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AUDIO VERITY: The better the advertisement, the worse the product.
As another CES rolls around, we are seeing some interesting and not-entirely encouraging things taking place in the audio field. The people for whom high fidelity was originally intended -- so-called serious music listeners -- have abandoned audio almost completely, leaving the pursuit of perfect music reproduction to a group of hobbyists who have more interest in hardware than in music. This, plus the recession, has almost killed middle-fi, which is now flailing out in all directions looking for a new market.

Here's how it all came to pass:

1877. A Frenchman named Charles Cros hands a paper describing how to record and reproduce sound to the Academy of Sciences. Approximately 4 months later, an American named Thomas Edison makes a similar discovery. Naturally, Edison is given historical credit for being first.

1887. American, Emile Berliner invents the laterally-modulated flat-disc gramophone.

1899. Vladimir Poulsen, a Dane, invents magnetic recording, using steel wire.

1902. Eminent opera singers begin recording for commercial distribution.

1909. The first recordings of a full orchestra are issued, in England.

1925. The first electrical recordings and phonographs are produced in the US. Music-lovers decry the new recordings as unmusical.

1931. RCA Victor introduces the first 33-1/3-rpm disc for home use. Unfortunately, they neglect to introduce a machine to play it on. It lays an egg.

1944. English Decca releases the first Full-Frequency-Range Recordings (ffrr), boasting a hitherto unheard of span of 40 to 10,000 Hz. Music lovers declare the new records to be unmusical.

1947. Magnetic tape recording, perfected by Germany during WW-II, comes into use for delayed radio broadcasts in the US. The German tapes were so good that US Intelli-
gence thought Hitler was broadcasting from where he wasn't. Bing Crosby is the first American to use tape for all his radio shows.

1948. Columbia Records unleashes the long-playing microgroove record and, having learned from RCA's earlier mistake, also supplies suitable players for it. Music-lovers denounce the LP as unmusical.

1949. RCA unveils their big gun: the 45-rpm disc, whose only advantage over the LP is lower distortion. Since most hi-fi enthusiasts listen to classical music, where selections run to 20 minutes or more, they choose the LP over the 45. Fidelity, shmidelity! This is the last time the classical buyer will ever have a visible effect on the American record market.

1950. RCA grudgingly admits that LPs are better for classics and starts issuing them. The 45 remains the speed of choice for pop singles.

1951. Noticing that all the classiest people -- doctors, lawyers, pop artists -- have component systems, the public at large discovers that hi-fi has status value and wants it too -- at lower cost of course.

1952. Low-fi phonographs, bearing labels which proclaim them to be "High-Fidelity," are marketed to a gullible public.

1953. Record manufacturers discover that adding shrillness and boom to their records will make them sound more hi-fi on the average phonograph. Published record critics with low-fi phonographs applaud the unprecedented "brilliance" of these hyped-up recordings, thus contributing to the incipient debasement of hi-fi on domestic recordings.

1957. Ampex introduces the first home stereo tape player, using 2-track 7.5-ips tape.

1958. Telefunken/Decca demo a stereo disc using vertical/lateral modulation. Critics declare it to be (1) incompatible and (2) unlikely to yield equal fidelity from both channels. Westrex demos a 45/45 system which is both compatible and symmetrical. Amazingly, the Westrex is adopted.

1959. Pre-recorded tape switches from 2-track to 4-track (2 per direction), pulling the rug out from under 2-track collectors who thought that medium was so good it would be around for a while. The pre-recorded music market becomes divided between tape and disc adherents.

1960. Classical record listeners, wooed until now as the major hi-fi market, are abandoned in favor of the rock-oriented "youth market" -- the people whom one producer who had made millions from them called "the snot-nosed kids." Mentions of concert halls, great masters, immortal performances and other appeals to adult snobbery vanish from audio advertising. Rock stars rather than conductors endorse products.

1967. Cassettes and 8-track cartridges are promoted for people who care more about portability than fidelity.

1968. Four-channel "quad" is set loose on a skeptical and unresponsive public. Originally conceived as a way of reproducing hall ambience ("Let's prod the classical listener. He may not be dead after all."), it is instead hyped as a source of sounds-from-all-directions. Critics adulate, classical listeners retch, pop listeners couldn't care less. And with three different and incompatible systems, quad's demise is foreordained. It is a dead horse by 1974.

1970. Component manufacturers begin to suspect that there is no limit to the money a perfectionist will pay for the promise of nirvana. As prices escalate, classical listeners give up in disgust, turning the field over to hardware enthusiasts who have little interest in music.

1971. Dolby B noise reduction makes true high fidelity possible (Continued on page 18)
Test Records
And How to Misinterpret Them

Everyone who has ever tried to use more than one test record for measuring phono-cartridge frequency response can report that there are — let us say — discrepancies between test records. This is only a polite way of saying that the measured frequency response of any given cartridge can vary by as much as 6 dB in the 10 to 20-kHz range, depending on the test record used. When faced with this situation, it is fair to assert that all but one of the measurements are wrong, and there is more than an even chance that that one is wrong too.

When we first started working with the Neutrik AudioTracer, which is now used for generating the frequency response curves which accompany many reports in this magazine, we ran head-on into this test-record discrepancy. This delayed any further test-record action until we resolved the problem in terms of subjective tests. We have observed that every "individually-run" frequency response curve supplied with every cartridge we have ever had for testing looked as if it was drawn with a ruler. When we tried to duplicate these results, things always looked a little less rosy.

In fact, the measurements we were getting depended entirely on the test record used. Finally, after an inexcusable amount of mucking-around, we came back to the same CBS test records we had been using at the outset. Why? Simply because they continued to reflect the way cartridges sounded. The records are the STR-100 and the STR-130. The STR-130 has, as far as we know, been issued in only one version, which gives a fairly accurate assessment of high-end response but is much more reliable as a measure of response below 500 Hz. As for the STR-100, there have been at least three versions of this produced. Versions 1 and 2 had a 2-db hump in right-channel output at around 15 kHz. The third version of this, which cannot be distinguished from the first two until you pull the thing out of its inner sleeve (it says "Issue 3" under the STR number) is the flattest of the STR Series 100 series, but it has a gradual low-end uptilt on it.

For the benefit of those who are just starting to get involved in the morass of test records, we should mention that these two test records are not supposed to measure the same things. The STR-100 assumes that you are measuring the direct output from the cartridge, without preamp equalization. With it, a magnetic cartridge should show flat response above 500 Hz and a 6-dB/octave falloff below 500 Hz. The STR-130 is for measurements made with RIAA playback equalization, as at the output from your phono preamp stage (i.e., the Tape Outputs). If the equalization is accurate, this record should give you a flat response from 40 Hz (its lower limit) to 20,000 Hz.

But even these two disagree somewhat as to the curves they yield from a given cartridge. How then does one ascertain whether a measured response irregularity is a function of the cartridge or the disc? Run the disc at 45 and 16-2/3 rpm, multiply the nominal frequencies by 1.35 and 0.5, and see whether the same response deviations occur at the same timed points during the recorded sweep tone.

This may need some clarification. If you measure a certain response irregularity at a certain frequency, it may be due to the test record or to the cartridge. If you change the speed at which the test record runs,
all of the recorded frequencies will change, and any response deviations which are actually on the disc will be shifted upwards or downwards in frequency. If the original measured response deviations were in the cartridge, changing the disc speed will NOT change their frequency, but will change only the point along the curve where they occur.

For example, the topmost (A) of the three curves shown below is a typical cartridge measurement taken with an RIAA test disc and measured at one of the preamp tape outputs. There are three main deviations: a rising low end humped slightly at around 80 Hz, a broad, mild hump at 2 kHz, and a pronounced peak at around 10 kHz. Are these in the cartridge or the test record? Curve (b) shows what we get when we run the test record at 45 rpm. Both the low-frequency deviation and the 2-KHz hump have been shifted upwards by a factor of 1.35, proving that they are actually deviations on the disc itself. The 10-kHz peak however stayed at 10 kHz, proving that that one is a peak in the cartridge.

