

# VALVE

VINTAGE AUDIO LISTENERS AND VALVE ENTHUSIASTS

## off and running

“  
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Well, I guess it's official. We had our first VALVE meeting Sunday, February 6, after the monthly swap meet, way out here in Poulsbo (uff da, that's a long trip!). Attendance was 14, just about the limit for my ad hoc listening room in the old shop. Yours truly stood in front and talked clubonomics for a while (more administrative junk later), and demoed my ever changing reference system. See box below

CLASSIC RADIO'S REFERENCE SYSTEM  
FEB. 94  
FRONT SPEAKERS - MAGNEPAN MG11A  
AMBIENCE SPEAKERS - OHM F  
FRONT AMP/PRE/TUNER - KENWOOD KR-9600  
REAR PREAMP - HITACHI HCA-8500 MKII  
REAR AMPS - AMPEX ULTRALINEAR MONOS  
PHONO - DENON DP6000/DA305/AQ404  
CD - TECHNICS SL-XP5  
OPEN REEL - AMPEX 800  
EXPANDER - PIONEER RG-1  
EQ - BSR EQ-3000

for Feb.'s system. Note that there isn't a whole lot of tube gear in this list. That's because I went for the best sound I could get from what was on hand and frankly, my low power tube amps don't have any punch with those Magnepans. The Maggies are so power hungry that they probably won't get tube power until I build my 200wpc monsterblocks.

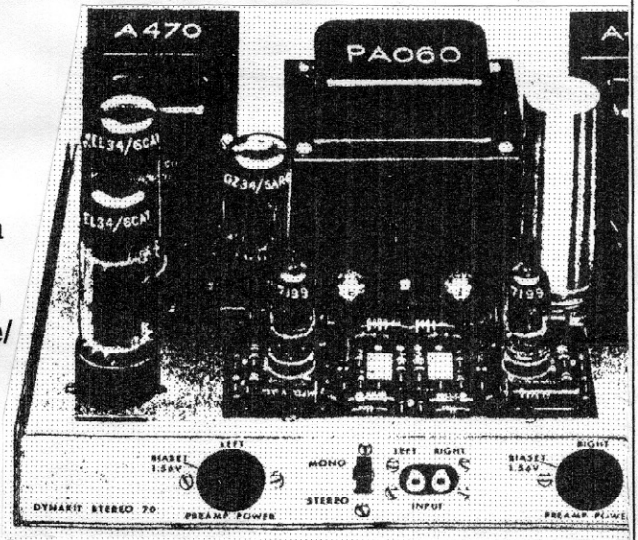
The gang in attendance talked about demo's in member homes, which sounds like a fun idea. Some of our founding members have some nice collections developing and it would be neat to see and hear them! We decided that the best approach would be to schedule an audition of

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## the venerable Stereo 70

Said to be the most popular tube amplifier ever made, the Dynaco Stereo 70 has been around for over thirty-five years. Its early popularity was due to a reasonable price coupled with good quality iron and a sound seemingly liked by all. A simple circuit consisting of a then new RCA 7199 sharp cutoff pentode/medium mu triode driving a pair of 6CA7/ EL34's per channel, with a GZ34/5AR4 for B+, made for an easily built, easily adjusted kit.

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VOLUME 1  
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Dan Schmale,  
editor

Next Meeting  
3/6/94 12 noon

Three modifications which are or have been available as kits

TOP: Curcio Stereo 70

MIDDLE: Van Alstine Super 70

BOTTOM: the ARC ST-70-C3

### stereo 70 - from p.1

It has also been a platform for more modifications than any other piece of gear made.

The mods have ranged from simple recap jobs to full redesigns ala Joe Curcio and Audio Research. Some examples of kit built mods are shown on this page.

All the mods are naturally done to correct perceived deficiencies in the original circuit and so tend to group around said deficiencies.

A list of interesting modification articles, reviews and related info is at the end of this article.

The two most common areas of attack seem to be the power supply and the driver stage.

