B.R.I.I.Ce

New BRIICe Interface Circuits versus Crossover Circuits.

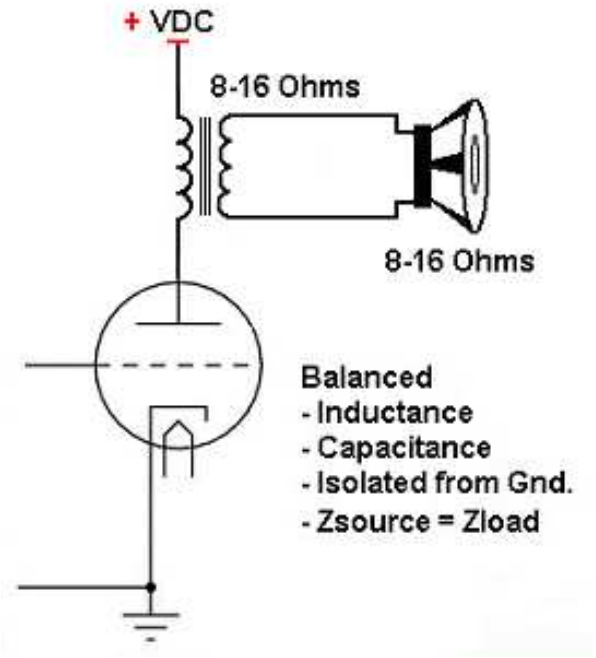
[Balanced-Reactance, Isolated-Inductance & Capacitance, electronics]

BRIICe circuits are balanced and isolated speaker connection schemes that overcome many of the destructive characteristics of traditional crossover circuits.

Crossover circuits are used to separate the audio signal into three different frequency ranges, this done the original signal is changed. Timbre is highly affected and the fidelity of the signal is severely compromised.

By not separating the audio signal, the same concurrent signal is feed to the three speakers with little interference from the connecting circuits. BRIICe circuits are simple to make and implement. Parts used are in-expensive and capable of providing a high level of Fidelity.

To reflect back, the old tube out-put circuits had a balanced circuitry, with small capacitance,

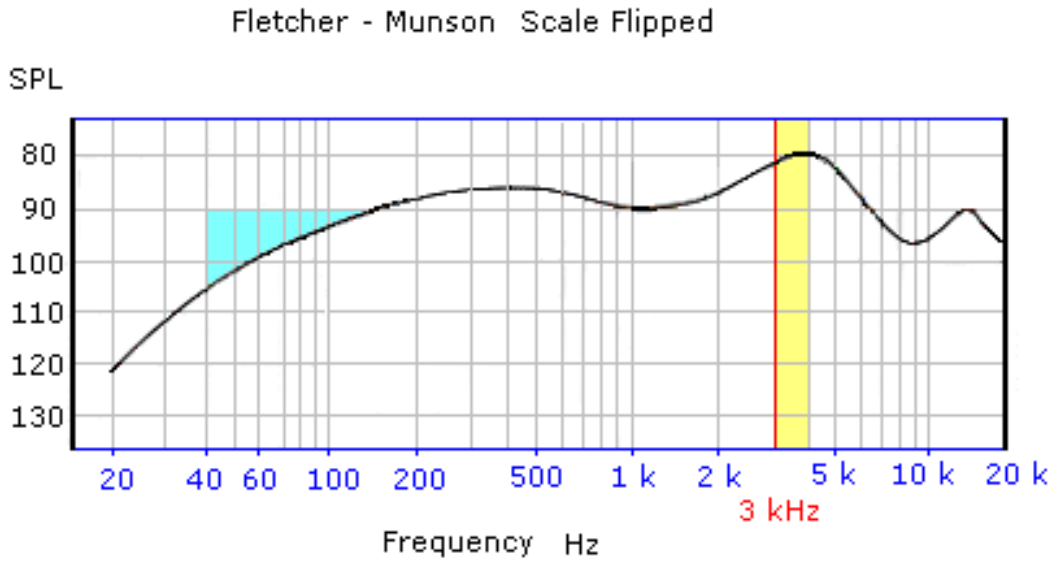


had matching impedances and was isolated from ‘ground’ or a common reference.

