

## DIY DRIVER MODS



photos by Joe Pittman

A Fostex full range driver modified by Bud Purvine using his "Enhanced Acoustic Boundary Layer" technology (aka EnABL).

### June 9th Meeting Recap by Gyro Gearloose

**O**ur June 9th meeting was an eye opening and hopefully, an ear opening meeting.

First we had Terry Olson, one of Audio's Most Pre-eminent Cheapskates, to provide us with an appealing look at driver backside damping. Terry discussed his favorite damping compounds (Goo, Glue, Potions and Paste) to begin the process of stopping the multiple

reflections and vibrations within a cabinet, from the metalwork and even to the cone of the drivers themselves. Terry went on to show how different materials can effectively drop any reflected energy from becoming audible through the cone. His demonstration featured several effective, inexpensive and somewhat ingenious solutions, displaying Terry's considerable skill with materials and techniques.

A quick list of materials (which can

be found at either Lowe's or Ben Franklin's) and where they're used:

1. Epoxy applied to the junction of the Chassis (Basket) and Magnet structure, followed by a Bondo, or even better, a Pulverized Lime/ Epoxy paste fillet. (Hardware Store 5 minute Epoxy is fine.)
2. Wool Carpet Felt (Lowe's) glued with Aleene's Original Tacky Glue to



Terry Olson shows how to apply damping compounds to the driver.

on a pair of floor standing transmission line speakers with two 6 1/2" woofers per cabinet. Bud pointed out that the EnABL'd drivers had also gone through a considerable modification process since that DIY meeting and that we could expect to hear something none of us had ever heard before.

First however, we needed some context. Bud started his talk by saying that loudspeakers were theoretically perfect. A tremendous amount of work in recent years, had gone into perfecting the materials, use of those materials and test techniques for examining the improvements brought about by a technological revolution. He then related that really the only place left for improvement, was how the drivers actually interacted with the air around them. He did point out that horns, grills and diffraction gratings were some of the methods that had arisen over the years in order to address the issues created when attempting to directly pressurize air from a driver diaphragm. Bud then went on to say that he thought most of these "solutions" were really not solutions at all. Then he showed us four quaint sepia toned movies that dealt with just what mechanisms arise when we attempt to transform the energy in a diaphragm into energetic molecules of adjacent air. It was actually rather shocking to see how non linear the process was, even when the different materials were much closer in mass and energy acceptance than are a cone and adjacent air. Here are those four movie clips on U-tube for those of you, who either missed the meeting, or would want to review them:

- <http://www.youtube.com/watch?v=sY6z2hLgYuY>
- <http://www.youtube.com/watch?v=kWadDtIFPNs>
- <http://www.youtube.com/watch?v=bAmjRK9wBA>
- <http://www.youtube.com/watch?v=3csi-2Hrzgh>

Bud then showed us a picture of an EnABL'd cone, and it turned out to be one of the drivers in the demo. Then he spoke of the difficulties in finding out what differences in performance were caused by eliminating these odd reso-

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the magnet structure. This is followed by a thinner "craft" felt cover applied and secured with Aleene's, over the whole magnet structure as an acoustic "hat".

3. The inside of the basket legs are covered with "craft" felt glued (again with Aleene's) to absorb any reflections from the legs back into the cone.

4. "Duct Seal" (brand name from Ideal) is rolled out and applied to the outside of the Chassis to eliminate any "ringing" and further reflections. (Lowe's Electrical Dept. has this.)

While every one of these steps help to improve the sound of the drivers, it is actually just a preparation for the final transformation....

At this time, Terry introduced Bud Purvine, the inventor (and patent holder) of the EnABL cone modification process, which is used for correcting the behavior of loudspeakers on the front side. Bud had provided an A/B comparison of the EnABL process at our last DIY Meet, two years ago. At the time, there were a lot of competing projects,. While Bud and his two pairs of speakers were demonstrated in a separate room, many of our visitors did go through and listen to his comparison, although it was a "rather casual" demonstration. This definitely was not the case at our June 9th meeting! Bud brought a complete audio system with him, along with a portable computer, projector and a small PA system. The speakers looked to be the ones he had brought to the previous DIY meeting and they were stacked as before. This time, however, they were stacked



nance behaviors. We saw a "blink comparison" of a driver with a pronounced resonance "nose" in a CSD plot. The only observable change was that the "nose" had become much more orderly, with pretty obvious steps to its energy decay, in the blink waterfall comparison after EnABL was applied. He has provided a link to a copy here:

