

Passive Crossovers – A few Basics, Notes

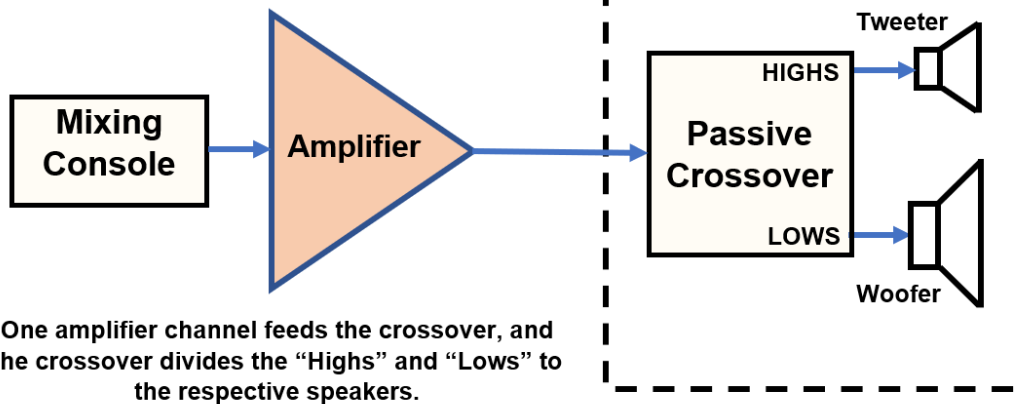
There are 2 categories of Crossovers – Passive and Active. The main difference is that the Passive types filter the signals without the use of power, and there are usually no adjustments that can be made. Active crossover types are powered, and very flexible. Best of all you can make adjustments to the crossover, and fine tune / calibrate your system to get optimal performance from your loudspeakers.

Passive Crossovers

- Are basically “Plug and Play” and are found in most 2-way or 3-Way speaker cabinets.
- Fewer Amplifiers needed – Example: One amplifier channel can power one passive speaker cabinet.
- Not 100% efficient as components can fail due to heat buildup, clipping, and overdriving the speaker.

Typical 2-Way Passive Speaker / Crossover Set Up

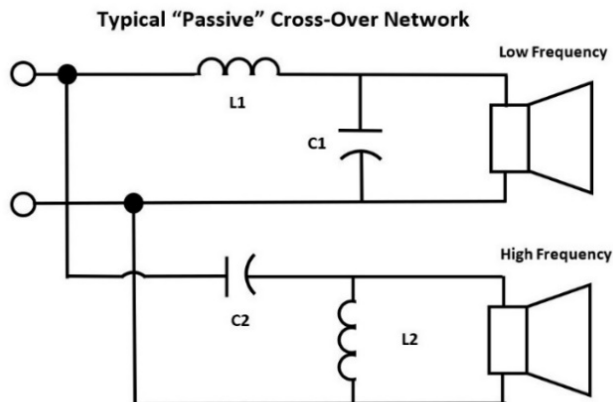
This 2-Way Passive Speaker cabinet has only 1 Input – So only 1 Amplifier channel is needed to power both the Tweeter and Woofer.



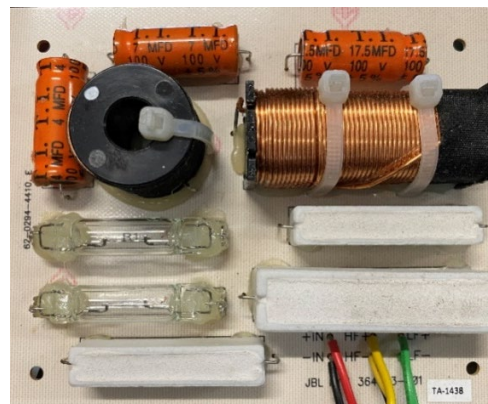
Electro-Voice
ELX115
Passive 2-Way,
Full Range
Speaker

Typical Passive Crossover

The diagram below left is a typical “schematic” diagram of a passive crossover network (protection lamps / resistors not shown). The image (below right) shows a typical passive crossover for a 2-way full range speaker cabinet. There is one amplifier input, this signal gets processed through the crossover network, and is distributed to the correct speaker components (High/Low Outputs).



