

VALVE

PO BOX 2786
Poulsbo, WA 98370

HEY! THERE'S
GONNA BE
FREE S.E.X. AT
CLASSIC AUDIO
ON SUNDAY,
AUGUST
11TH!

That's right folks, a drawing for a free, completed S.E.X. kit. The drawing will be open to the public, so bring a bud! We'll have kits for sale too, so you can get in on the promotional price of \$275, before it goes up to \$350 on September 1.



copyright 1996,
ELECTRONIC
TONALITIES
Mr. Bottlehead is
not a real
person. Any
resemblance to
an 807 is pure
coincidence.

Classic Audio is located at
7313 Greenwood Ave,
Seattle. Door opens at 10
a.m., drawing at 11a.m.

Full S.E.X. kit (monoblocks & drivers), \$275+tax+shipping&handling - "Amps alone" kit, \$245+tax+shipping&handling
(These are special *Subscriber Prices*, good through August 31, 1996) Assembly manual available separately for \$10, refundable
with purchase of either kit. Call Electronic Tonalities, 360-697-1936 to order, or for more info. MC, VISA, AMEX or check OK.

VALVE

VINTAGE AUDIO LISTENERS AND VALVE ENTHUSIASTS

in this issue:

QUAD restoration - part three

**three DIY virgins tell about their
first experience with S.E.X.**

**VALVE takes the challenge:
a speaker contest with the PAS!**

**the Brooklet:
a two tube choke loaded PP amp.**

And all sorts of other way cool stuff

volume 3, number 8

August 1996

VALVE

is the newsletter of
Vintage Audio Listeners and
Valve Enthusiasts

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We now accept MC/VISA/AMEX

VALVE in no way assumes responsibility for anyone harming themselves through exposure to the contents of this magazine. We believe electrons flow from minus to plus, and that they can kill you along the way if you're not careful. Vintage audio equipment operates at potentially lethal voltages. Always treat it with respect.



editor's thing

Okay folks, here's something to really sink our teeth into.

I briefly mentioned a proposed speaker design contest by the Pacific Northwest Audio Society last month.

Further discussion with current PAS president (yes, the PAS is a democracy, how quaint), Ron Jandrasek, yielded the following info.

The rules are super simple. There's really only one. The total cost of all electronic componentry in the loudspeaker pair may not exceed \$100.

That's it. Electronic componentry includes drivers, crossovers parts, wire, terminals, solder, connectors, and like that.

It does not include the cabinet stuff, as Ron figures a person can scab up a cabinet from scraps if necessary.

Yes, the cost of Superwhamodyne! componentry exceeds the \$100 limit (but the modified version I'm cooking up, the Hemiwhammy, should squeak by under the limit).

Ron has been kind enough to invite us bottleheads to the PAS January meeting for the judging. PAS has their meetings in a large church basement, and can handle about 100 people.

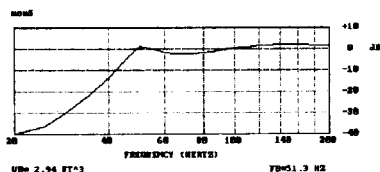
He also decided that there would be no fixed system by which to demonstrate each entry. This means that you might show up with your own flawless front end and killer SE amps to run your entry, while someone else may use 200 wpc of sand to demo theirs. I will suggest that each entry be tried on various systems, just to give us a feel for their potential versatility, but this will not be considered a factor in the judging (let's see, how do I go about borrowing that KPS-20i and Ongaku again?).

Ron felt that their club would be able to come up with three or four entries, so I'd like to hear from anyone who would like to participate, and see if we can get three or four of our own entries going.

I have offered to publish the winning designs in VALVE as incentive to budding designers who want to get their name out there.

Here's an idea for a design I'd like to see someone with strong minimalist leanings pursue.

The MCM 55-1290 driver we use in pairs on an open baffle for the S.E.X. speaks might be used singly in a 2.9 cubic foot vented box to give the following theoretical bass response:



The following port sizes should work: 3.45" diameter, .75" long, or 4" diameter, 1.5" long.

Efficiency is not such a critical issue for this particular design competition, so this single driver box, say 57.4" tall x 17.74" deep x 5.5" wide, or 35.5" tall x 28.7" deep x 5.5" wide (lined with acoustical fiberglass) with, say, an 8Ω series resistor to boost the top end, might give a killer midrange /super low budget /one way speak with a range of 50Hz to 15+ kHz and about 87-88 dB efficiency, which should easily handle 60 watt peaks.

And heck, you'd have \$84 left in the budget to spend on wire and terminals! See? It's not that hard to design a cheap speak. If anyone desires to try this design you have my blessing... with the stipulation that you bring it by a meeting for all to hear!

DAN

did you just tune in? here's what's happened so far...

Back Issues

Volume 1 - 1994 issues - \$20

a Williamson amp; Dyna Stereo 70 mod bakeoff; converting the Stereo 70 to 6GH8's; a QUAD system; triode input Dyna MkIII; MkIII vertical tasting; smoothing impedance curves; Altec A7; Ampexes Nagras and ribbon mikes; Triophoni, a 6CK4 amp; audio at the 1939 World's Fair; books for collectors and builders; V.T. vs. R.M.A. cross reference; FM tuner tube substitutions; Big Mac attack - the MI200; 6L6 shootout; a vintage "audyssey"; more FM tuner mods; vintage radio mods; Heathkit rectifiers; PAS heater mod.

Volume 2 - 1995 issues - \$20

Rectifier shootout, tube vs. solid; FM 1000 recap and meters; single ended 10 amp; triode output W-4; Optimus 990 - speaker for SE?; star grounds; tuner shootout; Living Stereo, vinyl or CD?; World Audio SE integrated; firin' up - smoke checking; Brook 12A schematic; 6C33 vs. 3C33; Heathkit power transformers; 6BA's + Magnequest = SEcstasy; W5 mods; triode operating points; Dyna restorations; Marantz 7,8 and Scott LK150 impressions; hackable vintage gear; Quasimodo - PP 805 amp; restoring a Scott 340 in 75 minutes; a dream system for 78's; cartridges and styli for 78's; Restoring a Lowther, Part 1&2; easy tube CD output hack; 6ER5 phono preamp; 304TL & 450TH SE operating points; hypothetical DC ESL amps.

