

# Portable Cell Phone Charger

By Miguel Contreras

# Design Overview

## Function:

Serves as a portable charging device.

## Specifications

- Uses Boost Converter/Boost Regulator
- 5V output @ 500 mA output
- Uses any AA battery (pref. Lithium)

# Bill Of Materials

Item #	Quantity	Reference	Type	Description
1	1	IC1	Converter	5V boost converter LT1302CN85
2	1	IC1'		8-pin socket
3	1	C4	Capacitor	Power supply capacitor 220uF/6.3V+
4	1	C3	Capacitor	Power supply capacitor 220uF/6.3V+
5	1	C1	Capacitor	Bypass capacitor (0.1uF)
6	1	C2	Capacitor	Bypass capacitor (0.1uF)
7	1	R5	Resistor	1/8W 5% 3.3K Resistor
8	1	R2	Resistor	1/8W 1% 75K Resistor
9	1	R4	Resistor	1/8W 1% 75K Resistor
10	1	R1	Resistor	1/8W 1% 49.9K Resistor
11	1	R3	Resistor	1/8W 1% 49.9K Resistor
12	1	D1	Diode	IN5818 Schottky Diode
13	1	L1	Inductor	10uH power inductor
14	1	X1	USB	USB type A female jack
15	1			2 x AA battery holder

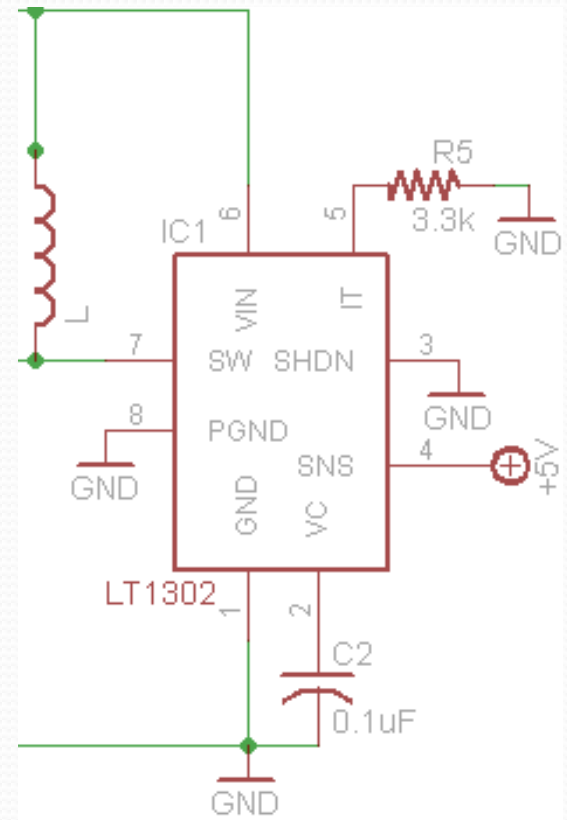
# Boost Converter

Boost Converter (step-up converter) must:

- 8-DIP package
- Exerts 500 mA @ 5V
- 3V minimum input voltage (for two 1.5V AA batteries)

What does it do?

- Output DC voltage greater than its input
- Principle:
  - Tendency of an inductor to resist changes in current
- Inductor acts like a load to absorb energy
- When being discharged it acts like an energy source

