

DCN23 kit

Digital Crossover kit - Assembly Guide

Features

- Active Crossover Filtering
- Loudspeaker Equalizing
- Room Correction
- 24bit / 96kHz Processing
- 48 biquads total processing filters
- XOverWizard software

Applications

- Active Amplification Systems
- High End Stereo setup
- Supreme Surround Sound Systems

Description

The DCN23 kit gives you the opportunity to perform active crossover filtering, loudspeaker equalizing and room correction in one unit. This guide gives you an example of how to assemble the kit with wires, connectors, power switch etc. in a Modu box – Galaxy GX247 measuring only 235mm x 175mm x 45mm. You can build the box from scratch in approximately 4 hour including the drilling and milling.

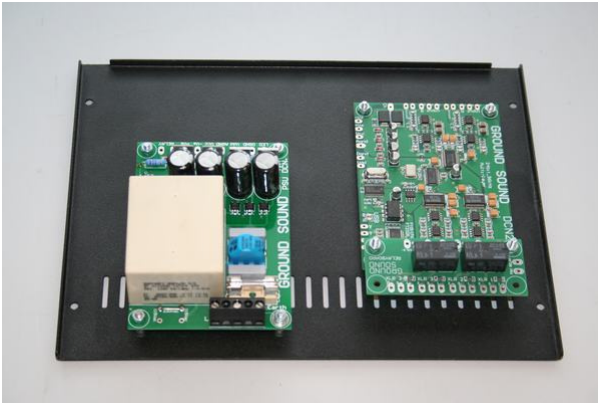
Please notice: Box, power switch, connectors, wires are **not** included in the kit.

DCN23 kit in Modu box:

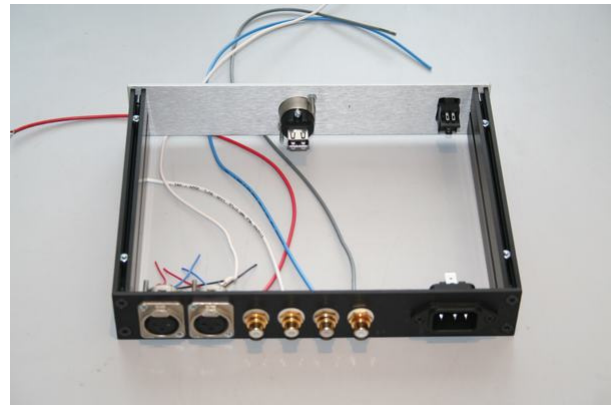


Mechanical Layout:

When you plan the mechanical design it is recommended that you have these considerations in mind: Place the PSU DCN board and DCN23 board so that the inputs of DCN23 are not right next to the transformer and so that the input wires not passes too close to the transformer either. It is also wise to avoid having mains power wires placed too near low voltages wires or over the DCN23 board or audio connectors. If you have to place low voltage wires along the mains power wires it is recommended that you put the mains wires in an additional isolation hose/heat-shrinkable tube. You have to make sure that there is enough distance between the bottom of the PSU DCN board and the chassis – recommended minimum 4mm and taking into account the lead ends of fuse holder etc. you should use distance tubes of minimum 5mm. Regulations says basic insulation distance of 2mm and reforced isolation distance of 4mm.

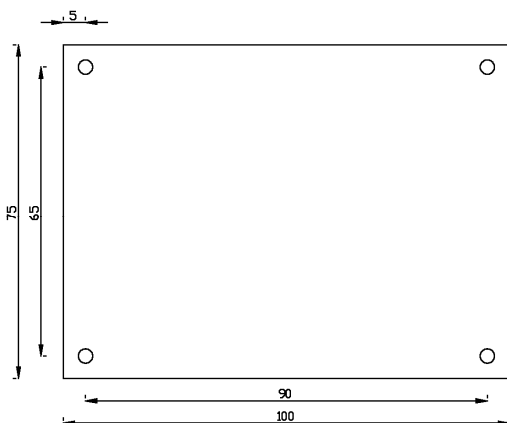


Here you see some detail pictures from the assembly. Notice the little trick of mounting the relay board on extended screws holding the DCN23 module, which gives an easier assembly and fewer holes to drill.