Now, let's say we had slowed the disc down to 16-2/3 rpm and got the bottom curve (B) as the result. The low-frequency deviations dropped in frequency by a factor of 0.5, proving that they are on the disc. But both of the upper-range deviations stayed put, indicating that both are cartridge deviations.

LAST Record-Preservation Treatment

LAST (Liquid Archival Sound Treatment) is a record treatment developed by one Dr. Catalano, which promises to retard dramatically the wear of vinyl discs. I don't feel that the advent of true digital discs will diminish the importance of LAST; on the contrary, as this century comes to a close many stereo records will be in their 30s and 40s and in need of as much preservation as possible, if the sounds and performances we treasure are to be preserved. After perusing the reprints of reviews in other undergrounders, supplied by LAST at their CES booth (all raves, needless to say), I was impressed by how fuddled were their explanations of the LAST-discovered wear mechanisms and cures. In this, my presumably-correct explanation, I will draw from information found in an excellent pamphlet entitled "The LAST Word," available for $2 from the manufacturer, Gamma Omega Associates, P.O. Box 41, Livermore, CA 94550. The explanation therein is worthwhile reading, not only for the technical information and the fascinating Scanning Electron Microscope photo-
graphs, but also simply for its point of view on stylus/record interaction.

Dr. Catalano's analysis begins by dismissing the relative importance of our most cherished model of record wear; that is, inelastic deformation of the record groove, brought about by repeated playings.

While conceding that earlier stylus forces of 5 to 15 grams -- and those figures were typical some years ago -- could accomplish record wear in this manner, modern stylus loadings of up to 2.5 grams, according to Dr. Catalano's investigations, do not result in groove deformation. Instead, LAST concludes from their scanning-electron-microscope (SEM) photographs that most record wear is of a type they call conchoidal fracturing (conchoidal means shaped like a cone with helical patterning), with some additional wear caused by the stylus tearing vinyl from the groove walls as they attempt to adhere during the stylus' journey through the groove. Although the full range of SEM photographs from which these deductions were made was not available to me, it is clear from those in the pamphlet that the two types of wear are quite different.

The conchoidal fractures most resemble the scars on the face of a person who had severe acne; the torn portions of the record groove resemble the sides of a canyon in the Southwest which has been extensively eroded by water. Accompanying both forms of wear, and perhaps the most annoying evidence of wear, are numerous irregular pieces of vinyl which, having been popped or torn out of the groove wall, are subsequently welded to it further down the groove by the heat generated by the passing stylus. To my knowledge, there has been no research into why different areas of the record are subject to the two different wear mechanisms.

The difference between the played and unplayed records in the SEM photographs is truly shocking. Another interesting observation is that one record, "Kotekan" by Reference Recordings, shows markedly less wear (say 80% less) than another record, Holst's "The Planets" (no manufacturer specified), though neither untreated record came through the initial 50-play test unscathed. It seems certain that this is due to differences in the quality and composition of vinyl in the two records. Perhaps the most interesting observation is that conchoidal fracturing occurs in silent grooves as well as modulated ones.

Dr. Catalano's model of what happens in disc playback goes something like this: As the stylus moves along the groove, it sets up shock waves in the vinyl. The energy comprising these can only be ultimately dissipated in the form of heat. These shock waves are reflected many times, greatly reinforcing one another, and causing high concentrations of energy at certain spots, such as imperfections in the vinyl. Above a certain threshold, the energy of the shock wave and its reflections is great enough to overcome the cohesive forces holding the polymer together and pieces of vinyl literally pop out of the surface. This is called conchoidal fracturing because the ejected pieces resemble the chips removed when a piece of flint is shaped into an arrowhead. Dr. Catalano also found that this conchoidal fracturing does not abate after a few plays, but occurs with every play of the record.

How then does LAST combat this fracturing? LAST effects a change in the surface of the vinyl to a depth of ten molecules which has the effect of reducing the "surface free energy"** of the vinyl. We find from the field of thermodynamics that

* Surface free energy is defined as the total energy minus the product of temperature and entropy, a definition which should be sufficiently opaque to all but thermodynamicists.
reducing the surface free energy of a substance increases its stability and therefore its resistance to change. In the case of LAST this increase in stability is sufficient to resist the conchoidal fracturing referred to above. The energy of the shock waves is not so great as to pop the pieces of vinyl out of the surface and we see in the "after" (after LAST treatment and 200 plays of the record) SEM photographs that little or no fracturing has taken place and there is a remarkable absence of welded on pieces of vinyl in the record groove. This is not to say that it would be impossible to observe conchoidal fracturing in a LAST-treated record: if either the vinyl was originally unstable enough (because of many imperfections, say) or the shock wave great enough (because of unusually high stylus loading, for example), conchoidal fracturing could still take place.

The other effects of LAST, ones not predicted by Dr. Catalano's model, are reduced record wear due to tearing (the stick-slip phenomenon) and a marked improvement in the sound of new, unplayed records. The reduction of tearing wear is also attributed to the reduction of surface free energy, so that the surface free energies of the stylus and the record groove are more closely matched. I do not understand the importance of this matching; perhaps Dr. Catalano will respond to this review and therein explain. The improvement in sound of new, unplayed records, which we have verified in limited tests and which is the most salient feature reported in reviews by others, remains somewhat of a mystery. Dr. Catalano speculates that the stylus-induced shock wave, travelling at roughly 37 inches/millisecond, speeds ahead of the stylus and damages the record groove prior to the stylus' arrival. While this may be true, it does not explain why treatment of a record groove already damaged in this manner, but not enormously (as in the second playing of a high-quality vinyl record), would result in a drastic improvement, unless the secret lies in a radical dampening of the shock wave so that there is significantly less interaction between the energy of the shock wave and the stylus itself, a possibility not mentioned by Dr. Catalano.

The application of LAST is a two-step process which takes about 2-1/2 minutes per side -- 2 minutes of which is waiting. First the record is cleaned with a product similar, perhaps identical, to Discwasher D4, using a supplied narrow velvet-like applicator. After the record is dry, a small amount of the preservative is applied using a similar (but gold-colored) applicator. It is allegedly impossible to use too much except from the standpoint of economy (the instructions are nicely honest by encouraging this economy). One is aware of the smell of the vehicle, Freon TF, which is highly volatile -- great care should be used to cap the bottle tightly, again in the interests of economy.

The test conducted by JGH and me attempted to eliminate other variables, such as the cleaning process which precedes a LAST treatment. We played sections of "Professor Johnson's Astounding Sound Show" (Reference Recordings RR-7) before any treatment other than dust removal. We played it again after cleaning with the Keith Monks, and then a third time after cleaning and LAST treatment.

The Keith Monks cleaning made a significant difference, in terms of lowering surface noise and improving openness and cleanliness of sound; in some passages this effect was greater than that achieved by the LAST treatment. (Why a simple wet cleaning would improve the sound of a new, unplayed record is not clear, but it has been suggested that it removes a slight waxy deposit of mould-release agent -- a substance which helps the vinyl to separate
from the stamper surface -- from the surface of the disc.) As I imply, there were passages where no observable effect of LAST was noted; however, in others the difference was astonishing. Most remarkable was the passage for harp, where prior to LAST treatment, the sound of the harp was intermixed so extensively with what sounded like tape modulation noise that one had to consciously separate the noise from the notes. After the LAST treatment some noise was audible but had to be consciously sought out rather than ignored.

Without access to our own Electron Scanning Microscope, we have no way of confirming Dr. Catalano's observations about the conchoidal fracturing and whether or not LAST prevents it. There is no question though about LAST's ability to improve the sound of discs; as JGH described it, the sound becomes less mechanical and more like original tape -- evidence enough that something did change when LAST was applied. The effect sounded as though the treated grooves were indeed damping out HF stylus resonances, which would seem to imply enhanced absorption of energy. We have no way of verifying the preservative effect of LAST, its greatest claimed benefit; but neither have we reason to doubt the authenticity of Dr. Catalano's SEM photos, which DO offer dramatic evidence. Even if the preservative effect were to be less than claimed, the immediate sound improvement makes the product well worth the investment.

