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Subject: Visit to Spkrman57's house (pic)  
Posted by [colinhester](#) on Sat, 28 May 2005 03:18:56 GMT  
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Finally got around to posting a picture I took of Ron's "museum" or at least the garage wing. Had a great time as always. As you can see, I picked up the A7 cabs. They are now sitting in MY garage waiting to be finished. I just need to put a couple boards across the horn port and wire everything up. I'll get pics up when this is done.....Colin

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Subject: Porting the A7  
Posted by [wunhuanglo](#) on Sat, 28 May 2005 17:07:07 GMT  
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Hi Colin A couple of years ago I built (and subsequently did everything I could think of to) a pair of 825 cabinets. Realize that this cabinet pre-dated T/S, was essentially never revised with respect to sonic performance from the time of its introduction and was primarily intended to wring the most sound (not necessarily the most accurate bass reproduction) from low powered tube amps. It has very little bass output below 60 Hz in its stock form (using single frequency SPL meter measurements). Many experiments, but without the aid of RTA which I didn't have at the time, indicated that a port height of approximately 3" was optimal with the 515-G. You might do some searching on the Altec board in this regard as others expressed much the same opinion.

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Subject: Re: Porting the A7  
Posted by [colinhester](#) on Sat, 28 May 2005 17:11:17 GMT  
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I've been cruising the Altec boards trying to find all the mods needed to bring these cabs "up to date." You're dead-on with the 3" rec. This seems to be the most preferred port height, giving an area of around 100 inches square. Any other tech tips you have to offer are more than needed.....Colin

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Subject: Re: Porting the A7  
Posted by [Manualblock](#) on Sat, 28 May 2005 18:55:20 GMT  
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He's using the 4168c though; have you investigated that driver in the A7 cabinet at all? I know some A7's came with 416's but the cabs with that woofer I have seen had 811 horns and 802's.

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Subject: Read this, if you haven't yet.  
Posted by [wunhuanglo](#) on Sat, 28 May 2005 21:48:41 GMT  
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Covers the waterfront.  
The Small VOTT

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Subject: Re: Read this, if you haven't yet.  
Posted by [Manualblock](#) on Sat, 28 May 2005 22:17:43 GMT  
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Have you done anything with the 288 drivers? Any listening comparison with the small HF drivers, 806/802? The 515g; many seem to think the Ferrite version sounds better but I cannot get a sidexside in order to judge. Any thoughts?

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Subject: Sorry, no  
Posted by [wunhuanglo](#) on Sun, 29 May 2005 12:01:11 GMT  
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Never had the opportunity to play with the large format drivers - they're just so expensive. But there may be some indication based on my new toys, the JBL 2435s. It seems as true as ever that a big driver loafing beats a smaller driver working every time.

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Subject: Re: Sorry, no  
Posted by [Manualblock](#) on Sun, 29 May 2005 14:03:10 GMT  
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Good way to approach it. One regret I have is not ever hearing the 288/515g/1505. Properly loaded and with the right cross-over. Something to look forward to. There is a pair of A7's by me with 511/515's for \$1k. If I only had the room.

