with sheer fabric, and slide the wire through there.

Or, if you're looking for an extremely easy short cut, or a quick temporary attachment, you could weave it back and forth through holes in the fabric, or hold it on temporarily with safety pins, zip ties, or clear tape.

When you get to the other end, make an entry hole, if needed. Leave about 2-3" excess wire at the end. Seal the end with heat-shrink tubing and/or glue, and mount it on the inside of the garment, as you did with the leading end.
Step 7: Finishing steps

First, you will need to deal with wire management inside the garment. There should be enough slack for the non-glowing connector wires to reach back to the inverter and battery without being pulled tightly when you move. But, you also don’t want so much excess wire that it will get snagged when you put it on. I recommend using a big stitch to sew these wires to the seams on the inside of the garment. If your jacket is unlined, this is especially helpful. If your jacket has a lining, it may be sufficient to make some anchor points at key locations where the wire bends, like the armpits.

After all the wires running back to the inverter and battery pocket are stabilized, reconnect them as needed. They can be hard-wired to the driver, or joined to a plug if you want it to be easy to change it later. Use heat-shrink tubing or other insulators to ensure that you do not short out the two conductors to each other.

Advice for the battery pocket:
Use an existing pocket in the garment or add one, if necessary. The pocket should be close to the size of the battery pack. If you will be dancing or moving a lot in the coat, you don’t want the battery pack to bounce around too much, or fall out. Closing the pocket with a zipper or velcro can be helpful.

Clip a small part of the pocket seam, pass the wire through, and re-sew the seam closed so that the parts don’t fall back into the lining. If you do not plan to change the inverter, that part can be hidden in an inaccessible part inside the lining, or sewn into a separate closed section of a pocket. Run the wire for the battery connector to that pocket. There should be enough excess wire to easily access the end and change batteries.

Many EL drivers run on 9V or 12V. A standard 9V battery is good for many applications. If you want longer battery life with a 9V system, you can also use a 6-pack of AA cells.

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Step 8: Other examples: EL wire logos and shapes

In addition to lighting up the seams of a garment, EL wire can also be bent into shape to create logos and other designs, and sewn or glued to fabric. Please see the notes on each image for more information.

Image Notes
1. Violet EL wire was used to create these initials on the back of a western shirt. (the other trim is aqua)
1. Yellow EL wire logo for a Black Rock Ranger shirt.

1. Lime green EL wire shamrock design created with multiple strands of thin (angel hair) wire.

1. Dragon artwork illuminated with multiple colors of angel hair thickness EL wire.

1. closer view of dragon: color changes occur by using the same entry/exit points for two different pieces of wire.
**Step 9: Other examples: EL wire suits**

Here are some examples of EL wire suits, with comments included on the photos.

![Image Notes](http://www.instructables.com/id/Easy-EL-Wire-Projects/)

**Image Notes**
1. EL wire on knees is sewn to a padded region, and connected to the driver at the waist with ribbon cable.
2. Arm cuffs are reinforced with foam craft sheets before the EL wire is added.
3. Front, shoulder and neck pieces are reinforced with padding.
4. These silver space suits are made of a thin metallic fabric that is not well matched to the stiffness of EL wire. So, reinforced padded areas were added to support the wire in key locations.

![Image Notes](http://www.instructables.com/id/Easy-EL-Wire-Projects/)

**Image Notes**
1. Leather motorcycle jacket with multiple strands of EL wire, in different colors, sewn next to each other.

![Image Notes](http://www.instructables.com/id/Easy-EL-Wire-Projects/)

**Image Notes**
1. Detail of shoulder on leather jacket with EL wire.

![Image Notes](http://www.instructables.com/id/Easy-EL-Wire-Projects/)

**Image Notes**
1. Detail of shoulder in bright lighting: each strand is sewn individually with fishing line, and is also sewn to the adjacent wires.
Image Notes
1. one good strategy for putting lights on a tight bodysuit is to install the EL wire on accessories, such as shoulder pads (which do not flex as much as the underlying spandex suit)
2. elbow pad with EL wire trim
3. glove with lighted trim on gauntlet

Image Notes
1. EL wire on sides of helmet

Image Notes
1. jacket with EL wire trim mounted in a casing between two layers of translucent fabric.
1. kneepads with red EL wire trim, created from one continuous piece on each kneepad
**Step 10: Other examples: EL wire hats and helmets**

Hats and helmets can provide a good sturdy non-flexing base for EL wire. Cut holes in fabric, or drill/melt holes in plastic to pass the wire in and out of the hat at desired locations.

A small inverter and battery (9V type, for example), can be hidden in a hat with extra space inside, so those are generally preferred over something tight, like a low-crown baseball cap.

The high-pitched whining noise of the EL wire system can be difficult to wear near your ears, although some people don't mind it.

Please see the photo comments for more information.
1. a bike helmet decorated with EL wire, attached with hot glue. The inverter and battery are hidden in vent holes on the back.

Image Notes
1. Another view of the same bike helmet in bright lighting. Note that the white-glowing EL wire looks pink when it is off.

1. Hats do not flex while you wear them, another good choice for EL wire. This black fedora is decorated with red EL wire.

Image Notes
1. Hats do not flex while you wear them, another good choice for EL wire. This black fedora is decorated with red EL wire.
Related Instructables

- Add EL wire to a hat! by Zem
- How To Make Two Daft Punk Outfits with Helmets by derektroywest
- Light Up Costume by scoochmaroo
- DJ hero Chrome Daft Punk Helmet by Zachariah Cruse
- How to make a glowing robot suit. by Feral_Messiah
- Daft Punk Table Replica Graphics Controller by ian
- How to build a Daft Punk Table Replica by mrgallea

http://www.instructables.com/id/Easy-EL-Wire-Projects/
EL Wire Fairy Wings
by DesChamos on August 15, 2010

I'm studying to be a Mechanical Engineer at Cal Poly (going into year 3).

Intro: EL Wire Fairy Wings
Fairy wings are totally awesome to begin with, especially at raves. What better way to make them more rave-appropriate than to make them light up? EL wire is awesome for this, as it keeps them light (tee hee) enough to dance in.

Some Back-Story:
A while ago I made a pair of fairy wings with the goal of attaching EL wire to them to make them more awesome. I used threadbanger's fairy wing tutorial for this. They were a huge hit at every rave went I to. Their success led me to upgrade them. They went from having one simple pass of purple around the edges to purple and blue around the edges with purple eye spots. This pair is made by following the easier route in this instructable.

At one rave, I got a request from a fellow raver named FireFly for a pair of wings. Since she gives away huge pieces of kandi and is all-around nice, I thought she deserved them. I drew out a concept sketch pretty soon after, but became lazy and didn't work on them for over a month.

Then I saw instructables was having an EL wire contest. Finally, something to get me to actually make FireFly's wings! Nothing like a deadline to get you going.

While this tutorial is primarily about how I made FireFly's wings (the harder method), I included how I made my first pair, so that anyone who wants to do this doesn't have to spend more time than they want to. If you are doing the easier method, ignore steps three through fourteen.