What we hope to have in 1996 (\$25):

Single Watt, Single Tube, Single Ended, an amp for Lowthers; the Vintage Speaker Shootout of 1996, QUAD vs. Lowther, vs. A7; the Voigt Loudspeaker, the Single Ended eXperimenter's kit; cathode coupled SE 6AS7 amp; how to build the Superwhamodyne; improved CD tube output; refoaming AR woofers; mesh plate tubes; rebuilding QUADS; QUAD amp filter surgery, and a whole lot more!

Quad ESL Restoration (Part 3)

by Doug Grove

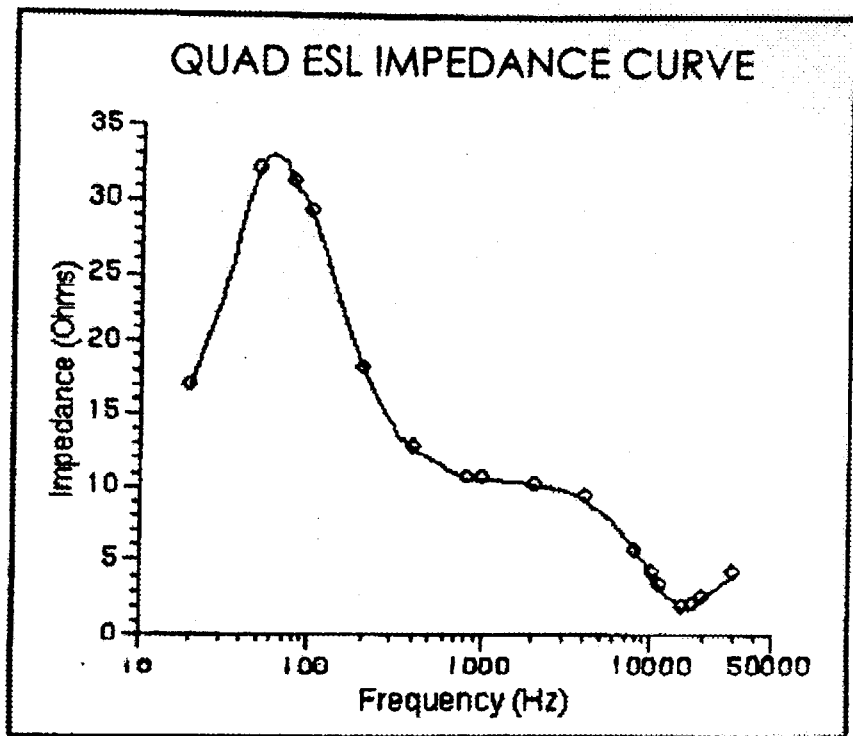
After some how-to story telling in my previous articles it's only fitting to offer a few words about care and feeding of ESL's.

First, a word about mains power. Quads use very little power and are safe to leave plugged in, as long as the internal EHT units are in good shape. Old units which haven't been played for awhile are best brought up on a variac. Quads will play almost immediately after mains connection, and given a few minutes will sound quite good. It takes a few hours for them to reach full potential (not 24 hours, or overnight as some

claim).

Then there's amplifier power. Any high quality amplifier is acceptable, but medium to low wattage tube power is preferred. Because of their highly capacitive load and impedance variation with frequency (refer to *Figure 7*), a proven stable amplifier is essential. Safe power range is about 10 to 35 watts continuous. Quads are medium efficiency loudspeakers, clocked at about 86dB/watt @1M. Quads can safely crank up to 95dB, but I wouldn't chance it. They are *not* designed to be played loud, but they are designed to be the most accurate midrange reproducer you've ever heard!

If frequency response is a function of accuracy, then Quads are pretty good.



They cannot reproduce the lower octave of bass, but with updated EHT units they are solid down to at least 50Hz. They also reproduce sound to well beyond 15,000Hz. Again, the mids are remarkably clear, accurate, smooth and uncolored. But then there's dynamic range. Some say Quads have none. This observation may be a response to the drivers we're used to hearing. Music from a point source, such as a dome midrange will sound much different than music from a large panel, like an ESL. With such a large radiating area, the musical "punch" is not as important, resulting in less listening "fatigue". How often do we listen for this type of speaker "dynamic range" when enjoying live music in a concert hall?

Quads are dipole radiators, with rear output and resonance attenuated by that hairy burlap stuff, and best located far enough away from rear and side walls to "float". And, they are not that dependent on intersecting planes (i.e. corners) to produce adequate bass. So you say Quads are directional - you gotta point 'em and sit and listen! Yup, they're the biggest headphones in the world! While Quads will fill a listening room with wonderful sound, wide dispersion is not their strength. However, this works to their advantage for imaging, sound stage, and stereo effect. Ask the Lowther guys about wide dispersion!

Countless modifications to Quads have been tried over the past few decades, with mixed results. Many of these attempts at perfection are recounted in past issues of publications such as *Sound Practices* and *Stereophile*. I have approximated the "stacked pair" concept, where there are two Quads per side, stacked one above the other, doubling the radiating area. I hooked them up in parallel for an 8 ohm load, one on the floor, and one sitting on a sawhorse

set-up just above. This is definitely room-filling, big sound, with plenty of bass. However they lose much of their "intimate" sound stage presence in favor of sheer acoustic power. It's like an orchestra playing music designed for a quartet, a worthwhile experiment if you're lucky enough to have two pair at one time. I'm quite happy with a single pair.

One factory supplied mod is an ESL "Protection Kit". This is a series of voltage limiting diodes designed to attenuate excessive current to the treble stator plates. Quad's technical information sheet indicates that the circuit will make the sound "clipped" when the speaker is overdriven. I have installed this circuit at the audio transformer with no audible effect on music reproduction, contrary to the stories I had heard about "phase shifting" caused by the diodes. If you treat Quads with respect (only the slow songs from Pearl Jam and Nirvana allowed) the protection device is unnecessary, unless your transistor amp is into hard clipping at high frequencies!

A note on Quad availability. There were around 60,000 units produced from 1957 to 1984. There are many still out there in reasonably good condition, priced anywhere from \$500 to \$1,000. If you're into finding a pair for yourself, listen carefully for full, balanced sound, and no zaps or pops! It's difficult to find a pair that hasn't been messed with in some manner, so it's helpful to inquire as to what has been done to them, and to know what you're in for if you think they will need attention. Happy hunting!

