

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

by [Sitalta](#) 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.

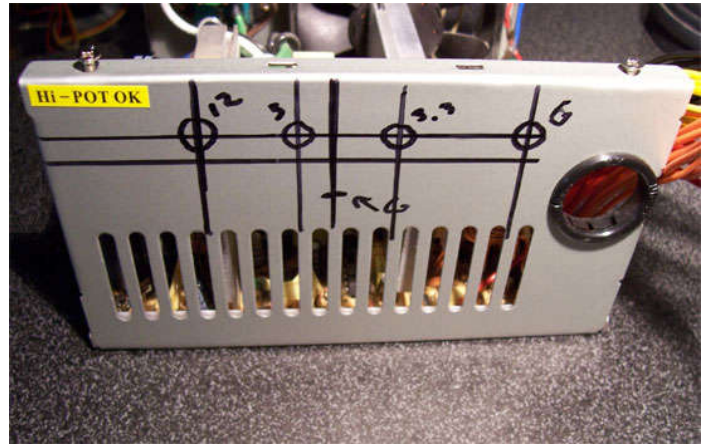
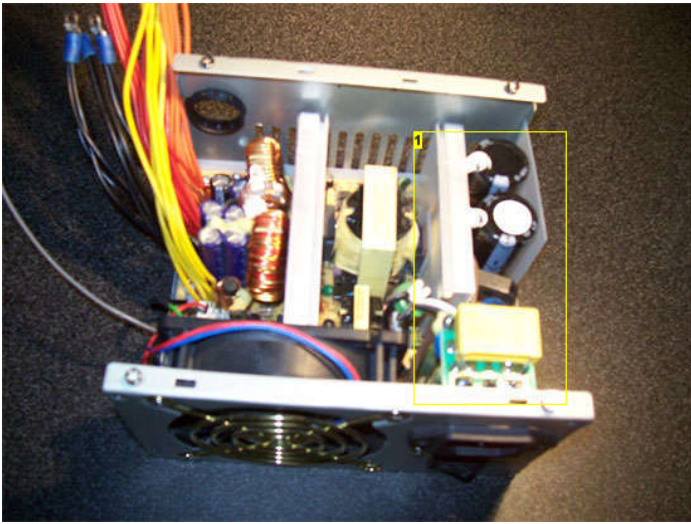


Image Notes

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.

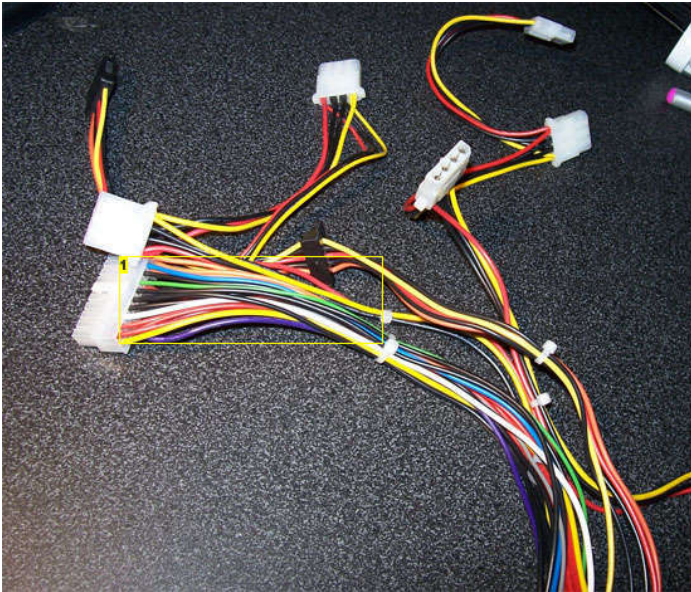


Image Notes

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.

