

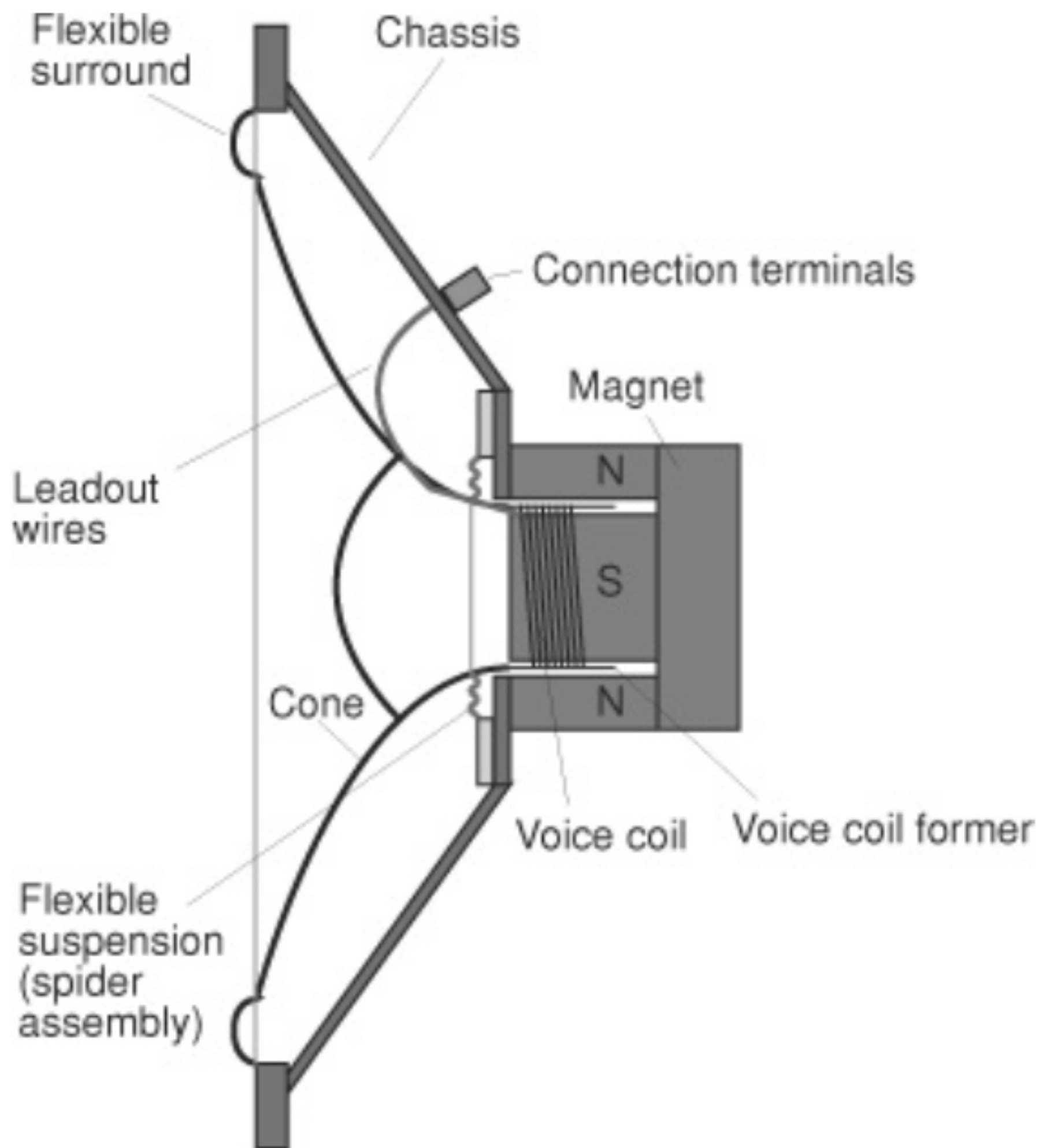
Amplifiers

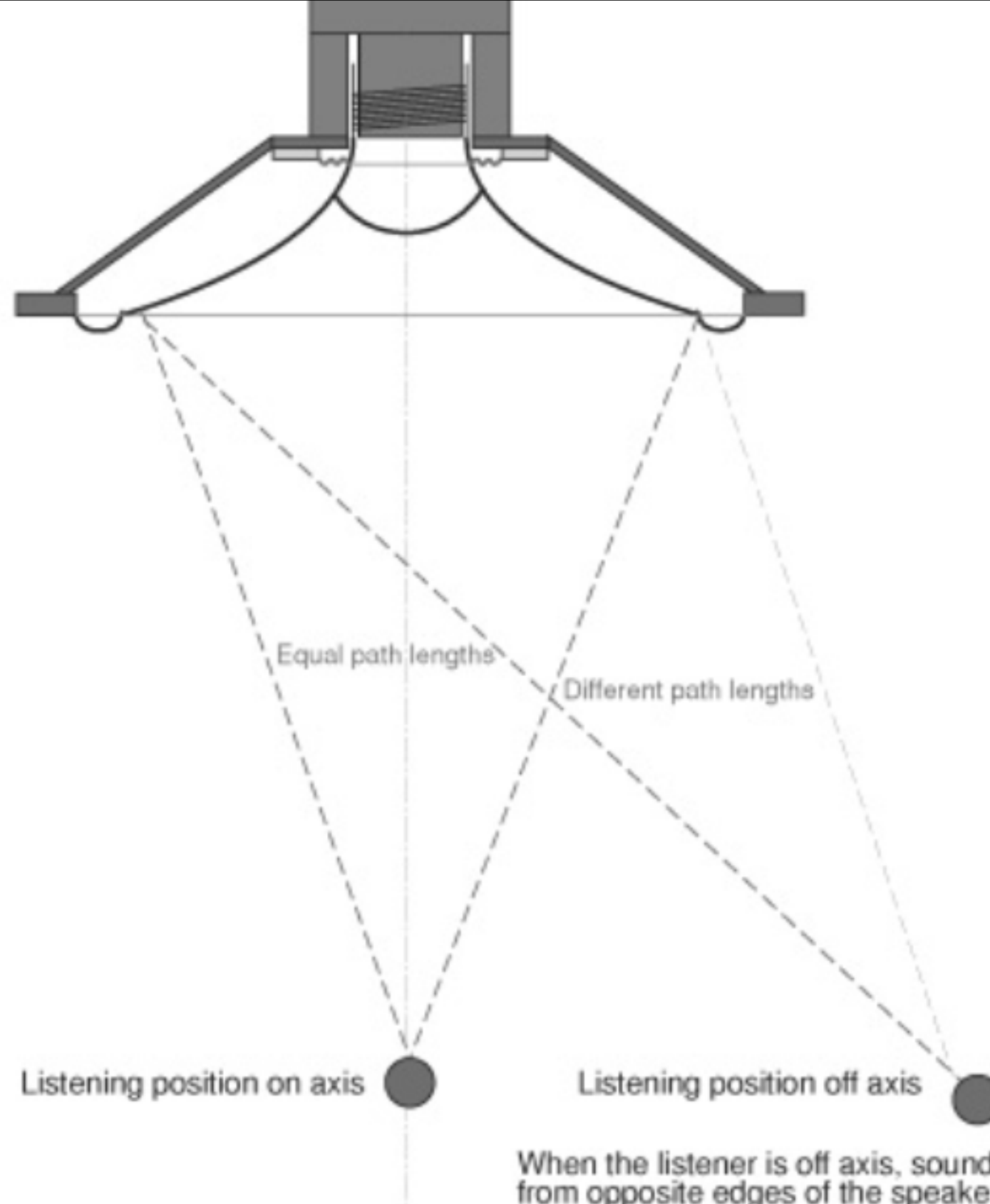
Take a tiny alternating electrical signal that represents the moment-to-moment variations of musical frequencies and their amplitudes (volume levels), and increases their strength many times so they're powerful enough to drive the cones and domes of speakers back and