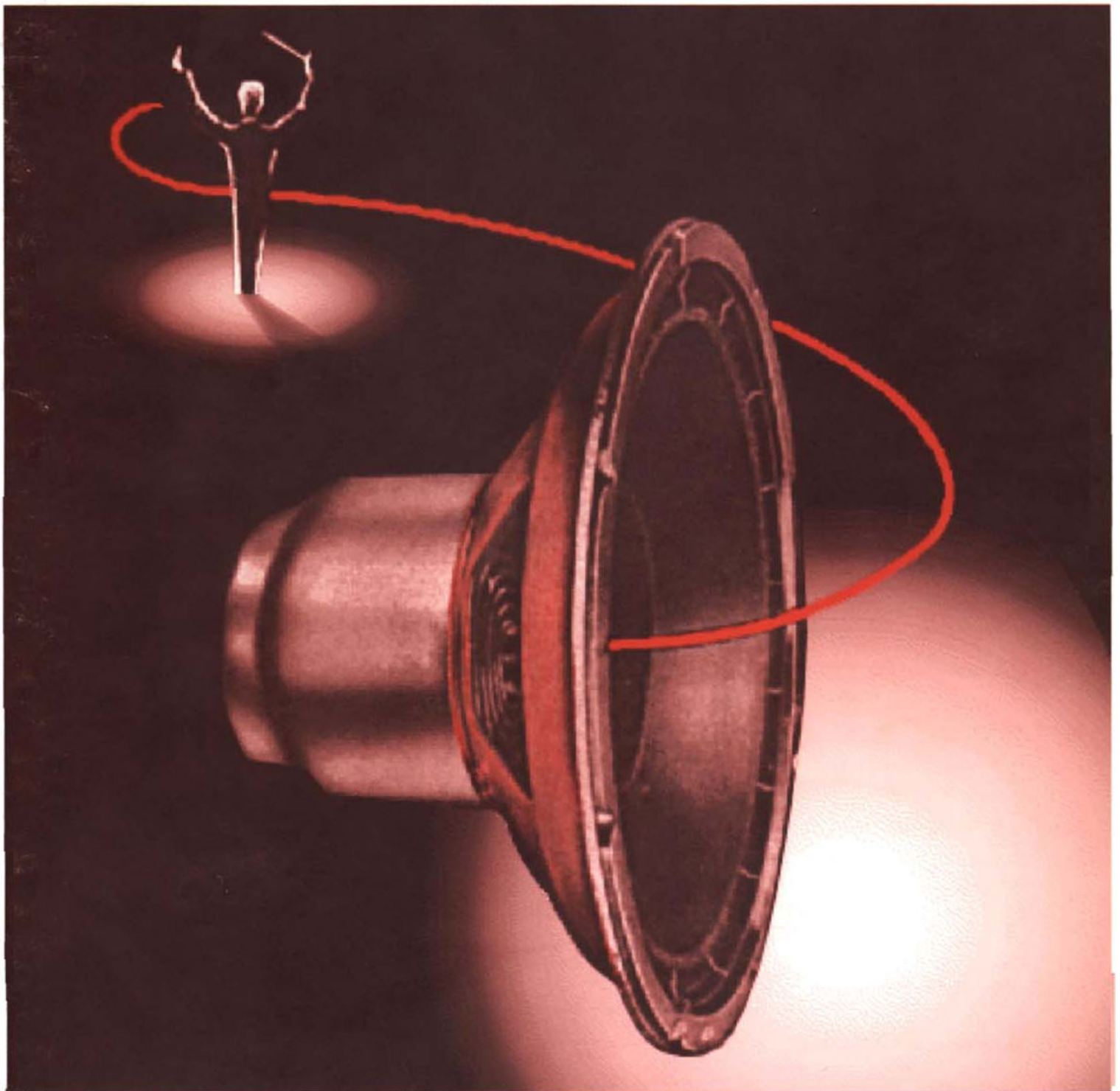


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Issue 9

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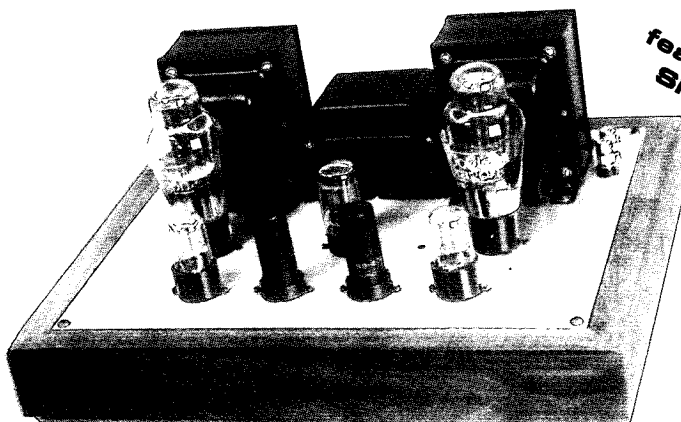
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... and MUCH MORE !!!

The Grand Illusion

Way out on the paranoid fringes of contemporary American thought, miles beyond even the craziest audiophiles, there are some scared technology worshippers who believe that an international elite bad guy network of power-hungry conspirators has been conducting massively funded, wildly successful experiments with holographic imaging technology. The claim is that gizmos exist for creating 100% real-looking motion pictures in 3-D space, 4-D if you count time as a D. These infernal devices can materialize illusions that can pass through our senses as reality itself! *Yikes!*

The above-mentioned whistle blowers are trying to warn us that fancy hologram projectors will play a central role in the ultimate power grab in all of human history, planned to go down at the turn of the millennium. Over the generations, many predictions were made about the year 2001, the dawn of the new Aquarian age, and in five years we'll be there. The sinister plot intends to take full advantage of all the symbolic weight we loaded onto the coming of the 21st C as a weapon against the mind.

Imagine the effects of a totally realistic 3-D holographic motion picture show of the Virgin Mary descending from the heavens directly above the field where the final match for the World Cup is being watched by billions on TV worldwide. Then a fleet of UFOs flying in formation is spotted by 100,000 tourists over the Washington Monument fifteen minutes before the 4th of July fireworks display. Elvis comes out of hiding. Bill Clinton starts blowing tenor like Eric Dolphy. Vinny Gallo delivers the Altec 755A + cabinets he borrowed from me "for a few days" back in 1991. The impossibilities are endless. After a few weeks of this kind of virtual unreality programming, our belief systems will be mush. World societies will be flung into chaos and the tyrannical monsters with the projectors will rise to global domination—or so the story goes.

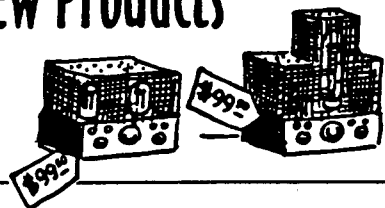
What I want to know is what do these schemers plan to use for speakers for this megascam? I don't think they can pull off a convincing soundtrack with Bose PA speakers and Crown amplifiers. Or Avalons and Krells, or anything else that I ever laid ears on. Would you believe an end of time show that rolls off at 50 Hz with a bit of squawk in the midrange like an Altec A7? How about an array of eighteen Wilson X-1 Grand Slams powered by Cary 805s suspended between two black helicopters? Nah, those diabolical New World Order cats better have something really hot up their sleeves, not just run-of-the-mill Recommended Components List junk.

Although audio brand names bow to the concept of the grand illusion we're all seeking to achieve, not even the best audio gear can truly deceive us into thinking we are *there*. None of this stuff sounds absolutely real, really. Even at its best, it's just a tease. Reading all the self-congratulatory prose in the glossy mags studded with loaded terms that don't permit argument or room for improvement — *accurate, neutral, transparent* — one would think that designers own the mysteries of music. Properly taken, terms like "accurate" don't permit gradations. Either it is or it isn't, so far it mostly isn't. Real sound is pure romance at our current level of practical know-how.

I'm not saying that it doesn't pay to set high goals, only that it is not productive to convince yourself that you're sitting under a tree drinking iced wine in the promised land when you're really still out in the desert sucking on a dry rock. Religious metaphors are appropriate here, because like other esoteric cults the High-End offers a menu of unquestioned articles of faith, arcane language, idol worship, crusades that nobody else cares about, anointed priests, and obscure ritualistic practices. Consequently, for average music lovers, a typical high-end product review is about as readable and relevant as Hare Krishna mythological epics. Indeed, attitudes and preferences which come naturally to music lovers enjoying their music are often loudly condemned as heresies of a high order among the Holy Knights of the Soundstage. No wonder so many non-audiophile music players and listeners think high-end audio geeks are just a bunch of clueless arrogant jerks with extra-loud stereos.

Maybe over the course of the next millennium, we will learn how to fashion audio systems that we won't have to study hi-fi magazines to appreciate, sound that everybody will instantly grasp, reproduction that imperceptibly dissolves into reality itself not some fake-science definition of "transparency". If the Aquarian Age brings us 100% real audio, *then* start worrying about the creeps with the hologram projectors. For now, let's just work on creating systems that can at least play music.

New Products



Raven Ribbon Tweeters

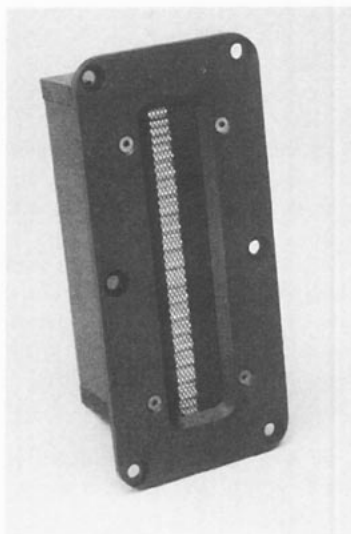
Recognizing the swelling popular demand for top quality high sensitivity drive units, ORCA is now importing the French-made Raven ribbon tweeters. Historically, ribbon drivers have been good-sounding but inefficient devices. Today's new neodymium alloy magnet materials permit ribbon transducers with very high sensitivity ratings. The spec sheet on the Ravens warns that if the magnets of two drivers are allowed to come into contact, it may be impossible to separate them! Furthermore, the super-light ribbon element of the Raven is pure conductive material (no metalized film) with 1/30th the mass of a dome tweeter!

R1 specifications

Sensitivity	95 dB/W/m
Frequency Response	2kHz - 45kHz
Impedance	6 and 12 ohm taps
Size	92mm H x 80mm W
Weight	1.14kg
	Price \$196

R2 specifications

Sensitivity	98 dB/W/m
Frequency Response	2kHz - 46kHz
Impedance	6 and 12 ohm taps
Size	92mm H X 80mm W
Weight	2.22kg
	Price \$340



Raven R2 Tweeter

ORCA
1531 Lookout Drive
Agoura, CA 91301
818-707-1629 voice
818-991-3072 fax

Marchand Vacuum Tube Crossover

The XM26 Tube Electronic Crossover is a fourth-order constant voltage crossover design that provides both low-pass and high-pass outputs. The slope of each output is 24 dB/octave. Because of the fourth-order design, the high-pass and low-pass outputs of the crossover are always in phase with each other.

The XM26 uses four 12AX7 tubes in each of the two channels. It has a solid state regulated power supply for both plate and filament voltages. The power supply employs automatic sequencing to protect the tubes from turn-on surges and to insure long tube life.

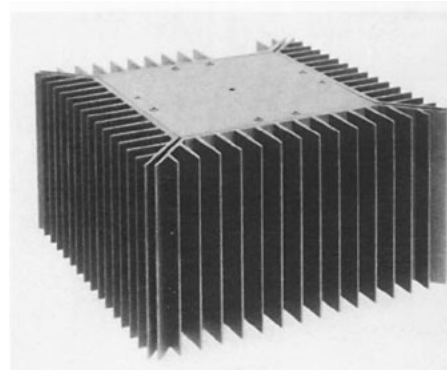
The crossover frequency of the XM26 can be set by replacing frequency modules. Crossover frequencies are available from 20 Hz to 5000 Hz. Normal slope is 24/dB constant voltage (Linkwitz-Riley) but modules for first, second, and third order slopes are also available.

The front panel features four calibrated level controls, one for each low pass and high pass and for left and right channels. A summing switch allows the low pass channels to be summed for use with a common subwoofer. A two year warranty covers everything, including the tubes. Priced at \$599 each. Frequency modules (4 required) are \$9.95 each.

Marchand Electronics
PO Box 473
Webster, NY 14580
716-872-1960 voice
716-872-1960 fax
phil@marchandelec.com
<http://www.marchandelec.com>

New Developments in Silicon SE

Following on the heels of the well-received Aleph 0 power amplifier, Pass Laboratories — undisputed leader in transistor SE amplifier design — recently announced October availability of the new 30 watt Aleph 3 stereo unit. With the Aleph 3, Pass hopes to make high quality single-ended transistor performance accessible to the average mainstream enthusiast. Suggested retail price is \$2000.



Pass Aleph 3

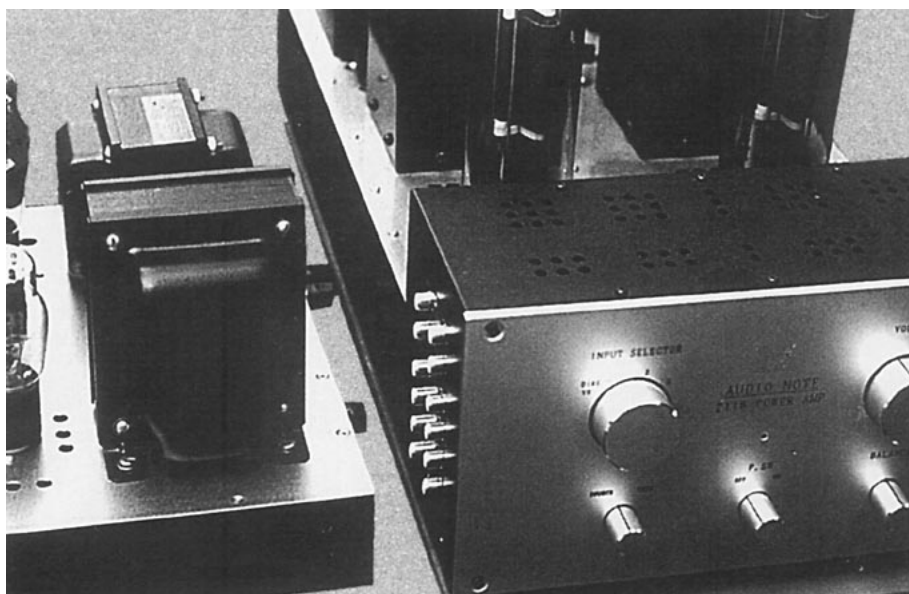
Each channel features two gain stages: one input mosfet and an output stage consisting of paralleled power mosfets with a current source. Along with some of his comrades in the tube camp, designer Nelson Pass advocates simplicity and purity in the gain path as a recipe for pure sound. Like all Class A amplifiers, the Aleph 3 runs a bit on the warm side. Generous heatsinking is provided to prevent injury and assure long component life.

Pass Laboratories
21555 Limestone Way
Foresthill, CA 95631
916-367-3690 voice
916-367-2193 fax

Yo, where's the WE 300Bs???

Westrex Corporation recently announced that the long-awaited release of the new production Western Electric 300B is currently scheduled for mid-November. The proposed breakup of AT&T into three separate companies will have only a minor impact on the tube and production work at Western Electric Kansas City Works is making significant progress, according to Charles Whitener at Westrex.

The reintroduced WE 300B will be manufactured in the USA at AT&T facilities using original tooling and the same materials, engineering specifications, and manufacturing processes of the original units. Existing WECO warehouse stock of NOS materials, such as a proprietary filament alloy derived from a 1963 melt, will be utilized in the new tubes. Bernard Magers, senior engineer of vacuum tube production at WE since the 1950s, provided valuable input on the tube and he will remain with the project to help ensure the highest quality standards.



Build the "Baby Ongaku" by Frank Reps

No relation, actually . . .

What nerve! Another ignorant scribbler writing in an audiophile magazine, rhapsodizing about a tiny 2A3 single ended amplifier and having the audacity to compare it to the peerless Audio Note *Ongaku*.

You may be tempted to think the author of this article never even saw a real live *Ongaku* let alone listened to one. Well, dear reader if you think that, you are wrong. Not only have I seen the *Ongaku*, the real thing is sitting on an equipment stand in my living room atop a Mark Levinson 31 CD transport, a 30.5 Mark Levinson D/A converter as well as a twelve year old McIntosh FM tuner (still as good as ever).

This seventy-pound boat anchor of a 211 amp is flanked by a pair of 1981 manufacture British Lowther TP1 enclosures furnished with the latest PM2 "A" Hi Ferric drivers.

This system is heaven to me and to most people who experience it. The *Ongaku* has no subtlety — it is colorless to a fault and it reproduces *all* of whatever signal is on the software. The Lowthers do have a very slight coloration, but to anyone who has spent any time listening to their crystal clear presentation, other speaker systems sound either like synthetic sound boxes or speakers with heavy blankets draped over their grille cloths.

I called my amp project "Baby Ongaku" because the end product is very close to the real thing sonically. The Baby is physically smaller, and much lower in power — 3 watts for the 2A3 vs. 15+ W for the 211-based *Ongaku*. This project puts the lie to the idea that one must spend \$50,000++ to obtain sound quality on the level of the purportedly best amplifier in the world. If you use high efficiency Lowther speakers, this three watt amp will produce three times the power needed for a moderate-sized listening room.

Details and nuances of the music are reproduced to an incredibly realistic level by the "Baby". I think it's because of the silver Magnequest transformers. All of the top level Kondo-designed Audio Note amplifiers use pure silver transformers, so I don't think the similarity in performance is accidental.

Oxygen free copper wire has about 94% of the conductivity of pure silver and one would think that a six percent difference could be compensated for in some way by the transformer designer. The cost differential is astronomical and what is six percent anyway? I have no physics class explanations of why silver sounds as it does but I do know from experience that well-made silver transformers provide a more transparent presentation and seem to pass on more of the detail contained in the program material than copper wired ones.

This is the "silver sound". The "Baby" has that sound. I have quite a bit of listening experience with the Audio Note *Neiro Silver* (silver caps) as well as the Audio Note Limited Edition *Kageki* (a *Neiro* with silver output transformers). All of these are great amplifiers. The *Kageki* is probably the best Audio Note of Japan product ever, even better than the *Ongaku* if you can live with seven watts output. There is definitely a silver sound and some of the best amplifiers I know of have it.

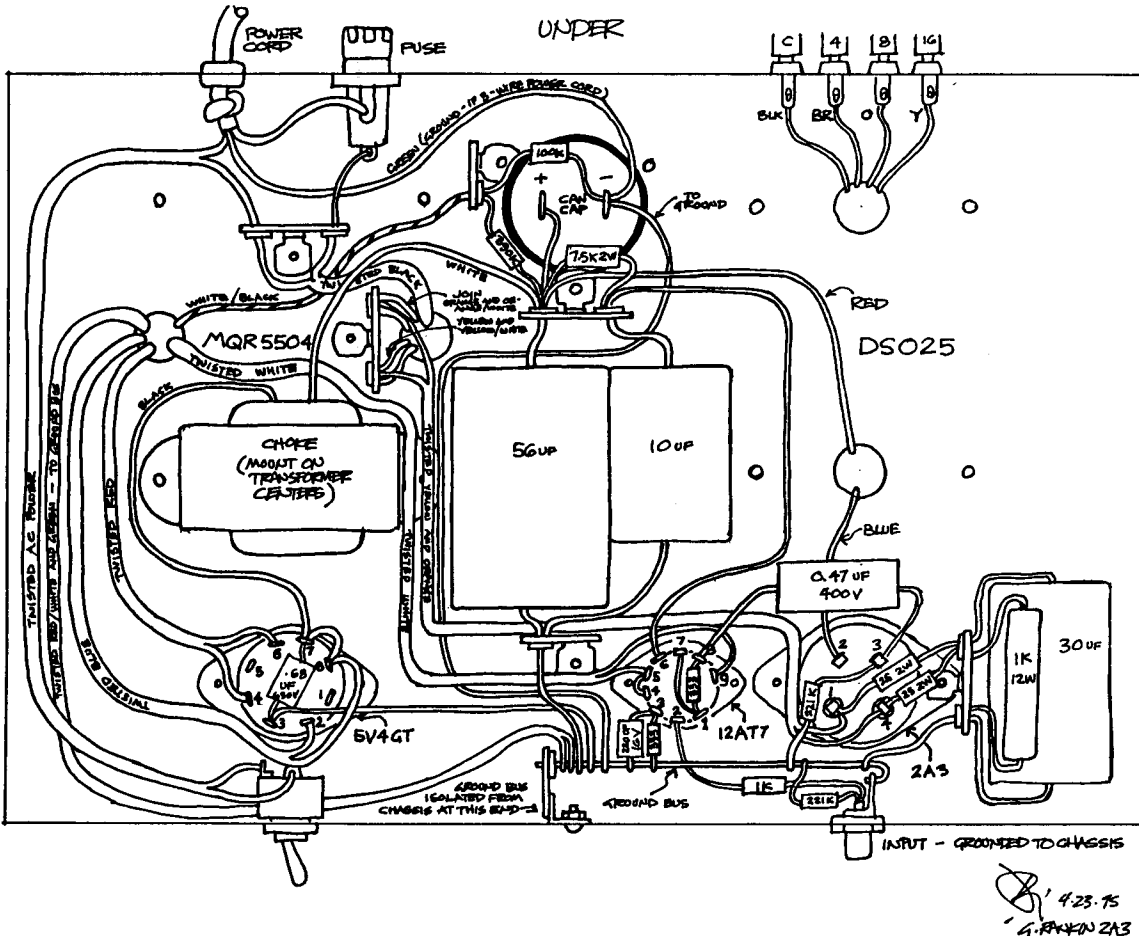
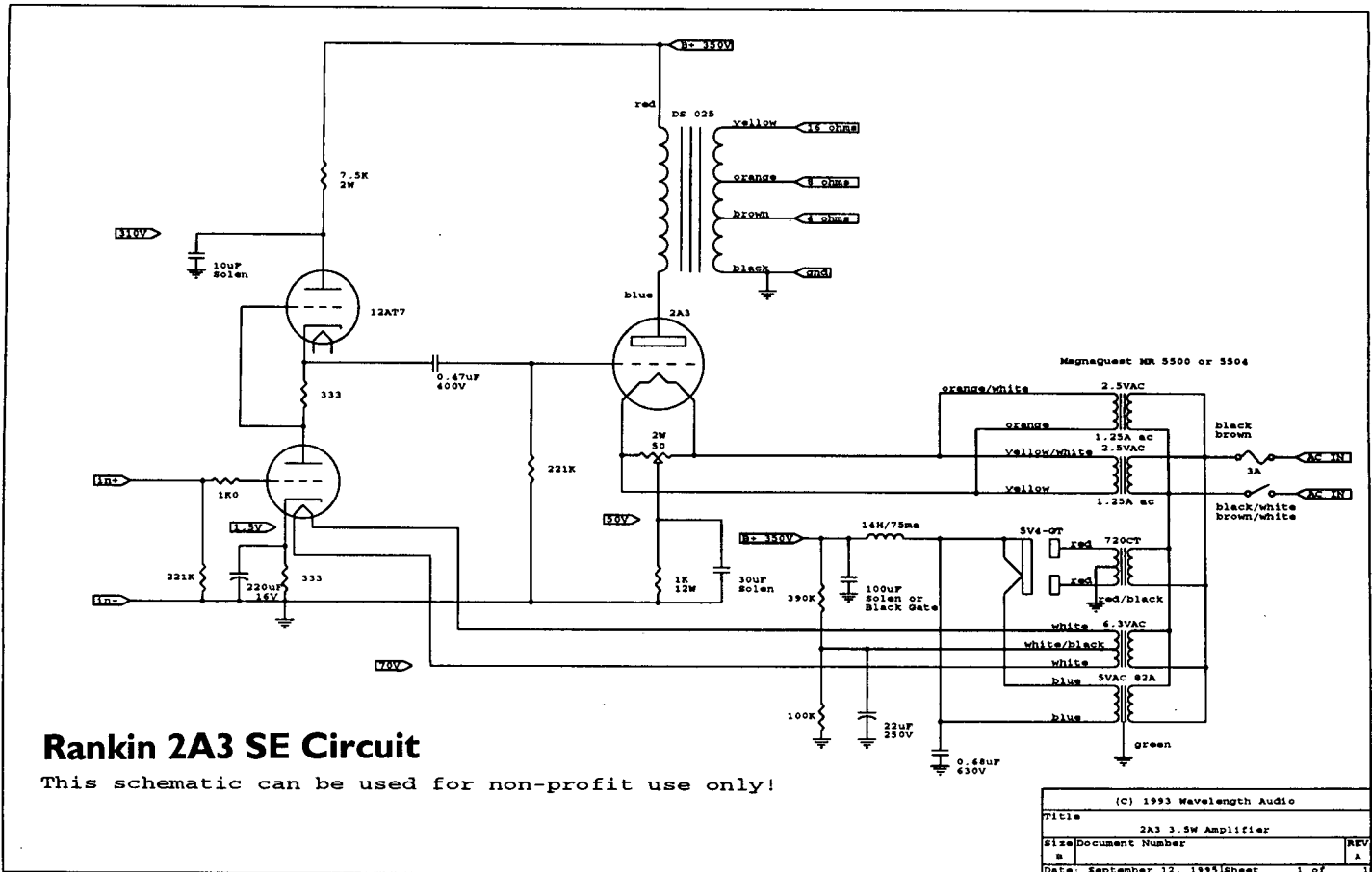
Even if one had the money the Audio Note Japan products are limited production items, hard to obtain, and outrageously expensive. If you can afford them, I would argue that the Audio Note amplifiers are a *necessity*, but from any pragmatic point of view Level 5 Audio Note products are a senseless way to waste money. The "Baby Ongaku" on the other hand, is well within the reach of any serious minded audiophile. But, if you want one, you must manufacture it yourself!

