An Interview with David Hafler

Part 2: The Dynaco Years

By Charles Kittleson

This is a continuation of the interview we conducted with David Hafler in May of 1999. The first part of the interview, in VTV #14, covered the early years and his affiliation with Acrosound. This part covers the Dynaco era.

When and why did you begin your own company, Dynaco?

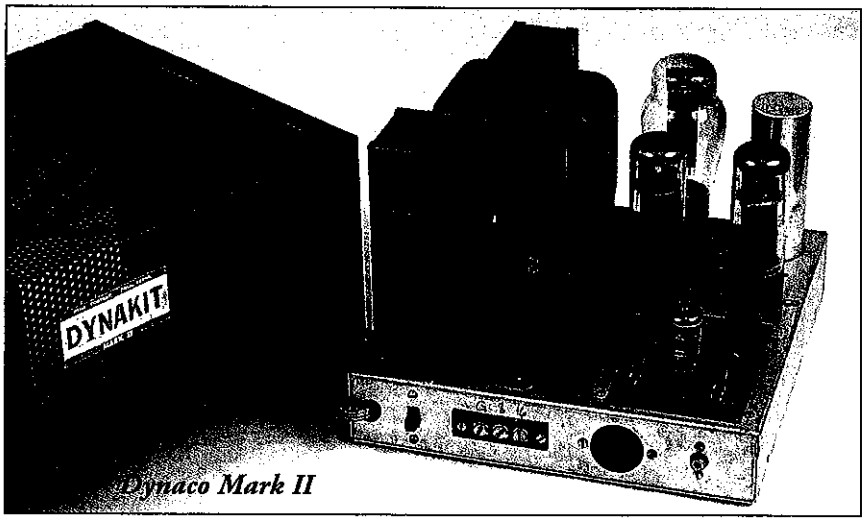
I saw that there was a hole in the market. I had been doing a lot of customer contact, but not so much sales contact. I'd have people from all over the country write in with questions about using the Acrosound transformers. We had a brochure showing about three or four circuits and different power brackets. I would get people who would write in "Where do I buy the parts to do this?" I would speak by telephone with them or by correspondence. I found that I could handle a lot of normal sales activity as part of my general work. I saw the need for something other than just selling transformers through parts jobbers.

At that time, I was, and still am, into good sound reproduction. Back then, it wasn't easy for somebody to attain this. When I made my first amplifier, I went to a home of a friend whose father had a sheet metal shop, and he bent me up an amp chassis. I used a hand drill to drill the holes for hardware and used a Greenlee punch for the tube sockets.

I spent more time drilling holes in the chassis than soldering components into the circuit. I thought that there must be some easier way to do this. I saw that Heath was selling kits by mail order and they seemed to be doing a good business. I thought that there was no reason why there can't be a kit of parts that would make it easy for somebody to assemble an amplifier and save some money over having a factory assembled job.

So with this thought in mind, I looked for suppliers who could take care of the printed circuit and chassis for me. I subcontracted all these things so it didn't take many people to run the business. With just a handful of people I had a small business operating without the difficulties and headaches of having a large workforce and the people to take care of it.

We had a little company where everybody did a little of everything and it was profitable. When I sold the com-



Dynaco Mark II

There are reasons . . .

WHY THE DYNAKIT*

50 Watt Hi-Fi Amplifier Kit

SOUNDS BEST

1. New High Stability Circuit

Superior transient response with greater clarity and definition. Designed for all speaker loads including electrostatic

2. Pre-Assembled Printed Circuit Board

Assures fool-proof assembly in less than 3 hours and guarantees faithful reproduction of performance specifications.

3. Superior Components Featuring the A-430 Dynaco Transformer

And of course the following minimum specifications that can be exceeded by any home constructor. . . . . .

Power Output: 50 watts continuous rating, 100 watts peak. Distortion: under 1% at 50 watts, less than 1% harmonic distortion at any frequency 20 cps to 20 kc within 1 db of maximum. Response: Plus or minus .5 db 6 cps to 60 kc. Plus or minus .1 db 20 cps to 20 kc. Square Wave Response: Essentially undistorted 20 cps to 20 kc. Sensitivity: 1.5 volts in for 50 watts out. Damping Factor: 15. Output Impedances: 8 and 16 ohms. Tubes: 6CA7/EL-34 (2) (6550's can also be used) 6AN8, 5U4GB. Size: 9" x 9" x 6¾" high.

*Pat. Pending

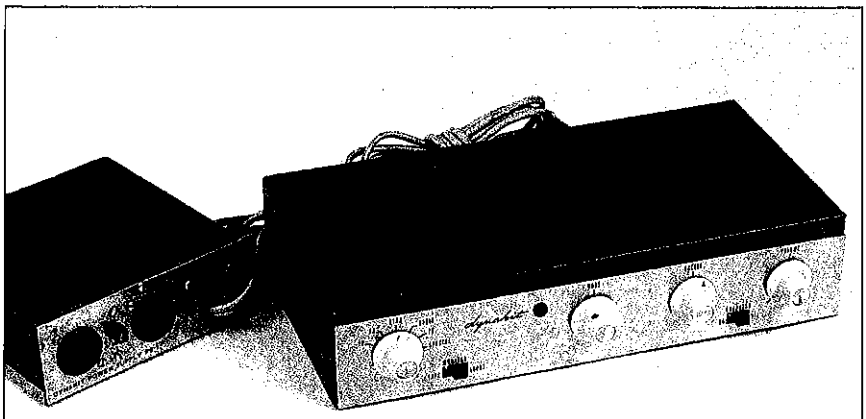
DYNAKIT Mark II

$69.75 Slightly higher in West

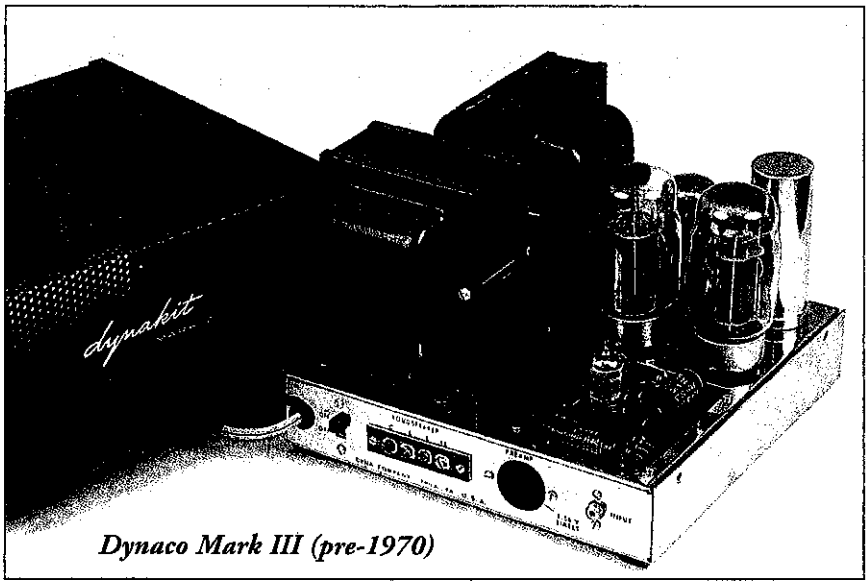
(Complete including protective cover and all component parts)

NEW! DYNA BIASET now included in all Dynakits. Simplifies bias adjustment and assures optimum operating conditions.

