SOLAR TV REMOTE

Juice your flipper with sunlight.

By Sparkle Labs

Powering a TV remote with the sun means you won't have to buy batteries every six months to surf from the sofa. Low-voltage devices that use power only occasionally, like remotes, are good candidates for a solar-powered trickle-charge. Here's how we modded our remote to live off the sun, using rechargeable batteries connected in parallel with a small solar cell and a diode to keep any power from trickling back out (Figure C).

1. Determine what you need.

First, open your remote to see what kind of batteries you'll need and how many. Our remote used 2 NiMH AAA batteries. Remote batteries connect in series, so add up the battery voltages to determine what size solar panel you'll need. Disposable AA and AAA batteries put out 1.5V, but the equivalent NiMH rechargeables produce 1.2V.

Look for a solar cell that generates a higher voltage than the batteries (a total of 2.4V in our case). Make sure it's a flexible cell that fits on the back of your remote so you can attach it easily.

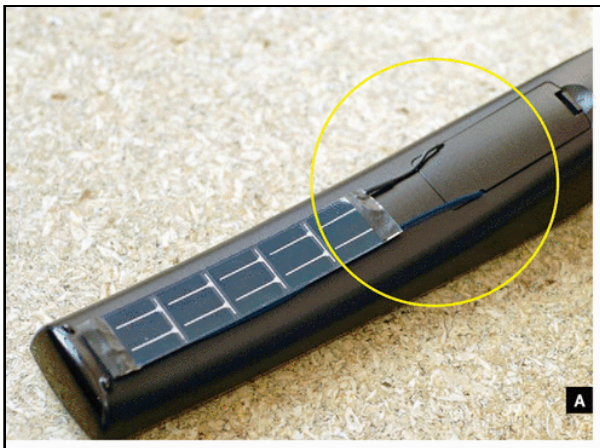
Use a multimeter at its lowest DC voltage setting to test the polarity of the cell. The needle or number will read positive with the meter's black probe (–) on the ground terminal and red probe (+) on power.

Switch the meter to test for continuity and probe to find the pair of contacts, (–) in one battery compartment and (+) in the other, that aren't electrically connected. These 2 contacts are where we'll patch in the solar panel.

2. Put it together.

Use a sharp knife to scrape the plastic off the 2 solar cell contacts, then dab a bit of hot solder on these points. Position the solar cell against the back of

Photography by Amy Parness and Ariel Churi



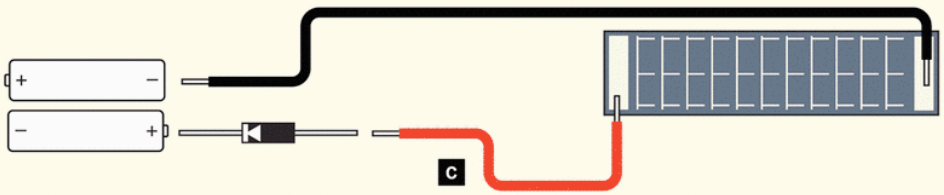


Fig. A: Cut a notch in the battery compartment door to route the wires through. Stick the solar cell to the back of the remote with double-sided tape, and cover the solar cell's contacts and the diode with electrical tape.

Fig. B: To smooth the wire connections in the battery compartment, solder copper tape over the ends of the wires. Fig. C: Wiring diagram. Solder the diode directly to the cell, or farther away, depending on your remote.

MATERIALS AND TOOLS

Remote control
Rechargeable batteries, NiMH size and number to replace the remote's batteries
Solar cell, flexible film Match voltage and size to your remote (see Step 1). We used a 3V 25mA cell measuring 4½"×1", item #227993 from Jameco (jameco.com), $4. You can also find these on other electronics websites and eBay.
Wire, 24–28 gauge, insulated, about 2'
Diode, 1N4004 or similar item #276-1103 from RadioShack (radioshack.com), $1
Copper tape, ½"-square pieces (2)
Double-sided tape
Electrical or foam tape matching the color of your remote
Multimeter
Hobby knife
Wire cutters and strippers
Soldering iron and solder
Rotary tool or small file

the remote, and determine the wire lengths needed for neatly connecting the 2 unconnected battery contacts to the solar cell contacts.

Cut 2 wires to length, strip the ends, and solder one wire between the negative (−) contacts of the battery and solar cell. Solder the diode's cathode side (without the stripe) to the positive (+) contact of the solar cell, then solder the other wire to the diode's anode side (with the stripe). Trim the end of this wire to compensate for the added diode length, then connect it to the positive battery contact.

To smooth over the wire connections in the battery compartments so the batteries slide in more easily, we soldered small pieces of copper tape to the ends of the wires.

Use a rotary tool or file to cut a small notch in the side of the battery compartment door, to route the wires through when the door is closed (Figure A). Attach the solar cell to the back of the remote with double-sided tape, and cover the cell's ends with electrical or foam tape, just over the light-colored parts. We taped over our diode as well.

Finally, load your rechargeable batteries (Figure B). Our remote takes 4–5 hours to charge its batteries fully, but it never gets low as we leave it by the window.

Get the kit at makershed.com/solarremote

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