3 DIY virgins try S.E.X.

Some of you may find these to be rather blatant testimonials intended to promote my own interests. You are a very perceptive lot. I include them in this issue out of amazement as much as anything. I never expected such a positive response from virtually every kit owner. I've heard S.E.X. owners say they like S.E.X. as well as, or better than, some pretty well established SE kits that they've built in the past, which cost a whole lot more. Regardless of the testimonial tone (I really did ask these guys to be honest and include the bad with the good when they volunteered to write these letters), I think you might enjoy reading what these guys have to say about building and flying the S.E.X. kits. - Dr. Bottlehead

Confessions of a DIY Virgin

or

"Backup honey, I'm about to plug it in!"

Let me get something straight right away. Anyone can build a pair of S.E.X. amps. Anyone. I'm proof.

If you look at the bottom of this letter, you'll see that my nom de plume is Bottlerocket. That's because I have never built a piece of electronic equipment in my life. Not one. The first and last time I ever used a soldering iron was in shop class in the seventh grade. The only other electronic experience I've ever had was when I plugged the speaker on my parents' Grundig console directly into a wall outlet. I was 12 or 13. It made the loudest, shortest noise I've ever heard. When I embarked on building my amps, I was positive a shower of sparks was somewhere in my near future.

To back up a bit, this all started because I really wanted to redo my audio setup. Not upgrade a component. Change the

whole thing. It simply wasn't fun listening to music anymore.

Thanks to my company's generous provision of free Internet access and a T-1 line, I was able to discover and tap into this whole DIY/TRIODE/HORN thang (see, digital technology does have its place). Along the way, I discovered the Lowther Club of Norway, the Lowther Club of America, Tony Glynn, and the amazing Dr. Bottlehead. Tony convinced me that the S.E.X. amp would be perfect for the Lowthers I'm going to build, Mauhorns with PM7AS drivers. A few short conversations with Dan later, my S.E.X. amps arrived.

I hied to the local Radio Shack and purchased a soldering iron, solder wick*, a solder sucker*, a multimeter, needlenosed pliers, wire cutters, wire strippers, hook up wire, and some wire for the ground buss*.

On July 18th I prepped my "shop" by installing a light receptacle with a plug outlet built into it, so I could fire up my new soldering iron. I also blew out all the fuses in my basement. I had decided that since I was now a legitimate Electronic Pioneer, I didn't need to undo the fuse for the light receptacle ahead of time, and shorted the two wires with a screwdriver. I also burned a hole in my finger trying to tin my new soldering iron (it said one should "tin" your new soldering iron on its packaging).

Saturday afternoon I began assembling the little critter. According to my notes, "everything went together perfectly well except for the terminal strip mounting holes, which I had to drill out to 13/64". I also had a question about "continuity testing" the speaker binding posts. I didn't know what that meant. Fortunately the last page of my Multimeter Owner's Manual is about continuity testing, so I got that squared

* - these are things I've never heard of before

away.

Sunday I started making my amplifier base. A friend of mine makes great metal "art" furniture, and will, when he gets his shop together, make me some sort of futuro-retro bases for my amps, but until then I needed something to temporarily house them. I decided to use an empty wooden wine case. This appeared to be a simpler solution than building the oak bases Dr. B. recommends. That is, no gluing, clamping or accurate sawing was called for, a big plus for me. I was originally going to use a lid for the wine box case that I had fabricated out of Foam Core (doubled for strength) because you can cut it with an X-acto knife, however, Dan thought the transformers might melt the stuff. I went back to wood. I simply cut two holes in the top with my (new) coping saw. There's plenty of depth for wiring, tube storage, etc., and the Vintage Wine/Vintage Amp parallel adds a certain je ne sais quoi to the overall effect.

Sunday night I soldered almost everything together. I learned along the way that you can't put a very large wire for the ground buss through the RCA jack ground tabs (*try bending the tab around fat wire and then soldering it - Dr. B.*) Also read everything carefully. I forgot to connect A7 to B7 and A8 to B8 the first time through (*use those little parenthesis at the beginning of each step to check off each completed step - Dr. B.*).

One tool I found handy was my 3 1/2 year old son's magnifying glass. Maybe it's just that I'm getting old, but I found it difficult to figure out the color code on the 1/4W resistors with the naked eye (yes, I realize I could have measured them all with my new Multitester).

Monday night I finished wiring everything up. It looks very tidy. And virtually everything resistance tested just like Dan promised. The only fault was due to one loose resistor I found.

Amazing! Literally! Proof that anyone who can read, solder, and saw can build a Single Ended Triode Tube Amplifier.

I plugged in the tubes, plugged the amp into the socket, warned my wife, and switched it on. The filaments glowed! No fuses blew! No shower of sparks! This is great. Next I'm going to check all the voltages and hook that baby up.

My advice: take the plunge. It's a ridiculously little amount of money for the experience alone. Believe me, people are much more impressed with the fact that you have built your own Vacuum Tube Amp than they'll ever be with boring stories about changing your tonearm leads. Call Dan now and take control of your own destiny. S.E.X. has changed my life.

Arthur 'Bottlerocket' Mitchell

Getting excited about audio again with S.E.X.!

From lo-fi to ridiculous fi, in the past 40 years I've had a bunch of them. About five years ago I pretty much lost interest in audio as a hobby. I mean, I was still interested and read Sound Practices and all, but didn't really feel I had the expertise or guts to build my own amps from a schematic without help. Big wuss! Spent my time playing the guitar and screwing around with old Fender Tweed guitar amps, a whole lot more involving than being a wire and cartridge swapper on some big expensive store bought hi-fi rig. All the kid needs is a whole lot of S.E.X. I mean, for the price of some proprietary six inch long piece of speaker cable I could have two bitchin' watts, twice, and four aluminum foil speakers on 1/2" old growth plywood, all assembled by moi, so I could brag to all my non audio friends how I cut the cost of my main hi-fi rig by 95%. Now we're talking hobbyist, pass me a beer and plug in that iron.

This amp goes together so quick and easy, even for a guy like me who hates directions, is impatient, and wants to fix or change everything in sight just to see what would happen. Well, what happened is I built one of the little buggers, wired the 4 diode mod in backwards (didn't understand Dan's directions too well over the phone) and disregarding voltages 100 to 200 volts too high in a couple of test locations, started groovin' to the tunes. *(we got the amps straightened out at the July meeting - Dr.B.)* Hard to believe two cheap aluminum musical instrument speaks could sound so righteous.

