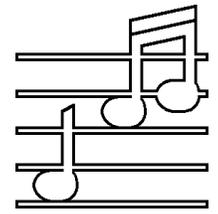


# AUDIO BASICS



The Complete 1989 Back Issue Set.

## VOLUME EIGHT NUMBER ONE JANUARY, 1989

### Welcome to Audio Basics Year Number Eight!

We are glad to have you back for another year, and we will do our best to make the 1989 *Audio Basics* the best year so far. We have got a lot of information for you this month – the "main course" being everything you need to know about selector switch operation and installation. Yes, with this issue you will have all the information you need to install a high quality replacement selector switch in any Dyna Pas, Pat-4, Pat-5, SCA-80, or SCA-50 chassis (and many other units too). And yes, if you cannot find the selector switch parts locally that we specify, we will sell you the switch set up for your Dyna and many custom units.

But, before we get into the main project (and for you non-builders the information supplied can help you understand your equipment better and make it easier to maintain) we have a bunch of shorter topics to cover, so lets get started!

### An Underground Magazine Editor Writes to Us

I got a somewhat disturbing letter from the editor of an "underground" audiophile magazine (not *Stereophile*) recently.

The good news was that he reported that he had heard our Fet-Valve equipment and that it "sounds real good." The bad news was that he accused me of selling only by running down everybody else's equipment. I don't know where he heard the equipment as that magazine does not have it for review, and I am puzzled over his impressions of the way we do business.

I re-read my current catalog (the pretty blue one dated September 15, 1988 – available to you upon request) and didn't find any disparagement of other brands. I do call them the way I see them here in *Audio Basics* especially when I see advertising claims that I believe are misleading. But I suspect that if you wanted to read simply that everything was "one of the best in its price range" you would not be reading *Audio Basics* at all.

Most of my phone time is spent explaining what we do and why we do it. Do I think our equipment is the very best? Yes! Is there other good equipment out there too? Of course! Audio Research and Conrad-Johnson come to mind immediately as examples of companies dedicated to the truth in audio reproduction – but their "truth" comes at a higher price than ours.

Anyway, what do you think? Do I run down other equipment too much? Is *Audio Basics* too negative? Is our good rating in the recent *Stereophile* satisfaction poll of their readers unjustified? Let me know what you think. Perhaps I will tabulate your opinions and publish the results herein. If I am unfairly negative, I want to change.

### Another Japanese Brand Calls it Quits in the U.S.A.

Kyocera Electronics has left the US market as of the end of 1988 and has sold its subsidiary brand, KLH. Kyocera was noted for using ceramics in high fidelity equipment – no surprise, their main background is as an OEM ceramic supplier for magnets, coils, etc. – but was perceived here as another high styled oriental "hi-fi" brand (and there are probably too many of them for the market right now). If you own recent Kyocera or Akai audio equipment, you might want to check with your dealer about what provisions have been made to provide continuing warranty service.

Sometimes no provisions are made at all as we learned to our dismay when the company making Connoisseur turntables was purchased and then liquidated in England about 10 years ago. By the time the word got out, the US importer was sold out of spare parts, and we could get no replies to requests sent directly to the new owners in England. Although our in house reserves of spares kept our clients going for several years, we finally had to disappoint people with otherwise good turntables when they went out of service for lack of spare parts.

Now if only Toshiba would join the exodus. All we got from them for selling high tech propeller milling machines to the Soviet navy was an apology in the newspaper and the dismissal of a few underlings. How quickly we forget.

### This is your Last Chance for B&W 1800 and 1600 Speakers!

As of today B&W has about 70 pair of black ash DM1600s and 50 pair of black ash DM1800s left in stock at the very low prices we mentioned in the November, 1988 issue. This inventory will be gone soon (one big western dealer bought 100 pairs of DM1600s in one day recently).

We have the DM1800s set up here now and report that they are extraordinarily neutral and high definition, non-fatiguing and easy to drive. They were worth their \$1200/pair list price, and at our closeout price of \$765/pair (\$565/pair for the DM1600s) (including shipping to you in the continental USA) are absolutely incredible values.

B&W made a mistake with the DM1800 and DM1600 models. These speakers have electronic protection circuits, real wood veneer cabinets, synthetic cone woofers, the new metal dome tweeters, and "matrix" internal bracing. They are great sounding, but were priced a little high for their size.

B&W then came out with the much less expensive "500" series speakers. Although these are very good speakers and are as musical as you are going to get in a value priced line, they are not built (or priced) to Matrix standards. They do not have the electronic protection circuits or synthetic cone woofers, and they are vinyl cabinets, not real wood. But, they are styled to look just like the much more expensive 1800 and 1600 models. Much to B&W's dismay, too many people buy speakers by looking at them rather than by listening to them. And sales of the 1800 and 1600 languished while the lower priced but equally attractive 500 speakers took over, even though the 1600 and 1800 sound more true to life. So, the excess 1800 and 1600 inventory is being sold off at near 500 series prices. Call us today to find out if you can still get a set. This is a real value opportunity. Purpose designed stands are available at \$67.50 per pair - but there is a story behind these too. See the next page.

### Read All The Instructions First!

Have you ever heard that advice before? Well, one of my B&W clients found out that advice is true the hard way! It seems that B&W is a bit retarded in regard to the accessory hardware and instructions they supply with some of their products – they kind of revert to being British – as in "the British drink warm beer because they have Lucas refrigerators" – anyone who

has owned an older British car in a winter environment knows what I mean. So, instruction number one for the sand filled stands for the DM1600s and DM1800s is to fill the stands with sand. Instruction number six is, you guessed it, turn the stand over and plug the holes in the bottom with the spiked or rubber feet supplied. Where is the sand going in the meantime? You got it! The design is clever enough to look like the sand won't run out the bottom – but it will. They must of hired the same engineer who did the side curtains in the Austin Healy Sprite. My client liked the speakers anyway.

### **If You Bought a Panasonic product between March and August 1988 You May Have a Refund Due!**

Panasonic and its parent company Matsushita has come to an agreement with the Attorney General of the State of New York regarding a "price fixing" investigation. While denying all charges, Panasonic has decided that a voluntary quick settlement would be better for business than to fight the charges in lengthy litigation. Thus a several million dollar fund has been set aside by Panasonic to provide partial refunds to those who have purchased specific Panasonic and Technics products recently. The refund amounts range between about \$17.00 and \$45.00 and apply to certain models of VCRs, camcorders, telephone answering machines, telephones, and a few items of Technics audio equipment. If you purchased a Panasonic or Technics product that is eligible for a refund, make sure you have sent in your owner's registration card and have a copy of your sales slip and contact Panasonic to find out how you go about obtaining a refund if one is due you. Panasonic has also agreed to inform all of their retailers that each has the right to set their own selling prices for Panasonic products.

I look upon this settlement with mixed emotions. Certainly there has been an effort in the past year by many major consumer electronics suppliers to control retail pricing much more aggressively, and certainly these efforts are considered by some to be contrary to the intent of the law.

However, without some way of insuring that product brands offer some assured profitability to the retailer the final loser in the frantic race to undercut prices is the consumer as brands are driven out of the marketplace by brainless excessive discounting. When a particular brand is picked as a "loss-leader" by the big discount houses it is dropped by all full service retailers because they cannot keep their doors open selling for no profit.

The big discount house sells because you demand the product – you already know about it – they are making use of the promotion and

education that the full service retailers have already provided. When a product brand is dropped by the full service retailers, it eventually loses its brand recognition in the discount houses too – and it dies. You lose because another quality brand is driven out of the marketplace because the company could not legally keep its products profitable to sell. The full service dealer loses because after he has committed to complete support for a quality product line, and has invested the time and money educating his market about its value, his payback is killed when the warehouse barn starts selling it for \$2.00 over cost.

Certainly "price fixing" and the days of "fair trade" were wrong. That denied your right to negotiate for a fair exchange of values in a free market. But when electronics suppliers are denied any control over the distribution of their own products, they are denied the right to control their own destiny, and that is wrong too. There has got to be a better way than the restraint of trade laws now on the books and the under the table dealings that go on to circumvent them.

### **The Selector Switch Project - How to Do It Yourself!**

OK it is time for another construction project, namely, the replacement selector switch. Although the main switch example is drawn for a Dyna Pas chassis and to match a stock Dyna Pas faceplate, the switch parts will work in many chassis, including the Dyna Pat-4, Pat-5, SCA-50 and SCA-80, and likely in many other audio products using a rotary selector switch.

*[1990 Note: We have recently completed additional point to point wiring diagrams for the installation of the selector switch in a Dyna PAS chassis. If you would like these additional diagrams, call or write us. They are free of charge. Note that these additional diagrams are included if you order the switch from us so you won't need to ask for them again.]*

The parts needed are two Centralab PA-18 2 pole 11 position non-shorting switch wafers (one per stereo channel), one Centralab SA-300 30° 1-3 section 2-12 position switch index assembly, and one Centralab 4B front shaft pressed into the SA-300 frame. These parts may be available unassembled from any Centralab distributor. The assembly of the switch is a bit tricky because the parts are ceramic. This means that the switch won't twist or warp in use and the contacts will stay in alignment, but it also means you can turn it to ceramic dust by overstressing or overtightening the parts when you put it together. If you cannot find the parts locally, we now have completely assembled switches available for you, with specific wiring drawings for the

Dyna Pas, Pat-4, Pat-5, SCA-50 or SCA-80 (please specify) for \$35.00, including shipping in the USA.

The first thing you need to know to successfully replace a selector switch is how the switch works. Just a rote wiring drawing is not useful, because it won't help you customize the switch wiring for your application. And, after you understand how the switch works you may find that it is easy to find more uses for it.

**So, let us look at the drawing on the next page.** We have shown the two halves, the ground half (front) and the signal half (rear) of a switch wafer. There is one wafer per channel, two wafers (four switch halves) for a stereo switch. We have also shown the metal front plate of the switch, and the selector switch knob with its indicator mark aligned with the active switch position. The view is looking at the switch and knob from the front of your audio component, as if each part was transparent and you could see through it to the next.

This Centralab switch assembly has twelve positions 30° apart to give it near universal utility. The positions that you use are set by how you wire it and how you set the locating stop rings on the front frame. There are two small removable adjustable stop rings located on the front plate held on by the retaining lockwasher and control nut. Each ring has a "finger" that drops through one of the twelve small holes in the front plate. The locations of these fingers sets the limits of rotation of the switch assembly. You can set the rotation for anywhere between two and twelve position, or for free rotation if the fingers are removed. We have drawn the front plate with the rings and fingers aligned for the six positions used with all Dyna chassis preamplifiers. If you buy an assembled switch from us, it will come with the fingers pre-set for your specific application. If you buy the parts independently, you will have to set the rotation stops per the Centralab directions for your needs. Since the rings are only held on by the panel mounting hardware, be careful when installing the switch to not allow the rings to slip out or you will lose the pre-set switch stops.

Now examine the top drawing which is of the signal half of a switch wafer. Note that there are twelve identical signal lugs spaced 30° apart around the switch wafer, except that the lug marked "output" is longer. When the switch is rotated, the metal disc (light gray) is rotated, and the lug extending from the metal disc will contact one and only one input signal lug at a time. This selected signal lug is thus connected to the output lug, which makes contact with the common disc all the time. Thus, the selected source is chosen. The output lug is wired to the tape monitor switch, and to the tape output jacks. So, the selected input source is routed to

the preamp's internal circuits for processing and on to the power amplifier, and is available to your tape recorder (ahead of the preamps circuits and controls) at the same time. In this switch design, the rotating lug is made narrow enough so that it breaks contact with one source before it makes contact with another. This is to prevent tying the output of two sources together momentarily in switching, which might damage them. This is called a "break before make" or "non-shorting" switch design.

Now examine the bottom drawing, that of the ground half of the switch wafer. This half would be unnecessary if we were not concerned about cross-talk – the background bleed-through of unused sources into the program we are listening to.

The purpose of this half is to short to ground all the sources we are not using so that the signals from those sources are attenuated and cannot couple into the preamp wiring and cause crosstalk. This half is made differently. The common rotating disc (gray) is larger and it picks up and shorts together all of the input lugs at the same time, all except for the one input lug now being used. That lug corresponds to the cutout "notch" in the disc and is aligned with the signal disc lug on the other side of the wafer. Note that there is no lug at all at the position corresponding to the "output" lug on the other side of the wafer because we certainly do not want to short the output of the switch or you would have no signal at all. Note too that there is no special output lug on the ground side, all the lugs are identical. We can use any convenient (and not otherwise committed) lug as the common ground connection to the chassis. In this drawing we have used the lug marked "ground" for this connection simply because it is easy to reach. As with the signal side of the switch, the notch in the rotating disc is made big enough so that two lugs are not connected at the same time to preserve the break before make characteristics.

Note that the rivets that fasten the lugs to the switch wafer electrically connect each signal side lug to its adjacent ground side lug. This is good in that a solder connection to either half will make both the ground and signal connections to the switch (to be sure, solder the connection wire to both lugs) but it is bad when it comes to one special switch application, namely for tape monitor use.

The Dyna Pas vacuum tube preamp does not use the selector switch to bring up the tape input source. That is done only at the tape monitor switch. The tape monitor switch connects either the tape amplifier input jacks or the output of the selector switch to its output

terminals and on downstream. A tape input position on the selector switch is not necessary.

However, with more complex preamplifiers, with two sets of tape inputs and two sets of tape outputs and tape to tape dubbing capability, the main selector switch must contain the tape input positions. There must also be a tape - input switch and a tape 1 - tape 2 switch to complete the necessary tasks. This is so you can select one tape recorder as a source, while recording to the second one while comparing the source signal to the newly recorded one. The signal path when tape dubbing is tortuous. The signal comes in from the source tape deck and is selected by the selector switch, this signal is sent to the output of the switch and on to the tape monitor switch and to the tape output jacks. The signal then goes to the second tape recorder where it is recorded, and then it comes back again to the preamp to the second set of tape inputs. From there it comes to the selector switch again and to the tape 1 - tape 2 switch. For that signal to be sent downstream, the tape 1 - tape 2 switch must be set to tape 2, which connects tape 2 to the tape side of the monitor switch. When the monitor - input switch is then set to tape, you hear the signal just recorded on the second tape deck (assuming it has 3 heads), when the monitor - input switch is set to input, you hear the source tape deck. Got it?

There is a catch, and that is that the tape inputs in a preamp with tape to tape monitoring capability cannot be attached to the ground side of the selector switch because they would then be shorted out during attempts at tape to tape monitoring making monitoring impossible.

But with this Centralab general purpose switch, all unused inputs are shorted, so what do we do about it? We slightly "modify" the switch, if necessary. In those applications where tape inputs appear at the selector switch, it is necessary to bend up the contact lugs on the ground side of the switch wafers at the tape positions, so the tape lugs cannot make contact with the central disc. Then the tape inputs will never be shorted out, no matter where the switch is set, and tape to tape monitoring will be possible. What about crosstalk? Simple – turn off the tape deck when you are not using it.

Note that the original Dyna SCA-50 has a selector switch in which the Tape 2 position does short out, and thus tape to tape dubbing is impossible with this unit in stock condition. Dyna fouled up the switch design, SCA-50 owners, you are not doing something wrong. However, when we rebuild these units we of course "fix" that problem, so tape to tape dubbing is possible with our CA-50 and CA-150 Plus integrated amplifiers.

Anyway, back to the switch drawings on page 5. Obviously we have shown the switch sections for only one channel. Another wafer identical to the first is necessary for the other channel. Note that in this application the bottom four sets of lugs are unused. If you had a bigger custom chassis and room for all the jacks, you could have 10 sets of inputs using all the capability of this switch. You need one position for output and another for the output ground.

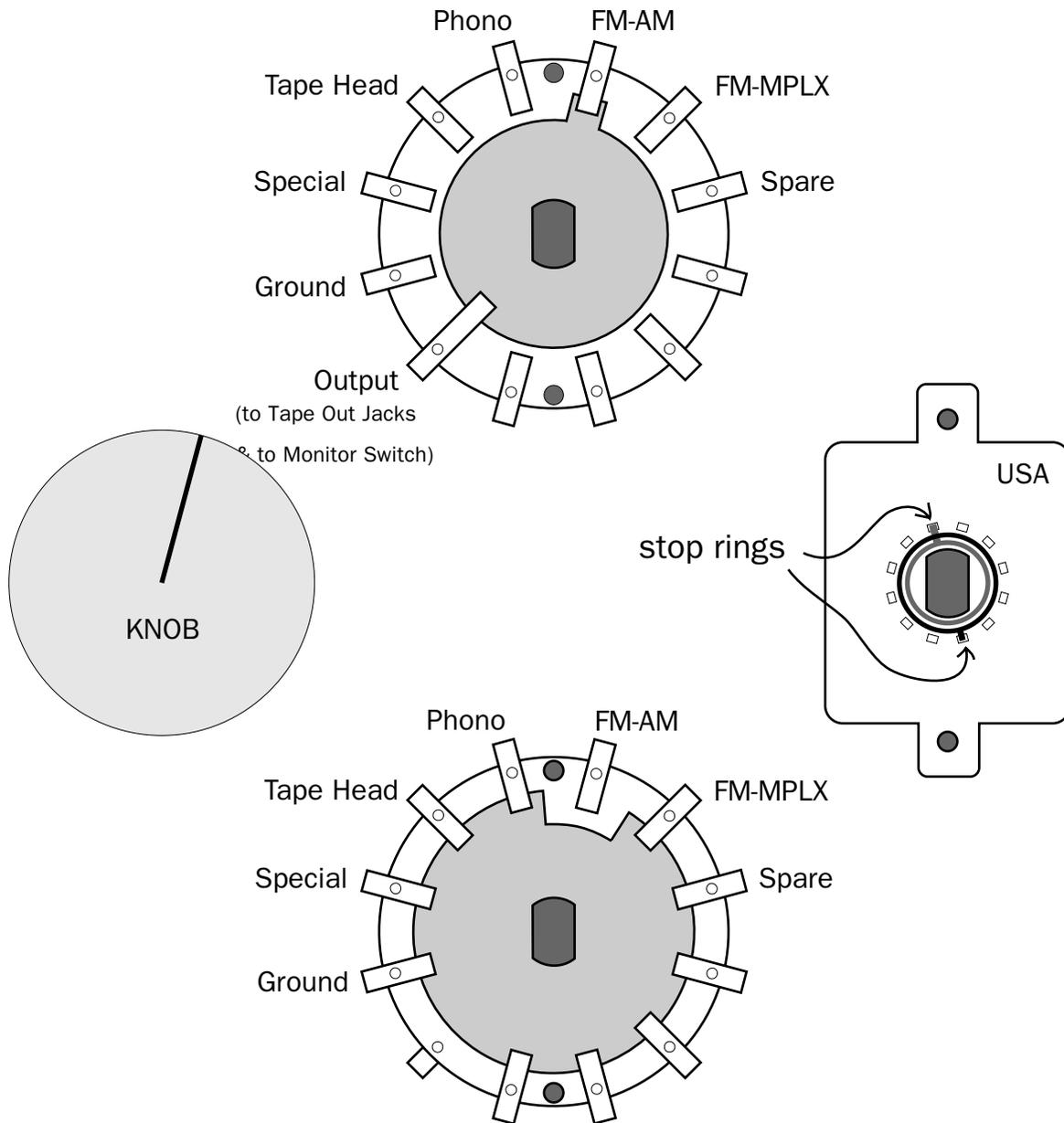
It should be obvious now that wiring up the switch is easy. Simply connect the input jack to the associated switch lug – the lug the switch points to when the knob is set at that name of the faceplate.

Oops, it isn't quite that simple – the phono inputs are special – they don't come from the phono input jacks, they come from the outputs of the RIAA phono preamplifier section of the unit.

Because the output of a phono cartridge is of much lower signal level than anything else, and because the recorded signal has the low frequencies scrunched way down in relation to the high (otherwise the record grooves would be too big to track) the phono inputs have to be first amplified a whole bunch and equalized (the bass boosted back up to where it is supposed to be) before the rest of the system can use the signal.

So, the phono input jacks connect to the input of the phono preamplifier circuits (signal eyelet 13 and ground eyelet 11 for the left channel, signal eyelet 6 and ground eyelet 4 for the right channel on the Dyna PC-6 board), and then the output of the phono preamplifier circuits (signal eyelet 7 for the left channel and signal eyelet 1 for the right channel of PC-6) connect to the phono position of the selector switch. I hope you realize that this requirement makes having two sets of phono inputs not a simple project. You either need two separate sets of phono preamplifier circuits (expensive and no place to put them) or a specially designed switch that has a set of switch wafers ahead of the phono circuits in tandem with another set after the phone circuits, four switch wafers in all. And, with a switch custom designed to provide special handling of phono inputs, you cannot convert one set of phono inputs back to line level inputs without going back to a standard switch design such as this one. Some products use custom wafer designs with the central disc split into sections to provide four wafer capability in just two sections. But it is not economically practical to try and design a new special purpose replacement. You would never pay the several hundred dollar each cost. So with this general purpose switch you are going to have to live with just one set of phono inputs – which is all most people want now anyway. Of course, you can just eliminate the

Signal side of switch wafer.



Ground side of switch wafer

This drawing shows the switch labeled specifically for the Dynaco Pas chassis to match the original Dyna faceplate. However the switch described herein can be used for many rotary switching applications. If the switch is ordered from us it will be accompanied by a relabeled sketch showing the connections for the specific Dyna application required.

phono circuits altogether now if you want and use the phono position for another line level input. In the Pas, change the first 10,000 ohm power supply resistor to about 24,000 ohms and disconnect the unused filter sections and also connect the common side of the line card heater supply to ground if you eliminate the phono circuits.

So back to the switch wiring. Obviously the switch goes in the Pas (or other) chassis right side up (the USA on the front plate is up). In the Pas the wafer closest to the front panel is the right channel, while the wafer to the rear is the left channel. Neatly connect the appropriate input wires to the switch lugs. The ground lugs on the switch connect to the ground eyelets (4 and 11) on the phono board. The output lugs have two wires each, one to the input side of the monitor switch, the other to the tape output jack for that channel.

Put the knob on the switch aligned to lug and notch and set the switch to the appropriate position on the faceplate while making the connection. This will help keep you from making wiring errors.

With the Pas, there is no need to bend up any of the ground lugs, and there are no dedicated tape inputs on the selector switch. The obsolete "Tape Head" position on the faceplate is now merely another ordinary line level input, as is the "Special" input position.

What about all those parts on the original third middle wafer on the Pas? They are not used any more. They were actually parts of the phono RIAA equalization circuits switched in and out on the fly to try and change the equalization to NAB tape head or very high gain flat microphone equalization. The effort was not very successful and the switch timing had to be perfect (it wasn't) to avoid switching pops. With the new switch, remove the ground wires on the back panel at the input jacks between the phono and tape head and special jacks, connect ground wires between the tape head and special and am-fm jacks, replace the two 10 ohm wires with jumper wires, and now those obsolete special and tape head positions can be wired to the new selector switch as useful line level inputs. You will need to replace the two 68 pF capacitors on the phono circuit board with 750 pF capacitors to hard wire the phono equalization back together and eliminate the wires to eyelets 2, 3, 8, and 9 of the PC-6 board. If the switch is going into a Pas with Audio by Van Alstine circuits, those chores have already been done.