Passive Crossover Schematic

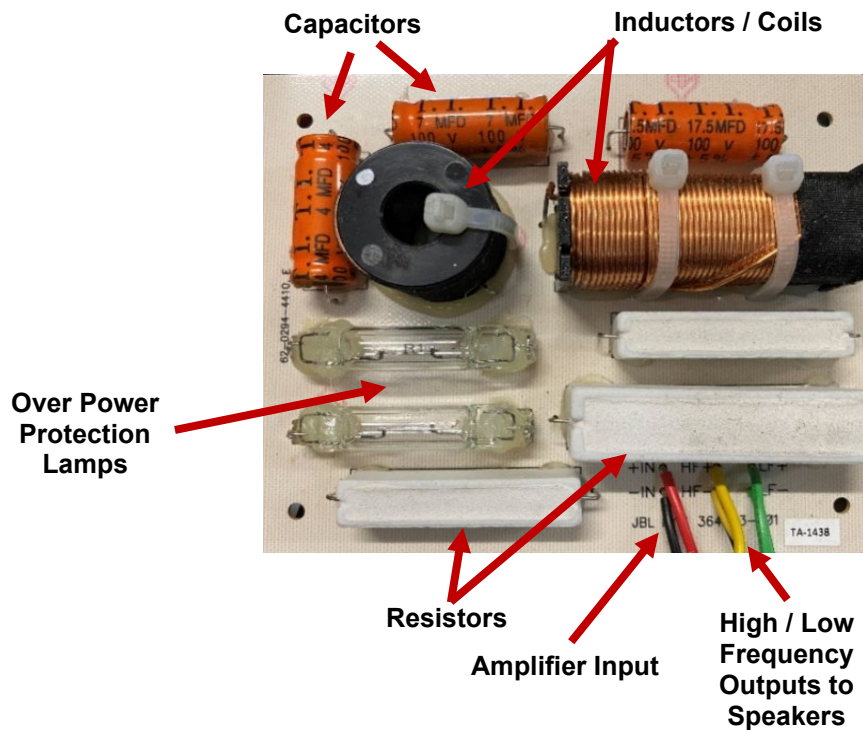


Typical Passive Crossover

Parts of a Passive Crossover – What do they do?

Passive crossovers consist of LCR components. The three main components are Inductors, Capacitors, and Resistors (this combination of components is referred to as LCR components). These LCR components do not need a power supply to operate. They are basically used for separating the audio signal so the desired frequencies can feed the correct speaker component.

- **L = Inductor** – Inductors pass Low Frequencies and filter out High Frequencies. Inductors are also referred to as Low Pass Filters, and Coils.
- **C = Capacitor** – Capacitors pass High Frequencies and filter out Low Frequencies.
- **R = Resistor** – Resistors are basically used for attenuation. Extra power gets shunted (diverted) through the resistor, and helps with maintaining a constant “load” for the amplifier.
- **Protection Components** – Over-Power protection lamps are basically a type of “fuse” that helps to protect the tweeters. They do not affect the sound quality. There are also different types of Tweeter protection “fuses” used with passive crossovers as well.



Passive Crossovers vs Active Crossovers

Other than the fact that the majority of “Passive” crossovers used in speaker cabinets cannot be adjusted and fine-tuned like “Active” Crossovers – The main advantage of Active over Passive crossovers is with the quality of sound. Passive Crossovers can significantly “degrade” the sound quality of signals that pass through them and can create higher levels distortion in the signal. Active Crossovers do not “degrade” the sound quality and provide very low levels of distortion. Active Crossovers are more expensive and also require an experienced technician to set-up and calibrate the crossover to get “optimal” performance from the speakers.