Subject: SPL question
Posted by James W. Johnson on Sun, 24 Jun 2001 18:02:43 GMT
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The JBL HLA 4895 3-way combined with the 4897 bass module are JBLs top of the line tour sound products, they are capable of producing 140dB from 34Hz on up from 1 meter....can a pair of these fill up a football stadium with sound? The reason I ask is that my current set-up can produce around 100dB from one meter so they are only 40dBs away from being able to fill up a football stadium with sound?Basically what I have now is not loud enough for me, but I am pretty close , it seems to me that if I could turn up my volume knob just a couple of notches more I would be satisfied, certainly the Four Pis I am preparing to build should get me there.So how does SPL perception work, is it that once you get to a certain point each decible becomes more powerful?..In other words does the sound seem twice as loud for each additional decibal after a certain point? How does this work?

Subject: Re: SPL question
Posted by Wayne Parham on Sun, 24 Jun 2001 19:46:36 GMT
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Point sources falloff at 6dB each time distance is doubled and line sources falloff by 3dB each time distance is doubled. Small spaces can generally be adequately covered with a few number of speakers having wide angular coverage. Larger spaces usually require more speakers, each with narower coverage. And there is also a matter of whether the space is indoors or outdoors, because sound systems indoors act very differently than sound outdoors, so sound systems used in each have their own sets of requirements. This is a subject that really needs a book (or several) to properly address. There are lots of good books, and the link below is a pretty good one to get you started.

Sound System Design Manual

Subject: Re: SPL question
Posted by James W. Johnson on Mon, 25 Jun 2001 01:21:29 GMT
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Where can I see a list of equipment professional bands use? I would love to hear what sort of equipment it takes to put on a show like Woodstock.

Subject: Re: SPL question
Posted by Wayne Parham on Mon, 25 Jun 2001 06:25:29 GMT
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For big name acts, you'll most likely find JBL, EAW or Meyer, companies like that with big P&L statements. There is generally a rider that specifies a list of what equipment can be used, and it is a short list for the bigger acts. The list of vendors grows larger as the acts get smaller.

Subject: Re: SPL question
Posted by mikebake on Mon, 25 Jun 2001 15:30:54 GMT
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Most non-pro audio people will not be that familiar with the associated electronics, which are such a part of the sound reinforcement scene. Several top line boxes require their own controllers in order to function correctly.Saw The Three Tenors outdoors in Detroit 2 years ago, an all-Meyer system, sounded great. Turbosound has some pretty powerful boxes, the Flashlight and Floodlight series. I guy I know who uses Turbosound is raving about Funktion One speakers, from the guy who developed Turbosound. Check out their website at funktion-one.com. Also check out audiodirectory.nl for some more interesting pro audio manufacturers.All the big names have web sites which pitch their particular solution and are pretty interesting. Certain truths in sound reinforcement have cropped up over the years, and are usually based on solid physics.

Subject: Re: SPL question

Posted by pickle on Mon, 25 Jun 2001 19:31:26 GMT
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Also, to see a partial sample equipment list for a company which does some pretty big shows (large national country or rock acts in a fairground setting; they did Def Leppard a few 2 years ago, routinely do first-rate large country acts at outdoor venues) see the URL below. Basically as the show grows they just add/rent more Meyer boxes and amps..... lots of people seem to like the Yamaha boards.....MBB

RG Sound

Subject: Re: SPL question
Posted by Wayne Parham on Mon, 25 Jun 2001 22:33:12 GMT
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Good links, Mike, thanks!

Subject: Re: SPL question
Posted by James W. Johnson on Tue, 26 Jun 2001 14:27:07 GMT
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Thanks for the link Mike. I found another interesting link these folks cater to bands such as the Red Hot Chili Peppers.Here is their take on horn loading... http://ratsound.com/concept.htmTheir Rat Trap Five speaker seems like a real winner, I wish I could hear a pair of them. Here is a link to their system configuration page , it kind of shows what it takes to fill a given area with sound... http://ratsound.com/sysconfig.htmThe pic is 24 of their Rat Trap Five speakers used at a Pearl Jam concert.

