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Product Review

Vidsonix VCB-100

Reviewed by Kent English and Nelson Pass

Vidsonix Design Works, 28415 Industry Drive, Unit 510, Valencia, CA 91355, 661-775-2760, Fax: 661-775-4967, www.vidsonix.com.

You see them in the catalogs:

"3 way crossover. 8Ω. 800Hz and 4500Hz @ 12dB/octave. 150W RMS. Made of only the highest quality components."

If you have a woofer, midrange, and tweeter already in mind whose manufacturer ratings resemble these specs, you could order this crossover for about $30, wire it up as instructed, and take a listen. Maybe you will be happy with the results, maybe not.

There is no doubt that these crossovers perform as advertised, and if loudspeakers behaved as neutrally as resistors, they would probably be close to perfect. Unfortunately, loudspeakers are not neutral. The input impedance, output amplitude, phase, and distortion will vary with frequency and power.

The result is that while a ready-made crossover will probably work, the chance that it will give you optimal performance is close to zero. There is no way to predict in advance which crossover components will give the best sound.

Most successful loudspeaker designers work with a mix of measurement and listening, and to them it is clear that both are absolutely essential. The product that represents the best mix of objective and subjective evaluation almost always results from much iteration and test. Usually the crossover components end up quite different from "textbook" values.

Designing a crossover involves a lot of clip leads, solder, time, and sweat. If you do this often, you start thinking about some kind of shortcut.

SOLUTIONS

At Pass Labs we designed an electronic crossover that allows rapid measuring and prototyping for active loudspeakers. Each of up to four poles for each filter is individually adjustable from 22Hz to 18kHz, resulting in millions of possibilities. Very nice if you can afford it and have the power amplifier required for each loudspeaker driver. For the average loudspeaker project this is too costly—both for the manufacturer and the do-it-yourselfer.

We've always thought the ideal solution would be some sort of switchbox that allowed standard components to be configured into first-, second-, and perhaps third-order systems for two- and three-way systems. A deluxe version would also allow substitution of nonstandard values and audio "candy" components in place of those already provided by the crossover switchbox.

You'd think such a device would be commonplace, yet it is not. Nelson relates how he used a big box of substitutable caps, coils, and resistors at ESS (remember the Heil transformer?) in the early '70s, but this was built in-house and was not very convenient to use.

Enter Charlie Miltenberger of Vidsonix. Charlie and his company not

PHOTO 1: VCB-100 printed circuit board with rotary switches installed (courtesy of Vidsonix Corp.).

ABOUT THE AUTHORS

Kent English works at Pass Laboratories in charge of purchasing toys and creating trouble. Prior to this, he spent 12 years at the UC Crocker Nuclear Labs running the cyclotron, purchasing toys, and creating trouble.

Nelson Pass plays with the toys purchased by Mr. English and also creates trouble.

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only thought about the practicality of such a tool, but they also produced a mature design and marketed it. I ran into Vidsonix's display at CES and thought, "What a cool product." When I saw the $299 price, I began to wonder how good it could be. Fortunately, Pass Labs has a big toy budget, so I called Charlie and ordered a crossover.

The service was excellent, and Charlie was available by phone or e-mail to answer any questions. True to audiophile tradition, on arrival I promptly unpacked the crossover, lost the instructions, and voided any warranty by disassembling the unit. Within an hour we ordered five more crossovers.

FEATURES

The crossover is very well made. The single circuit board is high-quality glass, and its conductive traces are minimum etch (*Photo 1*). Capacitors appear to be of high quality, inductors are of sufficiently low gauge, and the wirewound sand cast resistors are adequate—all typical of what you see in the majority of upscale commercial crossovers.

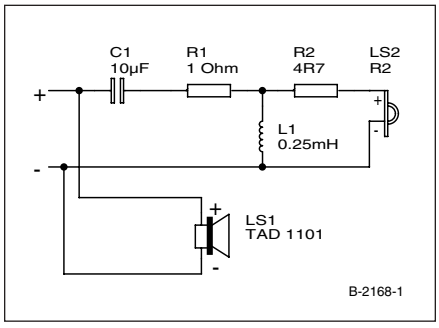

FIGURE 1: Filter configuration.

All the components are secured to the PC board with nylon zip-ties and what appears to be hot glue. The VCB-100 is not intended for permanent installation, nor is it intended to handle continuous power levels above 100W. Looking at the inside, we noted that "value engineering" did not materially affect the quality of parts or build quality (*Photo 2*).

A common concern with multiple inductors in a box is interaction between them. Vidsonix's solution is simple and effective: their inductors are contra wound on ferrite core bobbins to contain the magnetic fields within the inductor. As a result, there is negligible interaction between the coils, and the product is compact and portable.

