because people like music
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VOL. 10 NO. 1 JANUARY 1987
A Matter of Years
You may have somehow noticed already, but this issue commences the celebration of Stereophile's silver anniversary—our twenty-fifth year. What's truly remarkable is that one man, J. Gordon Holt, has managed to capture the attention of avid listeners for such a long time.

Though I can claim some minor credit for the most recent five years of JGH's survival in Stereophile form, any such credit pales alongside the durability of a legend like JGH. But he's not a legend—in an argument you'll find him nondogmatic, in a listening session you'll find him welcoming your observations, in person you'll find him actually quite humble. Above all, two things stand out: a kind of naive integrity—you couldn't possibly think he'd do other than call the shots the way he hears them; and an unswerving commitment to his experience of live music, which seems to shine like a beacon somewhere in his interior, surviving every fad which at one time or another sweeps up other critics.

And he's a human being. He hates the damp, hurts when attacked, cares for his family, and welcomes you to his home as an optimum host. Without getting too soupy, JGH has lasted so long because he's an unpretentious human being with a knack for getting at a particular truth and describing it. Though not always in fashion, the durability of his recommendations is—up to this time—unequalled.

And, while looking back a bit, we shouldn't overlook the promise for the future. JGH is joined in this silver issue by the first appearance in our pages of Martin Colloms, unquestionably the UK's most authoritative equipment reviewer. You won't find us resting on JGH's laurels, no matter our appreciation of them.
1987 will mark Stereophile's 25th year of continuous (if initially sometimes sporadic) publication. And while we haven't yet decided what we're going to do in celebration, the first issue of 1987 does seem to be as good a time as any to contrast the state of the audio art when we began publication with what is routinely possible today.

In 1962, the LP record had been around for 10 years, the stereo disc for four, and the audio marketplace was in chaos. The "hi-fi" mania which had made audio a multi-million dollar business during the late 1950s had peaked out, and public acceptance of stereo was growing at a much slower rate. Component audio was still the way to go,
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"All the sounds, even those different one from another, remain separated and distinctive. There results a sensation of contrast, precision, and uncommon clarity.

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but the ranks of "specialty" manufacturers designing products for perfectionists had become swollen with scads of me-tooers turning out dross in hopes that the public would buy anything labeled "Stereo." It was a period of shakedown, during which big advertising budgets were to make brands like Fisher, McIntosh, Klipsch, and Electro-Voice into household words, while perfectionist audio went "underground" to support smaller firms like Dynaco, Marantz, Lectronics (now called Fried Products), Bozak, and Janszen.

Solid-state components had not yet appeared in stores, but, despite the complaints of reactionaries who declared that stereo was unmusical and a violation of God's law, it was becoming increasingly difficult to buy a mono preamplifier. The perfectionist's choices of electronics then were the Marantz 8A and Dynaco Mark III power amps, and the Marantz 7A and Dynaco PAS-2 preamps. The top-ranked speakers were the Janszen Model Nine full-range electrostatic, the horn-loaded Electro-Voice Patrician 700, and the all-direct-radiator Bozak B-310. The top turntables were the Thorens TD-124 and the Fairchild 412-1A, the preferred cartridges were the Grado "Classic," the Shure "Laboratory Standard" M-3LS, the ESL P-1, and an Ortofon 'coil which appeared to have no model number. The favored tonearms were the ESL 310, the Gray 108C, and Shure's M212 arm and miniature cartridge combo.

Because almost all components back then were more colored than today's, mating of pieces with complementary characteristics was essential to achieve an acceptable sound. Nevertheless, even by today's standards, a well-matched 1962 system could produce quite respectably musical noises. It was just harder to do. What has changed in the last quarter-century is the ease with which those early standards can be met with moderately priced components, and the dramatic upping of the standards by which state-of-the-art sound reproduction is judged.

Here, then, are some examples of how audio has progressed since 1962. (If this sounds like a long time to you kids out there, consider that it took 48 years to get from the cylinder and acoustical horn to the electrically-cut disc.)

Measures of Subjectivity:
When Stereophile pioneered the "subjective" testing of audio products, there were only four objective measurements available for the qualitative assessment of amplifier or preamplifier performance: frequency response, harmonic distortion, intermodulation distortion, and signal/noise ratio. Transducer (speaker and cartridge) measurements were limited to frequency response, distortion, efficiency (more correctly, sensitivity), and dispersion, while turntables were evaluated according to their rumble, speed accuracy, and speed variation. There were a few other tests available for things like phase shift and dielectric absorption, but since those things were known not to affect the sound (!!!), they were deemed to be of merely academic interest.

Today, the science of objective qualitative assessment, using such tools as Time Delay Spectrometry and Fast Fourier Analysis, has added to those original tests new ones for slew rate and SID, stability, power-supply regulation, harmonic-by-harmonic spectrum analysis, clipping characteristics, overload recovery, spurious (unwanted) rectification, time alignment, trackability, acoustic breakthrough, current capability, damping factor, skin effect, time-delayed resonances, and coherence. And some of the older, "irrelevant" measurements, particularly those for phase shift and dielectric absorption, have been found to be more meaningful than anyone had previously suspected.

The fact that few of these truly informative measurements are ever cited by magazines like Stereo Review, who claim to believe in objective measurement as a means of equipment evaluation, merely confirms what we have long suspected: they aren't really interested in distinguishing the good from the bad. This doesn't bother us at all, however; if they were interested, there might be little need for Stereophile. (Fortunately, for us, the available measurements still don't tell everything about a component's sound. Even after 25 years of Stereophile, the ear remains the final arbiter of sound quality.)

1 Does that sound familiar, somehow?
2 In terms of equivalent purchasing power of the almighty dollar.

Stereophile
Trackability:
When mono LPs first appeared, many of them were roundly condemned in the audio press for being "overcut." Everyone assumed it was the fault of the discs: those cut below a certain modulation level would track cleanly, while discs exceeding that level suffered from horrible, tearing distortion. As cartridges improved during the 1950s, "overcutting" became less and less of a problem—until the advent of the stereo disc, which sent everyone back to square one on trackability. Mistracking was again king! But it had already begun to dawn on designers—and a few consumers—that mistracking was more the fault of the cartridge than the disc.

Simultaneously, audiophiles and electronics designers were learning that what used to be called "groove breakup" from mistracking was almost as much a function of early-stage (preamp) distortion as it was of poor groove tracing. Yes, the cartridge often did provide the system with garbage to work with, but any distortion in the early system stages exacerbated it to a greater or lesser extent. The realization of this gave rise to the "Spec Wars," wherein preamp manufacturers tried to outdo each other in terms of ever-lower levels of measured distortion.

Today, cartridges capable of tracking old LPs and stereo discs perfectly have become commonplace, and it is possible to buy, at less-than-appalling prices, supertracking cartridges that will handle, without stress, practically anything that can be cut on a disc. Except for a small handful of high-powered classical recordings (like Telarc's *Concerto for Cannon and Wiped-Out Woofers*) and a few genuinely overcut* pops, mistracking has become virtually a thing of the past.

As cartridge trackability improved, the ear-shredding hashiness evolved through edginess to a fine-grained roughness or dryness, and the extent to which these were exaggerated by the rest of the system continued to depend largely on the quality of those early stages. By the mid '70s, the engineering fraternity and the mainstream magazines (both of which still judged sound quality by the same four measurements considered definitive ten years earlier) had taken to pointing derisive fingers at audiophiles and their scorn for any preamp with more than 0.1% distortion. This was when the term "lunatic fringe" came into the popular lexicon.

Of course, today's best cartridges and preamps (and 'tables and arms) can make a disc sound almost exactly like its source, whether that source was an analog or digital tape, or a direct-wire hookup from the microphones.

Dynamic range:
For almost a decade after the stereo LP appeared, virtually every new release was distributed in two versions: stereo and mono. This provided ample opportunity for comparison—the stereo release always had considerably less dynamic range than its mono counterpart.

There were several good reasons for this. The most important, of course, was that stereo cartridges had even worse trackability than mono ones. Another contributing factor was that stereo disc cutters, being less efficient (at that time) than mono cutters, required more amplifier power to drive them to comparable levels, and were prone to burnouts if pushed too hard, particularly at high frequencies. The vulnerability of cutterheads was exacerbated by the already rampant practice of hyping high frequencies over and above RIAA requirements (see "Clout," below) to add that brilliance that mainstream-audio magazine reviewers once wet their pants over. (One small record company used to brag privately about the number of cutters they wiped out. This was offered as proof that their records had more highs than anyone else's.)

During subsequent years, improvements in playback cartridges and recording tech-

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*3 Well, at least one member of the audio press: *Audio* magazine. That was back in the days when hi-fi magazines reviewed only classical recordings, and when *Audio's* only classical reviewer was Ed Canby. The reviewers for other magazines never noticed anything about a recording except its performance and, if the sound was sufficiently stellar to be conspicuous, its "brilliance." In fact, it was the mainstream audio press's approbation of shilliness that helped make RCA and CBS recordings what they became during the next 20 years.

*4 These days, a "genuinely" overcut disc is defined as one in which the groove modulations exceed an angle of incidence with the stylus of 45°. Any angle greater than this causes the force in line with the average groove direction to exceed the force deflecting the stylus. This causes the stylus to climb one groove wall, thus losing contact with the other groove wall.
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nology gradually upped the attainable dynamic range from discs until, today, it is both possible and practical to cut a disc from a Dolbyed (or dbxed) master tape with, in most cases, no volume compression whatsoever.

**Noise:**
The history of background noise is the greatest success story to come out of audio. Noise elimination is, in fact, the only aspect of music reproduction which has seen dramatic and progressive improvement through the years, without any of the periodic setbacks (in distortion, for example) that usually accompany format changes. Shellac was quieter than Amberol (the trade name of the quietest material for mass production of cylinders), vinyl was quieter than shellac, open-reel tape was quieter than its contemporary vinyl, and compact disc has finally gotten rid of every last vestige of background noise. You’ve got to admit that that’s progress, regardless of how you feel about other aspects of CD performance!

**High-frequency reproduction:**
The late ’50s and early ’60s saw the introduction of two kinds of super-fi tweeters: the push-pull\(^5\) electrostatic, and the iconic or "blue-glow" tweeter. Because neither system relied on the stiffness of a diaphragm to impart sound waves to the air, they were freed from the constraints of moving mass which limited other tweeter types to a high-end range of 15 to 18kHz. Both were capable of reproduction to well beyond 25kHz, but were also costly, and not impressively reliable.

Apart from the reinvention of the metal-dome and metal-ribbon drive-units, there have been no new tweeter drive principles introduced since then. There have been, however, a number of developments in materials and production technology which have allowed the lowly dynamic tweeter, with its modest cost and superior reliability, to equal and, in some cases, surpass what was previously available only from electrostats and plasma tweeters. Use of extremely light, highly-damped plastics, combined with metal-deposition techniques, have made possible dynamic tweeters whose diaphragms have the almost ideal combination of stiffness and lightness. Some of this technology has trickled down to the production of inexpensive dome tweeters, whose HF range and smoothness rivals that of the best money could buy in 1962. State-of-the-art high frequencies are, in truth, little better today than they were 25 years ago, but average HF performance is infinitely better.

**Bass reproduction:**
Deep bass reproduction has been available to anyone with the money to pay for it and the space to accommodate it since the mid-1930s, but there were few who could afford either. In ’62, deep bass called for a huge enclosure or scads of amplifier power, but the quality of bass attainable either way was not very good. Good reproduction of deep bass at levels I thought adequate was possible then only from very large horn-loaded woofer systems.

As with tweeters, there has been no dramatic breakthrough in woofer design during the last quarter century, but there has been plenty of evolutionary refinement. Improvements in available materials and in our understanding of LF reproduction and propagation have yielded many speaker systems of reasonable size which produce as deep and detailed a low end as used to be possible only with behemoth designs. And trickle-down has been at work here too. Some small, inexpensive systems (such as the Celestion SL-600) now produce a level of low-end quality, if not quantity, which would have been unimaginable just ten years ago, let alone 25!

**Soundstage reproduction:**
Soundstaging, the Johnny-come-lately of high-end desiderata, assumed importance to the audio perfectionist only after all the

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\(^{5}\) Although every audiophile knows this term, few understand what it means. It refers to a change in mechanical or electrical state brought about by the simultaneous but complementary action of two opposing influences. Thus, in a push-pull amplifying stage, the passage of a rising signal voltage involves a current increase in one half of the push-pull circuit and a current decrease in the other half. In a push-pull electrostatic loudspeaker, diaphragm motion in one direction is the result of its attraction to a fixed screen on one side, and repulsion from a screen on its other side.
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other things he demanded from a system had been accomplished well enough by most systems that he came to take them pretty much for granted.

Many audiophiles had been noticing for some years that some stereo speakers reproduced depth better than others, and provided a wider spatial panorama than others without loss of center fill, but it wasn't until the late 1970s that loudspeaker designers realized that soundstage presentation was an important consideration in the design of a loudspeaker. By the early '80s, soundstaging had assumed such importance to perfectionists that, for many of them, it became the first criterion by which stereo reproduction of music was judged. (Personally, I cannot agree with such worshipping of the cathedral instead of God.) The result of this is that, today, we just assume that any high-end speaker system worth our attention is going to have superb soundstaging capability.

Clout:
Audiophiles bitten by the bug relatively recently take pretty much for granted the fact that very good, if not always superb, recordings are available from a sizeable number of recording companies. In fact, it is easy for even us old-timers to forget that, a mere 15 years ago, there was practically no "perfectionist audio" recording industry. At any given time, there may have been three or four tiny firms releasing one or two discs a year, but they came and went with depressing regularity. (Who remembers Cook, Audio Fidelity or Command Records?) Meanwhile, the durable major record companies continued to crank out their sonic abominations, scoffing that the "audiophile market" was too small to bother with.

Look at the situation today. Perfectionist record companies like Telarc, Sheffield, Reference Recordings, GRP, and DMP prosper as never before, multimiking and heavy-handed equalization are strictly out, and even RCA and CBS are trying to relearn their lost art of minimal mic'ing and the hands-off approach to classical recording. For the first time, the major record companies are paying attention to the wants of the perfectionist audiophile.

While we can easily argue that it was only a matter of time before the idiots in their corporate ivory towers came to their senses, the simple fact is that this revolution was brought about almost singlehandedly by Compact Disc. That *bete noire* of many perfectionists brought the mass of record buyers closer to the sound of original master tapes than they had ever gotten before, and they did not like what they heard. Even the mainstream audio publications had the temerity to suggest that something was seriously wrong with previously accepted recording practices, and started pointing to the audiophile record companies as examples of how things ought to be done. This was no longer a matter of concern only to the audiophile minority; it became a *cause celebre* for the entire consumer audio industry, and the big record companies at last began to pay attention. It would seem that, from now until the foreseeable future, we can only look forward to vastly improved recordings from *all* record companies.

So where do we go from here?
I don't see any technological revolutions waiting in the wings (although the laser LP player from Finial Technology may prove worthy of that title, but too late to delay the demise of the LP). And I am beginning to suspect that the best existing components may be approaching the limit of perfectibility. Direct stimulation of the brain's auditory centers is still pie in the sky, and as long as we are forced to use loudspeakers for sound reproduction, I believe we are not going to advance much farther than we are now until the industry realizes that acoustical space cannot be convincingly reproduced from two loudspeakers.

In short, it is my conviction that surround-sound is a technology whose time has come. If ambience is worth reproducing, it is worth reproducing properly, the way we hear it in real life: from all directions, not just from the front. There are those who argue that, just because a real space cannot as yet be reproduced convincingly, there is no point in trying to do it at all—an absurd attitude! Had we approached stereo that way, back when it couldn't be done "convincingly," how much progress would it have made during the past 25 years?
SOTA Star, SME V, Sumiko Virtuoso: Back To The Future

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We regret that time does not permit us to reply individually to letters, particularly those requesting advice about particular equipment purchases. Were we to do this, a significant service charge would have to be assessed—and we don't have time to do it anyway! Although all are read and noted, only those of general interest are selected for publication.

**Upgrading Horns**

**Editor:**

Having read a few articles concerning horn systems recently, I decided to upgrade an older pair of horns that were in the garage. The horns were a well-matched pair from Germany. I started by rewiring the horns with Kimber Kable. Then after "Tweaking" the switch and relay contacts I put them to the test. I am happy to report that the horns in my VW never sounded better. They played a lovely duet on the freeway that evening.

**Richard A. Smith**

Sidereal Akustic, Oceanside, CA

**Why No Carver?**

**Editor:**

In "The Carver Amplifier Challenge" (Vol.8 No.6), the Carver amplifier was characterized as being better than JGH's reference amplifier in one respect (p.40) and, after the improvement was eliminated, "sonically identical" (p.42).

Why, then, does not the Carver amplifier head the list of Class A amplifiers in the "Recommended Components" feature in Vol.9 No.7? Curiously, it does not appear at all in the listing of over 30 amplifiers. And when are you going to challenge Mr. Carver to make a preamplifier to match the Audio Research SP-11?

**A. Elgin Heinz**

San Rafael, CA

For it to appear in Stereophile's Recommended Components list, the Carver M1.0t would have had to have been auditioned in production form. True, Bob Carver had convinced us of his ability to make a prototype amplifier sound like the expensive model nominated by JGH, but we have no evidence that the production M1.0ts can do likewise. In fact, feedback from readers has been overwhelmingly negative. We have just received production Carver M1.0ts, however, and a review will appear in Vol. 10 No.2. If that review is favorable, the Carver will become a "Recommended Component."

**Unfair on Fried?**

**Editor:**

Dick Olsher's attacks on Mr. Fried's name and on Philadelphia in his review of the Fried G/3 loudspeaker (Vol.9 No.7) were totally irrelevant, inexcusable, and had no business being printed. I didn't know *Stereophile* was in competition with the supermarket tabloids. In addition, he claims that the measured bass response of the G/3 is only flat to 50Hz, and 9dB down at 31.5Hz.

He can't be serious!

A line-tunnel enclosure—which is not a "lowly" bass reflex, as described by DO—rolls off at 6dB/octave. It is impossible, therefore, for it to be down 9dB at 31.5Hz. The G/3 is flat to 25Hz.

Fried speakers are synonymous with excellent bass. I quote from JGH's SCES report on the G/3 in Vol.9 No.5: "There are two things I expect from Bud Fried's larger loudspeakers: unsurpassed reproduction of massed violin sound, and excellent bass. I was not disappointed. The low end from a transmission line system was awesome!" His review of the Fried Studio IV (Vol.8 No. 4), a speaker with a smaller line-tunnel enclosure than the G/3, indicates deeper flat-bass extension than DO found for the G/3.

In addition, DO said about the G/3's upper mids: "There's a pervasive dry thin quality throughout the range that most notably affects string overtones." Again, this conflicts with JGH's observations on the sound at the SCES. DO also states that "Extreme treble is not sufficiently smooth and airy . . ." The G/3 and Studio IV share the same tweeter, crossed over at the same frequency, and to quote from JGH's review of the Studio IV, "Highs are positively gorgeous, open, smooth, and airy."

Stereophile
Without question, the G/3 review is "factitious," with the strengths of Fried speakers suddenly becoming weaknesses. The measurements on the bass must be corrected. The sad part about the appearance of this review is not only the damage it will inflict on the Fried Products company, but also on Stereophile. Attacks on people, conflicting statements, and flawed measurements will ruin your credibility and put your magazine alongside other lowly audio publications on the magazine racks. David E. Finley

Lower Burrell, PA.

The trouble with measured defects, as far as someone who would attempt to deny a review's validity is concerned, is that no amount of rhetoric can reverse the measurement. To take Mr. Finley's points in the order in which he presents them, I too was surprised by the measured lack of low-frequency extension of the G/3. Surprised enough, in fact, that I repeated DO's measurements, using pink noise and a half-octave analyser, with the mike next to the woofer in LA's very large room (see also the letter from Mr. Katz in this issue). It was this measurement that indicated the 31.5Hz band to be 9dB down compared with the level at 1kHz. (DO's more rigorous sine-wave measurements showed that the response continued to drop below this band, shelving to -18dB at 20Hz.)

Mr. Fried informed me by phone that the response was indicative of a faulty sample with the woofer actually disconnected; as the results were identical for both speakers, however, and the woofers were visually and audibly not disconnected, a fault was ruled out. It might be that both speakers of the pair had somehow been assembled incorrectly; unfortunately for manufacturers, Stereophile's policy is to review products as received, as long as they appear to be working normally. If below-par review units slip through the manufacturer's quality control net, we assume it can happen to readers' units also.

In conversation with Mr. Fried, it emerged that he has ideas different from Stereophile about how the low-frequency cutoff of a loudspeaker should be measured. When assessing low-frequency extension, Mr. Fried measures the loudspeaker's response in-room, at the listening position. Unfortunately, this measurement includes the interaction between the speaker and the listening room at low frequencies. Not only will this interaction be unique to any given room and to any position in it; also, the room will boost the level of low bass by an arbitrary amount. I prefer to get a more universally applicable, if less generous, figure by measuring the speaker's response under anechoic conditions. If an anechoic chamber is not available—and it hardly ever is—then measuring outdoors is a less-good substitute; at the least, taking the response in-room with the measuring microphone very close to the driver will still give a more accurate indication of the rolloff frequency than Mr. Fried's method.

Mr. Fried claimed that he measured the response of the G/3s to be flat to 25Hz in his room. He did not send us these measurements, but I would suggest that the above paragraph implies that this statement is not incompatible with Stereophile's near-field measurements. Unfortunately for Mr. Fried, there are now speakers in existence, such as the KEF R107 and Thiel CS3.5, which do measure flat to below 25Hz under anechoic conditions, without the help of the room; subjectively, the G/3's extension has to be assessed against that of such speakers.

Regarding the disagreement between DO and JGH about the G/3's mid and treble registers, the fact that JGH liked the quality of the Studio IV's high frequencies is neither here nor there, despite the use of the same tweeter. Differences in the midrange unit, the crossover design, and in the voicing of the speaker's tonal balance can bring about the differences noted. In addition, as mentioned in the review, it turned out that the G/3 as submitted was not a finished product; a major revision to the crossover network was performed late in the review period to make the speakers conform to Fried's current production. It could well be that the G/3s heard by JGH at CES were different again.

Finally, regarding Fried's "line-tunnel" nomenclature, we have to disagree with Mr. Finley. There are three fundamental ways other than horn-loading in which a dy-
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namic drive-unit can be mounted in an enclosure: the "infinite baffle" or sealed box; the transmission line, and the ported or "reflex" enclosure (which includes such variations as the KEF coupled cavity). The first two ways attempt to prevent the back-wave—the out-of-phase radiation from the rear of the cone—from reaching the outside world and interfering with the sound from the front, the third way—the reflex—adds the backwave radiation to that from the front, in-phase at frequencies above the resonance of the port, and out-of-phase below.

The G/3, just as DO described it, is a reflex, having a ported enclosure. Bud Fried has pointed out that the port is not tuned in traditional reflex manner, and has additional damping in the form of foam in the port and in the cabinet, and that it therefore should be regarded as a new form of loading. With respect, I disagree. It is an overdamped reflex design and I regard Mr. Fried's "line-tunnel" nomenclature as confusing: it implies some form of transmission line loading, as JGH indicated in the SCES report to which Mr. Finley refers. The G/3 is even described as a "transmission line" in the Audio equipment guide. And a 6dB/octave rolloff? I am at a loss to know where Mr. Finley obtains this figure as even the most gentle case—a sealed-box speaker—will roll off at 12dB/octave below its resonance.

With hindsight, I can see that Stereophile shouldn't have reviewed the Fried G/3 so soon after its commercial introduction; rather, we should have waited for the design to settle down to its final form. —JA

A Matter of Concern
Editor:
As a subscriber to your magazine and a musician, I would like to voice a concern.

Like the gentleman who complained in a letter in Vol.9 No.4 that you were overlooking a good speaker (the Klipsch), I, too, feel that there are many such fine speaker systems out there that are never mentioned or reviewed in Stereophile.

I recently purchased the Polk SDA-SRS system, and I must state it is the most musical, natural, lifelike speaker, with truly awesome power, that I have ever heard. I am not a novice in respect to making a comparison with live music. I am a retired leading opera tenor, and having spent the last 25 years living with live music, and after several years of searching for the ultimate in realistic sound reproduction, I have found it in the Polk SDA-SRS.

One of your reviewers mentioned he didn't like sound to be manipulated as Mr. Polk was obviously doing. Well, manipulation or not, you owe it to yourself and, most important, to your readers, to review other cone speakers besides the Snells, Thiels, and Vandersteens. The Polk SDA-SRS is a very advanced speaker system, and I urge you to listen to it and present a fair review of what you hear.

John Reynolds
Mission Viejo, CA

The Matter of Music
Editor:
I wish to express my disappointment with the content of the record reviews and with the choice of repertoire displayed thus far. The content of the reviews has consisted of what I would describe as shallow, amateurish opinion-giving or, as in the case of JGH's review of the Respighi Church Windows recording in Vol.9 No.6, merely a springboard to launch into yet another technical tirade over the digital-analog controversy taken up elsewhere in that issue.

However, when I read the piece by Christopher Breunig on Berg's Violin Concerto, my confidence in your otherwise first-rate journal was somewhat restored. This is the kind of writing I would like to see. It is scholarly, concerned with musical matters—including detailed reference to the score—and keeps audio talk to a minimum.

Charles B. Hammell
Moorestown, NJ

Music & Vandersteens
Editor:
Thank you for the Breunig series. Please advise me of anything you can find that dates back to when the musicians were drunk, emotional, and playing their asses off.

Incidentally, I once owned (for a very short time) a pair of the Vandersteen speak-
SAMSON. Reproduction of music's bottom-most frequencies is often a moving experience. It can also be the difference between passively listening to music and emotional involvement. But the reproduction of sub 50 Hz fundamentals is a difficult proposition. And as a result most speakers are more shadow than substance at these frequencies.

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A QUESTION OF BALANCE.
A VIEW FROM THE TOP

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ers reviewed in Vol.9 No.6. They suffered greatly from cavity resonance inside the grille frame, had no bass, and were so dynamically restricted I wanted to send 'em a get-well card. And some ExLax.

Have they really improved that much, or is Mr. Cordesman very easily amused?

Hilary Paprocki
Rochester, NY

Vandersteens & Accuracy
Editor:
My wife and I drove from Scranton, PA to Definitive Hi-Fi, Thornwood, NY just to hear the Vandersteen 2Cs, all because of the review by Anthony H. Cordesman in Vol.9 No.6.

Believe me, it was worth the trip. We bought a pair after an hour and half of listening.

Mr. Cordesman should be commended for showing the public what's really out there, and for presenting a truly accurate review.

The dealer at Definitive Hi-Fi should also be given credit for properly setting up the 2Cs. He's also one of the nicest guys you'll ever meet.

Once again, thank you.

David Mizwinski
Moosic, PA

Vandersteens & Other Speakers
Editor:
Anthony Cordesman's review of the Vandersteen Model 2C speaker system in Vol.9 No.6 was very enlightening. While I fully agree with his assessment of the coherence and accuracy of these speakers, I do not understand why certain other speakers in this price range (under $2000) are not also considered by the critical audio enthusiast to be outstanding values.

I am serious in this regard. I'm almost tempted to believe the experts rather than my own ears. In future reviews, would you compare the JSE 1.8, the JBL 250 Ti, and the Polk SDA-SRS speakers with the Thiels, Vandersteens, Snells, etc.? A lot of us common folk have a lot of different tastes, so please, let's go for it.

Ted Plottner
Meeker, OK

Respighi & Organs
Editor:
With some dismay I read JGH's review of the Reference Recordings CD release of Respighi's Church Windows, in which he made reference to the "awesome" effect "When the pipe organ enters," allegedly evident on the LP but missing on the CD. What pipe organ? The lack of any clear timbre in the pedal, along with lack of bite in the mixture stop, identifies the instrument as a miserable electronic abomination, a state of affairs only too sadly evident on my ten-year-old Dahlquist-Hafler system. This review, in addressing the accuracy of the reproduction of a CD vs. the LP of the same performance, implied that the LP approximated the sound of actual live performance. I am constrained to seriously question your people's notion of what a real orchestra sounds like, and of course such ignorance guarantees the continued popular perception of publications such as Stereophile as cultist.