After having plowed through all this, the fatigued reader might wonder why so much time and space were devoted to this product. Primarily, the reasons are our love of records and our fascination with groove-level interactions. Certainly if this treatment (our LAST treatment of the subject, so to speak) is too verbose, or unclear, we welcome our readers' response. Direct your letters to: Sterophile's LAST Stand P.O. Box 1948 Santa Fe, New Mexico 87501 LA

Manufacturer's Comment below.

Dear Editor:

Thank you for the opportunity to review your article, re: LAST, prior to publication. You are very kind to allow me such an opportunity.

I do not blame anyone for being "fuddled" by thermodynamic concepts. I personally had a great deal of difficulty in learning the little I know about the general subject. And, although I have taught chemical thermodynamics a number of times, it is still difficult for me to do so and extremely difficult for students of either physics or chemistry to grasp the concepts on a deep, basic level. I consider the concepts of quantum mechanics to be much more easily understood than those of thermodynamics - and quantum mechanics concepts are NOT easy.

Some research has been done by various investigators on what I had called the tearing and gouging wear mode. Discwasher published some of this in a seminar about 2 years ago and attributed this wear to vertical tracking angle misalignment. They definitely showed that such wear could be induced by v.t.a. misalignment. There are SEM photographs in an AES journal in several papers written during the late 1960's that also show such wear.

The region on the record where tearing and gouging occurs is always in a strongly modulated groove. My interpretation is that this is due to stick-slip phenomenon (friction) where the stylus slams into the groove wall, sticks to it, and then bounces off of it.

I would like to clear up a point about our SEM research. The pictor-
ial damage which I call conchoidal fracture had been observed before. There is a classic paper by Coots and Woodward in the 1960's that shows such damage. Fortunately, I had not seen these photos or the paper prior to my research or I would not have questioned the mechanism for such damage. My major contribution in this research was to question established dogma and to see a physically reasonable mechanism as the cause of the damage.

The Holst record referred to in "The LAST Word" is an Angel recording.

There is one technical error in the edition of "The LAST Word" you have. Since returning from CES in Las Vegas, I have run across typical surface free energies for classes of material similar to diamond. I had not been able to locate measured data on diamond so I had estimated its surface free energy. That estimation, I now know, was incorrect, and I am retracting that argument. The improvement in sound then appears to be the result of reduction of friction (better traceability) caused by LAST lowering the surface free energy of the vinyl. Frankly, the friction reduction is so large, that I am surprised. If there is a radical dampening of the shock wave as you suggest, I do not understand what the mechanism is. You are right, there is still a mystery.

About the rest of the article, I have no comments except that we here at LAST are so pleased that you are pleased with it.

Sincerely,
Edward Catalano
President
The LAST Factory

Linn Basik

Dynamically-balanced tone arm with pre-mounted cartridge, removable headshell with adjustable overhang, bias adjustable by dial and internal spring. Price $149. MANUFACTURER: Linn Products, Ltd., 6842 Hawthorn Park Dr., Indianapolis, IN 46220.

This is something quite different from Linn: a popularly-priced product. Since the early 1970s, Linn has been a leader in England in the investigation of the active effects of supposedly-passive phono elements. Many English audiophiles believe the phono system to be the single most important factor in an audio system's performance. Buyers there are advised to choose the most expensive phono unit they can afford, even if it means compromising the quality of the other system components -- the rationale being that nothing can compensate for an inadequate phono. There is even a hierarchy in choosing phono components. The turntable is by far the most important element, followed by the tone arm, with the cartridge least important.* The phono system budget should be apportioned with this hierarchy in mind.

Basi(k)ally, the Linn philosophy is an analogue of the computer dictum: Garbage in, garbage out. Whatever is lost in the front end of a system is gone forever. Linn uses the phrase "Loss of information" (LOI) to describe this idea. From my readings and my discussions with the importer, I've learned that Linn prefers to accept a little tonal coloration rather than LOI, as one can work to reduce coloration but one can never regain lost information.

* Not in my book, they aren't. I agree that, if you don't want to butcher your record collection through the years, you should have a fine phono system, but I disagree about the "hierarchy." I'd rate the cartridge as most important, the turntable second and the arm third. That assumes of course that you don't go for a really lousy arm with high friction and rattling bearings. JGH
Linn's designs try to maintain a constant and stable relationship between the turntable and the pickup so that stylus motion is caused only by record groove motion. Achieving this goal requires a totally nonresonant system, which is an impossibility. So, as a second-best approach, Linn tries to design a controlled-resonance system where all the individual components resonate as similarly as possible, so that resonances at the cartridge coincide as much as possible with those of the disc. Accomplishing this demands rigid coupling of the tone arm to the turntable assembly, especially at structural discontinuity points like the headshell/arm-tube connection, the arm/base mounting, and the tone arm bearings. Linn even recommends using pliers and the largest screwdriver that will fit the screwheads when mounting a cartridge, screwing it down as tightly as possible. If something breaks as a result of this brutalization, Linn's attitude seems to be a cavalier shrug and the admonition that, no matter how good a design is, its full performance cannot be realized if the pickup/headshell interface is poor. I recommend a certain amount of skepticism towards this approach. A small wad of modelling clay (or, better still, the black stuff Shure provides for the purpose) under the cartridge should achieve the same result without the need for stripping mounting screws.

If the Linn Basik looks familiar to you, it should. It looks very much like the arm on the ADC 1500 turntable, with the mounting ring from the very costly Linn LV-II arm. One of the reasons for the Basik's low price is because, like the imperial starships in "Star Wars," it was made from slightly modified parts from existing products. (Plastic model kits for the starships, other arms for the Basik.) Linn's parts are used in most of the critical points where rigid connections are needed. And the geometry of the Japanese-made arm tube has been modified to allow interchangeability in the same mounting hole with the LV-II to facilitate later upgrading from the Basik to the more-expensive model.

A word of warning when mounting the Basik: The mounting collar on both Linn arms is held by three screws which enter from beneath the motor board. But the screw positions around the ring are different by 60 degrees for each arm. This is mentioned in the installation instructions, but the mounting template for the Basik is wrong. I had the whole thing ready to install before I caught the error.

The Basik comes with a premounted inexpensive cartridge manufactured by Nagoka. This is not custom-made for Linn, but I understand a lot of time went into auditioning candidates before choosing it. I won't dwell too much on the cartridge here, as your decision as to whether or not to buy the arm should be based on the arm's performance, with the cartridge considered as a bonus. It's a good economy cartridge, with very good octave-to-octave balance and a very smooth sound, but it is lacking in quickness and sounds rolled off at the extreme high end. Still, it is listenable enough to use as an interim with the Basik on any turntable.

Interestingly, Linn did not really design this arm for economy turntables. The main purpose of the Basik is to team with the Linn TT to provide what Linn feels to be an acceptable level of performance while holding down the total cost. Linn is acutely conscious that the price of his top phono system is over $2000. The Basik permits purchase of a Linn "starter system" for around $1100, and makes it easy to upgrade the arm and cartridge in future. But Linn is realistic enough to know that a lot of Basiks will be sold for use on non-Linn turntables like the Rega, Thorens TD-160, etc.
I tried the Basik with three cartridges: The Nagoka supplied with it, a Zeligman Z-Mod (a modified Grado G1+), and a the Technics EPC205Mk3 that was reviewed in issue V-2. What I heard from each was essentially the sound of the cartridge. Detail, transparency and focus were excellent. The arm's major flaw is a rather narrow-range mid-frequency boxiness along with -- in the same range -- some loss of openness and focus. I consider this unfortunate, not because it precludes my recommending the arm -- which it doesn't, by a long shot -- but because without this small flaw I could recommend running right out and buying one NOW. As it is, you will have to decide whether that one negative factor will intrude enough on your enjoyment of records to make even the Basik's attractive price seem unattractive. I do have two qualifications to add: First, that the slight coloration would probably not have been audible at all in a poorer arm, where it would be masked by other problems. And secondly, I noticed that, with extended listening, the problem seemed to recede and become less noticeable.

