How series or parallel speaker wiring affects amp and speaker power

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The total amount of power supplied by an amp and the power available to each speaker are affected by the speaker wiring. This diagram will provide some examples to help illustrate *why* this is true.

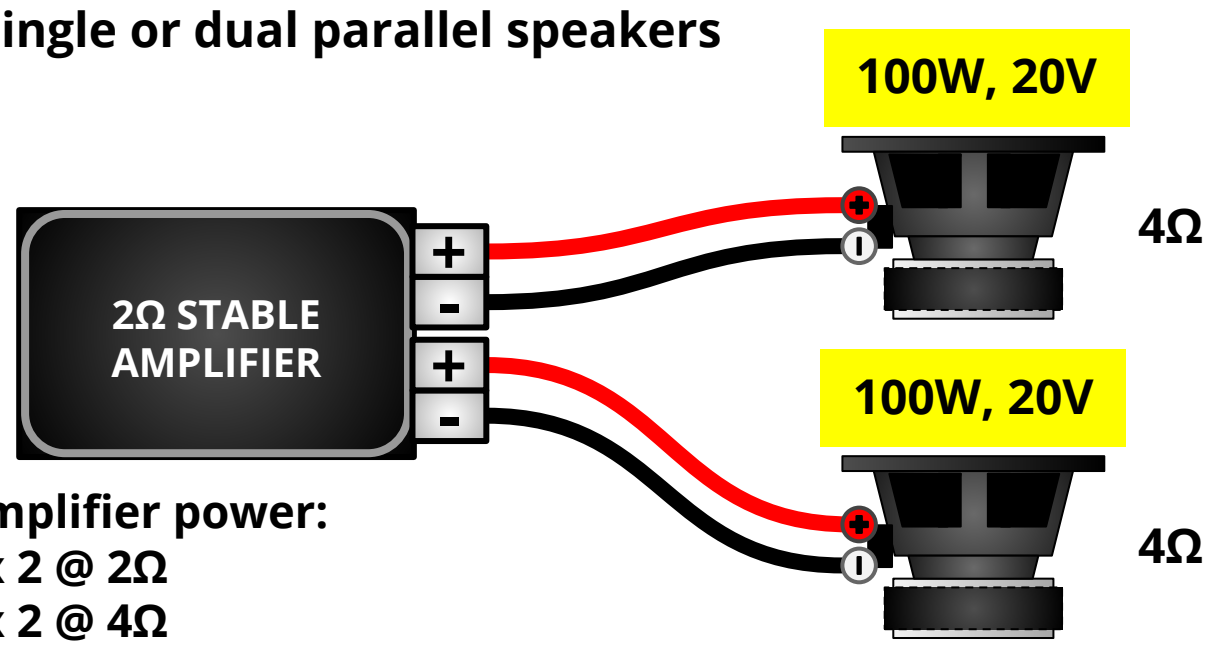
Ohm's Law: Power = (voltage x voltage) / resistance

$$P = V^2/R$$

We can use Ohm's Law for power and voltage to calculate amp and speaker power for different wiring configurations.

