

Convert an ATX Power Supply Into a Regular DC Power Supply!

by [Sitnalta](#) on August 26, 2007

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Intro: Convert an ATX Power Supply Into a Regular DC Power Supply!

A DC power supply can be hard to find and expensive. With features that are more or less hit or miss for what you need.

In this Instructable, I will show you how to convert a computer power supply into a regular DC power supply with 12, 5 and 3.3 volt outputs. For about \$10!

Why use a computer (ATX) power supply? Well, they're available everywhere, and they can output tremendous amounts of power in a small form factor. They have overload protection built right in, and even a 500W model can be reasonably priced with high efficiency. The voltage rails are incredibly stable. Giving nice, clean DC current even at high loads.

Plus, it's likely that many of you simply have an extra one lying around doing nothing. Might as well get the most value for your investment.



Image Notes

1. 12, 5, 3.3 Volt terminals with Ground. These binding posts are handy, and you can plug banana plugs into the front, or bare wire in the side.

step 1: Getting Started

The first order of business is that of safety. While I'm reasonably sure that there isn't enough residual energy to stop your heart, those capacitors can still bite, and that can cause significant pain and maybe even burns. So be paranoid when getting close to the internal circuitry. It would probably be a good idea to put on some insulating gloves. Also (obviously) make sure the thing is unplugged. You are responsible for your own safety!

Here are the tools/parts needed:

- Drill
- Needle-nose pliers
- Soldering iron
- 3 x "Banana Jack" Insulated Binding Post sets
- 1 x bag of "#6" Ring Tongue Terminals (16-14 gauge)
- Rubber feet
- Small bit of heat shrink.
- Screwdriver
- Wire strippers

Ok, let's get to voiding some warranties!

step 2: Opening Up

Open the PSU and make an assessment of the space you have to work with. Make sure that there won't be any clearance issues for the binding posts or wires.

Once you have decided how your PSU will be configured, mark with pencil where you want to drill the holes later on. This will help you in cutting the wires to the appropriate length.

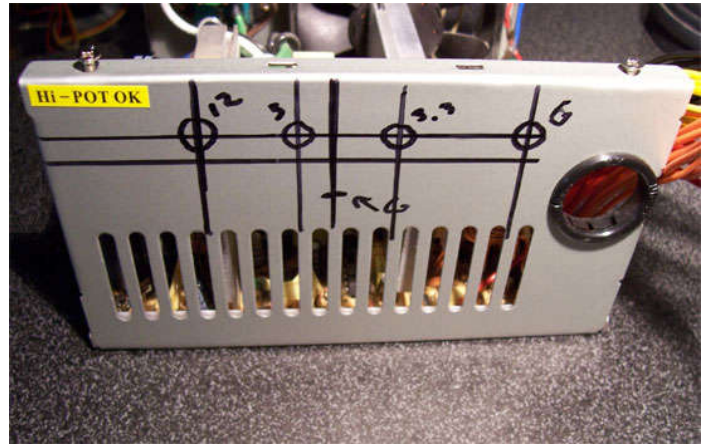
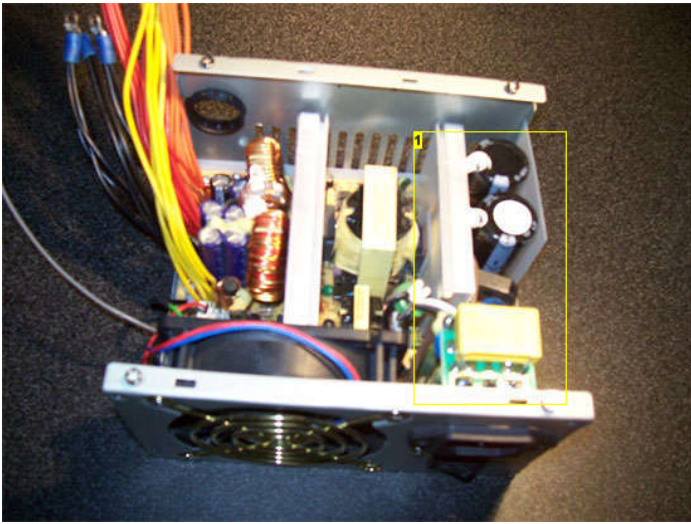


Image Notes

1. Be careful of this area. Nasty residual energy may exist.

step 3: Wires, Wires Everywhere

You will be met with the daunting task of sorting through a hundred wires of different colors. The only colors we care about are Black, Red, Orange, Yellow and Green. Any other colors are superfluous and you can cut them at the circuit board.

