

## Hacking ATX Power Supply?



OK, before going further, I need to inform you that we do not take responsibility on your safety and guarantee anything as this is hacking and it deal with AC power source. You will need to take your own risk and be careful with what you are doing.

Oh, you wanted a power supply that can give you 5A of 12V source? But most of AC to DC adapter is rated at 2A or less only, higher current output will cost you a lot. Normally you might go for switching power supply like this:



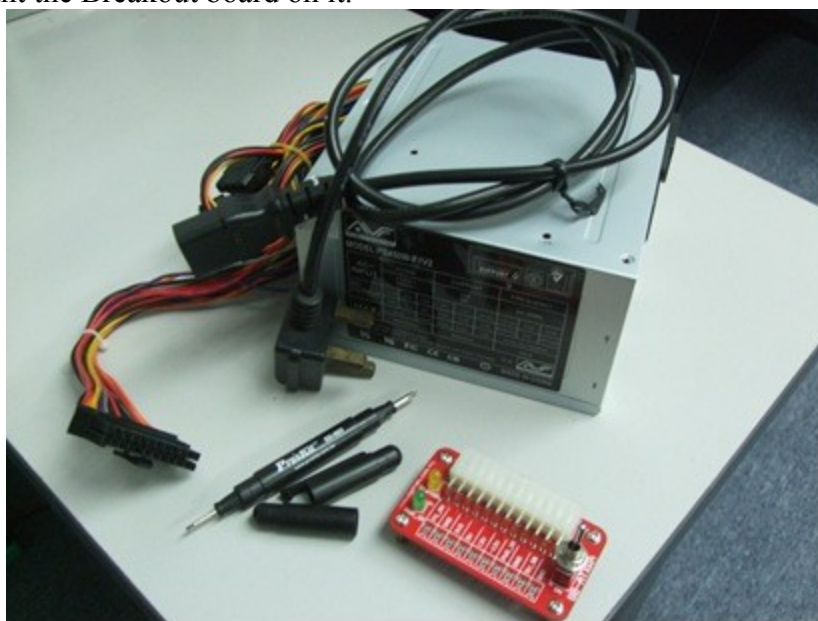
Here is an alternative. For armature hobbyist, they will hack the computer desktop power supply. Yup, it is actually a switching power supply dedicated for computer motherboard. You can buy it from computer shop, I am pretty sure they have it on rack. We are going to utilize it as the power source for our project and development. ATX power supply, come with high current output and stable voltage. It has 3.3V, 5V, 12V and -12V (you might not use it). As you might have notice, 12V and 5V is commonly use by embedded electronics to power microcontroller, stepper motor, DC motor, sensor, magnetic lock, you name it. Let me leave the current rating at the back. Now if you go to Wikipedia and search for ATX, which you will reach here, it actually explained quite comprehensive pin-outs and features of this power supply. Because most motherboard will have standard connector, all ATX power supply must be compliant with this standard. You can hack it like this example:



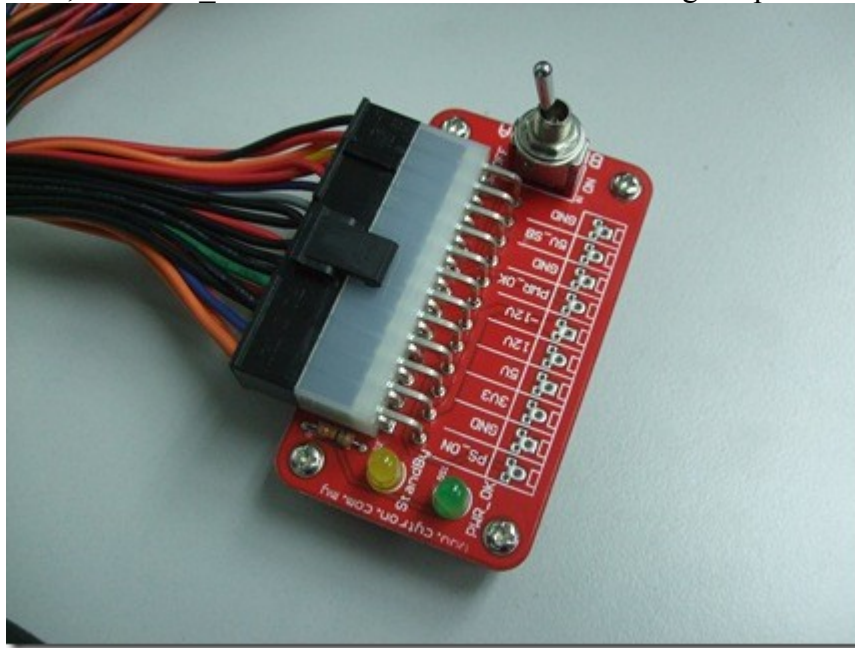
But you will need to figure out the wirings and get yourself proper connector, not to forget the drilling of holes to mount the connectors. Worst is you cannot use back for computer once the connectors and wires are cut and modified. Good for you that we have come out with a Breakout Board for ATX power supply, it will enable you to utilize ATX power supply in just 10 minutes of setup.