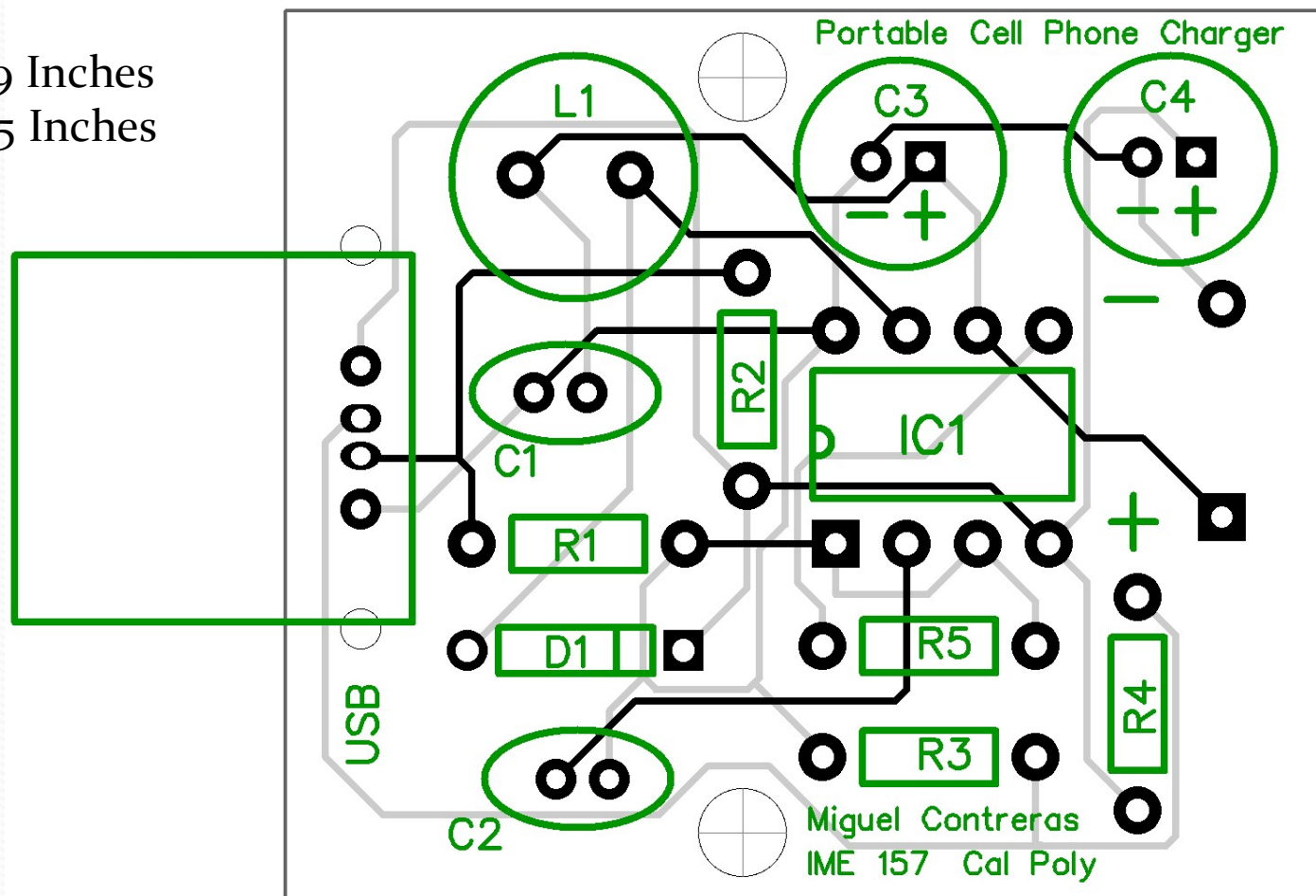


IC: LT1302CN8-5

[illegible]