This "Baby" amp came into existence somewhat in the same manner that the classic film *Casablanca* came together. I think a committee of ten made the movie. Even though *Casablanca* was a cut and paste job, it metamorphasized into a great classic film.

A committee of four just happened to get together to make this particular amp. A random series of events took place that resulted in the "Baby". This amp too was sort of a cut and paste job.

A few months ago, I was talking to Mike LaFevre (the manufacturer of Magnequest transformers which are now captivating the hearts of Japanese audiophiles long used to the high quality Tango and Tamura products) about Ducati motorcycles and Alfa Romeo cars when the subject of a really neutral, clear sounding low power SE amp came up.

He told me that Gordon Rankin of Wavelength Audio, designer of the rave review *Cardinal 300B* amps, had recently provided him with a very simple 2A3 amp schematic which he made public for non-commercial use. Aside from the 2A3 output tube, the amp uses a single 12AT7 SRPP driver and a 5V4GT rectifier tube. A few tubes and a handful of capacitors and resistors is all there is to this simple circuit. Word "on the street" was that people who built Gordon's 2A3 thought it was a great sounding amp project, so I decided to give it a go.





Let me digress. . . if any of you are *serious* music lovers who want to capture the rare and wonderful, emotionally satisfying experience obtainable from the "Baby Ongaku", the cost is very reasonable, even if you have a journeyman amp builder construct it. For you others, you *dumpster divers*, you *garbage night alley scroungers*, you *garage sale commandos*, and all of you who are reading this copy of *SP* in the form of a Xerox copy produced on someone else's machine, let me make one charitable attempt to enlighten you. Hey, this advice is FREE so glom onto it.

Always remember these fundamental facts of life that apply to all of Man's existence:

"Good things are not cheap!
Cheap things are not good!"

Any fool who seriously thinks that he or she can conjure up a "Magic Amp" with a few dollars worth of surplus parts, an old car radiator, and a \$4.98 Weller soldering iron should put this magazine down right now! Drop it, Fool! Take your 59 cent hamburger and plain wrap soda pop and retreat to the friendlier environs from whence you came.

Go back to the land of four year old *Popular Mechanics* magazines, room temperature IQs, and your dusty "I coulda/shoulda/woulda" projects. Go back to your dear friends who still believe that the 300 mile per gallon carburetor is being suppressed by Big Oil Companies.

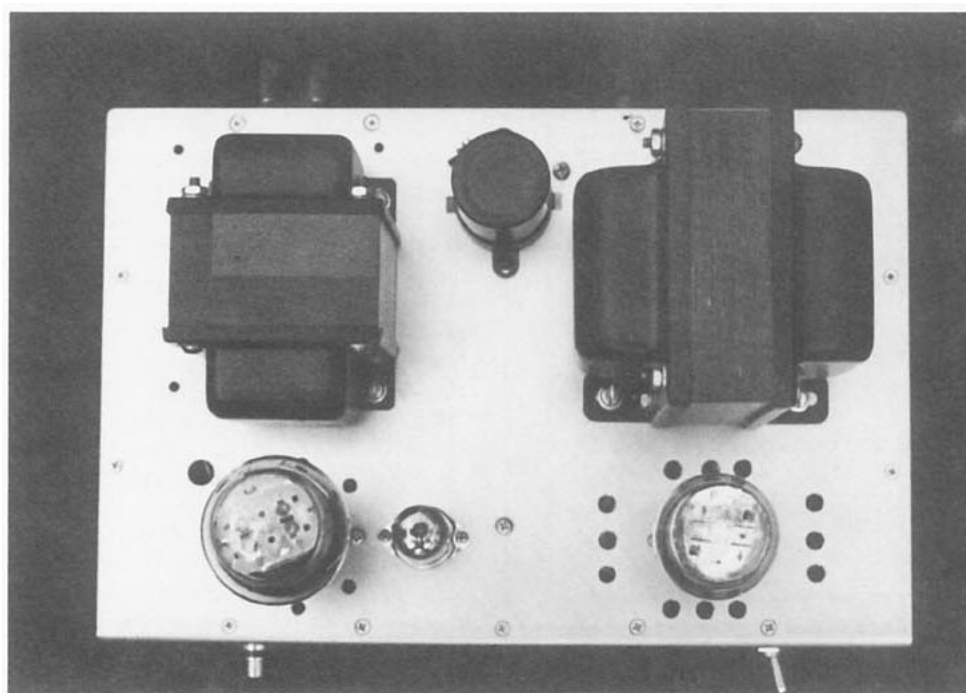
Mike sent me a copy of the schematic and after a lot of head scratching in an attempt to draw out a decent wiring diagram, I finally gave up and contacted Don Garber of "Fi" fame. He's the man who builds the exquisite direct coupled, silver wired 2A3 amps that have audiophiles on the East Coast captivated. Don Garber is probably one of the most meticulous and detail oriented amplifier builders in the country. I gave Don the mechanical layout and he proceeded to produce the simple and elegant wiring diagram illustrated which he agreed to make available as a gift to the *SP* readership.

Since I am an admirer of Audio Note of Japan products, I asked myself: Why not "ape" some of their construction details? This necessitated a 50 thou polished copper plate on the top of a black semi-gloss chassis. I used Solen filter capacitors as specified by Gordon Rankin and Black Gate capacitors in all other areas. But most importantly, I used the pure silver wire Magnequest output transformers and as much silver internal wire as needed.

In order to make the amp as solid and bullet proof as possible I utilized a Hammond aluminum chassis size 8" x 12" x 2". I cut out the top of the chassis leaving a one inch border along the sides. This would be the bottom of the new amp. I then took a sheet of 50 thou solid copper 12" x 9" x .050" and bent it at a 1" 90° angle along the 12" side. The 1" bend would serve as part of the ground plane where the input RCA socket and off/on switch are located. This plate would now be the top of the chassis fastened to what used to be the bottom of the

Hammond box, got it? The back of the alloy box houses the AC socket and speaker output posts.

Before I go any further, these "Baby Ongaku" are not cheap. To make them properly you will be spending \$1,600 for two Magnequest silver DS025 output transformers and an additional \$300 for a pair of Magnequest power transformers. Count on spending several hundred dollars for the Black Gate caps and tantalum resistors as well as a couple hundred or so for the Hammond chassis boxes, silver hook up wire, speaker binding posts, Solens, etc.



Top view of "Baby Ongaku" amplifier

I personally think that the publisher of *SP* should refuse any and all articles that rehash cheap and silly circuits and go over long-disproven theories. Our primary focus should be the search for the highest level of reproduced musical excellence, a level only obtainable by the use of vacuum tube technology (particularly single-ended topologies) in conjunction with the most efficient loudspeakers available, single point source if possible. I'm talking about the "less is more" philosophy carried to its highest level.

Depending on the degree of finish you wish to impart to your amp, it may take some time to construct. I used 6-40 aircraft blind nuts for the bottom plate fasteners. The top plate is fitted with recessed flat head 4-40 stainless aircraft grade machine screws using locking nuts. The photos and illustrations give you an idea of constructional details.

A most important aspect of construction is the ground buss. Use a #12 solid copper wire, wrap the ground end around the threaded portion of the RCA input socket and then put the nut on. Solder this with a high wattage gun after it is tightened down. All wires go to the ground as illustrated in Don Garber's drawing. I used a 25 watt 1k cathode bias resistor for the 2A3 bypassed with a 30 uF Solen cap and placed it in a central position on my chassis. For a

coupling cap, I chose the copper foil-in-oil Audio Note and they sound really great.

Do not bend any of the wires at right angles. Use gentle bends when routing the wire. Let the Magnequest transformer leads be as long as possible. They do no harm being long. Make sure the copper top plate is fastened as securely as possible.

Don't use sheet metal screws, use machine screws and nuts. The rigidity of the chassis will have an effect on the sound. The stronger and more rigid the chassis, the less chance of spurious microphonic noises.

The output tubes should be matched highest quality Chinese Golden Dragon 2A3s or NOS RCA, Sylvania, etc. The driver should be the Mullard manufactured 12AT7 equivalent or top quality Golden Dragon. The 5V4G could be NOS RCA but the Sovtek 5V4GT is an acceptable and available alternative.

Do your voltage checks and then plug in the tubes. Before you do any serious sonic evaluations be sure to let your creation burn in for a week or so. Don't ask me why, but at first the amp sounds as if you are listening to a set of headphones laying on the carpet with the volume turned up. After a few hours you will begin to hear some music shine through. I can't explain the break-in phenomenon, but within forty hours or so the amplifier will begin to give you a hint of what is to come. My suggestion is to play a tuner through the "Baby Ongaku" out of earshot for a couple of weeks before any serious listening.

You now have a pair of expensive to build 3 watt monoblocks, equipped with silver output transformers that taken alone cost more than many complete amps. What you also have is a close approximation of the "silver sound" produced by the Audio Note *Ongaku*. No it does not replicate the undefinable *Ongaku* quality of absolute silence and space between each precise nuance of the music. However, it comes so close to that undefinable *Ongaku* quality that unless you make a direct comparison to the *Ongaku* you probably won't miss the difference. Use the \$50,000 savings for a Porsche instead!

One of these days Mike LaFevre will start pricing his transformers at levels comparable to the Audio Note UK silvers (not as well made) or the Japanese Kondo manufactured silver transformers (unbelievably well made) and your opportunity to own a "lifetime" amplifier will have come and gone.

The previous issue of *SP* contained plans for the classic Lowther *Acousta 115* enclosure. It is worth the trouble to have a pair built, believe me. Form a co-op and get your friends to pool their talents and make those enclosures. They will reproduce music. They're not "hi-fi" speakers. The "Baby" will work perfectly with the Lowthers. In fact, it's a match made in heaven.

If you've been trying to get realistic sound from some of the ludicrous but highly touted multi-way particle board horn systems using crappy European drivers, or if you went the "Radio Shack" way and mounted a bunch of "Quam" and "Pioneer" speakers in your own unique enclosure you may be ready for the Lowther *Acousta 115* enclosure with even the least expensive Lowther driver. Build the cabinets, hook up the Rankin/Magnequest/Garber/Reps, et. al. 2A3 Silver SE "Baby Ongaku" and prepare yourself for a radical change in direction as an audiophile.

Your new focus will be on accumulating records and CDs and transport mechanisms, D/A converters, turntables, tone arms and cartridges up to the task. The "Baby Ongaku" and the Lowther speaker systems won't need upgrading. Your investment in time, money, and labor will yield music reproduction in a league with the best available at any price.

Notes from designer Gordon Rankin

The 0.68 uF cap can be varied to establish the 350V B+ to the specified value. The power transformer secondary plate is shown as 640 ct in this particular circuit. Make sure that all voltages are correct before attaching speakers and tune the 50 ohm pot for minimal hum. If using 6A3/6B4-Gs, I suggest trying a DC supply with large amounts of capacitance in the power supply (10000 uF or more) to avoid hum problems. You can play around with the coupling cap. The value should be between 0.22 and 0.47 at 400V or higher. I found that the 0.33 uF Hovlands sound really good.


Many constructors have built this amp with no problems using only the schematic provided above. If this is your first time, I suggest that you find someone close by who can help you with the details. I will accept comments and requests for help by e-mail ONLY: waveaudio@eworld.com. Enjoy.

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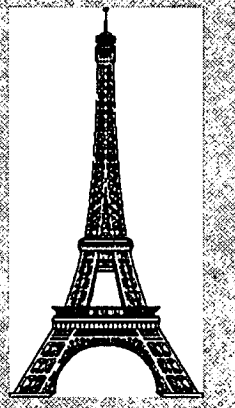
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MONSIEUR RANKIN'S EURO SELECTION

by Gordon Rankin, Wavelength Audio



*Yet more pro bono work from
the explorateur at Wavelength.*

Aside from the obvious requirement for reasonable sensitivity, speakers that work well with low power triodes usually have a well tempered (untemperamental) impedance curve. It really helps if the x-over uses a simple first order network so that power is going to drive the speaker not the network.

Perhaps it is because most American designers opt for higher order networks that I find I usually prefer some European models which present an easier load to a tube amplifier. On a few occasions I worked with series x-over networks and I found that they worked better than the standard parallel networks, though they were harder to develop.

My current favorite commercial speakers are the Swiss-made Reference 3A Royal Master Control (US importer Fanfare Int'l 212-734-1041). They are two way systems featuring an 8" driver and a partially horn

loaded tweeter. The 3A uses no crossover on the bass/mid driver and two resistors and one Hovland cap on the tweeter. Wiring is Siltech silver 22/2 (approx. 15 ga.). They are rated at 93 dB with an impedance that doesn't dip below 7.8 ohms and they sound great with my 300B amps. Aside from the Reference 3As, I suggest that owners of my 300B amps be sure to have a listen to Sendor 71 and QUAD ESL II (both from QS&D 800-659-3711) and also the ProAc Response 1 & 2 (US importer Richard Gerberg 410-486-5975).

The only vintage speaker I have had good luck with is the WE/Altec 755A, maybe because this full range cone driver requires less tweaking than multi-way systems. I used a 1.8 cu ft cabinet with the 755A with two Scan Speak Variovents to extend the LF a touch. Although these ancient, impossible-to-find speakers are great in the mids, they lack bass and high end. Other vintage components may have potential but I get frustrated with all the work necessary to get them right.

For a DIY project I recommend making speakers that are foolproof. Keep it simple, like a two-way with an 8" and a 1" dome tweeter. There are a few interesting Cabasse drivers that look good on paper, specifically the DOM4 tweeter at 96 dB and the 21M18 Woofer at 93 dB sensitivity. The woofer is good out to 5 or 6 K. Zalytron offers some kits using these drivers. Unfortunately the crossovers are hogs, but you can buy the drive units and cabinets and work on the x-over yourself. I personally don't like the sound of D'Appolito configurations or multiple driver arrays. Like I said, keep it simple.

LS 0/65 Single Driver Single Ended Partner

Looking over all of the drivers on the market for the last few years, I was discouraged since most require elaborate cabinets or complex correction circuitry. I began hearing good things about the Triangle T17FLV 608 paper cone 5 inch full-range drivers so I faxed France and bought a pair. The T17FLV 608 is rated at 94 dB with a range of 50-18 kHz. so it appeared to be an excellent candidate for a triode amp partner. What's more, this unit works real well in a simple to tune and construct slotted or ported design.

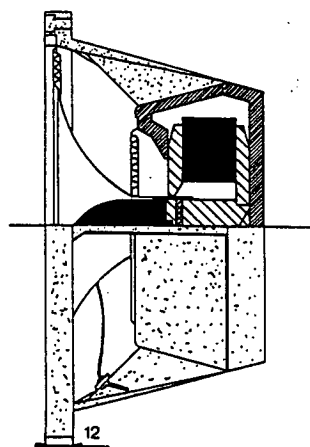
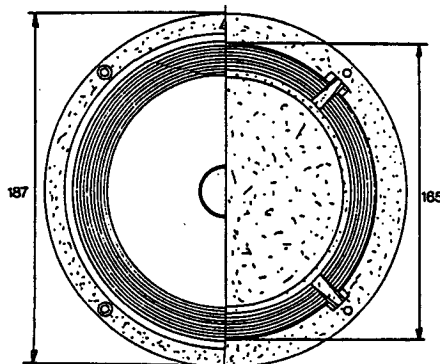
The Triangle drivers are now distributed in the US market by ORCA, which is a good thing because they can provide the basis for a reasonably priced, non-time consuming, near-foolproof efficient speaker project.

I built speakers for years back in the early 80s when I had access to great test equipment in college. I even designed a test fixture for the DEC VAX 11/760 for my senior project. After school, I got bummed out with speaker projects because testing can take forever. Luckily there are some great PC and Mac packages to help steer us modern speaker craftsmen through our explorations. I used the new Audiosuite software from Liberty Instruments, mainly because it was cheap, it does the job, and Bill Waslo lives here in town.

I also downloaded some programs from the Madisound BBS to calculate the cabinet sizes. The T17 FLV has a resonance of 49 Hz, nominal impedance of 12 ohms, and it is 94 dB efficient. With a Qt of 0.41, the volume of a ported enclosure needed to be 1.8 cu. ft. I used the Woodstyle WS123 cabinets for my 755A experiments and I remembered that these were just the size I needed. For this project, I used the new slim line (12" W X 13.75" D X 24" H o.d.) version.

TRIANGLE T17FLV 608

Diameter 107mm
Power max 40 W
Efficiency 94 dB/W/m
Resonant frequency 49 Hz
Nominal Impedance 12 ohms
Min. Impedance 10.2 ohms @ 300 Hz



With a 1.8 cu. ft. cabinet and a box resonance of 52 Hz (-3 dB point), I came up with a port size of 4" round and 4.5" long. Using the Audiosuite setup, I was able to adjust the port equal to the resonance frequency empirically. The optimal port size determined by measurement wound up very close to the calculated results at 4.375". There was a slight rise in the output of the driver at 2 kHz that was up around 5 dB higher than the mean of the response curve. I wrote a program in "C" on my PC to determine the appropriate notch filter for that frequency. I came up with 20 uF in parallel with a 6 ohm resistor and a 0.5 mH inductor.

Using the frequency response plotter in Audiosuite, I tuned the filter by varying the resistance and capacitance. The EQ sounded and measured best with a 5 ohm resistor and with a paralleled 0.22 uF Hovland across the SCR 20 uF capacitor. As you can see from the impedance plot, the notch filter centered around 1.75k instead of 2k. I think it sounds better with the filter because the main irregularities in the response shift down to the less offensive <2k region, aside from having a flatter response overall. The minimum impedance of the system is 11.9 ohms at 240 Hz with a mean sensitivity of 94 dB. Perfect for your SE amplifiers.

This speaker plays realistic bass down to about -3 dB @ 50 Hz. The highs are a bit attenuated but what's there sounds very good. Overall, the sound quality of the LS 0/65 in on a level with many of the high quality commercial speakers I have heard. The nicest thing about the speaker is the midband speed of the crossoverless driver. Also, this design avoids x-over distortion problems that usually accentuate driver mismatch in the upper midrange.

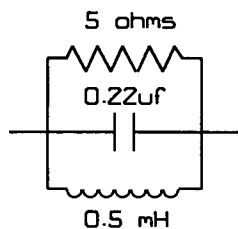
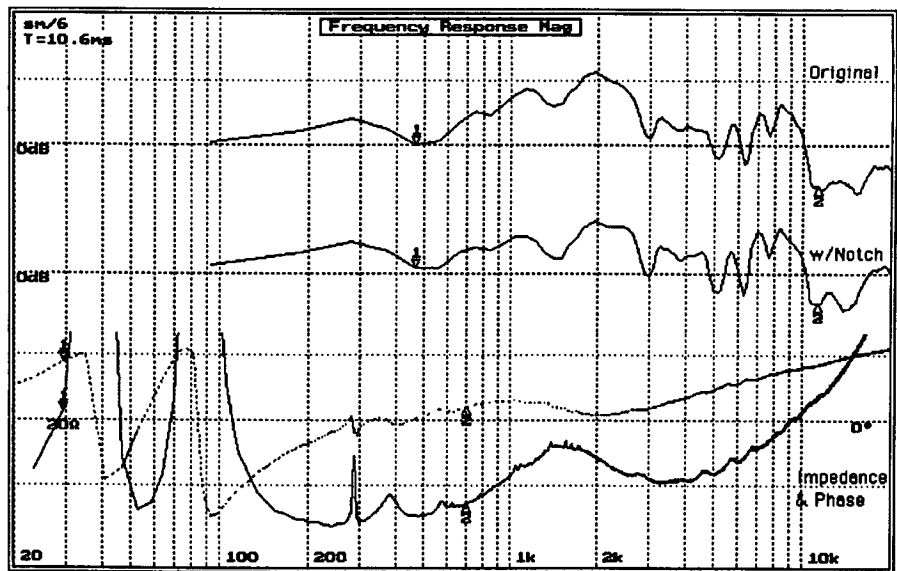
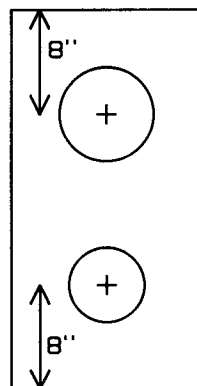


Diagram of notch filter/EQ network. Mount in series with the positive speaker lead.

Usual set-up configuration is with driver on top and port on bottom. However, if using high stands, try inverting the cabinet to get the driver down to ear level for your listening position. Experiment with placement for best balance.



Measured response and impedance plots of author's LS/065 SE Partner. Note smoother overall response with EQ filter installed (lower curve).

Construction is easy. Buy the following components:

- SCR 20 uF / 630 V caps
- Hovland 0.22 uF / 600V Musicaps
- Sidewinder 0.5 mH inductors
- 5 ohm Mills MRB12 or Lynk 20 W resistors
- Triangle T17 TLV 608 drivers
- Woodstyle WS123 narrow cabinets
- Spectra Dynamics Deflex pads (4 total)
- Silicone (100%) sealant
- Your favorite cable

Cut and route the driver holes and the duct. Install Deflex pads directly behind the driver and at the top of the cabinet above the driver. This will help clear up any cabinet resonances. Install the driver 8" from the top

of the cabinet to driver center and install the port 8" from the bottom to center.

I think you will be very pleased with the performance of this simple, low resource drain project. After listening to these one-ways, I have a better appreciation of why audio purists have always searched for the perfect single driver loudspeaker. A single cone and a nice triode amp can yield some fine musical enjoyment.