Here's a demo of the easier method:

CLICK TO PLAY VIDEO

(Sorry about the low picture quality, it was the best my camera could do.)

The threadbanger tutorial mentioned in the video: http://www.youtube.com/watch?v=5z20Ju7XJk

Let's get this out in the open: This instructable is neither cheap, nor quick. The easier method took me about five hours and about $50 in its simplest form, $80 in its current state ($30 more EL wire was added to form a second color around the edge). The hard method cost about $80 and took about 20 hours to make.

More importantly, if want to make yourself some wings, disregard the previous paragraph and go for it!

Giving credit where credit is due:
Cool Neon Wire - awesome company. They includes heat shrink tubing and copper tape if you need to solder your wire for free with your order.
Threadbanger's Tutorial - the basis for the "easier method" and a great tutorial all together.
Soldering Instructable - I used cool neon's guide myself, but it's the same method.
General EL Wire Attaching Instructable - helped me make my first pair of wings.
SparkFun's Tutorial on Sequencing - great if you want to use a micro controller with your wire.
That's Cool Wire - the sponsor of this awesome competition.
Step 1: Choosing Your Path
So at this point, you have two choices. The hard way, or the easier way. Both will give you something totally awesome, but the hard way is much more open ended (and much trickier).

The easier method consists of following a laid out, fairly easy tutorial made by threadbanger for fairy wings, and adding EL wire to them. You can pretty much ignore steps three through fourteen.

The hard method consists of coming up with your own design and (depending on your design) can include a lot of sewing. While the picture is of my finished product, this method is very open ended and I encourage you to plan your own design. Go crazy!

Step 2: Tools and Stuff
If you are using either method, you will need:

EL Wire
An Inverter of EL Wire
A Soldering Iron (depending on where you get your wire, some comes prepared)
Invisible Thread
Needle
Twine
Ribbon

For the Easier Method:
15 Feet of Wire (This is only enough for one pass around the edges and one pair of circles if you don’t waste your wire. The pair I am showing has two passes of different colors. If you want to do this, order 15 feet of two different colors).
4 Coat Hangers
2 Pairs of Tights

For the Harder Method:
Dust Mask (you will definitely want this)

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Sand Paper
Flat Rubber Bands
Needle Nose Pliers
Stretchy Fabric (Swim liner at the fabric store)
A Sewing Machine (You can hand sew, I'd just recommend against it)
Pins
Fabric Pencil or Chalk
Thread (color matching fabric, usually black)
?? Feet of Wire
?? Coat hangers
Measuring Tape
Epoxy (Plastic Epoxy if your hangers are covered in plastic. Mine were.)
Duct Tape
A Method of Grinding (I used a Dremel)

Image Notes
1. Nice and goopy. Worked very well.

Image Notes
1. A little too fluid for this use, but it worked fine about a minute or two after mixed

**Step 3: Plan Your Design**

If you are embarking on the easier path, your design is pretty much decided for you. Effectively, follow this tutorial: [http://www.youtube.com/watch?v=5z20jIu7XJk](http://www.youtube.com/watch?v=5z20jIu7XJk)

I suppose you can change up the design, but there is still not a lot of room for customization.

With the hard method, create your own design. I wanted them to look like fire, so I did a little research (see: Berial from Devil May Cry 4 for my inspiration) and came up with the image below.

Notes for designing:

Eventually ribbon will be attached to the wings. To do this as simply as possible, it's best if the middle is the thinnest part.

You will be sliding fabric onto the wings later. Don't draw any shapes that are extremely wide on the ends and thin as they get towards the middle. If you do this, you will have to hand sew more fabric.

Also, watch the tutorial even if you are doing the hard method. The video is great and includes a bunch of good information.
Step 4: Print Out Your Design

If your image is on your computer, convert it to black and white, and cut it to one side (like the one below), then print it out in the method of your choice.

Here’s a neat trick: you can use Excel to print out large images. Copy and paste your picture into cell A1 (I had to copy from MS Paint to do this). Then go into print preview. Next, zoom out a large amount. After doing this, you should see rectangles, designating paper edges. You can use this to size the picture up before printing. I wanted mine to be about three pages high.

After printing, arrange the pictures to form the image. Cut them and tape them together.
Step 5: Take Measurements

Using the twine, measure the edges of your design. To do this, I taped it down as I went and unwrapped more from the spool as I needed it.

I did this twice for my design: once for the absolute outer edge (so I would know how many coat hangers I would need) and once for where the wire would go.

Now that you have your measurements, order the EL wire you will need. Be sure to double the number you got (for two wings, not just the one you measured) and add a few extra feet. You do not want to run out of wire halfway through a design. Also use the outer edge measurement to buy your coat hangers.

The pictures for this step used a sketch instead of a print-out. I thought I was better at drawing than I really am. It didn't work out too well. Regardless, the method of measuring is the same.
Step 6: Bend Your Hangers
Get out your needle nose pliers and get to it! This step is fair()y tedious. Using the pliers and your hands, bend the hangers to the shape of the wings. Make sure that you frequently compare the hangers to your picture.

Some points to note:
I started at the bottom middle of the wings. As such, I started from the middle of a hanger. My thinking was that the middle of the wings would be a pressure point, and I would not want to rely on a joint there.

When you have to move on to the next hanger, make sure you bend it to overlap with the previous hanger by at least a few inches (2-3).

When you need a sharp point, as my design did, put a sharp 180 degree bend in the hanger (see the picture below).
Step 7: Attach Your Hangers
The time has come to epoxy the hangers together.

First, sand down the areas where the hangers will be attached. This helps the epoxy create a strong bond with the plastic.

Next, attach the hangers together using the rubber bands. The series of pictures below shows how to do this.

After that, mix up your epoxy and spread it on the joints (I liked Devcon Plastic Welder best for this. If your hangers aren’t covered in plastic, I suggest you use a different epoxy). Let it go through its working time (15 minutes for me) and then remove the rubber bands. Then, put epoxy where the rubber bands were.
1. Step 2: Bring the long end through the loop of the short end and tighten.

1. Step 3: Repeat on the other end for a secure connection.

1. The rubber band was here
2. Another here

1. Make sure you have something to keep you occupied while the epoxy dries

http://www.instructables.com/id/Easy-EL-Wire-Projects/
**Step 8: Strengthen Your Skeleton**

After Step 7, your design may require some strengthening. My design would get bent very easily if I didn't add support (in this case, more hangers). I added one vertical piece of hanger, and one horizontal one. Shape these over the print out (see the picture below).

Attach the strengtheners with the rubber bands and epoxy them the same way (making sure that you sand them ahead of time).

A picture of the finalized skeleton can be seen in the next step.

![Shape the vertical strengtheners](image)

**Image Notes**

1. Shaping the vertical strengthenener

**Step 9: Grind and Tape The Epoxy**

Dust mask. You have one?

No?

Go get one. This is serious, there is going to be epoxy dust going around here.