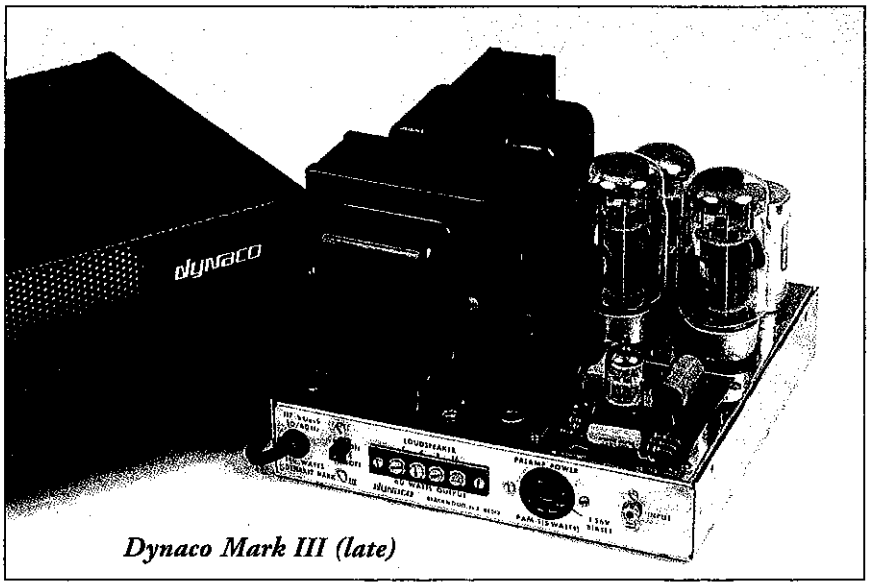
1957 Dynaco Ad



Dynaco PAM-1 (with power supply)



Dynaco Mark III (pre-1970)



Dynaco Mark III (late)

pany in 1968, we had 150 employees and were still subcontracting a good part of the production. I estimate that the total number of people working on Dynaco products must have been about 300 people.

What were your first amplifier and preamp products back then?

We had an amp that we called the Mark I, but it never went into production because it needed some modifications before it got too far. So that became the 50-watt Mark II. The Mark II was then superceded by the 60 watt Mark III that cost $10.00 more but offered the freedom of 4, 8 and 16-ohm speaker taps and the new KT88 output tubes.

There were speakers that specified a 4-ohm output including the AR speaker. However, the AR speaker required a high powered amplifier because it was very inefficient. We brought out an amplifier that did an excellent job into the AR speakers and the two coupled with each other very nicely. This turned out to be a great marketing arrangement because we could go to hi-fi shows and share the expenses. They sold speakers and we sold our amplifiers with no conflict of interest (laughter), but with complementary activity.

How did you initially market the Mark II and the PAM I preamp?

In 1955, we were making about 1,000 Mark IIs per month. That was fantastic business at that period. We had the demand for a preamp, but it wasn't quite ready. I had this preamp design which I had been carrying in my head for a long time. I did most of my circuit designing by thinking it over, rather than by breadboarding it. The circuit used a feedback tone control arrangement that would be very simple and wouldn't require many tubes. I tried it and it worked and I arranged production. We used outside people to help style it.

Just about the time we were ordering parts, I noticed a peculiar kind of noise coming from it when it was turned up all the way. The prototype unit didn't have the noise problem. I tried everything that I could think of for weeks, and tried to pin the problem down. I even had Stewart Hegeman come in from New York to analyze the noise problem. He took a look at it and couldn't find the answer (laughter). I finally resolved the thing by taking the

preamp apart, piece-by-piece and interchanged them between my breadboard unit and the pre-production unit. I found that the low-noise resistors were noisier than anybody could have anticipated. They were just no good. It took me all that time to find it because they were consistent. They had the same harsh, rushing, waterfall kind of noise. That delayed shipping by several months at a time when the demand was really high. So when we started shipping, we had back orders for a couple thousand units.

Who did your sheet metal work back then?

Well, it started with a company called Dalco. This gentleman had migrated from Europe, who was a competent production man. He did a good job on stuff and his prices were good. After I found him, he did 95% of all of our work.

Who made your circuit boards back then?

A chap named Art Leibchur was working for a company called Avionics and broke off from them to set up a business for making printed circuits. I just found him in the classified pages of the phone book and started using him. He made some prototypes for me for the first hi-fi exhibit we had and then he made everything after that.

Who manufactured the Dynaco output and power transformers?

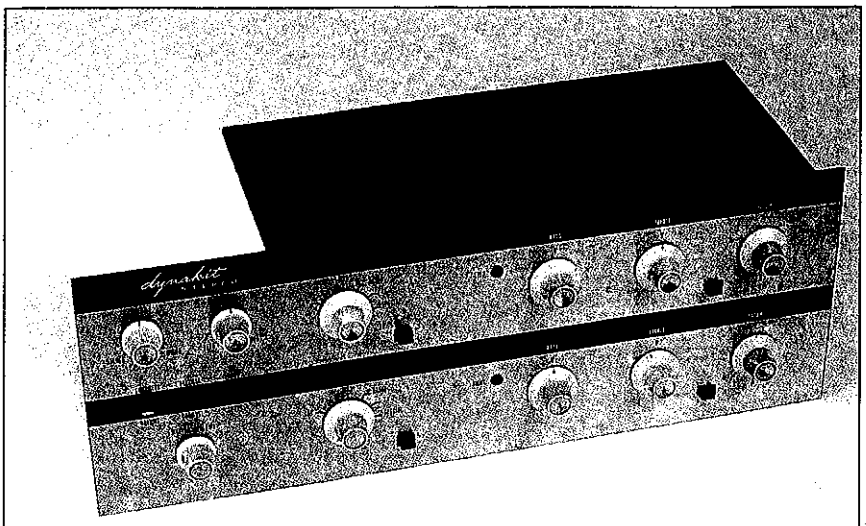
When Dynaco got started I knew of a company called Tresco that was located about 6 blocks from our factory. I was going to wind the transformers myself but I didn't like the idea of tying up money, buying new equipment, and the headaches of production. I went to visit the principals at Tresco and told them what I expected them to do. They made up samples for me according to my design. They sounded good and had pricing that was a very good deal for me. Eventually, I ended up buying 20% of Tresco. They supplied me everything I needed for years afterward and I turned out to be their biggest customer.