Vendors

Madisound Speaker Corporation
 PO Box 44283
 Madison, WI 53744
 608-831-3433 Phone
 608-831-3771 Fax
 608-836-9473 BBS 8/N/I

Zalytron Industries Corp.
 469 Jericho Turnpike
 Mineola, NY 11501
 516-747-2515 Phone
 516-294-1943 Fax

ORCA Design and Manufacturing Corp.
 (Triangle importer)
 1531 Lookout Drive
 Agoura, CA 91301
 818-707-1629 Phone
 818-991-3072 Fax

SPEAKing OUT for



by Scott Nixon, Anodyne

Love American Style

First off, support American products, or as close as you can get, when it comes to the purchase of your store bought fancy dude speakers. Most of the small time imported European fare costs double or more what it should, with half your money covering shipping, weak dollars, and high importer mark-ups. Readers in the ECM should do the inverse, or import more American goods while the dollar is down.

As will be shown below there are incredible values available from manufacturers in the US that offer much more for your real dollar. It is also time to be slightly wary of efforts to squeeze your juke-box-money with sham products that promise to be 'SE Ready'. Not long ago it was 'Digital Ready' speaker hype we had to put up with. So, look out for dumpy 15" 2 way jobs with fake EV 8HD horns or towers of thousand dollar '98db' hype. Sensitivity isn't everything. Caveat Emptor Rules.

New Designs — Real Finds, No Fluff!!!

KRK You got a modest sized room? How about a pair of 7" 2 way compact monitors that will fit on 20-24 inch stands and are 92 dB sensitive. As an audiophile you expect to spend what . . . \$3900? . . . too much? Well take back \$3451 and spend \$449 for a pair of K-RoK monitors from KRK. These come in a gray speckled finish and would look great in both Fred and Barney's groovy sound dens. Wilma and Betty will love the size and it matches all their furniture too.

K-RoKs were designed for nearfield home studio monitoring and are quite revealing little guys and certainly not mid-sucked mindless robots. If these were built by an audiophile producer, they would be gloss black and two thousand dollars. Find these at pro sound dealers that handle recording equipment. Think of these as a low cost fast and bulbous 'BBC type monitor' for the hungry SE masses.

METAPHOR A new model speaker, Metaphor 5 offers an 8" 3way floor standing, small foot print design that is 93 db sensitive. The current retail is \$3450 but these also feature unique and beautifully crafted

K-Rok Personal Monitors

Two way mini-monitor designed for home recording studio use.

Response	57Hz-19 kHz +/- 3 dB
Sensitivity	92 dB 1w/1m
Impedance	8 ohms nominal
Crossover	2.5 kHz
Size	14" x 12" x 9.75" HWD
Finish	Grey texture
Price	\$449/pr.

KRK Monitoring Systems
16462 Gothard St., Unit D
Huntington Beach, CA 92647
714-841-1600 voice
714-375-6496 fax

enclosures. They do dip to 4 ohms in the bass region, but ain't dat what th' dadburn 4 ohm taps 'fer? These offer a lot of value and better sound than most smaller, lesser performing imported products. The SE user is exposed to mostly full range, almost e-stat sound, that is virtually wartless.

The Metaphor 5s kind of remind me of an upscale sonic DNA crossing of an (please excuse the comparison) Avalon, B&W and Quad, but overall better, and they are drivable with most good SE amps. The Metaphors will definitely show up weaknesses in amplifiers of slack too. Overall, I'm pretty impressed.

Both of the designs above barely meet *my* minimum sensitivity criteria for a 7-8 watt 300B based amp. Both should work very well in modest rooms (12x15 to 14x18) if you can live with moderate playback levels. Speakers with 90 and below sensitivity should be home auditioned in big time audio party mode before plunking down cash. Play some solo female vocal, solo piano, small Gothic choral groups, and big sound symphonic pieces. If you don't clip the stew out of your amp on this music you're more than likely okay. It's mostly the sustained complex harmonics that clip your amp into the low sens. speakers. A lot of OTLs have similar limitations.

But there is a way out, and it won't hurt for very long. Think of the next speakers as a modified 12 step program to de-program your stereophule mindset. Bubba, you been remanded to Sensitivity Training . . .

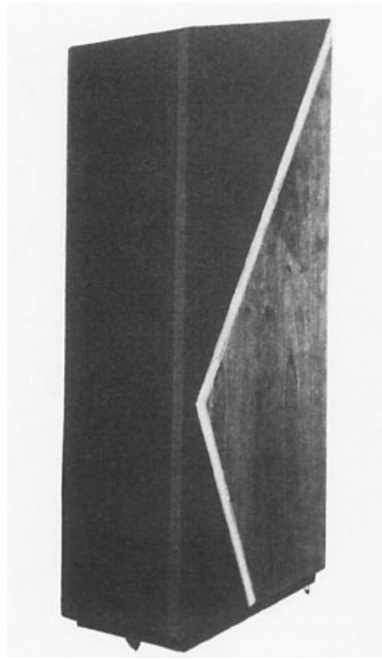


Metaphor 5

Three way system with each driver mounted in a separate tuned enclosure within a rigidly braced cabinet.

Amplitude response 35Hz-22kHz
Sensitivity 93 dB/2,83V@1m
Impedance 4 ohms nominal
Size 39" x 11" x 15 1/4" HWD
Finish Natural cherry/black grille
Price \$3450/pr. (standard finish)

Contact info:
Metaphor Acoustic Designs
15390 Twin Creeks Court
Centreville, VA 22020
703-815-0082 voice
703-815-2939 fax



HERESY For too long Klipsch speakers have mostly gotten a bad rap. The whole line has been castigated as a rowdy boy's white trash party sound. The Heresy and Forte II are 97 and 99 dB and with 7 watts these will blast. If you have heard either of these with any amp other than a high quality SE thang (including PP tube amps), forgetaboutit.

Simply put, these two relatively affordable models are the 'Vandersteen' equivalent for the SE toting crowd, with a most decent benchmark sound and the appropriate SPL factor. At \$400-800 used these will clearly outperform a lot of the Johnny-come-lately big SPL sham boxes that are begging for your attention. Instead of the juicy sucked out midrange death of a lot of audiophile-approved designs, certain Klipsch models really dance and sing, even with a few tiny watts.

Admittedly, Heresys are not the highest resolution design in the world, but they can get you started using SE without power limit angst. Be creative with setup of Klipsch and avoid the dreaded dead-on-axis position. Heresys are spazmatic to set up. Here are a few things to try: You can use the built-in plinths if you converge the center axis 3 to 4 feet in front of or behind your butt and, in a big room, the stage occurs at normal height. A favorite setup at the Anodyne megaplex has been 16" stands and flat up against the wall pointing straight out, a la Linn Sara. The boundary effect is great for the bass and you won't get the wallpaper soundstage effect.

Fortes need 10 or 12 inches of elevation. Try a couple concrete blocks. Fire them straight out and keep away from boundaries.

One option worth serious consideration if you like the Heresy concept but you are looking for something a step ahead comes from Gillum Loudspeaker Systems in Ridgedale, Missouri.

People who have heard them insist that Gary Gillum's g3 speaker is a much better sounding design than the Heresy and based on these reports, I consider them to be a

Gillum G3 Loudspeaker

Horn loaded compression driver midrange and tweeter with a direct radiating 12" woofer, featuring high efficiency and high output power.

Bandwidth 50-Hz-17.5 kHz +/- 4 dB
Sensitivity 97 dB 1W/1m
Impedance 8 ohms nominal
Crossover 750 Hz and 6.5 kHz
Size 23 1/4" x 14 1/4" x 13 5/8" HWD
Price \$1100/pr.

Contact Gary Gillum at
Gillum Loudspeaker Systems
PO Box 123
Ridgedale, MO 65739-0123
417-334-7428

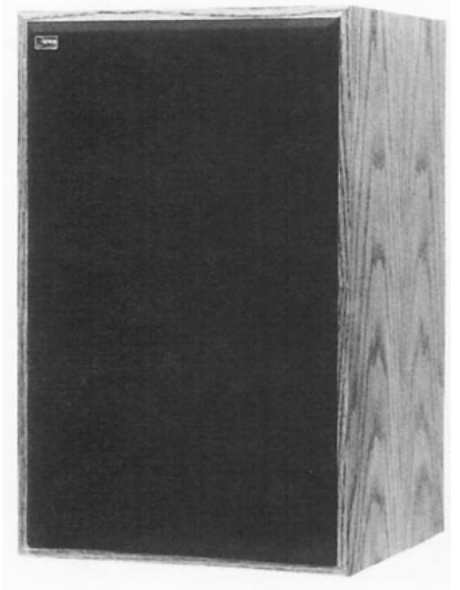
must audition. These carefully handcrafted units are NOT a copy of the K design but an affordable (under \$1500) speaker that is in a similar format — 12" + mid and tweet horns — using better drivers and horns than the current issue Heresy.

As with all of store-bought Plug 'n' Play speakers mentioned above, it's totally your personal choice. Remember just because you read about something in a good-looking slick magazine, does not make what is said true and does not make that product the best, or the worst compared to anything else.

This is a hobby, it's about illusion, and the reality is, for most publishers, only about advertising revenue, not your sound, not your music.

DIY Roll your own 8" 2 ways are pretty easy to do and you can find 92-94 dB Focal and Davis drivers that will roll off on their own. Then you add in a tweeter at 6 to 8 kHz. Simple, easy to drive, but hit or miss without some way to test them.

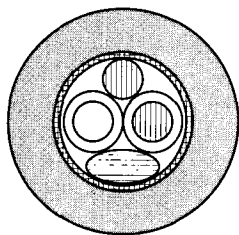
Fortunately, testing has never been simpler. New software to turn your PC with 16 bit Soundblaster card into a powerful FFT jammin' Spectrum analyzer can be had for 50 to 200 American dollars. But even so, unless you do your own woodwork, to buy drivers/enclosures, etc. you land around \$350 for something that might be great or might really reek. All DIY projects are a gamble, none have much resale, and you could buy KRK or used Klipsch for a few dollars more and have a known entity. That said, *you* decide how you want to proceed.



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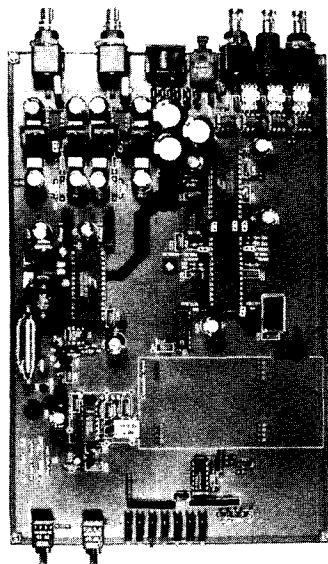
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Now you have some tunes while you expend efforts to build your ultimate Big Dog system. You will find the whole process much more enjoyable with decent SE sounds to entertain you, while you quest for more fire. Ugh, big sticks = more fire!

Big Dog Horn Rigs

Now we think about Edgar midhorns and biamping and big bass thangs and start breaking the normal audiophile code of conduct. With horns try to always use higher than first order filters, second order and up will lower out of band distortions and squelch diaphragm resonances, especially in bullet tweeters. First order is too easy, it works for direct radiator designs, but it is a cop-out, offering many problems when used with horns.

There are projects from the early 80s in *L'Audiophile* that combine Onken boxes with time aligned Audax 7" and Fostex tweeters that are direct radiating 100db designs that are quite good. This would be a raw parts cost thousand+ dollar project, and most big designs will be at this price level or even much higher.

Pro Sound Most of the offerings from most manufacturers are great for your typical lounge lizards or rockin teenage combos but are boom and sizzle audio death boxes for your home hi fi. High sensitivity and lumpy response curves are the norm and most come carpet covered/expando grilled/plastic cornered. Except for the high sensitivity, this is not your home hi fi dream speaker, more like a hi fi nightmare.

There are some pro candidates showing potential for home-based listening. Used UREI coaxial studio monitors have mid-90s sens. and do sound fine, but even the smallest used pair will go for over a grand. You may have heard of BagEnd ELF subwoofers in some of the recent audio press, they are quite good also. Most hobbyists probably have not heard of their full range designs. The Bag End TA12 is a time aligned 12" 2 way that is 100 dB sensitive, housed in a fairly small enclosure, and good to 70 Hz.

Use an SE amp on the TA12 full range, bypass the electronic crossover, and use a single mono ELF woofer (models from a single 10" to 2x18"). With the least expensive (\$798) ELF processor and a decent SS amp, you would be looking at a \$3-4000 system. You can substitute a pair of new Gillum g3 and use a single 10" ELF woofer and the crossover/integrator and get a huge flat to 20 Hz full range sound for a total of about 3K bills,

plus your SE amp and some SolidState dog for woofer duty. Pun intended.

Other finds for old pro prospects are obvious. Ain't got no money? I have seen old road-worn Altec A7s with 416/511/802 with blown diaphragms for as low as \$250 a pair. (No lie—the last time I visited the author in High Point, we spotted a pair of junked A7 cabs out in the street over by the railroad tracks! That ol' boy didn't act too excited, but I'm sure he went back for a pickup the minute I peeled out of town. - ed.)

Bondo the corners, apply paint, new diaphragms and for \$450 you can get started into big scale horn sound, not perfect but it's a start. Later add Edgarmids and biamp then you're closer to the big thang you're after. There are also lesser known bass 'bins' which may work better with Edgarmids than the A7. The JBL 4560 is a shorter front loaded bass horn. At 36" tall it has a tighter sounding bottom end and goes a smidgen lower. Road dogs of these can go for 50 to 100 bucks each.

Altec makes a short half-height front loaded horn enclosure, the 816. Same basic flare as the A7 with a tighter bottom end but slightly higher low cut off.

I heard a setup with 816s, D54 Edgarmids, Fostex slot tweeters, and all passive networks sound mighty fine, and it did not visually dominate the listening room. With most road dog rescued PA boxes, it's best to have your sound pad hidden from view, unless you're a true refinish-wiz.

All of the above has been heard either in the multi-tens-of-dollars Anodyne listening lounge or in rooms of dealers and friends of da'dyne in one form or another. By no means is this information the last word or anything of the sort, but a cryptic report on what has been seen and heard hereabouts. Important to remember is that this is all just equipment/toys and it is meant to be placed into action. Get off the phone, out of the cyber-junk wasteland, chain yourself to your work bench, then enjoy the musical fruits of your labor.

For more info on Anodyne products:

Anodyne
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CONFESSIONS OF A JUNKYARD DAWG!

by Steve Melkisetian, Angela Instruments

*Our underground hit squad
MADE the sucker speak out!*

When somebody comes to me looking to buy a single-ended amp, I usually ask what sort of music they listen to, how loud they like it, the size of their listening room, and what sort of speakers they now own. I've found that people who mainly listen to loud rock will probably not find the low powered SE experience very satisfactory no matter how efficient their speakers are. Remember, rock concert PA systems consist of super-efficient speakers (still mainly *horns*) driven by banks of very powerful solid state amps. Not surprisingly, many headbangers consider this sort of arena rock PA rig to be *ideal* for reproducing their notion of the true sound of live music in the home. Who am I to stand in the way of their pleasure?

Another group of listeners better served by higher power amplification includes lovers of large orchestral works who like their music played at "realistic" volume levels in medium to large rooms. Generally, when someone mentions the importance of large dynamic contrasts, presentation of "scale", high sound pressure levels, and a preference for digital source material, I try to steer them away from buying a seven or eight watt amplifier since no speaker known to man, whatever the efficiency specs, will deliver the wallop they crave.

Yet another group of potentially SE incompatible audionuts I frequently encounter are "the men who are married to their speakers". They want to know if these "little amps I've been reading about are any good?" I always try to explain that going SE calls for complete openmindedness in prospective speaker choices. No matter to this bunch of blindered cheap bums! The fact that they got "such a great deal" on some "*Stereophile Class B*" ranked Danish modern room dividers means that they are hitched to the damn things *for life*, or at least until their little pride n' joys are dropped from the Recommended Components List. To the dealer of SE triode amps, this means that your lovely little amplifiers will have to fit the Procrustean bed these audio cheapskates have made for 'em, or else!

My experience with SE triode amps over the past few years has brought into bold relief the realization that no one type of amplification known to man at this point is the most "absolute" in the presentation of sonic truth. All designs are flawed. They all have their strengths and faults. Which set of virtues and vices do you find most livable?

If you're willing to make some real compromises in the presentation of dynamics, low bass impact, scale, and you don't go nuts when your amp clips, then SE triodes with the right speakers will deliver a sense of

presence and immediacy (you-are-there-ness) that I have never heard from any other form of amplification. All good SE triode amps seem to share a unique ability to convey the emotional soul of great music through any kind of reasonable speaker. When you experience this presentation, it is unmistakable and almost scary!

Is it any surprise that the established amp manufacturers were the most aggressive opponents of SE triodes back in the '80s when most American audiophiles hadn't heard of such amplifiers? This war of disinformation was waged in the audiophile mags for some years, continuing in somewhat attenuated form even today. We were repeatedly told that none of the puny little amplifiers favored by Japanese audio 'cultists' could possibly drive big, bulging American speakers to satisfying volume levels in the average American home. After all the propaganda, local audiophiles are usually shocked when they finally get to hear this stuff and find out how loud it can actually go.

Could it be that the High End establishment was scared that American audiophiles would become infatuated with a product that *they* didn't make and promote? Even more subversive is the notion that some of the best amplifiers are built at home by hobbyists, unguided by the audio experts at the mags or by "professional audio consultants" in the High End salons. Accordingly, the homebrew/DIY zone was "ghettoized" by the High-End press, considered fit turf only for bottom fishin' Dyna-scum and other lowballers.

As far as the old establishment was concerned, High End audio electronics was a *tricky* business. Only a trained engineer/artist could achieve the proper balance of brute technical mastery and 80s sensitive guy shit required to design and manufacture such 'necessarily complex' circuits.

As I see it, the "problem" of speaker efficiency has been grossly overstated and it serves as the last line of defense for those in the High End community who wish the whole single-ended triode amplifier movement would just go away. If you have the guts to just throw the numbers out the window and listen without preconceived notions, you'll probably be shocked and delighted at the number of "illegal" (but good sounding) modern and vintage speakers that work with SE triode amps.

The only speaker kit I am aware of that was designed specifically for low power tube

amps is offered by *Hi-Fi World* mag in England. I haven't heard these but they appear to be well-designed and fairly priced (FAX 011 441 71 289 5620). I think it's likely that Audio Note UK will offer a kit version of their superb speakers within a year's time. I'm hopeful that other speaker manufacturers will see the opportunity here and jump into the fray as well.

Twenty five years ago I used to build ported, 'bass reflex' stage monitors for rock bands. I'd load my jammin' homebuilt boxes with 12"-15" Eminence ceramic magnet woofers and cheap, ringy aluminum horn tweeters on the top. At the time, these sounded better to us than anything you could buy at most music stores, so we loved 'em, especially since we couldn't afford to even dream of owning JBLs and other 'real' speakers. This efficient, primitive but venerable speaker system design lives on in dozens of commercial versions you'll find at your local 'combo' music store by Peavey, Fender, Sunn, CLS and countless others.

Recently, this design has even reappeared in the low end of the High End, targeted at single-ended bugeteers. Could this be the most popular design of all time? If you'd like to try building your own (its easy!) for under \$400, call Image Communications at 1-800-552-1639 for their very informative brochure/price list of RAW speaker components (woofers, horns, drivers, replacement diaphragms, crossovers, mo'...) by Eminence, McCauley, EV and others. Hey, if you don't



MY fave: ProAc Response IIs

dig the way YOUR homebuilt babies do "hi-fi", you could always start a band!

As a subscriber to the Japanese audio hobbyist mag *MJ* (\$245/year HA! HA!), I have seen a lot of ads for interesting high efficiency speaker components lately, including some horns, drivers, woofers, and some alnico coaxial designs! It might be worth checking out some of this stuff if you're undaunted by the potential hassles of cross-cultural mail order! Speaking of KOOL stuff from Japan, Pioneer still offers some of the wonderful TAD pro speaker components for sale, including Alnico high-frequency drivers and 15" woofers. Wide bandwidth, high efficiency, high dollar, top quality.

My current fave speakers remain the Pro Ac Response II boxes with massive Target stands that I've used for the past four years. I agree that they put a bit of a police spotlight on the treble but the overall balance is so much more realistic and *pleasurable* than anything else I've ever heard that I don't think I could ever cut 'em loose. Yes, they are *only* 86 dB efficient. So What? Seriously, I'd love to hear a version of this design with efficiency in the low 90s, Alnico magnets, and maybe some silver wire in there somewhere. I wrote the designer, Stuart Tyler, a couple of times about coming up with a more efficient speaker design for small tube amps but NO REPLY has been forthcoming. US Representative for ProAc— Modern Audio (410) 486-5975 / FAX (410) 560-6901

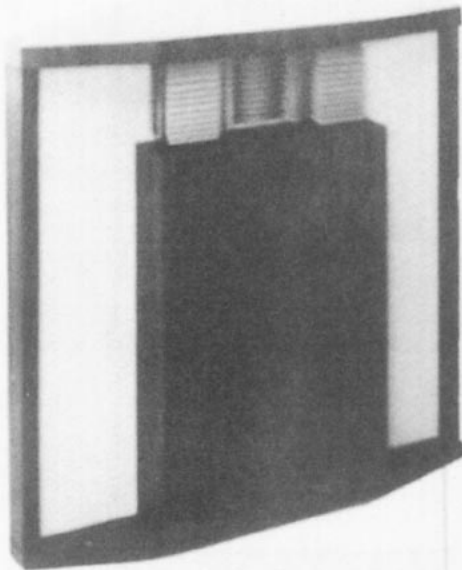
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Following are some speakers I found to sound good with low powered tube amps. Check them out for yourselves! By the way, I don't sell any of these except on occasion a few of the vintage units mentioned. You'll have to take your chances in *Audiomart*, your local hi-fi shop, wherever.

1. Almost any Spondor model except the LS3/5A (too dinky sounding and too inefficient for my taste at 82 dB). The folks, including many sound biz professionals, who buy these tend to keep them for a long, long time. The old BC-1 is a true classic and sounds wonderful with small tube amps.

2. The current line up of Audio Note speakers are unique in that they are the only High End designs I know of that were developed specifically to work with SE triode amps. Sure, I'm prejudiced, but anyone shopping for speakers in this price range owes it to themselves to check these out. I plan to buy a pair of the large Model 3s for my home system later this year.

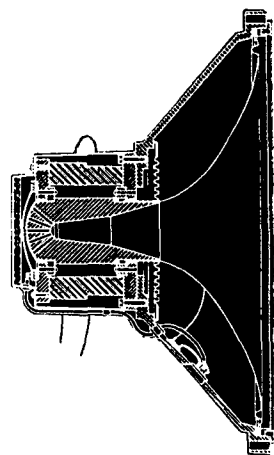
3. I heard the Royal Masturbators or whatever the @#!\$ they are called in the Jadis room at CES/Vegas. [*That's Royal Master Control Reference 3A, boss. Sheesh, I can tell you ain't French —ed.*] What a beautiful sound! They were driving them with the Jadis Defy when I stopped by but I bet these speakers would sound fine with any good SE triode amp. Fanfare Int'l (212) 734-1041.

4. On several occasions, I got to hear Classic Audio Reproductions Hartsfield repro speakers driven by Atmosphere OTL electronics and I liked them very much. I have never been a big fan of the old JBL "singing furniture" approach (Paragon? Ugh! Metragon? Forget it!) but this version by JBL nuts John Wolff and Mark Weiss seems to keep the resonances down to a manageable level.

