

POWER SUPPLY FOR BATTERY CHARGERS.

Converting A Computer Power Supply

By: Noel Hunt

We usually charge our TX and RX batteries at home using the "wall wart" chargers that we seem to accumulate. These are typically capable of about 50 to 60 mA (.05 to .06 Amps) and good for over-night charging. When at the flying field, many of us have a fast charger for topping up the batteries, especially on those long summer days. These are either connected to a car battery, or our field box battery, which are both 12 volts and capable of fairly high Amp output, and we now charge at .6 to 1.0 Amps. Some chargers such as the Hobbico Accu-Cycle Elite, come with a larger "wall wart" that is capable of about 2.5 Amps (2500 mA) and you can fast charge at home without having to go out to the family SUV in the drive way. (Your garage is full of RC planes, isn't it?!) They can also be used at the club field as we are fortunate enough to have electrical outlets there. But 2.5 Amps may be insufficient for bigger packs for electric flight and other fast chargers may not have such a power supply, in which case you must always power them from the vehicle, or your field box.

I needed a higher output power supply for charging simultaneously, two LiPo power packs for my explorations into electric flight. I figured I needed at least 5 Amps and possibly more for future use. An evening on the Internet came up with a solution using the power supply (PS) from a computer. (I'll provide links at the end) These are available very cheaply from computer stores, or can be salvaged from an old computer. The older ones are easier to convert as they are "dumb": If there is power coming in, they supply power out! They also have more room for the modifications. The newer PSs are more compact and have "smarts" that require a signal from the computer, before they supply power. The latter type is what I converted, called an ATX power supply. It is a 400 Watt unit that is capable of 16 Amps on the 12 volt supply - more than enough for my need.



THE MODIFIED PS

OK, back to the PS conversion: I suggest you take a look at the link for a fairly complete description of the conversion, but here is what I did:

What you'll need:

- The Power Supply. (\$20 or less - from a computer store like Micro Center)
- 2 banana plug Terminals (one red, one black - from Radio Shack)
- 2 Resistors (10 Ohm, 10 Watt - Available in pairs from Radio Shack)
- 1 12 Volt Automotive-type marker lamp and holder (from auto parts store)
- Electrical tape, or shrink tubing (from Radio Shack)

And tools:

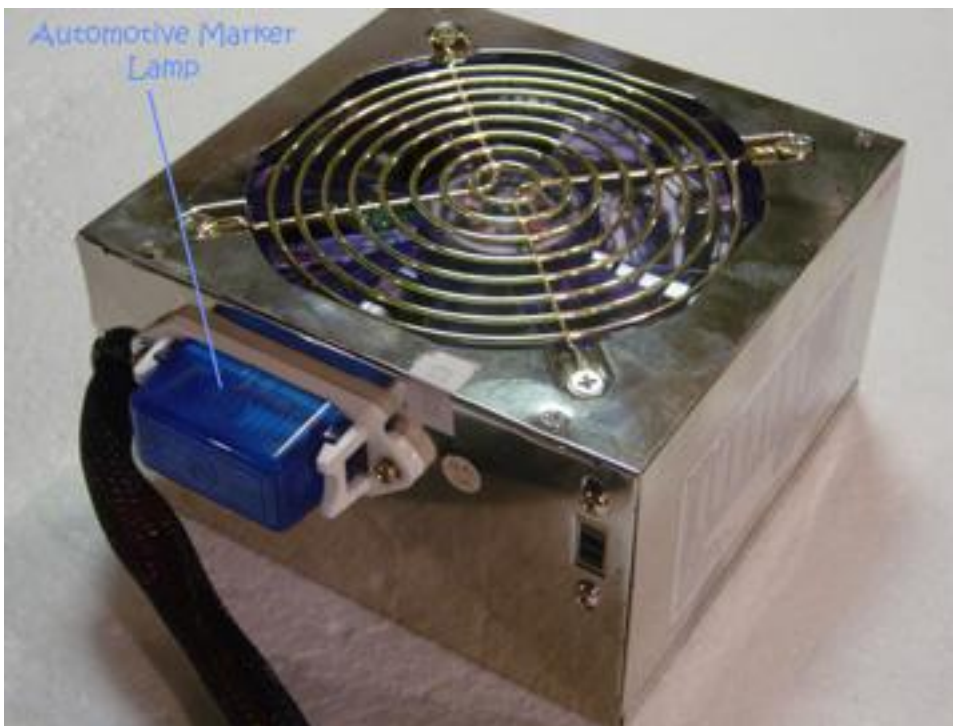
- Soldering Iron
- Multi-Meter
- Wire stripper (or knife)
- Heat Gun