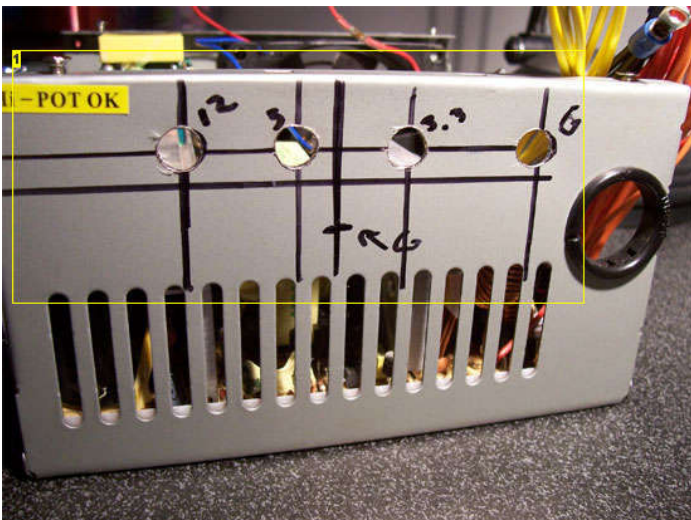


Image Notes

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

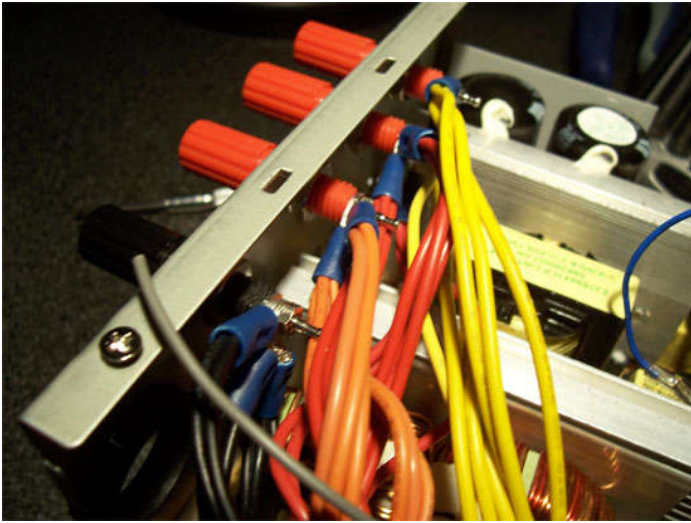
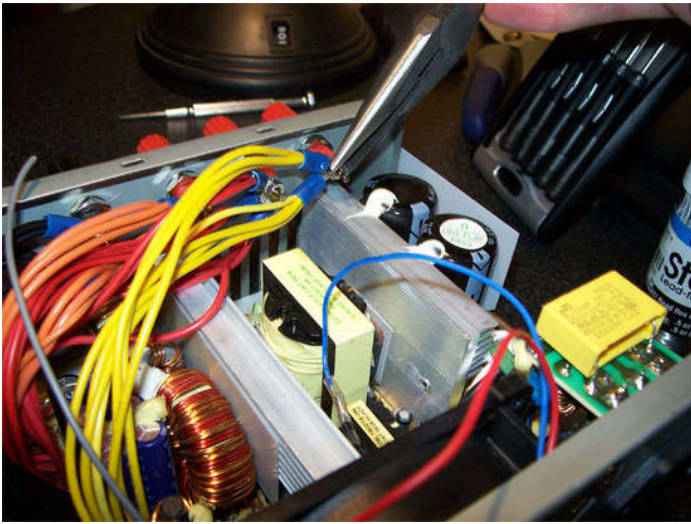
step 6: Putting It Together

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.

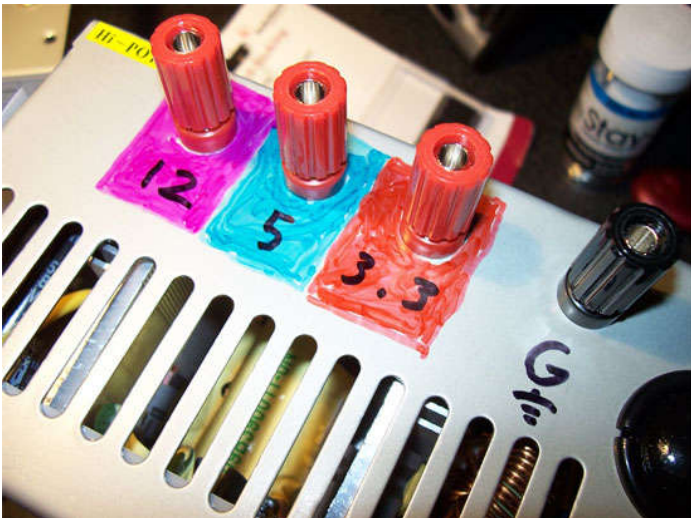


step 7: Make it Pretty

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.

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Comments

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Thav says:

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

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.



tristantech says:

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

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

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:

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

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.

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 resisor. That would draw about .95 amps, good enough for most PSUs.



Honus says:

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

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



joinaqq 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



thetech101 says:

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

You got that almost perfectly backwards. It's $P = V * I$.

$400 \text{ W} = 120 \text{ V} * I$.

$400 \text{ W} / 120 \text{ V} = I$.

