

---

Subject: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Mon, 08 Aug 2011 13:52:30 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

hi wayne, could you tell me which is better suited for surround duties?

i really like the footprint of the 1pi for my small room, but how much better is the 2pi with the 10" woofer?

looking at the specs, they have the same sensitivity, watt, and spl. i supposed the 2pi digs a little deeper with the 10" woofer?

can i comfortably crossed the 1pi at 80hz? or do i need to crossed them higher (100hz, 120hz)?

thanks much!

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Mon, 08 Aug 2011 16:34:14 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

has a little more in the ~60Hz range. In most cases, you can consider them to be equivalent when used as surrounds but there are a few situations where I'd probably lean a little more one way or the other.

If the speaker will be placed in a bookshelf that tends to provide too much reinforcement in the speaker is used on top of shelves it usually isn't an issue but I've heard speakers placed in situation, and is easier to fit into the shelves anyway.

On the other hand, if the speaker will be used on stands or otherwise away from boundary which is welcome when used with little boundary reinforcement. I also like this speaker when

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Mon, 08 Aug 2011 16:49:30 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne.

since they will be on stands in my room, i guess the 2pi is the better choice.

a few questions.

1) does the 2pi kit has everything i need (crossovers, drivers, etc.) besides the box?

2) finally, may i have the 2pi plan?

thanks!

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Mon, 08 Aug 2011 19:18:55 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

You've got mail!

and a printed copy of the plans.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Mon, 08 Aug 2011 19:46:06 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

perfect, i'll order the kits today and hopefully start making dust this weekend.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [justphil](#) on Wed, 10 Aug 2011 02:40:59 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Be prepared to be very pleased. =)

Phil

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Wed, 10 Aug 2011 12:52:14 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

hi phil, did you build some? can you post some pics?

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [justphil](#) on Wed, 10 Aug 2011 13:12:19 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

I am using 1 and 2PI for my L/C/R  
<http://audioroundtable.com/forum/index.php?t=msg&th=16373>

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Wed, 10 Aug 2011 14:59:09 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

great build, they sure looks nice, very nice!

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [justphil](#) on Wed, 10 Aug 2011 23:39:08 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

Thanks I am happy with how they look but even happier with how they sound. I feel like I have a real home theatre now.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Tue, 16 Aug 2011 17:32:29 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

wayne,

what's your thought on using non horn/wg surrounds with horn/wg mains?

i kept hearing debates that for best integration (timbre match) with horn driven mains, surrounds should also be horn driven (or coax).

i mean, they're just surrounds right? how much dynamics and directivity do you need from surrounds?

what's your personal take on this? do you use dome tweet as surrounds in your system?

thanks much!

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Tue, 16 Aug 2011 19:52:24 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

the larger uniform-directivity models, but not a directivity match. Surrounds really shouldn't be a directivity match anyway, because the pattern would be too narrow. What we want is ambiance, and a wider pattern. I'm not sure that it needs to be as uniform off-axis either. So we want power response to match the mains, but not directivity.

The traditional orientation for surrounds is positioned at the sides and slightly behind the listeners, pointed straight inwards, towards the listeners. But I've found another setup that works well is to put them a little further behind the listeners and point them at the sidewalls, with angle of incidence that brings the reflected sound back at the listeners from the sides. This gives the same impression of sound coming from the sides, but it gives a better sense of spaciousness.

Surround speaker placement

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Mon, 22 Aug 2011 15:02:31 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne, i ordered the 1pi kits. preferred the small size and hoping room gain will help with low fr extension.

do you recessed your tweeters/mid or surface mount them?

looking at the plan, didn't see any info re: recessed depth so i figured they are surface mounted?

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Mon, 22 Aug 2011 15:15:21 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

I've recessed the drivers in some speakers and I've built others with the drivers mounted on the surface of the baffle. You can do it either way, as long as you do both drivers the same way. In other words, if your route a groove for the tweeter to mount it flush, do the woofer also.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Fri, 26 Aug 2011 17:16:08 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

wayne, as i am getting ready to build the cabs, got a few questions re R13 insulation.

