Subject: Your Experiences With Constand Directivety Horns
Posted by Ka7niq on Wed, 08 Nov 2006 06:07:33 GMT
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There are several used pairs of CD Horns for sale near me.I am thinking about building a Hi Efficiency speaker around either my Cornwall woofers, or some Altec 421A's.I have a Rane active crossover that provides CD EQ if needed.I have never heard a CD Horn in a home setting, and wondered if anyone has compared them to say an Altec 511 or 811 ?I was looking at some Altec Manta Ray and big JBL CD horns.Any thoughts ?

Subject: Re: Your Experiences With Constant Directivity Horns
Posted by Wayne Parham on Wed, 08 Nov 2006 14:44:42 GMT
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I prefer constant directivity horns. When constant directivity is observed through the midrange upwards, the reverberent field is more uniform. The sound is much more natural throughout the room. This requires midrange and tweeter horns be matched, having the same coverage angle.

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by hurdy_gurdyman on Wed, 08 Nov 2006 19:23:44 GMT
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I've owned some pro speakers with constant directivity HF horns. The pair I still use for my band use are EV Sx-100 stage monitors/small venue speakers. These have a CD horn crossed at 1.8 kHz. These sound very good. I used them as my home speakers for several months. The highs sounded better that most of my previous speakers designed for home stereo use. Very clear and natural, no harshness unless it was on the recording.Not sure if this tells you anything about CD drivers in general, but at least it shows that they can work well. Dave

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by Duke on Thu, 09 Nov 2006 01:26:33 GMT
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I agree with everything Wayne said about the advantages of CD horns. I believe the sonic qualities that come from constant directivity to be audible and well worthwhile. In my experience, CD horns and waveguides can be hard to cross over. Wayne's paper on crossover networks is an excellent source of information. My attempts at crossing over horn-based systems were

disastrous before I got hold of his paper.I have a friend who went from the big Altec sectoral horns (both the 511 and 811) to CD waveguides and he is happy with the results. Two of the speaker lines I sell use CD waveguides. What Wayne is doing in his designs - using CD horns and matching up the woofer and horn pattern (at least in the horizontal) in the crossover region is in my opinion very intelligent. I think Altec was the first to do this with the Model 19 and Model 14 years ago, but even today few designs really pay attention to the radiation pattern. Shortly after the Altec Model 19 and Model 14 came out, JBL took it one step further with the Model 4430 studio monitor. Below is a link to a paper JBL's top engineers wrote describing the theory behind the model 4430 (link hosted by Wayne at PiSpeakers - surprise, surprise!).Duke
landmark JBL paper on CD loudspeaker system

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by Ka7niq on Thu, 09 Nov 2006 03:39:02 GMT
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Thanks Duke!I read the article, and It was great!Where do i find Wayne's crossover paper ?

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by Duke on Thu, 09 Nov 2006 04:56:22 GMT
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Hi Chris,Glad you liked it!Wayne's crossover paper is linked to on the "info" page at his website. I think the link below will take you to that page. Under "Helpful documents and software" down at the bottom, it's the third item.I am amazed at the time and knowledge Wayne shares for free. I try to send people in his direction - not with every post I make, but whenever I think Wayne has something to offer that would serve them well. I still haven't figured out how he makes money at this. If you find his crossover document helpful, let people who might be interested in his designs know about him and his website. Duke
http://www.pispeakers.com/contents.html

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by PointSource on Thu, 09 Nov 2006 17:08:14 GMT
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I, too, am amazed with what Wayne shares for free! How he makes a buck at it is truly a mystery to me, and I feel a little guilty about accepting design plans without including the offer to pay for them.

Subject: Re: Your Experiences With Constant Directivity Horns
Posted by PointSource on Thu, 09 Nov 2006 17:25:20 GMT
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A clarification, please: When you mention "constant directivity" in a HF horn, can I assume that you're referring to the typical diffraction slot style? I ask, because other designs claim constant directivity using non-diffractive throat geometries.

Subject: Re: Your Experiences With Constant Directivity Horns
Posted by Wayne Parham on Thu, 09 Nov 2006 23:28:05 GMT
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A diffraction slot is useful for widening dispersion, but it is not useful for controlling the pattern other than that. A diffraction slot can only widen the pattern; It cannot constrain the pattern. It also is very frequency dependent, not constant at all. See the diffraction applet for an example. What a diffraction slot is useful for is widening the pattern at higher frequencies where the pattern would become narrow otherwise.Constraining the radiation angle is what the horn flare is for. The wall angle of a horn sets its pattern and constant directivity horns have straight walls. Some widen near the mouth because the pattern tends to narrow slightly near the lower cutoff but the wall angle of a CD horn is straight (or nearly straight) along most of the flare.

