USB Batman Spotlight

by **KaptinScarlet** on August 7, 2008

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You saw Batman Begins, you've now seen The Dark Knight, and now go on admit it, you want one of those mega spotlights with which Commissioner Gordon summons the help of the Caped Crusader. But you don't have a gigawatt three phase power supply, all you have is a measly little 5V USB... don't despair, that's plenty to work with, and if you follow this instructable you'll be casting the most wicked bat shaped shadows all over your bedroom, living room and office walls.

It's dead easy if you have even the most basic making skills and great to try if you've never done any electronics before. Plus there's a little bit of fun hacking apart a Series A USB plug and using the guts!

You'll need

- A couple of old packaging bottle caps (shower bottle and single serving drinks bottle, or something similar)
- Some thick tin foil (take out tray, or aluminum roofing / flashing tape) although thin foil will work
- A cheap USB Laptop light (or the appropriate LED, wire, correct resistor and USB Plug
- A small piece of clear plastic sheet (OHP sheet or bit of old packaging)
- Some cardboard and or foamcore (not necessary but nice)
- Some low value loose change
- Soldering iron
- Hot Melt Glue gun
- Black and silver paint (spray or markers)
- About 1.5 to 2 hours to spare doing this project

step 1: **Find a couple of suitable bottle caps**

Actually you only really need one, for the spotlight itself, although the other cap is useful for the base, the base could easily be made out of cardboard. here you can see the top that I used for the main part and the bottle it came from.

Given the shampoo only cost about 50p for 750ml, it would be worth buying a bottle just to use the cap and then keeping the shampoo as hand wash or shampoo refill.

Note the fact that the cap is translucent, this is quite important, because in the real spotlight there is quite a bit of light leakage through the cooling vents at the side of the lamp, and the translucent cap lets us mimic this effect rather nicely.

The single serving drinks sports cap is nice because the push pull closure also rotates, which means that the finished spotlight will be able to rotate, although this is not really necessary, of course unlike the real one, your USB spotlight won't need a crane to turn it round.

http://www.instructables.com/id/USB_Batman_Spotlight/

step 2: Wrap top in foil strips

First prepare the cap by removing the flip up lid part. Cut it off with scissors or a craft knife and then cut off an lumps and bumps, such as hinge ends or catch notches. (discard the flip up part of the lid (or keep in making box for another project).

Put some double sided strips on the back of your thick foil, then cut into strips that are thin enough to fit about 5 strips with small gaps over the height of the cap. My cap had the product delivery hole slightly off center. I decided that I would make this the bottom of the lamp so I made certain that my strips all met at the bottom. We are going to cover the join up anyway.

step 3: Add reinforcing

On the real Spotlight the air vents don't go all the way round,so to give this effect, cut some wider strips and stick them across the other strips from the edge of the first strip to the end of the barrel and arrange them at 1/4 intervals round the circumference.
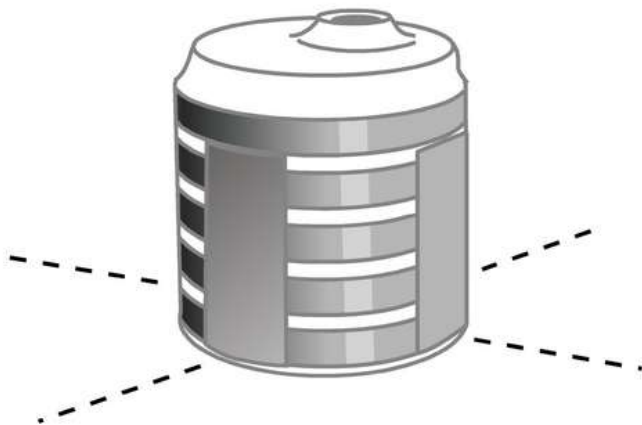
step 4: Build power supply from a cork

Well it's not a real power supply, it's just for show. Easiest way is to carve it out of an old wine bottle cork. The top side needs to be curved to fit the curve of the spotlight, but nearly the right curve will do. To cover up any poor joins, make the foil at the sides a little longer so it can flap up round the main barrel slightly.

Glue the foil on with hot melt, double sided, or fast setting two part resin epoxy.
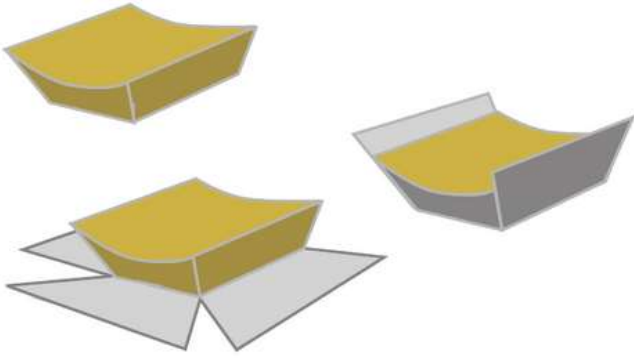
step 5: Attach power supply to base of spotlight