Other observations: Bass was excellent; deep and tight. Highs were extended and very smooth, and depth was very well reproduced. Stereo imaging was specific and stable and, over-all, the balance was slightly on the cool side of neutral.

So, while this doesn't offer a cheap route to perfection, it does offer a very high level of performance at a price that's hard to pass up.

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**Dolby C vs dbx-II vs CX**

dbx finds itself under serious attack, on both the tape and disc noise-reduction fronts, with the introduction of Dolby C and CBS Labs' CX. (And how can a company with only lower-case letters in its name hope to stand up to ones with fully-capitalized ones?)

Dolby C achieves its extra 10 dB of noise reduction (over Dolby B) with two separate noise-reduction stages, one working on stronger signals and the other on weaker ones. The high-level action is identical to Dolby B, so the flick of a switch can bypass the second stage for proper decoding of Dolby B recordings.

There are two other new features. An anti-saturation system compresses signals above Dolby level to prevent high-frequency tape saturation. At the same time, the highest frequencies are rolled off during recording and boosted during playback, to further improve HF headroom. This also reduces the noise reduction in the highest 1/2-octave

to less than that of Dolby B, but then Dolby asserts that very-high-frequency noise is not too irritating. I'm not so sure about that.

Already the fur has started flying. Dolby is claiming that its 20 dB of noise reduction comes with absolutely no audible side-effects. dbx on the other hand claims that Dolby B and C are only noise-reduction systems, while dbx eliminates noise. Dolby has pulled out the big guns, reprinting an article by the respected British engineer, Angus McKenzie. I quote therefrom: "I personally cannot see how Dolby can lose, and must admit to being amazed that dbx has been accepted by a minority in the States who appear not to be able to hear, or are able to disregard, many of the system's defects, which many audio critics including myself have referred to again and again."

Maybe, Mr. McKenzie, the reason we cannot hear those defects is because they don't exist -- at least, not when the dbx unit is working as it should. They sometimes do become defective, and will pump
and breathe like crazy, but I have made numerous live recordings with properly-functioning dbx's and, even though I have been told many times what the units supposedly do wrong, I have never been able to hear any of those problems. Finally, I have run bypass tests on the dbx 124. It is not audible in the system. (With all that goes on in it I find this hard to believe, but that's the way it is.)

Can dbx be made to breathe? Sure. Record live music with wide dynamic range on cassette and you will hear some slight breathing on diminuendos. (Breathing is hiss which is audible only during the quietest passages.) From what I understand about both the dbx and Dolby C systems, the latter will show a steady hiss background at least 6 dB higher. Take your pick. But why are you recording LIVE on cassette at all?

It is interesting to note that Crystal Clear Records is now starting to release digitally-mastered dbx-II-encoded cassettes. I was told that, if they thought there were any audible side-effects, they wouldn't be issuing the cassettes that way. I might also point out that there are several dbx-II discs of Mark Levinson recordings. This would also seem to imply that Mr. Levinson -- as dedicated a perfectionist as one will find anywhere -- has heard and approved of the dbx system. Why would he risk his reputation?

Dolby has become the Lingua Franca of noise reduction, at least for consumer products. It isn't likely that any other system can unseat Dolby now, regardless of its merits. In this light, Dolby C represents a significant advance. We will soon see it in the better grades of prerecorded cassettes, as well as (I hope) Barclay-Crocker's and Open-Reel Society's tapes. (Yes, even open-reel can benefit.) Barclay-Crocker's release of the Horenstein Mahler Third has audible noise; if it wasn't on the master, an additional 10 dB of S/N would be most welcome.

One question that will have to be resolved in the marketplace, though, is the effect on the existing NR systems of CBS' new CX. They will probably never be able to sell it to the audiophile market because of their reputation therein as the philistines of audio. But it is in the mass market where the megabucks are, and that is where CX stands a good chance of establishing a beachhead. CX has great appeal to record dealers, who resist carrying double inventories of regular/dbx or regular/Dolby or regular/What-have-you-encoded special discs.

dbx-encoded recordings are of course completely incompatible (unless you are hopelessly oblivious to sound quality). Without decoding, the sound comes through with a fixed 12-dB treble boost, plus heroic pumpings and surgings which must eventually persuade even the most insensitive oaf that Something Is Not Quite Right. But CX means Compatible Expansion. Without decoding, the discs sound like any conventional recording, with the usual dynamic-range restrictions but nothing else to discomfit the casual listener.

What is CX doing? So far, CBS has said nothing about it, but it is rumored that there is some complex, frequency-weighted compression (again, a 2:1 ratio) with attack and decay times set so that the ear hears little or no compression. CBS says that the records sound essentially (?) the same as ordinary records. (What does that say for the ordinary records they've been giving us?) It is also not clear how all this complicated compression can be undone with what is promised to be simple, cheap circuitry. Part of the answer is that only a "central" 40 dB of the signal is compressed; signals above and below that range are left alone. An expander for such a system could be much cheaper than dbx's, which operates at over 100
dB. But obviously that isn't the whole story. We'll have to wait for the technical explanations.

But outside of being quieter, will the CX discs sound any better than regular discs? Here, I think, the answer is a resounding NO. And it is CX's compatibility which is the culprit.

Consider: To be compatible, a CX disc has to play as loudly on a regular system as ordinary records do. (The marketing people know that "loud" records sell.) This means the average recorded level of a CX disc will have to be as high as that of a conventional disc. Unfortunately, the amount of tracing distortion rises directly with recorded level. (You don't believe me? Look at the grooves of the records you feel have the cleanest, most transparent sound. They are almost always cut at low levels.*) Since the loudest passages aren't compressed, these will be no cleaner than those of ordinary records. (And how soon will CX discs include peak limiting to improve tracking on the cheap phonographs that have always been CBS's standard of reference for playback?) But dbx is a linear system. It can be recorded at any level and still decode perfectly. dbx has taken advantage of this to cut their encoded discs at an unusually low average level, with the following benefits: 1. Low distortion, 2. Better amplitude linearity -- both the cutterhead and the cartridge operate at levels where they are most linear, and 3. The inner grooves stay farther away from the label, which reduces distortion from this source also.

Although dbx would work on discs without its treble boost, that nonetheless makes up for any S/N ratio lost through the lower cutting levels. So the mastering engineer has no reason NOT to cut dbx discs at a low level. And that means better sound for us.

In every instance where I have compared dbx discs with their regular equivalents, the dbxed ones always sounded better. Most of the Turnabout QS discs are noticeably muzzy, grainy and veiled. The dbx versions aren't perfect, but there is an order of magnitude less of these problems. And the Rachmaninoff "Symphonic Dances" is much more "alive"-sounding, with a more-forward and less sucked-out midrange. It's odd that some of the personal-soapbox magazines have claimed that dbx discs sound grainy and veiled when it is precisely in those areas that they are so much better than un-dbxed recordings, even audiophile ones.

Publisher's Note: I feel that Stereophile owes CBS and Dolby Labs a chance to provide examples of their products so that an accurate comparison of the products can be made. We are sending our requests to them with copies of this report and will publish responses and the results of further testing.

The Sony Esprit Line

It took longer than we thought it would, but some manufacturers are finally beginning to realize that mere staggering cost is no deterrent to the sale of audio components. (Indeed, industry sources report that sales of the highest-priced components have been relatively unaffected by the national recession and generally hard times. Cheapcrap audio is still selling nicely too; it's only the middle-fi market that has suffered disastrously in the past few years.)