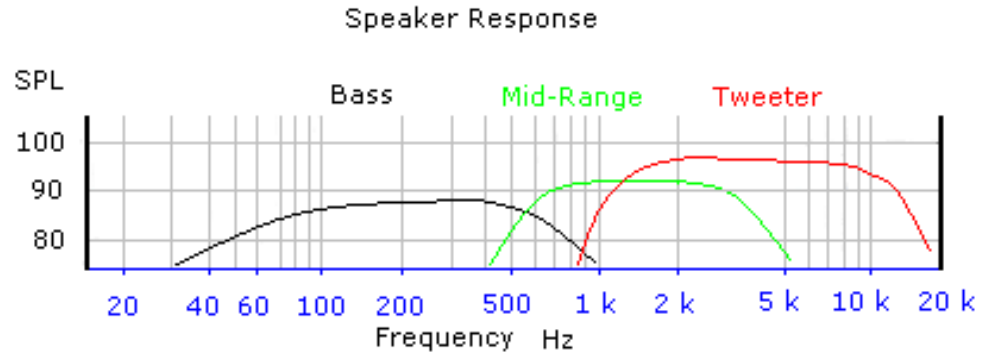
With BRIICe we also have balanced circuitry, lower value of capacitance, low-Q coils and very few parts. The BRIICe circuits have less phase shifting and do not have a 'crossover' region.

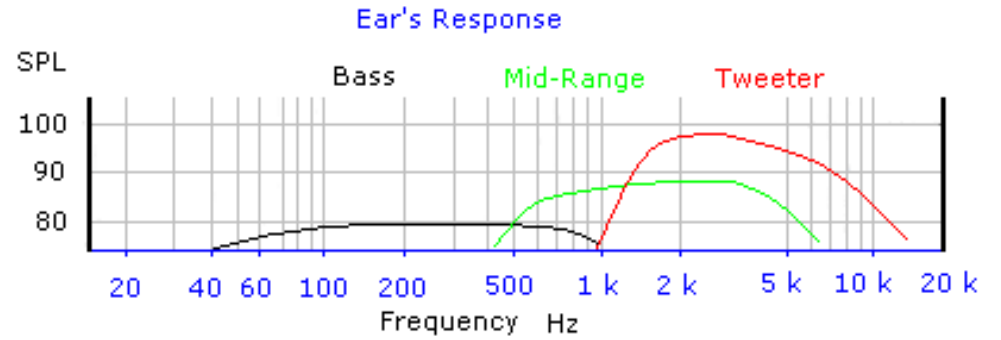
By using a common old idea of frequency OVER-LAPPING in the design of our three circuits, we avoid phase shift of the individual frequencies of an audio signal. Also it is our opinion that the concept of a flat frequency response has been over-played and misapplied when it comes to designing ‘crossover’ circuits.

The ideal frequency response of an amplifier should be a FLAT response, that is amplifying all signals equally, but speakers are not flat in their response. The human ear also has a non-flat response, being more sensitive of the upper frequencies and very insensitive to the lower frequencies and to a band of upper frequencies.



Looking at this inverted Fletcher–Munson graph we can see the extreme difference in ear sensitivity at 3-4 kHz frequency range as compared to the ear’s sensitivity at 40-100 Hz frequency range.