If you are installing this switch in a Super Pas Three kit and you want our new faceplate soon, then revise the wiring arrangement for the switch to match the Super Pas Three faceplate layout by swapping the locations of the phono and the special wiring at the switch wafers.

Then when you send your finished Super Pas Three kit to us for the installation of the new (black only) AVA Super Pas Three faceplate (\$40.00), we won't have to rewire any switch connections.

This should give you enough information to replace your selector switch in a Pas chassis and to think about doing it in other chassis too. Check with us before ordering the Centralab switch because sometimes we run low on stock and see 30 day delays before new supplies get here. Thanks for your interest.

### **Got a Mac? We have the Audio Basics Topics Index on a Hypercard 2.0 Stack Now**

Just send us a 3.5" floppy and we will dump this index stack on it for you, no charge. You must have Apple's Hypercard 2.0 program on your Mac computer to use this data.

Is there any public domain or shareware software you are especially looking for and cannot find? I can probably help you there too since I got the Apple CD-ROM reader for Christmas (nice wife and kids). It even plays music too with the control panel functions handled by the computer. I have the entire Educorp public domain software collection on one CD, and 8,800 more PD files from Nimbus on another (over 1200 floppies full on two little CDs). Tell me what you are looking for and if I have it I can probably dump that on your floppy too. Be sure to pay the shareware fees if you use the material and note what nice responses you get from the authors when you send them their deserved payments.

Thanks for helping make this January the best single month we have ever had.

*Frank Van Alstine*

## **VOLUME EIGHT NUMBER TWO FEBRUARY, 1989**

### **Bose Raises Doubts About FMX FM Noise Reduction**

At a recent press conference at MIT, Dr. Amar Bose and Dr. William Short of Bose Corporation presented well documented observations (both mathematical models and recordings of actual broadcast experiments) claiming to show that the FMX FM broadcast and reception noise reduction circuits may actually increase noise and distortion under many circumstances, for both standard FM tuners and for tuners with the special FMX circuits. They presented a demonstration showing that when FM multipath distortion is present (often a problem in a car radio in a city and for home systems in big city areas too) that the FMX encoded broadcasts were actually noisier and more distorted than those without FMX en-

hancements. They pointed out that the FMX system was only quieter in the absence of multipath and modulation reception problems.

Since incorporating FMX circuits into an FM tuner design means abandoning the FM Mplx IC circuits we now use – ones that are providing extraordinarily musical FM quality as anyone using one of our FM tuners knows – and substituting a whole new Mplx chip set under BTP (Broadcast Technology Partners – the developers of FMX) license with complete PC card redesigns and increased prices, we have been very leery of exchanging the proven musicality of what we have now for more bells and whistles that could only help a small portion of FM users (those in that "ring area" outside the limits of quiet reception now but inside the limits of still noisy even with FMX). Now learning that FMX may actually bring more noise and distortion to many instead of less makes us less enthused than ever.

Our idea of the ultimate in stereo broadcast and reception is to broadcast digitally encoded FM on a UHF TV station for reception by your TV tuner and decoding by your DAT machine or digital audio processor, such as the Sony PCM501ES I now use. With this system you can even tape record the broadcast with the plain old TV VCR you now own without decoding it and save the tapes for playback when you do get a digital processor some time in the future. Then you can get music broadcast and reception essentially the equal of your compact discs, with no noise at all - and with no new equipment needed on the broadcast end except using the now vast wasteland of UHF TV. All the TV broadcast station needs is a clone of my PCM501 and a good CD and record library, not an expensive investment in comparison with the cost of a studio quality color camera. Your local TV cable company could provide the service too with their underutilized public access channels. "Scrambled" satellite feeds have hi-fi sound now with the use of the GI decoder because the scrambled audio is digitally transmitted and received. Note that this method cannot be done on an FM radio broadcast frequency because there is not enough bandwidth available to carry all the necessary digital information. You need the "room" of a TV channel to handle digital audio broadcasts. This is the reason that DAT machines are actually miniature video recorders, with rotating heads and all. The DAT machine needs the bandwidth extension of video heads to record and playback all the digital information.

### **Nobody Did it Better!**

John Peterson is the owner of Sound Values/Stereo Cost Cutters, Inc., Box 551, Dublin, Ohio 43017. His company has, among other things, an extensive supply of original Dynaco

parts available for you – an inventory he maintains despite the fact that Dyna quit building electronics nearly ten years ago. He wrote a message explaining his enthusiasm for Dynaco products in one of his recent catalogs that deserves repeating here, inasmuch as I share John's respect for the original Dynaco concepts and I too got my start building and selling Dynakit. John says:

*"Welcome fellow Dynakit enthusiast! My first Dynakit spawned a kit-building love-affair that has lasted my lifetime. I built my first Dynakit back in 1969. It was 2:30 AM Christmas eve and there I sat at Port Columbus frantically soldering an SCA80 amp – my sister's Christmas gift. I ran out and bought the Pat-4 and St-120 for myself after hearing the amp I built for my sister. Little did I dream as an impoverished college student that I would purchase, in 1980, the Dyna inventory and reintroduce (in 1988) the St-70. Truth is stranger than fiction.*

About Dynakit...

*Over 25-plus years (1955 – 1980) one small U.S. audio manufacturer stunned the electronics world with a string of incredible sales records – units sales so amazing, it is unlikely these records will ever be broken. The Company? Dynaco.*

*The Record speaks for itself...*

1. *The world's largest selling quality loudspeaker – the A-25 (nearly 1 million sold).*
2. *Largest selling tube preamp in the world – the PAS.*
3. *Largest (and longest) selling mono tube power amplifier in the world – Mark III.*
4. *Largest selling stereo tube power amp in the world – the Stereo 70.*
5. *World's best selling stereo transistor preamplifiers – the Pat-4 and Pat-5.*
6. *World's best selling stereo transistor power amplifiers – the St-120 and St-150.*
7. *World's best selling stereo high-power amplifier – the St-400.*

*How? What accounts for a small company (just 150 people at its peak) emerging so dominant in its field? The answers, I believe, are fourfold: product sonics, product integrity, product longevity, and product value.*

*Yes, that's why so many (me, for example) continue to use their Dynakits on a daily basis. And why not? Even my older Dynakits still work and sound great (despite much exaggerated misinformation to the contrary), give me all the flexibility I need, and they hold their value. (Many audio buffs actively collect Dyna – as well as other "classic" audio components.)"*

John goes on to talk about Dynaco metal work (which his company sells and which we buy from him too for many of our products) and he explains very well why his inventory of never assembled Dynaco metal parts is of excellent value to us, and to you:

*"Metalwork? Big deal! Ah... but it is a big deal. While electronic parts for most current audio components are "off-the-shelf" items which an electronics distributor can supply, metalwork is a different story. All the holes, all the bent angles, all the rounded or formed corners are the results of custom tooling. Experience tells us that a typical stamping plant charges \$10,000-\$40,000 for a complete component tooling.*

*While many chassis are laid out with machine robotic assembly in mind (i.e., tight corners with everything jammed into a small space), Dynashells make ideal custom audio projects – layout is generously spacious – accommodating a wide range of changes and custom retrofitting. The metalwork was designed with the hobbyist (and later Dynakit factory mods) in mind.*

*Metalwork is already drilled for features and controls you'll want in your design... and then some. And, unlike so much of today's componentry, this is rugged steel and aluminum MET-ALWORK – not plastic. Housings designed for long haul and heavy use. And when you're finished your project will look new because the metalwork is new.*

*While we couldn't begin to produce these parts at today's prices, we can afford to sell some of them to you for less than Dyna's actual 1980 wholesale cost... at a price Dyna had to order thousands of pieces to obtain. In many cases you will be paying less than current audio manufacturers pay."*

Well stated, John! We buy Dyna shells from Sound Values and we continue to offer up-graded circuits for decades old Dyna components because we agree with John Peterson that Dynaco turned out some of the very best audio components ever made and had absolutely the best mechanical engineering values of all.

For example, we have never had a failure of an original Dynaco power transformer in any of their solid state components – an important reason why we keep offering St-120, St-150, St-400 and SCA80 rebuilds with confidence that they will continue to give you reliable service – the basic mechanical structure is superb.

As long as the supply lasts (and for some units there are hundreds of parts sets available) we still can build you great value by using a Dyna shell rather than by tooling new sheet metal.

Attention Dyna Pas vacuum tube preamp owners. Although the blend switch for the Pas is not available, you can use a part Sound Values does have, the Dyna St-400 meter range switch (Part #333020) as a replacement. We have an installation sheet for this switch available with our \$30.00 Super Pas Three rebuild kit plans upon request. You can use the switch with a stock Pas too. We will give you the plan sheet free of charge if you send us a stamped, self addressed envelope.

#### **A Couple of Neat Items from Radio Shack**

If you want CD playback in your car and you already own one of those little battery powered "Walkman" sized CD players, you might want to check out Radio Shack's #12-1951 CD to cassette deck adaptor (now on sale for \$14.95).

It looks like an audio cassette with a cable attached to it. What it does is to take the headphone output from your portable CD player and couple it to the playback heads of your cassette player.

You simply plug the cable into the headphone jack on your portable CD player, and stuff the "cassette" into the cassette slot in your car radio - cassette player, turn on the car cassette player and start a CD going in the portable and voila, you have got CD playback through your car system with no installation cost at all. With any luck, your portable CD player came with a 12 volt car lighter plug standard. Of course, since you take your CD player with you when you leave the car, it is not there to steal and you don't have an expensive looking CD player in the dash of your car screaming "break in and trash the dash to steal me quick." It sure beats the price of a Discjockey.

Although its not exactly an audio accessory, you do need to know that the \$49.95 Radio Shack #15-1902 Universal Remote Control is a pretty useful device too. It is one of those "trainable" remotes that can learn the signals from up to four other remote control units. Mine has replaced the remotes for a VHS and a Beta VCR, my TV and my satellite system. It works just fine and took only a few minutes to learn and to program.

#### **The strategic use of a universal remote control:**

Did you know that one of the main differences between an expensive feature laden VCR and the "stripper" model of the same brand is the number of buttons and functions on the remote control units?

Did you know that many of the "features" on the stripper, such as variable speed slow motion, really are built into the basic structure of the machine, but are simply not accessed by its "stripper" remote control unit? It is less expensive for the manufacturer to build all the inside

"works" just the same than it is to build a lower priced model without the internal functions just as some mainframe computers come complete with much extra memory built in, but you have to pay the manufacturer for the extra memory when all the installation consists of is sending out a technician to open the chassis and clip out a couple of jumper wires that was defeating the memory's use.

Did you know that you can get many of the nonexistent "features" on the budget priced VCR to work just fine if you point the remote control from the high-end machine at it?

Can you "teach" the inexpensive Radio Shack remote the functions of the expensive VCR? Yes, you certainly can. Is it legal, when you buy a new VCR, to take your inexpensive Radio Shack trainable remote control along with you and to train it with the signals from the store's high end remote control unit when you buy a low priced VCR of the same brand from them? If the manufacturer is selling you a VCR that actually has high end functions that he did not tell you it has, is it improper for you to access those functions? Is it ethical to "copy" the functions from the expensive remote control? Should trainable remote controls be put on the RIAA's hit list along with Digital Audio Tape Recorders? Are they as evil as radar detectors and Three Musketeer chips? Isn't it interesting how modern electronics makes more works for lawyers? Tell me what you think.

#### Thanks for the Feedback!

You have done two nice things for me recently. First, you have renewed your *Audio Basics* subscription at a rate like never before. We have kept a higher percentage than ever. Second, I have received many thoughtful letters regarding my self-doubts last month. You definitely don't think I am too hard on the competition, you don't think I sell only by running down others, and you do like to have me call them the way I see them. Thank you for your kind support – now back to the battle.

#### Speaking of Battles, Panasonic's Is Not Over

Last month I reported that Panasonic, while not admitting guilt, had agreed to set up a process to make several million dollars worth of refunds to satisfy the State of New York due to an alleged "price fixing" marketing scheme.

Well, it seems as though some consumer groups still are not satisfied. Two class action suits have been filed against Matsushita (parent company of Panasonic) in New Jersey and in Pennsylvania asking for triple damages due to alleged violations of the Sherman and Clayton Acts. This time, several major retail chains were named along with Panasonic too as conspiring to illegally fix prices. Among the names mentioned in an article in *TWICE (This Week*

*in Consumer Electronics)* were Best Products, Circuit City, Dayton Hudson, K Mart, L. Luria, Montgomery Ward, and Venture.

It is kind of strange to think of K Mart and Circuit City as being accused of being the instigators of illegally high prices, isn't it?

It is also kind of strange to see a Japanese company being raked over the coals for prices that are too high. Usually the government is unhappy because the prices of Japanese products are too low! It seems like the consumer could have simply chosen to buy some other brand if he thought Panasonic prices were too high, doesn't it? Who has really been damaged here and where will most of the settlement money go, to consumers, or to law firms? And finally, if this mess costs Panasonic a real fortune, what does that do to their cost of doing business, and finally to their prices? Are these legal interventions in the marketplace necessary and do they protect the consumer?

#### We Got Our Patent!

We have finally received our U.S. Patent Number 4,801,893 for our Improved Forward Transimpedance Amplifier – the "heart" of our Transcendence Series Two solid state amplifiers. Let's see how many other audio electronic companies out there have received patents for original analog circuit design ideas recently. It kind of separates the professionals from the "modifiers" doesn't it?

#### Switch Instructions for the Pat-4 Are Now Available

I have now prepared instructions for the do-it-yourself installation of our Centralab ceramic selector switch in the Dynaco Pat-4 chassis. The switch is \$35.00 and for the Pat-4 application, comes with an additional four pages of instructions and drawings. The switch and plans enhance our August, 1988 Fet Kit preamp project for the Pat-4 chassis. I will prepare plans for the Pat-5 chassis (both for the Fet Kit preamp circuits and for the new switch) as time allows, but probably not until early summer.

#### A Significant Upgrade is Coming for the Dyna St-70 Amplifier

The St-70 lives! I am going to produce the power supply board shown herein last year, along with a new audio board, just as soon as I get time at the computer to lay it out. I am also going to update the St-70 upgrade plans of 1982 and offer a full do-it-yourself rebuild parts kit as soon as we can gather up all the necessary parts and get the boards tooled. We offer an in-house rebuild too.

Why this sudden change of heart, you ask, when we have been advising you to avoid the St-70 for the past several years? There are three reasons:

1. Sound Values has put new Dyna St-70 units back into production and that means a new supply of necessary maintenance parts is available. I was previously dubious about your ability to find the necessary parts to keep your St-70 running long term.
2. I have discovered a new source of a very high quality and relatively inexpensive output tubes (6CA7/EL34) for the St-70 that are extraordinarily useful, with three reservations. (A) They have such high gain that a bias circuit resistor value must be changed to allow their use. (B) They have such high gain that they make the use of our input filter circuit more necessary than ever – although I have been able to extend the bandwidth of the filter satisfactorily. Without the filter, the higher feedback these tubes generate may cause excess transient distortion and harsh sound. (C) I don't know how long these tubes will last – only time will tell.

But, with our circuit enhancements, these tubes provide the best transient response, the most power, and the most solid dynamic range and "sock" that I have heard in a St-70 in 20 years! They make the old St-70 sound like 100 real watts per channel, not 20 soggy watts.

The tubes are made in the People's Republic of China, and every sample we have tested so far is of outstanding quality – a class of power tube I thought gone forever. We will have production quantities available for you soon, and will be looking at their 6550s, KT-88s, and 12AX7s too. [1990 Note: The Chinese made 6CA7 tubes did not pan out as well as we hoped - production quantities were not as good as the first samples. But - Sound Value does have Eastern European made 6CA7 tubes available that do provide consistently good performance.]

3. Finally, the St-70 properly retubed with matched drive circuit parts, adequate power supply bandwidth, and with the feedback loop running in a linear mode is simply too good an amplifier to give up on. It is much, much more musical than any modern "off-shore" receiver. If you combine it with our Super Pas Three, you can get the essence of a mega-buck esoteric system at a very reasonable price. I simply like the upgraded St-70 a whole bunch, it even drives my 801 Matrix speakers well!

Watch herein for release details soon!

#### The B&W 801 Matrix Series II and 802 Matrix Loudspeakers

Well, I have got good news and bad news for you. First the good news – all those nice things everybody has been saying (including us) about the B&W 801 Matrix Series Two loudspeaker are true – well almost all those things – the "bass alignment filter" is not an improvement. I even broke down and put in a set of Rosewood demos - they look as gorgeous as they sound. Next, the bad news about the B&W 802 Matrix Series Two, or as Senator Bentsen said to Senator Quayle, "you ain't no 801!"

Now where I thought Bentsen's statement was absolutely unfair, mean, and out of place – a cruel personal attack and a deliberate misreading of Quayle's reference to Kennedy's legislative experience, unfortunately, the statement would have been true if comparing the 801 to the lesser – much lesser – 802.

I wanted the 802 to be a fine loudspeaker, a much less expensive version of the 801. It is not a fine loudspeaker, its bass performance and overall tonal balance is too compromised. The only thing the 802 Matrix does really well is to reinforce our judgement that the new Matrix Three Series Two is a formidable loudspeaker at a much lower price – a rational second best when compared to the 801. The 802 is not a second best, it is not a good enough compromise of quality versus price.

Its main problem is a lack of deep bass response. It just does not play that octave below what you normally hear as "bass." The heft and deep power is missing (a rock and roller might never miss it). Thus the significant midrange power and high frequency brilliance of the new head design sounds out of place with the 802. The mids and highs lean toward slightly harsh and bright rather than sounding as extended, powerful, and super transparent as the 801. Adding B&W's active bass boost box does not help. It just makes the mids and highs harsher yet. By the way, we have examined the Signetics linear ICs everybody seems to be using (including B&W) in our in house designed audio IC tester – the torture test all our solid state hybrid modules and Fet ICs must pass perfectly. The Signetics devices have inadequate DC stability - they go offset to the rails in our DC stability test and they latch and go into hard oscillation in our power bandwidth and slew rate test – not an acceptable result for us.

So while we can sit back and enjoy the 801s and say with conviction that they are true \$5000.00 class loudspeakers - a once in a decade achievement in sonic quality, we cannot rank the 802s in the same league.

The inadequate bass extension is not surprising when you notice that the 802's woofer cabinet is quite a bit smaller than the Matrix 3. It really is not a very big speaker, and while the range may be adequate for a smaller speaker, it

is not adequate for \$3600.00! The last of the previous 802 series, the 802F Special was a better speaker, although less efficient and we sold them out at half of the new 802 price. It had a better overall tonal balance and adequate deep bass performance, given a sufficiently powerful and controlled amplifier (almost all of ours). The 802 Matrix is a more efficient ported design, but the woofer does not seem to keep up with the extended output of the new tweeter and thus the tonal balance is bright.

B&W occasionally makes mistakes (as do all of us) and they always seem to correct their mistakes. So, don't give up on the 802. I bet we will see an improved version, one that is a close second to the 801, sooner than you would think.

For now, my recommended B&W speaker choices (in order of absolute quality but all musically satisfactory) is as follows: 801 Matrix, Matrix Three Series Two, CM2, DM1800, DM1600 DM560 and DM550. I have not yet heard the Matrix Two and Matrix One Series Two speakers. Note that there still are DM1800s and DM1600s available at the closeout price. Call us now! They are great values but will all be gone soon.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER THREE MARCH, 1989

### Sorry We Are Late, But Its Worth the Wait!

The reason we are a few days late is because of the weeks of extra work I have put in designing during the past month, designing a complete new audio circuit card for the faithful Dynaco St-70 vacuum tube power amplifier. You simply cannot believe how many late night and Sunday hours one can put in getting a PC card design finished for fabrication and all the paperwork that goes along with it. I have just about worn out the old Mac II here on the project. But the fruits of many late night hours are offered to you herein – the Super Seventy amplifier do-it-yourself project.

The Super Pas Three (which is startlingly better than ever with the new high gain 12AX7A tubes) has been our single most popular product and project, but the calls and letters I get for the St-70 might even outnumber those for the Pas, and that is after two fine reviews in a row on the Super Pas Three (in *Stereophile* and in the newest *Sensible Sound*). So, really by popular demand, this giant issue of *Audio Basics* contains the complete Super Seventy construction instructions. Have fun with it!

### The Fet-Valve CD Player Will Be At the April *Stereophile* Show

No, we won't be there in San Mateo in person, but our Fet-Valve CD Player will be there helping the kind folks of Swan Speakers demonstrate their convincingly natural speakers again.

It seems that James and Elizabeth Bock of Swan IV fame liked our CD player so much at the Audiofest 88 show this fall that they asked to borrow it for the Winter CES show. It did them such good service at CES that we allowed them to keep it for an important eastern dealer meeting a couple of weeks later. Now they have asked for it again for the *Stereophile* show. That is a pretty nice compliment and of course away it goes again. If you get to San Mateo for the show I think you will find that one of the reasons the Swan speakers sound so natural is that they have our CD player for their source, and that because the Swan IV is so neutral it is easy to hear that the CD player is pretty special. I hope you get to enjoy their demo.

Note that the complete Swan IV speaker system is now available as a do-it-yourself kit at a small fraction of the finished system price and complete cabinets are available too. You should write to them at Swan's Speaker Systems, Box 356 Lighthouse Road, Swan's Island, ME 04685 for more information.

### Spectrum Loudspeakers Has Heard About Us Too!

Their president recently called and then wrote offering to trade a pair of their highly regarded Spectrum 108A speakers (\$269/pair) for a Super Pas Three rebuild kit. Of course I am going to take him up on his kind offer! It should be a good venture for both of us. Spectrum is going to get a really fine preamplifier and hopefully will tell others about it.

We are looking forward to evaluating a quality loudspeaker in a price range significantly less expensive than the lowest priced B&W loudspeaker and thank Spectrum for offering the trade. We will tell you all about the 108As in a couple of months.

### The Sutherland Hybrid Audio Board Didn't Work Out For Us

We wish it would have – it would have saved us the work of designing the new Super Seventy.

The Sutherland hybrid board contains a couple of sets of small signal J-Fet and Mos-Fet driver circuits designed to drive the vacuum tube output stage of the Dyna St-70. It replaces the 7199 input amplifier and phase inverter tube. The assembled PC card fits exactly in place of the original Dyna card and is built very nicely with automatic insertion equipment. The layout is beautiful, the parts quality is just fine, the installation plans are clear and easy, the work-

manship is excellent and the price is very low (\$85.00). Unfortunately, the circuit design does not measure up to the quality of the package. Our sample had a tendency to oscillate with open inputs (a sign of stability limitations in the design) and the amount of compensation inside the feedback loop indicates stability limitations too.