FACED or UNFACED?  
2" or 3" thickness?

how to attached to walls? 3M glue?

thanks

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Fri, 26 Aug 2011 17:40:24 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

All R13 is the same thickness, which is about 3" uncompressed. Remove the vapor barrier and attach it with white glue. Just run a bead back and forth on the inside panel, with the glue bead lines about 2" apart and lay the sheet of insulation on that. Push it in place and let it dry.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Fri, 26 Aug 2011 17:46:25 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne, when you said "white glue", herhaps something like this?

LOCTITE Power Grab 10 Oz. All-Purpose White Construction Adhesive

[http://www.lowes.com/pd\\_185445-69-841982\\_0\\_\\_?productId=3225018&Ntt=white+glue&pl=1&currentURL=%2Fpl\\_\\_0\\_\\_s%3FNtt%3Dwhite%2Bglue&facetInfo=](http://www.lowes.com/pd_185445-69-841982_0__?productId=3225018&Ntt=white+glue&pl=1&currentURL=%2Fpl__0__s%3FNtt%3Dwhite%2Bglue&facetInfo=)

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Fri, 26 Aug 2011 18:29:33 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Use a water soluble wood/paper glue like those from Titebond, Elmers, etc. It can be white glue (like used for paper) or carpeneter's wood glue, which is usually yellow. Either kind of glue is fine.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Sat, 27 Aug 2011 13:26:38 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne,

another question. can i assemble the cab now or do i need to wait for the components?

not sure if the port is installed from inside or outside.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [justphil](#) on Sat, 27 Aug 2011 13:48:25 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

I built mine fully except left the baffle off. Once I got my speakers I marked the spots for holes and used a drill press for the "T"nuts for the woofers. I had my inulation in at that point also. I then fine tuned if you would the cut out for the port and installed the port from the back side of the baffle making sure it was flush with the outside edge of the baffle. When I made my baffles I slightly oversized them in case my boxes were a bit out of square. I then installed the baffles and flush cut them with a router.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Sat, 27 Aug 2011 14:28:31 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks justphil.

i will build the cab and leave the front baffle for later.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Sat, 27 Aug 2011 14:32:22 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

I like to cut the port holes on the baffle so the port tube fits snugly in them. Cut the port to the proper lenth with a table saw and apply a thin film of white glue on the edge to protect it. Put white glue on the baffle edge where the port goes and press it in flush to the baffle, wiping off any excess glue.

I also like to paint the interior of the port. You can do that with an aerosol can before gluing it in or you can use a paintbrush after assembly. If you spray paint the inside of the port, protect the outside where the white glue will be using masking tape. The cardboard adheres best when it isn't covered with paint.

---

---

Subject: Re: 1pi or 2pi for surrounds?

---

Posted by [smokarz](#) on Sat, 27 Aug 2011 14:36:32 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne,

for spray cans, what brand do you recommend? i will also be building a pair of stands for the 1pis and like to paint it black.

thought i might get a few cans to paint both the ports and the stands.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [justphil](#) on Sat, 27 Aug 2011 14:53:00 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

I used Krylon satin black on my ports and stands. Satin is much more forgiving than a gloss IMO.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Sat, 27 Aug 2011 15:27:04 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks, do you also prime the stands before you spray paint? i assume the stands are either plywood or mdf?

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [justphil](#) on Sat, 27 Aug 2011 15:55:02 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

I think its wise to use primer no matter what you are using. It helps to make the paint coats go on more evenly.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Wed, 31 Aug 2011 02:55:07 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

hi wayne, got the 1pi kits today. thank you.

got a few questions.

- 1) what size screws should i use to attach tweeter to baffle?
  - 2) what size is the cut out for the speaker terminals in the back?
-

3) not sure what ports to get. something from parts-express or maybe a lowes/home depot?

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Wed, 31 Aug 2011 03:40:37 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Answers by numbers:

1. Use #6 pan head screws to attach the drivers to the baffle. You can get them at any hardware store, like Lowes, Home Depot or Sutherlands and even some department stores like Target or Walmart. If you can't find them with a black finish, you can paint the heads black with enamel and a small paint brush, like what you might use to paint a model.
  2. Cut a rectangular hole 2-1/8" x 2-7/8" for the connector panel. We put them on the center of the back panel, 3" from the bottom.
  3. The port is 2-1/2" diameter. I remember including the tube you should use, so look for a cardboard tube in the box. It's about 9" long. Cut two 3-1/2" long tubes from this with a table saw and glue them onto the baffle.
- 

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Wed, 31 Aug 2011 13:54:37 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne, i'll look for the tube. i thought i saw it when i unpacked.

is cardboard tube good enough? is it going to last a while in somewhat humid/moist environments?

