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Subject: Displacement calculations (or measurements)

Posted by [Wayne\\_Parham](#) on Thu, 28 Jun 2001 01:52:02 GMT

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Measured displacement will always be more accurate than simplified (composite solid) calculations. But then again, the differences are pretty small, and particularly with the typical slightly overdamped cabinet that tends to be tolerant of slight parameter shifts. Using a Composite Solid Geometry method, as I will describe below, will get you within a reasonable tolerance. Composite Solid Geometry is a term used in the 3D computer modeling field. CSG uses a series of solid shape "primitives" to describe complex object. To model the speaker driver mathematically, one can almost always use a cylinder and a cone. It's a simple mathematical model, but for this kind of displacement estimate, is really quite adequate. Just measure the depth of the cone and its diameter, and you can "model" the cone portion of the driver. Then measure the magnet length and diameter, and you can model it as a cylinder. Add these two volumes together, and you have the lion's share of the volume displaced by the motor. In the PiAlign program archive, you will find a little stand-alone program called "Volume.exe." This program is old and primitive, so you may have better and easier ways to calculate your composite solids. But it gives about a half dozen of the most common basic shapes and allows entry of their dimensions. It then returns the volume of the primitive shape, in cubic inches. That's what the "LFD Offset" field in PiAlign expects to see - cubic inches. So you can use this program or any other volume calculation you feel comfortable with, and you can estimate each item in the cabinets with whatever level of accuracy you feel is required. Just keep adding the offsets of each primitive you choose. You can even get down to the terminals by using tiny little cylinders, and the basket using a series of thin rectangles or toroids.

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