The VCB-100 is easy to use. Vidsonix's website supplies a thorough and entertaining manual with 16 pages of text and diagrams describing the operation and theory of passive crossover network design in pdf format. They do not go into the mathematics of filter calculations, but provide reference to excellent resources. With the product they include a pocket slide rule that simplifies speaker-design-related calculations.

Input to the VCB-100 is through a pair of color-coded push-button spring terminals which will accept bare wire or pin connectors. Output occurs through up to three pairs of the same type of connectors. They will not accept spade lugs, alligator clips, or banana plugs, one of the very few flaws in the system.

The front panel is silkscreened with a block diagram showing the building blocks of first- and second-order filters for a two-way or three-way system (*Photo 3*). The woofer has an additional switched 47µF to 200µF capacitor in series making its filter a quasi bandpass. At each building block there is a silkscreened legend on the front panel around a 12-position rotary switch allowing selection of up to ten internal components, one external component, and none. The external position allows you to place components of your choice in the circuit. The out position opens for parallel components and shorts series components, bypassing the part.

Midrange and tweeters networks have series attenuation resistors of values up to 15Ω. The outputs feature both straight and reverse polarity by means of a switch, a very thoughtful addition.

We have used the VCB-100 a number of times in projects in the past few months, and it does not disappoint. Typically it pays for itself in one project. During this time we encountered no issues with reliability or sound quality of the parts.

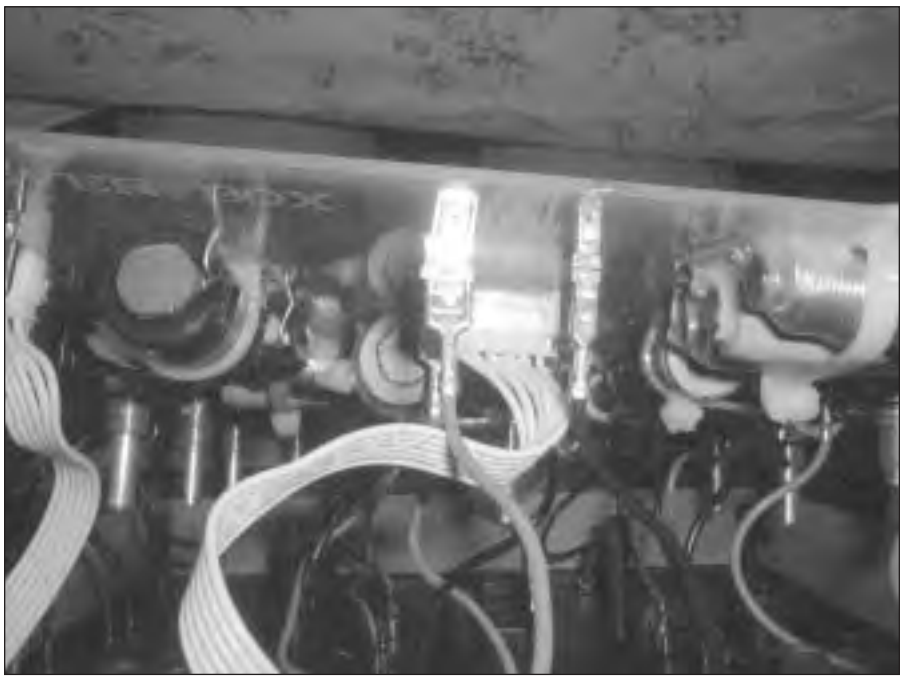

PHOTO 2: Close-up look inside the crossover box.

RECOMMENDATIONS

As with all crossover design work, ancillary equipment is highly recommended, though not strictly demanded. We use MLSSA and real-time analyzers, but anything with a microphone will be a big help.

Two or more VCB-100s may additionally be cascaded to produce networks of increased complexity, either with higher order networks or with four- or five-way systems. Using Vidsonix's crossover box reminds me of "free form" construction toys. Only your imagination and the number of crossovers at your disposal limit you.