Now, using some method of grinding, grind off the larger globules of epoxy. No need to get it to a mirror sheen, just make sure it's fairly even.

After that, cover the epoxy with duct tape. This serves to further strengthen the joints as well as provide an easier method of smoothing out the joints. It's important that the joints don't have any sharp edges so they don't catch the fabric later.
Step 10: Cutting the Fabric

Now take your print-out, and cut out the fabric for the wings. Lay the paper cut out on top of your fabric and draw the edge onto the fabric with chalk or a fabric pencil. Then, cut out the design. Make sure that you err on the side of excess material. You can always cut material off, but you can’t put it back on.

Leave extra material coming off the middle of the wings (this is clarified in a picture below). They kind of look like tabs. These will be used to attach the two sides together later.

Repeat this four times. Of course, you could do this only once, with all four layers of fabric at the same time.
Step 11: Pin It Down and Sew

This is by far the most time consuming step. At least it was for me. Maybe you're better at sewing than I am.

Lay one cutout on the floor. Place your hanger skeleton over that. Then lay another cutout on top of the skeleton (sandwich the skeleton between two cut-outs). Pin the two pieces of fabric together outside of the edge of the skeleton. To make sure this was done evenly, I first pinned all of the places that were closest to the middle.

After the pinning is done, slip your design off of the skeleton and sew it up. Since I was limited on pins, I had to pin select regions at a time.

Some things to watch out for:

Sew further in when sewing in and further out when sewing out. Sewing further in makes sure that the thread goes all the way to the hanger. Sewing further out makes sure that each point has enough fabric. See the second picture for clarification.

In general, make it larger than necessary if you plan on inverting the fabric (more on this in the next step).

If your design has any areas where you can't sew it and then slide it on, leave these un-sewn for now. You will take care of these in the next step.

After you are done with one wing, repeat for the other wing.

Step 12: Final Fabric Fixes

Clean up the edges of the fabric by cutting more excess material off.

This step is not required, but if you want very sharp, distinct edges, invert your fabric. This will keep all of your excess fabric on the inside, leaving very precise edges. I did not do this for two reasons: I could not have as I sewed mine too small. I liked the look of the excess material.

After this, slip the material onto the hangers.

If you had any un-sewn areas, hand sew those now.
1. Fabric slipped on

**Step 13: Hanger Adjustment**
After wrestling fabric onto the skeleton, I noticed the shape had become distorted. So, I did a little bit of fixing.

**Image Notes**
1. Adjust until you’re satisfied

**Step 14: Join the Fabric**
Hand sew the two wings together on what will become the side in contact with the wearer’s back. Repeat for the other side. You can also finish the outer side by keeping the tabs long and tucking them inside the wings.

To do this, simply sew together those tabs mentioned earlier.
Step 15: Solder EL Wire
This step may or may not be required. If your EL wire came soldered, awesome. If it didn't, refer to this instructable: http://www.instructables.com/id/How-to-Solder-EL-Electroluminescent-Wire/

If you have several strands connect them in parallel. Before doing this, you should have two wires coming from each strand of EL wire. Let's call them "Wire 1" and "Wire 2." Every strand has a Wire 1 and a Wire 2. Solder all of the Wire 1s together and all of the Wire 2s together. Then, attach all of the Wire 1s to one output wire on your inverter and all of the Wire 2s to the output wire.

By the way: Cool Neon (where I ordered my wire) will often include copper tape and heat shrink tubing with your order.

Step 16: Attach EL Wire
This step will apply to both versions.

Using the clear thread, attach the wire to the wings. Heres how I did it:

Thread your needle, double over the thread and tie an overhand knot.
Thread into the fabric, but do not thread all the way through.
Stitch back out of the fabric and pass through the loop by the knot in the thread. This serves as a starting knot (See the second picture).
Continue stitching, attaching the wire to the wings.
When you start running out of thread, do two stitches in the same area.
Here's where it gets tricky, cut the thread by the needle, creating two threads out of the doubled over thread.
Un-thread one stitch on one of the threads (See the third picture).
Tie the two threads with a square knot.

To go around the outside of the easy pair, start at the middle and go out to the top left section. Come around and cross over the middle and go to the bottom right section. Then over to the bottom left and then up to the top right. You can see the cross over in the last picture.

Some cool ideas:
Cover the wire in electrical tape anywhere you don't want wire. While this does seem a little wasteful, trust me, it's a lot easier than using separate pieces.

The pair on the main page has two wires going around the edge, an outer purple and an inner blue. To do this, sew down the two lengths of wire at once, as if they were a single, very fat wire.

That same pair also has an isolated circle. To do this, cover the wire (this is normal wire, not EL wire) leading to the power source in electrical tape if it's not already black. Sew down the normal wire leading to where the circle will be, then sew down a circle of EL wire.
1. Note the crossover

1. The starting stitch

1. Ending: the thread has been separated in two and one line has had one stitch undone. All this needs is a square knot.

1. Electrical tape is used to cover areas we don’t want to show

1. Blue and purple join forces for the edges

1. Normal wire covered in electrical tape
**Step 17: Attach Ribbon**
If you are doing the easy method, this is well explained in the video.

For those attempting the hard way:

Flip the wings over so the side that will be in contact with the wearer's back is up. Then slide ribbon underneath this in the middle (the thinnest part). Tie off with a square knot. If your ribbon slides around, sew a region of it to your wings.

Repeat with a second ribbon for two arm loops. Watch the video and this will make more sense.

**Step 18: Wear Your Wings and Expansions**
Wear your creation to any gathering! They're a huge hit at raves.

Some ways to add more:

Feel free to design in 3-D. My easier wings curve away from my body.

Go crazy with your design! The more creative the better, and the more likely you are to blow people's minds. For example, I just found this awesome instructable for crocheted fairy wings. It would be awesome to make and then add wire all over the design.

If you have more circuit skills, don't let them go to waste and don't settle for a simple "On" and "Off." There are two different ways to do make it more interesting. You can use triacs and a 555 timer to make it strobe. You could also use triacs, a microcontroller and several different strands of color for a light show! In my case, I could use some PWM (the analog pins for the Arduino fans out there) to add a flicker or a pulse for better looking fire. (see: http://www.sparkfun.com/commerce/tutorial_info.php?tutorials_id=130)
Image Notes
1. Finished hard method
2. Striped pants FTW

Related Instructables

MickeyTron
Lunacy: Homemade El-Wire Costumes (video) by ABOMIBOT

Crocheted Fairy Wings by Fruppi

DIY Halloween Contest 2008 Costume Entries—Pirates, Fairies, & A Dirt Devil, FaerySpell Creations (Photos) by faeryspellcreations

Lightwings: Fiber Optic Fairy Wings by the_gella

Spinning EL wire techno vortex thingee by Mike Begley

Light Up Costume by scoochmaroo

Removable EL wire art panels by SewLolita

Puppy Fairy Costume Wings by ArtisticBabe

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Add EL wire to a hat!

