Does elevating the L1™ change the line array performance? **L1® Users Forum**

This topic can be found at:
http://bose.infopop.cc/eve/forums/a/tpc/f/3976055944/m/3841041115

L1 Lover **Fri July 01 2011, 05:27 PM**

Does elevating the L1™ change the line array performance?
For when you get back:

http://www.capcapello.com/bose/L1Dispersion.mpg

Cap Capello
Bose L1 Family of Products

L1 Lover **Fri July 01 2011, 05:31 PM**

Hey, Chris. Been a loooonnng time, indeed. Time for a Mountain Beer Night.

For when you get back:

http://www.capcapello.com/bose/L1Dispersion.mp4

Cap Capello
Bose L1 Family of Products

Chris-at-Bose **Fri July 01 2011, 05:44 PM**

Sorry, Cap, I get a "page not found" when I click those links. The directory "bose" seems to exist, since it denies me the right to list its contents.
Chris

Rain Jaudon **Fri July 01 2011, 05:45 PM**

Linky no Worky

L1 Lover **Fri July 01 2011, 07:08 PM**

Perhaps this site does not allow mp4 links.

Let's try this then:

http://www.capcapello.com/bose/dispersionvideo.flv

If this gets blocked, it means there's an administrative block on codes on this site. The files are there and they can be accessed everywhere else but here.

Cap Capello
Bose L1 Family of Products

Chris-at-Bose **Fri July 01 2011, 07:50 PM**

Sorry, still not found.

Chris

L1 Lover **Fri July 01 2011, 08:35 PM**

Poop! Uploading to YouTube.

Cap Capello
Bose L1 Family of Products

ST **Sat July 02 2011, 03:09 AM**

Hi Cap,

Edit: Here is a link to the video (complete with the original narration from Cliff-at-Bose)

A Different Way

Original post continues below

There are no "administrative blocks" on links to mp4, flv or any other files. If a link appears in a post, there is nothing in the forum system that blocks it.

I can't get to your links either and I tried in four different browsers, different computers, different internet connections - direct links, independent of this site. No joy.

> quote:
>
> Originally posted by Cap Capello:
> Perhaps this site does not allow mp4 links.
>
> Let's try this then:
>
> http://www.capcapello.com/bose/dispersionvideo.flv
>
> If this gets blocked, it means there's an administrative block on codes on this site.
> The files are there and they can be accessed everywhere else but here.

This message has been edited. Last edited by: ST, Sat July 02 2011 09:40 AM

Oldghm **Sat July 02 2011, 07:57 AM**

The three links in Cap's last post are working for me this morning.

The video he is linking to at youtube, is a simplistic illustration of the L1 dispersion, which shows no reflection of the soundwave.

O..

L1 Lover **Sat July 02 2011, 09:40 AM**

I am sorry for the links hassle, folks. I have no idea what the issues with my ftp server and site

is. I'll try resetting the permissions later today.

In the meantime, here's the YouTube link:

http://youtu.be/oeE6ppKNZ_w

Thanks for being patient.

Cap Capello
Bose L1 Family of Products

Tom Munch **Sat July 02 2011, 09:59 AM**

The video roughly shows an L1 on a stage which would limit the reflection from the floor from what I understand.

Chris will have a great explanation that I look forward to hearing when the weekend ends.

Oldghm **Sat July 02 2011, 12:14 PM**

At 55 seconds into the video, the L1 slips to the back of the stage and then is joined by others. The lines representing dispersion show no reflection from the confines of the clamshell shaped "cave" stage, or the floor reflection that is the subject of this thread.

I'm hearing no audio explanation with the video so the visual effect is all one gets. A simple illustration of a complex event.

O..

ST **Sat July 02 2011, 12:42 PM**

Hi Everyone,

That single video without narration suffers for a lack of context.

Here is a link to the video (complete with the original narration from Cliff-at-Bose)

A Different Way

This video is number 5 in a series of 6.

You can see the series here: Clifford Henricksen Introduces the L1®

L1 Lover **Sat July 02 2011, 12:58 PM**

ST: Excellent links. Thank you.

Cliff does mention it takes the ceiling out but does not mention the floor, yet the demo does show the elimination of both. I'll make sure to correct my schpeil about the floor not being a concern.

Thank you again.

Cap Capello

Bose L1 Family of Products

Litesnsirens **Sun July 03 2011, 04:01 PM**

Cap thanks fro bringing the thread back to the forefront, as a fairly recent addition to the Bose forum I would have missed this completely and it was a great read.
There has been a lot of back and forth discussion regarding the effect of the floor but if I am reading what Chris has said in a lot of cases the floor really is a non-issue due to the fact that it is hopefully jammed with people who will absorb and or block any advantage the floor could offer, if there is no one at the gig and you have a lot of floor space to help you it probably won't be so necessary anyways because you aren't going to have to get your levels up over non-existent crowd noise.
So as interesting as this thread is in terms of physics and science and design, to me the bottom line seems to be, stage or no stage, point the L1's to the crowd set the levels and play.
That said I am still interested in reading on.

Chris-at-Bose **Thu July 07 2011, 05:54 PM**

Hey Cap,
(and ST, Tom, O', and Litesnsirens, et alia.) I'm back, with sore legs after hiking here. (Warming up exercises for next week in the Alps.)

Let me return to your original question.