Except for rap music and rock songs that rely on deep bass to get the point across, this combo is discount hifi heaven. Actually the sound leaves a little to be desired on distorted power guitar and Hammond B3 organ cuts. But who cares. This kit's strengths are so overwhelming it's few weaknesses are easily overlooked. This set up is so remarkable on acoustic music; blues, folk and classical music. Voices sound real, bells are so real sounding your pets will be looking around for the source. Strings have body, you can tell how large or small the instrument is. Voices, male and female, are a treat, as is the most difficult of instruments to reproduce, the piano. Chick Corea and Herbie Hancock's "An Evening With" double album shows how revealing a \$7.00 musical instrument speaker can be. I have always ben a fan of ribbons and film planar speakers, and these cheap cones have the same ability to convey low level detail as the megabuck inefficient drivers I've favored for years, Maggies and Infinity's larger speaks. All of these observations were with *one* speaker and amp, when I started I got the notion of listening in mono for a while, then strapping 2 amps in mono when I get the other built, and then going to a Whamodyne setup.

Hard to believe I could get this excited about an amp and cheap speak run in

mono thru an inexpensive Tascam pre-amp mixer and a NAD 502 CD player. This rig conveys certain truths of the original source that my Infinity RS-1b's, C-J 5's, Levinson woofer amp and pre, ad nauseum, etc., often miss. Makes me wonder about a stereo pair of Whamodynes (love that bass) with the S.E.X. amps equipped with the LeFevre trannies would do for screaming low budget super high end fun *(hey, that sounds just like my system, Michael - Dr.B.)*.

If you are curious about single ended sound and want to put the hobby back in hi-fi, how can you lose with this little budget rig. If there is anything else like this available anywhere near this cheap please tell us all about it! *(well, there's a couple of reasonably priced preamps being prototyped as you read this, and the Ultimate Pleasure output trannies should be available in October, at \$99 each - Dr.B.)* Dan should be applauded, this stuff is fun, sounds good, and an idiot can build them. Thank you Dr. Bottlehead. Job well done!

Michael Cameron

Guinea Pig Number One - a report from the very first S.E.X. kit builder

Okay, here's one novice's experience with S.E.X. My system started out as follows: Cal Icon CD player, Audio Electronics AE-OneP preamp, Adcom GFA-555 amp, ET LFT IV speaks and Genesis 12B subwoofer.

The amp and speakers were replaced with the S.E.X. system. The sub is crossoverless so I retained it. I listened to S.E.X. for several weeks and felt that there was improved imaging and clarity of instruments.

Then I thought I'd try an A-B test of amps on the S.E.X. speakers. In the drawer went that old classic, "Jazz at the Pawnshop". The difference was anything but subtle. (Cont. p. 15)

oops

Last month's "pn burst" filter mod for the S.E.X. amp had a big boo-boo in it.

I spec'd .01 mfd @ 630V ceramic caps for the filter, but hey Doc, that's 740 VAC across that power tranny secondary! You gotta use .01 mfd @ 1000V or better caps, which is what I used. Michael Cameron found this out the hard way. After performing the mod with 630V caps, he left the amp on overnight (which I do frequently, to no ill effect), and found a blown fuse the next morning. Good thing he wrote his flowery review of S.E.X. *before* this happened!

The lesson? Remember what the X in S.E.X. stands for. One of VALVE's tenets is to get the news to you as quickly as possible, and sometimes this means the particular mod or invention may only have a matter of days or even hours on it when published. If you jump right on a mod, which is very cool, you may be a bit of a guinea pig.

As insurance, I will try to maintain an inventory of replacement inductors at reasonable prices, in case the creative bug bites you on the butt and you smoke iron during one of your experiments.

Dr.B.

tube testers

If you're looking for a serious tube tester that's restored and ready to go, Tim Lollar suggests writing:

K&B Services
5016 Mt. Zion Rd.
Frederick MD, 21073

Tim was sent four pages of info on the models available, which explain that all testers are calibrated with tubes used by the National Bureau of Standards.

at *Classic Audio* this month...

*Don't miss the S.E.X. kit
give away, 10 a.m. Sunday,
August 11*

tube gear

Triophoni - Dr. Bottlehead's killer PP
6CK4 triode amps! 15W tube
rectified and regulated monoblocks
pair Heathkit W5's

three Dyna Stereo 70's

two Dyna MkIII's

two Dyna FM3 tuners - "baby 10B"