Hello everyone! Firstly, I would like to thank Enlighted for their Instructable on adding EL wire to clothes, it helped me out a bunch with this. Check it out: www.instructables.com/id/how-to-add-EL-wire-to-a-coat-or-other-garment/

Now, read on!

Image Notes
1. Top view of hat with wire on, and lights off.

Step 1: Supplies.
Okay, you'll need:

A hat, I used a cheap felt top hat from UsToy.

Scissors.

An awl.

EL wire kit. I bought mine from Thats Cool Wire. Link to the kit I bought:
http://www.thatscoolwire.com/store/item.asp?Category=168&SubCategoryID=124&GroupId=&SKU=WY-NH-LZ-3V

You'll need enough for the rim of the hat your working on. (Or whatever design your doing)

To attach the battery pack to the inside of the hat, I used a piece of stick on velcro. (The hook side)

A needle, and fishing line. (I used two really long pieces, I ran out the first time.)
Step 2: Prep the hat.
Okay, take your awl (Or you could use a nail) and poke a hole at the base of the hat. (See picture) Make sure your hole is big enough for the wire to fit through.

Step 3: Attach wire to hat.
Now, first attach the battery pack to the inside (If you have room) or somewhere else, I attached it to the inside using velcro since the hat is felt. Then take your fishing line, get about the length between you arms when the line is folded in half, thread it through the needle, and tie the ends together. Then, Whip-stitch the wire onto the rim. If you don’t know how to whip-stitch, you can kind of see from the picture, or look up how to on here. This part takes the longest... :/ But if you do it right, then it holds really well. When you reach the end, poke another hole in the brim and push the left over wire through, (See pic 3.) Then, cut the excess wire off, then take a piece of heat-shrink wire, or electrical tape, and cover the end.
Step 4: Finished!
Your finished!! Add a battery, turn it on, and admire your work!!

Sorry if this isn’t as descriptive as it could be, please check out Enlightened’s Ible’ from the first page if you want to know more about adding EL wire to clothes.

Please comment, rate, and vote for me in the Light Up The Night! contest!!
Thanks!
Image Notes
1. Me with hat on!

Related Instructables
- how to add EL wire to a coat or other garment by enlightened
- Programmable LilyPad EL-Wire Dress by quasiben
- Crazy Hat Day! (Photos) by depotdevoid
- NYE Disco Ball Hat by docstoyland
- How to silence an EL transformer by xjkh3vk
- Wire Jacket (Photos) by noahh
- MickeyTron Lunacy: Homemade EL-Wire Costumes (video) by ABOMIBOT
- How to make EL Wire Art by GlowWireGuy
El Wire Backpack!
by chaoschao99 on July 29, 2010

Hi I'm chaoschao99 a frequent user of instructables. I have made over 70 projects from this website and have started now making stuff for other people to use. Thanks and remember Subscribe!

Intro: El Wire Backpack!
Schools coming just around the corner, and all you have is a bland not so fun backpack...let's change that! In this Instructable you will be making your very own Electroluminescent wire (a.k.a. El wire) backpack!

Tools Needed:
*Knife or Scissors
*Needle

Materials Needed:
*Fishing wire
*Backpack
*El wire & Driver
*Tape

Skills Needed:
Small knowledge of sewing

How hard is this Instructable?
Easy-Moderate

***Note: I am not teaching you how to solder El wire. I am only teaching you how to attach it to your backpack. There are other Instructables out there that can teach you how to solder it. An example would be: [http://www.instructables.com/id/How-to-Solder-EL-Electroluminescent-Wire/](http://www.instructables.com/id/How-to-Solder-EL-Electroluminescent-Wire/)

***Note: I am not responsible for the breaking of your backpack. You will have to cut holes in your backpack to be able to feed the wire through. Cut at your own risk.

With all that said, let's get started!

--

Image Notes
1. ...To this!

Image Notes
1. From this....
Step 1: Pick a Design
Each backpack is different, and each person will only have so much EL wire. I only bought ten feet and I found that there were rings around the element symbol, so that gave me an easy design. If I had more EL Wire I probably would have outlined the whole backpack. Be creative! Share your unique design on this Instructable!

Step 2: Tape the Design on the Backpack
The next step is to tape the design to the backpack. This will insure that the EL wire will be secured onto the backpack when you are sewing it on. I used some scotch tape. Trust me now and DO NOT sew the EL wire onto the backpack without tape. Tape makes things a lot easier, the final product looks better, and it helps the fishing wire not get tangled.

I also made something special to give my backpack a little pizzaz. Look at the pictures to see what I mean. I made this by bending the EL wire into the letters and then separating the letters with electrical tape.

To make the rings look like they are separate rings on the backpack, what you will have to do is to cut a hole in the backpack and feed the wire through when you are done taping the first ring. Then cut another hole and feed the wire through and tape another ring making it look like the EL wire is in separate rings.
Step 3: Sewing

Now comes the long part, sewing. This was a pretty hard part of the project for me because it was so time consuming. Find yourself a semi-large needle and feed some fishing wire through the needle. Meet both ends of the fishing wire together and tie a large knot. This will insure that the wire doesn’t slip through when you start sewing. Secure the EL wire onto the backpack using fishing wire. When you finish sewing the EL wire finish off the job with a large knot inside the backpack. Make sure that if you have cut any holes in the backpack to sew them up so that they do not rip any bigger.

Step 4: You’re Done!

Feed the connectors through a hole that you cut and sew it up and you’re finished! Now it’s time to show it off. Be the cool of your school with your brand new EL wire backpack!
Related Instructables

How to Install the Arduino to the Lithium Backpack by Severino

How to silence an EL transformer by xjkh3vk

EL Wire Jacket (Photos) by noahh

Integrated Backpack Speakers by applesaucemodifie

Powering the Arduino Mega with a Lithium Battery by inthebitz

MickeyTron Lunacy: Homemade EL-Wire Costumes (video) by ABOMIBOT

How to make EL Wire Art by GlowWireGuy

How to Solder EL (Electroluminescent) Wire by leonardo ismael
El Wire Dog Collar & Leash!

by chaoschao99 on August 2, 2010

Intro: El Wire Dog Collar & Leash!
Have you ever wanted to have your dog stand out in the crowd? Well now your dog can be the star of the park with its very own El wire collar and leash! Let your dog feel like he or she has style with this great gift for your furry little friend.

Tools:
* Needle
* Scissors (or some other cutting utensil that can cut fishing wire)

Materials:
* Dog Collar & Leash
* El wire
* 2 Small AA Drivers
* Electrical tape
* Scotch tape
* Fishing wire

Skills needed:
Basic knowledge of sewing

*** This collar CANNOT get wet. Do not let dog swim in water with collar. This collar is used for night time walks and bragging rights.

*** Make sure that your dog is fully grown. You will be sewing on El wire to this collar and there is no way to tighten it.

With all that said, let's get started!

Image Notes
1. that's my dog, Kona

Image Notes
1. 2 AA driver
Step 1: Sizing the Collar
Make sure that the dog collar fits snugly around your dog's neck. This will be the permanent size of the dog collar so make sure that it is on right.