http://www.ratsound.com

Subject: Re: SPL question
Posted by James W. Johnson on Tue, 26 Jun 2001 14:36:12 GMT
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Thanks for the link Mike , I found an interesting link, these guys cater to bands such as the Red Hot Chili Peppers.Here is their take on Horn loading.....Minimize the use of horn loading. Horn loading increases output volume at the expense of sound quality.How many home stereos and recording studios use folded horns or any kind of horn loaded cone drivers? Why don't home stereo speakers use horn loaded speakers? Like talking through cupped hands for volume. Certain frequencies are louder than others, adding a honky or nasally sound. To correct this, equalization is used to reduce the volume of those frequencies. The bigger, more efficient horns, need more EQ. Cutting the loudest frequencies with EQ partially negates extra gain realized by horn loading and does not thoroughly solve the sound quality problem.
----------Making a excellent sounding system loud, rather than attempt to make a loud system sound good. In order to get horn loaded volumes from a reflex/infinite baffle system, every little bit counts. It is like fine tuning a race car engine. A lot of interrelated factors all sum together to reach the goal of reproducing sound with extreme accuracy at amazing volumes . Minimize facial area. Reducing the baffle size to the absolute minimum keeps the drivers close together within the cabinet and box to box. This increases driver coupling, minimizes phase interference and therefore, increases system efficiency. High Density. More components per box maximizes power handling per cubic foot for better coupling and more headroom. Precise component selection. We use several different manufactures in order to achieve the optimum balance between sound quality, power handling and efficiency. 5 way. Every component is utilized in its optimum operating range, where it sounds best and is most efficient. Matched and balanced power. Amplifier power is accurately matched to the components. Proper system protection. Our systems are protected by precision limiters that allow the cabinets to reach absolute maximum volume and then seamlessly engage to prevent component damage.
----------Smooth coverage of the audience. The Rat Trap 5 Array exhibits extremely well behaved coverage patterns. The small baffle/cabinet size minimizes the array size, reducing phase interference between drivers. The fly array is a spherical segment with variable angles in both the horizontal and vertical axis for smooth, even coverage of the entire audience area. Trapezoidal cabinets allow for minimum spaces between boxes in the fly array. Reducing gaps between cabinets increases coupling efficiency and reduces phase interference. The 18"s are in separate cabinets coupled to the floor, not in the fly array, keeping the system compact, improving sight lines. 4 different Rat Trap configurations: short throw, long throw, flyable subs, and ultra long throws. The Rat array is extremely versatile and can be configured to provide optimum coverage anywhere from clubs and theaters to arenas and stadiums. Their Rat trap Five seems like a real winner , I wish I could hear a pair of them.The Pic is 24 of their Rat Trap Five speakers used at a Pearl Jam concert.

http://www.ratsound.com

Subject: Re: SPL question
Posted by Wayne Parham on Tue, 26 Jun 2001 17:00:17 GMT
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Thanks for the link, James. Can't agree with them about horn loading though. You can always screw up anything, and horns are no exception. But a well built horn provides high output, smooth response, low distortion and controlled directivity. To be honest, the only valid argument I can see against horns is their size. But in a prosound environment, this vanishes. You're dealing with large spaces, so you can make large cabinets. In this case, the size of horns isn't a problem. In fact, the end result is smaller, because a horn produces more sound per cubic foot than a direct radiator does.

Subject: Examples of JBL Professional Installations
Posted by Wayne Parham on Tue, 26 Jun 2001 18:13:45 GMT
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The link below has a partial list of JBL installations. There are various types of systems and venues shown, from theaters and small clubs to concerts and football stadiums.
JBL Installations

Subject: Re: Examples of JBL Professional Installations
Posted by pickle on Tue, 26 Jun 2001 21:08:52 GMT
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I just read the last couple of posts, and I'd have to say the anti-horn rhetoric at Rat Sound looks like sales blather to me. This debate has been long ago solved. Properly designed horns work fine and have distinct advantages.My personal experience came on a small scale some years ago; I had music playing outdoors at a small festival through some older JBL horn loaded cabinets (4560BKA) which are fully horn loaded for the woofer at 200Hz and above.The old literature stated that 4560's were for use in listening distances of 80 feet and beyond. I walked down a street and up a hill where go-kart races were taking place, and was really suprised what kind of presence and volume these two simple cabinets had at about 450-500 feet distance. Much different than a non-horn box at any volume level. I listen to them in my workshop area and the response below 200hz suffers since the horn is only so long.My 4560's never fail at outdoor parties to impress people, particularly when they realize I'm only running a watt or so average much of the time.....Lucking into these cabinets some years ago is what made me a (very)

amateur JBL pro gear fan.Now, give me reasonably near-field listening and I'm plenty happy with a non-horn woofer arrangement. I've hired a guy for years to do a smaller outdoor festival, 200 feet wide, 400 feet deep, 1000-2000 people, and he uses McCauley cabinets. Not as efficient, obviously, but they are fine.Again, however, check out what Turbosound or JBL uses for the long-throw situations.....geez, am I wearing this out, or what?

Subject: Re: Examples of JBL Professional Installations
Posted by Wayne Parham on Tue, 26 Jun 2001 21:55:30 GMT
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I tend to agree with you, they're just putting spin in their sales pitch. Can't see anyone in prosound making a case for direct radiators over horns, not for sound quality or SPL. The only reason I can see using a direct radiator is if a properly sized horn can't be fit into the available space.

