Solar Notebook Charger (NB42 +E123)- Instructions

Description

The Solar Notebook Charger + Emergency123 is a direct current solar charger that can charge a range of battery-based electronic devices, such as cell phones, iPods, MP3 players, and power banks. A Power Bank is included in this design, to power phones, and to power a USB LED Light Bulb or Light Stick for emergency or routine lighting needs. This particular design is based on a custom solar module designed by Solar Schoolhouse to produce 8v and 400mA in clear sunlight. The 8 volts is slightly higher than the minimum input to a USB car charger, which outputs the USB 5 volt standard. Thus any device that can be charged with a USB connector, can be charged with this solar charger. For some devices, we've found that the charging process works best to charge a power bank **first**, then use the power bank to charge a phone. This strategy allows one to leave a power bank charging in the sun during the day, and then give your phone a boost when needed. While we've provided one Power Bank in this kit, you may consider adding another, so that you have one fully charged one with you during the day, while the other is solar charging.

This notebook is shown with E123 accessories & 2 solar modules.

The Solar Notebook Charger + E123 encourages you to design and build your own base coroplast (for durability and water resistance), and duct tape. The steps shown here illustrate both solder-based and solder-free options.

Materials:

- (2) 8 Volt* 400 mA, 3.2 watt Solar Module (v.NB4)
- (12) double-sided 3/4" foam tape squares (2) wire nuts
- (2) rubber bumpers
- (1) USB car charger
- (1) DC Auto socket ("cigarette lighter") with ~ 3" wire
- (5) cable 'Zip' ties
- (1) 2600mAh Power Bank, with capacity light indicators, plus cable
- (1) Pencil Pouch
- (1) USB LED Light Bulb
- (1) USB LED Light Stick
- (2) Coroplast piece. (Repurposed campaign signs). 7.5" x 9.5"

You supply: Duct tape, clear packing tape, old magazines to create 'renewable energy' collage for outer cover.

Tools: wire stripper/cutter, utility blade or snap knife, pencil/ sharpie, ruler, small screen driver or punch (optional), Solder Iron (optional), Heat Gun (optional, use if soldering), Digital Multimeter (optional)

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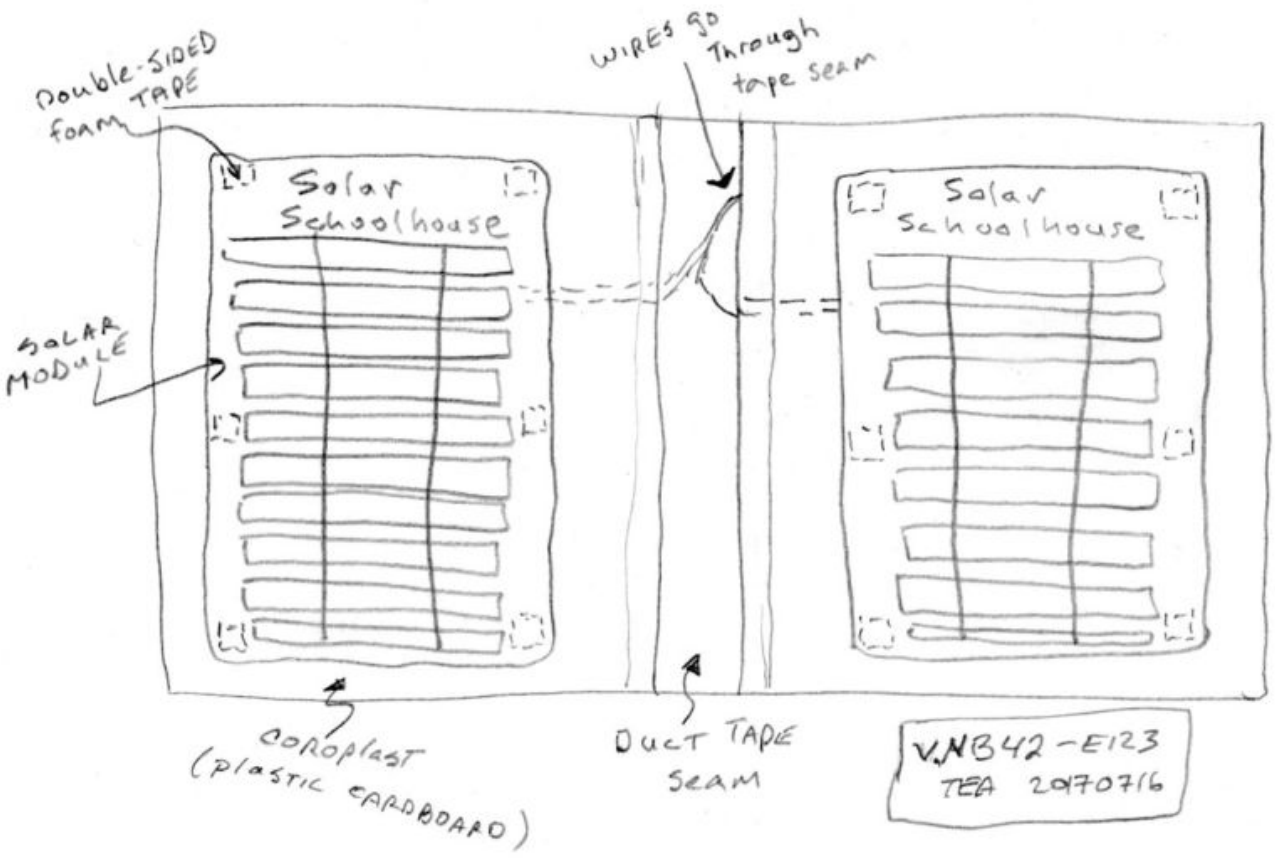
You Supply