OK, get yourself these item:

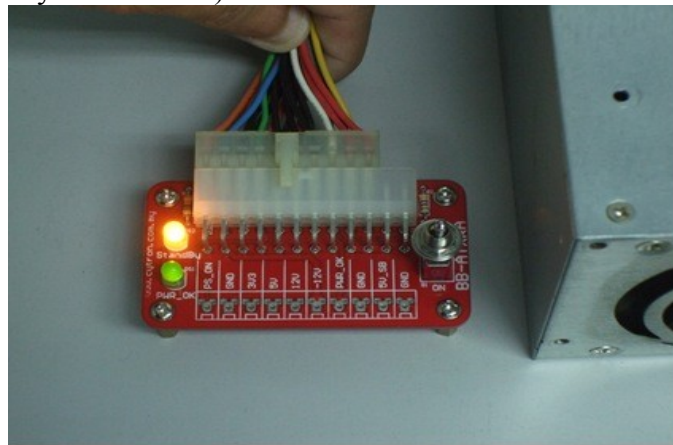
1. ATX Power Supply, you should be able to grab one from computer shop. I am not sure whether Cytron have it, but by the time I write this, we do not carry any
2. BB-ATXRA, the breakout board for ATX power supply from Cytron.
3. You might want to get the terminal block too, or header pin? Or turn pin? Is up to you. I will show all the connection, but I use the terminal block.
4. PCB stand, or sometime called spacer. I am using 10mm PCB Stand S/S.
5. AC Power cord, most of ATX power supply does not come with one, so you need to get it separately.
6. Screw driver, I am using 4 in 1 screw driver set. You need one to open the ATX power supply casing if you want to mount the Breakout board on it.



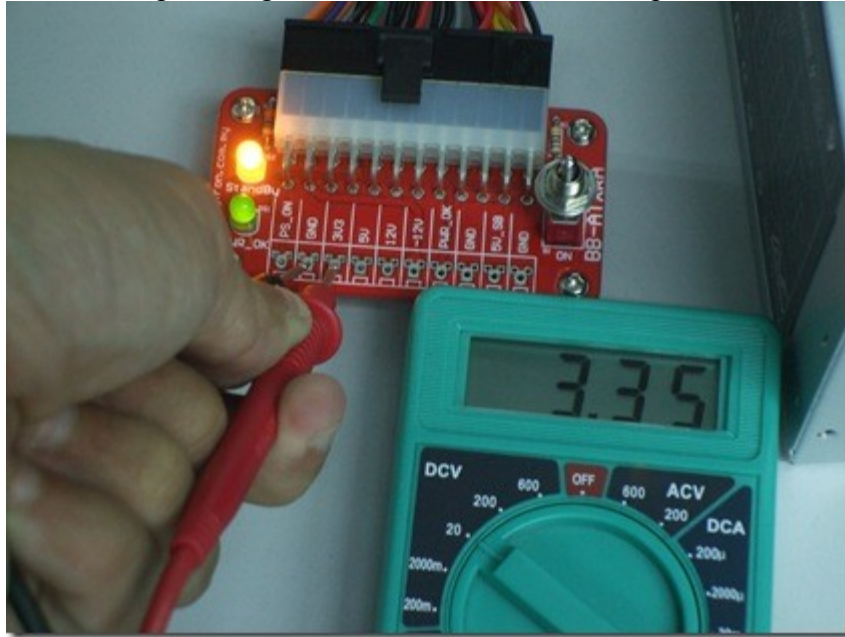
Now, test your ATX power supply first before you hack it. If there is problem at least it is still under warranty. I have two ATX power supply in my lab. One is a bit old which I took from my colleague desktop computer:). BB-ATXRA come with ready connector and other supporting components such as resistor, indicator LEDs, switch, PCB stand. Basically it is plug and play. Now, look at your ATX power supply, you will notice there are whole bunch of wires and connectors, not to worry. We are interested on only 1 set of connector. Look for connector that have either 20-pin or 24-pin. Connect it to BB-ATXRA, plug in the AC power cord to ATX power supply and ON the AC switch. Standby LED should illuminated indicating the ATX power supply is in standby mode. Now, activate the toggle switch on BB-ATXRA, the PWR ON LED should illuminate indicating the power is fine.