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Wed, 31 Aug 2011 15:52:10 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

I prefer the thick cardboard tube we use to PVC or even the plastic ones made to be used as speaker ports. The mailer tube we use is very thick, strong enough you could use it as a baseball bat. It's made of the same "stuff" as the cabinet, being a paper product which is essentially a derivative of wood pulp. And it is well damped, making no sound of its own. The only thing a plastic tube has to offer is they are sometimes radiused, but the port airspeed is not a problem in



any models of my speakers, so there's no benefit to be gained by radiusing the ports. For all these reasons, I have always preferred cardboard ports over plastic. Just paint the tube and seal the ends with glue as I described earlier in this thread.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Wed, 31 Aug 2011 17:20:28 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

great to hear.

no need to spend unnecessary cash on PVC or plastic ports.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Tue, 06 Sep 2011 14:05:21 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

assembled the cabs last night, but wasn't sure i needed bracing.

wayne, do you have bracing on the 1pi? back/front and side/side?

thanks

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [justphil](#) on Tue, 06 Sep 2011 14:24:55 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

There is no bracing on the smaller speakers. It is unneeded.  
Phil

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Tue, 06 Sep 2011 15:20:31 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

cool, thanks Phil.

---

---

Subject: Re: 1pi or 2pi for surrounds?

---

Posted by [smokarz](#) on Tue, 06 Sep 2011 17:50:45 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

is lining up the R13 necessary for only the top, back, and side panel nearest port?

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Tue, 06 Sep 2011 20:46:13 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Wed, 07 Sep 2011 01:24:27 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne, so it is a little different than the 4pi.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Wed, 07 Sep 2011 02:42:12 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Yes, that's right.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Thu, 08 Sep 2011 15:10:47 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

hi wayne, you mentioned you'd use laquer to finished your speakers.

what type/brand?

i tried the poly aerosol cans on my speaker stands and i wasn't impress.

thinking of trying lacquer on the 1pi, after i sealed it up with shellac.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Thu, 08 Sep 2011 16:37:55 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Bear in mind, I'm not a cabinetmaker. Understand that first. I've had some cabinetmakers that did excellent work. Don't know what they did, but I do know it's an art and that everyone does it a little differently.

A few years ago, cancer took the cabinetmaker that had been doing my cabinets since the mid 2000s. So I started looking for a new cabinetmaker, and ended up using the same shop that does my CNC cuts for horns. I used to have one shop that did the CNC cuts, and another shop that did assembly and finish work. But now assembly is done at the same shop that does the CNC work. The downside is, they don't do any finish work.

While looking for a shop that would do finishes, I got frustrated and tried it myself. I can do tung oil, basically just laying down a coat and waiting to do it again later. Tung oil is just a waiting game. Poly is easy too, a light coat looks like nothing is on it. A heavier coat looks nice, but the trick is to do a lot of light layers. Lacquer is tricky, because whatever coat you put down lifts off the one before it. There's no chemical change when it dries, all that happens is the solvent evaporates. So when you put on another coat, the solvent makes the earlier coat flow too.

Read up on lacquers. There are a few different types. Epstein recommended nitrocellulose lacquer, and I trust his judgement. That's what set me on this path, to tell the truth. I've used both Deft and Watco Lacquer, and found them to be pretty much the same. Maybe others more experienced will have more input. I got the Watco because I knew it was good, but it's harder to find for me. The Deft lacquer is available everywhere.

