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Hello shawty

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Author

Topic: ATX Power Supply Modification (Read 2216 times)

shawty and 0 Guests are viewing this topic.

shawty

Regular Contributor

Posts: 78

Country: <u>.</u> Q

ATX Power Supply Modification « on: July 19, 2019, 12:00:40 pm »

Reply

Quote

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Hi All,

Digital electronics I can do, more conventional stuff, well I'm probably closer to beginner than anything else.

Hence why I find myself here asking this question.

I have some specialized computers for powering industrial equipment, 4 serial ports on them a digital I/O system on them, 2 Ether, 4 USB and the whole thing just looks like a giant heat sink designed to be bolted onto the side of something.

What I don't have however are power supplies.

These things have a green 3 pin connector, which I've already sourced plugs for, the 3 pins are -v, grnd, +v

The voltage input to these things is from 9V all the way up to 40V so they can operate on quite a range.

My problem however is the ampage.

The - and + both require supplys that can support up to a 3 amp or above draw.

I have a whole bunch of old but working ATX PSU's kicking about, and all of them will give +12v at up to 20A but I can't find a single one that will give more than about 0.3A on the -12V output.

so, my question is.....

Is there anyway I can up the ampage on the -12V rail?

I don't mind having to build an external circuit with something like a boost converter if that's what I need, as long as

- A) The + & voltage levels match
- B) Both + and can hold 3A or higher

Ideally though, I'd like to modify an ATX to do this, or at the very least build an adapter to connect to the -12 that allows me to draw higher, is this possible?



Report to moderator 88,97,38,99

Meh....

□ joseph nicholas

Frequent Contributor



Posts: 408 Country:

 \mathbb{Q}

Re: ATX Power Supply Modification « Reply #1 on: July 19, 2019, 12:49:27 pm »

Withdraw Thanks

Reply

Quote

http://planetimming.com/atx_mod/atx_mod.html-

Have a look at this link. I did this and had some positive results increasing the current on all the rails of a cheap ATX supply.

Works great.

Report to moderator Logged

The following users thanked this post: shawty

shawty

Regular Contributor



Posts: 78 Country: <u>.</u> Q

Re: ATX Power Supply Modification « Reply #2 on: July 19, 2019, 01:50:49 pm »

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Thanks Joseph, reading now :-)



Report to moderator 88.97.38.99



Meh....

mariush

Super Contributor

Posts: 4585 Country:

Re: ATX Power Supply Modification « Reply #3 on: July 19, 2019, 01:57:06 pm »

Sav Thanks

Reply

Quote

You know you can buy power supplies that have higher current on both positive and negative, here's just a basic list: https://www.digikey.com/products/en/power-supplies-external-internal-off-board/acdc-converters/133?

FV=ffe00085%2Cii2%7C2211&quantity=0&ColumnSort=1000011&page=1&pageSize=25

17\$ gets you 1.3A +/- 13.5v for example : https://www.digikey.com/product-detail/en/mean-wellusa-inc/RD-3513/1866-3982-ND/7705981

But you know, there's toroidal and regular transformers out there starting from around 15\$ for a 50VA transformer (about right for a +9v and -9v and around 2.5-3A on each rail). Add a plain bridge rectifier that costs half a dollar and a couple of plain electrolytic capacitors to smooth the output voltage and you have your power supply.

Report to moderator Logged

□ mindcrime

Supporter

Posts: 394 Country:



Re: ATX Power Supply Modification « Reply #4 on: July 19, 2019, 02:06:35 pm »

Say Thanks

Reply

Quote

You may be able to make your own -12V rail, based on the +12V rail, instead of relying on the -12V rail built into the power supply. There are voltage inverter IC's you can use for this, but there are other ways to do it. See:

https://www.digikey.com/en/articles/techzone/2012/oct/generating-negative-output-from-positiveinput-voltage

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■ MagicSmoker

Super Contributor



Posts: 1408 Country:

2. Q

Re: ATX Power Supply Modification « Reply #5 on: July 19, 2019, 02:47:07 pm »

Say Thanks

Reply

Quote

Quote from: shawty on July 19, 2019, 12:00:40 pm

Is there anyway I can up the ampage on the -12V rail?