The sonic quality reflected what we saw with the oscilloscope. Some of the annoying qualities of a high gain solid state circuit were there - the "zip" and artificial brightness that drive some of us to vacuum tubes in the first place. This, on top of the mellowness of the Dyna vacuum tube output stage left this circuit neither fish nor fowl in our opinion. It is an interesting and inexpensive project, but not what we want. Its not bad - its just not good enough to merit a recommendation. But for the price, you might want to try it anyway. You can always revert to the original or the Super Seventy circuits.

*FVA*

## VOLUME EIGHT NUMBER FOUR APRIL, 1989

### Everything You Wanted to Know about High Fidelity in the Soviet Union, and More!

Yes, Darlene and I survived the Eastern Block (barely - with bad colds acquired in Smolinsk and a case of 9 hour jet lag) but with a new understanding of life (such as it is) behind the iron curtain. Essentially, nothing you have ever read about Russia and its East European satellites, nothing you have seen on TV, and nothing from your Geography classes in school will prepare you for the incredibly bleak vast wasteland of crud and incompetence that life in the "worker's paradise" presents you.

The toilets stink, the concrete is crumbling, the doors are sagging, the roads are ridiculously rough (they build them new with potholes by neglecting to smooth the rubble before they pave) and you can't drink the water (amoebic dysentery). The lobbies of the Intourist hotels are as filthy as the waiting room of a slum train station complete with falling down drunks and broken vodka bottles.

Dar and I have traveled through most of the western world and nothing we have observed before prepared us for the wide spread incompetence of life in a Communist state. They must send all their carpenters, plumbers, and masons to stupid school - there is no other reason for the absolute scuzzy quality of building construction - and this explains the tragic huge loss of life in the recent southern Russia earthquake. All the beehives of high density

rust streaked grey eight story apartment slums fell apart like crudely balanced children's blocks - because that is how they were built.

Go in a shop and you have to stand in line three times - first to pick out the item (if they have it) and to have a sales ticket written up, next to the cashier's line to pay for it, and then into a third line to actually collect the item you paid for. In a grocery or "department" store the inefficiency is worse, there are separate counters for each class of goods, and shopping for several different categories of products means standing in line after line and they need ten times as many bored clerks as necessary.

Yes, I found a stereo shop in the GUM store in Moscow. There were a few boomboxes, a few radios, and a few audio receivers of 1960s looking vintage playing through speakers looking and sounding like warehouse barn rejects in a hard concrete and tile room. The prices were high and there was more bare space than goods on the shelves. I found a TV store too - a big two room showroom with a guard at the closed door who only let in a few people (I arm-waved my way in with my video camera to take pictures). There were a total of six TV sets in the place (and a few boxed ones). Two were color units tuned to test patterns that afternoon, and there were two big and two small black and white units. There were crowds around the color ones (the size and shape of RCA table models of 20 years ago) and from the turn-on time, it appears they were mostly vacuum tube circuits (as were the ones in our hotels - when available).

### Corporate Japan Was Missing!

There were simply no Asian made consumer goods at all behind the Iron Curtain. Actually there were very few items that plug into the wall from anywhere. Can you imagine a society without Panasonic, without Sony, without VCRs, and without commercials or neon signs? What would your local K-Mart have to sell if all goods from Korea, Taiwan, Singapore, Hong Kong, and Japan were suddenly removed? That's right - there ain't no K-Marts in Russia! There was a Toyota agency on the outskirts of Moscow about the size of a rapid oil change franchise, but we never saw a single Japanese car on the road, only Ladas, Vulgas, Moscovitchs, and the occasional Wartburg. The big shots are chauffeured around in big things that look like a cross between a Mercedes limo and a Chevy Impala or in ZILs - a copy of a 1953 Packard and you cannot buy these even if you can afford them - they are for glorious leader types only.

Of course the reason there are no imported consumer goods in Russia is that there is no way for an importer to get paid for their products because the Russian Rouble cannot be

taken outside of the Soviet Union and cannot be freely converted into "hard currency." And inside Russia nobody wants any Roubles!

The government tries to maintain a fictitious legal exchange rate of one Rouble being equal to \$1.60 U.S. and that is the rate tourists like us prepay for Intourist hotels and meals through our tour company (we were on a darned good Cosmos tour). That is also the only legal exchange rate at hotels and banks inside Russia. Actually you have to log in all your money when you enter the country and log it out when you leave and exchange all Roubles before departing. You are supposed to keep receipts of all currency conversions made while visiting the country and receipts of all purchases. At the border, they have the right to add things up and confiscate all goods and currency that does not match your records. But, under slightly more relaxed recent policies towards visitors (they want our dollars badly) we went through outbound Russian customs without being searched and no black market goods were confiscated.

This was a darned good thing because our bus was chock full of black market goods! The "street" rate for the Rouble was only 10¢ and every taxi driver, waiter, and kid on the street was an illegal walking bank and flea market ready to exchange Roubles for dollars at 20 times the official rate and to sell or trade us for all kinds of curios. I actually traded a Mongolian kid my "Stardancer" farmer cap purchased on a cruise ship a couple of years ago for a set of 8 nested matryoshka dolls in Red Square near Lenin's tomb. Remember that a black market is simply free enterprise at work where the government has made it illegal - and even at the doors of the Kremlin you can't make freedom illegal permanently.

### We Found Records, but No CDs.

We found record stores stocked with mostly painfully obvious bootleg copies of U.S. rock records being purchased only by young people. The few Melodia Russian classical releases in Moscow and in a few other cities were gathering dust.

We searched for Compact Discs and found a few U.S. pop CDs in Moscow at Berioska (hard currency for tourists only) shops but we never saw a CD player for sale at all. We did find a Polish CD in Warsaw, recorded in Poland but produced in England. Interestingly, because of a just executed major "glitch" in the value of Polish currency (the Polish government just made the "black market" exchange rate legal) I was able to buy this Polish CD for the equivalent of \$2.00, the lowest price I have yet paid for a compact disc, and obviously less than its cost to produce. Actually now is a great time to visit Poland if you are thinking about furs, jewelry, or other Polish made crafts. The

official exchange rate of 620 Zloty per dollar is now 4000 Zloty per dollar and the prices in the marketplace have not caught up to the devaluation yet. This means you can buy goose down comforters that cost \$400.00 in West Germany for \$20.00 in Poland – not a bad deal. Poland seemed to be an exception to the overall scumminess of communism too. Glimmers of Polish ethnic spirit seemed to show through the dehumanizing political and economic Marxist madness and Warsaw was more European looking than termite mound. In Russia, only the young seemed to have any spirit left as they tried to sell us fur hats, dolls, black market caviar, and buy our hats, shirts, and shoes.

### Art & Music Live in Spite of Marx.

An exception to the grey bleakness of Russia and the endless miles of tenements and unpainted shacks was the performing arts.

We were very fortunate to obtain tickets for Tchaikovsky's Swan Lake Ballet performed at the famous Bolshoi in Moscow and let me tell you that this was state of the art in both dance and orchestral music. The classical tall European style hall with gilded tiered balconies was great sounding and the performance was unforgettable.

One annoyance is the habit the Russian audience has of starting applause and cheering at the exact millisecond that the last note of a movement is completed, drowning out the emotion of the endings. Its kind of a game they play, to see who can start cheering loudly first, and then clapping in cadence – as if they are more concerned about their own antics than the performance. That same aggravating super fast applause occurs on the Deutsche Grammophon *Horowitz in Moscow* CD and it is just as annoying recorded as live.

Fortunately because the state of the art in PA systems in Russia is about as developed as their marketing methods, we got to listen to real music again in Leningrad at a performance of a Georgian folk music and dance troupe. There was no PA system at all! The performance, both music and dance, was utter perfection and filled with enthusiasm, joy, and talent. Communism has not managed to crunch everything down to the lowest common denominator in Russia.

### We Didn't Escape PAs Completely.

Although the Moscow Circus, another great feast for the eyes and ears, had its own performing orchestra without electronic amplification accompanying the dazzling acts, we could not escape from western PA systems completely.

We were assaulted with dire PA sound at our evening meals, of all places, and assaulted with some of the worst performances of western pop music we have ever heard played loud

with all the fuzz, boom and whiz levers on the Peavys and Fedders turned all the way up. I guess the managers of these state run "food stations" (more appropriately called gas stations — do you really want cabbage, slightly green mystery meat hot dogs, and slightly brown mushy canned peas for breakfast and there ain't no private restaurants?) thought they were bringing western class to us along with the fodder, but they only succeed in redefining classical gas in more ways than one.

### We Found One Freedom We Don't Have Here - The Right to Tape!

It was perfectly OK for me to bring my video camera to the Bolshoi, to the circus, to the Folk Dance, and into the main stores and shops in Moscow. Nobody cared. At the Ballet, the only rule was "no flash" as that would distract the performers and detract from the performance too. In Moscow I filmed everything from butcher shops to the TV store and in Leningrad I have over an hour of tape made in the incredible Winter Palace of Peter the Great and pictures of masterworks of art from the Hermitage.

In contrast, I was kicked out of my local Target store here when I tried to video tape some inside displays to show the Russians and you would never get inside the door of any live performance here with a TV camera or tape recorder. It makes me wonder. In Russia, the only place cameras had to be put away was at the borders and of course we never saw any military installations at all. The RIAA would not be at home in Russia, there would be too much freedom to record for them there.

In spite of the efforts of my local Target store, I did get enough video footage inside that store (and of our neighborhood and our local shopping areas) to absolutely shock our Russian Intourist guide. I figured that as long as I was taking the video camera along, I might as well take a look at middle-class USA with it to show to the Russians. I left 15 minutes of the good old USA on the beginning of my first tape cassette and boy did that get their attention. "Those are all private homes?" "Your roads are so smooth!" "All those things are for sale without waiting?" "So many brands of toothpaste!" This is the kind of comments I got from our overall and our local guides and they would not put the camera down until the whole sequence was run. It was my own little strike for freedom and free enterprise – pictures that our Intourist guide could not argue with.

### We Never Saw a DAT.

Although our trip concentrated on Russia, we spent the first couple of days in West Germany and the last few in Scandinavia (a quick swing through Finland, Sweden, and Denmark on the

way home). So, I had time to do a little hi-fi store snooping in Europe on this side of the wall.

I did have fun CD shopping as there are many works available in Europe not available in the U.S.A. (such as the London performance of *Cats*, many orchestral works, and even lots of U.S. pop performances) and the music stores are chock full of interesting stuff.

I also looked for Digital Tape Recorders (DAT) but I didn't find any at all. I did see a report from West Germany that DAT really doesn't work very well. Tests show that there are machine compatibility problems (a tape recorded on one machine may not play back well on another) and that drop-outs and degradation starts to occur too quickly – perhaps after 25 plays the DAT will be starting to show wear. It is suggested that perhaps the DAT format does not have a big enough tape to give consistent long term results. I have wondered about that too and remain happy with my 1/2" video tape PCM format.

### We Didn't Find any Vacuum Tubes!

Although there are some vacuum tubes made in the Eastern Block (6CA7s from East Germany and China, 12AX7As from Hungary and Yugoslavia, and 5AR4s from Russia, for example) we did not see any vacuum tubes for sale and the only consumer electronics we found using them were Russian TV sets! So, it looks like I cannot write off the price of the trip as business research on finding better sounding vacuum tubes – I didn't find any at all.

### It is Good to Be Home in the U.S.A.

This trip certainly reinforces our awareness of how fortunate we are to be citizens of the United States of America and to have spent our lives in the freest society that has ever existed on earth.

Even those at the bottom of our society have more economic and political freedom than the average Russian and live under better conditions – at least you can drink the tap water. All it takes is a short real first hand look at that bleak, unkept, and messy landscape to realize exactly what Ayn Rand was talking about in *Atlas Shrugged*.

It is good to be home after a fascinating look at Eastern Europe even if *Audio Basics* is two weeks late now and has to be done right now!

Then I have eleven hours of raw video tape to edit down to a rational remembrance of our trip and this time I have to do the editing well and promptly because I got designated the unofficial "official photographer" of our tour. The 12 other friendly couples on the tour all decided they all wanted a copy of my tape and actually paid me a few bucks each to make copies of my

end results for them. I will let you know if I get a worthwhile distillation of Russia. Now, back to business in the USA.

### The Longhorn Grado Z is Special

Joe Grado got something very right with the current Grado Z cartridges and so did we with our newest Longhorn Grado Z phono cartridge. It is easily the best cartridge we have ever done and it will really make you care about your record collection again.

It is very, very high resolution and very quiet with no rough edges. It has a pure and extended top end that defines the term "liquid." The dynamic range rivals CD and the clean and solid bass extension is obvious. It tracks like crazy with no fuzz at all and it works in both expensive and low priced turntables. We have had no field failures at all.

The Longhorn Grado Z phono cartridge still has our complete 30 day satisfaction guarantee or your money back (not a single one has been returned!). It simply makes your records more musically rewarding to listen to.

It tracks at 1.75 grams and is an easy mechanical fit in a wide variety of tone arms. Replacement stylus assemblies are \$45.00 and you can install them yourself or have us do it at no extra charge. They seem to last for years. Sorry, it still won't work in Lynn-Sondek turntables or recent AR turntables because their unshielded AC motors generate too much hum.

Our Longhorn Grado Z costs just \$99.00 and may be the nicest thing you can do for your audio system. There remains lots of great music on vinyl – isn't it about time that you treated yourself to this tool to allow you to hear all of what you have?

### The Spectrum 108A Loudspeaker - Good Value at a Low Price

We have had the pleasant opportunity to live with a set of very low priced (\$269.00/pair) Spectrum 108A loudspeakers for the past several weeks (they are going to the Carleton College radio station control room today). We like them and suspect that they are about as musical a full range loudspeaker as you are going to find without jumping up substantially in price.

These are small speakers (14.5" high x 11.5" wide x 9" deep) but not too small for decent bass extension. They have an 8" woofer and 1.5" tweeter and weigh 16 pounds each and are of rugged construction with care used to avoid front panel and grill diffractions. They have an adequate walnut vinyl finish with black grills. They are built by Spectrum Loudspeakers, Inc., 1021 Nevada Street, Toledo, Ohio 43605. Call them at 419 698-4488 to find out the name of a Spectrum dealer near you.

We like the full range capability of the Spectrum 108A. The bass is quite good - certainly with much more authority than speakers like the Spica – enough bass punch to not immediately make you want a sub-woofer. The overall balance is slightly warm sounding with a bit of box colorations audible, but not aggravatingly so. The imaging is just fine, and voices are reproduced very well. They are not as transparent as the 500 series B&Ws, but they are not as expensive and they are probably more forgiving of mediocre electronics. They are very efficient – 92 dB – so they work just fine with very low powered amplifiers and they are fused to prevent brain fade from damaging them. They sound less good (a little stressed) when driven hard – but maybe that will simply keep you from driving them too hard.

If you have a kid graduating this spring from high school that likes high fidelity – especially one looking for a college dorm system – I can think of nothing much better for a useful graduation present than a pair of Spectrum 108As. They are very pleasant, non-fatiguing, and are faithful to the music. That is more than we can say about any other speaker we have heard at such a low price. We highly recommended them at this price range.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER FIVE MAY, 1989

### We Have New Signal Tubes – To Make the Super Pas Three Better Than Ever!

Super Pas Three sales are running at an all time high (especially the rebuild kits) thanks to the recognition of its musical value by *Stereophile*, but that doesn't mean we are willing to stop working to make it better yet. Recently we have succeeded in making the Super Pas Three better yet (significantly better) by the simple method of locating and installing a better signal vacuum tube as a standard in new production. The new tube is a JoLida brand 12AX7A that has about 30% higher gain than any 12AX7A tubes I have seen in the last 20 years and has a very consistent yield of low noise, low microphonic operation. We have gone through several hundred of these tubes now without any "come-backs" so it looks like their durability will be satisfactory too.

In the Super Pas Three, the sonic result is much more powerful deep bass (especially on phono), more impact, extended dynamic range, and overall higher definition. The tubes work in the Super Pas Two and Super Pas rebuild kits too with similar musical improvements. One minor circuit change is required on Super Pas Three power supply boards. The two 75K $\Omega$  resistors must be changed to 91K $\Omega$  because the

JoLida 12AX7A tubes draw less current than the 5751MPD tube. The resistors are changed to keep the power supply voltages at the proper value given less idle draw from the new tubes. This better sets the supply for more mundane 12AX7 tubes too. We are supplying the necessary resistors free of charge when the new tubes are ordered from us. The price is \$40.00 for a select set of four and they are available now. They are the nicest thing you can do for your Super Pas Three.

### What Is a "Better Sounding" Tube?

Actually there is no such thing as a better sounding tube. The tube doesn't "sound" at all – except when you hold it up to your ear and tap on it – then it may go "ping" (or "crash - tinkle" if you tap too hard). Indy race-cars are not made with "real fast" nuts and bolts and "great handling" wheel bearings. Airplanes are not built from "good flying" aluminum sheets. High fidelity audio reproduction does not depend upon "good sounding" wires, resistors, and vacuum tubes. Magic wires don't have good or bad sounds (except if you string a piano with most brands of magic wires instead of piano wire I suspect you might get some pretty bad sounds).

What is really important about the materials we use in building some project is that the materials be suitable for the application, and that the project be executed properly in its design, workmanship and use of materials, and that the project be suitable for its intended purpose. (By the way, "marketing" sells by making you forget what the intended purpose was at all). Many buy "hi-fi" based upon how many buttons the remote control has and forget that the purpose was to reproduce music.

Thus, the merit of a given vacuum tube is not "how it sounds" (a subjective opinion of how much more – or less – you like your audio system after randomly substituting different tubes) but a more careful analysis. To judge if a given tube type is indeed "better" in a given circuit, we first must know what the tube's transfer characteristics are, what the transfer characteristics of the circuits the tube is to be used in are, and whether the characteristics of the tube are apt to be useful in that particular circuit. We will make performance measurements of many samples of the tube (to see if it does in practice what the manufacturer claims on paper) and we will test it for conditions beyond normal specifications too. For example, one type of Gold Aero 5751 tube (black internal plates) did indeed have low noise – from a thermal noise standpoint, but it was of a construction type that provided poor internal shielding and thus had very high noise (hum) in the presence of a magnetic field (the preamp's

transformer). So, the low noise specification was meaningless in this case because in the application it had far too much noise.

We like to see "peas in a pod" test results from a tube type because that means the process of making that particular tube is a good one – that the people building it know how to do it repeatably. It also means that tube is a good mechanical – electrical design, a design that can repeatably be built to high performance standards without special tweaking or selection. If there is a lot of sample to sample variation, then something is wrong with the construction process and future reliability is suspect.

So we find a new supply of 12AX7A tubes that test out consistently with very low noise, low microphonics, extraordinarily high gain, uniform gain between the two sections in the tube (a 12AX7A is a dual triode – two separate triode amplifiers in one glass envelope) and low susceptibility to magnetic fields. Does this mean the JoLida is a "good sounding" tube? Not necessarily! In some applications (although definitely not ours) it may make your audio system sound worse! It all depends upon whether the characteristics of the tube are useful in the particular circuit application, and an extra high gain tube is not always desirable.

Audio circuits are feedback designs (even those claiming to have no feedback). The basic feedback loop is pretty simple and very elegant. The signal is amplified a whole bunch by the circuit, usually a two stage affair in which the first stage increases the voltage – the size – of the signal and in which the second stage most often provides a low output impedance (increased drive current rather than more voltage yet). A portion of the output signal is sampled and sent back to the front end of the circuit, out of phase with the input. If one sums two identical out of phase signals, the result is a null – no signal at all. So, the gain of the circuit as a whole is set (assuming adequate open loop gain in the first place) simply by setting up a relationship between the input signal and the feedback signal that determines the final desired closed loop gain. For example, if the overall open loop gain of the circuit was about 100dB and one wanted an actual gain of 20dB then one simply sends back to the front end enough output signal to provide 80dB of feedback. Since the feedback ratios can be set very precisely by passive circuit relationships (typically the relative values of certain resistors) the closed loop gain of the circuit as a whole can be made very repeatable, independent of the actual varying values of open loop gain in the active tubes or transistors (and there is a lot of variation between samples of the active devices).

Of course the real beauty of the feedback is that it also automatically reduces the open loop distortion while it is setting the gain. Since distortion is just a difference between the input and the output, feeding back part of the distorted output signal to set the closed loop gain will also generate an automatic correction signal because when the distorted output signal is summed out of phase with the non-distorted input signal, an error signal will result that is exactly what is necessary to "pre-distort" the signal so that after the loop distorts the pre-distorted signal, the effect will be to cancel the distortion. Or so it goes in theory - but unfortunately, in the real world it doesn't work that nicely.

The problem is that the circuit has real world limitations. It can only generate a finite "error signal" before it reaches its headroom limits and saturates (clips). Thus when the distortion gets too high (such as when very high frequency or very low frequency signals are rolled off by the circuit's natural limitations) the difference between input and feedback gets very large, and the front end is asked to generate an impossibly large correction signal. The correction signal is clipped, and the circuit overall generates more distortion than ever, rather than less as the pre-distorted correction signal fails to make the proper correction. In a worse case situation, the correction signal can actually add to the error instead of subtracting from it, causing the circuit to go into total oscillations and destroy itself.

To oversimplify, the open loop errors generated by a circuit with too little feedback tend to be harmonic distortions, making the sound warm and hazy, but finally muddy and ill defined. The closed loop errors caused by the feedback loop overloading from too much feedback (called transient intermodulation distortions), make the sound harsh, bright, and simply annoying.

So, too little feedback results in warm, muddy, sound (high harmonic distortion) while too much feedback results in harsh, grating sound (high transient intermodulation distortion).

Now, in the audio circuit, the closed loop gain is fixed by the circuit resistor values while the open loop gain is dependent upon the gain of the actual active devices used, and the amount of feedback is simply the difference between the open loop gain and the closed loop gain. So, what happens when we change tubes?

If we put in a low gain tube, then the open loop gain of the circuit is reduced and the amount of feedback is reduced. Thus the harmonic distortion will go up (sound goes towards muddy) but the transient intermodulation distortion goes down (sound gets less harsh). If we put in a high gain tube then the amount of feedback is increased, causing lower harmonic distortion

(clearer sound with better impact) but increasing transient distortion (harsher and more strident sound). How can you win?

With most designs, you cannot win. You can spend your life searching for that perfect sounding tube – the one with just the right open loop gain for your circuit to minimize the trade-off between harmonic and transient distortions – except that if you cannot express what you are really looking for (if you think you are searching for a "good sounding" tube) then you will have a pretty difficult time getting what you want.

The Super Pas Three makes life a little easier. Since we know that transient intermodulation distortion (overloaded feedback loop) is very aggravating, we designed our circuits so that the feedback loop can never overload, no matter how high the open loop gain of the tube used is. We do this by limiting the way the feedback works. We allow as much feedback at low frequencies as possible for good stability and clear bass but we allow no very high frequency feedback at all to eliminate the cause of transient distortion. We design for good open loop distortion characteristics, set input limits to insure that out of band distortions from sources such as cartridge mistracking and CD switching frequencies cannot get in, and live with low distortion in the real world and good music, rather than better spec sheets under narrow band conditions and grit instead of music.