I like the gloss brushing lacquer, put it on thick and sand and buff to a sheen. I use a car buffing wheel and an assortment of polishes, going from smooth, to real smooth to mirror. The trick is to get a real thick coat to start with so you can sand it down to a flat surface before polishing. This is the hard part because if you lay it on thick, it shrinks when it dries and forms "dimples", basically depressions in the lacquer that go almost all the way down to the wood. If you try to sand down to the level of the dimples, you'll end up with a thin coat. You can fill the dimples with small drops of lacquer, dripping them from a toothpick. That works best for the largest dimples, and keeps you from sanding all the way down. If you have a spray booth, you could perhaps lay multiple coats and build up the thickness without having the dimple problem. In any case, I think the real trick is the elbow grease - sand flat and then buff to shine.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Thu, 08 Sep 2011 20:06:39 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne, that sounds a bit complicated.

guess i will stick with shellac and a can of poly spray.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Sat, 10 Sep 2011 16:39:40 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

i know wayne loves pictures, so here goes.

cabs routed, trimmed, and sanded. ready for stain.

hopefully they will be ready to make some music in the next couple of days.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Sat, 10 Sep 2011 21:32:50 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

Nice work! They look great!

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Tue, 13 Sep 2011 02:57:49 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

and finally, my finished 1pis.

---

---

Subject: Re: 1pi or 2pi for surrounds?

---

Posted by [smokarz](#) on Tue, 13 Sep 2011 02:58:26 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

back view....

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Tue, 13 Sep 2011 03:01:33 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

haven't listen to these little ones yet. still waiting for the glue on the ports to dry overnight. i'll hook them up tomorrow.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [justphil](#) on Tue, 13 Sep 2011 14:36:50 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Hey those look great! How was it stuffing the insulation through the woofer cut out? Guess I am anal. I measured and cut my insulation then installed it before mounting the front(baffle) to make sure it fit as I wanted.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Tue, 13 Sep 2011 14:57:12 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks, yes i fit the r13 through the woofer cutout.

i am not much of a perfectionist. as long as there's adequate stuffing i think it will work just fine.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Tue, 13 Sep 2011 15:29:59 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

The finish looks great. Is it spray on poly?

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Tue, 13 Sep 2011 15:59:10 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne.

actually i skipped the poly, was a bit lazy, again i am pretty amateur when it comes to this stuff (this is my 3rd project).

i sanded the bb with 220 and 320 grits. applied a coat of clear shellac, sanded 400 grits. applied another coat of amber shellac, sanded 400 grits again. clean with mineral spirits and done.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Tue, 13 Sep 2011 19:15:07 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

Very good, it looks great!

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Wed, 14 Sep 2011 02:10:16 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

plugged them in tonight for a quick listen.

at first, i thought my 4x 15" subs were overpowering them, so i turned down the subs, still lots of bass. i shut down the subs completely, and wow!!! i was surprised, these little 8"s packed some punch. huge mid bass, for their size.

they seemed to lack a bit of dynamics/details, but that's what i expected coming in. i guess i am used to the horns/waveguides.

i'll take some measurements tomorrow to see how the response is in my room, but they sound pretty nice so i expect fr to be decent.

---

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Thu, 15 Sep 2011 02:08:10 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

here's the freq response as measured in REW, 3ft from speakers.

---

i am not quite sure what to make of it below 300hz.

wayne, any comments?

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Thu, 15 Sep 2011 02:17:59 GMT  
[View Forum Message](#) <> [Reply to Message](#)

and here's the graph with both speakers measured at the listening position, 9ft.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Thu, 15 Sep 2011 03:10:30 GMT  
[View Forum Message](#) <> [Reply to Message](#)

flat up top, with gradually reduced bass below a couple hundred Hertz. By 65Hz or so, they're really pretty much done, although in your case, a room mode boosts the output around 40Hz - 50Hz. The point is, the room is what really sets the response below 200Hz.

This illustrates pretty well why I don't use baffle step filters in my crossovers.

The reduced output below 150Hz - 200Hz is caused by the omnidirectional radiation at low frequencies contrasted with the half-space (forward-only) radiation above around 200Hz or so. At higher frequencies, the baffle sets the pattern, directing it forward. Since lower frequencies are omnidirectional, the same amount of power is distributed over a larger area, and the net result is on-axis response drops. The higher frequencies are "focused" into a forward-only direction, concentrating the energy in a smaller area.