The Vidsonix VCB-100 is not a speaker design panacea by itself. We recommend some sort of speaker measurement equipment to accompany and shorten the design process. Designing

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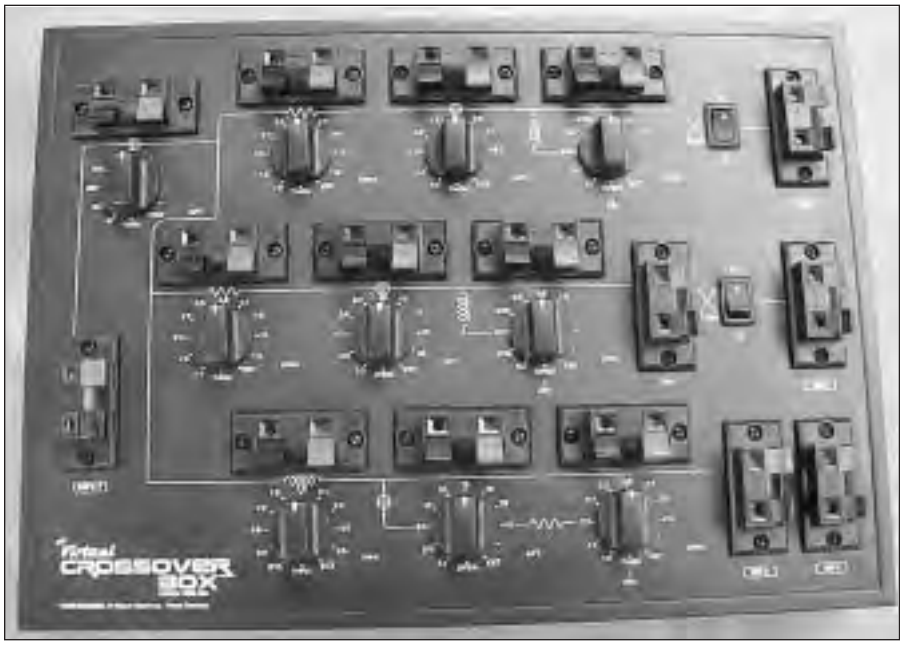

PHOTO 3: VCB-100 front panel (courtesy of Pass Labs).

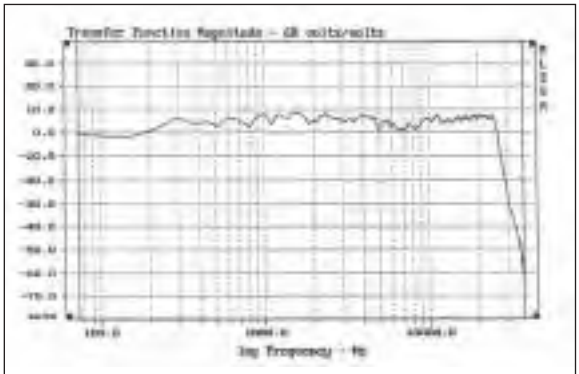

FIGURE 2: MLSSA response curve of TAD 1101H/Raven R2 taken at 1m, ACO Pacific microphone crossover configuration (courtesy Pass Labs).

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a good crossover filter still requires some knowledge, taste, and long hours of tuning and listening. This product can shorten the process dramatically.

We like the VCB-100 a lot, and recommend it highly. It is hard to believe that Vidsonix is making any money on it at this price, so we recommend that you buy one or two quickly before they come to their senses.

NOW FOR SOME FUN

Like most loudspeaker enthusiasts, you probably have a set of drivers put away for a rainy day. Our taste runs towards dynamic and efficient drivers, and in this case we had a pair of TAD (Technical Audio Devices) model 1101Hs, 11″ woofers rated 38–3000Hz with 97dB sensitivity and rated at 500W peaks. They have a particularly smooth character at the top end of their response, which is hard to come by in efficient wide range cones.

We mated them with the Raven R-2s from Orca Engineering. For those of you unfamiliar with the Raven, it is a 4″ ribbon tweeter; one of the best high-frequency drivers currently on the market.

We fit the TAD 1101H into a 3ft^3 reflex enclosure filled with Dacron, and auditioned it with a number of inductors/capacitors to limit its high-end extension. But in the final analysis we judged the natural rolloff of this particular driver the most natural, and so we used no crossover for it at all.

The Raven R-2 has been recommended for frequencies as low as 1800Hz, but with sixth-order slopes. We tried that and about 20 other possibilities, but in the course of a long afternoon decided that our preference was for a two-pole high-pass filter using a 10µF capacitor and .25mH inductor, with 5.7Ω resistance in series with the tweeter (*Fig. 1*).

We documented the system using Doug Rife's MLSSA system and an ACO condenser microphone. The result was a system that measured ±5dB from 70Hz through 20kHz (*Fig. 2*).

The sound was very impressive for such a marginal amount of effort. Part of the credit goes to the high quality of the drivers, but the ease with which the Vidsonix VCB-100 allows quick and reliable adjustment is not to be undervalued. Being able to make an instantaneous switch between crossover component values while you still remember what things sounded like before is extremely helpful. As indicated before, it paid for itself the first time we used it. Maybe you should order a few. ❖

SOURCES

DRA Laboratories
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MLSSA

TAD—Technical Audio Devices
Pioneer Electronics Service Inc.
PO Box 1760
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Model 1101H woofer

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