This is an AC electric generator which lights up a tiny incandescent light bulb. The generator is made from a hollow-ended cardboard box with a nail through the center. The box has many turns of varnished thin copper wire wound around, with four large magnets clamped around the nail. When the nail and magnets are spun fast by hand, the little light bulb lights up dimly.

**PARTS:**

* - Don't use [different parts](http://amasci.com/coilgen/generator_3.html#one)!
* 4 - 1x2x5cm [ceramic](http://amasci.com/coilgen/rsmagnet.html) magnet: [Edu. Inv M-700](http://www.teachersource.com/ElectricityAndMagnetism/Magnets/CeramicMagnets.aspx) or [R Shk #64-1877](http://www.radioshack.com/product/index.jsp?productId=2102689), or [HFT](http://www.harborfreight.com/cpi/ctaf/displayitem.taf?itemnumber=97504&Submit=Go), or [CMS](http://www.magnetsrc.com/ceramic_ferrite_block_magnet.htm)
* 1 - #30 Magnet wi re 200ft, [Rad. Shack 278-1345](http://www.radioshack.com/product/index.jsp?productId=2036277) $6.59 , or cheaper from [other stores](http://amasci.com/coilgen/generator_3.html#onewire)
* 1 - Miniature Lamp, 1.5V 25mA Rad. Sh. #[272-1139](http://www.radioshack.com/product/index.jsp?productId=2102813) $1.29, or [All. LP-3](http://www.allelectronics.com/make-a-store/item/LP-3/1.5V-T-1-3MM-LAMP-W/-10-INSULATED-WIRE-LEADS/-/1.html) or [#48 lamp](http://www.google.com/search?q=%2348+miniature+lamp)
* 1 - Cardboard strip, 8cm x 30.4cm
* 1 - Large nail, 8cm long or more
* Misc. - Knife or sandpaper to strip the wires
* Misc. - tape to hold wire down Optional: hand drill or electric drill to spin it (hand drill is best)
* Note: if you use different parts, then it won't work.
* Cheaper: 600ft wire from an open-frame solenoid from [Electr. Goldmine](http://www.goldmine-elec-products.com/products.asp?dept=1178) or   
  valve from [El. Goldmine](http://www.goldmine-elec-products.com/prodinfo.asp?number=G4521), [Surplus Shed](http://www.surplusshed.com/pages/item/r3041.html) (need vise-grips) Also: [other sources of wire](http://amasci.com/tesla/diode.html#wire)

I wrote this article because I found lots of projects for making a simple electric motor, but nobody gave the secret for making a generator. Well, here it is: use strong magnets, lots of fine wire, and a special light bulb which only needs 1/2 volt.

Also, don't bother making a "commutator," just hook the wires directly to the bulb. It's much simpler that way, but the generator will produce AC (alternating current).

Before you start, here are some notes: DON'T USE DIFFERENT PARTS. You must use a special light bulb. Normal flashlight bulbs will not work. Also, you must use the large, strong magnets shown in the parts list. Smaller magnets won't work. Use thin wire with varnish insulation. The wire must be #30 gauge or smaller. Also, you can improve the generator if you buy lots of extra kits of wire and wind it on the cardboard, since the bulb will light up even when the generator spins slowly. Three kits of Radio Shack wire is expensive, it's cheaper to mail-order just one or two [Open-frame box solenoids](http://www.allelectronics.com/make-a-store/category/575/Solenoids/1.html), but you'll, need vise-grips pliers to pry apart the steel frame and remove the spool of wire.

**CONSTRUCTION**

First make the hollow-ended box. Score the cardboard strip like so:

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| 8cm | 3.5cm | 8cm | 3.2cm | 7.7cm |

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NOTE: this page must be displayed in COURIER FONT, otherwise

these pictures will be wrecked and unreadable. Most browsers

do this automatically.

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|\ 7.7 | \ 3.5

| \3.2 | \

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| | | Fold it like this and tape

| | | it securely.

