

# How to make a solar iPod/iPhone charger -aka MightyMintyBoost

by **Honus** on May 2, 2009

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Author: Honus Multi-Bot

I'm a former bicycle industry designer turned professional jeweler.

### Intro: How to make a solar iPod/iPhone charger -aka MightyMintyBoost

I wanted a charger for my iPodTouch and the MintyBoost was definitely my first choice. I wanted to take it a bit further and make it not only rechargeable but also solar powered. The other issue is that the iPhone and iPodTouch have large batteries in them and will deplete the two AA batteries in the MintyBoost rather quickly so I wanted to increase the battery power as well. What I really wanted was a MightyMintyBoost!

Apple has sold over 30 million iPodTouch/iPhone units- imagine charging all of them via solar power.... If every iPhone/iPodTouch sold was fully charged every day (averaging the battery capacity) via solar power instead of fossil fuel power we would save approximately 50.644gWh of energy, roughly equivalent to 75,965,625 lbs. of CO2 in the atmosphere per year. Granted that's a best case scenario (assuming you can get enough sunlight per day and approximately 1.5 lbs. CO2 produced per kWh used.) Of course, that doesn't even figure in all the other iPods, cell phones, PDAs, microcontrollers (I use it to power my Arduino projects) and other USB devices that can be powered by this charger- one little solar cell charger may not seem like it can make a difference but add all those millions of devices together and that's a lot of energy!

There are some really nice features about this charger:

It's solar powered!

It's small.

Large battery capacity- 3.7v @2000mAh

On board charger charges via solar, USB or wall wart. Accepts input power from 3.7v to 7v.

Remove the solar cell after charging and you have a nice compact USB power supply.

Unplug the solar cell and use the Velcro to secure the MightyMintyBoost inside a backpack or messenger bag- now plug in a larger solar cell attached to your bag for even faster charging. Using a slightly larger solar cell (6v/250mAh) you can generate enough power to fully charge an iPhone in about 5.5 hours and an iPod Touch in 4 hours.

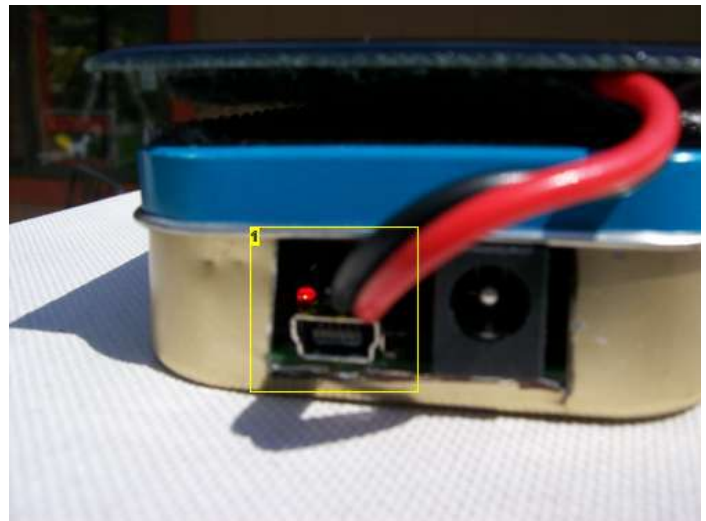
Building this is really easy and straightforward- it only took me around an hour so follow along and build one for yourself!

Safety note and general disclaimer: Be careful cutting the Altoids tin as it can have some really sharp edges- file them smooth if necessary. Assemble this at your own risk- while it is really easy to build, if you mess something up there is the potential to damage the electronic device you are trying to charge. Be careful in your assembly and soldering work and follow good safety practices. Only use a type of battery charger specifically designed for the type of battery you are using. Please read through the entire Instructable before asking questions- if there are any questions just ask and I'll help out as best as I can!



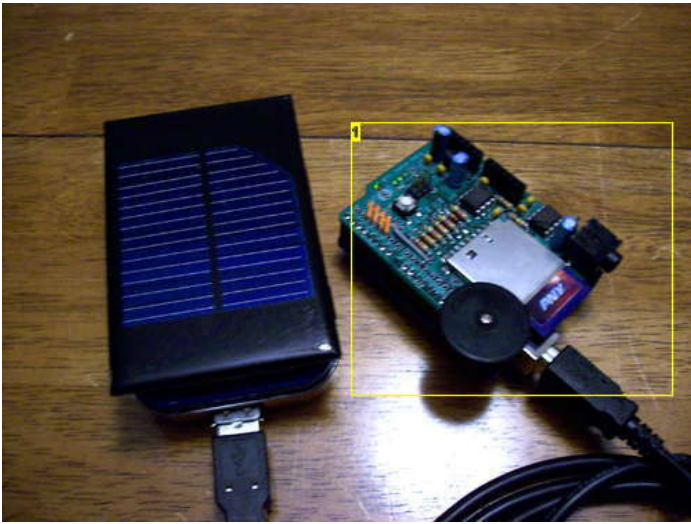
#### Image Notes

1. iPodTouch- it's charging!



#### Image Notes

1. Charging on solar power!



#### Image Notes

1. Arduino w/Adafruit Wave shield powered over USB

### Step 1: Tools and materials

Here's what you'll need to build your own MightyMintyBoost:

#### Tools:

Soldering iron  
Scissors  
Wire cutters  
Pliers (or multitool)  
Multimeter  
Metal shears  
Clear packing tape

#### Materials:

MintyBoost kit  
Lithium Polymer battery charger  
3.7v 2000mAh Lithium Polymer battery  
JST connector/wire  
Small solar cell  
2" x 3" adhesive backed Velcro  
Small double sided adhesive squares  
Altoids tin

7/10/10 UPDATE: Adafruit now also sells all the parts you need to make this a bit more mighty. Have a look here!  
<http://www.adafruit.com/blog/2010/07/09/how-to-make-a-solar-mintyboost-a-solar-power-charger-for-your-gadgets/>

#### Some notes:

The single cell Lithium Polymer charger can accept input power that ranges from 3.7 to 7v maximum. When the cell reaches full charge the charger will automatically switch to trickle charging. When charging using the mini USB port, the charging current is limited to 100mA. When charging using the barrel plug jack, the charging current is limited to 280mA.