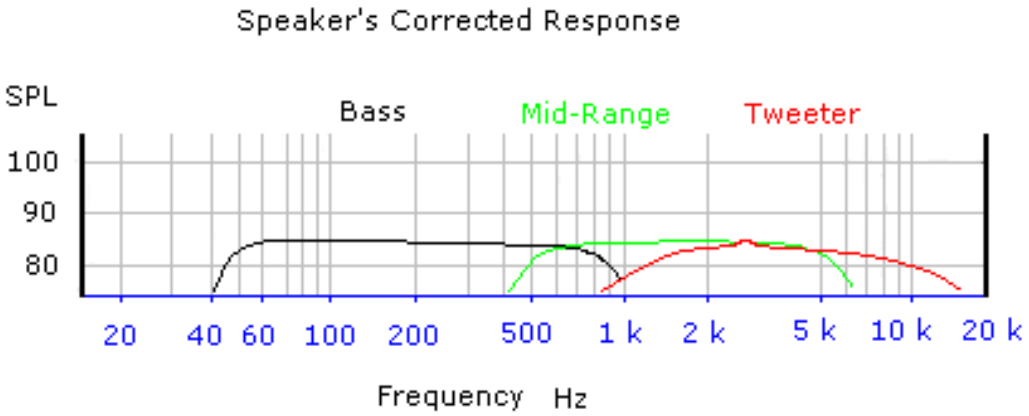


The first Graph above, of three general speakers, shows their individual Frequency Response. The second graph is how the Ear would respond to or ‘detect’ the three speakers outputs.

These two graphs show that a Flat Frequency Response is of less use to produce a higher level of Fidelity than we may suppose.

That is, to design crossover circuits to produce a TRUE-FLAT response is deleterious to Fidelity; not only due to 'crossover-distortions’, but also due to incorrect amplitude Settings. A flat response would favor the highs making the audio system bright. Low frequencies would be less or diminished according to the ear’s response.

To acquire a correct ‘RESPONSE’ we suggest that the lower frequencies be higher in amplitude, the mid-frequencies relatively the same and the Higher frequencies diminished to a level little less than the mid-frequencies.



Due to the modern speaker's ability to handle a wider frequency range, over-lapping three speakers is easily accomplished.

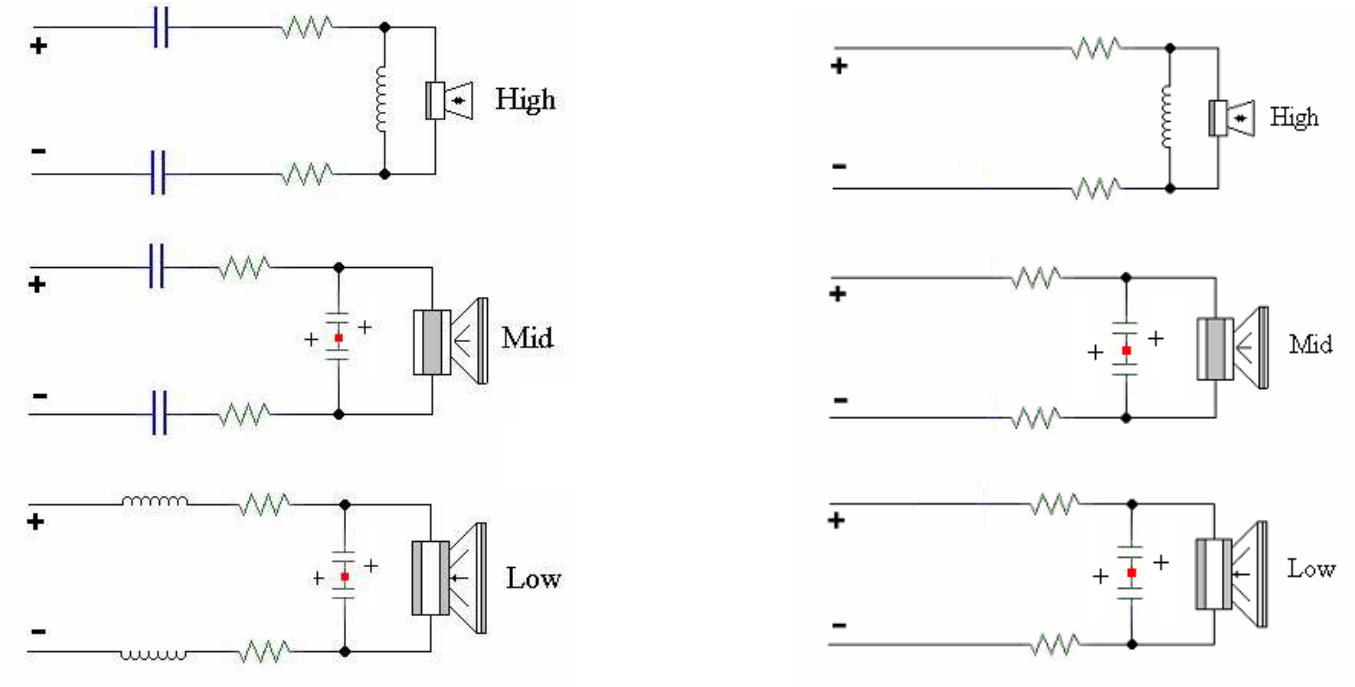
Voicing of the speakers becomes easier to do since the three 'over-lap' circuits allow a fuller frequency response of the speakers without excessive individual speaker concerns.