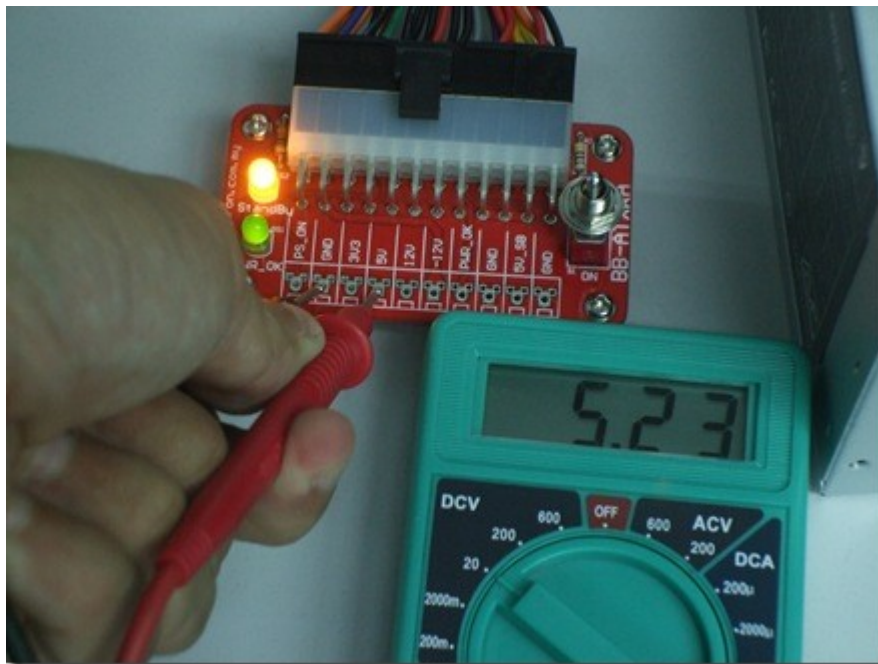
Generally there are two type of ATX power supply, the older come only with 20-pin connector. Don worry, BB-ATXRA support both 20-pin and 24-pin ATX power supply. Here you go, 20-pin ATX connector on BB-ATXRA with the switch ON. Remember, connect the 20-pin to the left side of BB-ATXRA (near to LED, away from switch).



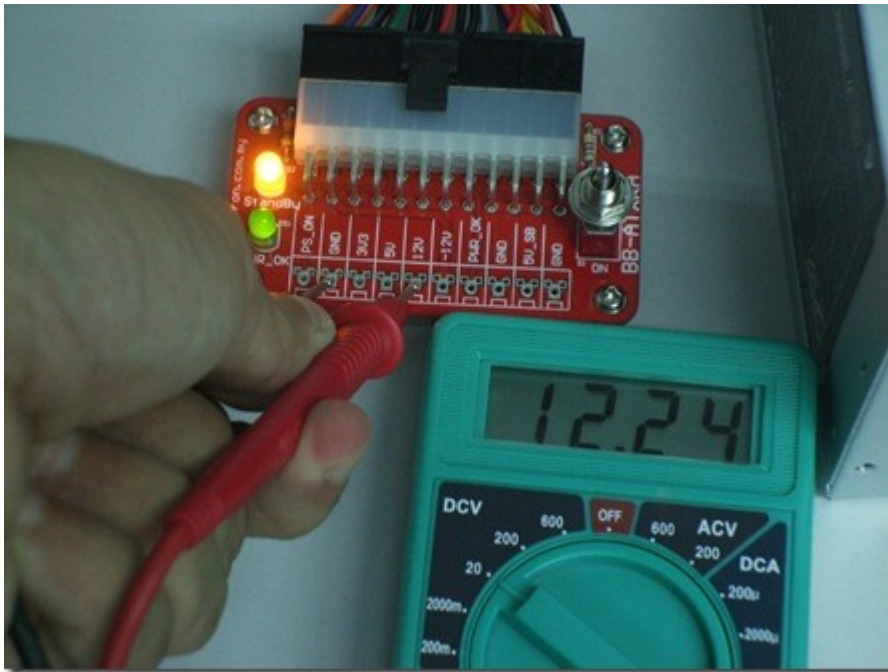
Now, you can measure the output using multimeter: Here is 3.3V output



Here is the 5V output, slightly higher, but still got for microcontroller because most of the maximum voltage is 5.5V