This is why some people use baffle step compensation. The idea is to equalize the speaker with a gentle low-pass filter, lowering output above 200Hz to match the on-axis output below 200Hz. Baffle Step  
The problem I have with baffle-step compensation on speakers the size of mine is that the directivity shift happens in the room's modal region. The thing is, directivity ceases to be a function of the loudspeaker below the Schroeder frequency, around 200Hz in most homes. So what we have is a situation where the room's influence makes electrical equalization impossible. You don't get a steady 6dB drop like you would outdoors. Instead, you get a series of peaks and

valleys. If you push that range up using a baffle step circuit, then the peaks and valleys become really pronounced. Essentially, you're throwing more energy into the modes, making them worse.

Whether used as main speakers or as surrounds, I prefer to use multisubs to provide the foundation of deep bass. It has the added benefit of smoothing the room modes too. What we really want is to add more sound sources at low frequency. This gives extension and smoothing, mitigating room modes at the same time.

Room modes, multisubs and flanking subs

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Thu, 15 Sep 2011 12:39:12 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne.

i was a bit suprised as they seem to produce quite a bit of mid bass.

so, what would you reccommend as a good crossovers to the subs? i am thinking 100/120hz?

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Thu, 15 Sep 2011 12:49:23 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Don't crossover to subs - blend them. Let the mains run full range and low-pass the subs. Flanking subs should be run up into the low 100's, more distant subs need to be cutoff lower to prevent localization cues.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Thu, 15 Sep 2011 13:14:00 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

wayne, the one pis will be used as surrounds so subs are far away.

i need to crosss them to subs, but like you said i can't cross too high due to localization. i am thinking 100/120 and just play around with those.

---

---

Subject: Re: 1pi or 2pi for surrounds?

---



Posted by [Wayne Parham](#) on Thu, 15 Sep 2011 15:25:21 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

What I mean is this - Run mains (and surrounds) full range. Flanking subs placed near right/left front mains should be low-passed between 90Hz and 120Hz or so. I prefer a second-order slope for flanking subs, third-order max. Don't use fourth-order if you can help it. The greater the slope, the higher the low-pass cutoff frequency should be. We want a seamless blend. More distant subs should be crossed lower to prevent localization cues, usually around 50Hz or 60Hz works well.

When I talk about flanking subs, I'm always talking about subs that flank the front mains. They smooth the midbass and midrange modes for stereo content. Surrounds generally don't have their own flanking subs. I mean, it wouldn't hurt to have them but I don't see them providing a lot of benefit either. Bass isn't directional, so the subs that are there will provide the foundation. Flanking subs are mostly for modal smoothing and the mere fact that there are so many sound sources in a multichannel system tends to do this anyway.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [smokarz](#) on Thu, 15 Sep 2011 16:32:14 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

ah, i see. but that raises a few concerns.

1) by running mains and surrounds as full range, that would put a lot of strain the amp. it takes power to produce low freq at high volume.

2) we're asking small drivers (such as the 1pis) to produce db at freq that they can't simply handle.

i guess the above concerns are not significant for music, but for movies where there are plenty of bass in the 20hz-100hz region.

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Thu, 15 Sep 2011 17:35:16 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

For home hifi and home theater, I like running the mains and surrounds full range because of the benefits in the modal region. Blending multiple sound sources smoothes the room modes.

If you were running in a prosound environment, it would be a different story. I wouldn't suggest running mains full range. In that application, you always high-pass the mains where systems are

pushed hard, to limit excursion.

Or if you had little bitty mini-monitors using drivers that could easily be overdriven. In that case, you'd want to high-pass them too.

But this just isn't the case for speakers like these used in a home theater. These are efficient speakers designed for high-power use, and you have several of them. The mains carry most of the load, as do the subs. The surrounds don't really do all that much. Even in the occasional full pan to a surround channel, we're still not pushing these too hard. As long as you keep the power below 100 watts, they're fine.

On the other hand, if you have the capability to high-pass at the Helmholtz frequency, that would be a good thing to do. It will limit signals where the woofer is unloaded, and isn't making any sound anyway. But if it isn't possible, don't sweat it. These speakers handle a lot of power, and are efficient enough that they produce a lot of sound. You can easily get over 110dB/M from them, which is plenty for surrounds.

So with all that said, I do not suggest using high-pass - at least not above the Helmholtz frequency - with these speakers. Very little is gained in a home hifi or home theater environment. The benefits of reduced IMD (from high-pass) are far outweighed by the benefits of modal smoothing (by not using high-pass) in this application.