The green wire is what tells the power supply to turn on from stand-by mode, we want to just solder it to a ground (black) wire. Put some heat shrink on this so it won't short out on anything else. This will tell the PSU to be constantly on without a computer.

Cut all of the other wires down to about a foot, and remove any zip-ties or cable organizers. You should have a forest of wires with no connectors.

The colors represent:

- YELLOW = 12 Volts
- RED = 5 Volts
- ORANGE = 3.3 Volts
- BLACK = Common Ground.

Now, theoretically, you could be done. Just hook the wires to 4 large alligator clips (one for each color set) or some other terminals. This might be handy if you're just going to be powering one thing, such as a ham radio, electric motor or lights.

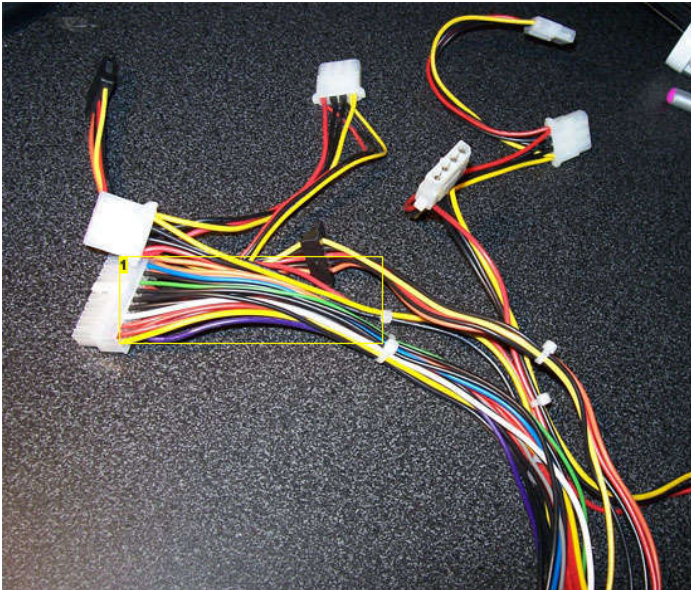


Image Notes

1. Note the green wire. You NEED that! Purple, white, and blue are not important and can be cut away.

step 4: Grouping Wires

Group the 4 wire colors together and cut them to length to where you marked where the posts would go. Use the wire strippers to take off the insulation and stick about 3-4 wires into one tongue terminal. Then crimp them. The exact number of wires per voltage rail depends on the wattage of the PSU. Mine was a 400W and there are about 9 wires per rail. You need all these wires so that you can get all of the current rated for that rail.



step 5: Holes

Now we come to the drilling. With most power supply units, you won't be able to completely remove the circuit board from the chassis. But you should be able to remove it partially and wrap it in plastic so that it doesn't get contaminated by metal shavings.

Once you have the holes drilled, file away any rough spots and wipe down the chassis with a damp cloth.

This might be a good time to figure out something for that hole the old wiring harness used to go through. I used a washer and the head of a bolt to make a cap, and epoxied it in there. But this is purely cosmetic and unimportant.