Step 2: Taping the Driver
What you want to do is tape the driver next to the side of the dog collar that doesn't have the metal loop where you attach the leash. Just secure it with electrical tape. Then you want to put the driver on the top of the dog leash near your hand for easy access. Also secure this with electrical tape.
Step 3: Tape the EL Wire
Tape the EL wire to the dog leash and collar in the pattern you want. This will secure the EL wire when you are sewing it or moving the collar. This is a very important step because it is really hard to sew EL wire onto something that it isn’t secured to.

Step 4: Sew
Thread the needle with fishing wire. Make sure that the fishing wire length is long, but not too long that it gets tangled every time you do something. Then get the two ends of the fishing wire and tie a big knot so that the fishing wire doesn’t slip through when you start sewing. It may be hard to push the needle through your dog collar or leash, if this happens then just flip the collar upside down and push the needle through by using the hard surface of a table. Once you are done with the sewing, just tie it off with a knot.

Step 5: Finished
Now put that collar on your dog and take a good long look at your hard work. Take your dog on a walk to show off his or hers fancy looks.
Related Instructables

Fluorescent Dog Collar (TRON’S DOG) by PeckLauros
Tangle Free Dog Leash Holder by CementTruck
Clicker Training Basics by timbit1985
How to Be a Good Dog Owner in San Francisco by caseyscieszka
EL Wire oxygen mask by sillyzombie666
How To Make A Paracord Dog Leash Using The Seesaw Knot by Doggie Stylish
How To Make A Hands Free Dog Leash In 15 Minutes by Doggie Stylish
Dog Leash Tripod Strap by agnivohneb

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Fire Skirt!
by la on June 24, 2007

Intro: Fire Skirt!
Wear your own special effects! Learn a glow-in-the-dark clothing technique that mimics the look of fire, using electroluminescent (EL) wire and a combination of reflective and transparent fabrics.

The main function of this dress is for safety and visibility in dark environments, but also it is functional if you love fire and want to look like it. The fire skirt design functionality was inspired by the chaotic, beautiful, intense environment found at outdoor-night-time events: while wearing this skirt, my friends can find me, no one will run into me with a bike or art-vehicle, and it illuminates nearby objects as I walk, making it easy to avoid tent stakes, cacti, or who-knows-what. The dress is visible from all sides, the pattern affords the freedom of movement necessary for walking and dancing, and it has a fiery look that contributes to the party deco.

This demo is based on a presentation about the dress pattern and process from Maker Faire 2007. The presentation was recorded and posted by ArtFuture on the ArtFuture YouTube Group, in 9 segments: here are the videos, with notes, pictures and links... thanks to instructables for providing a good venue for making the presentation & videos complete.


Available through Etsy.com

Image Notes
1. Two-layered skirts with glowing detail. (descending a staircase) ... Models: Mary Elisa, myself ... Photo: Joel Crisp

Image Notes
1. EL wire detail in motion. ... Photo: coppercat.

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Step 1: Part 1: Overview and Materials:

Materials: (approx. $70-80 cost... get the good fabric!)
2.5 yards satin fabric (gold)
2.5 yards chiffon fabric (maroon or wine-color)
20 feet electroluminescent wire (aka "EL wire" or "LYTEC")
EL wire power supply & driver
~12” x 1” Elastic
Electrical tape or heat shrink tubing
Soldering supplies

The dress is based on an A-line skirt pattern; a cone-shaped skirt that bunches with gravity and creates organic-looking folds. It has 2 layers: a shiny satin layer underneath, and a translucent chiffon layer on top. The shiny satin layer is adorned with decorative flames shaped in electroluminescent wire: a battery-powered, plastic-coated wire that emits light for a glow-in-the-dark effect.

The pattern and materials work together to soften the hard lines of the EL wire, and to create a fiery animated effect when the dress is "walked": the gold satin reflects the electroluminescence, and the contrasting maroon chiffon overlay creates a range of light intensity as it floats closer and further away from the satin and EL wire.

This A-line skirt pattern is very simple: a cone-shaped floor-length skirt that flares out from the waist at about a 25-30 degree angle. For this dress, I make two layers with the same pattern. The inner satin layer is floor-length, and the outer chiffon layer is about 5” above the floor.

(* i make my own pattern, according to my measurements - the top of this pattern is an empire-waisted halter, but any top can work - it's the skirt shape that is important).

Here are a couple of patterns that could work:
(lengthen inner layer to floor length. heels not recommended.)
Vogue V7857
Simplicity 4087

Image Notes
2. Satin layer - shiny and supportive (gold)
3. Chiffon layer - floaty and translucent. (maroon)
Step 2: Shaping the wire
Make sure the wire is not on any areas of the garment that will receive a lot of friction or action, such as the seat or joints.

The wire cannot be bent at sharp angles, so your design needs to be based on curves and loops. The smallest curve it affords is that of a pencil circumference.

For this design, I used small loops for the “points” of the flames.

Image Notes
1. Note that loops are used instead of sharp points.

Step 3: Sewing the wire to the fabric
Place the wire on the shiny satin fabric, and tape it down with masking tape into the shape that you want. Stitch the wire to the satin loosely, leaving about a centimeter in between each stitch. The loose stitching will protect the wire as you move around, leaving some room so the wire doesn’t get forced into any sharp angles.
Step 4: Supporting the power supply, making electrical connections

The power supply is attached to an elastic garter that is worn below the knee, allowing for freedom of movement and support for the power supply and batteries. Make sure to leave a short length of cord between the garter and the skirt so that it won’t pull the wire when you walk.

Strip away the plastic coating at the end of the EL wire, and you will see one main thick wire that runs down the center, and two very thin wires that stick out around the side. The thin wires are fragile, so it is recommended to anchor them to a small piece of copper tape wrapped around the coated part of the wire.

Tutorials for preparing & connecting EL wire:
- EL wire soldering tutorial from Cool Light West
- MakeZine: Glowing Wearable Blinky-Light

http://www.instructables.com/id/Easy-EL-Wire-Projects/
Step 5: Preparing and connecting the wires

The center wire has a phosphor coating around it; strip off the coating with wire strippers or scrape it off with a blade.

Attach the stripped center wire to one of the power supply leads (it doesn't matter which one).

Attach the other wire to the copper tape and thin wires.

Tutorials for preparing & connecting EL wire:
EL wire soldering tutorial from Cool Light West
MakeZine: Glowing Wearable Blinky-Light

Solder the wires together, making sure that the two connections don't touch; (you can put a piece of electrical tape between the two if necessary).

Put a piece of heat-shrink tubing over it to keep the connections together and keep the wires from catching on the inside of the dress. Shrink the tubing with a heat gun, a hair dryer, or a flame.

Seal the other end of the wire too - you can use more heat-shrink tubing, or a drop of glue.
Step 6: Questions: EL wire safety, Dress seams, Other Glow Artworks

Safety concerns:
The wire is electrical but not strong enough to damage you if it shocks you. Keep the connections sealed and dry. This is an electrical device, so I don't recommend wearing it all the time: use common sense.