Stick the power supply to what is going to become the bottom of the spotlight
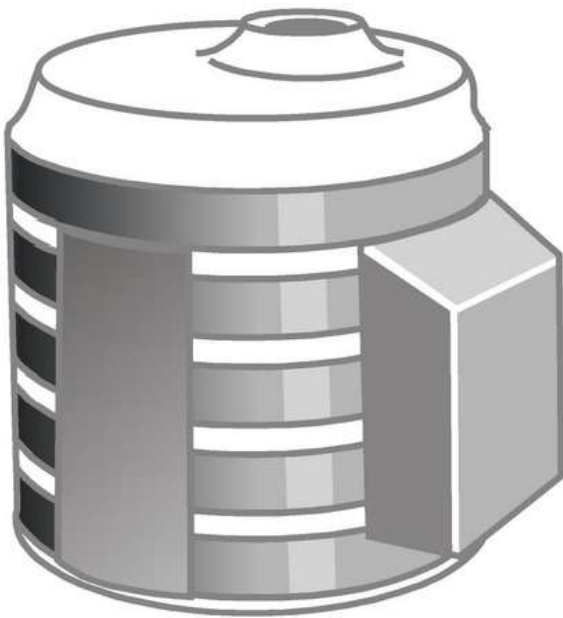
## step 6: Colour the end of the lamp barrel

Either mask off or just colour in with silver marker like I did. Don't colour the sides, leave those translucent.

step 7: Cut USB plug off USB Light

Well I tried to get the wires out without braking them, but it seems impossible as part of the wire is embedded in plastic that was cast in after the thing was put together. So plan B...

Cut the lamp assembly near to the plug using strong pliers.
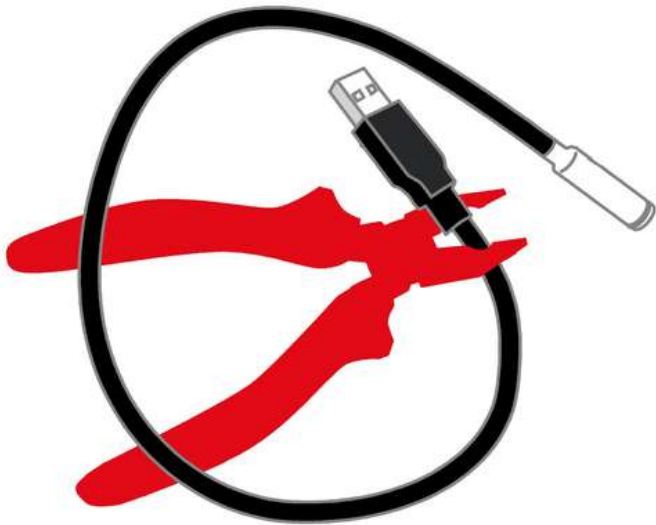
step 8: Take out the LED and its wire

The lens almost falls off the end of the device of its own accord. Once the other end has been cut, the LED can be coaxed out easily. For this project you now only need the LED, its wire and the USB plug, everything else goes into the making box or the bin.
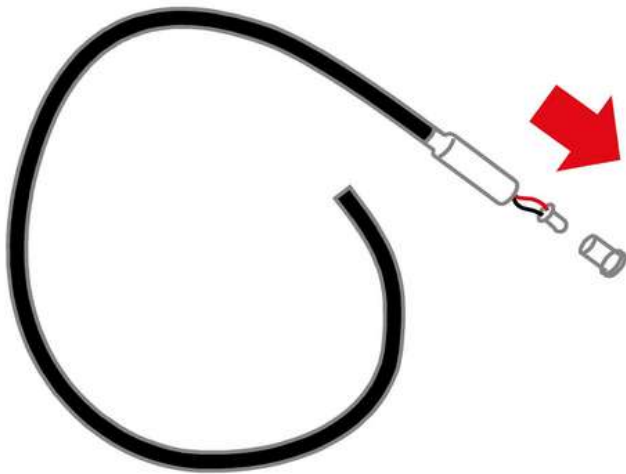
step 9: Fit LED to spotlight

Crumple up a bit of tin foil and shape it a bit into the shape of a reflector. Make a hole in the reflector and thread the LED through it , secure with glue and take care that the LED leads don't short out against themselves or the foil reflector.

When you've done it should look a bit like this... see second picture
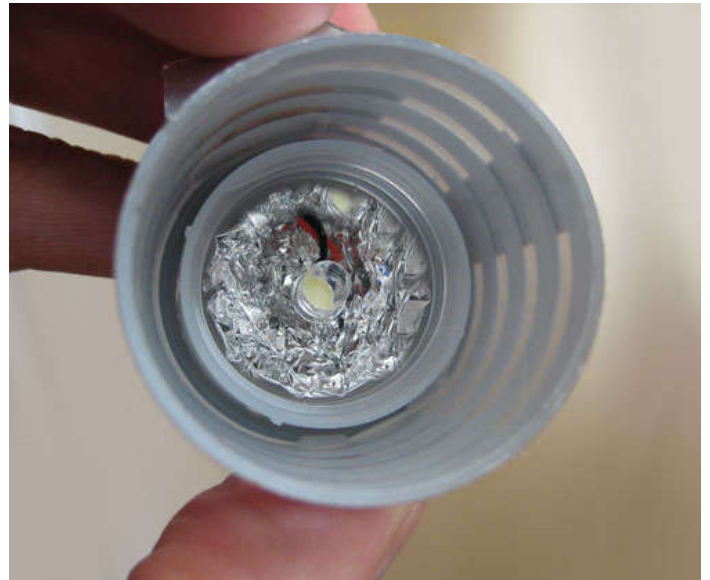
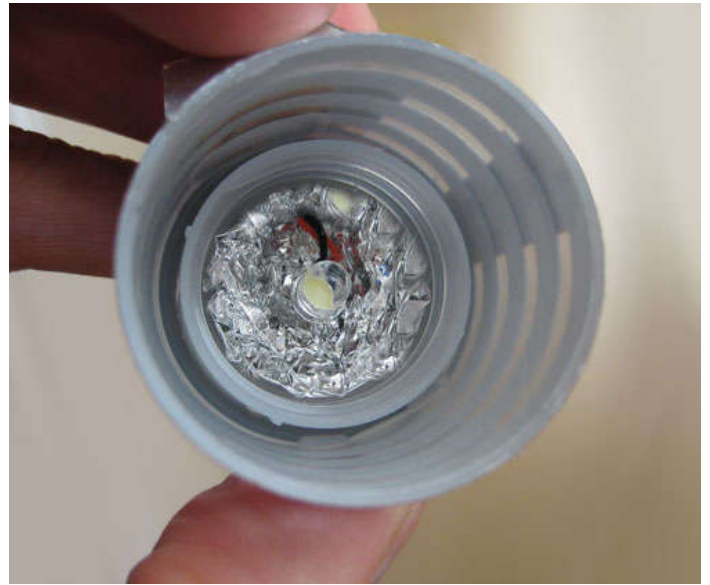## step 10: Hack the USB plug apart