<http://planet10-hifi.com/johnK-test/>

Following this, Bud showed us a brand new technique for displaying the typical test tones, called "Wavelet Analysis". It seemed a bit confusing at first, as it is a very vibrant and colorful (dazzling?) display. However, once we understood that vertical axis was frequency, the lateral axis was time and color was intensity, the wavelet pictures became more informative. What Bud was able to show, were the echo's emitted after the original pulse in an untreated driver compared to the very gradual and smooth emission, without much in the way of any echo's, in an EnABL'd driver. He proceeded to explain that the sounds being displayed would not be comprehensible by humans, being of only 4 ms duration individually. He hastened to point out that a huge number of these 4 ms long sounds would be comprehensible over time and that the resultant change in behavior shown with the wavelet pictures would actually allow us to hear sounds 40 to 50 db farther down than the typical 40 db down from signal level in a typical speaker. This was news to most of us I think, that we were not actually hearing everything that our drivers were providing, due to problems with the transformation of energy in a cone to energy in the air. Here is a link to that blink comparison of the wavelet analysis:

<http://planet10-hifi.com/mige-test/wavelet/index.html>

At this point, Bud again cautioned us about having to relearn how to hear and asked which speaker we would prefer him to start with. We pretty much agreed that we wanted to hear the untreated system first. The sound was startlingly good. The sound was very clear and up front, with excellent transients



Bud Purvine demonstrates an unmodified driver (top) to an EnABL modified driver (below).

and surprisingly good high frequency performance. We listened to most of the first cut from Patricia Barber's SACD Modern Cool. Then Bud switched the speaker selector. I have to admit that I was rather shocked. The sound seemed to recede somehow, to become less obviously available and less immediate. I thought to myself, this is supposed to be an improvement? And then I noticed the stage depth and the lack of any indication that the sound was coming from the speakers.

Bud switched back to the untreated drivers and I was immediately more comfortable. But the sound was, much edgier and yet less "interesting" somehow. Back again and this time I believe

I got it. All of the sound was somehow congruent, or whole. I could no longer seem to parse it into distinct "audio qualities", it had become lucid enough that I felt I could just fall into it, like some pristine mountain lake. The longer I listened, the more I felt that I was hearing ever deeper into the information. When Bud then switched back to the untreated speakers, it was like the whole sound field had collapsed into a seemingly two dimensional, almost cartoon-like approximation of what I had been listening to. To drive the point home, Bud put on some of the Audio Club's orchestral music. The differences became even more apparent, as music

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Patricia Barber SACD Modern Cool

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displayed the density that is a trademark of large scale orchestral music with both sets of speakers, yet through the EnABL treated speakers it lacked the usual congestion that seems to accompany it on most home systems and in-

deed on the untreated speakers as well. Bud even suggested that we should get up and walk around while the music was playing, check out the lack of hot spots from bass notes and the very wide sweet spot of the treated drivers.

We then played a member's SACD of a Bartok violin composition. The perceived differences seemed to have solidified in the audience's understanding and almost no one seemed interested in listening to the untreated speakers. I believe that this is indicative of an appreciation and understanding of the improved sound, almost a "learning experience" when all was said and done.

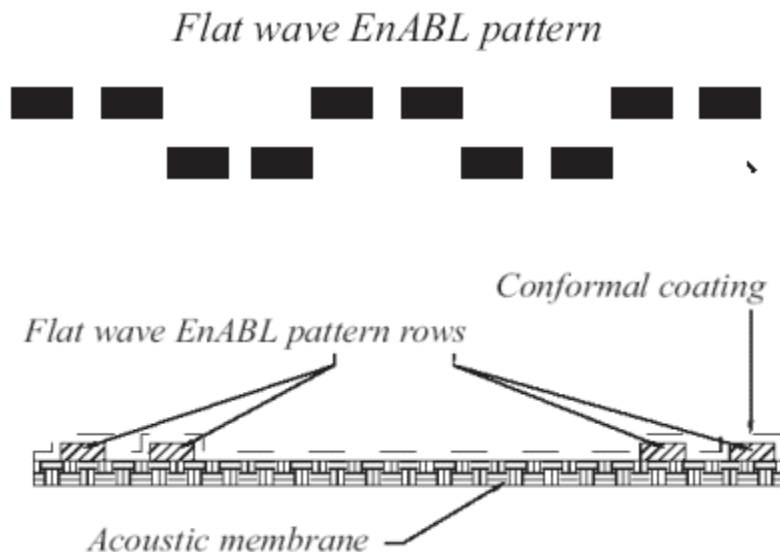
I suppose it's obligatory to mention what was used in the audio chain. Often, when a controversial audio topic is mentioned it becomes a debate between the Golden Ears (and those that aren't), or that someone's system has insufficient ability or resolution to demonstrate an improvement that another person claims to hear.

