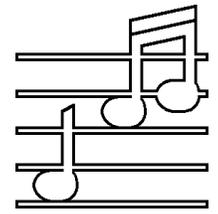


AUDIO BASICS



The Complete 1985 Back Issue Set.

VOLUME FOUR NUMBER ONE JANUARY, 1985

Here we go folks on year number four – 37 issues so far without a miss – is this some kind of record (for an “underground” audio publication)? Boy have we been busy processing renewals. Thank you, you have made our “batting average” very good this year.

This is kind of a potpourri month starting with a letter that falls into the “that is what we suspected” category.

The following is a letter I just received from a person who writes for *The Absolute Sound* upon occasion. I sent him a SUPER-PAS preamplifier to evaluate this fall. His reply, upon returning the preamp to me last week was, “Dear Frank, Thank you for the loan of the Super-PAS preamplifier. It proved to be sweeter and more tonally authentic to the natural timber of the violin and for that matter all string instruments in particular. But how do I say this in an article for *The Absolute Sound* that a \$250.00 pre-amp is more tonally accurate than an \$1800.00 pre-amp? I can hear the critics already, “Now you know (——) is crazy, a jerk, stupid, and all the other empty headed expressions.” I appreciate the loan.” For your information, dear readers, the \$1800 preamps he had were ARC and Conrad-Johnson equipment. And, of course that SUPER-PAS will not be reviewed in *The Absolute Sound*, it doesn’t cost enough to be any good.

Along the same line, I should point out that *Stereophile* has been camping on another SUPER-PAS sample for a year now (since February, 1984). Although they have not had time to review it, they have had time to write me three times requesting that I advertise in *Stereophile*. I will not, as there is no way for a magazine to avoid a conflict of interest if part of their income is coming from the makers of the products they review and I will not help support that (that is the reason I accept no advertising in *Audio Basics*). (You are going to have to think about this one for a bit!) Anyway, I wonder if the preamp review has not appeared because my advertising dollars have not appeared?

Anyway, that brings up the name of one more “underground” magazine that is the only one I think is really worth the subscription price, and that is *The Sensible Sound*, 403 Darwin Drive,

Snyder, New York 14226. A subscription is \$18.00 for four quarterly (really) issues and each 50+ page issue is packed full of useful information, reviews of rationally priced equipment, tidbits, some honest thought, record reviews, and data not available elsewhere. They have reviewed some of our equipment (most favorably, some unfavorably) and I don’t agree with all of their judgements (especially so-so reviews of our equipment – obviously they have got to be deaf in that respect – just kidding, Karl!). Anyway, tell them we recommended them when you subscribe and do subscribe if you can afford to, they are worth the money.

Here is another letter from a reader I think you will enjoy.

“Dear Frank, Good Lord, I almost forgot! I’m in a cold sweat, racked with chills, peering with blurred vision at the keyboard as I struggle to write these words that will insure my survival. Please, please, please renew my subscription to Audio Basics before I sink back into the cesspool of audio ignorance. I have included the paltry sum of \$16.00 hoping that you will grace me with yet another year of enlightenment.

“In case someone asks for an unsolicited impression, the Texas Instruments preamp retrofit does everything you claim and more. The bass has added richness and power, the dynamics are more so, and I swear that with a good recording the highs are so clear that you can hear the resonance of the drumstick itself as it strikes the cymbal. Yes, I like it and think it worth the money.”

Thank you, Mr. Price.

FINALLY! The B&W TWEETER UPGRADE KIT IS AVAILABLE. The upgrade kit for the 801/802 is \$223.75 per pair and the upgrade kit for the DM7/II and DM17 is \$213.27 per pair. The kit consists of two new TZS-80 tweeters premounted in new enclosures, complete with grills and mounting hardware. The installation is easy. You must remove the midrange driver to access the tweeter holddown screw, remove this, unplug the electrical connection, lift off the old tweeter assembly, and reverse the process to install the new complete tweeter assemblies. We do not have them in stock here, but have rapid access to them and our price of course includes shipping to you. You may order them from us now, or from your local

B&W dealer. The upgrade is definitely worth the money.

Cartridge set up addendum. Some of my readers have scolded me for suggesting that anti-skate can be set up using a blank record disc. They inform me that a more accurate set up can be done using a special test record and a dual trace oscilloscope to actually measure tracking distortion on each channel and set the anti-skate to get each channel equal. Correct! Of course! However, I didn’t really think that one of the recommended tools you must have to adjust a phono cartridge is an oscilloscope (especially when the test instrument costs much more than your record player). We simply want you to get the anti-skate “in the ballpark” by using a rather easy and low cost method of evaluation (blank disc). Our object was to get the anti-skate out of the hopelessly out to lunch mis-adjustment we see so often and at least usefully close. Obviously, if you have access to test instruments, you can get a tighter adjustment and better playback quality yet and of course do it that way. We were not suggesting that our quick and dirty method was best, only that it is useful if you don’t have test instruments.

Listening to the cartridge to hear VTA adjustments (forgot to include this last month). Simply, if the VTA is too high (arm points downhill too much) the sound will get thin, bright, and hard sounding. If the VTA is too low the sound will get muddy and boomy. When you get it right, it sounds “right.” Very small changes can make substantial sonic differences and you can go crazy trying to get it right (for that particular record) but it is something to think about if your turntable simply is not sounding very musical that you may be able to “fix” with a shim under the cartridge.

A year ago I told you about the Fluke 75 series multimeters, new digital meters that I suggested any serious audiophile should own to help keep his audio system, and everything else around that is electrical, running well. I reported that the Fluke 75 was a giant step forward in quality, durability, accuracy, and ease of use in hand held test instruments.

Well folks, Fluke has done it again! Setting here beside my old IBM electronic typewriter is the new Fluke 27 multimeter. Nobody else has “caught up” to the Fluke 75 yet, and with

the just announced Model 27, Fluke has simply buried their competitors.

The Fluke 27 is a bigger, more accurate, more durable (you are supposed to be able to bounce it off concrete although we are not going to try it) Version of the 75. It of course measures current, voltage (AC and DC), and resistance to .1% accuracy over a wide range of values. It is auto polarity and auto ranging. It has special functions to measure continuity and diode junctions in circuit. However, what is really neat are some new functions such as MIN/MAX. This function stores the highest and lowest reading made while the meter is connected to the circuit and allows you to display those readings later. Boy is this useful in troubleshooting, especially if you are dealing with a fleeting "glitch." If you have a component with an intermittent, simply leave it on overnight with the Fluke 27 connected to the suspected trouble spot, and if the equipment "hiccups" the Fluke will catch it in the act and store the readings for your later use. No need to spend hours watching the meter for an odd reading, the Fluke does it all by itself. This function can also be used to store the greatest change in readings too.

The HOLD function allows audio technicians to get by without three hands and an extra eye in the side of their head. You can concentrate on getting the probe into the right place in the circuit (without slipping and causing more damage than you are trying to cure) without having to watch the meter reading at the same time. The reading is held for you to look at after you remove the probe.

Fluke has thought of everything. The 75 series immediately became very popular for outdoor use but a few got dropped into the weeds and the gray case was hard to see so a few telephone linemen and others did have a problem with the Fluke – they lost it! With the 27 series, that problem is cured too, you can get it in a bright yellow case color as a no charge option. You will have trouble losing this baby. The price is \$259 (for quality and functions you could not have acquired for \$1000 two years ago) and the unit has a two year warranty (unheard of for test equipment). You can get one through Gopher Electronics, 222 E. Little Canada Road, St. Paul, Minn. 55117 phone 612 483-3322 (ask for Cathy).

We understand that Monster Cable is now offering interconnect cables for computers! Great! I assume they will make the computers run faster, eliminate entry and program errors and bugs, and make the computer sound better (especially when playing with music programs). Gee, when will progress ever stop?

Wanted! (Reward – One Free Longhorn

Grado Cartridge) The Load for one week of a B&K 140 Amplifier.

We will give a Longhorn Grado to the first reader that can supply us with a B&K 140 amplifier for a one week loan. We need this amplifier as soon as possible and they are not available in our market territory. It will be returned very promptly in the same condition as received. Help us out here if you possibly can.

Record care.

This is a topic readers keep asking me about. They are really asking the wrong person as I take horrible care of my records. I do own and use (once in a while when the debris on the record gets so thick that I can no longer read the label or cram the record back into the jacket) a Keith Monks record cleaning machine (kind of the Locomobile of record cleaning products – built like a World War I tank and nearly as heavy – and expensive). I had met Keith Monks (reminds me much of "M" in the James Bond movies) several times at trade shows and he knew I was kind of an audio "expert." Thus at the first trade show after I had acquired the Keith Monks record cleaner, I ran across Keith again, conversing with a group of magazine writers.

Mr. Monks spotted me and waved me over saying, "Frank, good to see you again. What do you think of the record cleaning machine we just sold you?" It was the wrong question to ask me just then and I couldn't help myself. I answered, as all the writers gathered around, "Well Keith, I am not too happy with it. It has got lots of rumble, the speed accuracy isn't too hot, the arm geometry is all wrong, its really tough to mount a cartridge in it, and that single lousy little thread running up the arm only gives me mono performance." Needless to say, the writers were giving me very strange looks and Keith was looking a bit flustered (much like "M" after a call from Bond).

I then continued, "But then I got it figured out, its a record cleaning machine, not a record playing machine – your directions were not very clear." At that point the group broke up laughing and Keith looked even more flustered. I was "on a roll" and went on, "But darn it, Mr. Monks, I am still not satisfied with it (all this with a completely serious expression). It will not take off solder blobs, it doesn't remove cigarette burns, and it is just absolutely useless in dealing with footprints. It really does not work well for me at all." By this time Keith's mouth was hanging wide open, his cheeks red, and the rest of the group was rolling on the floor laughing. Finally, with a big "sputter," Keith (really a very nice and very British person) realized I was pulling his leg. (English audio designers just are not used to my brand of humor). I doubt if he will ever forget my on

the spot "product endorsement" and I am sure he warned other British manufacturers to beware of me. As I said earlier, I am the wrong person to ask about record care. However, I will talk a bit about the record cleaning products I have used.

The Keith Monks record cleaning machine is probably the best (if still available and if you don't mind shelling out \$1500+ for it – it was about \$800 when I got mine many years ago). This guy has a heavy turntable platter that holds the record, a brush on a swing arm that comes over the record and lowers (by hand), a hand pump to dump a mix of distilled water and methanol (50-50) on the record through the brush, and you run the brush saturated wet on the spinning record until all the lumps are dissolved. Then (the secret of the machine) you turn on the built in vacuum pump, swing the vacuum arm (looks a bit like a very ugly tonearm) over the label, and set it down on the still spinning record surface. The plastic nozzle is held off the record by the thickness of a thread that is pulled through the arm by the vacuum and reeled up inside the machine. The arm is slowly driven outward by another typically British mechanism sucking all the fluid off the record, including dissolved debris, leaving the record surface clean and dry and sounding clear and as tick and pop free as it is ever going to get again. It is a very clever machine. I have never used any of the newer, less expensive record cleaning machines (such as the Nitty-Gritty) and cannot give you an opinion about them. There is also some debate over what mix of solvents to use in the Keith Monks cleaner and all I can say is that I have used the brew mentioned above for many years now and have not noticed any damage at all caused by the solution (cleaned many times).

I can also endorse LAST. This two step cleaning kit (one vat of cleaner, another of preservative) seems to work well too and I have not seen any buildup of chemicals or damage to records cleaned with LAST. As with the Keith Monks, cleaned records sound better but the LAST is not quite as thorough as the 100 times as expensive Keith Monks. I am not so sure about LAST stylus cleaner though. The liquid may work its way up the cantilever and into the suspension and I suspect no stylus cleaning solvent is going to do the elastic components of the stylus suspension any long term good. I do not use liquids to clean stylus assemblies (except as a last resort for totally gummed up fuzz ball stylus tips).

I am not happy with the Discwasher cleaning system. I cannot seem to hold onto the damn brush reliably and I have had it slip out of my hand while using it, tumble across the record making big "skid marks" and whomp into the tonearm, breaking the cartridge stylus. After this happened the second time, I relegated the

awkward Discwasher brush to a less damaging (and also useful) task – shining shoes.

I have been told that the Discwasher anti-static ion gun can also put cheap digital watches to sleep (permanently) so be careful where you point that thing (certainly not at your Apple or floppies).

I occasionally use Gruv-Glide on badly worn old records to put them into playable condition (it removes the worst of the distortion), but since it contains a powerful solvent (toxic) I suspect it is removing a lot of the vinyl along with the ticks, pops, and harshness and do not use it on records in good condition. Let the record dry for at least a day after using this stuff or the stylus will pick up a lot of goo from the record which is difficult to remove from the stylus.

Watch out for “sticky” surfaced after-market turntable mats (Audioquest, Oracle, Fulton, etc). You must keep them very clean (take them off and wash them often) as the surface picks up dirt and grit and can permanently imbed it into the record surface when the record is placed on the mat. You may think you are doing a great job of keeping the top surface of the record clean, while the bottom surface is being destroyed. The after-market turntable mat we like best is the Tri-Pad, by Eon of Canada. Monster Cable did sell it, but I don't know who distributes it now. It is a light, thin, damped cork mat that works very well.

I normally use a Decca Brush before playing my records. It is a carbon-fiber brush with jillions of soft bristles that does a good job of dedusting the record before and after play (I use it to clean stylus tips too). It also tends to de-static the records if used properly.

I am not happy with any of the brushes built into cartridges as they act as additional stylus assemblies, picking up and coupling the record vibrations back into the cartridge and tone arm in the wrong places.

Actually, the best way to keep records clean and free of ticks and pops is to not get them dirty in the first place. The record should go from jacket, to turntable, played with dust cover down, and then back to the jacket with minimum exposure to airborne dust. Keep the turntable and stylus clean, and your records will play well for years.

Note that “taping your records” isn't an answer. The dubbed tape is of much poorer quality than the record, and the tape wears out faster than the record does! Master alignment tapes are only good for 4 - 6 passes across a tape recorder head before the highs drop off enough to make their pre-calibrated response worthless. That oxide dust building up on your tape heads and on the guides and pulleys contains a lot of the music – gone. Of course the

heads attempt (successfully) to de-magnetize the tape a little bit more with each play. So the noise builds up and the highs go away. You must demagnetize the tape recorder heads each time it is turned on if you want even mid-fi long term results. (The turn-on and turn-off transients of most tape recorders immediately magnetize the heads enough to take the machine out of specification.)

Finally, I have found a sure way of getting much better sonic quality from most modern hard rock records. You clamp the record into the disc sander attachment of a typical 1/4" electric drill. Turn drill on and press record surfaces against a large Brillo pad for approximately 30 seconds per side. This technique is guaranteed to remove all annoying noises from the rock record and if followed up by an application of a damp rag saturated with Comet sink cleaner the record will have on a much quieter, and much more musical, playback quality.

Frank Van Alstine

VOLUME FOUR NUMBER TWO FEBRUARY, 1985

I would like to call your attention to what is new and why there is a pricing change on some products.

The MOS-FET 150B amplifier using a new Hafler DH-120 power amplifier chassis is new.

We just finished the tooling of our PC cards for this application. I am very pleased with this product. It is a higher powered version of the MOS-FET 150B with a better layout, and with useful extra functions. It is a cute little thing, a 2/3 scale sized version of the Hafler 220 layout with huge heatsinks and a big power transformer (+ and - 55 volt DC power supply). We are building it just like our MOS-FET 200B (which had a very favorable review in the last issue of *Sensible Sound*). Actually, we use the same set of ground plane output cards the same power supply PC card as in the MOS-FET 200B. We tooled new audio cards. The circuit is a higher voltage version of the MOS-FET 150B circuits designed especially for this application. The amp is super sounding. We get the smoothness and definition we have always had in the MOS-FET 150B but with better dynamics and better deep bass. It drives inefficient loudspeakers better too. I think we could call it a MOS-FET 150B that is more useful to more people in more audio applications. We retain three Hafler features that improve its utility.

1. It has input level controls for each channel. This is useful in a bi-amped application as you can adjust the level of the amplifier to

match your other amplifier. You can also use this amp with a digital disc player without need for a preamp at all – just use the level control on the MOS-FET 150B to adjust system gain. (Note that the controls, as supplied, have screwdriver slot adjustment – but it is easy to add a couple of Radio Shack knobs to the shafts for more convenient use.)

2. There are two sets of speaker terminals making it easy to hook up two sets of loudspeakers.
3. The Hafler ambiance decoding system (passive and switchable) is built in. You can, if you choose, get a pretty nice “four channel” effect for no extra cost other than the addition of a set of rear speakers. The original Hafler DH-120 also has a “bridged mono” switch that we do not use (provides louder, but poorer quality performance in all “bridged” amplifiers - not our idea of a way to get better sound).

The Transcendence Preamp and Super-Fet preamps are now available in the new Hafler DH-100 preamplifier chassis.

This was a tough project for us as the original design was an “everything including switches, jacks, circuits, transformer, and the kitchen sink on one big PC card.” Although the original DH-100 is a nice little inexpensive “starter system” preamplifier, we knew our clients would want much higher quality controls and jacks and a much better quality “feel.” Thus we could not reuse much of the original internal hardware which was designed only for a “mother board” application. Thus we designed three new PC cards especially for this application. The back panel ground plane replaces the original Hafler jacks and carries twelve new Switchcraft input and output jacks in a much stronger mechanical layout. The new double sided selector switch card provides excellent input isolation and termination. We also designed a new power supply card which isolates the transformer, our 20,000 µF raw supply, and the AC wiring from the rest of the circuit. Finally, we use a 4" x 10" metal ground plane installed in the bottom of the chassis, to which all grounds are attached, eliminating all of the ground return wiring. Depending on the application, our Super-FET phono and line cards or Transcendence phono and line-tone control cards are installed (four more independent circuit boards in each application). With our Transcendence circuits, and a few days of computer assisted engineering, we were able to set our tone control circuits so that we could interface with the Hafler tone control pots and provide very useful tone control action that is completely switched out of circuit when the controls are in their centered (detent) position. With the lower cost Super-Fet, we do not use the tone controls at all – a straight line preamp

is the best choice for this application. Both units get our precision stepped Noble volume and balance controls. It was a lot of work, but we have achieved two new preamps that sound, as always, like music, that have a fine quality feel and function, and are less expensive than the same circuits in the (still available) PAT-5 chassis. In addition, they match the styling of the Hafler based amplifiers we use (both the DH-220 and the new DH-120).

We now have a stock Hafler franchise and will be happy to provide you with new stock Hafler equipment, either as kits or wired. In general, we will charge you the old (before November, 1984) price for unassembled kits (including shipping to you in the continental U.S.A.) and charge you the new (about \$50 per unit higher) kit price for assembled units. If you order assembled units, you will get units custom assembled by us to stock Hafler specifications, but with a nicer than "assembly line" layout. Call us for prices and availability.

You will notice what appears to be a higher price for some of our products in this catalogue (those with an * after the price). Not really. What has happened is that the percentage of "basket cases" sent to us is going way up as the original Dyna units get older. We are seeing more units so old that they have major mechanical problems. We are getting more units that nobody else can fix (most shops have never seen a Dyna amp or preamp). We are getting units wired so badly that it looks like they have been done with an eggbeater, a crowbar, and a blowtorch. Recently I spent an entire extra day on the bench stripping out and rewiring the insides of a PAS and a Hafler DH-101 just to put them into a useful condition for our circuit sets. The owners of these trashpaks should have paid more for our extra services, but we don't want to charge everybody more because many of you send us nice tidy equipment that requires no interconnect rewiring at all. Thus, the "rebate" policy. If you send us a unit that requires no extra bench time to repair original mistakes or sloppy workmanship, you will, after the rebate, pay less than our last catalog price for your rebuild. If your unit is a mess, you will pay more, but when you look inside and see our efforts in your behalf, you will realize you got your money's worth too. We think you will prefer this method of having only those with bad equipment pay for our increased costs rather than making everyone pay more to subsidize those with trashpaks.

We spent a lot of time trying to get a Sony Biotracer electronic tone arm to work well last month. This is an electronically controlled tone arm. It senses cartridge motion and adjusts tracking pressure, anti skate, and other parameters to, in theory, make up for the forces of record warp, lateral irregularities, and other outside motions. It is not very difficult to set up, accepts a wide range of cartridges, and

does track very well indeed. However, it just doesn't sound very convincing. Everything kind of mumbles along, without an enthusiastic representation of life like dynamic range and stability we are now used to and demand. It kind of makes you want to buy a digital disc player!

I thought about this for some time and finally realized what is happening. It is the "automatic transmission" effect. The kind of device that makes life easy for you, but eliminates that final sense of "feel" and "control" that makes the difference between simply using a device as an appliance and having the human enjoyment of precise feedback and control through using the device as an extension of human abilities. I suspect this kind of convenience versus real usability trade-off is being made all the time, with all kinds of devices, and I wonder if it isn't leading many people to an overall "convenient" but rather sterile and non-useful life in general? Think about it. Do you want to be pampered by a machine and do nothing useful yourself, or would you rather use the machine to have a better control over your environment?

So the Biotracer, which cannot tell the intent or source of the vibration, removes everything it can from the record too, along with outside disturbances, leaving you undisturbed by outside vibrations, and undisturbed by the remaining "canned" sounding music too.

This thought has a lot of implications that need to be discussed. For example, just what is your audio system supposed to be doing for you anyway? And, what can it not do for you?

Your audio system is, simply, a Xerox machine!

It is supposed to be engineered just like a copy machine. With the same results as a good copy machine – to output a clear and undistorted copy of the input data dumped into it. How unromantic! How non-emotional! Gee, that is not any fun at all! But, come to think of it, how easy it is to set good, objective, definable goals for the design of our audio Xerox machine – we want to engineer a machine that doesn't make bad, blurred, distorted, mangled, or "off-color" copies. We want it to work reliably, be easy to use and repair, and we want it to not destroy the source material in the course of making copies. We want it to be mechanically stable to avoid "blurred" copies. We want clear and undistorted electronic "lenses" that do not go "out of focus" and do not need constant adjustment each time a new copy is to be made. We also understand, that assuming the original is in good condition, we do not and cannot have a better copy than the original. Explain please, what is "better" than the original?

Of course, if your original is dirty, torn, faded, and wrinkled, it would certainly be nice to have a copy machine that could reconstruct a

copy that did not have this wear and tear. However, we still would not be looking for a copy that was better than the original, just a copy that was equal to the original, when the original was new.

This presents a problem. Our copy machine does not know what the original "looked like" or sounded like when it was new. We have not invented "artificial intelligence" machines yet. (My definition of a true artificial intelligence computer system is one that will really know what we mean when we tell it – "ya know what I mean?" – one that will do what we want it to do, rather than exactly what we tell it to do!). However, we can fix things a bit. We can program our copy machine that if it sees a dirty gray original, to ignore the dirty gray and make the copy on a pure white background. Good idea? Not when you try to make a copy of that famous landscape painting with the overcast, dirty gray sky. You always wanted a pure white sky in your copy, didn't you? You did not? Tough, you are going to get what your copy machine is programmed to do, with all the changes it is programmed to make, whether you like the results at all. Go ahead, tell your copy machine that, "ya know, ah – gee – only change gray to white when it is supposed to be white – ah – but leave the gray alone when it is supposed to be gray – ya know what I mean!". (Or likewise – tell your audio system to "take out the noise but leave only the sound - ya know what I mean.")

Sorry folks, your audio system and all signal processing units, noise reducing units, fake mplx units, variable Q front ends, expanders, compressors, trashpackers, etc. connected thereto DO NOT KNOW WHAT YOU MEAN! They cannot read music! They have not evaluated the score. They do not understand the intent of the composer. They cannot follow the interpretation of the conductor. They cannot judge the talent of the musicians. They are unaware of the experience and judgement of the recording engineers. If you think you can tell your audio system to give you a copy that is just like the original was before it became worn, noisy, screwed up by bad recording engineering, and diddled by distortions in the playback process, you have got another thing coming. You are trying to buy an artificial intelligence machine that does not exist! Sure, there are lots of people that will try and sell you one. There are lots of strange devices out there designed to do something to the sound. I don't want one, I don't want a machine to do something to my music. I want my audio equipment to not screw up the sound at all.

Thus, I sometimes get people unhappy when they call me and start off with, "uh – what I really like and want is tube sound." I respond with, "I am sure sorry to hear that, because then we cannot be of service to you. We like music sound and design our equipment to that end."

They often retort, "Oh, what I mean is that I like warm, golden, concert hall sound." I reply, "So do I, when, and only when, the performance is given in a warm, golden, concert hall." I further point out that, "you have got a problem when the music was a marching band passing by the review stand outdoors, don't you? How do you turn that golden, warm, concert hall off when it didn't exist in the music?" (How do you tell your copy machine "ya know what I mean?").

Herein lies the fundamental philosophical problem in the evaluation of audio equipment:

IT IS BEING DESIGNED AND EVALUATED AS IF THE EQUIPMENT, IN AND OF ITSELF WAS THE WORK OF ART. IT IS NOT. THE WORK OF ART IS THE MUSIC SOURCE ITSELF, ITS COMPOSITION, DIRECTION, AND PERFORMANCE. THE ACCURATE CAPTURE OF THAT WORK OF ART AND ITS SUBSEQUENT PLAYBACK IS MERELY THE JOB OF A COPY MACHINE.