Using a sharp craft knife, carefully slit down one side of the plug rubber outer moulding. Don't worry about cutting anything inside... you won't, it's all protected by a metal case.

Once you have slit it you can peel the rubber cover off the metal parts. It might put up a little bit of resistance because it was moulded into place, but it should come off all in one piece and relatively easily. What you see immediately is a metal case.

The metal case is made up of two parts . to separate them, you first need to unwrap the top part cable grip. Once you have done this the top case part opens up on two little semi hinges and then can be lifted off.

Inside you'll find more messy rubber, you have to pick this off. It does come off quite easily, but you will quite probably break the thin wires in doing so. This doesn't matter at all because you are going to be soldering new ones on anyway.

When you have taken it all apart you can solder the wires that go tot the LED back on to the relevant pins, see diagram. The middle two pins are NOT used.
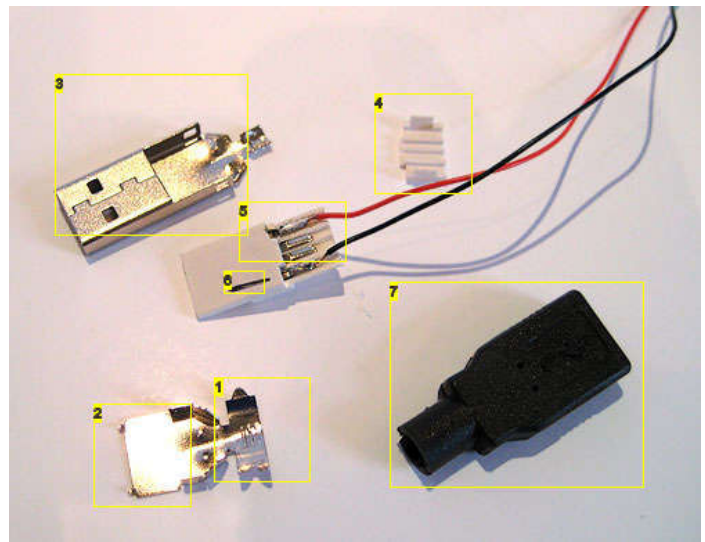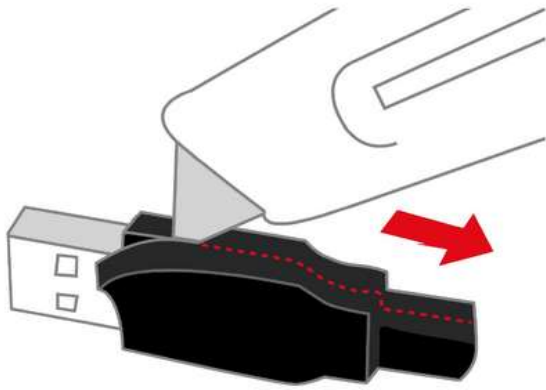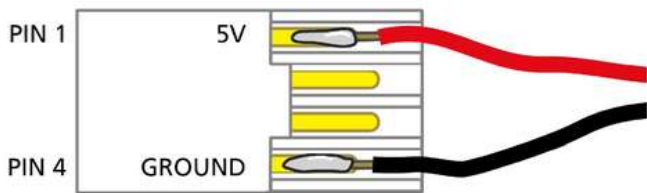
Image Notes
1. cable grip un-wrapped
2. top part of metal case
3. main chassis metal case
4. plastic lid for USB plug inner pin chassis
5. USB plug pin chassis and pins
6. The mark I made to make sure that I soldered the correct wire to the right pin
7. soft rubber over moulding

SERIES A USB PLUG

PIN 1 — 5V

PIN 4 — GROUND

step 11: Hack USb plug back together

Putting the plug back together is the reverse of taking it apart, except that the potting agent, is the trusty hot melt glue instead of injection moulded plastic.

Put some hot melt on to the soldered pin ends and quickly press home the top little hard plastic cover. Trim off any hot melt that gunges out the sides.

Slip the white plastic rectangle back into the metal case and put the metal case top back on and close the cable grips back up. Squeeze a little hot melt glue into the metal case to pot up all the wires and provide strain relief.

Offer the metal case up to the rubber outer housing to see where it should go and then as you put it back on put a tiny bit of glue gun glue at the wire end of the plug and wrap the rubber cover back round the metal case.