forth to generate air pressure variations (waves), which replicate the original sound waves.

Drivers

A chassis loudspeaker without a box or cabinet is called a loudspeaker

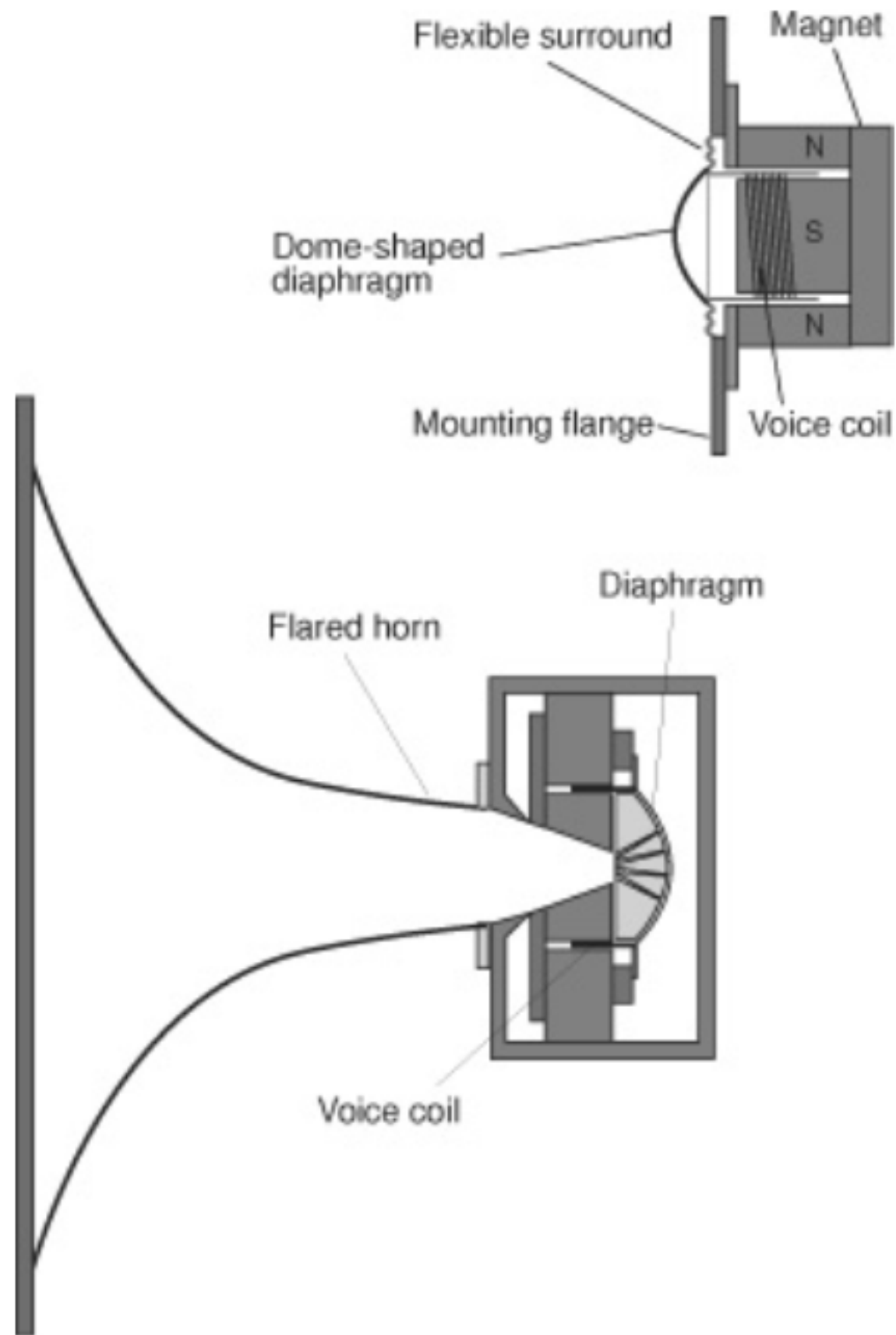
The driver is made up of a stiff cone of doped paper or synthetic material suspended in a rigid cage or chassis by means of a flexible surround.