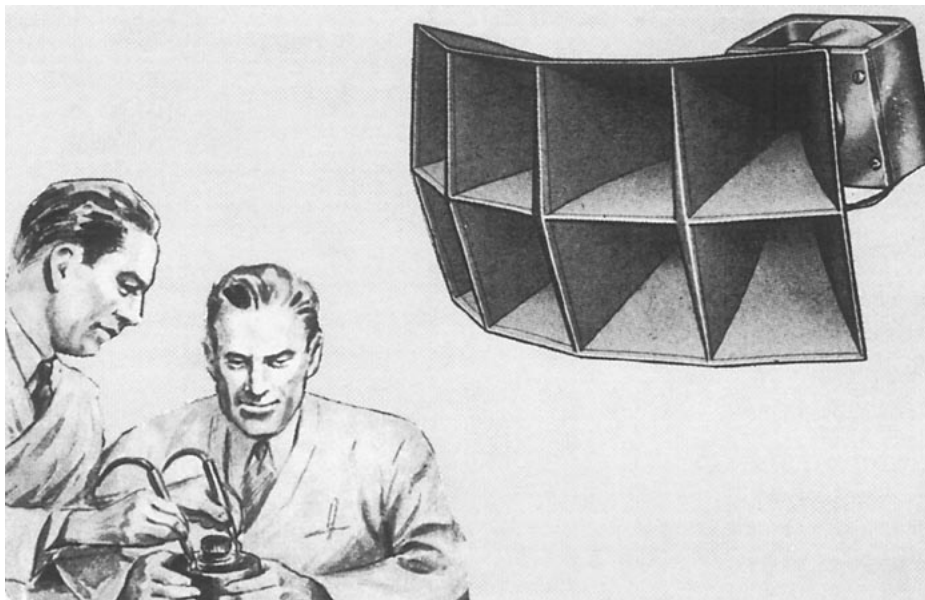
5. Over the years, I must have turned on dozens of tube amp fans on a budget to the Celestion 3 (\$289/pr.) and 5 (\$399) speakers. I like the earlier, non-ported versions better than the current higher efficiency models, but I still think they're a safe bet and they play much louder than the specs say they do! Like most budget speakers, these will benefit from upgraded crossover parts, cabinet panel damping, rewiring with Kimber wire, and all the usual tweakhead tricks. You'll only get the best out of these if you put 'em on MASSIVE stands (hint: make your own out of old truck crankshafts and other junkyard metal).

6. The little Acoustic Research Holographic Imaging M1 is another decent budget (\$270 a pair!) choice. Once again, tweaks and stands are mandatory.

7. The Sequerra MET 7 (\$750/pr.) is another popular long-term choice among lovers of all kinds of low-to-medium power vintage and contemporary tube gear. Despite drivers that look like something you'd find in the doors of a '76 AMC Gremlin, the smooth tonal balance and imaging capabilities of these speakers on good stands is most seductive.



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Do yourself a favor . . . forget about vintage theater horns

8. Numerous customers who've bought either the Angela Model 91 amps or the Audio Note Kit One from us report good results with a bewildering array of pricey (Acoustic Energy, Sonus Faber, etc.) and Econ-O-Mojo modern mini-monitor loudspeakers. I list here only those examples that I have checked out myself but consider my "thumbs up" to be, uh, qualified since I only heard some of these boxes 'on the fly'. Still, they're worth checking out if you're doing low powered tubes on a tight budget: Wharfedale Diamond (\$300/pr.), NHT Super Zero (\$280/pr.) and Model 1.1s (\$380/pr.), and the Dana Audio Model 1 (\$199/pr.).

Doubtless there are dozens and dozens of these little boxes to try out. The results can range from dire (any LS3/5A) to delightful. In general, stick with two way box speakers, avoid the exotics (anything with a ribbon, electrostatics, and other Science Fair projects). Also, avoid anything with a LOW specified impedance and high parts count/complex crossovers.

I suggest that you tote your tube amps down to your local hi-fi discount barn on a SLOW day and ask 'em if you can check out some speakers. Most of the folks I know who've tried this number were pretty damn shocked. There are some real sleepers out there and a whole bunch of doggies, depending on your personal tastes. It's my contention that, given the sheer volume of product out there, any determined person in any area of this great land can turn up listenable/affordable speakers if they try enough stuff.

Happy hunting! Let me know what you dig up.

9. Tannoy still offers a number of very efficient (95-99 dB) 12" and 15" Alnico dual concentric driver designs for both the home and recording studio in several formats. Included in the line up is an OUTRAGEOUS 99 dB efficient, \$30 K horn-loaded behemoth called "The Westminster" targeted at the Japanese market. Tannoy aficionados swear that the earlier models sound better. I agree but the quality of even their new stuff would put most other speaker brands to shame.

Do avoid the smaller Tannoy enclosures made from particle board; they sound *TER-RIBLE!* Remount the excellent drivers in custom-made robustly constructed solid hardwood boxes, well-braced and damped. Write to Tannoy in England for plans. The US distributor is actually located in Ontario, Canada—TGI North America (519) 745-1158 / 745-2364 fax.

POSTSCRIPT: On the Sunday I was finishing this article, I took a break and hit a local flea market. I found a clean, original pair of '50s 12" Tannoy "reds" for \$70! Who says that efficient vintage speakers are hard to find and expensive? Not me!

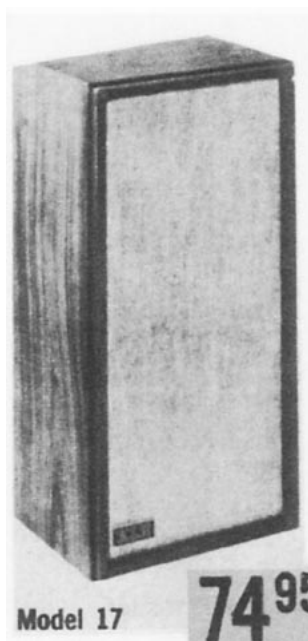
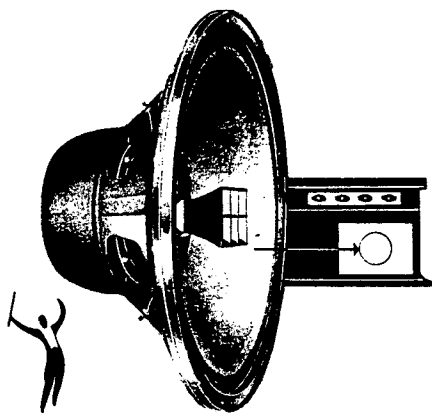
10. Technical Audio Devices offers a range of super high quality studio monitors reminiscent of older JBL Alnico designs. TAD systems employ heavy, SOLID WOOD high frequency horns and they are built to a level

of quality that is rarely achieved in today's so-called "High End" loudspeakers. Over the years, quite a few were shifted in the pro recording studio market. Maybe you should place a "Wanted" ad in *Mix* magazine classifieds. Be prepared to part with at least \$5K-\$7K to score these babies!! Call Barry Smith at the TAD division of Pioneer (310) 952-2387 for details on current offerings.

11. Unless you're filthy rich and can afford to outbid the elite collectors in Asia and Europe, do yourself a favor and forget about vintage horns. Cliched but true, if you have to ask the price for the best Western Electric and Altec gear, you probably can't afford it. Don't waste your time and energy lusting after an obscure object of desire you'll never even see a picture of, let alone own. It's maddening to American collectors but the fact remains that even if you have deep pockets full of money doesn't mean that you'll be able to buy this gear! The folks who're holding the best examples of these old speakers can afford to be damn choosy about who they sell to. Trust, honor, manners, sincerity in personal relations and other obsolete concepts count as much as money in this rarefied world.

"I don't get it Steve! I paid \$6000 for these speakers and they SUCK!" Even if you can score some good ones, grooving to the exciting sound of horns may not work for you. To those raised on modern "neutral" audiophile speakers, the colorations that seem to be inherent in horns may be intolerable at first listen, perhaps overshadowing their unique virtues. As with other acquired tastes, persistence and the passage of time can change bewilderment into appreciation. Or maybe not . . .

12. Altec 604/B/C Duplex speaker with coaxially mounted horn tweeter (any original Alnico iteration) '40s-'70s. Popular U.S. 15" two-way recording industry stalwart.



KLH Model 17. . . bring your hand saw!

These don't do 'fast', nor some other things that seem to be important to mod audiophiles but they are efficient and lively sounding. These are highly considered by a number of single-ended amp enthusiasts. Junk the original ugly Altec boxes: it shouldn't be hard to build something more beta. 604s routinely change hands for \$200-\$500 each but you may be able to find 'em in the pro sound/recording market for less (try the OLDEST recording studios in your area). Sounds best with the also defunct Mastering Labs crossover: you can probably find these through *Audiomart* in the \$250-\$400 range.

13. Dyna A-25, common two-way ported box speaker, late '60s-'70s. A favorite among budget audiophiles in its day, these had pretty nice quality Seas drivers. One day, just for kicks, I hooked up a pair of these to an Audio Note Kit One and boy was I surprised at how loud 'n clean they went! If you want to check these out you shouldn't have much trouble finding 'em CHEAP from used hi-fi dealers. By the way, avoid the '90s 'reissue' of this model; it SUCKS.

14. Flat broke? Loser? Can't even afford a pair of used Dynaco A-25s? Boy, have I got a speaker for you! Meet the KLH Model Seventeen! These are so common in the thrift stores in my area that I've seen 'em used, *nailed together*, as semi-permanent structural elements in the book and record shelving! Although an old-fashioned acoustic suspension design with not so great efficiency specs, they seem to work OK with all of the low (7-35W) powered tube amps I tried 'em

with. The El Cheapo paper cone drivers sound, not surprisingly, a bit 'cardboardy' but not bad either. Just for a goof, I used a pair of these at home for about a year with an ST70. You can certainly spend a lot more and do worse! Here's a tweak for you: remove (and discard!) the speaker grills. Then take a handsaw and cut the front edges of the boxes flush with the driver boards.

15. *Steve's Top Four ONE-WAY speakers!* Some of the best sound I've ever heard from small tube amps has been through what I call "ONE-WAY" vintage cone speakers. These old (40s-70s) full range speakers are an especially appealing match with low powered SE triodes and they share some of the same positive attributes: unparalleled mid-band realism and a powerful sense of presence and immediacy. True 'single point source' drivers offer some important inherent advantages over 'multi way' designs. Time alignment and phasing problems disappear. Also, you can forget about crossover colorations, cause there isn't one! Further, many of these speakers were designed with efficiency in mind since they're mainly from the pre-solid-state hi-fi era.

On the downside, power handling can be quite limited and bandwidth, even in the full range models, is somewhat less than what many modern hi-fi nuts would find satisfying. Still, some of you might discover that these relics from the past offer just the sort of listening experience you've been looking for. Interested in trying some of these? Try *Audiomart* ads but beware of sharks. Insist on original cones only! As with other vintage gear, it is usually better to obtain it from a fellow hobbyist than most of the dealers I know of. Experimentation with different cabinet designs (ported, acoustic suspension, T-line, etc.) might pay off big time!!!

1) Western Electric/Altec 755A 8" speaker. First brought to my attention in Bender and Werth's groundbreaking 80's article on vintage gear in *TAS* #59. Rated 70-13K, the "8 watts power handling" limit makes this one a natural for 300B amps! Very efficient and as fast as lightning!

2) Goodmans AXIOM 80 full range 9 1/2 inch speaker. Made in England, 50s-early 60s. The maker claimed 20-20K from this one, and that's not too far from what I've heard. With a power handling capacity of just 6 watts, the Axiom 80 certainly challenges our definition of SE triode amps as low powered! Seriously, if you're lucky enough to score a pair of these babies, be careful with that volume control since there

WHERE can you get all these features in one loudspeaker?

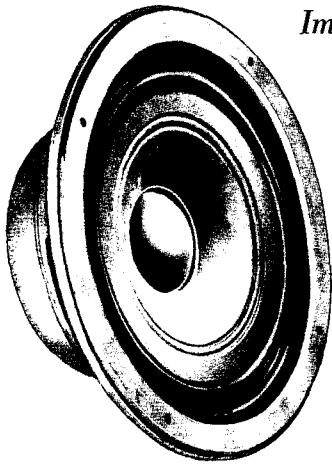
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Western Electric

Western Electric 755A ad from 1948

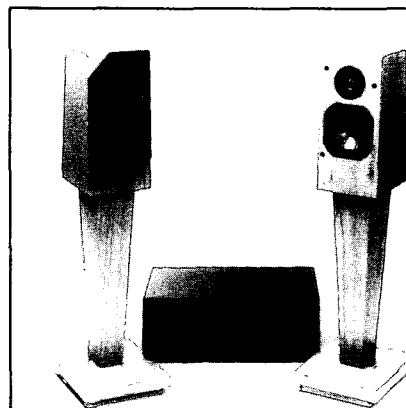
are NO replacement cones available. The other types of speakers (coaxials, triaxials, woofers, etc.) crafted by Goodmans during this period are also efficient and excellent sounding. BARGAIN HUNTERS ALERT: Goodmans sold lots of fine speakers here in the 50s-60s under the "Lafayette" brand name. (Yeah, but watch out. Lafayette also sold a lot of early Pana-sonic imports.—ed.)

3) Barker Duode 12" full-range speaker. 50s England. One of the strangest looking cone speakers I've ever seen! The cone appears to be made out of yellowed, parchment-like material! The sound is anything but antique, though. This one is pretty much fullrange (30-15K) and probably the fastest 12" speaker you'll ever hear! The "high flux magnet system" gives "high sensitivity and control, especially when Duode systems are used with low power amplifiers."

4) Wharfedale Super 12/CS/AL 12" full range speaker. England 50s-60s. I found one of these in a junk shop about four years ago. Picked it up because it looked a bit like the British guitar speakers (Alnico Celestion, Goodmans, etc.) I'm familiar with. Since it was Sunday, I took it home and hooked it up to my tube hi-fi rig for a quick test. When the music came on my jaw hit the floor! This was no funky guitar speaker—this thing cranked! Even with no baffle, there was decent bass! Rated at 12 Watts power handling from 30-18K, this one's a natural for single-ended tube amps! In my experience, these sound best in a REAL BIG BOX.

Other listeners report good vibes from vintage one-ways by Baker, Hartley, G.E.C., various Western Electric models and even ancient field-coil type full range cone speakers by Jensen and others. We're probably on the threshold of a revival of this type of speaker, as others will report in this issue of SP. Hopefully, these "new" one-ways will unite the superior materials (alnico, W.E. style complex cones, etc.) found in the best of the vintage units with the tight manufacturing tolerances and computer/laser testing methods available today. Some of these vintage or "second-wave" one-ways might turn out to provide just the sound you were searching for, or maybe not. In any event, this is certainly another interesting avenue for sonic exploration.

By the way, that's my point exactly! There's a big, wild, varied universe of valid listening experiences out there and no one approach is going to do for everyone.



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Loudspeaker Matching with Single Ended Amplifiers

by Graham Tricker, GT Audio

I normally consider loudspeakers to fall into two categories. These are horn and direct radiator designs. From a commercial point of view 8 watts is very limiting unless you have a market consisting of efficient loudspeaker designs like horns. I have a collection of vintage hi-fi which includes a matching pair of Voigt corner horns. In my opinion these are one of the finest sounding classic horns ever to have been made. On the whole, however, people using horns are few and far between in the UK and Europe. I guess this is due to the imposing physical dimensions needed to achieve realistic results.

Eight watts does not sound much to the average audiophile, especially when most familiar well-reviewed valve amplifiers had power outputs greater than 60 watts. Such high powered amplifiers are required to drive inefficient and power hungry loudspeakers like the panel, electrostatic and ribbon designs that have been popular these past decades.

Surprisingly, eight watts can be quite adequate with conventional loudspeakers providing the listener does not want to listen at loud levels; the chosen music is of the simple acoustic variety and not a full symphony or even worse rock music; the listening room is not too large; and lastly, the 8 watt amplifier truly measures 8 watts. Many so-called 8 watt 300B designs which run in self-bias configuration in fact only deliver 5.5 to 6.5 watts of power on the test bench.

Generally speaking, to meet all listening requirements with conventional loudspeakers, 12 to 25 watts is a minimum requirement. To achieve this output level, a single-ended design has to connect more than one valve in parallel, i.e. parallel single-ended or (my preferred option) use a single high voltage triode like the 211 or 845. In order to permit wide application, our GT Audio "TRON" range of valve amplifiers focuses on single ended Class A designs in the 12-25 watt range.

In choosing a loudspeaker to match an eight watt amplifier there are two things to consider (this also holds true for matching all loudspeakers to amplifiers):

Rule #1 is that there is no such thing as a perfect loudspeaker. Every design is a series of compromises.

Rule #2 is that one has to accept that there will be compromises and decide on a design which reduces these compromises the most for the size of loudspeaker and the type of music you will be listening to.

Horn Designs (Vintage and Current)

The principles of a horn loudspeaker (i.e. high efficiency) dictate that it is most suitable for low-powered single-ended designs. There are a number of different interpretations of horn designs, like the famous Tractrix Horn from the legendary Paul Voigt and designs like Tannoy, Lowther and Klipschorn, etc.

All of these loudspeakers have a broadly similar way of conveying a musical performance. Generally the sound is very realistic, very fast with excellent dynamics and it is often difficult to believe that a real instrument or voice rather than a recorded one is not actually in the room.

Horns were originally designed in the days of mono where a speaker had to throw as much sound as possible into a room or hall from a limited power output. This meant that they were generally placed in the corner of the room (hence the name "corner horn") and used the walls and floor as an extension of the horn.

When two horn loudspeakers are connected in stereo a big wide sound stage is achieved. However, horns are very room dependent and poor specimens can sound nasal, coloured and offer very little depth to the sound stage as well as producing large unrealistic images of voices and instruments. Some of the early Lowther and Tannoy

designs can sound quite forward in the mid-range often causing fatigue during listening sessions.

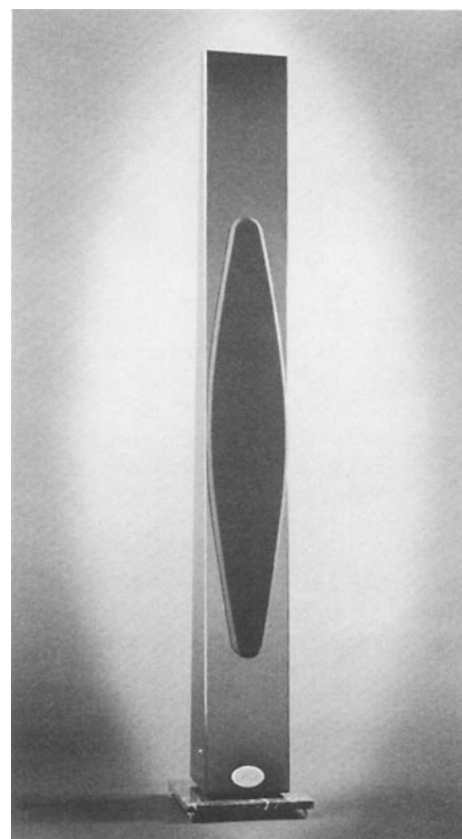
The best modern horn design which I have heard is the Great British Horn made by Nottingham Analogue. Based on the Klipschorn it uses very expensive drive units—see enclosed picture behind one of our TRON 300B prototypes.

Direct Radiator Designs

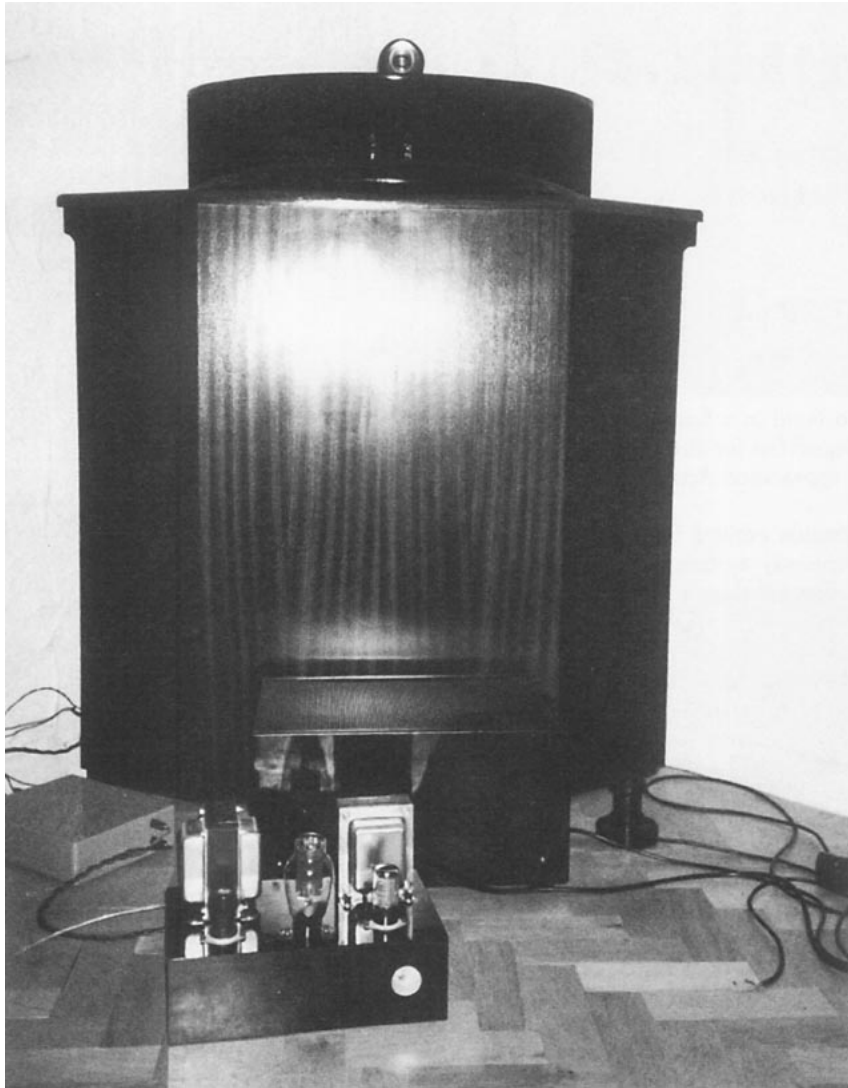
There exists a large variety of designs, e.g. bass reflex, sealed box, open baffle, etc. These designs generally give better bass extension, greater depth to the sound stage and better image placement but lack the dynamics and presence of horn loudspeakers.

Loudspeakers that we have found work particularly well and can be used with low powered amps are the Snell designs from America, Audio Note designs from the UK, the Cadence ES from India and the Horning and Posselt Albatross from Denmark.

The Cadence ES is an unusual design as it uses a bass reflex cabinet with an electrostatic mid range and treble unit mounted on top of the cabinet. Surprisingly this hybrid has an efficiency of 91 dB and nominal 8 ohm impedance.



Posselt Albatross



Great British Horn by Nottingham Analogue

The Posselt Albatross designed by Jens Posselt from Denmark took seven years to develop. They are a 91 dB 6 foot high floor standing design, giving excellent focus and imaging. The size is very important as it determines the correct position of voices and instruments as if the performance was being performed in front of you. We chose the Albatross as a reference for developing our forthcoming range of amplifiers. They are probably the least compromised loudspeakers we have ever heard. Posselt can be reached via fax @ +45 98 29 47 32.

Selecting an Amp for Your Speaker

Our experience when building single ended amplifiers is that the majority of audiophiles use conventional direct radiating designs and therefore the following questions have to be asked to discover whether their speaker will match an eight watt amplifier or not.

1. What is the sensitivity of the speaker?
2. What is the nominal impedance of the speaker and does it have a wild impedance curve?

3. What type of music do you listen to, e.g. chamber, symphony, folk or rock?
4. How loud do you listen to music?
5. How big is your listening room?

From these questions one can establish in a few seconds whether an 8 watt single ended amplifier will be suitable.

Here is a useful chart that can aid in the decision. Tick each question next to the appropriate column (either A or B) that suits your criteria. When complete count the ticks for each column. If there are more ticks in column A then you will need more power than 8 watts. If on the other hand you have more ticks in column B then an 8 watt amplifier may be suitable.

