Subject: Push-pull woofers
Posted by Wayne Parham on Sun, 10 Jul 2005 23:01:35 GMT
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Some call this configuration push-pull, and you're right, it reduces harmonic distortion by counteracting flux modulation. Drive units are used in complementary pairs, cancelling any asymmetries in an individual drive unit in the summed output. Essentially you have a strong motor and a weak motor on each half cycle. On each contiguous half cycle, the strong one and the weak one flip.Shorting rings in the motor structure correct for this too. It appears to me that the shorting ring works best at higher frequencies and the push-pull arrangment works best at low frequencies. At high frequencies, the distance between push-pull configured drivers is too great, and pneumatic coupling is reduced. Wavelength related issues come into play. At low frequencies, the ability of the induced EMF to counter the magnetic asymmetry is reduced unless the shorting ring is very large. And to make the shorting ring large requires more magnet and more magnetic return circuit material to be used, so the size grows out of hand. It's an issue of diminishing returns. So I think push-pull is best for subwoofers and shorting rings are better for midbass and midrange.