$I = 3.33333333 \text{ A}$.

That's nto so much current.

In my area it's .10 per kwh. Or .04 cents.



JakeTobak says:

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

$400 \text{ W} = 0.4 \text{ kW}$

$0.4 \text{ kW} * 1 \text{ hour} = 0.4 \text{ kWh}$

Depending on where you live, that might be 4-7 cents an hour I estimate.



chuckr44 says:

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

In Michigan power is 8.8 centers per kwh.



chuckr44 says:

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

Should be "8.8 cents per kwh".



awang8 says:

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

400 watts

$I = V/P$

$240/400$

0.6 Amps

Mains = 240v @10 Amps

$240 * 10 = 2400$

$400 = 2400$

4/24

2/12

1/6

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



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:

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.

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

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:

Yes some maths wrong there:

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

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

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.



omikun says:

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

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



jeff-o says:

No, the device connected to +5V will only draw as much current as it needs... up to 32A.

May 8, 2009. 6:58 AM [REPLY](#)



latitud39 says:

Hi. I need 13,8volt for my ham radio (mínimum 15A). What can I do for the volts?. Thanks for your help and have a good day.

Feb 21, 2009. 7:00 PM [REPLY](#)



jeff-o says:

Build a dedicated power supply.

May 8, 2009. 6:57 AM [REPLY](#)



ReCreate says:

most of the time devices that run at 13 volts accept 11 to 14 and sometimes up to 15 volts

Apr 8, 2009. 3:40 PM [REPLY](#)



hailster says:

Feb 26, 2009. 9:41 AM [REPLY](#)

You can run your ham radio transceiver at 12 volts, you might not get your full output power out at 50 watts. I run my Icom IC-207h on an old power supply from a server and the voltage actually drops to about 11.5v when the radio is running full power. It works fine and honestly the couple of watts that you'll loose, from the radio's output, is minimal. If you have any more questions send me a message.

73,
KC9FSH



RetroTechno says:

May 8, 2009. 6:31 AM [REPLY](#)

Be careful about pulling the full rated current through just one binding post or one wire. There's a reason they used all those wires in the original design. You wouldn't want to start a fire! Maybe doubling up the +12V and the +5V terminals could make life more safe.



geeklord says:

Apr 23, 2009. 7:37 PM [REPLY](#)

What do the -5v and -12v do? Doesn't the whole thing just have one common ground?



geeklord says:

Apr 23, 2009. 7:39 PM [REPLY](#)

Whoops, ignore this comment. I just read your last step.



ReCreate says:

Apr 8, 2009. 3:43 PM [REPLY](#)

i tested the orange cable on mine for voltage with a multimeter and it measures 0.16 volts(yes the ground was connected to anything that was ground,including the chassis)
what gives?



stephenniall says:

Mar 23, 2009. 8:53 AM [REPLY](#)

Hi i did this and added some audio Jacks for 12 vs (for my homemade tattoo gun) And a Set of Alligator Clips that way you can connect stuff without cutting all the cables off



matt1984 says:

Apr 2, 2009. 10:00 AM [REPLY](#)

can you post pics of that i'm trying to do the same thing



stephenniall says:

Apr 3, 2009. 1:01 PM [REPLY](#)

Ill try but i go away on vacation on sunday SO it may be a week or so



mahmoll says:

Mar 30, 2009. 6:37 AM [REPLY](#)

Thank you very much
cool thing
thanks



awang8 says:

Jan 25, 2009. 4:33 PM [REPLY](#)

Actually, I think I read somewhere that by reversing the polarity you can achieve - the voltage.

So if ground is connected to positive and +12 is connected to ground then you'll have negative voltages...

I may be wrong. It's just I read it somewhere.



xombie88 says:

Mar 28, 2009. 4:38 AM [REPLY](#)

In a way, it would work for simple devices. But it wouldn't be a true negative voltage.

It wouldn't work if you needed 12V, 0V, AND -12V (you might need them for some op amp circuits).



awang8 says:

Mar 29, 2009. 1:50 AM [REPLY](#)

It works for simple devices... What's classified as simple? And just wondering, what's negative voltage for anyway?



xombie88 says:

Mar 29, 2009. 3:45 AM [REPLY](#)

Devices with 2 terminals, that just need a voltage drop, not specific voltages.

If you think of voltages as heights, you can think of 0V as sea level (which is considered 0m/feet), positive voltages as places higher than sea level, and negative voltages as underground places.

What I called "simple devices" (not a real term) only need the height difference, they don't care if you're going from -12m to sea level or sea level to +12m, or even 24m to 36m. In all cases the "drop" in height is -12m.