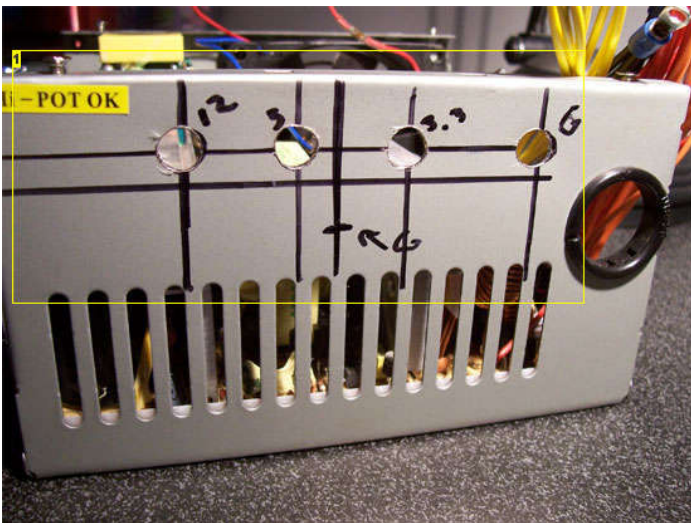


Image Notes

1. These particular posts need a 5/16" hole drilled.

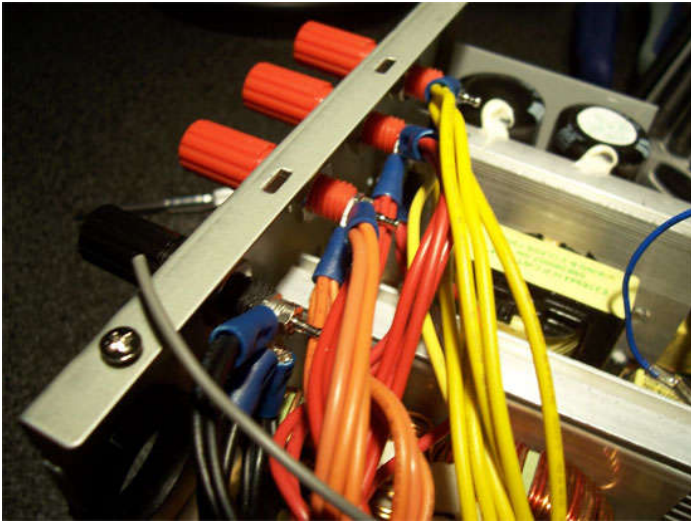
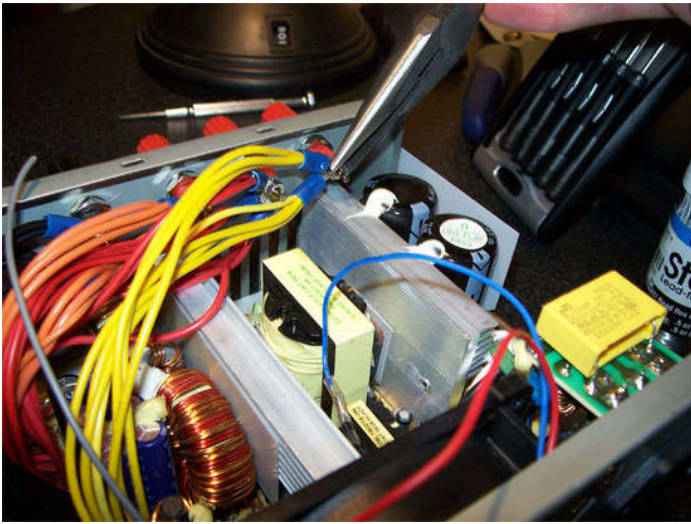
step 6: Putting It Together

Now comes the fun bit. Install the binding posts while using a small screwdriver to make sure they're all orientated right when you're tightening them down.

Install the tongue terminals onto the back of the binding posts and tighten them down good and snug with the pliers. This might be tricky if you have a high-wattage PSU as you will have more wires. The most the posts shown in these pictures can take is 4 tongue terminals.

After that's done, close up the power supply.

I had some clearance issues with mine- the 90mm fan just wouldn't fit. I figured since it will not be acting as the exhaust fan for a computer anymore, it wouldn't be needed anyway. So I removed it.