Dyna SCA-35 - sweet tweeter amp

Fisher FM100 tuner - mono

McIntosh MX 110 - Mac best buy

HK Citation II - just checked out

vintage speakers

JB L110's, L112's, L166's

AR 3a's

AR 4ax

Altec 1218A

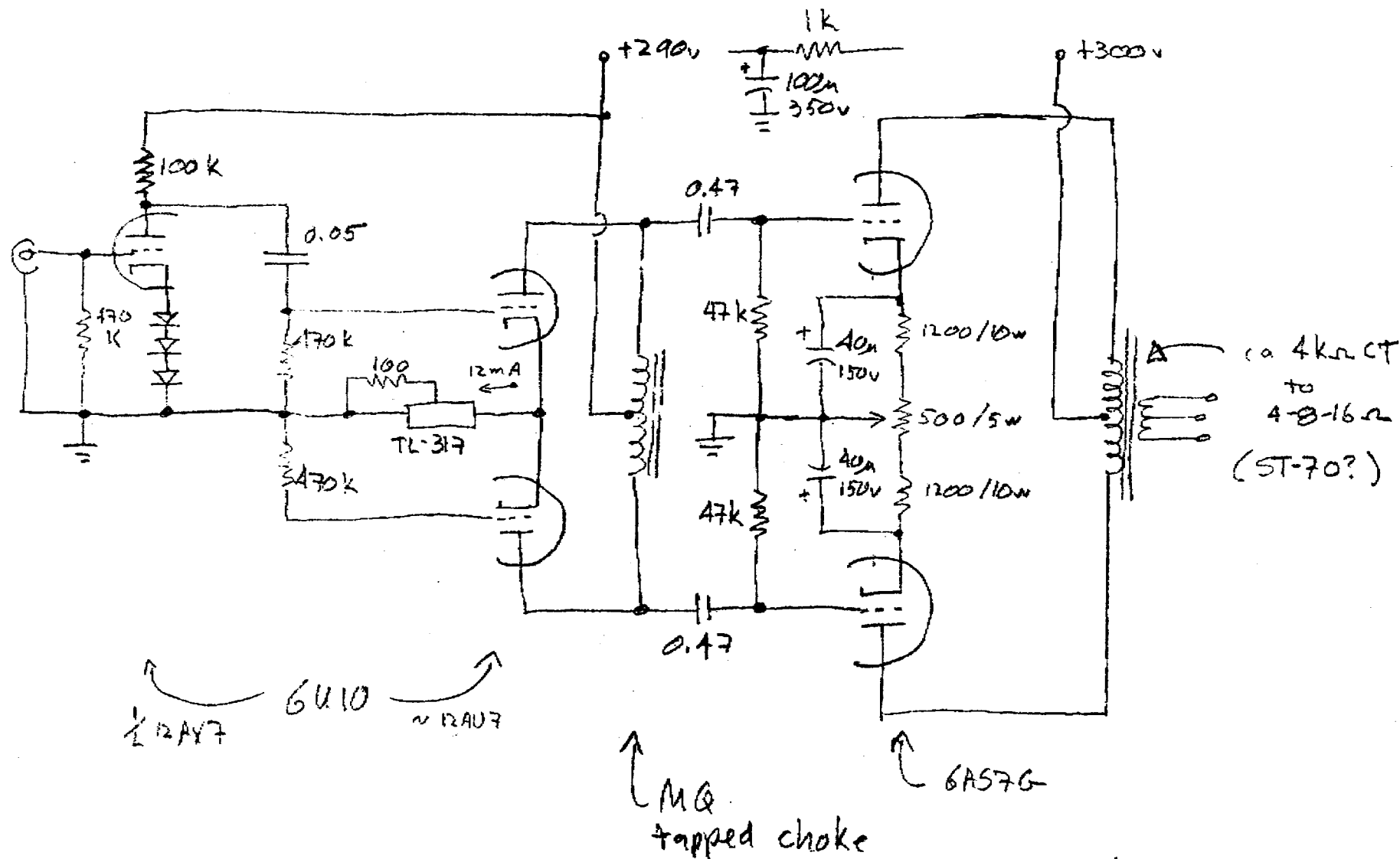
Altec 1203

front ends

Denon DP-51F

Lots of cartridges, Grado, AT, etc.

Classic Audio
7313 Greenwood
Seattle, WA
206-706-1561



the brooklet

Dave and Paul cooked up this circuit on the way home from the last meeting, as a way to use the cool center tapped plate loading choke Mike Lefevre is now offering. While I will eventually attempt a copy of the Brook 12 with this choke and my old MkIII iron, Dave used his minimalist approach and came up with a design that uses two tubes, a 6U10, which is 1/2 a 12AX7 shoved into a Compactron with a 12AU7, and a 6AS7/6080. The 12AX part is the input, the 12AU halves are the choke loaded drivers, and the two halves of the 6AS7 are the PP pair. Cool. Speedy Dave has already finished a prototype, which we shall audition at the August meeting. If it works like we think it will, it's gonna be somethin' to hear.

1st draft ckt by
Paul Jorja
96 July 17

It's Here! The Wright Sound Phono Preamp

Yes, this is the same preamp featured in last month's **VALVE** - the same one that beat the Conrad Johnson PV12.

In their comparison of past and current phono preamps, **VALVE** members unanimously rated the **Wright Standard Model WPP100** best sounding overall. Because of its accurate tonal qualities and fast transient response, the Wright sounded truer throughout the entire audio range. The way it presented voices and horns with unusual clarity, without edginess, and with extremely low background noise, made the Wright the favorite.

Here's what some of our customers have to say -

" I'VE BEEN LISTENING TO RECORDS SINCE I WAS FOURTEEN AND I'M HEARING THINGS FROM MY RECORDS THAT I'VE NEVER HEARD BEFORE!"

*Mark Chalecki
Recording Engineer
Capitol Records*

" FROM THE FIRST MOMENT I LISTENED TO A RECORD THROUGH YOUR PREAMP I KNEW SOMETHING SPECIAL WAS TAKING PLACE... BECAUSE I HAD TO SCRAPE MY JAW OFF THE FLOOR!"

*Jay Hammermeister
Seattle, WA*

The **Wright Standard Model WPP100** combines frame grid tube technology and passive RIAA equalization with level pots and a line stage, through a direct coupled cathode follower. It is at its best driving loads of 10K ohms and above, making it able to drive any line input on your line amp, preamp, or even directly into your power amps, with gain to spare, and can even drive loads as low as 600 ohms. The input is a standard 47,000 ohms with a 100 pf shunt capacitor. It follows the RIAA curve precisely, and has extremely low noise. The Wright preamp is not warm and fuzzy, not harsh and etched - it's clean and accurate, making it one of the most neutral sounding phono preamps you will ever find.

The **Wright Standard Model WPP100** is available in limited quantities, starting at just \$300 for the preamp that beat the PV12! There are other models of Wright Sound equipment in development - but you don't have to "wait and see". As new products become available, we will offer a 'trade up' allowance for your Wright Standard Phono Preamp.

To order inside the continental U.S., send a check or money order for \$300.00 plus \$17.50 shipping and handling (WA residents add 8.2% sales tax) to:

**Wright's Electronics
3516 S. 262nd St.
Kent, WA 98032**

for more information, leave a message at (206) 859-3592

6/97

DC or AC for your filament needs?

By the dangerous and daring Dr. Wright

I've wondered for years why some people feel the need to have those old fashioned directly heated emitter/cathode/filament/do-dad tubes/valves in their audio designs. Seems to be many of you out there, designing, buying and trying different versions of these directly heated tubes. Yes, they do have a sound that's hard to beat, guess those guys back in the 20's and 30's weren't as crude as some of us thought. The old timers I've talked to say things like "Nothin' ain't any better than a pair of 45's or 2A3's", they even talk about a pair of 46's running 20 watts class B sounding pretty fair. CLASS B!