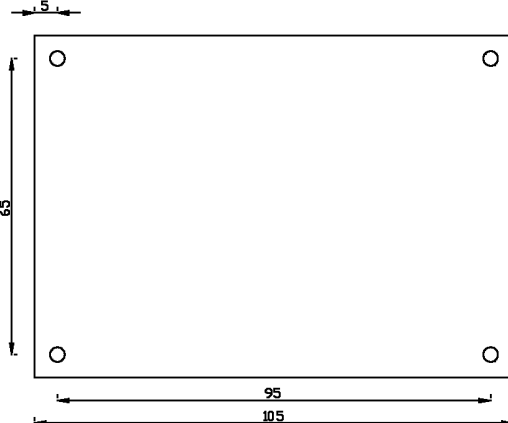


Mechanical dimensions of PCB's:

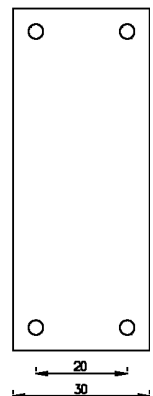
DCN23 module:



PSU DCN module:



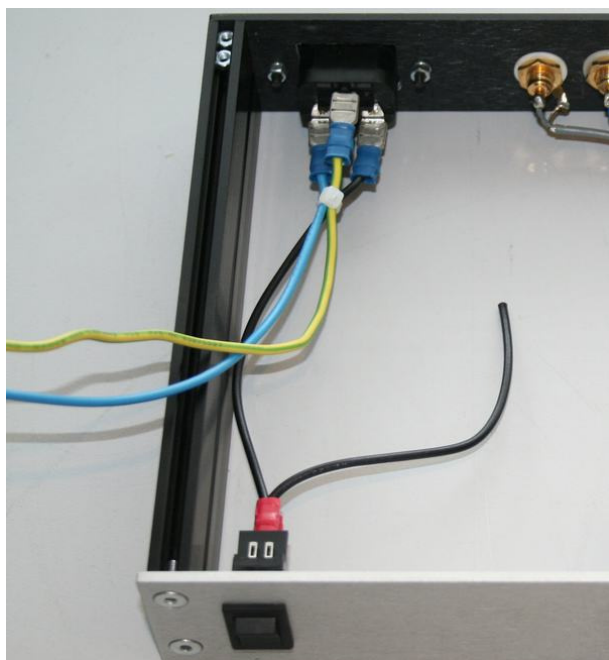
Relay board:



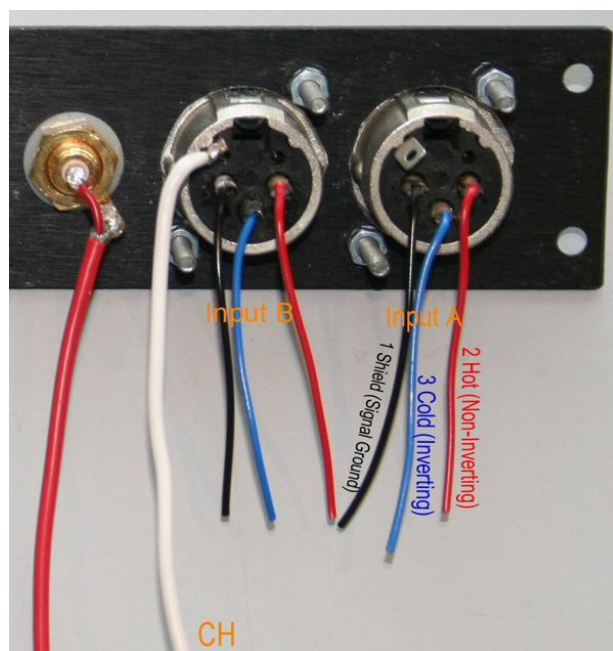
For addition information about the individual modules please see the specific manuals of the boards.

Wiring

The **mains** power wiring can be done in two ways, either three separate wires with an additional isolation hose/heat-shrinkable tube or simply a three lead mains cable. Notice that regulation requires basis isolation distance of 2mm if chassis is connected to Earth via mains cable and if **not** connected to Earth then reinforced isolation distance of 4mm is required. It is also recommended/required that all mains wires are double secured. E.g. two wires that are connected to mains IEC inlet is secured with additional cable tie. You can connect PSU DCN II direct to the power mains inlet connector or insert a switch in either the live or neutral wire or if the switch has 2-pol both wires. The mains wires should be between $0,75\text{mm}^2$ and $1,5\text{mm}^2$. The terminal block has three horizontal connections and live (black or brown wire) on the left, neutral (blue wire) in the middle and Earth (green/yellow wire) on the right / closest to the mounting screw. The Earth wire is not mandatory, but recommended. Make sure that the Earth pad/screw has good electrical connection to the chassis metal.