This fundamental observation can help you to make much better choices in your purchase of audio playback equipment. Keep it in mind when you shop. For example:

When McIntosh tells in their advertising for their big loudspeaker systems that they have selected "really good sounding" woods for the cabinet, BEWARE! They are telling you they are selling a loudspeaker designed to make its own music, not reproduce music. Loudspeakers cannot make music! They cannot follow the score! The wood cabinet can only "sound good" if it makes sounds! Sorry, if the wood "makes sounds" as McIntosh claims, then the ad really tells you "we make speakers who's cabinets vibrate and resonate a lot." We do not want the cabinet to resonate and make sounds, no matter how pleasing. We only want the loudspeaker system to translate into acoustical output, the electrical signal at its input. The only parts that should vibrate are the driven speaker elements themselves. All cabinet resonances are uncontrolled spurious resonances and indicate poor design and lots of strange colorations added to the proper sonic output.

B&W did not make a concrete midrange enclosure for the 801 system to get a "good sounding" cabinet. They did it to get a "non-sounding" cabinet! Think about it!

How about a dynamic expander? Sure, all you have to do is explain to the machine that sometimes, in the recording process,

due to limitations in the dynamic range of the real world equipment used, that compression circuits are used to lop off and scrunch down all signals exceeding a predetermined level to keep from overloading the recording machines. Now, machine, follow along with the output signal, and every time you notice that a crescendo is not being played back with the level the score calls for, whomp things up a bit. Of course you will need a telephone line built in too, so your expander can call the recording engineer and find out exactly how much compression was used, and under what conditions, so that the expansion transfer characteristics exactly mirror image the compression characteristics. If the curves don't match, your machine will be only a dynamic distorter. It will certainly sound different, but not better.

Any time we discuss these principles, we get lots of calls and letters saying, in effect, "but I like the results, I like my tube amp, I like my sub-woofer, it sounds just great to me, therefore it must be good equipment." Yes, you do have the right to like whatever you want to like. (Some people like being whipped and tortured). However, you must keep in mind that what you like is not music. We suspect you might like music even better.

Now for the last thought for this issue, the problems with subjective evaluation of audio systems.

The audio critic who endeavors to write a long, glowing (or damning) report on the perceived quality of an audio component, is in effect, attempting to describe the quality of the copy machine, based only on an evaluation of the copy it puts out, without having the original available for comparison. It is kind of hard to say, "this copy has the wrong shade of blue," when you don't know what shade of blue the artist used. Even if the critic has twenty different copy machines, and picks from the twenty different copies the one he "likes" best, he still has no data to claim that the machine making the copy he likes best is the "best copy machine." Without access to the original (direct comparison to that particular live musical performance) he cannot really tell if the copy he likes best is, in fact, closest to the original, or if it just happens to have been distorted in some pleasant way.

Certainly the expert critic does have some "tools" available to make a better judgement than a complete novice to the field. For example, an expert, familiar with the style and techniques and the pigments available to some certain famous painter could easily pick out bad copies who's color balance is not even close to his recollection of the artist's techniques. A novice, not previously exposed to

that artist at all, would have much more trouble deciding whether the shade of blue in the copy's sky was close to the artist's typical work. Likewise, those of us exposed to enough live, acoustical (not amplified) music have a reasonable recollection of what a good piano, violin, or trombone sounds like. We certainly can reject the output of an audio system that doesn't even come close to a convincing reproduction of "live." Sorry, lots of exposure to P.A. equipment does not help – you have no live reference, only the distortions of random "professional" sound reinforcement equipment thrashing around. (The "electronic original" is already a copy that has been run through a very distorted copy machine).

Thus, you can help yourself a lot to pick better audio equipment (at least to be able to reject the trash with certainty) if you will expose yourself often to live musical performances. Surely you have at least local high school band performances to attend. The playing techniques may not be fully developed, but you can certainly concentrate on what the sounds of the instruments are supposed to be. (Forget the "sound" of that awful old detuned upright piano being hammered on by the assistant music teacher accompanying the Jr. Hi. chorus – a piano does not sound like that at all!)

The fine photographic lens designer uses many sophisticated, and completely objective tests to determine the accuracy and trueness to life of the new lens he is producing. Test patterns and color charts can be "copied" and the output of the lens can be compared with the original. Likewise, in audio, careful comparison of test signals with the system's output can direct us towards designing better audio equipment. There still remains a problem with this approach. Our test patterns still do not have enough resolution to allow us to find all differences between input and output. Most are so crude (IHF tests, for example) that they only show up a few gross flaws. As if a lens was tested only on a black and white cross-hatch, and was rated "wonderful" if it reproduced the pattern accurately, even though the pink background came out orange in the copy. (ah – we were not testing for color – ah – we were not testing for transient distortion.)

To produce audio equipment that is an undistorted copy machine, we must test the equipment for, and correct all its problems, under all conditions, not just some of its problems under some conditions.

We are working on it.

Frank Van Alstine

VOLUME FOUR NUMBER THREE MARCH, 1985

Well folks, the old IBM 75 electronic typewriter finally gave up the ghost a couple of weeks ago and I have been out shopping for a replacement. My shopping adventures for a modern "hi-tech" product could just as well have been for audio components (we are dealing with essentially the same kind of salesmen and "selling" techniques) so I thought a report on my "shopping expeditions" and my observations into current marketing practices might be useful to you.

My first thought was simply to add a letter quality printer to our HP9000 engineering computer. However, this machine is being tied up for audio circuit analysis work nearly 100% of the time right now (and probably for the next year too). In addition, for the cost of a quality printer and interface card, I could buy a useful separate little computer just for my text editing work that would not interfere with the ongoing scientific efforts here (so I thought). So, my efforts were directed at acquiring a low priced computer – text editor system.

Having kept somewhat current in the "personal computer" field after writing the special *Audio Basics* article on personal computers two years ago (and noting that nothing much has changed since) I could quickly eliminate most offerings. Actually, I narrowed things down to an IBM PC Jr. and went shopping.

My first stop was Computerland, that fabulous chain of computer stores that handles IBM products and claims to be experts on equipping you with one. My goal was simple, to give the computer salesman a detailed description of my proposed uses for the computer and request that he price out the least expensive combination of equipment that would suit my purposes. Thus, I explained to the salesman that although I was familiar with personal computers in general, I was not familiar with the specifics of the various IBM models nor the available software for them. I did, however, specifically ask that he start with an IBM PC Jr. (most recently enhanced model with 128K of memory and the improved keyboard). I saw no need to go to the more expensive and soon to be discontinued PC model as it uses the same 8088 processor chip and operating system and obviously cannot do anything much better than the Jr.

The Computerland salesman (with no effort at all to let me try a machine or explain anything at all about any of the options or software) simply sat down at a computer, and after fumbling around a bit, brought up a "sales form" on its screen (much like the order form you are faced with when simply trying to get a price on a new car). He immediately started punching up parts, mumbling things like, "well, you are going to need this, and that, and these and

those, and some obscure word processing software, and a printer cable." I should mention that his opening remarks to me were essentially, "are you going to buy one right now and how much money do you have?" I have seen more tactful sales people on used car lots. Anyway, he came up with a price in excess of \$6000.00! (printed out right before my very eyes on his awful dot-matrix printer accompanied by lots of thrashing noises and disc whirrings).

My first observation (to myself) was that the salesman could have come up with a list of necessary parts and prices a lot quicker with a pad of paper and a pencil than he did with his "computer enhanced" sales form. My second observation was that this was a lot of money to spend for a PC Jr. (I was under the impression it was a \$900 machine.) I looked over the printout and discovered he had priced a full IBM PC, not the Jr. I had requested, and I also noted that he priced it several hundred dollars in excess of list price. I first asked him about his overpricing on the basic computer and was told this was the special Computerland deal including their warranty, their assistance in purchasing it, and their training in its use. That is really a great deal! Just imagine getting to pay a salesman extra for the privilege of having him try to sell you something. Oh wow! Obviously you had to pay them extra to show you how to use it too, as at this point all evidence was that Computerland certainly was not going to show you how anything there worked before you bought it. I suggested to the salesman that he try again because I needed his extra options about as much as I needed the dealer installed \$1000 wax job, \$500 rust spray, and \$300 upholstery spray when I purchased a new car – all done in ten minutes for \$5.00 by the "gopher" along with bolting on the licence plates and nailing the big advertising plaque to the trunk – not on my car, ever!

I hurt his little feelings! For the next several minutes I got a lecture on how important all of Computerland's added value services were. I then repeated my request that he try again, only with a PC Jr. as I requested. Now the BS really got thick. The next five minutes was spent by the salesman telling me how rotten and awful the IBM PC Jr. is! I was told it's keyboard is terrible (it works just fine). I was told it didn't have enough memory (it does). I was told it will not run any word processing software with spelling checking (it will). I was told there were no filing programs available for it (there are). At this point I stopped the salesman. I exclaimed, "Wait a minute, you are telling me the IBM PC Jr. will not do anything! Why is it in your store? What is IBM's purpose in making it? No, let me guess, I know your purpose, the PC Jr. is nailed to the shelf, isn't it? Its the old bait and switch game all over again. You

don't know anything about computers at all do you? You only know the old used car lot selling methods. Sorry, good-bye!" On my way out the door, the "salesman" shouted, "never come back here." I replied, "don't worry, I won't." If I experienced typical Computerland sales techniques, I can only wonder how they remain in business unless they have a lot more damn fools to sell to than I think exist. My suggestion, avoid Computerland like the plague and avoid any other salesman for anything that starts in with this kind of "pre-programed" sales "method." If you are pricing out a new car and you cannot find out the price without the salesman filling in an order form, leave right now! When they start tacking on "ADM" (added dealer margin), take a walk. When the price is over list for any reason, say NO! And when they try and add on that fly-by-night wax job, smile and tell them no thanks, you can do that yourself for \$5.00 and an afternoon's work.

Obviously, the same advice holds true in shopping for home entertainment equipment. When you cannot get a price over the phone or without signing an order form, when the salesman tries to add on extra cost "dealer" warranties, when you are told you must buy expensive cables and connectors, when you are told that the low priced model is "no good" and you really must buy the more expensive one, when the low priced model just happens to not be working today or is not hooked up for display, when the salesman's first question is, "how much money do you have and are you going to buy today?", when the advertised special is "out of stock" but this other one from Sri Lanka is "just as good," when the sale priced receiver is available only if purchased with the dealer's "house brand" loudspeakers, head out the door right now! None of these high pressure and fraudulent sales techniques are necessary if an honest dealer actually has quality goods available at rational prices.

Anyway, I still needed a replacement for the IBM electronic typewriter so I headed for downtown Minneapolis to get "accurate" data on the PC Jr. direct from the horse's mouth – from the IBM owned and staffed IBM Service Center. I figured that here I couldn't go wrong.

Upon entering the IBM center I was greeted by a professional looking middle aged salesman. I immediately explained my needs and informed him that I had made the trip into downtown because of the bad experience with Computerland. I told him my just experienced "bait and switch" game had turned me off and I didn't want any more of that. So we started over direct with IBM.

Deja vu! The salesman sat down at his computer, brought up the order form program, and started in plugging in parts numbers again just like Computerland! I again protested that he was estimating a standard PC, not the PC Jr. I

asked about. I again was told the PC Jr. was inadequate! I was told the keyboard was no good (it still was just fine). I was told that no spelling checking text editing system would run on the Jr. (The first page of the data sheet for the new IBM Typing Assistant word processing system for the PC Jr. says it contains a 100,000 word spelling directory.) I was given no opportunity to try the machine as the salesman could not get the IBM owned and maintained Jr. to load anything except game programs. The only demo I got was a "canned" demo program of a different text editor running on a large PC (not for the Jr.) and this demo was a "hands off" type, as useful as watching TV. The salesman told me he really didn't know much about the Jr. and had no useful data sheets on it or its capabilities. I left.

Upon returning home, I called the regional IBM office, explained my disgust as to the completely unprofessional and inept sales methods I had encountered both at Computerland and direct from IBM (IBM was not quite as blatant). I asked if I could evaluate a PC Jr. and its actual documentation and the software and its documentation in my shop inasmuch as the salesmen certainly didn't know anything about the machine or its capabilities. I was told no, I could not. The manager of the company store told me the salesman I had talked to had been with IBM ten years and was just wonderful. He told me I could not have extended hands on time on the machine to find out what it really could (or more important) could not do. I was told I should be able to learn everything about the machine in just a few minutes. I pointed out that his "just wonderful" salesman had had ten years there and had not learned anything about the machine so how was I expected to learn it all in a few minutes. I asked to evaluate a documentation set for the machine. I was told that there was not a spare set in the entire IBM organization, and the same held true for the software documentation. No way does IBM want you to know anything about what you are buying. No way would I buy anything again from IBM.

After lots more searching, I did find a company that would let me evaluate their product and a salesperson that actually was thoroughly informed about the product. I am using that product right now, a Royal electronic typewriter and disc drive. It works just fine, text editing is a breeze, I can store and recall whatever I want easily on floppies. The disc drive only runs while storing and loading, and if power goes out, the internal battery backup saves everything for a couple of months.

The best feature of the Royal, dear readers, is that it is allowing me to prepare a better product for you. Its "printed" quality proportional spacing and printing is the nicest I have seen other than professional typeset machines. I can also get a lot more data per page in a readable

form. Each page has about 50% more text packed into it. These three pages would have used up nearly 5 pages of paper on the old IBM. You are going to get more information each month. I hope you like it.

I am going to waste a bit more space this month mentioning another growing "pet peeve" of mine – **increasingly unreliable telephone service**. Our business absolutely depends upon having good telephone communications with you. Over the past year we are getting more and more "no connections" on incoming calls, dead lines, one way connections, and telephone transmission quality that could be bettered with two tin cans and a taut string. Long distance telephone service is deteriorating back to the poor quality and high noise that I remember from the 1940's.

We have started to make an informal survey here. When we get a connection from a client that sounds like it has been routed through a garden hose via Bangladesh, we are starting to ask our callers what long distance service they are using. Guess what, the answer is never AT&T! It is always one of your friendly discount long distance services, satellite routing your call around the moon, time-shared with the entire New York City local system, and amplified with a reject Bose PA system running in an empty gymnasium. The engineering is done by the same folks that use 82 microphones on a string quartet (I think). I hope all you people out there are happy with your bargain rate long distance service. You are getting what you are paying for, which is not much. We will stick with AT&T inasmuch as when we call long distance, we think it is rather clever if the party we are calling can hear what we are trying to communicate. We are really not overjoyed about the government forced breakup of the telephone company. We kind of put it into the "don't fix it if it ain't bung" category.

I mentioned MOBIL DELVAC 1 synthetic oil as being useful as a main turntable platter bearing lubricant a couple of months ago and got an interesting letter from a reader in response. The reader pointed out that if you read the fine print on the Mobil 1 oil can very carefully, you will notice that it really is not a true synthetic oil, but simply a petroleum based oil with gobs of additives. The reader is correct, in regards to the usual Mobil 1 "synthetic" oil available at service stations and K-Marts. However, Mobil DELVAC 1 is a horse of a different color. It is a true synthetic oil (5W-40) and approved for all use from Mack Truck to Detroit Diesel all year round. It is recommended for severe use turbocharger applications and is, to my knowledge, the only synthetic oil approved by Audi. It certainly smoothed out my little Dasher diesel and made winter starting easier, and seems to smooth out turntable bearings too. The only "catch" is that

you probably will not find it at regular service stations, just at truck stops and Mobil Oil distributors. It is worth searching for. For whatever it is worth, you might like to know that the Williams Formula One race car team ran Delvac in their Honda 1000 horsepower 1.5 liter turbocharged racing engines last year and will again this year.

In contrast to my bad experiences during my IBM search, I did have a pleasant hi-fi shopping trip this month. The store was the huge, new and up and coming Best Buy Company warehouse chain in Minneapolis. I was shopping for a cassette deck. Since the two Sharp RT-100 cassette decks I got for my kids' systems last year are still running just fine, I have been watching the weekly Best Buy newspaper ads for some time now looking for another RT-100 blowout sale. I finally saw the special I was waiting for, only for the "new and improved" Sharp RT-110 at all of \$39.95! Dealing with Best Buys is so simple. You just walk up to the order desk, say I want one of the RT-110 tape decks on sale at \$39.95, they write it up, take your money, send you to the will call window at the warehouse section of the place, and, in a couple of minutes, hand you exactly what you ordered. No bait and switch, no hassles, no catches, you simply pay your money and get exactly what was advertised at the advertised price with no hassles at all. What a simple and easy way to go shopping.

The "new and improved" Sharp RT-110 is simply the same RT-100 cassette deck with two colors of LEDs in the display (green for less than 0 dB and red for over 0 dB). In addition, its got a bit more overdone graphics "artwork" printed on it. The important characteristic is that it works just as nice as the old RT-100 did. It is a Dolby B machine, with switches for standard, chrome, and metal tape. The transport is smooth and quiet, and it handles tape just fine. Using BASF PRO II Chrome tape, I get (with Dolby B) very quiet tapes with fine musicality and only a slight bit of high frequency dulling from the original records. The secret is to use a quiet tape and don't let the record levels get much over -3 dB ever. I get my headroom by starting with a quiet tape and not overloading it, rather than by trying to drive the bejezes out of a high performance tape and overload everything anyway. Since the distortion inherent in the cassette tape is about 3% best case, why worry about spending a bundle on a super low distortion tape deck when the tape is the limiting factor in any event? Note that the price of the Sharp is so low (\$39.95) that I don't see how this covered the cost to ship it here from Korea, let alone manufacture it. Sharp must be operating on the "sell everything at a loss but make it up with volume" basis of doing business. Oh well, if they want to "give away" decent tape decks, I will take one! Final note – since the musical

quality of the tape you are making is primarily determined by the quality of the record playback system and the phono preamplifier and its ability to drive the tape recorder linearly. I will take a tape made with the \$39.95 Sharp driven by a Transcendence or Super-Fet preamplifier and our T-25 phono system any day over one made with a Nakamichi Dragon and any other preamp and record playback system – garbage in – garbage out!

Shopping for a VCR at Best Buy Co. was just as simple. When the Sony SL2300 model showed up at \$300.00 in their ads, I simply walked in and said, “I want that one.” No hassle, no fuss, just a good VCR, cheap. A well managed discount warehouse home entertainment store can be an excellent place to buy equipment at rock bottom prices. You need to know the following to insure really getting a “best buy”:

1. You need to know exactly what component you are shopping for and what it usually sells for in your area. Your savings at a discount warehouse comes from buying quality goods at a lower price than available elsewhere. Random shopping for whatever takes your fancy is a good way to get burned. Discount warehouses make up for the true values at a low profit margin (or as a get you in the door loss leader) by also having heaps and piles of “house brand” and obscure goods in which there is a very high profit margin because they are made cheap and you do not have the ability to compare value elsewhere. (If they are out of the “sale” Sony Walkmans don’t go for the Obscuro Strollman at the same sale price).
2. You need to know the discount warehouse’s return and warranty policy. In general, this kind of operation cannot afford to provide good personal service for you or to provide prompt and careful “in-house” warranty repairs. A quality warehouse operation makes up for this with a liberal return policy. In general, you will have 7 days or so to return something for an exchange or refund if it dies out of the box.

Make sure you take action, if necessary, within this time limit! Since all components are made by imperfect human beings with imperfect real world parts, some small percentage of anything is going to “expire” right away. Don’t neurose, simply take it back and exchange it. If a second sample dies too, then you are probably dealing with a poorly made unit and you should get a refund and try something else. Don’t bother with extra cost service contracts, if the unit works for a week, it will probably continue working for as long as it is useful to you without need for service. Again,

simply find out the “rules” of the warehouse before you buy, and then obey those rules (assuming they are rational) to insure the product you buy does what you want it to do.

I am still getting lots of inquiries regarding, “have you found a digital disc player you like now?” My answer remains the same, no. Although any digital disc player will sound better than 95% of the record playing setups out there, that is only because 95% of the record playing setups are just awful, so the disc player wins by default. A really fine record player is just as dynamic, and has a much purer top end than any disc player I have yet to hear. I am still not convinced to make the large investment in source material that I am uncertain of. I will note again that the Mission rebuilt Norelco Philips units are getting a good reputation, that Telarc discs are as well recorded and produced as any, but there is a lot more music on your old records than many of you are hearing. I am enthusiastically interested in new technology, but it has to be better, not just different. My advice: hang in there for a while yet and don’t throw your records away. Note too that the next generation of disc players and discs will have video material on them too, at no extra cost. You will have an additional output jack to be connected to your TV set and you will be able to bring up a visual representation of the music, or perhaps the score, along with the audio playback. If you jump into this new technology too soon you are going to have obsolete equipment on your hands sooner than you think. Be patient!

I am also getting too many calls starting with, “I just bought a Dyna St-70 vacuum tube power amplifier because it sounded just wonderful. Now, how do I get it to work?” This vacuum tube amplifier revival is occurring because many young and interested audiophiles have only been exposed to the current generation of “off-shore” solid state receivers, nearly all of which are harsh and non-musical sounding trash. Any old vacuum tube amplifier sounds nicer than the rows of little plastic button covered boxes, with tiny controls and blinking lights, all identical in form (its hard to tell a receiver from a record player or tape deck without a close examination) currently setting in stacks and piles at the mid-fi shop. The mellow old tube amp does not have to do much at all to improve upon the nasty noises issuing from shopping mall “hi-fi” or record den.

Unfortunately, buying an old vacuum tube power amplifier is simply jumping from the frying pan into the fire. The problem is simple. These old units are reaching the end of their useful service life. When I started building Dyna vacuum tube amplifiers, over 20 years ago, the vacuum tubes supplied would go

10,000 hours without failure. All major tube makers quit building power tubes in 1977! There simply is no source of low cost and long term durable tubes left for this application any more. (Aero Electronics of Los Angeles does have audio tubes available, but the parts cost alone to re-tube a St-70 is \$115.47, not counting labor and shipping costs or any other necessary repairs or maintenance.) The 525 volt rated quad filter capacitors are no longer made (necessary to keep Dyna MKIII and some other high voltage tube amps running). We still do have filter capacitors for the Dyna St-70 and PAS in stock and they are still made by Sprague, but they won’t help you if your Dyna MKIII units fail. Finally, the old and very hot running power and output transformers are living on borrowed time. They have long passed their design service life and are calamities waiting to happen.

Sure, we can get a Dyna St-70 to sound pretty darned nice (while it is working). Our \$15.00 rebuild plan tells you everything you need to know (published in *Audio Basics* in 1982). We are simply trying to point out again that we no longer have confidence that an old vacuum tube power amplifier will stay working long enough for you to get your money out of it in music system use. If you cannot fix it yourself without outside help, you are going to find the service costs are not worth it. Remember, although much solid state equipment does indeed sound pretty sad, there is no rule that says this is the way it all has to be. Our little MOS-FET amplifiers built into Dyna St-120 and St-80 shells play music better than any vacuum tube amplifier, run cool, are durable, inexpensive, and we have them available. Vacuum tube power amplifiers are simply obsolete, its time to let them rest in peace.

Frank Van Alstine

VOLUME FOUR NUMBER FOUR APRIL, 1985

Boy, did I get some “interesting” letters regarding last month’s issue of *Audio Basics*. I got three letters letting me know in no uncertain terms that they didn’t like the issue at all and not to do that again. I got one cryptic “cancel my subscription” with no explanation (an IBM salesman?), and I got four letters telling me they thought it was an especially great issue (one person passed it around his office and informed me that others there really liked my “shopping expedition” adventures). Anyway, I will admit that Computerland and IBM were correct after all, the IBM PC Jr. is so bad that IBM dumped it just after I went to press – enough said.

On February 26, 1985 audio lost a landmark, the home and studio of Harry Pearson, the editor of *The Absolute Sound*. His 99 year old

Victorian home at 156 Prospect, Sea Cliff, New York, was gutted by a major fire. The fire gutted the inside of the home, burned through the roof in many places, and destroyed much of Harry's record collection and audio equipment. Very fortunately, Harry and two others were able to escape without injury. The fire (rumored to be a firebomb!) started outside the house on the back side at 2:50 am. According to the Glen Cove Record-Pilot, it took two hours to bring the fire under control and it raged through all three stories of the landmark home. The damage was estimated at more than \$250,000. The fire is being investigated by the local arson squad because of its suspicious nature. The Record-Pilot said that Harry was overwhelmed by the sympathetic help of his Sea Cliff neighbors who offered him clothes (his wardrobe was destroyed), lodging, and even a hot casserole for supper the next day. We understand the business paperwork of *The Absolute Sound* was not in the home and is safe. If your next issue of *The Absolute Sound* is a bit late, please have patience. Harry will overcome this catastrophe and will, with our best wishes, be back in business soon.

Evidently Mission liked my evaluation of their 70 MKII loudspeaker published here about a year ago. I recently learned that Mission is using a reprint of my review in their advertising literature. This came as a pleasant surprise to me. It gave me a good idea – if Mission likes what I said about their fine little loudspeaker, they surely would like me to evaluate their (highly regarded by others) Digital Disc Player. Thus I called them a couple of weeks ago and requested a Mission DAD player for evaluation. After a little hesitation, the managers of the company agreed, and promised to send me the Mission compact disc player as soon as more are available in the U.S. (they are evidently so popular that they are having a hard time making enough of them). So I am supposed to get one late in April, 1985. I am really looking forward to using a disc player that is supposed to be a cut better than what I have heard so far. Keep tuned for my report after I have received the Mission and have had time to evaluate it thoroughly. (Now if I can get Telarc to send me some of the compact discs they promised me a while back.)