One look at the power transformer will make clear the motivation for power supply mods. It's not very big. Neither is the filter capacitor, with only 90 mfd total capacity. A clue to the effect this has on output power is the 40 wpc rating of the Mark IV, a monoblock cousin of the 70 with a separate power transformer and 90 mfd filter for each channel.

Using the voltage to the output transformer center tap suggested in the assembly manual (415VDC) total energy storage for the 70's power supply is roughly

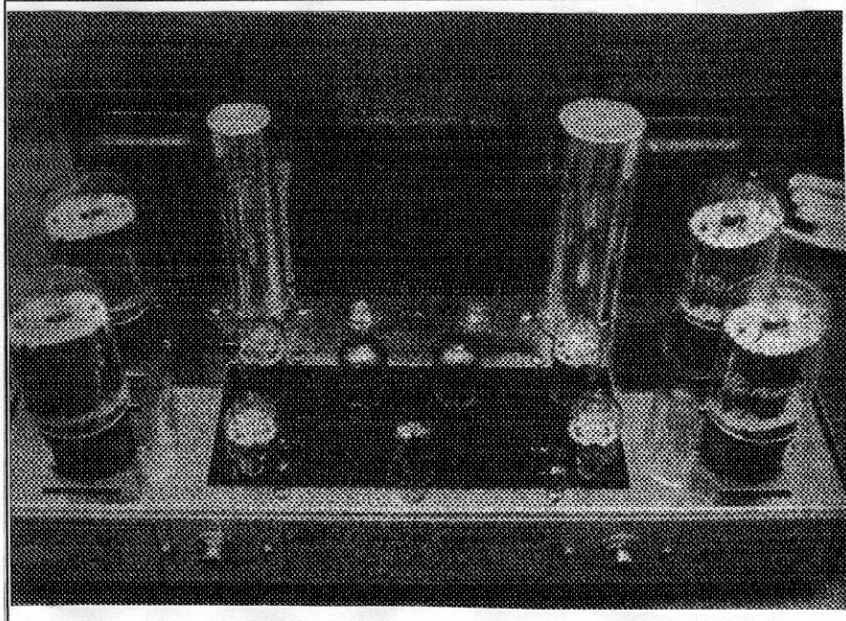
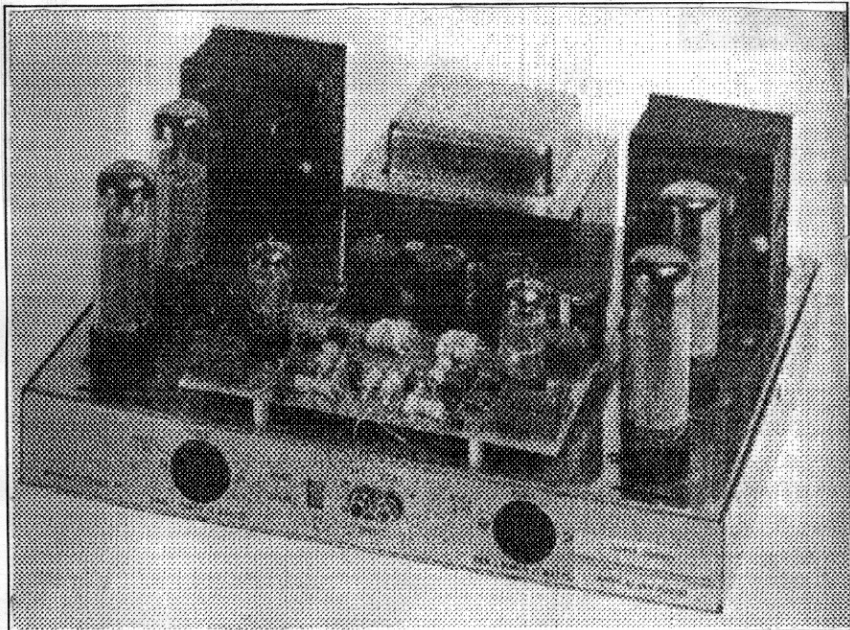
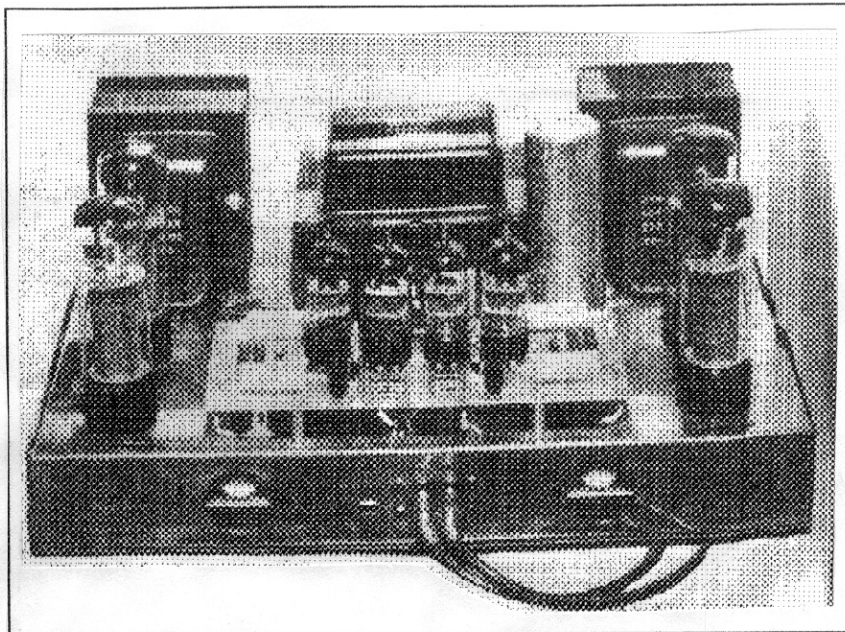
$$\frac{1}{2}CV^2 = 7.75 \text{ joules,}$$