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Subject: 2¢ more  
Posted by [Wayne Parham](#) on Sun, 29 May 2005 16:57:09 GMT  
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Thanks for the link, Charlie. That's an excellent resource, particularly in regards to Altec history and driver specifics. I do want to offer 2¢ worth though. I think some additional comments are in order. For example, the writer indicates that he believes the reflex chamber is "too large" but doesn't specify woofer or tuning frequency. He recommends the 515, but again, doesn't specify tuning. He suggests 12dB/octave crossovers, but would settle for 24dB/octave crossovers instead. These are sort of "seat of the pants" suggestions and I think probably a little more specificity is called for. The various models of Altec woofers have widely varied electro-mechanical parameters. For example, look at the 515E with Vas of 23.5ft<sup>3</sup> compared with the 515-8G with Vas of 12.4ft<sup>3</sup>. The 416 is different too, with fts tuned nearly an octave lower than most 515's, making the 414-8B or 414-8C most like the 515-8LFE. Generally, I'd say that the 515-8G is best used in cabinets from 2.0ft<sup>3</sup> to 8.0ft<sup>3</sup> tuned to 50Hz. The 416-8B and 8C are best in larger boxes, tuned lower. They work best in cabinets from 5.5ft<sup>3</sup> to 18.0ft<sup>3</sup> tuned to 30Hz. You can split the difference and average box size and come up with a 6.0ft<sup>3</sup> to 8.0ft<sup>3</sup> cabinet tuned to 40Hz for an acceptable compromise, but if you're optimizing parameters, that's not what you're looking for. So I don't think that driver substitution without consideration of cabinet tuning makes sense. On the subject of crossovers, I probably would not recommend a symmetrical crossover for a loudspeaker like this. The drivers are very different, and they're placed fairly far apart. It is most likely that an asymmetrical crossover would work best. A single frequency 2nd/2nd crossover might be acceptable, but I seriously doubt it will provide the best performance, whether active or passive. While I would agree that bi-amping is good, I do not agree that passive is necessarily bad. Further, I think the biggest improvement is due to the bandwidth reduction requirements of the amplifiers, not because of improved properties of the crossover and certainly not because of the drivers. To illustrate, consider these two systems: One is a loudspeaker with a passive crossover using premium components and configured precisely for the system, optimized by modeling and fine tuned with actual measurements. Compare that with the same loudspeaker and drivers, but "upgraded" using an active crossover bought off-the-shelf, with crossover points and slope set by guess. I don't say these things because I think active units are inferior - far from it - But I think that an optimized passive unit is very good. I've heard plenty of active setups that weren't right, so in my opinion, that's not the holy grail to strive for. It's a means, not an ends. I think the worst thing about old passive crossovers (and some modern ones) is cheap electrolytic capacitors. Electrolytic capacitors in passive crossovers should be replaced with polypropylenes or premium electrolytics, like Black Gate N-Types. Make sure any coils used are of adequate size that DC resistance is low. Use air core where possible. If a coil with magnetic core is used, find one that doesn't saturate easily. If resistors are used, be sure they are good quality non-inductive parts and upsize the power ratings. You don't want the resistors to get hot, so use large power resistors. Another thing about passive crossovers is conjugates. They aren't optional. If the crossover is higher than first-order, a conjugate network must be included, or response anomalies will result. The most noticeable problem is peaking near the crossover frequency. A damping component is required. Lots of speakers don't use Zobels, and I don't think they are installed in stock Altec speakers. But a passive crossover greater than first-order must have a damper or it sounds bad. There was a figure mentioned in the article for insertion loss of passive crossovers. I think the writer must have just made a guess, but whatever the case, it is wrong. To say that passive crossovers have a 25% insertion loss is just not accurate. As with all things, the performance depends on several factors, configuration, quality and so on. Measure the low bass from a woofer and then put a low DCR coil in series. Measure the low bass again. You will find that the deepest bass is at the same volume level. Do the same thing with a tweeter using a good quality capacitor, measuring the highest frequencies. The 25% figure of insertion loss quoted is,

in a word, wrong. There is more loss from speaker cables, in most cases, especially in installations like theaters with long wire runs. Switch to an electronic crossover if you'd like. But whether active or passive, some modeling is in order to find the best crossover slope and frequency points. Measure the final result to make it right, tailor if necessary. I think crossover optimization has been overlooked for vintage speakers like these for the most part. Wayne

