Subject: Kappalite 3015, DE250, QSC 152i waveguide
Posted by dprice on Tue, 12 Oct 2010 17:14:33 GMT
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Wayne,

What attenuation level do you suggest to match the kappalite 3015 to the DE250? 8 db (12/20/0.47 for R1/R2/C1)?

Any other suggestions? I've some spare inductors and caps to experiment on the woofer low pass.

Last but not least, is the 4pi crossover board pricing each or per pair?

Thanks,

Don

Subject: Crossover optimization
Posted by Wayne Parham on Tue, 12 Oct 2010 18:16:31 GMT
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Crossover prices are per board.

The required attenuation will probably be something like 12dB or 14dB. You can easily match

set the position of the forward lobe and vertical nulls. You probably shouldn't assume that the Kappalite 3015 will work as a drop-in replacement for the JBL 2226 or the Omega 15. There are differences that may require crossover changes in the low-pass network. The link below describes the process I use to optimize the crossover for the drivers chosen.
Crossover optimization for DI-matched two-way speakers

Subject: Re: Crossover optimization
Posted by dprice on Tue, 12 Oct 2010 19:30:43 GMT
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Yep, I've read over your crossover design documents. I only wish I had done that before ordering the kappalites a year ago.   So now a year later I have a measuring rig, a box full of x-over components, and just enough knowledge to be dangerous. I'm not going to solder anything until I've tested and measured it. I've worked up and tested a few variations of the eWave x-overs so my next step try the 4pi.

Thanks!

Don

Subject: Re: Crossover optimization
Posted by Wayne Parham on Tue, 12 Oct 2010 19:41:54 GMT
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It's kind of fun, if you have the time.

Setup your measurement rig like I do in the video in the "Crossover Optimization" thread. That will help you choose the right components to set the crossover phase, ultimately setting the position of the forward lobe and vertical nulls.

Subject: Re: Kappalite 3015, DE250, QSC 152i waveguide
Posted by dprice on Thu, 14 Oct 2010 00:52:36 GMT
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First whack. Kappalite 3015, DE250, QSC 152i waveguide, 8 db attenuation.

mic @ 44" on driver axis mid-point

L2 = 2.0
C4 = 20
L3, C5, R3 = NONE

C2 = 6.2 +0.47 = 6.67
C3 = 20
L1 = 1 (0.7 DCR)
R1 = 12
C1 = 0.47
R2 = 20

Looks like 1.5-2.5 on the HF needs some work.

File Attachments

1) response.jpg, downloaded 7506 times

Subject: Crossover configuration

Posted by Wayne Parham on Thu, 14 Oct 2010 03:14:20 GMT
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Any compression driver on a CD horn will be much louder below 4kHz, which is where mass-rolloff starts. Another thing I see pretty often, a common symptom of many conical horns and waveguides, is some quarter-wave peaking down low. This increases amplitude at lower frequencies and tends to further increase the difference of amplitude above and below mass rolloff.

That's what top-octave compensation is for, and you'll be able to manipulate the response curve

work for your application. But the topology most certainly will work, it's a strategy that is applicable to all constant directivity horns using compression drivers.

Your task will be to find the right component values to use. You may want to move the HF and/or LP crossover frequencies a little too, and you may need to play with the number of poles (2nd order, 3rd order) to get the position of the forward lobe where you want it to be. As I mentined earlier, this process is described in the "Crossover Optimation" thread.

The values of R1 and R2 are used to set attenuation below mass rolloff as well as to set the amount of damping for the high-pass filter circuit. This is generally set to provide a shelf response for the first couple of octaves before augmentation begins, countering mass-rolloff. Alternatively, if the horn's second impedance peak is in this area, it may be that more damping is needed to counter this. So optional component Rs can be used to provide additional driver damping, effectively swamping the driver impedance peaks.

The output shunt/load is the complex impedance of the compression driver, whose voice coil inductance provides increasing impedance and forms a natural 6dB/octave filter that conjugates

Rs and C1 are used to tailor the response further, where required.

Shunt resistor Rs can placed across the compression driver for impedance control. If all impedance peaks are below crossover, the Rs shunt is not used but if any are slightly above crossover, then Rs will probably be needed. It is generally sized at 2x voice coil resistance, Re. In your case, I think it is needed because it looks like there is an impedance peak around 2kHz, which is mirrored in the response curve.

Bypass capacitor C1 is often placed across the series attenuator resistor R1 to provide top-octave compensation. This may be needed in cases where driver inductance isn't high enough to fully conjugate mass-rolloff or where Rs is used, swamping it.

Sometimes, horns will need a little more electrical peaking, to prevent the top-octave compensation from forming a diagonal line. Sometimes they'll need more damping, to reduce a

crossover is it allows tailoring of the response curve, setting the amplitude below 4kHz independently of the response above 4kHz, while also providing the right 6dB/octave boost for

top-octave compensation equalization.
Constant directivity, compression drivers and crossovers
DI-matched two-way loudspeakers
Crossover considerations - power handling, frequency, slope, etc.