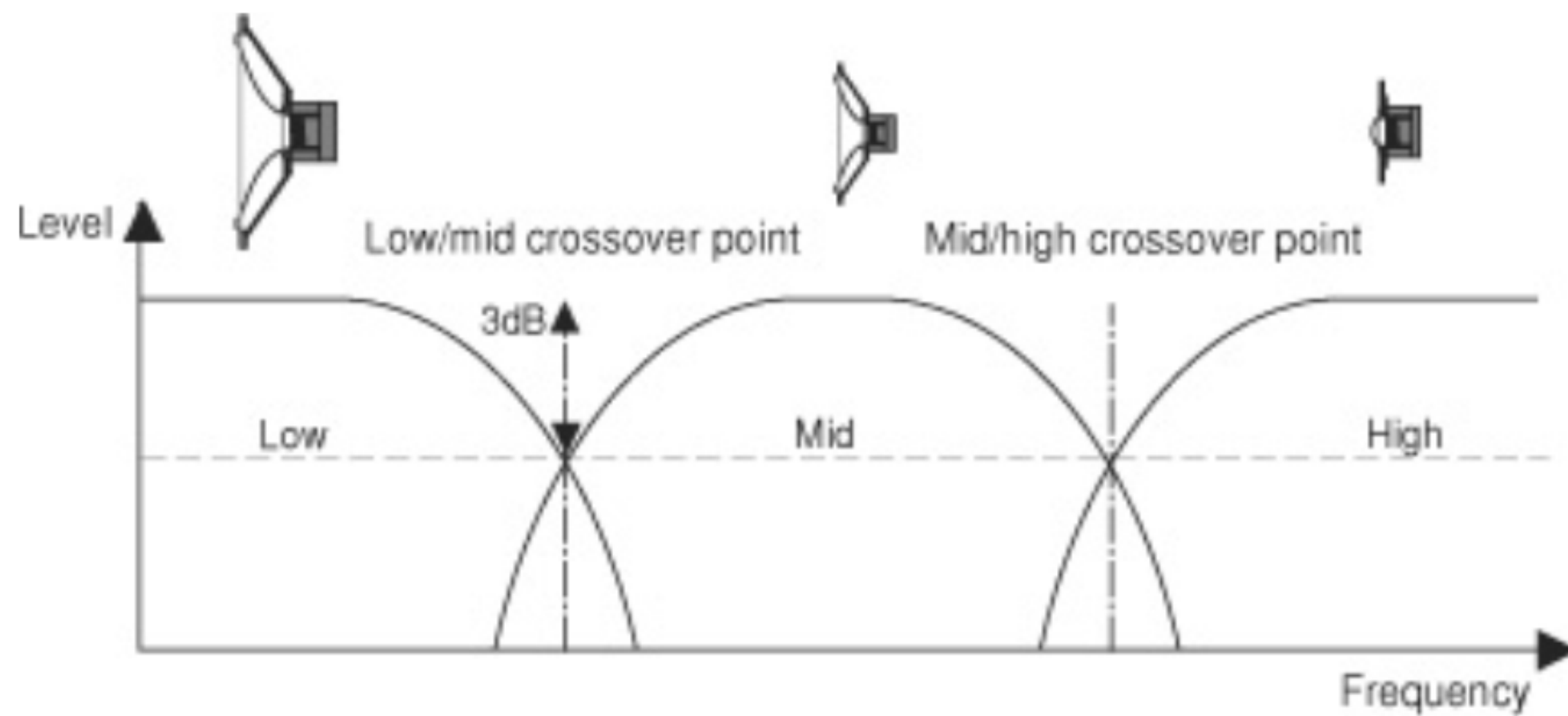


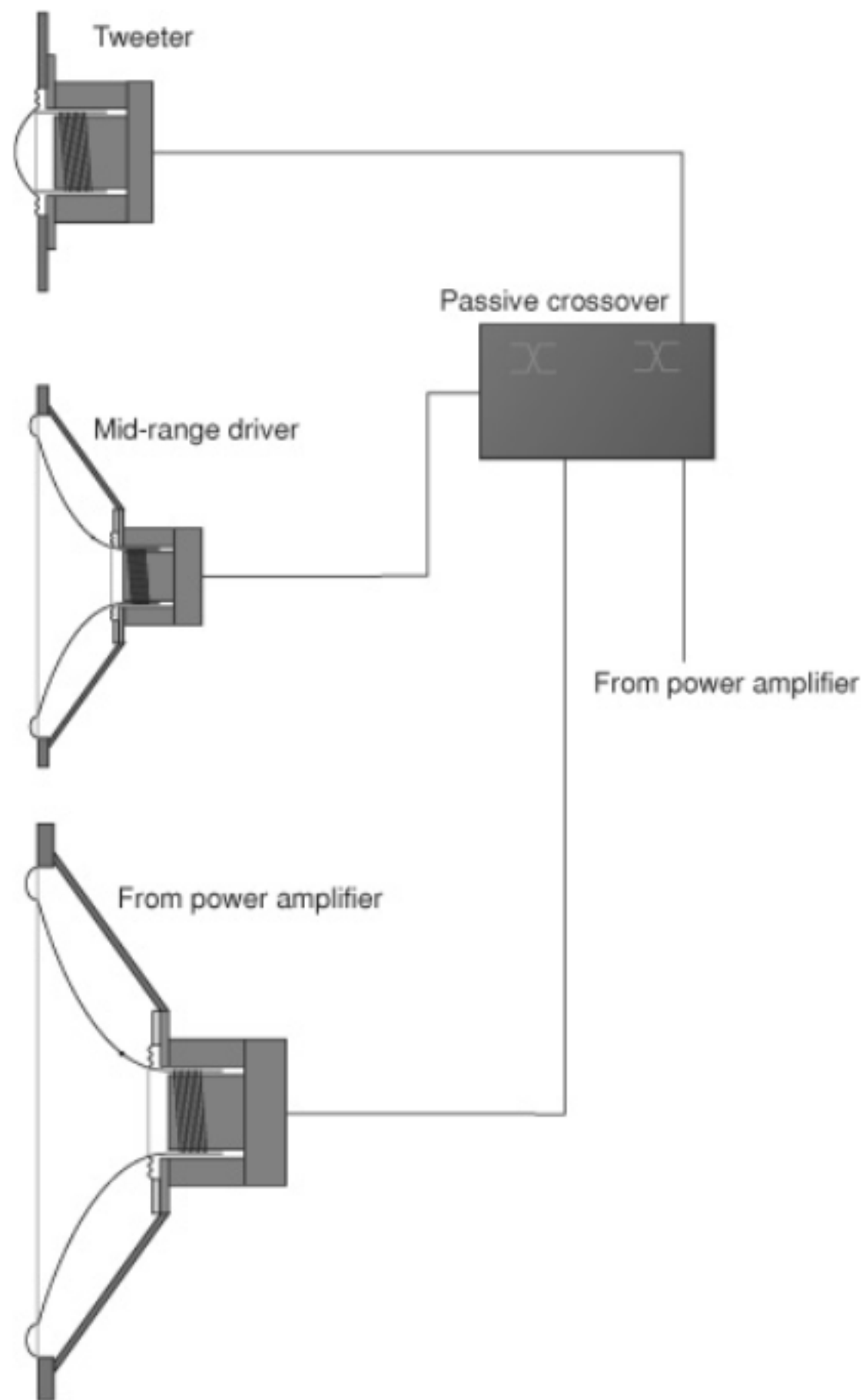


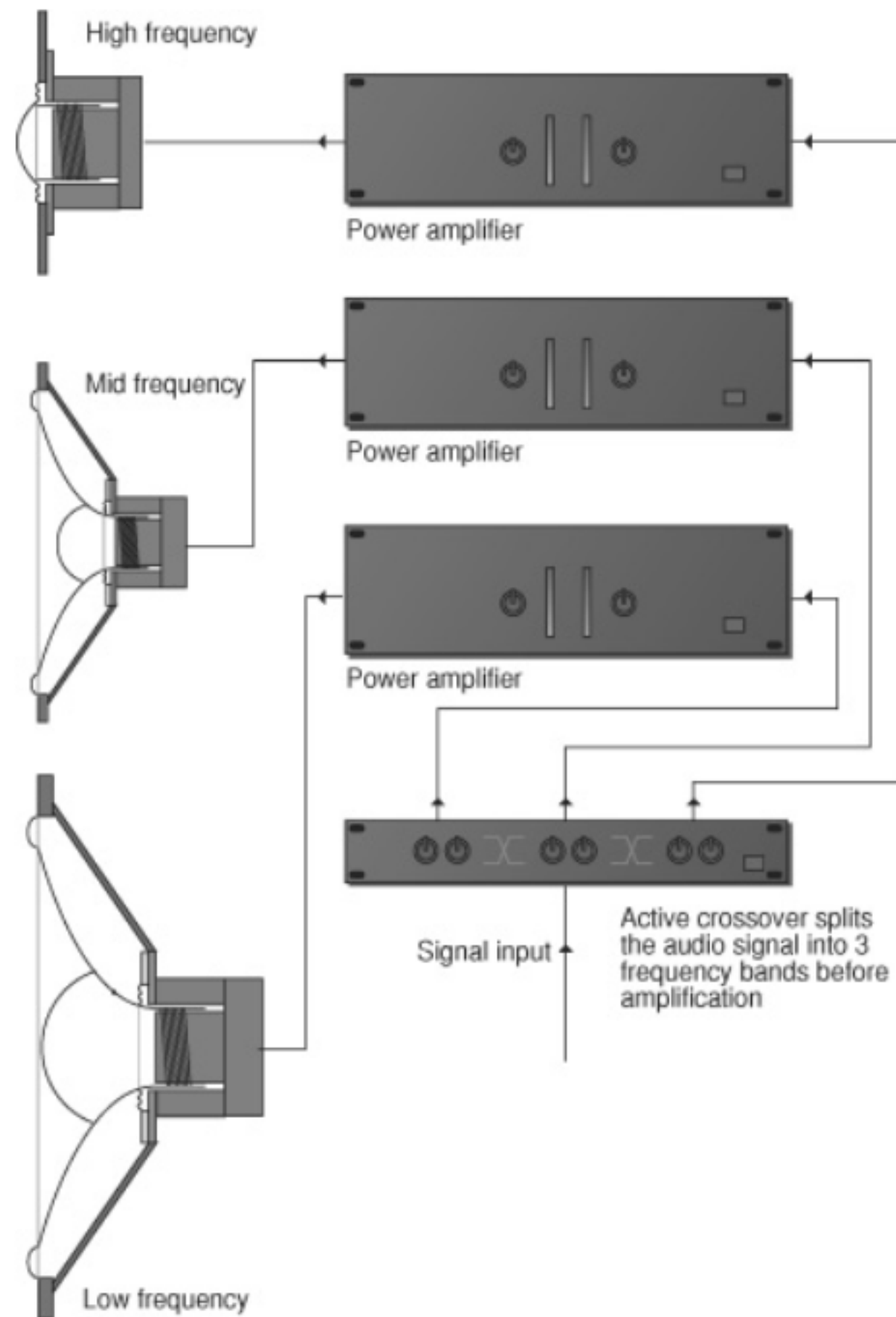
On axis, sound from the opposite edges of the speaker cone (and all points in between) arrive at essentially the same time, so no phase cancellation occurs