I'm not going into triodes, pentodes, heaters or filaments, I'm just going to discuss how to light 'em up. Many lower current type filament tubes were designed strictly for DC, and that's the only way to use them, however by the end of the 20's, AC was being introduced into tube designs, and larger current filament types with different coatings applied to the filaments began showing up. With 1 to 5 volt DC filament tubes used as rf, af, and detector stages everything worked well, but at higher plate dissipation problems started to happen. Years before, Mr. Edison was trying to figure out why his light bulbs were turning black inside and one end of the filament was burning out, but the other end was still thick. Seems that the DC his power plants were generating was causing more electron flow from one end of the filament than the other. His solution was to make the filament a little heavier on one end and to change the material of the filament itself.

Although these things helped the biggest change was the conversion to Mr. Tesla's AC generating system.

When you use DC on power triodes with directly heated do-dads, you'll cause a condition known as an imbalance due to the difference of grid bias from one end of the filament to the other. In some tubes, because of their construction, this may not be as bad as in others. For example, a 45 or 2A3 operates with a filament voltage of only 2.5 volts, so only 2.5 volts of bias difference will occur. Now take the 6B4, with its 6.3 volt difference. Over a period of time 1/2 of this tube will loose more emission than the other half due to the higher difference in bias potential. With AC, this effect is reduced because of the alternating effect imposed into the emission to allow the tube to conduct both ends of the filament equally. If you null the AC component out of the filament circuit by a balance pot, then the AC hum shouldn't be excessive with the low μ factors common to these types. If you go from a single ended design to a balanced push and pull design, you will reduce this effect even further. On top of that, that hard to heat 2.5 volt stage will have even less AC component in its output - better get those 2A3's and 45's while they're hot.

As a rule, I use DC on most high gain low current stages and AC on power types, filament and heater, unless it is used outside of the audio range, such as rf and if stages.

I plan to try out this class B 46 amp some of the old timers used to brag about, I might even bring it over to a VALVE meeting some month, but right now I'm in the middle of some more preamp designs and construction using those wierd frame grid do-dads.

letters

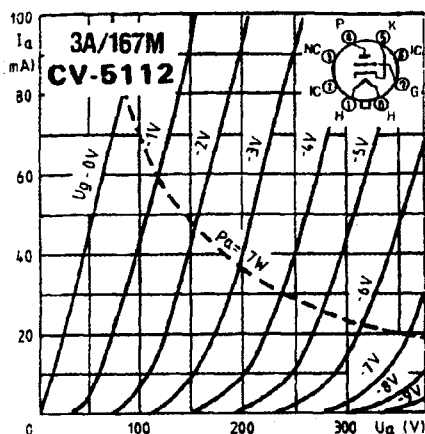
Mad Frenchmen

Le 22 Juillet 1996

Dan,

I confirm the statements of Jim Dowdy (VALVE, Vol 3, #7, p. 17).

Daring French audiophiles are totally mad on ITT or STC 3A/167M / CV5112, which is the UK equivalent of the WE 437A. This tube, not manufactured for audio, but for the aerospace industry, works fine in a *true* single tube amp.



Due to low grid bias, you can try to replace the cathode resistor with a Ni-Cd battery.

Marc Veyer
Parc Saint Maur
Lille, France

Tune Town


Gordon Burkhart-Schultz sent me a copy of an article from *Positive Feedback*, Vol 6 #3, by Doug Blackburn, about removing the rubber damping pads from toroidal power transformer in some bigass sand amp to gain a lot of depth and tighten the mid bass.

Here's some of Gordon's experiences with the same approach:

Dan:

I got to thinking about it and decided that a bit more information on the transformer mounting might be of interest to you. The Doug Blackburn article I sent you is what got me started on my own experimentation. Scary though it was, I removed the rubber cushions that protect the toroid and LIGHTLY clamped it in my amp and everything came alive! Absolutely amazing! The trick seems to be to clamp with just the right amount of pressure. Too much and it deadens the sound, too little and it sounds uncontrolled.

When I opened up the amp and looked at the uneven windings on the toroid and the resulting potential of resting all the weight on a protruding wire, it made me very anxious. So, on my first attempt I used some hardwood slats to insulate things from the chassis. The results,



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letters cont.

along with Michael's (*Green*) overall component clamping, was just sort of okay. Still nervous about those protruding windings, I tried again. This time I got some 7/8" brass automotive engine block freeze plugs and used them as feet on top as well as bottom. They are, hopefully, currently nestled on relatively even areas of the windings. Brass 5/16" threaded rod, brass nuts, brass plate across the top and that was the ticket!! It did exactly as Blackburn said it would ... scare hell out of you as you put it in and dramatically open things up. I love it. It would be interesting to see if the same phenomenon occurs with the iron core transformer in the S.E.X. amp...???

Another idea. The brass freeze plugs I mention make great feet for speakers and equipment as long as they rest on a hard surface. They are readily available in sizes from 7/8" up to about 2", and ring like a bell, so I guess that means they conduct vibration nicely, and only cost \$2 or \$3 each. They are a heck of a lot cheaper than the fancy \$15 or \$20 machined brass feet. I use them on all of my equipment from speakers on hardwood floors to components. I would be interested to hear how people who own the expensive feet think they compare. Gordon

virgins cont.

I could have sworn the S.E.X. amps played louder, even though I matched levels with an SPL meter and warble tone. Every instrument in the ensemble came through with substantially more flesh and more precise staging.

Could the 16 Ω impedance make the Adcom sound worse, or is it really that bad? I know it's not high end (I reckon my ears aren't either), but the GFA-555 was four times the investment of the S.E.X. amps.

Well, I guess it'll drive the linen closet system okay.

Ray Kuehlthau

how's your Italian?

Folks, I is a gen-you-wine international author now. Luciano Macri's gorgeous mag, AUDION, has an interesting article this issue, entitled "*Diffusori ad alta efficienza all' americana: le Superwhamodynes*." This translates roughly to "the atomic brain of Dr. Bottlhead triumphs in converting all those scale drawings into millimeters, but he obviously doesn't know that we round off the tenths".

It's truly amazing how the Italian language can make something so technical read like great opera. Grazie, Luciano. Dr.B.

just off the top of my head....