What was the very first Dynaco output transformer?

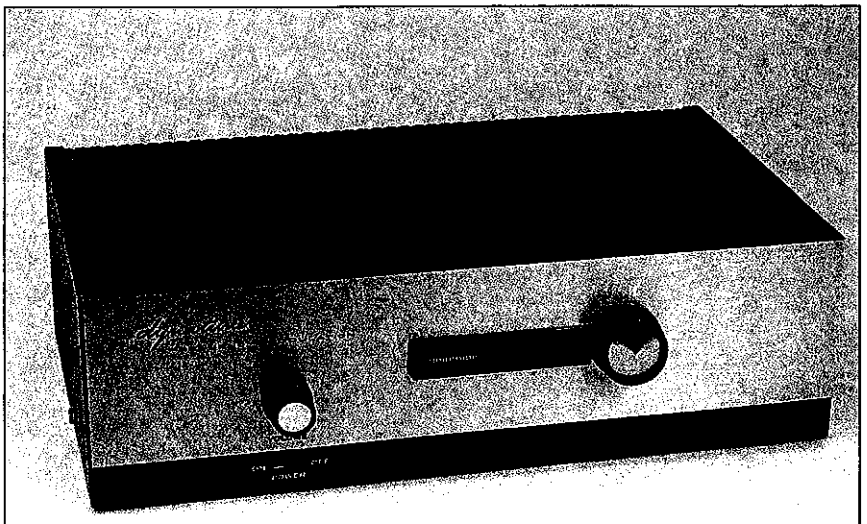
The A430 was first and the A431 just added the 4-ohm tap.

The A431 was your design?

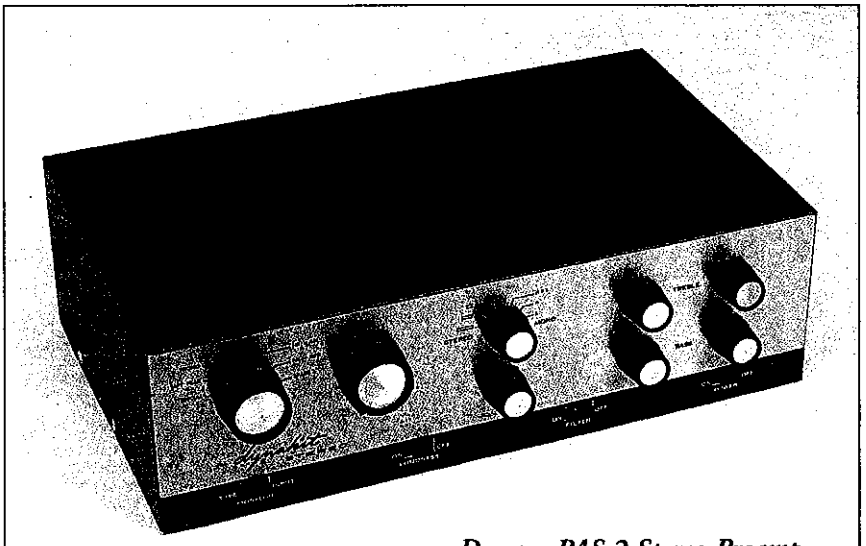
Yes, but I used the same long-tongue EI arrangement that Herb Keroes had used with the Acrosound design. It used a long,



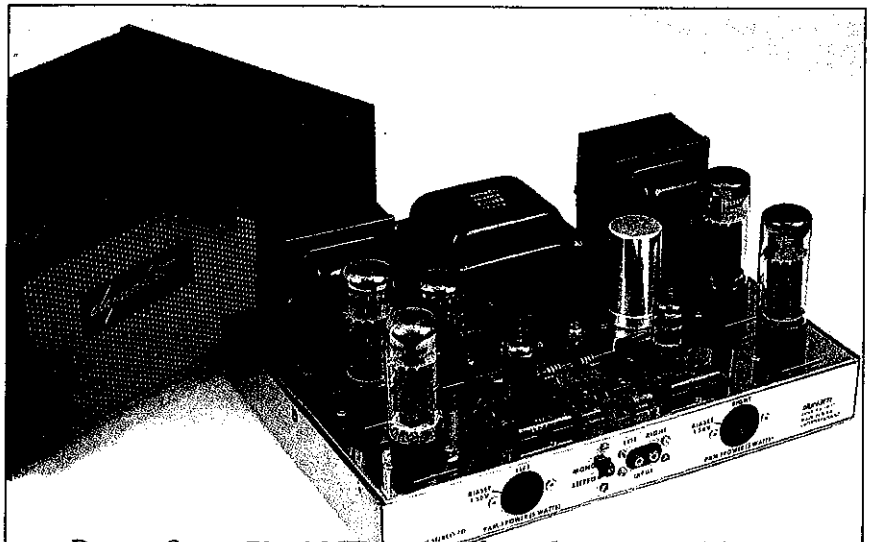
Dynaco PAS-1 (2-PAM-1s and DSC Stereo Adapter