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by Norris Wilson on Fri, 10 Nov 2006 00:44:49 GMT
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Wayne is truely an audio hobbyist at heart. I think he really enjoys this sharing of knowledge, while gaining relationships that spring up along the way.If you have a job that you truely enjoy, you will not feel like you are working.And if he manages to make a buck or two, that is icing on the cake.Or, at least that is how I see him.Thanks WayneNorris Wilson

Subject: Re: Your Experiences With Constant Directivity Horns
Posted by PointSource on Fri, 10 Nov 2006 00:58:20 GMT
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Then, what would be your product recommendations for decent non-diffractive CD horns, whether cheap or expensive?

Subject: Re: Your Experiences With Constant Directivity Horns
Posted by Wayne Parham on Fri, 10 Nov 2006 02:48:21 GMT
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There are lots of horns that are good, it really depends on what you need and/or expect, such as frequency band, angular coverage, symmetrical or asymetrical, and quality of pattern control. For example, if you just need a tweeter, then the horn doesn't have to be all that large for true CD. The lower in frequency you need pattern control, the larger the horn needs to be. There are lots of things to consider. Look at horns from Eminence, DDS, etc.

Subject: Re: Your Experiences With Constant Directivity Horns
Posted by Wayne Parham on Fri, 10 Nov 2006 02:56:21 GMT
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Thanks, guys. You're making me blush.Duke, you're too understated. Fred Thompson and I were just talking about that last night at dinner. You've made quite a few nice contributions in the field yourself.

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by akhilesh on Sun, 12 Nov 2006 16:27:44 GMT
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Great link to the paper, Duke. Thanks-akhilesh

Subject: Re: Your Experiences With Constand Directivety Horns
Posted by Todd W. White on Tue, 26 Dec 2006 01:11:48 GMT
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ALL constant-directivity (actually a misnomer, but I digress) horns have, as do all things in general, some flaws that must be understood and compensated for (or, at least, tolerated) in order to get the most out of them.1. The most noticeable problem with them is that they suffer from what Mark Ureda describes as an problem with "Apparent Apex." Simply stated, this means that ALL constant-directivity have at least TWO locations within the driver/horn assembly from whence the sound appears to originate. In the vertical plane, the apparent origin to the listener's ear of where the sound starts is at the comrpession driver. HOWEVER, in the horizontal plane, it appears to originate at the point where the diffraction slot (or curve, for you EV and JBL fans) opens into the bell flare.The ultimate result is that the sound appears to originate somewhere

between the two points.But it doesn't stop there. That's only at ONE frequency - the horizontal apex shifts with frequency, resulting in a really interesting, and sometimes difficult to listen to, phenomena.With the WE/Altec multicellular horns, this problem did not exist - the origin (apex) of the sound source on a multicellular horn start AT EXACTLY THE SAME PLACE: where the horn bolts to the throat. That's why they were hand-filed to almost razor-sharp: to eliminate any reflections back into the throat area, AND to make SURE that the sound emanated from the same spot in the vertical AND the horizontal planes.As my old friend Don Davis likes to say, "Those guys in the Bell Labs really knew their math - they understood what was going on, acoustically, and made sure they found a way to do it right!"To solve this problem in multiple horn arrays, Mark Ureda came up with an interesting compromise which actually worked quite well, although the arrays ended up looking pretty strange at times - nothing at all as beautiful as the symmetry we used to see in the big 210/211 clusters with multicellular horns.Our friend Ted Uzzle teamed up with Mark to write an Altec Technical Letter about this called, "TL-262 = Coverage Of Multiple MANTARAY® Horns." This is a paper whose concepts are still not understood by most modern acoustical consultants, sound system designers, and sound contractors, and is a MUST READ for anyone interested in how to cover large areas with multiple constant-directivity horns while minimizing phase interference, and maintaining apparent apex. You can find it here:http://alteclansingunofficial.nlenet.net/publications/techletters/TL_262.pdf2. All that said, these horns DO work well. Quite well, in fact. BUT it must be remembered that, for all their detractors, multicellular horns do not exhibit the beaming problems nearly as bad as Thomlinson Holman and his ilk liked to say they did. John K. Hilliard said that he had to slow the turntable down in the anechoic chamber to it's lowest setting and speed the recording pen up to full in order to even be able to MEASURE the lobing problems mentioned in Leo Baranek's book "Acoustics", which is where those who hate multicell's (and Altec) got a lot of their fuel.But hey - in real life, you can't hear it, unless you're listening to pink noise, and who listens to THAT for any length of time at all unless they have to?3. The only really CD horns from the "Big 3" who brought them to prominence are the MANTARAY ones designed and built by Altec. They have precise coverage patterns, unlike the ones from EV & JBL, which were far less accurate - not really "constant". While you could walk in or out of the MANTARAY coverage pattern, with the others, you kind of faded into or out of theirs....All told, CD horns are, like everything else, a compromise. If they do what you want and sound good, use them. If not, keep searching, but don't bypass some of the better older designs - you might be surprised at how well they work.