Stick the slit edge of the rubber cover with Super Glue (Cyanoacrylate). Most soft plug mouldings are made out of the same plastic (PVC, vinyl or rubber) as the wires and Super Glue sticks them very well. (remember it also sticks skin better than almost anything else, so NEVER let children do this bit of the project).
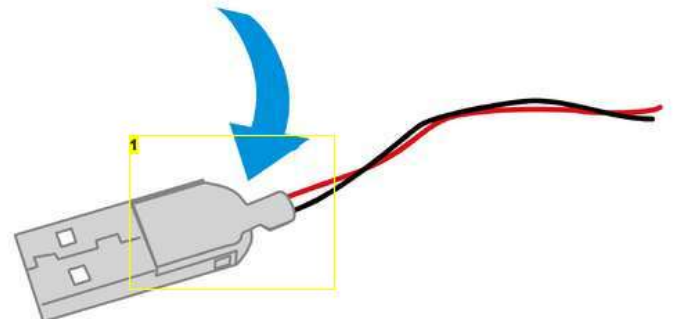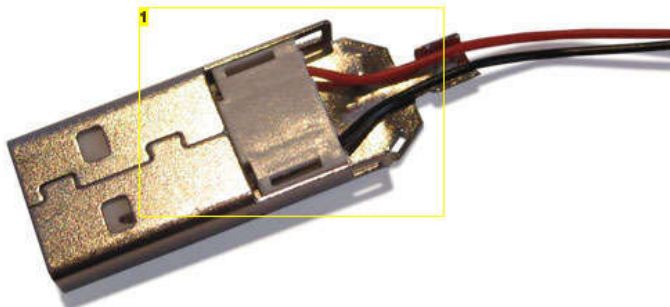

Image Notes

Image Notes
1. top metal case hinged back on with a little bit of hot melt glue underneath

1. plastic inner reassembled into main metal case part with cables laying neatly in cable grip waiting for top metal case
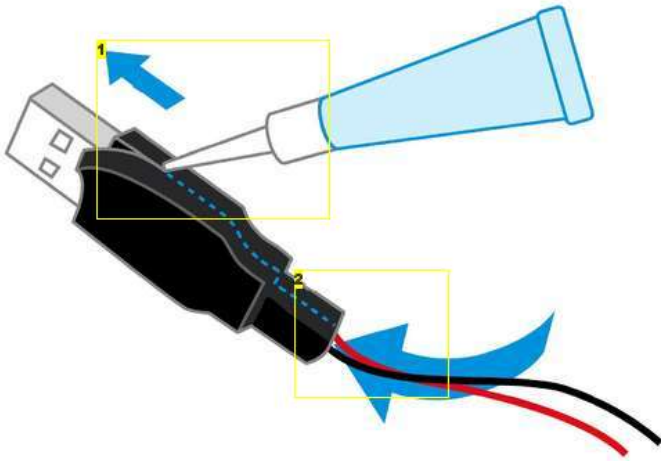
Image Notes
1. glue together with Super Glue
2. inject hot melt in the end of the plug to make sure that the wires are nice and potted

step 12: Make the spotlight lens

Place a sheet of clear plastic (OHP slide or old bit of packaging) over the top of the spotlight and mark a circle (water based ink) just inside the inner wall of the lamp. Add three tags to the circle and then cut it out. Then wash off the marker pen, and then dry. When dry, stick a small square of double sided masking tape to each tag, but leave the backing on for now.

Measure the inner circumference of the lamp and make a foil strip that will fit neatly inside the lamp without sticking up proud from the top.

On a similar piece of foil mark up and then cut out the Batman logo. The logo must fit the area of the lens. Put a strip of double sided sticky tape on the back of the foil before you cut it out.
Get images to copy from off the web, or go to dadcandothe batman project where there is a downloadable template of the bat logo (and the mounting yoke, you will need in a minute).

Cut out the bat logo and using double sided tape stick it to the lens in the center. Fold the tags down.

Insert the foil strip into the lamp and then insert the lens tags and push the lens down so it is level with the top. The best way to down this is to peel off only one of the tags double sided, poke this tag in and stick it firmly and then push the other tags in and pull off the double sided backing with tweezers or the corner of your craft knife once the tags are in place.

