
Subject: Trapezoid enclosures

Posted by [Larry Acklin](#) on Mon, 09 Feb 2004 14:07:34 GMT

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Hi-

Has anyone tried to make a "trap" enclosure out of a 3 or 4 PI? I'm thinking about a couple of pairs for mid-tops in the PA. Would the trap's ability to "throw farther" (myth?) affect how the box is calculated?

Thanks

Larry Acklin

Subject: Re: Trapezoid enclosures

Posted by [Chris R](#) on Mon, 09 Feb 2004 15:18:29 GMT

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Hi Larry,

Could tell me the tale of how the box shape effects how far it throws? I haven't heard it before. Sounds like a myth to me too, but I'm curious to hear anyway.

Thx, Chris

Subject: Re: Trapezoid enclosures

Posted by [Larry Acklin](#) on Mon, 09 Feb 2004 16:05:48 GMT

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From--

<http://www.atr-treehouse.com/PA10.html>

start quote

BOX DESIGN SHAPE - Trapezoidal vs. Square

The reason for that "wedge-back" trapezoidal enclosure geometry is to facilitate the creation of semicircular arrays where multiple enclosures are arranged closely side-by-side. Created initially for "flying" in elevated clusters, trapezoidal enclosures have also found their way onto stages all over and are used in small numbers with great success.

Their shape looks a little horn-like leading sometimes to speculation about them having "longer throw" than similar, square enclosures - of course we know better now. However there is a potential benefit in this shape - when properly configured, it reduces internal standing waves which means smoother frequency response and possibly improved phase coherence, a factor

which gives the enclosure a "tight", "focused" sound. On the other hand, not all trapezoid boxes automatically benefit from this shape, nor do all square boxes fare less than favorably in comparison to them.

end quote

So in an array- better coverage, about 3 db gain by stacking close together, and a possible standing wave issue. Plus they pack better in the trailer.

-Larry

Subject: Re: Trapezoid enclosures
Posted by [Wayne Parham](#) on Mon, 09 Feb 2004 20:34:04 GMT
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There's no harm in making your cabinets this shape as long as the cabinet volume is kept the same. All box volume calculations are the same - The Helmholtz resonator formed by the bass-reflex cabinet doesn't care if the volume is formed by a box, a trapezoid or a bottle.

Subject: Re: Trapezoid enclosures
Posted by [JLapaire](#) on Tue, 10 Feb 2004 14:29:46 GMT
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Larry, the Theater 4 stuff makes a great speaker (see mine, above left). I've run 'em wide open, and hipassed anywhere from 80 to 150. They seem to blend with the Omega Pro 18s best at around 150.

John

Subject: Re: Trapezoid enclosures
Posted by [Chris R](#) on Tue, 10 Feb 2004 19:13:47 GMT
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Thanks. I think we were clear before hand. :^)
chris

Subject: Re: Trapezoid enclosures

Posted by [Larry Acklin](#) on Tue, 10 Feb 2004 19:16:32 GMT

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Good looking mid/tops (to me, anyway). What is the horn flare? Looks to be about 15X6 inches - not an Eminence flare, for sure. How did you handle the crossover and compensation?

Looks like i'm gonna be building 6 for a club/smaller outside jobs rig.

Larry Acklin

Subject: Re: Trapezoid enclosures

Posted by [Wayne Parham](#) on Tue, 10 Feb 2004 21:45:27 GMT

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That horn is a Peavey CH-3. It's one of my favorites.

Subject: Stock Theater 4 parts

Posted by [JLapaire](#) on Wed, 11 Feb 2004 11:40:47 GMT

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I think Wayne used to include the CH3 in the Theater 4 kits - I remember voting on whether we wanted the CH3 or H290 so he could standardize.

The crossover is stock Pi/Eminence with the 10db pad and comp circuit. I'd have to look at the parts, but the HF section is probably right out of the Crossover Document for the PSD2002.

6 of them will be a good project! The full-size version is kinda big to put on stands, though - how are you going to get them up high enough to reach out over the crowd? On second thought, 6 of them in a room should reach everything just fine.