But some devices (especially ones that measure electricity) need accurate voltages to work.



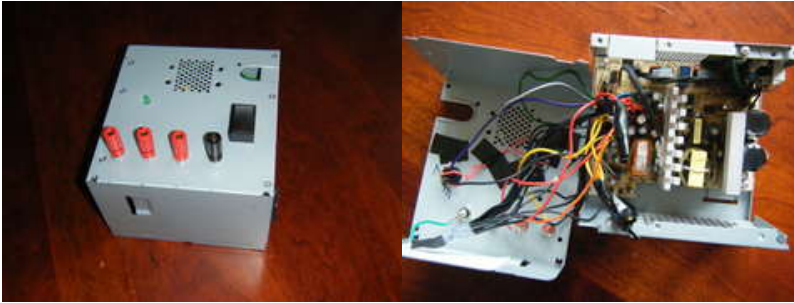
joinaqd says:
nice job buddy.one of my favourite instructables. 5 stars

Mar 19, 2009. 6:01 PM [REPLY](#)



mortaldoom780 says:
This is really helpful in place of a really expensive lab power supply. I've made one using an old 230W ATX power supply from a Dell. It's got a status LED, and a power LED (the status LED goes dark if there is a short on the output lines, thermal overload, etc).

Mar 8, 2009. 7:41 PM [REPLY](#)



tubbsey88 says:
wont grouping the wires together increase the voltage?

Feb 23, 2009. 8:35 PM [REPLY](#)



Xunil says:
No, the voltage stays the same. The current-handling capability is increased, because the current flows over all of the available paths (all of the wires). This means you can draw more current and not risk melting the wires.

Mar 6, 2009. 9:25 AM [REPLY](#)



scorcher says:
Hey whats it mean when the atx turns on and then turns off and then turns on again and then turns off and so on... im going to let it sit for a day , and heres the time:

Feb 11, 2009. 2:38 PM [REPLY](#)



scorcher says:
i have an atx power supply out of a mini pc, how would i get that to work? btw the mini pc power supply is exactly the same voltage, workings, and has the same cables as a regular atx, but differently shaped. Would this still work?

Jan 18, 2009. 6:47 PM [REPLY](#)



scorcher says:
It works!!!!!!!!!!!!!!!!!!!! wooot!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! YAY

Feb 10, 2009. 5:23 PM [REPLY](#)



scorcher says:
5/5 stars! and faved, btw i dont usually fav things...

Feb 10, 2009. 5:22 PM [REPLY](#)



scorcher says:
lol i said things

Feb 10, 2009. 5:22 PM [REPLY](#)



pejuve says:
Thanks, It's working fine

Jan 19, 2009. 4:31 PM [REPLY](#)



slimguy379 says:
ok well this is a decent instructable, however i have currently bought a projection panel, used for over head projectors to make a movie projector, from ebay. the item has a custom power cord and requires a 12v, 5v, and a -5v. you covered the 12v and +5v, but is there a way in which i can get a -5v? i have the website that tells me how someone did it...: <http://www.realm-online.com/eovation.htm> any help would be greatly appreciated. thanks

Dec 29, 2008. 9:44 AM [REPLY](#)



obentou says:
I keep wondering why no one drills the TOP HALF of the PS case to mount the binding posts onto... The top half is removable, so it would be easier to drill and clean rather than drilling holes in the bottom half which is attached to the guts. Seems a lot easier than having to make absolutely sure to vacuum out all the stray metallic shavings in order to avoid a possible meltdown. :(

Oct 3, 2008. 12:10 AM [REPLY](#)



omnibot says:

That's exactly what I'm doing with mine, there's no room anywhere else.
I've just taken a break 'til morning though, just realized it's half past midnight and I was about to start drilling.

Dec 18, 2008. 3:30 PM [REPLY](#)



cheeto4493 says:

I went to reply to this one, but accidently replied to my own .duh..

Dec 19, 2008. 5:59 AM [REPLY](#)



omnibot says:

Not to worry, I've read that one to. Just got through the chassis last night at the expense of a drill-bit, diamond file and my thumb. Man that is some tough metal to cut.

Dec 20, 2008. 1:00 AM [REPLY](#)



Seraph101 says:

HA true, I can't speak for everyone but for my units the side that has the wires soldered on the PCB board has more room on the side. Also if you have it on the hard unit you don't have to have a foot of wire so you can have play when you remove the lid.

Dec 7, 2008. 11:31 PM [REPLY](#)

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