> quote:
>
> Having read through this discussion with great interest, why does the posted reflection application data and explanation seem to dramatically contradict the various videos showing how the L1 propagates its sound waves (e.g 90 degrees top and bottom, about 170 degrees left and right)
>
> It was previously understood that the L1 takes the floor composition and ceiling height almost completely out of the acoustical equation.
>
> Would you please provide a layman's answer to a possible inquiry that the words doesn't match the pictures?

I'm sorry if I allowed all the exuberant detail in this thread to obscure the big picture. I'll try to put things back into perspective.

To clarify, the video shows a good portrayal of that "big picture": the animation is the most accurate way we know of to convey how the L1 array really does behave. Any decision you or we make with that animation in mind is almost certain to work out well.

But of course, the animation does not show **everything** that happens--that's why it's a computer graphic of an idea, not a picture of actual sound data. The idea shown is a useful simplification, like a map is a useful simplification of complicated geography. But it's not an inflation or distortion of what happens. It's most of the story, but not the complete story. This thread has focused on adding more detail to the story, but those details only cause small changes to our overall impression.

Let me try to summarize the "big effects" and "small effects" of the L1 array. (I'm referring here to the array behavior only, not to the B1's, which are covered in other threads.)

Big effects:

- The biggest effect is the "layer" shown in the video. Most of what we hear under most circumstances is captured in that animation. The sound is clear and strong in the layer and we do not hear much reverberation from the rest of the room. But if your ears leave the layer, the sound will be very muffled.
- The second big effect is the obstruction of the layer if there are lots of people filling it. This muffles the sound in the back of the audience. The fix is to raise the array so that some of the layer travels over the heads of the front rows and reaches the back.

Small effects:

- Walls near the sides and rear of the L1 will cause reflections that affect the midrange tonal balance to a small degree. It's slightly better to avoid this placement, but sometimes we can't.
- A large solid flat floor will give a nice warm sound by strengthening the mid-bass and lower midrange. This is because the mid-bass is less confined to a layer than the rest of the spectrum is, so it reflects back into the layer and strengthens the mid-bass we hear. If you raise the L1 several feet up or put it on a small high stage, the sound in the audience may lose some of this warmth, but it will still be pleasant.
- A large flat open floor or ground will help the layer to extend much farther than if there were no floor. The practical effect of this is that L1's can play well to audiences that are very far away on a flat surface, if there are not many people obstructing nearby. Raising the speaker onto a bandstand may weaken this effect significantly.

I hope you find this a useful way to organize the main points covered in this thread. And I hope I haven't left anything important out; but if I have, you friends will point it out here and I'll amend this list to try to make it as good as we collectively can.

Cap, does this meet your need for a layman's explanation that harmonizes the video with the new information in this thread? If not, I'll keep trying.

Chris

L1 Lover **Thu July 07 2011, 08:58 PM**

Chris: Yes, it almost does it.

Is it too bold to ask the degree of up and down expansion? It seems as though the left and right is pretty cast in concrete (170 to 185 degrees). How about top and bottom? Anything approximate is good enough.

When performing to larger groups (500+), I require a traditional riser (about 18" - 24" typically.) I do notice the need to pump up the volume more than traditional levels and have always attributed that to the number of bodies, not the elevation nor relationship to the floor.

Cap Capello
Bose L1 Family of Products

Chris-at-Bose **Sat July 09 2011, 02:26 PM**

Hi Cap,
Here ya go. I did a calculation that most speaker engineers could do* and here is a brief summary of the results. They agree with what I hear. Remember that it's only a model; it conveys the concept, but real speakers may not be exactly like this. For example, we could never

set things up perfectly enough to measure 719 feet of layer at 5 kHz from a real speaker. Beyond 100 feet or so, it's hard to hear where the edge of the coverage is. Note that all the angles listed measure from the top edge of the coverage to the bottom (or image below the floor), not from the center to the top.

For a 7 foot tall ideal line source WITH NO FLOOR,

- At 200 Hz, the layer extends 6 feet, then expands at 58°.
- At 500 Hz, the layer extends 18 feet, then expands at 22°.
- At 1000 Hz, the layer extends 36 feet, then expands at 11°.
- At 2000 Hz, the layer extends 72 feet, then expands at 6°.
- At 5000 Hz, the layer extends 180 feet, then expands at 2°.

For a 7 foot tall ideal line source PERPENDICULAR TO A REFLECTING FLOOR,

- At 200 Hz, the layer extends 28 feet, then expands at 28°.
- At 500 Hz, the layer extends 72 feet, then expands at 11°.
- At 1000 Hz, the layer extends 144 feet, then expands at 6°.
- At 2000 Hz, the layer extends 288 feet, then expands at 3°.
- At 5000 Hz, the layer extends 719 feet, then expands at 1°.

You see that the floor narrows the angle by half (both up and down, but it makes the layer extend by a factor of four. This is why the floor helps make the lower midrange and midbass sound warmer if there isn't a lot of obstruction.

Okay, I'm off to a sailboat race in Boston Harbor. Wish me luck. Hope this helps.
Chris

* For the engineers out there, all I did was compute the far field coverage angle vs. frequency of an ideal line source (angle shown above), then I found the distance where two lines spreading at that angle intersect the top and bottom of the near field layer (the distances shown above). I crosschecked this with a very fancy computer model that predicts the full field of an ideal line array and the agreement was good.