In determining whether a horn loudspeaker will fit the bill or whether a conventional loudspeaker is more suitable to your requirements, physical size may well be the deciding factor.

However, the question should be asked- what is the listening criteria? i.e. is it live in the room stuff or a much more relaxed sound with pinpoint imagery. If the latter criteria is more important then a reasonably efficient direct radiating design will give better results than a horn design.

My own personal preference for SE amps is the high voltage triode design like the 211 or 845 as these drive conventional loudspeakers and horns very well. Eight watts in certain domestic situations simply does not give enough power unless horns are used. Eight watts can drive a conventional loudspeaker on simple music but a full symphony orchestra on full chat will run the amp dry.

GT Audio
5 Upper Road,
Higher Denham, Bucks, UB9 5EJ UK
tel/fax 01895 833099

Question	Column A	Tick for A	Column B	Tick for B
Speaker sensitivity	< 90dB		> 90dB	
Nominal speaker impedance	< 4 Ohms		> 4 Ohms	
Type of Music	Rock music, large Orchestral		Chamber, folk, simple acoustic music	
Listening Level	normal to Loud		normal level	
Cubic room size	< 1152 cubic ft		> 1152 cubic ft	

DEGREES OF COMMITMENT

Musings on the topic of loudspeaker selection

by Don Garber, Fi

Fo, Fum. . .

If you're listening to music you want to listen to, a plastic boombox is fine. But, yes there is something better. And it does make a difference. Is there a contradiction here? I don't think so. But I don't consider myself to be an "audiophile". I suppose the major difference between myself and most audiophiles is that I hate talking about it. I can't think of anywhere I'd rather not be than a CES. With this as a preface, I'll try to respond to the editor's request for "Speaker Tips from the Amp Makers".

First who I am. I run a one-man operation, by choice. I make a number of variations on a direct-coupled single-ended 2A3 amp. I recently finished the production prototype of a single-ended 300B amp. It's now in production. I have been promising a preamp "next month" for unconscionably too long but I recently discovered a new twist that I may incorporate and which may set things back a bit. I also do custom work to order. I love designing and building things and try to make them as simply and as elegantly as I can. I also try to get orders out as quickly as possible, sooner than promised if I can. This doesn't leave much time for speakers.

I have little experience as a speaker designer. Most of it has been pure experimentation so I'm not sure how helpful I can be. There are a lot of books and references available, but nothing beats the empirical approach.

Tip #1— If you are seized with the desire to strap a pair of 15" drivers directly on to your ears, do it. If an attempt isn't any good, you will usually know it immediately. The books are more often than not right, but nothing beats direct knowledge.

I have four different speaker systems in my home and shop. The living room system consists of Focal T120T102T, 7V313, and 10C01 mounted on a very heavy 16" X 38" board with a very minimal crossover. Completely open on the back. If I ever get the

time to build in a finished form, it will be very elegant but for now it is a little less than that in appearance. Artist's rendition below.

This creation evolved from a pipe-loaded 7" Focal one-way system J.C. Morrison built for the Fi retail shop. It's 95 dB efficient and very good with a 2A3 amp (plays 95% of what I listen to), but with 3 watts it won't play everything. With the new 300B amp it's making me revise my statements about the 2A3 being the better tube. It's very live and very good. It will go a little deeper with a pipe, but at a great cost in immediacy. *Tip #2 — There's always a tradeoff.*

The second system, the Pipedream, is a case in point. With a good single driver system one can get clarity and imaging unachievable by anything else. I don't intend to slight this system but enough has been said about it elsewhere.

The third system is a modified Altec A5: 805 horns, 288C compression drivers, 515 woofers in 828 cabinets with an occasionally-added tweeter. The crossover is my own; it's much simpler than the Altec, but then I'm not using it in a movie theater either. Everything the audiophiles say about this setup is true. On the other hand, it has more immediacy, more startling reality than anything else I've ever heard. I want that. It's also HUGE and it doesn't go down very low. *Tip #3 — If you want the ultimate, you'll have to pay for it in space, money, real estate, and no doubt, other terms.*

I have in mind a Japanese gentleman who lives somewhere in the mountains. Photographs published a few years back in *MJ* show two equally-sized houses on a mountainside. The one on the left has two projections out the back going uphill to a pair of sheds. He and his family live in the other one. The two projections are low frequency horns (the sheds contain the drivers) leading to the end wall where they open into eight foot a side horn mouths inside the room. He

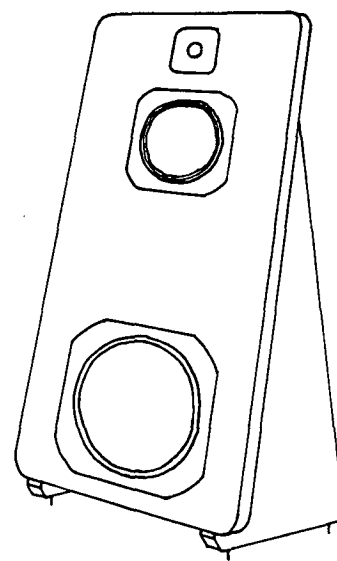
is pictured smiling in front of them. Yes, there are varying degrees of commitment.

The last system, if you can call it that, is a pair of little KLH speakers (Model 24) that I picked up off the sidewalk on 37th Street. These are high on a shelf in my studio/shop, driven by a pair of slightly minimalized Heath W3s through 50 ft. of thin Canal Street "speaker wire". It plays far better than many highendmegabuck systems that I've heard. *Tip #4— Define it yourself.*

I wouldn't feel terribly limited if I were confined to any one of these systems. They all play a lot of music well. But then, I'm not an audiophile. I don't listen to Mussorgsky or Respighi. When I do sit down to listen to music, its more often than not string quartets or Northern Indian classical music, Jazz, or a few other arcane things I won't bother to mention. You can extrapolate from here to what qualities are important in my system. But then, I occasionally listen to Mahler. There is only one way to play Mahler.

The perfect system designer is probably a Talmudic scholar: ". . . but then, on the other hand". If I should ever have the time to do some serious work on speakers, it'll no doubt start with horn loading. That presence and immediacy is like nothing else. The efficiency in itself, though welcome, is secondary. And who knows, maybe coffin bass—remember that. Komuro's new 845s are amazing on the bottom and the new preamp doesn't have multiple outputs for nothing.

Oh yes, I forgot to mention that there's a plastic boombox in the darkroom. But then, I'm not an audiophile.



Experimental three-way Focal system mounted on open baffle

Mary Anne, Mary Anne

Fascinating sound from Japan!

by Frank Reps

One truly rewarding aspect of being a contributor to a "reader driven" audiophile publication is my freedom to report as accurately as possible (my personal biases being present of course). In other words, when reviewing I don't have to be a whore! In fact, I shelled out thousands in cash before the fact for the privilege of listening to the equipment discussed below. That sure doesn't happen every day in hi-fi journalism—you can bet that the reviewers in the commercial mags are more moochers than Midases!

It seems that quite a few writers in commercial magazines bow to the advertising department and rhapsodize about products that are a complete joke to intelligent people or just plain junk. Sometimes, the size and frequency of a manufacturer's ad in the magazine appears to influence the content of reviews to an unbelievable degree. With my purely "amateur" status in mind, let me share my impressions of the products of a small company in Tokyo called Mary Anne Inc. This specialist company manufactures a series of alpha numerically designated single ended and push pull amps as well as a preamp, all called "Euphony".

According to the *New Webster's Dictionary*, Euphony means a pleasant concordance of sound. That they are! The logo on the enameled badges on the transformers also declares "Fascinating sound". The sound is fascinating but what is even more fascinating is the build quality of these products.

I saw Mary Anne Inc.'s ad in a tube magazine and was intrigued by their KT88 single ended 6 watt amp, model 231a (DC heated filaments). I ordered one, and after adding up the price, air freight, customs broker and customs duty I realized I had paid close to the price of a McIntosh amp with a lot less power and *no* dealer trade-in value.

Upon opening the box, I saw an amp painted a most unusual plum purple. I know Audio Note of Japan paint their amps dull black and Shindo products all look as if they came from Altec Lansing with their "Altec Green" color. This amp was painted a textured semigloss light plum sauce color. I doubt if there is a "Mexican Color Mixer" in an East L.A. auto paint store who could even come close to this shade of purple!

It was heavy, over 45 pounds, and looked very solid, with potted Tamura transformers and a heavy-gauge welded steel chassis. The tube sockets are mounted on separate sub-chassis featuring vents to provide a cooling airflow around the power tubes.

I unscrewed the bottom plate and my first look made me think that the people in this company must be either manufacturers of military specification equipment or served apprenticeships at Mark Levinson. The build quality is better than any commercially produced amp in the USA today. If the McIntosh commemorative edition is solid, this one is a tank! Attention to detail is unbelievably refined, even the tube socket connectors are shrink wrapped after soldering. All interior components are first rate. Tango and Tamura transformers are standard equipment.

The Managing Director, Mr. Kobayashi, could not emphasize more strongly that because these are relatively simple circuits, the selection of materials and components is based on intensive and extensive listening tests. Months of instrument and hearing tests went into the selection of individual components for the basic circuit. Only when a panel of professionals are satisfied that the absolute pitch, tone and timbre of the music is being faithfully reproduced does a model become a production item.

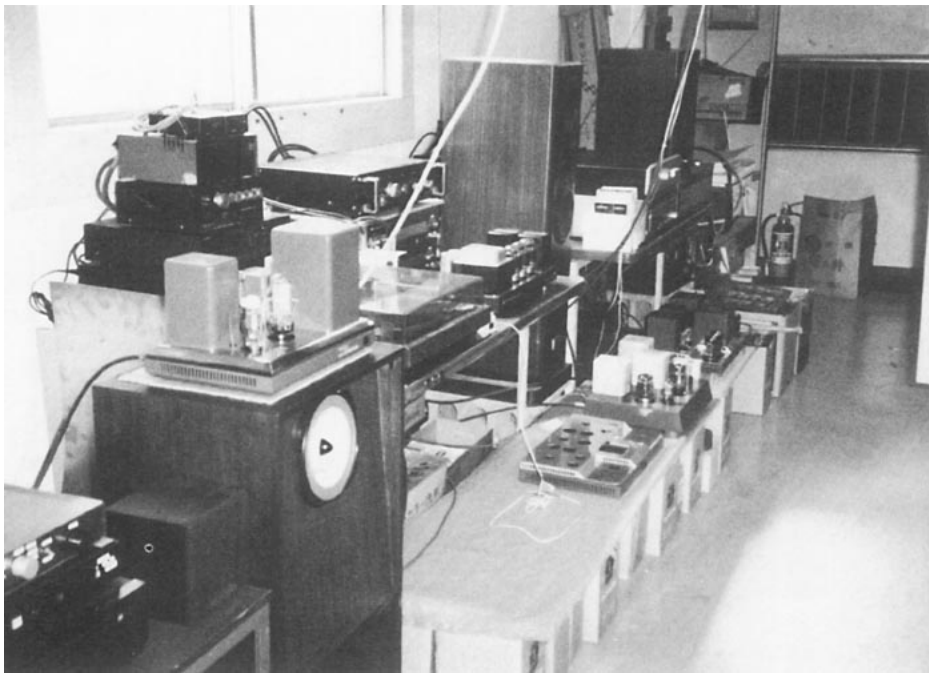
Many people know that the KT88 is a tetrode and does have third order distortion. People who prefer the KT88 like it because it has a "bloom", a punchy powerful sound bigger than life, more real than reality! The tube is great for guitar amps for this reason.



Euphony 231-α KT-88 SE Stereo
6W + 6W / 8ohms 12Hz-65 kHz (-3dB)



Euphony 131-α 2A3 SE Stereo
3.5W + 3.5W / 8 ohms 12Hz-60 kHz (-3dB)



Mary Anne, Inc. amplifier factory

The Mac 275 is another case in point—real woolly bass response, better than life mid-range and sweet highs—all due in no small part to the KT88. This tube may not exactly be considered the perfect recipe for true audiophile gear, yet the same tetrode tube plugged into a Mary Anne reproduces music that is so sweet and real (I use Lowther speakers exclusively) that one wonders how they pulled it off.

On the topic of pentode SE amps, I also recently got to hear a pair of the Shindo KT88 single-ended, six watt amps driving Shindo speakers while visiting Auditorium 23 in Frankfurt, Germany. Shindo Labs is another Japanese company with a faithful following of serious Audiophiles worldwide. Mr. Shindo's KT-88 was certainly on the same high level of performance as the Mary Anne gear. So, although it may be a lot harder to tame a tetrode, clearly it *can* be done. The six watt output of the Mary Anne KT88 amp has (unlike their 2A3 SE) just enough power for some of the more efficient traditional speakers on the market today.

Don't come to me for specialized technical test results. I'm not an engineer, I'm a hobbyist whose kids have grown up and who can indulge himself with these toys. I have tried hard to read *Stereophile* equipment reviews and in looking at the graphs and renderings of the sound patterns I think back to when I was an eighteen year old Marine in the early 1950s running around the hills in Korea with a contour map in my hand.

Contour graphs for Hi-Fi reviews? What a bunch of crap. What the hell do contour maps have to do with music? I am convinced that just like the Criminal Justice System in Los Angeles, the current crop of commercial audio magazines have lost their way. Lots of hot air — just like the O.J. trial! Their tests are a joke, a joke sponsored by manufacturers who put peanut-sized Taiwanese transformers in giant pots (to make them seem big) and mount some crappy components with glossy face plates and neat badges on audio junk. Chevy *Vegas*, that's what they are!

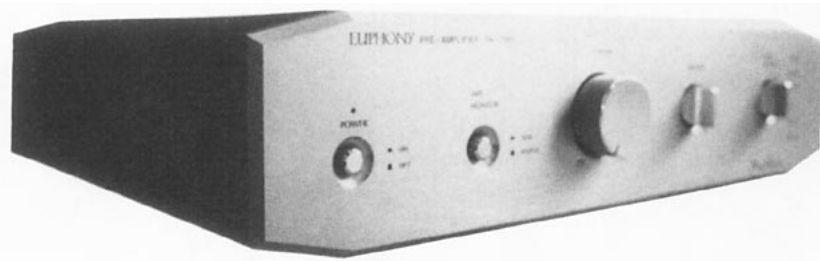
The honesty in the build quality and the purity of the sound of Mary Anne products is evident immediately. I'm used to the good stuff. Audio Note Japan, Audio Note UK and Gordon Rankin designed amps are sitting around the house. I don't keep bad company with mediocre amps for more than a day. Mary Anne amps are worthy contenders indeed. These amps hold their own among the elite of single ended amplifiers.

Whether the company sells *many* components here is the question. "Euphony" components will only be purchased by those unique individuals willing to pay a rather high price for beautiful sound reproduction, that in my opinion will last as long as the "collector item" components manufactured years ago in Binghamton, N.Y. (McIntosh tube gear for you new arrivals to the audio world).

Since the KT88 amp, I've auditioned the Mary Anne 300 B, their 2A3 amp and their PA-7000 preamp which is dead silent, colorless and possibly the best built preamp in the world! The preamp faceplate is gold-anodized aluminum, 1/2 inch thick! The chassis, built up of alloy bar stock and aluminum sheet, is divided into several shielded compartments. The whole thing is held together by "machine screws", not a sheet metal screw to be seen. It comes with both MC and MM phono inputs. The MC has a 3 ohm as well as 40 ohm input. When playing music, this preamp simply disappears, adding no constraints or colorations to the sound. I haven't heard anything better anywhere.

Any readers in the Southern California area who are sincerely interested in auditioning these products and have healthy balances in the bank can contact me and I'll be happy to share the listening experience. The 2A3 will cost approximately \$4,800 here, the KT88 \$5,200, the 300B monoblocks \$14,000. The fantastic PA5800 is \$6,700. These units are all well worth the money if you want the long lived quality inherent in these products.

It may interest you to learn that this little company was formed by several professional men who are dedicated audiophiles and home amp builders. Their friends were so enthused about their products that they went commercial in a very small way. It is a spare time business for them. Since advertising rates as well as everything else in Tokyo are unbelievably expensive, their only exposure in the Japanese home market was word of mouth.



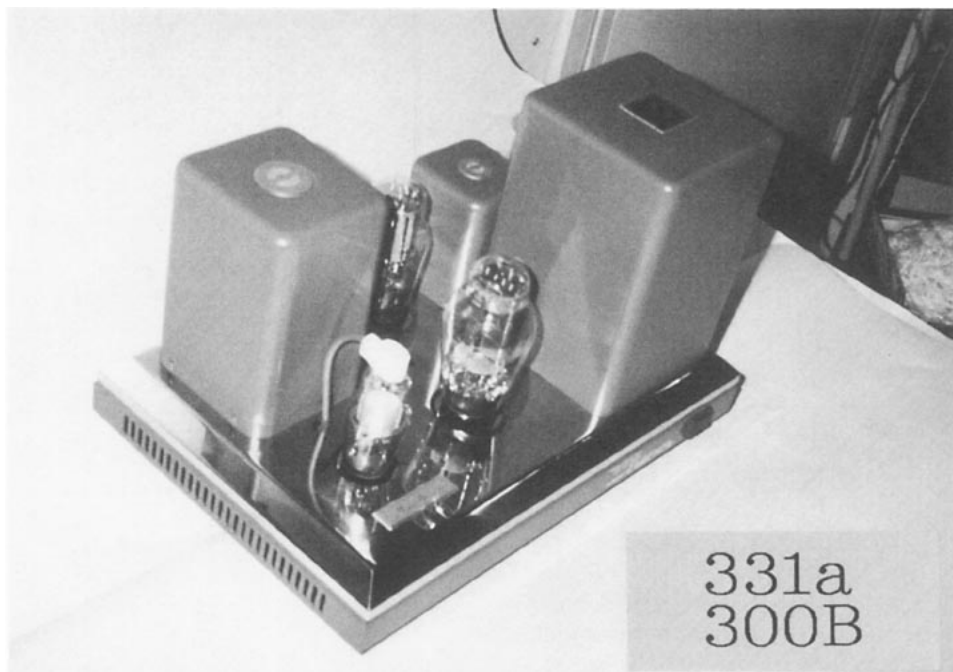
Euphony PA-7000 Preamplifier

Nevertheless, Mary Anne, Inc. has sold over 190 carefully made, hand built units in the past 18 months. Mine are not for sale! Incidentally, after using Pioneer and Fostex drivers for several years, the designers at Mary Anne are now experimenting with several of the Lowther drive units and enclosures. My prediction: Good-bye Pioneer and Fostex!

Some photos of the Euphony series are included with this article but no black and white newsprint photo will do justice to this equipment. Mary Anne products are enough to send a gearhead to heaven! I think the ideal customer for Mary Anne products would meet two qualifications.

1. He or she must be a person who loves music and really understands why good single ended amps and high efficiency speakers are the only methods of reproducing the emotion and soul of performing artists.

2. He or she also demands components that are carefree and long lasting. Components with no problems, amplifiers that can be left on the shelf to work for years and years doing their job of reproducing music in an accurate and emotionally satisfying way. In other words, Mary Anne products are pretty much perfect for the modern realization of the old golden-eared McIntosh customer.



You may pay a premium price for these fine products, but I can say with certainty that long after you have forgotten what you have paid for your Mary Anne Euphony amp and preamp you will still be enjoying your music. I think I used the proper phrase above to describe the products of Mary Anne Inc. "Modern McIntosh, for people with golden ears."

Contact info:

Mary Anne, Inc.
1-8-3 Koenji-Kita
Suginami-Ku
Tokyo 166 JAPAN
Tel. 03-3388-7595
Fax 03-3388-8260



Interior view of PA-7000 preamplifier showing compartmentalized subchassis construction technique for superior noise elimination

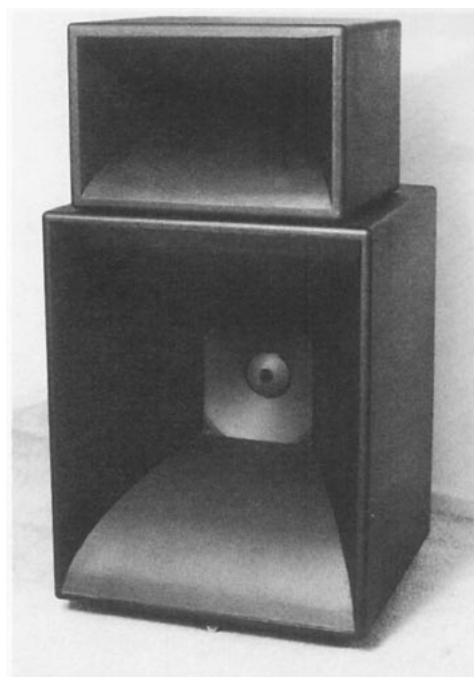


**The pink and aqua cloisonné badge on the 231- α output transformer says it all...
Euphony: Fascinating Sound !!!!**

— HORNS REVISITED —

THE EXEMPLAR PROJECT

Jeff Markwart and John Tucker
Triode Support Systems, Houston



Almost Heaven

When we finished tweaking our Altec Voice of the Theater systems as described in *Sound Practices #4* we were happy campers. A mere triode half-watt or so into those babies produced big smiles and lots of foot tapping; movie soundtracks that sounded so right; speed, dynamics! Life was good!

Unfortunately, VOT life was not perfect. There are a few major drawbacks that come with the territory when the home music listener adopts a classic Altec auditorium design. To list a few—

Size - A pair of A7s on spikes carrying 311-90 horns on top visually dominates any normal size listening room. The decor aspect of a VOT is best described as "Early Industrial Strength" or "West Coast Monolithic".

Bass - Not much below 40-50 Hz. A subwoofer or two is needed. This sure doesn't help the size issue any.

Horn Integration - The aluminum exponential and the plywood radius short horn just don't sound the same.

After many experiments, we recognized that we stiffened, damped, and tweaked the basic VOT technology well into the region of diminishing returns. To successfully overcome the remaining drawbacks meant *major* changes, a rethinking of the basic system design to the point where the result probably wouldn't look or sound much like an A7 when finished.

We needed a smaller cabinet along with a lower system tuning point to address size and bass issues. It turned out that Altec had

been building such a cabinet for many years, the Model 816. The 816 is basically an A7 horn with a much smaller internal reflex volume.

Well, we built a pair of 816 cabinets (ash veneer - still in the shop somewhere) following Altec's plans, and stuffed them with ALNICO 515Bs. Next came a matching pair of boxes to house the 811 horns, with provision for filling the interiors with sand. We filled the exterior horn concavities with patching concrete and mounted a pair of 806-A ALNICO compression drivers on the resulting 811 module.

Nice looking system; small footprint, tuned at 40 Hz, crossover at 800 Hz, 16 Ohm impedance. It sounded good in most respects but the midrange was not as articulate as the A7.