The 'noise floor' [inherent ground noise] is very low since the mid point is in the center of the speaker's voice coil, which cancels the common-mode noise. In use, the first thing you will notice is the sound stage is very open, with a diminished, far less noticeable 'SWEET-SPOT'.

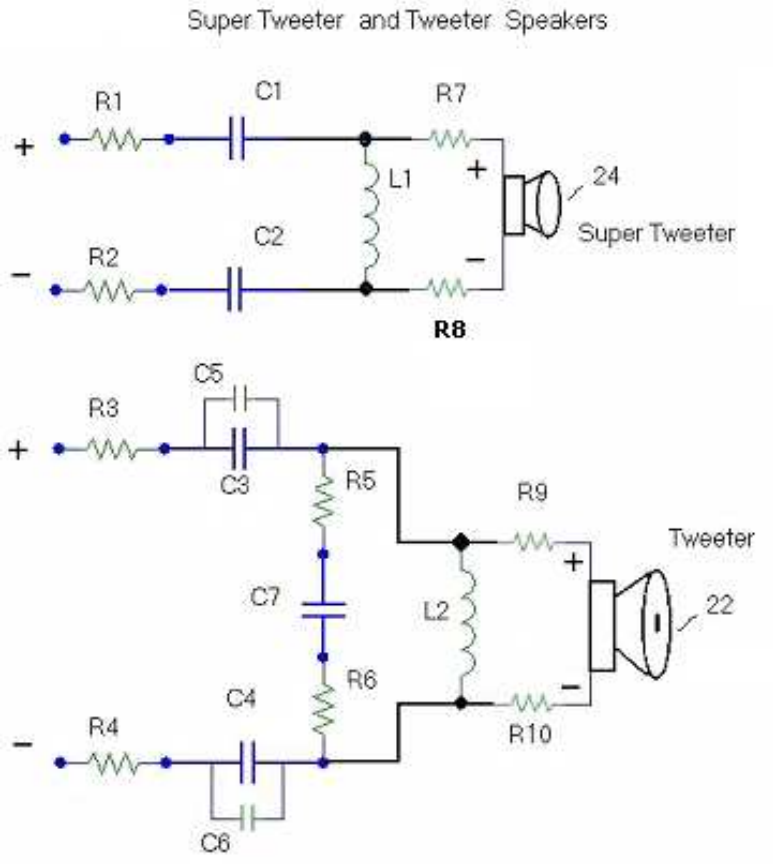
Details of the recorded music will be so noticeable it will sound like you have a new system. Voices will be more natural; piano will be more real, organ music easier to listen to, air and space of the Sound-Stage fuller and more defined. But nonetheless, try them for yourself.