One of my readers sent me a press clipping regarding a very interesting audio service available in his area – a hi-fi ambulance for mobile (on the spot) audio service calls. The service truck is painted like an ambulance (complete with red crosses) and the owner of the service was even thinking of carrying the sick equipment out to the truck on a stretcher but decided that was going a bit too far. Service work is done on the spot (the truck is fully equipped with test equipment and parts for most repairs). Seems like an enterprising idea, especially for those that just cannot be without their equip-

ment and don't mind paying the service call prices.

There was a very interesting article in the March 11, 1985 issue of *Forbes* (page 117 - 118), telling all about Joe Grado, entitled "Facing the Music." We suggest you check out this issue at your local library and read it. You will find out that Mr. Grado, beyond building fine phono cartridges, also makes violins, and is a very accomplished opera singer. There is even a "cute" color photo of Joe. Read it, you will like it.

One of my readers sent in another newspaper clipping, talking about the Audio "Grand Prix Awards" and asking me to comment on this process. These awards are bestowed each year by *Audio Video International*, an industry trade publication. The magazine sends out ballots to their subscription list of audio retailers, and the awards are bestowed upon those manufacturers gaining the most votes from the retailers returning ballots. Obviously, the audio manufacturers like to advertise that their product had won a "Grand Prix" award, because it makes the potential customer think that the product must really be wonderful, right? Not necessarily!

I have followed these "awards" for the past several years. In general, they do tend to go to companies producing new and unusual products (even the insiders in the industry are getting really tired of clones upon clones of little receivers with lots of little buttons and lights – all looking the same). However, the awards tend to go to products that are different, not necessarily better. They also tend to go to products that sell well for the retailer, not necessarily to products that play well.

However, the "Grand Prix Award" status of a product is useful to you. It does indeed indicate a product that at least is not boring, and probably does offer some superior aspects of design, styling, performance, or desirability, as compared with the tedious rows of routine off-shore boxes.

One of the most blatant "scams" regarding awards was perpetrated by the Institute of High Fidelity (IHF) during the Jimmy Carter administration. It seems as though this U.S. trade association thought it would be a great idea to donate a fine stereo system to the White House. Unfortunately, all the members of the association got into a squabble over who's fine equipment was going to be donated and receive the "honor" of being in use at the White House. Also, unfortunately, the members of the IHF are, in general, simply importers of oriental audio equipment. They "solved" their argument over what equipment to donate by simply throwing all the names of the various products into a hat, and "drawing" one of each – like blindly selecting at random one of each

item from the menu of a Chinese restaurant (one from column A, one from column B, etc.).

So, did the White House get carefully selected fine audio components made up from the very best that American suppliers could offer? Of course not. The White House got a random selection of Japanese components, with no effort to assure a combination of equipment that would even work together (simply luck of the draw). The Institute of High Fidelity really helped advance the state of high fidelity there, didn't they?

I have been looking carefully at all of those "one piece rack mount" systems that are now being pushed so hard by your friendly audio dealers. I have finally realized where they originated. Remember those big "coffins" of years ago? Those "brown boxes" (as they were called by the trade) with everything in one long, low, brown wood (or artificially enhanced synthetic plastic like material) occupying all the floor space at Sears, Macy's, and your local TV dealer. Remember the brand names – Electro-Phonic, Magnavox, Wards Air-line, etc? Did you ever wonder what happened to them? I now know the secret. Simply take the long low brown box, paint it silver or black, add lots of little buttons, turn all the internal table radio parts 90°, and tip it on end! You got it, folks! Nothing changes much, does it?

A Little Bit about Design Theory.

I think it is time to bring you up to date with what we are doing in the way of advanced research to improve the state of the art in audio electronics design, and how we are doing this, and what we hope our research eventually leads to. Unfortunately, for a few of you, we are going to mention computers again (not shopping for them – but using them). There simply is no other useful tool for doing the mathematics of circuit analysis and design, so please be patient with us – what we are researching cannot be separated from computers.

Imagine that you were trying to make your own bass reflex speaker system. Consider that you would have a box (with some basic resonant frequency), a tuned port or hole in that box, which can modify or adjust that resonant frequency, and that you had a woofer (with its own basic resonant frequency). To back up and simplify a bit further, to get a clear understanding of what we mean by "resonant frequency," consider your automobile – with the shock absorbers removed (or worn out). Simply push down hard on a fender and watch the car bounce up and down (oscillates) – at its resonant frequency. The frequency being determined by the stiffness of the springs and the mass of the car. Obviously a heavy car with soft springs will have a low resonant frequency (that "floating" ride that turns into berserk

large uncontrolled bouncing when the shocks wear out). A light car with stiff springs will have a much higher resonant frequency (a much "stiffer" ride turning into teeth loosening "jars" when its shocks fail). The shock absorbers are simply mechanical devices to "damp out" the uncontrolled oscillations – a kind of "resistance" to the basic resonance of the spring – mass system. Observe also that the basic resonant frequency of your automobile is independent of how slowly or quickly you push the fender down. The "bounce" occurs at a rate (frequency) determined by the characteristics of the system, not by how quickly or slowly you push, once you let go.

Now, take your car for a drive. Notice that your car has more than one basic resonance. Although most characteristics of the "ride" are determined by the inherent "spring rate" or resonant frequency described above, unfortunately, there are lots more resonances (little undamped springs) at work. All the rattles, buzzes, and judders of the mechanical parts and sheet metal vibrating are resonances. All the mechanical noises from the engine, transmission, drive train, wheels, and "road noises" from the tires are resonances. Even the wind noise from the air passing the car (changing as it flows through vents, and across antennas, mirrors, and moldings) are resonances (higher pitched of course).

Be happy that the designer of your automobile has done a pretty good engineering job of "damping" the basic spring rate of your car's suspension so that your car handles the "pushes" on it (the "input" from the irregularities of the road) without bouncing too much and banging your head into the roof. Consider however the following – how do you think your car would behave if all its resonances were completely damped out? What if it had no noise, no vibrations, and no judders at all? What if it responded perfectly to all road conditions and was completely stable and unstressed no matter how rough the road or tricky the curve? Do you think you might like that car a bit better?

O.K., now lets go back to our bass reflex speaker (or any other kind of speaker design for that matter – but a bass reflex is easy to talk about). Lets compare it with our automobile (from a standpoint of springs, mass, spring rates, and other resonances). How many different basic "springs" are we dealing with? Remember, with our automobile, we were dealing with more than one set, including the springs at each corner holding the car up, but the seats have springs, the tires are springs, and some of the component mountings are springs too.

Well, first of all, the air in the speaker box is a spring. The bigger the box, the softer the spring and the lower the spring rate; the smaller the

box the stiffer the spring, and the higher the spring rate (resonant frequency).

The suspension of the loudspeaker itself is another spring (actually two separate and different springs). One spring is the "surround" – the flexible material attaching the edge of the cone to the metal frame, the other is the "spider" the corrugated stiffer material locating the base of the cone in the magnetic gap and also attaching the cone to the metal frame. In general, larger speakers used for bass applications have softer springs (a lower frequency resonant frequency) while speakers used for mids and highs have stiffer suspensions (a higher resonant frequency). Obviously, each spring in the loudspeaker system has its own individual resonant frequency (the frequency at which it wants to "bounce" uncontrollably).

Note that the capacitors and inductors in the loudspeaker crossover are also "masses and springs" combining to form additional resonances – but we won't get into that can of worms, yet! Note also that each loudspeaker voice coil is an inductor too, and is, you guessed it, another spring.

Where are the "shock absorbers"?

You noticed that your car didn't ride too well without shock absorbers (damping), consider that your woofer will not "handle" well either, over the rough road of audio signals, unless shock absorbers are attached to its suspension too.

There are some built in shock absorbers in your loudspeaker system. Remember that the shock absorber is simply a resistive element that absorbs the stored energy from your springs and mass and keeps the spring – mass system from oscillating uncontrollably. The internal resistance of the flexible material in the surround and spider of your loudspeaker is a shock absorber (resistive damping). Internal padding material in the speaker cabinet can act as a shock absorber (a loose fill of long haired wool is a pretty good shock absorber). Resistive elements in the crossover network can act as shock absorbers. But actually, the shock absorbers in a speaker system are pretty small compared to the mass of the moving cones and voice coils and the spring rates involved. Most of the damping of the oscillating systems in your loudspeaker is provided by the power amplifier. The typical amplifier looks, crudely, like a low value resistor in parallel with the speaker coil. This is the most significant shock absorber in the system. Note that the resistance of the speaker wires, if it becomes significantly high, can increase the overall resistance of the amplifier – speaker wire system connected to the loudspeaker and cause the system to lose damping (behave like your shocks are worn out). Note too that a high output impedance amplifier (the 32 ohm Futterman comes to

mind) will absolutely change the sound of any loudspeaker system in the same way that removing the shock absorbers from your car will change its ride. Note too that some people seem to like this change.

Are you following me so far? Good! Now lets backtrack to our loudspeaker, our cabinet, and our book of charts and tables showing us what to do with them.

What we are trying to do, obviously now, is to attempt to juggle a bunch of different spring frequencies and shock absorbers and come out with a good ride without too many lumps and bumps.

We have got to be very careful in fitting our box and speaker together. We must have adequate data about the spring rate and moving mass of our woofer and the spring rate and resonant frequency of our box.

If we simply pay no attention to the spring rates of the box and the speaker, we will end up with a random combination of underdamped resonances. Once we realize what is going on, it becomes obvious that trying to build a loudspeaker system on a "mix and match" basis using parts and boxes available (and the simple data about them) from retail and mail order speaker parts sources will give us similar results as trying to make a car suspension from shocks, springs, tires, wheels, and suspension parts ordered from the J. C. Whitney catalogue.

Each system of springs, mass, and damping interacts together to form complex resonant systems that cannot be intuitively predetermined. It is possible, however, to write a mathematical formula for each resonant element in the system, combine all of the mathematical representations for each element (all of the various springs, mass, and damping) into one complex system of equations, and then solve the equations for exact answers. The answers will show exactly how the resonant systems are interacting and what the resultant performance actually is.

Unfortunately, the conceptual level of the mathematics involved, and the computation equipment needed to implement it is usually far out of reach of the resources of the amateur hobbyist. That is why your library is full of books on loudspeaker design. That is why those books are full of charts, tables, and nomographs, instead of obvious and simple directions. These graphs and charts are simply predetermined solutions of a variety of loudspeaker and box spring rates (on a crude basis) allowing you to fit a speaker to a box with results that are not out to lunch. The math these books have done for you is valid only for the exact loudspeakers described. You cannot substitute a similar or "better" woofer for one analyzed in the book and expect to get satisfactory results. Chang-

ing part of an equation gives you different results and changing woofers, for example, changes the equation.

Note too, that the math and tables we have mentioned so far only help us solve the large scale problems – getting our basic spring rates and shocks proper for the mass involved. We have not solved for, or eliminated all of the smaller resonances. We can have a fundamentally proper suspension in our automobile, providing a smooth and well damped ride and still have very unsatisfactory overall results if the rest of the car is a mess of rattles, buzzes, and judders. Likewise, we can have a woofer in a box system that is properly damped and tuned for a smooth measured frequency response, and still have multiple unsatisfactory smaller resonances and colorations. The box flexes and resonates, the metal frame work of the loudspeaker resonates, the cone of our woofer does not behave perfectly, it too “breaks up” and resonates instead of behaving like an ideal rigid piston. We have got lots of smaller “springs” at work here, and there are no books giving you pre-solved math tables on how to handle this much more complex system of equations. Consider too that the combinations of “minor” resonances may (if ignored) operate at frequencies that interact with the basic large scale box – woofer resonance problem you have worked so hard to solve, and create new resonances that negates all your efforts. (Putting tires of a much different spring rate on wheels of much different mass on your car may screw up the ride of an otherwise satisfactory car – this actually happened to many people early in the radial tire age, when they put new and better radial tires on large American cars designed for crude cross-ply tires. The much different spring rate of the radials completely screwed up the ride of the otherwise smooth working system. The automobile engineers were taken by surprise and had to recompute their suspension systems to maintain proper damping even when radial tires were used.)

Note that so far we have basically discussed a very simple mechanical system – a single woofer in a box. When we start making this system more complex (such as connecting it to a crossover network and a tweeter) the problems that we must effectively deal with rapidly become much more complex.

Remember that we previously mentioned that the most significant damping element in the system was the power amplifier connected to the loudspeaker system. With a simple woofer in a box, the amplifier is connected directly to the loudspeakers and the damping is relatively easy to keep track of. Lets see what happens when we include a crossover network in our loudspeaker system (usually necessary to keep high frequencies from getting to the woofer in this application). We have to not only get the

system to work well within the range in which it is designed to operate, we must insure that it cannot be forced to operate outside of that range – where it tends to distort badly or self destruct. Your passenger car suspension may work well on normal roads, but if it is feed an “out of range” signal, such as a fast jaunt off-road down the Mexican Baja, you are very likely to find the “out of range” signal input into the suspension may do things to your suspension system you are not terribly pleased with – such as leaving your rear axle laying on the desert and permanently pointing all remaining attached wheels in random directions. Why do your teeth “buzz” when you drive your car down a “washboard” gravel road? Because this high frequency input is too “high pitched” for your car’s suspension to cope with – it is an out of range signal. In your car, we cannot do much to limit the signal bandwidth or amplitude you might see. We must depend on the common sense of the driver to not go over too many curbs, run through plowed fields, or lose the sucker in a New York City pothole.

With a loudspeaker system, although there is not much we can do to prevent you from running over curbs (bottoming the woofer suspension and damaging it from too large a signal – don’t play the Telarc cannons or bass drums too loudly) we can limit the bandwidth the woofer sees with the crossover network. However, there is a “catch.”

When we isolate the woofer from the high frequency signals from the amplifier by using a crossover network, we also isolate the woofer from the amplifier’s damping effects. Our best shock absorber now only works on a frequency dependent basis. Oh oh! Our nice damped woofer in a box system may no longer be adequately damped! Its back to the drawing board to re-examine and recalculate the interaction of all of our resonant elements, only this time we must factor in variable, frequency dependent damping from our amplifier through the crossover. At this point, your library “speaker builder” book of charts and nomographs runs out of data.

You want to connect a tweeter to the system too, to make a good full range two-way system? Congratulations, you just added another spring set (the tweeter), changed the cabinet spring rate (by the volume taken up by the tweeter), added more mass and springs to your crossover (the parts required to keep bass out of the tweeter), changed the amplifiers effective damping again (it now has two different speakers to damp, through a more complex frequency variable and dividing crossover), and made yourself a much larger mess of interacting calculations to execute if you wish to find out what is really happening. (We are still not factoring in another mess of smaller

resonances such as additional high frequency panel resonances and defractions.)

You want a three-way system to let each driver work in a range where it works best without “stretching” the response of the woofer and the tweeter to cover midrange sounds? Simple – add another set of springs, masses, crossover parts, and spurious resonances to your system of equations. Are you beginning to get a feeling why many “home built” or designed by ear loudspeakers do not sound very good?

The loudspeaker is a rather simple combination of predictable parts. Yet, without the computing power of something similar to a Cray, you simply cannot compute what it is exactly, really doing. Next month, we will turn our attention to the audio amplifier, a much more complex combination of springs, masses, and resistances, and give you an idea of what must be done to insure that this system of complex tuned circuits works well, and what new ground we are breaking with our engineering computer to find out exactly what is going on.

Frank Van Alstine

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Interesting Source of Parts Department.

We have located a convenient source for original manufacturer’s stylus assemblies for many phono cartridges, and parts (such as headshells and drivebelts) for many common turntables such as AR, Dual, Thorens, etc. The supplier is Lyle Cartridges, 115 South Corona Avenue, Valley Stream, New York 11582. They have a toll free phone number, 800 221-0906 (except New York, Hawaii, and Alaska). Write or call them for their catalogue. We got nearly instant service from them on an order for an AR headshell and drivebelt.

Aero Electronics, 2129 Venice Boulevard, Los Angeles, California 90006, is a good source for many audio vacuum tubes. They also have a toll free number, 800 421-4219 for those outside California or 800 556-6700 for those inside California. If you are using vacuum tube equipment, we suggest you call or write them for their price list for their Gold Aero vacuum tubes.

If you are considering sound absorbent treatment for your listening room, we suggest you write The Brewster Corporation, 50 River Street, Old Saybrook, Connecticut 06475. This company makes a wide variety of sound absorbing panels, for wall mounting, free standing, or even ceiling hanging in a variety of sizes. They have a large variety of fabric colors, textures, and styles available. This manufacturer will probably not sell to you directly, but ask them for their catalogue and to be given the name of a Brewster dealer in your area.

Another possible source of sound damping material might come from your local bowling alley. Check out the paneling used along the sides of the alley and ask the owner who his supplier is. Many bowling supply houses have attractive sound absorbing materials available.

MISSION has not yet sent us the compact disc player for evaluation promised last month. I will send them a copy of this, and last month's *Audio Basics* as a gentle reminder. Watch this space for a review, when and if they come through with a sample as promised.

Another parts source (for a simple improvement project for our Super-Pas preamplifier to be discussed next) is All Electronics Corp., 905 Vermont Avenue, Los Angeles, California 90006. The part they have that is of special interest to us is an inexpensive high capacitance, high voltage, but small case size photo-flash capacitor (their part number PPC-750, a 750 μF at 330 volt capacitor). Their price is \$1.25 each or ten for \$11.00. They do have a \$10.00 minimum order plus \$3.00 shipping. All you need is two of them for this project, so its a good place to get a combined order in if you have friends that also use our Super-Pas.

A Dyna Pas power supply upgrade project.

[1990 Note: This project is now obsolete – you will want our modern Super Pas Three rebuild kit or at least our bare Super Pas Three power supply board and the much more current upgrade described in the February, 1988 issue.]

The background for this project is a "problem" that exists with all vacuum tube triode circuits that cannot be completely cured. The problem is the plate resistor. This resistor is one of the components that sets the closed loop gain of the circuit and the configuration is common in most vacuum tube amplifiers and preamplifiers of all makes. In an audio component, we want the closed loop gain to be constant over a wide bandwidth, we do not want the circuit to change operating parameters with frequency (except for dedicated and purpose designed equalization circuits, such as an RIAA phono preamplifier, and even in this case we want only the designed frequency response shaping, not random changes caused by changing circuit conditions either unknown to us or beyond our control). A careful analysis of the operation of the plate resistor in a typical triode circuits shows that this resistor is actually in series with the power supply capacitor. This is an interesting observation, because the value of the power supply capacitor varies with frequency. Obviously, at DC, the power supply capacitor is an open circuit (capacitors do not pass DC signals). At very high frequencies, the capacitor becomes inductive and is an open circuit too. Thus, at very low and at very high frequencies, the power supply capacitor

changes value as it goes from its normal AC value to an open. Thus what happens to the value of the plate resistor in series with this capacitor? Obviously, at very high and very low frequencies, it goes open too, as R_x in series with R infinite = R infinite (an open circuit). In other words, in the typical triode circuit, the plate resistor value varies with frequency. Obviously then, the closed loop gain of the circuit varies with frequency – attempting to go very high at low and high frequencies. The circuit cannot do this, it simply runs out of open loop gain (determined by the gain of the tubes themselves). The result, very high distortion and overload at low and high frequencies. (Vacuum tube sound?) In a solid state circuit, we do not need to have this kind of problem if the circuit is properly provided with active current sources and complementary devices, but, there is no such thing as complementary vacuum tubes (they can only manipulate electrons, not holes). Thus, we are stuck with plate resistors and non-linear circuits.

There is, however, something we can do to reduce the problem. We can make the power supply capacitor much larger so that it remains a capacitor and not an open circuit to a much lower frequency. This, combined with careful bandwidth limiting at the input of the circuit, can insure that the circuit remains quite linear over the range of signals that can enter it. In the stock Super-Pas we designed in this direction by adding a 100 μF capacitor to the line section power supply and a 33 μF capacitor to the phono section power supply (the largest conventional capacitors we have available that will fit in the chassis). Recently, however, one of my field representatives, Gregg McArthur of Chicago, called my attention to the availability of these low cost surplus photo-flash capacitors from All Electronics. We have ordered samples and have confirmed that making the power supply capacitors about ten times larger does indeed improve the linearity of the Super-Pas enough that you can easily hear the difference. Although it is not practical for us to incorporate this change in normal production (All Electronics has only a finite, one time supply of these particular parts), it is certainly a worthwhile, low cost, and easy project for you to do yourselves. We are researching the continuing availability of new OEM parts for our in house applications. Anyway, here is how you can make your own Super-Pas work a bit better yet:

1. Acquire two of the described photo-flash capacitors from All Electronics. Unplug your Super-Pas and allow its power supply to discharge overnight.
2. Remove the cover and bottom panel and locate the 100 μF at 450 volt capacitor (next to the heater supply stack on top of

the chassis). Remove this capacitor, noting the present connection of its two leads. Be very careful not to damage the circuit foil when disconnecting the capacitor lead going through the circuit card.

3. Using double sided sticky foam tape (available at office supply shops) attach the two new photo-flash capacitors to the chassis (terminals up) where the 100 μF capacitor had been located, one in front of the other.
4. Be very careful to note that the silver terminal on each capacitor is hot (+), and the black terminal is ground (-). Reversing the connections will destroy the capacitors, and may damage your power transformer.
5. Using insulated hookup wire, connect the black terminal of one capacitor to the back panel wire where the previously removed 100 μF capacitor had been connected. Connect the silver (positive) terminal of this capacitor through PC-5 eyelet 15 and then to the same foil path that the positive lead of the 100 μF capacitor had been connected to. Make sure no leads or connections can short against the chassis or other components.
6. Connect the silver (positive) terminal of the other photo-flash capacitor to PC-6 eyelet 16 (in addition to the wire already connected there from the bottom of the board). Connect the black (negative) terminal of this capacitor to PC-6 eyelet 11 (in addition to the three other wires connected there). Again, be sure these new wires cannot short against the chassis or other components.

This completes the project. You now have installed additional 750 μF capacitors in parallel with the third and fourth section of the power supply and have substantially improved the range over which the circuit will be linear. Note that the turn on time of the preamplifier will now be a bit longer as these capacitors slowly charge up. If you have a voltmeter, you can carefully measure the DC voltage at the positive terminals of each new capacitor. At initial turn on, the capacitor attached to PC-5 will slowly (over about 10 minutes) charge up to about +300 volts DC. The capacitor attached to PC-6 will slowly come up to about +200 volts DC. If the supply does not come up, if the unit blows fuses, hums, or does not work, turn it off and check your work. You may have miswired it. Note that the energy stored in these capacitors can be dangerous to you. DO NOT SHORT these capacitors out or touch the exposed terminals. I am not going to tell you "what the improvement sounds like." I would like to hear from you and have you tell me! Have fun.

Our beginning discussion of design and research last month has caused a few of you to leap to the wrong assumption regarding our present and future products. We have had some calls saying, in essence, "Well, this issue is really interesting, and it must mean that I shouldn't buy anything from you now because you must be coming out with all new stuff next month, right?" WRONG! Last month we started, and will continue, a discussion of the kinds of problems we must take into account and deal with in attempting to build, sometime in the future, "better" audio circuits. This discussion is to help you understand what kind of problems really exist that must be dealt with, and how these problems differ from simply "better IHF specifications." We are attempting to explain that you cannot do better if you do not know where the real problems are, and that you better really try and find out where the real problems are on an objective basis rather than to guess or make unfounded assumptions. We are trying to separate real problems from fictitious problems such as "bad sounding" capacitors and wiring.

We have three major challenges:

1. To create a computer assisted circuit analysis methodology of adequate speed, resolution, and accuracy to allow us to document exactly what each semiconductor, passive part, connection wire, and PC card foil trace, in and of itself is actually doing, and to do it at a price, and on a machine, we can afford to use (we couldn't afford to pay the air conditioning bill on a Cray, let alone the cost of time on the whole machine, and unlike the government, we don't have thousands of programmers available).
2. Once we can determine how each part and connection is behaving as an independent item, we must combine the parts and re-analyze the circuits as a whole to determine how they interact and to locate and document all of the non-linearities and distortions at all frequencies and under all conditions.
3. We must then design out all of the non-linearities and resonances. We must cure all the problems. And we must do this with circuit executions that are inexpensive enough that many people will be able to afford to buy them.

This is going to take some time! We are making very good progress. We are well into stage two, looking at how individual parts really behave (they do not behave as the over-simplified data given in the manufacturer's specification sheets indicate). We are having to make our own "data sheets" from scratch for each device investigated. Thus we are NOT announcing "all new products" next month. We

will hope to offer you a new generation of products in, perhaps, two years.

Remember, that the products we offer now are already based upon the best engineering techniques currently available, and important areas, such as power supply feeds, have already made use of our computer aided design programs to make major improvements in stability.

Also keep in mind the fact that we do care about our old customers, and will, where possible, make any future new circuits available as a lower cost retrofit for our products already in the field, as the owner desires. Remember too, that there is always something "new and better" in every field of endeavor, and that if you always wait a little longer for the soon to be released newest and best, you are not ever going to buy anything, and will be walking to work.

Anyway, let's now get back to discovering what our amplifier (or preamplifier) really is, and what we can do about it. Remember that last month we showed you how a loudspeaker system is a series of springs, masses, and shock absorbers, unfortunately bouncing and rattling around at random far more than we would like.

In an electronic circuit, all of the inductors can be considered to be springs, all of the capacitive elements can be considered to be masses attached to the end of a spring, all of the resistive elements can be considered to be shock absorbers, and all of the active devices (transistors, tubes, fets, etc.) can be considered to be a complex combination of springs, masses, and resistive elements.