The reason turned out to be standing waves created between the parallel non-flared sides of the 816 horn. With the sides at 16.125 inches the fundamental resonance was at 419 Hz. Altec avoided this standing wave problem in the A7 bass horn with non-parallel surfaces for the short horn sides. An additional effect of the parallel sides in the

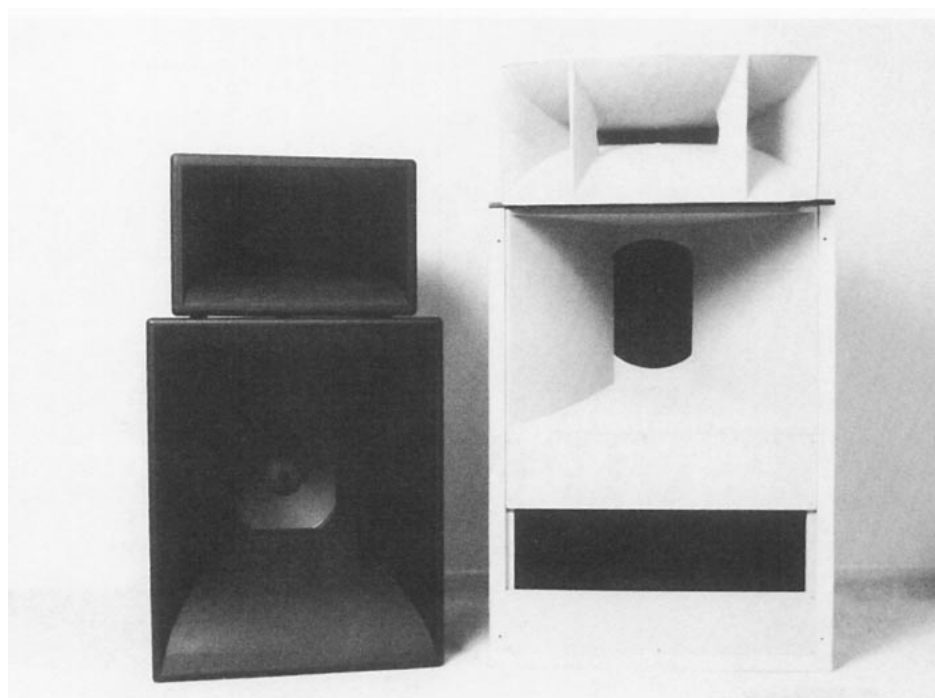


Fig 1 — Exemplar system shown with camo white A7 for comparison

816 was a higher horn cutoff due to a smaller mouth area compared to the A7, 177 Hz versus 160 Hz for the A7. These problems made a smooth transition out of horn loading more difficult.

Although our faith in the Altec drivers and horn technology was high, we slowly realized that we would have to create a system tailored to our goals to realize the full potential of horns in a home listening situation. We wanted the entire system to have a footprint smaller than an A7, offer a seamless blending of the horns, and play deep, loud, and clear on a measly triode watt or two.

Enter the Tractrix

It was during this period that we heard a full range speaker system employing tractrix horn flares for the midrange and bass drivers. The tractrix flare, although not new, has seen a resurgence of interest in the last few years thanks to the efforts of Dr. Bruce Edgar.

The tractrix expansion is unique in that it is the only horn flare whose mouth terminates at 90 degrees to its central axis. It is also the only flare that can produce a spherical waveform and it offers very low mouth impedance reflections compared to other horns. The effect of this flare is a horn that does not sound like a horn. The music is clean, clear and natural without the characteristic *horn* signature. What a difference!

We started to wonder:

- Would high efficiency, professional quality drivers excel in tractrix horns?
- Would compression drivers be suitable for use with tractrix horns?
- Would a simple two-way design be feasible and adequate?
- Would our favorite vintage drivers be suitable for retrofit?
- Could bass reflex be effectively integrated with tractrix?

We decided that working out positive solutions to these questions would bring us closer to our goal of overcoming the A7's drawbacks and improving the overall listening quality of our Altec-based horn systems.

Bass Horn Module

We started off on our design quest with bass cabinet design. In designing the bass horn we had to juggle a bewildering number of inter-related factors. The going was slow as we wrestled to produce the optimum blend of aesthetics, performance, and size using spreadsheets and CAD tools.

A few of the major factors we dealt with were:

- a. Horn shape - round, square or rectangular
- b. Mouth area/cutoff frequency/aspect ratio
- c. Overall height to allow acceptable compression driver horn mounting height
- d. Driver mounting depth to allow ease of compression driver time domain alignment
- e. Optimum internal reflex volume versus aspect ratio
- f. Materials and construction techniques
- g. Tuning

What finally emerged from our brainstorming and number crunching activity was a freestanding, wooden, rectangular tractrix bass horn with a mouth cutoff of 135 Hz., and four 6 inch diameter rear-firing ducted ports. In order to meet our design goal of a relatively compact two-way system with extended bass response, and also utilize free standing tractrix horns to the maximum extent feasible, we decided to handle the bass below a predetermined point without horn loading. Overall dimensions of the finished product are 33" tall, 26" wide, and 25" deep and the visual aspect is far more domestic than the old A7 bass cabinet (**Figure 1**).

Since direct radiation would be important in the region where it blends with reflex energy, the bass driver would have to perform from the deep bass through the upper midrange—a span of 6 to 7 octaves. We also needed high efficiency and a reasonable reflex volume requirement.

Our initial modeling efforts concentrated on finding a woofer that met these requirements. Plot after plot of Theile-Small parameters yielded few contenders. Our favorite vintage Altecs, 416s and 515Bs were knocked out fairly early in the process due to their low mass rolloff frequencies and large reflex volume requirements.

What we needed was a driver with a huge motor, a very light and stiff cone assembly, and $F_s/Q_{es}/V_{as}$ values that allowed the best tradeoff of box tuning and mass rolloff. In a nutshell, we needed a driver designed for horn loading. Our search finally led to the current production 515-8G from Altec.

Reflex modeling for the 515-8G looked good but we were concerned about mass rolloff. Altec Applications Engineering assured us that with the light, stiff cone and large motor assembly on the 515-8G, the F_s/Q_{es}

ratio didn't tell the whole story. Altec assured us that we could expect flat magnitude response to at least 1 kHz in our application.

While we were thinking about what to do for a midrange horn, we set up a few prototype systems using the new bass module with Altec 511Bs. The unit was set up to allow flush front mounting the 511B horn with compression driver time domain alignment, and a vertical central axis height of 39 to 41 in. The 511B horns and Altec 902-8B compression drivers were installed in sand-filled boxes for mechanical damping.

We set up this prototype system for listening evaluation in four venues over several months. We tried both a stacked D'Appolito arrangement with Altec 511s (**Figure 2**) and more conventional single bass module per side with 511 compression driver horns. Listeners usually mentioned the bass modules' low distortion, high articulation, and natural transients. In smaller rooms, we got a fundamental bass response down to 20 Hz. The low end of this system got consistent praise from listeners.

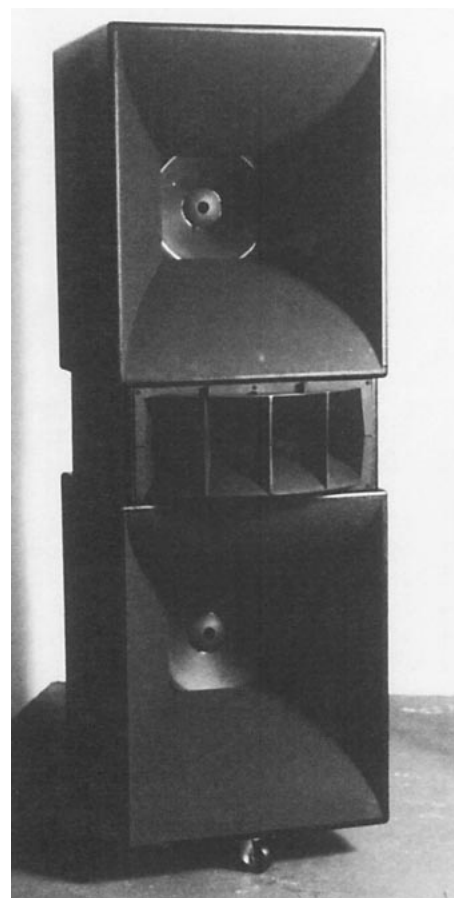


Fig 2— Experimental d'Appolito configuration using bass horn prototypes with sand-damped Altec 511B HF horns

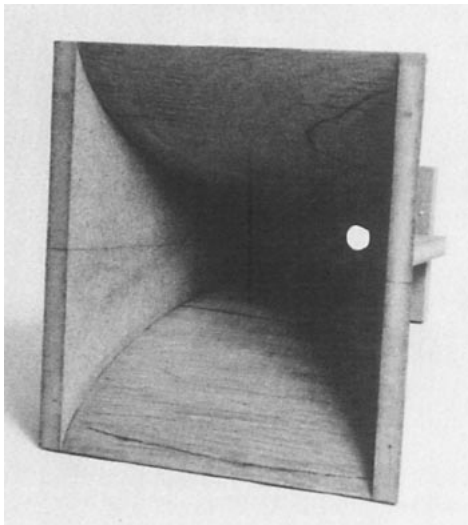


Fig 3 — Early prototype 333 Hz 35° tractrix HF horn.

Unfortunately, comments regarding our superdamped 511B horns and 902 compression drivers were also consistent — they were way above average for 511Bs due to the sand damping but they didn't really click. Nobody could put their finger on it, but something wasn't quite right. These findings sure kept us motivated to continue our HF tractrix horn development program!

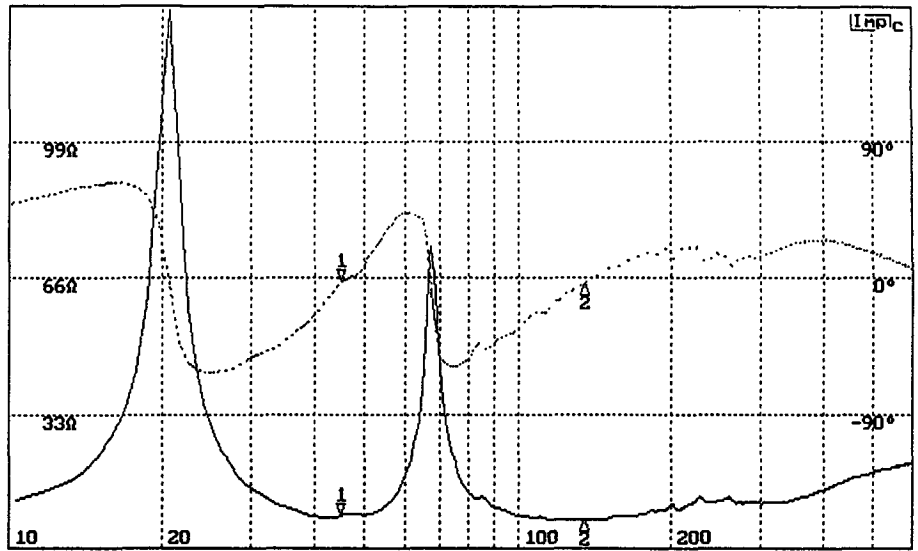
One of the big lessons we learned during this period was how different the horn profiles actually sounded from each other. And when different types were mixed, such as a VOT bass with a tractrix treble, or a tractrix bass with an exponential treble, their unique signatures were very apparent, and didn't sound well integrated. When we switched to a tractrix horn curve for compression driver loading that problem went away and the LF and HF sounded as one. The Exemplar system had been born.

Tractrix Compression Driver Horn

The prototype tractrix compression driver horn was also fashioned from wood, covered a narrow 35 degrees in the horizontal, and had a mouth cutoff of 333 Hz. See Figure 3. It was obvious from the first note that it shared the high articulation and low distortion characteristics of the bass module.

Working prototypes were then produced with a wider 70 degree horizontal dispersion, which more closely matched the bass modules in coverage angle and sensitivity. The larger mouth area produced a cutoff frequency of 232 Hz. We adopted this horn

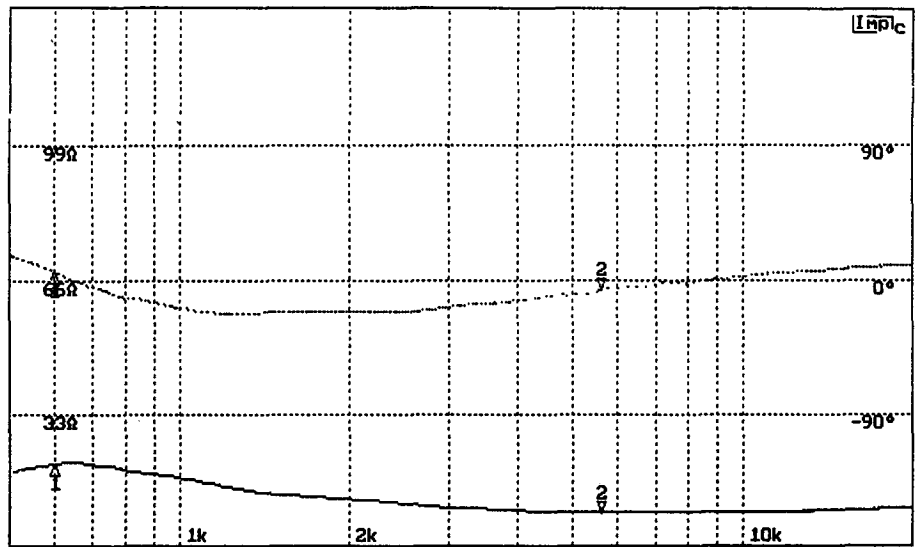
2:SIZE 3:RATE 4:INPUT 5:MKR1 6:MKR2 7:WINDW 8:GAIN DATA c IMP AUDIO ANALYZER
 2048 1.92kHz MIC 48 144 NONE
 acquired: 17:26:20 11/20/1994



45.00Hz: Z=8.38, -2.3°

135.0Hz: Z=7.41, -3.4°

2:SIZE 3:RATE 4:INPUT 5:MKR1 6:MKR2 7:WINDW 8:GAIN DATA c IMP AUDIO ANALYZER
 2048 61.2kHz PROBE2 20 187 NONE
 acquired: 17:34:17 11/20/1994



600.0Hz: Z=20.6, 6.53°

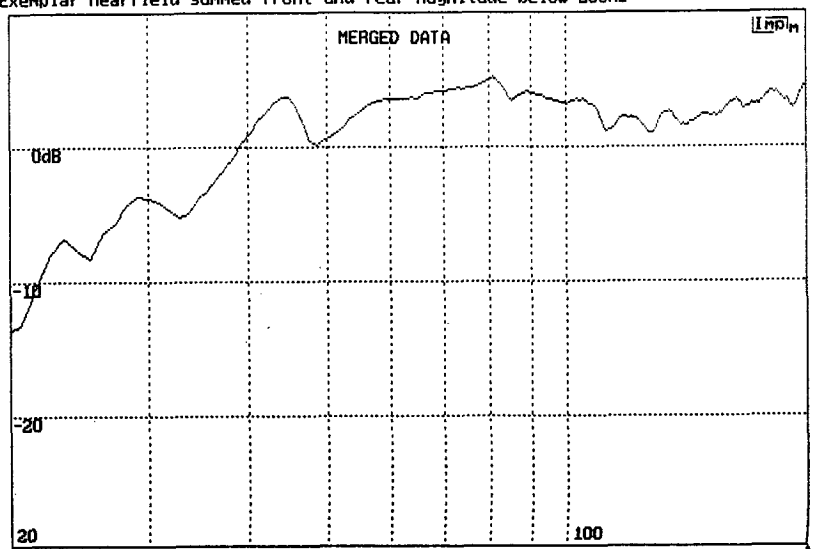
f0= 2886.

5610.0Hz: Z=8.68, -6.5°

Exemplar nearfield summed front and rear magnitude below 200Hz

Top to Bottom

Fig. 4
 Fig. 5
 Fig. 6



profile for the final design as pictured throughout this article.

An interesting thing happened about this time that at first seemed to be a disaster, but eventually proved to be significantly beneficial. We contacted Altec to order some 8 Ohm aluminum diaphragms and were told they were going to be discontinued—the aluminum alloy Pascalite would effectively replace them when all stocks were exhausted. This was distressing. I had compared the two diaphragms on 802-Ds and felt the aluminum had superior extension/transient response.

Gary Jones at Altec listened patiently but was confident that the Pascalite would be superior on the 902. The major difference between the 802 and 902, aside from the magnet material, was the phase plug. The newer Tangerine phase plug (802-8G and later) was designed for more output above 10 kHz, and the even newer Pascalite diaphragm took full advantage of it. We tested and listened to the 902-8As (effectively transforming them into 909-8As). Gary was right.

System Integration

Initial testing showed few surprises. The bass module impedance and phase curves (Figure 4) revealed standing wave effects in the 200-250 Hertz region created by the internal dimensions utilized. The enclosure was stiffened and additional damping material was incorporated to minimize any effects. The tuning point is at cursor 1, 45

Hz., and the minimum system impedance at cursor 2, 7.41 Ohms at 135 Hz.

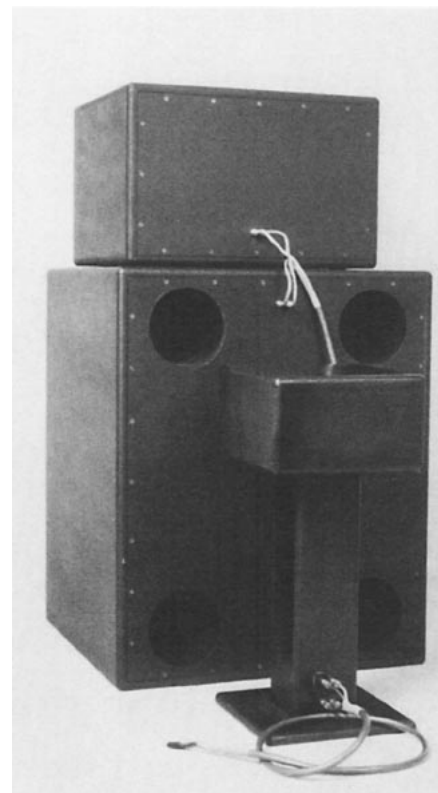
Figure 5 for the compression driver shows the passive crossover at 750 Hz, a benign phase response, and a minimum impedance of 8.68 Ohms at 5610 Hz.

A composite magnitude plot of front horn/cone and rear port radiation for the bass module is shown in Figure 6.

The quasi-anechoic magnitude response curve for the compression driver (Figure 7) reveals the basic characteristics they all share; peaks centered around 2 and 4.5 kHz and falling high frequency response. Interestingly, the tractrix did better in the extreme top end than either exponential or constant directivity horns, which were typically down by 10 dB and 20dB respectively at 20 kHz.

This peaked and rolled unequalized response is what gives compression drivers their presence and speech intelligibility and it also explains why a simple shelving control will not produce adequate results in Hi-Fi applications. If you shelve down the upper midrange to match the woofer the high frequencies are lost; if you crank up the high frequencies the upper midrange drives you over the edge.

Figure 8 indicates what we accomplished with passive equalization - same test setup, same driver. An additional benefit to this equalization was that the compression driver sensitivity could be matched to the woofer



A separate sand-filled enclosure houses the Exemplar crossover

and thus eliminate the need for series padding resistance in the high-pass circuit. The resulting system sensitivity is 103 dB/SPL @ 1W/1m.

A Better Crossover

The vast majority of two and three-way speakers are designed with passive

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2048 61.2kHz MIC 11 120 NONE 0.00dB ---- 2048 61.2kHz MIC 11 120 NONE 0.00dB ----
acquired: 13:47:48 11/25/1994 acquired: 15:16:38 11/25/1994

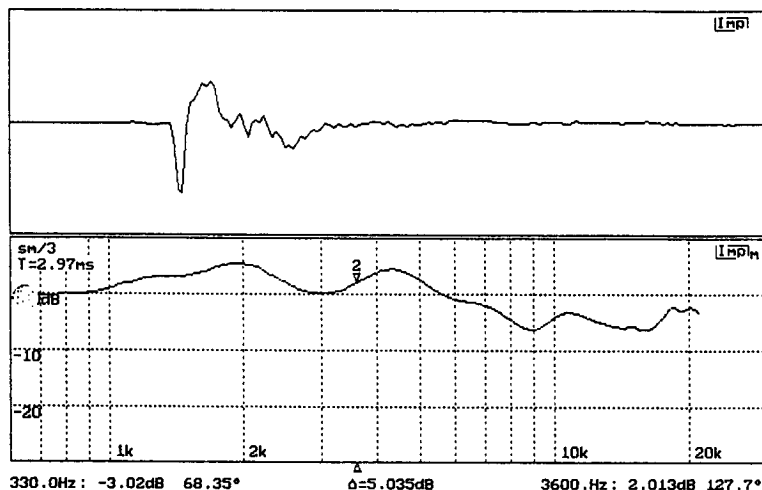


Fig. 7— Unequalized system response

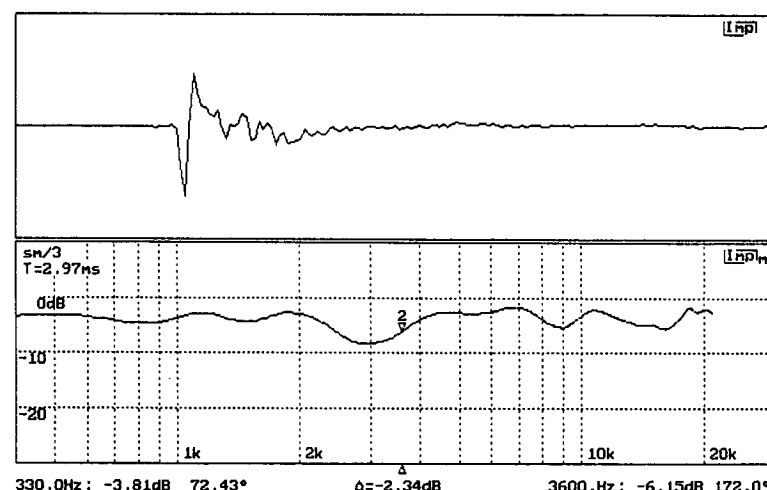
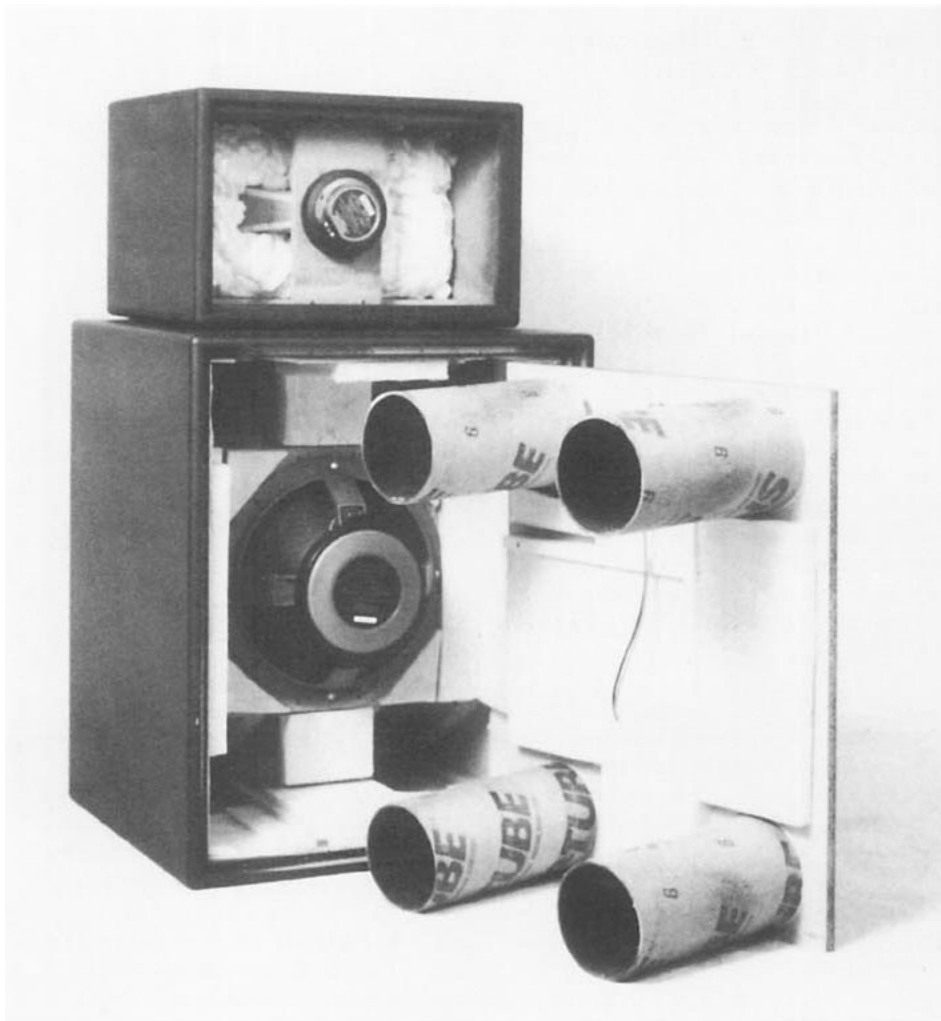


Fig.8 — System response with passive EQ



Interior aspect of Exemplar cabinets showing ducted port construction

crossovers. They are relatively simple to implement for the manufacturer and hold down cost and complexity for the user. You just plug in an amplifier and play!