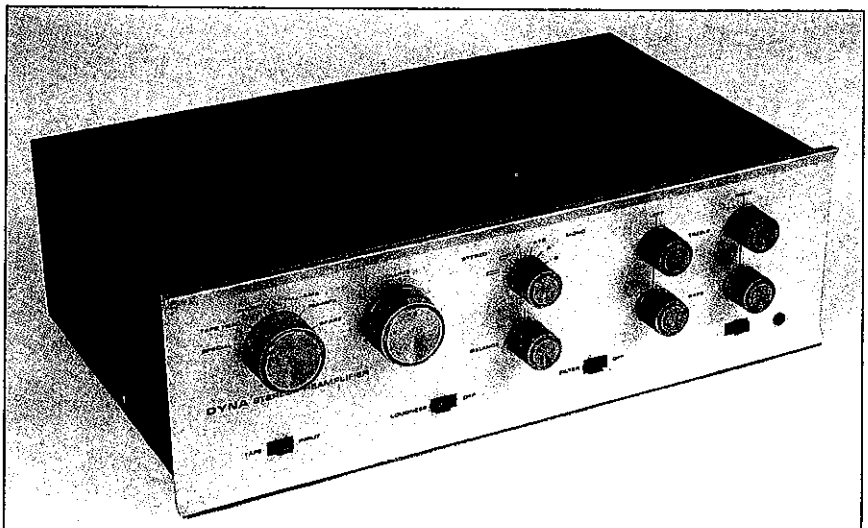
Dynaco FM-1 Mono Tuner



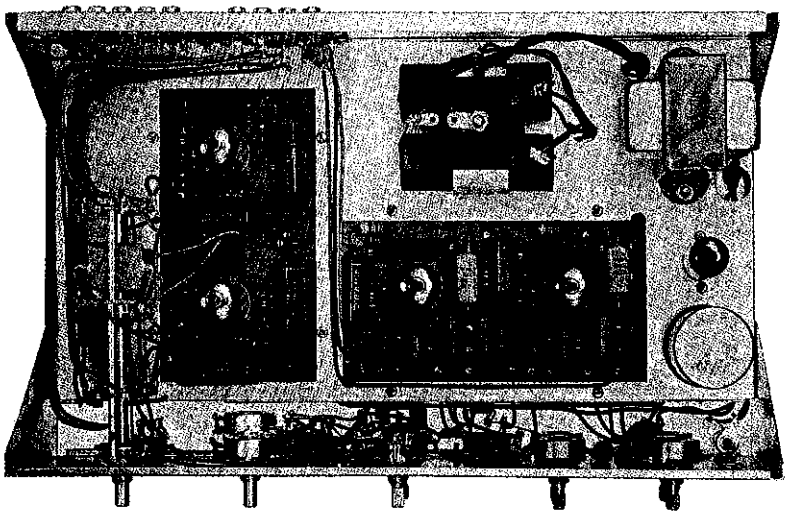
Dynaco PAS-2 Stereo Preamp



Dynaco Stereo 70 - 35 Watts per Channel Stereo Amplifier



Dynaco PAS-3 Stereo Preamplifier



Dynaco PAS-3 Chassis Photo From Owner's Manual

narrow coil.

What about the winding arrangement in those transformers. Are they different than the Acrosound?

Oh yes, they are definitely different. I had a patent on the Dynaco transformers.

Is that patent still in effect?

No, the patent was only good for 17 years.

What were some of the unique winding features of the Dynaco design transformers?

The Dynaco design had something that was very rarely done, I had not seen anybody do it in output transformers. It inverted part of the winding. The coil was spun in the opposite direction and windings were put in parallel, criss-crossed sections. It is a little hard to describe. It was interweaved through a parallel connection rather than series connection which I had not seen other transformers use.

So the transformer had four winding sections. The first and third were wound in opposite phase and inserted backwards in order to make it work out. The secondary came in between the first and third or second or fourth sections. This is hard to describe without drawing a diagram. You could probably find that patent very easily if you wanted to look it up. It shows that both series had parallel arrangements. Both of them were unique with that step over.

What core material was used in the transformers?

I don't recall. Tresco brought this in for our use.

You also came out with some potted versions of those transformers that were kind of the deluxe line. Were they a better grade of transformer or was it just cosmetics?

Well actually there weren't any standard end-bells available for the larger sizes, 60 watts and above. These included the A440 and A450 models. They looked good and I guess the end-bells didn't look as nice as the sheet metal cans. They were not the same as the deep-drawn cases that we used with the Acrosound transformers.

Were you involved in all the designs of the transformers, such as the A470 for the Stereo 70, or the Z565?

Those were just derived from the basic

unit. The A430 was the starting unit and to make it smaller or make it larger was just a matter of changing the wire sizes, turns ratios and the size of the lamination stack. They were straightforward measurements and calculations. Tresco, based upon our specifications, designed the power transformers.

Did you use any other transformer vendors or imports?

The only thing that was made overseas, when I was still there (up until 1968) were some of the chokes.

Did you design the whole kit process?

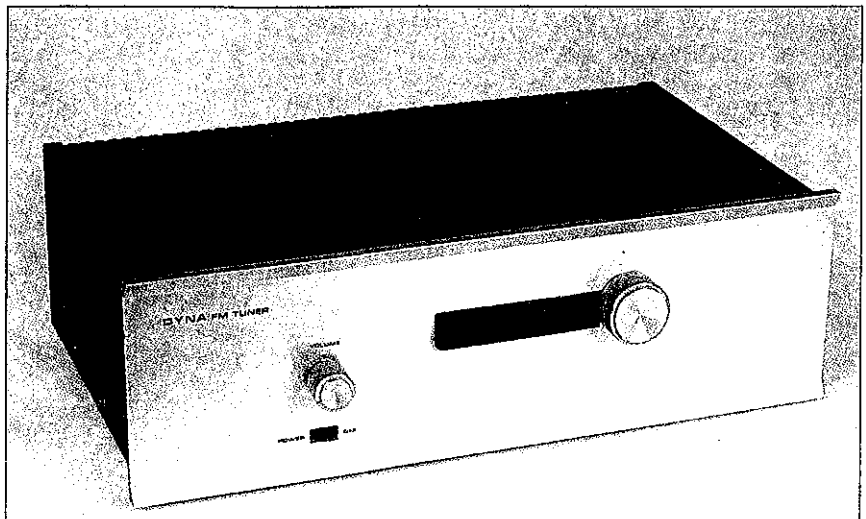
The first ones I did myself completely. After that Bob Tucker got involved. He was very good at thinking of what problems a customer might have and trying to eliminate them. Anything that we were going to put out, he field tested it very thoroughly. He assembled them himself to write the manual. We also used people, who were not skilled, to assemble the kits under Bob's watchful eye. He could see where they ran into problems and make adjustments. The manual was an important part of the kit, of course. I think we had it down to at least as good as Heath and better than EICO and other kit companies.

Was Stewart Hegeman involved in the design of the FM3?

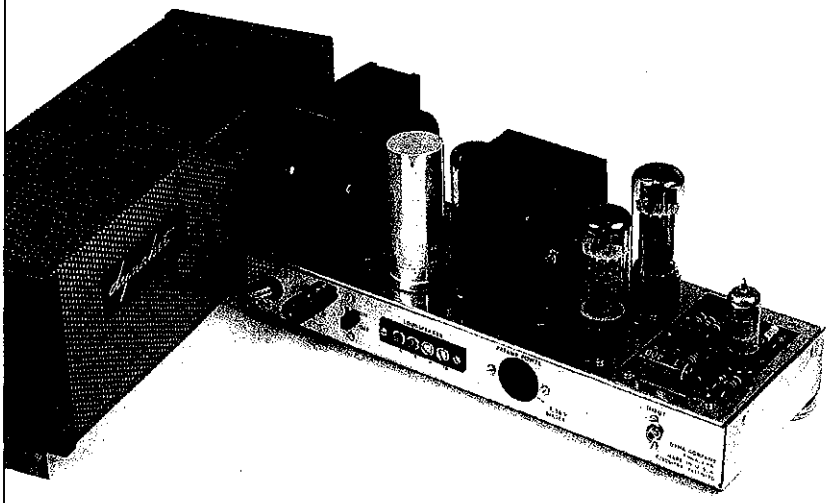
Yes, he worked on the FM-1 and the FM-3. We had a deal with him where he got paid, I don't remember exactly just how it worked out, but it made him a nice sum by the time it was finished. Unfortunately for us, we had to bring somebody else aboard to finish it up because Stewart was a guy that never finished a design.