When the listener is off axis, sound from opposite edges of the speaker cone arrive at different times due to the different distances the sound has to travel. In practice, the listener will hear sound from all parts of the cone, all with slightly different time delays. The resulting phase cancellation will conspire to reduce the level of off-axis sounds













What are Ohms?

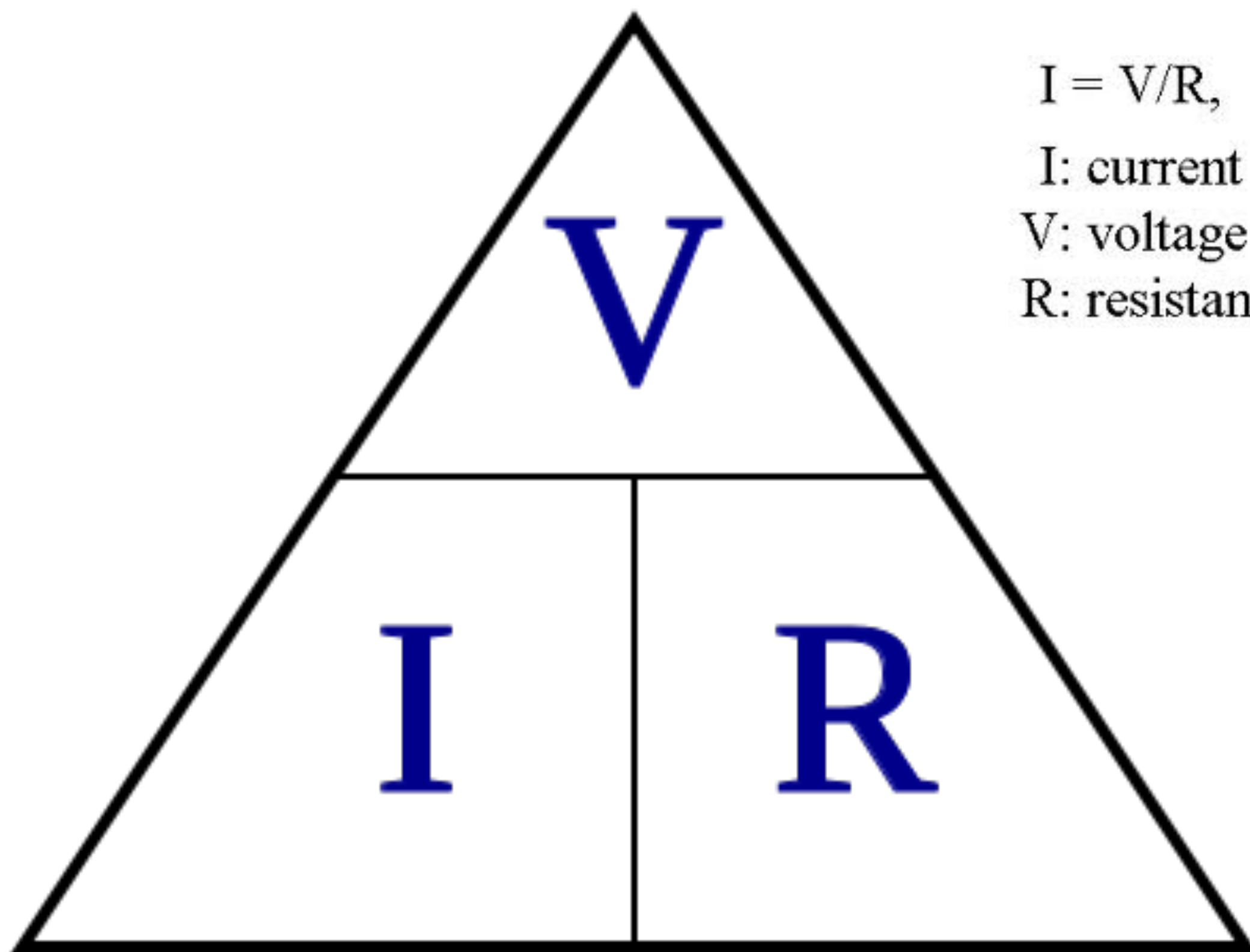
Ohms is a measure of resistance.