EXAMPLE 1

Single or dual parallel speakers



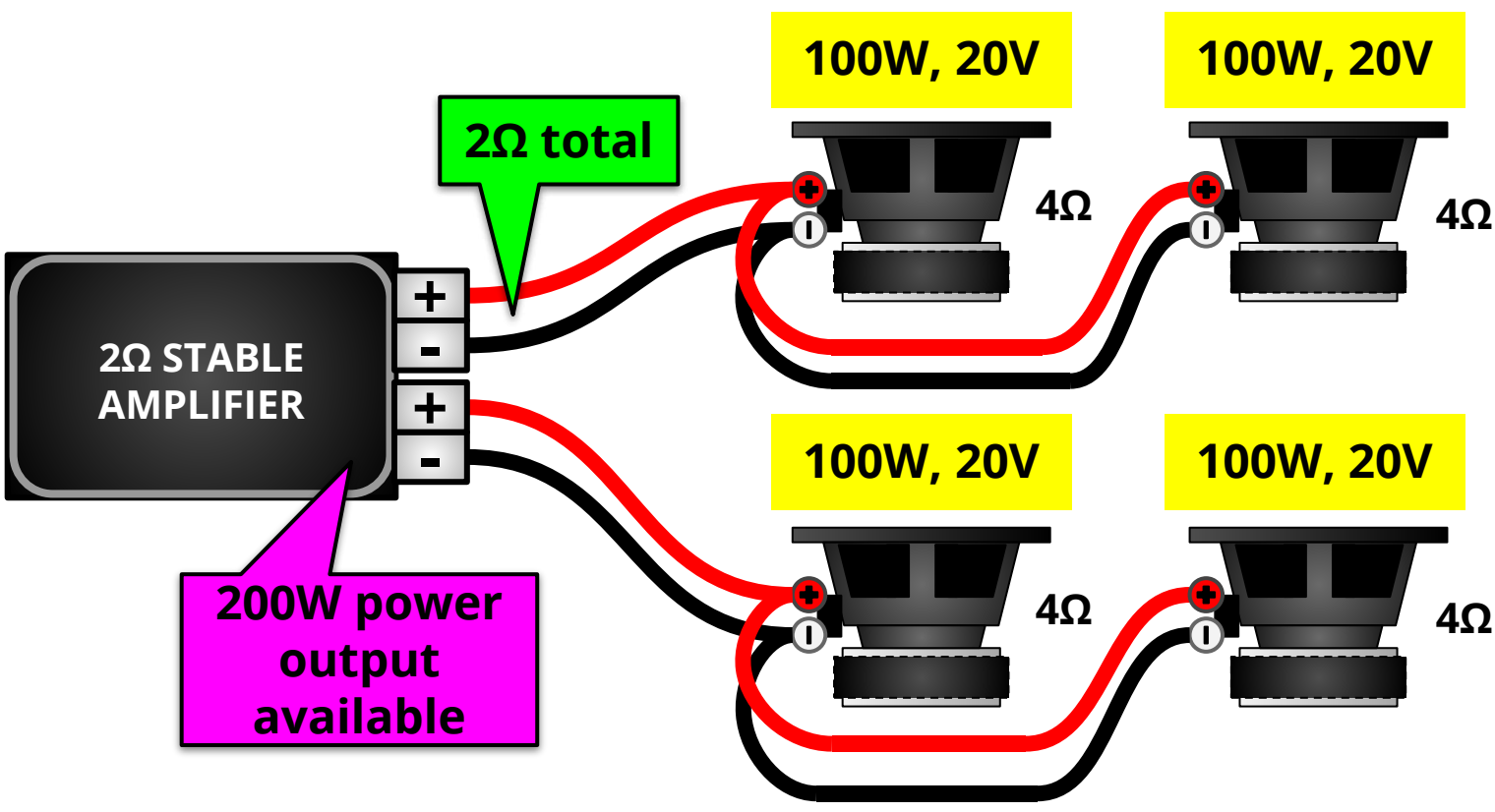
Example amplifier power:

- **200W x 2 @ 2Ω**
- **100W x 2 @ 4Ω**

The amplifier's output depends on the speaker load as it acts as resistance to the flow of current.is maximum (the rated output for a 4Ω load/speaker). Low Ohms load = more current & more power.

We can calculate the voltage output (maximum) for the amp using its max. power output for a given Ohms rating:

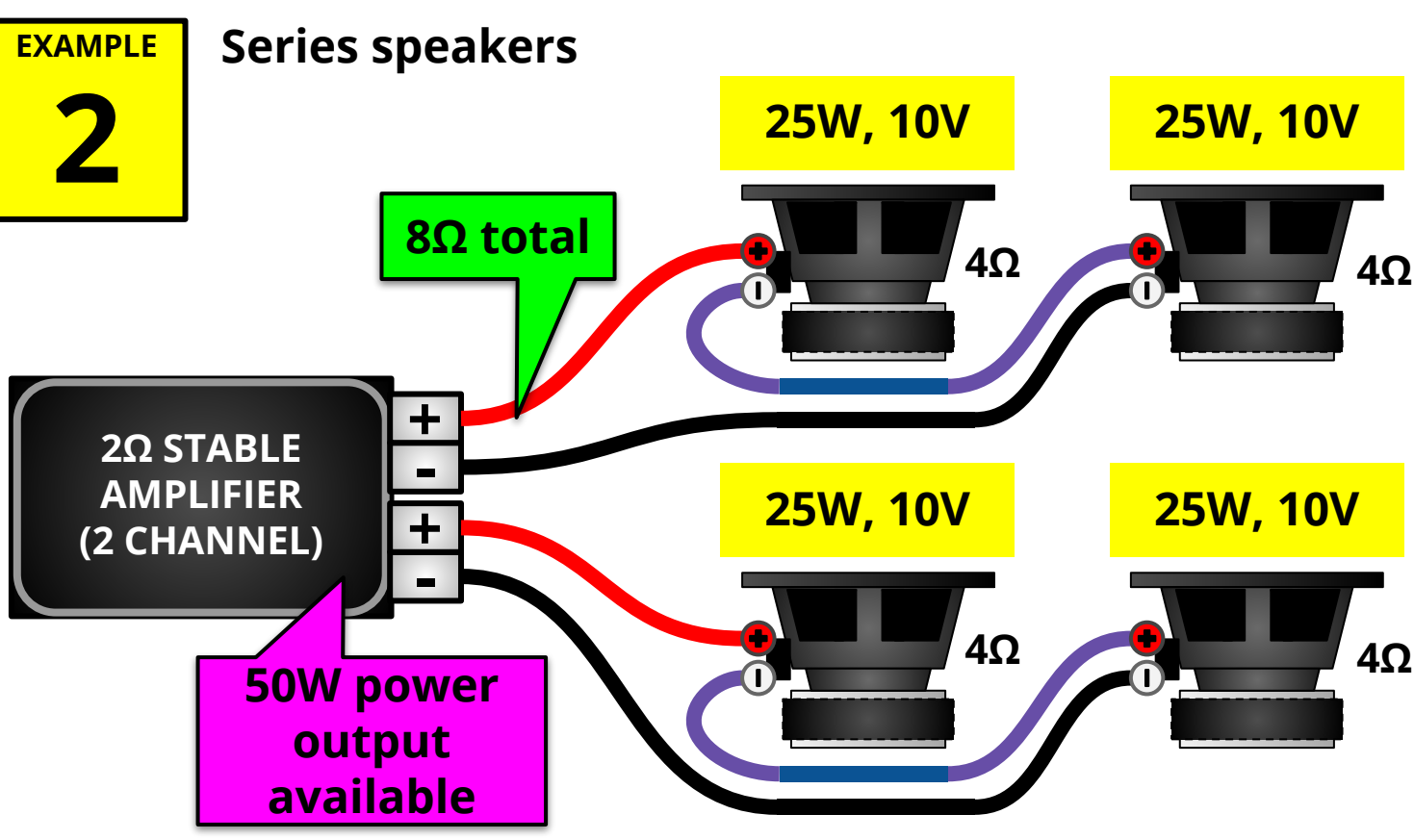
*$200W = V^2 / 2\Omega$ -> $V = \sqrt{(200 \times 2)} = \sqrt{(400)} =$ **20V.***



*With speakers in parallel (at the min. supported Ohms load) the amp can supply its maximum power. Each speaker receives ½ of this power. **The same output voltage is shared by each speaker when connected in parallel.***

EXAMPLE 2

Series speakers



*Speakers in series **add** together. In this example, two 4Ω speakers add up to an 8Ω load for the amp. If we know the amp can put out up to 20V, the power the amp is putting out is then:*

*V^2/R or $(20V \times 20V)/8\Omega = 400/8 =$ **50W***

***Because there are 2 speakers in series, each gets ½ of the total power = 25W each.** (For series speakers or resistance, voltage is divided between the series items. In this case, each speaker only has up to 10V available hence the power is lower)*

As you can see from the examples:

- ***Parallel speaker connections supply the most power and are preferred when possible.***
- ***Series speaker connections reduce BOTH the amp power output available AND the power to each speaker.***