Who designed the other units like the PAS3, the SCA35?

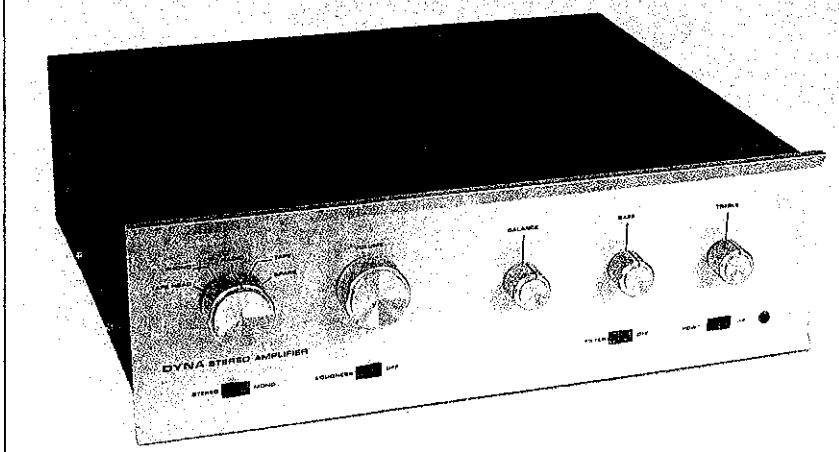
I was involved in all of the tube designs. Ed Laurent did most of the conversions from preamp to integrated amps. He did a good part of the mechanics. Actually, for practical purposes, I was chief engineer and in an administrative sense, Ed did mechanical design and stuff like that. I was involved in everything since I had started the company when I was the first person in it. I knew how to do everything that was done inside the company. I knew how to keep the books. I knew where to buy the components and it was a one man oper-