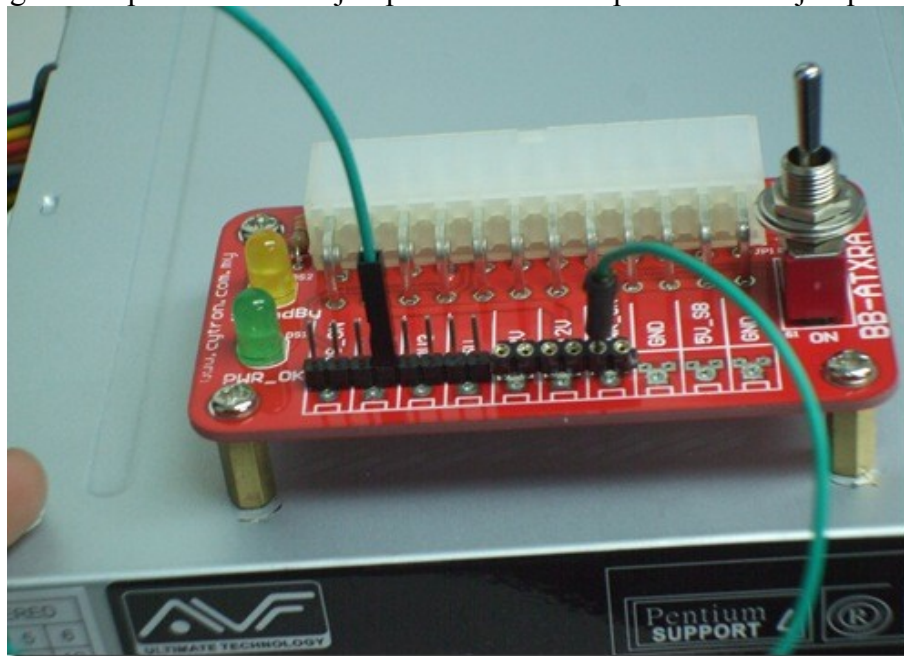
+12V output, again is a bit high yet it is good.



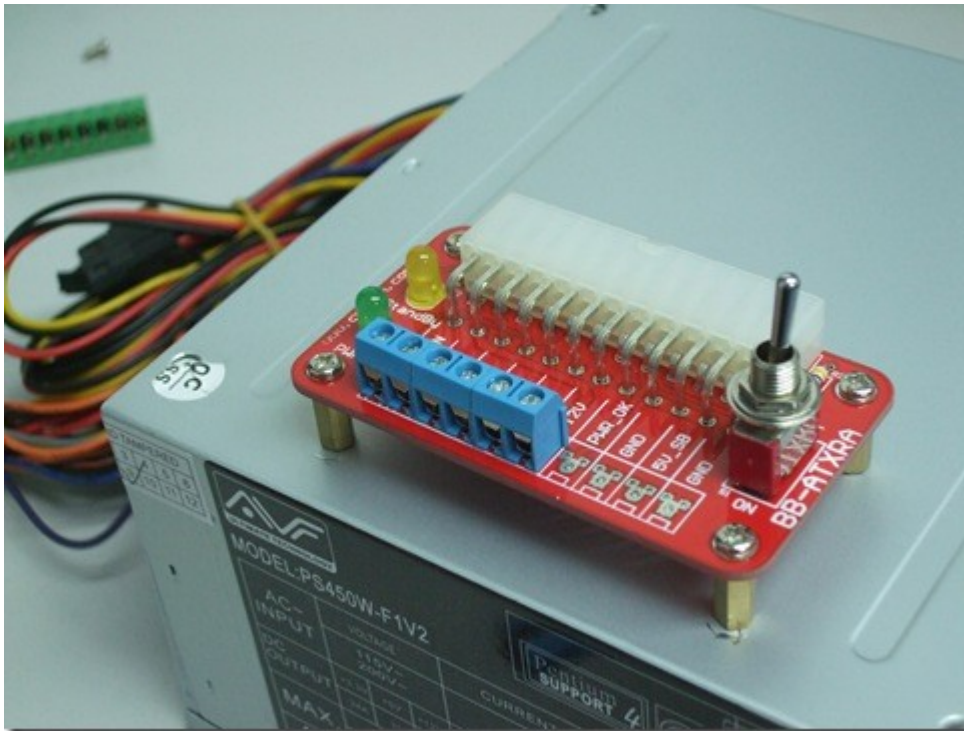
Good, if you like the  $-12V$ , go a head and measure it, I am getting around  $-11.50V$ .

These measurement prove the ATX power supply and BB-ATXRA is working . Let's proceed to next step. We will need to some soldering. BB-ATXRA come without connector, you will need to decide what you want to use. The PCB support header pin, turn pin (machine pin), blue color terminal block and green terminal block, or if you like you can solder wire directly to the PCB pad. I am going to use blue terminal block and bare in mind you don have to solder all the pad.

