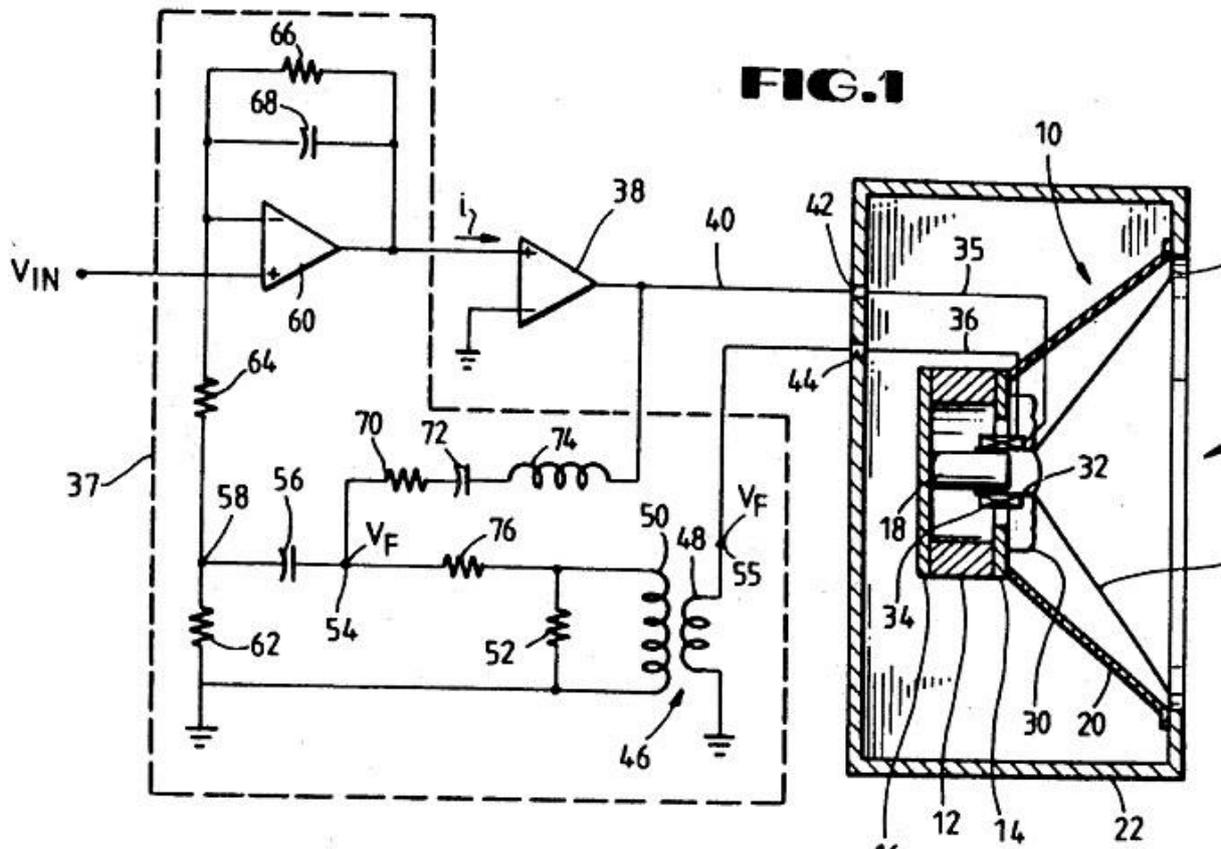


ERATH LWE Speakers



Not too many speaker systems are truly unique. Just look at the long listing of all the manufacturers models that are on this review site may of them VERY SIMILAR IN DESIGN (and sound). This listing doesn't even scratch the surface of what has been made since the 1940's. A geophysical engineer in Houston named Louis W. Erath started a tiny speaker system manufacturing firm in Houston back in 1966.