Never a company afraid to do its
homework, Sony's market researchers observed this interesting phenomenon and, already doing nicely in the low-priced area, decided to invade the audio stratosphere by launching its Esprit line of state-of-the-art, no-holds-barred, price-no-object components. The Esprit line comprises an almost-complete system, from a $1000 moving-coil cartridge (reviewed here recently) to two large loudspeaker systems -- everything except a turntable and tone arm. (And those will presumably soon be forthcoming.) We had the loan of a pair of the Esprit TA-N900 mono power amplifiers for several weeks, and had a TA-E900 preamp for several days. It was not enough time for adequate testing of the preamp, but during that period we were able to set up the preamp, power amps and cartridge with a pair of speakers we know quite well. The results were quite remarkable.

We auditioned a pair of the larger Esprit speakers (which sell for around $8,000 per pair) at the '82 Winter CES, and were not exactly bowled over. The sound was superb at moderate listening levels, but things tended to get a little hard and bright during loud passages. As we have observed many times, bad sound at a show doesn't signify much (good sound does), but without a relisten under better-controlled conditions we could not as now recommend the Esprit speakers.

The ones we used were Infinity RS-4.5s, speakers whose strengths have made them quite popular among perfectionists but whose weaknesses -- a certain unctuousness and lack of gutsiness -- have always tempered our enthusiasm for them. The tone arm used -- an SME 3009-III -- is probably not one Sony would have recommended, but in view of the sound we got, we don't expect them to accuse us of being unfair to their products.

The Esprit power amps do not, however, like Acoustats one little bit. With these speakers -- and it matters not which model -- the Esprit amplifiers sounded tizzy and grainy at the high end. Sony claims the amplifier is "free from speaker load reaction" and no doubt blames this problem on some peculiarity of the Acoustats (They claim the amps work fine with Quads but we would not recommend any 200-watt amplifier with those speakers.) And since Acoustat makes such a thing about what an easy load their speakers are, we are confident that that firm would lay the blame on the Esprit amplifiers, so without a resolution to this, suffice it to say these speakers and amplifiers are just incompatible.

We regret that we didn't have a longer visit from the Esprit preamp, because we never resolved one interesting thing we observed. Sony's XL-88D cartridge measures as having a rising high end, and sounds that way with our "standard" preamp, the Berning TF-10. Yet with Esprit's own preamp, the cartridge sounded very, very neutral. (Our reference here, for the benefit of newcomers to the magazine, is un-gimmicked discs made from some of the same 15-ips tapes that we have and, if most of these discs, reproduced through a preamp which we know from bypass tests to be neutral, sound like the tapes, we figure the cartridge must be pretty neutral in sound.) Our reaction, then, to this hybrid system: Over-all very neutral, with a subtle tendency toward mid-bass heaviness. Highs were exquisitely sweet, open and airy, and detail and definition throughout the entire range were quite simply extraordinary! We have heard a couple of other systems with comparable definition, but none which combined that characteristic with the high-end ease and listenability of Esprit's components. Bass was awesomely deep and solid, with tremendous punch and delineation. But it was that definition which really stood us on our ears. By comparison, our old re-
able Infinity HCA amplifier sounded -- would you believe? -- muddy!

We have in fact never before heard the 4.5s sound as good as they did with this equipment feeding them. Even brasses and lower piano strings -- the 4.5's major weaknesses -- approached the kind of gutsy power we expect to hear from them at a live performance. So...

Simply because it does so well all those things most audiophiles value most, this must be considered a perfectionist's system par excellence! We are now listing this as an alternative Class-B Recommended System, Audiophile Division, because we still feel that properly-driven Acoustat Fours may appeal more to the Music-Listener Division. If you consider yourself to be equally audiophile/music listener, then that puts you in rather a dilemma, doesn't it? We do not know (as yet) of any system which will do all things best for all people, but we're still looking. That's what "Stereophile" is all about anyway."

JGH

Sony Esprit TA-N900 Power Amplifier


What is there to say in a subjective report about a power amplifier which is built like the proverbial brick outhouse, seems to do everything it is supposed to do, and has virtually no colorations of its own? Not much, but we can always be counted on to find a few nits to pick.

Considering its rated 200-watt output, this is a surprisingly lightweight amplifier at 23 lbs, thanks to its pulsed power supply and lightweight toroidal power transformer. The outputs are class-A (drawing full supply power at all times) and, because Class-A operation tends to generate heat, the amplifier contains a cooling fan. Unlike most so-called "whisper fans" though, this one is truly quiet. (The one in the HCA sounds like an acute case of tape hiss.) Although Sony has taken great care to prevent CM (see the report on the FW-90 Sound Base, probably in this issue), the installation instructions for the TA-N900 advise placing the unit(s) on a solid foundation such as a concrete floor and then laying a slab of marble on top of it. We really doubt that this accomplishes anything, but it probably comes under that category of "oh what the hell, it can't do any harm and it MIGHT do some good."

We mentioned colorations. There are some, although very subtle ones. Its high end, although about as liquidly textureless as any we've heard, has a slightly wispy quality which translates into a rather more-natural sound from dynamic tweeters than from electrostats. (Except in the case of Acoustats, which do NOT sound pleasant on these amps.) And, like most other top-notch solid-state amplifiers, the TA-N900 has a very slightly laid-back brightness/presence range whose appeal or lack thereof will depend on what you like to hear and what other components you'll be hearing it through.

The big question, though, is whether this is worth $2000 per channel. That, we would say, depends on your priorities as well (naturally) as on your financial condition at the moment. If inner detail and definition are the things you are most critical of, this will probably give you more of those without the sonic liabilities that those qualities often entail in other high-priced amplifiers, such as tizzy top
and a slightly metallic edginess. Speaking strictly for myself, I would think twice, simply because I happen to like the speakers it doesn't particularly cotton to: Acoustats.

But if I'd never heard the Acoustats, I could be happy for a long time with these amplifiers and any number of other excellent speakers. JGH

Sony FW-90 Sound Base

About a year or so ago we composed a little "Miscellany" item about a newly-discovered source of system distortion: Component Microphony, or CM for short. The gist of this was that sound waves in the air impart subtle vibrations to the resistors, capacitors and wires (not to mention tubes) in a preamp and amplifier, causing variations in the capacitance between these items and making them behave like tiny condenser microphones, converting the sound waves into small audio signals which smear the sound of the program.

Actually, it was all in jest. We made the whole thing up, prompted by the growing conviction that if anything can conceivably degrade reproduced sound, there is someone out there who will hear the degradation.

We never used the item. It got squeezed out of a couple of issues by other items of more importance, and we finally got tired of looking at it and heaved it out. We figured anyway that it was too silly for anyone to take seriously. Then we got Bill Sommerwerck's report on the Summer 1981 CES, and Lo and Behold, there was a passing observation that Sony was using vibration-isolation feet under their then-just-introduced Esprit power amplifiers. We wondered, Could this herald the actual discovery of CM? It did.

Each of these impressive-looking devices weighs in an impressive 416 lbs, and contains two potent magnets oriented so that like poles are facing one another. Since like poles repel, the opposing magnets serve to hold the ends of the FW-90 apart as though it contains a powerful coil spring. Internal damping is added to prevent jiggles and bounces. Each base will support from 7-1/2 to 15 lbs weight which, at $125 per base, can add up to one helluvan investment. A typical preamp will require three FW-90s, while a 100-lb amplifier will need 7 to support it, for a grand total of $875. And it's obvious that the whole thing is a joke anyway.

Or is it? Used under several different turntables, we found the FW-90s to be only marginally effective in controlling floorborne feedback and minimally effective in controlling airborne interference. The sound quality was improved perceptibly but by no means dramatically, and most of the improvement was in low-end detail. Used with Sony's Esprit electronics, we could not convince ourselves that these made any difference at all. If they did, it was not to a degree that could begin to justify their cost. But then, the Esprit electronics have their internal organs encapsulated in solid plastic to minimize CM. So, we tried some other electronics, tubed and solid-state, and guess what? The damned things DO make a difference. Not a tremendous difference, but an unmistakable difference nonetheless. Everything about the sound was improved, from definition and impact to stereo imaging. With two tubed units we tried, the improvement was even more readily audible.