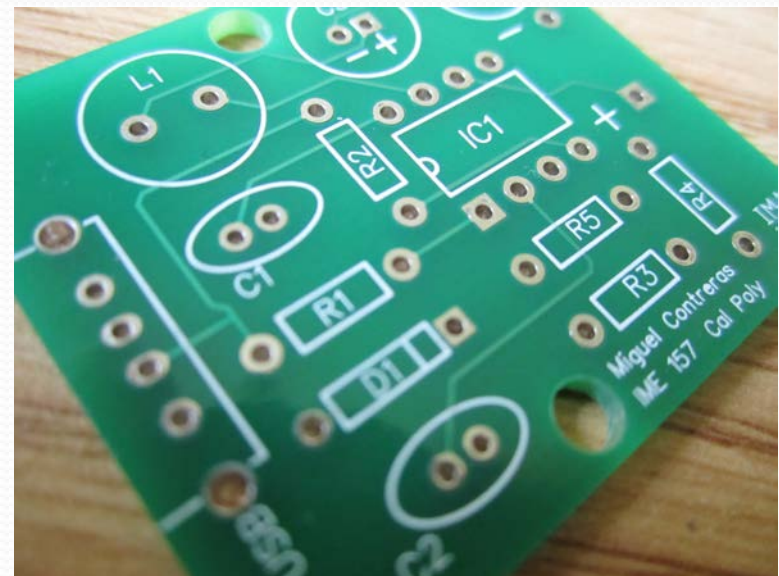
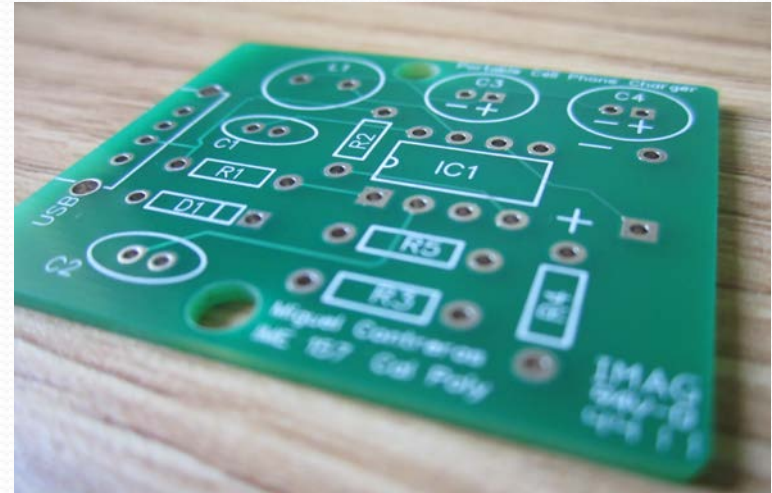
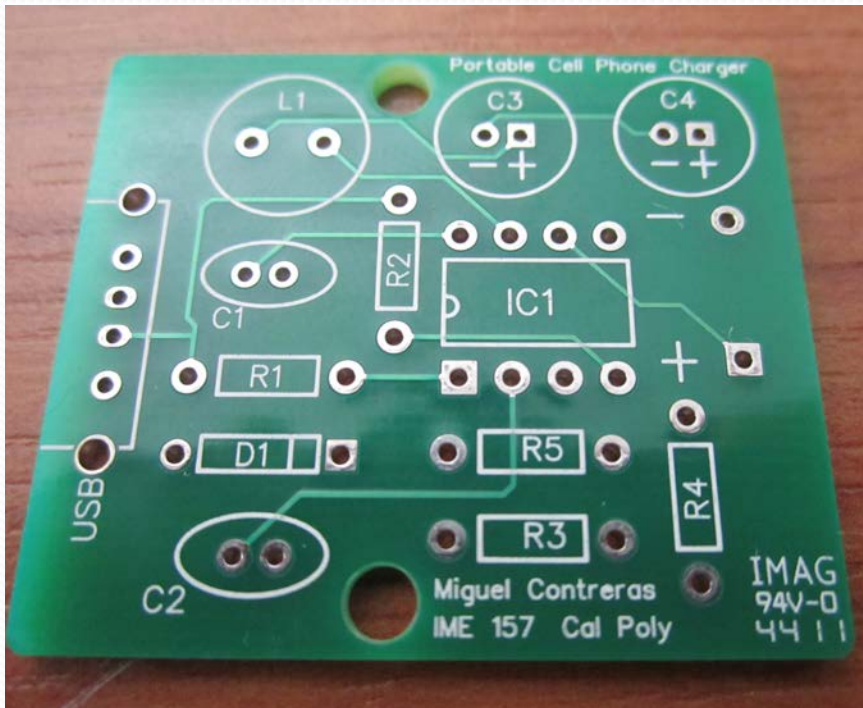
# Printed Circuit Board