Steps:

1. The PS will have a few wire bundles coming out of it. A 20-pin connector, a couple of 4-wire harnesses with 2 or more 4-pin connectors along their length, and perhaps another 4-wire harness with a small square 4-pin connector. Here's the pin-out for the 20-pin connector.

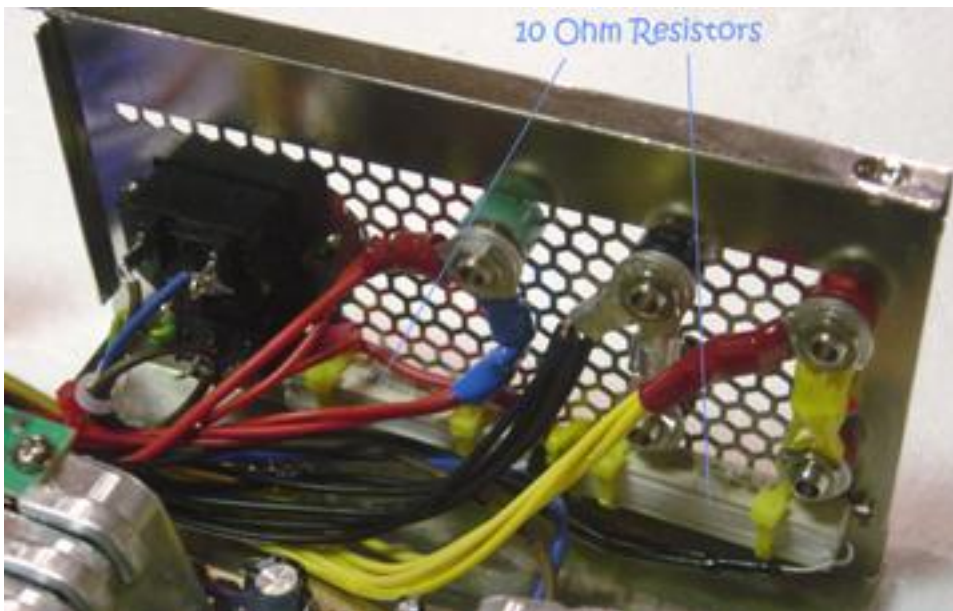
	Pin		
	Number		
+3.3V	11	1	+3.3V
-12V	12	2	+3.3V
COM	13	3	COM
PS-ON	14	4	+5V
COM	15	5	COM
COM	16	6	+5V
COM	17	7	COM
-5V	18	8	PW-OK
+5V	19	9	5VSB
+5V	20	10	+12V

2. Plug in the PS, turn it on, and use the multi-meter to find the common or COM (usually black), +12V (usually yellow) and +5 volt pins (usually red) on the 20-pin connector. If the fan does not start, or starts briefly, then stops and you do not find +12V on any pin, don't panic; you probably have a "smart" PS. But you should be able to find a +5V on the big connector (pin 4, 6, 19, or 20),.
3. Now the "toughest" step: Find the "power good" wire. This wire carries the signal from the computer to tell the PS it's OK to turn on. We will "fake" this signal. It is usually (not always) orange and is pin 8 on the 20-pin connector.
4. Turn off the PS. Find a way to "jumper" the "Power Good" pin and a +5V pin. I used a bent paper clip. With this jumper in place, turn on the PS again. The fan should run and you should be able to probe the +12 volts. Note that it may be a bit less than 12V. This is where the automotive lamp and/or resistors come in.
5. The 12V supply is affected by the load on the 5V circuit. Connect a lamp, or resistor across any +5V and any COM pin. I had to connect a lamp and two resistors in parallel across the +5V to get 12.4V. When I am charging batteries, it goes down to about 11.9V.