So while we hate to admit it, we
must confess that these costly little dinguses DO achieve positive benefits, although the amount of improvement you realize will depend upon so many imponderables that it is impossible to predict whether or not they would be worth their cost to you. It is probably safe to say that, if you use tubed electronics, you'll hear an improvement with these, particularly if any of the tubes therein go Bonk or Boing when you tap them lightly with your fingernail. (If they do, you'd do well to replace them anyway, with ones that don't.)

It must be emphasized that these are intended to achieve the last vestige of improvement in a system that is already state-of-the-art in performance. They are not inexpensive bandaids for a mediocre system, and will in fact effect no audible improvement in most such systems. Only when the more mundane sources of signal degradation have been reduced to the vanishing point will the cost of these gadgets be justifiable in terms of sonic improvement. Most of us could more-wisely invest their cost in better components than we already own. But for those who don't know where to turn for the next vestigial increase in sonic quality, these are worth looking into despite their high cost.

JGH

Bill Reed 6-02 Speakers


These are the remarkable little cheapies we mentioned a couple of issues back as being real competition for some high-priced audiophile systems. We don't really think they'll make you want to sell your Infinity IRS, but our initial shock when we first heard these -- after having lived with Acoustat Fours for a month -- was that, in terms of spectral balance, they didn't sound all that different. Considering that the price is little more than 1/10 that of the Fours, that's no mean feat!

The speakers are shipped in bits and pieces but with all holes cut out, and all the necessary assembly hardware provided. You provide the tools and the labor. The only precaution to observe is that all glued seams have a continuous bead of glue between them, to avoid air leaks (which cause a hissing modulation of bass). We were not too impressed with the speaker-edge sealant provided, and preferred to use window-caulking rope.

Completed, the speakers are attractive enough in appearance (real oiled-walnut veneer) but certainly no more impressive than any number of other bitsy boxes. But it's their sound that's remarkable. Their spectral balance is very much like that of a large, fairly expensive system, being neither thin nor fat nor tubby. The high end is rather bright and alive, giving the impression of more extreme top than there actually is. (Actually, there isn't much.) Deep bass is not floor-shaking, but the system goes deeper than one would expect for its size. And although some harmonic content was audible from sine waves at 50 Hz and below, bass from program material was surprisingly tight and well-defined. Middle-range definition was very good but not astounding, but stereo imaging was superb -- something we have observed in practically every small speaker system.
Colorations? A few, and they're visible on the measured frequency-response curve (a composite of 3): A broad, mild hump at around 90 Hz (slight boomininess), another at around 400 Hz (slightly warm quality), and a narrower, sharper peak at around 17 kHz (slight wispiness). The high-end peak sounds less conspicuous than it looks, unless you happen to be blessed with a phono cartridge that also has a mild 17-kHz peak, in which case the result is a pronounced tizziness at the top, plus exaggerated surface noise. (We should point out that many moving-coil cartridges have a peak in that region, but we don't really expect anyone to use a MC cartridge with a pair of $250 speakers.)

Because of their brightness tendency, these do better with good solid-state amplifiers than with tubes. Mated with, for example, an Audionics CC-2, they provide a good starting point for a minimally-priced system of surprisingly high listenability and accuracy.

Highly recommended for the music listener on a tight equipment budget.

JGH

Where (From page 3)

from cassetes and 8-track tapes. Cassetes adopt it, 8-track doesn't. Sales of open-reel tapes start to decline, as collectors have the rug pulled out from under them again.

1975. Audio loses its status value. Audiophilia and good music become even more estranged as component audio becomes increasingly equated with over-amplified rock and the drug "culture" or lack thereof.

1976. Arnold Schwartz has a 17-lb preemie at Zion Community hospital. Audio takes a breathing spell.

1977. The first digitally-mastered analog discs start appearing. Audiophiles denounce them as machinations of the devil. Record critics hail them as the third coming. (The second was LP.)

1978. Recession and inflation put a damper on consumer spending. Oddly, the highest-priced and lowest-priced component sales are relatively unaffected, but the bottom drops out of the middle-fi market. Home computers and component video compete for electronic hobbyists' dollars.

1977. The 8-track cartridge starts to go into a decline, probably because "Stereophile" predicted its demise 7 years earlier.

1978-79. The most earth-shaking development during this period is the concept of dealer inventory as volume rather than area. The cause of fidelity benefits imperceptibly.

1980. After that hiatus, all Hell breaks loose. Several disc and tape noise-reduction systems are introduced, their incompatibility vir-
tually guaranteeing the standardization of none. IMF in England introduces Ambisonic sound. ("Omi-god, not ANOTHER quad system!") Philips unveils a laser-digital disc system, which will obsolete all existing playback systems. Millions of collectors envision rugs under great tension. Myriads of "underground" magazines disagree about everything. The general public gives up in disgust, while dedicated audiophiles argue in circles as to how many samples and bits it takes to put a hot album on the head of a pin. Most of them have never sampled bits.

1981. Ambisonics lays a lead egg in the US. The audio industry regards the shambles of its house and asks "Where did we go wrong?"

1982. The industry answers its own question. "We overlooked the auto hi-fi market." Unh huh!

Puzzler

Walter G. took meticulous care of his system, which had given him immense satisfaction for over a year since the last round of upgradings. He was scrupulous about cleaning each disc before playing, he kept his stylus free from dust and gunky deposits, and of course he always returned each disc to its sleeve after playing and carefully lowered the turntable's lucite cover to keep dust and his Siamese cat off the mat while the system was not in use. Except for that one occasion.

He had just re-sleeved a disc and turned the system off when the phone rang. It was his fiancee, stranded on the freeway with a flat tire on the car and another flat in the trunk. In his hurry to leave, he forgot to close the cover over the turntable.

During his absence, his cat used the phono unit as a takeoff point for the window ledge and, in so doing, dislodged the tone arm from its rest post and sent the cartridge hopping across the platter pad. When he returned home, Walter noticed the uplifted phono lid and the cartridge resting next to the platter spindle. A brief examination of the cartridge revealed that its stylus had been bent to one side by about 20 degrees. Closer examination with a 30-power magnifier showed however that the stylus tip was still in place and still looked vertical to the disc surface when viewed from in front.

Walter thought of the time and cost of getting a replacement stylus -- the cartridge was an expensive moving-coil that had to be shipped back to the importer for a stylus replacement -- and decided to try a hunch instead. "The armature is not crimped, only bent a bit," he thought. "The only thing that has changed is that the positions of the contact ellipses have been rotated, relative to the groove modulations. All I have to do is change the tangency of the cartridge so that the stylus and its front part of the armature are properly lined-up with the direction of the groove, and the rest of the armature behind it will respond to the stylus motions just as it did before."

Is Walter's reasoning correct, or is he all wet? For the answer, see page 26.

Time Up?

If your address label on this issue bears an alphanumeric code of V-3, this is the last issue of your subscription. If you have just renewed, ignore this and accept our thanks. If you haven't, now is the time to do it. We're publishing so often now that a delay of only a week in renewing your sub will miss you an issue. Prices are on the subscription coupon.
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THE OTHER HALF is an Ambience Access System, that is unique: It incorporates at the core of its design rationale a very sophisticated binaural computer — YOU, the listener. It does not attempt, futilely, to compress Carnegie Hall into an integrated circuit. Rather, it uses technology as a proper link between the original performance acoustics and the music lover. What results is the restoration of much of the missing sense of being in the concert hall.

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Price: $949.00 net.

