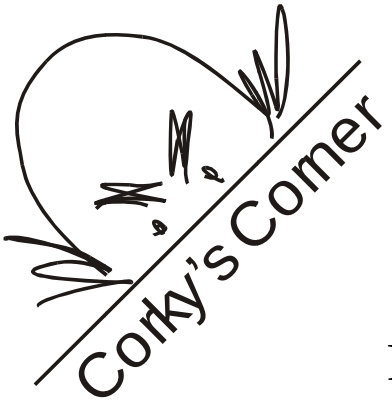


From the desk of Corky Mork,
Audioplex Tech Support

Poor Man's Impedance Measurement

Knowing what the impedance of a speaker (or combination of speakers) is important to getting an audio system to operate properly and efficiently. Usually you can find the impedance "by the numbers" (see Corky's Corner 5) if you know some basic facts about your speakers and other components.

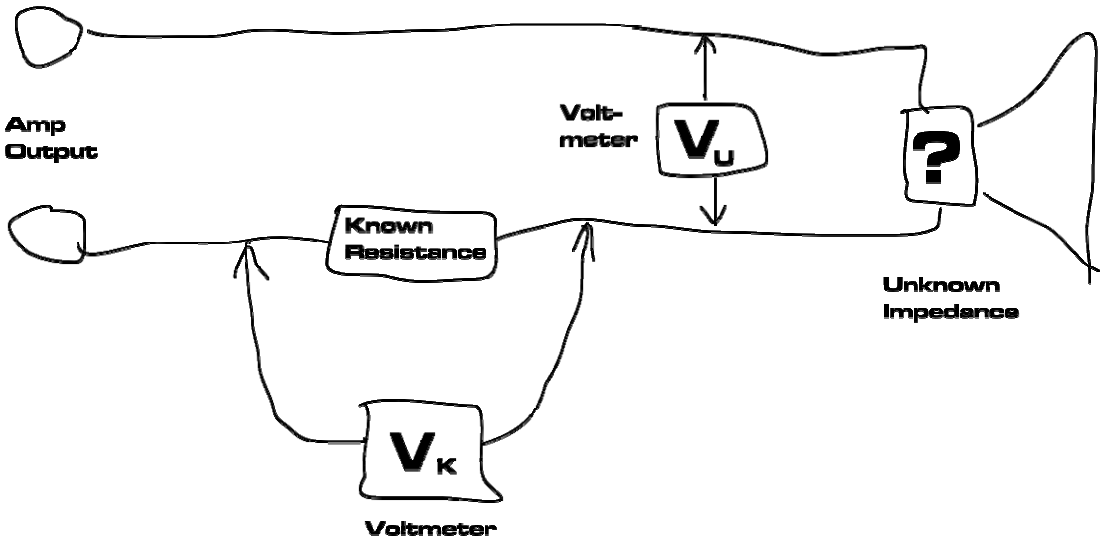
But what if you don't have that information and want to be sure that everything is working properly. Ideally, an impedance meter (like the Audioplex Impedicator) can be used to measure the system impedance "seen" by the amp. (By the way, an ohmmeter won't do; it measures DC *resistance*, we need to know AC *impedance*.)

But impedance meters are not common in most installers' toolkits, what can we do?

Here's a way of measuring impedance using tools an installer is more likely to have.

You'll need an AC voltmeter (or the AC volts setting on a multimeter), a known resistance of about 8 ohms (a speaker would do for this), and a source of a constant audio signal. For this a CD with test tones is good, but you could also use the hiss of an FM tuner tuned between stations. (An FM station or music CD won't work because you can't get a steady level reading on your meter.)

Hook everything up like the diagram. The unknown impedance could be a speaker, or several speakers connected to volume controls, switchers, hubs, and other devices. You don't need two voltmeters; just take a measurement in each place.



Now use your AC voltmeter to measure the voltage across the known resistance, V_K, and the voltage across the unknown impedance, V_U. You may need to adjust the volume of your amp in order to get reasonable readings, say a few volts.

Now we can calculate the unknown impedance by multiplying the known resistance by the ratio of the unknown voltage to the known voltage. Mathematically, it's:

$$Z_U = R_K \frac{V_U}{V_K}$$

Where Z_U is the unknown impedance and R_K is the known resistance. So for example, we have a known resistance of 8 ohms, 4 volts across the known resistance, and 3 volts across the unknown impedance. Our calculation would be:

$$Z_U = 8 \text{ ohms} \times \frac{3 \text{ volts}}{4 \text{ volts}} = 8 \text{ ohms} \times .75 = 6 \text{ ohms}$$