A sound system must do three things:
1. Reproduce all the fundamentals and overtones of a musical performance as recorded.
2. Deliver as much of the original dynamic as is consistent with the home environment.
3. Keep extraneous audible garbage to a minimum.

Spatial clues are all very nice, but to give this esoterica priority over the above betrays a complete absence of musical sensibility.

When I first became interested in hi-fi in the 1950s, the conventional wisdom was to put the major portion of the audio budget into speakers, the theory being that each additional dollar invested in a speaker brought a greater return in the accuracy of the musical signal delivered to the listener. I see no reason to question the truth of this advice 30 years later.

Richard G. Smith
Staten Island, NY

JGH & Organs
Editor:
J. Gordon Holt, in his article on bass in Vol.9 No.7, seems to downplay the LF requirements of pipe organ music. Even a moderate-sized instrument (30-40 stops) will have at least
one 32-foot stop, and the most common 32-foot stop is not a reed stop (which, granted, has little energy at the fundamental pitch), but a stopped flute, which has considerable energy at the fundamental pitch (16Hz at low C).

Stephen Roberts
Dallas, TX

We, and our reference books, stand corrected.

The Importance of Frequency Response
Editor:
This letter addresses the importance of frequency response to the sound of a system. But before anyone places me in a camp with Leonard Feldman, Julian Hirsch, or David Clark (unless the latter learns from Les Leventhal’s articles in the JAES and Stereophile Vol.9 No.5), let me stress that among the most critical items in my stereo system are a Linn Sondek turntable with Ittok arm, Interlink Reference A cable, and Krell KSA-100 amplifier. I certainly did not pick these components because of “frequency response,” but because of other virtues which are distinctly audible.

Nevertheless, I would like to confine my letter to questions of frequency response, because it is important to the sound of a system. Perhaps I may even show that frequency response is far more influential to the sound and, paradoxically, more difficult to measure than most audiophiles are aware.

Caveat: Measurement Methods and Their Errors. The swept sinewave method of measuring frequency response has been accepted without question for years when testing all transducers and media, except, naturally, microphones and loudspeakers. Then Howard Roberson (in Audio 1985-86) proved to me that modified pink noise is the preferred measurement method for cassette tape recorders having noise-reduction systems. Next, Peter Butt, writing in Recording Engineer/Producer (1985), made an eloquent case for measuring tape recorder frequency response with band-limited square waves and an FFT analyzer. This has engendered considerable controversy in the industry, especially considering that Mr. Butt’s first review using this new method rather
trashed the performance of a new professional Sony analog tape recorder.

Now what about speaker measurements? Recently, JGH has discussed how certain loudspeakers with flat "measured" midrange response do not sound flat to him. Well, I can sympathize with him, for I too have found too many loudspeakers (especially two-ways) to sound inaccurate (usually thin) on male voices, even though these speakers may measure flat. What I would like to question is not J. Gordon Holt's ears (God forbid), nor my own ears, but rather the accuracy, repeatability, and applicability of most of the methods used to measure frequency responses. Since this is far from an in-depth article on the subject, let me just pick on one of the most popular methods: Real-Time Analysis (RTA) with pink noise.

Real-Time Analysis: For those of us earning real-time dollars, RTA is one of the most economical methods. Unfortunately, it is the most deceiving of all. Its accuracy is fair to middling: in the range below about 150Hz it is only accurate to within about 3dB, due to standing waves in the room and to problems with determining the true value of the random pink-noise waveform at low frequencies. Its repeatability from day to day is medium to high, provided we use a tape measure to determine exactly where we placed the microphone and loudspeaker.

But even worse, the applicability of RTA is very low: we can hardly predict the sound of a loudspeaker using RTA. One controversy is whether to use an "omnidirectional" microphone with flat response on its axis or one with flat overall response (which will result in a bright high-frequency response on-axis). Measurements made with these two mikes can differ by greater than 5dB at high frequencies on the same speaker in certain rooms! And most importantly, all should be aware by now that the RTA cannot distinguish between the direct sound of the loudspeaker and the reflected sound from the room. This is one reason that most loudspeakers which measure flat via RTA will

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1 A measurement microphone of very small ("""") capsule diameter will have essentially flat on-axis and off-axis response to beyond 20kHz. But the most important problem of RTA measurement still remains.
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sound bright in the room. Therefore, like most smart professionals, I have reduced the use of RTA to chores like verifying gross defects in loudspeakers or adding a subwoofer to a system. Any other tests should be done with cautionary knowledge of the faults of the measurement in your system.

**Caution: Objective Testing can be Hazardous to Your Health.** So what measurement method should we turn to? Anechoic chamber measurements are hardly better; they will not tell us, for example, how an omnidirectional radiator with flat on-axis response will be perceived in a moderately live listening room. Nor will they tell us how any speaker with a particular on-axis anechoic frequency response will sound in the real world, given the variety of combinations of polar response (dispersion) and varying listening-room characteristics. As a matter of fact, even Richard Heyser's sophisticated computerized measurements (in *Audio*) raise more questions than they answer,² although I believe that in the future some Einsteinian audiophile will correlate statistical analysis of Heyser's reports with subjective analysis of the same loudspeakers, eventually leading us out of the dark ages of loudspeaker testing. But don't hold your breath. Read *Stereophile* instead, and do a hell of a lot of listening on your own.

**Suggestion: Subjective Testing is Safer.** After this taste of the problems in the scientific community, I wonder if JGH doesn't feel better being part of the "underground fringe?" It certainly doesn't seem to be much safer in the "legitimate world." And, please, Mr. Holt, take into account some of these questions when you quote the "measured response" of certain loudspeakers. In truth the utility of any "measured response" is overstated and frequently misinterpreted.

**Frequency Response and Record Reviews.** I wonder how many of us realize how much system frequency response may affect a reviewer's judgment of a record album? For example, in *Stereophile* Vol.9 No.5, JGH reviewed the Sheffield Firebird, noting how much his perception of that album differed from that of The Absolute Sound's Harry Pearson. I wonder if frequency response is the prime reason why the two gentlemen differ so dramatically. Here are some clues: JGH is using a pair of loudspeakers that he says are "subjectively bright." Let's say, for the sake of argument, that in addition to bright loudspeakers, his cartridge is a moving-coil (typically with tilted-up response), and his listening room is somewhat live. Again, for the sake of argument, let's say that HP is using a pair of the larger Apogee Ribbon (or Magneplanar) speakers in a plush listening room. (It's certainly easy to imagine HP's listening rooms to be overstuffed, just as JGH's may be a little spartan. The two gentlemen's tastes often differ as much as wine and beer.)

I submit that the Sheffield recording is already a little dull due to the use of ribbon microphones in the relatively dead MGM Soundstage (as a recording engineer, not a combination I would have used). I'll bet this information begins to explain HP's album judgment of "dull high end, closed-in sound, not enough spaciousness." I'll also wager that if JGH inserted a high-frequency rolloff of about 5dB in his system, he might feel the same as HP did about the same record!

So which reviewer is right? In his own listening room, each reviewer is right... but unaware, HP is probably missing a good-sounding album. Sheffield Lab's engineers make their recording judgments (mike placement, equalization if used) based on a given set of loudspeakers in a given monitoring environment. I would guess that JGH's monitor/room frequency response is a lot closer to Sheffield's than HP's.

The moral of the story: Try inserting a tone control before rejecting an album.

**Bob Katz**
New York, NY

**Interestingly enough, JGH's and HP's listening rooms and associated equipment are about the opposite of what is surmised by Mr. Katz: JGH's room is very dead, being lined with ASC tube traps, and his moving-coil cartridge (the Ortofon MC-2000) is as flat in response as a CD player; by all reports, HP prefers to listen in a relatively live, undamped room, and uses Infinity IRS IIIIs—which can, it must be admitted, sound a little dull at the top\footnote{Mostly, "now that I have all this data, how do I interpret it?"}**
with some amplifiers. He also uses a number of cartridges; I don’t know which he used for audition of the Firebird. —LA

VPI & Clean Power
Editor:
With regards to AHC’s review of the VPI Mk.II with Power Line Conditioner in Vol.9 No.4, I am really surprised that his response to the PLC was not that positive. At the present time I know seven people who own PLCs (four of them do not own a VPI ‘table; they use a Linn, an Oracle, a Goldmund, and a Yamaha). These seven people live all over North America—all are amazed by this product. The dramatic cleansing of the audio signal is instantly audible to all! “Noise” that many of us had always attributed to our vinyl has disappeared. Bass is clearer and greatly extended; a newfound clarity is upon us—and this is not taking into account the “speed control” aspect of the PLC. Clearly AHC must have some pristine power where he listens; here in NYC, the difference is frighteningly apparent. For the audio consumer who has not tried this product, let him be aware that he is missing out on a quality of sound that would be difficult to match at any reasonable price. This is a “real-world” product; a super performer at a price that can make a turntable sound better than most mods you could dream up.

As a final consideration of the excellence and value of the VPI, one only has to evaluate the clamping system. To say that it is simple is an understatement of the greatest magnitude. Today is the world of warped vinyl: to purchase a pop or rock record is a risk which often leads to a return trip to the store. You have to watch a warped record flatten—it’s a wonder! Run to your closets and rescue all those warped records you gave up on—they have a new life.

David Nemzer
Brooklyn, NY

VPI & Good Sound
Editor:
Stereophile’s recent review of the VPI and SOTA turntables in Vol.9 No.4 was both interesting and perplexing. On the one hand the review appeared to conclude that the VPI had better overall sound than did the SOTA. Yet, because the SOTA’s vacuum system caused a few select records to sound “better,” the conclusion was that the SOTA was the product to buy. This seems quite at odds with the assertion that the VPI has better overall sound.

If we look at the behavior of a vinyl disc on a turntable, it becomes apparent that there is a complex series of interactions between the turntable and the record. It is most unfortunate that there are no constants in these interactions which might be fully compensated for. The vibrating stylus puts energy into the vinyl record. Different vinyl formulations have varying energy characteristics. Different cartridge/arm combinations put more or less energy into the record. And different turntables react differently to energy transmitted from the record to the mat, platter, bearing, and chassis in varying ways. All of this affects the reproduced sound.

To find a turntable which sounds as good as the VPI does with the vast majority of records is a rare thing indeed.

Prior to co-founding my present company, which specializes in technical and educational writing, I was involved in research on the behavior of turntables. As a result of this work and reports from engineer and audiophile friends, the question of the use of vacuum hold-down systems for record playback should be viewed with extreme caution.

The vacuum system has its origins in professional recording lathes, where tight coupling to the platter and extreme flatness of the master lacquer is of vital importance. It seems natural to apply this same principle to the playback of the final vinyl product as well. In many cases, using a vacuum hold-down system on a playback turntable leads to a subjective loss of “air” and “ambience.” Since these are present when listening to either master tapes or to reference lacquers, it can be assumed that there is some loss in the playback system. It can also be argued that this air and ambience never makes its way to the vinyl record, and that the vacuum system lets us hear them with extreme accuracy. If we accept the latter as the case, then 1, for one, prefer the ”enhanced inaccuracy” of a conventional turntable.
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Together, they are the world’s most exciting cables to listen to and are sure to make a sonically rewarding addition to your sound system.
I believe that the case is much more complex, however. The work of my associates and I reconfirmed that the turntable can significantly affect the reproduced sound. For us, the design of an ideal playback turntable involves a bit of artifice to allow the sound of a conventional grooved record to approach, as best it can, the sound one would experience at the actual recording session or at a live concert. In other words, records need some help. And the type of help a vacuum hold-down system provides is precisely the type most records need least of all.

Another aspect of vacuum systems which has been brought to my attention is of more concern. Disturbing reports of actual physical damage to records makes me very wary of vacuum mats and vacuum platters. Two theories have been proposed. One is that any dust present on the platter or on the record can be pressed into the surface which rests against the platter. The other is that the extreme forces involved in vacuum hold-down in some way affect the chemical balance of the vinyl compounds. The effect reported is a great increase of noise in records regularly played using a vacuum hold-down system. In some cases, the records were rendered unlistenable—at least to audiophile ears.

John Fink
Jackson Heights, NY

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Most hybrid power amplifier designs use small signal-input vacuum tubes, then rely on FETs for the output stage. Audio Research has chosen instead to eliminate these low-level input tubes — tubes which can be prone to problems. The new FET “front end” is combined with Audio Research’s patented cross-coupled circuit to provide a design offering stability, reliability (low maintenance), and superior performance.

These advances have been coupled with yet another Audio Research patent: an output stage utilizing vacuum tubes, and partially cathode-coupled, but with the screen grids operating with a signal voltage precisely in phase with the cathode voltage. True “pentode” operation and efficiency is thereby achieved; however, all the advantages of partial cathode coupling are maintained.

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The latter problem mentioned by Mr. Fink is indeed of great concern, and was uncovered by Stereophile during and after our review of the Audio Technica AT-66EX vacuum bold-down add-on system (Vol.6 No.6, p. 16). The SOTA vacuum system, as reported by SWW in his initial review of the SOTA Star Sapphirre (Vol. 7 No. 2, p. 41) uses dramatically less vacuum than the A-T, and we have neither experienced record damage nor beard reports of such damage. SOTA has conducted research on the subject and found that vacuum has to reach 7-8* of Hg to cause vinyl damage (which seems to involve the second mechanism mentioned by Fink); SOTA employs 4-5* vacuum during startup and 1-3* as play continues. We have not checked SOTA's research, but I feel certain we would have beard if damage was being caused. —LA

The Blue Book Problem
Editor:
This letter is in response to recent letters concerning buying components through mail-order outlets vs. patronizing a local stereo salon. I agree that when the local shop invests the time and energy to demo a product satisfactorily to a prospective customer, that customer should give the shop his business. However, there is a common factor in the retail stereo industry which makes this an often unwise consumer practice.

I am referring to the nemesis of stereo consumer up graders everywhere: the Orion Blue Book. I am going to make an assumption with which I expect little disagreement: Well-made stereo equipment wears out very little if at all (vacuum tubes not included). The Blue Book, however, treats stereo components as if, once the box is opened, the component has lost considerable value. For example, a Conrad-Johnson Premier 3 preamp (list resale value of $1112); a Krell KMA-100 amplifier (list $2750), trade-in value of $836 (mint) and a resale value of $1348. As a percentage of retail price, automobiles hold their value much better than stereo equipment.

The stereo consumer wants value for his (or her) stereo dollar. But if components lose 70% or more of their dollar value as soon as the customer brings the component home, where is the value? The only way a customer can reduce his loss is to reduce the original purchase price. The result is that the local stereo salon feels cheated and abused when the customer buys from mail-order. What is the alternative?

Jerry Richards
Aurora, CO

The Grado & The AR
Editor:
In response to Chris Coury's letter concerning AR/Grado hum (Vol.9 No.4), you suggested he "trade in the cartridge or turntable for a different brand ..." I say, wait, Chris! Before you do that go to the kitchen, get a piece of aluminum foil and wrap it around the turntable motor; then make twisted pairs of the headshell/cartridge leads and reconnect. If this doesn't reduce the hum to a barely audible level with the tonearm over the platter and your ear close by, call Underground Sound in Memphis and have them send you a Merrill hum shield and/or a rebuilt motor.

If none of the above work, then trade in the turntable or cartridge.

Michael Lesser
University of California, Berkeley, CA

The Truth about OTL
Editor:
I would like you to know that "OTL" is a registered trademark of New York Audio Laboratories, and that to use it to refer to a Counterpoint amplifier (in your "Recommended Components" in Vol.9 No.7) is improper.

Harvey Rosenberg
Elmsford, NY.

Legally it may be improper, but unfortunately such problems always arise when a generic term becomes copyrighted. "OTL" stands for "Output-Transformer-Less" and has been used for many years, not just for the Futtermans-designed OTL tube amps manufactured by NYAL, but also in the beginning of solid-state, for transistor designs lacking an output transformer. We will tread more carefully in future.
'Before we could make our speakers better, we had to invent a better speaker test.'

—Eline Archibald, DIRECTOR OF RESEARCH AND DEVELOPMENT

ONE STEP IN THE MAKING OF A KEF

'A speaker is usually measured by frequency response sweeps. But their proper interpretation is difficult at best — misleading at worst. So in 1971, KEF joined forces with Hewlett Packard and Bradford University to develop a more reliable test: computerised Fast Fourier Transform (FFT). Our computer analyzes a series of pulse tones to produce a far more accurate, more detailed picture of frequency, phase, and transient time-domain behaviour. FFT testing has already spurred us to major advances in phase integrity and production consistency. It's certainly easier to make progress when you can see where you're going.'
Owning a pair of Quad ESL-63 speakers is like marriage to a difficult woman you love—hard to live without, sometimes hard to live with.

The $2950/pair ESL-63s are among the very few speakers I could live with for any length of time. They are as free of coloration as any speaker I know. Like other electrostatics (and ribbons), they are fast: transients are quick, and there's no sound trapped in the box because there is no box.

Weaknesses of the Quads are well known by now, and sometimes overstated. They do not play particularly loud. This can be a disadvantage not only with rock music, but also with large-scale orchestral works—Mahler becomes moderated, Bruckner bridled. Haydn and Mozart do fine, though, as does chamber music of all kinds. Known as a classical-music lover's speaker (kids into rock can't afford them anyway), the Quads are also terrific for jazz. Listen to a tenor sax on the Quads—driven by tubes all the way—and you know you're listening to the truth. The tenor sax is, for me, the most difficult of all instruments to reproduce.

Philips engineers use Quad speakers (and amplifiers) for monitoring their recordings. Philips recording artists like Bernard Haitink, Alfred Brendel, and Jessye Norman have purchased Quads for home listening (though Sir Neville Marriner uses Magneplanars).

I have yet to hear speakers I like better, though I have yet to hear the Sound Lab A-3s reviewed by JGH in Vol.9 No.6. Still, the Quads aren't perfect. I am not bothered so much by the fact that they don't play loud or that the bass doesn't go particularly low (although it goes lower than you think with an amp like the PS Audio 200C). What bothers me most about the Quads is a certain fuzziness in the treble, which I first heard identified by Richard Heyser two years ago in an Audio review. Along with this fuzziness goes a certain lack of precision in imaging. This might seem surprising, considering the sense of spaciousness and depth the speakers produce. I'm talking about two different things, however: spaciousness is not imaging.

I was surprised to see Alvin Gold savage the ESL-63s (in the September '86 issue of Hi-Fi Answers) while reviewing the Martin-Logan CLS speakers. True, the M-Ls do things the Quads don't: they have exceptional transparency through the treble, and image as well as any speakers I have heard. In fact, I was so taken by the M-Ls after hearing them at CES in the summer of '85 that I had a pair on order. DO had problems with his pair, though, and I put the order on hold.

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— Frank Merricks, KEF Product Engineer
something wrong with the M-Ls—based not on home audition but on several listens elsewhere—came at last winter's Vegas CES. The speakers sounded thin, peaky, and deficient in the bass. And the bass bottomed out, just like the Quads, when cracked up on certain killer Telarc.

For a while I entertained the idea of a pair of Apogee Calipers; they certainly made a favorable impression on everyone at last summer's CES. Subsequent auditions, though, revealed problems with those speakers as well. Yes, they may be more transparent through the treble than the Quads—a lot of speakers are, including the Celestion SL-600s—but they also struck me as bass-heavy.

So, at least for the moment, I am sticking with the Quads—my second pair, acquired earlier this year. If Bernie, Al, and Jess can live with them, I suppose I can, too. And, they are quite good for reviewing. One of the surprising things is that the Quads, without having much deep bass, reveal those amps which produce deep, tight bass. That's one of the first things I notice when I switch amps—a change in the bass. (The Quads reveal that the British Fidelity P-170 has deeper bass than the B&K ST-140, for instance; otherwise, these two MOSFET amps sound virtually alike. I can recommend both for use with the Quads.)

The Arcici Quad Stands

The Arcici stands came at the right time in my life—just as I decided to forget about the Martin-Logan CLS and Apogee Caliper to stay with ESL-63s. I had been offered a pair of the Chicago Speaker Stand Quad stands for audition, but wasn't impressed by what I saw (I didn't have much chance to hear them). Most important, the Chicago stands don't significantly add anything to make the speakers' frames more rigid, which is what ESL-63s really need. Moreover, filling the CSS stands with sand or lead shot—as recommended—makes them weight two or three hundred pounds! You can hardly move them around, a big disadvantage for a reviewer (though perhaps not for you).

The Arcici stands seemed much more promising. For one thing, they raise the Quads over 16 inches off the floor, while the old Stand and Deliver stands raise the Quads just over 8 inches. I thought the extra height might be beneficial, raising the soundstage along with the speakers. Also, the Arcici's reinforce the frames, holding the speakers at the wooden base and clamping to each side with setscrews top and bottom.

You get other benefits, too. With the Arcici stands, the Quads become very stable. It would be hard to tip them over, which is otherwise a real hazard with the Quads, especially if mounted on the S&D stands with little kids or large dogs running around the house.

The Arcici stands change the appearance of the Quads rather dramatically. The speakers look more 1966 and less 1963. (If you are buying a pair of Quads at the same time you buy the stands, you might choose black for the wood finish; it will blend better with the Arcici's black wrought iron.) The sound is affected, but not dramatically; it is, however, a definite improvement. Raising the speakers does raise the soundstage, and helps the Quads fill the room with music. The Quads can use all the help they can get in this regard, since they don't play particularly loud. Bass is tighter (the stands are spiked), and the overall sound has a little more clarity and definition. An altogether worthwhile improvement for $175 a pair.

The stands are a good value, too; that will become obvious when you see how well they are made. A lot of careful thought went into the design, and they can't be cheap to make. I'm surprised they cost so little. (Don't raise the price, Ray, the way John Iverson raised prices when we called his Eagle 2 a bargain.) You must fill the stands with sand or lead shot (or a mixture of both), however. Otherwise, they ring; besides, the added weight in the base increases stability. And you must install them carefully, to avoid damaging the speakers. If the setscrews are not firmly secured, you could have a disastrous crash; with the setscrews firmly in place, stand and speaker become one, each supporting the other. Be prepared, too, to touch up the stands with semi-gloss black spray paint; UPS can really rattle these around. (Actually, they should be wrapped in bubble pack for shipment so you don't have to worry about paint.)
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I don’t regard stands for the Quads as optional, and the Arcicis are far and away superior to those from Stand and Deliver. With the speakers selling for such a premium over the UK price, it’s nice that the Arcici stands are made in America. They are worth every penny and every Quad owner should immediately order a pair. (It’s also nice to see us get a leg up—no pun intended—on the British, standwise. Bravo, Arcici!) If you have difficulty in finding Arcici, they can be located on (212) 724-6021.

The JVC QL-Y5F Turntable
What’s a turntable doing in a speaker column? I don’t know, I just thought I’d tell you about something that happened.

About four years ago, in a moment of weakness, I bought this high-tech, servo-controlled, fully automatic, direct-drive, JVC QL-Y5F ‘table. Later I passed it on to my son, who was never fully happy with it. I bought my son a Dual CS5000 and he gave me back the JVC. It was sitting in my warehouse—ah, basement.

I wondered. What would this ‘table sound like if you put it on a Target shelf, used an Audioquest headshell, a dynamite cartridge like the Shinon Red, and a SOTA clamp?

Answer: Much better than I expected!

For a while I was so impressed with the sound that I teased JA about it—there’s good depth, the sound is very spacious, LP surfaces sound very quiet, and bass is rich and full (not overdone, though). Too bad you live 2000 miles away, John; we could compare your Linn with my carefully set up and finely tweaked JVC. John made strange noises in response. (I find most high-end ‘tables and arms a pain in the ass to use, especially compared to the ease of a CD player.)

All right, it’s not a Linn. But it is proof that a well-engineered direct-drive ‘table can sound pretty decent. The most impressive thing about the QL-Y5F is the servo-controlled arm, which works extraordinarily well. It’s certainly not a waste to use a cartridge like the Shinon Red, which really shines on this ‘table. The JVC arm takes high-end “universal” headshells, like those from Audioquest, is height- and azimuth-adjustable, and works well with every cartridge I’ve tried. The arm is able to track severely warped records.

If only JVC had offered this arm on a belt-drive ‘table. Alas, it’s direct-drive. The sound seems a bit forward, and individual instruments could be a bit better defined; it’s sometimes hard to follow musical lines. Also, the QL-Y5F is very susceptible to acoustical feedback (a Target shelf helps, but you need to make a special wooden platform for the JVC, extending the shelf).

At the moment, I continue to use and enjoy this ‘table; no one else wants it! I like it because the sound is acceptable and the ‘table is so user-friendly. Auto-cue and auto-return are especially nice. You put on a record, close the cover, and push a button with your little finger. It takes about ten seconds or so for the arm to do its thing—flawlessly. By then you are seated in your chair. Since the ‘table is no longer made, I don’t have to hear about modifications and updates—Valhallas and the like.

I think JVC should bring back the QL-Y5F, just as AR brought back the AR table. Even if it’s not belt-drive.
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WORKIN' on the
Most audiophiles know Mobile Fidelity as the record company with the philosophy of resurrecting old, important, recorded performances and re-releasing them with (hopefully) the kind of sound they should have had in the first place. Few audiophiles are aware that Mobile Fidelity is also the name of a (different) recording company which collects sound effects in four channels for motion picture and television post-production.

"Post-production" is that phase of filmmaking which takes place after all the actors and cameramen have gone home. Most of it consists of the addition of, as well as dialogue, sound effects which for various reasons could not be properly recorded at the time of the original filming. In particular, scenes which are shot outdoors are often a nightmare for the audio crew, because while it is fairly easy to keep extraneous objects out of the camera's view, it is almost impossible to keep unwanted sounds away from the microphone(s). Nearby street traffic, overhead jet planes, even insects reconnoitering the microphone, can spoil a take at any time, and it is nearly always the take which the director okayed because it was the first (after two dozen) that the actors managed to get through without blowing their lines.

Because our world is so noisy, a film director will often choose to shoot "outdoor" scenes indoors, on a soundstage, adding any necessary scene-setting background sounds during postproduction. But even then, the ambient sounds must be "right." If the sounds of crickets and distant crows help establish a scene in a cornfield circa 1842, there cannot be a jet plane roaring overhead. This may seem like a trivial detail that no one in a theater audience would notice, but if the background ambiance in a scene is wrong, the illusion of reality is impaired, even though the viewer/listener may not be conscious of what's "wrong" with the sound.

This is why postproduction houses keep on hand a large library of ambient (continuous) and incidental (one-shot) sound effects, meticulously cataloged and detailed as to locale and mood. And because usable effects are so hard to come by, most users prefer to buy them from someone who has already done the sweating and cursing, than send out their own people to collect them.

Mobile Fidelity Productions of Nevada is one of their sources.

The firm's name derives from the mobility of its recording equipment. While MFPN's effects library includes many "small" sounds, their specialty is on-location recording of things too big to bring into a recording studio.

Such as trains.

And not your ordinary, everyday, noisy, smelly, diesel-electric trains, either (although MFPN has taped many of those

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1 Although both firms have the same name and use the same trademark, they are no longer associated.
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too), but old-fashioned, romantic, noisy, smelly, steam-powered trains.

Few of us remember the days when coal was king on the railroads, nor indeed when the train was the fastest way of getting from one place to another. But prior to the late 1940s, when the inefficient, polluting steam locomotives were being phased out in favor of the new diesels, the passenger train was a continuing reminder to homebound citizens that there was a whole world of adventure and discovery out there beyond the bend where the tracks disappeared from sight. Thus was born the idea of the romance of the railroad, and its symbol was the wall of a distant steam whistle, reverberating through the valley on a cold, clear winter night.