For Bud's demonstration he used a \$250 Sony SACD player, with a Soundstream commercial DAC for Redbook recordings. This was fed to a Nikko Beta 1 solid state preamp from the 1970's and then to Terry Olson's nice sounding (but inexpensive) Chip Amp driving the main speakers. The subwoofer/bass units each had it's own individual monoblock (plate amp) powering it. Even with this inexpensive equipment, I really couldn't find any fault with the sound...not bad at all!

While the "untreated" drivers were surprisingly good, the EnABL'd drivers seemed to sound less like a system and more like actual music and no Golden Ears or Mega-Buck Super System was necessary this time. By the evening's end, we had to deliberately cut off the music, as almost everyone was still there and we were all talking about what we had heard.

For further information on Bud's EnABL process see:

<http://www.positive-feedback.com/Issue21/standingwaves.htm>



## President's Message by John Stone

On the agenda for this month's meeting is a discussion of the club's equipment, both current and future. The Executive Committee, which includes the club's elected officers, and committee members, has reviewed our current equipment and with your help, would like to proceed with a refresh of some of our components in order to provide a better listening experience for us all. On the table for discussion will be proposals for the following:

- ◆ New digital playback system
- ◆ Speaker driver upgrade
- ◆ Phono cartridge upgrade

But before we proceed, we would like hear your feedback. Details on these proposals will be provided at the July meeting.

After our equipment discussion, we will shift our attention to the audition of a pair of high efficiency speakers. High efficiency speakers are known for their dynamics, speed, and their ability to fully exploit the special sound that only a low power SET amp can provide. High efficiency speakers can also provide the mixed blessing of revealing upstream equipment deficiencies, and noise, including home wiring issues (hummm).

This month's meeting will spotlight the Cain & Cain Abbey. The Abbey's are a ported, full-range, single-driver, design known for their neutrality, clarity, and musicality. They also employ some drop-dead gorgeous cabinet work. Their presentation of simple acoustic music is outstanding, but can they keep up with complex orchestral works and hard rock? Come to the meeting and find out. And as an added bonus, we'll be throwing two or three different tube amps into the mix just for fun.

## Road Trip to Mike Lavigne's August 11th

Following is some preliminary info from Mike:

*As far as 'showcasing'; I will have a new turntable, the Wave Kinetics NVS.*

<http://wavekinetics.com/nvs.html>

*I'll have the Talea 2 tonearm mounted on the NVS, last year i had the Talea 1.*

<http://www.durand-tonearms.com/Specifications/specifications.html>

*I will have whatever new tapes the Tape Project has shipped by then, as well as a number of 'un-obtainium' tapes we'll play with a few very interesting tapes with 'familiar' titles I'll play and compare to the digital, original pressing and 45 rpm pressing.*

*Since last August's meeting, I have*

*made further changes in the room and system performance including installation of the Equi=Tech 10Kw wall panel with balanced isolation transformer, removal of the majority of the ceiling bass trapping, and addition of more diffusion panels in the ceiling.*

*It's possible, but unlikely, that I'll have my new custom built 3-4 watt 2A3 tube based, mercury vapor tube rectified, monoblocks by then built by my friend Scott Schaefer.*

<http://www.found-music.com/45.html>

*I'll likely have a Playback Designs MPD-3 dac (or MPS-3 CD-Player), which will play back 24/384khz PCM or 6.1Mhz DSD thru USB from either a Mac or PC. we will play some of those files off my server. Jonathan Tinn from*

*Playback Designs will likely be there to answer questions.*

<http://www.playbackdesigns.com/mpd3.html>

*Hopefully it will be a fun time.*

*Best,  
Mike*

Mike has requested that anyone planning to attend please RSVP the club so that he and the Executive Committee will know who will be there so we can plan for the food, drink, chairs, etc. We will send out a meeting notice, prior to the meeting, and please respond to that.

## DIY Meet August 27th

The club will host our biennial DIY Meet (every two years, alternating with the Puget Sound Speaker contest) at the church, on Saturday, August 27th. We will have more details in the next Audioletter. Everyone is welcome and there is no fee.

## Local Music



Tuesday July 12th 7.30 pm, we are excited to be featuring The Susan Pascal Quartet with Bill Anschell on the Steinway, Chuck Deardorf on Bass and Matt Jorgenson on Drums. This is a Quartet of brilliant musicians led by Susan on Vibes. Listen to her MP3 samples on her website [www.susanpascal.com](http://www.susanpascal.com).

Venue for our concerts Sherman Clay 1000 Bellevue Way. Tickets \$13 Adults, Students 18 and under \$8.

Bring your CD's for exchange, or buy from the box @\$5.

**Enquiries: 425-828-9104 or 425-454-0633.**

Tickets: \$13 Adults, Students 18 and under \$8.