These performances are delightful, although the Ibert could be a shade more vulgar. It's not quite "sassy" enough for background music for a farce (The Italian Straw Hat). The Poulenc is a charmer. Originally written for a ballet production of Diaghilev, this suite for orchestra displays elan and verve. The Honegger, with which I assume most people are familiar, captures the spirit of a high-powered steam locomotive fully. The Satie Gymnopedies, two of which have been orchestrated by Debussy, are fragile wisps of music. I prefer the leaner harmonies of the original piano versions, but Debussy's orchestrations do capture the essence of the music.

This is an exceedingly reverberant recording. I suspect that the original disc was SQ quadraphonic. This is however the only drawback to the disc, and I certainly would recommend it. MG


I didn't care much for this disc. The performance is lacklustre and overintellectualized, lacking the spontaneity which this music needs. And the high end is steely-hard; Soundstream really ought to work

Reprints and Back Issues

We still have on hand a limited number of the softbound reprints of our first and second 12 issues. If you're curious about how and why this whole business of perfectionist audio got started (It was all our fault!), these two reprints are a not-too-compact history of the whole sordid affair.

Volume 1 contains 240 pages and covers the years 1962 to 1966, and Volume 2 has 290 pages and covers up to Spring of 1971. Both are 8-1/2 by 11 size (That's the way we were then!), and the price is $25 each.

Also available in rapidly-dwindling quantities, for the princely sum of $4 each, are original, unsullied copies of the following back issues (Volume and Number): 3-3, 3-4, 3-5, 3-6, 3-7, 3-9, 3-11, 3-12, 4-1, 4-5, 4-6, 4-8, 4-10, and 5-1. Good Xerox copies of out-of-print issues can be obtained at varying prices, depending on number of pages. Inquire about specific issues.

See the subscription coupon on page 18 for ordering information.
over that aspect of their recording system. Their problem, coupled with Chalfont's consistently hard high end, makes this a noticeable defect. Add this to the so-so performance and there really is no reason to buy this disc except for dbx's exceptionally quiet surfaces.

**THE SHEFFIELD DRUM RECORD. Improvisations by Jim Keltner and Ron Tutt. Sheffield LAB-14.**

There was a time when drum records were as common as records of steam locomotives and thunderstorms. It has been so long since anyone has tackled any of them that a lot of technology has gone over the dam, but they are precisely the kind of program material which illuminate the state of the audio art like nothing else. Thus, Sheffield's drum record emerges as a landmark -- a technological tour de force that should discourage anyone else from issuing a similar disc until the state of the art advances by a few more years.

This, in short is a doozey! A real workout for any system, and my prime candidate as of now as the best leasebreaker since Emory Cook's old "Speed the Parting Guest" recording. And while I am usually hesitant to make such recommendations, I am recommending that this be played LOUDLY. If your system can take it. (If it can't, I assume no responsibility for catastrophic failures.)  

**ITALIAN PLEASURES: Works by MAURO GUILIANI, FERDINANDO CARULLI, and LUIGI LEGNANI. Michael Newman and Laura Oltman, guitarists, with The Sequoia String Quartet. Sheffield Lab 16.**

Mr. Newman's guitar technique and interpretations continue to impress me. I especially enjoy the combination of guitar and string quartet in the Guiliani. The balance of solo instrument and ensemble is nice, and the music itself is charming. The players are obviously not intimidated by the fact that this is a direct-to-disc recording in which a single mistake means a complete side re-take. Their playing is sensitive and full of movement. And a word of credit must be given to Laura Oltman, whose duet performance with Mr. Newman is exquisite. The balance and coordination of the two players in the Carulli is superb. Mr. Newman's solo performance of the Legnani Theme, Variations and Finale is ravishing.

Sheffield's recording is stunning as always. The perspective, balances, and lack of tinking is evident from beginning to end of this disc and, as has been the case with all recent Sheffields, the high end is so completely natural that it may simply be taken for granted. Definitely Top-of-the-Pile.  

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**Letters**

**Reversals**

When ascertaining absolute-phase correctness, a listener is at a disadvantage when his audio wiring alters and obscures the information he is trying to perceive. Poor speaker wiring can grossly shift phase response.

This is particularly true of lamp cord, which exhibits 18 to 30 degrees of phase shift at 20,000 Hz. Monster cable also fits into this notorious category. These types of wire are inappropriate for faithful music recreation.

My suggestion is that you test for absolute phase using either Fulton Gold or Brown cable. They have negligible phase shift, even at 100,000 Hz. An additional consideration with this wire is that it maintains spectral energy in all
octaves. This octave-to-octave balance is important as it allows you to more-easily spot those culprit out-of-phase recordings. With a record that is IN proper absolute phase, not only will the midrange come forward as you suggested, but the timbres of the midrange will audibly improve and spatial information will become more specific. Finally, the bottom-most octaves will be present, unlike the situation where absolute phase is reversed. Good wiring greatly assists you in hearing all this.

The "cheap-and-dirty" pair of compact speakers provided you with absolute-phase correlations but your larger speaker didn't and neither did your headphones. This divergence is explainable.

On your larger speaker system, which is a partial dipole radiator, there are confusing phase anomalies which make it difficult to determine absolute phase. These phase anomalies hold true for all dipole speakers because of the phase-reversed signals which are constantly being radiated from the back of the speakers. They "speak out of both sides of their mouth."

Headphones are useless for evaluating absolute phase because you are coupled too closely to the diaphragms. Also, with headphones, you are listening to binaural sound from a stereo program. It's a totally different perspective from the sound which emanates from a properly-designed loudspeaker which re-creates musical information in the air and propels it across the room to your favorite listening position. Typically, 10 to 35% of most record collections is absolute-phase inverted. All of my Erato, Ry Cooder and Sheffield recordings are inverted. I mark the spine of their record covers with red tape and listen to these records properly -- with speaker leads for both channels reversed at the power amplifier.

Regarding AC plug polarity, there are a few simple points to remember: (1) Always remove or defeat (with a 3-to-2 adaptor) the ground pin on a 3-pin AC plug. (2) Locate a point at which you can connect to the household-wiring ground. The screw which holds the cover over a wall outlet is usually grounded, but it can be checked by ascertaining that it measures 115 volts above the "hot" side of the AC line. (3) Disconnect all interconnects between components. (4) Use an AC voltmeter to determine which side of each system AC outlet (including the wall outlet) is "hot" with respect to ground. Use a highly-visible marker such as a dot of bright-red nail polish to mark the hot side of all system AC outlets. (5) Measure the voltage between the household ground and the chassis of each component in turn. Reverse its AC plug and remeasure. The correct plug orientation is that which gives the lowest voltage reading. (6) When each plug is properly oriented, put a red mark on the side of each one, next to the red mark on its outlet.

Other suggestions: Power all components from the same wall outlet. This avoids ground loops between different outlets. If additional outlets are needed, use a rubber cube tap. Metal-cased AC outlet boxes degrade the sound. Finally, try to avoid using extension cords. If you must use one, keep it short and of heavy gauge. Also, avoid extension cords whose wires are twisted rather than run parallel to one another.

Initially, I oriented all my AC plugs by ear. At a much later date, all polarities were checked by measurement and the results agreed completely with what I had arrived at by ear (including the plug to my Linn-Sondek turntable). Anyone with normal hearing and coherent reproducing equipment should be able to do the same thing by ear, but a voltmeter makes it easier.

Jeffery D. Medwin

We thank Mr. Medwin for his interesting letter, but are moved to argue with some of his assertions.
We are curious to know where those figures for cable phase shift came from. They seem a bit overblown to us. We measured 15 feet of Monster cable and found about 4 degrees of phase shift at 20 kHz. We have not measured any of the Fulton cables but hope to before the next issue goes to press. (Incidentally, we used Fulton Browns for our polarity tests.)