Width: 1.49 Inches  
Height: 1.25 Inches

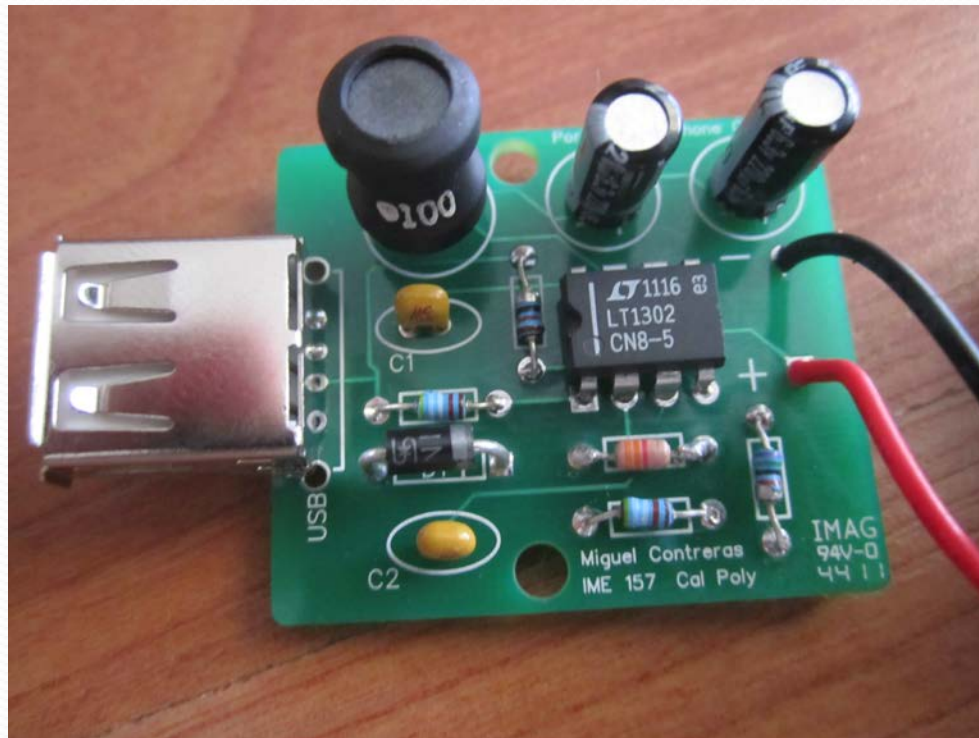


# Manufactured Board: Unpopulated

- All components are through-hole
- Components spread out for ease of assembly



# Manufactured Board: Populated



# Chassis Design

Length: 3.75 inches

Width: 1.38 inches

Height: 0.70 inches

Material: Acrylic Plastic



# Some Numbers...

- iPhone (all types): 3/4 full recharge
- iPod touch : 26 hours more (1.5 full recharges)
- iPod touch video: 3 hours more video (1 full recharge)
- iPod nano: 4 full recharges
- iPod shuffle : 60 hours more (5 full recharges)
- Higher quality batteries give you a longer boost time!

# Conclusions

- Diptrace is a versatile program to design schematic and PCB layout
- Double sided PCB
- Small enough to design portable chassis
- Total size, including battery pack: 2.50 in by 1.25 in
- Works for: Apple, HTC, LG, Motorola, Samsung, Sony Ericsson, and MP3 players
- Efficiency 85% with 2 AA batteries
- Circuit Worked!

# Recommendations

- Place components closer together
  - Serves for a more portable/compact device
- Use different chassis material
  - Easier to work with

# For more information...

- Visit:

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

# Questions?

