

# DC1 DC Filter

The DC1 is a DC filter to be used with switched power supplies in eurorack cases. It is used to remove ripple on the power that otherwise can find its way into the audio of your modules or mess with the logic in digital modules.

The DC1 is a dual passive first order filter that can handle up to 5A on both the plus and minus 12V power rails. It shall be placed between the switched power supplies and the busboards of your system.

If you calculate that you have 1A of power for each row of 84hp in your case this filter can handle at least 4 rows of power. If you think about power this way when building your cases, you will basically be able to put any combination of modules into your system without any problem with power. You should always have a little bit more power available in your system than you think you need. Some 25% extra is a good margin.

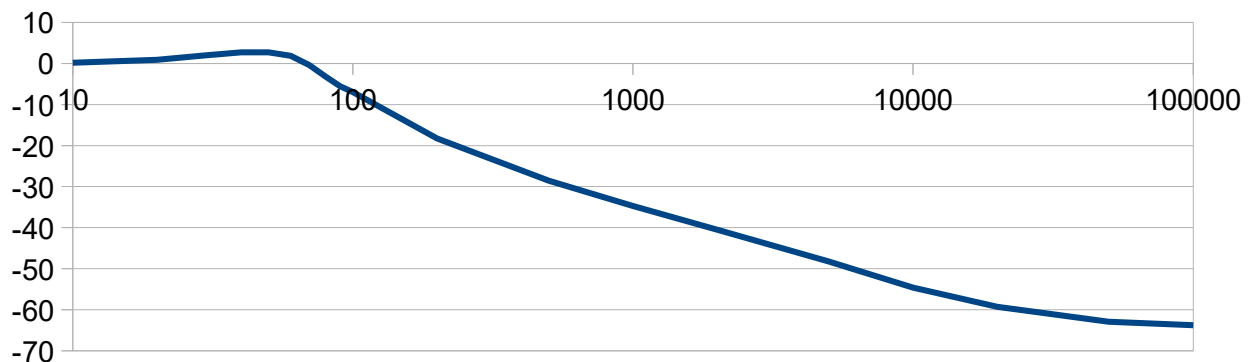
Switched power supplies typically have a switching frequency of about 100kHz. The 100kHz ripple on the power rail is usually fairly easy to filter away. Can be fixed with a physically small filter even at fairly high power.

It can be a bit trickier with the regulation loop frequency rippel. That rippel can be in the region of 1kHz to a few kHz, that is right in the audio range where you don't want it to be.

As the regulation loop frequency is so low bulkier components are needed, especially when you need quite a bit of power.

The DC1 filter is designed for a worst case scenario of a regulation loop frequency of 1kHz on the power supply. Most switched power supplies are specified to have about 100 mV of rippel out. The DC1 is designed to attenuate that rippel on the power at 1kHz by 35dB. This is absolutely good enough for audio equipment applications.

As most power supplies have a regulation frequency higher than 1kHz the rippel is actually attenuated more than 35dB. See filter curve below.



## Device specs

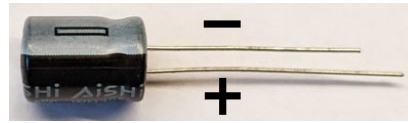
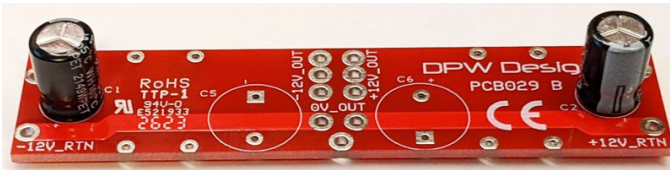
Module size: 83 x 57 x 19 mm. Weight 65 g.

Power requirements: +/-12V. Max current 5A but max 4A is recommended.

Voltage drop over the filter: Max 0,2V at 5A current.

# DIY building instruction

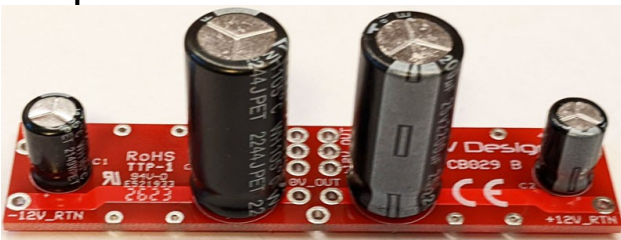
## Step 1



Solder the two small 220uF capacitors. Note, the polarity of the capacitors. Mount as noted on the PCB.

