

Monitoring In-Between

✝ Church Audio ✝





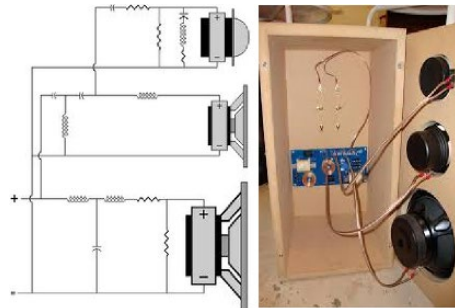
In between an Amplifier and a Loudspeaker you may find extra items.

Crossovers



If we simply connect our audio signal to the Tweeter, Mid-range and Woofer in a Loudspeaker cabinet there would be a big mess. Certain frequencies can be reproduced by more than one loudspeaker, and some not, and the result will be that some of the frequencies are boosted (because they arrive at several speakers) while others won't be. Not good!

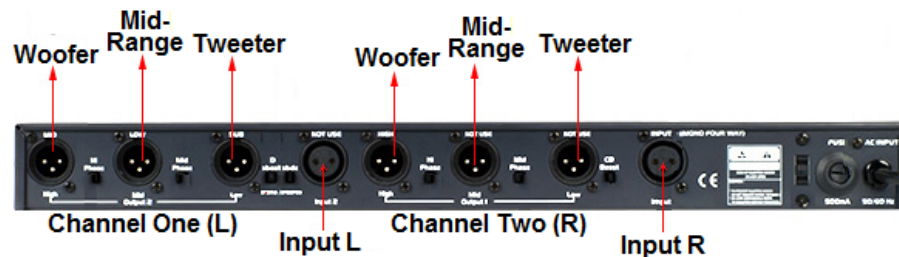
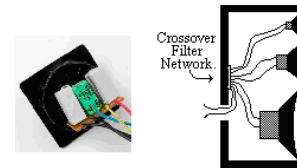
For this reason, we place filters on every Loudspeaker cone to control which frequencies arrive at which cone. We call these filters "**Crossovers**". There are Passive (un-powered) Crossovers and Active (powered) Crossovers.



Passive Cross-overs

Passive Crossovers are essentially a Capacitor and Coil combination, placed inside the cabinet, which filters out unwanted audio from each Loudspeaker.

Passive Crossovers are powered by the audio itself, so you just forget about them.



Active Cross-overs

In large sound systems we often have loudspeaker cabinets that only have Tweeters, another that only has Mid-range, another Woofers, and another Subs. These have no power amplifiers inside, and may have no crossovers inside. An Active Crossover is a separate device that you connect to the output of the Mixer (L-R) and then each of it's many outputs can be programmed to filter out the frequencies you want... Highs, Mids, Lows, Subs. Each output will go to a separate power amplifier and then to it's designated loudspeaker cabinet.

Loudspeaker Protection



Peak Limiters are made to catch any harmful volume spikes (transients) that cross the maximum electrical volume you choose. These protect the Amplifier and the Loudspeaker.

Graphic Equalizers can be used to filter out the really low bass frequencies (which will have the highest electrical volumes). Cutting out the very low frequencies doesn't affect the sound, indeed it usually makes the sounds cleaner, as well as protecting your Sound System.

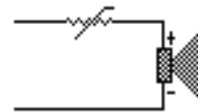
Drive Racks are dedicated to protecting your Loudspeakers (and they even remove your feedback squeals for you, which can be harmful because they are narrow peak frequencies).



Poly-switches. These are devices you solder in place in the loudspeaker cabinet. They cut off the power to the loudspeaker when they overheat. This may be caused by a high current (high volume) for a certain length of time or the air temperature just got too hot. If a Poly-switch cuts off, then the loudspeaker Voice Coil was probably near melting point and you just saved it.

Because they cut off the signal to the loudspeaker, the result is 'silence'. The congregation all turn around and look at you (nothing new) and the Poly-switch won't give you back your audio until it cools down! ☹️
It's better than blowing your loudspeakers but it can be awkward in a live concert setting so have a backup plan for such things, if nothing else, spin a couple of floor monitors around to face the congregation and turn them up.
Poly-switches are particularly good Horn protectors and Tweeter protectors. Some Power Amplifiers have Poly-switches built in to them... same deal, if you run a high current for long, or it gets too hot, it will go silent till it cools. *It's just a part of life, better with them than without them.*

Polyswitch PTC resistors can be purchased at any electronics shop





FUSES

Sometimes, particularly with Woofers and Subs, there is a **'fast-blow fuse'** on the outside of the Cabinet. Tweeters consume very little current and so fuses on these are not necessary.

Use the fuse type that the manufacturer recommends. At best, fuses are just a helpful sentinel against power surges. Some technicians do like to put a fuse on each speaker. Fuses won't detect if a voice coil is starting to heat up, so don't put all your faith in this protection.



BULB

Sometimes, particularly with Mid Range and Tweeters, technicians place a **light-bulb** inside the cabinet. In series with the Mid-range, is quite popular. The light bulb will glow brighter and its resistance increase as the volume increases. In this way it draws a higher percentage of the surge.

As it behaves like a compressor, the sound may become 'quite bright' at soft levels and 'too dull with a fuzzy top end' at loud levels. The latter can be overcome by adding a small capacitor across the bulb so there is less overall compression.

Combinations of 12 and 24 volt automotive type bulbs of varying wattage are used depending on the size of the Driver.

Note: Fuses, Light-bulbs and Poly-switches are all placed inside the loudspeaker cabinet in **'series'** (in line) with the signal.

Adding a Volume-Control to a Loudspeaker Cabinet



At times we find ourselves in the situation where one loudspeaker cabinet needs to be a bit louder or softer than another, but they are both on the same line.

There is a simple inexpensive component called an “L-Pad” that you can get fitted to any “Passive” (no Amplifier inside) Floor Monitor.

This gives you independent volume control for that cabinet.

For a 100w 8 Ω Floor Monitor you would buy a 100w 8 Ω L-Pad and connect it.

CREDITS

This material is offered freely to the Christian Churches; downloadable at Pietango.com

Text: *Original, by the Author, a Christian Recording Engineer.*

Images: *Designed by the Author. Some photographs were sourced from the Internet, then re-worked.*

Ever since the creation of the world, God's invisible attributes and divine nature have been evident. They are clearly understood through his workmanship, and all the wonderful things that he has made. Therefore, those who fail to believe and trust in him are without excuse, or defence. **Romans 1:20**

All of us have sinned and fallen short of God's glory, but God treats us much better than we deserve.

Because of Christ Jesus, he freely accepts us and sets us free from our sins. God sent Christ to be our sacrifice. Christ offered his life's blood, so that by faith in him we could come to God. **Romans 3:23**

If you declare with your mouth, "Jesus is lord," and believe in your heart that God raised him from the dead, you will be saved. For it is with your heart that you believe and are justified, and it is with your mouth that you profess your faith and are saved. **Romans 10:9**

For the Scripture (*Isaiah 28:16*) says, "Whoever believes in Him will not be disappointed." **Romans 10:11**

These things have been written so that you may believe that Jesus is the Christ, the son of God; and that by believing, and relying on him, you may have new life in his name. **John 20:31**