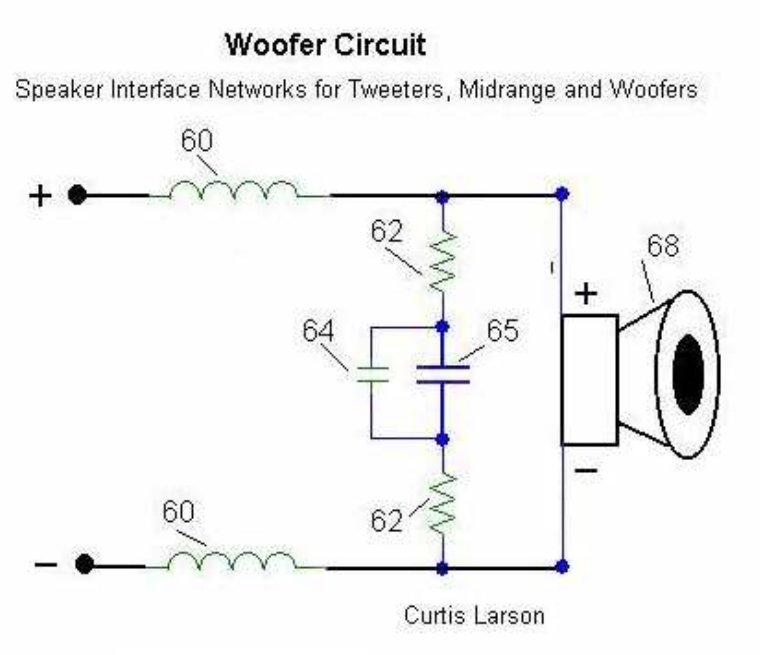
Here are some basic samples of the BRIICe circuits.

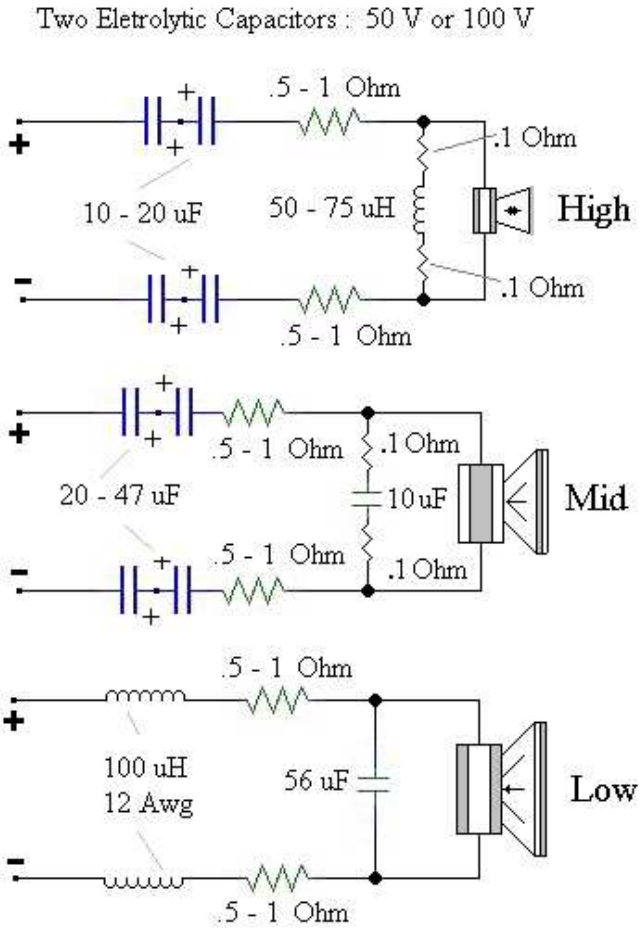
Suggest you try these simple circuits first and then try the more complex circuits as you learn to 'tweak-in' your system as per your taste.

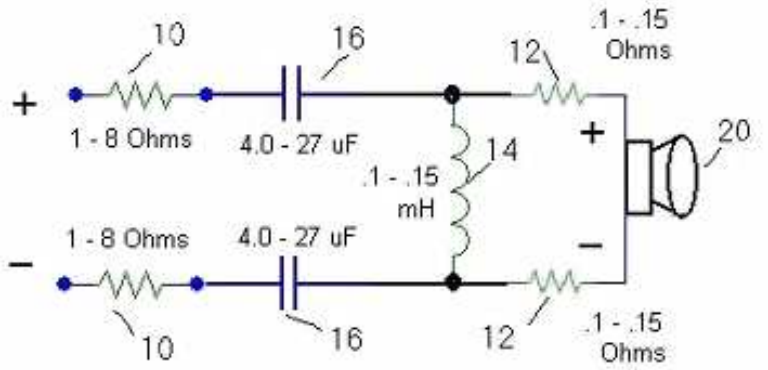


These BRIICe circuits were turned in for patents years ago as you can see. We tried to offer these circuits to several speaker companies, but they said their engineers have designed useful crossovers for year and were not interested. These simple circuits were used in speakers selling for $15,000 to $38,000 !