That distinctive, mournful wail came from the fact that, although a steam whistle is a tuned resonant device, its pitch varies widely according to the pressure of steam forced through it. This was under the manual control of the engineer, who learned to "play" the whistle as a bugler plays his instrument, suitting its intonation and phrasing to the situation. (By contrast, the modern compressed-air locomotive horn has only two states; on or off. It's practically digital.) The engineer would sound a long, rising, sustained and then falling wail when the train was moving at speed in open country, to warn vehicles approaching crossing gates ahead. A short, sharp blast or two when the train was stationary would signal its intent to start moving, while a series of ululating hoots might express nothing more than the engineer's exuberance of the moment. The steam whistle's range of expression was almost limitless, its sound unique from one locomotive to another, and—heard from a distance—that sound was shaped in countless ways by the surrounding terrain. This, apart from sheer nostalgia for the sounds from one's childhood, is why train buffs never tire of listening to recordings of steam locomotives. But then, those of you who are "into trains" know this already. The preceding was for the benefit of those audiophiles who may have wondered what in the name of heaven it is that train buffs see (or hear) in those ear-splitting recordings of whistles and thundering wheels.

For the audiophile who isn't interested in trains, recordings of them are nonetheless one of the best means of demonstrating—particularly to tone-deaf friends—the capabilities of a super audio system. Their dynamic range spans that of human hearing, and their frequency range goes from the infrasonic to the ultrasonic. There are, in fact, very, very few audio systems which can reproduce the sound of a passing train at its original volume level without clamping out or frying drivers. (We're talking here of SPLs approaching 120dB. That's LOUD!) The accurate reproduction of train sounds is as challenging in its way as the accurate reproduction of a symphony orchestra. It's just that the requirements for success are different.

But one area where music recording and train recording are similar is in the connoisseur's conviction that the acoustical environment is an integral part of the total sound. In music recording, the environment is the concert hall, and its acoustics are considered as important a part of musical sound as the "raw" sound of the instruments themselves. In train recording, the acoustical environment is the unique patterns of echoes and reiterations of the "raw" whistle sound reflecting from the surrounding terrain. The more convoluted the terrain, the more varied and complex are these reverberations, which was why MFPN chose the Cumbres and Toltec railroad for this series of recordings.

This narrow-gauge road, which joins Chama, New Mexico, to Antonito, Colorado, snakes a circuitous route along 64 miles of track to travel a straightline distance of a mere 35 miles, crossing the NM/Colorado border 11 times along the way. The terrain it passes through is some of the most spectacularly scenic and mountainous of any in the US through which steam trains still travel, and the track runs through expansive plains as well as around craggy hillsides.

Built in 1880 as an extension of the Denver and Rio Grande Western railroad, to provide a supply line for the mining operations in Durango and Silverton, it was also the route of a luxury passenger train (the San Juan Express) until 1951. The line continued
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"I believe that anyone considering upgrading his system in any way should first obtain one of these record cleaning machines. Only then will he be aware of what he might be missing in the music, or of what his current system is really capable of in terms of disc reproduction."

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to haul freight until 1968, when stiffening competition from highway truck lines forced it to cease operations. In 1970, it was purchased jointly by Colorado and New Mexico (as part of their Historic Preservation programs), refurbished, and reopened the next year for the edification and delight of train and scenery buffs. It has operated in that capacity during the summer tourist season ever since. (A trip from one end of the line to the other takes about 6 hours, and costs $41.50 per person. Passengers grab lunch and then change trains for Antonito at Osier, midpoint along the route. The Chama train then returns, and passengers are returned to Chama by bus.)

Mobile Fidelity's president and founder, Brad Miller, got hooked on trains as a kid, and when his father bought one of the first home tape recorders, Brad started borrowing it. He soon became hooked on recording too, switching first to stereo, then to 4-channel sound as each offered an improvement in his ability to record trains the way they actually sound. Offering some of his recordings for public sale just seemed the next logical thing to do, and it subsidized his hobby. (He also organized a Muzak-style orchestra called "Mystic Moods," and issued some recordings in which he mixed music with mood-setting background sounds. Buyers hated them, writing to complain bitterly about the sounds messing up the music or the music messing up the sounds, depending on what they wanted to hear.)

MFPN's crew for this mid-September "shoot" included Brad M, Mrs. Miller (also known as Patricia), and train buff and frequent recording partner Joe Niklas and his wife, Sarah. Brad had invited me to join them, to find out what MFPN was all about and, maybe, get a little free publicity. The two teams had spent several preliminary days scouting the route for trackside locations where all the desired elements of terrain, track grade (steepness), and access to a suitable recording site were optimal. After selecting what appeared to be the best ones, it was necessary to obtain access permission from whoever owned the tracts of land where the recordings would be made from, as well as from the operators of the train itself. The latter was necessary because the object of these sessions was to record whistle sounds, and in order to get them phrased in the right manner, at the best times to take advantage of the terrain echoes, Brad himself wanted to be at the whistle cord, for which it was necessary for him to ride in the cab of the locomotive.

The day 1 was to accompany the teams was their second day of actual recording. On the first, Brad had one of the recording systems right in a locomotive cab, where the sound of the whistle was, as he described it, "earsplitting." Unlike most steam locomotives, which had the whistle located at the front of the engine, this one — a Baldwin
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2-6-2 "Mikado"—had it mounted right on top of the cab. (The engineers who routinely drive the train all wear earplugs. Brad hadn't thought to bring any.) On the day of my visit, all recordings were to be made from trackside.

Each team had its own car, each loaded with identical recording systems consisting of a new kind of 4-channel digital processor (see photo), a Sony Model VO-6800 portable (18-lb) U-MATIC VCR, several 25-foot lengths of mike cable (each carrying all four audio channels), a lightweight microphone stand, two belt-strap battery packs, a pair of wide-range AKG headphones, a few blank videocassettes, and a custom-built coincident 4-channel condensor microphone mounted inside a large windscreen that looked like an obese blue-gray phallic. The total weight of one such complete "mobile" recording system is around 55lbs.

Since the train wasn't scheduled to depart the Chama station until 10:30 AM, I wondered why we had to set out for the first recording site at 9. I found out soon enough. We followed paved roads for about 15 minutes, then followed a dirt track for about half a mile to a small group of tourist cabins in the middle of the large tract of land at whose edge we would be setting up. The dirt track ended at the cabins; the rest of the way we would go on foot.

I stood by idly while both recording systems were unloaded and hung from shoulders and hands, until I finally succumbed to an attack of guilt. "Here, let me carry something," I said. Brad handed me a battery pack that must have weighed all of 5lbs.

The trek to the first site was a snap: across a wide field to the far fence, and through a gate to the train track. We followed the track for about a half a mile, to a grassy knoll overlooking a distant highway. There we pause while Brad, barking instructions like a Prussian general, outlined the next step. He and the ladies would set up at a site near there, and one of them would drive him back to Chama to board the engine. Joe was to continue on to a site nearer to the tracks.

I dumped my battery pack, and set out with Joe because I had gotten the impression that what he would be taping offered better prospects for interesting photographs to go with the article I hoped to get out of all this. Once again, I volunteered to carry something. "What about the VCR?" I offered, expansively. He handed it to me without hesitation. It had a wide, comfortable shoulder strap, and again the walk was easy: all downhill.

Our setup location was next to a track curve about a hundred yards from a wooden trestle bridge\(^2\) spanning a deep, narrow gulley. There would be some action here, Joe told me, because the train would have to do some engine shuffling. Because most of the run from Chama to the Cumbres station is up a steep (4%) grade, the train would pass here with two locomotives in tandem pulling it. Because, however, of the load-bearing limitation of the trestle, only one locomotive at a time could cross it. The first would uncouple from the second, cross the trestle by itself, then stop and wait for the second to cross with the rest of the train. (Fortunately, the track grade was not steep at that point). They would then recouple, and start up the increasingly steep stretch of track next to where we would be setting up. Joe began unloading his gear while I scouted for some good places from which to photograph.

It was obvious from the start that wind was going to be a problem. The four-channel microphone would best capture the whole ambient field if it was at least several feet above the ground (where its rear quadrants would not be aiming at a nearby embankment) and well away from any other sound-absorbing barriers such as dense shrubbery. There was, however, enough of a breeze that, despite the windscreen over the mike, air turbulence would have caused pops in the sound. That, Joe explained, meant two things: seek a wind barrier of some kind, and get the mike near the ground.

As a barrier, he selected a meager shrub about 15 feet from the track. He placed the unfolded mike stand on its side, anchored it in place with some small rocks, and attached the mike, vertically, on the leeward side of

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\(^2\) This refers to the wheel configuration: 2 small front guide wheels (1 per side), 6 large drive wheels, 2 rear guide wheels.

\(^3\) For the benefit of those who know the route, it was the Lobato Trestle, spanning Wolf Creek, 5.2 miles from the Chama station.
For over thirty years Teac has been famous for building precision tape recording equipment. But, we're not willing to rest on our reels. So now Teac offers its most comprehensive line ever. From audio and hi-fi video recording equipment, to compact disc players, to graphic equalizers, speakers, and a complete line of audio and video accessories.

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the shrub. The capsules were about 10 inches above the ground, but I noticed, to my surprise, that when the upper part of the shrub was swaying in the breeze, the leaves down near the capsules were motionless. The wind problem was apparently solved.

Then I got my first glimpse of Colossus. Unlike the kludged prototype I had been expecting, the digital processor looked like a finished product, with a flat-white front panel with silk-screened black lettering, and a pale blue perforated metal top. It had four gain controls on the front, and I noticed that Joe had turned them all the way up. "You mean," I asked incredulously, "you're actually going to try recording a train from 15 feet with everything wide open?" Joe explained, patiently, that Colossus and the microphone had a dynamic range greater than that of human hearing, and were calibrated together so that it was almost impossible to overload them. And there were VU indicators on the front panel to show when they did need to be turned down. I later learned that the mike overloads at an SPL of 140dB, but Colossus doesn't. Thus, it is impossible to overload the processor. I was duly impressed.

We checked out the system through the headphones to make sure everything was working, then unplugged the battery supply to conserve energy. The train wasn't due for another hour. Joe said that they always left plenty of time because, if they didn't, something would inevitably go wrong that would require, at the least, a walk to the car and back. I sat down, lit a cigarette, and pretended to be bored.

I had mentally marked three locations from where I could get great shots when the train hove into sight. But I was requested not to move when recording began, because "the mike is so sensitive, it will pick up rustling-grass sounds when you move." I selected what I felt to be the best spot, and vowed that I would stay put. (I lied.)

Finally, barely perceptibly, we heard the train whistle as it left the Chama station, almost 5 miles away. Many minutes later we heard it again, still a long way off. Joe didn't move. Again the whistle, a little closer still, this time followed by the slightest continuous sound of something else. Immediately, I saw Joe start the recorder, and I froze in place. I was, of course, standing right in a dense clump of dry grass. That continuous sound soon resolved itself into a familiar huff-chuffing, and I saw clouds of gray and white smoke billowing into the air from behind a distant bluff. Still, most of what I was
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hearing was an occasional grasshopper, the gentle rustle of windblown leaves and grass, and a bumble bee lazily circling my ankles. Then the whistle sounded again, but distinctly closer this time, and followed by an impressive echo from the far left, where a row of hills towered above the distant highway. The site had been well chosen.

Then the whistle started blowing in earnest, each blast following before the echoes from the last had died. The train stopped on the other side of the trestle while they were uncoupled, then the lead locomotive slowly crossed the trestle and stopped just beyond Joe and his equipment setup. It was still about a hundred yards from me, but already the racket was impressive. I knew that, now, there was no way that sensitive microphone 10 feet in front of me would "hear" rustling grass. Watching Joe, who was facing the other way, for any sign that he had heard a rustle through the headphones, I moved away from the mike, made a wide loop over and down the hillside, and stretched out on my belly right beside the track between Joe and the front of the first engine. I put the wide-angle lens on the camera.

Finally, the train started again and approached from behind me, audibly gaining speed with each second. I framed the picture I wanted, with Joe and his equipment at the right and the train at the left, and held the camera still, waiting for the train to appear and hoping it wouldn't loom too high above the camera's field of view. As the first locomotive passed by me, the ground began to heave with bone-jarring shocks, and I found myself pelted with cinders from the smokestack, some of them still red-hot. The noise was unbelievable; almost frighteningly loud. Then I saw the locomotive through the viewfinder, waited until it occupied about half the frame width, and fired off the shot.

When the incredible din started to fade, I assumed my frozen stance again. Then, just when the whistle blasts had almost vanished behind the distant hills, I heard a remarkable thing. One short toot, barely audible as it happened, was followed by an echo that must have been at least twice as loud and sounded half as far away. I could tell by the mutely jubilant look on Joe's face that it was exactly the kind of thing he was after. A minute or so later, I got the Tape's Stopped signal. "We got it!" said Joe. "It was perfect, except for a bee that kept buzzing the mike."

The hike back to the car was not as much fun as the one to the site, because the opposite of all-downhill is all-uphill. I am 56 years of age, I get little exercise, and I smoke a lot. But, miraculously, I did not get out of breath. What I did run out of on the return trek was stamina. The VCR I carried no longer weighed 18lbs. It weighed 23, 32, and then 40, rapidly approaching 50. Now, 50lbs is almost half my body weight, and my leg muscles simply rebelled. After two brief rest stops, which helped but not much, I was obliged to hand the VCR to Joe. "What the Hell," I rationalized, "He would have had to carry the damned thing all the way in both directions if I hadn't been along." But I graciously relieved him of the 1-lb mike stand.

Our next stop was Cumbres. From there on, the track grades were much more gentle, so only one locomotive would be needed for the return trip. We watched while the lead locomotive was disconnected and backed onto a siding. A railman operated two switches, and the engine pulled off the siding and back onto the main track, this time facing towards Chama. It paused with its tender4 next to a trackside water tank, and the trackman climbed up, pulled a large spout from the tank over an open trapdoor, and refilled the boiler supply with water.

Brad had arrived there before our party, and already had a mike set up 15 feet from the track, in the shelter of some bushes. The recording system was sprawled across the back seat of the Millers' car, and Patricia was now hovering over the VCR awaiting Brad's raised-arm circular wave which meant "Roll tape!" The single locomotive was recorded departing. (As it pulled away, I spotted one of the engineers leaning out of the cab and doffing his trademark cap as though to acknowledge audience applause.) Then we grabbed a delicious portable lunch, cour-

4 The tender is an open-top car attached to a locomotive, which carries coal for the furnace and water for the boiler. It "tends to" the locomotive's nutritional needs.

I cannot resist posting an ancient riddle. Q: Why can't a locomotive sit down? A: Because it has a tender behind.
The reference standard—experience it at CSA Audio
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tesy of the Niklases and of Brad’s parents, who just happened to be camping in Chama when the recording took place.

For the third pair of recordings, we schlepped the equipment along a mile or so of track from the Cumbres station into a heavily wooded area adjacent to a wide meadow, through which meandered a hairpin track turn\(^5\) and a rising grade. Even in the shadow of the dense stands of spruce, there was enough breeze to make it necessary, again, to shield the microphones and place them low to the ground. At one site, inside the hairpin turn, the mike was placed about two feet above ground, on the leeward side of a large stand of trees facing the valley from which the train would approach. And because the now-solid overcast was threatening to dump some rain on us, Joe and Sarah set up the rest of the equipment under the largest and highest of the nearby spruces. (They had brought along plastic covers for the equipment, just in case, but nothing to keep themselves dry.) I saw no promise of interesting photos here, so I went back to the other site. This one was near the top of the grade above the hairpin, where a steep embankment falling away from the railbed would allow me to get below the track level to shoot the approaching train from a very low perspective, to enhance the impression of its size. Here, the mike was placed about 20 feet back into the trees below track level. The processor and VCR, manned by Brad’s wife Patricia (she doesn’t care to be called Patricia), were about 8 feet from the track. Even before the recorder started rolling, we had an inkling that this session might not turn out all that propitiously.

 Barely a minute after we heard the first distant whistle, the sound of a high-flying jet plane started intruding, growing slowly enough in volume that we knew it was going to last a long time. Miraculously, it had faded to inaudibility before the chuffing of the locomotive became (barely) audible and Patricia started the tape rolling. Then, just as the locomotive was becoming clearly audible, what sounded like a trailer truck with a defective muffler went roaring across the highway a mile or so away. It drowned out the train for several seconds, but Patricia let the VCR continue recording anyway.

Everything then went splendidly until the train passed our setup location. Many of the passengers waved, and we waved back, and then the last car passed. It was one of those old-fashioned “observation” cars, with the rear balcony from which generations of politicians used to do their stumpings during “whistle-stop” campaigns. This observation car, though, contained a group of tourists who had apparently been celebrating ever since the train left Chama that morning, and were now feeling loudly exuberant. Not content to wave demurely, they cheered us rousingly as they passed. Scratch one “ambient” recording of a passing train!

 The other team had been more fortunate. Because they had sought shelter from the rain that never materialized, they were never spotted by the observation-car revelers, who were at that moment silently appreciating the scenery. So at least most of one tape was usable.

 It was time to fold up again. Observing that the entire return trip was uphill again, and having learned my limitations, I graciously offered this time to carry a pair of mike cables and one of the mike stands, and thus arrived back at the car in something less than a state of complete physical collapse.

 Since I had never once spotted the be-cabbed Brad during any of the train passes, I asked if we could get a final shot, back at the rail yard, of him doing his cab thing. There just happened to be a locomotive standing furnace-cold and unoccupied in front of the engine house. Brad grabbed a mike, climbed up into the cab, held the mike out the window, and gave me a big grin. “No, no,” I protested. “I’m not here, remember? Don’t look at me, look to the horizon ahead, where the track disappears around the bend toward that distant world of romance and adventure.” He gave me a strange look (Are you kidding?!), but complied. I took the picture, and that was it.

 **Postscript**

 Several days later, Brad, Patricia, and one of the mobile systems visited us in Santa Fe,
A pre- eminent arm needs a formidable combination of strengths. It must combine almost zero friction with near-absolute rigidity. In following the groove, it must keep side forces to a minimum—in fact drastically improving on all pivoted arms in this regard. Its design should ensure that resonances are reduced to insignificant levels. It must be easily adjustable in every way that affects performance, including VTA, azimuth, and dynamic balance.

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—Thomas O. Müller, *The Absolute Sound*, Issue 39

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—*Hi-Fi News & Record Review*, July 1986

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**UPDATE NEWS:** Our new van den Hul monocrystal silver lead wire offers improved signal transfer and flexibility: standard on new arms, available as an update for $50. Also, remember that you can trade in your ET Tonearm 1 for our Tonearm 2 for just $250. Contact your dealer or Eminent Technology.
and we thought it might be enlightening to listen to some of the tapes they had just made, as well as a few older ones Brad had brought along. We started in my main listening room, where the Sound Lab A-3s had been (temporarily) backed up with the small Technics wall-mount speakers I usually use in my video room for Dolby surrounds. That system, which I have found to be eminently satisfying for music reproduction, was hopelessly inadequate for reproducing trains, close aircraft passes, and fire engine sirens recorded from a distance of 15 feet. Not only did it give up in despair at volume levels far below what were necessary, it was also conspicuously deficient in that bottom octave (20-40Hz) that is apparently needed to reproduce the earthenborn thuds of heavily-loaded steel wheels on a trackbed. We moved everything to the video room.

There, I had a pair of Watkins WE-1-II speakers up front, and with these (and a 200W/channel Perreaux 2150 power amp) we were able to listen at more realistic levels (clocked at 108dB on one occasion) and to get an inkling of the floorshaking low end we should have been reproducing but still weren't. We might have been able to get more level from the system than we did, but since I own the Watkinses, I was afraid to try (although they did manage to survive a humongous BANG that was recorded on one tape when someone plugged in the microphone while the tape was rolling). It was clear, though, that had I been seeking for these past years a system to reproduce big, natural sounds rather than music and dialog, I would have ruled out "perfectionist audio" systems early in the game. This brought home to me, as never before, the fact that there is not—and perhaps cannot be—any one system that will reproduce all kinds of sounds with equal faithfulness. Does this mean, then, that true "high fidelity" sound reproduction is, in fact, an impossible goal? I'll have to think about that one. Some other time.

**About the equipment**

The heart of MFPN's mobile recording system is Colossus, a 4-channel digital processor designed for Brad by Lou Dorren (who developed a 4-channel broadcast system called Quadracast and the phase-locked loop circuit used by JVC for their CD-4 decoder), and manufactured by a firm called By The Numbers. It's a 16-bit linear-encoding system, but uses a proprietary code which is claimed to provide wider dynamic range with much lower distortion than any other digital audio system. Remarkably small in size (similar to that of an expensive tubed preamp), Colossus's name would appear to refer less to its dimensions than to its hype.

The 4-channel microphone is a self-powered FM condenser system, originally designed (from scratch) by Carl Countryman. Countryman had made a similar mike for Brad in 1969 from a Neumann SM-2, and also custom-built for him his first 4-channel portable tape recorder, a battery powered 30-ips unit that used ½-inch tape. (Miller has been making outdoor 4-channel recordings since 1970, releasing excerpts from some of them on disc for public sale. Only recently has the film industry become concerned enough about sound to show an interest in MFPN's work.)

The "FM" here has nothing to do with wireless communication, but describes the operating principle of the microphone. The condenser capsule is part of the LC (coil/capacitor) tuned resonant system of an oscillator. Diaphragm movements vary the value of C, changing the oscillator's frequency, and these changes are converted to audio signals by conventional FM demodulation. The main advantage of an FM mike is high output and very low noise (typically several tenths of a volt of output, compared with a millivolt or so from other microphone types). The disadvantages are complexity and cost.

The mike is not being manufactured as yet. In fact, its design is not yet finalized. When available for sale, though, it is expected to sell for a cool $8.5 grand, to professional users and well-heeled amateur recordists.

Colossus, on the other hand, is being manufactured now, and can be purchased for only $15,000—plus an additional $5000 if you want the black box that converts the Colossus code to Sony 1630 (CD) code.
HYBRI-DOME...A NEW ERA IN LOUDSPEAKER DESIGN

Featuring the revolutionary new HYBRI-DOME High-Frequency Driver, Siefert Research's new Magnum III 3-way Loudspeaker System ushers in a new era in loudspeaker performance.

Key to Magnum III's natural sound is its exclusive HYBRI-DOME high-frequency driver with its hybrid mating of metal and polyamide. This two-piece construction uses an optimally-stiff aluminum dome supported by a highly-compliant polyamide plastic suspension. Aluminum's stiffness extends response to over 24 kHz whereas the compliant polyamide suspension permits operation down to 1500 Hz. Also, this provides transverse-wave absorption and edge termination that can't be achieved by one-piece metal assemblies.

Thus, the HYBRI-DOME provides unmatched sound smoothness, transparency and an effortless, uncolored reproduction of complex tonalities.

At the heart of the Magnum III is a new, unique Six-Octave Midrange Driver. The exceptionally-smooth response (100 Hz to 8 kHz, ± 2 dB) of this four-inch, polypropylene-cone driver extends with minimum group delay one octave on either side of the 250/3000-Hz crossover frequencies.

Magnum III uses an expensive Third-Order 250-Hz Crossover Network that is just below middle C (262 Hz). This locates any crossover phase changes well below the extra-sensitive 400- to 1500-Hz sound region.

The final element providing a robust low end to below 36 Hz (-3 dB), is the Integrated Tuned Port that shares the enclosure's ¾-inch wood material. Others use a lower-cost cardboard tube that causes audible air turbulence.

The synergism afforded by Magnum III's features gives it extraordinarily-low-group delay, exceptional imaging and 38-Hz to 24-kHz response within ± 2 dB.

The compact enclosure (only 22H x 13.5W x 14D) is available in walnut, oak, or black-lacquered natural hardwood.

We invite you to audition the Magnum III at home for 30 days. If it does not meet your requirements, the purchase price will be refunded with no hassle.

For the complete story on the Magnum III, or its highly-regarded predecessor, the Maxim III (2-way system), call or write. VISA and MASTERCARD are accepted. PRICE: $699/pair, plus $36 UPS.

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The art of sound reproduction may seem to progress in leaps and bounds, but the truth is that, just as in every other scientific field, progress is the result of innumerable small developments. The best place to observe audio progress in the making is at one of the biannual Audio Engineering Society Conventions, where an engineer's ritual presentation of technical papers to a critical audience of peers is the modern equivalent of the medieval trial by ordeal. If the presenter comes through unscathed, his paper stands a good chance of becoming accepted lore. Also, the concentration of so many people with shared interests in such a small area seems to have a catalytic effect as they strike sparks off each other—when it comes to intellectual ability, two plus two often equals five.

The main theme of the 81st Convention, held in Los Angeles last November, was the digital/analog fusion, subtitled, in rather florid fashion, "A Rainbow of Technology." What follows, therefore, is a condensation of the important papers on digital technology and the ideas presented at the various workshops.

Perhaps setting the right tone for the convention, the very first paper was presented by Diana Deutsch, of the University of California, San Diego. Professor Deutsch has specialized in auditory illusions; anyone who is convinced that what we hear is an absolute should hear some of her demonstrations, designed to fool the brain's auditory processing. Her presentation featured an intriguing pattern of tones which appeared to ascend in one key, but to descend in another. When played at different speeds, some listeners hear it as ascending, others as descending. Evidence that the human ear is rather different from a microphone could not have been more clearly presented.

Most important at this convention were gathered large numbers of recording and mastering engineers with considerable practical experience in handling digital hardware. Not for these people the facile "perfect sound, forever!" while enthusiastic supporters of digital, they still have to deal with its problems. (Remember that, even if perfect, digitizing by itself can never improve sound quality, only preserve it in a more rugged form.) Awareness that A/D converters are not all-powerful was common— one engineer expressed the opinion that 4x oversampling CD players have better digital electronics than most professional recorders. Practical compromises must be found. Engineers, for example, have found that it is best to fade to silence very quickly, otherwise noise modulation and quantizing artifacts become audible, even at the very low levels concerned. (Apparently the only exception so far is the digital technology developed and used by Decca, which can fade with uniform sound quality.)

A converging body of opinion is emerging as to what is right and wrong with the bits. "Nobody likes pre- and de-emphasis" was an oft-expressed statement, as was "Most mastering engineers want as few passes through a digital editor as possible," it being felt that preserving the digits in as pristine a form as possible was essential for good sound. The high ratio of peak levels to the average capable of being preserved by digital is causing philosophical problems. Engineers want natural sound quality but their masters at the record companies would...
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like their CDs to sound as loud as possible (loudness being related to the average level). "We don't want no level wars," said one prominent mastering engineer, but, faced with adverse critical reaction to natural but soft CDs, he had no option but to add compression in order to produce a commercially acceptable product.

CD has forced record companies to find out something that record enthusiasts have known for a long time: that their archives are of considerable value. The question of how best to transfer historic tapes to CD—"historic" meaning anything before 1980—was debated at length. Too often, the original master is missing or has been degraded. And should the engineer add ambience or even tape hiss between the tracks to avoid that sickening descent into digital silence?

There was much argument whether new technology should be used to "improve" old rock and jazz recordings when remastering for CD, now an almost universal practice for classical recordings. It was put forward that for release on CD, the mastering engineers should remix with the benefit of more versatile mixers and new types of equalization and reverberation units, and maybe even replace unsatisfactorily recorded instruments with new overdubs. Philosophically analogous to the argument that if Bach were alive today he would have recast the Brandenburgs for synthesizers and rock percussion, this policy is directly comparable with "colorization" of black and white movies.

Thankfully, a majority of the attendees seemed to be against the idea. Indeed, one of the beauties of an AES Convention is that abstractions can become specific: a proponent for "improvement" instanced the classic Motown recordings from the mid-'60s as prime candidates for such treatment, at which point the actual engineer responsible stood up and stated that he was sure the equipment imperfections were as much part of the artistic process as the music. He would be damned if anyone was going to second-guess someone like Marvin Gaye about what was good sound.

Also a hot topic was whether the CD standard should be compromised so that discs will play without problem on very cheap players. Commercially, of course, the answer is "Yes," as no one wants to restrict the market, but should this be at the inconvenience of those buying good players? The main problem area lies in how much offset time the mastering engineer should allow between the "start" of a track and the actual start of the music. The standard is to offset the start of the track by about 5 frames to allow the player to lift its muting, but as cheap players apparently are excessively slow to un-mute, they often clip the first note of music. To overcome this incompatibility, some mastering facilities are offsetting by up to 15 frames, but this delay—half a second, an eternity in digital terms—is annoying on good players and unacceptable for broadcasting.

