
Subject: Re: Formulas

Posted by [Adrian Mack](#) on Sun, 25 May 2003 09:37:44 GMT

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Hey Wayne! Ok, I understand most it now :-). So here's what I've learnt for determining the voltage/power ratings of each component for a particular power handling you want. $X_L =$

value of the inductor or capacitor in the woofer circuit (or tweeter for whatever you want) for which you want to calculate reactive impedance. For the power handling equations though, I don't know which cap/coil to calculate reactive impedance for... as some circuits have more than one cap/coil. I would assume I would use the larger result from all the caps (or coils, for whichever you're calculating) that are in the circuit to be on the safe side. Series calculation for woofer/inductor circuit is $Z_t = Z_1 + Z_2 + Z_3$ etc. In this, I would enter the impedance of woofer (8ohm), and also the result from the reactive impedance formula (which is for impedance of caps/coils as you've told me). Is this correct? "Now parallel calculations will be done for the total system impedance at 100hz and 10Khz. Using the formula for parallel impedance and the series Z_t values found above, find the system Z_t at 100hz and at 10Khz." Parallel connection is $Z_t = 1 / (1/Z_1 + 1/Z_2 + 1/Z_3)$ and so on... so we have two freqs, 100Hz and 10KHz, you would end up with two figures. Since it's obviously two calculations (one for 100Hz, and one for 10KHz), do you include in the parallel calculations (for total system impedance), the impedance of the woofer (or tweeter) itself? I would think so, it's probably a very obvious answer. EG: Series impedance of woofer/inductor circuit is 20ohm (for example) at 100Hz, and the woofer itself is 8ohms. So for total system impedance, we would go $1 / ((1/8) + (1/20)) = 5.71$ ohms. Is this correct? In PiAlign.doc, it says "Now we have total system impedance, the impedance of each series circuit at two frequencies, and the impedance of each component at two frequencies. Now we can plug these values into our power translation formulas:" I understand how to get total system impedance, and the impedance of each series circuit at two freqs. Just to make sure, the impedance of each coil, and/or cap, is found by using the reactive impedance calculations. So now, say we want the crossover to have a 200W power rating. We could use the formula $E = \sqrt{P \cdot Z}$, which will tell us how many volts the capacitor needs to be to handle 200W. So substitute "P" for 200. For Z, would we use the impedance of the series circuit? (which does have two frequencies so two series circuit impedance results.... which result would be used in this formula?). And now for resistor, use the formula above to get E (voltage) for 200W, then use $P = E^2 / Z$, Z being the series impedance of the circuit. This will tell us the power of the resistor needed for 200W. Whew! It's taken me some time to understand this, I hope most of that is correct. I would appreciate if you could go through the above, and correct anything that I have got wrong, or basically the questions that I have asked above. Just going back to the compression drivers, I tested today using the graphic EQ with 8KHz slider half way up, and 16KHz slider all the way up, and the rest flat, with below 1KHz set to minimum. They sound much better! I did not use the 10uf cap and 8ohm resistor like you have said (I would have to purchase them), I am just wondering, what would be the purpose of this? I will be ordering the proper parts soon anyway :-). Thanks! Adrian