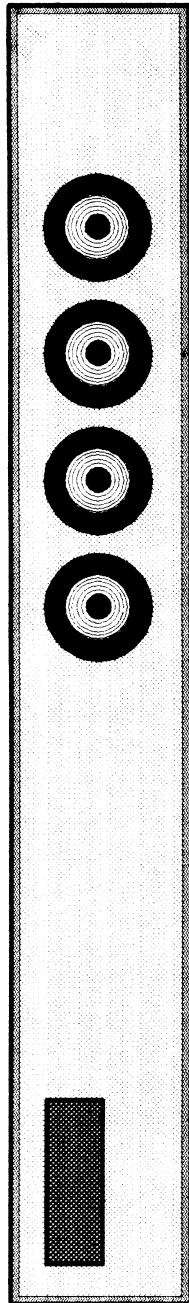


s k a e p s w e n

both ways



a high tech loudspeaker designed for single ended amplifiers- 103 dB@1W- 8 Ohms  
no horns - no crossovers - cork/foil/carbon foam composite cabinet - \$t.b.a.  
ELECTRONIC TONALITIES - 1127 nw brite star lane, poulsbo, wa 98370-8241 (360) 697-1936

## The continuing saga of a search for a loudspeaker for single ended amps

By Dan Schmale,  
ELECTRONIC TONALITIES

Without a doubt, the single most revolutionary change to take place in audio in this decade is the widening acceptance of single ended topology as the most musically accurate form of signal amplification.

The term revolutionary may be a bit mild. So much audio angst has been stirred up by the idea of going 'backwards' to 1920's technology that a new audio subculture has grown up around the concept, sharing information when the mainstream audio press turned a deaf ear to the topic.

By now of course, the mainstream is listening. We see reviews of single ended amps in recent issues of every large publication. And the reviewers aren't saying "Gee this is cute" anymore. They're calling some examples of this 'old fashioned' technology the best there is.

Part of what makes the best of these single ended amps sound so good is the high tech materials employed in their construction. From high tech capacitors made from polypropylene and oil to tantalum film resistors and, at the extreme, pure silver transformer windings, new technology abounds in Single Ended design.

A logical development would be someone producing comparably up to date loudspeakers of high efficiency, by which one could fully appreciate the exceptional clarity and detail of the Single Ended.

Up to now little new technology has been employed in the type of loudspeakers used by most SE enthusiasts.

Favored types vary with the weather, but often include vintage coaxial drivers such as the Altec 604, theater behemoths like the Altec 'Voice of the Theatre' A7, or exquisite sounding but inefficient QUAD electrostatics.

As the do it yourself speaker types moved into the SE realm, large horn systems of high efficiency, high complexity (often bi- or tri- amped), and high price became the system of choice.

Few audiophiles are satisfied with the sound they get from their favorite standby loudspeaker when hooking up a SE amp. But for the majority of enthusiasts dying to jump into SE, designing a whole new, complicated speaker system is not feasible, nor is paying current collector prices for the latest vintage fantasy, which usually comes sans cabinet.

What's a mother to do?

If you read the last couple issues of any audio magazine, the void needing to be filled is screaming out at you.

So I did something about it.

I made Both Ways.

Both Ways, in its current guise, is a two way tower loudspeaker of high efficiency. It uses four aluminum cone 5.25" full range drivers in a vertical array, a 10" paper cone band pass subwoofer, no power draining, phase shifting cross-overs, and an extremeley high tech carbon foam/foil/cork composite cabinet. It weighs about 25 pounds and has a frequency response of about 55-15,500Hz, similar to many horn/coax and discrete two way horn systems. But they don't honk or boom.

The original iteration of this speaker was code named One Way. It consisted of the four full range 5.25" drivers in a vented tower enclosure. Unfortunately, I didn't like the slight megaphone effect I perceived in voices due to a hump in the 120-250Hz range. This was caused by a slightly less than optimal alignment which was necessary to smooth bass response in the 50-80Hz region. The

bass, although present down to 35Hz, was rolled off from about 110 Hz down.

At this point I decided to relax my demand for a full range speaker. I first calculated that the bass hump would be smoothed if the full range drivers were placed in a closed box with fairly dense stuffing.

I then dug into my speaker catalogs and found a woofer that might generate an efficiency near that of the full range drivers and an upper -3dB point near 110 Hz when placed in a symetrically loaded bandpass enclosure. Miraculously, the closed box and bandpass enclosure volumes added up to the same volume as that of the existing full range vented tower.

The modification to two way fit very neatly, greatly strengthening the super-lightweight cabinet in the process.

I tamed "cone cry" resonances in the metal drivers with small strips of paper tape attached to the cone. This removes a 'zing' that became apparent on loud horn and string passages, a problem encountered with many metal dome and horn tweeters.

The cabinet material is 1-5/8" thick carbon filled polyisocyanurate foam with foil on both sides. The material is easy to cut, and assembly is "stitch and glue", similar to high tech boat building methods. Cabinets will be covered with cork sheets to add some damping.

I won't try to kid you into thinking that these speakers are as efficient as my JBL LE175 horns, but I measure around 83-86 dB at 1 watt at 2.8 meters. This is with the four 5.25" drivers padded down about 3dB to better match the single subwoofer driver. Near field (1M) sensitivity readings are a bit difficult due to the long vertical array. The drivers are rated 91 dB each (103dB total), so maybe they are 100dB. I do know that my 1W SE amp will play them loud at a listening position of 8 ft. from the speakers, and my 15W Triophoni will drive you out of the room. Come hear 'em.