The papers themselves both pointed to the future and provided reasons for what has not worked in the past. The latter was illustrated by a paper presented by N.H.C. Gilchrist of the BBC Research Department, from where so much audio verite has originated. Offputtingly called "The Subjective Effect and Measurement of ADC/DAC Transfer Characteristic Discontinuity," this paper was the result of research into the audibility of errors in quantizing level (ie, if an analog level is wrongly coded by the ADC, or the DAC produces the wrong analog amplitude from a digital number—a distortion peculiar to digitization that does not produce high measured levels of THD or IMD). Using 14-bit ADCs and DACs—they were specified as 16-bit, but the last two bits were unreliable—the BBC found that an error of just one quantum level at the zero crossing point of the signal (equivalent to four 16-bit levels) could be audible on piano music. If the error was elsewhere in the dynamic range window, its audibility decreased, due to the reduced chance of the waveform crossing the discontinuity. We were then shown what a larger error—32 quantizing levels at the zero crossing point—sounded like with a Chopin Barcarolle, the effect exaggerated to overcome the problems of large-scale demonstration. The sound became gritty, with a fatiguing edge, but even more significant for me was what happened to the die-away of the piano sound and the reverberation: it became
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granular and discontinuous. If that sounds familiar to what subjective reviewers have been saying about digital in general, you’re absolutely right—a case of the sound being unpleasantly wrong despite relatively low measured distortion. When asked how common were such errors, the answer was that the BBC had found that they were not at all uncommon in commercial chips. The problem having been identified, let us hope that the quality of converters available to CD player manufacturers will now improve.

On the positive side, three papers looked at the possibility of achieving what might seem impossible: more than 16-bit resolution from CD players. Many commentators regard the fact that CD reproduction is limited to 16-bit data words—the best that could be achieved in the late ’70s when the system was conceived—as its biggest problem. This now would not appear to be the case; however. Professional word lengths are already longer than 16, not due to the soon-to-be-introduced 18-bit digital recorders, but to already extant digital mixing consoles.

Two English companies, Solid State Logic and Neve Electronics, lead the field here, with all equalization, mixing, and level changing performed by subjecting the stream of digital numbers to mathematical functions. A moment’s reflection will reveal that any mathematical operation on a 16-bit word will increase its length—the digital filter used in Philips-process players, for example, produces 28-bit words as its output—and the digital word length must be reduced to 16 before the data are in a format compatible with the CD standard. It might appear that simply trimming the excessive length to the required 16 most significant bits will ensure that the CD will contain accurate 16-bit data without any quantizing distortion. Certainly, this is what I used to think, but a paper presented by Stanley Lipshitz and John Vanderkooy, of the University of Waterloo, Canada, showed that such simple truncation reintroduces quantizing distortion. (This is the reason for the sonic inadequacy of digital fades mentioned earlier.) Stanley and John, whose collaborative papers are remarkable for both rigor and number, have already thoroughly researched the use of analog dither to linearize ADCs; their new paper looked at the use of digital dither to ensure that resolution is not lost when truncating to 16-bit words. (Digital dither simply involves adding random numbers generated by a computer to the data.) The details will be covered in a future article, but the implication is that the careful application of digital dither will preserve 18- or 20-bit resolution at the expense of a slightly increased noise background.

A paper from Barry Blesser and Bart Locanthi reinforced this idea by looking at the improvements in ADC linearity due to different types of dither, but the real clincher came in “On the Use of Computer-Generated Dithered Test Signals”, presented by Robert Finger of the CBS Technology Center. CBS used a computer to generate test sinewave signals based on a word length longer than 16 to ensure an accuracy way beyond anything possible from current hardware. The problem then is, how to put these signals on a 16-bit test CD, with their resolution preserved so that they can be of practical use? (Normally, a sinewave at a level of -90dB—1 LSB peak—will be so coarsely quantized that its own distortion will swamp any due to the nonlinearities of, say, the DAC being assessed.)

Well, to cut a long story short, CBS has, by using digital dither, been able to “cut” test sinewaves on their new CD-I test disc down to a level of -120dB, 24dB below the 16-bit cutoff point! These sinewaves have distortion below the noise floor, so when being used for assessing CD players, any apparent distortion can confidently be ascribed to the electronics. In addition, a stepped-fade 500Hz test signal, sweeping from -60dB to -120dB, enables the monotonicity of the player’s DAC to be assessed, revealing the problems discussed in the BBC paper discussed above. If it can be measured, it can be fixed.

Finally, two Teldec engineers presented a paper on CD mastering with wide implications for the record industry. At present, CDs are mastered optically and expensively, in special clean-air rooms, adding enorm-

Continued on page 198.

1 This disc is available from Old Colony Sound Lab, PO Box 243, Peterborough, NH 03458.
Meridian, the company which led the way in demonstrating the true sonic possibilities of the CD medium, continues to lead the industry with the introduction of their new model 207 Professional compact disc player.

The 207 is built on two chassis. The transport and all mechanical components are housed in a chassis which offers front loading convenience while carefully isolating both the disc drive and laser mechanism from external vibrations. A separate chassis containing the audio and control electronics is entirely free of the electromagnetic radiation of the transport motors and any microphonics that might be introduced by their operation. These factors contribute to the 207's ability to reproduce the more subtle nuances of a musical event.

The full function remote control capability of the 207 includes a recently designed circuit for controlling the output level. This revolutionary electronic gain control provides the highest audible quality ever available with a remote control, allowing the 207 to be conveniently used to directly drive active loudspeakers or a power amplifier without requiring a preamplifier.

In addition, the 207 provides an auxiliary high level input and a full tape loop, making this product essentially a CD player plus preamplifier. The 207's innovative design can simultaneously improve your sound quality and simplify your home entertainment by performing as the control center for your system.

Select Meridian and take the next logical step.

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Select Meridian and take the next logical step.
Ask most professional symphony musicians for their views concerning recording sessions, and you might be greeted with seeming nonchalant and cavalier responses. You will probably be told that although recording can be quite lucrative, it is almost always an exercise in futility. If you press further, and inquire as to why these "artists" display such negative attitudes, they would treat you to both a lecture concerning the shortcomings and gross musical distortions usually involved in the recording process, and to a tirade on the incompetence and arrogance of many recording engineers and producers. And once you have opened this can of worms, you will undoubtedly be told about the frustrations of having to deal with inaccurate and distorted representations of their art at the hands of the musically inept.

There has certainly been enough written about the sonic shortcomings of the commercial recording industry, with experts arguing over the attributes of minimal microphone technique, the effects of phase distortion, not to mention the digital/analog debate. While all of this may well be germane, nearly everyone has missed the point: unless the recording accurately reflects the artistic parameters of the original performance, and remains consistent with the performers' intentions, it really isn't worth a plugged nickel.

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1 Lewis Lipnick is the Principal Contrabassoonist for the National Symphony Orchestra.

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the musician in the middle

Lewis Lipnick takes a look at symphonic recording from the musician's point of view
Assuming that we are dealing with material originally intended for concert presentation, and not solely for the studio, the fact that composers design their works to be heard from a perspective in the theatre must be considered. The argument that many engineers and producers use, "that their ability to alter the original textures and balances can add to the musical validity of the performance," just doesn't hold water. When Bach, Beethoven, and Brahms were alive and well, the microphone and tape recorder did not exist. These composers obviously had to rely on the performing artists successfully to represent their musical ideas and intentions to listeners. Composers such as Hector Berlioz and Gustav Mahler took great pains to specify the most minute shadings of dynamics and textures in their works, so as to assure the proper presentation of the various lines and voices to the concert-hall audience. For example, Mahler clearly specifies in several of his symphonic scores that, during solo unisons of trumpets and oboes, the former should play mezzo-piano, the latter fortissimo. He knew that the trumpet is a louder instrument than the oboe, and in order to assure an honest unison between the two, dynamic balances had to be taken into consideration. Unless the recording team is aware of such musical factors, and sensitive to the musicians' efforts to remain faithful to the composer's intentions, the final product will be nothing more than a caricature of the original.

Most people do not realize that a performer's reputation can be significantly affected by the way in which they are presented in the recorded medium. Highly acclaimed soloists with artistic power and control have the opportunity to ensure that they are favorably presented in the final product. Symphony musicians, on the other hand, who may be responsible for important, exposed solos, have no such personal input. The number of listeners hearing any individual player via a recording will undoubtedly be much greater than the number able to attend the live performance; and, of course, have no other method by which to judge the musician's capabilities. If this representation is an inaccurate, musically compromised rendition of the artist's efforts (which is often the case), the power of the recording engineer to dictate the performer's credibility becomes a potential editorial weapon.

This brings to mind an experience I had during a session in the not too distant past. We were recording for a well-known European outfit, and I, being the inquisitive type, decided to listen to the playbacks. This was probably not the most intelligent thing to do, since it got me into a rather unpleasant situation. What I heard was not only sonically inferior, but didn't even begin to resemble what we were producing on the stage. When I asked the engineer if all of the 52 microphones were being utilized, I was told that indeed they were. Since the balances which we (the performers) created were not correct, they could render a more valid interpretation of the composition through their technology. When I suggested that perhaps the main purpose of recording was to make a sonic imprint of a performance without any editorial comment, the other party stated that I should mind my own business, and leave artistic matters up to the experts. On the other side of the coin was a situation related to me by Frederick Fennell, the conductor responsible for those magnificent performances of the Eastman Wind Ensemble on the Mercury label. At the playbacks of one of the earlier mono sessions, Fennell commented that the clarinetets were not as prominent as he would have liked. When he asked C. R. Fine, the engineer, what could be done to obtain a better balance, Fine firmly suggested that Fennell tell the clarinetets to "play louder."

Which of the above scenarios is more valid? I vote for the second, but perhaps there should be some sort of compromise that will give us good sound and honest music. Just as the cinematographer has the license to create a mood or atmosphere, the recording engineer should have a reasonable amount of flexibility in determining various sonic parameters such as soundstage dimensionality, overall perspective, and general ambience. It is important, however, that this not be at the expense of the composers' and performers' musical endeavors. Proponents of multi-mike recording techniques are quick to point out that since the human ear and microphone perceive sound differently

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(the former acting as an editorial filter and the latter not), many of the fine nuances and balances must be "brought to the fore" in order to reproduce the performance effectively. Their point is well taken, since the microphone does not have the advantage of a visual reference, which helps the listener to interpret the sonic and musical cues present in the live experience. The real problems arise when overzealous engineers or producers believe that they have the right to become part of the artistic chain of events, therefore placing their editorial stamp on the final product.

Some recording companies engage musicians to help in production, in theory an excellent idea. Unfortunately, these are often individuals who have their own sets of values. Many times they are at odds with the conductor and musicians, with definite ideas on what type of sound and performance their employers will accept. Furthermore, they very rarely have any practical orchestral performing experience, and therefore cannot deal effectively with the important artistic decisions required of them during the session. It would certainly help if recording personnel made more of an effort to acquaint themselves with the problems and performance philosophies of the musicians, in order to help, rather than hinder, the musical process.

Professional instrumentalists and vocalists are trained both in the conservatory and through practical experience to produce big, resonant, clear sounds in order successfully to project to the "last row in the house." They accomplish this by adding an edge, or "zing," to their sounds that is clearly audible up close, but not at a distance. If one were to sit in the middle of our wind section during a concert, the visitor would probably find the unfocused and unrefined quality of the sound to be distracting and unmusical. If microphones are placed too close to the instruments, the perspective will not only be incorrect, but the musicians' sonic intentions will be misrepresented.

There are other problems which confront the recording engineer that are often dealt with in a less than insightful manner. For example, I'd like to take a look at the matter of "the microphone behind the French horns syndrome." Many engineers, in an effort to clearly delineate the horns within the orchestral soundstage, place a microphone directly behind the bells of the instruments and pan the mike placement to the correct point in space. While it can be very effective (London/Decca has had great success with this approach), the indiscriminate use of this technique can cause problems. First, the French horn is a reflecting instrument, inasmuch as the sound emanates from the rear, but is heard from the front. When microphones are placed directly behind the instrument, the quality of sound will not only be unnaturally open and hard, but the pitch will be higher than is heard from the front (due to something like the doppler effect). Although this pitch difference is not large, it is enough to cause degradation of sound and an unclear pitch center from the horn section (especially if the rear presence microphone is used at too high a gain, or is opened and closed during the performance).

The harp and tympani are also regularly "done in" by insensitive engineering. Both produce noises audible in their vicinity from the internal mechanisms and pedals, and, when overly miked (to gain "clarity" and "presence"), sound more like a boiler factory than musical instruments.

There is another sonic phenomenon that most recording engineers do not seem to recognize: many of the finest instruments seem louder at a distance than up close. The reader might find this hard to believe, but it is indeed the case. One of my colleagues in the National Symphony plays on a beautiful Amati double bass, which sounds rather dull and unfocused up close. At a distance, however, this particular instrument has a huge, resonant sound with incredible bass impact. The same is true of my Fox contrabassoon. To me, and to other musicians in the immediate vicinity, the tone sounds small and covered. But I have been told that, in the hall, my instrument can be clearly heard through full orchestral tuttis, having the same impact as an organ pedal. My point is simple: orchestral instruments are meant to be heard from a distance, not from two feet away.

And, of course, we all know about the ludicrous balances so prevalent in solo concerto recordings. I can remember the time we
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recorded a well-known romantic violin concerto with a prominent American artist and recording company (names withheld to protect the guilty). The playbacks were strange enough, but the finished product was beyond bad taste. The solo violin appeared to be nine feet across and louder than the entire brass section playing fortissimo; the orchestral strings sounded as if they had phoned in their contribution. While I am sure that the soloist had some influence in the final mix, the grossly overblown, unnatural balances completely negated all of the fine nuances we had worked so hard to achieve.

At this point the logical question is, why do so many recording companies resort to the complexities and related problems of multi-miked and multi-tracked recordings? Some cynics would say that the engineers are intentionally intimidating the technically ignorant performers so as to be able to place their own stamp on the final product, thereby justifying their existence. While these critics may have a point, the real reasons are simply economic. With the cost of recording sessions so outrageous (especially in the US), all musical information must be covered in the least possible time, with the assurance that all has been put down on tape. If one is running a simple two-channel two-mike mix, any deficiencies in the balances not recognized at the session cannot be corrected after the fact. Ultimately, it is probably better to have the more natural perspective, but with the deficient acoustics in many recording locations, the minutes ticking away, and the dollars mounting up fast, one can hardly blame the producer for taking the less artistically valid, but economical, way out.

Just as it takes two to tango, we cannot place all of the blame for poor recordings at the feet of engineers and producers. The lack of any technical knowledge regarding the recording process on the part of the performing artists, especially soloists and conductors, is appalling. Many conductors will complain that their intentions are not properly carried out by the recording team, and that the engineers are insensitive to their artistic goals. But most of these same individuals display no desire to involve themselves in the technical process, thereby negating any possibilities of their understanding the various problems that confront the engineers. With their heads in the clouds, displaying the required arrogance which seems to be part of the classic conductor’s profile, they refuse to stoop to the mundane, and thereby forfeit a significant amount of artistic control.

Having participated in many recording sessions, I have viewed the uneasy relationship between performers and technicians for years. Not unlike that between labor and management, the mutual distrust between the opposing parties often leads to many more problems and misunderstandings than necessary, resulting in an inferior product. Until the time that both parties decide to lend more of an ear to one another, and attempt to see the other’s point of view, I fear that the future of quality symphonic recordings is grim indeed.

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Editor's Introduction

1987 sees Stereophile celebrating its 25th anniversary of continuous—if occasionally sporadic—publication. For an ostensibly "underground" publication to have survived so long is a tribute to the skills and enthusiasm of the magazine's founder and Editor, J. Gordon Holt. I thought it fitting, therefore, to ask a contemporary of Gordon's, Ed Dell, himself a respected publisher and editor, to pen an appreciation of the man who defined the world of subjective reviewing.

—JA

No-Holts-Barred

The temptation to talk at length about the effects J. Gordon Holt's work has had on the quality of recorded sound, or the equipment we use to reproduce it, is almost irresistible. But that is not my task here. I got this job because I'm older than Gordon and can remember farther back than most people (one of the facts of life that is not X-rated). I have had the pleasure of knowing him for a long time, longer than Stereophile has been around.

To gain some perspective on the man, some history is mandatory. In the days after World War II, the primary source of information was Audio, founded in 1947, the only US publication on the subject. Largely given over to construction, it was edited by the late C.G. McProud. Charles Fowler's brain-child, High Fidelity, appeared in 1954. Fowler, a veteran of McGraw Hill's magazine empire, wanted to start a monthly about high-quality sound, but he and his wife Mary also wished to escape the New York rat race. They set up shop, therefore, in an old Victorian mansion in Great Barrington, Massachusetts, a couple of hours from New York and very close to that musical mecca, Tanglewood, summer home of the Boston Symphony.

Everything about audio seemed new in those days. Frequency modulation broadcasting was in its infancy, although several large cities had at least one struggling station. Boston's WGBH had been operating their Armstrong FM transmitter since 1938, but few people believed that the new form of ultra-quiet transmission would ever be more than a curiosity. The new microgroove 33 1/2 rpm disk from Columbia's resident genius, Peter Goldmark, was just beginning to become widely known. The German development of wire and tape recording was also being explored, and promised all sorts of new advances in audio technology.

Charles Fowler saw that there were at least two main interests in hi-fi types: the musical and the technical. He started Audicraft, a technical spinoff, in November 1955; it was edited by Roy Allison, who later became production director at Acoustic Research and later yet founded his own company, Allison Acoustics. Audicraft's tape editor, recruited from Wallingford, Pennsylvania, was J. Gordon Holt. The magazine quickly grew to approximately 30,000 circulation, and gained ad support rapidly. In 1957, it began to publish equipment reports which had previously been available in a rather badly produced, highly critical newsletter from a group calling themselves Hirsch-Houck Laboratories. In 1958, the stockholders of Audiocom, Inc., which published High Fidelity and Audicraft, sold the two publications to Billboard Corporation of Cincinnati, Ohio. Audicraft's death was announced a few months later.

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Predictably, *Audiocraft* quickly disappeared from *High Fidelity’s* pages despite Roy Allison’s assurances it would continue there undiminished. The only surviving vestige was the Hirsch-Houck equipment reports. Our hero, J. Gordon, gained invaluable experience working on the third-floor lab of that comfortable Mansard-roofed house in Great Barrington. He wrote about tape in every issue of *Audiocraft*, dealing with the rapidly expanding recording technology. He published a construction series on a tube-type portable mike mixer. Tape was a hot topic, and readers had a choice of buying Pentron, Viking, or even a $100 kit from Heath.

But after the big corporate influence moved into the picture, things began to change for J. Gordon. The “bottom line” attitude began to affect policy, and issues of quality began to fall victim to the profit motive. Before long, J. Gordon left Great Barrington to return to Wallingford. He had long since formed the idea of publishing a reader-supported magazine free of commercial taint. *Stereophile* was born in 1962, the first issue appearing in November of that year.

Meeting J. Gordon Holt for the first time, you see a slight figure, a tiny bit stooped. But you realize after five minutes that the sandy hair and the slim figure hide an energy that is pushing him slightly forward all the time. The intensity is most readily apparent in his eyes, but his physical attitude runs a close second—he is a coiled spring of interest. He moves in quick motions, hands are almost constantly in some kind of obbligato to his speech. The voice has a nasal quality and a huskiness in it, but also that headlong character of speed and velocity.

The clothes are always casual, and, except for a few hours on one day of his life, I cannot remember seeing him in anything other than sneakers. So characteristic is the footwear that when his daughter was born she received several pairs of the smallest Keds. Some of us were convinced she came into the world in tiny tennies, but this proved to be only a rumor. He insists on comfortable clothes; the thought that even he might be persuaded to don a rented tuxedo, to receive a Nobel prize in Stockholm, is unthinkable.

Gordon’s clothes are a clue to one of his most basic characteristics: pragmatism. Whatever he chooses to buy, use, build, review, or wear must always be as practical as possible. That is, it must serve its function completely, without any frills. His lifestyle, generally modestly abstemious, may seem to have been shaped by the low income characteristic of most of those who choose publishing as a profession. I suspect, however, that had he been wildly successful and enjoyed a far larger income than he has, he would still wear an open-necked shirt, faded khakis, white socks, and sneakers.
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Natural Sound.
His twin passions are sight and hearing. They are, I believe, the primary motivation behind most of what he does. I doubt whether anyone, even Gordon, could exactly weigh which of the two senses he finds more intriguing. His eye and ear are equal in acuity, tape recorder and camera (film or video) are equally his milieu. It is as though all his awareness is poured into these two senses, however. He seems to care very little about what he eats or drinks (although a fondness for Tanqueray Martinis emerges in the evenings). His artistic sense, however, is extraordinary, and it is not surprising that he married a museum curator. Although sonic memory is apparently a rare capacity among humans, Gordon's is a solid fact. His sonic experience database is as rare as it is extensive.

His visual sense is evident in more than his lifelong curiosity about photography and video. Although the credits for the slow evolution in the unique cover-art style at Audiocracy go to Philip Geraci, the humor and airbrush work on them was Gordon's. The Robert Naujoks cartoons, and the splendid technical illustrations in Stereophile, are all his work. The really hilarious covers on the magazine's early issues are in a class by themselves. The one with the unusual distortion analyzer manufactured by the Beast-kit Company of Henton Barber, Michigan, which featured a switch for selecting tests for "timbre" and "acuity," and a meter ranging from "lousy" to "whooppee!" is typical. The meter's secondary test levels are "Muffled, Balanced, Shriil, and Ecch!" The cover humor was unequalled until Rodrigues cartoons began appearing in Stereo Review. For some while, his favorite reading was the National Lampoon.

The humor seems not to be an effort for Gordon. His laughter is always ready to erupt. It is almost as if he has an endless supply bottled up inside, awaiting any fresh episode of the human comedy to set it off. His humor, though, is mordant. It is not that he is entirely cynical about the human race, but that he believes devoutly in the power and pervasiveness of Murphy. He doggedly hangs onto his belief that people could do better, but is never surprised when they do not. In Gordon's world, Pollyanna is the most pathetic of freaks.

His love affair with the tape recorder is the perfect complement for his love of music. He has spent a remarkable quantity of time doing live recordings, which has been the foundation for his certainty that the recording companies were producing products that were not nearly as good as they could be. Some of my happiest hours have been spent in three of Gordon's rather jumbled lodgings listening to his tapes. The immediacy of them puts almost everything I have heard on vinyl, with rare exceptions, to shame. I have not kept track of his activities as recordist since he moved to the wilds of New Mexico, but I know that in his Pennsylvania days, few weeks passed when he did not spend one session with a group, recording their often modest efforts.

As I write this, Stereo Review has just published a survey of "Audio's Near Misses," by Ian G. Masters (December 1986). One of the "near misses" is the infamous RCA Dynagroove system. Gordon took on RCA and Dynagroove in two of Stereophile's 1963 issues, eventually refusing to review them at all. At the same time reviewers in all the consumer audio magazines, excepting Audio, were enthusiastic about RCA's new recording system. Apparently Stereo Review's vision of technical matters clears only after 20 years or so.

Equipment is not, in itself, an end for J. Gordon Holt. In no sense can he be regarded as an equipment freak. He is profoundly curious about how things work, because I suspect that, for him, that is the way to more satisfying sonic results. He has a certain
quality of technical genius about him. And although he could not keep a magazine on schedule, he never allows a piece of defective equipment to remain so. He is doggedly curious about technical mysteries, and stays with them until he can find some satisfactory answer. His knowledge of equipment is encyclopedic, and retrievable in detail.

Gordon has few peers in his ability to explain how a device or process works. He pursues his homework on matters physical until he is clear about them. Which brings me to the central fact about the man: He is as near to being absolutely honest as anyone I know. He is not overly impressed by the fact that he has been a publisher for a quarter century, and written lucidly about audio for a third of one. His motives are transparent for any to see. The agendas are not hidden. He is remarkably single-minded about the puzzle of sound and how to reproduce it accurately. He appears to care little about what people think of him; I have seen him hurt and disappointed about some fracs, but only insofar as it ultimately affected which battle about sound would be won or lost. He is a member of a very tiny minority of audio writers who admit in print that they have been wrong in a previous judgment. His eye is out for the truth, and even his own pride is less important than that goal.

Gordon has a firm grasp of logic's disciplines; it is not a good idea to take him on unless you have done your homework thoroughly. He is tenacious, fair in a fight, keeps his humor most of the time and his respect for those who differ philosophically. I have never seen him resort to a personal attack on an adversary, an action too common in this field.

In an age when English vocabulary usage is not only shrinking but is so decimated by widespread misuse that we are communicating more sloppily and inexacty than at any other time in the century, the level of writing and the quality of the prose in Stereophile has been some of the best anywhere. Holt as editor has few peers in any publication. Although the magazine has grown in size and frequency since its purchase by Larry Archibald, Gordon's commitment to the best in English prose is still evident, despite the typos and occasional gaffes one sees there these days. This is not a pedantic matter with him; good prose is simply a required minimum, a basic necessity he seems to achieve without thinking much about it.

He has made a profoundly valuable contribution to audio in descriptive language. His attempts to forge a vocabulary for comparative evaluation of sound quality are unmatched by anyone. He was one of the first to realize how small that vocabulary is, far smaller than those for the other senses. It remains, even now, quite rudimentary. His efforts have been the target of a lot of ridicule at times, but I have not seen anyone make a significantly better contribution.

As a publishing professional, Gordon has been generous and remarkably influential. In looking over back issues of Stereophile, I find it curious that two letters, on facing pages 26 and 27 of the Autumn/Winter 1967 number (God only knows the actual publication date), were written by two who soon became his competitors. Their names were Dell and Pearson. No reply to Dell is printed, but JGH is very open and gracious in replying to Pearson. After my subsequent announcement of Audio Amateur's first issue, Gordon offered the use of his mailing list without a second's hesitation.

Many imitators and would-be publishers have come and gone. His ideas and goals have, more and more, become realized. His single-minded commitment to quality sound reproduction is a rare phenomenon in a world increasingly given to instant gratification. His influence, ideas, and the publication he started are, in very large measure, the foundation for what we know as "the high end" phenomenon. And even there, he has been as critical of what he considers false and unnecessary in high-end equipment as he has been about marketing hype and technical disasters. His sense of humor about the human scene has probably been his salvation, but he has not wavered—at least not for very long—about what are the basic issues, and most of all about what is true.

If Diogenes were about today, I could tell him where to find his man.
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THE SILENT TREATMENT. While AM stereo may not yet be available in your area, you can receive FM stereo. Including stations so fraught with interference and distortion that you may be tempted to return to mono AM. That's why the TX-11a includes the first circuitry to remove hiss, "picture fencing" and the myriad other unpredictable noises which often disturb FM listening. Without reducing stereo imaging, frequency response or dynamic range.

Part of the FM signal, the left minus right portion, is extremely prone to "ghosting," or multipath interference caused by hills, buildings and other obstructions. Bob Carver's Asymmetrical Charge Coupled circuitry cancels distortion-causing "dirty mirror" images before they can reach your ears. It filters out noise and restores the part of the signal needed by our ears and brain to construct stereo imaging. Reinforced into the mono (L+R) signal matrix, a net reduction of 93% — or better than 20dB of noise reduction — is achieved. All ambient and localizing information is recovered. Only hiss and distortion are left behind. Or, as High Fidelity magazine put it, "Clean, noise-free sound out of weak or multipath-damaged signals that would have you lunging for the mono switch on any other tuner!"

Ovation magazine observed that the circuitry, "...may well mean the difference between marginal reception of the station signals you've been yearning to hear and truly noise-free reception of these same signals."

Audio magazine called it, "An FM tuner breakthrough."

THE FIRST AUDIOPHILE AM STEREO CIRCUITRY. Contrary to popular belief, most AM stereo stations have frequency response (20-15kHz), separation (30dB), and signal-to-noise ratios (70dB) audibly indistinguishable from FM stations of equal strength. But only Carver offers the technology to appreciate this hidden performance.