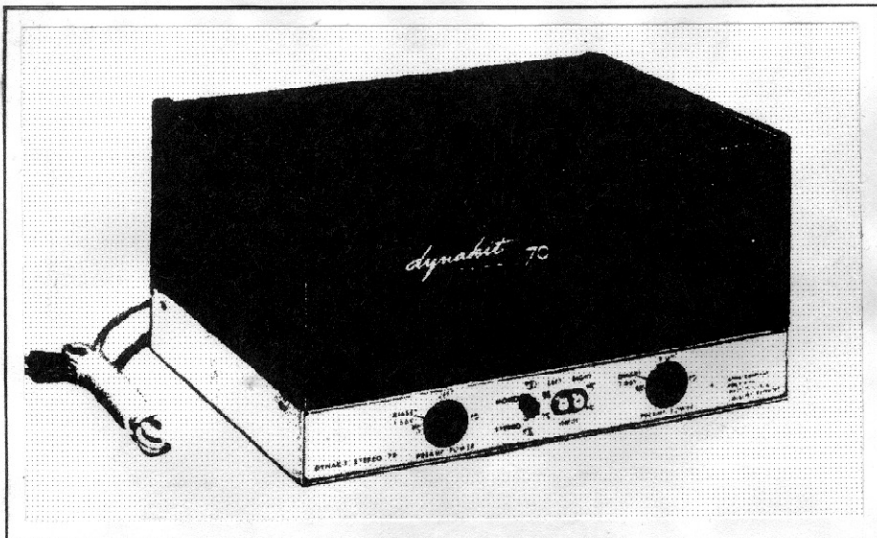
considerably lower than some other amps of the same era. A Heathkit W-5M for example, used 110 mfd of capacity for one channel, and was rated at 25W output instead of the 70's 35W (Note that actual storage is somewhat less as two stages of the filter operate at lower voltages for the driver circuit).

Common power supply mods are increased filter capacitance and regulation, as well as solid state rectification of B+.

My own humble opinion is that the slight gain in B+ voltage from solid state rectification is not worth the stress placed on the

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power transformer during start-up surge of the filters, or the mysterious cathode stripping which occurs when the output tube plates are subjected to high voltage before heater warms the cathode.