Let us imagine our amplifier as being a bizarre modern metal sculpture. Consider it to be a "work of art" nearly filling a large gymnasium. When we open the door and look in, we will see a wild collection of springs of all shapes and sizes with thousands of weights welded randomly to the springs here and there, and with hundreds of shock absorbers (ranging from worn out Pinto units to new Konis) welded, tacked, and tied on. Our whole interconnected structure is suspended in mid-air and is kind of quivering like a cornered rabbit.

We notice an "input" lever near us, and an instruction that says this monster sculpture is a "times twenty" multiplier. When we yank the lever, a pulse will go through the complex network, like a shudder, and an output lever at the other end will move twenty times as much. We give the lever a sharp pull. It is like dropping a handful of stones in a calm pond. The machine quivers and hiccups, springs start bouncing and rebounding, a slinky like bloop travels through the system, and eventually, at the other end, the output lever does kind of mimic our input, only with about twenty times as large a reaction. We note however, that the

output is not quite the same as our input. There are many little wiggles that we did not put in. We note the system continues to judder and shudder long after our input stopped. We observe that the input lever is continuing to wiggle and vibrate too, even though we are no longer touching it. We notice that many springs in the system compress or rebound to their limits and stop abruptly, with sharp and resonating rebounds. Finally, when the caretaker for this display tells us that its time to shut it down for the day and turns off the system, letting many of the supported weights drop to their rest positions, we notice that this action causes another giant hiccup to go through the system, causing the output lever to flail around wildly, and the backlash even bounces the input lever, which neatly raps us in the shins. Ouch! We have of course, actually opened a door into the real world workings of an audio amplifier. The resonances and vibrations, the jiggles and wiggles, the random bouncing of the input and output levers, and even the hiccups at turn on and turn off, these all really exist.

Now, to start to figure out what is happening, we must make a model of all those springs, masses, and resistances. This is where mathematics and the computer comes into play. Some parts are rather easy to represent as numbers. For example, a one million Ω resistor is simply 1,000,000 ohms while a 12 p Ω resistor (a short section of circuit foil) is .00000000012 ohms. It is, however, not so simple to try and combine these parts.

Lets try a little experiment. Get out your pocket calculator or your Apple or IBM computer or whatever. Now, "add" these two parts. Simply add 1,000,000 and .00000000012. Got an answer? Good. Now, let's check our work by subtracting out the resistor again (subtract 1,000,000 from your total). You should of course, be left with the circuit foil again, an answer of .00000000012 Ω . Whoops! You say your answer is now zero? It is not .00000000012? What happened to your circuit foil? It vanished, didn't it? Your computer or calculator decided to remove a part from your circuit all by itself. Congratulations, now you have a different circuit than what you put in. How do you expect to analyze your circuit when your computer or calculator changes the circuit to something other than what it is?

Here is another example. We want to find the current flow through the circuit foil in a voltage divider in which the 1 M Ω resistor is to ground after the circuit foil with one volt applied to the input of the circuit trace. The voltage at the input is $V_1 = 1$. The voltage at the output is $V_2 = 1 \text{ M}\Omega / (1 \text{ M}\Omega + 10 \text{ p}\Omega)$. The current thru the foil equals $I = (V_1 - V_2) / 10 \text{ p}\Omega$. What is the correct answer?

If you have a typical calculator or computer, you will arrive at a value of 1 for V_1 and a value of 1 for V_2 , and you will calculate a value of zero for I . Wrong! The actual answer is about 1×10^{-6} or approximately $1 \mu\text{A}$. There is a lot of difference between a circuit in which there is some current flow and in one in which you calculate no current flow at all!

Thus, our first problem in trying to figure out what is really happening is that our calculator wants to give us wrong answers, or no answers at all. Why? We will tell you next month and continue with this discussion.

Frank Van Alstine

VOLUME FOUR NUMBER SIX JUNE 1985

A lot of you have asked if we could improve the performance of the Harman-Kardon T-60 turntable as we have done with the T-25 and T-30 models. The answer is yes, no, and maybe.

Yes, we have discovered how to get into the vertical arm bearings with liquid silicon. It is necessary to use a bit of Ronsonol Lighter Fluid dripped into the "seam" between the black end cap of the bearing assembly (at the right side of the arm base) to loosen the glue holding it on. The cap can then be gently pulled off without damaging it, exposing the vertical bearings. After removing the platter and securing any travel hold-down screws, tip the turntable on its side with the tonearm up (the exposed vertical bearing will then be at the top). About 15 – 20 drops of Dow-Corning 1000 centistroke liquid silicon (200 Fluid) can then be inserted into the bearing assembly, and if the turntable is left on its side for about 24 hours, the fluid will filter through into both the left and right vertical bearings. Wipe off the excess from the outside, reinstall the end cap, and you will find that your tonearm is now much smoother and dynamic. You also can see (barely) the top horizontal bearing ball assembly from the back of the arm post and can inject 4-6 drops of liquid silicon into it with a hypodermic needle.

No, it still will not perform as well as the T-30 or T-25 models, which have simpler, but better arm bearing assemblies overall, but it will be much nicer than stock.

Maybe, we can install our outboard power supply which helps the T-25 and T-30 so much. We developed the turntable power supply after we were out of stock on T-60 models, and since our T-30 works so well, we have not seen a T-60 since. If the internal electrical layout of the T-60 is similar to the T-30 (the transformer, AC to DC converter, and power supply preregulation separate from the motor speed control and servo-feedback card) then we would be able to outboard the former cir-

cuits and get the same kind of stability improvement we do with the T-30. We have not done one yet though, so I cannot report on exactly how to do it here.

Well, I finally did it! I have just purchased a Compact Disc Player. My local friendly discount warehouse, Best Buys, had a blowout sale I could not resist, and I bought a Magnavox FD1010 (North American Philips) for all of \$149.88! While I was in the store, they also had a drawing for a free prize, and I won that too - a GE "Help" 40 channel CB radio. Since the GE CB radio lists for \$99.00, I figure I got a pretty good deal.

I have been looking for the Magnavox unit for some time because it meets many of my criteria: 1. It does not have a motorized drawer for loading and unloading. I have yet to see any kind of audio equipment with a sliding drawer work well for very long (they bind and jam) and I didn't want to pay for the extra motor and trash that does nothing useful for me except to break sooner. The FD1010 is a top loader, it is in keeping with the KISS theory of design - keep it simple, stupid! In addition, moving drawers mean that all the interconnect wiring from the laser reading unit to the digital and control circuitry is moving too, flexing back and forth on each cycle. A little known law of electronics is that wires that are flexed, break! Even the special wiring used in test equipment probes break eventually, and I didn't want this designed in destruct mode in my Compact Disc Player, where it just is not necessary. 2. The simple Magnavox unit has an excellent reputation for being solidly built. It looks like a disc player, not a tape deck or receiver. It has no controls or knobs that are not necessary, and it is the basis for the Meridian disc player. It has good heat sinks for its electronics on its back panel. It is compact. 3. It is inexpensive. If something a lot better becomes available in a couple of years, I can afford to throw away a \$149 unit without too much dismay (I doubt if the owners of the first generation \$1200 machines can say that). 4. Complete technical data is available. I have already ordered, and received (for \$12.50) complete service manuals for the FD1010 from North American Philips. These contain complete schematics, board layouts, parts lists and values, disassembly and assembly instructions, documentation of production changes, and alignment and troubleshooting data, along with a list of necessary special tools required. There are no secrets, just complete professional technical data. Obviously, we shall carefully evaluate the technical data and report if useful engineering improvements can be made to the unit. Note that the audio output circuits are only a tiny part of the circuit - a couple of dual NE5532N ICs after everything else in the circuit.

Note also that my purchase is not an unqualified endorsement of the FD1010 or a recommendation that this is the unit you should run out and buy. I bought it because it was very inexpensive, was built well, and didn't have some of the drawbacks of many other much more expensive models. You still need to use your own judgement in evaluating disc players.

One of my field representatives, Gregg McArthur, "jiggled" the memory of Mission at the recent Chicago Consumer Electronics Show, and has informed me that Mission will be sending me their modified Philips disc player for evaluation soon (I hope). It will be a useful addition now because I will be able to report to you on an A-B basis how the Mission compares to the stock Magnavox unit.

Anyway, I suppose many of you are wondering how the Magnavox FD1010 "sounds." I don't have a big enough collection of compact discs yet to give you a final answer, but my initial impressions are as follows:

1. The FD1010 does not produce the obnoxious high end harshness to anywhere as noticeable an extent as do the many Japanese disc players I have evaluated.
2. It is very quiet and has excellent transient dynamics and fine imaging and stability.
3. Overall, it sounds like our Longhorn Grado phono cartridge being used in a mediocre turntable-arm setup. By this I mean that there is a sense of "grit" on complex passages, and "sterility" to the playback that kind of hides the emotion of the performance. For better or for worse, the CD playback just does not please me as much as the playback of an identical record on our T-30 system does. This is not to say that there is anything obviously "wrong" or unnatural about the CD playback. It is very good indeed, dynamic, clear, and exciting. It just does not do better musically on most material, and does worse in reproducing the human factor of the music.

Doesn't the CD player handle transients and attacks better? Yes. Doesn't the CD player "track" better on complex dynamic passages? On some of them. Isn't it quieter? Of course. Doesn't the CD player have better definition and clarity? Maybe. Isn't it less subject to feedback? Yes. Then how can a LP be "better"? That's a hard question to answer coherently!

I guess it is because what the CD player does wrong, it does worse and more objectionably in my sense of priorities than what the LP does wrong. The CD player gets musically "grainy" on loud string or horn passages. My T-30 playback system does not. The CD player just never seems to get everything musically coordinated in the way my T-30 system does. It is

clear, exciting, dynamic, and quiet, but something is missing or scrambled. In fact, at first listen, the CD player sounded much the same no matter what electronics or speakers were used with it, which brings up another observation and later, a prediction:

I have observed that any time we make an improvement in our reference system, a change that obviously improves some aspect of its performance in a big way, that improvement short term “swamps” my subjective evaluation process. I tend, at first to hear nothing but the improvement, and find that it overpowers the differences between many other components. By this I mean that a big preamplifier improvement seems to make all the amplifiers sound better (and much the same), an improved phono cartridge seems to make all the preamps sound better (and much the same), and so on. It takes me a while to “learn the sound” of the improvement and to be able to obviously hear the characteristics of each other component, too.

This learning and listening adjustment process happened to me with the new CD player as it has in the past with other components. My first impression was very favorable (in particular the obvious lack of gross harshness that has been an instant turn-off to me on so many CD players). The Philips unit sounded like the early prototype units I heard at trade shows several years ago and reported on so enthusiastically about in these pages then. On the first play through of several Telarc discs, the marvelous dynamics and quietness made everything sound really good and all my components “sound the same” – just fine. In fact, I wondered “what does anybody need us for if even ho-hum electronics sound good with a CD player?” It was not until the second or third playing of various discs occurred that I established a new “equilibrium” and was able to clearly hear that better (more linear and stable) amplifiers and preamplifiers were still obviously more musical even when the CD player was used. In fact, it became obvious that the CD player has a kind of “plateau” of performance that does not exist with the LP. This “plateau” is lower than the capability of the best amplifiers and preamplifiers. In fact, switching in our very best components only revealed the limitations of the CD unit more clearly.

Kind of look at the situation as if you were viewing a mountain range. There are many lumpy foothills and eroded slagpiles (“consumer level” record players), beyond them are a few much higher true mountains (most “high end” turntables), behind them

a large flat topped mesa rises (CD players), but, dominating the landscape, rising high into the sky, top hidden in the clouds, unclimbed and awesome, is the Everest of the range (the potential of the LP player).

In other words, with our T-30 record playback system, every single improvement in the rest of the system brings us closer to the reality of live music and we do not know where the limitations of the record are. With the CD player, our best production electronics already exceed the potential of the digital disc as it now exists. The CD player works very well indeed, but I am not satisfied with this plateau of performance, I want to climb that mountain top.

My prediction then is that the coming popularity of the Compact Digital Disc will cause audio to break into two tracks:

Track One, which will be followed by over 95% of those interested in audio, will be the digital path for the following reasons:

1. The Compact Disc Player is much better than 99% of the record playing machines out there. For most people, the acquisition of a Compact Disc Player will be the single largest improvement they can possibly make to their audio system. Anyone suffering along with a typical “off shore” plastic turntable and standard phono cartridge should be looking for a disc player right now.
2. The improvements in dynamic range, low noise, definition, stability, detail, and reduction in colorations and bass mud will be heard no matter how poor your receiver and speakers are. In addition, the CD player bypasses the usually worst part of the inexpensive receiver, its RIAA phono preamplifier.
3. Unless you are aiming for “the top of the mountain,” as long as you do not install truly state of the art limited production electronics in the rest of your system, you will never hear the limitations of the CD player, and will simply be very happy with the improvements it makes to your audio system.

This is, of course, why the major commercial writers are so “hot” on CD playback. Their own playback systems are not good enough to reveal the limitations of CD, and they can be much more comfortable with the sonic quality of the systems their major oriental advertisers push when CD players are the main source.

Track Two, of course, (followed by less than 5%) is the path to the top of the mountain. Those people who’s playback is already good enough to tell them that the CD player, as it now exists, simply is not the end all in music reproduction will continue to investigate the improvements in LP playback. They will be the people that demand more linear amplifiers, preamplifiers, and record playback systems. They are the people that are not satisfied with simply hearing a good reproduction of the music, but realize they should be hearing the musicians. They are the people that will finally make the designers of digital equipment break past their present plateau of performance and redesign the format so that we can hear the musicians. These people must continue to quest for the best. If you do not, what you hear now is what you are going to get, today, and far into the future, and better is not going to happen. [1990 Note: *Fortunately we have subsequently learned that the worst problems with off the shelf CD playback was mostly bad execution of the circuits, not inherent non-musical limitations with 16 bit 44 kHz sampled source material. As we have made the CD player better and better, the decently recorded music has become closer and closer to real, and now the record player is only a memory for many people.*]

Note that the reviews and evaluations of equipment in major advertiser supported publications still remains two years away from accuracy. Today, all the writers for *Stereo Review* and *Audio* will tell you that the first generation disc players of two years ago were very harsh sounding, unreliable, and not very nice at all. They will also tell you that there is major differences in the sonic qualities of the machines of two years ago. They will inform you that lots of the Compact Discs produced then were simply awful (poorly mixed, mastered, and recorded). Would they tell you that two years ago? Of course not! Then, every new CD player and every new disc was just wonderful, and so wonderful that everything sounded uniformly wonderful, and that future improvements were impossible. Now, of course, they are willing to tell you that two years ago their judgment was bung! Is their candor and judgment any better now?

There may be an exception in the commercial audio press you should investigate. The magazine is *Digital Audio* P.O. Box 976, Farmingdale, NY 11737-0976. The cost is \$19.97 per year (12 issues). This new magazine covers digital audio only, with many reviews of equipment and discs (and some other playback equipment). They seem to be willing to call a spade a spade, tell you which discs are

good, and which suck, and they give many sources for discs and equipment. I like their layout and graphics, and the editorial comments by Wayne Green (also the founder of *Byte*). They must be doing something right, for they are making CBS people nervous. So nervous, in fact, that *Audio* magazine is suing them. Why? *Audio* claims that the name, *Digital Audio* is a violation of CBS's rights to the name, "Audio." Gee, are they going to sue *Audio Visual International* and *Audio Basics* too? Anyway, I recommend that you shell out \$19.97 for a year's subscription to *Digital Audio*. I think you will get your money's worth in useful information.

I had an interesting experience last week. I was contacted by a local audiophile who was having problems getting his system to sound decent. He owned Dahlquist DQ-10 loudspeakers with sub-woofers, a huge old Lux receiver, a monster Lux turntable with some bizarre tonearm, and a "top of the line" Empire cartridge (along with an equalizer, a DBX expander, a "high end" cassette deck, and of course, "magic cables"). His Lux receiver had blown up for the third time and he was looking for better electronics.

I brought over a Super-Fet preamplifier, a MOS-FET 200B amplifier, and, as an afterthought, our T-30 phono playback system.

His system wiring was a basket case so I connected standard (and reliable) two conductor speaker wires, put our preamp and power amp in his system, disconnected the sub-woofer and all the other accessory trash, and fired things up. The system sounded awful, even after I relocated the DQ-10 speakers so they were not firing directly into his dining room table.

I then shut things down again, and replaced his monster turntable with our simple and inexpensive T-30 system. I fired the system up again with a Crystal Clear Virgil Fox organ record to see if we might get a bit better bass playback now. Talk about day and night improvements! The owner's wife, who had been out of the house, came back in and immediately exclaimed, "Oh! You have finally got the sub-woofers to sound really wonderful! The bass and dynamics are just super now!" I had to smile when I informed her that the "sub-woofers" were not in the system at all, and that the bass and dynamics she heard so obviously were simply the result of the speakers being fed a signal with clean bass and dynamics. Now the system sounded just fine in every respect.

I explained to the couple (with the system playing as proof) that an audio system will not play bass unless the cartridge, tonearm, turntable, preamp, and power amplifier play bass, that throwing money at sub-woofers, elec-

tronic crossovers, bi-amplification, expanders, and equalizers doesn't help a bit if the source is bung! I demonstrated that even the installation of a high quality preamplifier and power amplifier will not do much good if the record playback system is a disaster. By switching equipment back into their system, I was able to prove to them that their entire investment in expensive equipment was essentially wasted as long as they used their awful sounding turntable.

I did not make a sale! They "wanted" a new amplifier and preamplifier. They did not "want" a new turntable! It did not matter what they needed to make their system work. It did not matter what I was able to prove to them. It did not matter what they could obviously hear. They wanted what they wanted, and the reality of the situation did not concern them. They did not like finding out that their record player was awful. They did not like learning that they had blown lots of money on things that did not work. It did not matter that they both agreed that with our turntable, the system finally sounded great to them.

What they "wanted" was a nice sincere salesman to sanction all of their past purchases, exclaim how nice their equipment was, and to kindly sell them just what they wanted. They wanted a salesman who didn't care what their system sounded like and didn't care if his suggested merchandise would help them or not. They just wanted a sanction for their past decisions. It is not nice to be the bearer of bad tidings. In the old days, the King lopped off the head of the messenger who gave him the message that his army had been defeated (except in the case of the smart messenger who brought the news to the Spanish King that the great Spanish Armada had been destroyed by the English. He told the King, "I have great news sire, we have discovered that our sailors can swim much better than the English sailors can!" By the time the King figured out what he really meant, the messenger was long gone). Since I was the bearer of bad tidings to this couple, of course they did not want to do business with me. I had proven to them that they needed a new turntable, and that is not what they wanted.

Two observations:

1. We get many calls from people who do not want any information from us at all, and who could care less about what we design, build, and sell. They call only to try and get our sanction for what they already own. They may sort of ask our advice with questions such as, "I want something really good! What should I get, Threshold or Conrad-Johnson?" Well thanks a lot! They are almost as insensitive as those that start

a call by asking us, "Is your equipment really any good?" [*still true in 1990*].

2. In almost all systems, our T-30 turntable system is probably going to make a bigger improvement in your sound quality and reality than anything else you can do. Your turntable system must work first if you expect to have realistic music.

A quick final note: We have already had such favorable feedback on the Super-Pas power supply improvement we discussed last month that we will put the improvement into production immediately. Call us for prices for new units and retrofits.

Frank Van Alstine

VOLUME FOUR NUMBER SEVEN JULY, 1985

First of all, *Audio Basics* will be a bit late next month. Don't look for the August issue until Labor Day weekend. The reason—I, and my 15 year old son, will be messing around in "Yurup" from August 8th through August 26th. We are going from London to Graz, Austria, and back to Amsterdam to catch a couple of Formula One Grand Prix races and see a bit of the old World. If any of my readers from that part of the world are interested in saying hello in person, get a note to me soon and I will send you my itinerary. I would be happy to meet you some evening.

You kind folks that have equipment in for rebuild, or are planning to send us equipment or order new, don't panic! Dave, Aado, my wife, and Vanessa (my college bound daughter and full time summer expert solderer and assembler) will be here to answer your questions, take care of problems, and build your equipment orders. I would not leave the shop if I didn't know that things would be done just as well in my absence as they are when I am here.

We did receive a T-60 turntable to rebuild (packed upside down in its shipping carton due to bad repacking instructions from Harman-Kardon) and have rebuilt it with an external power supply and internal liquid silicon lubrication. The results were better than we expected. Noise is way down, stability is much better, and the arm performance is much sweeter. Although it still is not as quiet, dynamic, or exact as our T-30 package, it is still a big improvement over its stock performance and the rebuild work was well worth the effort involved. I will write up the rebuilding of the T-60 as a do it yourself project in *Audio Basics* next month.

We have not yet received the promised (and long overdue) Mission digital disc player yet either. We have received an invoice for \$525.00 from Mission! Needless to say, I would rather

have the disc player to compare with my Magnavox than the invoice.

I have received a Kodak Kodavision 8mm video camcorder to play with. It is a very interesting piece of technology – a complete color video camera and videocassette record-playback unit in a simple little 6 pound package. The batteries are smaller than a cigarette box (it runs from one-half to one hour on a single gelcell battery) and the 8mm videocassettes are just slightly larger than an audio cassette. It has auto-focus, power zoom, auto color balance, auto fades, and, of special interest to people interested in audio, a true high fidelity sound system (a FM system on the video head similar in concept to Beta Hi-Fi video recorders).

Of even more interest is new products Kodak will be soon producing using 8mm videocassettes, in particular a stereo PCM (digital) audio (and video) recorder. This unit, about the size of current analog cassette decks, will soon simply obsolete existing home audio recorder technology, and I predict, shortly thereafter obsolete both Beta and VHS video recorder technology. Why? Simply because PCM recording gives much better results than current analog tape recorders do and the small size of the equipment will make it more suitable for many more people than the tank like present generation video recorders. Keep tuned for a full report.

Now it is time for a report I am most sad to have to give you. It is a report written by Steve Keiser, formerly of B&K (Beyer and Keiser) Components, the producer of the B&K ST-140 power mos-fet amplifier. The B&K amplifier was reviewed most favorably by *Stereophile* (the reviewer refused to sell me the sample B&K ST-140 he had advertised for sale in *Audiomart*). Why, we shall see later.

A couple of years ago, Jim Strickland, the Acoustat designer, called me to inform me that he had seen a B&K ST-140 amplifier at a trade show and that it looked suspiciously like a copy of our MOS-FET 150B design. Thus, at the January, 1984 C.E.S. trade show in Las Vegas, I made sure to visit the B&K display and examine their products very closely. As I subsequently reported in *Audio Basics*, the PC boards B&K displayed at that particular trade show did not look like copies of our designs. There the matter rested until another equipment reviewer informed me a few months ago that their evaluation sample of a B&K ST-140 looked a lot like a our MOS-FET 150B.

That information prompted further investigation by us and an appeal a while back in *Audio Basics* for the loan of a B&K ST-140 amplifier from one of our readers if they owned one. The

amplifier in question is not sold in our area at all.

A reader kindly did respond with a sample B&K ST-140 amplifier, complete with schematics of it from B&K. Much to our dismay, the schematic was a virtual duplicate of our 1981 MOS-FET 150B schematic (with the exception of the location of the DC balance trimpot). Resistor and capacitor values and semiconductor choices were for all practical purposes identical to our original engineering work. The B&K amplifier followed the schematic, and in addition, was essentially a mechanical duplicate of the Dyna ST-150 chassis we used for the original MOS-FET 150B design.

At this point, direct contact with B&K was attempted, to find out what was going on here. Although we have received no written response from John Beyer, the following is the letter sent to me by Steve Keiser (the designer of the new Dennesen mos-fet amplifier according to a recent Dennesen press release!).

*Frank Van Alstine
2202 River Hills Rd.
Burnsville, Minn. 55337
Dear Mr. Van Alstine:*

I am in receipt of your letter dated March 29, 1985 from your attorney, Mr. Stocco. I am providing you with information as per our numerous telephone conversations. Additionally, please feel free to print this letter in your monthly publication.

On April 8, 1981, John Beyer and Steve Keiser formed a corporation called B&K Components to manufacture original designs by Steve Keiser (myself) which consisted of a 70 watt per channel mosfet amplifier and a solid state pre-amplifier. On Sept. 15, 1981, John Beyer established corporate headquarters on his personal premises at 48 Hillcrest Road, East Aurora, N.Y. On Sept. 20, 1981, Mr. Beyer hired technician David Thompson to implement Mr. Keiser's (my) designs transferred to B&K Components via written contract dated April 8, 1981. These designs and a copy of the written contract are enclosed. Please also note the schematics for both the pre-amplifier and power amplifier are signed by Mr. Beyer and Mr. Keiser (myself).

On March 22, 1982 I sold to Mr. Beyer a Transcendence pre-amplifier, a Super-Fet pre-amplifier, and a Mosfet 150B power amplifier manufactured and sold to me by Jensens Stereo Shop. The sales receipt for this transaction is enclosed and is also signed by myself and Mr. Beyer.

On April 1, 1982 Mr. Beyer informed and instructed technician David Thompson to copy

and implement the Mosfet 150B instead of my design. On May 15, 1982 B&K Components commenced to manufacture the ST-140 which was in fact a direct copy of the Mosfet 150B. Mr. Beyer occasionally demonstrated my own designs at various C.E.S. shows, but never shipped them to paying customers. To the best of my knowledge, B&K continues to manufacture the ST-140 as a rip off copy of the Mosfet 150B and has implemented production of the Transcendence pre-amplifier as well.