The solar cell maxes out at approximately 5v @ 100mA in bright sunlight. If you need faster charging simply use a larger solar cell- a 6v cell @ 250mA would work very well and they are easily obtainable and inexpensive. I used the size of solar cell that I did because I wanted it to be super compact.

I could not find out from the manufacturer if the solar cell I used has a blocking diode. A blocking diode is used in many solar charging systems to prevent the solar cell from draining the battery during low light conditions. Instructables member RBecho pointed out that the charging circuit used negates the need for a blocking diode in this application. You can tell when the solar cell is producing enough power because the little red LED on the charger will come on during charging.



**Image Notes**

1. 3.7v 2000mAh LiPoly battery
2. double sided adhesive squares
3. Velcro
4. trusty multitool
5. JST connector
6. Sparkfun single cell LiPoly charger
7. Adafruit MintyBoost kit
8. Sparkfun small solar cell
9. multimeter



**Image Notes**

1. My trusty soldering iron

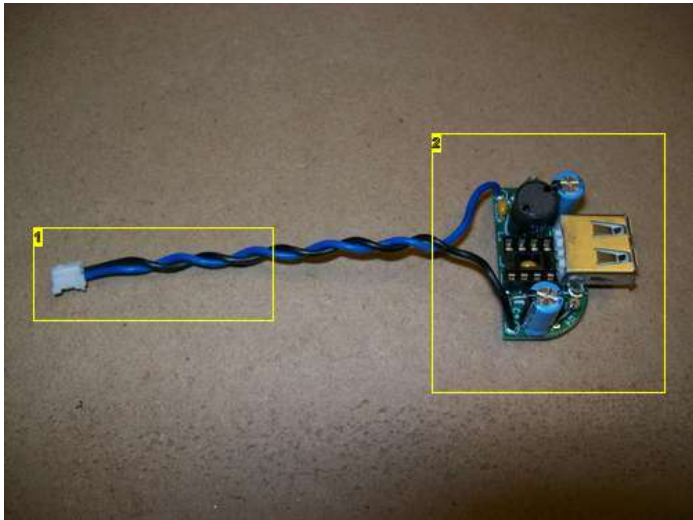
**Step 2: Build the Minty Boost kit**

First build the MintyBoost kit according to its instructions. It's really easy to assemble- even a complete novice can do it.

Instead of connecting the battery holder in the kit, we're going to solder a JST connector to the MintyBoost PCB. This tiny connector will then allow the MintyBoost circuit to connect to the Lithium Polymer battery charger circuit. Make sure you get the polarity correct!

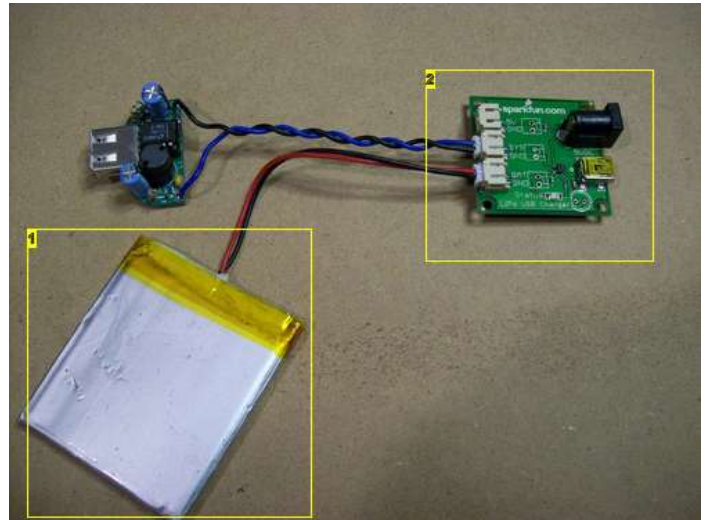
Test the MintyBoost by connecting the battery pack (make sure the battery pack has a charge) and charger circuit. The MintyBoost connects to the connector marked SYS on the charger board and the lithium polymer battery connects to the connector marked GND.

Now cut a notch in the Altoids tin for the USB port and use some double sided adhesive to mount the PCB to the Altoids tin.



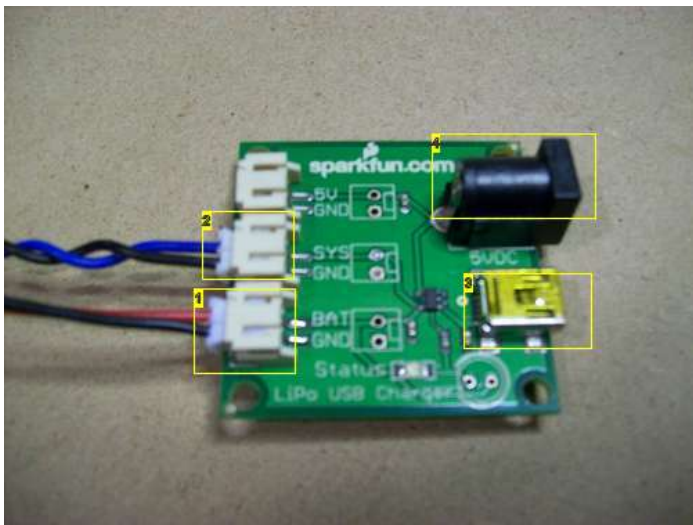
**Image Notes**

1. JST connector
2. MintyBoost PCB



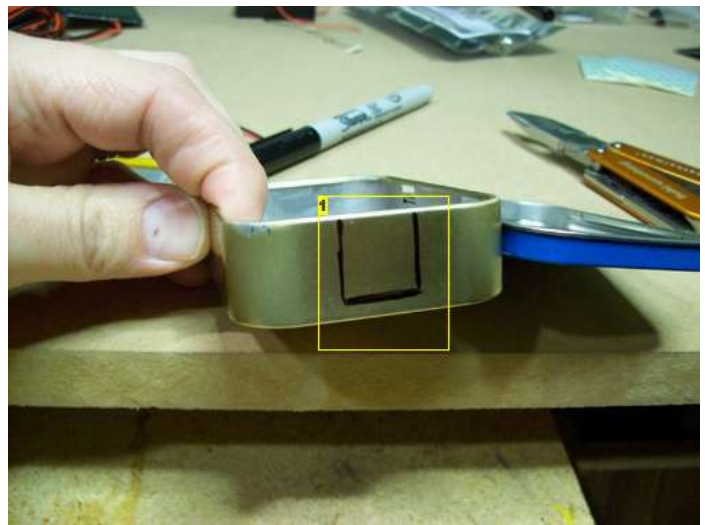
**Image Notes**

1. 3.7v 2000mAh Lithium Polymer battery
2. Sparkfun single cell Lithium Polymer battery charger