The first product was a bookshelf system (Model 1). The basic designer choices then were identical to what we have now; acoustic suspension, reflex, or horn for the low frequencies. As we all now know, the acoustic suspension systems are inefficient but with extended low end, the bass reflex types are more efficient with potentially better transient response but somewhat less ultra low-end response in smaller boxes, and the horns; the most efficient with the (potentially) best transient response and dynamic range of all but with the largest size and (usually) higher cost. Of course there are many more subtle considerations within these choices, but these are the basic limitations design engineers have to work with. Surely there must be some of you out there that have dreamed of using classic high efficiency large magnet woofers (normally reserved for bigger reflex designs) in a relatively small bookshelf size box and "somehow" designing the box or the venting or "tuning" or "something" so that you could get the extended low end response of an acoustic suspension system but at a much high efficiency and not give up the transient response. Erath's experience in designing transducers and amplifiers for geophysical survey trucks with their ultra low frequency 'ground-thumper' systems designed to shake the earth enough to get recordable reflections back from subterranean strata was a really unique background for branching off into loudspeaker system design and production. He invented and developed a design that did cheat and win handsomely. As a point of reference you can see what happens if you mount old classic high efficiency large magnet drivers in a WAY-TOO-SMALL-BOX by referring to the Klipsch model H (Heresy). I know there are some of you out there who love this little box system, but frankly the extreme low end down at 32.7 HZ (LOW C on pipe organ) just isn't there at all. All that the model H produces is harmonics of the fundamental frequencies down in this range. I know it may be wonderful through the rest of the range but lets face it the extreme bottom end is crucial for the emotional impact that we all strive for in a system.

The LWE approach to get around this is based on "negative feedback control". OK...in a typical amplifier (still mostly vacuum tube back in those days, of course) you have anywhere from 25-80% of the output of an amplifier used in reverse phase as negative "feed back" used to minimize distortion and in some gross cases to make an amplifier stable (not oscillate or 'howl!'). The out-of -phase signal is fed from the output of an amplifier's final output stage back to the input of that same stage. Actually

the same concept can be used in any intermediate stage of amplification as well. The concept works well in lowering distortion and, in some cases, increasing stability. An interesting effect which is actually pretty well known by most design engineers is that if you reduce the negative feedback of an amplifier's output stage by 3 db the output will increase by 3 db. If there were no other limitations present (power supply current ratings, etc., the amplifier would double in power. Of course there might be a slight increase in distortion in some designs depending on the original design goals and criteria in design. Erath's principle was to reduce the negative feedback selectively only at the extreme low frequencies where a big 15" woofer in a really tiny box was just not capable of responding fully. This would leave the feedback and distortion character untouched at frequencies up above 50-70 HZ.

Erath's feedback control unit was in the speaker box next to the crossover network. That meant that the negative feedback lines from the amp's output stage had to be "clipped" and extended out to the speaker using some 6 conductor shielded Belden cable. 2 conductors for the regular voice coil audio and 4 conductors for feedback 2 incoming and 2 outgoing. This was all connected using 6 conductor TRW/Cinch-Jones "Jones Plugs" which made it all very convenient and inexpensive.

As you can imagine, some amplifiers didn't seem to care about having 15 or so db of their negative feedback 'whacked away' at the low frequencies and some didn't like it all. In Erath's defense, I will say that he recognized and dealt with this problem in a very honorable way and would openly tell prospective buyers which amplifiers worked well and which ones didn't. Erath made a 60 watt per channel solid state amp that nestled right into a cavity that was in the rear of the model 1 box and was isolated from the inside of the box. This one was so stable it would allow far more feedback to be removed than most commercially available amplifiers at the time.

So....how well did they work? In a word, extremely well. The model 1 had a rather high efficiency (96 db at 1 w/1meter) 15" woofer with a fairly stiff suspension with a 5" high efficiency cone mid range (both made by Chicago Telephone Supply or 'CTS'), and an Electro-Voice T-35 for high output 'top-end' response. This was the same tweeter used in the 104 db at 1 meter/1 watt K-horn at the time so you can see that the tweeter would have to have about 6-8 db of padding to match this combo). This was sort of like a "hot-rod and scaled up model 'H' if you will. I even know of a few cases where Klipsch K-1000 horns were tried with various drivers and padded 6-8 db instead of the 5" paper cone radiator, but I always thought that the CTS 15 incher didn't have enough output in the 600-1KHZ range to use this mid range because a slight 'trough' in the response curve would develop in this range. (a larger 600 HZ mid range horn would not fit inside the box though)

A very neutral sounding speaker system with very little or virtually no coloration or "sound character" of its own. It played loud like the Klipsch model H, but the extreme low-end down in the mid 20HZ region would rattle the fluorescent light fixtures in the old sound room at (now long-gone) Audio Center sound room, (where I worked part-time during my years at U of H), in Houston where I first heard these. It compared so well to really large high efficiency classical systems that we ended up placing them on top of the Klipschorns and of course comparing them frequently on a variety of program material.