Subject: Re: Examples of JBL Professional Installations
Posted by mikebake on Wed, 27 Jun 2001 03:12:43 GMT
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Right-o! So, Wayne, new guy that I am to all this stuff and these forums, what drives you to share all your wisdom so generously with so many different people? I'm sure a lot of people appreciate what you do.If there is a forum for "people who like using good pro audio stuff at home because it is fun and loud and built like a rock", then we're in luck. Otherwise, Mr. Johnson might as well go to the pro audio forum and start pickin' their brains.....Still, as an utter neophyte to these forums et al, I have to say that Pi speakers are interesting to me because they seem to promise what I have come to love about pro audio boxes..... efficiency, dynamic range, high SPL capability, heavy duty drivers. I've always said that I would rather hear a big box loafin' than a small box workin' hard..... think of the irony of those guys who love the really expensive, high tech small speakers, with 5.5-6.5 inch woofs, etc. I understand and appreciate what it is that they like, but keep coming back to "the big sound".

Subject: Driving motivation
Posted by Wayne Parham on Wed, 27 Jun 2001 06:00:33 GMT
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I agree with you. I prefer the effortless dynamic range of a high efficiency speaker, and the low distortion of a driver used at 1/100th the power it was designed to handle.I design loudspeakers because the choices I would make aren't found anywhere else. The components I use are sometimes value-priced, but more often than not are higher quality parts, occasionally price-no-object. I tend to prefer high efficiency speakers with controlled directivity at a fairly wide radiating angle that isn't very tall. Good on-axis response is important, as is a uniform reverberent field. To make this happen, I pay careful attention to driver spacing and crossover topology. I also like the cabinet to be attractive as furniture. Pi Speakers do well at all of these things; It's important to me that these criteria be met.I spend a lot of time perfecting the designs, and even though I do it just for my own use, I find it better not to keep the designs to myself. It would be gross underutilization to spend dozens, sometimes hundreds of hours on a design, and to have the loudspeaker only used by one person or a single family. So by publishing the designs and supporting them here on this forum, they benefit others as well. It is very gratifying to see my loudspeakers proliferated across the globe, enjoyed in homes and small businesses everywhere.

Subject: Flared mids, not trousers please
Posted by Rog on Wed, 27 Jun 2001 22:04:18 GMT
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Another important reason for horn loading (especially in mid top use) is to control dispersion. The old days (1970's) of 50 horn mid and top boxes shooting in all directions is over. Proper control of dispersion has many benefits. The effects of lobing and comb filtering can be radically brought under control and, the sound can be directed where it is needed, at the audience, not at the walls of a venue where reflections will end up energising the room and making for a less intelligible sound.The fact that only the audience is targeted means you need less power than a system that scatters everywhere. A football field stadium with an audience of up to 70,000 people expecting up to 125 dB in most positions can be had from an all horn loaded system using around 40,000 watts. I have worked and mixed on non horn loaded systems in these same venues with systems of over 150,000 watts and not got as high an SPL at distance, and a far less intelligible sound. The 150 Kw system with all its amps takes three 32-ton trucks, 18 crew and 2 days to assemble.

The 40 Kw system will fit in one 32-ton truck, needs only 6 crew and an afternoon to setup. Need I say more.Best wishes,Rog.

Subject: Things and stuff
Posted by Wayne Parham on Wed, 27 Jun 2001 23:15:08 GMT
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Absolutely, agreed 100%.There are several horn flares that are designed specifically for dispersion control. Most designers are more concerned with directional control than they are with acoustic loading purely for efficiency's sake. That is definitely the current trend, the focus of modern loudspeaker design.About loudspeaker arrays, when there are multiple point sources - which is what it takes to fill a 70,000 seat stadium - then directivity control and efficiency are your friends. One helps convert electrical power to acoustic power, and the other helps you put it where you want it without comb filtering and other anomalies.

Subject: Re: Things and stuff
Posted by mikebake on Thu, 28 Jun 2001 19:17:16 GMT
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There are perhaps some more current rigs than these x-arrays, but they seem to hint at what you guys are talking about. I heard them at a LARGE country concert (www.countryconcert.com) and I am NOT a country fan but had a free front row pass.....the system was notable for vocal clarity and great coverage, and was VERY obviously a better performer than previous generations of systems at large outdoor shows. You could tell right off the bat, "now that PA sounds GOOD".....and it wasn't a HUGE stack really, either.....

X array info page

Subject: Re: Things and stuff
Posted by Wayne Parham on Thu, 28 Jun 2001 21:09:13 GMT
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Good stuff, thanks for the link!