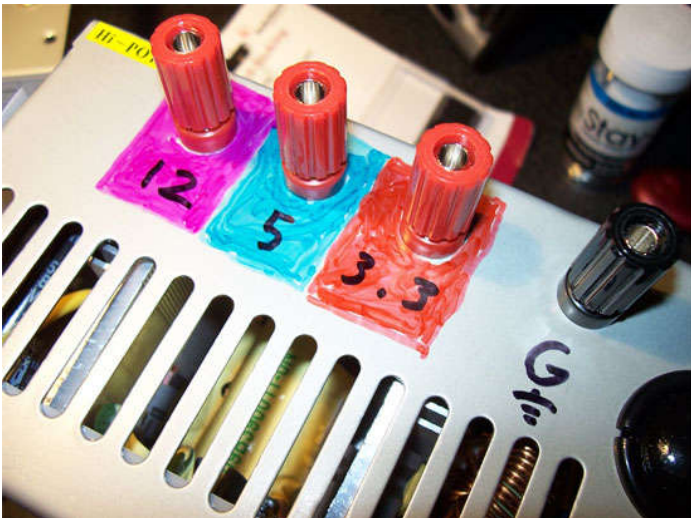


step 7: Make it Pretty

You need some way of clearly marking which post is which voltage. You could go super polished and make a color-coded decal in Illustrator and print it at your local print shop, but I'm lazy... and cheap. So I used some permanent markers.

You could also take some plastic or vinyl paint and color each post. Whatever puts a bee in your bonnet.

Lastly, stick on the rubber feet on what you want to be the bottom.



step 8: Conclusion

My 400 Watt power supply can deliver 23 Amps through the 12V rail, and 40 Amps through the 5V. That's very good for something that, aside from the initial cost of the PSU, cost about \$10.



Image Notes

1. 12, 5, 3.3 Volt terminals with Ground. These binding posts are handy, and you can plug banana plugs into the front, or bare wire in the side.

step 9: Updates

Originality

This project is not necessarily original and has been done by many people.

The most "together" project is that of this guy: <http://www.wikihow.com/Convert-a-Computer-ATX-Power-Supply-to-a-Lab-Power-Supply>

There are a multitude of other projects, but I feel mine and his are the best I've seen so far.

Issue of the Resistor

Power supplies need a certain minimum load to work properly. The min. load for mine is around 0.8 amps. Thus if you plan on powering LED's or other such low-power device exclusively, you'll need a resistor to waste power. Otherwise you could damage the PSU.

The load requirements are different for every PSU. So I cannot recommend any one resistor to use. Consult a resistance calculator or do the calculations yourself to select the right resistor for your PSU.

The resistor will also get hot, so think about cooling it.

-12V and -5V lines

It has been brought to my attention that the -12V and -5 lines are pretty handy for diversifying the voltages this thing can produce. These are the white and blue wires I told you to cut earlier.

Of course, adding them is simple, it's just a matter of getting two extra binding posts and connecting the wires to them. It's just a question of "Do I need these?"

I didn't, all I really needed was the 12V line. But as I said, if you need them, they're easy to install.

Related Instructables



Cheap (AXT) Bench Power Supply 30 Amps!
(slideshow) by muttyfutty



Converting a computer ATX power supply to a really useful lab power supply by abizar



ATX to Lab Bench Power Supply Conversion by mat_the_w



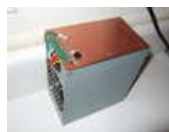
Take a Look Inside a ATX computer power supply by thermolectric



Universal device charger - get rid of the wires AND THE CHARGERS, TOO! by klee27x



Convert A Computer Power supply to a Variable Bench Top Lab Power Supply by prodlad



Easy ATX Bench Top Power Supply. by klee27x





The Ultimate ATX Power Supply Mod With USB Charging Ports by rocketman221


Comments


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 **gnasty gnork** says: Aug 3, 2009. 6:46 PM [REPLY](#)
I wonder if you can just have 2 leads coming out of the box and have a potentiometer pot to control the voltage