Example of using header pin with female jumper wire and turn pin with male jumper wire.



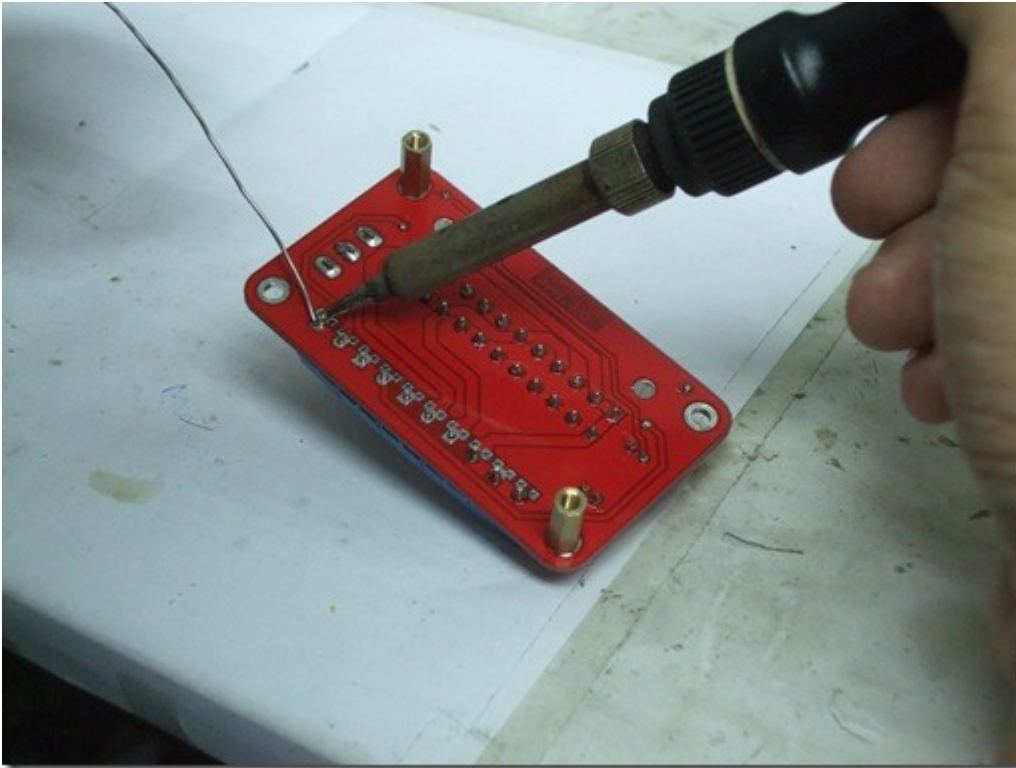
Using Blue Terminal Block



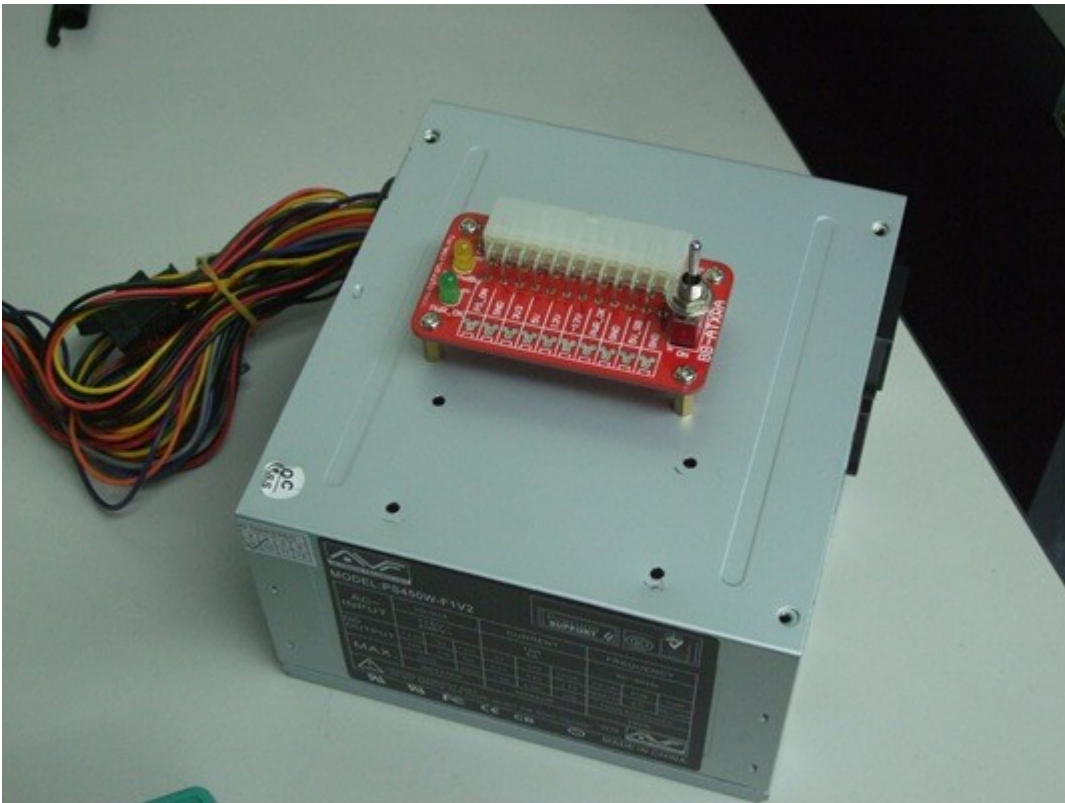
Using Green Terminal Block



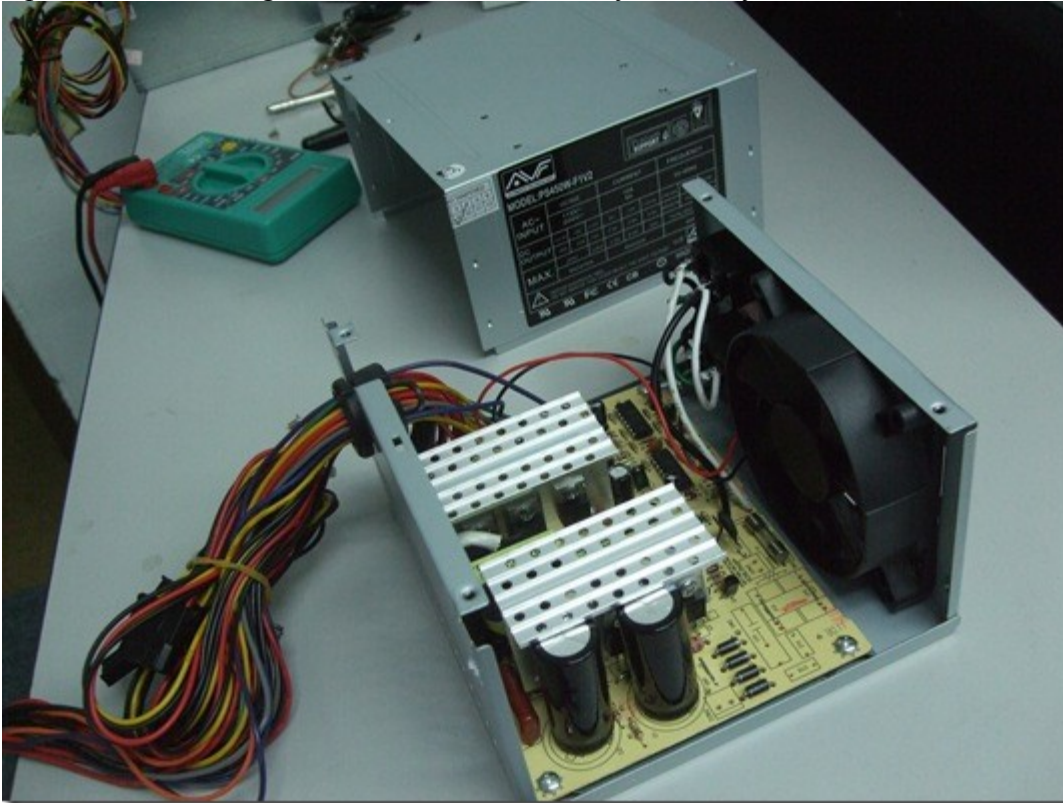
OK, now solder the preferable terminal to BB-ATXRA.



So you are ready to use it. But I am going further as I need to make it proper. I will now drill 4 holes on ATX power supply to give proper mounting to this breakout board, don't like it tangling around. Bare in mind, never short those connection on the bottom of BB-ATXRA, you will short the terminal and might damage the ATX power supply. Measure the hole location with the BB-ATXRA, mark it and drill the holes.



Open the ATX casing, this will void the warranty, do it at your own choice.



Mount the BB-ATXRA PCB stand from the bottom of the casing (upper surface) and it become:



OK, is getting nicer I like it. Now find yourself a wire which is suitable to be use. Normal wire and use the DC jack is great idea and simple.