So, unique with our circuits, a higher gain tube really means "better sound" because harmonic distortion is reduced without the penalty of increased harshness because transient distortion cannot occur. As an added bonus, phono bass response is really improved. The amount of gain in a dual triode tube is barely adequate to provide any control of the bass frequencies in an RIAA equalized phono circuit because the bass boost equalization is so great and so much gain is necessary overall to get the phono signal up to a usable level. A 30% boost in gain in our RIAA circuit really firmed up the bottom end. It is not heavy or ponderous, but you would never call it a lightweight any more.

Since the same transient distortion limiting circuits are in the Super Pas Two, and even in the original Super Pas, the JoLida 12AX7A is indeed a "better sounding" tube in these applications.

How about with a stock PAS or other audio components that use 12AX7A tubes? Here, the higher gain may give you harsh and bright sound if the higher gain (and higher feedback) causes your feedback loop to overload. How can you tell if this will happen? You cannot tell, unless you have the test equipment and knowledge of the circuits electronic behavior to document the results. Sorry, the "I like it"

method, in the absence of any confirming objective data, doesn't count. Remember, the guy in the back of the bus with the boom box turned up to full distort is working in the "I like it" mode too.

The JoLida 12AX7A has become standard in our Transcendence Three Fet-Valve products too. Here the improvements are less obvious because the vacuum tubes have much less work to do and the open loop gain is higher because of other circuit parameters (and of course our feedback loop cannot overload in Fet-Valve designs either). But the higher gain does lower distortion a bit more, making the Fet-Valve products even a bit clearer and more dynamic than ever (and we bet you owners didn't think that was possible). They are a direct "plug in" replacement for the 5751 tubes in the preamplifier, tuner, and CD player, and are available for \$40.00 per set of four or \$25.00 for two. The JoLida 12AX7A tube is not a user installable change in a 5751 equipped Fet-Valve amplifier. We must make two resistor changes on the audio board to reset the DC centerline for the higher gain of this tube. Without this resistor value changes, your amp will not make full power if you substitute tube types. The cost to retrofit, including new tubes and return shipping is \$50.00 for any Fet-Valve amp in the USA. The sonic improvement is audible, but not obvious. If you want to upgrade start with the preamp first.

I suppose you are wondering why we were using the GE 5751MPD tubes in the first place.

Actually the answer is pretty simple, we were getting a good yield of good tubes. The 5751 is nothing more than a ruggedized version of the 12AX7A, built to withstand rough handling. The GE version of this tube even had double mica insulators. We have looked at many 12AX7A types over the years and found most had defects that we could not tolerate - such as poor and unreliable yields, low gain, poor microphonic performance, and poor hum performance. The GE5751MPD was a source of consistent good (but not spectacular) results.

Some of you have told me you replaced them with "brand x" or whatever and "you liked it." When I asked what parameters you changed and what the transfer characters of the replacement tubes were, I got blank looks (over the phone). Some of your "likes" were for tube brands we knew were typically very low gain - you liked more distortion - but you didn't like me to point that out. Now I can assure you that using the much higher gain JoLida 12AX7A tubes in our vacuum tube products will give you significantly less overall distortion - and that is something you can like with confidence.

A final thought, the choice of active devices to set the gain and feedback characteristics is not just a vacuum tube adventure - these explora-

tions are made by the designers all the time in the world of solid state too. It is just that there you can't simply plug in the new transistors yourself, so the expeditions are not as much fun. You just get to use the results rather than partake in the search for them.

### The Dahlquist LP1 Crossover Revisited.

In the 1970s Dahlquist built one of the very best electronic crossovers ever done, their LP1. It was an elegant design with variable crossover points between 40 and 400 Hz and adjustments for the relative levels of the low and high frequency outputs. The low pass filter (woofer output) was an active 18 dB per octave circuit but the high pass filter (mid and high frequency output) was a simple passive 6 dB per octave design that in theory has much less chance of damaging the music than an active high filter of that day (or of today too) does. We developed a simply improvement to the LP1 that came to the attention of *The Absolute Sound* in the late 1970s and became the modification in demand at that time. We upgraded the power supply with raw filter capacitors about 10 times the capacitance of the originals and shunted all the audio capacitors with 620 pF dipped silver mica capacitors for improved high pass transient response. Why the 620 pF value? Simple - because it was small enough to not materially affect any of the filter pole points, and because we had thousands of them - from a previous order error. (They are all gone now!) We only charged \$60.00 for the upgrade and made many customers happy.

However, time went by and the LP1 went out of production. The units we got to rework started showing their age and lots of problems from inept amateur modifications. We started designing all our own circuit boards and it was obvious that the reducing demand for improved LP1s did not justify a new board design. We took our rebuild out of production years ago, but still tell anyone who asks what to do to help the unit a bit - just what we told you above.

However, now there is an increasing demand for knowledge about the LP1 and bi-amplification (there is still not much that beats the LP1) and thanks to the kindness of Carl Marchisotto, Vice President of Dahlquist, I have permission to reprint data about this great crossover to bring you up to date:

### DQ-LP1 ACTIVE/PASSIVE CROSSOVER

#### Product Description

The Dahlquist DQ-LP1 is a unique line-level crossover which combines an electronic low-pass filter with a completely passive high filter. The LP1 is intended primarily for integrating a subwoofer into an otherwise full range loudspeaker system. It may also be used in the

bi-amplification of a single loudspeaker system where the crossover point is from 40 to 400Hz.

As with other electronic crossovers, the LP1 is connected between the preamplifier and the two power amplifiers; one amplifier feeds the main speaker, the other drives the subwoofer(s). (Please note: The LP1 requires the use of a second power amplifier.)

The active low-pass section, which feeds the subwoofer amplifier, is continuously variable from 40 to 400Hz and provides a cut-off rate of 18dB per octave. This steep slope is achieved through a non-ringing, staggered arrangement of 6-12-18 dB/octave slopes, preserving bass transients. Distortion is exceptionally low, measuring 0.005% THD.

Of particular importance in a device of this type is the performance of the high pass section which feeds the main power amplifier. Any distortion introduced in this stage will noticeably degrade the important middle and upper frequencies. In order to avoid such degradation, the high pass section of the LP1 is purely passive. Distortion is unmeasurable by normal techniques. If it were possible to measure the THD of the LP1's high-pass section, we would expect a figure like 0.000001%

Since the high-pass section is passive, it may be necessary, depending on the desired crossover frequency and the main amplifier's input impedance, to insert a capacitor or resistor into the terminals provided on the LP1's printed circuit board. We have designed this to be simple enough for the average consumer to do himself—instructions and a kit of resistors and capacitors are provided with each unit—but, of course, the service technician may be called on in some cases. The high-pass section can be set for any frequency from 40 to 400Hz; its slope is 6dB/octave.

This combination of active and passive circuitry insures the sharp cut-off and "tuneability" required to best integrate a subwoofer into a loudspeaker system, while not degrading main speaker performance. The Owner's manual provides complete instructions for the hook-up and tuning of the LP1, including an easy to use chart showing the appropriate combination of resistors and/or capacitors to achieve a variety of crossover points.

### DQ-LP1 CIRCUIT DESCRIPTION

NOTE: Left low frequency channel described; right channel identical.

The input signal is direct coupled through an audio taper level control RV1 and is then AC coupled through C2 to the non-inverting input of Z2A. Z2A provides 14dB of flat gain set by R1 and R2 in addition to continuously variable

low frequency equalization of +5dB maximum at 20Hz controlled by RV2 and C5. D.C. offset control is provided by trimpot RT1 and is adjusted for  $\pm 2$  millivolt D.C. offset with the frequency dial set to 60Hz. C3 provides 100% D.C. feedback around Z2A for maximum stability. RV3 is the triple ganged frequency control which in conjunction with C6, C4 and C7 provides for continuously variable crossover frequencies from 40-400Hz at the -3dB point. Z2A, Z1A and Z1B are non-inverting unity gain buffers which eliminate interaction between the three R-C filter sections. Z3A provides active unity gain summing of left and right low frequency signals and Z3B is a unity gain phase inverter which phase corrects the center channel output signals to match left and right low frequency outputs. Z6 is a precision dual tracking voltage regulator which powers both channels. D.C. outputs are held to  $\pm 15V \pm 5\%$ .

The high-pass section is passive and provides 6dB per octave slopes whose frequency is fixed by C1 and the amplifier input resistance. This frequency is set for a given amplifier input resistance by connecting additional capacitance to the Cx terminals or additional resistance to the Rx terminals. The front panel frequency control does not effect the high pass frequency. A chart showing typical values for Cx and Rx is contained in the LP1 owner's manual. Film capacitors (polyester, polypropylene, polycarbonate, etc.) and carbon film or metal film resistors are recommended for this application. Push button switch S1 allows complete passive defeat of the high-pass section and muting of the low frequency section to instantly restore the system to single amplifier operation.

#### ALTERATION OF DQ-LP1 HIGH-PASS CROSSOVER POINT

The DQ-LP1 is supplied to the user with internal capacitance set to a value that will effect a 60Hz crossover point for the high-pass section with a 100K $\Omega$  amplifier input impedance. (We selected this value as the best "standard" amplifier input impedance.) The 60Hz crossover is best suited for use with the DQ-10 and DQ-1W speakers. If the main amplifiers input impedance is other than 100K $\Omega$ , or speakers other than the DQ-10 and DQ-1W are being used, a change to the internal capacitance must be made. To do so, refer to the chart in the owner's manual or compute the exact value using the formulas supplied below. It should be noted that the high-pass slope is very gradual (6dB/octave), so the crossover point should be thought of as a general range (ie. 60 to 80Hz) rather than a specific point.

NOTE: In the formula, R (or resistance) is always expressed in Megohms. 100K $\Omega$  would be computed as .1 Meg $\Omega$  or 1/10 of 1 million

$\Omega$ . Also, the input impedance of the subwoofer amplifier is irrelevant due to the active circuits in the low-pass section.

Example: We will use an amplifier input impedance of 25,000 $\Omega$ , or 25k $\Omega$ , expressed in the formula as .025 Meg  $\Omega$ . We will use a crossover point of 150Hz.

First we calculate the total capacitance required:

Subtract the fixed internal value from the total value, to determine the difference and install this value of capacitance to the terminals marked Cx on the rear of the LP1's printed circuit board near the high-pass outputs.

ie:  $.042 - .027 = .015\mu F$

In this case, the necessary capacitance is included in the kit of parts supplied with the DQ-LP1.

#### ADDITION OF RESISTANCE

High input loads will require a paralleling resistor to reduce the effective load impedance to the 75 to 100 K $\Omega$  range. Also, for high-pass crossover frequencies higher than 120Hz, it is often possible to use the reactance of the fixed .027 $\mu F$  capacitor with a value "R" (Rx and R in parallel) which will provide the desired crossover point. First determine the required R value in Megohms from:

If R is greater than the amplifier's input impedance, use the top formula. If R is smaller than the amplifier's input impedance, calculate the required value of Rx in megohms from:

Solder the resulting value to both sets of Rx terminals. Note: Dahlquist's address is 601 Old Willets Path, Hauppauge, NY 11788 phone 516-234-5757

#### Dahlquist's Recommended Updates:

1. The original capacitors were polyester film/foil construction. These should be changed to metallized polypropylene caps.
2. Bypass all electrolytics with 620pF silver mica caps.
3. Resistors may be changed from original carbon film types to good metal film units. This will have a smaller effect on the sound than steps 1 & 2.
4. Change of Op-Amps I do not recommend at this time as I have not done enough research to find a better unit for the LP1. Many Op-Amps with improved specs actually sound worse than the originals.

Finally, Mr. Marchisotto told me that Dahlquist had best results with Raytheon brand MC4558 dual op-amps in this circuit and that other brands of the same MC4558 devices did not perform as well. He also informed me that Dahlquist still has the Raytheon MC4558 available as a repair part.

#### A.V.A.'s Recommendations

The LP1 is still well worth investigating if you want to bi-amp. Check with used equipment sources such as Q Audio in Boston if you want to buy one (we don't have any at all).

If you want to play with your LP1 beyond the suggestions above, it is probably worthwhile replacing the five audio op-amps (Z1 thru Z5) with modern and fast fet-input devices such as the TL072 or MC34082. Do not use an uncompensated device in this circuit because it has unity gain feedback and an uncompensated op-amp will turn it into an oscillator. To really get best use out of an LP1 you must adjust it properly for your loudspeakers and amplifiers. You must know the input impedance of your amps and set the Dahlquist accordingly. For best possible results, set the controls with a square wave generator and a dual trace oscilloscope so you can get a perfect match between the two channels. Finally use it with a couple of our power amplifiers, since their input impedances do not interact with the driving source, they will give you great bi-amped results. Next month, what's new at CES.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER SIX JUNE, 1989

#### The Consumer Electronic Show Offered Few Surprises

But there was enough interesting to make the trip to Chicago worthwhile and to tell you about. There were no revelations in audio design but there were several new products of real value and there was a display of a breakthrough video product that was impressive enough to discuss herein.

The SCES (Summer Consumer Electronic Show) is held early each June in Chicago, filling the huge exhibition halls at McCormick Place on the south lake shore of the city, and filling most of the adjacent high rise motel, the McCormick Inn too. This year, the "esoteric" audio displays were moved from one of the older downtown hotels to the higher floors of the McCormick Inn. This made them more convenient to visit, but the sonic possibilities of the tiny motel rooms of the Inn were dismal, so musical judgements were difficult to make.

The SCES is the place where most of the major home entertainment manufacturers gather each year to sell their products to dealers and to

show off what new and interesting things they have done (such as to build a clock radio that looks exactly like a time bomb – three sticks of dynamite taped and wired to an old wind up clock – executed in unbreakable plastic and hopefully waterproof for when someone panics and throws it in a bucket of water – such progress). It is the place where you see that next year's boom-boxes have stickers on them advertising 400 watts, 550 watts, 700 watts, and even 900 watts of PMIP (peak music instantaneous power) which is, of course pure advertising bullshit – just trying to have this trash keep up with the car radios. The only way you could get 400 watts out of a boom-box would be to burn it and measure the thermal energy given off by the fire. Note that there is the Consumer Electronics industry and then there is High Fidelity. They do not corollate nor is one a sub-set of the other. Anyway, on with the show.

### The Best Came Last – High Definition TV is Here!

HDTV is real, I finally saw a demo presented by Barco (a Belgium based supplier of large screen video projectors) and Fosgate (who provided the surround sound for the presentation).

My initial reaction was – it's time to go home and burn the Advent. Can you believe TV sharper and clearer than the motion pictures you see in the small mini-mall theaters? Folks, those little fourplex and eightplex theaters are all going to be gone when HDTV gets to your home, because your home TV will beat them rotten. You will need to find a 70mm theater to do better, and one without a sticky floor and with a good sound system. HDTV brings projected 35mm film video quality to your home, and does it in a wide screen format. There is no cutting off the sides of the pictures to fit them to your TV set any more because the aspect ratio of HDTV is just like Cinemascope. You get all of the movie, not just the center.

The reality of the demonstration told me a lot about what consumer choices should be regarding video equipment over the next several years. And the most important thing HDTV told me was don't make any unnecessary expensive investments in conventional video or TV equipment because you will cry when you see how bad "normal" TV is in comparison to HDTV.

I saw lots of interesting improvements in normal TV and video equipment at the show. There were better (clearer) TV sets, smaller, lighter, and higher resolution video cameras, and lots of neat accessories, such as Sharp's 3" flat plate battery powered color video monitor for hand held video cameras. I thought, for example, that Panasonic's new big screen TVs looked really nice. However, after the HDTV

demonstration, I realized that the "improved" normal TVs were like getting a '73 Ford Pinto after being used to a '35 Chevy, but without realizing that there were new Mercedes 450SEs around. Every conventional improvement I saw was "who cares" after watching 1125 line resolution TV projected on a 12' wide screen. There were no scan lines; there was no grain. The image was clearer and more dynamic than your local mall theater and the screen was not contaminated with cigarette smoke or scars from flying popcorn boxes. Fosgate's discrete multiple channel sound system was good too – it was not overdone into the typical "blast you out of the house mode" – but I get better movie sound right now at home simply by feeding my video audio into the Fet-Valve equipment and a set of B&W 801 Matrix speakers (and with a low cost passive Dyna Quadaptor for movie surround sound) but that's another story. The major observation was that HDTV absolutely obsoletes all of the TV and video equipment you now own, and when you see it, and when it is available, you will want it.

Of course, the "when it is available" is the big catch. We saw HDTV from a video tape source and even that took a special video recorder with much greater bandwidth than conventional video equipment has. Actually the easy part of the demonstration was the stock professional Barcodata 1001 projector used. It already has 2000 line resolution capability and since it is a three gun projector, fed from a video or RGB input, and it does not have to cope with a broadcast composite RF signal, it had no problem dumping the HDTV signal to the screen. The hard part of bringing HDTV to you will be broadcasting it.

The problem is that High Definition TV requires at least 5 times the broadcast bandwidth as conventional TV does because there is so much more information that needs to be transmitted to you, right now.

A conventional TV channel eats up about 6 megahertz of the airwaves. HDTV needs 30 MHz in its original full 1200 line wide screen format and even that is doing some data compression. Nobody has lots of spare 30 MHz channels to spare – all the broadcast space has been gobbled up already. Thus any reassignment of broadcast frequencies will have to come out of somebody's hide! And that somebody will not be happy.

There are lots (over 20) of competing schemes before the FCC at this time to compress the HDTV format into much less air space - most trying to scrunch all the data into existing TV channels or into 1.5 to 2 adjacent channels (9 to 12 MHz bandwidth). It simply cannot be done without bastardizing the resolution and quality that HDTV promises.

For example, for an honest 525 high x 700 wide line normal resolution TV broadcast, you can get by with the existing 6 MHz channel assignments, providing you broadcast in black and white only. To maintain simple 525 line resolution in color, you really need three times the bandwidth of what is now assigned - so, you don't get good color resolution now at all. You get about 525 high by 230 wide resolution – fuzz in the vertical mode. This is the reason they never tell you the vertical resolution of the equipment you are now buying. That resolution is cruddy and far less than the original black and white broadcast standard.

The reason for our existing poor color performance is that the original broadcast frequencies and TV broadcast and reception equipment designs were for black and white television. When practical color TV came along, the FCC demanded that it be kept compatible with existing broadcast frequency assignments and with existing black and white TV sets – thus, the resolution potential was badly compromised then just to make color even partially compatible with the black and white equipment of the 1950s. That has been what we are stuck with, color video equipment that is far poorer in quality than it need be – just to maintain compatibility with long obsolete equipment.

Looking hard at the promise of HDTV with its demands for many times the bandwidth of current equipment, I see no way that it can be done within the context of current channel assignments and of course compatibility with existing video recorders or television sets is out of the question – it would be like trying to play CDs on a hand crank 78 rpm phonograph.

Probably the most promising venue for uncompromising HDTV is direct broadcast satellite reception. This will use home satellite dishes, but because the proposed transmissions will be at a much higher frequency than currently used and with much greater power, the home dish will only need to be a couple of feet across, and thus will be inexpensive to manufacture accurately and easy to use. It will not be compatible with existing home dish equipment. Because direct broadcast satellite reception can offer the necessary bandwidth for HDTV transmission without treading on anybody's already assigned space it is a political possibility as well as an engineering one. The technology exists to do it, but it will require new dedicated satellites, new broadcast equipment, and new reception equipment in each home along with a high resolution big screen TV – the Japanese are working on the appropriate high resolution liquid crystal flat displays right now – your TV set will simply replace a picture on your wall.

Of course the direct broadcast satellite scheme does create political "problems" of its own – such as bypassing your local TV station and its great services such as replacing major sporting events with re-runs of old *Heidi* movies and telling you the weather history in agonizing detail. It also eliminates the insertion of local advertisements (just think of all the used car sales you will miss). Economically, the consumer's cost for the front end equipment (the little reception dish and its electronics) will be a small part of the price for a HDTV reception system, so the cable company with its fuzzy pictures and camera swinging between the clock and the thermometer will become redundant too (as they say in England).

The next few years will be interesting to observe how all the political, economic, and engineering problems are resolved. I should touch upon another issue HDTV raises.

Some claim that the national security of the nation will be affected by what broadcast scheme is selected. It seems there are Japanese standards under consideration as well as European standards and less developed US standards. Depending upon who gets the "go-ahead," the floodgates of consumer demand for billions of dollars of sophisticated electronic parts will be generated. HDTV will require great gobs of micro-processor and dense memory chips, along with sophisticated high resolution displays and other high tech parts. The assurance of a huge consumer payback will push a ramp up of manufacturing capacity to make the necessary new generations of electronics. These same advanced processors and high density memory will go into war weapons and computers. A real U.S. political concern is that if the Japanese standards for HDTV prevail, then the ramp up in electronic parts capability will be Japanese too – and it probably isn't clever to have all your war weapons built with Japanese parts that cannot be second sourced in the USA. The thought that HDTV standards set outside the country might further relegate the U.S. electronics production industry to second class status is not comforting either. The USA needs to be good at something better than making McDonald's burgers.

One further worry – even if we decide upon a "home grown" standard for the USA, the Japanese may go their own way with the rest of the world for their consumer base. Because they are more actively pursuing the engineering solutions right now it is altogether possible that they may arrive with a world standard that works far before a USA system is ready and thus create a defacto standard it will be hard to keep beyond our borders without a full scale trade war. Gee, isn't home entertainment interesting! Meanwhile, the Defense Department is happily donating your tax money to companies

proposing to research some aspect of HDTV. You are going to pay for HDTV even if you don't get it.

So, what can we expect and when? Obviously the broadcast aspect of HDTV is a much thornier problem than bringing you much higher quality via video tape. Thus I expect to see HDTV video playback decks available within a couple of years, driving existing technology high resolution projectors with the prices slowly decreasing within rational consumer range. There will be an adequate supply of source material as major studio films can easily be translated into high definition video tape. Home broadcast of High Definition TV will be a few more years out, and probably the first appearance of home HDTV video will force a broadcast standard that keeps up. Nobody used to the true capability of the system will accept poorer resolution in a broadcast scheme.

Meanwhile, if you own good and reliable TV and video equipment, we suggest that you avoid being tempted by the advertising promises of the new standard equipment (such as the slight improvement of S-VHS in comparison to standard VHS) and don't buy unnecessarily now. The very limited technical improvements that can be done within the constraints of the existing broadcast system pale in comparison to true HDTV. You will be glad you saved your money for the real thing.

#### The B&W Acoustitune Sub-Woofer

Here is a new audio product introduced at the SCES that I think will be of real interest to many of you. It is B&W's new \$350.00 sub-woofer. It is designed to work with all of the small B&W speakers (both current and older models) and it does so by offering several very clever engineering accomplishments. There is lots of good news here for you.

First, you only need one of these woofers. It accepts both your left and right channel amplifier inputs, directs the low frequencies through its built in crossovers to the two internal woofers, and sends the audio signal on to your two main speakers.