 **joerice01** says: Nov 13, 2009. 11:55 PM [REPLY](#)
How to Add Variable Voltage to Your ATX Based Bench Power Supply - wikiHow
There you go mate

 **darkthero** says: Nov 5, 2009. 7:25 PM [REPLY](#)
isn't there suppose to be a small load so the power supply doesn't burn up. (if its in the instructable sorry i missed it) Can i use a small fan as a load and mabey some LEDs . here is my model i have. <http://www.imicro.com/item.php?item=PS-IM400W>


 **joerice01** says: Nov 13, 2009. 11:52 PM [REPLY](#)
Sure is. On mine i connected a 12 Ohm 10W resistor between a red 5v wire and ground so there is always a load on the supply.


 **darkthero** says: Nov 5, 2009. 7:28 PM [REPLY](#)
i forgot to add this. Can u send me the answer at Dark_thero@yahoo.com


 **muttyfuffy** says: Sep 27, 2009. 2:08 AM [REPLY](#)
It possible to connect multiple AXT PSU's in parallel or series to increase the current and/or voltage?
Thanks a bunch,
Mike :)

 **patto2142** says: Oct 30, 2009. 11:33 PM [REPLY](#)
Yup, sure is!
Just make sure your wall supply can take the current the psu is pulling.

 **albylovesscience** says: Oct 7, 2009. 1:27 PM [REPLY](#)
if there still is some energy how do i discharge it to make it safe to matinenceit and also how potent? enough to kill,knock out, or just a nasty zap

 **odavidson** says: Aug 11, 2009. 7:34 PM [REPLY](#)
hey, great instructable, i needed at least a 12v 2a psu, and had a 400w atx lying around, i use it as the psu to charge lithium batteries for electric models, works great, cant wait for a project that can draw up to its recomended of 20A, thanks

 **TheSodaJerk** says: Aug 5, 2009. 4:09 PM [REPLY](#)
Hey I was just wondering your PSU's wire guages, I got all the same stuff as you but i cannot get those #6 crimp-ons to fit more than 2 wires, and even thats a bit tight. They are 16 gauge, any tips?

 **joinaqd** says: Mar 19, 2009. 6:08 PM [REPLY](#)
wow 400 Watts...wonder how much its cost is per hour to operate?
 $I = V/P$
 $= 120/400$
 $= 0.3 \text{ Amps}$
Wow dude thats a lot current

 **inductionmind** says: Aug 2, 2009. 11:19 AM [REPLY](#)
i think you meant to:
 $400w/120v = 3.33 \text{ amps}$

 **joinaqd** says: Aug 4, 2009. 6:48 PM [REPLY](#)
Ur correct , my bad, i was sleepy that day..



ste5442 says:

I wish I could make a supply as efficient as this :-)
Sounds like the answer to the worlds energy problems!
A simple mixup - think of $P=IV$ as a triangle with P at the top and I and V at the bottom. $P/I=V$, $P/V=I$, $IV=P$.

PCBPolice

May 12, 2009. 1:16 AM [REPLY](#)



thetech101 says:

You got that almost perfectly backwards. It's $P = V * I$.
 $400 W = 120 V * I$.
 $400 W / 120 V = I$.
 $I = 3.33333333 A$.

That's nto so much current.
In my area it's .10 per kwh. Or .04 cents.

May 8, 2009. 4:57 PM [REPLY](#)



JakeTobak says:

$400 W = 0.4 kW$
 $0.4 kW * 1 \text{ hour} = 0.4 kWh$
Depending on where you live, that might be 4-7 cents an hour I estimate.

May 8, 2009. 7:28 AM [REPLY](#)



danlab says:

That is only if you run the thing at full power, under most conditions it won't use nearly as much power as it is rated for.

Jun 4, 2009. 1:24 PM [REPLY](#)



chuckr44 says:

In Michigan power is 8.8 centers per kwh.

May 8, 2009. 12:08 PM [REPLY](#)



chuckr44 says:

Should be "8.8 cents per kwh".