Obviously, since B&K is engaged in the manufacture of stolen property and my name is associated with the company, I write this letter and have enclosed the information to protect myself. Mr. Van Alstine and his associates should please note that the designs submitted by myself to B&K are entirely different from the designs of Jensens Stereo Shop. Further, I am requesting that David Thompson also write a letter to you giving additional corroboration.

If I can be of further assistance, please contact me.

*Sincerely,
Steve Keiser*

There you have it folks, right from Steve Keiser himself (I can supply a photocopy of his original hand written letter if any of you are doubtful). What can I say?

We also wrote to Dennesen when we found out that they claimed Steve Keiser was designing their new amplifiers. We simply informed them we had doubts about what was going on based upon our experience with B&K and asked them for copies of their schematics so that we could assure ourselves that the use of our circuits was not spreading further.

They have not cooperated. Their attorney answered, claiming that our circuits could be "reverse engineered" and thus were fair game for anyone to copy. The attorney also claimed that I was a copier, that I had copied Dyna's 416 amplifier in the 1970's and marketed it as our "Double 400" amplifier. Dennesen's attorney (who was a customer of mine years ago) got his data a bit mixed up regarding the last statement.

For those of you who are interested, I refer you to Volume 3 Number 9 (Spring 1977) *Absolute Sound* which had a thorough review of our Double 400 amplifier (pages 28 through 31). In my response to the review (page 29, manufacturer's comments, #2) I did credit the output circuit design to Dynaco (used with their permission) and separated out what we had done, and what Dyna had done. Harry Pearson himself commented that it was "too bad that Dyna itself doesn't proceed with Van Alstine's modifications." The success of the Double 400 and the fine review in *Absolute*

Sound finally did motivate Dynaco to later do just that and build the 416, a copy of the Double 400. Dennesen's attorney got the villain and the victim mixed up. I regret that.

Anyway, these goings on simply make it difficult for us to supply you with the best possible product for your money. Here are the problems. Do any of you readers have any rational solutions?

The problems that the incidents mentioned previously bring up are as follows:

1. How can I afford to pay an electrical engineer to design original circuits for Jensens Stereo Shop when after they are designed and sold to you, it is claimed that anyone else has the right to simply take the designs I have paid for and produce them themselves?

2. We have endeavored to be more professional in our dealings with you than other esoteric companies are. We realize we have an obligation to not only provide you with competent equipment, but that we have a further obligation to provide you with adequate documentation so that you can keep it running even in our absence. Thus we have not hidden parts, potted circuits in epoxy boxes, or refused to provide schematics or service data as other "high end" companies do.

Must we change our way of doing things to protect ourselves (at your expense)?

Shall we no longer publish schematics? Should we remove the markings from our semi-conductors? Should any future circuits be in "analog modules" hidden from you and your service man, but necessary to hide them from thieves too? Do you really care if we do not provide any service data?

3. Yes, we can obtain a degree of protection for our rights by going through the patent process. However, this process costs you, dear reader.

A patent does not grant any rights other than the right to sue an infringer. The cost to defend our rights are simply added to the price you pay for the product. A small time company can still go ahead and copy, as long as they don't get caught, and the time necessary to stop them may be years and the cost may be more than our resources can allow.

A U.S. Patent only recognizes our rights within the U.S.A. For real protection, we must file patent applications in all industrial foreign countries too. The filing must be done before the U.S. Patent is granted, and the cost is simply out of sight.

The time lag between developing a new circuit and actually having the patent process far enough along to be safe to actually produce the product for you may be several years! You, kind customer, lose again, as we would not be able to offer you our best work in a timely manner.

Finally, it is very easy to get around a specific patent. Simply slightly change a resistor value or two and you have your license to steal back again. For real protection, we must go for a broad based conceptual patent.

This involves a patent for the whole circuit configuration in a broad sense – claiming and proving that the circuit configuration is unique and that it remains unique even if parts value changes are made. This is the most difficult kind of patent to get, the most expensive to fight for, and the most likely to be overturned on appeal. Judges in our altruistic socialist society feel that it is evil and nasty for a company to try and keep something really good for themselves. Years ago, RCA lost rights to their original color TV patents, simply because their inventions were too useful and desirable. Selfish old RCA didn't have rights to their inventions because it wasn't fair that other leeches couldn't produce color TV sets too without paying RCA for their ideas. Thus, take RCA's rights away because it was in the "public interest" that everyone else be allowed to steal from them. You can't develop too good a circuit or it will be taken from you.

Finally, if we invent some really broad based and super useful circuit, the government will probably (as they have done in the past) declare it "top secret" and confiscate it. A patent will not be issued, and because we do not have security clearance, we will be denied further access to our own invention ourselves. Don't laugh, it has happened to researchers inventing better ways of encryption for secure telephone communications. Since the government claimed that the results of their work would have compromised national security, their patent applications were confiscated!

Do I have any really clever lawyers out there among my readers that can come up with a foolproof and cost effective way for us to protect our intellectual rights from predators? If so, I would really like to hear from you, soon!

The first place where you lose, dear readers, is in further descriptions of the techniques we are developing and using to make better and more linear circuits. I cannot continue to tell you what non-linearities we are looking at in audio circuits. I cannot give you any more clues

about the computer programs we have developed to quickly analyze large circuit configurations in exact detail. Even though B&K's description of the ST-140 amplifier circuit is essentially wrong in their sales brochure, and even though the sample we evaluated did not even come close to making its advertised specifications (you don't get 70 watts from a single pair of mos-fets on a 48 volt DC power supply, you get about 45 watts), we cannot afford to give away any more details about how our circuits really do work. We are selfish, we feel we should get paid for our efforts. Enough said.

Now for some good news.

I have completely rewritten the SUPER-PAS do it yourself instructions into a 20 page step by step manual with much better drawings, clearer prints, and more detailed and easier to follow instructions. (Yes, I know, here we go again, publishing details of our engineering research, but since it was already published in a sketchier form a year ago, we are not doing ourselves any more harm.)

The new SUPER-PAS instruction manual also includes the instructions for the dual 750 μ F photoflash capacitor addition to the power supply. This improvement will be reported upon soon in one of the audio magazines, with a rating, we suspect, better than the current Audio Research and Conrad-Johnson vacuum tube preamplifiers.

The prices for the improved Super-Pas preamplifier are as follows: [1990 Note – Obviously these prices are obsolete, check with our current catalog or call us at 612 8990-3517 for current prices and availability on Super Pas upgrades before ordering].

Do it yourself plan set only (regular price) 20.00

Do it yourself plan set only (price for *Audio Basics* subscribers) 10.00

Complete Super-Pas Parts Kit and Plans 125.00

Complete Super-Pas Rebuild (We do it) 225.00*

Complete Super-Pas Preamplifier (used chassis, new circuits) 275.00

Optional set of 5751 high gain industrial tubes 40.00

Set of two 750 μ F 330 volt photoflash capacitors only 10.00

*Subject to an up to \$50.00 rebate if your chassis does not require extensive mechanical repairs or interconnect rewiring.

In addition, the following are update prices for older Super-Pas units (call for R.A. please!):

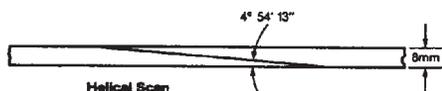
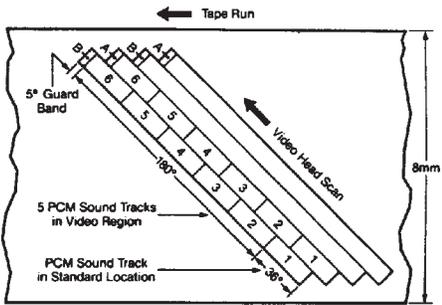
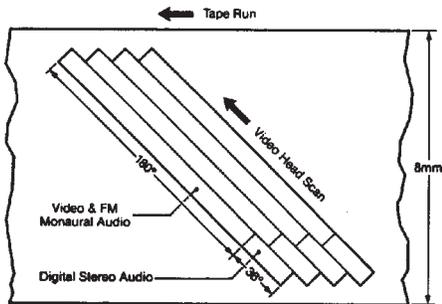
Install new photoflash power supply 35.00

Install new stepped balance control, LED pilot lamp,

photoflash power supply, and circuit updates in older units 100.00

All prices include shipping to you in the continental U.S.A.

More good news – I have just received a “mercy pack” of a nice assortment of Telarc compact discs, compliments of Robert Woods, executive vice president of Telarc Corporation. Most are duplicates of Telarc records I already own, so I will be able to carefully compare the CDs to the records and give you



NTSC Tape Speed = 14.345 ± 0.072 mm/sec

my best judgement of the virtues and vices of the two formats.

Although it is premature to make a complete report yet (I want to listen carefully on the Mission disc player as well as the stock Magnavox) I do have a few preliminary observations for you:

1. I am getting the best sound from the compact discs using a Transcendence Preamplifier, a Transcendence 400 amplifier, and a set of new B&W 801 F Special loudspeakers. Although this is not completely surprising (after all the T Preamp, T-400 and 801 F Specials are state of art) the interesting aspect is that the CDs simply sound less grainy and strained, and more musically natural with this combination. I suspect it is because the 801 F Specials handle large dynamic

transients better before their coils saturate, and the Telarc CDs have lots of dynamic transients.

Certainly it points out the importance of owning electronics and loudspeakers that will handle great dynamic range for best results with compact discs, especially a very powerful amplifier and very dynamic loudspeakers.

2. The technical advantages of the compact disc seem (to my ears) to be most suited for piano recordings. In all my direct comparisons so far, piano sound is improved the most by the dynamic advantages of the CD format.

3. In a more modest system, the Super-Pas preamplifier seems to be very helpful in making compact disc reproduction more listenable and less aggravating. Its slight “tube sound” and slight “rounding” of hard transients slightly mellows out some of the grain on the more obnoxious compact discs. Yes, I know this mellowing of the sound is not exactly truthful, but it is very pleasant, and much more listenable than the harshness of much commercial solid state equipment.

Thus, if you are making a compact disc player your main source, and you cannot afford to really upgrade all of your components to highly dynamic and high power versions, we would urge you to consider our Super-Pas preamplifier as an important choice to make the rest of your equipment sound musically acceptable. It does not overload on the output of CD players like so many other vacuum tube preamplifiers.

4. I still do not find myself heading to the CD player when I simply want to relax and listen to a musical performance. It’s the T-30 system and my record collection every time.

5. One Telarc CD is a definite no! California Project (Papa Doo Run Run #70501) simply sucks. It was recorded on a Mitsubishi 32 track digital machine (not the Soundstream). It was not engineered by Jack Renner. The performance is fake Beach Boys with an overpowering and out of place heavy bass, and simply is not musically pleasant. The surf is down! [1990 Note: Well, we sure blew this one. As we got better speakers, better CD players, and better preamp circuits this CD keeps sounding better and better with balance and musicality nicer than the real Beach Boys recordings. Now I would recommend this CD].

Finally, I wrote to *Stereophile* regarding the new power supply for the Super-Pas. If you

remember, I sent them a sample in February of 1984 for review and it is (I assume) still gathering dust there and has not been reviewed as promised. I received a reply from them! Their advertising director wrote me suggesting that I advertise in *Stereophile*. An interesting response.

Frank Van Alstine

**VOLUME FOUR NUMBER EIGHT
AUGUST 1985**

Surprise! *Audio Basics* isn’t late this month after all. I am cheating and writing it before I leave for Europe inasmuch as I have plenty to write about already in late July.

I will be visiting the B&W facilities in Worthing, England in August. Peter Haywood, their director for USA and Canadian sales and service, has kindly informed me they will give me, and my son, a good look at their new research and production facilities. I will be looking at things with the Kodak Kodavision 8mm camcorder and will be able to supply any of you with a Beta copy of the B&W plant if you want to send me a blank Sony brand Beta video cassette. Call me first (in early September) to insure that I have had time to do a decent edit on my raw footage before sending a blank Beta cassette.

I want to talk a bit more about the 8mm video and audio tape process as it certainly is going to be the tape format of the future, and will obsolete VHS, Beta, audio cassette, and open reel tape machines for almost all home use within five years.

Of most interest to you from an audio standpoint is a new Kodak product announced and displayed at the C.E.S. show and available this fall – the Kodak MVS-5380 system. It looks like a very compact VCR, but is much more. It is both a very high quality 8mm (the tape cassettes are just slightly larger than a standard audio cassette) video recorder, and a high fidelity stereo (actually three channel – more about that later) PCM (digital) audio recorder. Note that while this discussion is specifically about the Kodak product, you can expect the rapid proliferation of similar 8mm machines from many of the major Japanese suppliers.

Of special interest is the flexibility of the new Kodak audio-video VCR. It is of course a high quality video recorder, with all of the features and conveniences expected of a modern VCR such as regular and slow record and playback speeds, fast forward and reverse scan, a clear freeze frame and an outstanding single frame advance, complete function remote control, on screen programming for multiple program and channel selection for future recording of programs while you are away from home, a 169 channel cable ready tuner-timer, and all of the other features you would expect in a high end

video recorder. This is done in a package much smaller than typical 1/2" VHS or Beta machines. More important, however, is its high fidelity audio capabilities.

The Kodak MVS-5380 has three high fidelity audio modes:

1. A mono FM high fidelity audio track (audio recorded on the video head similar to hi-fi Beta). This format is primarily used for the playback of live 8mm video tapes made with the Kodak Kodavision camcorders, the current generation of which records high fidelity mono sound using this FM process.
2. A stereo high fidelity PCM (digital encode of the input signals, storage on the 8mm cassette as "numbers," D to A decode of the encoded data at playback, and then playback of the analog output after decoding) along with normal video recording and playback (maximum four hours record and playback time of video and stereo PCM audio combined).
3. If the MVS-5380 is used for stereo audio recording only (no video on that specific cassette), then six times as much stereo PCM audio can be recorded for a total playing time of 12 hours in the standard speed (one Kodak official joked that some "equipment orientated" audiophiles would be able to record their entire record collections on one Kodak P120 video cassette!).

Note that under some conditions, it is possible to use both the two channel PCM audio and the single channel FM stereo audio at the same time, and blend between them, for three channel "surround sound" or other special effects. It is going to be an interesting audio tool.

For those that are interested, the following are diagrams of the helical track configurations on the 8mm tape for video and multi-channel PCM audio use:

**Helical Track Configuration for 8mm Video
Video & FM Audio & Digital Stereo Audio**

**Helical Track Configuration
for 8mm Multi-Channel PCM**

Note that this configuration is a international agreed upon standard for all future 8mm video and PCM stereo audio tape recorders! (No VHS-Beta incompatibility kind of problems.) A tape you make (either video or audio) on one brand of 8mm machine will play back on any other 8mm machine.

The PCM audio standard for 8mm video cassettes uses an 31.5 kHz sampling rate allowing a flat frequency response up to 15 kHz and an 80 dB signal to noise ratio. Don't neurose about not getting to 20 kHz!

1. This is a far better range than any analog audio cassette recorder's capability. Note

that an audio cassette's signal to noise ratio is measured at 0 dB while the frequency response is measured at -20 dB. You cannot have both at the same time, and at 0 dB, an audio cassette is lucky to make 10 kHz bandwidth, with great gobs of distortion. At -20 dB, the signal to noise ratio of an audio cassette is poorer than 40 dB, so any really high highs (if they existed) would be buried in the noise anyway.

2. As I have stated so many times before, there simply is no useful music in the 15 kHz to 20 kHz range. It simply does not matter if small children, a few women, and most dogs and bats can hear out to 20 kHz and beyond – there isn't any music out there to hear! True, if measured very close to the instrument, one can pick up harmonics going out into this range. However, when we listen to a live performance, we don't do it with our ear stuffed in the bell of the horn! At least I don't, and I hope you don't either (Whaaaat? Speak up please!). We listen at some real distance from the performers, separated from them by a bunch of air. Air is a natural high filter! By the time the music gets to you, the extreme highs have been rolled off until they are simply buried below the ambient noise floor. They just are not there at all. They are not there to record (unless the mic is stuffed up the a— of the instrument to provide you with that very unnatural listening location). The 15 kHz to 20 kHz sounds are not on the records, not on the tapes, and whether or not we have the bandwidth in the tape recorder to record these non-existent sounds (as Clark Gable told Scarlet in GWTW) "frankly, my dear, I don't give a damn."

By the way, this is the reason that any time one tries to "equalize" ones system so the highs are "flat" at the listening position, the resulting sound is very bright with screaming and unnatural sounding highs. In real life, the highs are not flat at your listening position, they are rolled off by the air between you and the performers. Trying to boost the highs to make up for the natural rolloff simply makes the highs very unnaturally excessive. Forget it!

3. As I have also said before, what is important for perceived realistic reproduction of music is very low distortion (from all distortion and resonance generating mechanisms) within the range that can be recorded. If we can achieve perfect reproduction of the performed sound from, for example, 30 Hz to 12 kHz, even the most demanding "golden ear" will perceive the reproduction as being a very natural illusion of "live." The reason we can still

tell live from recorded is not because of bandwidth limitations of recorded, it is because of distortion and resonance limitations. If "extending the bandwidth" of some piece of audio gear gives you the impression that the "highs" are now closer to real, you are hearing a "side effect" – in the process of extending the bandwidth, the design probably accidently, improved the linearity in the 5 kHz to 15 kHz range, and that improvement in real linearity is what you are liking, not the extended bandwidth in and of itself – and it is not necessary to extend the bandwidth to improve the audio range linearity. In the Super-Pas preamplifier, for example, the effect of our new photoflash B+ power supply did not extend the bandwidth of the unit at all, it simply improved the linearity of the plate resistors, but it sure sounds like it extended the bandwidth as the highs, bass, and mids too, are much clearer and more musically natural now. It still has the same bandwidth, but golden ears (who almost always mix up cause and effect in evaluating products only by ear) will surely think we extended the bandwidth of the unit. We didn't.

Anyway – back to 8mm PCM sound. The important characteristic of this new format is how well it is executed, not the 15 kHz high frequency limitation. If the makers of the machines build equipment that is very linear and free of distortions and resonances within the range that they can record, the results will be just great. If however, the output filters and analog output stages are done as badly as in most compact disc players, the results may be disappointing. For a final evaluation, we will have to wait until we can get ahold of a sample to play with.

The new PCM 8mm audio record and playback format can work, but it is too early to tell if it will work. In any event, it is almost surely going to be better than analog cassette tape recorders, which simply don't work. And finally, if you make your own live recordings with the new format, almost any of you can do better than the typical "studio sound" engineering with booming bass, whizzing highs, and the 80 musicians each in their own individual padded telephone booth imaging.

I have now had quite a bit of time to use the Kodavision camcorder and have recorded a couple of concerts with it. It simply works just great! The video quality and color balance (both indoors and out) is just fine and the resolution is as good as the best consumer 1/2" Beta or VHS cameras. I can't get over having only a little five pound package to carry – color camera, video recorder, hi fi sound recorder, battery, cassette, and all. The FM high fidelity sound record and playback is just fine. It makes standard Beta or VHS audio performance sound

simply sick! The jazz band performances I have recorded with the Kodavision give me better audio playback than the professionally done Dolby encoded audio cassette copies of the same concert. The sound simply “sparkles.” It is quiet, dynamic, low distortion, and clear. I like it a whole bunch! I can hardly wait to record those Grand Prix cars going into Tarzan corner at Zandvoort. (I will be using ear plugs, but it sure will be nice to get audio on my video tapes that doesn’t sound like the camera was wearing ear plugs.)

I can pick a couple of “nits” with the Kodavision hardware:

1. The switches that turn the power for the camcorder on and off are on the “body side” of the unit when it is being carried by the shoulder strap while not being used. It is too easy to bump the slide switch without knowing it, and turn the camera on accidentally. Thus, it is possible to run its battery down while you think it is off, and surprise, dead battery when you want to use it again. Kodak should add a safety cover to this switch bank to prevent this possibility. All isn’t lost though, the batteries are very small and light, and you ought to be carrying a couple of charged spares.
2. Although the “cradle” (an indoor adaptor that holds the camcorder and converts it into a full function VCR complete with tuner-timer option and remote control) works just as well as any VHS or Beta VCR (with much higher quality audio than either), it does have an annoying limitation – no blinking lights!

There are no visual indicators (except for a very hard to read little LCD tape counter) to tell you what mode you are in when using the unit as a VCR. You cannot be sure whether you are in the record, pause, play, rewind, or whatever mode unless you are very certain of which buttons you pushed.

Note that the camcorder itself has excellent “telltales” of what you are doing (most visible on the black and white TV screen viewfinder). It is only the optional separate cradle VCR adaptor that is lacking these functions (and the blinking lights on the camcorder are buried and not visible when it is in the cradle).

Kodak should most certainly revise the cradle and equip it with the necessary control function indicator lights to make its use as “foolproof” as any other VCR.

3. The shoulder strap for carrying the camcorder should be revised so that it can be kept on your shoulder while bringing the camcorder to the use position. Now,

you must drop the strap off your shoulder to use the camera – leaving you with another possible failure mode – the “drop the camera” mode when you forget to slip the shoulder strap back on your shoulder before letting go of the camera (good-bye \$1800.00!).

4. The retail price is simply too high for the Kodavision system to gain wide acceptance at this time (a \$29.95 Instamatic, it isn’t). The full function camcorder is about \$1800 (with AC adaptor – battery charger – VCR-TV interface), the VCR cradle is about \$200 and the timer-tuner module for the cradle is another \$300. Extra batteries are about \$30 each, while the list price of 90 minute 8mm tapes is about \$15.00. Throw in another \$80 for the travel bag (holding the camcorder, AC adaptor-charger, and supplies) and you have a very expensive little package. The system is widely discounted though (check out all the New York mail order camera companies – not audio stores).

I have seen the basic camcorder, with AC adaptor-charger and travel bag, for around \$1100 from some mail order discount houses. And, since you don’t really need anything else to playback through your TV set (and you can dub and edit to any standard VCR without other accessories) I guess \$1100 is not too far out of line for a complete color TV camera and hi-fi video-audio recorder that only weighs 5 pounds. I am not going to let go of mine!

Now, not for the long awaited summer C.E.S. show report. My field rep is still working on it – draft one came through sounding too much like it had been written by Len Feldman – he will try again with a bit stronger value judgments. Hopefully in September?

Now, what do you want me to do next, the T-60 rebuild project, a look at a couple of really nice Telarc CD’s, or a preliminary report on the recently received (at long last) Mission 7000R digital disc player?

I thought so. Since I did spend some time last month thoroughly panning the Telarc CD of Papa Do Run Trip Flop Crash Burn, it is only fair to advise you of some really useful Telarc CD releases:

1. CD 80108, Mozart, *Eine Kleine Nachtmusik* and *Posthorn Serenade*. This Telarc is a positive must buy. It simply has the nicest string sound of any CD I have yet heard (and it is nearly all string sound). It is a lovely performance of a couple of lovely pieces of music and is simply enjoyable for the music’s sake. You get to find out what a “posthorn” is too (if you read the program notes) and hear its striking and somewhat haunting sound. We note

with interest that this Telarc was monitored using B&W 801F loudspeakers instead of their usual ADS monsters. Does that correlate with their improved string balance? I wonder?

2. CD 80102, *Telarc Sampler Volume II*. This sampler contains excerpts (typically two to four minutes each) from twenty different Telarc CD releases. Since I have nearly all of the complete works sampled, I can assure you that the samples are indeed representative of the various works as a whole. Why waste time reading about what I think of the various discs when you can become your own reviewer before buying the whole thing. Get this sampler and use it to select or reject the Telarc CD previewed therein.

We will talk about some more CD software next month anyway.

On to some new CD hardware, namely the Mission 7000R (remote) CD player.

What I didn’t like about it:

1. It is about three times as expensive as the Magnavox 2040 machine it is based upon (I can buy the 2040 right now for \$248 from, you guessed it, Best Buy Co.)
2. It has a humungous on and off “pop.” Keep your preamp volume control all the way down when turning the Mission on or off or kiss your woofers good-bye. This is simply crappy engineering and there is no excuse for it. The Magnavox 2040 does not have this “modification” and I can certainly do without it.
3. I don’t like watching my disc vanishing inside a sliding drawer (urp!) not knowing for sure if they are ever going to come out again. This feature is stock Magnavox (on this model but not on the 1010 series machines) and although in Philip’s design, the drawer is a disc carrier only (the turntable, laser, and wiring thereto are fixed inside) I still don’t like it. I have noticed some “rough center hole edges” on a few of my discs that have been regurgitated back out to me, and although I am not sure that they were not there before, it makes me wonder.
4. The interconnect cables supplied are single ended soldered in. You do not have standard audio output jacks giving you a choice of interconnect cables (and the capability of easy replacement of a worn out cable rather than an expensive trip to the repair shop). Mission claims this is to eliminate a set of contacts and give more wonderful sound.

I note the cables are identical to the Magnavox plug in cables supplied standard with my \$149 1010 CD player. I do note

that while some Magnavox models (such as mine) do have standard output jacks and separate cables, some Magnavox models do come with hard wired in cables (so do \$89 boomboxes). I claim that the unit has hard wired cables because that is the way Mission got them from Philips, and that is the cheap way to do it. Better sound? Baloney!

5. There is absolutely no Mission supplied documentation giving any data at all as to why the unit should perform better or cost so much more than the standard 2040. The technical data is similar to the specifications of any other Philips disc player. There is not a clue as to what Mission has done to the unit (except to paint it black and raise the price).

Even for service, the unit goes to, you guessed it, Magnavox (North American Philips). What is going on here anyway?

What I like about the Mission 7000R disc player:

1. It seems to be very slightly smoother sounding on some CDs than my Magnavox, but slightly less dynamic sounding on others. The differences are minor, but, if the two units were the same price, I would choose the Mission over my Magnavox, if the Mission did not have the large on-off thumps the Magnavox does not have.