At a press conference in front of America's top stereo writers, Bob Carver unveiled a low powered C-QUAM format AM stereo broadcast transmitter with a Carver Compact Disc Player as a source. The CD player and the TX-11a were also routed directly to a preamplifier and speakers for comparison.

When Bob switched back and forth, most listeners had difficulty distinguishing between the straightwires CD player and the TX-11a's over-the-air AM stereo reception! Many could tell no difference at all!

HUMAN ENGINEERED FEATURES AND CONVENIENCE. The TX-11a is designed to make enjoying FM and AM easy, not dazzle you with flashing light and complex programming. Thirteen presets, wide/narrow band selection, automatic/manual scanning as well as Multipath and Noise Reduction buttons are inset into the burnished anthracite metal face. Full instrument panel including digital display, 6-step signal strength LEDs and other monitor functions are tastefully recessed, visible but not garish. The result is performance without theatricality, access without complication.

CLEAR THE AIR by visiting your nearest Carver dealer. Ask to hear the most expensive tuner they sell. (It probably won't be the Carver TX-11a.) Tune a multipath-ravaged, hiss-filled FM station on it; then the same station on the TX-11a Stereo AM-FM Tuner. Now press the Carver Multipath and Noise Reduction buttons. You'll hear why High Fidelity Magazine called it, "By far the best tuner we have tested..."
Editor's Introduction

The rise of the popularity of subjective reviewing of amplifiers arose in the ‘70s from the total inadequacy of existing measurements to predict what an amplifier would "sound" like. One camp of enthusiasts decided that, as the measurements in fact predicted no differences to be audible, then the state of amplifier design must have reached its final state of perfection: All good amplifiers will sound the same when not overloaded. The rest of us, however, observing that amplifiers did tend to have identifiable sonic signatures, assumed that the measurements of distortion, noise, and frequency response, under steady-state conditions when the amplifier was driving an ideal resistive load, were simply inadequate. No doubt, someone, someday, will devise a cocktail of tests that can predict what a piece of electronics will sound like, but until then, careful listening provides a shortcut to the truth.

The search for objective tests has provided full-time employment for any number of engineers; what have also sprung up from that fertile ground are tests confirming that the amplifier under test was so good that it couldn't possibly have a sound. One such was an ingenious method of comparing an amplifier output with its input, devised by Quad's Peter Walker, among others. If a test amplifier was so good that no difference could be detected in such a comparison, then there was nothing it was doing wrong to account for any departure from neutrality.

Unfortunately, there didn't appear to be any guarantee that an amplifier doing well on this test would sound perfect; in some cases, the opposite appeared to be the case. It turned out that the way the test was implemented assumed that linear distortions of the signal—shifts in frequency and time response—were unimportant, and that nonlinearities were all that it was necessary to observe. Accordingly, the comparison compensated for linear changes, a process referred to by David Hafler as comparing an amplifier, not with a straight wire, but with one bent in such a manner as to obscure what was happening.

David had long felt that if mysterious differences were being reported, there should be a real-world explanation; a comparison test should examine an amplifier as it actually performs, not one under conditions bent to suit the needs of the test. Together with the
...audible results with the finest in connecting components.
Hafler Company's President Ed Gately, he devised a simple yet powerful manner of detecting all aberrations produced by an amplifier when actually driving a loudspeaker, including those 'not yet defined.

—JA

So, on to JGH . . .
The Hafler Straight Wire Differential Test (SWDT) is basically simple and straightforward (see schematic in fig.1). An external driving amplifier is used to provide a low-impedance, high-current source against which the test amplifier can be properly nulled. (The driving amp can, in fact, be the other channel of the amplifier under test. The quality of this driving amp is not a consideration, as its output is cancelled totally by the test set-up.)

Instead of trying to provide an inverted-phase equivalent of the input signal to cancel the test amplifier's output (as in some early attempts to do "null" tests), Hafler connects the "hot" outputs from both amplifiers across a monitor loudspeaker. In this configuration, identical outputs from the two amps will produce a condition of zero voltage across the loudspeaker, so no sound will come from it. The test amplifier's output is exactly the same as the input. Any difference in these signals, however, will produce a voltage across the speaker, eliciting sound from it and giving a direct indication of the errors occurring under dynamic conditions.

Another (not necessarily identical) loudspeaker is also connected across the test amplifier, to simulate normal operating conditions. Since this load speaker reproduces the input signal at full volume, it must be acoustically isolated from the monitor, usually by distance and doors between, to allow one to hear the residual signal. This necessary use of a long cable to the load speaker introduces an atypical condition which may, in fact, be a weakness of the test.

Because the SWDT, unlike earlier straight-

wire bypass tests, appears thus far to be beyond reproach on theoretical grounds, and because amplifiers which were not designed to pass it tend to do very poorly on it, the Hafler Company is supplying its dealers with special SWDT boxes. It is challenging them, and their customers, to try the test on any competing amplifier.

There are two ways of doing it. You can adjust everything for the maximum null and then listen to what's left over. Or you can instrument the test and come up with hard, cold figures which—if my experience was typical—will seem to prove beyond question that the Hafler XL-280 is the most accurate amplifier on earth.

On a listening-only test, the nature of the residual (uncancelled) sound should yield clues as to the sound quality of the amplifier. For instance, a residual which is moderate in volume (relative to the uncancelled position of the test switch on Hafler's box) but sounds clean may be the result of phase shift, frequency response deviations, or both. If the residual sound is dirty, similarly irritating qualities will usually be more or less audible in the sound from that amplifier under normal listening conditions. But how does one equate garbage in the residual with garbage under typical use conditions? Listening can assess the nature of and approximate frequency ranges of the garbage in the sound, but can only give a hint as to their severity relative to the original signal.

Millivoltmeter measurements from a white-noise input signal can give a clue as to the amplitude of the residual, but only in the most general sense, as the reading obtained will simply be that of the frequency range where nulling is least complete. With only a meter for measurement, a swept sine-wave is the only signal source that will tell you anything, and even that will only show the amplitude of the strongest residual signal, which could conceivably be a harmonic of the input signal rather than the input signal itself. Either an oscilloscope or a distortion-measuring set-up, therefore, is needed to determine whether the frequency being measured is primarily the test signal or a harmonic thereof.

By far the best instrument for this test

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1 If memory serves me, this technique was proposed during the late 1950s by Roy Allison, then editor of the short-lived magazine Audioncraft. It was dismissed as impractical because even the best-sounding amplifiers of the day did very poorly on it.
ART, and artists...

Great musicians, painters, writers, cabinetmakers, sculptors all have the same ideas about excellence. Imposing the highest critical standards upon themselves, they reject much of their own work and offer to others only their very best.

Like music itself, the reproduction of music is an art. That’s why we will always offer only the very best of our work to our customers.

The new customer, walking for the first time through our unique store, may not believe that its two owners constructed it themselves in its entirety. That first time visitor then comes to know us, and to understand.

We are music lovers, not equipment lovers, who believe listening to music in the home should be one of life’s most wonderful, thrilling pleasures. We also believe there is never any substitute for true, lasting quality.

AudioVisions was incorporated in 1981. Over the past six years we have painstakingly evaluated hundreds of audio component models; the evaluation of one model may continue for months. The two AudioVisions owners share over forty-five years of combined audio and musical experience. We are not "copycats" who make decisions on the basis of the publication of a rave review.

AudioVisions has been the sponsor of the national debuts of several outstanding new components: those debuts took place many months before glowing reviews of the components were published. Meanwhile, in general our approach to new products is very cautious. Though the AudioVisions store is larger (and more comfortable) than most, we feature only a relatively small number of products. All the products featured at AudioVisions reflect our beliefs: We make real choices, real decisions, and we stand by them. Perhaps that’s why so many of our customers tell us that they trust us, and believe in us.

In addition to really enjoying music, we also really enjoy people. Perhaps that’s why we feel that everyone deserves excellence, whatever their audio budget. That old adage, "Take the time to do it right," means a great deal to us. We will gladly take that time, if you will: please call in advance for an appointment.

The View is Best from the Summit ... Close Your Eyes and Listen
would be a real-time spectrum analyzer, which should allow one to view simultaneously the frequencies and amplitudes of all spurious present in the nulled input signal.

**Precautionary notes**
The SWDT test has two absolute requirements: the amplifier under test must not invert polarity; and the test-signal source must be totally isolated from any measuring instrument connected across the Monitor speaker. They *cannot* share a common ground circuit. If *neither* of these conditions are met, the SWDT interconnections will cause instant full-power oscillation of the amplifier under test, which could destroy the test amplifier, a loudspeaker, or both.

Even when those two preconditions *are* met, the SWDT still has the potential for doing grave damage to some of the equipment involved. Power amps supposed to be non-inverting may still go into full-power oscillation when the SWDT box is connected, if they happen to have enough phase shift at either frequency extreme to turn degeneration (negative feedback) into regeneration (positive feedback).

Adequate fusing in the speaker line of the test amplifier will reduce the likelihood of damage due to oscillation, but since many amplifiers are fused to protect only the amplifier, not the loudspeakers, it is best to follow a simple precautionary procedure when connecting *any* amplifier to the SWDT box.

First, make sure both amplifiers are turned off when connecting the Hafler box. Make all connections to the driving amplifier, but connect only the Input to the test amplifier, leaving its output disconnected for the time being. Check *twice* to make sure that the Ground (black) terminal on the Hafler box's Drive Amp Out goes to the drive amplifier's Ground terminal. Turn both amplifiers on and give them adequate time to stabilize (10 seconds for a solid-state unit, 60 for a tube amp). Set the test switch on Hafler's box to Null, then take a 1- to 3-amp fast-blow fuse, hold one end against the Hot pin of the Test Amp Out plug, and touch the other end of the fuse to the test amplifier's Hot output terminal. (If you cannot reach the metal part of that terminal with the fuse, put the fuse in an in-line fuse holder that has a wire leadout at each end.)

If the fuse doesn't blow, it is safe to make the connection between the box and the Test Amp Output. Just be certain that Ground goes to Ground again, or you'll blow everything up.

**The Results**
Besides the Hafler XL-280, I rounded up four other amplifiers to run through the SWDT: a Belles 400, an Electron Kinetics Eagle 2, and a Robinson 4010. (I already had a pair of Threshold SA-1s on hand.)

I had ambitious plans for the null tests, including off-screen photographs of spectrum analyzer traces from sinewave and white-noise input signals. But that was not to be. The only such device we could locate in the Santa Fe area had too much internal noise to show anything of value at the levels.
Phono Cartridges

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ M-1, Induced Magnet Cartridge.</td>
<td>95.00</td>
<td>40.00 stylus only</td>
</tr>
<tr>
<td>AQ MC-4, High Output (2.5mV) Moving Coil.</td>
<td>155.00</td>
<td>125.00 with trade</td>
</tr>
<tr>
<td>AQ MC-5, High Output (2.5mV) Moving Coil.</td>
<td>250.00</td>
<td>160.00 with trade</td>
</tr>
<tr>
<td>AQ 404B, Boron Cantilever, 2-piece brass support system.</td>
<td>295.00</td>
<td>195.00 with trade</td>
</tr>
</tbody>
</table>

Choice of: AQ 404BH (2.2mV), AQ 404BM (1.6mV), AQ 404BL (5.5mV)

Option B-100, Hollow Boron Cantilever, machined body. | 595.00 | 395.00 with trade      |

Choice of: AQ B-100H (2.2mV), AQ B-100M (1.6mV), AQ B-100L (5.5mV)

You may trade-up by using the credit earned by your old cartridge toward any higher model.

Compact Disc Players

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ CD-1, 16 bit 4x oversampling, includes 4 AQ Sorbothane feet.</td>
<td>695.00</td>
</tr>
<tr>
<td>AQ CD-1R, 16 bit 4x, remote, fully programmable, 4 Sorbo feet.</td>
<td>795.00</td>
</tr>
<tr>
<td>AQ CD-100, tubed, 2 chassis, remote, fully programmable, 4 Sorbo feet.</td>
<td>1695.00</td>
</tr>
</tbody>
</table>

Speaker Cable

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiveWire BC-2, twisted pair, OFHC.</td>
<td>.50/ft</td>
</tr>
<tr>
<td>LiveWire BC-4, spiraled 4 conductor, FMS geometry, OFHC.</td>
<td>.95/ft</td>
</tr>
<tr>
<td>LiveWire Type 6, spiraled 4, FMS geometry, polypropylene insulation.</td>
<td>1.50/ft + $20/pr. prep</td>
</tr>
<tr>
<td>LiveWire Type 8, spiraled 8, FMS geometry, polypropylene insulation.</td>
<td>3.00/ft + $30/pr. prep</td>
</tr>
<tr>
<td>FMS Grey 3, tubular teflon core construction.</td>
<td>10.00/ft + $30/pr. prep</td>
</tr>
</tbody>
</table>

Interconnecting Cable

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiveWire Reference, foam polypropylene dielectric, 100% shield.</td>
<td>45.00 per 3 ft. pair</td>
</tr>
<tr>
<td>FMS Gold, 4 conductor FMS magnetic field balancing geometry.</td>
<td>96.00 per 20 ft. pair</td>
</tr>
<tr>
<td>FMS Blue 3, spiraled 4, tubular teflon core construction.</td>
<td>65.00 per 3 ft. pair</td>
</tr>
<tr>
<td>Tonearm sets with teflon plug, 4 feet : Reference 58.00 FMS Gold 88.00 FMS Blue 169.00</td>
<td></td>
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</table>

 McLaren Audio Electronics

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>McLaren 602 Straight line preamp, 60 or 80 dB gain.</td>
<td>1195.00</td>
</tr>
<tr>
<td>McLaren 402 Full feature preamp, 6 inputs, tone controls, phase switch.</td>
<td>1495.00</td>
</tr>
<tr>
<td>McLaren 702 Stereo power amp., 100/100 watts, stable into any load.</td>
<td>1195.00</td>
</tr>
<tr>
<td>McLaren 902 Mono power amp., 250 watts, dedicated mono block design.</td>
<td>2390.00/pr</td>
</tr>
</tbody>
</table>

Sorbothane Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ Sorbothane Record Mat, 1/8&quot; thick, damps record and platter.</td>
<td>35.00</td>
</tr>
<tr>
<td>AQ Sorbothane Record Damper, damps record and spindle.</td>
<td>12.00</td>
</tr>
<tr>
<td>AQ Sorbothane Isolation Feet, for CDs, turntables, tube electronics, etc. (set of 4)</td>
<td>40.00</td>
</tr>
<tr>
<td>AQ Sorbothane Vacuum Tube Dampers, reduced hysteresis distortion. (set of 4)</td>
<td>12.00</td>
</tr>
<tr>
<td>AQ Sorbothane Self-Stick Sheet, self adhesive backing lets you damp anything.</td>
<td>15.00</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ Superclamp, solid Delrin, holds down grooved area of record, not just label.</td>
<td>45.00</td>
</tr>
<tr>
<td>AQ Superclamp Plus, solid Delrin reflex clamp/damper.</td>
<td>75.00</td>
</tr>
<tr>
<td>AQ Record Brush, over 100000 carbon fibers clean and control static.</td>
<td>15.00</td>
</tr>
<tr>
<td>AQ Electro Stylus Cleaner, vibrating stylus cleaner.</td>
<td>35.00</td>
</tr>
<tr>
<td>TRT's Wonder Solder, this solder really does sound better (15 ft).</td>
<td>15.00</td>
</tr>
<tr>
<td>AQ-10 Headshell, 10 gram anti-resonance headshell, LiveWire headshell leads.</td>
<td>45.00</td>
</tr>
<tr>
<td>AQ-16 Headshell, 16 grams, adjustable azimuth, LiveWire headshell leads.</td>
<td>45.00</td>
</tr>
<tr>
<td>Profile Pro-Lift, puts end-of-record-lift-off on any turntable.</td>
<td>45.00</td>
</tr>
<tr>
<td>LiveWire Headshell Leads, pure copper litz, no other insulation.</td>
<td>7.95</td>
</tr>
</tbody>
</table>
I was trying to read.

These tests, therefore, had to be limited to the use of swept sinewaves for the nulling measurements, and of musical material for assessments of the quality of the residual signals. For the latter, I specifically chose somewhat worn, noisy disc sources rather than the cleanest available material, because mistracking and surface noise are typically the first things to be adversely affected (exaggerated) by small amounts of amplifier distortion. (Many “controlled” listening tests purporting to demonstrate how much system distortion is audible have yielded misleading results because of their reliance on tape rather than discs as a signal source.)

For loudspeakers, I was forced to use a pair of dynamic speakers I had on hand instead of my reference Sound Lab A-3s, because the combination of the long speaker cable and reactive load caused oscillation with every amplifier in the Null mode.

Hafler's SWDT box was used for the tests, and each amp was checked for stability with the box before proceeding. For each test, the straight-through (uncancelled) output level was first set to 1 watt (2.83 volts across 8 ohms) at 1kHz, then the box was switched to Null and the input frequency and nulling adjustments were varied to find the point of maximum null. A series of points were then plotted to produce the nulling curve for each amplifier. I then played the musical signal, for an assessment of the amount and quality of the residual output, and finally readjusted the null for maximum subjective attenuation of the sound. My intent was to re-plot the curve if a different null setting was required, but this proved unnecessary; maximum measured null also proved in all cases to be the maximum subjective null.

Not surprisingly, the Hafler did much better than any of the other four amps on the SWDT. Nulling the Hafler was made a little more difficult because of the amplifier's Excelinear “tweak” control, which—contrary to Hafler's description of it as a high-frequency adjustment—did in fact affect the nulling all the way down to well into the midrange. Although I was unable to duplicate Hafler's published 70dB figure at 10kHz, it was possible, by juggling this adjustment and the null pots against each other, to go for a sharp, narrow -62dB null at 10kHz with an appreciable loss of nulling through the rest of the spectrum, or to maximize across-the-board nulling at the expense of a few dB of null at 10kHz. The deeper null also exacerbated the changes in tonality that I had noticed previously when making the adjustments, making it more difficult to determine by ear the maximum null point. So I went for a compromise here, in order to get the best nulling over the widest possible frequency range. (This also provided what sounded like the most effective nulling.)

The -55dB maximum null measured at 10kHz was very broad and shallow, and stayed within the 30s and 40s through the entire range below the maximum null point. The XL-280's residual was so low in level that I had to use headphones to get a handle on what it sounded like. (There's a headphone jack on Hafler's test box.) The spectral balance of the residual was almost correct, reflecting the remarkable across-the-board uniformity of the null, and the sound was amazingly clean. Crud and grittiness were virtually nonexistent! This, then, should have been by far the cleanest and smoothest-
Anthony Cordsman says:*

"The HW-17 is as easy to use as the far more expensive Keith Monks, and does everything just as well. It is also far easier to adjust for the best possible performance than any of the Nitty Grittys, and shows better quality of manufacture."

*Stereophile, Volume 8, Number 1

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sounding of the amplifiers tested.

The Electron Kinetics Eagle 2 amplifier is a source of disagreement among Stereophile's editors. Although JA and I agree that it has superb bass quality, we continue to disagree about its mid and upper-midrange performance. I find its rather upfront, forward sound conducive to a convincing sense of realism and aliveness, while JA simply hears it as an ultimately irritating brashness.

The Eagle 2 did not give a good accounting of itself on the SWDT. Although the maximum null was a very respectable -57dB at 1kHz, the null was a very deep, broad dip, which diminished rapidly at higher and lower frequencies. Nulling was poor (in the teens) above 7kHz, but was moderately good (in the mid to upper 30s) through the lower part of its range.

The Eagle's residual was quite shrill, but was only slightly gritty in quality. LF content was noticeably greater than that from the Hafler, but seemed no different in quality. This is in dramatic contrast to the way the two amplifiers actually sound; their lower-end characteristics are very different, the Eagle being much more "sparse," but quite a bit tighter-sounding than the Hafler.

The Belles 400, a relatively new design not yet evaluated by Stereophile, did not do well on the SWDT. (Its performance was probably compromised by the fact that it, alone of all the amps we tried, was tested "right out of the box," without an initial warmup period.) Despite an impressive 57dB null at 1kHz, the null was very deep and narrow, and nulling at higher frequencies never exceeded 19dB. Below 1kHz, nulling remained in the 30s.

The Belles had the worst-sounding residual of the five amplifiers tested, being very harsh and truly dirty, with a great deal of sibilant, spitty surface noise from discs. The LF residual was also fairly strong.

(I gave a brief listen to the Belles after running it through this test. It had excellent low end but a rather shallow soundstage and a definite, finely textured, high-end dryness. I am confident that it would sound better and test better after a suitable warmup, but I was primarily interested now in observing the correlation between its residual and its listening quality. There was a definite correlation.)

The little Robertson 4010 nulled surprisingly well, from a shallow -49dB dip at 1kHz to -20dB at 20kHz and -32 at 20Hz. The LF residual was only moderately strong, and the HF component was somewhat rough and gritty, about midway in cleanliness between the Belles and the Eagle 2. In
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Exceptional precision is provided by a pair of low distortion, class A amplifiers driving each of the motor phases.

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Aldburn Electronics
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Toronto, Ontario
Canada M5R2N4
normal listening, the Robertson has a hefty low end—a little leaner and tighter than the Hafler—but is a shade less suave at the high end, where a certain chalky dryness is evident. Again, this correlates fairly well with what I heard in its residual.

The big Threshold SA-1 mono amplifiers have been my reference standard units for the past year, and their sonic superiority over the Hafler XL-280 (in my system, at least) is a major reason I have harbored some misgivings about the validity of the SWDT. Their performance on the SWDT is now another reason.

The SA-1 hit a maximum 49dB null at 325Hz, in a fairly deep, narrow dip. Above that, its nulling diminished progressively to a mere 12dB at 20kHz. Below the null, it was even worse, dropping from -29dB at 200Hz to -10dB at 20Hz. The quality of its residual was another story, however. Although at a much higher level than the Hafler, and quite shrill in tonality, the SA-1's residual sounded even cleaner, having no perceptible trace of crud or grit. Of course, its poor nulling through the high end bestowed an advantage there, because small amounts of nonlinear garbage would have been masked by the much stronger linear error. (The sound of the SA-1 is discussed, relative to the Hafler, in the latter's report elsewhere in this issue.)

So, how much correlation did I find between the SWDT and the actual sound of the amplifiers tested? Not all that much. The amplifier that did best on the test was judged rather less listenable, overall, than two which fared very poorly. The quality of the residual sounds was more informative, almost allowing me to rank the amplifiers in terms of their high-end ease and listenability. But the SWDT, at least as I was able to carry it out, failed to indicate in any way the quality of low-end performance delivered by any of the amplifiers.

I still find the SWDT unassailable on theoretical grounds, and feel that it is probably the closest thing we have to a true test of accuracy in a power amplifier. But I think its greatest weakness is that it does not discriminate between imperfections which apparently have little or no effect on the sound, such as across-the-board phase shift, and those which do, such as IM, TIM, and so on.

It is very likely that an amplifier which does extremely well on the SWDT—substantially better than the Hafler, for example—may also sound better than any other amplifier, but this remains to be demonstrated. Until then, we still have the unanswered question of how much nulling is required before an amplifier can be assumed to sound perfectly accurate? (And what would a "perfectly accurate" amplifier sound like, anyway?)

In other words, while I feel the Hafler SWDT to be a useful tool for assessing the theoretical perfection (or lack thereof) of an amplifier, I do not see it as the last word in the testing of real-world amplifiers.
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I nearly reviewed a Linn Axis turntable this month. Nearly, but not quite. What I did do was spend a week or so living with a relatively early production sample out of the factory, which proved an interesting experience.

No-one should doubt the importance of this product, nor of the company who makes it. For years now, Linn Products has almost single-handedly dominated the specialist market in the UK, to the extent that, with the clarity born of hindsight, it now appears obvious that they would have had to break the bond with Naim Audio even if they hadn't disagreed in such a delightfully public way. The companies were growing apart, and as Linn, especially, have moved from a vulnerable position of reliance on the LP12 and the lower-cost loudspeakers toward being a full-line manufacturer, housed in a custom-built factory designed by Richard Rogers, they were bound to tread on a few exposed corns.

But this is history. The Axis is now, and it comes at an opportune moment. While sales of the LP12 may have been largely unaffected by the inroads made by compact disc (in the UK), there certainly wasn't much growth left in that market. Linn badly needed a turntable to compete head-on with CD for black vinyl users considering a change to the silver variety. They also needed a suitable weapon to compete with the fairly large number of respectable mid-price decks that have been doing such good business, sheltered from Linn by their lower prices. Most of all, however, Linn badly needed a prominent success to counter the generally disastrous reception their last two important introductions had received—the Index loudspeaker and, of course, the amplifier.

I am convinced that the Axis will be an outstanding success. It has just about every important quality demanded of a turntable in this area of the market, plus a touch of glamor and the kudos of what is still the most prestigious name in turntables in the world today. It even has performance, but by a rather strange quirk, it has a degree of vulnerability from a quite unexpected direction.

I will not take acres of space to describe the ins and outs of the deck; this isn't a formal review, and I made no notes on the physical aspects of the design. But the most relevant qualities are clear. It works almost straight from the box, a by-product of ingenious design and a consequence of designing a turntable around a specific arm, the LV-X. This is an excellent feature for the middle-market buyer rather than the cost-no-object customer, whose demands are already well served by the LP12. The Axis also looks great, doesn't have an unnecessarily large footprint (quite a number of decks are profligate in their use of space), and is finished to the standards required.

I was also happy with the sound of the deck. Again, there's little cause to elaborate since the hi-fi press is already awash with reports about how good it sounds—always stopping short of sounding as good as the LP12, of course, as is only right and proper.

There were, though, a couple of features of the Axis performance that I found interesting. One is the curiously dry bottom end. The kind of dryness I'm talking about could have stepped off a compact disc, and I mean this as praise since I strongly admire this lack of bottom-end waffle that some critics have ascribed to the turntable's elder brother. Associated with this, however, is a certain lack of power and projection that leaves stereo images sounding rather "small" (though always as, or even more, explicit

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1 The architect responsible for the Pompidou Center in Paris and the new Lloyds of London building

Stereophile
Revox cassette transport turns pro.

For consistently superior results in home audio recording, you need a professional tape transport. So we put one in the Revox B215 cassette deck. Our company philosophy would allow nothing less.

Studer Revox of Switzerland is the world’s leading supplier of audio tape decks to recording and broadcast studios. Every transport we build adheres to the same strictly professional design criteria. The B215 is no exception.

1. A Die-Cast Aluminum Alloy Chassis—Stamped or rolled metal is not acceptable because it could warp or bend over time; also, it cannot be milled and drilled with the required precision. The B215 chassis reflects the same massive stability seen in every Studer Revox recorder right up through our $70,000 24-track machines.

2. Direct Drive Motors—The only alternative is belts and gears, both of which degrade performance over time. To avoid such compromises, the B215—and only the B215—has four tape drive motors: two quartz-locked Hall-effect motors for the dual capstans, and two microprocessor-controlled DC spooling motors.

3. An Azimuth Stable Headblock—This is difficult to achieve in the cassette format because the headblock must move in and out of the cassette shell. Nearly all other decks use an inherently unstable “sled” mechanism. But the B215 uses a pivoting die-cast headblock mounted on precision bearings (0.01 mm tolerance) to assure the stability required for optimum high frequency response.

4. Gentle, Safe Tape Handling—An on-board microprocessor (one of three) monitors all tape motion in the B215. Optical servos govern the spooling motors to give constant winding speed, controlled tape tension, and smooth tape wrap. The motors gently slow the tape just before the end to prevent tape-stretching and tape damage of any kind is virtually impossible.

Such uncompromisingly professional transport design brings extraordinary performance to the home recordist: incredibly low wow-and-flutter, extended frequency response, and consistently repeatable results time after time, year after year.

For one astute listener’s evaluation of the B215’s sonic qualities, please note the review in Volume 8, #7 of Stereophile. Reprints are available on request to the address below.

Studer Revox America, Inc.
1425 Elm Hill Pike.
Nashville, TN 37210/(615) 254-5651
than with the LP12), and arguably a little lacking in fluidity, progressiveness, or a natural sense of momentum.

