How to Convert a Computer ATX Power Supply to a Lab Power Supply

1. Unplug the power cord from the back of the computer. "Harvest" a power supply from a computer by opening up the case of the computer, locating the gray box that is the power supply unit, tracing the wires from the power supply to the boards and devices and disconnecting all the cables by unplugging them.

2. Remove the screws (typically 4) that attach the power supply to the computer case and remove the power supply.

3. Cut off the connectors (leave a few inches of wire on the connectors so that you can use them later on for other projects).

4. Discharge the power supply by stripping the insulation of the ends of a black and a red wire and connecting them together.

5. Get all the parts that you need together, such as the following: binding posts (terminals), a LED with a current limiting resistor, a switch, a power resistor (10 ohm, 10W or greater wattage), and heat shrink tubing.

6. Open up the power supply unit by removing the screws connecting the top and the bottom of the PSU case.

7. Bundle wires of the same colors together. IMPORTANT: Make sure that the lone brown sense wire is bundled with the orange wire. If the brown wire is tied to 3.3V, the power supply will produce an output. The color code for the wires is: Red = +5V, Black = 0V, Yellow = +12V, Blue = -12V, Brown = Sense (tie to 3.3V), Orange = +3.3V, Purple = +5V Standby (not used), Gray = power is on, and Green = Turn DC on.

8. Drill holes in a free area of the power supply case by marking the center of the holes with a nail and a tap from the hammer. Use a dremel to drill the starting holes followed by a hand reamer to enlarge the holes till they are the right size by test fitting the binding posts. Also drill holes for the power ON LED and a Power switch.

9. Screw the binding posts into their corresponding holes and attach the nut on the back.

10. Connect all the pieces together.

    - Connect one of the red wires to the power resistor, all the remaining red wires to the red binding posts;

    - connect one of the black wires to the other end of the power resistor, one black wire to a resistor (330 ohm) attached anode of the LED, one black wire to the DC-On switch, all the remaining black wires to the black binding post;

    - connect the white to the -5V binding post, yellow to the +12V binding post, the blue to the -12V binding post,

    the gray to the cathode of the LED;

- connect the green wire to the other terminal on the switch; and hook up the orange wires with the brown.
- Make sure that the soldered ends are insulated in heatshrink tubing.
- Organize the wires with a lot of electrical tape.

11. Make sure that all the connections look good. Put a drop of superglue to stick the LED to its hole. Put the cover on.
12. Plug in the IEC power cord into the back and into an AC socket. Switch on the main switch on the PSU. Check to see if the LED light comes on. If it has not, then power up by flipping the switch that you had placed on the front. Plug in a 12V bulb into the different sockets to see if the PSU worked, also check with a digital voltmeter. It should look good and work like a charm!

Tips

- OPTIONS: You don't need an additional switch, just connect the green and a black wire together. The PSU will be continuously on. You also don't need an LED, just ignore the gray wire. Cut it short and insulate it from the rest.
- In the older ATX power supplies, the brown sense wire needs to be attached to the 5v wire for the PSU to work.
- In some cases, you may find that there is no brown wire. However, if you get a pin-out of an ATX motherboard connector, you can see which wire is the sensor wire (pin 11.) If not brown, this wire is probably orange. (Most plugs seem to have the pin numbers imprinted in the moulding, very small, - older readers may need their spectacles!)
- If the power supply does not work, that is, no LED light, check to see if the fan has come on. If the fan in the power supply is on, then the LED may have been wired wrong (the positive and negative leads of the LED may have been switched). Open the power supply case and flip the purple or gray wires on the LED around (make sure that you do not bypass the LED resistor).
- If you are not sure of the power supply, test it in the computer before you harvest. Does the computer power on? Does the PSU fan come on? You can place your voltmeter leads into an extra plug (for disk drives). It should read close to 5V (between red and black wires). A supply that you have pulled may look dead because it does not have a load on its outputs and the enable output may not be grounded (green wire).
- The power resistor needs to be attached to the metal body as it gets pretty warm and needs to be kept cool by conduction. If you cannot attach the resistor with a screw, attach the resistor by tying it to a ventilation slot with twist ties or large diameter copper wire.
- Feel free to add some pizzaz to the dull gray box.
- You can also convert this to a VARIABLE POWER SUPPLY - but that is another article (hint: Uses a 317 IC with power transistor).

- The voltages that can be output by this unit are 5v (+5, 0), 7v (+12, +5), 10v (+5, -5), 12v (+12, 0,) 17v (+5, -12) and 24v (+12, -12) which should be sufficient for most electrical testing.

- You can add a 3.3 volt output to the supply by hooking the orange wires to a post (make sure the brown wire remains connected to the orange bundle) but beware that they share the same power output as the 5 volt, and thus you must not exceed the total power output of these two outputs.

Warnings

- Line voltage can kill. Make sure that you have removed the power cord before doing the conversion and have discharged the capacitors by tying the +5V to ground or by shorting the capacitors with the power resistor or with screwdriver.

Things You'll Need

- An obsolete computer with an ATX 250W, 300W or 400W power supply.

- Wire cutters, needle nose pliers, drill, reamer, soldering wire, soldering iron, electrical tape, heat shrink tubing

- Binding posts for output terminals, LED, current limiting resistor for the LED, power resistor to load the power supply, a low wattage switch.