However, the Mission is not the same price (it is much more expensive), and it does have large turn-on and turn-off transients. I will keep my Magnavox 1010.

Note that the differences I can perceive between the Magnavox and the Mission are not clearly "better-worse" differences, but simply slight "different" differences. There is much more difference between the engineering merit of any two CD records, and much more improvement can be gained by simply making sure that the rest of your system is reasonably linear.

There is simply nothing about the Mission to justify its much higher price.

This looks to me like another example of esoteric hi-fi hype in which the claims are that the piece is just wonderful because we say it is just wonderful and we are the authority on knowing that it is just wonderful and we can write pages of prose telling you absolutely nothing except that it is just wonderful and because it is just wonderful because we say it is just wonderful then it is worth some small fortune more than mundane not just wonderful equipment and you should be so very happy to pay us any price our whims try to extract out of you for our self proclaimed just wonderful gear and you should be grateful to do this because we are ourselves just wonderful for

dedicating our lives to bringing you equipment we say is just wonderful and really you should even pay us more, so there! I seem to be missing something here. To me, just wonderful is not \$1000 turntables with \$2.00 clock motors or \$600 CD players that are modified to go "whatch" when you turn them on. Thanks but no thanks.

I will stick to products that exhibit good engineering. We will engineer a new power supply for your T-60 next month. See you then.

Frank Van Alstine

VOLUME FOUR NUMBER NINE SEPTEMBER, 1985

Here it is the worst of all possible times and the best of all possible times – or, what a messed up, confusing, unproductive, and stunningly productive month. It's lucky that *Audio Basics* is getting written at all, but I sure have a lot to tell you about.

I stepped off the 747 returning home from England (after camping in the London airport for hours due to an "engineers meeting" (wild-cat strike) by British Airlines, watching all their flights to everywhere change to "delayed" on the big departure board) with a giant sinus infection – which simmered along for a week and then turned into the worst virus infection I have had in years. Two days flat on my back hallucinating with a 102+ fever, followed by another week with no sleep and making everyone around me miserable too. At the same time, our daughter left for college (I lost a first class component and PC card assembler and the house got mighty quiet), and Dave Umeda became a proud father for the second time (a girl) and was called home for domestic duties for a week. Needless to say, not much got done that week – except – during my rational moments (I think) I spent my time at my test bench putting the finishing touches on a new product, a product that finally makes me like my CD player and all my compact discs, a product that is going to make a lot of waves – kind of a "CD fixer" and a lot more. I sent one to *Stereophile*. Three days later they called me back to say they liked it. Three days later another *Stereophile* reviewer (from a different part of the country) called me to ask if I would build one for him. The waves are starting to splash already! More about it later in this issue. Anyway, everybody either gets sick or goes away, and at the same time, out comes a new product that everyone is going to like. As I said, an interesting month.

August was interesting too – most important to you was my **visit to the B&W factory in Worthing, England**. I would like to tell you a little about it.

Worthing is a little typical English village on the channel coast, about 20 miles southwest of the resort city of Brighton. It's set in rolling hills down to the grey channel, with gobs of green patchwork farms and red tiled roof cottages. It was a pleasant morning hour's train ride from London's Victoria station, and the round trip fare combined for my son and I was under \$15.00.

We were met at the station by the wife of Peter Hayward (the director for USA sales and service) in a ten year old, but immaculate, Mercedes. Mrs. Hayward whisked us off (talking to all the other drivers like a polite NY Cabbie) to the main administrative headquarters (and components assembly building) on the outskirts of Worthing. There we were met by Mr. Hayward, and he and his wife spent the entire day being our guides and hosts.

I must mention here that B&W is a closely held private company, much like a family, and we were treated like old family friends in the best sense of this tradition. Visiting them is a lot like going to Grandma's for Thanksgiving. It was really fun and they made us feel so welcome and comfortable. They are nice people!

B&W now operates from four separate facilities (none really big – maybe 100' x 200' single story industrial type buildings similar to those in any modern suburban industrial park). Three of the buildings are within a short drive of each other in Worthing; the components assembly building where the raw woofers, tweeters, mid-range units, and crossovers are made, the small speaker assembly building where everything up to DM1400s are built, and the large speaker assembly building where 2000s, 3000s, 802s, 801s and the new 808s are built. There is a new fourth building located in Steyning, a smaller village ten miles or so away; the research building where John Bowers, the engineering staff, the laser interferometer, the PDP computer, and the prototype shop and the custom listening rooms reside. The research building previously was owned by the founder of SME (the English tonearm designer) and thus didn't take a complete internal redesign to become very useful for B&W's purposes.

Our first stop was to an old BMW sedan parked in the employee's parking lot behind the component assembly building. It contained the new B&W MASS car speakers, driven (as I recall) by Alpine and Nakamichi car electronics. Mr. Hayward played a demo cassette and I was most impressed. We actually got music in an automobile, with clean bass and highs without mid-fi boom and whiz. The B&W MASS car speakers come in a variety of configurations; the basic building block being a 120 mm kevlar cone loudspeaker with a 2" 250°C voice coil and a 2.75 pound magnet structure. This driver is available in a variety of mounting fittings, including a dual driver array

designed to replace a standard 6" x 9" car speaker. The speakers are passively equalized for car applications where most of the output is reflected off the window glass. There are tweeters (based upon the DM3000 and 801 units) and crossover modules available too, complete with a back panel woofer system coupled from a trunk mounted sealed box sub-woofer. Many attractive mounting panels are available. I don't have data yet on prices and all the permutations (there are many and the basic prices are in the \$70 to \$120 each range) but, one of these days soon I will do a MASS system in my Quattro and tell you the results. I can tell you already its the first car system I have heard that sounding more like music than like a loud mid-fi car radio thrashing around.

The component assembly building is, as mentioned above, where B&W hand makes all of their internal parts. I watched voice coils being wound, kevlar cones being stamped, crossovers being assembled and tested, and woofer cones being damped. It is an astonishing combination of careful hand craftsmanship and exacting electronic testing. Everything gets tested. The plant abounds with "mini" anechoic chambers where individual tweeters and mid-range units can be swept with the output being compared to the design standard for that particular model. The driver either passes all the tests, or it is rejected, the metal framework salvaged, the works ripped out, and back to the assembly line for all new moving parts to be installed. The careful workmanship is evident, not many raw drivers fail. A special group of craftsmen were building the 808 components. The magnet on its tweeter is awesome – four times as thick and powerful as any other B&W. Yet DM100 components were being built with the same care and workmanship and testing as the parts for the expensive systems. Its nice in this day and age of quick and dirty stamped out merchandise to find real craftsmanship.

Next, we visited the small loudspeaker assembly building. The first thing we noticed is that B&W does not make sawdust or boxes. Almost opposite from other speaker manufacturers who simply make wooden boxes and buy their components from OEM suppliers, B&W has their cabinets made to their specifications by outside custom cabinet shops and then installs their own purpose designed insides at their own factories. This keeps their plants clean and free of hazardous woodworking chemicals. Incoming cabinets are carefully inspected – I saw rejects for which I simply could not find the flaw!

I think the most impressive system at the small speaker assembly building was the full size anechoic chamber at the end of (and a part of) the assembly line. Every single finished loudspeaker system is completely tested again and

compared to the reference standard for that model. The finished product must be completely within the specifications for that model or it is rejected and not shipped. The tests include frequency and phase response, distortion, and even a very careful check for cabinet resonances and buzzes. To provide true matched pairs, B&W can store in its computer the exact response evaluation of all passing loudspeakers of a production run, and then tell the computer to "match pairs" from all the properly working systems, to insure that pairs of B&W loudspeakers are very tightly matched to each other.

Because even with careful workmanship and testing, loudspeakers are made by human beings who sometimes make mistakes, B&W further does their best to "foil Murphy" by including, with each and every shipment of products to their worldwide distributors, a shipment of tested spare parts to insure that any flaws can be given prompt warranty attention and to insure that the need to go all the way back to England for service parts is nearly eliminated.

Our next stop was the large speaker assembly building. There we watched the astonishing new 808 monitors being assembled. These are B&W's 126 dB output, 90 dB efficient wide-band studio monitors for those professional situations requiring sustained very high level output exceeding the capabilities of the 801F Specials (which are used now by almost all classical recording studios worldwide). The 808's are shipped in wood crates with a total shipping weight of nearly 250 pounds each. They use two monster woofers, dual kevlar transmission line tuned mid-range units, and a new super high power tweeter. The production line anechoic chambers were much bigger at this plant to accommodate the bass capabilities of the loudspeakers. I found out that the shortage of DM2000 and DM3000 models last winter was due to a sustained production flaw by their glass top supplier. They rejected nearly 3000 finished glass tops and had to stop production of these models until their supplier learned to get the tops cut and finished as B&W specified them.

We also learned that although the huge and expensive (\$7500/pair) 808 superspeaker has become quite popular for private home use in many parts of the world, not so in England. It simply is too big for almost all English homes in which a 10' x 12' listening room is considered big. Their domestic dealers do not stock or display them. There were production lines running the newest version of the 801 loudspeakers too, the 801F Specials. This state-of-the-art system has evolved quite a lot over the years, and now has concrete mid-range enclosures, the latest polyimide tweeters (808 technology) and my current 801 demos are simply the best sounding 801's I have yet heard – very

smooth, articulate, dynamic, and high resolution. Because the basic design was done right the first time, and engineering improvements have been retrofitable, the 801 simply goes on and on.

Next we headed for lunch. Frank Jr. got to ride with Mr. Hayward in his pet Porsche 911. It was a bit of an experience for him, as he was sitting in what would be the driver's seat in the USA, watching the world zip by at normal English driving speeds (which would make the Radar Nazis here go berserk). He was a bit wide eyed when we caught up to them at a little Inn in another nearby village.

Mr. Bowers was waiting for us – he had taken a half day off from his research just to meet us, have lunch with us, and give us a thorough afternoon tour of the research facilities. Lunch was simply unbelievable! The Inn had a buffet like nothing I had ever seen before – hors d'oeuvres including fresh salmon, squid, and shrimp to a main course including five standing prime roasts – beef, veal, pork, ham, and lamb, along with loads of fresh veggies and tons of homemade breads, pastries, cakes and pies. The B&W folks thought it was simply a normal little lunch place!

I could have spent the rest of the day there, munching on everything – the owners made sure we knew we were supposed to be trying everything and, "surely you want some more, don't you?" But time was going by and we were due at the research lab.

This facility was acquired so that Mr. Bowers and the engineering staff could be separated from the routine management of production, and become more productive in developing new product and trying out new ideas. The building contains the computer room, the laser interferometer room, several listening rooms ranging from semi-anechoic to typical small live rooms (B&W wants to be sure their loudspeakers will work well in your room), a sophisticated prototype building lab, and electronics lab, engineering staff and Mr. Bowers' offices, and, temporarily, a production line building the new John Bowers Active 1 (self powered) loudspeaker system.

Our first stop was the biggest listening room where the 808s were set up, driven by a pair of new (prototypes) 1.4 kilowatt each mono mosfet B&W power amplifiers and a B&W preamplifier (\$3000 each for the amplifiers, \$2000 for the preamp). Along with the \$7500/pair 808s, this made up a rather expensive (\$15,500!) system, and I thought that it better be pretty impressive. It was! The demo used a variety of compact discs for a source (a top of the line Nakamichi CD player was used) and, to be brief, it simply literally knocked my socks off! The 808s simply reproduce dynamic transients, cleanly, from top to bottom, that would just destroy any other loudspeaker system.

One of the remaining major differences between the reality of live music and recorded reproduction is the dynamic transient limitations of any playback systems. One simply cannot (until the 808s) play back music transient peaks with the same sense of "being there" as live. The 808s with their extraordinarily high efficiency and extraordinarily high power handling capability and acoustic output, goes a long way towards bridging this gap. They played back rim shots and drum whacks that would have simply bottomed the drivers of any other system. And, they did it without stress, and with excellent musicality in all other respects. To those that can afford them, they will be well worth the money in a major step forward in musical reality.

We then visited Mr. Bowers' office, where the Active 1 system was set up, driven by another Nakamichi CD Player. The Active 1 (\$3000/pair including built in bi-amplification – all you need is a preamp) was much more impressive than its early write-ups would suggest. The woofer in each side is driven by a 100 watt mosfet amplifier and the mid-range and tweeters by another 100 watt mosfet amplifier of B&W design – total 400 watts of dedicated power per system. The cabinet looked superficially like a DM1400, but a close inspection shows a much larger cabinet volume and purpose built drivers for this application. The system played with satisfying dynamic range, impact, frequency response, and musicality, even after our recent exposure to the 808s. I decided to play the devil's advocate and asked, "O.K., these are really nice, but have you directly compared them with a set of DM3000s driven by a separate high quality amplifier so that the package price is about the same?" I was thinking, of course, that 3000s and our Transcendence 200 would be about the same price as the Active 1 System. I didn't get a really direct answer. Bowers, and his engineering staff suggested instead that the Active 1 system was for the music lover who didn't understand, nor wanted to put up with, a normal components system. It is for the person who wants the minimum of parts and connections, doesn't want to learn how to connect an amplifier to a loudspeaker, but simply wants quality music playback. They pointed out that sales are exceeding their expectations, so there must be a lot of people like that out there. B&W supplied me with a complete service and parts manual for the Active 1. The amplifier circuits do not break new design grounds, but work smoothly and well, and seem to be well built. The same construction and testing detail work was evident in both the Active 1 electronics and loudspeaker assembly lines.

Dr. Glyn Adams was still busy with his laser interferometer, doing detailed analysis of B&W drivers (and, I noticed, competitors' drivers too). I saw a few three dimensional plots of

some competitors' (unnamed) drivers that looked like an aerial photo of the Rocky Mountains. The prototype lab was busy building up all kinds of odd looking things, including a speaker that looked a bit like a small DM1400 with a free air mounted tweeter. An electronics lab has been added as B&W starts production of their own electronics. There were several more engineers and technicians busy there, measuring and testing. They seem to be very happy with their Active 1 electronics and the new giant mono (bridged) mos-fet power amplifiers, but were less sure about their prototype preamplifier circuits. I suggested that we could build them a good preamp, for a reasonable price. They asked me lots of questions, and I suggested the next step in loudspeaker design was drivers with much greater slew rates and dynamic transient capabilities so that the transient performance of the 808s could be achieved at a much lower price for the average customer.

I pointed out that CD is with us (whether we like it or not) and now the industry must design to get the best from those compact discs, and that yesterday's thinking probably isn't good enough. The B&W people did not disagree with me. The day ended far too soon, and Mrs. Hayward drove my son and I back to the train station. Unfortunately, we got on the wrong train and ended up in Brighton instead of London. Fortunately, there is really super train service in England (when they are not on strike) and from Brighton we were able to catch a faster train a half hour later that actually got us back to London as soon as the original local would have. Then it was back down to the subway (surrounded by green and red spike hairdos – after a couple of days they started to seem to look normal) back to our hotel and then the following day off for the continent with Page and Moy tours and a super two weeks following the Grand Prix circuit, but that's another story. I got about an hour of video tape in at B&W but simply have not had time to look at it yet. I will report here when I have time to get it all edited.

Now, for something completely different.

You are probably wondering why my about face of page one. What have we done to our CD player so that I now am very happy with the musicality of my compact discs? I have not done anything (directly) to my CD player. I have, however, done something to the interface between my CD player and my system – namely, a new preamplifier, the SUPER-PAS TWO.

The SUPER-PAS TWO is a brand new (three PC card set) vacuum tube preamplifier for any Dyna PAS chassis. It is giving us musical results far better than I had expected, and most usefully, extraordinary musical results with Compact Disc Players. All of the "digital edge"

is gone, replaced by the highest resolution, most natural musical overtones, and best staging and imaging you have ever heard. No, we are not rolling anything off (the Super-Pas Two has much wider bandwidth). Simply, the Super-Pas Two seems to cope much better with high voltage ultrasonic garbage from CDs, suppress it, but play all the music. My CDs now have a more liquid and musically natural high end than the very best of my direct disc recordings. Do I recommend a CD player now? You bet! But only if there is a Super-Pas Two in your system.

Is it the "perfect" component? Of course not. It does not play extreme bass dynamics with quite as much authority as our best solid state preamps (but with much greater authority and control than the original Super-Pas and with stunning mid-bass clarity). It does play bass "fast," and musically "right." Transients don't "zing," but are musically clearer. If you want crash bang boom sound, or simply won't go near a vacuum tube, the Super-Pas Two is not for you.

What's inside the Super-Pas Two that makes it sound so musical? First, an immense new power supply, built on a new PC card, replacing the quad filter cap, the heater supply parts, and most of the grounding network. The new B+ sections are 100 μ F, 100 μ F, 750 μ F, 750 μ F – over 300 times stiffer than the original supply. There is simply no ripple or audio signal on the supply feeds at all. The heater supply (built on the same PC card) uses 20,000 μ F of filtering. In addition, the supply board layout eliminates all the inductive B+ wire runs and their high frequency resonances. The wide band and stable characteristics of our new power supply allow us design freedom with the audio circuits not before possible. We have extended the audio bandwidth dramatically, but still keep it further than ever within the power supply envelope.

Next, we designed a new stereo RIAA phono preamplifier circuit board. Taking the basics of our Super-Pas phono circuit, laying it out without compromises on a new circuit card configuration, adjusting the time constants to take advantage of the new power supply, and building it with better quality parts yet gives us a phono section that simply will not overload, no matter what kind of high frequency garbage is fed in. The result, stunning musical transient behavior, with cartridge mistracking "spit" essentially eliminated, and superb harmonic structure and imaging.

Then we designed a new stereo line amplifier section circuit board. This is the "heart" of the Super-Pas Two – a line section that does not overload on anything. The high frequency extension and mid and bass linearity is over four times better than the original Super-Pas. This circuit does exceptional things – such as "sort

out” the music from the garbage, play the music, but not pass the garbage downstream. Your amplifier will love it! Although the better the amplifier, the better the overall system result (it works simply great with a Transcendence 400), the Super-Pas Two line section does wonderful things for less expensive amplifiers – it will make an inexpensive MOS-FET 120B resolve music and play bass and transients in a way you would think impossible. We designed the line section suspecting that high voltage ultrasonic garbage was causing the non-musical highs on CDs. Our theory, if nearly unmeasurable high voltage trash was overloading low voltage solid state circuits downstream (even solid state filters as in the Mission and Meridian disc players), then the cure should be a high voltage, very linear, and overload proof line section. At this time, this can only easily be executed with a vacuum tube line section. We did it, it appears we were right, and now, with the Super-Pas Two, CDs will play music, not garbage.

Are there any drawbacks to this line circuit? Yes, because the output impedance of a vacuum tube stage is higher than with solid state, you should use short, low capacitance interconnect cables, and avoid the use of a very low input impedance power amplifier (less than 20 K Ω). The system will still sound musical, but dynamic range, bass impact, and frequency extension will suffer somewhat.

Of course we use precision volume and balance controls and rewire everything except the AC outlets and some of the switching wiring (if originally done properly). There are two useful extra cost options: 1. We can install a new ceramic selector switch which provides two additional sets of line level inputs (phono, five sets of line in, plus tape in, tape out, and audio out) and extends switching reliability. 2. We can install a set of four select hi gain 5751 industrial tubes, and at the same time further extend the line section bandwidth time constants to take advantage of the greater drive of these tubes for better dynamic performance yet. Each option is \$40.00. The basic price of the Super-Pas Two rebuild is \$300 if you furnish the original PAS (either a working unit or a new S.C.C. kit), or \$400 if we furnish a complete unit built in a clean used chassis. If you supply an original Super-Pas for the Super-Pas Two circuit set, deduct \$50 from the price as we can salvage the precision controls. Note that *Stereophile* has already called us telling us that they like their sample. We think you will like it to, especially if CD is to be your main music source in the future.

Frank Van Alstine

VOLUME FOUR NUMBER TEN OCTOBER, 1985

It is renewal time for your *Audio Basics* subscription again for many of you. The good news is no price increase for 1986 as we do not anticipate any short term increase in first class postage and we will absorb the increased paper and printing costs for a year. Please get your renewals (\$16.00 for 12 1986 issues + \$4.00 for foreign air mail) in early so they don't get mixed up with the great Christmas Card rush and become delayed. If there is some aspect of *Audio Basics* that you don't like, please let me know. The people who like my writing always let me know they like it, and give us steady renewals. Those of you that are disappointed simply do not renew, but do not give us any feedback about what you want changed. Since my crystal ball design project still is stalled, I simply cannot make *Audio Basics* more what you want unless you tell me what you want! We are smaller than *Stereo Review*! We can be more responsive to your requirements, but only if you tell us what your requirements are! I want to hear from you!

I was the guest speaker at a Minnesota Audio Society meeting recently. I presented the new Super-Pas Two preamplifier to the club, using it (and a Mos-Fet 200B) with several CD players brought in by members, especially playing some of their “problem” compact discs to see if the problems would vanish with the Super-Pas Two. I have several observations I would like to relate to you regarding the demonstration:

1. The acoustics of the meeting hall (a church annex) were terrible – gymnasium sound all the way. Why can't audio clubs find good sounding meeting facilities? In spite of the room acoustics, the character of the system still was audible.
2. Although I did not need to bring loudspeakers (a pair was to be furnished by a club member) I don't like to give Murphy an even break and hauled along a set of B&W DM33Os anyway. The promised speakers did show up, a set of JSE Infinite Slope Model I speakers (\$919/pair and highly regarded by many audio critics).

I am glad I brought the DM33Os (\$650/pair). Even with the JSE speakers set on chairs to reduce floor coupling and boom (the B&Ws remained floor standing) the JSE speakers boomed worse, and had obvious midrange dips and treble thickness. Essentially, with the JSE it seems you pay about 50% more to get 50% less loudspeaker (both in quality and size) than the B&W. So far my continuing observations regarding B&W over the years has held true – when directly

compared with other loudspeakers in the price range (using a high quality amplifier that does not change sonic character depending upon the load it is driving) the B&W speakers always seem to win.

3. Even with the worst of the member supplied compact discs, I was able to prove my point – CDs simply do not sound harsh when the Super-Pas Two is in the system. Granted, there are CDs that still sound terrible – but for different (and now obvious) reasons. You now hear the potted 15 kHz equalizer control the recording engineer used to “get better highs” as simply a far too loud and unnatural top end – but without harshness. You now hear that the recording hall was all wrong for the performance (you now hear “gymnasium sound” from the recording session rather than a vague concern about “missing ambiance”). But best of all, you now really hear when it is done all right – best example – Telarc's *The Four Seasons*, CD80070.
4. I used a variety of Compact Disc players at the meeting, and although most worked well and musically with the Super-Pas Two, I did notice some sonic differences – mainly a Hitachi unit that simply sounded like a Japanese receiver – compressed, undynamic, and dull. It had loading troubles too (simply gorged and would not play my flawless Telarc CD-80076, *Symphonie Fantastique* – another must for your collection). It thumped in and out of muting on the last movement making nasty noises through the system. Perhaps the Hitachi was simply defective. It was the worst sounding CD player I have yet heard.

The CD players furnished focused another of my “pet peeves” – black audio equipment with myriads of tiny black buttons and tiny grey labels simply are worthless in a dimly lighted room – you cannot read the control functions. I gave up trying to squint at them and had the respective owners (who hopefully had the control functions memorized) run them.

I then also (much to my dismay) came up with another pet peeve and learned the reason why “CD cleaners” are now sold everywhere. I was amazed at the number of people who simply pick up the disc between thumb and fingers (greasing up both sides) and stuff it in the player – flop grunch! – with my CDs too! Arg! Perhaps the theory is that lots of fingerprint grease helps prevent scratching when you slide the disc across the metal trim into the loading drawer.

5. My final comment regarding the meeting is that the group was polite, interested, and made me feel welcome. There were lots of well informed people there and they asked me useful questions in the discussion we had. I enjoyed the meeting and I think I better join the club.

I have had several repeated questions regarding the Super-Pas Two (along with many positive comments from people who are absolutely delighted with its performance). One of the most common questions is, "Why don't you use a solid state rectifier rather than the 12X4 rectifier tube?"

There are lots of good reasons why I do not use a solid state rectifier in a vacuum tube preamplifier:

1. A solid state rectifier immediately turns on hard, supplying full B+ voltage to the power supply capacitors and the circuit before the tubes have warmed up and started conducting. Thus the B+ voltage goes much higher than it does after the tubes have turned on and are drawing current. This causes several problems:
 - a. One must use higher voltage rated capacitors throughout which are bulkier, more microphonic, more inductive, and more expensive. The large physical size of the parts required gets in the way of a tight, and non-resonant, PC card layout. The end result is a more expensive and larger preamp that does not sound as good because it is not as stable.
 - b. The high voltage, applied suddenly to the cold signal tubes shortens their service life and leads to sudden tube (and possibly circuit) failure.
 - c. Coupling and blocking capacitors are inappropriately charged, leading to large (and equipment damaging) turn-on thumps and pops.
2. The output of a vacuum tube preamp power transformer is in excess of 350 volts AC unloaded. Power line spikes can multiply this momentarily to over 1000 volts! While a tube rectifier "doesn't care" and absorbs the spike without incident, solid state diodes simply short – zap – and sometimes take the transformer along with them. Just try and find rationally priced 2000 volt rated power supply diodes!

Some people try and make up for the voltage limitation of power supply diodes by using several in series. This does not work reliably as under transient conditions the diodes do not share well. You will still zap one and then take out all the others, your power supply capacitors, and your transformer too.