When the electricity passes into the speaker, some of it is resisted.

An amplifier amplifies the electrical signal.

How much the amp drives the speaker is measured in watts.

When an amp manufacturer gives it's wattage rating, it's always at a specific Ohm resistance. "100 watts @ 4 ohms," for example. When the resistance is 4 ohms, this amp will produce 100 watts. If that resistance changes, the amp will produce a different amount of watts.

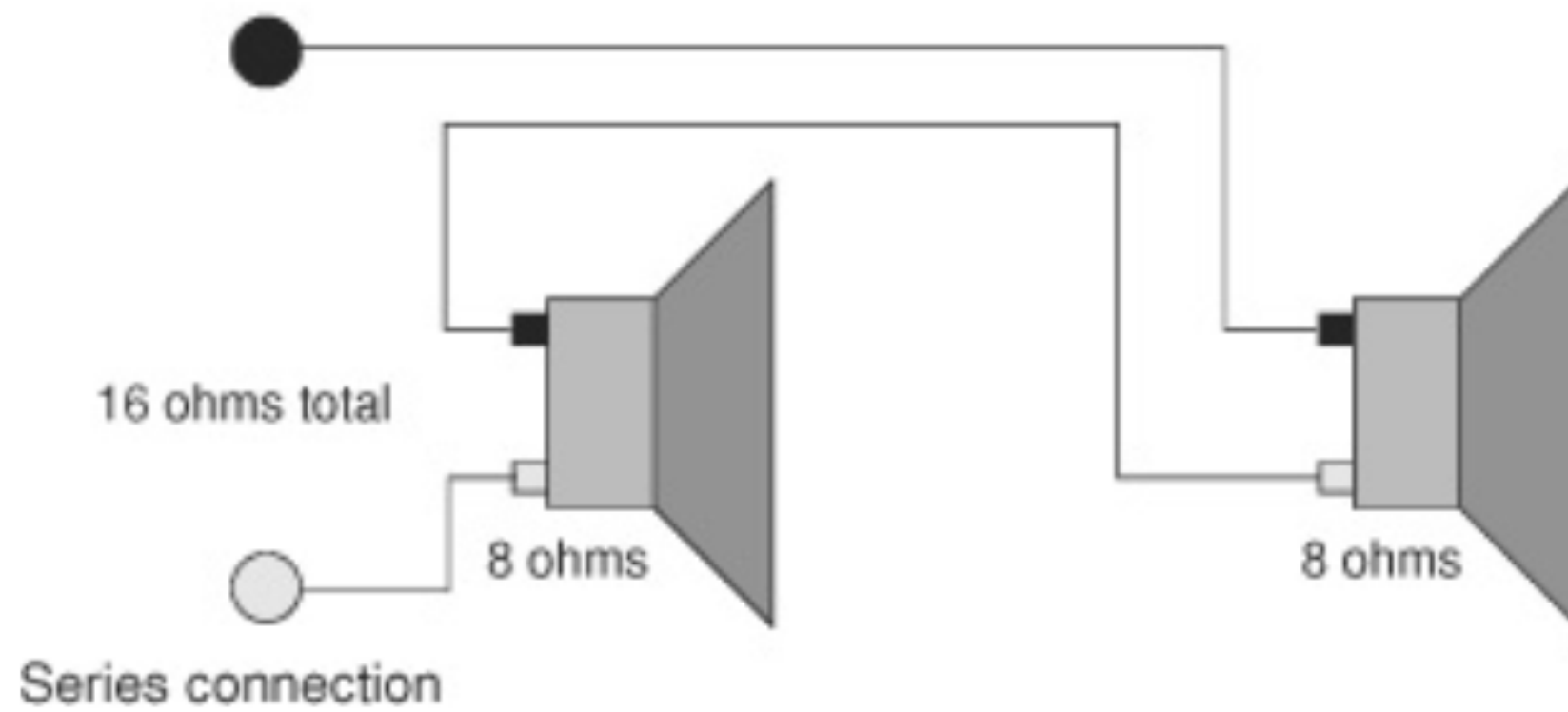