Try an experiment substituting a couple of PTC205 diodes for a 5AR4 rectifier in an amp and put a voltmeter on the filter inputs. Start the thing up and watch the meter. Whoa!

There are enough Stereo 70's with a blown power transformer out there. Why make more. That 5AR4 is one sweet tube. I put 2110 mfd of extra capacitance in the filter circuit on my Stereo 70, which runs about 410VDC at the output transformer center tap (about 185 joules of storage). It has a big beefy Eico ST-40 transformer 'cause it was one of those victims of stress to which I referred. It never exceeds 415V during start-up. The slow warmup of the 5AR4 really reduces stress on the power transformer and the filter caps. The usual comments on increased definition and extension of bass seem to apply to my filter mod. It really made the amp sound different -- louder, much more bass and mid bass.

But there was also a change in the treble. It may be smoother, or it may be depressed, I haven't

decided.

The amp is much brighter without the extra capacitance, a sound I don't particularly like. This maybe due to the fact that the 70 has very little feedback in the high end which becomes a problem when changing to polypropylene caps.

The poly caps seem to bring out the treble in many amps I've recapped. Why greater filter capacitance counters this is something I'm still working out. Regulation is another area of some controversy. I put a string of ten 39V zener diodes across the filter at the centertap of the output transformer after hearing a Curcio Stereo 70, which relies on heavy regulation of plate and screen voltage of the EL34's.

Then I read an article by Tom Holman (*JAES Jul/Aug 81, in our library*) claiming that the loss of headroom caused by the lower instantaneous voltage available in the regulated supply outweighs any gain in steady state power due to the regulator.

Ironically, the Curcio Stereo 70 I heard and liked, was measured at 11W steady state output per channel. It should be noted here that in later years Dynaco used a different method of rating their amps and lowered the 70's wpc

from 35 to 20.

So the zeners will come out and I will listen again.

I mentioned before that I replaced the coupling caps. I do this as much for protection of the output tubes as for sonic improvement. Some capacitors used by Dynaco were pretty good leakage-wise, the Pyramids come to mind, and some were not so good. I use polypropylene caps from Mouser Electronics (nice folks) because they are affordable, seem very reliable, and have made definite changes in the clarity of the treble in many amps I've done. Cap changes are pretty standard for all mods.

The driver mods vary from a simple changing of the traces on the driver circuit board to accomodate the 7199's cousin 6GH8A to all new topology using different tubes or solid state driver circuits.

I had intended to report on a solid state driver conversion that was really simple, but I couldn't locate a current cross reference for the FET's that were listed in the 1966 vintage article, and the FET's I used distorted with any more than soft volume.

One commercial rework of the 70 which uses a FET front end is the Nobis Cantabile (*Stereophile 15/9*). Curcio's mod uses 6DJ8's in cascode for the driver, and ARC used a really complex cross coupled circuit with so many tubes they had to use 6L6GC's as output tubes to limit heater current draw.

My impressions of 7199's in other amps have been favorable, but I am constantly frustrated at how insensitive the Stereo 70 is. The 35W max output was reached at 1.3V input instead of the standard 1V used by other designs. This makes the amp hard to use in biamp and surround situations. A very interesting analysis of the 7199's performance in the 70 and mods to correct it's weaknesses

### running - from p.1

some vintage gear for every meeting, either in a member home or here at the shop. It seemed appropriate to me to start these auditions with the old standard, Dyna Stereo 70. In March we'll have a shootout among every iteration of the beast we can come up with.

So far that should include a stock Stereo 70, one recapped with polypropylene bypass and coupling caps, a Sound Values mod, a Curcio mod, a pair of Mark IV's, and my own mod with beefier power transformer, polypropylene coupling caps, and a 185 joule energy storage bank (stock is about 8 joules).