3. We are even more suspect of the transistor regulated power supplies used in some very well known (and very expensive) vacuum tube preamps. When a solid state power supply is combined with regulator transistors downstream, even worse things happen! The power transistors are simply grossly overvolted at every turn on and are a disaster waiting to happen. One Delco power transistor commonly used has a 7 volt base voltage breakdown rating. At turn on, before the signal tubes are conducting, the solid state diode bridge can put 400 volts across this junction. The only thing we don't understand is why this transistor regulator application ever works at all. Don't misunderstand, there is nothing wrong with the Delco part in and of itself, it is just that this is not a proper application for it.

Thus, we use a vacuum tube rectifier because it is reliable, has gentle turn on characteristics that do not overvoltage or stress parts or tubes downstream, is immune from high voltage line transients, and has no sonic disadvantages in this application. Note that in a solid state circuit the disadvantages discussed above do not exist. The power transformer step-up ratio is much less and the circuit is operating at somewhere between 15 and 80 volts (rather than 400+ volts). The current demands of the solid state circuit are, in general, much higher (beyond the current capability of a rectifier tube) and the "shock" of B+ to a cold device doesn't exist as the solid state signal devices turn on without need for prior warm-up. Line voltage spikes are not amplified as much so that 200 to 400 volt rated solid state rectifiers are reliable, and, in any event, careful power supply design can give gentle enough turn-on characteristics to insure that the circuit does not make severe turn-on thumps. Thus, what is needed is the appropriate rectifier for the application. There is no magic in the parts, the magic is in how well they are used.

Announcing another new option for the Super-Pas Two: A new ground plane back panel Switchcraft input and output jack set. The cost of this option is \$25.00 [1990 Note – now \$50.00 but includes gold jacks] installed when we rebuild your preamp. It replaces the original Dynaco jacks with a much higher quality and solid set spaced far enough apart that all brands of interconnect cables will fit without scrunching, and also includes a phono ground post. Yes, the jack set will interface with existing units (both with our circuits and stock) but you will need to do some sheet metal trimming of the vertical back panel sections between the existing jack sets and drill a few new small holes in the back panel. The do-it-yourself set is also \$25.00 (shipping in the USA included).

One afterthought regarding the Audio Club meeting – fuses. I ran the Mos-Fet 200B with 2 ampere quick-blow speaker fuses all evening, on both the B&Ws and the JSE speakers. The amp was driven hard, filling a 40 foot by 60 foot room. I didn't blow any fuses, didn't even stress them at all. Please tell me what clients are doing that routinely blow 5 ampere speaker fuses in a much smaller (and less power demanding) home listening room?

We get one general kind of telephone call routinely asking for advice that deserves a general answer here. The question is, "What brand of CD player, or what brand of video tape recorder do you recommend I buy?" Our answer, all other things being nearly equal is – buy the product from the company that was the original designer of that class of product. In other words, in video tape recorders, if you want Beta format, buy a Sony machine, if you want VHS, buy a JVC machine. Likewise, in CD players, buy a North American Philips machine (Magnavox or Sylvania brand) or if you want all the bells and whistles of a Japanese machine, buy a Sony. Why? Because all other things being nearly equal, the original designer of the technology probably knows more about the technology, how to improve it, and what its limitations are, than an outside company that is simply reproducing the technology under license. The licensee is probably behind on the learning curve. Think about this when you buy.

Another aspect of CD performance I need to call to your attention is called the "SPARS" code. This is a proposed standard identification for Compact Discs suggested by the Society of Professional Audio Recording Studios. At the moment, the use of the code is optional, but many of the better CD producers have adopted it. The SPARS code is a three letter code, such as [DDD] located in a very small rectangular box somewhere on the disc label or with the data sheet packed with it (sometimes, unfortunately, impossible to see until after you have purchased the disc and opened the packaging). The letters in the code, A or D, obviously tell you a lot about how that particular disc was produced:

The first letter tells you if the original recording was A (analog) or D (digital). In general, original digital recordings have better dynamic range, are quieter (no tape hiss) and obviously are likely to be more recent performances (for what that is worth). Obviously, one can make a fine analog recording or a sad sounding digital recording (especially with the first generation Sony digital recorders) but the first letter (A or D) does help you identify material pulled out of the archives.

The second A or D tells you if the original master tape (assuming, in the case of

analog, that the original master tape and not a third generation equalized dub was used—and you can never be sure about this until the studios become more consistent and aware of their need to produce consistently good material) was mixed to a digital (D) or an analog (A) recorder.

The third A or D tells you if the results of the first two steps were transferred to the final Sony 44K format via an analog (A) tape recorder, or was directly digitally (D) transferred. All other things being equal, lowest noise, distortion, and greatest dynamic range is possible with a digital transfer.

Thus, a [DDD] code tells you that this is an original digital recording, mixed and mastered to digital recorders too. An [AAD] code, for example, tells you the source was an analog tape, mixed to an analog tape recorder, and finally transferred to a digital master for making the compact disc.

As Christmas is approaching, its time for me to give you a brief rundown on the Compact Discs I have acquired that I like (and that you may like yourselves or will be pretty sure will make a good Christmas present).

Understand that my observations are primarily on the fidelity of the compact disc, not an evaluation of the subtle interpretation of the score by the conductor and the artistic merit of the orchestra, although none of the discs mentioned are obviously bad performances. The discs mentioned below are high fidelity with no obvious engineering screw-ups.

Earl Klugh, *Low Ride* (Capital CDP 7 46007 2) [?]. Soft jazz guitar with excellent fidelity into the character of the guitar and performer. Useful in judging the musicality of your audio system.

Dave Grusin, *Out of the Shadows* (GRP Records GRP-D-9511) [DDD]. Kind of organized pop jazz with excellent transients, range, and clarity. It is “studio” recording techniques at its best. After the first couple of plays, you will probably want to program to bypass a small number of boring cuts, but overall, worth owning.

Dave Grusin, *Mountain Dance* (GRP-D-9507) [DDD]. See above – ditto.

Beethoven, *Symphonies 5 & 6*, Berliner Philharmoniker, Von Karajan conducting (Deutsche Grammophon 413 932-2) [DDD]. I bought this disc primarily because it offers two complete symphonies on one CD (62 minutes of music) digitally recorded. If of equal quality to Telarc’s CDs it would be better value as Telarc has been a bit stingy in selling lots of blank CD time (they could do “two-fers” with most of their releases in the CD format). However,

it is not as good as most Telarc recordings. The 6th is a “good” multi-mic recording (as far as multi-mic goes) with a good performance and basically pleasant sonic balance and adequate definition. The 5th is not my idea of a good performance (hurried) and is much more “pinched” sounding. It is worth owning this CD to clearly sample the difference between DG recording technique (better than on many of their recent vinyl releases) and Telarc’s. With at least one mic on each orchestra section, the attacks “pile up” onto one another, juxtaposing the orchestra sections into a heap.

Leonard Bernstein, *West Side Story* (Deutsch Grammophon 415-253-2) [DDD] (two disc set). I really like this release! Contrary to a “panning” review in *Opus*, the quality of the performance is just fine (no, you cannot “understand the words” if you are trying to play it back on an off-shore all in one rack system – try again with a good playback system, *Opus*). Extremely musical throughout, excellent voice fidelity and sense of “space.” Lets have a lot more musicals done this well.

Linda Ronstadt, *What’s New* (Asylum 9 60260-2) [?]. Fine fidelity and sense of reality in the orchestration, with a series of meaningful performances by Linda Ronstadt on a collection of old “torch songs.” It suffers from a poor choice of vocal microphone which overloads and plays some “P.A. Sound” on the louder vocal passages. One of the last two fine orchestrations done by Nelson Riddle for Linda Ronstadt before his recent death. Worth owning.

Fresh Aire III, Mannheim Steamroller (American Gramophone AGDC-365) [?]. What can I say except it beats my now well worn analog record of this “fresh” studio “country jazz” performance in every respect. Unlike the Sheffield CDs I have heard, which sound like they were recorded on a Viking 88, American Gramophone loses nothing in the conversion to Compact Disc. American Gramophone calls this “Classical Rock” – whatever – its still fun to listen to, especially the performance by Claudette.

Fresh Aire V, Mannheim Steamroller, London Symphony, and the Cambridge Singers (American Gramophone AGCD-385) [?]. Again a fine “classical rock” recording that is simply clearer than the vinyl version of the same. I like it, my kids like it better yet.

Now comes a listing of a whole bunch of Telarc Compact Discs. To save space, note that all are [DDD] and most were done with a Soundstream digital recorder. I won’t restate

Telarc and [DDD] each time. All are high fidelity recordings using fine microphone techniques with excellent tonal balance and definition. This listing is more or less in order of my preference of these Telarc discs, with fidelity and a sense of “live music” being the most important considerations, but the quality of the performance as worthwhile music is considered too. With each Telarc CD for which I have the same performance on normal record format, the CD is purer, higher definition, and clearer, when the playback system is good enough. Even the tail end of this list is a superior chunk of software, and Telarc’s not listed are simply ones I don’t own, yet. Here goes:

Vivaldi: *The Four Seasons* (CD-80070). The best string sound I have yet heard.

Berlioz: *Symphony Fantastique* (CD-80076). I could listen to the 4th and 5th movements over and over again – beautiful musical dynamics.

Mozart: *Eine Kleine Nachtmusic & Posthorn Serenade* (CD-80108). I especially like movement VI of the Posthorn, when the Posthorns finally show up.

STOP THE PRESS – HOT NEWS FLASH! I have got to break in here, folks, to tell you about another vastly improved product, out of final testing today. Its our new Mos-Fet 120C power amplifier. It has been improved (and the sonic difference is obvious) in three separate areas:

1. A brand new output coupling network using ultra-modern low impedance blocking capacitors combined with fast film capacitors mounted on a new (additional) PC card has been designed. This network replaces the original ugly Dynaco chassis mount output capacitors and substantially extends the bass response, dynamics, and transient clarity of the amplifier. Long term reliability is improved too.
2. Two new, and twenty times as stiff isolated power supply sections are provided (one for each audio circuit card). These new power supply sections take interaction between the currents drawn by the output mos-fets and the small signal audio circuits down to the vanishing point. They provide the same kind of sonic performance improvement as the new power supply did for the Super-Pas Two – an obvious, and very pleasing improvement in musicality, definition, sense of space and imaging, and simply the character of the sound. It is closer to real. The new power supply sections are located on the additional new circuit card.

3. The input capacitors are replaced with film units having better impulse response characteristics and the values have been chosen to substantially lower low frequency loop error correction, thus giving substantially nicer bass definition.

The total of the improvements are synergistic – providing you with a low cost power amplifier that sounds a lot more like a Transcendence than it does like a Mos-Fet series amplifier (within its power limitations, of course). Its got great gobs of drive, excellent dynamics and imaging, and a top and mid range that is simply musical. The best news of all – NO INCREASE IN PRICE. The Mos-Fet 120C remains \$350.00 outright if we supply a clean used Dyna St-120 chassis or \$275.00 if you supply the original Dyna St-120 to gut and rebuild.

Retrofits are practical too! The cost (for all Mos-Fet 120B amps already having the ground plane output network located on a foil sheet between the output mos-fets on each channel) is \$95.00 including everything described above, complete re-testing and return shipping in the continental U.S.A. old (non-ground plane) Mos-Fet 120 or Mos-Fet 120B amplifier require the latest generation audio boards too, and a complete tear-down of both output circuits to retro-fit to Mos-Fet 120C status, a major project in which only the original 5 power mos-fets and the small regulator circuit board can be salvaged. The retro-fit price for these prior to ground-plane status amplifiers is \$200.00. Its still worth the money. We will have all the production parts available to fill your orders within three weeks. You are going to like it.

I will have to scrunch the rest of the Telarc CD list into the remaining space and tell you more about them later. Saint-Saens: *Symphony No. 3* (CD80051). Beethoven: *Piano Concerto No. 5* (CD-80065). *Iberia*: Music of Rimsky-Korsakov (CD-80055). Tchaikovsky: *Symphony No. 5* (CD-80107). “*March Slav*” and other *Russian Favorites* (CD-80072). Gershwin: *Rhapsody in Blue & An American in Paris* (CD-80058). Berlioz: *Requiem, Op. 5* & Boito: *Prologue to Mefistofele* (CD-80109-2) (two disc set). Tchaikovsky: *Symphony No. 4* (CD-80047). *Star Track* (CD-80094). *Ein Straussfest* (CD-80098). Copland: *Appalachian Spring* (CD-80078). *Holst/Handel/Bach - Cleveland Symphonic Winds* (CD-80038). *Malcolm Frager Plays Chopin* (CD-80040). Orff: *Carmina Burana* (CD-80056). *Stars & Stripes* (CD-80099). Stravinsky: *Symphony of the Psalms* (CD-80105). Stravinsky: *The Firebird* (CD-80039). *California Project* (CD-70501) (previous critique herein retracted). *Time Warp* (CD-80106). Michael Murry: *Bach* (CD-80088) (I don't care for this organ). *Sampler, Volume II* (CD-80102) (good bits and

pieces). Now readers, tell me about CDs you really like! I will report on those too. See you next month.

Frank Van Alstine

VOLUME FOUR NUMBER ELEVEN NOVEMBER, 1985

Thank you for the large response to last month's “renewal time” request. We are getting many renewals every day now, many with comments about what you like and dislike in *Audio Basics*. You seem to really like my writing in general, but some have mentioned that I may be using a little too much space “pushing” my own products. Sorry about that, the majority seem to want us to keep you up to date with what we are doing. Inasmuch as I have a whole bunch of new and exciting product announcements to make this month. We have not had time to rewrite each separate catalogue sheet itself. The cover letter, however, tells you what is important about all our new products, and nearly everything is new, and all work great both with records and CD. Thus, you have a fat envelope this month.

I received a letter one of my readers, J. S. Pannaman, that I need to reprint here for your information concerning problems with the use of the “audiophile” grade contact cleaner called TWEAK. Mr. Pannaman reports:

“I would like to take this opportunity to confirm a telephone conversation we had concerning the use of “Tweak.” A group of friends, four of us in all, indulge in attempting perfection in our high fidelity systems. We have all at some point tried the legendary “Tweak,” and to a certain extent it has worked, however it has a nasty side-effect. On all the pre-amps and power amps we have used it on, all have suffered from the Tweak attacking the plastic compound used as the centre insulator in the RCA phono sockets, and in the case of the Sumo Electra and Thalia pre-amps, and the Sumo power amps, the plastic mounting plate on which the RCA's are mounted. The result, which occurs as long as 18 months after first using the Tweak, is that the plastic becomes very fragile and very brittle. To date we have all had to replace or at least repair the rear plane of connections in the above mentioned equipment. As you mentioned, you may want to write about this in Audio Basics. It is a ROYAL pain in the neck to repair, replacement is the only cure.”

In addition, I just received a telephone call from another client requesting a replacement Noble volume control for his Super-Pas. He said he had used Tweak on the volume control and that the stuff killed it!

Thus, CAUTION! is urged in using the contact cleaner, Tweak, in your system. I have not ever tried the stuff myself so these are not reports I can confirm hands on. If you really want to try

Tweak, I suggest you apply some to some jacks, PC boards, and plastic parts you have laying around in your scrap pile before using it on your good equipment and see what happens.

I can report again that we have continuing excellent results, long term, with Cramolin Red contact cleaner. It actually removes surface corrosion and does a great job of cleaning contacts in switches and controls, quieting them permanently, with no adverse effects at all.

Got another letter from a client in Holland, asking where he could find high quality American vacuum tubes. I suggested he try Dutch Amperex made right there. Oh no, was the answer, imported tubes were better! Obviously then, all U.S. and European audiophiles should swap equipment. Then all would have much better imported equipment! Enough said.

I asked you to report to me about Compact Discs that you really like. I have got a couple of responses that I will now pass on to the rest of you (I have not heard these myself).

John Nangle reports that his list of favorite CD's is:

Glen Miller Orchestra: *In the Digital Mood*.

Fleetwood Mac: *Rumours*.

Linda Ronstadt: *Get Closer*.

Bruce Springsteen: *Born in the U.S.A.* (and comments that this has much better sound than the *Born to Run* CD, which is not well produced).

Jackson Browne: *Lawyers in Love*. (no low bass for some reason).

Christine McVie.

David Beverly informs me that he likes:

Flim and the BB's. DMP CD443.

Dire Straits *Communique*' CD 3330-2.

Special EFX. GRP D-9505.

Dave Grusin *N.Y. LA Dream Band*. GRP D-9501.

I can add to this list again myself, as follows:

The Sound of Music, Original Movie Soundtrack. RCA PCD1-2005. State of the art sound, it isn't, but it is way better than my antique record and has not suffered the effects of a G.E. variable reluctance cartridge tracking at 10 grams. The vocals are clear, without nasty breakup, and with little background noise. One audio professional has informed me that he is using the CD format to first build a

collection of replacements of old vinyl favorites now worn and noisy before the music goes "out of print" permanently. Not a bad idea!

Dave Grusin, *One of a Kind*. GRP D-9514.

GRP Digital Sampler, A New Age in Jazz, Volume 2. GRP D-9529. (In my opinion, GRP is doing for the CD format much what Sheffield did for records – producing extraordinarily well mixed and mastered Jazz with really pure sound and great dynamics. Simply good work and enjoyable so far in every case).

My Christmas "wish list" for my kids and wife has been made simple this year – any Telarc or GNP CD that I do not already have!

Another client writes asking about a limitation with some Magnavox CD players, namely programming capability for only 15 tracks (some CDs have more than 15 tracks). The reader wonders if this can cause harm to the CD player or the disc. The answer is no, it will not. Although you can only program access to the first 15 tracks, the Magnavox players will play, in order, all the tracks (there can be as many as 99 – I think) without harm to the CD player or disc. [This paragraph reminds me of another reader's complaint regarding my writing in *Audio Basics* (claims I use too many parentheses) (he is probably correct) I will try and do better from now on].

Tom Gauser occasionally keeps me up to date on the wondrous new products from TRT (the magic parts division of *International Audio Review*). It seems that they are now into the third generation of "Wonder Caps." So now it is certain that the original yellow Wonder Caps definitely are not wonderful at all, and neither are the newer white Wonder Caps and Ultima Caps. I wonder how long the latest and greatest Wonder Caps will remain wonderful? Anyway, now there is Wonder Solder and Wonder Wire too. Wonderful!

Folks, I have an apology to make to you. My intent was to use the rest of this space to give you the complete power supply rebuild project for the Harman-Kardon T-60 turntable. I actually got nearly two pages of the instructions written before getting into a real problem. We unfortunately let the project get "stale" and have found, to our dismay, that we cannot interpret our notes on the project unambiguously in some places. Since a step by step do-it-yourself project must not have any errors, we simply cannot in good faith print it now until we can get the problems with our notes nailed down. I regret this. That is the bad news.

Now for the good news! I will rebuild another H-K T-60 free of charge. We have got to have

another one "hands on" to perfect the instruction set. Call me at 612 890-3517 if you have a Harman-Kardon T-60 turntable you would like us to do free. We must have a turntable in good working order for which you have all the original packing material. First come meeting our requirements gets the free project!

Because of some new products from B&W, I am getting involved with making an honest high-fidelity automobile audio system. The project is under way now, with good results so far, and there is a lot more to go.

As I mentioned in September, B&W is now building a new line of car speakers, the MASS (Modular Automobile Sound System) series. The line consists of the following:

LM60. Two separate 5" kevlar cone speakers in a common casting designed to mount in a standard 6" x 9" location. The unit has a built in passive equalizing network that lifts the bass and highs in relation to the midrange. This is a full range speaker. The list price is \$249.00/pair.

LM50. This is a single 5" kevlar cone speaker in a sophisticated mounting assembly allowing use in a variety of spaces. Unlike the LM60, the LM50 driver comes out of its mounting assembly completely for "hidden location" applications. The equalizing module is a separate little "black box" to be installed in series with the speaker wires. The price is \$199.00/pair.

LT30. A panel mount B&W super tweeter (similar to the DM3000 tweeter) in a mounting assembly matching (but smaller than) the LM60 & LM50. The price is \$99.00/pair.

LT40. The 801F Special tweeter in an automobile use free standing dual-action swivel mounting. It is small enough to be stuffed nearly anywhere. The price is \$199.00/pair.

LS20. A true automobile sub-woofer. This is a complete enclosed system (trunk mounted). The bass output is fed via a flexible pipe to any convenient point in the car interior. An interior panel matching the LM60 & LM50 is used to terminate the connection between the woofer and the interior. The LS20 also includes all necessary crossovers for the rest of the system. Price, to be announced.

LX30 and LX40. These are crossover modules needed when using the LT30 or LT40 tweeters respectively, with either the LM50 or LM60. They are mounted in panels matching the attractive other modules. Their third order two-way crossover circuits also include B&W

APOC electronic protection circuits, making it nearly impossible to damage the speakers connected to this crossover. The price is \$139.00/pair for either.

Also soon to be available is a "Bridge Mounting" – an aluminium extrusion designed to bridge between the wheelwells of hatchbacks and carry a complete stereo array of MASS components.

Obviously, any combination of MASS components can be used, as appropriate to your installation needs and budget. One further interesting design feature – B&W chose the speaker's magnets and suspension so to make it impossible to bottom and damage the LM50 and LM60 voice coils. They are tough!

Anyway, I have started the installation of a state of the art audio system in my Audi Quattro by replacing the O.E.M. Audi speakers in the back deck with a pair of LM60 modules – a day and night improvement in definition and purity. Transportation Electronics of Hopkins, Minnesota, worked with me on this project, doing the actual work. It was not easy, lots of sheet metal cutting and deck reinforcement needed to stuff the LM60s in the space available, but their knowledge of car installations is super, the final result simply looks "designed in." B&W helps by supplying all kinds of mounting hardware and wire terminations and good instructions and diagrams.

The next step will be the installation of LM50 modules in the front doors. The LM60s make the original dash mounted factory installed speakers sound so bad I cannot stand them any more.

At this point, I know I will simply run out of power to drive the B&W speakers with the dynamics they are capable of producing. Not to worry!

The next step after this is one I am eagerly awaiting, David Hafler's new (should be available next month) switching car amplifier. I am tired of looking at cruddy off-shore power boosters built out of reject K-Mart walkie-talkie parts rated so dishonestly that the first real power demand will blow all their Taiwan capacitors back to the South China Sea. I am assuming that Hafler will do their normal honest and thorough job of supplying a unit with a switching power supply adequate of providing some real power without excess battery drain and with good reliability and sonics. The first one I get hold of is going into the Quattro, and that ought to make the MASS system jump! Then, after evaluation and testing, I plan on designing some state of the art audio circuits to interface into the Hafler switching power supply and chassis, and provide you and me with a car amplifier that will be second to none, but without an outrageous price tag.

Next, if necessary, to get that Last bit of “sparkle” I plan on adding LT40s and LX40 crossovers to the basic MASS drivers as necessary. The interface will be easy.

Finally, I will dump the original “hi-end” Audi (Panasonic CQ series) radio – cassette deck and install the best FM Tuner and tape player – preamp I can get ahold of, probably, after certain internal circuit replacements from a Transcendence Series Two preamp. I will keep you informed of the progress with this system. One thing for sure, it is not going to cost anywhere as much as certain hi end boom boxes being regularly installed out there for megabucks, all sounding like a berserk rock concert P.A. system trapped inside a garbage can. We are going to play music!

Why, you wonder, is the original car radio going last. Because of another new PCM (digital) tape format soon due on the market, that’s why!

I have already told you about the 8 mm video PCM audio recording and playback format now being introduced by Kodak and others. That format is an 8 bit 30 kHz sampling rate system giving 80 dB of dynamic range and signal to noise ratio and dead flat response to 15 kHz using new 8 mm video tape cassettes.

Probably not quite good enough, and already obsolete for audio only purposes. How about a 16 bit 48 kHz sampling rate format with 90+ dB of dynamic range and flat response past 20 kHz? Yup, that’s what is coming. Why a 48 kHz sampling rate you wonder, instead of the compact disc’s 44 kHz rate? Simple, so you cannot make a direct digital to digital copy, that is why!

If one had a digital tape recorder with the same sampling rate as the compact disc player, and if one then came out of the disc player ahead of the D to A converters and into the digital recorder after its A to D converters, you would no longer be making tape copies of your compact disc collections, you would be making clones – exact duplicates. The recording industry has enough trouble as it is with pirating and bootlegging of stolen material (so do we) without giving you a new recording format that simply makes theft much easier yet. Thus a different sampling rate was chosen to deliberately make the two formats not directly compatible. Of course you can still make tapes from compact discs, but with the CD players D to A circuits and the tape recorders A to D circuits being used, the copy will not be quite as clean as the original, but of course light years ahead of standard audio cassette results.

The new PCM audio recorders will work in a similar fashion to the PCM video recorders, using video technology rotary heads to achieve the necessary “write speed,” but will use an incompatible, but similarly small sized cas-

sette. Note that (oh no) another incompatible audio PCM format is also in the works, using fixed heads. In this scheme, the tape passes across a whole mess of tiny heads at the same time, giving the necessary information density. I doubt if this last method has much of a chance to work well, minor tape tracking errors would be disasters.

Obviously, Far East technology is going to bring you new products (and subsequently obsolete them) so fast, that you may not even know you want them before they are already gone. Obviously too, they will all be available at \$5.00 under cost at your local discount super-store six months after their introduction. You know, one of these days Japan is going to go broke.