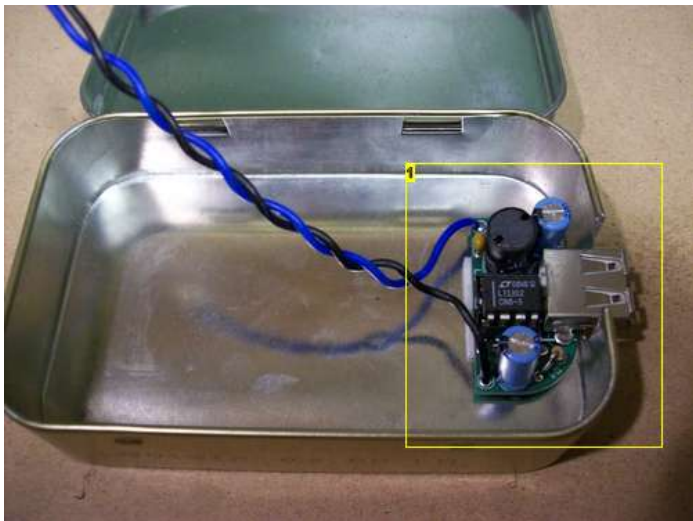
**Image Notes**

1. battery goes here
2. MintyBoost goes here
3. USB power in
4. 3.7 to 7v power in



**Image Notes**

1. cut notch for USB socket

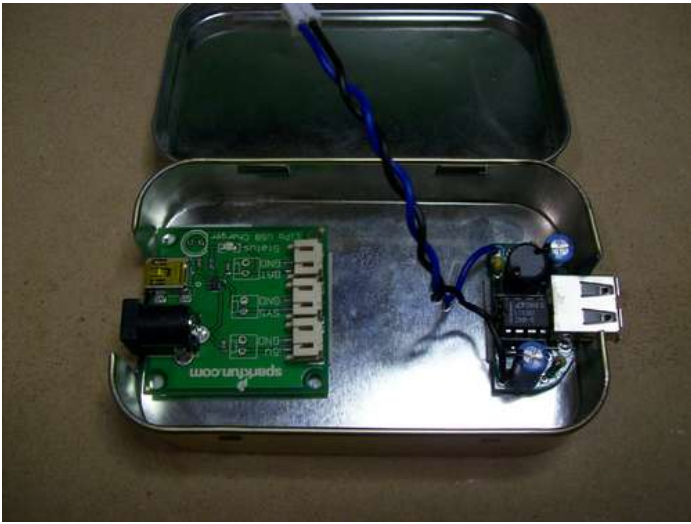


**Image Notes**

1. Adhere MIntyBoost PCB with double sided tape

**Step 3: Add the battery and charger**

Now cut a notch out of the other side of the Altoids tin to fit the charger and secure the charging circuit to the bottom of the Altoids tin with double sided adhesive. Reconnect the battery and the MintyBoost PCB to the charging circuit. Make sure nothing on the bottom of either one of the circuit boards is touching the bottom of the Altoids tin.



#### Step 4: Add the solar cell

There are a couple of different ways to connect the solar cell. The first is by simply shortening the connector leads and plugging the barrel plug into the barrel jack on the charging circuit.

