

Make a drawing of your proposed network and add the power taps of all the proposed speakers, bearing in mind that if you reduce the power tap value of a speaker by half it will equate to a 3 dB drop in level of the speaker volume. The sum of all of the speaker power taps should not exceed the power output of the amplifier. The maximum number of speakers that can be added to a system must not present an impedance load which is lower than that which the amplifier is designed for. When designing a speaker network, be aware that too many speakers across a line may overload the amplifier by lowering the impedance to a point that may damage the amplifier.

Refer to the table for a cross reference of impedance versus power.

Calculate the impedance of your system or alternatively, how many speakers you can fit to a given amplifier.

Using Ohm's Law where;

P = Power (maximum continuous average power in Watts)

V = Voltage (70.7 or 100 V)

Z = Impedance in Ohms (minimum load impedance in Ohms)

Examples: **a** Determine the minimum load impedance for a 100 W amplifier on a 70 V (70.7 V) system

$$Z = V^2/P$$

$Z = 70.7 \times 70.7 \approx 5,000$ Volts divided by 100 Watts = 50 Ohms
(speaker impedance must not be lower than 50 Ohms).

b The measured impedance for a 100 V system is 100 Ohms.
Therefore, the power needed to drive this system would be -

$$P = V^2/Z$$

$P = 100 \times 100 = 10,000$ Volts divided by 100 ohms = 100 Watts
(amplifier should be at least 100 Watts).

Once you have installed the system, compare the calculated impedance level against the reading measured with your meter. When you measure your system you should expect a similar reading to the calculated figure. There may be some additional impedance added due to the cabling loss between the amplifier and the speakers (this should be expected).

RMM51

IMPEDANCE vs POWER

Power	70 V	100 V
700 W	7.15 Ω	14.3 Ω
500 W	10.0 Ω	20.0 Ω
375 W	13.3 Ω	26.6 Ω
300 W	16.6 Ω	33.3 Ω
275 W	18.2 Ω	36.3 Ω
250 W	20.0 Ω	40.0 Ω
200 W	25.0 Ω	50.0 Ω
150 W	33.3 Ω	66.6 Ω
125 W	40.0 Ω	80.0 Ω
120 W	41.5 Ω	83.3 Ω
100 W	50.0 Ω	100.0 Ω
80 W	62.5 Ω	125.0 Ω
75 W	66.6 Ω	133.0 Ω
60 W	83.3 Ω	166.6 Ω
50 W	100.0 Ω	200.0 Ω
40 W	125.0 Ω	250.0 Ω
30 W	166.6 Ω	333.3 Ω
25 W	200.0 Ω	400.0 Ω
20 W	250.0 Ω	500.0 Ω
15 W	333.3 Ω	666.6 Ω
7.5 W	666.6 Ω	1333.3 Ω