Since there is no industry standard for disc phasing, it would be surprising if only "10 to 35%" of existing discs are phase-inverted. Purely random polarity would lead us to expect roughly half to be inverted. Then there is the question -- not yet answered to our satisfaction -- as to whether or not those "inverted" records actually are. We will not be convinced that what SOUNDS right actually IS right until someone takes the trouble to check through the polarity of a complete recording system, from mikes to cutterhead, to determine objectively what polarity the playback system must have in order to reproduce an original compression wave as a compression. With that knowledge, it will then be possible to determine whether subjective polarity correctness does or does not coincide with objective correctness.

It would certainly seem that out-of-phase radiation from the rear of a dipole speaker should tend to obscure polarity-reversal differences. But Stan Lipshitz, whose proselytizing on behalf of absolute phase is largely responsible for audiophili-a's current interest in it, asserts that polarity reversal is very audible through his Quad electrostatic speakers, which are dipoles.

Mr. Medwin's objections to the use of headphones for polarity evaluations are nonsense! Headphones provide the most unadulterated phasing information that it is possible to deliver to our ears, for precisely the reasons Mr. Medwin claimed they do not. And if we are indeed trying to ascertain the effect of polarity, it does not matter whether the sound source is binaural, stereo, or Ambi-

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**Why Not?**

If you support our views, why not support our magazine? Now that we're finally publishing monthly, and are starting to do the things we were only promising to do before, we expect you folks to show that you meant it when you said that, if we ever started publishing on schedule, you'd subscribe. Well, now we're publishing on time, which means you no longer have any excuse for not subscribing.

There's a subscription coupon on the back of this shamelessly commercial pitch. Clip it out, fill it in, and send it our way with your check for the ordained amount. Or, if you'd rather not scissors this copy of the magazine apart, you can accomplish the same noble deed by sending merely a check and your mailing address. We'll start you with Volume V, Number 1 unless you specify otherwise.
sonic; intrachannel phase relationships remain unchanged regardless of polarity. In fact, the ideal signal for our purpose would be monophonic, because there would be no other phase information thereon EXCEPT polarity.

Those awful metal-cased AC outlet boxes have a distinct advantage over rubber cube taps if a power amplifier is connected to them. Because they have much higher current-carrying capacity, they don't cause as much line-voltage drop when the amplifier is putting heavy demands on its power supply during loud signal passages. Frankly, we don't see how metal-cased outlets can degrade sound, but we'll keep an open mind on that. Likewise the effects of twisted rather than parallel AC cords.

Answer to Puzzler (From page 19)

Walter's reasoning was wrong, as was obvious to him as soon as he tried listening to a record. The sound was DIRTY!

His mistake was in assuming that stylus/groove alignment is the only important parameter in cartridge alignment. He overlooked tangency.

As far as the cartridge's sensing coils (or magnets) are concerned, the shape of the armature between the stylus and the pivot point is of far less importance than the alignment with the groove direction of an imaginary line between the stylus tip and its rear pivot point. If this imaginary line is not tangential to the groove at the point of stylus contact, the cartridge will produce a distorted waveform. But with the bent armature, correct alignment of that imaginary line will orient the stylus tip so that its elliptical contact faces are no longer in proper contact with the same modulations on

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The Winter CES

This short report on the '82 Las Vegas bash is late getting published, but better late than later still, we sometimes say. So saying...

The Convention Center, where the mass-market merchandise is displayed, was just as gaudy and circusy as ever, perhaps because they weren't trying to sell high-end audio. But if there was any question about the dominant field at last year's LV show, there was no doubt about it this year: 1982 is the year of the video revolution, with video exhib-
bits occupying almost a third of the total exhibitor space.

Meanwhile, back at the Jockey Club -- exclusive hangout of the high-end audio set -- dealer attendance was even sparser than last year, but there was one encouraging difference. Most exhibitors reported that the dealers who came into their rooms seemed more interested in ordering equipment than in previous years. Most felt that their attendance at this year's Winter CES was worth the time and money, which they did not feel last year. Nonetheless, the general tone at high-end village was rather somber and businesslike, as though much of the fun had gone out of audio.

We took a number of photos this year. Unlike the last time, we had the film properly attached to the takeup spool, and came home with the pictures. Several are included here.

There was nothing revolutionary unveiled at this show, although there WERE a number of interesting new products. Most were a little...
less expensive than previous years' crops, with one glaring exception: The WAMMS speaker system, from Wilson Audio, with a price tag of -- you'd better sit down -- $32,000! Okay, Infinity, what do you say to THAT?

As for the others, here's a sample of the goodies we saw (and, in some cases, heard) at the '82 Winter CES:

Top honors for interest went to the following (some of which we mentioned two issues back): Roger Wests's $1500/pair SoundLab A-2 electrostatic speakers, the Nitty-Micro-Seiki's AX-5000 vacuum-holdown turntable. Gritty record cleaner (reviewed here last month), the SOTA Sapphire and Wayne Colony air-bearing turntables, a one-piece PCM audio recorder from Technics, the Acoustat TNT-2000 all-MOSFET power amplifier (to be reviewed here soon), Scandinavian Sounds' QLN-II mini-speaker, and (Ta-Daah), from strain-gauge Sao, a Win moving-coil cartridge. And it looks as if we are being invaded this year by British turntables: The

![Micro-Seiki's AX-5000 vacuum-holdown turntable.](image)

Pink Triangle, Dunlop Systemdek and Ariston were but three of the new ones.

Equipment most in evidence (i.e., chosen by manufacturers of other products to show off their own): the Acoustat Four speaker, the Threshold Stasis I, Bedini 25/25 and Berning EA-230 amplifiers, and the Oracle turntable. A veritable hall of fame of audio.

Best sound, as judged by our correspondents: Plasmatronics, Krell, Counterpoint, Acoustat.

And already it's Summer-CES time.

JGH, DO, LIA

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**Feedback Polarity**

Many cases of low-frequency acoustic feedback can be helped by reversing absolute phase.

It seems that a disc is polarity-sensitive to changes in air pressure caused by passing sound waves. A compression wave causes the disc surface to move downwards more readily than upwards. If this compression wave reaches the disc at the same instant as the speakers are moving outwards, the result is an audio signal which encourages feedback from one or both speakers, aggravating any such tendency which may exist.

Reversing the polarity of the connections to both speakers will prevent the reinforcement, reducing the feedback.
Over the years, our retail dealers and customers have asked us why we did not produce a step-up device for moving coil cartridges. We explained that with so many such products available, we saw no reason to simply produce another product and would not do so until we could offer a product with significant improvements in a number of critical areas at a reasonable cost.

The Audionics of Oregon model ET-1 offers substantial advances in several problem areas. The ET-1 is compatible with virtually all low-output moving coil phono cartridges. It is as quiet, both measureably and subjectively, as any electronic product yet offered. It features Pure Class A circuit operation, direct-coupled design, with no 'front-end' negative feedback. The ET-1 eliminates interaction with your phono cartridge as well as offering low-distortion and high overload capabilities. In the past it has been difficult, if not impossible, to obtain such performance from a moderately priced unit. The ET-1 retails for a suggested $250.00.

The ET-1 is supplied with an external power supply. The active circuitry is housed in a cast aluminum enclosure fitted with gold plated input/output jacks. The ET-1 is reliable and offers outstanding sonic performance...in fact we're willing to bet the ET-1 may be the last moving coil step-up device you'll ever need to purchase.

If you want out of the 'headamp or transformer of the month' routine, the ET-1 is an affordable alternative offering state-of-the-art performance for now and the future.

For more information regarding the ET-1 as well as our other new products, send a stamped, self-addressed envelope to AUDIONICS of OREGON for a reply by return mail. Thank you.
Puzzler (From page 26)

both sides of the groove, which will cause another form of audible distortion. It is simply not possible to align both parameters at once.

If the stylus had been a spherical instead of an elliptical, it could have been made to work, even with the bent armature, by aligning the cartridge so that that imaginary line from tip to pivot was tangential to the groove at the contact point. But with his elliptical tip, Walter is out of luck. He must get the damaged stylus replaced or get used to a lot of distortion.

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