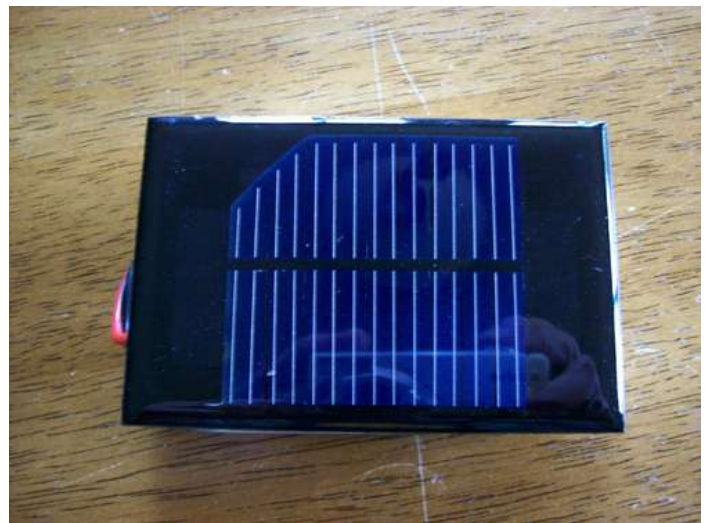
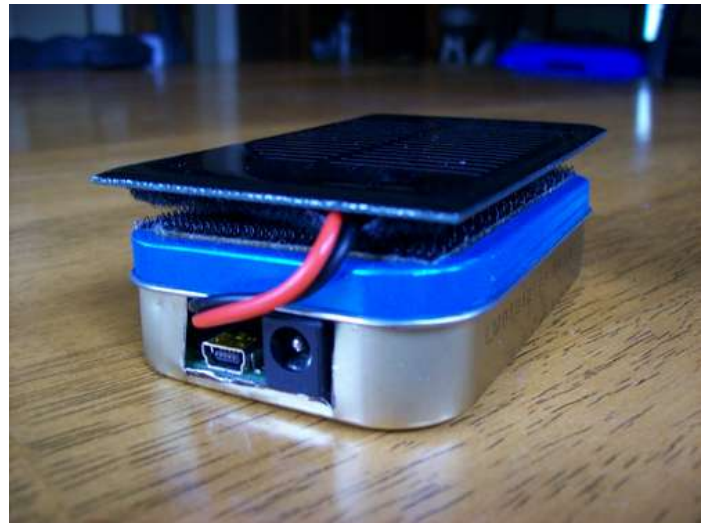
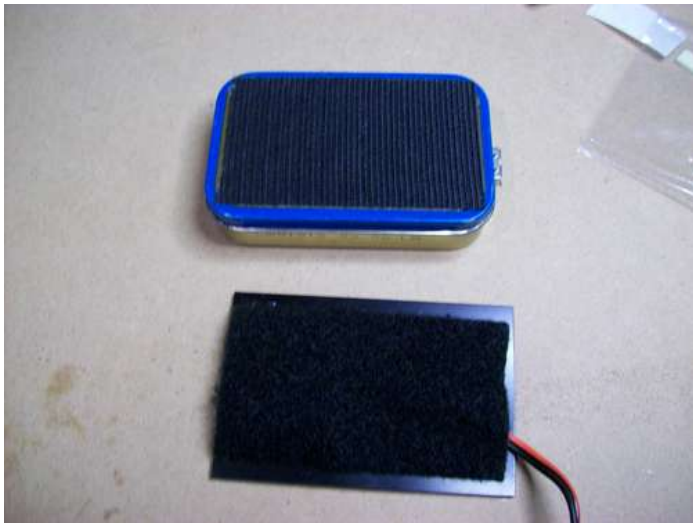
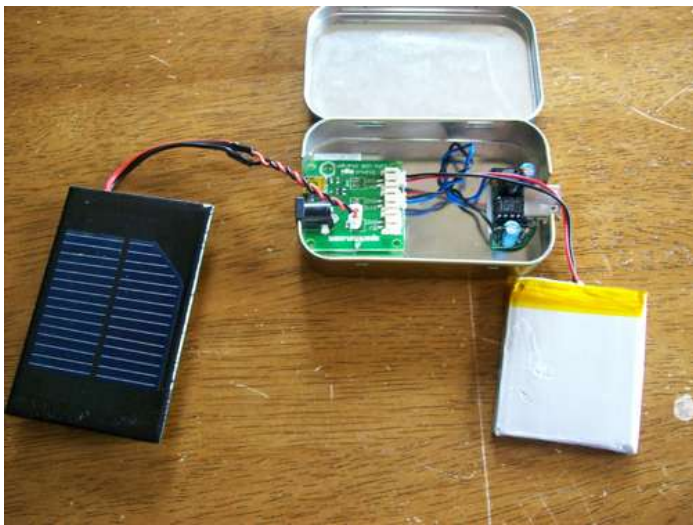
The second method is to replace the connector with another JST connector and plug it into the third connector marked 5v on the charging circuit. I didn't have another JST connector handy so I just soldered a salvaged two pronged connector to the charging circuit where there are two open pins on the 5v line.

Using the second method certainly is a bit cleaner since you don't have the big barrel plug sticking out of the side of the tin.

Now attach the solar cell to the top of the Altoids tin using some 2" wide Velcro. I wrapped the battery pack with a layer of clear packing tape to help protect it. Then the battery pack is simple set down on top of the two circuit boards- it's a near perfect fit.

Now set your MightyMintyBoost out in the bright sun and charge it up! You should see a little red LED on the charger board light up. Once it's fully charged connect your iPod/iPhone/USB powered device and enjoy!





## Step 5: FAQ and additional info

Here's a list of frequently asked questions:

### Q: Is it possible to overcharge the Lithium Polymer battery?

A: No- the charger will automatically switch to trickle charging and then shut off.

### Q: Is it possible to drain the Lithium Polymer battery completely and damage it?

A: No- the battery has its own low voltage cut off circuitry that will prevent it from completely discharging- the low voltage cut off is around 2.8v

### Q: Does the solar cell have a blocking diode to prevent it from draining the Lithium Polymer battery?

A: No blocking diode is necessary- the Lithium Polymer charger prevents the battery from leaking current.

### Q: How long will it take to fully charge the Lithium Polymer battery and how long will it take to charge my iPod/iPhone?

A: How long it will take to fully charge depends on the amount of sunlight available but as a rough guesstimate it would take around 20hrs using the small solar cell in direct sunlight. Using a larger solar cell could easily take half if not one third the amount of time. Those same figures would apply if you were charging it over USB or using a wall wart power supply.

Charging your iPod is much faster. How fast it does it depends on your device's battery capacity. An iPod Touch has a 1000mAh battery so it should fully charge it in around 2hrs. A 3G iPhone has a 1150mAh battery so it will take slightly longer and a 2G iPhone has a 1400mAh battery, so it will take around 3 hrs.

### Q: The Lithium Polymer charger has an input voltage range of 3.7v minimum to 7v maximum- what if I want to use a higher output solar cell for faster charging?

A: To use a solar cell with a voltage output greater than 7v, you need a voltage regulator to drop the voltage to a level that the charger can handle. You could use a 7805 voltage regulator to limit the output to +5v -they only cost about \$1.50 and are very simple to wire up. The 7805 will give you a fixed +5v and is usually good up to 1A current. You could also use a LM317T which is an adjustable regulator, but it would involve a bit more circuitry to use. Some people also use diodes to drop voltage, since many diodes have a voltage drop of .7v

There's a lot more info here: [http://en.wikipedia.org/wiki/Linear\\_regulator](http://en.wikipedia.org/wiki/Linear_regulator)

The other option would be to use a 6v/250mA solar panel. This will stay within the current input range and voltage input range of the Lithium Polymer charger. Remember that you can also connect smaller solar cells in parallel to increase the available current- two 5v/100mA solar cells connected together in parallel will give an output of 5v @200mA

### Q: What if I want to use a charger with a higher input current limit?

A: Sparkfun does have a Lithium Polymer charger that maxes out at 1A:  
[http://www.sparkfun.com/commerce/product\\_info.php?products\\_id=8293](http://www.sparkfun.com/commerce/product_info.php?products_id=8293)

### Q: How would I connect the more powerful charger- there doesn't appear to be a clear way to do this?

A: To use the more powerful 1A charger you would need to wire a two way switch to the battery so that in one position the battery would be connected to the charger and in the other position the battery would be connected to the MintyBoost circuit.

### Q: Will this work with USB devices other than iPods and iPhones?

A: You bet! There's a list here: <http://www.ladyada.net/make/mintyboost/>

### Q: Won't the inside of the Altoids tin short out the circuit?

A: No- using double sided foam tape to mount the circuit boards keeps the bottom of the board from coming into contact with the inside bottom of the tin. If you're really worried you can cover the inside bottom of the tin with clear packing tape.

