

## 2-Way Electronic Crossover Network

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*Please note that this crossover (although it will work very well) is nowhere near as good as the Linkwitz-Riley alignments. These are available on the Projects Page in both 12dB / Octave and 24dB / Octave. They are completely phase coherent, and offer better overall performance than this version ever will.*

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I have had many enquiries about my Phase-Coherent crossover network (this isn't it!), and thought that a good crossover - easy to build and set up - was a worthwhile project. This unit is all of the above, and if properly set up should satisfy the most critical listener. The behaviour is certain to be far more predictable and accurate than any passive crossover in a speaker system, and (with the additional amps) you get a bi-amplified system which will make you wonder how you ever put up with the system before.

The electronic crossover featured here is an 18dB / octave unit, and has the crossover frequency centred on 300Hz. The frequency may be changed by increasing (or decreasing) resistor / capacitor values.

- Increasing capacitance or resistance - Reduces frequency
  - Doubling the capacitance or resistance halves the frequency
- Reducing capacitance or resistance - Increases frequency
  - Halving the capacitance or resistance doubles the frequency

The values of resistance and capacitance (indicated with a \* in the circuit diagram) in the filter are critical, and close tolerance components are mandatory. If you cannot obtain close tolerance capacitors, use a capacitance meter to select values within 5% of the indicated value. Use only 1% metal film resistors throughout. The 1uF coupling caps are not critical, and standard tolerance is Ok.



If the crossover frequency is changed, it is critical that the **ratios** of capacitor and resistor values are not varied. For example, if you wanted to halve the frequency, the resistors would become 22k and 102k (100k is only *just* acceptable. If the ratios are changed, the filter damping is also changed, and the behaviour at the crossover point will be unpredictable (causing a dip or peak in the frequency response).

The values you change to alter the crossover frequency are indicated with a \* in the circuit diagram

Do not change the 10k resistors - they set the damping of the filter and strange happenings will befall s/he who fiddles indiscriminately.

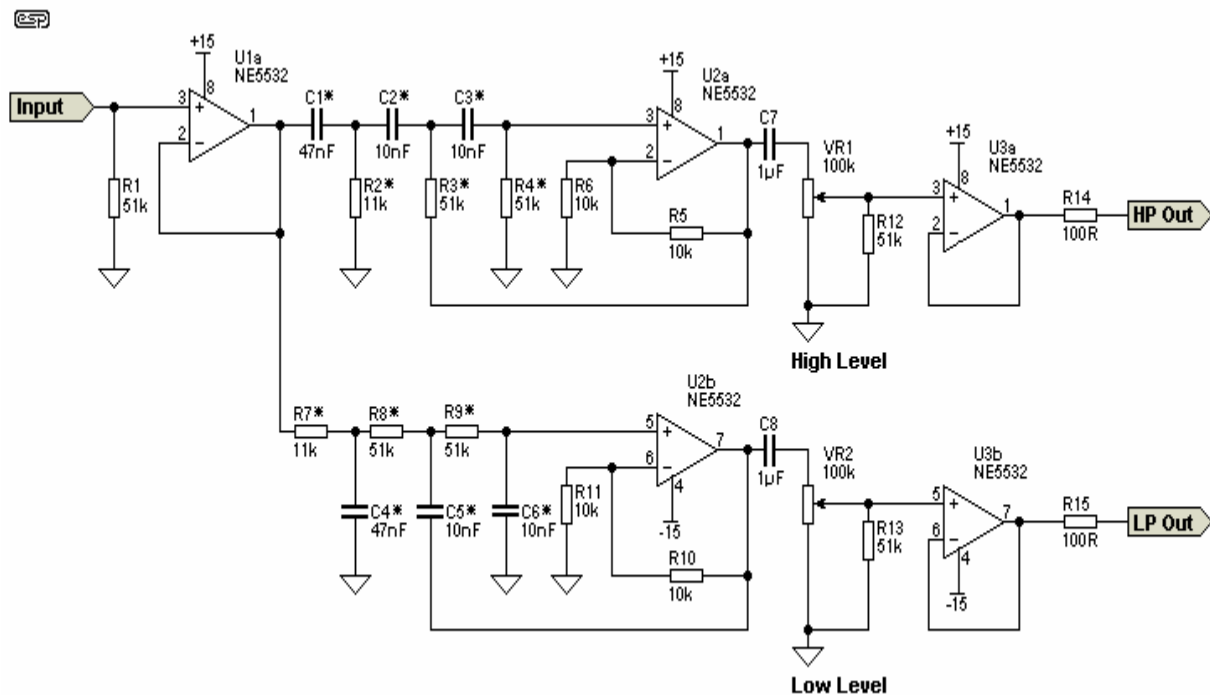
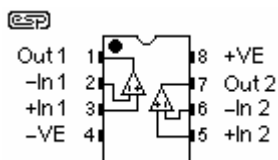


Figure 1- 2-Way Electronic Crossover Network

Figure 1 shows the circuit diagram, and the NE5532 Dual op-amp is used. This circuit can be operated from the same power supply as the Audio Preamp, featured elsewhere on these pages. Other dual opamps may also be used, depending on your preference.



Standard Dual opamp pinouts are shown on the left. These are an industry standard, and are the most readily available and easiest to work with. Make sure that a bypass cap is connected between supplies, as close as possible to the supply pins. Alternatively, use a bypass cap from each supply pin to ground. Bypass capacitors should be 100nF monolithic ceramic types for best performance.

The input is buffered by U1a (the second channel can use the other half of the op-amp), and fed to the two filter networks. Each filter is a 3rd order section, and has a gain of 2. The output of each section is fed (via a 1uF polyester capacitor) to the level control and output buffer stage.

In use, the output of the preamplifier is fed to the input of the crossover network, and the outputs are fed to their respective amplifiers. For more information on bi-amping, refer to the article "[Bi-Amplification - Not quite magic \(but close\)](#)" on these pages.

Be careful when adjusting the level controls, since it is easy to create a mismatch in levels between the amplifiers. I suggest that the controls be mounted on the rear panel, with their shafts cut off really short, and a slot cut into the end with a hacksaw. Once the adjustment is made, it should not require further changes in use. Make sure that the power amplifier volume controls (if fitted) are turned fully up, and try to set the crossover controls so somewhere between midway and 75%. This ensures plenty

of scope for getting the levels right, and will ensure that the preamp settings are not radically different from their "pre-biamp" days.