Unfortunately few commercial crossovers use premium parts and bi-wiring. Even fewer can be easily bypassed to allow direct access to the drivers and not many are contained in separate outboard enclosures to eliminate the acoustic and magnetic effects of a hard working woofer nearby.

The Exemplar passive crossover was designed with all of these concerns in mind. Housed in a separate, sand-filled enclosure, it is completely bi-wired from the supplied speaker cable right up to the individual drivers. Reactive signal path components were chosen for their sonic merit — Solo CFAC inductors and Sidereal capacitors.

For cable and point-to-point wiring we selected long crystal copper developed for the Japanese super-conducting magnet program.

The crossover point and slope are 750Hz and 12dB per octave, the filter type is Linkwitz-Riley. Internal enclosure wiring is also super conducting magnet type, 12 AWG to the woofer and 18 AWG to the compression driver.

Drivers

Why do we use premium drivers anyway? After all, the Altecs cost many times more than the typical drivers found in most high-end speakers. Wouldn't less expensive drivers have been just as good? Frankly, *no*.

The Altecs have a lineage that traces directly back to the Western Electric theater systems introduced in the 1930s. They deliver linearity, high efficiency, and long life. We are continually impressed by old Western Electric/Altec drivers that perform flawlessly and continue to sound excellent after 30, 40, and 50+ year "break-in" periods.

The newer magnet materials used in the Exemplar drivers aren't sensitive to temperature and mechanical shock like the older

Alnico Altec motors and they aren't as susceptible to overpower problems like the old Alnicos. In short, the quality plus proven performance and longevity of professional quality Altec drivers should easily offset their higher cost. They should outlast their owners!

But how well do they work? — the inevitable bottom line, and a good question. This project didn't start out as an exercise in blending engineering and art for its own sake, although there is powerful satisfaction in turning a concept into a physical reality through innovation and creativity.

Our basic goal from the start was to fashion improvements in looks as well as sound, to better satisfy aesthetic sensibilities and to enhance emotional responses to music. It needed to work on visual and sonic levels.

Looks

The matching, complimentary, horn flares terminate at 90 degrees and then continue to quickly curve away, and at the same time into each other, via the rounded cabinet edges. Flat cabinet frontal area is simply nonexistent, the horn is dedicated to producing direct sound from the drivers. The curves lead the eye inward as well along the junction of the surfaces, and give visual form to the concept of the tractrix.

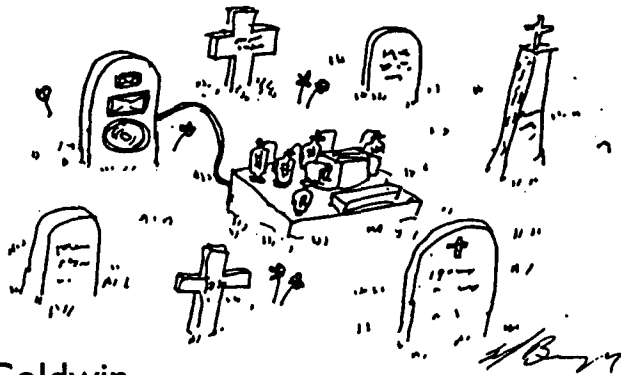
Sound

At times the speakers utterly disappear in an acoustic sense, like articles of furniture sitting mute amid sonic figures arrayed on the soundstage. They can seem totally out of place. . . we have found ourselves wondering "who parked these objects in the center of all this musical activity?"

So, after eight years of modifying, redesigning, substituting, measuring, and countless hours of listening, we finally managed to create a horn based system that does all the things we were told horns aren't supposed to be able to do. Things like deep and wide soundstaging from virtually any listening position in front of the speakers; flat, extended treble response from a compression driver, transparency; and emotional impact.

Obviously, we are very pleased with the results of our efforts. We are also pleased to be part of the resurgence of horns and triodes for home listening. By the way, some of the motivational credit has to go to the "theys" who said it couldn't be done!

WHY THIS REVIEWER IS DESTINED FOR MASS SUICIDE



by Seth Goldwin

Ain't no free lunch, pal . . .

Since building my single ended kit amps last summer I've been on a more or less full time search for a pair of speakers for them. I've heard a decent variety of low to medium cost speakers that sound good with 30 plus watt amps, but when you get into the sub 10 watt arena you *really* need an efficient design and, so far, most the speakers I've heard that claim to work with watt-wimp amps just didn't cut it when I installed them in my living room and gave a serious cranked up listen.

This time out I wanted to get serious and find something, *anything*, that really rocked my world. Furthermore, I wanted to compare whatever I found to a real fine, fine, super fine solid state amp/acoustic suspension setup. I guess the idea was to compare the fringe world of single ended amps to the mainstream cult of solid state amps, and settle for myself whether one kicked the ass of the other or what.

To do this I rigged my homebrew buffered passive preamp to have two switch controlled amp outputs. With minimal effort (two switch flicks and a volume adjustment) I'd be able to A/B the two major thrusts in audiophilia today and give you, the curious public, my report.

Well, do this I did. Despite every piece of evidence that he was committing review suicide by letting me have a pair—since the magazine I write for *loves* SE amps driving efficient speakers, and "hates" solid state amps driving acoustic suspension speakers—Ken Kantor, master of NHT and all he

surveys, demonstrated the ample faith he has in his ability to design a world-class speaker and sent a pair of his flagship speakers, the 3.3s.

I powered these with the solid state Acurus 3X200 amp I usually use in my home theater rig. The other camp was represented by my hand (and home) built Audio Note Kit One 300B single ended amp and sometimes my fairly well-tweaked AES kit amp, now modified to use 2A3 tubes to pump out a bullet-stopping 3.5 watts.

The sources were a Pioneer PD-65 CD player used as a CD transport, an unimproved Theta Basic D/A converter (the official current version of this product is III, but I'm still digging the I) and a really cool, very cheap, Sumiko Project One turntable and a terrific \$800 phono stage from Golden Aero Tubes. Almost all the wire is Kimber Kable, PBJ interconnect between everything and 8TC from the Acurus to the NHTs. Speaker wire from the Audio Note amp is . . . Audio Note. Just to be different.

NHT 3.3 These speakers have been near ecstatically reviewed by a lot of people who ordinarily would rather be accused of sleeping with goats than of agreeing with each other: Corey Greenberg, Peter Aczel, Mike Fremer, D.B. Keele and some guy from *Sensible Sound* to name a few. Well, I'm here to tell you they're all wrong, maaaaaa! No, actually, just kidding. These speakers are so good and provide such a pleasing and easy access to just about the highest level of reproduction of recorded music that I would have no problem recommending their purchase to *anyone* who could afford them.

The 3.3s are unusual in design. They stand 41" tall, are 31" deep (!), but only 7" wide. The fronts of the speakers are angled and contain three drivers, each in its own enclosure within the larger cabinet. A butyl foam strip runs along the outside edge of the tweeter and midrange drivers, to catch image smearing first reflections before they happen. The fourth driver, a big 12" woofer, is on the inside edge of each cabinet near the back. The whole thing is veneered in a durable, cool-looking black. There's some disagreement I guess about the looks of these speakers but I like 'em a lot and so has everyone who's come over since I got them.

Since the whole arrangement is so tall and thin, and therefore unstable, two metal stabilizer bars are screwed to the bottom of each cabinet to extend the surface touching the floor by another 3" on each side so the massive 123 pound *each* cabinets don't fall over and crush your cats while you're sleeping.

Every single unusual aspect in the physical design of these speaker is extremely deliberate, based on science, and part of a very explicit set of design goals. These goals being: extremely flat, full range frequency response in *your* room, very high volume capability and correct stereo performance. The idea of the speakers is to *exactly* follow the manufacturer's instructions for room placement and, except in rare cases, hear exactly what the speaker's designer intended you to hear.

The instructions are to put them as close to the rear wall as possible, preferably about 3" away, then to align them to be exactly parallel with both each other and the side walls. Sit at roughly the same distance from the speakers as they are from each other (i.e., make an equilateral triangle) and you're there, dude. I actually ended up sitting a lot farther away than that, and surprisingly, this had the effect of opening up the soundstage even more while not yielding the image focus an iota.

Placed this way, the speaker's woofers are firing into a 3 surface "corner" made up by your room's floor and back wall, and the slab of the speaker's cabinet. By enforcing this, the speaker was designed with the designer knowing what kind of acoustic environment the woofer would be firing into. Compare this with speakers designed to go *anywhere* and you can see the advantage. While the woofers are firing away into their virtual corners, the three way design on the angled front of the cabinet is pushed 31" away from

the back wall, angled in by 21 degrees, and stray reflections are scooped up by the foam strip. In other words, this part of the speaker is designed to both minimize room reflections and to put the listener in the right place for best channel separation and minimal interaural crosstalk.

As I understand the design, its purpose is to work *with* your room, to minimize the effects of the particular room on the sound of the speaker. That is, what you hear out of *your* 3.3s is likely to be what I hear out of *my* 3.3s, which is likely to be real close to what Ken hears outa *his* 3.3s.

Traditionally, you get a speaker and spend the next three months driving yourself and all around you crazy making infinitesimally small adjustments of the speaker placement until it sounds least bad to you. The 3.3s on the other hand were pretty optimally set up within a week. This may not be a positive selling point to those of us who have made a life commitment to the geekier edge of audiophilia, but it's a godsend for those who want to hear their music as it was recorded.

When I first put these speakers in a couple of months ago, I was astounded by their unparalleled bass performance and complete precision of focus. But I was less than blown away by their rendering of acoustic space. In fact, I thought I preferred the *el cheapo* SuperZeros. Why? I wondered. This actually lead me to one of the very few insights I've ever had about music reproduction.

Where I'd placed the SZs was almost exactly half the distance between the listening sofa and the back wall. I'd arrived at that placement by the time-tested method of moving the suckers around 'til they sounded "right." What that position does is provide a falsified illusion of depth and palpability, that is not necessarily the depth recorded. Only after listening to a good chunk of my CD collection over a period of several weeks did I fully come to trust what I was hearing from the 3.3s. On some discs, the soundstage was completely flat, while on others it would stretch to Cincinnati. With my SuperZeros I got a bigger picture, but much less variety.

The point is, that once I got used to it, I realized that these speakers tell you what's been recorded. Not everything always sounded pretty, but that's because not everything is pretty. Man, I can't tell you how *liberating* it then became to start listening to my records knowing that what was *on* the record was what I was hearing. Finally, I had speakers I could trust! The actual meaning



NHT 3.3

Perennial high-end favorite
big rig loudspeaker system

In-room response 23 Hz-26 kHz +/- 2 dB
Sensitivity 87 dB SPL@2.83V
Impedance 6 ohm nom, 4.3 ohm min.
Recommended Amp power 30-300W
Size 42" x 7" x 31" HWD
Weight 123 lbs. each

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535 Getty Court, Suite A
Benecia, CA 94510
1-800-NHT-9993 voice
1-707-747-1252 fax

of reference gear became clear to me for the first time. And I'm telling you, all other speakers with the temerity to enter my listening room are gonna have a tough time.

The bass on these speakers is mind-blowingly good. I've never heard better in my room. It was precise and tight, yet fully capable of grunting like a tortured demon. This is bass so damned good you don't even notice it. Know what I mean? Usually on speakers with "great" bass, like the B&W 801s you're all sitting around being *pummeled* by waves of low frequency energy going "Hey, man, isn't this great??" while secretly hoping the apocalypse will happen *now* and the electricity will go out and you'll be free, oh, free, free at last, so help me God!

Not the 3.3s. Instead, all you hear is the bass energy that was recorded, in correct proportion and weight to the rest of the music. I threw all my bass-heavy shit at these speakers, and even went out and bought more. Art Zoyd, Melvins, Metallica, the killer new PJ Harvey: all went down like honey. Angry, scary honey, perhaps, but still sweet to my ears.

Another outstanding, but somewhat confusing, feature of the 3.3s is the laser-locked focus these guys provide. Why confusing? Because they don't image in the way I've heard some other focus-monsters do. For instance, the Wilson Watts seem to not only paint the picture of the instrument being played, they draw a black line around the

picture like a child's coloring book so none of the color leaks out. While this can be a cool effect, to me it seems to be another lie, another way that audiophiles demand a little more out of reproduced music than they do out of live music, or for that matter the music that has actually been recorded.

With the 3.3s it is abundantly clear where and what is being played. However, those sensations are not then hyped up to a carnival level presentation of imaging fakery, like you'd get out of say, the Avalon Ascents.

Incidentally, forget about tubes with these. I tried powering them straight, and biamped, with my big gun (ex-big gun. I sold it.) 30 watt Lectron amp and my little gun AN amp and they both sucked. Bass went all to hell when trying to power the whole deal, and even biamped with the Acurus on the bottom, the tube amps, especially the AN, were just too weak to deliver the goods in other than a compressed, over-driven and distorted fashion.

When I first biamped with the AN I thought I loved it, but then the weekend came around and I turned the volume up a little and found out what it really sounded like. Just do like all right thinking Americans do and use a big solid state amp.

Overall, the 3.3s produced music in a wholly neutral and transparent way. After my initial concerns, it became clear that on disc after disc what I was hearing was what was recorded. If I didn't like the sound, it wasn't



Stage Accompany PS 44

Upscale home speakers from a Dutch leader in pro sound gear

Response 40 Hz-32 kHz +/- 3dB
 Coverage angle HxV 110° x 40°
 Nominal Impedance 8 ohms
 Sensitivity 93 dB, 2.83V@1m
 SPL dB Program/Peak@ 1m 115/121
 Size 22.6" x 14.6" x 14.4" HWD
 Standard Finish Anthracite coating

Stage Accompany USA
 6573 Wyndwatch Dr.
 Cincinnati, OH 45230
 513-624-9977 voice
 513-232-8709 fax

the fault of the speakers, it was the fault of the recording. This is a big deal not so much because I want some of my records to sound bad, but because it's important to me to hear my records as they actually are even if they do occasionally sound bad.

STAGE ACCOMPANY PERSONAL

After Joe Roberts went wild about how cool the Stage Accompany ribbon tweeter sounded with his Onken box bass cabinets in issue #7, the company was moved by his impassioned prose to call him up and offer the chance to listen to their packaged speaker, the Personal. Joe showed greater generosity than I ever would've and got them sent to me for inclusion in this review.

And for that, I lick the ground just before where his boot steps might fall so that no dust shall ever impede his path because *finally* I've found a great sounding speaker that can be happily powered by weensy-teensy watt-wimps. After many happy weeks auditioning these babies, they have only two real drawbacks: they cost \$4,300 and they're *red*. The Personals offer a silky smooth, super detailed high end, a charming midrange, and a powerful, articulate bottom end on almost no power!

They're reasonably sized, about 23" high, 15" across and 14" deep. They are a very simple two way, front ported design mating a 12" paper cone woofer with a version of the totally excellent Stage Accompany ribbon

tweeter and have a rated frequency range of 35Hz to 30 kHz.

Revealing Stage Accompany's Dutch roots in international pro audio, the Personal uses the completely consumer-alien SpeakOn connector. While the SpeakOn connector is convenient, easy to use and guarantees a solid connection at both ends, it's completely useless unless you've got SpeakOn connectors AT BOTH ENDS!! Which, of course, I don't. So I had to jerry-rig SpeakOn connectors on the speaker end and then solder regular old speaker cable (the green Audio Note stuff I had) to the naked ends. If it sounded bad you could question my setup, but since it sounded GREAT I guess the issue is moot.

The Personals are housed in a thick and heavily braced MDF cabinet, and as I said, mine were finished in an actually kind of cool, but *definitely* noticeable Ferrari red lacquer. I've been assured, however, that you can get other, more restrained, colors upon request. [*They probably send the red ones to reviewers to make sure they send them back — ed.*]

Before I got the specs on these I guesstimated sensitivity at 96dB. As it turns out, they are only 93 dB but man they sounded clear and loud even with my smallest amp. While raw efficiency obviously counts, there's clearly more to it than just that: for instance, a smooth, highish impedance curve.

The best sound I got them was with my 2A3 powered AES amp and that's what I did most of my listening with, though I also tried the AN amp and the Acurus. I was able to drive both of the li'l amps into clipping before reaching actually painful volume levels, but was able to hit and sustain more than reasonable volumes, even with the tiny 2A3 amp. With the 200 watt Acurus I was able to wake the dead and then kill them again. These suckers play *LOUD!* Again, even with the 3 watt 2A3 amp, I got really good sounding, powerful and tuneful bass. Not quite in the 3.3 league, but then again virtually nothing is.

As usual, I spent a lot of time moving them around in my room looking for the ideal spot but these just weren't that position sensitive. The first day I had them, they sat on the floor and boomed bass willy nilly. I immediately put them on 16" stands and like that, boom, the bass tamed itself. Once on stands, no matter where I put these in my room I got at least real good sound. The best setup was in the traditional hifi location about a third of the way into the room and approximately 30" from the side walls. I toed them in, feeling I got best imaging that way.

Overall, the SA Personals fared well in comparison to the 3.3s, suffering only in quality and extension of the lower bass. They also gave up a little of the extraordinary image focus of the bigger, badder 3.3s. What they offer in recompense is a smoother, more grainless treble. And volume. The Personals were completely satisfying playing off my littlest amp. I couldn't even *hear* the 3.3s when I tried to play them off 3 watts.

Given the paragraphs of spume I spew on speakers I don't really like, I got relatively little to say on these. They're just real damn good speakers and do nearly everything well. Great tonal balance, good dynamics, terrific bass and midrange, outstanding treble range, better than good imaging and soundstaging. I could be real happy owning these speakers, and would expect that satisfaction to last for a good long time.

While I had the Personals and the 3.3s set up for the wall to wall A/B comparison I had a fair number of friends come by and hear the two. Much to my surprise, the consensus of opinion as to which was better correlated almost exactly with the degree of audiomania: those with more liked the Personals, those with less liked the 3.3s. Interesting, huh?

SHOOTOUT CONCLUSION

The NHT 3.3s win. I'm buying them. Best, most pleasing, most music-like reproduction I've ever had in my apartment. While still being the most expensive thing I own, the \$4,200 price tag strikes me as a bargain for the level of sound quality that they deliver.

The Stage Accompany Personals come surprisingly close, giving up the edge only in bass extension and clarity and in imaging focus, but beating the 3.3s in treble smoothness and air.

As mentioned above, the big deal for me in this review was to finally put a topnotch efficient speaker up against a really good "mainstream" speaker. I got real good, rock-in' sound out of both the 3.3 and the Personal, both of which were sound statements I could be happy living with.

But, in the final analysis I decided to purchase the big NHTs because they gave me the most perfect insight into the actual recorded musical event I've heard in my living room, single ended or not.

So, I'm glad that I finally found a cool sounding efficient speaker in the Stage Accompany Personal. But, you know what? I'M STILL PISSED OFF. And I'll tell you why. After listening to really quite a few speakers these are the first ones I've found that I *really* want to own to use partnered with my single ended amps. So, that's a good thing, right? Yeah, sure, of course it is but these cost more than \$4K!!! Well, so what, I hear you saying, the NHT 3.3s cost more than \$4K too!

But here's my point: without really suffering *that* much I could be happy listening to my old Dynaco and a pair of \$230 SuperZeros plus a \$600 SW2P subwoofer. But if I *had* to slot in a sub 10 watt amp I would not be happy with *any* of the speakers I've seriously auditioned in the last year given my listening habits except for the Stage Accompany Personals.

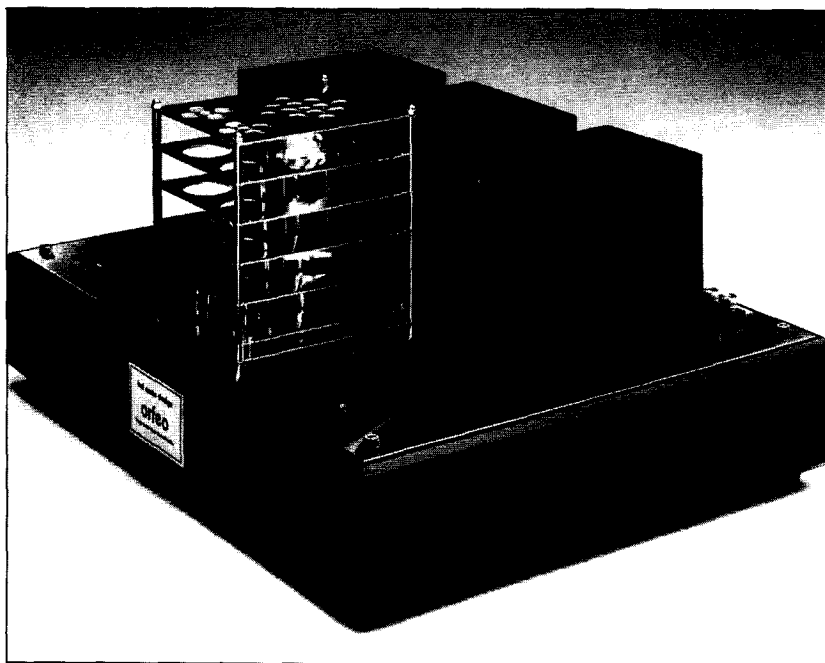
Sure, they're a *lot* better than my lowest level of acceptability, but why isn't there *anything* in the \$0 to \$4,000 price range? See what I'm saying? You can get a really pretty cool sounding stereo rig together for about

\$3,000 but NOT if you go single ended. Then you gotta pony up and PAY THE PRICE.

In other words the single ended pursuit, like high-fi generally, is a completely fringe pursuit open only to two types: A) those with wad after wad of long green to cast into the stereo rack, and B) the simultaneously unemployed and technically talented with the time and skill to build their own.

Since we all know that food tastes better when you kil't it 'urself the single ended pursuit of perfection really belongs, morally, to those in group B, and group A should move on to sailboats which are more efficient at sucking up money.

Given that, I think the reviews I've been writing, essentially trying to bring an off-the-shelf product focus to what at this stage of market development is properly an experimenter/DIY pursuit, are bogus. Build more, buy less, have more fun. That's what I say.



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Casual Reactions:

The Search for Audio Tranquility



by Herb Reichert, Audio Note NYC

Get the tweak monkey off your back

Audiophiles who have never abused drugs or alcohol should consider themselves very lucky. Can you imagine an audio fiend on crack? He would be down the toilet to Trollsville in 48 hours. Once the audio obsession hits most music lovers are finished, never to enjoy music again. Did you ever see one of these wino-trolls walking down the street talking to himself. . . swatting flies that are not there, turning around in circles, or arranging broken bottles in perfect order? This guy is listening to voices in his head. There is a little committee up there in the control room of his skull and this crazy committee can't agree on anything. The Troll drinks and drugs to turn off these voices — or at least to turn the volume down.

From where I am sitting, it looks like most audiophiles also have voices in the head. . . "Sammy Davis says Tango is the best, but he uses 2.5K with 300B." "I thought that they used REAL *Tang* with the vodka, now you are telling me. . . Keith Richards says expensive winos must always parallel output tubes and never use oil caps." "Herb told me the Quad ESL was a wonderful speaker." "That's funny, cause he told me it was slow and incorrect." Reggie says, "Always bypass." Ricky says, "Lucy knows best about tone character." This is not funny, I get calls like this every day! An evil virus infects the mind of the restless audio consumer. People become addicted to the hi-fi 'good sound' fix. They don't realize it is not good sound but *good music* they are after. A few minutes of musical pleasure here, some tight bass there, soundstage everywhere — always trying to capture and hold on to some memory of audio bliss where it all comes together.