Make sure that the tags go down in between the foil and the lamp wall, so they are hidden when it is assembled.
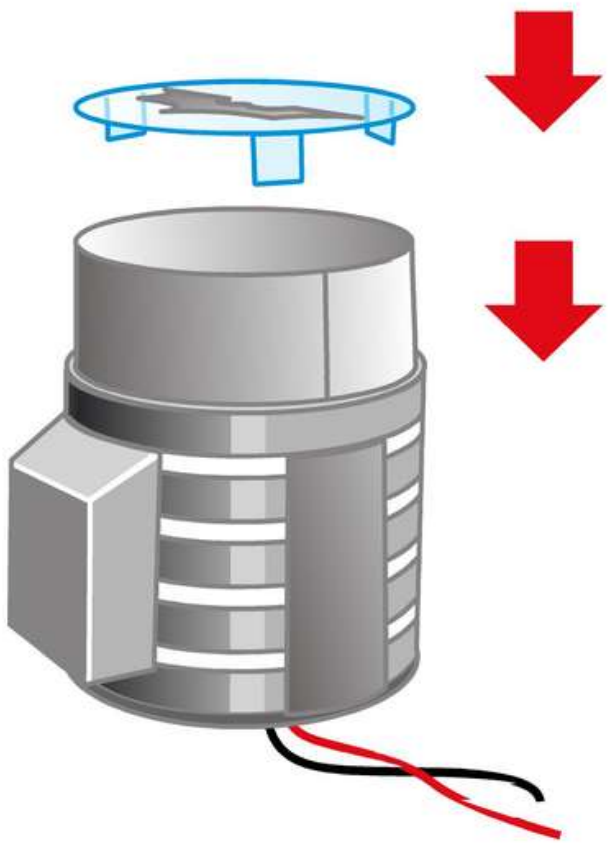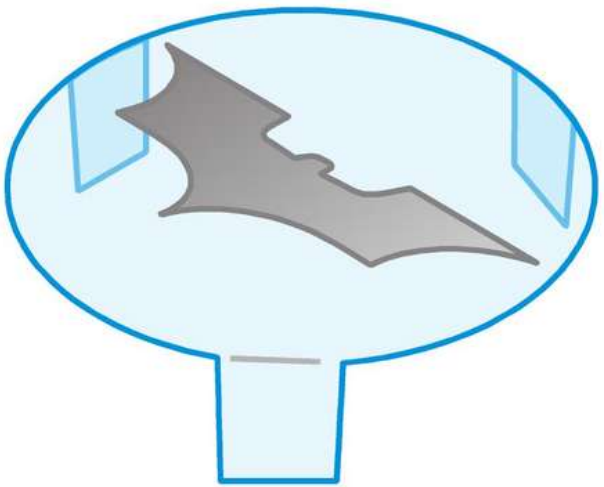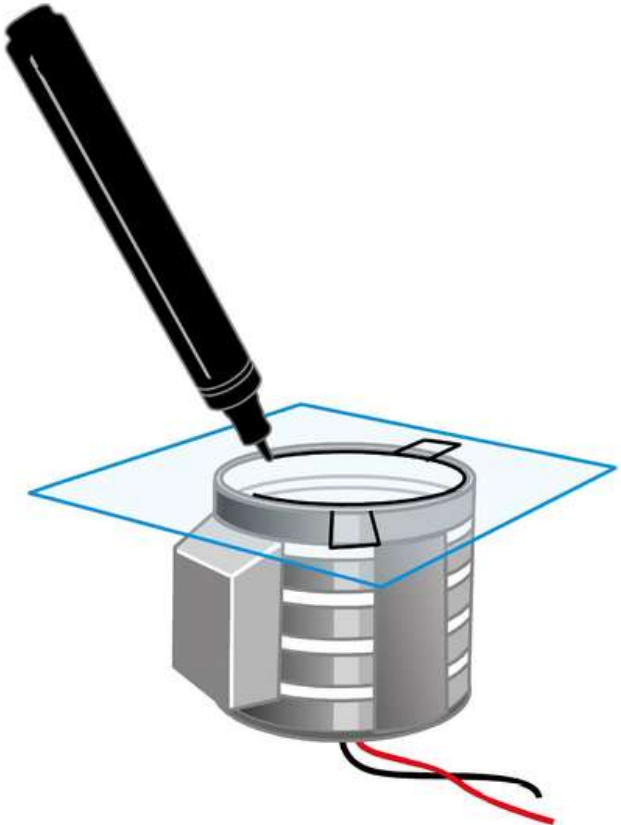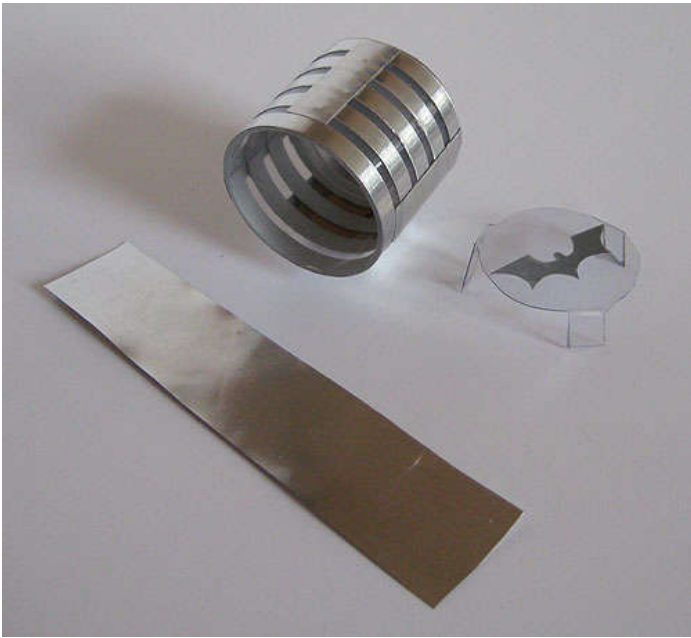
step 13: Glue on the yoke mounting

Cut two small pieces of thick strong card into rectangles. colour them in black with a permanent marker and glue them to the sides of the lamp with hot melt.One on each side.

step 14: Make the base

To make the base I used a sport cap from a single serving juice drink bottle.

I filled the underside of the cap with 2 pence coins and hot melt and then when I reached the top of the cap I turned it over and stick it to a sheet of stiff card. When it was set after a few minutes I cut round the edge with my kitchen scissors.

