Subject: Re: The AudioKarma Econo-Waveguide Speaker
Posted by AudioFred on Mon, 16 May 2011 15:43:53 GMT
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A few LSAF visitors asked me to post in one place all the information needed to build a pair of EconoWaves like the ones I exhibited using the Eminence Delta 12LFA driver. So here it is:

The crossover is almost identical to the original one in the Audio Karma Econowave thread. Here's the link:
http://www.audiokarma.org/forums/attachment.php?attachmentid=151281&d=1242968714

This crossover is a generic prescription for almost any woofer. I made three specific changes to better accommodate the Eminence woofer:

1) In the woofer crossover I added a zoebel consisting of an 8 ohm 20 watt resistor in series with a 10uF capacitor. The zoebel is installed parallel to the 12uF shunt capacitor, connecting the positive and negative woofer terminals.
2) For the series resistor in the tweeter L-Pad I used a 25 ohm resistor in series with a 2 ohm resistor for a total of 27 ohms. This voices the tweeter a bit on the quiet side, and other builders may prefer to use only the 25 ohm.
3) I ommitted the variable L-Pad, instead trying different fixed resistor combinations until the speaker tested and sounded the way I like it.

All the parts are sourced from Parts Express. The total cost of the parts for a stereo pair is about $440.(For a stereo pair order two of each unless otherwise noted). I assume you will supply your own wire and will line opposite interior walls of the enclosure with R-13 fiberglass insulation from Home Depot.

16 ohm 10 W resistor #004-16
25 ohm 10W resistor #004-25
2 ohm 10W resistor #004-2 (in series with 25 ohm resistor)
8 ohm 20W resistor #017-8 (woofer zoebel)
0.47uF capacitor #027-406
4.7uF capacitor #027-422
10uF capacitor #027-428 (woofer zoebel)
12uF capacitor #027-430
#8 X 3/4 screws black 100 pcs #081-422 (one pkg required)
1/4" female disconnects 50 pcs #095-290 (one pkg required)
Speaker binding post #260-303
Eminence Delta-12LFA #290-416
0.60mH 18awg air core inductor #255-234
1.5mH 15awg air core inductor #255-426
2.5" flared port tube #260-478 (two required per speaker)
Selenium D220Ti-8 driver #264-270
H6512 waveguide #270-318

Small DIY Enclosure (Seen at LSAF) Details

The pair I exhibited were in an approximately 2 cu ft enclosure, which is marginally small for the Delta 12LFA. I would use this enclosure only if you know you will be using a subwoofer. In other words, it's a good choice for HT use, but not the best for music only use. The enclosure dimensions are 16"W, 13.5"D, 24"H.

For driver and port placement look at the picture and consider this: The tweeter is mounted with the outside of its flange about 1" from the top of the enclosure. The woofer is positioned with its frame about 1" from the tweeter. The ports are centered in the available space below the woofer. You should determine the proper mounting positions by placing the drivers and ports on the front baffle and marking their position with pencil.

This enclosure has one "window-frame" brace between the woofer and tweeter.

Large DIY Enclosure Details

This is the preferred enclosure for music use without a sub. The dimensions are 16"W, 13.5"D (same as the small enclosure), but 40"H. This height places the center of the tweeter horn at 36" seated ear level. I recommend three window-frame braces, one between the wooofer and tweeter, one just below the woofer, and one halfway between the below-woofer brace and the enclosure bottom. The drivers are mounted the same distances from the top of the enclosure as in the small enclosure. One 4" port (PE #260-411) should be used cut to 3" length. The port can be centered on the front or the back, midway between the lowest two braces. Front mounting is preferred if the speaker will be placed close to the back wall.

I plan to build this version soon and will post construction pictures here.

PE Flat Pack Trapezoidal Enclosure Kit Details

Here's some really good news for anybody who wants to build this speaker but doesn't have the equipment to build DIY enclosures. You can build a pair of the $69 Parts Express flat pack enclosures using only an electric drill, a skil saw, and a screwdriver. Here's the link to this product:

The folks at PE were kind enough to supply the kit with an 11" hole to accommodate any 12" pro woofer. You must cut the rectangle for the tweeter. Place the tweeter on the baffle with the woofer already set in place, position it one inch from the woofer, draw the outline of the tweeter, and use that as a guide to cut the tweeter hole.

This does not leave enough space on the front for the ports, so you will use a single 3" port (PE #260-404) on the back panel. This port is already the required 4.5" length, so no cutting is needed. Center the port so its inside opening isn't blocked by either the woofer or the tweeter magnet. A good location would be about halfway between the woofer and tweeter center lines.

This enclosure is a bit smaller than the one I exhibited at LSAF. The F3 will be about 60hz, and a subwoofer is highly recommended.

If you visited my room at the LSAF and you plan to build the AudioFred EconoWave, PM me for the "Show Special" price on the parts. If you were unable to attend the LSAF you can get the parts

directly from Parts Express.