Everyone is welcome. Please join us.

Best regards,

Cooksie Kramer

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See [www.eastsidejazzclub.com](http://www.eastsidejazzclub.com)



## M•A Recordings now Available in Hi-Rez DVD-ROM

by Joe Pittman

Music With A Mind Of Its Own



I was excited to read in 6moons.com that M•A Recordings is now releasing some of their recordings in the original master recording format (like Reference Recordings HRx). Due to the immense file size, it is a real pain to download such files through the internet, so M•A Recordings has decided to sell the albums on DVD-ROM and send them through the mail. When you receive the disc, you simply copy the WAV files to

your server. This is a good approach as far as I'm concerned. The label minimizes theft of their intellectual property, and you have a hard copy for archival purposes.

One of my favorite albums "La Segunda" available from M•A Recordings. This is the second album from the group Será una Noche. This album is now available in the original 24bit/176.4 kHz resolution and sells for

\$40.00 (Catalog Number: M062A-HR). This is a very realistic recording of early 20th century tango music from Argentina which many will enjoy. The original recording was made in a church using only two custom made omni-directional microphones, Crystal Cable and a portable digital recorder.



## Coming Attractions

### July 14 PNWAS Meeting

The Equipment Committee report and High Efficiency Loudspeakers.

### August 11 PNWAS Meeting

Road Trip to Mike Lavigne's.

### August 27 DIY MEET

Our biennial DIY Meet on Saturday. Everyone is welcome!

### September 8 PNWAS Meeting

Music only. Everybody bring their own music and say a few words about it.

### October 13 PNWAS Meeting

TBD



### October 14-16 RMAF 2011

Hi Ho Hi Ho it's off to Denver we go!

### November 10 PNWAS Meeting

It's dark outside, time for Jerry's annual HD Concert Video Fest.

### December 15 PNWAS Meeting

Annual Christmas music competition.

## Classified Ads

RPG Skyline diffuser approx 2'x2'x7", 20 each available in excellent condition (no damage) and are sold in pairs only. Retail price is \$419 per pair plus \$40 shipping, street prices as low as \$350/pair including shipping. My sell price is \$150 per pair, but you must pick-up at my place. I don't want to ship them. If you are interested in all 20, total price would be \$1200. Contact Joe Pittman, 206-878-3833 or email [joe@kosmic.us](mailto:joe@kosmic.us)



### Visitors Welcome!

Meetings are held on the second Thursday of every month at 7:30pm at 4545 Island Crest Way, Mercer Island, WA 98040.

### PNWAS Mission Statement

- ◆ To bring people with a common interest in music reproduced at its best, for their mutual edification and pleasure.
- ◆ To facilitate the exchange and dissemination of accurate data concerning audio equipment and musical recordings.
- ◆ To promote, sponsor, and cultivate the highest quality reproduction of music in the home.
- ◆ To encourage maintenance of high standards in the performance, recording and transmission of music.

### PNWAS Objectives

1. Provide a forum for meeting other audiophiles and exchanging information on musical recordings and audio equipment.
2. Demonstrate and compare equipment and recordings.
3. Give members opportunities to become familiar with the techniques of audio manufacturing, testing, repair, recording, broadcasting, etc.
4. Explore related avenues as the member-

ship deems appropriate.

### Club Website

[www.audiosociety.org](http://www.audiosociety.org)

### E-mail

[info@audiosociety.org](mailto:info@audiosociety.org)

### US Mail

Pacific Northwest Audio Society, PO Box 435, Mercer Island, WA 98040

### Annual Dues

\$60 due each January. New members pay a prorated \$5 per month for remainder of year.

### Executive Committee

President: John Stone

[John.W.Stone4@boeing.com](mailto:John.W.Stone4@boeing.com)

Vice-President: Darin Forkenbrock

[forkenbrock@gmail.com](mailto:forkenbrock@gmail.com)

Secretary/Treasurer: Willy Chang

[chang98@comcast.net](mailto:chang98@comcast.net)

Editor: Joe Pittman

[joe@kosmic.us](mailto:joe@kosmic.us)

### Committee Chairs

Equipment: Terry Olson

[CornyGuy@aol.com](mailto:CornyGuy@aol.com)

Music: Vacant– Volunteers?

Refreshment: Vacant– Volunteers?

### Editorial

Editorial submissions are welcome.

Content must be audio-related or of general interest to the club in plain text or Word document format without automation (macros and scripts). We reserve the right to edit for style, content, and length.

Editorial Deadline: two weeks before meeting date.

Publishing any editorial material is contingent upon the approval of the Executive Committee.

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Bringing Audio Enthusiasts Together Since 1978

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