

TWO CHANNEL PLUS SUBWOOFER CONFIGURATION FOR TRIPATH BRIDGED AMPLIFIERS

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Deriving a subwoofer channel from stereo

Any Tripath 2-channel bridged amplifier can be easily configured to drive a passive subwoofer along with two satellite speakers for a complete, full-range system. When used in conjunction with a few passive crossover elements, L and R channel mid and high frequencies will be sent to satellite speakers, and L+R bass frequencies will be summed into a passive subwoofer, as shown in Figure 1.

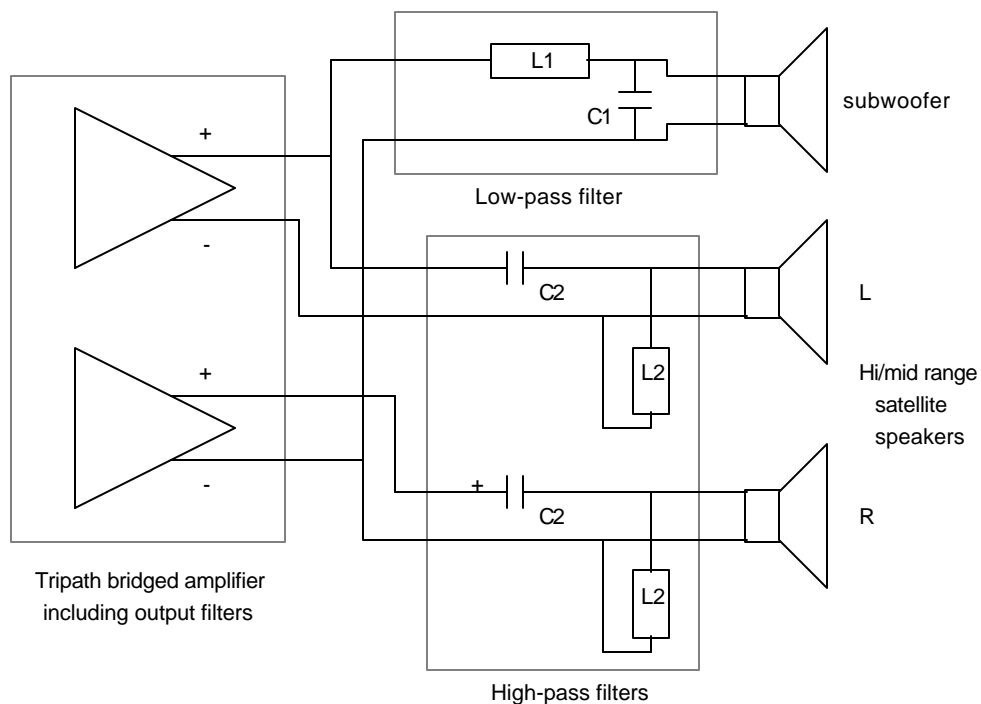


Figure 1: Generalized crossover network for two mid/high-range satellite speakers with one subwoofer

Figure 1 shows a generalized crossover network for the "2.1" type of speaker configuration using a bridged stereo amplifier and achieves 12dB/octave rolloff. If a simpler system is desired and 6dB/octave rolloff is acceptable, C1 and L2 components can be excluded.

Selecting the crossover network

To achieve an even distribution of energy across the entire audio spectrum, the crossover frequencies for the high- and low-pass filters must be properly selected. Also, the impedance of the subwoofer should be half that of each satellite speaker; i.e., if the L and R speakers are each 8 Ohms, the subwoofer should be 4 Ohms, or if the L and R speakers are each 4 Ohms, the subwoofer should be 2 Ohms. For customization of crossover design to fit specific speakers (based on their impedance and frequency response), useful component selection tables for crossover networks can be found at <http://www.solen.ca/6db.htm> and <http://www.solen.ca/12db.htm>. Please note that all capacitors are of the non-polarized type.

Design examples

1. As a reasonable starting point, for a 200Hz crossover frequency with 6dB/octave slope in a system with a 4 Ohm subwoofer and 8 Ohm satellite speakers, $L1 = 3.3\text{mH}$ and $C2 = 100\mu\text{F}$ (for 6dB/octave circuitry, L2 and C1 are not needed). If the satellite speakers are 4 Ohm and the subwoofer is 2 Ohm, L1 becomes 1.7mH and C2 becomes 200 μF .
2. For a 200Hz crossover point with 12dB/octave slope, a 4 Ohm subwoofer, and 8 Ohm satellite speakers, $L1 = 4.7\text{mH}$, $C1 = 150\mu\text{F}$; $L2 = 9.1\text{mH}$; $C2 = 75\mu\text{F}$. If the satellite speakers are 4 Ohm and the subwoofer is 2 Ohm, L1 becomes 2.2mH, C1 becomes 300 μF , L2 becomes 4.7mH, and C2 becomes 150 μF .

The above design examples are given as possible starting points only and do not constitute recommendations for any specific system. Custom design of the crossover networks by the OEM customer is strongly encouraged, since impedance and frequency response will vary from one model and type of speaker to another.