Second, you don't need an electronic crossover or a second power amplifier at all! A single Acoustitune woofer is all you need. B&W realized that a low priced sub-woofer isn't low priced if you need a whole bunch of expensive additional electronics to make it work. Thus they decided to not cross over their main speakers at all (which are all carefully damped anyway). Although the signal to the woofers is crossed over inside the Acoustitune to keep highs out of the woofer, the output to your main speaker is still full range. The disadvantage of doing this is that the power handling capability of your system is not improved because your main speakers still have to work

full range and the Acoustitune probably will provide too much bass for some other (non-B&W) brands of "boomy" loudspeakers. The advantages of not cutting off the lows to your main speakers outweigh the disadvantages in this application. Obviously, you save a lot of money because the electronic crossover and the second amplifier are eliminated. Sonically, it is nearly impossible to build a really neutral electronic crossover, so there is much to be said about not needing one at all. As long as the Acoustitune is used with an appropriate main speaker (anything from DM10s to CM-1s and more) the acoustical match will be just fine because:

The final really clever engineering idea is a user-tuneable port design. The Acoustitune comes with four different length tuning ports that each lock into the cabinet. The response curves for each are printed on the back of the cabinet. Changing tuning ports changes the efficiency of the sub-woofer from about 82 dB to about 90 dB in 2+ dB steps. This allows you to easily match the acoustic output of the Acoustitune woofer to your particular main speakers. Of course changing the port length changes the low frequency cut-off frequency too (the higher the efficiency tuning the higher the cut-off) but in general efficient small speakers are helped most in the 50 Hz to 100 Hz range while lower efficiency models such as CM-1s will like the lower efficiency but extended range response setting of the woofer. One B&W designer told me he likes the CM-1s better with the Acoustitune than with their own much more expensive CM-2W woofers and that is a pretty strong statement. Final fine tuning of the Acoustitune is made with placement and room position according to simple charts that come with the woofer.

The frequency response of this small (21 3/8" x 13 1/4" x 9 3/4" 28 lb.) system is impressive. The -3dB points range from 22 Hz with the longest tuning port to 44 Hz with the shortest. Highs are rolled off at about 110 Hz in any configuration. Distortion is very low, less than 1.4%, an extraordinary figure for a woofer, and really uncommon for a low priced sub-woofer system.

I have only heard this system under trade show conditions connected to B&W's new CWM8 wall mount speakers (another story altogether) and in the display room it was really hard to get a handle on what was happening as there were conferences and conversations going on between 50 different people at the same time. But I was impressed enough to place an initial order – they should be here soon. If they work here anywhere as nicely as they promise, then the quest for clean deep bass response for a modestly priced audio system will be ended – assuming that you demand nothing other than

a simulated (very good vinyl wrap) black ash finish, because, like the Model T, that is the only way they come.

### Our CD Changers Are Finally Here

It took a long time but we finally have six disc Philips technology CD changers available to build into Fet Three or Fet Three Plus CD players. Sorry, there just is not room inside for the Transcendence discrete board sets. The model we now have available is the Magnavox CDB586. Current production uses the improved CDM-4 transport, and is of course a times four oversampling and digital filtering design with the high grade digital filter chip. The machine has all the functions of the 582 plus Favorite Track Selection and more buttons on the remote control. Since it is the same electronically and mechanically as our tried and true rebuilt 582 once the disc is playing, it provides the same great sound as our other Fet Three and Fet Three Plus models. The price is just \$100.00 higher than for the single play model—\$450.00 for the Fet Three or \$650.00 for the Fet Three Plus changer. We can build one for you now. Extra cartridges are available at about \$15.00 each and there are 3" CD cartridges and single play cartridges available as options too at about \$20.00 each. *[1990 Note: After more field experience, we cannot recommend any of the CD changer mechanisms. They are simply too mechanically complex, too flimsy, and to difficult to service. They are going to break sooner and cost more to fix. Stick with a single play machine.]*

### Meanwhile, Back at the Show

There were a couple of other loudspeakers that merit a mention. Dahlquist got impressive sound from their new DQ-20 or was it the DQ-12? Anyway, it was a \$1000/pair replacement for the old DQ-10 that sounded very nice. Hafler showed a brand new Spectrum electrostatic hybrid loudspeaker that was high resolution and neutral, again in the \$1000/pair price range. It impressed me much more than their old Acoustat models. It was short enough to fit in rooms and the dynamic woofer blended in well with the electrostatic panel. The new grey styling was an improvement too. DMP CDs and several high end companies put up a display room called The Sweet Spot and did a good job of making a musical oasis worth stopping at. Actually there was more reasonable sound at the better displays and less terrible sound than I remember from the past. But I heard nothing that compares with what I get at home (or with what we can get at a concert hall). There is still room for higher-fi. You can now buy DAT Recorders from several "grey market" New York dealers, complete with instructions in Japanese and an external 100 volt to 120 volt step up transformer. Prices start at about \$1500.00 (too much). There are

several new FM indoor antennas coming from Terk, Parsec, and Magnum Dynalab. I got a sample of the Magnum Dynalab SR-100 Silver Ribbon passive antenna and it works just fine (a modern sculptured looking version of the old rabbit ears). But it has sharp edges – kind of like storing all your knives in your living room with the blades pointing out – and you will cut yourself (children may do themselves serious damage) and I cannot recommend this product unless the razor sharp edges are removed. What a careless thing to do! They moved all the active car radio displays outside where the satellites used to be and the rude noises coming from thereabouts sounded like a herd of elephants that had gotten into the pinto bean field. They actually shook the glass walls of the convention center rooms a story above and 100 feet away from the blasting vans and boats and interfered with displays inside! Bad taste knows no bounds. The nifty new video and TV stuff didn't look so good after finally finding the HDTV display – it was turn out the lights the game is over for TV as you now know it. Video games are on an upswing again. Nintendo and friends rented 50,000 square feet of display area (half the lower level of an entire building) to show off hundreds of shoot-em-up video games. That's about where my interest ran out. I went home wishing I had a HDTV right now and hoping that Hafler and B&W will ship me evaluation samples of their new speakers soon.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER SEVEN JULY, 1989

### We Have Built a New Headphone Amplifier!

It is available to you two ways. First, the Fet Three Plus stereo amplifier board will fit inside a Pat-5, Pat-4, or DH-110 chassis equipped with our solid state circuits. It will interface with our existing power supply and provide you with excellent headphone performance without the need for an external headphone amplifier or connections to your power amplifier. One limitation – it cannot go into units already equipped with our phase inverter circuit board – you run out of room. The price of the headphone amplifier installed is \$150.00.

We are also making this headphone amplifier available as a separate component complete with power supply and volume control. The "stand-alone" is in a pretty black and charcoal chassis just 9" wide x 7.5" deep x 3.75" high. It is equipped with RCA phono inputs to connect to your preamp, tuner, CD player, or tape deck. It has two sets of stereo 1/4" headphone jacks, a precision volume control, and a lighted power switch. It is very useful in many appli-

cations such as in a component system without headphone connections to the existing power amplifier. You will also like it for direct use from a CD player, tuner, or tape deck most of which have typical anemic headphone performance or no volume control. Now for headphone use, you can get controllable volume and true high fidelity dynamics from these components directly, without need for a bigger amp or preamp at all. The cost of the discrete headphone amplifier is \$295.00 using Fet Three Plus technology circuits, or \$395.00 with Transcendence Two discrete solid state circuits. You will like your headphones better driven right! *[1990 Note: The Headphone amp is now built with Omega circuits of course!]*

### Read the August Issue of Audio

We are referring to R. A. Greiner's article on speaker wire (pages 46 to 53) of course. To save you some suspense, we can report that Dr. Greiner (a professor of electrical engineering at the University of Wisconsin) explains the basic mathematics of speaker wire performance and that the math and other's claims of magic in speaker wire performance (the expensive part of the speaker wire's price) do not correlate. The math wins! We have been trying to tell you this too ever since *Audio Basics* was started eight years ago. Although we agree with most of what Dr. Greiner has to say and we are very happy to see *Audio* magazine publish this information, we are not comfortable with some of his conclusions and suggested remedies.

For example, Dr. Greiner examines the distortions that a speaker fuse may cause under extreme conditions - conditions you are very unlikely to experience in your home system because almost always the conditions that would cause significant thermal related harmonic distortion will also blow the fuse before you hear the distortion. He suggests that a "cure" would be to put the fuse in the feedback loop of the amplifier. We consider that cure to be worse than the problem because now the front end circuits of the amplifier will have to cope with generating a correction signal to make up for any errors caused by the fuse and that may drive the amplifier's internal circuits into saturation (a distortion situation that could occur all the time - not just before the fuse blows). Obviously, in our designs we do not put the speaker fuse in the feedback loop.

Also, Dr. Greiner seems to ignore any resonances in the speaker wires that are outside of the audio range. We suspect that the "if you cannot hear it, it is not important" syndrome has struck again. By this we mean that many engineers have made the assumption that audio signals that cannot directly be perceived by

human beings (outside of a 20 Hz to 20 kHz bandwidth) can be safely ignored as a cause of lowered fidelity in an audio system.

Unfortunately this assumption simply is not true and test evaluations made assuming that out of band signals can be ignored are flawed. Again, I will repeat an extreme case example proving our point. If you feed an appropriate amount of out of band high frequency energy to a tweeter (say 10 watts of 30 kHz sine waves, for example) you will very rapidly fry the tweeter dead. You then can hear the effect that excess inaudible high frequencies had – no more highs at all because your tweeters are cooked. Likewise, you cannot hear DC but I can assure that your woofers and many amplifiers can – and the result of sustained DC into your woofers and/or through your amplifier's output stage is likely to be a fire – and not only can you hear that – crackle, crackle, but you can smell it too. DC does not smell good! Or does this mean that you had some bad smelling speaker wires?

Reasonably obviously then, lesser amounts of out of band energy dumped into your audio components will cause less distortion than total equipment failure, but distortion that will be audible nevertheless. Oscillating amplifiers sound harsh and bright and make nasty "hissing" noises (harmonics of the source oscillations). Speaker grills flap and woofers bottom and scrape when underdamped amplifiers dump high energy sub-sonic trash into them. Your amp runs out of power when it has to play high levels of turntable rumble and tape hiss along with the music. Out of band signals are important and must be considered and controlled if a true high fidelity system is desired.

Another case of an out of band signal causing audible problems happened here recently. A customer returned a preamp to us that "had excess crosstalk" when used with his FM tuner (a Magnum Dynalab), but only when the high level outputs of the tuner were used, and the problem did not occur if the tuner was connected to the preamp's tape inputs instead of its tuner inputs.

We found there were no problems with the preamp at all. Its inputs were all properly terminated (unused inputs – except tape inputs – are shorted when not used to eliminate crosstalk – a standard industry practice). We did find a serious problem with the tuner though – it oscillated at high frequencies when its high level outputs are shorted. Actually the short at the selector switch isn't really a dead short – the impedance of the interconnect cable is in series with it so in reality the switch puts a low impedance load across the device. And under this condition the tuner went berserk and dumped high energy oscillations throughout the system – the audible symptoms were kind

of a buzzy, distorted cross-talk sound overriding other sources. You could not hear the out of band oscillations directly but you sure could hear their effect. The tuner is curable – this sample needs a more stable and better decoupled audio output stage. But then again why bother fixing it as the oscillations it generated would never show up in a test report – they were out of the audio band and thus inaudible – right? Wrong!

Anyway, we would be happier with a speaker cable evaluation in which the feedback loop behavior of the amplifier was monitored while driving various speaker wire configurations. We suspect that some cables' rather innocent looking out of band resonances may cause severe problems to even "good" amplifiers if one looks at the amplifier as the two stage device that it really is (a voltage amp followed by a current amp) and understands that both stages had better be working linearly in and of themselves and not going into saturation or cutoff at all even when the load is strange. Nearly all amplifier tests look at the unit as a "black box" and ignore the fact that 100% distortion in the voltage amp (feedback loop overload) is often masked by the low pass filter effects of the following nearly always slower current amplifier.

Dr. Greiner does mention that capacitance and inductance in a speaker wire can be "traded off" depending upon the construction of the wire. He also recognizes that heavy capacitive loads can cause some amplifiers to become completely unstable and oscillate. He suggests that this is a amp design problem and of course he is correct. However, increasing the capacitive load across any amplifier does cause transients to generate greater underdamped resonances at some high frequency – not a way to get higher fidelity. Thus we have trouble with his recommendation to use twisted pair speaker wires as that does increase the capacitive effect.

We also cannot agree with his observation that since a shorter speaker wire is better (true within limits) that the ultimate is no speaker wires at all – that the amp should be located directly at the speakers. To follow this suggestion you would probably have to increase the length of the interconnect cable between the preamp and the amplifier. This will increase the capacitive load the preamplifier has to drive. Most preamplifiers we have evaluated exhibit marginal load driving ability and increasing the capacitive load in the interconnect cable by making it long simply rolls off the highs and increases the likelihood the preamp's output circuit will current limit and distort.

Our suggestion is that the speaker wires should be no longer than necessary. But because the amplifier is a better load driving device than the preamp don't trade off short speaker wires for long interconnect cables.

Now does all this mean that we disagree with Dr. Greiner's conclusions which in essence say that exotic speaker wires don't really have any magic characteristics that make your hi-fi system sound better? Not at all. We agree with him completely.

However, we do hear differences when various types of speaker wires are used with many conventional amplifier designs – not better-worse differences and not better or worse magic differences – but simply the effects of the electrical load causing the loop linearity of the amplifier driving that load to change substantially. These are inexpensive electrical load differences, not expensive magic differences.

We can suggest an engineering project that would be of value – namely the evaluation of what combination of electrical qualities in a speaker wire gives the least problems to the widest variety of off the shelf power amplifiers. Then a recommendation of speaker wire brand and construction could be made that would be of value to many, and there would be a motivation to produce a good speaker wire at a rational price rather than just magic speaker wires at a ridiculous neurotic audiophile price.

### **The Super Seventy Stays at \$150.00 for Audio Basics Subscribers**

Due to popular demand, the volume of Super Seventy rebuild kit orders has been large enough to allow us to continue with the special \$150.00 price for *Audio Basics* subscribers indefinitely. We keep getting such nice feedback from you about this little vacuum tube amplifier that we are really happy we produced it.

We are working on a couple of more upgrades for the St-70. The first is a new power transformer. The object is to interface perfectly with the Super Seventy kit (or even stock St-70 units), to eliminate the 5AR4 rectifier tube, and to make higher power with less heat and better reliability. What do you think of that idea?

As long as the stock St-70 power transformer is used, then a vacuum tube rectifier is necessary. This is because the amplifier was designed before reliable high voltage solid state rectifiers were made and because the transformer was designed to make up for limitations with rectifier tubes.

The problem with the rectifier tube is that it is inefficient. The 5AR4 has an on resistance of about 500 ohms. This means there is a large voltage drop across it and much of the amplifier power is dumped out there as heat. The

folks at Dyna knew that but it was all they had. Thus the original power transformer was designed to make up for the voltage drop in the 5AR4 tube. The transformer was designed with a much higher voltage output than necessary, so that the voltage would be right after the drop across the 5AR4 tube. Thus the combination of the original transformer and the 5AR4 rectifier tube works OK together (if you don't mind the heat and the power limitations).

Warning! The original transformer is not at all OK if you substitute a modern diode rectifier for the original 5AR4 tube. Then, the built in voltage drop across the tube is eliminated and the resulting much higher B+ voltage will be too high for the circuit parts and will damage capacitors. Also, at turn on the voltage will surge to higher and more damaging levels yet because the rectifier will turn on hard before the audio tubes start conducting and loading the supply back down. These problems can be resolved by designing a slow turn on circuit and providing high power dropping resistors to replicate the on resistance of the 5AR4 but this is a silly thing to do because the cost of the tube elimination circuits would be higher and the reliability worse than the cost of the rectifier tube you are trying to replace.

Still, it is annoying to think of all that head-room going to waste and 5AR4 tubes are getting expensive. Thus we are designing a new power transformer that is optimized to work with a solid state rectifier. Its basic output voltage will be lower (but with much higher current capability) and there will not be the loss across a vacuum tube rectifier.

So the initial turn on voltage will not overshoot, as it will be designed to be the final safe operating voltage, and there will not be the voltage drop across the rectifier nor the drop across the transformer when you start to push the amplifier hard. Thus the amplifier will make more power due to the much more efficient supply regulation and run cooler at the same time because the heat of the rectifier tube and inefficiency of the original transformer will be eliminated.

The transformer will be a "drop in" replacement for the original and the diode rectifier will simply wire across a couple of pins on the original tube socket. It requires no other changes to a Super Seventy and it even will interface perfectly with a stock St-70 amplifier eliminating the rectifier tube there too.

If I order an initial run of these new transformers are there enough of you interested in them (at about \$85.00 each) to make it worthwhile? I will need to place an order for about 25 pieces to get them built. Let me know if you would want one. If there is adequate interest I will go ahead with the project. [1990 Note: The Super Seventy power transformer has been produced

and is available for you right now at \$90.00 including the new diode power supply parts and instructions plus \$12.00 shipping in the continental USA.]

The second St-70 project under way here is much simpler but is one I know you will like – a new input jack set and output jack set kit built like our Super Pas jacks on small ground plane PC cards. [This is now done too - the cost is \$35.00 for the combined output and input jack set kit.]

There is just enough room in the original input jack chassis cutout to fit a pair of high quality PC mount jacks on 0.5" centers with grounds isolated from each other and from the chassis. This will keep standard RCA plugs from scrunching into each other. While I am at it I will make the board big enough to block the "hole" where the unused mono switch is removed. The back panel jacks present one problem. If we provide high quality color coded 5-way binding posts for output terminals, then there is simply not enough room for four of them in each chassis cutout. Thus we propose to design a PC card that holds three jacks per channel; 8 ohm outputs, 4 ohm outputs, and ground. The 16 ohm transformer taps will be wired to internal isolated solder lugs, along with the feedback wires connected there, and will not be immediately accessible. Of course if you use 16 ohm speakers (very few do) then you could exchange the 16 ohm taps for the 4 ohm taps and be in business again. There just isn't room for all sets at once without resorting to dinky little terminal strips again.

I would like to keep the price of this set of three ground plane cards and the input and output jacks for them down to about \$35.00. Can we put you on the list for a set?

#### **D.A.T. May Get Here After All**

Ever since the National Bureau of Standards reported that the analog notch filter scheme would be an undesirable way of keeping CDs from being recorded, the whole issue of high quality consumer grade Digital Audio Tape Recorders has been on hold in the United States (and the sales have been slow elsewhere in the world because they are too expensive).

The RIAA has threatened legal action regarding copyrights if a tape recorder capable of making clones of originals (especially fast and cheap multiple clones) was turned loose on the general public. Japan, Inc. has been a bit worried about the political climate here (after the Toshiba adventure got Congressional attention there has been a general feeling of "don't make waves") and thus nobody has wanted to be the first to stick their necks out to import DAT equipment. Sure a few high priced car systems are available, but they don't record.

Thus this promising advanced technology has been sitting on the shelf and we go on making millions of terrible analog cassette tapes.

Now there may be a compromise coming using a Philips developed digital anti-copy process that will make everybody not too unhappy, not screw up the source music, and allow DATs to finally reach you in quantity and thus at a lower price.

The Philips system works by allowing one direct digital to digital tape to be made from a source CD (or whatever) but in the process of making the copy it adds an "anti-copy" flag to the clone. This anti-copy information will prohibit the second generation tape from being direct digital taped again. The DAT will read the anti-copy flag installed when the tape was made and will refuse to make subsequent direct digital copies from that tape.

Of course you can still make a copy of the clone DAT as long as you come out the analog outputs of the source recorder as the anti-copy flag does not exist there. It is just that your third generation copy will not be a direct digital clone because the D to A converters on the source machine and the A to D converters of the recording machine will be in the signal path. So there will be some signal degradation depending upon the quality of the conversion process, but still the third generation tape will be much, much better than any analog cassette.

The overall concept of the Philips anti-copy method is rational. It allows you to make as many first generation direct digital tapes as you want, but it does not allow those tapes to be "cloned" again thus keeping the number of originals from propagating exponentially in the "pirate" end of this business. Since the anti-copy flag is in the digital "housekeeping" end of the information (almost all commercial CDs you buy already have a digital anti-copy flag) it has no effect on the music at all. And, since the flag is installed on your new tape when it is recorded, the system protects all sources from endless direct digital copying even if they were produced without digital copy protection themselves.

The necessary circuits must be installed in the digital recorder in the manufacturing process and thus there remains one major political and economic roadblock and that is a legal one.

The manufacturing powers that be really need national legislation making the installation of the anti-copy circuits mandatory before they will be willing to commit to large scale production. They are afraid of being undercut by a renegade company if the anti-copy scheme is done simply as an industry accord.

The scenario they worry about is what happens if an industry accord is agreed to and everyone builds anti-copy machines and gets DAT and

digital tapes in as large a scale production as cassette is now. They suppose some outside company comes along with a DAT machine without the anti-copy chips that will make clone after clone. It will sell like crazy until laws are passed and by then the music producers feel the damage will be done. They really want to make the anti-copy technology legally mandatory now before giving anyone a chance to undercut them.

Ah, isn't the politics of high fidelity interesting? An audio company needs more lawyers than engineers. Meanwhile, my PCM 501 digital audio processor continues to make just fine (and legal) digital tapes on my VCR. Keep waiting.

Next month we may be a bit late because I will be helping Vanessa move to the University of Wyoming where she will earn a Masters Degree in Electrical Engineering. Yes, she can answer your technical questions just fine!

*Frank Van Alstine*

## VOLUME EIGHT NUMBER EIGHT AUGUST, 1989

### Digital Audio Tape Accord Reached

The major manufacturers of audio equipment and the RIAA have reached an agreement regarding the distribution of DAT recorders in the United States. The machines will be equipped with the Philips designed digital anti-copy chip discussed herein last month. There are two further "catches" regarding the use of DAT machines with the anti-copy chip.

First, because the anti copy flag is added to anything one records with the DAT, the machines will be useless to artists trying to record their own performances and to professionals trying to record other live performances. One will be unable to make second generation DAT tapes of one's own recordings because the anti-copy flag automatically added to the original will prohibit this. Obviously multi-take dubs will be impossible too with consumer grade machines.

Second, there may possibly be further capabilities in the protection devices not widely advertised, such as the capability to "remember" the code name of any CD recorded and not allow you to make a second original DAT from that specific CD (whether the first take was good or not). It has also been reported from Europe that DATs made on one machine will not reliably play back on another machine. Whether this is by design or because of sloppy production tolerances, I don't know. I do know that the transports are so small that I don't see how they will hold up long term.

Anyway, don't expect to see much promotion or distribution of DAT machines for several months as it will take a while to get the anti-copy machines tooled up and into production. Meanwhile, there is not any pre-recorded source material available and the prices are far too high. Wait.

### Read the September Issue of *Audio*

Last month I told you to read Dr. Richard Greiner's article on speaker wire. This month read about my thoughts on speaker wire and connection cables! Ivan Berger, *Audio's* technical editor, has reprinted a portion of my October, 1988 issue of *Audio Basics* in his Spectrum department (page 34) in the September, 1989 issue of *Audio* magazine. I have already received many calls and letters regarding the editorial, mostly from people expressing relief because I had eliminated their worries that they really needed to spend more money on their speaker wires and hookup cables than on their components to get a good sounding audio system. I smile when I get letters starting "I didn't know there was anybody honest left selling hi-fi equipment" and it makes my "voice in the wilderness" position less lonely.