### Q: How much does this cost? Can I build it for less? Is it cost effective?

A: If you buy everything as listed it would cost \$70.75 (not including the Altoids tin or shipping.) If you wanted to scratchbuild it using the MintyBoost PCB from Adafruit, building your own charging circuit and supplying your own parts from various sources you can save quite a bit. Both the charging circuit and the MintyBoost circuit are available online- just go to the web pages listed in the tools and materials section- they're also listed at the bottom of this page.

Both Maxim and Linear Technology supply free samples (according to their websites) of their ICs so you just need to provide all the other bits (available from places like Mouser and Digikey.) Using a slightly smaller solar cell and a 2200mAh battery it is possible to build it for a lot less:

2200mAh battery  
solar cell  
MintyBoost PCB

After adding up the small parts for the MintyBoost circuit, a small blank PCB for the charging circuit (you would have to etch the board yourself) and a mini USB connector, you could conceivably build this for around \$21.00 (not including shipping or an Altoids tin.) It wouldn't be exactly the same of course, but it would be functionally the same. I don't know if the 2200mAh battery would fit into an Altoids tin either. It would be a LOT more work of course, and there could be a fair bit of troubleshooting if you're not experienced in building these types of circuits or soldering surface mount components.

So is it cost effective? Absolutely- it just depends on the amount of work you want to do. Either way, you get a very useful and versatile solar powered charger.

### Q: How did you calculate the power usage and equivalent CO2 values?

A: Here's the math-  
 $3.7v \text{ (LiPo rated voltage)} \times .1A \text{ (solar charge current)} = .37W$   
 $.37W \times 12.5hrs \text{ (charge time based on average battery capacity)} = 4.625Wh$   
 $4.625Wh \times 365 \text{ days} = 1688.125Wh \text{ per year}$   
 $1688.125Wh \text{ per year} \times 30,000,000 \text{ units sold} = 50,643,750,000Wh \text{ total used per year (50.644gWh)}$   
 $50.644gWh \text{ per year} \times 1.5 \text{ lbs CO2 produced per kWh used} = 75,965,625 \text{ lbs. CO2 produced per year}$

Granted these are more or less maximum values but they clearly show some potential for some serious energy savings. A 12.5hr solar charge time per day isn't realistic for the majority of the planet but if you shorten the solar charge time to approximately 4.5hrs at a 280mA current the results still remain the same.

### General information about the Lithium Polymer charging circuit as well as a circuit diagram and data sheet can be found here:

[http://www.sparkfun.com/commerce/product\\_info.php?products\\_id=726](http://www.sparkfun.com/commerce/product_info.php?products_id=726)

### A complete description and documentation of the MintyBoost circuit can be found here:

<http://www.ladyada.net/make/mintyboost/>

<http://www.instructables.com/id/How-to-make-a-solar-iPodiPhone-charger-aka-Might/>

## Related Instructables



**Create A Solar iPhone and USB Charger (video)**  
by [hastyhost](#)



**Minty Boost Extra** by [AleGuy](#)



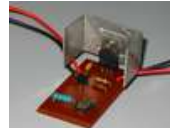
**Energizer USB battery charger**  
by [pcmofo](#)



**Solar powered iPhone charger and Arduino in a book** by [t-square](#)



**Powering the Arduino Mega with a Lithium Battery** by [inthebitz](#)



**How to make Lithium charger**  
by [hosam\\_eldin](#)

## Comments

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**Landcruiser87** says:

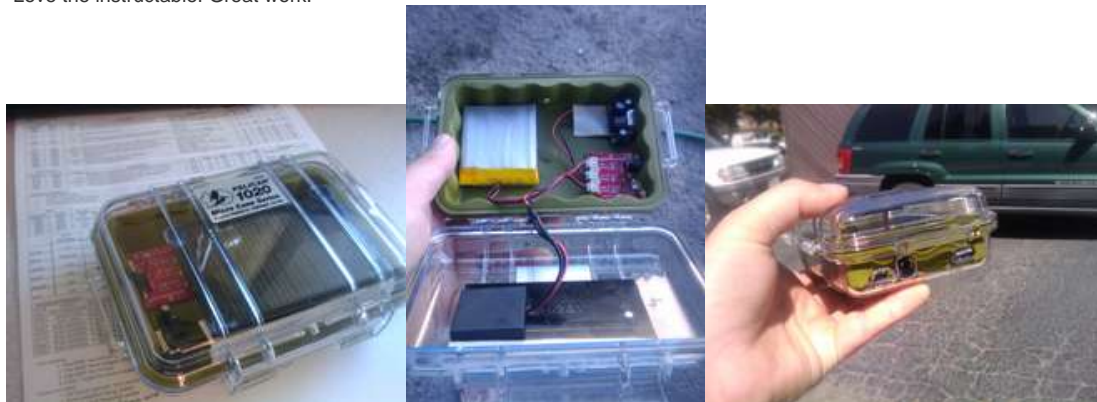
Sep 27, 2010. 1:28 PM [REPLY](#)

Love this setup,

I plan on building a 12V system for other power hungry applications, but instead of a flimsy altoids can, i decided to beef it up a bit with a pelican project box. If anyone has any suggestions about how to cover ports a little better, that would be great.

Check it out!

Love the instructable! Great work.



**Honus** says:

Sep 27, 2010. 7:16 PM [REPLY](#)

Looks awesome. Pelican cases are great- I have a large one that's over 15yrs old and it's still going strong. Maybe for port covers you could mold some silicone plugs. Try Sugru!



**Landcruiser87** says:

Sep 28, 2010. 1:14 PM [REPLY](#)

Thanks! They're possibly one of the best made containers of any sort. I've been using them for various things here and there over the past 7 or 8 years. I like the idea of using Sugru for port covers! I was having all sorts of failed trials with grommets, silicon and other failed devices, but sugru might just be the ticket. Thanks Honus!



**Honus** says:

Sep 28, 2010. 7:45 PM [REPLY](#)

No problem- let me know how it works out!