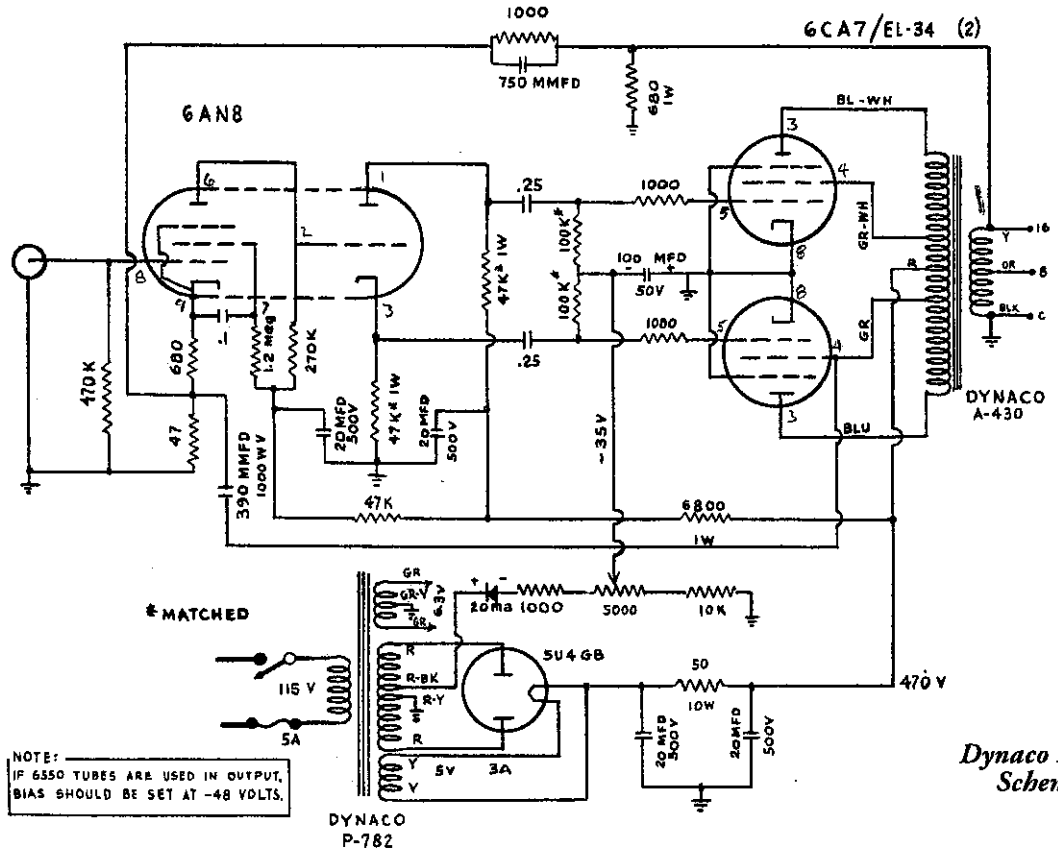
Dynaco FM-3 Stereo Tuner



Dynaco Mark IV 40 Watt Mono Amplifier

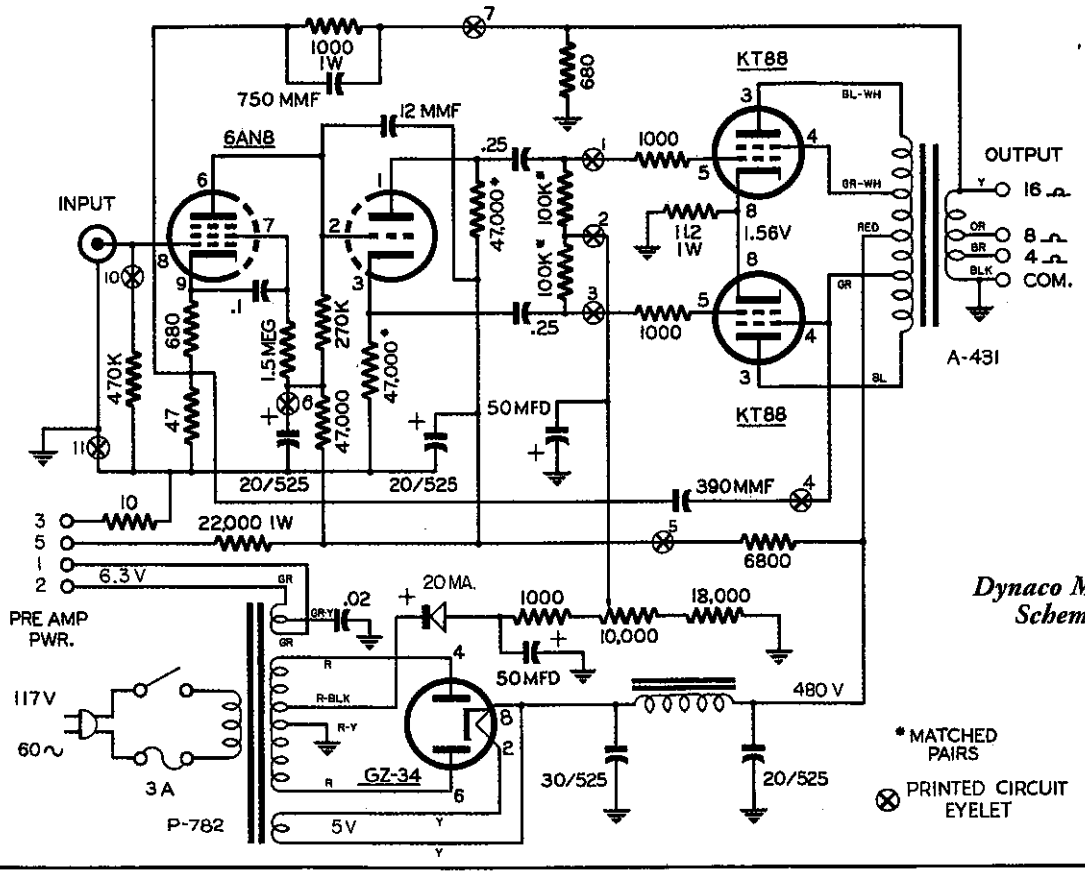


Dynaco SCA-35 Integrated Amp



Dynaco Mark II Schematic

DYNAKIT MARK III 60 WATT POWER AMPLIFIER



Dynaco Mark III Schematic

ation for quite awhile. One man with assistants, let's say. It was only gradually that I was able to delegate some of the work over to other people. At the time when I left, I think the organization had gotten to where we had a quality control man and other specialists.

Let's talk a little about some of your design philosophy. You used the 6AN8 and 7199 as driver tubes. What were your criteria in using those tubes?

The normal criteria to choose any tube. Low noise is one. Most people don't realize that you have hum in some of these things just because of the internal construction of the tube. What we found was that Sylvania 7199 had less noise than the RCA. We would pick tubes on the basis of noise or distortion if we found a difference in distortion. I think it is very difficult how you pick tubes because you are balancing one thing against another.

Did you use a combination driver tube to keep costs down?

The combination driver tube was done initially because it was space saving and saved costs without sacrificing anything.

What about output tubes. What were your selection criteria?

There are differences because some output tubes require higher voltages. So to have a decent safety margin you have to allow for the fact that you can't use the maximum voltage all the time. Hum was usually not a problem, but distortion levels were an important characteristic.

What were your favorite EL34s?

We used Mullard EL34s, because the Mullard salesman got to us first and he got friendly with the engineers, people who would have some say. They were aggressive sales people.

In the Mark III amps, you used the Genalex KT88s?

When the KT88 was first designed, Genalex came to me with samples of the tubes and they looked ideal. It handled more power than the Tung-Sol 6550s and we knew they were good tubes, so it was a natural. Also the KT88s had lower levels of distortion than others that we had used previously, but that was in a range below audibility.

During the mid to late 50s, which was kind of a golden era, if you will, of hi-fi in this country, were you influenced by any other designers, when you were producing your kits? Was there anybody that had major influence on you?

No, in fact I think it's the other way around. I had major influence on them (laughter).

I would say so too (laughter)!

Actually, when I think about it, things that I did as routine back in the 70s were still not adopted by the bulk of practitioners; Little tricks of the trade, like how to bypass input shielding in preamps, stuff like that. People who had been in the business and making designs for years and years still had not picked up those little things.

Were you impressed with any other manufacturers equipment back then, even though it might have cost more?

There wasn't anything I saw that cost more, that would contribute to the sound. I think that I was able at that time to pretty well convince most people that our equipment was the best. And when I say the best I don't mean the most expensive. I think we were ahead of the whole industry in terms of being able to produce a low distortion and accurate amplifier. Some people made it more expensive and sometimes they used more expensive components that were more than necessary. Some designers had their own wild circuit ideas, some of which worked in the field and many of them really didn't do anything special. I felt there was not a direct correlation between price and quality. This is especially true if you define quality as accuracy.

The Dynaco Stereo 70 was probably the most popular tube stereo amp. When did you start thinking about building a stereo amp? What motivated you to get into this?

The first demonstration of stereo records were in the late 1950s. The stereo tape recorders of the era were not very successful. Plus, there wasn't any reason to change equipment because there was very little binaural program material to be played. There was very little emphasis in promoting it in the 50s. But when the first records came out it, it gave consumers a chance for an easy conversion to stereo and gave retailers an opportunity to raise the price.

What year did you come out with the Stereo 70?

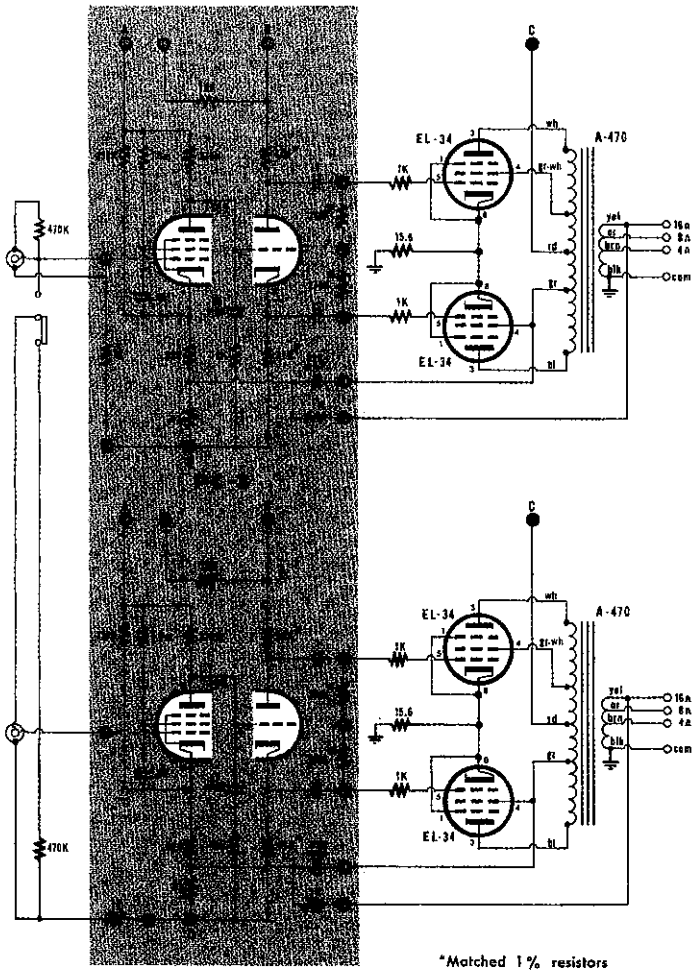
The Stereo 70 came out in late 1958 or early 1959. However, first we had the stereo adapter so that you could hook up two PAM-1 preamps to two Mark III amplifiers. I guess this got us into stereo earlier. That was a way of salvaging what was in the market already and selling consumers another preamp to line up with what they already had. It was a practical approach and it worked. The stereo tuner, I guess, came along in the early 60's.