While that was setting I made the support yoke.
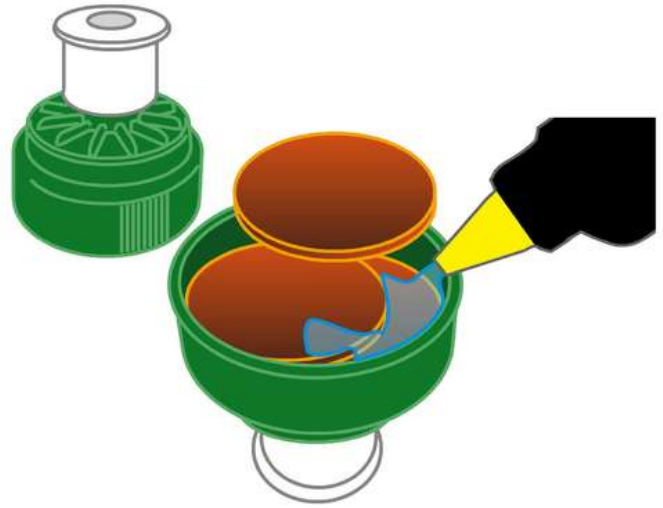
step 15: Make the support yoke

The support yoke is shaped like a big fat tuning fork. The design is roughly octagonal with the top part chopped out. Download yoke templates from dadcando's Batman project or draw up your own easily.

Measure the width of your lamp with its extra side pieces and just make sure that it is a sung fit in the yoke. I used foam core for the yoke, but you could use much nice materials. Two bits of card glued together, thin plastic or thin wood for example.

Cut the bottom prong so that it fits into the hole in the top of the drinks bottle.

spray or paint both the yoke and the base, black and then stick them together using hot melt or any other quick setting glue
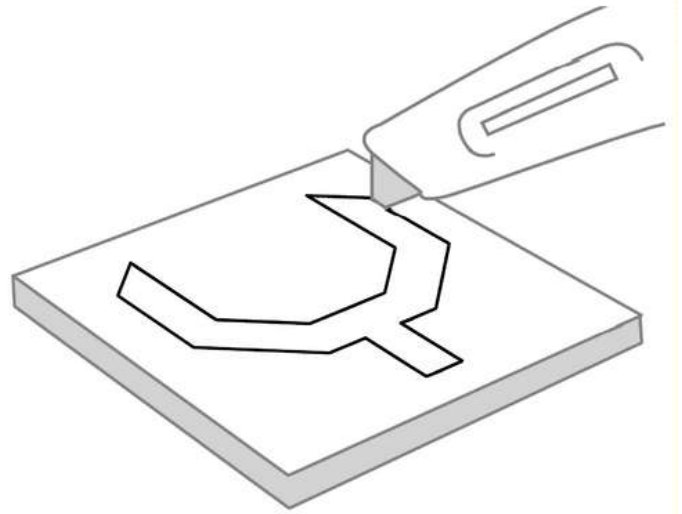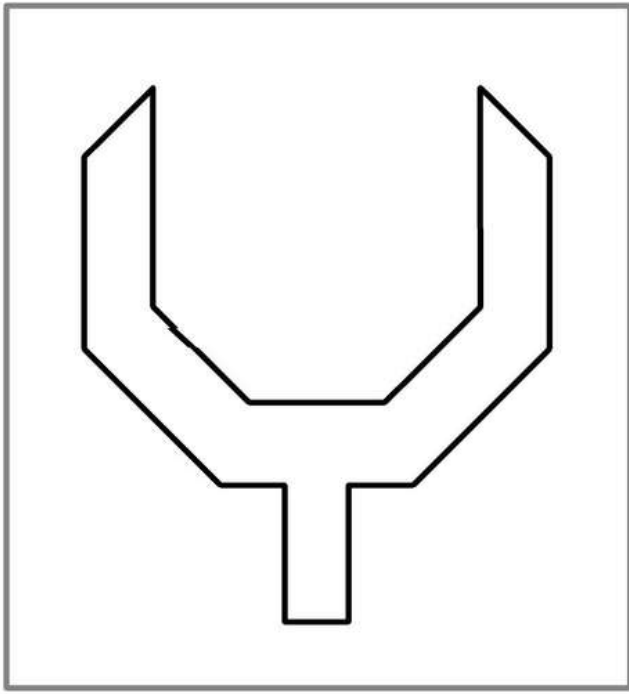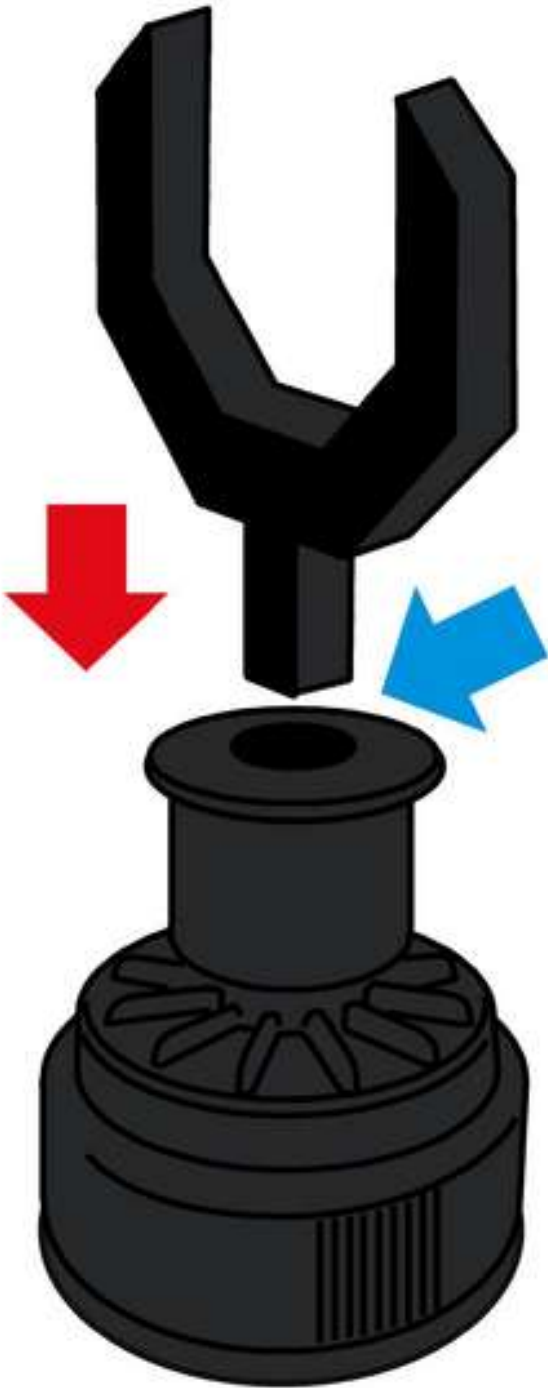
step 16: Assemble lamp into yoke

