Twin Driver Filter Options

for Twin Driver wiring

24 -february-2018

Low Pass on 2nd FR

Twin driver boxes can be run both drivers full range or can have one driver rolled off for a 1.5 way system.

Filter effects change with amplifier output impedance (see Table to the right of the filter diagrams)

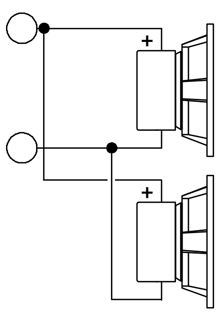
The filter is usually set to somewhere around the bafflestep -3dB point (BS_3) – typically 0.707-1 x BS_3. Exact placement will depend on room, FR of drivers in box, in room, and the impedance of the speakers. Most often any deviation from this is downward, by as much as half.

With a parallel connection and a voltage amplifier this is critical if you are using the 0.5 way for baffle step correction. With a current amp the same can be said for series connection. In the case of series/voltage amp or parallel/current amp no gain means that the only criteria is to keep the transition frequency below 1/4 wavelength of the centre-to-centre of the 2 drivers. Note that 6dB of bass gain is most often too much unless you prefer elevated bass. This could be EQed down.

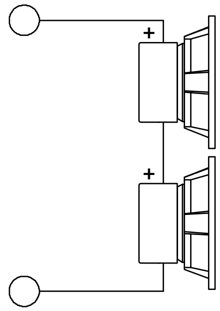
Use R_{driver} at the filter frequency for initial calculation. Since the filters usually occur near the lowest part of the typical saddle shaped impedance curve, it should be noted that as the impedance rises a capacitor becomes more effective, and an inductor will become less effective, causing a deviation from the nominal first order slope.

Ensure that you amplifier can handle the impedance of a parallel set of driver if wiring in parallel (ie 2 4 Ω drivers will be 2 Ω). With tube amps using a tap for the lowest impedance seen will likely give the best results.

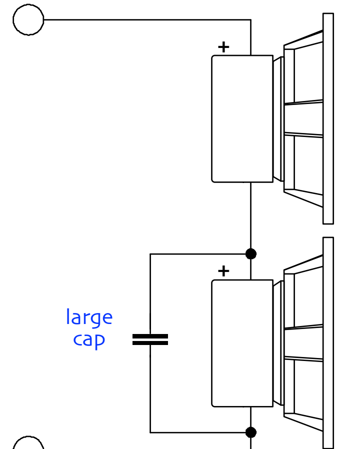
Can also be done actively by driving each driver with a seperate amplifier and low-passing one. Controlling the gain of the amplfiers also gives finer control of the relative LF/HF levels



parallel
1/2 x driver impedance



series
2 x driver impedance

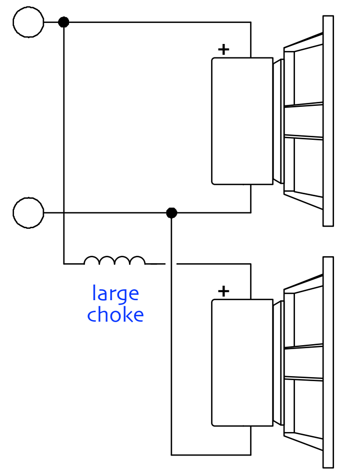


Drivers in series
Bypass cap shunts 1 driver
1 driver impedance at high frequencies
2 x driver impedance at low frequencies

Voltage amp (typical SS amp -- output imp << speaker imp)	Amp imp ~ speaker imp (typical tube amp)	Current amp (rare -- output imp >> speaker imp)
3 dB efficiency gain -3 dB power $SPL_H = SPL_L$	3 dB efficiency gain ~ 0 dB power $SPL_H + 3dB = SPL_L$	3 dB efficiency gain 3 dB power $SPL_H + 6dB = SPL_L$
2 x S_D at LF 1/4 the excursion	2 x S_D at LF	2 x S_D at LF

Using the nominal bafflestep -3dB as a staring point then:

$C = 1 / 2\pi R_{driver} f_{bs}$



Drivers in parallel
SeriesChoke with 1 driver
1 driver impedance at high frequencies
1/2 x driver impedance at low frequencies (ensure your amp can is OK with this)

Voltage amp	Amp imp ~ speaker imp	Current amp
3 dB efficiency gain 3 dB power $SPL_H + 6dB = SPL_L$	3 dB efficiency gain ~ 0 dB power $SPL_H + 3dB = SPL_L$	3 dB efficiency gain -3 dB power $SPL_H = SPL_L$
2 x S_D at LF	2 x S_D at LF	2 x S_D at LF 1/4 the excursion

Using the nominal bafflestep -3dB as a staring point then:

$L = R_{driver} / 2\pi f_{bs}$