Seams:
I recommend designing your garment such that the EL wire ends near a seam - seams are a natural place for transitions in garments, and don't require any special sewing. Keep the stitches loose near the seams so that the EL wire can naturally change directions.
Step 7: Questions: More about EL wire & Other Glow Artworks

Where do you get the wire?
I get my wire and power supplies from CoolNeon.com. You can order any length of electroluminescent wire.

How many feet of wire will I need?
This dress is made with approximately 20 feet of wire.

If I am designing a pattern beforehand, how do I measure it?
Draw your pattern on paper “actual size” and measure it with a string - place the string along the line and then measure the string with a measuring tape or ruler.

Is the wire available in different thicknesses?
Wire is available in different gauges ranging from 1.2mm to 5mm.

How much power does it need? What are the electronic specifications?
You will need a different power supply for different lengths of wire.

What is the history of the Fire Skirt?
I started making luminous artwork in 1997, studying Neon and Glassblowing arts. I wanted to make a neon dress, but while I love the glow of neon, its fragile glass tubes would make the dress completely non-functional, so I looked into other alternatives, and found EL wire.

What other projects have you done?
One of my art missions is to create magic-realist objects: I’ve noticed that people respond in a particularly fond and comfortable way to art objects that belong in everyday life = clothing, furniture, cars, and software applications don’t seem to intimidate people as easily as gallery art can.

Everyone loves the artwork that glows - there is something very poetic and inspirational about the idea of illuminating the darkness.

http://www.instructables.com/id/Easy-EL-Wire-Projects/
See below for images of my other glow artwork, or visit my website: caballera.com or my etsy shop: caballera.etsy.com

Image Notes
1. EL wire necklace with beadwork mesh detail.

Image Notes
1. Armchair: acrylic shell with neon and plastic tubing decorative detail inside.
1. Yes - the chair is totally functional and very stable: you can sit, stand, or jump on it...

Image Notes
1. Glass and neon jellyfish, with chain, wire, and beadwork tentacles. ... Photo: Ron Carlson
Image Notes
1. Glass jellyfish all together in a group installation: "Let there be light" at UC San Diego Visual Arts Facility. ... Photo: Chris Csikszentmihalyi

Related Instructables
- how to add EL wire to a coat or other garment by enlightened
- MickeyTron Lunacy: Homemade El-Wire Costumes (video) by ABOMIBOT
- How To Enter the EL Wire Contest by Contest Robot
- Light Up Costume by scoochmaroo
- Unicycle pimpin’ :) by LostRite
- Programmable LilyPad EL-Wire Dress by quasiben
- The Full "How To" Manual For EL (Electroluminescence) Wire by Pyroject

http://www.instructables.com/id/Easy-EL-Wire-Projects/
How to Solder EL (Electroluminescent) Wire
by leonardo ismael on October 23, 2007

Intro: How to Solder EL (Electroluminescent) Wire
EL Wire (electroluminescent wire) is a flexible, easy to work with, low power consumption light source that you can use to light up just about anything from skirts to sculptures. The wire is made from two different sets of wires that are coated with phosphor and plastic that light up when you hook it up to an EL wire driver or sequencer.

This Instructable is a collaboration between leonardo ismael (aka Oscar - Instructables’ newest intern) and noahw that was made possible by the good folks over at Cool Neon. In addition to the step-by-step instructions that are in this Instructable, you can also check out the easily printable/portable .pdf directions that are attached to this step.

File Downloads

[NOTE: When saving, if you see .tmp as the file ext, rename it to 'coolneonconstruction.pdf']

Step 1: Prep the End of the EL Wire
In order to make your EL wire light up you will need a driver or sequencer of some sort to power it. No need to be afraid of these terms - the drivers and sequencers just deliver power to the wire similar to how a power brick delivers power to your laptop. You can buy a driver or sequencer from the same place you get your EL wire. You will also need either a harness or some kind of connecting wires to attach the EL wire to the driver or sequencer. Assuming you have these components, you're ready to start putting the EL wire together.

Some wire may have its’ ends already stripped and prepared for you. If your wire has already had its’ ends prepped then just skip this step.

First you will start with the bare EL wire pictured below. There are lots of different pictures in each step so click on each of the images below and follow along with the numbered steps.

Second picture:
Now grab a wire cutter and strip off the colored PVC sleeve around half an inch from the end of the wire. Make sure that you do not cut all the way in, just strip off the colored PVC covering.

Third picture:
Now you will see a thinner clear PVC sleeve covering the core wire.

Fourth picture:
Cut the clear PVC sleeve off, but be very careful not to cut too deep because two very small and fragile wires called angel wires are right underneath it.

Fifth picture:
Now that you have both sleeves off, you will notice that there is phosphor coating on the thicker center wire. This is not a skin so do not cut it off. Instead, carefully scratch or sand it off with some sandpaper or a razor blade.

http://www.instructables.com/id/Easy-EL-Wire-Projects/
1. This is the color tinted PVC sleeve.

1. These are the wire cutters.

1. Clear PVC sleeve.

1. Strip off the clear PVC sleeve.
Step 2: Knowing Your Wires

Now that the end of the wire is prepared you can see everything a bit more clearly. This is how your wire should look after step 1, so if your wire matches the wire in the picture, read on.

Image Notes
1. These are the angel wires.
2. This is the center wire. Also known as the solid copper. And will be connected to the battery pack's wire that gives a positive charge.
3. Tinted PVC outer housing.
5. Phosphor coating.
Step 3: Soldering the Angel Wire
Now, slip a piece of heat shrink tubing over the end of your EL wire and push it back a few inches form the tip.

Picture 2:
Next, wrap your copper tape around the colored PVC sleeve.

Picture 3:
Your wire should now have the tape wrapped around the PVC. Next, pull the angel wires back and solder onto the copper tape. Make sure you melt the solder against the hot copper tape, not by simply pushing it onto the tip of the hot soldering iron. Make sure you hold the angel wires down with the tip of the solder as the liquid solder dries so that the wires stay fused to the copper tape.

Picture 4:
Now your wire should look like this. If your wire matches what’s in the picture, then go on to the next step.

Image Notes
1. This is the heat shrink tubing.

Image Notes
1. This is copper tape that is included in the packet you buy.

Image Notes
1. Use a soldering iron to solder the angel wires onto the wrapped copper foil.

Image Notes
1. Angel wires are firmly soldered in place.
**Step 4: Prep the Battery Pack Wire**
The wire that connects the EL wire to the driver or controllers has a white harness on one side of it and two different length wire ends on the other.

Now you will have to cut the insulation off of the tips of the wire that connects the EL wire to the driver. Strip about 1/4” from each of the wires.

Picture 2:
Your wire should now look like this.

**Image Notes**
1. The shorter wire is positive, and should be connected to the solid copper wire at the core of the EL wire cable.
2. The longer wire is negative, and should be soldered to the copper tape.