May 8, 2009. 12:09 PM [REPLY](#)



awang8 says:

400 watts

$I=V/P$

$240/400$

0.6 Amps

Mains = 240v @10 Amps

$240 \times 10 = 2400$

$400 = 2400$

$4/24$

$2/12$

$1/6$

1/6th of total mains power = 0.6 Amps. There you go.

Mar 29, 2009. 1:53 AM [REPLY](#)



Sparkington says:

600 mA is not a lot of current, I have seen bigger toaster before that require 25A connections.

May 8, 2009. 6:09 AM [REPLY](#)



joinaqd says:

woops! my bad! i did the math wrong!

Apr 16, 2009. 8:04 AM [REPLY](#)



MACSWAG says:

wow!can you do this and make it do 24 v dc.

Apr 12, 2009. 3:54 PM [REPLY](#)



Thav says:

May 11, 2009. 9:22 AM [REPLY](#)

There should also be a -12V line floating around in the power supply somewhere. If you bring the -12V out to the front, you can connect your circuit from -12V to +12V to get 24V DC.

There are two things to watch out for. That 24V will NOT be ground referenced like you might imagine, so if you hook an oscilloscope to the -12V to measure up to the +12V line (to see your shiny new 24V supply) you stand a very good chance of toasting your circuit or your oscilloscope because one of the scope's leads is usually a low impedance connection to ground. If you have isolated probes, that's another thing, but those are more expensive and it's unlikely that most people will have them.

Less importantly, the 24V supply you make will likely be able to supply much less power than then +12V supply alone, because the -12V is usually limited maybe 50 times less than the +12V, so you might only get about two times the -12V rated power from the 24V supply. If you need more power than that, you might want to look into DC-DC power converters.



dcallaghan says:

May 8, 2009. 7:09 AM [REPLY](#)

Yes some maths wrong there:

$I = P/V$, $I = 400/120$, $I = 3.33'A$ ($I = 1.66'A @ 240VAC$)

I dont know why you would calculate the current as mains is sold in kWh anyway.

As the supply wont be 100% efficient the input power will be higher than 400W when the outputs are loaded up to 400W.

You can get 24VDC by using the -12V and 12V wires although current will be limited to what the -12V output can provide.



francoiskapp says:

May 11, 2009. 11:29 PM [REPLY](#)

Other than the incorrect maths, you guys are also forgetting that you don't use the maximum power all the time. The typical efficiency of ATX supplies comes down at the low power end, but it is still not too bad. So if you are only taking out a couple of watts on the output and wasting a few watts in the supply, those are the numbers you should use in your calculation.



omikun says:

Mar 19, 2009. 7:47 PM [REPLY](#)

The 120Volt is the AC input. The output voltages are in 3.3, 5, and 12V.



sssssboom says:

Jun 9, 2009. 10:51 AM [REPLY](#)

Wow, I just picked up a power supply from a thrift store for \$5 and it is the exact same one in the pictures cool.



sssssboom says:

Jun 9, 2009. 3:01 PM [REPLY](#)

turns out the one I got is not working :(I wish I had the ability to check before I bought it o well



voodoo_chicken1 says:

Jul 8, 2009. 8:25 PM [REPLY](#)

It probably does work. You have to do some tinkering as I had the same problem. Go to <http://www.hangtimes.com/id45.html> for better instructions.



voodoo_chicken1 says:

Jul 8, 2009. 8:15 PM [REPLY](#)

I made one of these a long time ago. Super easy. The instructions I used can be found at: <http://www.hangtimes.com/id45.html>



wee_man says:

May 29, 2009. 11:52 PM [REPLY](#)

I've got two black cables which one do i use as ground



bylerfamily says:

Jun 22, 2009. 12:34 PM [REPLY](#)

Twist them together.