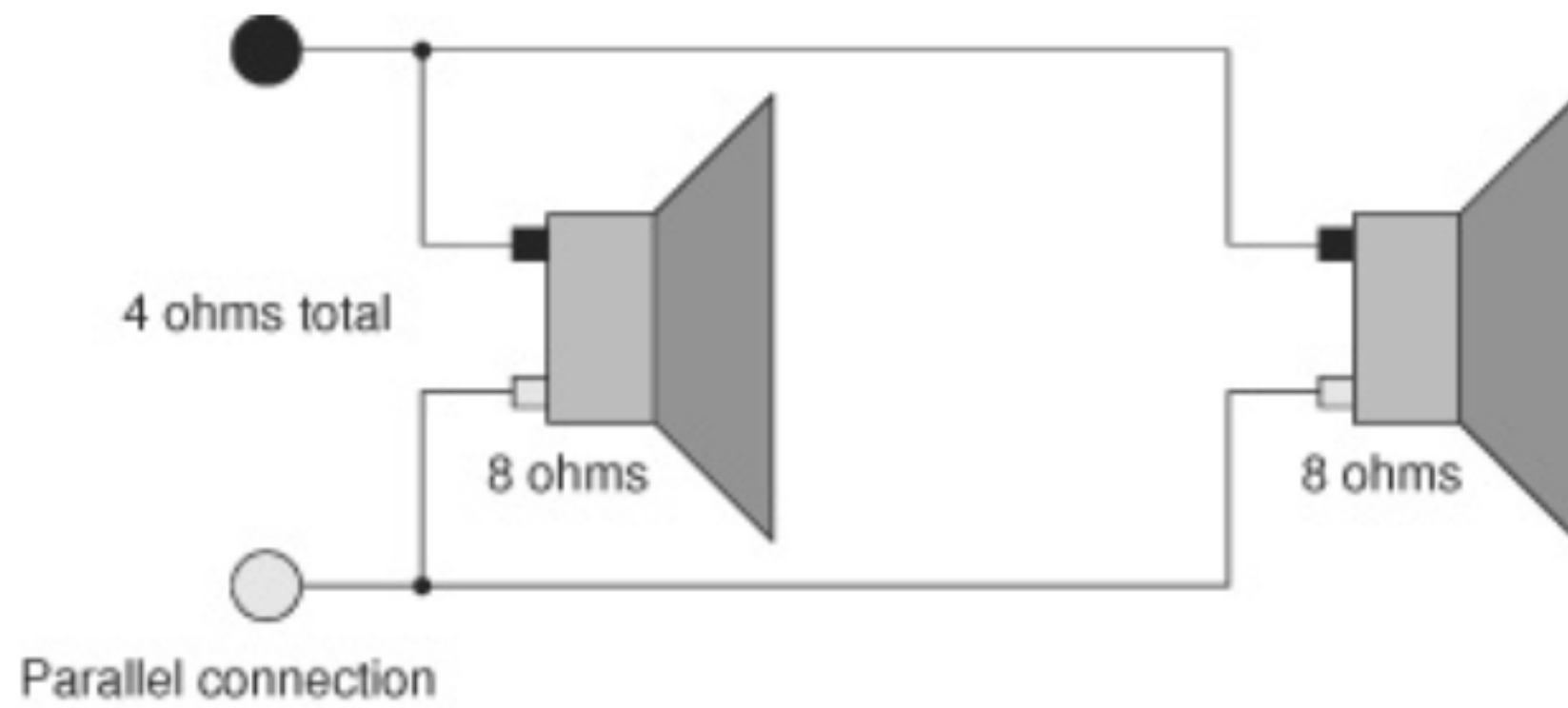


$$I = V/R,$$

I: current

V: voltage

R: resistance



Parallel reduces the total resistance increasing the total output. That is, because electricity flows through all of the speakers simultaneously, each speaker added reduces the resistance of the chain. If you visualize all of the negative electrons on one side trying to get to the other, they'll have an easier time because there are so many possible paths for them to go by.