My experience indicates that there are significant audible differences to be found in these mods, so it should be fun to A/B them. Please see the rest of this edition for more Stereo 70 modification info. Some future demonstrations we'll try to prepare:

An entire QUAD system from tuner through speakers

Tube vs. solid state tuners shootout

A system composed of some of the best Fisher tube components.

Altec A7 and Corona demos

Call me if you have something fun to demonstrate and I'll try to locate complimentary components for the demo.

Our vintage schematic and manual library project got off to a great start with the additions of Dyna PAS, MkIII, MkVI, and Stereo 70 assembly manuals, a Heathkit W-5M assembly manual, QUAD tuner, amp, and preamp owners manuals, an Eico HF-89 assembly manual, a Mac MR-65B service manual, a Craftsman C-500A manual, and a Rider tube substitution guide.

If you have paperwork on any vintage audio gear, please consider loaning it to the club for copying. I will offer use of my

copy machine to members needing a copy of anything in the library. The price for members will be a nickel a page (to cover paper and toner costs).

Speaking of members, next meeting we need to discuss membership dues and our basic organization.

I find clubs in which the members are constantly coerced into volunteering kind of a drag.

And so I have an offer to make. I would be happy to administer this club for you.

You would still decide what you want to do and talk about, bring gear to demo, maybe submit an article or two to the newsletter,

### **any requests?**

**We had a shortage of chairs at our first meeting. I take that as a good sign. We need more. If you have some folding chairs you can bring/loan/donate it will really help!**

**Auditions would be improved with the addition of an efficient pair of quality loudspeakers, say > 94db@1w@1m. Anybody have a transportable pair?**

and other fun stuff, but you won't have to make time consuming commitments to administrative positions unless you want to. I think there are only two possible side effects to be considered:

1) some unintentional, subliminal commercialism may creep in- I may promote my business a bit in spite of myself. Vintage audio is not just a hobby for me, I make a living dealing with vintage audio and antique radio. Consequently, I may influence the direction of the club as I pursue the growth of my business, even with a

conscious effort to minimize said influence. It would not be possible for me to do otherwise.

2) membership dues will be somewhat higher. One reason people are hesitant to volunteer in clubs is the time investment required to perform the duties. I too, have a family and a job. Whereas I would gladly volunteer to serve in one or two of the administrative positions, performing all of the admin duties on a continuing basis will require that I am able to do them and pay my bills as well.

Hence the non-volunteer type of club will have to be operated as a business for profit.

On the upside, I can promise a continual improvement in newsletter quality and meeting agendas as the membership grows, and a sincere commitment to the interests of the membership.

So I suggest we deal with this topic at the beginning of the next meeting.

The difference in annual dues would probably be \$20 for a volunteer, non profit club where you the member administer the club through your voluntary effort vs. \$30 to \$35 for a club with national exposure, a growing newsletter, member discounts, guest speakers, free equipment clinics, a large library of vintage audio related material, monthly swap meets, free use of a LEDE listening room, loaner test equipment, and whatever else I come up with, coordinated by me. In either case, membership is the key to success. Please call anyone you think might be interested and invite them to the next meeting.

And thank you to those who attended the first meeting. I think were on to something good!

dan

**NEXT MEETING  
& SWAP MEET  
MARCH 6, 1994  
SWAP AT 10 a.m.  
MEETING AT NOON**

### stereo 70 - from p.3

done by Norman L. Koren are to be found in Glass Audio, 1/92. I'll give this one a try when I get the courage to punch holes in the chassis.

Well, the Stereo 70 may be old, and it may not sound like a new \$3500 tube amp, but it sure is a fun amp to dink around with. If you have one, bring it to the next meeting, 3/6/94 at high noon --- dan

#### Stereo 70 info sources

\* indicates presence in library

\* Stereo 70 Assembly Manual by Dynaco. Gotta have this to start.

#### \* Sound Values Catalog.

This is where the old Dynaco stock went. They have new parts, having revived the Stereo 70 for a few years in the late 80's. Also carry a 6GH8A type mod.

\* Audio by Van Alstine Catalog. Source for another 6GH8A mod w/solid state rectifier.