PS "REAR" VIEW

6. Once you have the "load" figured out, remove the cover from the PS. Now find an appropriate place for the banana plug terminals, and the marker lamp and/or resistors. To dissipate heat, the resistors must be mounted against the case of the PS. I used zip-ties. Make sure that these component locations allow the PS case cover to be replaced. On mine the fan is in the cover and presented a problem. Like I said, there is not much space inside the new power supplies.

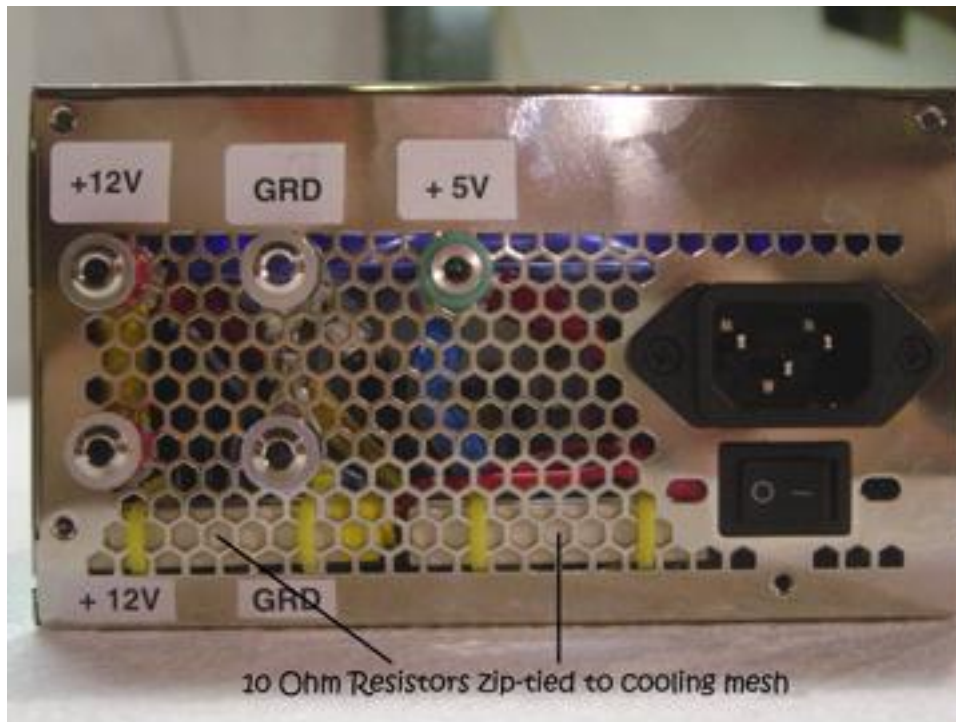


INSIDE VIEW OF FRONT

7. Drill holes for the terminals, mount them and then connect about 5 or 6 COM wires (black) to the black terminal and about 5 or 6 +12V wires (yellow) to the red terminal. (One wire is not thick enough to safely carry the high Amp load that may be drawn.)
8. Make sure any of the +12V connections are insulated with electrical tape, or shrink tubing.

9. You may wish to remove all un-used wires, by cutting them off at the printed circuit board. Use caution. The "Power Good" must be reconnected to +5V as described above and soldered. Also there may be 2 wires going to one pin on the 20-pin connector. On mine it was pin 11. You can cut these off shorter, but they must be reconnected and soldered together.

Note: You will see that I installed two sets of red and black terminals, so that two chargers can be supplied simultaneously. I need about 4 to 5 Amps to charge two 2000mAh packs; the PS is capable of 16 Amps on the 12 Volt circuit. I also installed a green terminal, to which I connected the +5V red wire. I can use this as a replacement where 4 NiCds are needed. It can also be used to check the rotation direction of brushed motors (not brushless) and other electronic uses. These additions are optional.



FRONT OUTSIDE VIEW

I am not smart enough to come up with all this myself. I have just summarized what I found on the Internet and added my experiences. The most comprehensive description I found is at:

<http://www.marcee.org/Articles/PCPowerSupply.htm>