Subject: Why Flares?
Posted by GarMan on Tue, 09 Mar 2004 03:27:27 GMT
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Straighten me out if I'm wrong. My understanding is that the horn in front of a compression driver acts as a transformer, to allow for a better impedence match between the diaphram and the air in the room. The end result is increased sensitivity.What I don't understand is, most compression drivers with horn flares are typically 10dB to 15dB more sensitive than the cone drivers in the same speaker. Why attach the flare to increase SPL, and then attenuate it with an L-pad? Can't compression drivers be used without flares, and therefore, operate at (almost) the same sensitivity level as the woofers?Gar.

Subject: Re: Why Flares?
Posted by Dean Kukral on Tue, 09 Mar 2004 04:21:30 GMT
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Horns also establish directionality. (Is there such a word? :))Many tweeter designs do not have horns, but they do not need the control, as it is designed in.An l-pad also gives you some degree of control for fine tuning the balance of the two drivers.

Subject: Re: Why Flares?
Posted by Adrian Mack on Tue, 09 Mar 2004 06:05:35 GMT
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Yes, directionality is a word ;)> Many tweeter designs do not have horns, but they do not need the > control, as it is designed in.Why do you say this? Hi GarMan. Not everyone attenuates the HF horn with an L-pad. If the system is passive/all subsystems running off the same amplifier, then the l-pad is used to match the sensitivity of the HF horn to match that of the woofer (which should also be of a high efficiency design). If the woofer is horn loaded then it may not be necessary to include the l-pad, or at least the attenuation would be a lot less than 15db. High efficiency woofers as direct radiators still only reach around 98db 1w/1m whilst horn loading them will get you much closer to the ~110db 1w/1m of the HF horn. As Dean mentioned the flare also provides directional control, a big benefit of using a horn. It will also alter the frequency response curve and the horn can be designed to boost output on-axis such as a radial horn, or do other things too. Even though the horn may be attenuated you maintain the dynamic range of the device being another positive. If the system is bi-amped then output levels are matched with the amplifier and not attenuation circuits. Adrian

Subject: Dynamic range
Posted by Wayne Parham on Tue, 09 Mar 2004 16:19:52 GMT
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Dynamic range is the single quality I find most attractive from the use of horns.I think it's important to consider dynamic range for a moment before looking at the option of using a horn tweeter with a direct radiating woofer. So let me digress for just a moment.Dynamic range is simply the range of output levels between highest and lowest. In an amplifier, the lowest level is usually defined as the point where the noise floor (hiss) masks the input signal. But a loudspeaker doesn't usually generate this kind of noise, so the lowest level is zero. This means that dynamic range for a speaker is set by its upper boundary.A preamp is measured in very small power levels, and an amplifier in larger levels. But dynamic range is measured in ratios or decibels. If either the amp or the preamp is capable of 160dB dynamic range and the other only 120dB, then the system is limited by the smaller of the two, in this example, to 120dB.In a typical home sound system, the power amplifier is usually the device with smallest dynamic range, but pretty often it is the loudspeakers, particularly designs that are rated below 90dB/W/M. A typical 90dB/W/M speaker is generally capable of only about 105dB SPL, one meter away. But an average high efficiency speaker is capable of 120dB dynamic range, at one meter, on axis.Notice that I haven't mentioned specific power levels. That is obviously important if amplifier power is scarce. If that is the case, then the speaker's sensitivity becomes important. But that's another issue. It's relevant, but it is a separate issue.Tweeters are generally the parts of loudspeakers most prone to fail at high output levels. There is a requirement that they be physically small in order that they work at the frequencies they're designed to work at. This then makes it difficult for them to handle a lot of power. One way around this problem is to make them in a configuration that doesn't require a lot of power to provide a lot of output. This makes a horn attractive for a tweeter.This is why I don't find it particularly unattractive to use a horn loaded tweeter with a direct radiating woofer. The horn tweter is going to need 10x less power than the woofer for the same output. So be it. At least you'll be able to keep the tweeter from spitting its diaphragm out onto the ground tring to keep up with the woofer at high power levels.It isn't difficult to find a good high efficiency woofer that is capable of 120dB output at one meter as a direct radiator. And most compression horn tweeters will deliver 120dB/M somewhere between 10 and 50 watts, which is a safe power level for them. The woofer's max power is about ten times that of the tweeter but the woofer's sensitivity is about ten times lower, so both have approximately the same dynamic range. That makes them a pretty good match, each hitting about the same SPL at their respective maximum power levels.

Subject: Re: Dynamic range: why is it important to listenng at moderate levels?
Posted by akhilesh on Thu, 11 Mar 2004 13:43:23 GMT
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Hi Wayne,Thanx for your informative post on dynamic range. I have read articlein stereophile & elsewhere too that talk about why HUGE amplifier power is needed for the 120DB peaks in the 87 db speakers that sell in the general hi fi market. On reading these articels & other posts, i wondered why we would WANTDB peaks. I mean, at moderate listening levels (say around 90-95

DB) do we really have notes hitting 120DB? Or is this just for people who like to run their systems really really loud?My khorns are 104 db at 1 watt, and i run them with a zen (around 2 watts) ...and i was wondering if i am missing something.-akhilesh

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Subject: Re: Dynamic range: why is it important to listenng at moderate levels?
Posted by Wayne Parham on Thu, 11 Mar 2004 14:47:48 GMT
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There are two places I find wide dynamic range in program material - Orchestral pieces and movies. Some musical passages go from barely audible to creschendo in an instant, a sort of startling punctuation by the composer. Beethoven liked to do that a lot. Tiny little piano whispers and then WHAM! The whole orchestra at triple forte. Movies do this too, especially action and horror flicks. You've got a couple of guys sneakin' around, whispering and all you hear is crickets and a rustle of clothing or something. Then out comes the bad guy or the collision or whatever and it's avalanche rocket booster engine loud. Those are two examples of 120dB+ range. If you have the sound up high enough to hear whispered conversation, then the punctuated action strikes are pretty loud.