No time to generate a schematic for this, but here's an interesting idea for an 'advanced' S.E.X. kit mod:

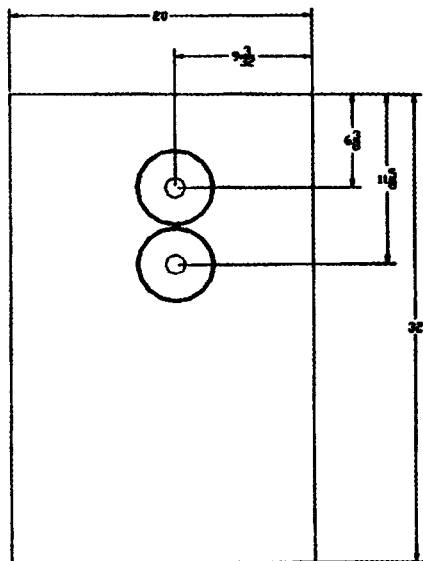
Remove one 6DN7 and replace it with a 6B4. We'll use this as the output tube, so rewire to single SE configuration to the OPT. Adjust B+. Better make 6.3 VDC for the filament.

Now take the remaining 6DN7 and rewire it as a mu follower with the big triode on top as the constant plate current source, and the smaller triode on the bottom as the gain stage. This should drive the 6B4 nicely. Remember to float that heater supply at about 90VDC to cut heater/cathode leakage hum, and use the constant cathode current source diode setup.

If you have to be really different, change the 6DN7 to something else, maybe a 6SN7, 6922, 12AT7, 6DR7, or 6U8 with the pentode half on top. Whatever you like.

If "DHTness" (a Dowdism) really makes a difference, this might be a way to tell without starting from scratch. Mod just one amp and compare to the original S.E.X. sound...

baffled again



Dan,

Here is the layout detail I've used for the S.E.X. speakers. I used the ratios suggested by Paul Joppa in Volume 3, Number 6.

I thought you might like this info (no need to beg - Hal)

Stay tuned

Chadd Moore

Thanks, Chadd. I apologize for scanning your beautiful CAD rendering and lopping off the second, mirror image speaker.

By the way, folks, Chadd and his brother Dean are working on a reasonably priced transformer output preamp, which we should have a report on in the near future. Sounds cool. Dr.B.

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3/97

A visit to the Lowther Club of America

Spent a warm Sunday a few weeks back cooling off with iced tea in Tony Glynn's Lowther listening room/wet bar.

I had delivered Tony's second pair of S.E.X. amps (this guy has more S.E.X. than anybody), and brought a pair of amps with the Ultimate Pleasure prototype trannies to audition as well.

We listened through Jennifer Crock's Blue Circle preamp (a beautiful stainless steel cabinet, Shallcross ladder attenuators, rear mounted selector switches, and cool blue acrylic isolation mounted subchassis for the 6922 tubes), to a pair of PM7A silver voice coil drivers in Tony and Jennifer's Medallion cabinets.

We started with the stock S.E.X. amps and moved on to the Ultimate Pleasure versions which everyone [Tony, Jennifer and Mike Crock (JENA LABS), Lynn Olson (Positive Feedback) and Steve Jones (Lowther owner and dedicated Oregon Triode Society member)] thought had a wider soundstage, and a bit better instrumental separation.

I have to tell you that bass presentation with the Medallion cabinet is the best I've heard yet from a Lowther driver. Tony credits the dadoed side panels, which rigidly lock the inner horn parts in place, for the tight sound. The mouths of the horns are also felt lined to damp out standing waves, and Jennifer had put a swamping resistor across the terminals of the PM7s to further reduce any hiccups in the impedance of the driver.

These Lowthers definitely grow on you, particularly when put in good cabinets and tweaked around a bit to suit your tastes.

Thanks again Tony, for the hospitality, the great lunch, the company, and the sweet sound.



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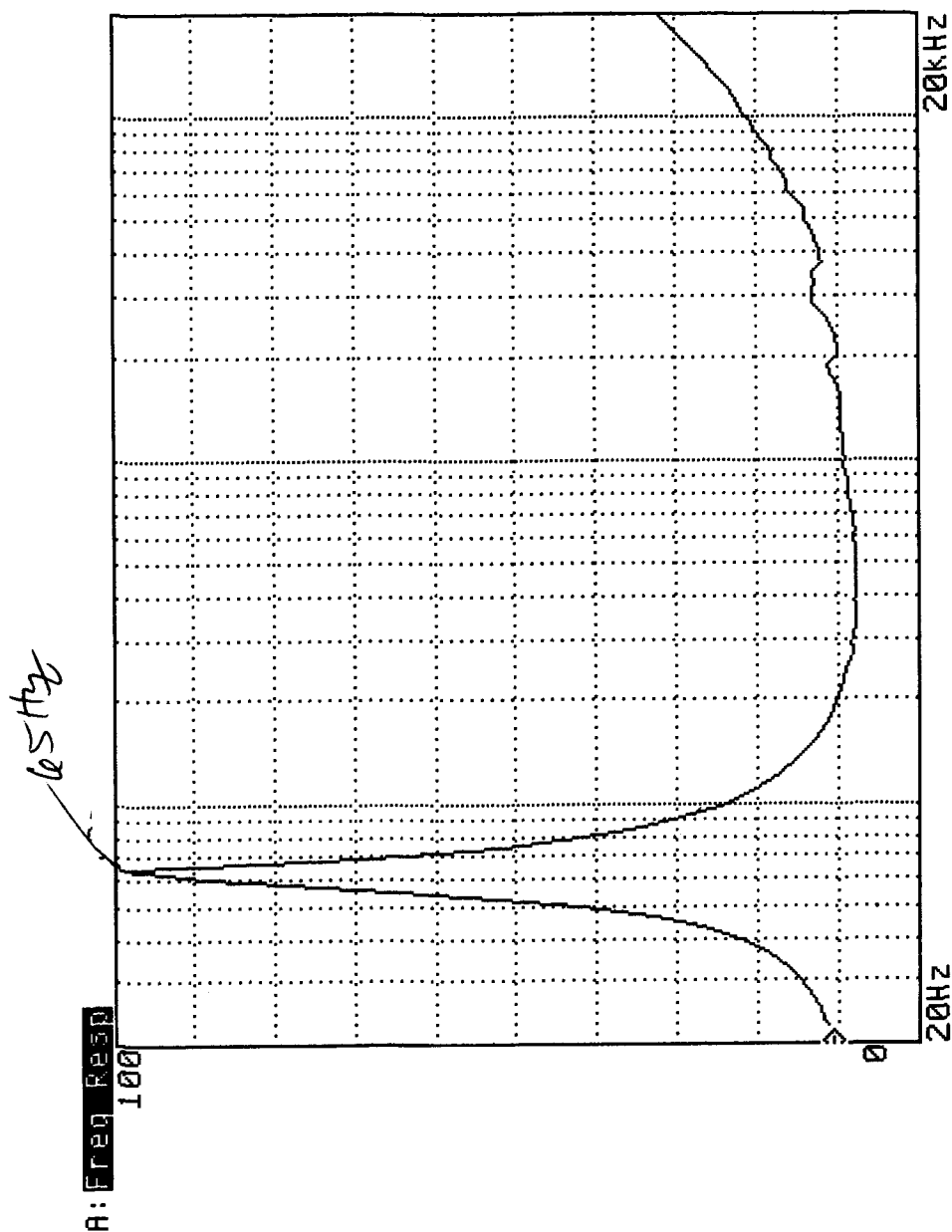
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The impedance curve of a Lowther PM7A driver with 40 hours on it, in open air. Y-scale is 10Ω per division