Maybe, but the approach I would take is to hang a buck-boost converter off the 12V rail. Note that the peak current in the switch for Vout = -Vin will be a little more than twice the DC load current, so keep that in mind if you restrict yourself to integrated switch controller ICs (which, to be fair, are all you should really be considering if you haven't built a switchmode power supply before).



Posts: 4585 Country:



☐ Marian_elf Contributor



Posts: 12 Country: $\mathbb{R} \square \mathbb{Q}$



Re: ATX Power Supply Modification « Reply #6 on: July 19, 2019, 03:03:01 pm »

Say Thanks

Reply

Quote

Some switching power supplies have a boring 7812 linear regulator or a 34063 style switching regulator for -12v, because it's not critical - it's only used for serial ports, and most serial devices are happy with anything better than around -8v anyway.

So you can't really "increase" the -12v output by a significant amount. It's pretty limited to that 0.3A .. 0.5 A

You CAN use switching regulators in inverting mode, a MC33063 or MC34063 will give you maybe up to 0.75A to 1A \ldots a LM2576 or LM2596 will maybe give you up to 2A \ldots but by the time you buy the psu AND the switching regulator and the inductor and the various tiny resistors and capacitors and make the circuit board, it's often easier and cheaper to just buy the actual psu with those outputs, or buy a classic transformer with center tap or two secondary windings.

Report to moderator Logged



Re: ATX Power Supply Modification « Reply #7 on: July 25, 2019, 05:49:38 am »

Say Thanks

Quote

Quote from: shawty on July 19, 2019, 12:00:40 pm

Is there anyway I can up the ampage on the -12V rail?

Hi,

Most of the low-end ATX supply units i have worked draw the -12V from the +12V main power transformer secondary winding trough some FR104 rectifier diode (or others like it) and it achieves regulation trough magnetic coupling on the main choke (inductor) with the main +12V output

The main current limiting factor is the wire gauge on the inductor for the -12V output, the leakage inductance referred to the main +12V winding on the choke, and the rectifier diode it's self.

Still if this is the configuration for your ATX supply units than you really should get more than jut .3

Maybe you could post some photos with the main board inside, just to be sure we know what and how...

I can understand the 3A requirement for the +12v, however on the industrial style PCs that I have worked on in the past, the -12v was only to support the serial comms and the current requirement

All the best.

Report to moderator Logged

Say Thanks

Quote

Reply

"What's right is what's left if you do everything else wrong" - Robin Wiliams.

My first question would be: Are you sure you need 3A on the -12 ν rail?



☐ Mr.B

Supporter

Posts: 1200 Country:

shawty

Posts: 78

Country: <u>.</u> 9

Regular Contributor



Just asking...

was quite low.

Report to moderator Logged

Time is the overseer of all things.

Re: ATX Power Supply Modification « Reply #9 on: August 06, 2019, 09:43:22 pm »

Re: ATX Power Supply Modification

« Reply #8 on: July 25, 2019, 06:08:01 am »

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Hi all, sorry there's been no immediate reply, work called and I had to take off for a week or 2 to a job site.

I'll read through the replies thus far, and reply to them as appropriate.

Shawty

Report to moderator \$\mathbb{\mathbb{B}}\mathbb{L} 88.97.38.99



Meh....



Re: ATX Power Supply Modification

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Regular Contributor

Posts: 78 Country:

shawtv

Posts: 78 Country:

<u>.</u>. Q

shawty

Posts: 78 Country:

<u>.</u> Q

Regular Contributor

Regular Contributor

« Reply #10 on: August 06, 2019, 09:46:57 pm »

Ouote from: mariush on July 19, 2019, 01:57:06 pm

You know you can buy power supplies that have higher current on both positive and negative, here's just a basic list: $\underline{\text{https://www.digikey.com/products/en/power-supplies-external-internal-off-board/ac-dc-converters/133?}\\$ FV=ffe00085%2Cii2%7C2211&quantity=0&ColumnSort=1000011&page=1&pageSize=25

17\$ gets you 1.3A +/- 13.5v for example : https://www.digikey.com/product-detail/en/mean-well-usa-inc/RD-3513/1866-3982-ND/7705981

But you know, there's toroidal and regular transformers out there starting from around 15\$ for a 50VA transformer (about right for a +9v and -9v and around 2.5-3A on each rail). Add a plain bridge rectifier that costs half a dollar and a couple of plain electrolytic capacitors to smooth the output voltage and you have your power supply.