**rnicholls1** says:

Apr 2, 2011. 4:54 AM [REPLY](#)

Nice project. I am thinking of taking this one on however i want to make my own case, if you could tell me the approximate specs of the "altoids" tin, that would be great.



**Honus** says:

Apr 2, 2011. 9:10 AM [REPLY](#)

Here's the standard size Altoids tin inside dimensions (not taking into account the rounded corners)- 93mm long x 58mm wide x 21mm deep



**rnicholls1** says:

Apr 2, 2011. 10:08 PM [REPLY](#)

In doing some more research i have also discovered that sparkfun have discontinued the single cell LiPoly charger. they seem to have an alternative, could you tell me if it is still suitable for the job? i have provided the link below

<http://www.sparkfun.com/products/10161>



**Honus** says:

That should work just fine- it's pretty much the same except they've switched the IC manufacturer.

Apr 2, 2011. 10:51 PM [REPLY](#)



**Cattango** says:

Hello again,

We talked briefly about the charge issue I was having. Wanted to let you know my findings. I am getting a steady 3.8 volt charge from the solar cell and output of 5 volts from the USB Minty Boost. My problem is even after keeping it charged under the sun for about 12 hours, I still get no charge from off the USB. It's almost as if the battery isn't charging. Would you happen to have any advice as to where I should look to troubleshoot?

Thank you,  
Rob

Mar 16, 2011. 1:30 PM [REPLY](#)



**Honus** says:

You may have a bad battery. What is the battery voltage when the battery is disconnected from the charging circuit and MintyBoost circuit? The LiPo shouldn't be below 2.8V minimum.

Mar 16, 2011. 4:25 PM [REPLY](#)



**Cattango** says:

The LiPo has no DC voltage at all when disconnected.

Mar 18, 2011. 1:47 PM [REPLY](#)



**Honus** says:

Email Sparkfun tech support and have them send you a new battery (assuming that's where you got it.)

Mar 18, 2011. 7:46 PM [REPLY](#)



**Cattango** says:

Thank you. I'll give it a try.

Mar 18, 2011. 8:07 PM [REPLY](#)



**salesmanager** says:

Hello Buyers

I am Kennedy Ray (Sales Manager) from CONFIRM STORE LIMITED. We sales Genuine Apple iphone Products with 2yrs warranty offer and 90days returnable Policy. We export internationally to any interested buyers outside the United Kingdom; We make delivery right to your Destination.

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Apple iPad 3G + wifi 64GB cost \$450usd

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We offer buy 3units and get 1free (PRICE INCLUDES SHIPPING CHARGES)

APPLE IPHONE 3GS 32GB:

Buying 1 Unit \$350USD, Drop shipping charge \$50

Buying 2 units \$700usd, Drop shipping charge (PRICE INCLUDES SHIPPING CHARGES)

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Buying 1 Unit \$450USD, Drop shipping charge \$50

Buying 2 unit \$900USD, Drop shipping charge (PRICE INCLUDES SHIPPING CHARGES)

We offer buy 3units and get 1free (PRICE INCLUDES SHIPPING CHARGES)

We are capable of making delivery right at your doorstep at affordable price.

For more Details Contact::

Email: [globa\\_electronics@net-shopping.com](mailto:globa_electronics@net-shopping.com)

MSN: [globa\\_electronics@hotmail.com](mailto:globa_electronics@hotmail.com)



Mar 18, 2011. 3:09 PM [REPLY](#)



**mleane** says:

hey

I'm going on a 2 week hike in tazzie and I am wanting to run google track the whole way to track my speed/progress/hight/climb etc etc

So solar is the only way to go if i wanted my phone to last the trip.

I'm going to go head and make this great booster but I have one question

Do you think it will give enough charge to keep the phone alive while it runs GPS and several different apps to monitor my positions? Will I need a larger solar panel or more?

Mar 12, 2011. 7:22 PM [REPLY](#)

I'm thinking of attaching the panels to the top of my backpack (will have to be super water proof too, as it rains 2 days out of 3) do you think it will charge/keep the phone alive even in very thick clouds and rain.  
I'm using a HTC desire Z android that is very power hungry =P



**Honus** says:

Mar 12, 2011. 7:53 PM [REPLY](#)

I just don't know as I don't have any experience with this phone/application. How long will the phone be on each day? Do you know the phone battery capacity and how much charge is left after running your application for a set period of time?



**robertmark68** says:

Mar 11, 2011. 6:36 AM [REPLY](#)

Hi there, Honus

I've been wanting to tackle this concept for a while. So I was kinda bummed when I found that you'd beaten me to the punch. But, the engineer in me decided to modify your concept a bit. I married adafruit's 'mintyboost' circuit to Sparkfun's LiPo charger circuit on ONE PCB. PLUS i added a mini USB conn so you can charge the LiPo via a PC USB as well as solar panel.

I submitted the GERBER's to batchpcb.com for FAB yesterday. I'll let you know how it goes!

R



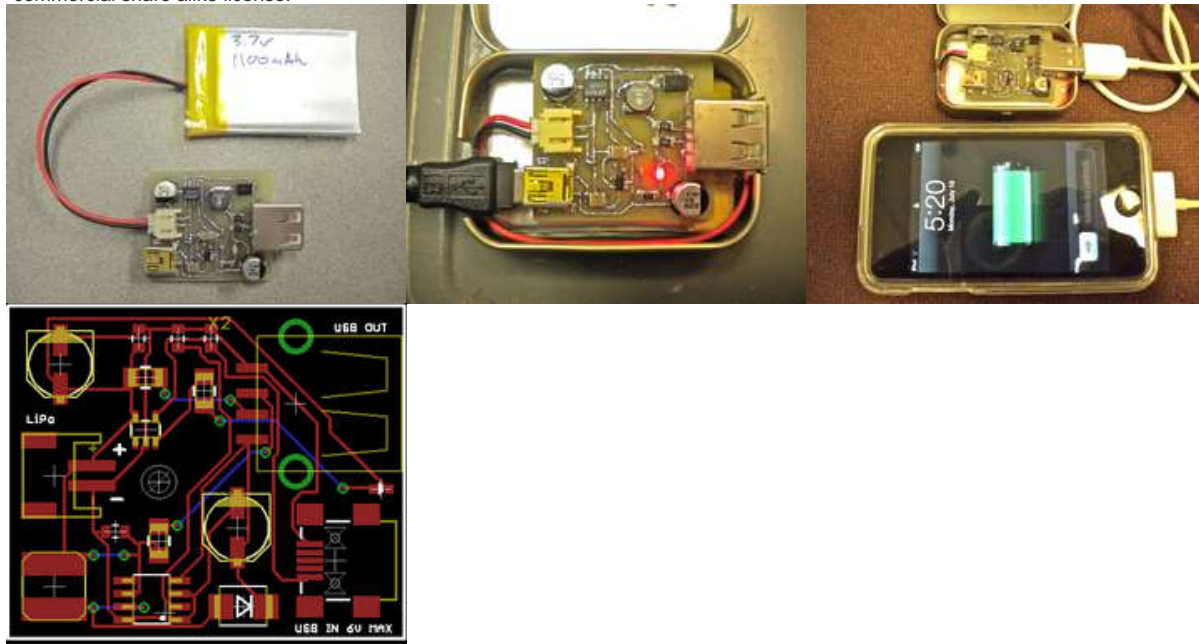
**Honus** says:

Mar 11, 2011. 4:54 PM [REPLY](#)

Cool! Let me know how it works out. Did you make it using through hole components or SMD?

I actually already made it into a single PCB last summer that combined the charger circuit, MintyBoost circuit as well as the mini USB charging port and LED charging indicator. The board measured 1.5" x 1.25" and used surface mount components and worked like a charm- made it for my brother in law for his birthday. He's an electrical engineer and he got a big kick out of it. The images show the etched prototype and the final image is the revised PCB.

If you want to sell your board on BatchPCB (or anywhere else) make sure you contact Adafruit for permission as the circuit is released under a non commercial share alike license.



**Cattango** says:

Mar 5, 2011. 9:14 AM [REPLY](#)

Hello everyone,

I have recently built the solar charger shown here. While checking voltages, I get between 3 and 5 volts while being under the sun. However, when charging my USB device under the sun, it shows a charge for a little bit and then stops, going between charge and no charge as if the the battery is depleted.

Also, once taken from out of the sun, I have no charge at all (no battery voltage) even when having it under the sun for the entire day. Is there anything I may be doing incorrect?

Thank you.



**Honus** says:

Mar 5, 2011. 2:33 PM [REPLY](#)

Is that 3 to 5 volts at the solar cell? Are you charging the LiPo battery, waiting until it has a full charge and then charging using the USB port?



**Cattango** says:

Mar 5, 2011. 6:04 PM [REPLY](#)

I get 3 to 5 volts at all points while under the sun - the cell, lipo charger, and battery. I'll keep it charged under the sun for a while and have no results when trying to charge it from the USB.



**Honus** says:

Mar 5, 2011. 7:55 PM [REPLY](#)

So let me make sure I get this right. So you aren't able to get any voltage reading at the Minty Boost USB port after the LiPo has been fully charged? You should see a stable 5V at the Minty Boost USB port.

Are you charging the LiPo to full capacity in the sun and only then connecting the device you want to charge to the Minty Boost circuit?



**Cattango** says:

Mar 5, 2011. 9:36 PM [REPLY](#)

Correct. Perhaps I'm not charging the battery to it's full capacity, but I've left it in the sun for the entire day and still get no charge to the battery.

Only when I have it out in the sun do I see any signs of voltage from the battery and USB.



**Honus** says:

Mar 5, 2011. 9:48 PM [REPLY](#)

I don't understand- either it's charging the LiPo or it isn't. Those statements are contradictory.

Is the charger LED on when it's out in the sun? If it is on then it's charging the LiPo. The LED will turn off as soon as the LiPo is fully charged. If that's the case, measure the voltage at the LiPo when it is fully charged. If it's over 3.7V then the charging circuit is working and the LiPo is good. The LiPo voltage should never drop below 2.8V.

Once the LiPo has a full charge measure the output at the Minty Boost circuit USB port. It should be a steady 5V. If it isn't then there's a problem with the Minty Boost circuit.



**Cattango** says:

Mar 5, 2011. 10:19 PM [REPLY](#)

The LED comes on while in the sun. I'll keep it under constant light tomorrow to check to see if it turns off over time and check the voltage at the USB port. Didn't know this. I'll let you know my results.

Thanks for your help.  
Much appreciated.



**onlinemastering** says:

Mar 3, 2011. 10:35 AM [REPLY](#)

Cool project and environmentally friendly too. thanks.

online mastering



**amkamk13** says:

Feb 21, 2011. 4:26 PM [REPLY](#)

Why dont you need a charge controller to prevent overcharging? I want to build my own and I'm worried the batteries might ruin or get on fire.



**Honus** says:

Feb 21, 2011. 7:07 PM [REPLY](#)

Overcharge protection is built into the MAX1555 chip in the charger circuit so it's not a problem.



**Iridium7** says:

Feb 15, 2011. 2:55 PM [REPLY](#)

Will this store a charge for charging use or do I need it to have it plugged in to use it? (like a calculator)



**Honus** says:

Feb 15, 2011. 7:54 PM [REPLY](#)

It will store a charge. After the LiPo is charged you then plug it in to your iPod or USB device.



**dailj2** says:

Jan 7, 2010. 10:00 AM [REPLY](#)

I've been using mine for about a month now, but the red LED is always on when it is in the sun. I thought once the battery was fully charged, the LED would cut off. So I'm assuming my battery has never reached full charge. And I've only used it a few times to charge my iPod. Any ideas?



**stuartjohn24** says:

Feb 8, 2011. 10:48 AM [REPLY](#)

Due to the design of the sparkfun li-po charger circuit, if there is a load on the SYS output the battery will never fully charge as the output is connected directly to the battery, thus the charger IC will never see the battery fully charged condition due to the load of the boost converter, hence charge LED does not extinguish.

Have you tried just charging the battery using the solar cell and not with the ipod/iphone connected?

I have done a similar application and designed a customised charger/boost circuit using ideas from a microchip application note, when an external supply is available this takes priority and supplies the boost convertor and charges the battery separately.



**Honus** says:

Jan 12, 2010. 10:49 AM [REPLY](#)

Do you have a multimeter to see if the battery is being fully charged?



