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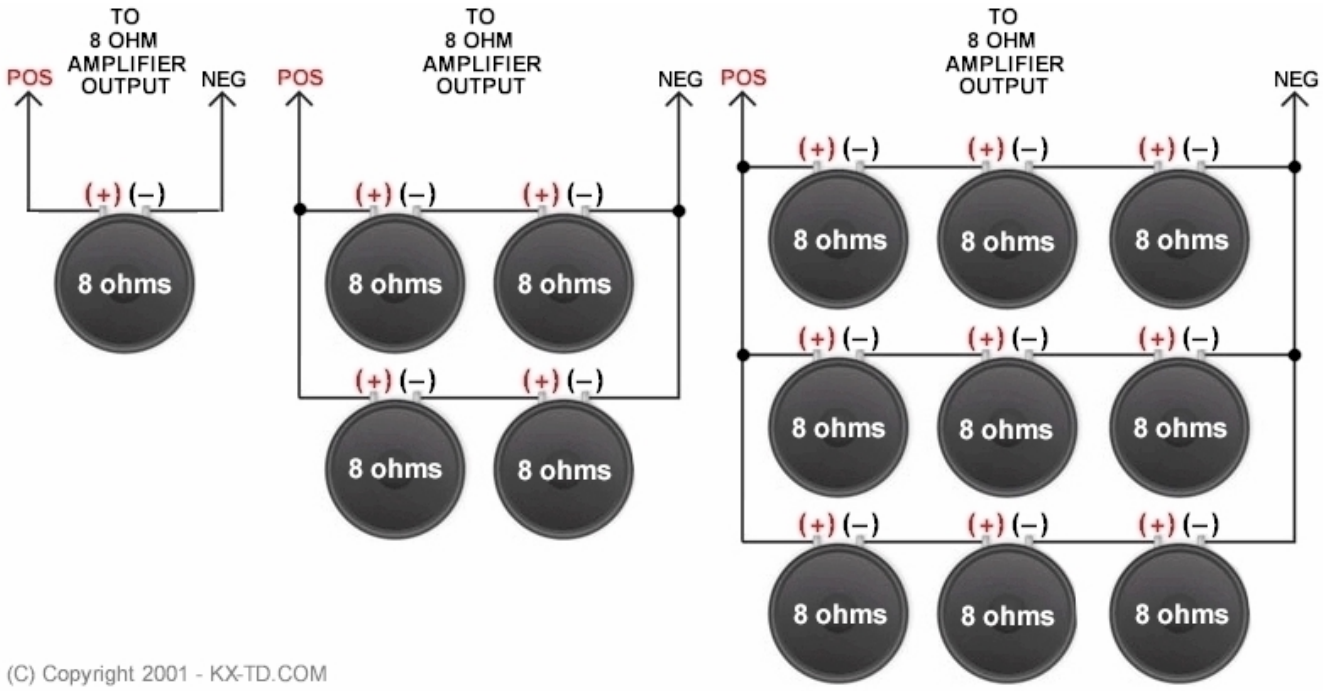
Impedance Balancing of 8 Ohm Speaker Systems

Some older paging systems use 8Ω speakers and horns connected to a central Public Address Amplifier. With this technology, if the impedance of the speakers does not match the output of the amplifier, the amplifier will eventually fail. Some amplifiers also have 4Ω and 16Ω outputs for added flexibility.

Parallel Connections: Connecting two (2) 8Ω speakers in parallel changes the total impedance presented to the amp to 4Ω. (8 / 2 = 4). Connecting three (3) 8Ω speakers in parallel is a 2.7Ω load (8 / 3 = 2.66). Connecting four (4) 8Ω speakers in parallel is a 2Ω load (8 / 4 = 2) and so on. To an amplifier that was designed with 8Ω outputs, 2 ohms is getting very close to a zero ohm dead short.

Series Connections: Connecting two (2) 8Ω speakers in series changes the total impedance presented to the amp to 16Ω. (8 + 8 = 16). Connecting three (3) 8Ω speakers in series is a 24Ω load (8 + 8 + 8 = 24). Connecting four (4) 8Ω speakers in series is a 32Ω load (8 + 8 + 8 + 8 = 32) and so on. To an amplifier that was designed to output to an 8Ω load, 32 ohms is like an open circuit.

Series-Parallel Connections: To compensate for these opposing wiring schemes, and to keep the load presented to the amplifier as close to its specifications as possible, you will need to use Series-Parallel connections. The examples below show a single 8Ω speaker, four (4) 8Ω speakers and nine (9) 8Ω speakers, all of which present a total load of only 8 ohms to the amplifier.



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