
Subject: Is mixing 'n matching cabs a bad idea ?
Posted by [pieter](#) on Fri, 13 Jan 2006 10:19:14 GMT

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Hope this is the right forum, I'm looking for some open minded speaker and cab geeks.....I'm looking for a 2nd cab for my bassguitar playing. My first cab is a 1x12 + tweeter. As a whole, that cab is full range. It is 8 ohms.I'm looking for a second 8 ohm cab. Some guys buy (or build) an identical cab, so that they have two 1x12 cabs. The second cab can be without a tweeter. They say: the two cabs must be identical, otherways the lows will never be tight. Other guys like to add a 10". So, they have a 1x12 + 1x10. Or even a 1x12 + a 2x10. Or, they add a different 1x12 (so, they use two different 12" drivers). Usually, no cross overs are used between the cabs, so both cabs run full range. These guys say: the second cab should be different, to compensate for the weak points of the first cab. For instance, if the first cab has a strong bass but shy mids, they like to add a cab with a lean bass and strong mids. My question: who is right? Must the cabs be identical, to prevent "mud", or can the cabs be different, so that they complement each other ? Second (related) question: if one uses different cabs with overlapping frequencies, MUST one use a crossover? Why? What cross over? Thanks in advance, Pieter

Subject: Re: Is mixing 'n matching cabs a bad idea ?
Posted by [Wayne Parham](#) on Fri, 13 Jan 2006 14:51:29 GMT

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Assuming you're planning to use a group of speakers for high-fidelity sound production, you're looking for flat response, low distortion and even and predictable coverage. You have a handful of things to consider. Where groups of speakers are used, you have interaction between them.

combine and act as a single sound source. But as frequency rises, the interaction will become complex, and you will find places in the listening area where dead spots will form. Other places the same frequency will be loud. So you'll find pockets of sound in the listening area. Even straight on-axis (the only place some home hifi owners consider), you'll have complex interactions that develop between sound sources. It all depends on the size and position of the speakers and the crossover and any electronic delays that are used. High fidelity requires flat response, low distortion and as faithful reproduction of the recorded signal as possible. But electronic musical instruments use the loudspeaker as part of the overall sound, and it is voiced to suit the musician. So basically what sounds good to your ears is what you should be using. Rarely do musicians choose a speaker for the same reasons that a home hifi buyer would, or even a sound company doing shows. As a bass player, you might not be as interested in speakers with a neutral presentation as you are with making your own sound. Modeling amps are a little bit of an exception to this rule, but still, as a musician, you're looking for your own unique sound. So if you're not looking to do modeling, you might want to keep an open mind, try a few setups and find what sound suits you best.

Subject: Re: Is mixing 'n matching cabs a bad idea ?

Posted by [pieter](#) on Fri, 13 Jan 2006 15:07:45 GMT

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Wayne, thanks for the thoughtful reply. As always, I'll let my ears decide!

Subject: This is what we did.

Posted by [Shane](#) on Fri, 13 Jan 2006 20:32:17 GMT

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When I was playing gigs, our bass player tried several of the combinations that you talked about and settled on a single 12" and a single 10" miked from his cabinets, then we ran some of the feed from that out from the board to a couple of 18"s. This seemed to sound better to all of us out of all the combinations as far as bass extension and that almighty crisp thump that you're looking for.

Subject: Re: This is what we did.

Posted by [pieter](#) on Sat, 14 Jan 2006 13:13:25 GMT

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Good idea. Been thinking about that. Some miked cabs (12 and 10) sound for the colour, and some bass direct to the board for clean lows. Right? Thanks.

Subject: Re: This is what we did.

Posted by [Shane](#) on Sat, 14 Jan 2006 16:43:02 GMT

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Yeah, we just miked each speaker and ran those signals to the board. Used the 12" for "color" as you say and spit it out of the general PA setup and our own feedback stage monitors and sent the signal from the 10" through the board, many many power amps, and to the 18" prosub cabinets for extreme kick. Worked nice.

Subject: Re: Is mixing 'n matching cabs a bad idea ?

Posted by [jimbop](#) on Sat, 14 Jan 2006 20:00:06 GMT

Try posting your questions here:

<http://www.talkbass.com/forum/forumdisplay.php?f=15>

Subject: Re: Is mixing 'n matching cabs a bad idea ?

Posted by [Paul C.](#) on Sun, 15 Jan 2006 02:41:07 GMT

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(First, about Guitar cabs, then a link to bass cab design.)Guitar cabs vs PA (or home stereo) cabs: Some time ago I received this from my brother, and lifelong sideman, a guitarist himself. He asked me to post this: The basic audiophile rules of speaker design need to be ingored. For guitar cabs, the cabs themselves are part of the sound--they need to be live, not dead, as with audio and PA cabs--so you don't want to stuff the boxes at all. I have some decent, but rather old Epicure stereo speakers and have run my Les Paul through them--Yuck! It is the driest, deadest sound imaginable. You want the sound to be colored by the cabinet because the straight sound is uninteresting. Craig Anderton, John Simonton along with PAiA have a tube pre-amp for guitar called stack-in-a-box (<http://www.paia.com/tubestuf.htm#siab>) with "two switchable filters simulate the timbre of speaker cabinet resonances." You want to minimize bracing, until you get up to 4x12 cabs and then a single front to rear brace is fine. You want limited low end response and so forget porting and you want nothing over about 7.5 k, so forget piezos (or any kind of tweeter) altogether. Anything over 7.5 k you get an unpleasant harshness that even a heavy metal guitarist would want to avoid. There is a good discussion of this at the Celestion site. You want neither ports nor tweeters nor damping material in a guitar amp. Bass guitar, keyboard, other instruments, PA, etc. will have different designs, but these will usually follow the guidelines of standard hi-fi speaker design more closely than guitar cabs. Electric-acoustic guitar speaker design is different still, using more of the upper mid range and less of the lows. DJ cabs will often be a bit heavier in the bass guitar range to pound out the beat for dancing. Just as with other things, "Form follows function." The guitar amp probably does no damping of highs. The reason for this is that guitar amps are designed to run with guitar speaker cabs, which do not reproduce frequencies above about 5 or 6 k. No need to worry about those highs if the speakers are not going to reproduce above 5 or 6 k. If you want the amp/speaker setup to do several things, it might be a good idea to put an L-pad in the crossover and turn the tweeters way down. An on-off toggle to the tweeters would probably work just as well. (Now, on to bass cabs)Go to the link below, read up. Also take a look at this link: <http://sound.westhost.com/instamps.htm>
<http://www.geocities.com/SunsetStrip/Bistro/3491/speaker.html>