**jwwarren** says:

Jan 31, 2011. 9:46 AM [REPLY](#)

This is a great Instructable and I'm looking forward to building this, however, the LiPoly Charger has been discontinued and the suggested replacement ( USB LiPoly Charger ) at sparkfun does not have the 5V input. Any suggestions for adding the 5V input to the new board or another source for the charger?



**Honus** says:

Jan 31, 2011. 8:16 PM [REPLY](#)

Why not just use the mini USB port for input power? Just cut a mini B USB cable and connect it to your solar cell. Adafruit also makes a charger that has a barrel jack connector- you could remove the connector and solder wires directly to the board.  
[http://www.adafruit.com/index.php?main\\_page=product\\_info&cPath=44&products\\_id=280](http://www.adafruit.com/index.php?main_page=product_info&cPath=44&products_id=280)

The other option is to make your own charger- it's pretty simple but it does require a bit more work since you have to make your own PCB.



**PJPEEJ** says:

Jan 27, 2011. 1:50 PM [REPLY](#)

And i forgot to ask. If you put a magnifying glass on the panels in direct sunlight, would it charge faster?



**Honus** says:

Jan 27, 2011. 8:49 PM [REPLY](#)

No because the charger will always max out at its maximum current throughput so there is no advantage to trying to boost the output of the solar cell.



**PJPEEJ** says:

Jan 27, 2011. 1:46 PM [REPLY](#)

Can you charge while using it?



**Honus** says:

Jan 27, 2011. 8:39 PM [REPLY](#)

You could but it probably wouldn't work that well as most devices will act as if they are plugged into a power source and use that source instead of their own battery.



**Serenechaos7** says:

Jan 22, 2011. 8:32 PM [REPLY](#)

I literally just had this idea a couple months ago, though I wanted something even more exciting and elegant, and I wonder if you could let me know how feasible it is. I was hoping to actually replace the back panel with a solar panel. Theoretically, I could wire it directly to the battery, or simply hack the end off the iPhone USB connector, wire the hacked end to the panel, and plug it in when I need a charge.

I was going to do this to my itouch, but an iPhone 4 is much, much better with its flat, square, easily removed back.

Is this possible/efficient/affordable?



**Honus** says:

Jan 22, 2011. 9:42 PM [REPLY](#)

It's possible but it's probably not terribly practical since it would only charge when your phone was upside down down in the sun and it would take a very long time to charge.



**Serenechaos7** says:

Jan 22, 2011. 10:29 PM [REPLY](#)

Why should it take a long time? Isn't it basically the same thing as your setup, just attached to the phone? And the upside down thing isn't a big deal. I actually see it as an advantage in some respects (I don't need to have my phone plugged into anything; no extra devices or cords, no being tethered to walls or computers, etc.). If it's only taking an hour or two (assuming it works like yours; you did say an hour or two?), it's perfectly easy to lay it down and go take care of other stuff. Or if I'm outside, simply lay down in the grass, and I always welcome an excuse to be horizontal =D



**Honus** says:

Jan 22, 2011. 11:27 PM [REPLY](#)

I say it'll take a long time to charge your phone because a solar panel of that size will probably only be putting out around 100mA in bright sunlight. The MintyBoost circuit can put out 500mA so it can charge the phone much faster (once the LiPo is charged.) The advantage of using a MintyBoost based charger is that it can charge its battery while you're using your phone, so it makes more use of available sunlight.

I'm assuming you're wanting to bypass using the MintyBoost circuit and you're wanting to connect the solar panel directly to the USB cable- is that correct?

If that's the case you need to use a solar panel that can put out more than 5v and then you'll have to use a voltage regulator (or switching step down regulator) to drop the voltage to a regulated 5v. A switching step down regulator is much more efficient than a typical 7805 voltage regulator, which drops the excess voltage as waste heat. The greater the difference in excess voltage the more sense it makes to use a step down regulator.



**Serenechaos7** says:

Jan 23, 2011. 9:08 AM [REPLY](#)

Ah I see what you mean. I would wonder how much the peripheral light hitting while I use it would help, but from what I can find, the best I can do is 6.1-6.6v at 120-190mA (6 Solarbotics 33x37mm cells in parallel). I'd still love to do it, but quite possibly I could simply do both. That way I have a permanent, no-wire-or-charger-needed option, AND the ability to use it while it charges, if I absolutely must.

At only 6 volts, would I need to worry about a regulator?



**Honus** says:  
You absolutely need to provide a regulated 5v.

Jan 23, 2011. 7:30 PM [REPLY](#)



**cavelry** says:  
This is a great project, and I'm glad to finally get my hands dirty with some soldering and circuit construction.

Jan 15, 2011. 3:56 AM [REPLY](#)

I know a big question regards charging apple products. I looked at some of the sites regarding soldering together the middle two prongs of the USB adaptor on the MintyBoost board, or some sort of voltage divider. But I tried charging my 64 Gb Itouch with and without the center prongs being soldered, and the Itouch still said it didn't recognize it as a charger. I did have it charging my Samsung Vibrant Droid though, so I know it works. Any thoughts on getting through to the Itouch?  
Thank you



**Honus** says:  
Thanks- glad you like it! What generation iPod touch is it and what version Minty Boost circuit? Mine is the Touch 2G and charges just fine using 100K resistors on the USB data lines (using Minty Boost v2.0 circuit.) I haven't yet built the v3.0 circuit so I can't say how it works with a Touch 2G but it's supposed to work just fine with a Touch 3G.

Jan 15, 2011. 3:40 PM [REPLY](#)



**tarness** says:  
will someone, like me, who doesn't completely understand wiring, be able to build this?

Jan 7, 2011. 7:38 AM [REPLY](#)



**Honus** says:  
Absolutely! It's really very easy to build.

Jan 7, 2011. 7:43 AM [REPLY](#)



**vitamind239** says:  
Hey H,  
I have a solar panel with USB connection. I can charge my old iPod fine but my iPhone doesn't charge - message pops on iPhone saying that device is not authorized or something. Do I need dividing resistors? Funny that sometimes in the car when I am charging iPhone it will also say that device is not authorized but still would charge the bugger.  
Thanks and cheers,  
D

Jan 5, 2011. 3:26 PM [REPLY](#)

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