**Step 5: Attach the Battery Pack to the EL wire**
Now you have to twist the core wire from the EL wire with the shorter wire from the black driver wire. It is best to move the longer wire out of the way by bending it back.

Picture 2:
Now, you will need to solder the connecting wires for the driver to the inner core wire of the EL wire cable. Make sure the solder wicks into the wires for a firm hold.

Picture 3:
You do not want your longer wire to touch any of the wires you just connected, so you can use a piece of the heat shrink tubing or some electrical tape to cover the other wires.

Picture 4 and 5:
Now you have to solder the longer lead from the battery pack wire to the copper tape.

Picture 6:
Isolate these wires with another small piece of heat shrink tubing. We used a heat gun to shrink the tubing down but you can use any source of heat such as a lighter or even a strong hair dryer.

**Image Notes**
1. It is best to bend the negative wire back, so it will not be in the way
Image Notes
1. This will not hold so you need to solder it.
2. You can not see it too well, but the longer wire is being bent back here.

Image Notes
1. The angel wires, and negative wire are not touching directly yet are
connected, through the copper tape.

**Image Notes**
1. When the metal is blobbed together like this on the tip of the wire it's probably a sign that you didn't make the greatest connection. If it seems loose or insufficiently bonded you can just grab the soldering iron and re-solder the wire into place.

**Step 6: Shrink the Tubing**

Now you can slide the piece of heat shrink tubing that you slipped over the wire a few steps back over the entire area that you were just joining the wires in. Use a heat gun or a hair dryer to blow hot air over the tubing - this will shrink the tubing. The tubes will become a little warm and gooey, but once it cools down, they will be as hard as plastic.

**Image Notes**
1. Use some heat shrink tubing to seal the entire area that you just worked on.

**Image Notes**
1. This is a heat gun
Step 7: Let it Shine!
Now just plug the harness on the battery back into the harness coming from the EL wire and turn on your driver or sequencer.

The EL wire should light up and you should be good to go for many hours of EL wire fun!

Post pictures of your projects that you make with EL wire in the comments. If you need supplies you might want to check out the awesome folks at Cool Neon which is located just 10 minutes from Instructables HQ in Oakland, CA.

Related Instructables

- The Full "How To" Manual For EL (Electroluminescent Wire) by Pyrotect
- Fire Skirt! by la
- Razor Scooter Underglow Double Mod (UPDATED) by Radioactive_Legos
- how to add EL wire to a coat or other garment by enlightened
- EL Wire Fairy Wings by DesChamos
- Neon Kicks - EL wire shoes by wealeybin
- panel lantern by guerroloco
- EL wire eye candy by guerroloco
Intro: Programmable LilyPad EL-Wire Dress

Nicole A. Wolfersberger and I, with support from Prof. Kylie Peppler at Indiana University, made a LilyPad Arduino-controlled EL-wire dress. With a few extra components we were able to control the blink frequency of the EL wire. This introduces the new possibility of controlling the EL wire via sensor (button, touch, temp, light, etc.). Now the EL wire doesn’t simply have to be either on or off—it’s ready to be programmed!

The LilyPad Electronic Platform is an electronic platform designed to be easily sewn into fabric using conductive thread, which provides designers freedom from the traditional construction method of soldering.

EL wire (electroluminescent wire) is a thin wire that glows when an AC voltage is applied. The wire is often wrapped in a colored transparent tube and is quite pliable. Many people often outline clothing (hats, pants, jackets, etc.) with EL wire, giving the garment an interesting colored glow. We, however, want not only outline a garment but also control when the EL wire is lit.

Controlling the EL wire is not difficult but it does require some electronic pieces that everyday crafters may not be familiar with.
**Step 1: EL-Wire Difficulties**

As mentioned before, the EL wire is only illuminated when an AC voltage is applied. Most, if not all, suppliers of EL wire also sell inverters necessary for this task. The inverter has a DC input and an AC output.

This is the beginning of our problem: how can we use the LilyPad to turn the EL wire on and off if the EL wire is controlled by an AC signal and the LilyPad uses DC? And the problem is often even more difficult, because the LilyPad board can be powered between 2.7-5.5 V. Inverters often have input DC voltages of 1.5V, 3.0V, and 12V, though input voltages range between 1.5V and 18V. Furthermore, if there is a spike or surge with the inverter it may damage the LilyPad.

**Step 2: Optoisolator**

First, let's tackle the voltage issue. Ideally, we would like to isolate the inverter and its power supply from the LilyPad and its power supply. That way, any surges in the AC line will stay on the EL wire side.

Luckily, good electrical engineers invented the optoisolator. Simply put, the optoisolator uses an IR LED to send an photon to a detector to control other side of the circuit. I used an NTE3044, which is an optoisolator with a Darlington pair. The Darlington pair is just two transistors in series.

If we connect the anode to a pin on the LilyPad, the cathode to GND of the LilyPad, and the collector to the Plus side of the inverter power supply, then we have effectively isolated the LilyPad from any dangerous spikes. The emitter will be used as the trigger for the Triac.

---

**Image Notes**

1. Ground
2. Pin From LilyPad
3. +3V Power Supply
4. Output to Triac
**Step 3: Triac**

A triac is a solid state device which allows for control over AC loads. If you apply a voltage at the Gate (G) relative to MT1 the triac will conduct from MT1 to MT2 as long as the current through the triac doesn’t dip below a threshold hold value. I am using a MAC-97A triac which has a holding current of 5mA and a gate voltage of 2.0 V.

Every time I send a signal from the LilyPad to the optoisolator, that pulse is translated to a 2V pulse from the Darlington Pair. That pulse then opens the gate and grounds one side of the EL wire. That’s okay, because we are going to connect the copper core directly to inverter. If you hold one line of the EL wire at GND and the other line receives the AC signal, the EL wire will still work because the AC signal will still be oscillating relative to something—in this case, the GND of the battery.

![Triac Diagram](image1.png)

**Image Notes**

1. GND of Inverter Power Supply
2. One End of the EL-wire

**Step 4: EL Wire**

There are a number of Instructables dealing with the stripping, prepping, and soldering of EL wire. This is my favorite. I stripped off the blue plastic from the EL wire, revealing a copper core and a smaller clear plastic tube housing the angel wire. After carefully removing the clear plastic tube I glued some copper tape to the EL wire and soldered the angel wire to the copper tape. If I had some shrink wrap tubing I would have inserted that over the copper tape for protection.

After soldering test that the EL wire illuminate when connected directly to the inverter and the inverter is powered by the appropriate source.

![EL Wire Image](image2.png)

**Step 5: Electronic Parts**

We need the following:

1. perf board
2. solder
3. soldering iron
4. 330 Ohm Resistor
5. NTE3044 Optoisolator Darlington Pair
6. 6 or 8 pin socket
7. Triac MAC-97A4
8. 2xAA holder with 9V plug adapter
9. jumper wires

http://www.instructables.com/id/Easy-EL-Wire-Projects/
**Step 6: Solder Components**

Before soldering it's always a good idea to lay out your components on the board and see how they will fit together. I made a number of mistakes and had to solder on jumper wires.