Because of the drinks top it will turn, but if you want to to be adjustable for rake as well then you'll have to secure it with pins or thin nails. Form me I only wanted the turning as a gimmick, the fact it sits there next to my computer displaying the Batman logo on the wall is just too cool.

I've loved doing this project, I feel many more USB light type projects coming on, it was so easy and the effects are really cool.

http://www.instructables.com/id/USB_Batman_Spotlight/

Related Instructables
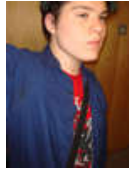
Comments

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Xerillum says: Nov 14, 2008. 7:43 PM **REPLY**
Nice design, but I'd probably scale it up with a coffee can. Great job

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KaptinScarlet says: Nov 14, 2008. 11:21 PM **REPLY**
sounds cool, look forward to seeing that ;-)

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onlyonebowman says: Nov 13, 2008. 2:11 PM **REPLY**
Nice Pics
Did you use Illustrator?

and great job

KaptinScarlet says: Nov 13, 2008. 11:24 PM **REPLY**
no actually I use Macromedia Freehand thx. I have done an instructable on how I do the drawings which can be found here.

Are you an Illustrator user?

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onlyonebowman says: Nov 14, 2008. 1:25 PM **REPLY**
no, but i wish i had cs4 extended edition, but my computer is slow and i'm broke. I guess bittorrent could be an answer.

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amature engineer says: Oct 30, 2008. 3:34 PM **REPLY**
And the best thing about it is that you can use whatever image you want! Is there any way to get around soldering?
Thanks.
Very cool Instructable.

KaptinScarlet says: Oct 30, 2008. 4:17 PM **REPLY**
Thx.

yes if you don't mind a slightly less than neat join for the plug wire. Proceed as described but for the USB plug use another plug from another USB wire. For this plug cut and strip the wire back slightly away from the USB plug and the all you have to do is wrap the correct wires together and hey presto. make sure they don't short together, use regular sticky tape to insulate the joins.

Good luck, hope it goes well.

Carlos Marmo says:
Wonderful Work!

Congratulations!

Oct 30, 2008. 2:49 AM **REPLY**

KaptinScarlet says:
thank you

Oct 30, 2008. 3:14 AM **REPLY**

cosmos92 says:
one of the best things on this site, love it

Oct 18, 2008. 8:57 AM **REPLY**

KaptinScarlet says:
your a star, thx!

Oct 19, 2008. 10:38 AM **REPLY**

cosmos92 says:
and your amazing, lol

Oct 19, 2008. 12:39 PM **REPLY**

beauwalker23 says:
you need to sell these. brilliant

Oct 16, 2008. 6:44 PM **REPLY**

vandalex says:
this is an awesome instructable i just finished mine i used a battery op LED keychain so i can signal for batman on the go, other than that i followed this design, it authentic looking. Oh and i used a black plastic lid from a can of mixed nuts for the bat shape, worked good

Sep 29, 2008. 8:00 AM **REPLY**

KaptinScarlet says:
good idea about the battery op LED. would be great to see a pic of it though... thx for the comments and glad you enjoyed it.

Sep 29, 2008. 8:44 AM **REPLY**

mettaurlover says:
i mauled a broken flashlight and used metal tape for this: it is awesome. i did cut holes in the reflector so that the sides would show through, and i killed an old USB stick for the plug in part... i just hook it up to an extendor for the power source and it's awesome...

Sep 20, 2008. 3:14 PM **REPLY**

KaptinScarlet says:
fantastic... pictures??

Sep 21, 2008. 12:50 AM **REPLY**

mettaurlover says:
no, i got no camera!

Sep 22, 2008. 6:02 PM **REPLY**

mettaurlover says:
and i gave it to my dad for his birthday.

Sep 22, 2008. 6:02 PM **REPLY**

KaptinScarlet says:
well that's kind of you, we'll have to imagine what it looks like then

Sep 23, 2008. 12:09 AM **REPLY**

Cono78 says:
Why do you have to cut off the head of the USB plug? Could you finish the project without cutting it?

Aug 21, 2008. 1:57 PM **REPLY**

mettaurlover says:
well... you COULD kill a cheap flash drive and se it's end to make it...

Sep 20, 2008. 3:07 PM **REPLY**

KaptinScarlet says:

I don't get this comment, do you want to explain??

Cheers

Sep 21, 2008. 12:49 AM **REPLY**

Cono78 says:

P.S. This is a great project! I am new to Instructables, and this is going to be my first! Thanks again for the awesome guide and idea!

Aug 21, 2008. 1:59 PM **REPLY**

KaptinScarlet says:

I wanted a thin wire from the light to the plug and I could get the big springy bit off the wire without cutting it off, although I did try. If you can do it please tell me how, because it is a bit of a pain cutting it off and then soldering it back on again.