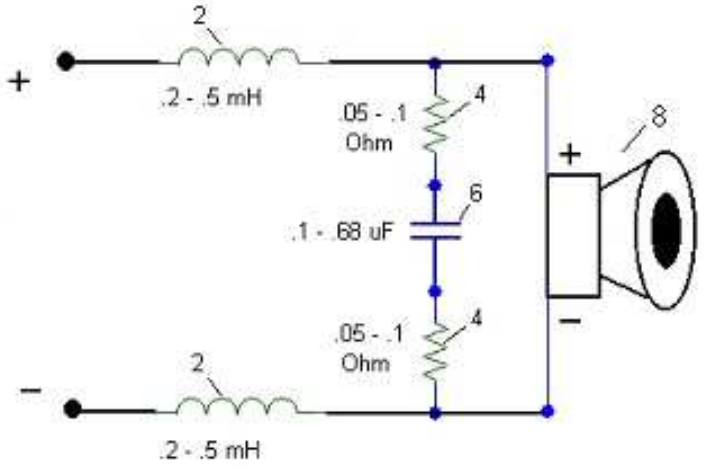

Woofer Circuit
Speaker Interface Networks for Tweeters, Midrange and Woofers
60
62
68
64
65
60
62
Curtis Larson


Two Eletrolytic Capacitors : 50 V or 100 V
.5 - 1 Ohm
.1 Ohm
10 - 20 uF
50 - 75 uH
High
.1 Ohm
.5 - 1 Ohm
.5 - 1 Ohm
.1 Ohm
20 - 47 uF
10 uF
Mid
.5 - 1 Ohm
.1 Ohm
.5 - 1 Ohm
100 uH
12 Awg
56 uF
Low
.5 - 1 Ohm



Tweeter or Super Tweeters or
Mid-Range Speakers

Fig. 1



Basic Balanced Interface Circuit : Inductor
Large Mid-Range or Woofer Speakers

Use R1, R2, R3, and R4 from values of: .1 or .5 to 1 Ohm depending the speaker's DC resistance, in order to obtain approximately 8 Ohms.

The all-resistor input parallel capacitors circuits also use various values…

Resistors R5, R6, R7, R8, R9, R10 and '62' are .1

Tweeter coils are .1 uH to .15 uH selected as required per tweeter being used.

MID-range Speaker capacitors 22uf to 47uf, input resistors as noted…

Capacitors in all circuits are from 10 uF to 100 uF Zicor type electrolytic reversed-connected; C1, C2, C3, C4, C5 and C6. In order to use electrolytes the Positive [+] poles of the electrolytic capacitors are connected to the speaker's resistor and the Negative is connected to the input resistors.
In all of the circuits, the positive connection is on the 'inside', while the negative connection is 'outward' being connected to the input circuit elements.

Any non-polarized Capacitors can be used for C7, with 10 - 22uF for **C7** and 56uF and 1uF or smaller .47uF.

Woofer coils are as explained earlier, 70 uH to 150 uH, large .5 to 1.2 mH for Sub Woofers. [for conventional use - thump-thump]

Woofer capacitors are 56uF [65] and 1uF [64] [smaller: .47uF] as testing requires.
- - -
A final note here, when you use these types of circuits try the following experiment.

Toe-in is unnecessary for the sweet-spot is now severely diminished. The off center signal is broader due to a more correct timing-phase of the audio signal. So turn the face of the speakers to a face forward position, or even a little twisted to the outsides 5-10 degrees. Play a musical piece you are well familiar with.

Stand at a position 8 feet out from the middle of the speakers that are 6 feet or more spaced apart. Slowly walk towards the center, continue until you feel the need to STOP!
You will stop because your mind will sense you are about to walk through the singer, or band !
Now continue through the center and you will notice that the mind senses that the singer or band is behind you !

Well have fun,
Curtis
RosVeta Audio