There was an old Bel Canto 1/4 track Ramsey Lewis open reel jazz piano/bass/drums tape ('Stretching Out') that was utterly amazing on the LWE 1's. It was typical of back room jazz recordings of black musicians in the late 50's and early 60's with a not really too wonderful and slightly out of tune upright piano and a small sounding studio with no frills/no EMT reverb, just dry, clean sound. The sudden impact from the drums and cymbals and L.D. Young with his very long fingers whacking mightily on the big double bass (and on cello on one cut) always was a crowd pleaser in the old sound room. In background you could actually hear and feel Ramsey stomping his foot on the old studio wooden floor as he powerfully ripped through some extremely complex and satisfying passages. Wow! It was very hard to listen to the model 1's on this stuff without smiling.

If you ever happen onto a pair of these or any of the other smaller or larger LWE speaker systems made later on, I would highly recommend that you buy the amplifier (with modifications intact) along with the speaker system. These don't sound too wonderful at all played from an 'un-modified amp'. The best of all would be to find some model 1's with the Erath amplifier in the back of one of the two speakers. I wouldn't pay a lot for these if you see them at a garage or estate sale. The manufacturer has been gone for many years and there are no parts or replacements specifically available. On the plus side, chances are, if you find these, the woofer suspension edges will probably be in perfect condition as Erath never used polyurethane grey foam edges because he knew that it was an unstable material. We had discussed this material (it then used only on British Wharfedale speakers) when I worked for Louis part-time in the late evenings and weekends at the LWE plant in Houston on Rampart street. I wired rotary switches, and assembled systems and control networks. It was a wonderful and enlightening experience.

David L. Winebrenner

From : <http://www.lweloudspeakers.com/index.html>



I am Louis W. Erath, the inventor of the legendary LWE loudspeakers first developed in the 1960's. The picture above shows some of the loudspeakers that I have recently designed and built. The horn loudspeaker on the left uses a 2X4 multi-cellular theater horn (no longer being built) and an Altec 25 watt compression driver with a sensitivity of 110db. The bass speaker is a 15" heavy duty woofer built to my specifications by Eminence. The tweeter is a JBL ring tweeter. The bass speaker is driven by a 120 watt Mosfet amplifier with an LWE feedback network controlling the low end (20hz to 700hz). The Altec horn and JBL speakers are driven by a 15X15 watt amplifier fed from a 12db/oct electronic crossover network. The sound is magnificent! I can custom build one or two more pair of these speakers with available parts.



The loudspeaker in the center is the LWE 2A1. It uses the same woofer described above with a heavy-duty 8" mid-range Eminence loudspeaker and a Bohlender-Graebender NEO8PRD transducer for the upper mid-range and high-end (2khz to 20khz). The picture on page 2 shows this arrangement with the grill removed. The crossover networks are highly customized for the best sound. The cabinet is shown on a stand which is removable if desired. This particular cabinet is made of solid red oak. This particular pair of speakers uses an Eminence Magnum 15LF driver which is available from parts supply houses. The LWE amplifier shown on top of the loudspeaker cabinet is a 120 watt Mosfet amplifier with an LWE feedback network and some of the crossover components built-in. The crossover network is designed to use a single amplifier full-range. The results are comparable to the horn system. The planar loudspeaker out-performs any dome tweeter in the reproduction of transients except for the horn system described above. The loudspeaker on the right of the picture uses the same components as the LWE 2A1, mounted in a pedestal box with the woofer in the black box on the floor behind it.



Louis W Erath - In Memoriam

Louis W. Erath has just died Re: Louis W. Erath (June 10, 1917 - September 8, 2008)
His daughter Annie asked to have this message forwarded to his friends and industry.
My father, Louis Erath, went to be with the Lord at 9:52 this evening. He was surrounded by his wife of 68 years, two of his daughters and his granddaughter.
He passed in the same home in which he was born some 91 years and three months ago in South Louisiana.

Although he was ill this past year, he remained a creative and productive man all of his life.

Although many here on Audiogon will not remember him, his speaker designs were well ahead of the times. A link below to his website: www.lweloudspeakers

A truly gifted man that never lost the desire or passion that this hobby brings to all of us.
He will be sorely missed.