Thank you, Ivan Berger, and thank you *Audio* magazine for publishing my comments!

### The AVA Hybrid Phase Inverter

We finally have the ultimate component for your state of the art audio system, the AVA Hybrid Phase Inverter. This brand new free standing little charcoal and black box (9" wide x 7" deep x 3" high) allows the perfect conversion to bridged mono operation of any common ground stereo power amplifier; solid state, hybrid, or vacuum tube.

The operation is simple. You run the audio output cables from your preamp to the inputs on the AVA Hybrid Inverter. You then run a pair of output cables from the Inverter's normal and inverted outputs (one pair of outputs per channel) to each of two separate stereo amplifiers. You connect your speakers across the hot outputs only of the two channels (the ground terminals are not used). This sums the voltage swing of the two channels, in theory quadrupling the power. In practice the typical amplifier power supply gives up a little earlier, but usually one does make three times the normal single channel power of that amplifier.

You get a lot more than just higher power. Inevitably the sense of image and realist staging is greatly improved, the feeling of lifelike power is significantly enhanced, and the amplifiers perform much better than you would believe. For example, two Super Seventy amplifiers bridged into my B&W 801 Matrix speakers sound much more powerful and wide

range than they have any right to do - I would not trade the setup musically for any other vacuum tube stuff I can think of.

Of course we designed the hybrid bridge to give us a phase inverter that would keep up with the Fet-Valve amplifiers and preamp. Our Fet Three Plus bridge, although the equal of any solid state equipment, isn't quite transparent enough for that application. The hybrid bridge doesn't get in the way at all - in fact it enhances the performance of the Fet-Valve equipment too. Two Fet-Valve 400 amplifiers bridged with the AVA Hybrid Inverter yield about 600 watts per channel - real serious clean power with outrageous dynamics and musical purity.

The Hybrid Bridge contains the power supply of the Fet-Valve preamp and our newly engineered hybrid inverter circuits. The inverter circuits are a simplified version of the Fet-Valve line circuits, especially engineered to invert the phase of a signal without adding undesirable phase lag or notch distortion.

Normally the unity gain feedback of an inverter creates a harsh sounding signal because the feedback signal is too big for the front end to handle under transient conditions. With the AVA Inverter, the front end headroom is enormous because the front end is a high voltage triode with hundreds of times the overload capability of a typical transistor or op-amp front end. However, our inverter is not limited to the meager current drive into a load of a typical vacuum tube. The output of the AVA bridge is Class A power mos-fet, ready to drive loads a signal tube simply cannot. The combination gives ideal results - a bridge so good your system not only is much more powerful, but simply sounds much more musical too.

The AVA Phase Inverter is \$395.00 outright, or just \$295.00 if purchased at the same time as any AVA power amplifier (new or rebuild - but not kits). It uses two select high gain 12AX7A tubes that should have a long service life as they are not stressed in our circuit design. It will make your audio system better. It is available right now. Call us about it for more details or come in and have a listen.

### Wanted - Dyna St-70 Amplifiers

For some ongoing experiments and to fill customer demands, I need several used Dyna St-70 vacuum tube amplifiers in good mechanical condition with good transformers. The condition of the audio circuits, tubes, and filter cap is not important, but I do want the tubes that are in the unit.

I will pay \$50 to \$100 per unit depending upon condition. Call me if you have one stashed in your attic or garage. We need some now.

### The Acoustitune Really Works!

Two months ago I gave you a detailed report on the new B&W Acoustitune sub-woofer telling you how it works and how simple (and inexpensive) it is to use. There was only one reservation – I had only heard it under trade show conditions and could not report how well its theory of operation translated into better bass performance in your home.

Now we have the Acoustitune in stock and use it in our own system and can report to you that this new sub-woofer works very well indeed – perhaps even better than we expected.

I have tried it with B&W CM1s, DM560s, and even with my Matrix 801s and in each case I like the results a lot.

With the CM1s the bottom fill is very effective, perhaps not quite as much bass as with the dedicated CM2SW woofer columns, but at a much lower price. The overall performance is so good that I have set aside one Acoustitune for my son to use with his CM1 speakers at college. I think he will have an ultimate small room system.

The woofer really helps the DM560s – I like this combination better than the DM570s or DM580s because you get the small box clarity and lack of cabinet resonances from the DM560s along with the extended bottom of the Acoustitune without needing the space for the big DM580s. It is a good match for the DM550s too.

One of the fun things with the Acoustitune is the ease of changing the bass characteristics instantly by simply plugging in a different port (it comes with four of them). While one might like the very tight, deep, and refined bass extension a long port provides with classical music and CM1's for example, it is absolutely easy to make the system "boogy" on pop and rock material by simply stepping over and plugging in a shorter port and getting more and warmer bass. You can have it the way you want it.

I even like the Acoustitune with my 801 Matrix speakers, as strange as that may seem. The 801s are just a tiny bit lean in the extreme bottom. B&W tried designing that out electronically by providing the external bass boost circuit with the speakers. Unfortunately, we don't like the way their bass boost box works at all, the low-cost IC audio circuit in the boost box in series with your system turns the 801s into a giant boom-box in our opinion and loses all the definition that really fine drive electronics have to offer. Remember, your system will perform to the capability of the worst circuit in the chain, and a unity gain feedback slow IC circuit pretty well defines the term worst case circuit.

The Acoustitune properly located and with one of the longer ports, adds just enough sense of heft, deep power, and warmth to the 801 system to make it better than ever. And it enhances the bottom without screwing up the mid-range and top the way B&W's electronic box does. The Acoustitune is a remarkable little tool.

I cannot go along with all of B&W's recommendations regarding the Acoustitune. In our experience it does have to be placed near a wall or corner to develop adequate output. B&W shows one placement out in the room as kind of a coffee table. Forget it! In that location the woofer just does not have adequate output. It may be different with an underdamped amplifier that has excessive low frequency output in the first place, but with an amp like that you will never hear bass quality at all anyway.

Our first demo sample was set up only for a day. The first client who heard it bought it on the spot. Now we have finally received a restock and actually have inventory available to ship. The list price is \$350.00 and you only need one and no additional electronics. Your local B&W dealer should have inventory now too. If you can't find the Acoustitune in your area call us. We will beat the list price a bit for our clients and you do know we provide long term service on what we sell. The Acoustitune is a winner.

#### **Our New St-70 Input and Output Jack Set Kit is Available Now**

There is no drilling or cutting necessary, all the new parts mate with your Dyna St-70 original chassis cut-outs and mounting holes. The wiring is simple, most original wires can be reused. The kit works great with both Super Seventies and with original stock St-70 amplifiers too. This nifty little kit is available right now.

I designed the new input and output jack set because I got tired of the poor quality of the originals. The input jacks were too close together so that interconnect cables smashed into each other and metal cased cables touched and caused ground loops. The tiny screw terminal output jacks broke, stripped, and were a pain in the ass to connect. Using heavy gauge speaker wire was impossible.

The new jack set kit has gold input RCA jacks mounted on 0.5" centers so cables will fit. The new output jacks have color coded 5-way binding posts that accept banana jacks, pin jacks, spade lugs, or bare wires. All jacks mount on custom tooled FR4 PC cards designed to interface perfectly in the chassis. Because of space limitations, we furnish three output jacks per channel (ground, 4 ohm, and 8 ohm) on 0.6 inch centers. There simply is not room for more without taking a hacksaw to your chassis. The 16 ohm taps are tied off internally on

provided terminal strips. Of course if you need the 16 ohm outputs, you can wire them to binding posts instead of either the 4 ohm or 8 ohm outputs. You can wire the outputs the way you need them.

The kit includes three new PC cards (the input board and two output boards), the gold input jacks, six new 5-way binding posts, terminal strips, mounting hardware, and our instructions. The cost is \$35.00 for the complete kit. Sorry, we cannot offer just part of the kit, we would never pay for the tooling costs. The input board is designed to cover the hole from the removed input mono-stereo switch not used with our Super Seventy circuits. If you want to retain this switch in a stock St-70, simply cut off that portion of the input PC card before installing the jacks.

The new jack set kit simply makes your St-70 nicer to use. It is especially convenient when connecting two Super Seventies for bridged mono operation with our new AVA Hybrid Phase Inverter box. Then you get musicality, dynamic performance and extended range much closer to ultimate than you would ever suspect.

#### **We are Still Working on the New Power Transformer for the St-70**

This project has been a bit of a struggle because there are so many interacting taps that our supplier has had a bit of a problem predicting exactly what working voltages they will get until after a sample is wound, and once done it cannot be undone.

The first try worked great except the turn-on voltage went too high and overshot the rating of the power supply capacitors. The second sample is working within our voltage specifications, except that it droops a bit too much at full power, limiting power to only a bit more than with the stock transformer.

We have three different voltage criteria to deal with. First is the unloaded voltage – the voltage the power supply puts out before the tubes warm up and start drawing current. This must not go higher than the voltage rating of the circuit parts. Next we need the idle voltage (everything warmed up but no signal to amplify) to be at a stable and predictable level. Finally we want the full power voltage to remain as close to the idle voltage as possible to make maximum power and to eliminate phase distortion caused by biasing shifts due to power supply fluctuations. Of course we want to provide these stable operating conditions at a reasonable price – one can always just throw more money at it. Thus we are spending quite a bit of time and effort in the design process to save you money in the long run and the process has been a bit frustrating.

Nevertheless, eliminating the 5AR4 rectifier is very useful. The amp runs much cooler with the new transformer and a solid state raw supply and *sounds* as though it has a lot more power than it really does. We will be getting back with the transformer design people again to optimize the design before putting it into production. Perhaps next month.

Remember, you cannot do a solid state supply with the original Dyna transformer, the voltages will go far too high and damage the tubes and the circuits.

### Finally a Word from Yellowstone

We made a brief tour through Yellowstone National Park after getting our daughter settled in at the University of Wyoming last week. (That's me and my faithful pet puma Pauline at the brink of the Grand Canyon of the Yellowstone). We love this great national park and have spent weeks there over the past 30 years.

The fires have devastated it. About the only thing the fire fighters did (or could do in light of the delays and restrictions of fighting the fires when they were small) was save the old historic buildings. For two hundred miles, from south of the park in the Tetons till the northeast corner near Bear Tooth Pass you are seldom out of sight of burned forest. It is still interesting and pretty now while the dead trees still stand and the contrasts of black, green, and brown still exist. But soon the dead trees will become dead stumps, the landscape will overgrow with scrub vegetation and the beauty will be gone for a generation. See the park soon before terminal ugliness sets in! Don't believe the government's claims that forest fires are good for you! They screwed up and after the fact rationalization doesn't cut it. Yellowstone was not a natural forest, it was a national treasure. Those managing it violated our trust. I am sad.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER NINE SEPTEMBER, 1989

### Not Much Happened This Month, Except

We are renovating our home and the work to keep ahead of the painters and carpenters is taking all our "free" time. The painters want us out of all the bedrooms — pile everything into the living room and dining room — while at the same time the carpenters show up to make the new audio-video wall in the living room and want everything out of there too. I guess we are supposed to stuff everything we own into a heap in the back yard and live under a tarp for a month. Meanwhile we moved our son back to college this month to St. Olaf in Northfield,

Minnesota. This is only a 70 mile round trip, a bit easier than the 2200 miles last month to get our daughter established at the University of Wyoming. On top of all this, Darlene and I are reworking the kitchen cabinets with new hinges and hardware (amazing how fast you can run down a ni-cad screwdriver with wood screws into oak) and we are still trying to run a business too. Thus another Sunday *Audio Basics* writing project. It is the only time the commotion is quiet enough to write.

### We are Taking Orders for the new St-70 Power Transformer

Our prototype units are working just fine and we have placed a production order promised us by the end of October. So we can take orders for the new improved St-70 power transformer right now, assuming you understand that delivery will be as soon as we get them, about 4-5 weeks from now.

The new transformer eliminates the 5AR4 rectifier tube (we include the two new solid state rectifier diodes and installation instructions at no extra charge), lets your St-70 run much cooler (the 5AR4 dumped about 100 watts of heat all by itself) and provides about 30% more power (33 watts per channel instead of 25 watts per channel depending upon the quality of your output and phase inverter tubes). More important, the amplifier simply sounds better with the new lower impedance raw supply. It has obviously more authority and punch.

The new AVA power transformer interfaces perfectly with either a Super Seventy or with a stock Dyna St-70. We are even having the leads color coded to match the originals so that the replacement will be easy. It drops into the original mounting holes.

Of course we could not match the color codes of the primary leads because the AVA transformer has dual primary windings so that you can use it with either 120 volt or 240 volt AC. The original was for 120 volt use only. Foreign customers, now you can use your St-70 directly with your 240 volt AC power.

The price of the AVA St-70 power transformer is \$90.00 plus shipping. Call us for details now!

### B&W Introduces Two New Low Priced Loudspeakers, the V201 & the V202

Would you believe just \$250 per pair and \$350 per pair list price for these new beauties? These two new B&W models came as a complete surprise this month and we are happy to have them. No longer do we have to send our entry level high fidelity clients elsewhere for mid-fidelity speakers. Now we have true high fidelity B&W loudspeakers for them at prices they can afford. You get true B&W sonic performance and construction quality, and of course

our *Audio Basics* readers get our special prices too, making these bargains even better values yet. Check with us for details.

The V201 is slightly more forward sounding and is about the same size as the more expensive DM550 model, 14" high x 8 1/4" wide x 7 1/2" deep. It has a 6 1/2" woofer and a polyester dome tweeter. The frequency range (-6dB points) is 53 Hz to 22 kHz and the sensitivity is 90 dB at 4 ohms. It handles 60 watts. The V202 is nearly as big as the DM560. It is 19 1/2" high x 9 1/2" wide x 8 3/4" deep. It has a 7" woofer and a polyamide dome tweeter. It handles 65 watts of power and also has a sensitivity of 90 dB at 4 ohms. Its range is 45 Hz to 22 kHz. It too is a bit more forward than other B&W loudspeakers, a characteristic that moves the performers closer to you and one that many younger buyers prefer. Of course both the V201 and the V202 work great with the new B&W Acoustitune woofer (you only need one). This is an ideal way of adding more bass later at a low price or to put together a wide range system where you don't have room for larger wide range speakers. Both speakers are available in black ash vinyl with very attractive "floating" grill assemblies.

What do you give up to get B&W quality at this low price? You give up the molded front baffles and the built in fuse protection. The treble is smoother on the more expensive 500 series and up B&W models as they use the premium metal dome tweeters, but then you should get something extra with the more expensive speakers and the treble on the new V series speakers certainly puts that of its low priced competition to shame. The V201 and V202 are low coloration, have no "box" resonances, and sound much bigger than their size. You get modern, clear, high resolution, big sounding, and easy to drive speakers for a very low price. We have them available right now.

### If You Cannot Find a "Stock" CDB582 CD Player, We Have Got Them for \$199.00!

Some of you have informed us that it has been nearly impossible to find the "good" Magnavox CD player models in your local stores because all they were stocking were the lower quality "brick wall" filtering promotional priced models. So we have ordered extras of the high grade digital filtering and times four oversampling model 582 in order to supply those of you who want only a stock low priced CD player at this time with a good machine.

For \$199.00 plus \$8.00 shipping in the continental U.S.A. you get a new stock CDB582 CD player that we have opened and inspected and that has gone through and passed the same demanding test sequence we require for those machines we rebuild. Remote control and the improved CDM-4 transport is standard.

O.K., for those sharp eyed *Audio Basics* readers, as long as this special is on we will sell you complete Fet Three Plus machines for \$495 and complete Transcendence Two machines for \$895 using new 582 chassis. You don't have to buy the basic machine and the rebuild separately to get our best price. Note that these prices no longer include shipping. Check with us for the appropriate shipping charge or:

### Ask for Our New AVA Catalog

It is the September 15, 1989 issue with the green cover. It has more details on our newest products, an explanation of our new Exchange Policy, and more detailed ordering and shipping cost information. We will be happy to send you the catalog free of charge, together with detailed data sheets on any B & W loudspeaker you desire. Call or write us for your copy now. We can also supply you with a reprint of the Super Pas Three *Stereophile* review if you desire. Just ask for it.

### The Body Language of Bad Service

In this day and age many consumers complain about bad service, overpriced and inept repairs, faulty merchandise, and essentially an adversarial relationship when dealing with many sales and service departments. Why is this happening? What can the end user do to make life easier for himself? Lets take a look at some of the problem areas and go over a few suggestions on what to do to keep problems from getting out of hand.

I stopped by a new car agency a few days ago, something I seldom do (my 83 Audi Quattro and my 80 VW diesel wagon will get driven until their wheels fall off and that is not going to happen soon). I stopped by a Mazda agency to take a peek at their mini-van (rated highly in *Car and Driver*) and perhaps to evaluate their new Miada sports car too. The Miada was easy, they didn't have any. They had the mini-van, but it rapidly became obvious that it was their customers that were going to get had. First of all, driving the vehicle was like getting trapped inside a Japanese receiver — myriads of tiny illegible buttons in all directions as a substitute for design quality. The ride and handling insulated the driver from the control feedback loop turning him into the passenger who's duty it is to herd the vehicle. Useful cargo space was nil (no flat floor), just what you need when you buy a van. It looks like *Car and Driver* forgot what a van is for in making their rating. Remember that the purpose of "marketing" is to make you forget what the purpose of the product is. But the real shocker was the price tag — over \$24,000.00! On second glance the price tag was even more of a shock because it was not the "real" government mandated price sticker but was instead a simulation with a few additional features, such as \$1995.00 for "Adjusted Market Value" and \$300 for "Dealer

Advertising Association." Talk about an instant adversarial relationship. These suckers were out to stick me with over \$2500 worth of nothing on top of the list price of the van (I didn't tell you about the double charges for dealer prep and shipping). How can they possibly be getting away with this rip-off? How can so many car dealers be charging "ADM" (additional dealer mark-up) without being tarred and feathered and run out of town on a rail?

They are doing it because the car buyer lets them get away with it, that is why. If every last buyer simply would do as I did as soon as I saw the rip-off pricing, namely tell the salesman that I wanted to see the new car manager, and then told the new car manager that I never, ever, do business with a company trying to charge me something for nothing and then walked out, the overcharges could not exist. *So Rule One is if the prices or conditions are wrong, take a walk.* You really don't need the product, especially if the dealer's policy is an obvious rip-off. Remember, if they can screw you once, they will do it again. As long as the buyer is willing to pay something for nothing, there will be large supplies of sellers available offering nothing for something. It is up to you to stop the con game now. As long as your body language says that you are willing to be overcharged (your body is still there — you didn't take a walk) you will be.

If you don't know what Super VHS can actually do in comparison to standard VHS (gives somewhat better original tapes and significantly better tape to tape copies) then you are ripe for a salesman to sell you a bigger LED display and more buttons on the remote control rather than a better VCR. If you don't know that there are no such things as "three laser" CD players (the single laser beam is split by a mirror into many beams and only three of the reflections are used) then you are ready to pay more for a "three laser beam" CD player that has no more lasers at all. If your body language says that technology is magic, you will be sold magic, and magic is much more expensive and has much less value than science.

From a service standpoint, we are much more likely to be able to quickly, economically, and properly repair a unit when the client can tell us, "while listening to records, and only while listening to records, I get an annoying hissing sound on the left channel that gets louder when I turn the volume up" than in those that simply call and say, "it doesn't work," or worse, simply send the piece in with no note at all. *Rule Two is to Know a Little about the Product and let your body language tell the Sales or Service Agency that you are informed.* If you want to be taken seriously, have some serious facts on hand. If you learn a little about the equipment you may not even need service at all when you

forget and leave the tape monitor turned on. Or, you too can learn how to make that little clock stop blinking. Read the directions! The best service of all is to not need any.

Now consider this situation. We get two pieces of equipment in for service on the same day. One is packed with care, is clean and looks just as nice as when we built it four years previously, and has a note attached telling us under which condition it misbehaves. The other piece is thrown upside down in an undersized carton with only a few wads of old newspapers or undershirts for packing, has bent corners due to inept packing but the dings are not obvious because the unit is covered with chicken fat, pizza smears, and droppings from the bird cage that have accumulated in only three years. The droppings in turn are covered with the stain and paint from where the walls were painted without moving the equipment and these in turn have the cat hair stuck to them. Which unit is going to get the best service attention? Which will we care most about? Which will get fixed first, best, and for the lowest cost? *Rule Three is to show the service agency that you care about the equipment.* If your body language says that you think the equipment is trash and that you really don't care about it, how do you expect any one else to care about it either? I have kept my Audi Quattro in brand new showroom condition (easy to do because it was so well built and finished). When it goes in for maintenance everyone takes special care of it and it always gets washed for free when I pick it up. It is so nice that my Audi dealer wants to keep it like new just as much as I do. It makes service easy and the work gets done right because everybody cares.

Here are a few more service examples to think about. A Dyna St-150 amplifier comes in to rebuild and the customer calls to tell us we should offer him a discount because the unit is in such good condition. We open it up and nearly throw up. The customer's cat has pissed in the unit — it was fuzzy green inside. We take it outside and dump in a can of tuner cleaner and it still turns our stomachs to work on. Why did the customer tell us it was "clean" when he knew it was not and he knew we would find out it was not? How does an up-front lie aid his cause in getting our best service? Another unit comes in from a long lost customer for minor maintenance and control cleaning along with a note telling us how wonderful the equipment is and how much he likes it. It shows up for sale in *Audiomart* advertised as "just back from factory checkout" even before we have burned it in. Thank you. It really makes us want to hustle when the "just wonderful" turns into an instant "for sale." Of course the, "I've only had this unit a few months and have never used it" translates into "built in 1978 and used by the disco-bar ever since," time after time. Don't

people realize that we do have customer and equipment records? Do they really think service agencies are so stupid that they cannot tell how old equipment is and how much it has been used or abused? If you depend upon the good will and conscientious care of a service agency to get good results, why begin the relationship with a lie? Who is going to get free repair service outside the terms of the written warranty? The person who lies and says the year and a half old unit is 7 months old or the person who has the correct date of purchase and tells us up front that his 2 year old stuffed a jelly sandwich in the load drawer? Finally consider the example of the client who rummaged around inside his amplifier to put odd-ball magic speaker jacks in it, destroying 5 transistors (breaking them right off the PC card) shorting out both channels to the chassis, and ruining the input shielding by replacing all the coax cable with bare wires. When we get the unit back to restore it to working order, the letter says we, "must use an 800° solder tip" in resoldering the hot only connections to his new "gonzo jacks." Gosh, we only have 700° tips. Gosh, his ground connections were all rotten too, he did not want them repaired? Now we could have done as normal with a very heavy connection and used two temperature controlled irons on it at once, but we certainly would not want to disobey the demands of this obviously expert customer. So guess who's unit is setting waiting for a special-ordered 800° degree solder tip to show up? Guess who will pay for that tip? Does making unreasonable demands get you better service? *Rule Four is don't lie to the service agency people or patronize them. They probably are not as stupid as you think and when you destroy a relationship up front with a lie you are never going to get their best efforts.*

The customer — service agency relationship typically is so bad that at the last Philips service training school I attended, the teacher repeated the old chestnuts, "the customer is always wrong," and all the customer ever says is "it doesn't work" and all technicians there simply laughed. Then we were reminded to never make an estimate or start a repair assuming that the customer's information was correct because it almost always is not. Nobody disagreed with the instructor. Because so much customer supplied information regarding service problems is wrong a nasty feedback loop is occurring with all kinds of service work. The repair agency no longer even tries to get useful data from the customer regarding repairs to his equipment. Instead of a technician at the incoming service desk there is an untrained clerk who can only take down your name and address and give you a claim check. Since the customer supplied data is so bad, the shop does not try and get your input at all. Thus, even if you know what the problem is you cannot

directly relate it to the service technician. Your useful input is screened out too and all service costs go up as the person making the repairs has to start from scratch. Note that in most car dealers, that is not a mechanic up there writing service orders, instead it is a service order writer clerk translating your "it doesn't work" to his "it does not work." You are lucky to get the right end of the car looked at. The last time I dealt with one of these clerks was when my VW diesel started to run rough. The VW service writer told me they would have to first check the spark plugs and replace them. I pointed out the car was a diesel and did not have spark plugs. Then I was told that they would have to pull and test the distributor. I again pointed out there was not one of those either. Finally, I was told that the carburetor would have to be replaced. Rule One was then applied. How can a dealer have so many incompetent customers that he can get by with a person who knew absolutely nothing about automobiles as a full time service writer? If just a few more of us applied Rule Two we would not have to put up with this nonsense.