The Stereophile, winter-4, 1966. Edward T. Dell's "Brute" modification.

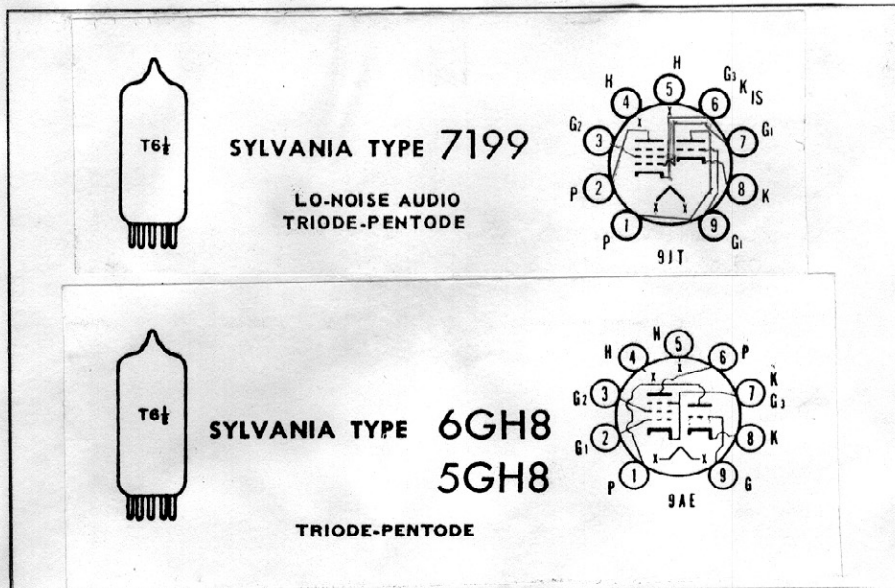
\* Audio Amateur #4, 1977, Edward T. Dell, jr. The ARC ST-70-C3 mod. A serious mod!

\* Glass Audio #1, 1990, David Davenport. A report on five mods - ARC ST-70-C3, GSI, Curcio, Purist Audio, and Vacuum Tube Audio. Doesn't discuss what the mods are, just how they sound.

\* Glass Audio, #1, 1989, Joe Curcio. Curcio's solid state regulated pentode output w/cascode driver mod. Serious.

\* Glass Audio, #1, 1992, Norman Koren. Triode mode input stage. Neat mod to correct problems inherent in 7199 driver stage. I'll be trying this one.

\* Glass Audio #2, 1989 Paul Becker. Dyna Mk IV mods.



Here are the pin basing diagrams for the 7199, which sells for around \$24.00 these days, and the 6GH8A, which sells for about \$4.00. With a little careful trace cutting one should be able to rejump the 7199 socket to take the 6GH8A. Cut trace to pin 2 of 7199 jumpers to pin 6, cut trace to pin 6 jumpers to pin 7, cut trace to pin 7 jumpers to pin 2.

#### the library -

We have the following in our library. Members will be able to copy these docs for a nickel a page.

Audio Anthology, Vol. 1-4

Glass Audio, 1988 to present

Journal of the Audio Engineering Society, 1976-1991

Radio & TV News, 1947-1960

Audio Amateur 1970-1977 (soon to be completed)

Speaker Builder 1980-85, 88, 89

Sylvania, GE, and RCA tube manuals

1962 Allied Catalog

Sam's Photofacts 340-540 (more or less)

Eico HF-60 manual  
Eico HF-89 manual

HK Citation II manual

Dynaco SCA-35 manual  
Dynaco Stereo 70 manual  
Dynaco MkIII manual  
Dynaco MkVI manual  
Dynaco PAS manual

Fisher FM-1000 manual  
Fisher FM-200-B manual

Heathkit W-5M manual

McIntosh MR65B manual

QUAD tuner, preamp, and amp manuals

Various Loudspeaker Brochures

Various issues of Audio Magazine

1944 Radio's Master

1949, 1950 Walter Ashe catalogs

Williamson amp reprint

and lots more!