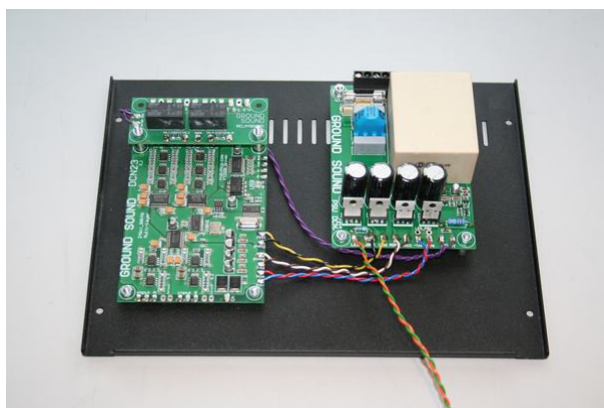


This is an example of how a switch can be inserted in the live mains wire for power ON/OFF. Remember to double isolate the mains wires with isolation hose/heat-shrinkable tube.

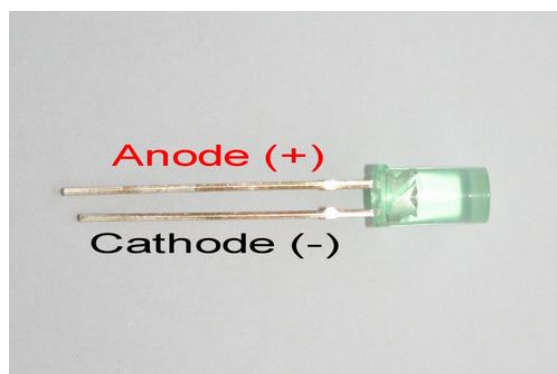


A close view of the Neutrik XLR female input connectors. Notice the white $0,75\text{mm}^2$ makes the ground lifted connection to chassis from the DCN23 pad marked CH. Connect close to input!

The **regulated supplies** ($-V_s$, $+V_s$, V_{cc} , AGND, V_{dd} and DGND) for DCN23 /DCN24 will sufficiently be wired with $0,2\text{mm}^2$. It is recommended to twist the $-V_s/+V_s$ pair, V_{cc}/AGND pair and V_{dd}/DGND pair.



Wires has been twisted in pairs for better noise rejection, easier mounting and nicer looks.



Here is a close up of a LED, which can be connected to the PSU DCN to indicate power ON. Connect anode to LED pad and Cathode to the left of the DGND pad on PSU DCN II.



The **LED** wire will be sufficiently wired with $0,2\text{mm}^2$. There is no need for twisting the wires for LED, but it helps to keep them together. This is a low current wire and it's no problem with 1m wires, if it is desired.
Example: Mounting on front panel.

The **relay** wires will also be sufficiently wired with $0,2\text{mm}^2$. There is no need for twisting the wires for the relay board either, but it helps to keep them together. There is no polarity of the wiring, because the mandatory reverse diode is placed at the PSU DCN II board

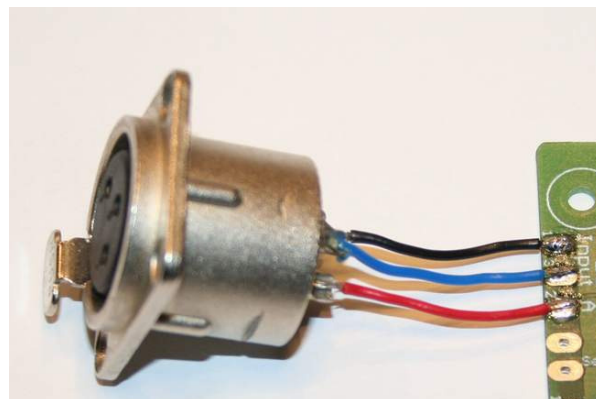
The **CH** pad is actually the lifted ground connection which should be wired to chassis metal very near (RCA) or on the input connector (the XLR connector often has a soldering tag for this purpose).