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Subject: And my 2¢ more

Posted by [spkrman57](#) on Sun, 29 May 2005 18:11:30 GMT

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Wayne, Great info, but I have to argue about the stock crossovers not sounding very good due to no Zobel network and using 2nd order crossover topology. What you say would be closer to truth when using solid state amps, or tube amps with higher power. When a stock A7 (416/802/511/N500) is used with a nice little 45 or 2A3 amp, most of the anomalies don't surface. I know it doesn't make sense, but I have found the sound to be better with stock crossover than with tweaked out high tech crossovers. Maybe I just like the mellow/warmish sound that they are so well known for. Now with my JBL 15" (2226) 2-way (Valencia type clone) with Pi speaker crossover for the horn, I will agree it sounds much better, must be something with the 416 drivers that I don't like them w/2nd order crossover and Zobel on them when used with 3rd order Pi crossover on the horn. I don't have a clue why??? Ron

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Subject: Re: And my 2¢ more

Posted by [Wayne Parham](#) on Sun, 29 May 2005 18:48:33 GMT

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Too many variables to know what's up with your particular setup, and that was precisely my point. Different drivers will act differently, both in cabinet tuning and interaction with the horn and crossover. What works with your drivers may or may not work when other models are used. If you're running a second-order on the woofer, the output from the crossover measured across the woofer voice coil probably has a significant peak somewhere near the crossover point. Look at pages 14 and 15 of this crossover lab document to see what I mean. If the driver and horn are falling off about the same place, then crossover peaking may help boost the top end, I suppose. That would make summing through the crossover difficult to predict, so the only way you'd know is to check it and see. This is all very implementation specific, and that was the point I wanted to make.

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Subject: Wow! Makes my wittle head spin!

Posted by [wunhuanglo](#) on Sun, 29 May 2005 20:36:45 GMT

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Like when the mean ol' putty 'tat chases me around the room. In fairness to Dickinson (though I don't feel particularly charitable toward him) he was writing for theater owners and installers to convince them that the old stuff didn't have to be replaced to continue to provide satisfactory service - I don't know if Dickinson has the horsepower or not, but he might have written differently if it was written for speaker designers. Me, I got no horsepower whatsoever. While I'm trying to digest this I want to ask a follow-up question: are these issues addressable by equalization? Not many active XO's (until the digital revolution ) had selectable slopes, etc... Or put another way, is EQ a brute force way to address the kinds of things you're talking about with active analog XO that would be better addressed by the use of digital EQ that can be highly tailored? Hope that makes sense?

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**Subject: One other observation**  
Posted by [wunhuanglo](#) on Sun, 29 May 2005 20:46:56 GMT  
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If I remember right (and I probably don't, knowing me) the 3" port height reflects the -8G in the 828 enclosure which has about 8 ft<sup>3</sup> of reflex volume tuned to approximately 50Hz. I had it worked out in detail once upon a time but I can't seem to find the file right now.

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**Subject: Re: One other observation**  
Posted by [Wayne Parham](#) on Sun, 29 May 2005 22:41:10 GMT  
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I appreciate the link and think it provides a lot of very valuable information. I just thought I'd throw in a few comments that I thought might be helpful too.

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**Subject: Understood - any comment about the EQ question?**  
Posted by [wunhuanglo](#) on Mon, 30 May 2005 12:21:39 GMT  
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Just wondering - ie the issues you talked about, do they equate to simple symmetrical crossovers plus EQ in active systems?  
Original, inelegant question

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Subject: Re: Understood - any comment about the EQ question?

Posted by [Wayne Parham](#) on Mon, 30 May 2005 15:18:06 GMT

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When there is interference between subsystems, you can't EQ that out. When two drivers cancel, the more energy you throw at them, the more there is to cancel. So if a crossover isn't setup properly, no amount of EQ can help. If there is resonant peaking, that can be reduced by EQ. If there is rolled off response because of mechanical mass or inductance, that can be EQ'ed. But if there are ripples in the crossover region, that's not something you can equalize away.

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Subject: Thanks very much! <nt>

Posted by [wunhuanglo](#) on Mon, 30 May 2005 15:39:45 GMT

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