Tools

Directions:



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1. Cut two pieces of 4mm thick corrugated plastic (aka coroplast) ~ 7.5” x 9.5”. (These dimensions can vary but you should allow minimum 10mm border on all sides around the solar module, with >25-30mm border along the seam). The channels in the coroplast should align with the short (7.5”) side, so that one has the option of threading the wires through channels to the seam. Make sure they are roughly the same size. Trim one to match the other, if needed.

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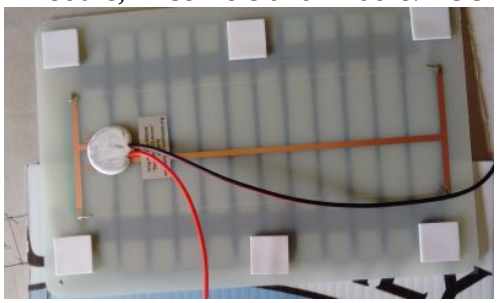
2. Create a binding for your solar notebook by duct-taping the two coroplast pieces together on one of the long edges. Leave a **ONE** inch gap between coroplast pieces. This is enough room to allow the notebook to open and close.. A seam can be made using 2” wide duct tape or 3” wide duct tape.



a. Make a 1” guide., b. use the guide to maintain the 1” gap when making the seam with either 3” wide duct tape or 2” wide duct tape.

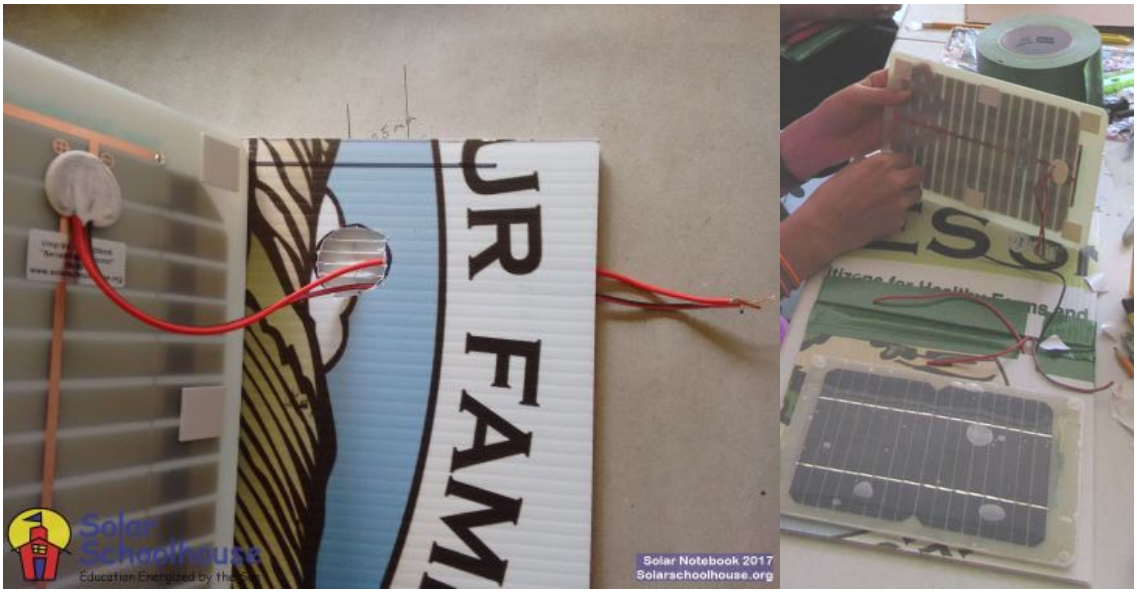
3. Place foam tape on back of solar module, in corners and middle. As shown.



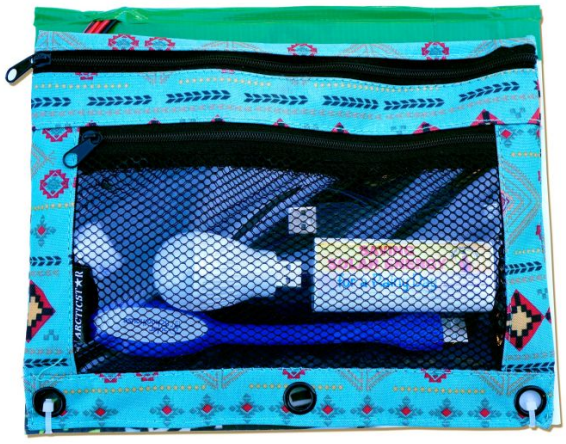
4. Place the solar modules on the coroplast. Using a ruler draw a guideline approximately 10mm from the top and bottom, and 20mm from the side. Leave more space toward the seam (where the duct tape is). Use a Sharpie to “ink” the silicon Blob on the back of the solar module, then place the module where you want it and press down. This will leave a mark on the coroplast. Use a snap knife (or xacto knife) to cut a circle around the area of the blob identified by the sharpie mark, halfway through the coroplast, as shown in picture below right.