---

Subject: Helmholtz frequency of each model

Posted by [Wayne Parham](#) on Fri, 16 Sep 2011 14:41:18 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

It occurred to me that it might be helpful to list the Helmholtz frequency of each model here for reference. You can high-pass at this frequency to limit excursion where the driver is unloaded. There is very little sound produced below this frequency anyway.

Again, for home hifi or home theater, I do not suggest high-passing the mains above this point. We want to blend the mains and the subs for modal smoothing. But there's no harm high-passing at the Helmholtz frequency because no sound is produced below that. These speakers have pretty stiff suspensions, so low frequencies aren't going to rattle them to death but high-pass at the Helmholtz frequency is a good idea anyway. Not required, but beneficial.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Fri, 16 Sep 2011 23:16:52 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

thanks for posting that wayne.

it's interesting, because after i ran audyssey last night. it set the 1pis at 60hz crossover. exactly as you posted.

while setting my mains (horn/wg) at 90hz. i know my mains go flat down to around 50-60hz when i measured them.

not really sure if i can completely trust audyssey either.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Sat, 17 Sep 2011 00:30:00 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

Good to know the system chose a setting that made sense for the surrounds. I'd run the mains with high-pass at their Helmholtz frequency also, or just run them flat out. If you high-pass the mains, make it pretty low like 30Hz or 40Hz, wherever the Helmholtz frequency is.

The main thing is, we just don't want to rolloff the mains early. We want as many sound sources as possible playing in the room's modal region. Same thing for the surrounds, but with a different goal in mind. We're not looking to them for modal smoothing, since they play such different content. But we do need them to have similar spectral balance, and they need to be able to stand on their own, for the most part. They don't need to be capable of real deep bass - that's covered by the subs, which is non-localizable. But we do need them to run competently down to 60Hz or so.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Sat, 17 Sep 2011 13:45:03 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

thanks wayne.

i like to give what you're saying a try. but i am not quite sure how to implement it with my current setup, without having to get additional devices.

here's my setup.

pre/pro: Integra 80.2  
Amp: Emotiva UPA-7 (mains & surrounds)  
Sub Amp: Behringer EP2500  
Subs: 4x MFW-15 (in sealed boxes)

how would i run mains and surrounds as full (with an HPF such as 40hz for mains and 60hz for surrounds). and run subs with with a LPF such as 90hz.

and again, if i want to incorporate Audyssey, it has its own settings so that could get a bit complicated.

sorry, this is getting a bit off topic but this discussion is peaking my interests.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [Wayne Parham](#) on Sat, 17 Sep 2011 14:00:39 GMT  
[View Forum Message](#) <> [Reply to Message](#)

I'm not familiar with your components, so let me ask a few questions. Does the Integra have a way to select the fronts as "large" or otherwise choose to have them set full range, no high-pass at all? I think that's the only thing we want different from what it is trying to auto-configure. The surrounds are OK to high-pass at 60Hz, and the flanking subs are good for low-pass at 90Hz.

---

Subject: Re: 1pi or 2pi for surrounds?  
Posted by [smokarz](#) on Sat, 17 Sep 2011 14:16:44 GMT  
[View Forum Message](#) <> [Reply to Message](#)

yes it does. however, if i set it to full (large) then all contents of the main channels will go to the mains only, and not the subs. so the subs are not sharing the LFE contents of the mains, unless i cross it over to the subs, which mean having to set mains to small.

i believe that's how Audyssey works?

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [Wayne Parham](#) on Sat, 17 Sep 2011 15:45:16 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

You might consider getting one of these:

Active Sub Crossover Seems cheesy, but it really works great. If you are running a separate sub amp anyway, then this isn't much extra cost at all. And doing the mods is kinda fun too.

Just set the mains as "large" and connect this crossover to a preamp out. For flanking subs, the 90Hz low-pass setting is usually best.

---

---

Subject: Re: 1pi or 2pi for surrounds?

Posted by [jshupe](#) on Thu, 09 Jan 2014 03:21:42 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

That finish is amazing. If you don't mind me asking -- did you use Zinsser brand amber shellac, or another?

---