Anyway, an ideal location for a digital audio tape system is in the dashboard of my Quattro. Thus, the original radio will go last while I patiently wait for PCM car tape players. No point putting a digital disc player in my car, it cannot record. I want the CD player at home, along with a digital tape recorder so I can make digital tapes for my car. I want the digital tape recorder too so that I can ask you, dear reader, to lend me your favorite compact discs for a review and write up here in *Audio Basics*. I won’t start doing that until I have a digital tape recorder, as then, of course, I can make nearly perfect copies of your CDs, and won’t have to buy any more for myself at all. Shame on me! Of course, the producer won’t really be stuck – he will be getting a review of the CD here in exchange for the tape copy. Probably a fair exchange.

Speaking of fast obsolescence, you know about the Sony D-5 “world’s smallest” CD player (was \$299 now \$199 nearly everywhere). It is obsolete as Panasonic (Technics) came out with an even smaller “worlds smallest” CD player – take that, Sony! Ah, so – comes the new champion – the Sony D-7 – the new “world’s smallest” CD player, about the size of a standard compact disc jewel box case. The price is \$299.00. Now the D-5 is only the third smallest and really obsolete. You ought to be able to buy D-5s for \$59.95 on the fake television auction shows pretty soon. Does the world really need a new smaller CD player? Why not use the R&D funds for something useful, like making better microphones?

Another new audio product getting down to a price where it is worth considering is the Sony PCM-501ES Digital Audio Processor (\$750.00 list price). This unit is an A to D and D to A processor for use with your existing video recorder, either VHS or Beta. It essentially, turns your video tape recorder into a digital stereo audio tape recorder of very high quality, much better than any analog tape recorder. I am really tempted to buy one and see how well it will duplicate my CD collection. Certainly it

is something to consider if you already own a VCR and were considering a new cassette recorder anyway. Obviously, it should be available soon at a lower price than “list.”

This technology is superior to the Hi-Fi Beta or VHS technology as no compression and expansion or noise reduction circuits are used to get the 90 dB signal to noise ratio. You need not own an expensive VCR, just a machine free from gross dropouts in good condition with clean heads and with a good grade of video tape.

Speaking of video tape, I have been running video tape recorders for over ten years now, and am happiest with Sony brand video tape. I use it exclusively because it does not shed oxide particles. My VCRs keep running and running for thousands of hours without wearing the heads out or gumming the works up with garbage dropped off the tape. I have used a few other brands, but find the machine fills up with oxide particles very quickly. I should also note that I do not use any of the head cleaner tapes in my VCRs. When the rare occasion occurs that the heads do need cleaning, I pull the cover off the machine and clean the heads and rollers by hand. I don’t trust any of the gop or abrasives on “run it through the machine” head cleaning cassettes.

I am hearing from some readers that they are getting into the habit of leaving their audio equipment on all the time. This is a practice that I do not recommend (with special exceptions). My reasons:

1. Sometimes, equipment can fail. If everything was always perfect, we would not need any repair shops, would we? If the equipment is left on all the time and an internal failure occurs, the excess currents through the rest of the circuits can possibly, over a period of hours or days, turn minor problems and minor repair bills into catastrophes. For example, the failure of a tube in a preamplifier may draw excess currents from the power supply. If it happens while you are using it, you will know about the problem right away and can shut the system down with no damage other than the need to replace that tube. If, however, the failure occurs in the middle of the night, the excess currents will slowly overheat the rectifier, cause it to fail, which then can draw excess currents from the power transformer, cause it to slowly heat up and, after a few hours, short out too. You can easily turn a simple tube replacement into a major repair job.
2. All electronic parts have a finite service life. The parts do not last forever. The best way to get your money’s worth out of the parts is to use them only when you need them. Don’t waste their service life by having the equipment on when you are not

using it. This is especially true with vacuum tube power amplifiers whose output tubes are only good for a few months of service with the kind of power tubes available these days.

3. There are exceptions to this rule, of course. Some equipment is so unstable that it generates large internal transient pulses and oscillations when it is turned on or off. These transients stress the internal parts beyond their ratings. Obviously, this equipment may fail more quickly if turned on and off a lot of times than if it is simply left on. A better answer, get equipment that is stable and does not have internal turn on transients.

Another possible reason to leave equipment on all the time is climate related. If you live in a damp climate, your equipment will be attacked by corrosion faster. If you leave the equipment on, it stays warmer and drier, thus possibly prolonging service life. However, Cramolin cleaner on all the contacts and the use of high grade film capacitors will eliminate this reason.

In general, all our equipment (except the Super-Pas Two which needs about 10 minutes warm up time to charge its power supply) turns on instantly, without transients, and need not be left on to either guard against corrosion or to "sound good." Save electricity and extend the life of our equipment by only turning it on when you use it.

Frank Van Alstine

VOLUME FOUR NUMBER TWELVE DECEMBER, 1985

A Merry Christmas to you and our wishes that you have a great New Year! You have supported us well, dear readers, and your many kind comments make the writing of *Audio Basics* a labor of love. For you, this month, is the do-it-yourself rebuild project of the Harman-Kardon T-60 outboard power supply. Have fun with it and enjoy much quieter and more stable record reproduction.

A big highlight of my year was my visit last weekend, to Chicago, for an open house held by my fine Chicago area field representative, Gregg McArthur. He had invited a formidable number of his clients to his beautiful home for the introduction of our Series Two components and to allow me to meet these people and get to know them personally. It is hard for me to express my appreciation for all of his efforts in our behalf adequately. Gregg's wife, Theresa, prepared a luscious buffet spread for a crowd of 50+ and took the kids and left, abandoning their beautiful and spacious suburban home to this crowd of audiophiles – leaving us free to demonstrate and talk without any distractions.

She had a lot of faith in us and I think we in return left the place in the same immaculate condition as when the two day get together started (except for piles of amplifiers and loudspeakers all over the place). Gregg himself put in an enormous amount of work organizing the meeting, and organizing it very well indeed. Two clients from northern Indiana even came up the day before to help set up and man the equipment for me, making my job easy. All I had to do was look intelligent (I hope), answer questions, and smile as people responded to the equipment and the music.

Finally, there was the great, polite, and attentive response to the open house by all of Gregg's clients themselves. They really are the ones that made the weekend a great success.

I brought with me all of the new generation Transcendence products; the Transcendence Series Two preamplifiers, the Transcendence 400 Series Two amplifier, and the Transcendence 200 Series Two amplifier. On Saturday evening we did a preliminary set up and "trial run" for Gregg and a small group of his clients. We succeeded in answering several unasked questions at once:

1. Some of my clients and *Audio Basics* readers were concerned that I was "abandoning them" with my recent "conversion" to strongly recommending Digital Audio Disc as a main musical source for their audio systems. They had not yet heard Compact Disc playback sound as nice as I was now used to, and thought my advise in *Audio Basics* might be a sell out, or that I was going deaf.

Not to worry! As Gregg already knew from using the Super Pas Two and the Super Fet Two, and confirmed with the Transcendence Series Two equipment, CD playback came out as musical as I had described (and Gregg's Magnavox sounded just as nice as mine). My friends were reassured.

2. Gregg and the clients had another serious concern. They had already heard the Super Pas Two, Super Fet Two, and the MOS FET Series C products previously shipped to Gregg in the preceding few weeks. After living with this new equipment for a while, none of them could contemplate any possibility of the Transcendence Series Two equipment I was bringing with me (and that they had not yet heard) having any chance at all of being better yet. They thought there was no more room for better sonics yet.

Boy did I surprise and delight them! The new Transcendence products proved themselves immediately to all. It was a rewarding experience for me to see the

expressions on their faces as the music came obviously closer to reality.

I learned a lot that weekend too, experiences with equipment I would like to pass on to you:

During the course of the weekend, one person brought in the new Adcom GFA-555 amplifier so highly rated in *Stereophile*. We were using B&W 801 F Special loudspeakers at the time. I had not heard the Adcom before, so we took a break in the demonstration with a room full of people, and hooked up the 240 watt per channel Adcom and cranked back on the Telarc *Fanfare for the Common Man* CD we had previously been playing on a MOS-FET 150C.

Talk about amazing sound! The Adcom did an amazing "grunch" on the first transient, an even more amazing "gorp" on the first drum whack, and staggered through the brass fanfare sounding like a Pioneer receiver reject.

I smiled and plugged in our little 40 watt per channel MOS FET 120C, which promptly drove the Adcom into the ground in every respect.

The Adcom owner complained, "Wait a minute, that is not fair. You are playing your MOS FET 120C louder than you were playing the Adcom."

"Right!" I answered, "and you tell me which one was in hard clipping on the bass drum, the 240 watt Adcom playing at modest levels, or the 40 watt MOS FET 120C at louder levels overall!"

The Adcom owner thought about that for a while and finally asked how that could be. I took the time for my lecture on how amplifier power is not real unless it is useful power into a loudspeaker, and that the MOS FET 120C simply made more clean useful power into a loudspeaker even though its test bench rating was one-sixth that of the Adcom. Our amp sounded more powerful because it is more powerful when used to drive a loudspeaker.

We then, at the further request of the Adcom owner, put it back into the system on gentler music, a Telarc "Four Seasons," and started it up again. I simply smiled and watched the previously full demo room slowly empty of people as everyone, after a few minutes, decided it was time to head to the buffet spread, take a "rest break," or stroll into the adjoining rooms to look at the insides of the equipment we had on display. The sonic effect of the Adcom was apparently similar to that of yelling "fire" in a crowded theater—everyone left. I simply cannot understand the good

reviews, the Adcom just is not a good amplifier.

In contrast, another person brought in his Phase Linear 500. After hearing the Adcom, he was not expecting much from it either. Surprise – it played very nicely, with good dynamics and balance and no harshness. It was not a high definition amplifier, but it was musical when used with our preamps (as has been my past experience with other older Phase Linear amplifiers) – certainly much better than the Adcom which was a big disappointment to everyone.

Another interesting comparison was between several B&W loudspeaker models and the new KEF 104/2 loudspeakers. We started the Sunday open house using the KEFs and were quite satisfied with their musical performance, for a while. They are competent loudspeakers without obvious colorations and are quite smooth too.

However, as the late morning session wore on, the system started to sound “worn out.” I started hearing hollow colorations on piano music and others thought the highs were a bit crispy sounding on some fine GRP CDs.

It was time for a change and Gregg brought out his B&W DM3000s (about the same price as the KEFs). It was, in comparison, then all over for the KEFs! The B&W DM3000 is a much more neutral, transparent, wide range, and dynamic system and that observation was confirmed by the 20 - 30 people there at the time. Gregg was not satisfied and brought out a set of little B&W DM110s (\$300/pair) to compare with the \$1800/pair KEFs. It was a toss-up with the little B&W winning on balance and smoothness, the KEFs (five times as big) on range. It was educating to me as I had never heard both brands side by side before and had previously thought that KEF gave B&W a good run for the money in sonic value. I don't think so any more.

I met an interesting gentleman at the open house, Al Hart, the chief engineer for Grommes, a company that makes P.A. equipment and long ago was one of the “names” in hi-fi equipment before the Japanese invasion.

Mr. Hart dates back to the era of Rudy Bozak, Saul Marantz, and David Hafler – one of the great pioneers of the audio industry. He told me about his own home loudspeaker systems and had photos of the system too. The system is not very portable and is as follows:

It is a four channel system but with all the channels built into the same (front) 40 foot long concrete wall. The wall is simply a “walk-in” common bass enclosure. (Really!) The wall is about 5 feet in front of the “real” home back wall and has a door in it with all the drive electronics kept in this 40 foot x 12 foot x 5 foot “enclosure” too.

Each of the four loudspeakers contain 16 RTR electrostatic tweeter panels and 2 12" woofers driven by an independent 50 watt amplifier channel of Mr. Hart's own design. Each built in system is about the size of a big patio sliding glass door, but finished very attractively.

Oh yes, there are two sub-woofer channels too! Each uses four more 12" woofers mounted into transmission lines the length of the room (concrete, of course) and exiting at each end. This uses two more 50 watt amplifier channels.

For source material, Mr. Hart uses four-channel master tapes he has made himself. Because he is known and respected by many of the music groups that play in Chicago, Mr. Hart has been allowed to record many of the great “big bands” for his own private use. It must be nice!

Because of the press of time, I didn't have a chance to get out to listen to Mr. Hart's system, but I sure want to! Gregg is going to bring some

of our electronics over there to try in this monster system and I am anxiously awaiting his report to me. Mr. Hart also gave me a 1957 paper written by Norman Crowhurst on “Defects in Amplifier Performance.” This 20 year old engineering report says many of the same things we are still trying to make clear now. How times don't change.

I could go on and on about Gregg's open house, it was a great success, but it is time to move on. Thank you, Gregg, for a great weekend.

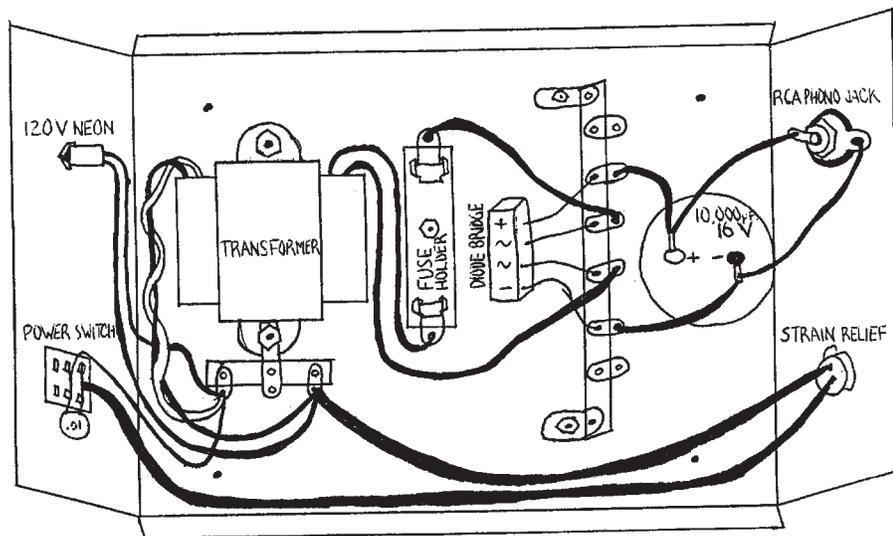
Now, for the “meat” of this issue, namely the long overdue construction project, installing an external power supply for the Harman-Kardon T-60 turntable.

Caution! This is not a beginner's project. As with any major electrical change in a piece of audio equipment, mistakes can destroy the equipment! Obviously, any remaining Harman-Kardon warranty will be voided and we cannot warrant your workmanship either. It also is not a cure for a defective turntable. Your T-60 must be in good working order before beginning this project.

The object of this project is simple – to remove from the chassis of the turntable the AC components – those parts that either vibrate mechanically at 60 Hz, dumping these vibrations into the platter and arm turning the otherwise stable mechanism into a little “shaker table,” and/or those parts that radiate an electromagnetic field – generating hum fields that are picked up by the cartridge, and also causing mechanical vibrations by coupling the field into other metal parts in the turntable. These parts are the AC power cord, the power transformer, and the parts used to rectify the AC output voltage of the transformer into the DC voltage used by the turntable's internal servo-drive and DC motor.

Note that this type of project cannot be done on most brands of turntables that use an AC motor. It is only applicable to turntables with a DC motor in which the AC line voltage is first converted to DC. In addition, the turntable must have an AC power supply and AC to DC converter that can easily be separated from the DC servo-drive parts downstream. If everything is done on one big circuit board, the project is impossible, unless you want to start sawing PC cards into little pieces (not recommended!).

This project is specifically directed at the Harman-Kardon T-60, a popular, and good quality unit that really benefits from this change. The instructions apply specifically, and only, as written, to the T-60. However, the concept is applicable to any DC servo-drive turntable (including most Harman-Kardon models except the T-65 which has an AC motor) in which



it is physically practical to "outboard" the power supply. Certainly, a clever reader can use these instructions as a guideline to work on other turntable models. Note however, that the parts values we specify herein are for the T-60 only dealing with the final 12 volt DC supply it uses. You must make voltage measurements with other units and use parts appropriate for the required working voltages.

If you properly complete this project, you will be simply amazed at how much "quieter" your turntable plays, and at the obvious improvements in definition and imaging. It will make you wonder why the manufacturer didn't do it this way in the first place.

Parts required for this project:

Radio Shack (Archer) Deluxe Metal Utility Cabinet 4" x 2 3/8" x 5 7/8" #270-252.

Radio Shack 120 volt neon lamp #272-708.

Radio Shack 36" Shielded Hi-Fi cable. Phono plug to Stripped Leads #42-2370.

Radio Shack SPST toggle switch #275-612 (or similar).

Radio Shack AC power line Strain Relief #278-1636.

RCA Phono Jack (ground isolated from chassis).

Radio Shack Clip in Chassis Mount Fuseholder #270-739.

(2) Radio Shack 5-lug Tie-Points #274-688.

0.25 ampere slow-blow 3AG fuse.

0.1 μF 100 volt film capacitor.

0.01 μF 1000 volt disc capacitor.

10,000 μF 16 volt electrolytic capacitor (radial lead).

Misc. #4 and #6 nuts and bolts to mount hardware in chassis box.

Locate all the parts before you start, as your turntable will be out of service until you finish the project. Read all the following directions and observe the diagrams carefully before starting to insure that you want to proceed. Note that the color codes used are typical of all T-60 units we have observed, but we cannot guarantee uniform wire color coding in all T-60's we have not observed.

Preparation: Remove your headshell/cartridge and counterweight. Remove the platter and belt and set aside in a safe place. Reinstall the H-K supplied transit screws into the appropriate holes in the top of the chassis. You will need a soft support for working on your turntable with it upside down on your bench (an old blanket or similar) to avoid scratching it. Avoid

heavy pressure as this may damage the arm or arm bearings.

The first part of the project is to remove the power transformer from the T-60 (unsoldering and soldering required) along with the AC rectifier, and to install the 12 volt coax power supply feed in place of the original AC power cord.

Remove (and save) the 11 bottom screws and remove the bottom plate.

The work to be done inside the T-60 is only to the power transformer and the power supply circuit board near the transformer at the rear of the chassis. We will not be touching the front card (DC servo-drive regulator) or the drive motor itself. Be very careful not to disturb those parts or to disturb the adjustable trim pots on the servo-drive board.

Unsolder the AC power cord and red and white transformer primary leads from the pins marked AC on the power supply board. Remove the power cord and strain relief noting its orientation (it only fits one way).

Unsolder the secondary transformer leads (both blue) from pins 6 and 9 of the power supply board.

Remove the power transformer (two screws from the top of the chassis). Reinstall the ground lug (with black wire attached) with one of the screws as this grounds the chassis plate to the inner casting.

Remove the fuse from the fuseclips on the power supply board.

Remove the two screws holding the power supply board in place and tip it up to access the foil side. Unsolder and remove the diode bridge (large black rectangle with four leads) from the card. Reinstall the power supply board in the chassis.

Unsolder and remove the switch wires (both white) from pins 7 and 8 of the power supply board (the wires remain attached to the switch).

Install the new shielded cable in the strain relief with about 2" of the stripped end inside the chassis, installing the strain relief in its original location. Solder the wires to the two pins marked AC.

Install an insulated wire from the AC pin with the shield side of the new shielded cable to pin 14 on the power supply board (solder both).

Connect one white switch wire to the AC pin with the shielded cable center conductor. Connect the other white switch

wire to pin 10 on the power supply board (solder both connections).

Install a .1 μF 100 volt film capacitor across the two pins marked AC on the power supply board and solder.

This completes the work inside the turntable. Check everything and see that there are no loose wire ends or wires located that might interfere with the mechanical function of the turntable. Reinstall the bottom cover (11 screws).

The sketch on the next page (compliments of my daughter, Vanessa) shows the layout of the inside of the new power supply box about actual size. Use this layout to set the location of each component and to drill the necessary mounting holes.

First mount the switch, followed by the neon lamp, the RCA phono jack (isolated from the chassis), the power transformer (oriented as shown), the fuseholder, the necessary terminal strips (yours may be a slightly different configuration), then the 10,000 μF capacitor (with double backed foam tape to the bottom and side), and finally the AC power line in its strain relief.

Wiring: Note that all connections are made to ungrounded lugs on the terminal strips and that no components leads or solder drippings should touch the chassis.

Look closely at the diode bridge (previously removed from the power supply card). The four leads are marked +, S, S, -, respectively as shown in our sketch. You must follow our orientation in mounting it on the terminal strip. Note that the + lead of the diode connects to the + lead of the 10,000 μF capacitor and on to the hot (inner) connection on the phono jack.

The - lead of the diode bridge goes to the - pin on the capacitor and on to the outer (shield) side of the phono jack.

One blue power transformer lead connects to the fuseholder, the other blue lead connects to one of the S pins on the diode bridge.

The other end of the fuseholder connects to the other S pin on the diode bridge.

Install the 0.25 ampere slow blow fuse in the fuseholder.

One conductor of the AC power cord is connected to the bottom lug(s) on the new power switch.

The other conductor of the AC power cord connects to an ungrounded lug on the second terminal strip.

At this terminal strip lug, the red lead from the power transformer and one lead from the 120 V neon lamp connects too.

An insulated jumper wire is connected from the middle lug(s) of the power switch to another ungrounded lug on the terminal strip.

The white lead from the power transformer and the other lead from the neon lamp connect to this second ungrounded terminal strip lug too.

A .01 μ F 1000 volt disc capacitor is connected from the middle to the bottom lug(s) of the power switch as shown in our sketch.

This completes the power supply wiring.

If you have a voltmeter, it should read about + 15 volts DC from the + to the - leads on the 10,000 μ F 16 volt capacitor, and the neon lamp should light up. If the fuse blows or the voltage reading is wrong, unplug the box and call us for help, you undoubtedly have made a wiring error.

If all goes well (and it should) then install the cover. Be very sure that no cover screws can contact any of the inside components or the wiring.

Reinstall your counterweight, headshell and cartridge, platter and drive belt, re-balance your tone arm for the tracking pressure for your cartridge, and reinstall the turntable in your system.

The power supply box should be located away from both your preamplifier and from your turntable. The new shielded cable from your turntable plugs into the power supply box. The AC line from the power supply box can plug into an accessory outlet on your preamp or directly to a wall outlet.

You now must first turn on the power supply box to operate the turntable. All turntable functions will operate normally and moving the arm away from the rest will continue to turn on the motor (start up time is faster now). You must remember, however, to turn off the power supply box too when you are finished using the turntable.

We think you will instantly appreciate the major reductions in noise (hum) and improvements in playing definition now that your turntable does not have to cope with AC fields and 60 Hz vibrations. Let us know what you think about this project (and let Harman-Kardon know too).

I have got two more neat things to talk about this month, but I don't think I can fit them both in, so what should it be, my "early Christmas present" – a set of B&W 808 superspeakers – (about as impressive as, and nearly as large as the great Pyramid of Cheops), or my daughter's early Christmas present, a Sony SL-HF400 Super-Beta Hi-Fi video recorder?

Inasmuch as you can more easily afford the Sony, I will start with it, but like the Pyramids, the 808s are impressive enough to be sure and

visit if you are within 500 miles of them – you are welcome, you will be amazed, you will want them, you might want to get a second mortgage to own them, they are awesome! More about them (much more) next month.

No! This is not about video recording! This is about high fidelity audio recording. The new generation of Sony Super-Beta Hi-Fi video recorders simply make audio cassette recorders obsolete! Most of the problems with the first generation Sony Hi-Fi video recorders simply are not there any more, and a Sony Super-Beta Hi-Fi video recorder is now worth owning, for several reasons:

1. The Sony can simply be connected to your audio system (stereo tape in and stereo tape out) like any other audio tape recorder, no TV connection is necessary. You use it like any other tape recorder, but with a big difference – much better quality sound and vastly better dynamic range, headroom, and freedom from noise.

I simply cannot accurately record from a Telarc digital disc onto an analog tape recorder. If I set the levels low enough to not saturate the tape on the peaks, the low passages are buried in noise, and the dynamics are scrunched anyway. If I set the levels up high enough to eliminate noise from the soft passages, the dynamic transients simply go "gorp." Yetch.

The Sony video recorder handles the dynamics of compact discs just fine. Not perfectly, please understand, but much better than any cassette deck. The Sony sounds sweet and smooth, with no messing up of harmonic overtones, no scrunching of dynamics, and with nearly no noise at all. It is slightly duller than the original CD, the deep bass loses a bit of power and definition (but no boom or real mud) and transients don't sound as fast. Compared to an original record, the loss is barely audible except with the very best direct to discs. The noise reduction circuits can occasionally be fooled – for example, a bell "ting" coming out of a silent background may be accompanied with a soft "swish-swoosh" sound of the Sony's circuits working, but this is not as obnoxious as the tape hiss and scrunched dynamics there all the time on conventional home tape recorders. In addition, you get three hours of uninterrupted recording time on one \$5.00 L-750 Beta video tape. When recording from CDs, this eliminates the "jump to flop the cassette" annoyance.

2. When you connect the Sony to your TV antenna too (ahead of your TV) it automatically converts your TV to stereo sound – nothing else to buy. You simply turn the sound down on your TV, feed it to

the picture from the Sony's tuner, and feed the stereo audio signal from the stereo TV broadcasts in your area on to your audio system. Sony just un-obsolete your TV set – you don't need to buy a new one or any other converter to get stereo TV reception (for what its worth).

3. Finally, the Super-Beta simply gives you much better picture quality, especially if you have a large screen or projection TV. Rent a Super-Beta Hi-Fi recent movie, and the sound and the picture will put you right in the theater. Try it, you will like it.

Frank Van Alstine