However, there is a beneficial side effect in that the Axis—I wish they hadn't chosen that name—appears to be very easily integrated into systems of varying potential. In a curious way, because the sound it gets off disc is a little smaller and less potent than that of the LP12, it gives the amplifier and loudspeakers an easier, less stressful time. It is a magnificent match to mid-market components of decent but not outstanding quality.

Conversely, if you try to treat it as though it were a low-cost LP12, Roksan, SOTA or whatever, then it comes unstuck. The very qualities that serve it so well in systems of moderate potential act as limiting factors in first-class systems, where the Axis is easily outgunned in a whole range of areas. Dealers are going to have to sort out a sensible hierarchy within which the Axis can be pigeonholed, and it won't survive too many upgrades elsewhere in the equipment it drives. But I can imagine an excellent market for secondhand samples; nobody is likely to end up a loser.

In my opinion, it is not the turntable that is the ultimate limiting factor in the Axis so much as the arm. Since its introduction, the LV-X has been the standard low-cost arm against which all others have been measured, but under the skin, it is actually a rather ordinary, if relatively well-sorted, design that has met its match more than once among its competitors. The latest Audio Technica arm, for example, is essentially its equal.

But the LV-X is no longer leading the running. That title belongs to the Rega RB300, and its offshoot, the RB250. At one time, Rega needed all the capacity they could get for their own turntables, but now they're selling the arm on the open market as an OEM item, and third-party turntable manufacturers are very excited by the prospect.

Let me run over the most important features of the arm. Unlike the LV-X—basically an Erector Set operation based on off-the-shelf parts and built in Japan—the Rega employs some extremely elegant and innovative engineering and a set of bearings as good as any. The RB300 costs only about £90 ($130 or so) in the UK, but the cut-price version, the RB250 (felt by some people feel to be even better because it lacks the spring that applies some of the downforce) readily undercuts the Linn arm. The Rega must have cost a great deal for its initial tooling compared with the LV-X, but now the pressure must be on Linn as the Yen continues to drift upward against a weak Pound.

I have used both LV-X and RB300 arms for a long time now, and it will come as no surprise to long-term readers if I say that while the LV-X is a very fine budget arm, the Rega is in a different class altogether. It is probably comparable with the finest arms made, regardless of price. The money has been spent where it counts, and the very considerable spit and polish it displays is engineered in, not a mere veneer. It also looks simple, but don't let that fool you. However, you don't get adjustable arm height while you're playing the record, or any other such stupid gimmicks.

I know most of this is old ground, but a good story bears repetition; there are still far too many people around who won't take the arm seriously because of its price.

That's their problem. What is happening now is that a few of the more aware turntable manufacturers are starting to fit the OEM Rega arm, the RB250, where in the past they have used the LV-X. Invariably in the cases I know about, the manufacturers have been more than a little surprised and delighted by the sheer clarity and hear-through qualities of the arm, the natural stereo perspectives and dynamics, and the absence of hardness or artificiality. They have also been surprised by odder facts; for example, cartridges needing a given tracking force in other arms are often happy with 10% or so less in the Rega, such is its dynamic stability in the groove.

One such turntable is the Manticore Mantra (see Stereophile passim), which coincidentally happens to cost exactly the same as the Axis when supplied in the same form: with electronic speed control and, of course, arm (but not cartridge). The Mantra is an excellent turntable in any case; fitted with the Rega RB250, it must be pretty close to unbeatable, at least when used in a high-grade system.
HAFLER XL-280 POWER AMPLIFIER

J. Gordon Holt

Solid-state stereo power amplifier with Excelinear circuitry and tweaking adjustment. Rated power: 145W into 8 ohms at 0.05% distortion. Dimensions: 17” W x 10” D x 5” H, overall. Price: $600. Manufacturer: The David Hafler Company, 5910 Crescent Blvd., Pennsauken, NJ 08109. Tel: (609) 662-6355.

Some time ago in these pages, AHC observed rather ungraciously that the whole line of Hafler electronics “could do with reworking.” This was interpreted by many readers—including the good people at the David Hafler Company—as meaning that AHC felt the entire Hafler line to be mediocre. In fact, he does not. (He had given a Hafler product a positive review a few issues previously.) Tony’s comment, however, did express a sentiment that most of us at Stereophile have shared for some time: a feeling that Hafler products had slipped from the position of sonic preeminence which they enjoyed during the ’60s and ’70s to one of mere excellence in a field where only preeminence is acclaimed.

These days, most audio perfectionists see Hafler products as ranking about halfway between the mainstream mid-fi of Sansui and Akai and the cutting-edge leadership of, for example, Krell and Threshold. It is not that Hafler products are perceived as being mediocre; just that they are not considered to be among the products one would choose were cost no object.

Actually, Hafler has never tried to go the cost-no-object route. Affordability has been an important aspect of David Hafler’s products ever since he founded The Dyna Company back in the mid 1950s. But what put Hafler on the map to begin with was the fact that the low prices would also buy you close to the best-sounding amplifiers that...
any amount of money could buy. It was a case of price-no-object-in-reverse: a modest outlay brought you sound that made McIntosh owners feel as if they had been had! It is that cutting-edge image of the Hafler line which has seemed lacking in recent years. Their new XL-280 amplifier may represent the first "reworking" of Hafler products that AHC had in mind.

David Hafler, an engineer of the "old school," holds as an article of faith that there is no magic in audio. He scoffs at the audiophile preoccupation with sonic differences so slight that their audiability is still open to question, yet believes that any sonic imperfection which does exist is objectively measurable, if we can just find a measurement for it. This actually hews very close to our own views on the matter.

Since there are probably things going on in amplifiers that we don't, as yet, have tests for, David decided to look for a test which would detect all forms of distortion, including those not yet identified. It didn't have to identify or quantify them; merely show whether or not they were present in an amplifier's output. A version of the venerable null test—which Hafler has dubbed the Straight-Wire Differential Test—seemed best to meet this requirement.1

The XL-280—dubbed the Excelinear amplifier (for "Excels in Linearity")—is, according to Hafler, the first amplifier ever designed to meet the extremely stringent demands of the SWDT, which is probably true. But the XL-280 is also, to my knowledge at least, the first amplifier a manufacturer has claimed to be perfect. Hafler did not make that statement, exactly. But a company Q&A sheet about Excelinear answers the question "Is it perfect?" with "[The XL-280] has reached the practical limits of audible distortion for its power class." That sounds like "Yes" to me.

The SWDT does appear to be a definitive test for an amplifier's accuracy. I find no basis for faulting it. So an amplifier which gives a complete, total, 100%, infinite-deci-bel null across the entire frequency band on that test can very probably be considered a perfectly accurate amplifier. Unfortunately, no amplifier does achieve such a result, including the XL-280.

According to Hafler, the XL-280 achieves "up to 70dB of nulling in the midband and about 60 over most of the rest of the audio spectrum." (On the other hand, their own null figures for the 280 show 70dB at 10kHz and around 65 through the midrange.) These are impressive test results, particularly in comparison with earlier efforts to obtain a straight-wire null against real-world amplifiers, but are they good enough to offer conclusive proof of perfection?

An attenuation of 70dB produces a signal less than one three-thousandth the amplitude of the original (0.0003 of the original), therefore distortion at this level, just 0.03%, would be a very respectable figure by anyone's accounting. But is it low enough to be completely inaudible? Well, assume we're listening at an average SPL of 90dB to an amplifier producing 0.03% spurious content at 10kHz. A level of 70dB below 90dB SPL is 20dB (surprise!), a level at which 10kHz is very clearly audible in the absence of other sounds which would otherwise mask it. And, there, of course, is the catch.

In the presence of much louder sounds of similar frequency, that -70dB at 10kHz may or may not be audible. Whether or not it is so is simply one of those things about which engineers and audio perfectionists have disagreed about ever since there were meters that could measure distortion that low. What is certain, however, is that a 70dB null on a SWDT is not necessarily proof that the amplifier is audibly perfectly "accurate." And with the XL-280, 70dB is the maximal amount of null obtainable with the SWDT. (In fact, I could not achieve that high a value in my own tests; see "Nothing to Hide," elsewhere in this issue.)

Interestingly, more conventional measurements on the 280 yield results which aren't all that different from the SWDT results. Hafler's literature states that the XL-280 has "conventional harmonic and intermodulation distortion specifications comparable to the DH-220 amplifier." At 0.05% (as compared with the SWDT's 0.03%) and 0.005% respectively, those are very good but not fantastic specs. So what makes the 280 any

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1 For a full description of the straight wire differential test, read the article in this issue.
better than the 220? Presumably, it is those elusive qualities for which we have no measurements, but which are improved by such circuit refinements as:

- No input, DC-blocking capacitor, and only one other capacitor in the entire signal path. Low-frequency phase shift should thus be very low, although not as low as it would be with an all-DC coupled signal path, and the amplifier should be free from capacitive aberrations (as outlined by Jung and Marsh in their Audio Amateur articles on getting the most from the DH-200).

- In common with amplifiers from Krell, Threshold, and Naim, the XL-280 has no inductors in series with the outputs. These inductors are included in nearly all designs to define the HF rolloff with capacitive loads, and thereby avoid high-frequency oscillation. Without them, the amplifier must be very much more intrinsically stable; with them, sound quality undoubtedly suffers.

- 30dB less negative feedback than the DH-220, for reduced TIM.

- Two completely isolated power supplies, making the amp essentially a dual-mono design, apart from a common line transformer. Each supply consists of two separate sub-supplies for the output and voltage amplifier stages.

- 31,200uF of power-supply storage capacitance—56% more than in the DH-220.

- A rated current capability of 18 amperes, as compared with the 220's 10 amps. And a short-term power rating at 1 ohm of 325 watts!

While these are excellent particulars, there are any number of (admittedly much costlier) amplifiers which can easily out-spec and out-rate the XL-280. We have a few of them on hand, but so as not to prejudice myself unnecessarily, I made a point not to subject them to the SWDT until I had finished all my listening tests on the XL-280. I did, however, run the 280 through Hafier's SWDT, and tweaked it for maximum audible HF null, using the amplifier's built-in "Exclinear" adjustment, and with the speakers with which it was to be auditioned.

It was while trying to null out the white-noise input signal that I noticed two odd things. First, the residual (un-nulled) sound differs markedly in spectral content on both sides of the null point. To one side of maximum null, the entire spectrum above the lower midrange increases in level; to the other side of null, the residual sounded primarily like midrange energy. The Exclinear trim adjustment seemed asymmetrical in its action, producing a different quality of residual sound on each side of the null point. Additionally, instead of nulling only the high end, as it is supposed to, adjusting the trim seemed also to change the pitch of the upper midrange and middle high range. Thus, getting maximal null involves a little judgment, as well as a sensitive ear.

I wondered if these nulling oddities might be due to unmatched loads, due to the much longer wire running to the distant load speaker. But shortening that cable made the sound from the load speaker so loud at the monitor location that there was no possibility of hearing what was going on. It occurred to me then that I might get a better idea of what was what by substituting a heavy-duty resistor, close to the amplifier, for the faraway loudspeaker. This did not work. The moment the amplifier under test was switched on, it generated a loud and ominous hum and the 10-watt resistor became very hot almost instantly. Something was causing oscillation. (I am still trying to figure out what.) I reconnected the remote load speaker.

After the null was as good as I could get it by ear, I played some music signals and listened through the monitor to the nature of the residual sound. It was very quiet, so much so that I had to plug headphones into the appropriate outlet on Hafier's box in order to tell that the residual seemed very, very clean. Even with discs which I know to be rather worn (and thus a rich source of mistracking transients), the sound from the monitor speaker remained sweet and clean.

This, I thought, had well for the sound.

But when I finally got around to auditioning the XL-280 on its own, my initial reaction was quite different from how I expected to respond to what might well be the most accurate amplifier made. Although the 280 was superbly clean and uncolored through its entire midrange, I was immediately aware of two areas in which it sounded very different from my reference amplifier (the awesomely expensive—$2900 per
channel—but similarly powered Threshold SA-1.

First, the 280 produced quite a bit more low end than the Thresholds, and with this went (as is usually the case where there is simply more low end) an impression of diminished control and detail. The low end from some Telars—notably The Stokowski Sound—was positively billowing and sounded very loose, yet when I used that CD later as a test source for nulling capability, there was absolutely no indication, audible or visual, of any loss of woofer control by the 280.

Second, the 280 sounded somewhat rougher and drier at the high end than did the SA-1s. Massed violins sounded subtly dirty (although there was no added steeliness), and the whole sound had less of what I think of as "suavity."

Third, there seemed less of a feeling of space and air around the instruments from the 280. Some of their roundness and solidity seemed lost.

And finally, although the 280 sounded no more forward through the midrange than the Thresholds, it seemed to produce a slightly shallower soundstage.

Actually, the 280 reproduces both depth and spaciousness very well—better, in fact, than many of the higher-priced amplifiers I have auditioned during the past three years, but not quite as convincingly as some others. All of them, interestingly, were much more costly than the XL-280. In fact, the only comparable priced amplifiers I can think of which clearly surpassed the 280 in any respects were the $440 B&K ST-140 and Carver's $600 Model 1.0 amplifier after it was worked over for our "amplifier challenge." The B&K had a much sweeter high end than the 280, but was not quite as good in any other respect. The souped-up Carver prototype sounded amazingly like one of our favorite tube amplifiers.2

It is important to remember that these are comparative assessments, and that I do not pretend to know which of the amplifiers are more "right" in any areas, because I really don't know what the original program material sounded like.

Were my speakers exaggerating bass that the 280 merely revealed, while the Thresholds complemented it? Was the XL-280 mercilessly exposing a roughness in all my program material that the Thresholds somehow prettified? And just how wide and deep were the original soundstages on which the recordings were made? I am not prepared to say. But there was no question in my mind that, with the two loudspeakers used for the comparisons (the Altec Lansing 301s and Sound Lab A-3s), the Thresholds produced what I judged to be a more musically realistic sound, with sweeter highs, better proportioned and controlled bass, and a more persuasive impression of the sound coming from a real performing space.

But look at the price difference! A pair of the Threshold SA-1 amplifiers costs a staggering 12.5 times as much as the 280! For the Hafer to not sound laughable by comparison is reason enough to view it with great respect.

As I write this, my null tests on other amplifiers, including the Thresholds, are still in the future. Perhaps, after those are completed, I will be prepared to say that the Thresholds sound better than the XL-280 because they outperform it on Hafer's own SWDT, and are thus more accurate. As of now, however, I can only speculate as to whether, in fact, accuracy is, or should be, the ultimate test of a component's suitability for use in a given system.

I know, I know, this is heresy. Accuracy is supposed to be the audiophile's touchstone, but there is accuracy and there is accuracy. There is intrinsic accuracy, which is the quality of perfection in an individual product, and there is ultimate accuracy, which is the ability of a complete system to produce convincingly musical noises despite the intrinsic inaccuracies of its components.

Some of our readers have written to express the conviction that we at Stereophile are obliged to perpetuate the "myth" of subjective testing because, were anyone to devise a test which could predict with absolute accuracy how a component will sound, we would all be out of a job. Well, the SWDT may prove to be just such a test. But we do not see the function of subjective reviewer as threatened by it, because as long as one

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2 Carver is now mass-producing that modified amplifier as the 1.0T. We recommend that you read Vol. 10 No. 2 to find if it sounds as good as the custom-tweaked version.

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component in an audio system is intrinsically inaccurate, the system will sound more ultimately accurate when that component is paired with another whose inaccuracies complement its own.

For example, loudspeakers are still very imperfect components, and vary in sound far more than do today's halfway-decent power amplifiers. Since one cannot listen to a loudspeaker without using an amplifier to do so, it is impossible to determine what the inherent sound of a particular loudspeaker actually is. So, even were a given amplifier demonstrably perfect, there is no guarantee that it will elicit convincingly accurate sound from a given loudspeaker system.

Clearly, the way to design an accurate loudspeaker would be to do so in conjunction with that amplifier which outperforms all others on Hafler's SWDT, but until loudspeaker manufacturers actually start doing that, choosing a power amplifier must continue to be done by ear, on the basis of what it makes our favorite loudspeakers sound like. (Or, conversely, we can start with the most accurate amplifier, as determined by the SWDT, and look for speakers that sound the most musically accurate with it.)

So, let's just forget about the SWDT for the moment and consider the Hafler XL-280 as a product.

Okay, so it's perfect—but how good is it? I am not even going to try to excuse it for not "sounding" as good as the Thresholds. They aren't its competition. In its own price class, I venture to say the 280 might well be a hands-down winner.

But—to quote Darth Vader—"There is another." I refer to the $440 B&K ST-140, an unknown factor at this point. That unit has apparently undergone substantial modification since I tested a sample back in August of 1984, with a resulting increase in output from 70 to 100 watts per channel. If the latest version has lost none of the high-end sweetness and openness of the original, it could well be a better choice than the Hafler. But since higher power often goes hand in hand with high-end roughening, I am not going to climb out on a limb and recommend the B&K over the Hafler without an audition. But it is with only that qualification that I recommend the 280.

(Significantly, the 280's high end was still growing gradually sweeter after about 20 hours of listening. I don't know how good it will become, with time, but I'll have a follow-up on the XL-280 when I do.)

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THIEL CS3.5 LOUDSPEAKER

Anthony H. Cordesman


I hear a new speaker with sound excellent enough to merit the words "reference quality" rarely more than once a year, but now the Thiel 3.5s arrive scarcely a month after the Apogee Duetta IIs—virtually an embarrassment of riches! More interestingly, the 3.5s and Duetta IIs make a fascinating contrast: both sound so good and so musically satisfying.

The Thiel model 3.5 is Jim Thiel's fourth-generation version of a three-way loudspeaker (the 03, 03a, and CS-3 preceded it) and represents a dramatic sonic upgrade from the CS-3. The looks remain largely the same, but virtually everything else has changed:

• The speaker baffle has an improved profile to reduce diffraction effects.
• The crossover is redesigned, with a smooth 6dB transition between drivers.

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• A new 11cm midrange unit is used with a bandwidth of seven octaves. It has a very large 38mm voice-coil, and is said to have exceptional dynamic range with low distortion.
• The 25cm woofer has been modified and improved with a new surround.
• The electronic equalizer is vastly improved, and now has no capacitors in the signal path. A switch allows you to choose between 20- or 40Hz bass extension, to accommodate problem rooms.

This list of new features may initially seem similar to the improvement claims you’ve read in your last 10,000 speaker brochures, but the technical measurements issued with the Thiel 3.5s are very different indeed. Only Vandersteen and a few other firms provide similarly detailed data. The step response and decay spectra look excellent, and the on- and off-axis frequency response curves are comprehensive. The rest of the Thiel 3.5 brochure is almost a short course on how to design a cone loudspeaker system; it’s worth reading simply to find out what a cone speaker system should do.

Fine, so Thiel is a good engineer and has a great copywriter; what about the sound? Well, let’s put it this way . . .

Bass
The energy, depth, and range of the bass is greatly improved over the model CS-3. Only a few true subwoofer systems, and the Infinity speakers with servo woofer columns, rival the Thiel 3.5’s bass; its full-bass range is actually deeper, better controlled, and more dynamic than most subwoofer systems. As for more conventional speaker systems, let me take one recent example: the new KEF 107 has very good bass, but the bass of the Thiel 3.5 is much more realistic, subjectively deeper, and more powerful.

As for some of the other competition, I

1 Maybe they should dress Jim up in a white coat and refer to the genius of Jim Thiel. But then, maybe they should shoot anyone who is on so much of an ego trip that he devotes so much of his advertising to his own picture.
2 Measuring the 3.5s nearfield in LA’s giant room revealed an impressively smooth bass response, with a -3dB point at 22Hz. The woofer, however, was working hard at the lower end of that range. For comparison, under the same conditions, the KEF R107’s -3dB point (with the K-UBE set for maximum flat extension) was at 27Hz, but with less distortion apparent.

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the Spendor SPI and Celestion SL600, for example—should ever rank more than Class C.

Midrange
We tend to take cone speakers far too much for granted. The Thiel 3.5 joins the Vandersteen in showing that the best cone systems may present a somewhat smaller apparent image than the better electrostatic and ribbon planar speakers, but can certainly rival or surpass them in resolution and transparency.

Yes, a few of the very best ribbon and electrostatic speakers do offer more detail and coherence in the midrange, but the Thiel 3.5 outperforms the Quad ESL-63 in coherence, smoothness, and transparency, and rivals any of the Sound Lab speakers I've heard. The Thiel 3.5 is slightly less "live" and detailed than the Infinity RS-1B, but it is smoother and more convincing. The Thiel 3.5 is not as detailed as the best Martin-Logans, but its detail seems musically more realistic and satisfying.

If there is any valid criticism I can make about the Thiel 3.5's midrange performance, it lies in the area of overall timbre. Thiel designs his speakers to measure flat at three meters, while most speaker designers seek flat response at one meter or, at the most, two. Perhaps as a result, the midrange and upper frequencies of the Thiel 3.5 are tilted up relative to most other speakers and—indeed—to most of the equipment used to monitor recordings.

I would like to see a switch to offer an alternative "tilt" to soften the upper midrange and treble by several dB. Without it, the 3.5 can seem a bit bright, and too forward, with a great deal of material. Lovers of older classical or direct-to-disc LPs will not run into problems, but those who listen to CDs, DGs, old Columbia's, and some of the less clean popular music may share my reservations in this regard.

Treble
The overall treble performance is superb. It is transparent, sweet but detailed, and extends over a wider radiating angle and wider frequency range than virtually anything around. Only the larger Apogees can touch it in terms of the top octave. No electrostatic that I've heard comes close. My one reservation is the same overall energy-balance problem just discussed for the midrange.

Top to Bottom Transparency
Equal or better than that of the Quad ESL-63, and that is saying one hell of a lot.

Dynamic Range
Much better than the CS-3s, and surpassed only by the larger Infinities and VMPS. All the other competition I know of—outside of hybrid mixes involving subwoofers—is slower, more constricted, less dynamically realistic at some level of loudness or part of the frequency band, and/or more limited in overall dynamic range. No full-range electrostatics can rival the Thiel 3.5, and only the larger Apogees—with just the right amplification—come close.

Imaging and Soundstage
Excellent and very detailed. The soundstage of the Thiel 3.5 is stable, and realistic in both width and depth.

Drive Compatibility
Easy to drive, and an accurate reflection of the quality of the amplifier. Given the 3.5's power-handling capability, however, I'd want to use an amp with at least 100 watts per channel.

Room Compatibility
Room compatibility is excellent. The lack of rear radiation slightly reduces the apparent depth of image, but allows for a much more uniform frequency response than is possible with a dipole. The excellent dispersion makes this a real pleasure in terms of placement and listening position. The 3.5s will, however, benefit from an absorptive rear wall, and wall-to-wall carpet with heavy padding.

Appearance
Nicely finished. Not exactly a piece of sculpture, but a high WAF (Wife Acceptance Factor) score.

After according this much praise, about all I can say is that you should consider the
3.5s competitive with virtually any of the most expensive monitor speaker systems—and one hell of a lot easier to locate and live with than most. For more insight, listen for yourself. Buy a pair if you like them, write Jim Thiel if you agree with my comments on the upper octave balance, and/or write the magazine a nasty letter if you think I’ve gone overboard. You should, however, listen to them.

The Thiel 3.5 vs. the Apogee Duetta II

Having said that, I cannot resist going on to compare the Thiel 3.5 with the Apogee Duetta II, and I have to say it is a hard—if not impossible—choice to make. I’ve spent one hell of a lot of time listening to both speakers with a wide range of record material and found that both not only offer the sustained musical enjoyment that comes all too rarely even at the high end, but are of sufficient quality for the most demanding audio reviewing.

As for the differences which have emerged, the Apogee remains the most transparent and coherent single home speaker I have yet heard. Extended listening comparisons consistently favored the Duetta II in timbre and detail, although both the Duetta II and Thiel merited exceptional praise.

The Apogee Duetta II, however, is limited in deep bass response and smoothness by the fact it is a dipole. It does not have the Thiel’s dynamic range, and will clip if driven to really high sound levels. The performance of the Duetta II also tends to be a bit more amplifier-dependent, favoring the Classe, Belles, Krells, Meitners, and Tandberg.

There are also some important differences in soundstage, listening position, and placement. The Duetta II tends to have a recessed soundstage while the Thiel’s soundstage is forward—by and large I prefer this aspect of the Apogee. Both benefit from being as far from the rear and side walls as possible, although this is much more important and audible in the case of the Apogee. The Thiel has a better vertical listening area than the Apogee, which allows good listening in a standing position even if you are over six feet tall. The Apogee sounds best for seated listeners.

Both the Apogee Duetta II and the Thiel 3.5 are so transparent, they clearly reveal any overall bias or coloration in your system—or your dealer’s. Both provide new insights into most recorded music. Be sure to take this into account in auditioning.

As for interfaces, I feel the Thielis do best with the use of MIT and Monster Cable speaker cables and interconnects, and the Apogees do best with Straight Wire, Livewire, and Kimber. Others, however, may disagree. In addition, the Apogees benefit substantially from biwiring. A host of minor tweaks like altering cartridge VTA are unusually audible and can affect your preference. So can virtually every other system choice and adjustment.

To hell with making hard decisions! As a reviewer I can solve my problem by refusing to give either the Thiel 3.5s or Apogee Duetta IIs back until the manufacturers send the Sheriff. As a rich audiophile, your choice is easy: buy a pair of both for every listening room in your house.5

5 The fact that the Apogee is a dipole makes it unsuitable for use in most small private yachts and jets. If you are not a rich audiophile, you should immediately become one.
Panel speakers are back in fashion. After years of determined effort on the part of a few established manufacturers, the number of these designs has seen a marked increase, and many new exotic models have appeared. *Stereophile* has recently reviewed two leading examples of the genre, the $2780/pair Apogee Duetta and the $2490/pair Martin-Logan CLS, (both in Vol.9 No.7). To judge by the tone of letters arriving at the magazine's offices, the reviews generated heated controversy. John Atkinson asked me, therefore, to conduct an in-depth examination of the two models, to give a fuller picture of what these speakers are capable of. Lurking in the wings, and at present perhaps unfairly overshadowed, is the $1995/pair Magneplanar MGIII in its latest ("a") form; I decided to include it in the review, its influence being too great to ignore.

I hope to present rather more data than contained in a conventional review. To begin with, there will be new supporting evidence on the sound of the Duetta and CLS generated in alternative rooms. Furthermore, the review samples were of recent vintage, with the Duetta in true Mk.II form after some Mk.I gestation difficulties, and the Logan equipped with the latest electronics. The CLS frequency balance had also been changed for the UK market. This involved the substantiation of a higher resistor value in the treble section of the equalizing/matching network to provide a richer, and in my view, more accurately balanced sound. (Those comparing my remarks with JA's in Vol.9 No.7 should bear in mind that JA's samples had not been so modified.)

As an alternative to a classic comparative review, JA requested a preliminary exploration of the principles of these two speakers to discover how their fundamental operation affects their performance and sound. This is a tall order, and requires that judgments be made in the context of the technology used. This part of the report should not be taken too literally in terms of the analysis of sound quality; if audiophiles were fully briefed on the limitations of most designs, many would refuse to buy a speaker at all. What does matter is the subjective judgment of the final result, governed by price and expectation.

As the report developed, the Duettas and the Logans began to position themselves at extremes of technology and specific performance, while the Magneplanar emerged as the classic, balanced, middle-of-the-road contender.

**Design Compromises**

Although radically different in appearance, the Duetta and the CLS are both medium-sized, floor-standing, open-panel speakers. The Duetta is a two-way system, with a moderately sized, broad-band ribbon tweeter working through the upper mid and treble ranges. It is related to the three-way Scintilla, which uses a composite multiple-ribbon system for the mid and treble range.

The number of "ways" is crucial to a design, since no single transducer can properly encompass the breadth of the audible frequency range. From the design viewpoint, the more ways — ie, the greater the number of divisions of the frequency range — the more freedom there is for the engineer to trim and balance the frequency response to provide a natural sound. Conversely, with a low number of "ways," the designer has to fight for continuity and an even power over the range, not always with complete success. Increasing the "ways," however, makes it more difficult to design a well-integrated full-range system out of proportion to the increase in complexity.