Did you sell more Dynakits than assembled units?

The kits were more popular in the beginning. In the later days, the kits became less popular because people didn't mind spending the extra few dollars for an assembled unit. Then there's always a little fear from people who put kits together that they were not getting the best results. There was always a market for assembled ones at any price level but we did it at a competitive price level.

Did the kits present much of a problem from a technical support standpoint?

No, because we debugged the assembly manuals to the point where they didn't make incorrect assemblies. But there were always a few people who just never could make something work because they couldn't solder point A to point B. We had a very inexpensive service policy, I think we only charged either $5.00 or $10.00 to fix any kit problems. We had two service techs at the factory handling kit issues and other service jobs. These guys handled up to a thousand pieces of service work in a month sometimes.



*Matched 1% resistors

VOLTAGE TEST POINTS

Pin #	Any EL-34	GZ-34	Either 7199
1	1.56	—	*
2		435	*
3	410	—	*
4	415	360 ac	
5	—32**	—	
6	—32**	360 ac	1.0
7		—	0
8	1.56	435	*
9	—	—	*

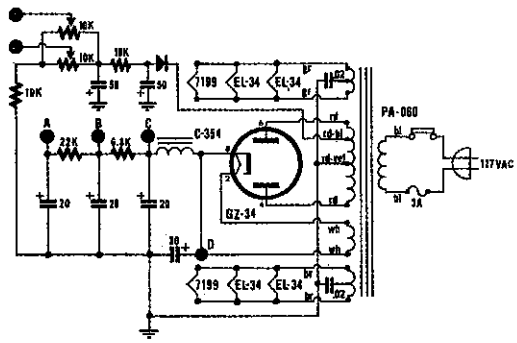
6.4 ac

6.4 ac

*Measurements at these points vary from tube to tube and do not indicate whether performance is normal.

**Measurements at these points can only be made with a vacuum tube voltmeter. The two tubes in a pair should have identical readings.

Capacitor lug		Selenium rectifier		Printed circuit
A ■	305	Bottom (+) lug	50 ac	Eyelets #3 and #18
B ▲	375	Top (—) lug	—65 dc	370 volts dc
C	415			
D ◠	435			



Dynaco 70 Stereo Schematic

What was your dealer markup?

On the kits they were getting one-third. On the assembled product they were getting 40%. They usually cut the price a little so they weren't making all of that.

Would you say that mail order sales companies like Allied, Lafayette, and Radio Shack were some of your biggest customers?

Yes they were. At the very beginning there were few retailers who were interested because they couldn't afford to promote an unknown brand. Allied Radio didn't want anything that wasn't advertised and promoted.

Was your relationship with AR continued through the late 50s?

I first met Edgar Villchur in 1953 or 1954 when he introduced the AR-1 speaker at the early hi-fi shows. We maintained a perfectly good relationship and I joined them in terms of promotion. AR rented a space in Grand Central Station in New York, for product demonstration purposes. Anybody who walked through the station and had time to kill between trains could go in and hear some AR and Dynaco working together. We paid AR for half of that, of course. Even after AR came out with their own amplifier, we still had a close relationship.

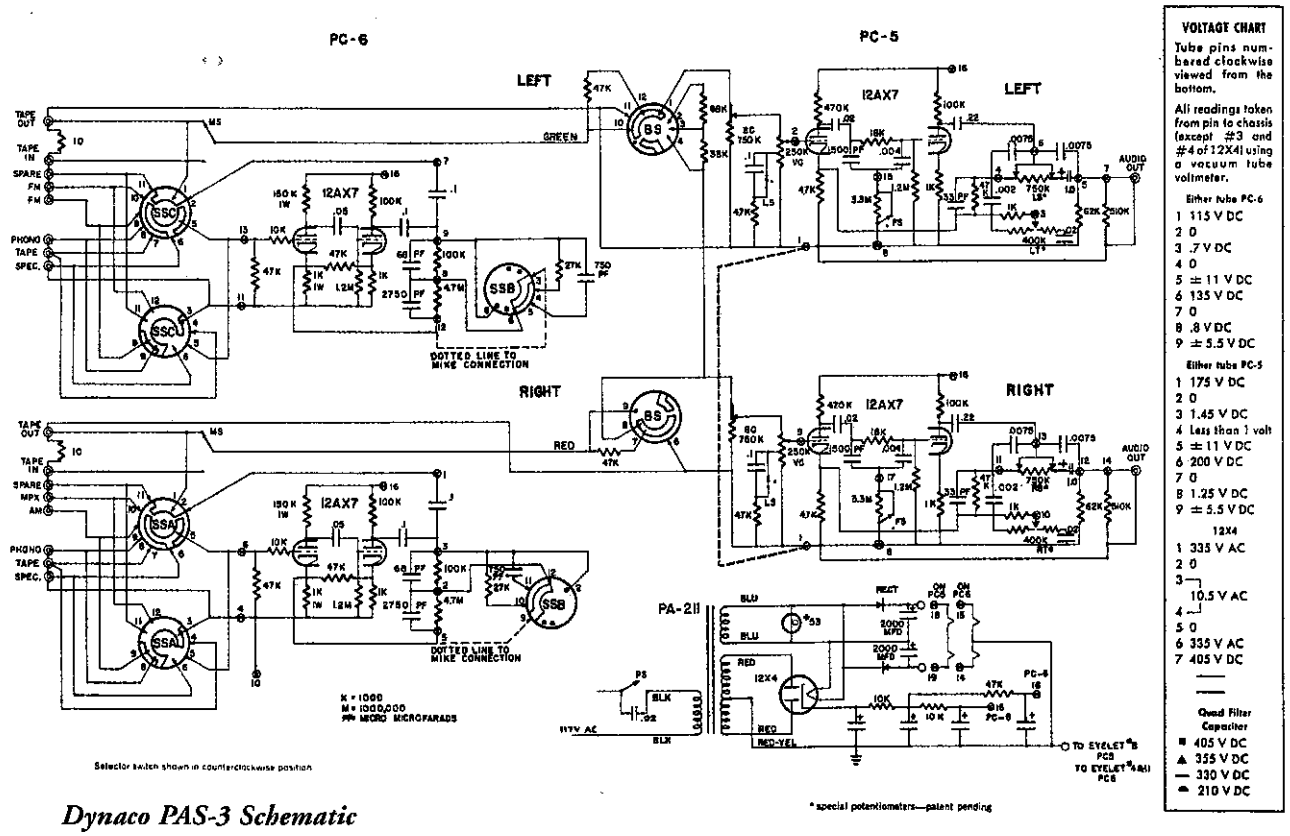
What brought about the development of Dynaco loudspeakers?