Note that the lie destroys sales relationships too. More than anything we dread the call from the customer telling us that "the check is in the mail for an order" when it is not. Obviously then, the check does not show up. Thus we know the potential customer lied to us. Worse, the potential customer knows that we know he lied. This embarrasses him because in his mind he knows he has been caught lying. What then does he do? Of course from then on he avoids us. One simply does not want to be confronted with someone who absolutely knows you are untruthful. Too often a customer's lie has cost both of us a useful relationship. When you call us and tell us an order is coming or has been mailed you might find that we make light of the situation, telling you humorously that we never count our orders until they arrive and that our mailman should be delivering mail with a Mercedes 600 (purchased with all the missing checks in the mail, or course). What we are really doing of course, is assuring you that it really is not critical to us if we get your order now, or if we get it later because what we really want is to maintain our good long term relationship, impossible if you think you have betrayed us. Thus don't lie now to make someone "feel better," or because you think it will please them, it will only make all feel worse later.

Finally don't leap to make a judgement on an "n" of one. We have needed to replace transports in just three of the CD players we have ever sold after they passed our outgoing quality control burn in. Many hundreds of AVA CD players units are working flawlessly under all sorts of conditions. Yet, two of the three CD player owners with transport failures strongly

inferred that we build real crummy and unreliable CD players when theirs had a problem. Their unjustified overall condemnation of our workmanship sure helps us do cheerful work on their repairs. We have never had a field failure of a Mos-Fet 240D amplifier. Yet one was returned recently for repair with a letter soundly condemning our rotten design and workmanship. We did replace the blown speaker fuse (the only problem) for free. We did not pay return shipping. Some days it is very difficult to keep on trying to do our very best because sometimes we get so little encouragement.

We live in a world in which the cash registers in the fast food restaurants are labeled in hamburgers and french fries instead of dollars and cents because our education system turns out graduates that don't know how to make change. Half the kids in my bowling league can't add in their heads well enough to keep score. (I had three 600+ series in the past two weeks!) When I write editorially about the overall philosophy of audio design, marketing and service I get very little reader feedback — although Ivan Berger's notice of my "seven shiny pennies" essay and its subsequent publication in *Audio* was much appreciated. Sometimes the professionals do notice us but few end users commented on that editorial except for those who wrote to ask, "then what brand of wire do you like?" Now many of your *Audio Basics* subscriptions are about due for renewal. Let me know if you still want me to call them the way I see them by getting your renewal, still \$16.00 in the USA, in early. Thank you.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER TEN OCTOBER, 1989

### It Is Time to Answer Readers' Questions

I get letters from you with questions deserving detailed answers that will be of interest to most of my *Audio Basics* readers. Thus this month lets print some of those questions and try and provide some good (and hopefully interesting) answers.

First, I need to print Victor Price's comments regarding speaker wire:

*"I've developed a new speaker cable that you might wish to recommend. It improves the sound quality by at least 237.683% and is really quite magical. It is composed of three components:*

1. 400 ampere welding cable to carry the current portion of the signal.

2. *Automotive spark plug wire to carry the voltage portion of the signal without arcing to the floor.*
3. *Optical fiber to carry a picture of the musical score so that the speakers can see what notes to play.*

*It sounds very wonderful and is only \$50.00 per foot."*

Please contact Mr. Price (not me) regarding this wonderful cable. It might even be useful in helping get rid of annoying hum in your system. You do know what causes hum in your hi-fi system, don't you? It happens of course when the speakers don't remember the words to the tune. Thanks, Mr. Price!

Now for Some Serious Letters:

Cyrus Won writes to me about Absolute Polarity. He says, *"Perhaps you disagree with me regarding my last letter on absolute polarity, but if you don't, you may do your readers a service by discussing it. If you consider a speaker's driver as a linear motor, a reversal of polarity will make it move in the opposite direction that it should with respect to the original sound. This will change the sound especially when transient information is important. Unfortunately, unless my ears deceive me, not all discs are mastered with the same polarity. I hope you have tried this yourself."*

I certainly have tried this, Mr. Won, and I find there is no repeatable better-worse difference I can hear at all because the polarity of each recording, in fact the polarity of each instrument on each recording, is random, as it is in the real world too!

Superficially it seems like a good idea to be able to preserve the "transient attack" of recorded music, to keep a "forward pulse" from some musical instrument a "forward pulse" from our loudspeakers. In other words it seems logical that on a big drum whack that our speakers should push out, not suck in. One would think that the music would somehow sound better if the absolute polarity of the signal was preserved.

However, like many other good ideas, this one does not pan out when the details of the situation are observed.

First of all, the phase angle of the music (whether the sonic air pressure wave is increasing or decreasing when it gets to your ears) is completely dependent upon whether any component in your audio system reverses phase. Do you know what your system is doing? Are you sure?

Secondly, the phase angle depends upon the distance from you to your source loudspeakers. If you don't like the phase angle, move a few inches!

Thirdly, the phase angle of the recorded music is dependent upon whether or not each element in the recording chain reversed phase or not, and those elements include the microphones, the record electronics, and the distance the instruments were from the microphones! You might think about the fact that each instrument was a different distance from the microphone and so the phase angle of each instrument is different. Which one do you want to maintain absolute polarity with? The first violin? The oboe? The timpani? You cannot have them all at the same time.

Ah, what a problem! Fortunately it is not a problem at all. When we listen live we get the same conglomerations of phase angles and polarities which does not damage the live performance at all, and again, if you don't like it, buy a ticket to a different seat!

Maintaining absolute polarity in an audio system then is a myth — a straw man of a problem you need not worry about. Can you hear differences when you reverse the polarity of your speakers on some recorded works? Yes, you might, but it is not a better - worse difference as neither arrangement brings all of the music to you in the same polarity as the instrument played it. The phase angles are random and of no concern to your music enjoyment or in the quest of higher fidelity.

Phase distortion is another matter! It is important that your audio system not bastardize the phase relationships of the music and especially not to create phase differences between the two channels that were not in the original source material. A worse case example would be when you wire two speakers out of phase with each other. This completely destroys the spacial quality of the system and the bass response too as low frequencies from each speaker fight each other and cancel.

Many loudspeaker systems (and lots of audio electronics) have very poor phase-gain balance from channel to channel. Two crossover capacitors just 10% different from each other can change the frequency and phase response of two speaker systems significantly in relation to each other and bastardize the imaging qualities of your system. How many loudspeaker companies match crossover parts? A poor tracking volume control, tone controls that don't really go flat, or almost any tape recorder will produce enough phase distortion to take the "hi" out of the "fi." Note that the "biggies" don't tell you how both channels work in relation to each other, they only measure one channel. Lets see them use the test we apply — dump wide band white noise from a test CD into both channels and then invert one channel and add the channels on the scope — a condition which should cancel the output completely if the dynamic phase-gain tracking

of both channels are identical. That is one (but not all) of the big differences between off the shelf CD players and our output stages. Ours are matched in phase-gain response between the channels so that the phase relationships of the music and its preservation of "space" is not destroyed.

Note that it is unnecessary to maintain wide band flat phase response to maintain identical channel phase-gain balance and good imaging. A gentle phase roll-off does no damage at all. Obviously the passage of sound through air creates a frequency and phase roll-off in the real world (air is a low pass filter). What is necessary is to keep the phase-gain relationships between the channels identical and the roll-offs gentle (no abrupt peaks or dips) so that the phase differences you hear (that help you tell where the instrument is) originate in the source and not in the playback equipment.

Jerry Schrader asks me about apparent contradictions in my advice in *Audio Basics* between old and recent issues:

*"1. In the July, 1982 issue you said a tube amp with a solid state power supply is no longer going to sound like a tube amp. So what's with the solid state supply you just developed? Have you changed your mind?"*

There is no change of mind here and no contradictions either. In 1982 we were referring to active solid state regulators after the raw supply which essentially puts a bipolar transistor output circuit (with all of its stray oscillations and high frequency garbage) directly connected in series with the tube output circuit — not a clever thing to do. In 1989 we are simply referring to replacing the inefficient raw vacuum tube rectifier ahead of the raw supply with an efficient and cool running diode bridge. The raw rectifier bridge (tube or diode) is decoupled and isolated from the output circuit by the filter capacitors (it better be or the amp really would not know the words). The 70 sounds better with the new supply because the new transformer has much better regulation, maintaining more uniform operating points during varying load conditions and thus less phase distortion. The fact that it is more powerful and more efficient does not hurt either.

*"2. You also mentioned in that issue that running the St-70 in mono was not a good idea due to variations between tubes and output transformers. Yet in last month's issue you said you are running two Super Seventy amps in mono via your phase inverter with the B&W 801s and it is fantastic. What gives?"*

Again, this comment compares apples and oranges. In 1982 (and now) we point out that using the original Dyna St-70 mono configuration gave poor results. In fact we don't even maintain that obsolete capability with the Su-

per Seventy. That is because it was not a bridged configuration, but simply wired the channels in parallel (something you can do with an output transformer coupled tube amp but not with a direct coupled solid state amplifier because you will destroy both channels — both solid state channels each see the low output impedance of the other as a dead short load and promptly self destruct). But even with a tube amp the paralleled output configuration really only produced more power into higher impedance (16 ohm) loads and generated kind of a fuzzy error signal that was the difference between the two channels being driven in parallel. The sound got a little louder, but with poorer definition.

In 1989 we are using a very high performance hybrid vacuum tube phase inverter to bridge the two channels which sums their voltage swing and nearly quadruples the power. The load impedance looks lower so the 4 ohm taps are used and common mode distortion is eliminated. The amp runs very quietly and with astonishing power, definition, and control. It ends up to be a very practical way to get high power tube operation because excessively expensive higher voltage parts and tubes are not needed and heat and reliability doesn't get out of hand. Of course this mode is only as useful as the quality of the phase inverter and nobody else makes a hybrid phase inverter that is completely faithful to the spirit of the music. In fact, nobody else makes a hybrid phase inverter at all. It is our invention completely! It will work nice with your Johnson amplifiers too (either Bill's or Conrad's).

"3. I know there are a number of highly regarded tube amps on the market today (Audio Research, VTL, etc.) and I'm curious how the Super Seventy compares to a modern tube amp. Does it compete, or is the performance restricted by any of the remaining Dyna components (such as output transformers)?"

Whoops — a bad assumption here. The Super Seventy is a modern amplifier (assuming you don't equate modern and vacuum tube as a contradiction in terms)! The output transformers are simply an impedance matching and voltage changing device and the Dyna ones work just fine at the power rating of the amplifier and within the bandwidth we have designed for. There is no magic here and no reason for a "better" output transformer. We did a new power transformer to take advantage of modern power supply parts. The only reason to do a new output transformer would be if Dyna's were not reliable (they are) were unavailable (Sound Value still makes them) or if they were a weak link in the performance of the amplifier (they are not). We make much higher power by bridging the amplifiers (much less expensive

than building equivalent high powered non-bridged tube amplifiers and with better results).

Like the Super Pas Three preamp, the Super Seventy is a modern high resolution audio component with better bass control than you would expect and much better inherent musicality than most audio buffs have ever experienced. Yes, it dares to compare with the very most expensive (especially when two Super Seventies are bridged). And yes, Mr. Schrader, one or two would be an ear opener in your system. It's too bad you didn't hear B&Ws on them. The boomy and dull treble was not in the speakers but originated with the signal to the speakers. Also watch out for "extended treble." We have observed people mistaking mundane rough solid state edge for "detail" and extended highs for years. There ain't no harsh "detail" in live music.

Mac Hawley writes with comments about our headphone amplifier and gives a couple of suggestions.

*"You are an irascible curmudgeon. You also build the finest audio equipment I've experienced. I have coupled your new headphone amplifier with a Technics SLXP6CD player and Sony VDR6 earphones. The sound is exquisite. Question: Could the power supply for the headphone amp be separated from the boards to provide a smaller envelope? The CD player is tiny. I keep it on the head of my bed. The headphone amp looks ungainly sitting up there."*

Gee - the AVA headphone amplifier is only 9" wide x 7" deep x 3" high and the audio and power supply circuits are separate internally. But the reason it sounds so good is that it is not built with the smallest and cheapest parts known to man (or automatic assembly machine) but with power supply parts right for the application, lots of supply decoupling right at the active devices, with quiet and stable RN60 series resistors, and with precision film capacitors, and with much more drive current than conventional headphone amps. To build it smaller would probably make it worse and to build it in two boxes would simply make it cost more and it is expensive enough to build now.

*"I suggest that you send a postcard acknowledging receipt of order. Give a ship date that you know you will beat easily. This will eliminate anxiety over whether or not you got the check and order. It will allow customers to feel that you are good at living up to your commitments."*

OK readers, what do you think about that? We have not been sending postcard acknowledgments because experience has shown that the orders come mainly from two types: 1. Those that call us to find out if the order was received

before a return postcard would have gotten back to them. 2. Those who are not as concerned and who's orders are filled before they have a chance to get worried in any event.

We do promise to ship within 30 day or less in our catalog and we always keep our promises (we must in the direct mail business). Only rarely do we have to write a customer informing them that an order might be delayed — almost always because of a supplier screw up. We think the best way to make the customer know we live up to our commitments is to supply equipment that we have engineered and crafted to outdo our promises, and most of our customers believe that we do just that.

I don't want to supply acknowledgments unless you really think we should - it just raises our costs and takes up productive time. But we can do it if you agree with Mr. Hawley. Lets hear from you about this.

Finally I want to answer a question I have received from several of you: Why don't we supply any do-it-yourself "mod-kits" for CD players?

We don't because to make changes to a useful current generation Philips-Magnavox CD player you must remove the main mother board. To remove the mother board you must first remove the transport. To remove the transport you must disconnect the laser assembly's ribbon cable from its preamp circuits. This leaves the laser susceptible to destruction by stray static charges, just like CMOS logic chips.

Philips (and common sense) requires a grounded workstation for servicing CD players — a static free environment with a grounded solder station and with the technician grounded through a wrist strap. Servicing and handling the transport also requires experience with static sensitive electronics. Mistakes make \$150.00 ZAPS instantly (the cost of a new transport - the laser is not repairable by itself).

Those suggesting that you modify your own CD player are either irresponsible (they are not going to buy you a new transport when - not if - you zap your laser) or they are working with obsolete machines. Neither possibility is a useful choice for you or for us.

One other observation — the foil traces on these machine produced CD circuit boards take very special care and tools to service successfully. A normal solder pencil will fry the foil traces, a normal solder sucker will suck the traces right off the boards. Finally, do you have the knowledge and tools to readjust the laser current and servo-offset? It comes with the territory when you make changes to the design.

Finally to repeat a warning: The Signetics op-amp we have seen others recommend for CD modifications is not a unity gain stable device.

It oscillates if used with less than a gain of 5 (read the manufacturer's data sheets!). The filter circuits of the CD player drives the op-amp to unity gain at high frequencies This turns the output into a low level oscillator, not an amplifier. On our test bench this device latches and oscillates when clipped and has poor DC centerline stability. Can you hear the difference? Yes! Is it a good idea? If you say so. Don't let our facts overcome your opinions.

One reason we offer a complete upgraded CD player for just \$350.00 is so that you won't have to risk amateur modifications and damage to achieve outstanding CD performance at a budget price. Let us do it and you will get good engineering (and great sound) not amateur tweaks.

### Super Seventy Transformers Are Here!

We have got them in stock now and they test out great. Our supplier came through with the new St-70 power transformers we told you about ahead of schedule. I got busy and wrote the installation instructions (for both the Super Seventy and the stock Dyna St-70). We have the necessary high voltage power supply diodes in stock. We are shipping these new high performance transformers (which eliminate the 5AR4 tube) right now. There is one very minor "glitch" and that is the color coding on the red/yellow and the red/black leads were swapped. We have already corrected for that in our instruction manual. Note that our St-70 transformer can be wired for 240 volt 50 Hz operation (impossible with the original) and I have written the instructions to cover that no extra cost option too.

As a bonus (because my HP Scanjet Plus scanner and optical character recognition program works so well) we have included a condensed version of the text of the complete original Dynaco St-70 assembly instructions and trouble-shooting guide with our transformers at no extra charge. The trouble-shooting and bias adjustment information is still useful today.

### We Have Compete Custom Built Super Seventy Amplifiers Too

Because I was lucky enough to make a buy on a good supply of stock St-70 chassis, I now can supply your complete ready to play Super Seventy amplifiers (new circuits in good used chassis). The price is \$695.00 complete with carefully selected tubes and our jack set, or \$795.00 with the new AVA power transformer installed too. When you buy a complete Super Seventy from us (not just a kit) you are eligible to buy the AVA Hybrid Bridge for \$295.00. Now you can make that state of the art vacuum tube system at an affordable price!

### Check that 4 Digit Number!

That four digit number to the right of your name on your *Audio Basics* mailing label is not your customer number – it indicates the year and month of your last issue. For example, "8912" means your subscription expires with the December, 1989 issue. We thank those of you who have taken the time to get your subscription for next year in early (your label will now read "9012" or thereabouts). We sure would like to get the rest of your renewals now rather than later – all those late December \$16.00 checks make Christmas season a bit busier than we like! Remember to ask for our new (green cover) catalog too. Thank you.

*Frank Van Alstine*

## VOLUME EIGHT NUMBER ELEVEN NOVEMBER, 1989

### We Write *Stereophile* to De-Fuse a B&W Non-Problem

November 7, 1989

Richard Lehnert

Assistant Editor

*Stereophile*

P.O. Box 5529

Santa Fe, NM 87502

Dear Mr. Lehnert:

The B&W 801 Matrix crossover crosstalk "problem" described by Tom Lewitt in the October, 1989 letters column in *Stereophile* is not as serious in the real world as your readers might suspect.

Obviously the measurements described by Mr. Lewitt were made with the undriven midrange and tweeter open (not connected to an amplifier). Under that condition the signal generated across the rather high impedance protect circuit would be observable.

However, in the real world we operate the loudspeaker attached to an amplifier! Then any crosstalk signal would be shorted out by the low output impedance of the driving amplifier and for all practical purposes would not exist — unless you have a very bad load sensitive amplifier — as too many audiophiles do!

Sincerely,

Frank Van Alstine

### Will Our Data Get Printed?

I have written *Stereophile* two additional times in the past eight months asking for the Super Pas Three back long enough to install the better performing Chinese high gain tubes and appropriate power supply resistor changes. I also

requested that they send me their old Dyna St-70 amplifier and the Mos-Fet 120B we built for them about 1982 for installation of our current circuit sets.

So far there has been no answers to my recent letters. We keep trying, but sometimes this business is frustrating!

### Service Contracts - Pure Profit

A recent promotional brochure from one of our suppliers tells us, "Now you can make up to an extra \$149.00 on every electronic product you sell." Guess how we are supposed to make this extra profit? Of course – we are supposed to sell you a service contract when we sell you the merchandise.

Did you know that about 40% of the home entertainment equipment purchasers will buy a service contract for the goods they are acquiring, extending the warranty in some degree?

Did you know that the profit margin to the selling dealer can be as great as 500% on these service contracts? On many promotional and sale items from large discount barns the profit on the service contract can easily be much greater than the profit on the goods sold.

Did you know that there are basically two kinds of service contracts?

1. A service contract offered by the manufacturer of the product, valid at any authorized warranty station for that product.

2. A service contract offered by the selling dealer or through an independent service agency. These contracts are only valid at that dealer or through the service agency. A word of caution – there have been service agencies that have sold lots of service contracts and then folded up and gone away. We suggest you make sure you are getting a manufacturer's extended service contract unless you are very confident in your local dealer and his independent service agency.

The reason that service contracts cost the selling dealer so little in relation to their suggested retail price is that the service agency hardly ever has to perform under the contract.

First of all, the service contract does not take effect until the terms of the original warranty have expired. Almost all failures in electronic components comes about because of "infant mortality." This is a brutal but accurate term describing the statistical tendency of a small portion of electronic parts to fail shortly after being put into service. A part with a manufacturing defect is most likely to fail very soon after first being used. As the component get more run time the bad parts fail first while of course the good parts don't fail at all. Thus a few weeks of operation culls out the bad parts, and if your equipment makes it through that

period without problems, it is likely that it never will have problems until it gets old enough to wear out. Since the service contract will not be used for infant mortality problems, most likely it will never get used at all.

Secondly, most users forget about the service contract by the time their equipment is old enough for it to take effect. If the equipment needs repairs, they often simply throw it away and buy new or take the equipment to a local repair shop and forget about their extended warranty. Of course the service contract normally does not cover damage caused by accidents, abuse of the equipment, or commercial use.

Finally, the service contract generally expires long before the equipment is old enough to wear out. Essentially the service contract provides for service during the time frame in which it is highly unlikely that your equipment will need service at all – after the infant mortality period but before wear out problems begin. It is a really good deal for the seller!

However, a service contract is not all bad news for the buyer.

Many video components have inadequate initial warranty coverage (90 days labor coverage is typical). VCR and color television repairs can be very expensive. If you can negotiate a rational price (and remember that the contract price is just as negotiable as that of the item you bought – one of our suppliers even suggests that the service contract be "thrown in" to make the sale if necessary) you very well may want to consider a service contract.

Consider also that components with complex mechanical moving parts assemblies will be much more likely to develop problems or wear out sooner than those without moving parts. Thus you can expect the service life of a VCR or CD player to be less than that of a FM tuner or power amplifier. Obviously, if you can get an extended service contract on a VCR, for example, at a rational price, it might be a good deal if you expect to put heavy use on the component. It is not too tough to wear out a VCR in two years so a three year service contract may really pay off.