Apogee has pioneered the use of modern "ribbon" technology, and in the case of the Duetta, this description is certainly true for the HF unit. Here, a tall, pleated aluminum foil/Kapton ribbon with three conducting paths is suspended between the poles of a
powerful, linear, open magnet. The radiation is bidirectional and bipolar, the energy behind being out of phase by 180° with that for the front. Unless placed very close to a back wall, this will not result in specific cancellation, since by the time wall-reflected rear waves have combined with the direct radiation, their phase is randomly indeterminate. Suppose the panel is typically placed at five feet from the back wall, and the listener is 15 feet from the speaker. At the low frequency end of the range handled by the tweeter ribbon, say 1kHz, the listener is 15 wavelengths away from the front-panel sound, and 25 wavelengths from the reflected sound to the rear. Given normal room reflections, specific cancellations will be diffused and of small significance; with reducing frequency, however, this factor will assume increasing importance.

The lower frequency range of the Duetta is handled by a stretched film diaphragm, tensioned and supported over its whole boundary perimeter, and referred to by Apogee as a "ribbon." Its motion is akin to a drum skin, as is that of the Magneplanars and the vast majority of electrostatics. This is quite distinct from the piston-like, push-pull, action of a freely suspended ribbon whose fundamental to-and-fro resonance may be so low as to occur below audibility. At present, it is inconceivable that a loudspeaker could be made to operate fullrange in a true ribbon form. The magnet system would be so huge that no-one would be able to move it. It is also likely that such a design would overload prematurely at subsonic frequencies.

Apogee has overcome, in a number of ways, many of the fundamental resonance problems of a stretched diaphragm. The moving element of their woofer is a laminate combination of aluminum foil and Kaptan plastic tape with good self-damping properties. The element is generally pleated in the horizontal direction to increase its resistance to bending, while the shape is semi-trapezoidal to maximize its geometric asymmetry and thus disperse resonant modes. Finally, the upper and lower sections of the diaphragm are differentially tensioned to provide a broad, double-tuned low-frequency resonance, rather than one of a higher Q.

Several factors control the frequency response of an open panel. At low frequencies, the bass rolls off at 6dB/octave and is generally augmented by some deliberate diaphragm resonance. After passing through a fairly level region, the output begins to fall naturally and the drive signal must be crossed over to the next driver before this happens—in the case of the Duetta, around 500Hz. For the mid-treble ribbon element, the low-frequency rolloff begins at over 1kHz, and the crossover overlap is deliberately broad to help account for this. Once again, given some consideration of the acoustics of the vertical slot in which the tall ribbon tweeter operates, and the mild canting of the element to improve the vertical directionality, the treble ribbon's output falls at the top of its band. In the case of the Duetta, this is at frequencies above 12kHz. The Scintilla's more extended top-end response is assured by the final set of four half-inch ribbons, which augment the output from the mid-treble ribbon.

The Duetta's treble ribbon is a wide-range transducer, covering a range from some 500Hz to 22kHz, and is of exceptional sound quality. Advantages of this large ribbon include a virtual absence of resonance or coloration, with great acoustic transparency—no physical obstruction before or behind the driver element, plus direct coupling of the applied electro-mechanical force to the air. Good horizontal directivity is achieved by the virtual line source form. However, owing to the wide magnet gap which is necessary to accommodate the conductor, the tweeter does not offer much sensitivity. Running the three conductor elements of the ribbon in series brings the load impedance to 4 ohms, but the sensitivity remains very low, in speaker terms, at typically 78dB/W (this is an 8-ohm watt), which is some 10dB below the average. There are penalties to pay for this low sensitivity in terms of required amplifier power.

The Duetta's low-frequency driver is necessarily subject to some resonance modes and, in addition, suffers from some acoustic obstruction due to the perforated steel-plate baffle used to support the massive array of planar magnets. These pro-
vide the distributed magnetic field associated with the zigzag current flow of the diaphragm conductor pattern. The acoustic "window area" of the bass section is not very high, though if this were increased, panel rigidity would suffer. The bass driver, having a one-sided magnetic field, is driven in single-ended rather than the preferred push-pull mode. In theory, this would predict higher distortion levels, but in practice, the distortion from such a large radiating area is quite negligible, even at realistically high sound-pressure levels.

Due to their large area, the Duette diaphragms radiate heat well, providing a high power handling which is necessary in view of the low sensitivity. A particular feature of the Apogee drive system is its very high inherent linearity, resulting in a freedom from the compression effects apparent in many moving-coil systems, as well as in some electrostatics when the peak handling limits are exceeded.

Turning to the Martin-Logan CLS full-range electrostatic, this open-panel speaker must also suffer the low-frequency rolloff limitation of a finite baffle, and copes with this by means of a designed resonance at 50Hz. The electrostatic principle is attractive in many respects, not least because it allows the use of an extremely light diaphragm—so light, in fact, that its vibratory contact with the air molecules may be used as a palliative, controlling, damping mechanism. Light diaphragms can move quickly, promising good high-frequency response, while their low inertia assures a low level of stored energy, promising an accurate transient response.

In principle, the electrostatic driver is very efficient in its conversion of moving electric charge into acoustic power. Problems arise, however, in interfacing the necessarily large electrostatic element to the room, as well as to the power amplifier. The science of electrostatics is the science of high voltages, with the polarizing field established by as much as 7kV applied to the inner shielded diaphragm. Ideally, the fixed-mesh electrodes on either side of the diaphragm need to be driven in push-pull at upward of 500V, and require isolation from the user. (In the case of the Quad, the electrodes are protected behind grounded mesh screens.) A thick, tough, black plastic insulating coating is applied to the CLS electrodes; these simultaneously form the external grilles of the speaker.

High-ratio step-up transformers need to be used to couple the amplifier to the system, while the input characteristic is not one which allows for optimum power transfer. An electrostatic offers an input characteristic which is predominantly capacitive, hardly an ideal load. By the time these considerations have been taken into account, as well as the need to improve the poor dispersion of a single large diaphragm, the much-vaunted efficiency has been whittled away. Nevertheless, most electrostatics have a basic sensitivity of around 85dB/W (8 ohms), which is rather better than that achieved by present large ribbon systems.

The CLS diaphragm is unusual, for although it is only 0.004" thick, and consequently very light (the whole system is reckoned to weigh the same as one cubic inch or 16.4ml of air), it is formed from a pretty rigid plastic and is almost self-supporting. No mechanical damping is used in the diaphragm; its stretched "skin" and "plate" vibration modes are partially controlled in the first instance at the boundaries, where a lossy foam-plastic mounting is used, and by the acoustic impedance of the air load imposed on the diaphragm. For comparison, the Quad ESL-63 uses an 0.00137" diaphragm, with 0.001" plastic film for the dust-cover membranes. The CLS uses a density of Mylar similar to quad, giving a total mass of around 0.02gm. (The ESL-63 is even more extraordinary, its diaphragm weighing just 0.003gm, or 3 milligrams, not too far removed from the tip mass of a pickup cartridge!) Another interesting comparison is with a typical wide-band moving-coil dome tweeter, where the moving mass is normally around 200mg. Quads enjoy higher levels of air-damping than Martin-Logans and, in addition, use an interlayer of the sheerest gauze to provide necessary resistive mechanical contact damping to the diaphragm surface.

From its appearance it is obvious that the CLS diaphragm is broken up into discrete radiating areas by damping strips. It is possible
to acoustically excite these separate "cells" by blowing on them. As when air is blown over the necks of differently sized bottles, each one has its own distinct "sound." By this means, dominant resonances are moderated and dispersed by dimensioning each rectangular cell differently (rectangular, in any case, to reduce the resonance-mode symmetry).

The vertical side compartments of the CLS diaphragm are of fairly high Q, and are tuned to 50Hz. Above resonance, this level falls at a natural rate of 6dB/octave, partly compensating for the naturally rising 6dB/octave response of the panel as a whole. Beyond this frequency range, the double-section, frequency-compensated, step-up transformer applies a further reduction in mid-treble level. Finally, the distribution of the cells and the arc of the curvilinear diaphragm complete the frequency balancing.

A full-range planar diaphragm like the CLS becomes increasingly directional as the wavelength of sound approaches the size of the panel. In the Magneplanar and Apogee, this is solved by allocating the subsequent frequency range to narrower and narrower line-source elements. For the Quad, the diameter is subdivided no less than eight times, providing a controlled reduction of element size with frequency, and thus maintaining a good radiation angle. Martin-Logan deals with the problem in a different way: the electrostatic panel is formed into a near-parabolic contour with a prime radiation approaching a vertical half-cylinder. With this broader-angled distribution, some of the natural rise in frequency response is also offset.

If the diaphragms were sufficiently well damped, and dimensionally stable to operate without the subdividing cells, this geometry would approach the ideal. In practice, the cells' boundaries terminate the high frequencies in a nonuniform manner, resulting in an array of treble radiators rather than a uniform whole. Such an array is likely to result in an off-axis polar response with a complex fine structure at high frequencies. This will generate random amplitude and phasing irregularities when a stereo pair is considered.

Electrostatics generally have a finite sound-level limit, due to considerations of peak voltage and electrical flashover, or saturation limiting in the cores of the step-up transformer. Other problems include aging—changes in the diaphragm tension—and dust build-up due to electrostatic attraction. The Quad ESL-63 is dust-proofed, but the Logan has no such protection, and I would suspect that its use in a dusty environment would be inappropriate. On the other hand, the Apogee has a physical weakness in that its diaphragms are relatively susceptible to damage; even a light finger touch will mar the fragile diaphragm surface. (Apogee report no field problems, however.)

The well-established Magneplanar MGIIIA, based on a proprietary drive unit in which a wire-conductor array is bonded to a plastic-film diaphragm, is probably the most durable of the three designs under test. The exposed diaphragms are at the rear, behind the magnet array; they are also sufficiently resilient to resist minor impacts. Magnepan's true ribbon tweeter is also well guarded. The fact that the MGIIIA is a three-way design has given its designer more freedom to balance its frequency response; it is arguably more successful in this particular respect than the two other models.

Other advantages of the MGIIIA include a truly extended, wide-directional high end, plus a respectable 86dB/W sensitivity and well-damped film diaphragms, achieved via a lossy coating and the use of a special adhesive for the wire conductor bondings. Acoustically speaking, the bass and mid sections are not as transparent and unobstructed as the Logan or the mid-treble section of the Duetta.

**Sound Quality: Apogee Duetta II**

I shall leave the more effusively indulgent characteristics of sound quality to my American colleagues and present (I hope!) a rather more academically objective view.

This speaker has improved considerably since my first acquaintance with the original samples some 15 months ago, which I declined to review. In my system, problems were experienced with tonal imbalance, midrange glare, and a lack of precision in the high treble, though other critics seem to
have enjoyed greater success with its sound.

With the Mk.II, I found a greatly improved uniformity of frequency response, and the high-treble problem was avoided. The speaker was easy and relaxing to live with, and had great virtues. However, there was also what I feel to be a considerable flaw: the Duetta was demonstrably and unarguably rich in balance, and sounded dim when set against my established references, all of which have been directly compared with live sound sources under controlled conditions. If the Duetta is the only speaker you use, or perhaps the only speaker used that day, and you only play your brightest-sounding records, then you may become accustomed to its tonal balance. In my 80m³ room, the bass was almost overpowering in level, while the balance sounded as if downtilted with increasing frequency all the way from 50Hz to 10kHz. (Imagine a Quad 34 or 44 tilt control rotated fully for the richest tonal balance.) I felt a strong urge to beg, steal, or borrow the nearest Cello Palette and attempt some moderation of this speaker’s slow, ponderous balance.

In addition, while the problem I had perceived above 12kHz from the Mk.I had gone, so, it appeared, had the extreme treble itself! The treble sounded filtered, with little air or sparkle in the final audio octave. The end result was still very sweet, but lacked a sufficiently ‘open’ quality. Perhaps surprisingly, however, the Duetta sounded best with the treble switch up (i.e., dimmer).

With the switch set down, the treble was lifted slightly at the expense of a mild return of upper-mid “glare,” something I can do without. I also indulged in some strictly illegal fiddling: I tried placing 1.5-ohm resistors (25 watt wirewound) in series with the woofer panels, which helped the tonal balance somewhat.

The Duettas are amazingly insensitive; for example, Audio Research M100s (on their 4-ohm taps) sounded wonderful at low levels, but failed to stir the Duetta into life at high levels. Substitution of Krell KMA-100s (lovely amplifiers these, despite their being solid-state) essentially maintained the standard of reproduction but added some 6dB of level, bringing the Duettas to a satisfactory volume level.

A quick lab check showed that the KMA-100 could churn out 200 watts into 8 ohms, and 360W into 4, yet to obtain the full dynamic range I believe the Duetta capable of, I felt the need for a KMA-200 or the equivalent. In room, this would establish maximum sound levels of typically 105dB from a stereo pair. For reference, a KEF R107 fed a standard 100W (8 ohms) per channel will deliver 107dB. An MGIIIa fed its power limit of 100W (8 ohms) would deliver a satisfactory 101dB.

With its rich balance, the Duetta needed heavy driving to bring up the mid and treble ranges subjectively, whereupon the magic qualities of this fundamentally musical transducer were then revealed. Most of the frequency range was of high purity with excellent transparency, and once you had become adapted to this speaker tonally, it rewarded you with an excellent focus, fine orchestral perspectives, and big sound-
stages. The usable treble range was dulled, but otherwise of very fine quality. Leaving aside the question of balance, the bass was appearing powerful, clean, articulate, and extended, virtually to the subwoofer level. But most importantly, the midrange was very good indeed, and worthy of both the brandname and the asking price.

Coloration (in the resonance sense) was very low, the sound imbued with a great sense of ease. The Duettas were not immediately lively, in a dynamic sense, but did continue to impress with their high resolution of inner detail, as well as by their discrimination of subtle harmonic shadings.

**Sound Quality: Martin-Logan CLS**

An earlier CLS had sounded quite impressive—lively, brilliantly clear, and full of dynamics as well as considerable musical information. Ultimately, however, it had proved a trifle wearing in that its tonal balance was uptilted—too bright—the converse of the Duetta. The current review sample sported the latest “electronics” comprising a factory-specified treble resistor selection, which balanced it closer to tonal neutrality.

This CLS was better balanced than before, yet much of its impressively exciting “liveliness” was still apparent. My listening notes contain a very good first impression which placed it in the true high end. The broad midrange was undoubtedly very fine, and sounded quite remarkable on plucked instruments, such as harp and acoustic guitar. As with the best panel speakers, the absence of the usual wooden-box colorations came as a welcome relief. The mid was highly informative and immediate, with that now much-sought-after “direct-coupled” character.

The speaker could play pretty loud with quite modest amplifiers, and showed a surprisingly healthy bass and bass-power handling. If I had stopped listening here, the CLS would have sailed through the subjective testing; however, as the listening period was extended, I became increasingly aware of certain adverse effects which

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1 In larger rooms—200m²—the bass was proportionately reduced, and much better balanced.

2 JGH also noted this quality when he heard the CLSs in my room. He refers to this as the “Venetian blind” effect.

—JA
the CLS showed a tendency to lose this level of clarity. In addition, it could be made to clip on moderately high levels of solo piano. (JA mentioned this in his review; Martin-Logan reckons it due to core saturation in the drive transformer at the power-handling limit).

Careful comparisons on master-quality sources suggested that the treble range suffered from some fine structure unevenness, while in terms of tonal balance it was felt to be somewhat midrange forward and showed some mild sourness on violin tone. Its overall performance brought to mind the inherent character of the Decca cartridge: "direct-coupled" immediate sound, odd bass, and suspect treble, all allied to a marvelously "live" midrange.

**Sound Quality: Magneplanar MGIllla**

This revised speaker was given the full review treatment by AHC in Vol.9 No.4, but for the sake of completeness, here are my brief notes on its sound. The treble was pleasantly pure, and very extended, directing a wide spread of "air" and "sparkle" into the room; a little too much so, in fact, for my tastes. The good treble added a sense of upper-range speed and delicacy that was somewhat lacking in both the Duetta and CLS. The MGIllla mid has been improved, now sounding faster and more open, and setting a genuinely good standard. The overall tonal balance was close to neutrality and did not draw much dissonance from me. Certainly the mid was not as pure or transparent as either the Duetta or CLS, but was no slouch for all that. The bass came midway between the two main contenders; at least it was present in better proportion, with pretty good extension, if not to Apogee standard. The MGIllla was more tactile and articulate in the bass than the original MGIII, and in this respect, at least, has the CLS beat. Its bass was also of respectable uniformity.

It proved easy to drive, and handled high input power levels gracefully, never sounding strained. Even when the bass was deliberately overloaded with over 100W at 50Hz, no bangs occurred—just a gentle "blurring" of the bass tone.

For the record, the Quad ESL-63, while not able to play rock bass to the same level of any of these three speakers, was, in fact, the best as regards tonal balance and low-frequency uniformity. It was also consistently neutral to a wide range of sources.

**Technical Test Results: Apogee Duetta II**

Just how hard is the Duetta to drive? Contrary to rumor, it proved quite tolerable—no less than 5 ohms, almost purely resistive, on the "1" setting, and it would warrant an across-the-board specification of 6.4 ohms, which is an easy load in speaker terms. The amplifier problems arose, not from an excessively low impedance as in the case of the 1-ohm Scintilla, but from its chronic insensitivity in normal speaker terms of about 80dB/W. The impedance graph (fig.1)
reveals the crossover located at around 500Hz.

Measuring the sound output in 1/3-octave bands, the mid-tweeter response, shown on fig.2, is pretty healthy down to 400Hz. The vertical marker is placed at 12.5kHz, and graphically demonstrates the declining final octave, even when measured directly on-axis, with the mic on the "hottest" angle. Down 3dB at 12kHz, it was -10dB by the 20kHz 1/3-octave band. This graph also shows the output of the bass driver and its excessive level when interfaced with the tweeter, typically 6-8dB too high. (Note that this curve will encompass some significant nearfield effects, particularly in the bass.)

Fig.3 is a composite of the axial response, plus the output at 10° above axis, and 30° off the horizontal axis (toward the center stage). This shows that the output off-axis is pretty well maintained in the desired manner. At 30° to the horizontal, the 12kHz region picked up a little but with no significant improvement in extension. On driver integration alone, the Duetta can be rated fine.

Finally, we come to the computer-aver-
aged response assessed in the listening space (fig. 4), a summation of some 64 responses. In my 80m³ room, the 30Hz and 25Hz bands were clearly excessive in level, with the 30Hz rising 12dB above the computed median. Note that the bass rise was part of a rising curve and not an isolated “boom.” From the response, it is clear that the general energy trend is rather rich, with the midrange broadly weighted to a maximum in the 400Hz to 1kHz sector (the marker is at 1kHz). Above 1kHz, the output declined some 5dB, though in a fairly controlled manner. The average output held up to 10kHz with a desirably smooth rolloff thereafter. The dotted curve shows the effect of the 1.5 ohm bass resistor—a mild improvement in balance.

Larger rooms would definitely improve the Duetta's bass-mid balance, though the low bass would remain overpowerful down to 30Hz. For the benefit of those readers not familiar with these room-averaged responses, I can assure you that it is possible to obtain a room curve using this method which runs within ±3dB 25Hz to
200Hz, ±2dB 200Hz to 8kHz, with a gentle rolloff thereafter. (This latter effect is due to the finite directivity of almost all commercial tweeters at higher frequencies.) Blind listening tests have shown a consistently good correlation between perceived response and the room measurement.

**Technical Test Results:**

**Martin-Logan CLS**

Looking at the amplifier load factor, the impedance curve (fig. 5) is typically “electrostatic.” Low at low frequencies, and with no visible signs of the 50Hz diaphragm resonance, it climbs steeply to a harmless 33 ohms by 1kHz. Above this level, the load is almost purely capacitive, falling with frequency at 6dB/octave, reaching 2.5 ohms at 10kHz, and finally bottoming out at a value of 1.6 ohms at 20kHz. Wide-band synthesizers played at high level will not do the amplifier-speaker combination much good, while this load non-uniformity will cause more treble balance variations than usual with different cables and different amplifiers. In fact, one or two power amps may
not be too stable with this load under heavy transient drive.

The CLS frame assembly seemed to show a minor mechanical resonance which was checked out acoustically (fig.6) and clearly placed at 160Hz. This resonance could be picked out on nearly all response curves taken.

The forward response set is shown in fig.7. Taking the solid axial line first, the speaker output was high in the midrange, partly due to proximity. Above 1kHz, the output was even and well-extended, suggesting a basically good tonal balance. No loss was seen by 20kHz. The low frequencies also deserve some comment. As predicted by Gayle Sanders of Martin-Logan, the main resonance was precisely at 50Hz, and, in my view, showed excessive amplitude. The bands above 50Hz were deficient, while a steep rolloff held below 50Hz, the output already -8dB by 40Hz, and -18dB by 30Hz.

Given the smoothing advantage provided by 1/8-octave analysis, the off-axis responses of the CLS were remarkably good. It held a well-extended response over a wide range...
of angles, ±15 degrees vertical and up to 45° horizontally. This is shown by the commendable closeness of the off-axis response group.

To explore the subjective comment of “phasiness,” a narrow-band analysis was performed in the 500Hz-20.5kHz range for the axial response, and for a small 5° lateral angle change (fig.8). The results show that the CLS does have a peak at 15-16kHz (heard on audition), and that the two responses, although subjectively alike, do not correlate well. Inter-response differences of 3-5dB are frequent at high frequencies which, of necessity, implies quite rapid phase shifts. These effects are typical of a multi-sourced, multi-lobed treble radiating system—the multiple cell configuration. The computer-averaged room response (fig.9) provides the final stage of measurement analysis. Here the 50Hz resonance can be clearly seen, while the energy loss above 60Hz is also apparent. The broad midrange is well balanced, while the upper treble is a little too well-extended at the highest extremity, suggesting an aural “edge” or corner. This is associated with the
16kHz axial prominence.

Without claiming sonic superiority for the Quad 63, the response for this model under identical conditions (fig.10) makes for an interesting comparison. Quad has attained a commendably uniform bass to 30Hz, with a broad sweep of uniform output held over the entire range, culminating in a naturally smooth room-energy rolloff in the highest frequencies. Yes, it can be done!

The CLS offered a below-average sensitivity of 84dB/W, with a power handling of 100W per channel. Maximum room sound-levels of typically 100dBA will be possible, though the speaker generally seemed to sound a mite louder than that.

Technical Test Results: Magneplanar MGIIIa

I could not resist a sneak look at this speaker while it was "passing through the lab."

Fig.11 is a "snapshot" of the forward axial response, showing some lift up to 16kHz. The mid-treble is linear and well integrated, while the bass is more or less level to 40Hz, in good proportion with the rest.

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**FIG. 11**

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**FIG. 12**
The response in the listening room (fig. 12) was remarkable at first sight, although the upper treble was just too good to be true. In addition, the moderate prominence at 60-80Hz could ideally have been avoided. This curve confirms both the inherent neutrality of the IIIa, and its new found extension to 25Hz in-room.

**Conclusion**

I was fortunate in having access to all three speakers at once during this three-way contest (though I am sure my wife did not agree!).

Because the final purchase decision must include major considerations such as required loudness, room size, speaker placement, available amplification, and the amplifier/speaker interface, I find it hard to pick a winner. The kind of music played may also be important, while matters of personal taste on tonal balance are also crucial.

Given a near-unlimited amplifier budget, my ultimate sympathies lie with the Duetta II. As a reviewer, however, I could not cope with it in its present state. It is simply too rich, tonally too insensitive to use as a reviewing tool; if intended as the basis for a music room...well, that would be another matter! If the diminished final octave does not matter too much, and if really high sound levels are not required, and if a large room is also available (quite a few "ifs"!), then the Duetta is the best choice. There is no doubt that its intrinsic quality was in the highest class, and implied no limit in terms of the matching amplifier quality; the ARC M100 proved this, though it didn't achieve a sensible volume level.

I would ask Apogee to consider an approved modification for bypassing the crossover. Dan D'Agostino could then work up a nice equalized electronic crossover, working in conjunction with a pair of KSA-100s, to provide direct-coupled, biamped operation. I confidently predict that this combination would provide one of the finest performances for the money presently available in the business.

I find the CLS has considerable merit, particularly for smaller orchestral forces, offering an essentially uncolored, "fast" sound. Reservations remain, however, concerning the nonuniform impedance load, the peak midrange power-handling for its price and size class, the treble phasiness and related fine structure irregularities, and, finally, the almost one-note 50Hz bass.

The CLS is an interesting speaker of remarkable appearance. Only a careful audition will properly inform a prospective customer, especially since broad areas of its frequency range sound quite as transparent as it looks.

Finally, we have the well-established Magneplanar MGIIIa, which has not suffered too greatly in these comparisons. Of eminently reasonable sensitivity, easy to drive, and possessing an essentially neutral tonal balance, it also has a notably wide frequency response, which survived well in my 20-foot long, 80m³ room. In no way can it be dismissed as "old technology." Admittedly, the Maggie's mid did not reach the peak of the Duetta or the CLS but it was nonetheless good. In the long term, its overall engineering integrity told in its favor, to which must be added the ease of amplifier rating matching.

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3 Provisions have been made for the Duetta Series II to be driven via an active crossover. Owners should consult the Manual for instructions.

—JA

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**ORTOFON MC-30 SUPER MC CARTRIDGE**

J. Gordon Holt

Most audiophiles know that you cannot make subjective qualitative comparisons between two signal sources as long as they are quantitatively different. If your aim is to compare distortion content between the signals, you must not only have their volume levels set identically, you must also equalize one or the other (or both) so that they have identical frequency response characteristics. Otherwise, at the least, you will have a volume match through one frequency range and not through another.

This "common knowledge" somehow went by the board when CD appeared on the scene, with most perfectionists declaring the new baby to be inferior to big daddy analog because it sounded so much shriller! Eventually, some very clever souls began to suspect that much of the difference was due to frequency-response considerations, but did they consider the possibility that the cartridge might be wrong? That couldn't be; the cartridge sounds good, while the CD sounds baad. Instead of second thoughts about analog, what we got were gadgets designed to "improve"—not the analog source—but the CD, by making it sound more like analog.

Today, putting the specific distortions characteristic of digital to one side, there is increasing reason to believe that what we hear from the best CD players is spectrally very close to what is on the original master tapes. We can conclude from this that the best CD reproduction is pretty close to the way the equivalent analog disc should sound when played with an accurate cartridge. In other words, if we're really interested in accuracy in our signal sources, we should be trying to match analog to CD rather than the other way around.

There's really nothing intrinsically wrong with the opposite approach, except that it is an invitation to endless frustration. Cartridges, tonearms, and preamps suffer so much in coloration that they offer an almost limitless palette of possible sounds, only one of which is correct. If you somehow miss the magic combination (and it is probably "hit" no more than once per 100,000 combinations), and then convince yourself that your choice is the right one, you will not be able to enjoy any signal source other than records.

By "other" signal sources, I am, of course, talking about Beta and VHS Hi-Fi, Laserdiscs (analog and digital), CD, and—sometime next year—RDAT. Even FM radio, that long-time paragon of sonic deformity, is relying increasingly on CD these days, and not even all their limiters, clippers, and compressors are going to make CDs sound all that much different from the way they sound in your home.

Ortofon MC-30 Super cartridge

I do not tout any of these alternative sources (other than CD) as an ultimate standard by which others should be judged. My point is only that all of them differ from analog discs in that they are nonmechanical systems, and are thus inherently free from the resonances which impart such interesting variety to the sound of analog discs. And since CD is apparently the most tonally neutral signal source we have today, it makes the most sense to try and get one's analog discs to sound as much like their CD counterparts as necessary. Then, if the sound from both sources sucks, work over the rest of the system—matching amplifier inaccuracy against loudspeaker inaccuracy—until both sources sound as much like real music as you can get them to.