Notes: I curled up one end of the resistor so that I could sew from a pin on the LilyPad to the resistor.

A cartoon diagram is provided below. I soldered the DC inputs of the inverter to the resistor, triac, socket, power supply connector, and two jumper wires: one for the minus side of the LilyPad and one for the copper tape on the EL wire.

I will provide an eagle file soon.

---

**Image Notes**

1. Add Jumper Wire to unconnected pin of triac to copper tape of el-wire
2. Curl a loop to sew into
3. Wire to Minus side of LilyPad
4. 3V Power Supply connector
Image Notes
1. Jumper Wire due to mistake

Image Notes
1. Jumper Wire to Copper Tape
**Step 7: Sewing and Soldering EL-Wire**

Parts needed:

1. LilyPad
2. LilyPad Power Supply
3. Conductive Thread
4. El Wire

First decide on where the EL wire is going to be attached. We decided to simply outline the button of dress with the EL wire. Next sew the Lilypad and Power Supply to one another on the dress. Attach the perfboard with components, 3V power supply, and inverter to the dress (I used sticky back velcro). Lastly, solder the EL wire copper core to one side of the inverter and the angel wire to the jumper from the perfboard.

**Step 8: Testing and Finish**

Once everything is connected, upload a simple code that pulses a pin on the LilyPad HIGH and LOW every 2 seconds. If the EL wire doesn't flash, first check that the voltage from the optoisolator's emitter pin is between 2-3 volts. If it's still not working double check that the EL wire is illuminated when connected directly to the inverter.

When it's done, you'll be able to control the flashing of the EL wire!

This material is based upon work supported by the National Science Foundation under Grant No. 0855886. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
How to make an EL Wire Hula hoop

by Danger is my middle name on August 15, 2010

Author: Danger is my middle name  author's website
I'm just a girl who likes making stuff.
If you have any questions or suggestions about any of my guides, feel free to e-mail!

Intro: How to make an EL Wire Hula hoop
I've been wanting to make something with EL wire for a long time and I've wanted some sort of glowing hoop for a while so this seemed to be the perfect opportunity to do both!
Step 1: Collect materials

Finding the materials for this project was quite a hunt. To power EL wire, or electro luminescent wire you need a driver. There are some small drivers out there, but I needed to find one that could power enough feet of wire and be small enough to fit inside a tube with a 1 inch outer diameter.

- a length of polyethylene irrigation tubing with an outer diameter of 1 inch for the hoop. I think I used about 9 feet. I use PSI 100 weight
- a connector for the tube
- heat gun
- heat shrink tubing
- soldering iron and solder
- scissors
- electrical tape
- wire
- switch
- black gaffer tape
- hand held power drill
- pliers
- bubble wrap
- wire cutters and wire strippers
- RC-2KN 12 Volt 2000hz driver for 3-15’ of wire
- 8 single AA battery holders and batteries
- 2 15 foot lengths of EL wire. If you make a bigger or smaller hoop you might need less or more. It comes in different thicknesses, I think mine was just general purpose. Don’t get too thin or delicate wire, or it will break when you use it.

A voltmeter was also very helpful for this project.
Step 2: Cutting Tube and Soldering the el wire and battery cases

Cut the tubing for your hoop and use the heat gun to heat one of the ends so you can out the connector in one side. Don’t close the hoop yet though!

There are other really good instructables about how to solder EL wire so I won’t go over that here but it can be found here: http://www.instructables.com/id/How-to-Solder-EL-Electroluminescent-Wire/

I wanted to distribute the weight of 8 AA batteries around the hoop to the circuit is literally a circle. Solder the EL wire to the driver and solder the 8 battery holders together in series with enough wire in between each one so that they will be about evenly spaced around the hoop. Don’t solder the driver to complete the circuit yet!

Make sure your circuit is working either with a voltmeter or by using the driver with the EL wire to close the circuit. A voltmeter is way easier.
Step 3: Drill holes for the EL wire

Since all of your circuit will be inside the tube of the hoop, you need to drill holes to thread the EL wire to the outside so you can later wrap it around the hoop. Using a
hand held drill, make two holes big enough for the EL wire to fit through (but not too big!) on the inside of the hoop about 1 inch apart. Drill on the side of the hoop with
the connector already in, but make sure you don't drill through the connector.
Thread a stiff wire through the hole from the outside of the hoop to the opening and tape the wire to the tip of the EL wire and pull it through the hole so the EL wire is on
the outside of the hoop and the driver is on the inside. Repeat or the other wire.
Step 4: Put the circuit inside the hoop!

This part took me a few tries to get right, but be patient. I used electrical tape to tape the batteries into the holders, just to be safe, but they seemed pretty secure. Use a long, larger gauge wire threaded through the tube to pull the circuit into the hoop. As you pull it though, wrap the circuit in bubble wrap to keep it from rattling around inside the tubing.

Make sure your soldered connection points are VERY secure before this step. I had to redo this part three times because my connections kept breaking or coming loose.
**Step 5: Attach EL wire, driver and switch**

Once you have the circuit threaded through the tube, solder the driver leads to complete the circuit. Make sure you are connecting positive to positive and ground to ground (I always make positive red and ground black, just to be sure). This should be obvious since when you have the correct wires soldered together, your wire will be glowing.

It was important for me to make an easy way to turn the wire on and off without taking the entire hoop apart so I added a switch. Use the drill to make a hole and file it out to make it big enough for the switch. Make a hook out of stiff wire and pull the positive wire through. Some switches are different, but for mine, I cut and stripped the two ends and connected one to the middle lead and one to a side lead, making sure they don't touch. Heat shrink can be helpful here. Check and make sure your switch is working and then tape it down securely with the black gaffer tape.

**Step 6: Close Hoop and wrap and secure wire**

Close the hoop by heating the end of the tube with a heat gun and connecting it with the connector (or do what I did and just have really strong friends). Tape over the seam.

Decide how you want to wrap your wire. The possibilities are pretty much up to you. I opted for a crisscross pattern where the wires wrap in opposite directions and forms Xs on the hoop. Secure the ends with black gaffer tape and tape every few feet along the inside. Depending on how tightly you wrap it you may need more or less tape.
Step 7: Enjoy your hoop!

Now go have fun! Because of the batteries, this hoop may be heavier than hoops that you're used to, so be careful and start slow at first. It's a great workout, lots of fun, and it looks awesome!
Related Instructables

- LED Hula Hoop by jeffkobi
- 21 LED Rechargeable Hula Hoop by dog812
- How to Make a Model of an Atom out of Hula Hoops (Photos) by wareneutron
- Teach your dog to jump through a hoop by tac135
- L.E.D. Hula Hoop Replacing Broken Battery Holder by CDNF
- LED Hula Hoop, rechargeable by dog812
- Collapsible Hula Hoop by summation
- Hula hoop, UK style by tringsthings

http://www.instructables.com/id/Easy-EL-Wire-Projects/