Lowther stuff

Promised some Lowther impedance data a couple months ago, and finally have room to publish it.

NOTE: These figures have been interpolated from a graph and are very approximate. NO GUARANTEES ON THE ACCURACY OF THIS DATA!

We used John Carey's PM7A drivers for these measurements, using the good old HP Dynamic Signal Analyzer for the tests.

John had put in about 40 hours on one driver and about 10 on the other.

The 10 hour driver gave the following results:

| | |
|--------------|----------|
| Z_{min} | 8Ω |
| F_s | 56.37 Hz |
| Z at F_s | 163 Ω |
| Q_{ms} | 6.36 |
| Q_{es} | .328 |
| Q_{ts} | .312 |

We used an Acousta 115 cabinet with the mouth closed off to give us a closed box of roughly 3 cu. ft., and got a Vas of about 40 cu.ft. Whoa!

The 40 hour driver gave the following numbers:

| | |
|--------------|-------------------|
| Z_{min} | 8Ω |
| F_s | 65 Hz |
| Z at F_s | 99 Ω |
| Q_{ms} | 4.40 |
| Q_{es} | .387 |
| Q_{ts} | .355 |
| Vas | approx. 29 cu ft. |

Obviously Tony Glynn is correct in telling us we need to get 100 hours on these drivers before we can judge their performance. Interesting that the F_s is higher for the '40% broken in' driver. Could be a tolerance variation.

Equally obvious is the fact that these

are not intended to be closed box or vented box loaded. I get optimal box sizes in the 18 cu. ft. range for vented, with a rolloff at about 80 Hz, and box size of 9.5 cu.ft. and a roll off at 135 Hz for a closed box with Q of .707, with my cheesy PD cabinet design software. Hardly worth it.

OK, how about horn loading?

Upper mass rolloff is determined by

$$2F_s/Q_{es}$$

which works out to about 336 Hz, a very good, high range to which the horn functions. That stiff surround helps this. What this means is the horn is helping to boost the frequencies where diffraction loss usually begins to take its toll, propping upper and mid bass response up to the level of the mids.

And the lower cutoff can be a bit lower than F_s , as this is influenced by the size of the horn mouth (and hence, the length of the horn) and can be designed for any frequency you like, as long as you have the real estate to hold it.

Some horn loaded Lowther owners claim to hear output at 30 Hz (way down output, that is), so their horn must be doing something down there.

Another interesting observation is that the Lowther drivers flip phase about 108 degrees around resonance in free air. Horn loading in John's Acousta cabinet creates several smaller phase flips, at about 40Hz, 80 Hz, 160 Hz etc. My guess is there are standing waves in the horn mouth at these freqs. Prudent damping with towels in the horn mouth seems to smooth this effect a bit.

What else can you put a Lowther in?

Well, John and I are each working on tapered pipe enclosures. I don't expect to get the same bass response as a good horn, but the enclosures should be nice slender towers, I just don't have time to build horns right now, and besides, I just gotta play with this stuff!

Dr. B.

cravings

First I want to say thanks to Mike Hayes for seeing my request for a manual for my HF30 and sending me a copy, and to Eric the Forgetful for sending me a schematic for my Scott LK150. VALVE members actually read the classifieds and help each other out!

For Sale: Sams Photofacts, #30 to #649. I'm open to selling the complete set or parting it out. Two four drawer file cabinets are part of the deal (you'll need them).

Wanted: a small aluminum knob for my HK Citation I preamp.
Ed, 360-678-7414

For Sale: Pair Heathkit W3s in restored working condition, \$400. Need a pre-amp? I have the super sleeper Heathkit SP2 to go with them.

Crazy Eric, 360-871-5921

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Powerwedge 114 line conditioner - \$175
Citation 22 power amp, 200wpc - \$300
Citation 21 preamp - \$150
Citation 23 tuner - \$150
Pedro Armenta, 206-924-6840.

august

This is a triple whammy month.

First we'll have the regular meeting Sunday August 4, 12 noon, at the old clubhouse. We'll hook one of the cool center tapped Magnequest chokes Mike LeFevre sent out, into Dave and Paul's Brooklet two tube PP triode monoblock amp. We'll also lay plans for a full scale assault on the speaker contest we're having with the PAS in January. Come with some ideas and catalogs.

Then on Sunday, August 11, 10 a.m., Dr. Bottlehead will finally stage the great Free S.E.X. demonstration at Classic Audio, 7313 Greenwood, Seattle. We'll be demonstrating the S.E.X. kit, and Dr. B. will hold a drawing to give away his personal pair of S.E.X. amps and speakers. This event is open to the public, so bring a friend and expose them to S.E.X. We'll have a few kits on hand to sell at the promotional price of \$275, so you can get one before the price goes up to \$350 in September.

Thirdly, don't forget the Puget Sound Antique Radio Association's big Annual Swap meet, Sunday, August 18, 9 a.m. at the Shoreline Historical Museum (get there way earlier if you're selling). This is one of the best events of the year for finding vintage gear and tubes.

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ing lots of modification ideas, from simple capacitor bypasses to high performance output transformer upgrades and detailed circuit mods

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