John

Subject: Re: Stock Theater 4 parts

Posted by [Larry Acklin](#) on Wed, 11 Feb 2004 15:03:05 GMT

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Thanks! I thought it might be a Peavey. My application is usually 2 or 3 traps a side, stacked on top of a dual 15" folded horn sub (2 horns in one box) which is 32" high when laid on its side. That puts the HF horns about 55-60" up, OK for clubs and whatnot. Outside, for bigger shows- (300-500 people) the midbass and mids are a huge EV 90X40 horn, with an EV 12" in a 1 cu ft compression chamber. Big, heavy, but very dynamic.

I do the speakers on sticks indoors, but these would be marginal in weight for the supports I own.

Thanks

Larry Acklin

Subject: Re: Trapezoid enclosures

Posted by [Maxjr](#) on Mon, 19 Sep 2011 18:59:42 GMT

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Wayne Parham wrote on Mon, 09 February 2004 14:34 There's no harm in making your cabinets this shape as long as the cabinet volume is kept the same. All box volume calculations are the same - The Helmholtz resonator formed by the bass-reflex cabinet doesn't care if the volume is formed by a box, a trapezoid or a bottle.

Wayne, I've been thinking about this lately and going toward the direction of building trapezoid cabinets for my 4Pi pair. I wanted to see if anyone has actually implemented this and what their thoughts are, as well as if this is still your recommendation. My reasoning for the trapezoid enclosure is since they will be toed in 45 degrees, this shape will make them more visually appealing as well as functional as one of them will be right next to a walkway.

I would keep the baffle width and height and keep the internal volume and port dimensions the same. The end result would look something like a standard JBL PA cab.

Subject: Re: Trapezoid enclosures

Posted by [Wayne Parham](#) on Mon, 19 Sep 2011 19:32:12 GMT

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In general, you can make the shape of the cabinet anything you want. The bass tuning doesn't care, unless it becomes very long and thin, in which case pipe modes setup in the bass, making it a transmission line. But in general, you can make the shape anything you want and that won't change bass response.

But this isn't true at higher frequencies. Midwoofers used in cabinets this size have standing waves in the midrange. Maintaining the Helmholtz frequency keeps the bass response right, but the midrange will be changed when you change cabinet shape, or even the positions of the drivers and port within the cabinet.

It is widely believed that trapezoid cabinets have a tendency to stagger standing wave frequencies, but depending on that really gives a DIYer a false sense of security. It's true, but it doesn't really matter. It only takes one standing wave mode in the midrange to mess up response, and to tell the truth, that's usually the case. So even if you use a cabinet like that, you really should make measurements to see what the response looks like.

The real benefit of the trapezoidal shape is in prosound, where sometimes it is desirable to splay cabinets. You can hang a number of trap cabinets to form a curved line array. Beyond that, I don't see any real benefit. But if it looks cool to you, then go for it. Just be sure to make measurements of your loudspeaker, looking in particular for peaks and dips in the 80Hz to 200Hz range. If it has some, rebuild with the drivers and ports in different places.

Subject: Re: Trapezoid enclosures
Posted by [Maxjr](#) on Mon, 19 Sep 2011 19:54:31 GMT
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Wayne,

Thanks for the quick response! I do like the looks of the trapezoid cab. Since I'm building the cabinet from drawings, I thought I would add something different to it. I hope response doesn't change much. I did a search here, on several other audio forums and even google, and didn't find any results of a trapezoid 4Pi cabinet. Are you aware of any previous users making one?

Subject: Re: Trapezoid enclosures
Posted by [Wayne Parham](#) on Mon, 19 Sep 2011 20:02:37 GMT
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There have been soooo many builders here over the years, several of them doing their own mods and twists. The most common are just slight dimension changes, but some are towers. Some have made slanted front baffles and some have made angled sides, forming the trapezoid shape you're talking about. But I don't recall seeing any acoustic measurements of any cabinets like that.