Subject: Re: Is mixing 'n matching cabs a bad idea ?

Posted by [Paul C.](#) on Sun, 15 Jan 2006 02:55:56 GMT

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Further, I did some tone analysis of samples of bass guitar sent to me by a fellow here. We found that for all of them, the 2nd harmonic ($f \times 2$) was stronger than the fundamental (f). As far as this bass spkr project <http://www.geocities.com/SunsetStrip/Bistro/3491/speaker.html> the model number he quotes for the 15" woofer is no longer valid. I ran the numbers and in that cab you can also use the Eminence Delta-15, Delta Pro-15, Gamma-15. For the 2x12 cab by the same author <http://www.geocities.com/SunsetStrip/Bistro/3491/speaker2.html> You can use Eminence Delta-12's.

Subject: Re: Is mixing 'n matching cabs a bad idea ?

Posted by [Matts](#) on Sun, 15 Jan 2006 05:10:33 GMT

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I've seen a lot of spectrographs for different instruments, and for most orchestral instruments, the second harmonic is louder than the fundamental. This is especially true for violins. There's often a whole harmonic series in each note on a good violin, and it varies depending on how and where it's bowed.

Subject: Re: Is mixing 'n matching cabs a bad idea ?

Posted by [Paul C.](#) on Mon, 16 Jan 2006 00:06:28 GMT

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Right you are... my own instrument is the saxophone (ALL of them), and without exception, the 2nd harmonic is 3 db - 6 db stronger than the fundamental. The lowest note of the bass saxophone is 52 hz, but my PA spkr's only go down to about 60 hz. That low note comes right on through and sounds fine. The low instruments are heard more by their overtones than the actual fundamental. We need to realize that for electric guitar and bass that the amp and speaker is as much a part of its sound as the instrument itself. Even though the fundamental of the low E string of the bass guitar is 41 hz, having speaker response to 41 hz is simply not necessary. This is not to say that you don't need speakers that go that low... you do. Bass drum, the impact of tympani, and other tones are down in that region. On the other hand, I will often see where a sound engineer will note that the "normal" range of, for example, the tenor saxophone (this does not include players such as Bill Holloman, Kirk Whalum, etc), is from 104 hz (tenor sax's low Bb) to 624 hz (tenor's high F)... and then state that is all the speaker range needed for that instrument. But that is the range of the FUNDAMENTAL. What gives an instrument its identifying tone quality is the number and relative strength of its overtones. The violin, trumpet, sax, oboe, flute all have both odd and even overtones. That is, f (fundamental), $2f$, $3f$, $4f$, etc. This generally adds to be a sawtooth wave. But there are differences in the relative strengths of the overtones. The clarinet family has only odd overtones which add up to an approximation of a square wave. I can generate these waveforms with a synth, toss in some fixed and variable filters, and closely duplicate the tone of these various instruments, but still, it won't sound like the instrument. There are transients, and other things that make up the tone that are less easy to define. It is generally

agreed that a sound requires at least the first 10 overtones to fool the ear into thinking it is hearing a certain instrument. I tend to agree. But I can take that highest sax tone, 624 hz, and filter above 6250 hz, and still, you can hear a difference. As far as a speaker's "sound", the midrange and highs are much more important than the bottom end. We always concentrate on the woofer, and low end, but it is the tweeter and xover that really makes a huge difference in sound reproduction. But regarding this bass guitar speaker... it is not a sound reproducer, it is a sound PRODUCER. It is a part of the instrument. Don't get hung up on exactly how low it goes. If it will get at least down to 55 hz - 60 hz it will do well for bass guitar. For sound reproduction, club speakers, PA at outdoor musical events, etc, we do need to go further down. Bass Guitar is not the lowest we deal with... it is the bass drum, aka "kick drum". This has a lot of energy in the 40 hz-50 hz range. And a good, fast, tight bass speaker is important. Kick drum does not go "Whooooommm, Whooooommm..." (the sound of "4th order" subwoofers, what I call Johnny One Note speakers). The kick drum goes "BAP!!!" It has indefinite pitch, and a strong transient. It has "kick". A speaker that will do this is a little different from a bass guitar speaker. Still, for bass, you need response up to about 4khz. Some styles of bass (like you hear on the tags in Seinfeld) require more highs. Guys that play like that use 4x10 cabs for the quicker transients and more projecting tone. Guys that play walking bass in a 50's Rock and Roll band like a single 15". And some use a 15" with a pair of 10"s.

Subject: Re: Is mixing 'n matching cabs a bad idea ?
Posted by [Matts](#) on Mon, 16 Jan 2006 04:07:34 GMT
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the violin plays down to the G below middle C, but middle C is the lowest primary tone the violin will play. the notes below middle C are ONLY heard through the harmonics, and they sound fine to everyone. What the mind does with sound is amazing!