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| \ | \ Use the nail to poke a hole

| \\_\_\_\_\_\_\_\_\_\_\_\_\_\_|\_\_\_\ perfectly straight through the

| | | center of the box, going through

| | \ / | both sides and all three layers

| | \ / | of cardboard. Then pull the nail

| | \ (hole) | out and use it to widen all the

| | \ / | holes slightly, so when you put

| | O | the nail back through, it will

| | / \ | be a bit loose and able to spin.

| | / \ |

| | / \ | ( You can find the exact center

\ | / \ | by drawing an "X" to the corners

\|\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_| using a ruler. )

At this point you should clamp your four magnets around the nail and give it a spin. This makes sure the box is large enough. The nail and magnets should spin freely. The corners of the magnets should NOT bump the inside of the box as they spin. If the box is a bit too small, start over and make it a little bigger. Either that, or try a thinner nail. (Also, be sure to use the right magnets. Small ones won't work.)

Pick the spool of number-30 magnet wire from

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the kit of spools. This is the thinnest.

\_|\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \ Tape one end of the number-30 magnet wire

|\ | \ to the side of the box, then wind all of

| \ | \ the wire onto the box as shown. It's OK

| \\_\_\_\_\_\_\_\_\_\_\_\_\_|\_\_\_\ to cover up the nail hole. Pull the taped

| | | end of the wire out, then tape down both

\ | | of the wires so the coil doesn't unwind.

\\ | | You should have about 10cm of wire left

\\\====================| sticking out.

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-----+-\====================/ \

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/ | | | \ Use sandpaper or the edge of a

| \ | | | knife to scrape the thin plastic

| \|\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_| | coating off 2cm of the wire ends.

| Remove every bit of red coating,

so the wire ends are coppery.

(note: the five lines of wire shown above are not real, that's

the 'equals signs' I used to draw with. The real wire can just

be wound up in a big wad in the center of the cardboard box.)

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| \\_\_\_\_\_\_\_\_\_\_\_\_\_|\_\_\_\ Spread the wire away from the

| | | nail hole and tape it in place.

\ | | Stick the nail back through the

\\ | | holes and make sure it can spin.

\\\====================| Take your four magnets, stick

\\\========---=========/\_\_\_ them face to face in two pairs,

|\\========(\\)========/ \ Then stick the two pairs inside

-----+-\==========(\_)=======/ \ the box and on either side of the

/ | ==================== | nail so they grab the nail. Push

/ | | | | them around until they are some-

\ | | | what balanced and even, then spin

\|\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_| | the nail and see if they turn

freely. If you wish, you can

stick 2cm squares of cardboard

between the magnets to straighten

them, and tape the magnets so they

don't move around on the nail.

\_\_\_\_\_ magnets

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|\_\_\_\_\_| |\_\_\_\_\_\_\_\_\_\_\_\_\_| 2 magnets

=================|| NAIL |\_\_\_\_\_\_\_\_\_\_\_\_\_|

|\_\_\_\_\_| \_\_\_\_\_\_O\_\_\_\_\_\_

|\_\_\_\_\_| |\_\_\_\_\_\_\_\_\_\_\_\_\_| 2 magnets

|\_\_\_\_\_\_\_\_\_\_\_\_\_|

SIDE VIEW OF THE

NAIL AND MAGNETS VIEW FROM THE END

### TWIST THE WIRES TOGETHER

Make sure that each end of the generator's wires are totally cleared of red plastic coating. If there is a bit of plastic left, it can act as an insulator which turns off your light bulb circuit.

Twist the scraped end of each generator wire securely around the silver tip of each wire from the small light bulb. (If necessary, use a knife to strip more plastic from the ends of the light bulb wires.) One generator wire goes to one light bulb wire, the other generator wire goes to the other light bulb wire, and the two twisted wire connections should not touch together. In the twisted wires, metal must touch metal with no plastic in between.