Aug 21, 2008. 2:49 PM **REPLY**

AnarchistAsian says:

lightly cut the springy bit, then cut a slit with knife. peel off with pliers, cut off excess with knife.

ps-i like the rubber covering, makes it look proffesional ;-)

Aug 23, 2008. 11:04 AM **REPLY**

KaptinScarlet says:

Yup good idea, depends on which one you get. Mine was ok of the outer two layers, basically the structure is this: plastic dipped coating, soft pliable aluminium wire wound coating, hard high carbon steel spring thin little wires. The outer plastic dipped coating can easily be slit and peeled off, the aluminium wire wound layer can be picked apart at any given point, with a bit of effort and then unwound relatively easily, then you are left with the high carbon, hardened spring. It is very springy and very hard. I managed to break it without cutting the wires inside, which was in itself a miracle, but it is impossible to unspring, unwind or otherwise remove. At the plug end it is moulded on to the plug and at the other end it is trapped by the LED being soldered on. So despite all my efforts the only way was to chop it in half. and cut the plug off. After all this, that's why I recommend cutting the plug off straight away, much quicker and the same outcome.

Aug 24, 2008. 2:53 AM **REPLY**

AnarchistAsian says:

ouches!
you might as well have made your own, it's about the same effort, from what you described. plus, you can make any number of changes.

Aug 24, 2008. 10:12 AM **REPLY**

AnarchistAsian says:

ohhhh, crap, my computer said there was a power surge on the usb hub...
i think it's because i didn't use the resistor, i'll solder it on later, but did it cause permanant damage?

Aug 20, 2008. 3:41 PM **REPLY**

KaptinScarlet says:

no I think not. it has a protection on it for that. I used to charge my phone always and I had one phone that always caused a power surge. don't so that again though... obviously

Aug 23, 2008. 1:06 AM **REPLY**

AnarchistAsian says:

i added the resistor, everything's cool now...

Aug 23, 2008. 11:06 AM **REPLY**

KaptinScarlet says:

great, glad to hear it

Aug 24, 2008. 2:53 AM **REPLY**

AnarchistAsian says:

time to shine!
huge leds!!!!!!!!
did it myself and i'm almost done!

Aug 22, 2008. 4:41 PM **REPLY**

KaptinScarlet says:

excellent, that should be bright!

Aug 23, 2008. 1:04 AM **REPLY**

AnarchistAsian says:

but the viewing angle is 10 degrees...
that's too small, so it may not project, but it'll look cool!
i may have to use a special lense, but i think my 'sis will apreciate it as just a reading light with a blurry shape in the middle...

Aug 23, 2008. 11:09 AM **REPLY**

UrmiRaj14 says:

i just finished mine - and the light actually lights :D (this is my first time resoldering a usb plug). only thing: it isn't exactly a signal - it shows only diffused light :(but its cute as a button. planning on giving this to my bro as a surprise

Aug 15, 2008. 10:06 AM **REPLY**

KaptinScarlet says:

That's so cool. I think your brother will love it, what a nice brother you are!

Aug 15, 2008. 11:26 PM **REPLY**

AnarchistAsian says:

yeah, that's what i'm doing for my 'sis

Aug 22, 2008. 4:40 PM **REPLY**

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shammallamaman says:

She is a girl, or "female" as her profile says

Aug 20, 2008. 4:08 PM **REPLY**

UrmiRaj14 says:

yes I'm the sister who gave to **her** brother :-)

Aug 20, 2008. 10:26 PM **REPLY**

AnarchistAsian says:

funny, i'm giving one to my big sister...

Aug 22, 2008. 4:39 PM **REPLY**

KaptinScarlet says:

Oh dear I'm so sorry (and sexist...) well that's taught me, I do beg your pardon, what I meant to say was , what a lovely sister you are. Did your brother like it?

Aug 20, 2008. 11:56 PM **REPLY**

UrmiRaj14 says:

no worries :D yes he liked it (his initial reaction was a mix of a child-like "oooh what is that" and a "yay something for me"

Aug 21, 2008. 12:28 AM **REPLY**

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shammallamaman says:

Lol, maybe i should teach my sister to solder,
so that she can make me something ;)

Aug 21, 2008. 3:09 PM **REPLY**

KaptinScarlet says:

Yeah, everyone could do with a sis like that, my little sister turned all my flared trousers into drainpipes for me (that was a few years ago now), but then I did change the clutch on her car !

Aug 22, 2008. 12:59 AM **REPLY**

AnarchistAsian says: Aug 22, 2008. 4:41 PM **REPLY**

well, my 'sis is great at sewing...
that'll come in handy someday.

KaptinScarlet says: Aug 23, 2008. 1:09 AM **REPLY**

sure will, but maybe she should teach you, then come the revolution you'll be completely self sufficient. I have a brilliant
sewing machine and people are always amazed but secretly jealous

AnarchistAsian says: Aug 23, 2008. 11:11 AM **REPLY**

ha ha!... yeah.
my mom and 'sis will teach me when that time comes...
i want to make a sheath for one of my knifes, so i'll ask later.

KaptinScarlet says: Aug 24, 2008. 2:54 AM **REPLY**

yeah, sewing leather is actually really cool because it is such a tough material and really looks neat when you sew
it. Remember larger stitch length is better though (just a tip)

AnarchistAsian says: Aug 24, 2008. 10:14 AM **REPLY**

ahhhh, thanks, i thought smaller stiches were *always* better. that should save me loads of time...

view all 191 comments