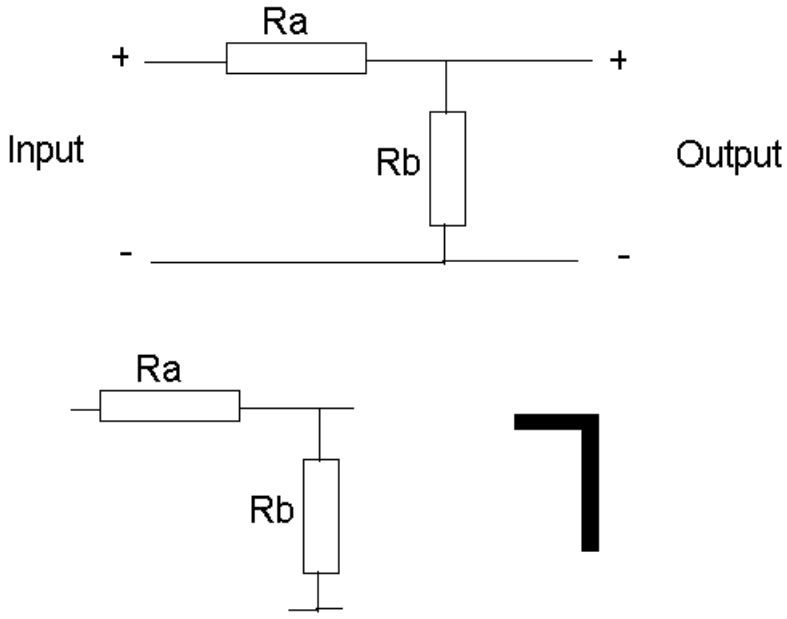
All About L-Pads

There have been some questions about L-Pads as used in some of the crossover schematics. Here's some info about them...

An L-Pad is electrically two resistors (arbitrarily named Ra and Rb here), intended to attenuate the level of a tweeter or midrange. The resistors are configured like so:



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Notice how the two resistors (if you ignore the common wire to input and output) look like an upside-down "L", hence the name. The idea of the L-Pad is that the input side (amplifier or other circuitry) always sees an 8 ohm load if the output is an 8 ohm load, but less signal comes out of the output than if the L-Pad wasn't used.

In that picture, the resistors are shown as "fixed" (non variable) resistors. But you can also buy something called an "L-Pad" which is a variable version of that circuit, where Ra and Rb both change when the knob is turned, in such a way that the overall input impedance stays near 8 ohms (again, assuming the output load is 8 ohms). To do that, the resistors have to act like somewhat like this:

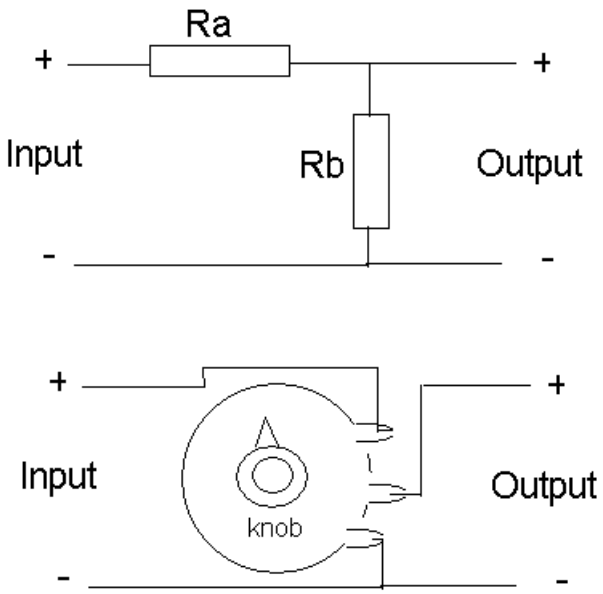
Ra varies between 8 ohms and 0 ohms, the smaller it is, the higher the output level.
Rb = (64/Ra) - 8

The attenuation in decibels from input to output is:
- 20 * log(1-(Ra/8)) [dB]
And the value for Ra can be calculated:
Ra = 8*(1-10^(-attenuationdB/20))

So, if you wanted to attenuate the tweeter driver by, say, 3dB, you could calculate Ra and Rb for fixed resistors like so:
Ra = 8*(1-10^(-3/20) = 8*(1-0.707946) = 2.336 ohms ..... closest standard resistor value would be **2.2** ohms, use that
Rb = (64/2.336)-8 = 19.39 ohms ..... closest standard value is **20** ohms, use that.

Or you could buy a variable L-Pad, adjust its knob until the resistance between the input terminal and the

output (center) terminal measures about 2.336 ohms, then install it in place of the two fixed resistors. Then you'd be able to easily tweak the level a little later on if you wanted, which might be good or bad.



I've never seen any variable Lpad other than for 8 ohms, but similar could be done for other impedance values, of course.