$$\text{Resistance} = (\text{Speaker A} \times \text{Speaker B}) / (\text{Speaker A} + \text{Speaker B})$$

$$\text{Resistance} = (8 \text{ Ohms} \times 8 \text{ Ohms}) / (8 \text{ Ohms} + 8 \text{ Ohms})$$

$$\text{Resistance} = 64 / 16$$

$$\text{Resistance} = 4 \text{ Ohms}$$

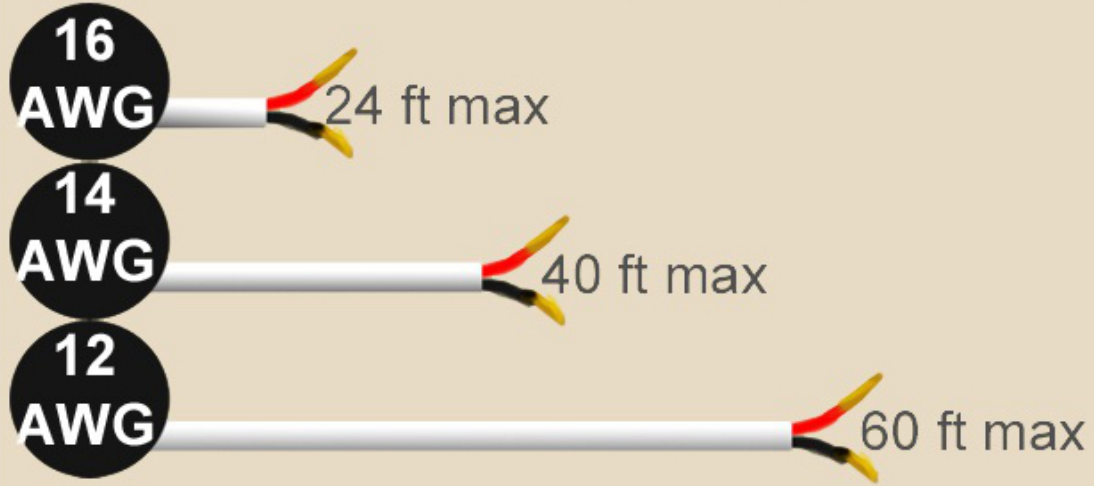
Series increases the total resistance, reducing the total acoustical output. That is, because the electricity has to flow through each speaker one at a time, each speaker adds its resistance to the whole. The formula is as follows:

$$\begin{aligned}\text{Speaker A} + \text{Speaker B} &= \text{Total Ohms Rating} \\ 8 \text{ Ohms} + 8 \text{ Ohms} &= 16 \text{ Ohms}\end{aligned}$$

Two 8 Ohms speakers wired in series will have a total rating of 16 ohms.

What Gauge Speaker Cable Do I Need?

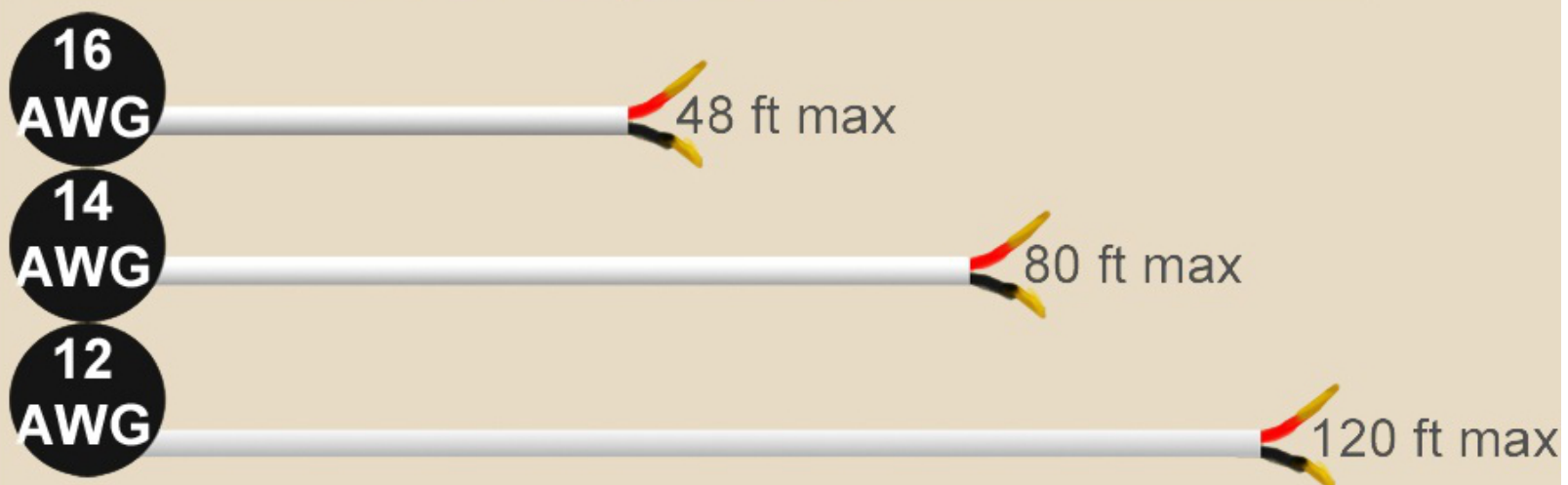
4 ohm Impedance



6 ohm Impedance



8 ohm Impedance



Wire Size Comparison between AWG (American Standard) and Euro Standard (mm²)

AWG	Euro Std mm ²	AWG in mm ²	AWG	Euro Std mm ²	AWG in mm ²
16	1.5	1.31	6	16.0	13.30
14	2.5	2.08	4	25.0	21.15
12	4.0	3.31	2	35.0	33.62
10	6.0	5.26	1	50.0	42.41
8	10.0	8.38	0	50.0	53.49
			00	70.0	67.43

Conversion chart between USA and European wire diameter conventions.