Winos call the first drink of the day "getting connected". Audiophiles think good connectors get them closer to the music. The guys selling audio magazines know that audio is a drug. So do the manufacturers. The minute you stop concentrating on the music and the little voice in your head says, "Maybe the bass is soft. . . maybe the string tone is wrong. . . too strident, maybe I should move my speakers," you might as well be out on the street selling your bod to get bucks for crack. You are G-O-N-E.

I know what I am talking about because I keep getting this same disease. The uncertainty, the confusion, the lack of clear facts all make audio difficult but it is the voices in the head, fueled by the voices in the audio press and the words of the audio salesmen that send us to Trollsville.

Crazy Facts and Twisted Lives

Reckon me this: The 1994 *Audio Directory* lists at least 2600 (!) different audiophile speakers. Five years ago, the same directory listed a *different* 2600 speakers. All but ten or so of these 1989 speakers are no longer manufactured. Worse still, how many cents on the dollar do you think you can get trying to sell one of these five year old speakers? It is important to grasp the absurdity of this dynamic.

Try calling up the manufacturer of your preamp and telling him your system sounds bad and you think his preamp is the cause. My guess is you will learn that the man who designed your amp is a wife-beater, the manufacturer of your cables is a fraud, and the store that sold you the system is misanthropic. If you think your system could sound better than it presently does, please believe me it is not your fault. The only thing you are guilty of is not telling your wife how much you spent to get it to sound this bad.

Let's just say I want to 'quit' the audio hobby and just listen to music. I decide I hate building, selling, and writing about audio. I have been doing this a long time, but let's just say I surrender—I am *burned out*. I still haven't figured out how to 'get it right', I am more confused than ever and all I want to do is stop copping audio fixes and sit peacefully listening to some piano music. What do I do? It is like kicking drugs. I may never be happy again. I can't buy a rack system or a wave radio - I am too jaded for that. I am also too jaded to think that just one more big infusion of cash will set my system up right for a long time. All I now want is simple audio peace. I want the voices of the audiophile committee in my head to stop so I can listen to everything ever recorded by Franz Liszt. If you know an easy solution, a patch for my arm or something, please call me now. If you are in this hobby and you have not burned out at least once yet, you will. The fever keeps rising.

Each of us requires a different 'medicine' to bring the fever down and some of us will need quite a large truck to haul away the audio wreckage we created while in the delirium. I spent nearly five years trying to make 4-way horn systems 'work' in my room. These were multi-amp systems with multiple power supplies and exotic tubes and parts. I fell to my knees and begged for help. This is why I stopped with the Edgar Horns—I couldn't do it. . . I broke down intellectually, physically, and emotionally. My wife said, "Don't you listen to music any more? All I ever hear is test tones." Her words were my catalyst. I *knew* she was right. Hell, I was walking down the street and laying in bed scheming system changes. If by accident you are getting like I was, here are a few suggestions and a few observations.

Too many choices

The hardest thing for most audiophiles to grasp is that the loudspeaker plays the room and the room plays the whole hi-fi. The relationship between the listener, the system and the room is the most important relationship in audio. Steve Guttenberg, Chesky's balance engineer, always reminds me: "Don't expect a Steinway grand piano to sound any better on your hi-fi than it would playing live in your room." This rule applies to a full rock or jazz drum kit or a full orchestra. You can't overload the room and expect natural timbre and clarity. All we can hope for is an intimate, naturally proportioned, realistically balanced *miniature* of the recorded performance. Therefore the size of the room, the size and radiation pattern of the speaker, the

decoration of the room and where we sit are very important considerations.

I want you to imagine your listening room with just three or four small, simple pieces of audio equipment sitting on beautiful, low, hardwood altars. Tiny pin-spots illuminate the faceplates and the rest of the room is shadowed with a Rembrandt-like glow. You have created a chamber, a retreat, a place to visit to renew yourself. I believe that if we can create the simplest most elegant system in the simplest, most serene room we can make the voices stop.

The single biggest mistake that audiophiles make is picking the wrong speaker. You can't blame the audiophile too much because there are thousands of really bad speakers to choose from. Unfortunately, once you pick a speaker that goes to war with the room, the hope of audio peace is over. If the speaker is big and ugly, the hope of simplicity and elegance is also lost. So let's start the quest for peace and beauty with small and simple.

Pick a *classic* new or used speaker that has proven its' worth through the test of time. These are easy to spot. A classic speaker is one that has been in production, largely unchanged, for more than ten years AND has retained its original value or risen in price. A one year old Avalon Accent that originally sold for \$16K and is now worth only \$6K is NOT a classic. A Quad 'ESL' that was in continuous production for over thirty years IS. In 1978 the ESL sold for \$535. Today you can expect to pay \$600 - \$1200 for a nice pair. The JBL 'Paragon' and the Altec A-7 are worth ten times what they cost used in 1978! They are too big for our purposes here.

I recommend a small speaker in a small room - this minimizes the amount of obsession required to place the speakers optimally. The original Quad, the Rogers/Spendor LS3/5A, the Spendor BC-1, the Western Electric 755, the Lowthers, and for those of you who do not have a small room, I recommend my favorite speakers of all time: the Snell A2 and A3.

All of these speakers will retain their investment value, in fact they should all go up in value while you are listening to them. Will your current speaker do this? More importantly, all of these speakers are happy with 20 watts or less. Isn't it funny how all the classics (don't forget the Klipschorn) are speakers that work well with low powered amps? A case in point: the original Advent and the Dahlquist DQ-10 were very

popular, decent sounding speakers. Tens of thousands were sold. Today you can barely give them away to an audiophile—too power hungry, not enough (any) quality high-powered amps. Can you name a 100-watt amp that has gone *up* in value?

If you are not a speaker designer, admit it to yourself. Chances are, you never will be. I sometimes like to think I am since I have been trying for 30 years—but I have never even come close to beating any of the above-listed speakers. Sorry, but what I am telling you is that the voice in your head that says, "you can do better" is lying. That is the same voice that told the designers of those 50,000 discontinued speakers, "you can do it - and cheaper too." Yeah, right!

We must stop the war between the speaker and the room. Most systems that sound bad do so because the speakers integrate poorly with the room acoustic. Play a 440 Hz tone and walk around the room. In some places you can barely hear it and in others it will be twice as loud. When I listen to most peoples' systems I become stressed because I feel the conflict between the system and the room. Quality music reproduction is simply a matter of proportion. When the basic tone and dynamic capabilities of a system are in order, in balance if you will, when reproduction has a sturdy, unshifting dynamic balance, then even poorly recorded records seem very listenable. Why? Because great musical art communicates its own proportions and when the mind can recognize these proportions during playback, the music sounds good. All we really need to enjoy our records and CDs is to preserve the basic proportions of the performance.

If you want to find peace with audio, start by TURNING THE VOLUME DOWN! You must learn to listen on a modest scale. The speakers I recommend here will minimize your placement and room coloration problems only if you learn to listen at lower than live volumes. Audio systems actually have greater resolving power at lower volume levels. Playing music quietly shows that you are sophisticated, that you have been around the audio block, and that you have recovered from audio burn out.

More than half way to green pastures

If you have a modest speaker in a modest room and you are sitting in a very nice chair listening at connoisseur levels to some PJ Harvey or some Elly Ameling, you are almost home, but the next step is VERY HARD. Almost no one gets this one: You must figure out what really matters to you most in

music reproduction. Choosing one of my recommended speakers has already limited your low frequency response, some of your high frequency response, and, in the case of the Quad, your dynamic expression. In order to create a satisfying system you will have to find a CD and/or a LP source and some amplification that will not limit you any further. You must have gear that will paint with a full palette of tone color, keep extraordinary tempo, and wring the last bit of expression out of your music software.

This is tough, but it does not have to be expensive. I think many of you are already on the right track because most *Sound Practices* readers already know that a small parts count goes a long way towards creating quality electronics. More important though, is compatibility. The amp, speaker, cable combination is the motor that drives the heart. This combo pressurizes the room and gives the reproduction its sense of life. If the voice in your head says, "you must build your own audio" then build your own amp. It is possible to learn from the classic amps and build something in the basement that will not sidetrack you from your quest for audio serenity.

The *classic* amps, the ones people keep playing music with for decades, have a few things in common. First, they are usually simple tube amplifiers and secondly, more often than not, they have tube rectifiers. The most lovable preamps have tube rectifiers also. There is a beguiling sense of continuity, like a river flowing, that makes these tube rectified electronics subliminally appealing.

There is a similar effect with "split-load" inverters in push-pull amps. The popularity of single-ended amps is based on this feeling of continuity. Single-ended is the purest expression of continuity. The best SE amps also have tube rectifiers. The full wave bridge tube rectifier is rare but the best at evoking this effect. The Mac, Marantz, WE, Fisher, Scott and Dynaco gear mostly had tube rectifiers. They also used Allen-Bradley resistors and some of the most musical of these classic amps and preamps used choke filters. A choke, a tube rectifier, and a simple design are almost a lock when it comes to classic status. Reliability does not hurt either. So what do I recommend?

Lets start with the Quad ESL. This speaker should only be used in small dedicated listening rooms. Its bass performance is near perfect in rooms of less than 5000 cubic feet and rarely 'goes to war' with the room it is

playing in. This speaker's only problems are famous: it beams very badly and its dynamic expression is quite limited. The amp choices are simple; forget the OTLs that were the rave and stick with the Quad II. Get the amp, preamp, and tuner and enjoy your music while you watch the value of your whole system go up. The Dyna ST-70 and Citation II amps are fine also. This system will make your friends feel bad when they go home and turn on theirs. Single-ended can work here, but you must have around 18-watts with at least 20 volts swing at the output. Remember what the expensive wino said. . .

The LS3/5A will be around a long time after the Sonus Fabers are gone. These tiny boxes are the definition of what I have been talking about - let's call them an 'antidote' loud-speaker. I like the Quicksilver Monos (8417), the Dynaco ST-70, the 300B single-ended amp and the 2A3 push-pull with this speaker. Don't laugh, I honestly think the Dyna ST-70 is one of the most satisfying of all the vintage amps. Try not to modify it too much. . . leave it alone and enjoy the music. This speaker can be a fine start towards elevating your internal reference for balanced reproduction.

The Lowthers and the WE 755A are both established classics. Their character is 'fast' and chameleon-like. NOT dynamically challenged. They will play any kind of music. If you don't agree, the voices are talking wild in your head or you are not ready to surrender to audio peace. Two other possibilities; you haven't heard them with a no-feedback triode amp or you are playing them too loud and loading the room in a bad way. Speakers like these are what we climb the mountain to talk to the master about. The Holy One does not use crossovers. With no crossover you hear the cone, sorry! You also see the light.

With either of these classic full range drivers, use the BEST amp you can build or buy. The ST-70 will not do here — I recommend the Audio Note Gaku-Ons (\$252,100.00). The discontinued Snell A2/A3 should still be in production. This speaker has little competition for the rank of most musically satisfying ever! Which amp? 20 - 100 watts directly-heated triode is perfect.

Next you must have a preamp, but recommending preamps is tough for me. There are only a few I can personally say will bring audio peace. Most preamps lack naturalness and ease and therefore will turn up the volume of the audio committee in your head.

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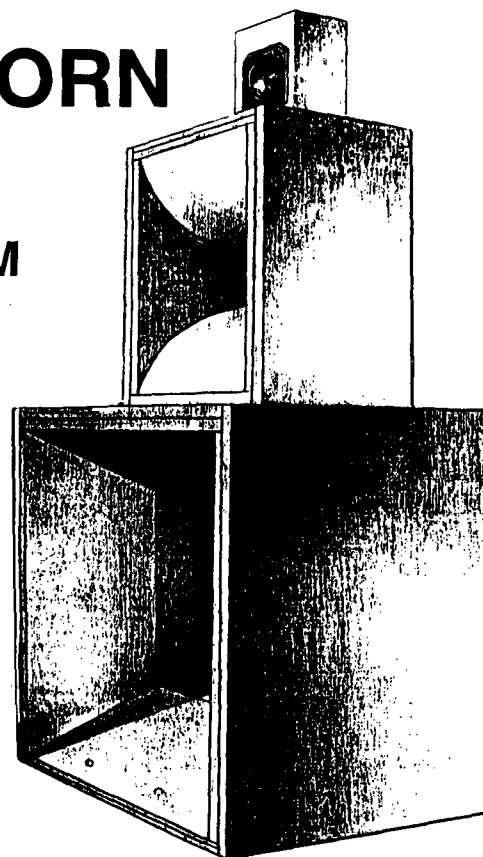
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From a home builder's standpoint I say build the RIAA and the line stage from any RCA tube manual and get a step-up transformer for your MC cartridge. The Marantz 7-C has become a high-prop collector's item that is fundamentally charming and engaging but not simple enough for audio peace. I hate to say it but I like the Dyna PAS II. This preamp is weak on information recovery but simple and honest. Again, don't modify it too much.

Remember, our goal here is to create a simple system that will impress ourselves and our friends with its ability to draw us in and make music enjoyable. Some other possible choices are the Audio Research SP-6B, the Vendetta phono stage, and maybe the Super-It. If you get this far towards audio peace maybe you can tell me which preamp works.

I am still too front-end crazy myself to make any firm recommendations regarding software playback. The Linn LP-12 and the Rega tables are a good place to start. After

these, the investment aspect gets shaky. CD? You-pick-em! Trying to buy a separate transport, cable and DAC from three different manufacturers seems unmanageable and a sure-fire formula for turning up the voices.

I must say that my heart is truly with the music lover. Buying a satisfying music playback system from a high-end audio salon is nearly impossible. Audio magazine reviews only make the confusion and the fever rise. Building your own is a formula for years of lost sleep. Where does that leave us? I think the builder or the buyer can both enjoy the process of acquiring and listening to a good hi-fi if they just remember to limit their aspirations. Don't tax the room; choose a small simple speaker. Don't tax your budget; choose components that retain their resale value. Don't tax your mind; choose components that have *proven* their worth and musical prowess over time.

Most important of all—work slowly and trust your own feelings.

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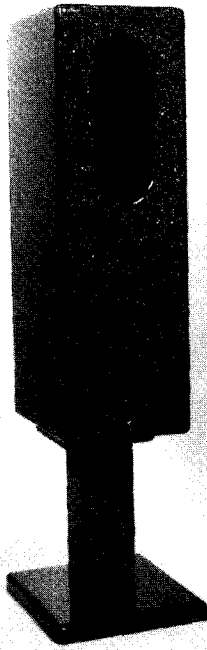
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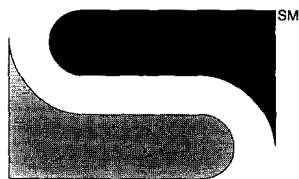
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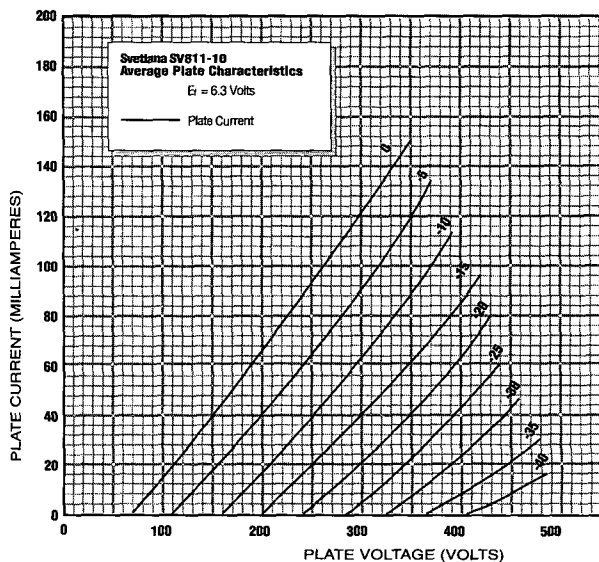
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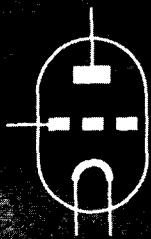
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W.A.F.

by Joyce

The Do-It-Yourself Life

About 100 years ago, when we were still counting, my future husband got himself caught in a piece of heavy equipment during the graveyard shift at work. Luckily everything was expertly patched together again, but he still faced a long recovery period wearing an arm cast so enormous it should have required a license plate.

"Isn't there *anything* I can do for you?" I was moved to ask during one visit. He hesitated, "Well, there is one thing. . ." "Anything," I murmured, kneeling at his bedside. "If you really want to, you could put in that phono amp mod in my PAS." I stood up so fast I nearly fell over in a faint. "You want me to what???"

I was trapped and good as lost. I'd just been conscripted into the murky underworld of audio electronics. I learned to solder. I learned to saw. I learned to read schematics, rewire circuits, work a drill press and punch exquisitely sharp round holes out of raw steel. I became his toy, a slave to every whim of this bandaged-up DIY monster.

"This really is kinky," I'd find myself thinking, a smoking soldering gun in my hand. After all this is *someone else's hobby* you're engaging in here. Kinda like being asked to play with someone's train set while its passionate owner sits and watches. You can tell they're trying to be a good sport about it, but the whole time you *know* they're just *dying* to rip those controls out of your hands.

When the cast came off, I solemnly (and gladly) handed over the soldering gun. He stayed up until 4:00 am touching up a few cold solder joints I'd made. Months of deprivation had left their mark. No appliance in his path has since been safe from his tinkering. (Remind me someday to tell you about the time he beefed up the espresso machine...)

Everything changes once they go DIY. Be forewarned that let loose in a home, a DIYer

can have more impact on the landscape than a herd of snorting water buffalo on the rampage.

For starters, no matter how much workspace you may have in your house or garage, you might as well kiss your kitchen cabinets, your shelves, your every empty surface goodbye. Eventually, your dining room table is bound to become the setting of a major, possibly permanent, audio project—unless of course he already has another hobby going there.

It may begin as a discreet little "weekend project" sharing a modest spot with you at the far end of the table. Before you know it your "little visitor" will have outgrown the family dog and like me you will become an expert at eating dinner from a plate delicately balanced on your lap.

While there's no doubt that ongoing audio electronics projects will disrupt your life, it's those famous *future* projects I've learned to watch out for. DIYers are amazing pack rats. Some find it impossible to pass a loose piece of wire or scrap of sheet metal in the street without moving in for a pickup. To the avid DIYer, any little bit of hardware represents a potential junkie fix. On trash night they can sniff out hot project opportunities like a pipe head homes in on a crackhouse. One thing leads to another and before you know it he's got a stash in virtually every corner of the house.

So I was surprised a few weeks ago when he came home from a local ham radio swap-meet seemingly empty handed. "Don't tell me," I tried to guess, "you left whatever it is tied to the roof of the car, right?" He shook his head sadly, "Nope, I didn't see anything really good. In fact, all I got was a power cord I need for that old 386 upstairs in the linen cabinet."

I was very impressed by this uncharacteristic show of restraint. *One* power cord? And not just any power cord, but a genuinely *needed* one? I felt a sudden rush of pride as I envisioned my man standing firm in a sea of

boundless electronic temptation, the single power cord clutched in his hand testifying to his tempered judgment and self-control.

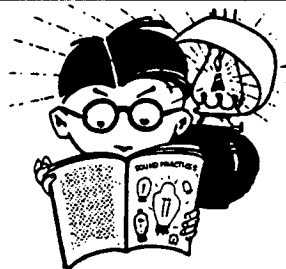
"It's in the trunk", he remarked, waking me from my reverie. Which should of course have been enough to warn me that no way was this going to be your ordinary power cord. Nothing could have prepared me for the actual sight of the box that he literally dragged into the house. It was so heavy it left ripples in my wall to wall carpeting in the wake of its passage across the room, and the floorboards audibly groaned and strained when it finally came to ground near the coat closet in the hallway.

While I was awed by the sheer size of the box, it was the giant Gorgon's head of severed electrical appliance cords inside which left me staring, speechless and transfixed. From the snaking wire tendrils escaping over the sides to the impenetrable writhing knot of rubberized wire at its core, this thing was not only impossibly large and unwieldy, it was absolutely hideous.

Catching his breath after his exertions, he reached down and pulled out a single cord which had somehow, miraculously, managed to set itself free from the mass. "When I tried to buy one of these power cords, the guy told me to just take the whole box," my husband said, seeing the look of horror on my face. "These are hospital grade plugs," he added, as if that explained everything.

"What on earth are you going to. . . Hey, that's my coat closet!" I began to protest, but Medusa bounced into the closet and was already starting to look at home and familiar next to a crate of dusty WWII radio parts.

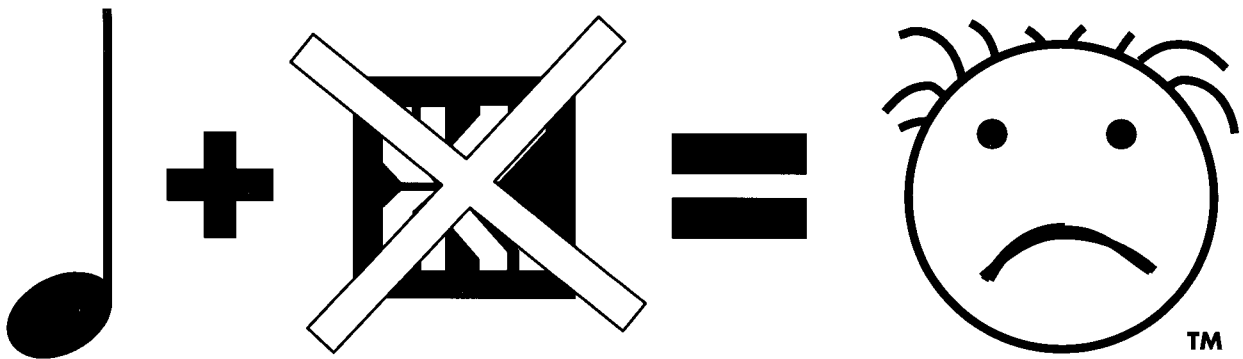
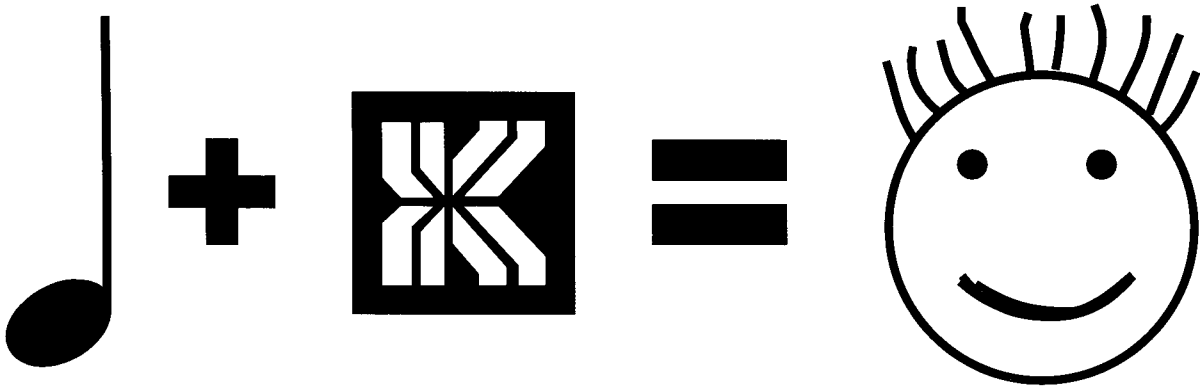
"It looks like you're running a small salvage operation in there," I told him. "It's way too warm for coats around here anyway," he countered, closing the closet door. I made a face at him, but I think I'm beginning to catch on. When they're a part of the DIY lifestyle, simple coat closets, like ordinary dining room tables, are destined for far, far greater things.



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