5. Thread the Red and Black wires from the solar module through the hole and along one or two channels toward the seam. You should have left a section in the seam without duct tape, so that you can pull the wires through. Repeat with the other panel. Make sure they line up with each other. Remove the protective paper on the foam tape, place & press the solar modules into place. Try to place it so that the blob sits in the hole that you cut, so that the solar module sits flush with the coroplast. If needed, cut the hole a little bigger.

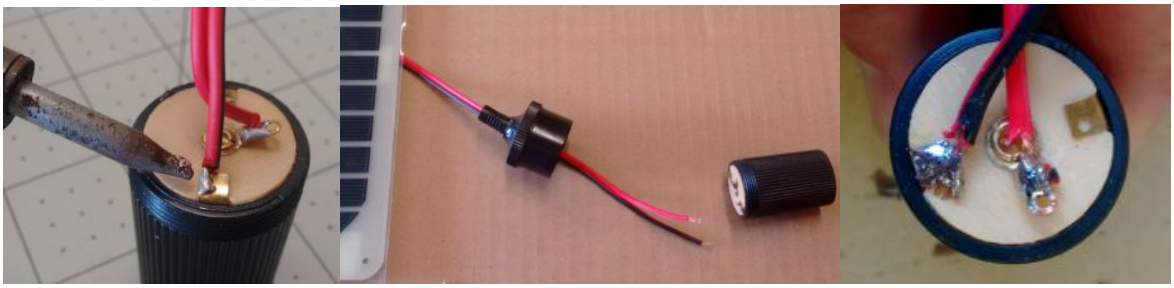


6. Place the Pencil pouch on the back of the notebook. Attach the pouch to the coroplast using zip ties through the two eyelets (pouch) and small holes in the coroplast (using a screwdriver or punch). Then punch a hole through the pouch and coroplast in the corner away from the wires, near the seam. Secure with a zip tie. Cut a small hole in the pouch near the zipper and thread the wires into the pouch.



7. Connect the Solar Module wires to the Autosocket.via the SOLDER option or SOLDER-FREE option.(see below)

   7a. (SOLDER OPTION) – Unscrew the cap of the autosocket. Using the hot soldering iron, heat the solder on the wire connections to loosen them, and remove the existing ~ 3" pieces of wire. Take care to avoid touching the plastic part of the autosocket as it will melt. (Alternatively one could snip them off with wire snips.) Strip ~ ¼" of the insulation off the Solar Mod wires. "Tin" the tips – ie. Add a little solder to the ends before connecting to the autosocket. This will make it easier to connect the two. Be sure to thread the wires through the autosocket cap before soldering to the socket. The RED (+) wire connects to the MIDDLE contact on the socket, while the BLACK (-) wire connects to either of the OUTER contacts. Be sure there is NO wires bridging between the Middle and outer contacts – this will short your circuit, keeping the solar electrons from reaching their desired destination. Screw the cap back in place to complete. *IF 2 solar modules, then solder BOTH Red wires to the center, and BOTH Black wires to the outer contact.*



   7b. [SOLDER FREE OPTION] Strip ~ ½" of the insulation off of the solar module wires AND the wires attached to the autosocket. Twist the RED (+) wires together and secure with a wire nut. Repeat with the Black (-) wires. Ok to unscrew the cap to see which color wire is connected to the MIDDLE contact. This is Always the Positive (+) contact.

8. Insert the USB Car Charger in the Autosocket. TEST the charger in sunshine and see if the green or red light on the USB car charger lights up. Green (or red) light means it works!!

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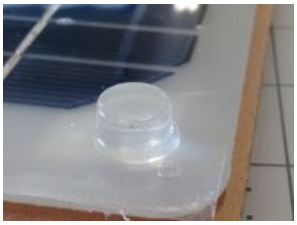
9. Place a clear rubber bumper on the outside corners of two of the solar panels. This will help protect the module when closing the Solar Notebook. You may choose to leave the clear protective film on the solar module to protect against scratching.



10. Cover up the area where wires are exposed on the seam with another piece of duct tape.

11. You are now ready to charge your device. Be sure to decorate the outside of your Solar Notebook Charger.

12. Best charging results in direct Sunlight. ie. Doesn't work that great (or at all) indoors.

Note: most portable electronics use Lithium-Ion batteries. Li-On batteries have a very high energy density, allowing for more power in a smaller space. Li-On cell voltage is typically 3.7volts. USB ports are designed at 5 volts. The USB car charge has a built-in voltage reducer to convert the input 12volts to the 5v that is compatible with your phone/ipod.