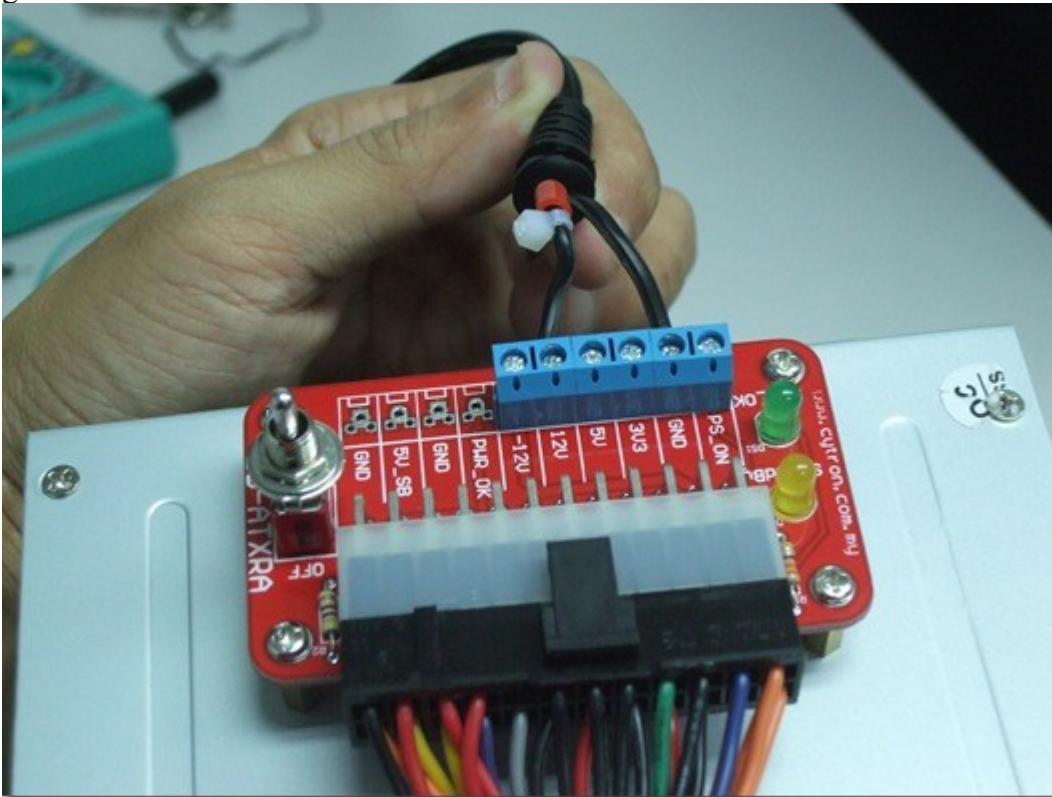


But I have a lot of ready wire with this terminal:

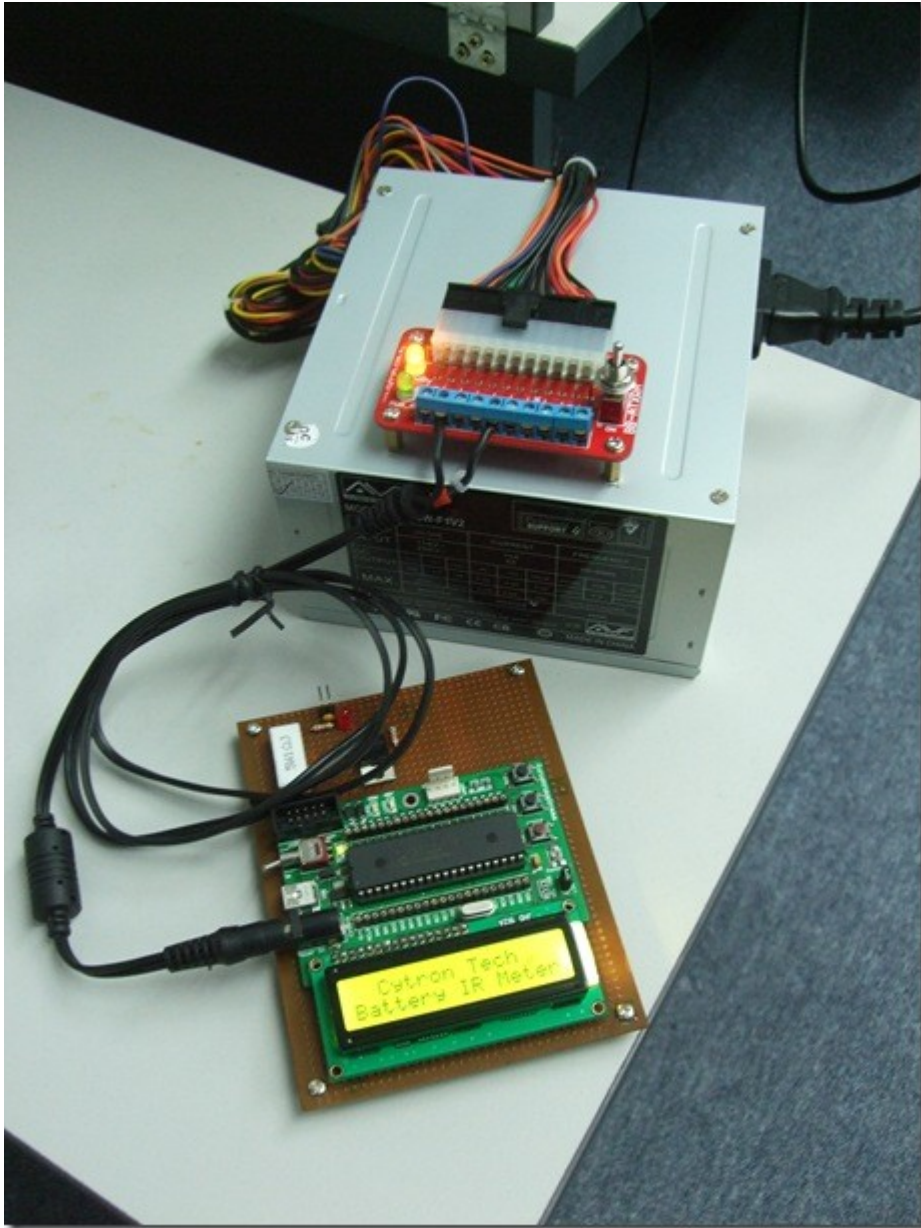


I get it from the old and damage AC to DC adapter. Do take care of the terminal polarity, use mutlimeter continuity test to find out which wire is positive, the outer ring of terminal should be negative.

Screw the wire to BB-AXTRA, choose the voltage you want to use. I normally use 12V, so here you go:



Power it up and enjoy using it. Now you can really have a power supply with different voltage, 3.3V, 5V and 12V. I have here powering a project from my colleague. He did it for ROBOT. Head to Toe magazine. The Battery Internal Resistance Meter.

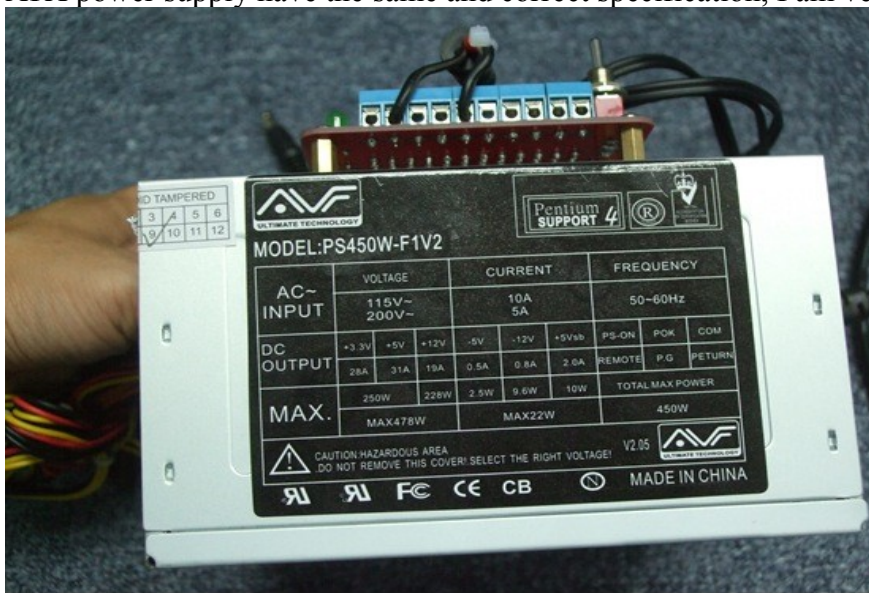


I added a proper mounting at the back of ATX power supply for the ease of carrying it.



Remember, leave the other connector untouched, you can still use back the ATX power supply if you need it 1 day. If you hack it by cutting the wire and connectors, sorry, you cannot use it anymore for your desktop.

Now, what is the specification of current output from ATX power supply? I am not sure whether all ATX power supply have the same and correct specification, I am very satisfy with my one:



Woh:

3.3V at 28A (Max)

5V at 31A (Max)

+12V at 18A (Max)

But do bare in mind that the BB-ATXRA cannot support those current as the PCB track width is limited. From what we test, 10A continuous is no problem, higher than 10A will be on your own risk. You can power your battery charger for lipo if you like Send us some photo of your ATX power supply with the breakout board on it and show us what you use for.