In general, the more reliable the component, the lower the cost of the service contract, and the less likely that you will need to use the service contract.

For example, now that Magnavox has made the CDM-4 transport assemblies in its CD players nearly bullet-proof (we rarely have an out of the box failure while we rejected nearly 40% of the earlier transports before rebuilding the CD players) they offer a service contract extending the parts and labor coverage to 1, 2, or 3 years beyond the 1 year warranty period for a suggested retail price of \$49.95 per year.

We can offer that CD service contract to you for \$25.00 per year subject to some restrictions and observations.

1. Although the contract states that service can be performed by any authorized service agency, you really would have to get the unit back to us for service. Since we have rebuilt sections of the machine, an agency unfamiliar with our work might reasonably decline to fix it – claiming unauthorized modifications or that they don't know how to deal with our circuits. Also, authorized repairs under the contract must be made with Magnavox supplied original equipment parts. Obviously, a service agency cannot order our high grade parts from Magnavox. We know what is standard and should be repaired with fresh Magnavox assemblies and what is special and is our responsibility alone.

2. The service contract must be purchased within the time frame of the original warranty coverage (one year from date of sale from us). You would have to supply us with the serial number of the machine and payment. We would send you the service contract to fill out and you would have to return the appropriate copies to us to file with Magnavox to execute the coverage.

3. The service contract does not cover shipping costs. You pay shipping both ways.

4. It probably is not a worthwhile investment for you. We have only replaced one CDM-4 transport in the past year (and that was within the standard 1 year warranty) and only five of the less reliable CDM-2 transports in the three years before that once they passed our incoming inspections and were aligned properly in our rebuild process. Two of those transport replacements were in off the shelf machines purchased elsewhere. Other than that, repairs have been minor and inexpensive (a couple of bad display segments and one noisy digital filter). Of course the transport is a \$120.00 part (it is a complete assembly with a new frame, laser swing arm assembly, disc motor, hub and appropriate electronics) but one bit of good news is that the new CDM-4 transport is used in all repairs of older CDM-2 transport equipped machines – effectively upgrading their performance and projected reliability. So, even if you have to pay for a new transport, you do get a machine repaired to better than new status.

5. Remember, we do offer a "\$250.00 chassis transplant" service for our older rebuilt CD players. We will move your existing Audio by Van Alstine circuit set to a new Magnavox 582 or 610 chassis for \$250.00 including furnishing the new machine! Our high grade circuits are good for years of musical operation and they most likely can economically be transplanted into a more modern Magnavox chassis

if the need arises. Remember this \$250 transplant fee includes the cost of the new CD player too! You might find it a desirable upgrade path if repairs on an older machine are necessary.

Finally, getting back to service contracts in general, we would suggest that they are not a good buy because statistically you are unlikely to get repairs under the terms of the contract equal or greater to the amount the contract cost you. The "peace of mind" the salesperson tries to sell you is really his peace of mind for making a higher commission. Of course if you are one of the few unlucky ones needing expensive out of warranty repairs then you may be really happy you bought that service contract. But, in general, unless your purchase has too short a warranty or is a complex mechanical device, you probably would be better off spending your service contract funds on lottery tickets or simply saving them for that rainy day. Your manufacturer's warranty should really take care of any real parts and workmanship defects.

One further thought – by offering a service contract to extend warranty coverage, the manufacturer effectively has provided himself with the capability to give you a, "we told you so!" response if your equipment does decide to die just after the terms of the original warranty. They can now simply say, "if you wanted longer warranty coverage why didn't you pay for it?" rather than consider the specific conditions of your equipment problem. The service contract can be useful to the manufacturer even if you do not buy it. Think about it!

### **An Unanswered Letter to *The Absolute Sound***

November 2, 1989

Frank Doris

Technical Director

The Absolute Sound

P.O. Box 115

Sea Cliff, NY 11579

Dear Mr. Doris:

Nearly a year ago (on December 13, 1988), at your request, I rebuilt a Dynaco St-120 amplifier for you at no charge and sent it to your Steve Stone for review in *The Absolute Sound*.

Mr. Stone called me about the amplifier a couple of months later, most enthusiastic about its performance. He was impressed with its electrostatic speaker driving ability - he seemed to think it was the best solid state amp he had heard on Quads - and its durability (it survived accidents that sent other associated equipment

back for major repairs to their manufacturers). We have been looking forward to seeing his comments in print.

Six months later (in late June, 1989) your Shari called to inform me you needed photographs of the amplifier within two weeks and that a manuscript of the review would be sent to me "very soon."

We had the requested photographs sent to you by Tom Krehbiel of World Communications Syndicate, Buffalo, New York. Mr. Krehbiel (who has favorably reviewed the amplifier for his column in *The Buffalo News*) wrote to us and confirmed he had done us the kind favor of taking pictures of his sample of the amplifier and had indeed sent the necessary prints on to you at that time.

Now nearly another half-year has gone by and we have heard nothing further about the amplifier review.

I am concerned as to what has happened? Do your readers (and do we) deserve these delays? Please advise us about what is going on.

Sincerely,

Frank Van Alstine

*[This letter needs only one comment added for you Audio Basics readers now and that is perhaps you can feel my frustrations at trying to get our products reviewed. The only publication that has given us timely reviews – for better or for worse – usually for better – has been the Sensible Sound and even they are months late in their publication schedule now. But at least they respond to my letters].*

**Instigating an AVA Used Equipment Brokerage Service!**

One of my readers recently made the good suggestion that since our newsletter goes mainly to people who are interested in what we have to say and in AVA products, that it would be the ideal vehicle to let people know about the availability of used AVA equipment at advantageous prices.

We have also been thinking this idea over, because good used AVA equipment might be the best way for some of you to get into high end audio at a entry level price.

We have also observed that since it is so difficult to get our equipment reviewed and because the costs of heavy national advertising are not built in, not as many "uninitiated" audiophiles know about our equipment as should be the case. Thus, sometimes great values in our used equipment go begging in publications such as *Audiomart* simply because their readers don't know what our equipment is.

Finally, because we are a direct-mail custom manufacturer, we have not been able to handle trade-ins effectively. We don't have (or want)

heavy "walk-in" traffic and our general catalog buyers are looking almost exclusively for new equipment.

But, we can accommodate more of you in *Audio Basics* (and make *Audio Basics* more valuable to you) by adding an additional page as a used AVA equipment section based upon the following observations and restrictions.

The purpose of this brokerage service is to benefit both *Audio Basics* subscribers and Audio by Van Alstine three ways: First by offering readers guaranteed good value used AVA equipment at much lower than new prices. Secondly, by providing a safe and effective "trade-in" capability for *Audio Basics* subscribers who want to trade in old AVA equipment for our newer models. Thirdly, by allowing us to make sales we would otherwise lose because a trade-in of old equipment was a prerequisite to making the new sale.

To satisfy these constraints this service will exist only for those *Audio Basics* subscribers wanting to trade their existing AVA equipment towards the purchase of new AVA equipment from us. The used equipment must be sent to us for our inspection and evaluation. We will then suggest a fair used price for it (typically about 60% of new for newer equipment and 30% to 50% for older models, depending upon age and condition). If our suggested price is agreed to by the owner, we will then list the equipment in *Audio Basics* at the agreed upon price. We will guarantee to prospective buyers that the description of the equipment is accurate, we will clean the controls and switches as possible to put the equipment in good working order, we will clean up faceplates and knobs as necessary and possible, we will even make minor necessary repairs at no labor cost to the seller (parts will be charged for as necessary).

When the equipment sells (the buyer pays us directly) we will pack and ship to the buyer and offer the same 30 day satisfaction guarantee as with our new equipment (subject to the same 15% restocking charge). We will also provide a 90 day limited parts and labor warranty or transfer the balance of the original AVA warranty to the new owner, whichever is longer.

When the 30 day satisfaction return period has passed, we will credit the seller with 95% of the sale price toward the purchase from us of new AVA made equipment. No cash disbursements will be made other than as reimbursement against sales paid for in full in anticipation of our sale of the used equipment. We will keep 5% of the used equipment sale price as a reasonable fee to cover our overheads.

Essentially what we are saying is if you must sell some used AVA equipment in order to buy new AVA equipment from us, we will sell the equipment for you, provide the prospective

buyer a better warranty than you can, reach a market you cannot, and charge you just 5% for our service.

Obviously, you are not going to get your new equipment as fast as if you simply pay for it outright (we won't deliver until your old equipment is sold and paid for), but with a bit a patience, this service can be of real value to both buyers and sellers.

Prospective buyers, this is your way of getting outstanding AVA audio components at a much lower price than new, with little risk because of the satisfaction guarantee, and with an AVA warranty.

If the equipment does not sell within a reasonable time (perhaps 60 days) then the seller will have the option of either lowering the price or having it returned to him for only the return shipping costs.

If we cannot sell the equipment at a fair price then we will not charge the owner for our listing, testing, and clean up service for that equipment. Fair enough?

**CALL US FIRST AT 612 890-3517 BEFORE SENDING USED EQUIPMENT HERE FOR OUR LISTING!**

We need to discuss the equipment with you, find out what you will be buying, suggest what the pricing should be, and make sure you have equipment suitable for our service. Send us your used equipment only after obtaining written authorization from us. We will start this process right now. Call us immediately if you have equipment that should go in the December 1989 issue of *Audio Basics*.

We have some details to work out here, but lets see if we can use this service to make *Audio Basics* of more value to you than ever.

**So if your Label Says "8912" Get Your Renewal in Now!**

We have many interesting things for you ahead in *Audio Basics*, including a thorough discussion of how to get true high fidelity stereo audio for your video system (not just more channels of mid-fi surround sound), a complete do-it-yourself upgrade procedure for the old Dyna FM-3 vacuum tube tuner, reviews of some interesting new products, and an easy upgrade for the Swan Four speaker electronic crossover.

Remember AVA gift certificates are available for both *Audio Basics* subscriptions and towards anything we make or sell. Call us soon for Christmas time service.

*Frank Van Alstine*

## We Write *Stereophile* Again Because We were Wrong about the B&W Matrix 801!

December 15, 1989

Richard Lehnert, Assistant Editor, *Stereophile*,  
Dear Mr. Lehnert:

Regarding our letter to you dated November 7, 1989 regarding the The B&W 801 Matrix crossover crosstalk problem described by Tom Lewitt in the October, 1989 letters column in *Stereophile* we must offer our apologies to Mr. Lewitt. He is correct in noting that a crossover crosstalk problem exists and we were in error in suggesting that the problem did not exist when an amplifier is connected to the undriven circuit.

Unfortunately, we based our observations on the crossover schematic published by B&W in their replacement parts manual for the speaker, while in fact the 801 Matrix Series 2 is not built exactly in accordance with that published schematic.

The speaker as actually manufactured has the wiring to the protect circuit LED relocated to keep the LED from flickering when activated, attaching this common wiring to a different point in the circuit than shown in the schematic. Mr. Lewitt is correct in his observation that reversing the polarity of two amplifiers driving the speaker in a bi-amp mode with the crossover "bi-wire" jumpers removed can blow the protection circuit zener diodes and that the wiring arrangement does cause some crosstalk between sections. The two jumper wires on the PC card near the terminal block should be removed. This will isolate the LED to the mid/hi section only, eliminating the crosstalk path. Both protect circuits will still work, but the LED will light only when the mid/hi circuit activates. Obviously two separate LEDs could be used if there was a good place to locate them.

However, most of the observed crosstalk is not through the protect circuits, but is magnetic coupling between two of the crossover inductors. The first inductor in the bass crossover (L6) is directly in line with and close to the last inductor (L5) in the mid-range crossover. At 200 Hz with an amp connected only to the woofer cross-over, a dummy 8 ohm load connected to the mid-range crossover, and the input to the midrange crossover shorted, the signal out of the undriven mid-range crossover equaled the signal out of the woofer crossover! You couldn't get much better coupling if the two coils had been wound on a common core!

There is an easy fix – remove the L5 coil from the PC card and relocate it in the corner of the enclosure bottom as far away from L6 as possible (and at right angles to L6). When we did

this to my pet 801 Matrix units the crosstalk dropped from 6 volts out of the mid-range section (with 6 volts into the woofer section) to 200 millivolts out – a 30 dB reduction!

Probably a more eloquent solution would be separate PC cards for each section of the crossover and magnetic shielding between the sections. I will be interested to see what Mr. Lewitt proposes.

Oh yes – then there is that other question – can one actually hear the difference relocating the L5 inductor makes? Yes you can! There is a difference in tonal balance obvious on both white noise and on music. Is the difference better? Well, I am not changing mine back to the old configuration. We suggest you try it too!

Attached are drawings showing the original 801 Matrix crossover schematic, the schematic as the speaker is actually built, and the schematic with our proposed "fixes." Also attached is a drawing showing the PC card parts location and the location of the fixes.

Finally, it is important that your readers should keep in mind that the 801 Matrix is a great speaker right out of the box without anything done to it at all. But we perfectionists are never satisfied and are always searching for ways to make audio components more faithful to the source. It is a complement to B&W that so many people are researching the 801 Matrix so carefully. A lesser speaker would simply be ignored.

Frank Van Alstine

**Dear readers, stay with us a bit while we show you the schematics and our layout "fix." Many readers are technically interested in the inside workings of audio devices and this is a good example of how simple things, like mis-locating parts, can make unsuspected sonic aberrations. Or – What is the crossover layout in your loudspeakers like?**

### **An Outstanding New Speaker, the Spectra 11 from Acoustat!**

No sooner did we get our B&W Matrix 801s working better than ever than another very pleasant surprise showed up here, the Acoustat Spectra 11. We first saw and heard these speakers at the CES show last June, but they are just now getting into full swing production.

At the CES show we thought these new Acoustat electrostatic speakers might be something very special (you can never be sure about what you are hearing at trade shows) and we were looking forward to evaluating production models in our own sound lab to see if they were as good as the show samples hinted they might be.

Well, lets not make you read further to get the news. Not only are the Spectra 11s much better than we expected (and we were expecting a lot), they are absolutely the best \$1000/pair loudspeakers we have yet had the pleasure of using! As I write this, the Spectra 11 speakers are playing chamber music (with our Fet-Valve tuner, Super Pas Three preamp, and a Super Seventy amplifier) and it is hard to concentrate on the writing – one wants to quit working and just listen. The mid-range musicality and definition is simply natural and compelling.

I have a real respect for Jim Strickland's Acoustat designs because from the first X model years ago they have always exhibited a sympathy to the spirit of the music. There may have been colorations and dynamic and impact limitations on some models, and sometimes the prices and sizes of the speakers got out of hand. But always they were musically listenable and capable of a lifesize sound stage – and they have always been ruggedly bulletproof – there is a lifetime guarantee on the electrostatic panels themselves and nobody ever breaks them. There have always been big and expensive Acoustats that have played almost all of the music with minimum flaws but with the Spectrum 11 I believe Strickland has outdone himself – these speakers probably do more things right and less things wrong than any Acoustat that has come before them, price not an object. Obviously they are going to be serious trouble for many other "high end" speaker builders. If you plan on spending \$2000 to \$4000 a pair for new loudspeakers, you had better listen to the \$1000 a pair Acoustat Spectra 11s first!

O.K. then for those who don't know, what is an Acoustat Spectra 11 and how does it sound and why does it sound that way?

The Acoustat Spectra 11 is a big (6' tall x 15" wide) electrostatic hybrid. The bottom 23" of the cabinet is 15" deep and contains the active electrostat interface elements and an 8" woofer. The top 4' is just 3" deep and contains the push-pull electrostatic mid-range – tweeter panel. There are no conventional tweeters or mid-range speakers. My samples are finished in black fabric and a durable artificial oak finish on the woofer cabinet. An attractive gray alternative is available.

An electrostatic speaker works by driving a large panel membrane between a pair of charged grids in front of and behind the membrane. The electrical forces harnessed are electrostatic, not magnetic. There are no magnets or voice coils. There is no significant current flow thru the panel and no heavy conductors are required – only a proprietary conductive carbon film – so the driven membrane can be very low mass. The panel is push-pull directly driven over its entire area from control grids both in front of

and behind the panel so the response remains linear over a wide dynamic range. The catch, of course is that very high voltages (about 5000 volts) are required to generate enough electrostatic attraction force for reasonable efficiency. Thus the electrostat is actively energized (it must be plugged into AC as well as to your amplifier) and the voltage output of your amplifier is stepped up to that needed by the speakers internal matching transformer.

Getting the step-up electronics right, the high voltage panel and grids reliable, and achieving good range and dynamics has been a formidable job for electrostatic speaker designers. Despite the allure of their virtues, many electrostat designs have ended up being very fragile or nearly impossible to drive or outrageously expensive and big (or all vices combined – after all some audiophiles think that the equipment has to be totally silly to be any good). So when The Spectra 11 comes along with 88 dB efficiency, an easy to drive 8 ohm impedance, an affordable price, good looks, and a size that, well while it tells your friends that you have got really exotic loudspeakers, so there!, is not all that impossible to fit in the room, it makes you wonder why it wasn't done sooner.

The Acoustat Spectra 11 is not a perfect loudspeaker, in fact it has one significant weakness – the quality and extension of the bass. From an absolute sense the woofer really does not reach deep enough (no solid foundation there) and the bass it does play is warmer than I like and a bit rubbery too. But anything else I can think of at \$1000 a pair or less has bass limitations too! However the midrange definition and musicality keeps up with anything at any price and only the acknowledged best dynamic speakers (such as the 801 Matrix) have a more extended (but not necessary a more musical) extreme top end. The Acoustat is remarkably enjoyable to listen to for the same reason a really good vacuum tube amplifier always is a treat even if it isn't completely accurate. These electrostatic speakers have an intangible quality that I really like and this is the lowest price I have ever seen for a planar speaker with this kind of musical charm.

Fortunately, there are two rational cures for the Spectra's bass. Note that the limitations here would not be as apparent if the mid-range and top end were not so nearly perfect.

The first fix is inexpensive, easy, and available right now. It is the B&W Acoustitune sub-woofer! This woofer fills in the deep bottom end without booming and the combination is synergistic – it seems to take all the rubber and boom out of Acoustats own woofer too – and I have no idea why, except to tell you that it works much better than I would have expected. The B&W Acoustitune sub-woofer turns the

Spectra 11 from a great \$1000 class speaker into a great \$2000 class speaker for only \$1345 list price total. No electronic crossover, woofer amplifier, or supplemental electronics are needed. Just run your speaker wires first to the Acoustitune and from there on to the pair of Spectra 11s and smile.

The second fix is supposed to be coming soon from Acoustat (a division of Rockford Corporation – who also makes Hafler products) and that is an upgraded version of the speaker, the Spectra 1100. It will sell for \$1500 and will have a real oak veneered woofer cabinet, a selectable high frequency adjustment, more color choices, bi-wire and bi-amp wiring capability, and according to Acoustat a better woofer design. I have not heard the upgraded version (due out the spring of 1990) so I cannot tell you if it will work better than the Spectra – B&W combination I like so much. There are also two much more expensive Spectra models coming, full range electrostatics priced at \$2250 and \$2600 per pair, but now we are getting back into the realm of expensive.

The size of the Spectra 11 and the nature of a bipolar loudspeaker may make them a poor choice for you. They are 6 feet tall and they are going to visually (and perhaps physically) dominate your listening room although they are certainly nicely styled.

If you are into the game of high-tech on-upsmanship, with Acoustats, you win, hands down! If however you want your system to be unobtrusive because you only want to hear the music and think that the size of big components is a distraction, you better look elsewhere. Of course if you close your eyes the Spectra 11s do musically vanish – another characteristic of an exceptional speaker system.

The Spectras make demands of your room you may not be expecting. Because they are bipolar there is as much midrange and high frequency output to the rear as there is to the front. Thus the speaker is more sensitive to room location (and room acoustics) than are many conventional speakers. In general a location with a hard, reflective wall close behind the speaker will reinforce the highs and mids in unfortunate ways. The sound will get much hotter than it should and the sound stage will scrunch. Room reflections (except those that are a part of the performance) are never correct, so the speaker is best used in a reasonably large room several feet away from the nearest wall. They are easy to move, so we suggest you stuff them back out of the way for background music and move them out and give them some “breathing space” for serious listening. Also (although to a lesser extent than other planar speakers) the speakers do have a “sweet spot” – a seated listening area centered to the pair that gives a

better sense of reality than off axis. So when your friend standing to the side does not share your enthusiasm for the Spectras, trade listening places with him and you will trade sonic vistas too. It would be nice if the best of the Spectras musical capability could be more widely shared in your listening room.

Unlike most other electrostatics the Spectra 11 is not a power sink (my 25 watt per channel Super Seventy works just fine) and is not an impossible load – but certainly don't hook it up to a harsh sounding receiver if you want your fillings to stay in place. You will certainly find out that garbage into a Spectra gives garbage out. Because all AVA amplifiers are absolutely stable into capacitive loads, and because the step-up transformer of the electrostat makes the load look like a pretty mean capacitor, it should not be surprising that AVA amplifiers have a musical advantage driving Spectras. In fact, our evaluation of the speaker may be more favorable than some simply because our electronics interface with the speaker better.

But, enough! What more can we say? We advise you again to listen to the Spectra 11 before you buy a new speaker system.

### **So How Does Spectra 11 Fit Into the B&W Scheme of Things?**

Just Fine! In fact the Spectra 11 fills a hole in our recommendations of the B&W product line perfectly. The lower priced 500 series B&W products are in a class by themselves. The 550 and 560 are great small room speakers at low prices (and work musically in big rooms too, especially with the Acoustitune added).

The 801 Matrix remains the champion and the Matrix Three Series Two still comes close at half the price and the CM-2 Mini-tower still provides the most music from the most charming and unobtrusive package.

The Spectra certainly poaches into Matrix One and Matrix Two territory and some DM580 prospects will want to make comparisons too. But usually the buyer of the more robust sounding dynamic speaker will not be an immediate prospect for an electrostatic – it is a bit of an acquired taste. However, once you learn to love an electrostatic, its hard to forget them and I have loved them since the first Koss panels of years ago. Did you know that B&W's first super-speaker, the DM70, was an electrostatic hybrid? Although few were ever imported (they came and went before a real B&W distributor was established in North America two decades ago) they remain a legend. No, I never heard one.

### **Speaking of B&W, How About This for a Real Special Value!**

For a limited time, the combination of a pair of B&W DM550 loudspeakers and an Acoustitune Sub-woofer is available for \$595.00 total. Our

normal price (already a bargain) was \$675.00 for the set. The 550s are available in black ash or walnut vinyl, the Acoustitone in black ash vinyl only. I cannot think of a better way to have great full range sound in a small room. Call us about this special now!

**I Did Hear From *The Absolute Sound*.**

That is the good news. Their technical editor sent me a thoughtful note telling me that the review of the Mos-Fet 120D amplifier is still on but that it got bumped a couple of times in the greater scheme of things and for some rewriting work. I have not seen a preprint.

It should break sometime late winter and the hints are that I won't be unhappy. *[1990 Note: Another year has gone by and no review has been published and recent letters have gone unanswered again. I am getting tired of this!]*

*Frank and Darlene Van Alstine*