Stormrage says:

Jun 9, 2009. 4:42 PM [REPLY](#)

these boxes can be useful for lots of cool stuff... i putted my sound amplifier in a ATX :)



bylerfamily says:

Jun 4, 2009. 11:33 AM [REPLY](#)

Um, got a question. I only see 3 output terminals excluding ground. So, where is the negative terminal? For what I would use this for I need a negative.



Sitnalta says:
Ground = Negative

Jun 4, 2009. 12:18 PM [REPLY](#)



bylerfamily says:
Okay,so the negative is a shared negative?

Jun 4, 2009. 1:02 PM [REPLY](#)



danlab says:
Yes

Jun 4, 2009. 1:18 PM [REPLY](#)



kvon99 says:
I tried this and when i tried to use it to power a car stereo head unit it just shut off the power adapter that is.. anyone know why?

May 24, 2009. 3:53 PM [REPLY](#)



medicat says:
Will this still work without frying something that runs on 12V and uses only 750mA?

May 20, 2009. 9:20 AM [REPLY](#)



ACProdigy says:
Yes. A device will only pull as much amperage as needed.

May 23, 2009. 1:10 PM [REPLY](#)



ACProdigy says:
I must say, I'm fairly impressed. Particularly the use of binding posts (That was a nice touch).

I once stacked four of these in parallel to get 12V @ 52A (13A per channel) for a friend who needed such power for a competition. But it didn't have binding posts; it was just clobbered together with a 2 Farad automotive amplifier capacitor for a clean, reliable, output.

I think I may have to build one of these now. I'm rather inspired.

May 23, 2009. 9:58 AM [REPLY](#)



MairseyDotes says:
Thanks for this, it's inspired me to finish a job I've been considering - converting a small ATX power supply with a 12VDC input to provide 5VDC to my media player for use in the car.

May 12, 2009. 10:47 AM [REPLY](#)



francoiskapp says:
Just a small warning: Most ATX supplies have a minimum current on one (or two) rails below which regulation is not guaranteed. I've done this many times and I have not yet had problems, but just in case I started adding a minimum load resistor to the rails in question. It's a bit wasteful though, so for non-critical use, leave it out.

May 11, 2009. 11:26 PM [REPLY](#)

I also add an LED on the POWER OK and a switch on the PSU ON, but that's not really needed.



ste5442 says:
I think the ATX spec states that the power supplies should reach their target voltage (and be within spec) with no load now. There may be older supplies which need a minimum load though?

May 12, 2009. 1:12 AM [REPLY](#)

Good work on the 'ible :-)

PCBPolice



Thav says:
I would recommend bringing the power good wire (the green) out to a switch on the case instead of always being grounded. That way you have an easy way to disable the output power without shutting the whole power supply off.

May 11, 2009. 9:12 AM [REPLY](#)



tristantech says:
Check the label on the power supply for the correct wire colors!! It may be different for your PSU!

May 10, 2009. 5:37 PM [REPLY](#)

Also, you may find it useful to wire the other color wires to binding posts as they give you voltages like -5V or -12V; these may be useful for op-amp circuits.



dark sponge says:
You mentioned that power supplies need to have a certain minimum load to work properly, and you also mentioned that resistors would get hot. I have an idea to fix this problem.

May 9, 2009. 1:20 PM [REPLY](#)

My original idea was to just use a 12v fan that drew more than 800ma to cool the PSU. But because a small cooling fan probably doesn't use that much power, you could have a 12v 200ma or above fan blowing on a 16 ohm 10 watt resistor. That would draw about .95 amps, good enough for most PSUs.



Honus says:

Thanks for posting this- I've got 5 power supplies that I salvaged from some old work computers that will be great for this.

May 8, 2009. 10:06 PM [REPLY](#)



Horus020 says:

Hi i have a question, i have a somewhat old 380W PSU, for the 5V red wire it says 32A. Does this mean that if i have all the red wires in a single terminal, whenever i connect something to it i'll receive 32 amps? It says 155W max for 5V though, thanks for the answer.

Apr 7, 2009. 2:03 PM [REPLY](#)

[view all 182 comments](#)