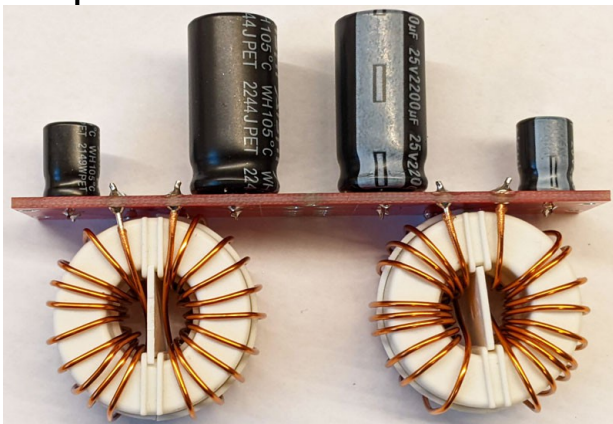
The negative lead is shorter. The negative lead shall go into the hole with the square solder pad.

## Step 2



Solder the two 2200uF capacitors. Note, the polarity.

## Step 3



Solder the two inductors.

## Use case examples

**WARNING!** If you don't have the proper knowledge it can be dangerous to build power solutions like this. AC main voltages are dangerous!

### Connecting your filter, case 1

The following example is with two 50W Meanwell power supplies. Article number LRS-50-12. This is good for at least 4 rows of 84hp. It is for +/- 4A of power.

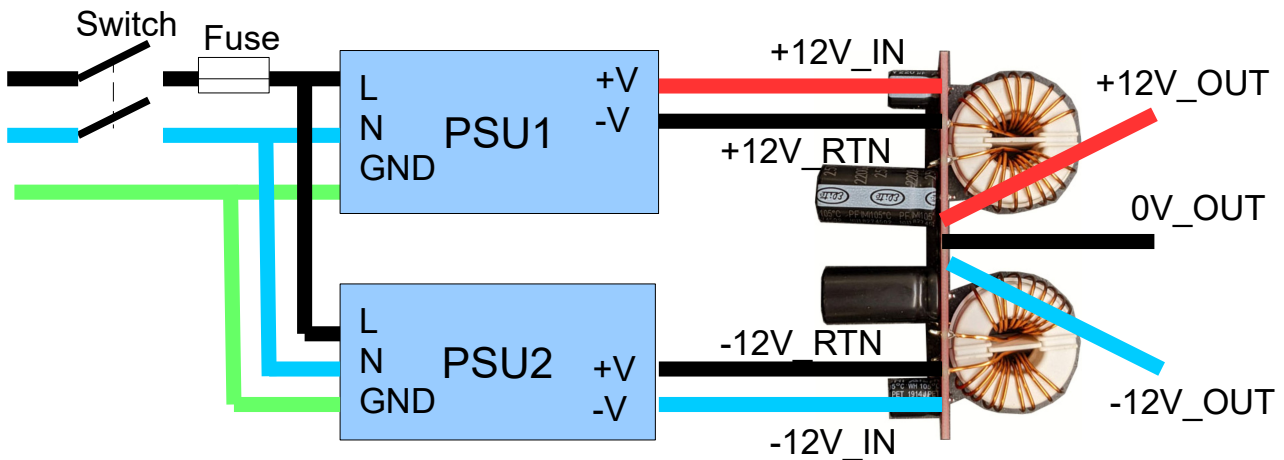
The reason for using two power supplies in this way is that it in general is easier to find suitable single voltage supplies than dual ones, especially for higher power.

The Meanwell power supplies used are cheap and well built. They also work all over the world with the different available AC voltages, including Japan.

The building practice makes the solution scalable for making bigger cases.

The good thing with a power solution like this is that if you use this for a two row case then you will have more power than you need and you can use this main case to power satellite cases.

If you are using some other power supply, be sure to check that the output of the power supply is floating. Otherwise you can not connect two power supplies as in this example.



Going from left to right in the picture above. Use a 2-pole switch so that the AC mains is completely disconnected when switched off. The fuse is necessary for safety.

The power supplies. PSU1 produces +12V and PSU2 is for the -12V. They are connected like two batteries in series with the midpoint between them being the 0V out.

Connect the DC filter as shown in the picture, according to the markings on the PCB. The +12V\_RTIN and -12V\_RTIN are connected through the PCB to the 0V\_OUT.

Connect +12V\_OUT, 0V\_OUT and -12V\_OUT to your busboard or busboards depending on the size of your case.

The reason for having three outputs for each voltage on the DC filter is so you can easily distribute the power to multiple busboards.

## Connecting your filter, case 2

The following example is for a bigger system where you need up to +/- 8A of power, that is 100W.

Suggested is a pair of 100W Meanwell power supplies. Article number LRS-100-12. This is good for at least 8 rows of 84hp with two DC filters.

Connect as in case 1 but use two DC filters connected in parallel. Connect half of the busboards in your case to one DC filter and the other half to the remaining busboards. This way you will draw maximum 4A through each DC filter.

For other comments see case 1 above.