Hi Mariush.

Unfortunately owing to time constraints I have actually done this now, I've bought 4 of these: https://www.ebay.co.uk/itm/AC220V-to-DC5V-12V-24V-48V-Switching-Power-Supply-LED-Driver-Transformer-Adapter/391782456678? ssPageName=STRK%3AMEBIDX%3AIT&var=661152128164&_trksid=p2057872.m2749.l2649

I would still have liked to make use of gear I already had available (I hate wasting stuff, especially electronics), I salvage and re-use pretty much everything I can.

Cheers Shawty

Report to moderator \$\mathbb{b}\$\ 88.97.38.99

Meh....

Re: ATX Power Supply Modification « Reply #11 on: August 06, 2019, 09:48:39 pm »

Reply

Quote

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Quote from: mindcrime on July 19, 2019, 02:06:35 pm

You may be able to make your own -12V rail, based on the +12V rail, instead of relving on the -12V rail built into the power supply. There are voltage inverter IC's you can use for this, but there are other ways to do it. See:

https://www.digikey.com/en/articles/techzone/2012/oct/generating-negative-output-from-positive-input-voltage and the state of the sta

Thanks, I'll have a read of that. Even though I've bought some PSU's now (See above) I'm still going to follow through and read up on this subject, as I have a load of spare ATX's that I can (and would like to) repurpose for other things.

Report to moderator \$\mathbb{B}\L 88.97.38.99

Meh....

Re: ATX Power Supply Modification « Reply #12 on: August 06, 2019, 09:51:43 pm »

Reply

Quote

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Ouote from: Marian elf on July 25, 2019, 05:49:38 am

Quote from: shawty on July 19, 2019, 12:00:40 pm

Is there anyway I can up the ampage on the -12V rail?

Most of the low-end ATX supply units i have worked draw the -12V from the +12V main power transformer secondary winding trough some FR104 rectifier diode (or others like it) and it achieves regulation trough magnetic coupling on the main choke (inductor) with the main $\pm 12V$ output winding.

The main current limiting factor is the wire gauge on the inductor for the -12V output, the leakage inductance referred to the main +12V winding on the choke, and the rectifier diode it's self.

Still if this is the configuration for your ATX supply units than you really should get more than jut .3 amps... Maybe you could post some photos with the main board inside, just to be sure we know what and how...

All the best.

I've got lots of ATX PSU's so unless I knew exactly which was the best one to use, I wouldn't know which one to photograph :-)

PS: Like the robin Williams quote ...



Meh....

shawty Regular Contributor

Posts: 78 Country:

Re: ATX Power Supply Modification « Reply #13 on: August 06, 2019, 09:58:43 pm »

Reply

Quote

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Quote from: Mr.B on July 25, 2019, 06:08:01 am

My first question would be: Are you sure you need 3A on the -12v rail?

I can understand the 3A requirement for the +12v, however on the industrial style PCs that I have worked on in the past, the -12v was only to support the serial comms and the current requirement was quite low.

Just asking...

According to the specs for the industrial PC's I'm trying to power, yes, there very strict about it. I did actually just try hooking one up without increasing the ampage, IE: -v to -v, + to + and gnd, both supply's at 12v and the PSU basically gave me the middle finger. It was happy as larry again once I disconnected the -v rail, but then the 4 serial ports on the device didn't power up and initialize correctly, and caused the Linux distro I was trying to boot with to crap itself and fall over with a kernel panic in the driver file.

The devices are an older model "Arbor" (Actual model num escapes me at present and I'm not at my usual PC at the moment), in quite a thin in height case that looks like one huge heatsink. 4 serial ports, 4 USB, 2 Ethernet, serial ports are capable of RS485 and a row of Digital and Analog I/O along one side that I need to work out how to program.



Report to moderator 81,88,97,38,99

Meh....

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