Recommended wire colours and used in this Assembly Guide:

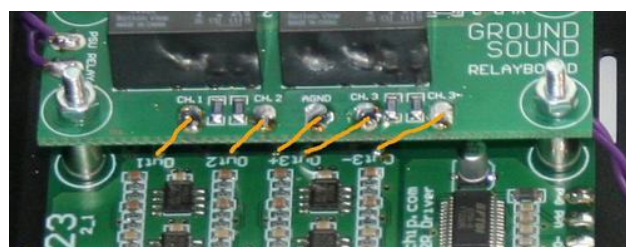
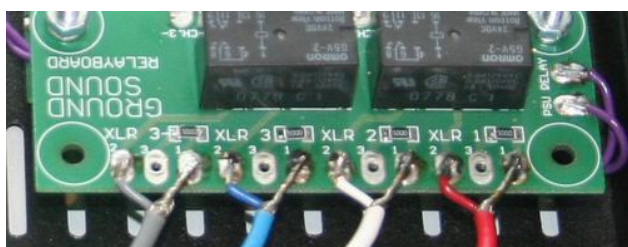
Yellow = Vdd (Digital supply voltage)	Blue = $-V_s$ (OP-AMP negative supply)
Black = DGND (Digital ground)	Purple = Relay/PSU Relay (2 wires)
Brown = Vcc (Supply voltage for ADC/DAC)	Orange = LED anode (Voltage for LED)
White = AGND (Analogue ground)	Green = LED Cathode (Ground for LED)
Red = $+V_s$ (OP-AMP positive supply)	White $0,75\text{mm}^2$ = CH (Ground lift from AGND)

The **input** wiring depends upon the connector and the distance. If the distance is very short from connector to DCN23 input pads it should be sufficient to use ordinary $0,2\text{mm}^2$ wire or else shielded cable. The shielded cable will have to have one inner core for unbalanced RCA connector and two inner cores for balanced female XLR. When the unbalanced RCA is used remember to short inverted input (pad3) to AGND (pad1) and the RCA has to be an isolated type to avoid ground

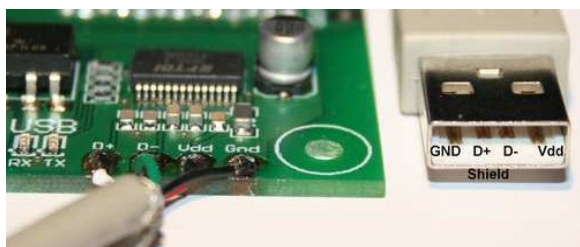
loops. If only one input channel is used it's recommended to short both pad 2 and 3 to AGND (pad1) of the unused input.



The **outputs** should be wired with a good shielded cable unless the distance from relay board to connector is very short. It doesn't have to be large square as the signal is line level and low current. The shielded cable will have to have one inner core for unbalanced RCA connector and two inner cores for balanced female XLR. If the output connector is RCA solder the inner core to pad labelled 2 and shield to pad 1 (AGND). When using XLR output connector the inner cores are connected to pad 2 and 3 and shield to pad 1. The balanced output option is a pseudo balanced output having the advantage of a balanced input of the connected power amplifier without extra active circuitry.



The **USB** connection has four pads labelled D+, D-, Vdd and GND. This part of the circuitry is isolated from the rest of the board. An opto-coupler transfer data from the PC powered part to the μ C. The board is designed with pads instead of a USB B connector for flexibility and mounting options. The chassis connector could be a Neutrik NAUSB or NAUSB-B or a USB B connector on a small printed PCB or simply a wire with a USB A connector. Be careful to connect red wire to Vdd and black wire to Gnd. Normally white wire connects to D+ and green wire to D-. The shield isn't connected on the DCN23 board, there is no need. Please notice that D+ and D- have to be swooped when using a NAUSB connector as it swoops the two inside the connector. If you get a pop-up window with the text "USB Device Not Recognized" when connecting the USB to the PC you simply have to swoop D+ and D-. Examples:





The final project seen from the front and back.



Now that the assembly is well done you only have to install the software and make the right setup of your loudspeakers and correct for room influence on the sound, then you can enjoy high quality sound reproduction – thank you for buying the Ground Sound kit.

Remarks and Revision history

Ground Sound reserves the rights to make alterations without prior notice.

Please notice that Ground Sound will not be held responsible for any property damage. It's assumed that the customer is aware of the danger of high voltage and takes the necessary precautions to avoid personal injury and fully understands the consequence of dealing with high voltage.

Revision A: 2009-05-20