I always thought the speaker market was a good one. First, it is an easily produced item with a high profit margin. Also, when somebody buys one of your products, chances are you could sell them a complimentary product if he was happy. I always thought that we were going into the speaker business, not to manufacture speakers drivers, but to buy raw speakers, breadbox them and handle it from there on. I was going to Denmark regularly to handle Dynaco's distribution of B & O products. So we knew a lot of people in Denmark who were in the audio field. There was a small company called Seas who did a nice job and had good quality. We found their prices were reasonable and we started to have them make speakers for us.

Later, people split off from Seas and formed their own company, in order to continue production of our product. I think we outgrew Seas at that point. We were selling 1,000 speakers a week during the late 1960s.

Who designed the A25 speaker?

A fellow named Skoning who still has some custom speaker business. Another fellow came along with the idea



Dynaco PAS-3 Schematic

for stuffing fiberglass in the bass reflex port to make the bottom-end more damped. The way he did it worked well and we paid him a percentage for the first 10,000 speakers or some such value, I can't remember now the exact details. So he took the credit for designing it even though he and Skoning actually worked out the parameters jointly. It came down to two final speaker designs. The two of them looked alike and had essentially the same specs but they sounded entirely different. The one I picked turned out to have an aluminum voice coil instead of a copper voice coil, so it had a good low bass response and a nice sparkle at the high end.

How many A25s do you think Dynaco sold?

Bob Tucker once told me they had passed the one-half million mark. He kept track of those kinds of things.

While we are talking about production figures, let's go down the list of the tube products. What are your estimates of tube equipment production figures?

I did make a couple of notes based on what I knew about production figures up until I sold the company in 1968. These are more approximations than exact numbers:

Mark II - 30,000; Mark III - 85,000; Mark IV - 55,000; Mark VI - 1,000; PAM 1 - 120,000; Stereo 70 - 250,000; ST-35 - 65,000; SCA-35 -80,000; PAS-2 and PAS-3 - 500,000 (combined); FM-1 and FM-3 - 200,000 (combined) (*NOTE: for more descriptive information on Dynaco Equipment, refer to VTV #1 p 5-7*)

Even though I sold the company in 1968, I stayed on as an advisor through 1971. The above numbers do not reflect production figures during that period. *(Note: David estimated that the total number of Stereo 70s made through 1977 is over 400,000; PAS-2/3s >600,000 and Mark IIIs >125,000)*

Did you sell many products overseas?

Yes, because most people didn't do any business overseas at that time. A lot of the overseas business went to McIntosh, who did a good job because their high price made it a very attractive item in the Japanese market. We sold more units than McIntosh did, but they sold more dollars into that market because their prices were so high.

You had a fairly good market in Japan then?

For a while there Japan did very well for us, buying 5,000 units at a clip.

What about Europe?

We set up our own distribution company in Europe and did well, we got about 20% of our business out of Europe. At that time that was very, very good because, let's face it, most American companies did very little in Europe and especially in Japan.

What was your favorite Dynaco amplifier?

I guess the Stereo 70 because it worked well, was inexpensive and was adequate for three-quarters of all people. The remaining quarter needed higher power, mostly because they played it loud or because they had inefficient speakers, like electrostatics.

So your favorite loudspeaker would probably be Dynaco, right?

Yes, I did think they were great speakers for the time and price.

In VTV #4, we did a vintage speaker article and listening evaluation. Our listener panel found that the A25 was one of the best-sounding vintage bookshelf speakers, so that still holds true today.

I agree. Also, as a general class of speakers, I like electrostatic designs, but you need a lot of power to handle them properly.

What were your first solid-state amplifier and preamplifier?

The Stereo 120 and the PAT-4, which were brought out in the mid-1960s.

Why did you decide to go into transistors?

People were clamoring for them. They wanted them. I would say, in terms of listening, there wasn't any essential difference between tubes and transistors. If there was a difference it wasn't because of tubes versus transistors, it was because they may have been trying to drive wrong size speakers, with the wrong size amplifiers.

We have quite a few readers who would disagree with you on that, David! Who designed the transistor equipment?

Ed Laurent and his technical staff did much of the design. Then Erno Borbely, who we imported from Norway, was also involved in the design and final details. He was a very

careful and methodical guy. A lot of the new things, I would personally suggest and tell them to "try this."

So you were making both tube and solid-state equipment in to late 1960s?

Yes, but the tube stuff was fading down at that point.

After you left Dynaco in 1971 as an advisor, how long did they continue to make tube gear?

I would say to approximately 1977 or so.

When and why did you decide to sell Dynaco?

I reached a certain age where I decided that being a workaholic was getting old. When I first started Dynaco in the mid-1950s, I had two full-time jobs and two part-time jobs all running at the same time. When somebody had to do all the legwork, it turned out to be me.

Was the fact that the Japanese audio companies had significant volume in the US hi-fi market a consideration in your decision to sell Dynaco?

The Japanese thing came a little later. They did a good job and sold product at realistic prices. They started out kind of weak and ended up very strong.

Who bought Dynaco?

Tyco Laboratories bought it from me. Tyco had the idea that anyone who took a business course at Harvard could manage any type of company anywhere. They felt like it was always the same only the details varied.

What are your thoughts about what is occurring in consumer audio today?

You are not going to like my feelings, I'm afraid. There is a big rip-off going on. Companies are selling extra high-priced equipment that has no benefit except a high profit to the company that sells it. I don't think that many of these fads that come along are true advances.