All this is a roundabout way of explaining why I have used Ortofon's top-of-the-line MC-2000 cartridge as my reference standard for the past 18 months. The MC-2000, with its T-2000 step-up transformer, has brought me closer to equivalence between CD and analog sound than ever before. The rest of my system complements both, to produce a
high level of overall musical naturalness and—dare I say it?—accuracy. (Interestingly, all of the analog recordings I own which I made myself, as well as most of my collection of prerecorded stereo tapes, also sound very good now—much like CDs with rounded-off transients.)

I gave the MC-2000 a rave review in these pages (Vol.8 No.2), but it was a much-qualified rave: I found it very difficult to get rid of the last vestiges of hum from a cartridge with an appalling 0.05mV of output. I did, finally, but felt a little uncomfortable recommending to anyone a $2000 cartridge/step-up combination as being the only way of obtaining ultimate accuracy from LPs.

So, when I read Ortofon's announcement of a $600 MC cartridge with high enough output to be used "straight" into many high-end preamps, I had high hopes that this would be the next best thing to the $2000 MC-2000 system, and could be recommended as achieving much the same things for a lot less money (not to say a lot less trouble with hum).

The MC-30S is designed for use into a preamp having a typical MC input. (It will work okay into the MM input of some high-end preamps, but with some background hiss and practically no reserve volume.) Its spec sheet cites neither a source impedance nor a recommended load, but it was found to produce "normal" MM-type output level (ca 6mV) when fed into a step-up transformer having a nominal input impedance of 30 to 100 ohms. (Those of you who might contemplate purchasing the MC-30S will be heartened to know that it does not need to be used with the very high voltage gain, $1000, T-2000 step-up transformer which Ortofon makes for their MC-2000 cartridge. That sizeable outlay is neither necessary nor permissible for the MC-30S.)

I was dubious from the moment I set eyes on this cartridge. Except for the Ortofon name emblazoned on its front, there was no visible resemblance between the MC-30S and the MC-2000. They looked like the products of two different manufacturers. They even differed in mounting provisions, with the 2000 having a pair of deep, closed-in holes for the screws, and the 30S having open-ended metal tabs at the top.

The MC-30S is a snap to install in the headshell, but the supplied tracking-force gauge caused me some anguish. It has low enough friction to allow one to get reasonable readings from it, but its scale is not calibrated in grams, but in milliNewton!

Now the reference works I have on hand variously define a milliNewton as being equal to 100 dynes, 0.00225 pounds, or one thousandth of the force necessary to accelerate a 1-kilogram mass at a rate of 1m/s².

Two of them state that the Newton is used mainly for acceleration computations. So what in the hell is it doing on a stylus force gauge?!

We do not need, and we do not want, another way of measuring tracking force. The gram is the universally accepted standard for tracking-force measurement, and it works jes' fine. So what's with this milliNewton crap?? Well, Gee, I thought, maybe

2 The SI system of units, universally used in scientific work, and increasingly in engineering, attempts to minimize ambiguity, as well as refer all units of measurement to a small number of fundamental definitions. The Newton, a unit of force, was introduced to distinguish force from mass. What we all refer to as a gram of force when setting up cartridges is not the same as a gram of mass; it consists of that gram of mass multiplied by the acceleration due to
Ortofon specifies tracking force in mN. That could at least excuse calibrating their gauge that way even if doesn't justify it. But no. I quote from the accompanying data sheet: "Recommended tracking force: 1.8gm. Tracking force range: 1.6 to 2.0gm." No mention of milliNewtons at all.

I dislike wasting so much space about something seemingly so far removed from the subject at hand, but this kind of mindless improvisation needs to be scotched. My advice here is the same as it was for Ortofon's other gauge that had too much friction to be usable: curse it, heave it, and forget it.

For my initial listening tests, I set both the tracking force and the VTA to the recommended values. I never felt moved to change either.

The MC-30S is a superlative tracker, negotiating the Telarc 1812's cannonades effortlessly despite very visible lateral wobble of the whole arm on some of the blasts. (This is in the heavily damped Well-Tempered Arm; I offer no guarantees about trackability in less stable arms.) HF trackability rivals but not does not quite equal that of the Shure V-15V, which still (to my knowledge) holds the all-time trackability record. The difference, however, is observed only on obviously overcut discs with horribly sizzly highs or intransient transients; it does not show up on any recordings that an audiophile would listen to anyway.

Low-frequency performance, too, is excellent. The MC-30S has the kind of bass range, heft, and solidity usually reserved for the best CD reproduction, and easily outclasses my reference MC-2000 in this respect. Inner detailing is also excellent, and there is a nice feeling of air around the instruments.

Highs are gorgeous—smooth, open, and sparkingly crisp, yet without a trace of sizzle or other typical MC high-end irritations.

Soundstaging is a little less spectacular, although still very good. Breadth and spaciousness are there in abundance, as is stage depth, but because of an apparent presence-range suckout, front-to-back perspectives are somewhat compressed. Nothing ever sounds close-up, including vocal recordings whose sibilant content makes it evident that they were recorded from a few inches' distance at the most. By comparison, it makes the equivalent CDs sound a bit hard, steely, and brash—exactly the qualities which those whose systems are geared to other, similar-sounding cartridges have attributed to "problems" with CD sound.

The diagram shows the machine-measured frequency response of the MC-30S. Note the excellent low-frequency performance. The presence-range brightness suckout is much less visible than it is audible. The high-end rise, however, is much less audible than it is visible on the curve.

In short, while the Ortofon MC-30S is a very nice-sounding cartridge, equal to the best I've heard in some respects, it is apparently not the most accurate of cartridges. Its sound, I feel, is typical of an age whose time is past. Nonetheless, it's well worth auditioning at home, and Ortofon offers your money back in 30 days if you're not satisfied. But one thing is certain: if you like what this cartridge does to the sound of your system, you are not going to care for what your system sounds like with CD, FM, Beta Hi-Fi, VHS Hi-Fi, and—maybe some time next year—RDAT.

**COMPACT DISC PLAYERS: THE NEVER-ENDING SURVEY**

Anthony H. Cordesman

In Jean Paul Sartre's most famous work—*Monty Python and the Holy Grail*—he sums up the existential essence of both audio reviewing and the current state of the compact disc player in the terse passage of dialogue that won him the Nobel prize:
The Latest CD Good News/Bad News Jokes

The good news is that the overall quality of recordings on CD is getting steadily better. This ensures not only that the sound is rarely irritating—a growing number of CDs prove that digital sound can be musically outstanding—but also that more producers seem to be discovering the fun they can have with the soundstage, and are either doing a much better job of mixing or are using simpler microphone techniques.

This has some ironic results. Many of the larger European recording companies are now doing about as well as—if not better than—most American audiophile firms. Real music by real performers is becoming widely available on CD, and in all deference to far too many audiophile recording groups, listening to major performers and respected orchestras and groups is a heaven-sent relief from mindless crap like drums falling off chairs, edgy string sections, and bubble-gum rock and jazz groups.

There is also good news about CD players. Being selective will get you a very good machine. Moreover, one of the cheap-

1 The reader should be aware that these comments are based on listening experiences in the US, France, FRG, and UK, as well as listening through my own reference system. In each case where a specific brand or model is referenced, the listening was done on a system using components I know very well and have listened to previously. All of the recommended players, and most of the "also rans," were reviewed in my listening room. The reader should also be aware that my descriptions focus only on major sound characteristics are likely to consistently emerge in using a wide range of preamps, amplifiers, speakers, and cables. As for the reference comparisons, the preamplifiers included the Audio Research SP-11, Convergent Audio SL-1, Krell PAH-3, and PS Audio 4.5 preamps. Amplifiers included the new Krell KMA-100s, the Krell KSA-50, the new Meitner 100 watt monos, and the PS Audio 200C. Speakers included the Apogee Duetta IIIs, Fussell 3.5, Infinity RS-18s, and Thiel 3.5s. Cables included the Straight Wire and Monster Cable Reference interconnects, and Kimber, MIT, and Straight Wire speaker cables. Listening impressions were controlled using "blind" listening tests comparing multiple copies of reference CDs, with gain matched between different players using an SLM.

2 For those of you who are not economists, $699 is a dishonest way of saying $700.
fecting CD reproduction do not need to group around any given cause. In fact, the causes of the problems in any given event of CD playback are likely to be an almost random collection of minor technical problems and manufacturing mistakes. No one has yet presented any meaningful evidence that there is a single dominant cause of such errors. It is painfully apparent that many of CD's strongest advocates and critics are in need of both a good course on operations research and urgent psychiatric treatment.

To put it bluntly, most of the debate in audio journals over the technical causes of the problems in CD sound quality is intellectual garbage. First, no one even attempts to prove the extent to which a given parameter affects actual perception. Second, there simply is no scientific way to analyze a complex process or "system" by focusing on a single limiting factor or problem unless you can prove the relative importance of that factor and give it suitable weight relative to other causes of error.

Reproducing Imperfect Recordings Forever

If this discussion still seems a bit abstract, let's consider what has to happen simply to create and playback a CD. In broad terms, music and voice are converted during the recording process from their normal "analog" form into a series of digital numbers whose changing magnitude corresponds to the changes in the analog waveform. These numbers are produced at a frequency roughly twice the highest audio frequency to be recorded, or 44.1kHz. This can be done during the actual recording process (when it is called direct-to-digital) or from analog tape (when it is called analog-to-digital).

As has already been described in Stereophile (Vol.9 No.6), this recording process may or may not use fully standardized digital recorders and processors. Several different digital recorders or processors are used before the final processing to create a digital disc. This process converts the digital signal into an optical record which is then used to "master" the compact disc, and is extremely complicated; a great deal can—and inevitably will—go wrong at any given stage.

Much of the advertising for compact disc implies that there is a very low inherent level of distortion. These claims, however, only have validity at the very top of a CD's dynamic range window, and look at only one small part of the recording/playback chain. They ignore the real situation.

Even a perfect digital recording process will still have inherent levels of coloration and distortion because it is ultimately dependent on an analog signal from a microphone—which may, and nearly always does, introduce a noticeable sonic "signature" to the sound. In addition, the inevitable mixing consoles are not designed with purity of sound as a key prerequisite, and will further degrade the signal. And if the performance is recorded on analog tape before digital processing, another family of distortions will be added.

Once digital processing does begin, the sheer complexity of the long chain of steps from the point of analog-to-digital conversion to the point where a CD is actually manufactured will steadily add to this degradation in a manner unique to each CD, due to the inevitable lack of standardization and control at various points in the process.

More and different kinds of distortion will be added if the performance is recorded on the older digital processors or transferred from one kind of processor to another. In the latter case, processing may well have lowered the effective resolution to the point where HF response is severely compromised, and complex and unpleasant distortion products are added to the sound. The measurement of all these forms of distortion and their importance relative to those in analog tape and LPs is still in a state of flux—there are plenty of data but someone has yet to pull all the threads together. It is clear, however, that trace amounts of digital processing distortion can be as unpleasant to the ear in long-term listening as much higher levels of conventional distortion.

Further, an increasing number of compact disc recordings restrict frequency response and dynamic range to prevent complaints from owners of low-performance systems that distort trying to reproduce natural recordings of music at
realistic volume levels. This processing inevitably does more than remove musical content. Virtually all of these devices add further distortion.

Even if the recording process were not so problematic, and if it were not so easy to degrade the performance through improper miking and production, the signal on a compact disc is certain to have an average distortion level higher than anyone would accept in the specifications for their home audio equipment. To paraphrase one of the more immortal—immoral—ads for CD, even perfect reproduction in the CD player will reproduce imperfect recordings forever.

Understanding the error-prone nature of this recording technology is essential to realizing several things about the purchase of a CD player:

The technical differences between players interact sharply with the errors in digital recording and CD production. Players can and do sound very different in reproducing different compact discs.

CD is not a holy grail. No matter what you do with the player, the sound isn't going to be "pure"; you'll still hear problems in the recording, and unnatural sound.

You can really only select a CD player by listening to a wide range of the recordings you know and love. You will be selecting a compromise in the interface between errors in the player and errors in most recordings; the choice of which is the best player is highly subjective.

Imperfect Reproduction Forever

Things get only marginally better once a recording is completed and placed in the compact disc player. Once again, the sheer complexity of the technology means there is long error budget of things that can go wrong. The compact disc player uses a computer-controlled motor to spin the disc at a rate which gradually decreases from 500 to 200rpm. A narrow laser beam is focused on the bumps in the mirrored surface of the compact disc. The reflected light is then fed to a photodiode that generates an electric output corresponding to the "ons" and "offs" (1s and 0s) of the microscopic bumps. This stream of digital information represents both channels of audio, mixed together with data representing track and time information, and features a great deal of redundancy; ie, the same data appear in several places so that errors will not cause all information concerning the signal to be lost.

The circuitry in the CD player has to unravel this mess of information and present it to the digital-to-analog (D/A, D to A) converters (DACs) in a form which they can use to roughly recreate the original analog waveform. If any problems emerge during this readout and sampling process, the player uses a process called error correction to reconstruct the original number(s) or, if the error is large, uses interpolation to make an educated guess as to what the signal should be, based on the signal just before and after the error. A lot can go wrong at this stage, and the state of the art in manufacturing is sufficiently imperfect that it adds substantial random problems from player to player.

To increase the accuracy of the eventual result, some CD players—but by no means all—"oversample" the digital signal coming from the photodiode. There are now three main variations on this theme: 4-times oversampling of a 14-bit number (Philips); 4-times oversampling of a 16-bit number (Philips); and 2-times oversampling of a 16-bit number (Sony, Yamaha). All depend on sophisticated chips, and chip quality can be far from perfect. The actual reconstruction of the analog signal is performed by low-pass filtering of the output of the DACs; usually this is done with conventional analog circuitry, but increasing numbers of players use digital filters before the final conversion, with mild analog filtration afterwards. Once again, a host of things can go wrong, some of which are inherent in the design and some of which are random manufacturing variations.

The analog signal has then to be buffered, so that the CD player can drive a power amplifier or the high-level stage of a preamplifier. The power supply must be carefully designed and regulated to prevent current drain occasioned by one part of the

3 See JA's thorough discussion of some of these issues in "Zen and the Art of D/A Conversion," Vol.9 No.6.
circuitry interfering with another. Mechanical and electric shielding are critical. Further, the disc-playing mechanism must be carefully damped to prevent vibration of the compact disc from increasing the error rate.

Every player approaches all these tasks somewhat differently, and manufacturing costs impose significant limits on what can and cannot be done. But player cost is no indication of quality. It is often far easier and cheaper to mass-manufacture an improvement than to provide one in a player sold in small numbers for several thousand dollars. No high-end player to date has convincingly explained the importance of the innovations it contains, and most seem to be critically dependent on relatively cheap mass-manufactured assemblies which can be at best tweaked or adjusted.

What the consumer really needs to know about all this is that a great deal can go wrong in making a CD player, most of which is not apparent as a dramatic malfunction. It is common for defective and poor-sounding CD players to have significant levels of particularly unpleasant digital distortions, but still to have excellent measured frequency response, and low measured harmonic distortion.

"High Tech" versus the Consumer

For all the claims, most of the rapid changes in technology have little practical relevance to making an intelligent purchase. It is impressive to see some of the high technology components being stuffed into the newer CD players, and some may well have useful effects. It is impossible to believe that the audio industry could develop so many different disc drives, laser systems, D/A converters, stabilizers, sampling and oversampling rates, analog and digital filters, optically coupled data links, and power-supply features, and not end up with some real advances.

The problem, however, is that there are so many technical variables in a CD player that it is rarely possible to tie superior or inferior sonic performance to any given technical feature or mix of features. Moreover, simply adding as many high-tech features as possible does not help. CD players are like Christmas trees—over-decoration does not improve the aesthetic result.

**Trying to Brook the Technobabble**

Even if a buyer understands the technology, he or she has no way to use that understanding. No manufacturer has yet made really convincing claims that one form of drive is truly better than another, or that one form of disc loading, or laser tracking, is best. As for tracking capability and error correction, it is clear that important differences exist, but even less useful data are available than on D/A converters. Barring major and obvious defects, the only way to determine how well a machine tracks is to test it with a wide range of musical recordings.

Error correction can be a source of trouble. There is a hierarchy here: first, the player is able to correct the signal error completely (using various digital algorithms); second, if the error is gross, or persists for longer than the holding buffer in the player can cope with, the player goes into "error concealment"; third, if this fails, the player mutes its output until it can pick up the data stream again, on the basis that a burst of silence will be less objectionable than a burst of noise. Error concealment is definitely a source of audible problems. In cases requiring large amounts of error correction—necessitated, for instance, by a grossly defective or too off-center disc—the player attempts to interpolate the value of the missing data from the magnitude of the signal immediately before and after the gap, and such interpolation will only be inaudible if the error or gap in the signal is short, no significant changes are taking place in the music, and the circuit is very well designed. Some players do a much better job with music on problem discs than others. Most advertising literature, however, says virtually nothing about error correction, and no test records exist which measure comparative capability other than on gross, single errors (the graduated dot and standard "fingerprint" discs available from Philips and others).

The most one can say about the correla-
tion between CD technology and sound quality at this point is that there is a reasonable consensus on the part of both reviewers and technical experts in two specific areas. First, most experts agree that machines using oversampling and digital filters, and consequently more gentle analog filters, sound better than those using steep analog filters, which will introduce severe HF phase shift. Unfortunately, some digital filters are better than others, and some units with analog filters sound quite good.

Second, there is a general consensus that machines with two D/A converters sound better than machines with only one. This superiority is logical since a single converter requires the machine to introduce a twelve-microsecond delay in one channel. It should be noted, however, that most machines using a single D/A converter are made more cheaply in virtually every other respect as well, and this raises the question as to whether the problem is a single D/A converter or low overall quality.

Further, some units with dual D/A converters begin to introduce HF noise at levels only 60dB below maximum recorded level, while others remain pure to nearly -80dB. This helps explain why the soft passages in CDs can often sound distorted or vaguely irritating, but consumers have little hope of finding out anything about the performance of a unit's D/A converter in most technical and advertising literature.

Many reviewers used to feel that players using the Philips 14-bit 4-times oversampling process and single-beam lasers sounded better than those using the Sony 16-bit process, but there are more and more exceptions. Many recent Sony-process players are directly competitive with Philips-process units at the same price level. As will be discussed shortly, Philips may also have taken a serious wrong turn in going to its new 16-bit 4-times oversampling process, and three-beam systems are coming on the market which are considerably more accurate than they used to be in tracking the spiral of bumps.

Most of the other claims made regarding technical features really don't seem to impress anyone, including the technical staffs of many of the major importers making such claims about given CD players. In fact, the more you listen to different machines, the more you tend to ignore most CD advertising as little more than hype.

And NOW you can Program Over 320 Selections for a 30-Day Period from a Distance of 400 Miles

Reviewers have also learned to be very cautious about the growing tendency to glamorize compact disc players by adding more and more complicated displays and remote-control features. Many of these features are absolutely useless to most buyers, and they often disguise manufacturer indifference to sound quality.

Some of the best CD players around have no remote control and comparatively limited control features. Many remote controls also do not affect the volume or channel balance—which means you have to get up and adjust your set for each disc regardless of the control. The ergonomics of many of the most complex machines are so bad that you could learn Lotus 1-2-3 in less time than it takes to figure out how to use the special features.

Players which do have variable volume controls also tend to sound notably worse through the variable gain output than they do through the fixed gain output. The reasons in most cases are clear: poor quality components and cheap circuitry. Even when such controls do not degrade the sound, they do not eliminate the need for a preamplifier. It takes a pretty strong indifference to soundstage quality to ignore the lack of a balance control.

If you really want controls, display features, and programming features, by all means buy them. Remember, however, that they come at the direct expense of sound quality since the manufacturer must always make this tradeoff at a given price. It generally pays to invest in sound quality: what

4 I tend to think that the amount of sheer work it has to do is the problem with the single D/A converter (D/As are pushed hard as it is); the 12us delay in the arrival of sound from one channel amounts to about a half inch of speaker placement change; not negligible, but most systems aren't set up as accurately as that. —LA
good are control features if you don’t get maximum pleasure from listening?

The Most Important Feature of Digital is Analog?
As a further irony, the most audible empirical differences which most subjective reviewers find between the technical features of well-made CD players do not emerge in the digital or “high tech” part of the player, but rather in that most humble and mundane of areas: the analog gain stage. While the better-sounding designs differ over the proper amounts of feedback and all the other technical details that preamplifier designers argue over, there is a very clear correlation between high-sound quality and those few companies which have focused heavily on improving the analog stages. All the best players now come from this relative handful of high-end firms.

In practice, this means that you need to buy for the best CD players. Few of these high-end firms have broad distribution, many selling only at a small number of dealers. Further, the players they make have the same kind of sonic differences that exist between good preamps or any other audio electronics, and choosing between CD players is very similar to choosing between preamps. The choice of CD player cannot be based on some mix of technology or arbitrary standard of truth, and has to be based on how well a given player blends into a given system. This means picking a CD player on the basis of extended listening.

Global Economics vs. the CD Player
This advice regarding the need to listen is reinforced by the problems affecting the international audio industry. Most key foreign currencies are rising relative to the dollar, there are far too many manufacturers for the size of the market, and many firms are fighting to survive and preserve their market share by cutting their retail costs in spite of diminishing profits because of the fall in the value of the dollar.

These financial pressures have led many Asian and European firms to cut quality and/or after-sales service. One US audio manufacturer, for example, reports that nearly a third of the machines he receives from Philips for modification have some defect. A major high-volume audio dealer reports getting over 100 defective machines from one of Japan’s most famous audio firms, sending them back, and having the firm declare they were “uneconomic to repair.” Since most of these machines function to the extent of playing music, the consumer and dealer face major problems in knowing when some glitch is present.

However, it is not simply the lower-priced machines which are a source of trouble. Quite a number of the high-priced, audiophile machines have quality-control problems, or exhibit at least minor sonic differences from unit to unit. This is partly the result of the fact that all of these machines are dependent on Philips or a Japanese manufacturer for the mechanism and digital electronics in their player, but it is also a function of the fact that many high-end manufacturers are making circuit changes without making changes in model number, and have quality-control problems of their own. Price is no object in making machines objectionable.

Further, rapid shifts in models, constant in-production changes, and a lack of training mean most warranty stations and many importers simply cannot repair machines quickly or properly. In many cases, they simply lack parts and schematics. This means a steadily growing proportion of CD players that simply cannot or will not be repaired in the real world.

The Importance of Listening and Defensive Buying
The combination of the inability to correlate technical features and sound quality, and of declining quality control, means that the only way to determine which CD players are best and really function properly is to listen. This, however, can present a real problem for the consumer.

Bad machines are easy to deal with. If a compact disc player sounds hard, bright, or irritating in short listening periods you simply should not buy it. The dealer or manufacturer argument that it is the rest of
the system that lacks dynamic range, proper frequency response, etc., is virtually always wrong. The truth is that CD players still fail to provide musically natural sound far more often than associated component systems fail to get the best out of CD players.

You also should take standard defense precautions against a lemon. Never buy any CD player that shows any sign of having been opened before you buy it, except at a very trusted audio dealer. Insist on seeing the machine opened at the store. Look out for any sign of its having been returned by a manufacturer after service (different tape, marks on the box, extra shipper tags, etc.). When it is opened, insist on having it demonstrated in terms of both sound and control features. If anything goes wrong during this test, don’t buy that machine or any of the same model at that store.⁵

The problem is much greater, however, when a CD player sounds good. It is far too easy to prefer one player over another for the wrong reasons if you only listen to a few selections or listen on a strange system. You may find out to your cost that a machine which performs well at a dealer’s on a few compact discs—especially in playing the more unnatural audio spectaculars—sounds less musically realistic than its competitors when auditioned on your home system.

You need extended listening to a wide range of familiar, musically natural CDs to reveal relative performance in the major problem areas that still affect compact disc. These include problems in:

- The soundstage, especially with regard to depth, and the proper balance of left-to-right imaging and centerfill;
- Handling of complex orchestral music and opera;
- Dealing with massed strings;
- Reproducing the bite of loud brass solos, and handling of complex brass passages, without excessive harshness;
- Handling of very soft passages;
- Exaggeration of the upper midrange;
- Providing controlled and extended deep bass;

- Handling voice—particularly in choral music.

Only a relatively few audio dealers can afford to allow extended listening, and equally few can provide loaners, or generous refund and exchange privileges. Finding such dealers and trying a select list of machines is, however, the only way in which you can really be sure of the quality of what you are buying. This is especially true because of the constant turmoil in the industry. New models and claimed improvements in CD technology are arriving far more quickly than anyone can get a review into print.

The only alternative I know of is to hunt out those major retailers who do give generous return, refund, and exchange privileges, and/or to shift the way in which you bargain over sales price and focus on service and refundability. At least some dealers will sweeten the pot with a 30-day refund and/or exchange privilege. Do, however, get any promises in writing, and don’t expect long listening periods, special return and warranty privileges, and a bottom price. Even high-end dealers have to eat.⁶

Shortlisting the Right Players for Listening: Medium Quality to “Best Buy”

This background helps explain why the most any reviewer can do with the cheaper machines is make some generalizations that may help you select the players to put on your “short list” for listening. While any generalizations are dangerous—particularly given some of the reorganizations taking place in the Japanese audio industry—some brands making medium-quality machines have so far been consistently better than others. There are also some high-end machines which are consistently good; a few emerge as outstanding.

This brings me to this issue’s mini-reviews, which can be neatly divided into three groups: the names of the more acceptable manufacturers of medium-quality CD players, a number of specific machines of special interest which don’t quite make it into

⁵ This advice may be rough on dealers, and often will be unfair to a particular manufacturer. However, many problems in CD machines seem to occur not randomly, but as a whole production run, or as the result of design defects. Only a few machines really fall out of the box; most take time to fully reveal their problems.

⁶ But, of course, not eat well!
the top bracket, and a handful of Philips-based 14-bit machines which US and European audio manufacturers have successfully modified, and which now define the practical state of the art.

**The Mass-Market and Medium-Quality “Also Rans”**

I hesitate to identify the better “mid-fi” machines because no one can listen to all the models coming out from different companies, and because of the growing quality-control problems discussed earlier. In talking to other reviewers and to dealers, however, I have found a rough consensus that more or less agrees with my own listening. You are likely to have reasonably good luck with the most current models from Akai, Denon, Magnavox, Marantz, McIntosh, Mitsubishi, NAD, Nakamichi, NEC, Onkyo, Philips, Pioneer, Sony, Technics, and Yamaha.

While a bit of the old CD edge remains in all these machines, only a grinch would claim that they don't provide good sound—and better value than any record player or tape unit at the same price. Note, however, that there is no correlation in this list between price and superior quality. You might just as well go for a cheap Marantz as for an expensive Nakamichi.

**The Special-Interest “Also Rans”**

The “also rans” of special interest are more difficult to characterize. Some are looking back at past but fading champions, and some are top-quality players that are not competitively priced. Some are simply interesting variations on a theme, and a few provide some interesting hints regarding the state of compact disc technology:

**The Adcom GCD-300: $499**

The Adcom is a good contemporary mid-fi CD player with the special benefit of a switchable equalization filter that can be set to smooth out the “CD edge” apparent in many CDs, and to match the overall sound of the player to a given system. It is a pity that the filter switch has to be on the back, but this error in ergonomics isn't Adcom's fault. It is the result of the fact that Japanese manufacturers generally are totally uncooperative with any real effort to modify the CD machines they sell to other manufacturers. This is also why most attempts to modify Japanese-made machines sound worse than modifications of Philips-supplied players.

**Cambridge Audio CD-1: $2500**

One never knows if one is hearing the final version of this elite and nearly total rebuild of the Philips Model 104, even if there ever will be a final version of this player. I should point out, however, that Cambridge is now being imported by Sumiko—one of the best and most demanding importers—and hopefully will now be both consistently reliable and available in the form of a stable and finished product.

The two units I have heard so far avoid the treble edge and upper midrange emphasis of far too many CD players. They have good deep bass. They have excellent overall resolution, and have complex front-panel switchable filter options that allow you to “tune” the player to the sound characteristics of different CDs. The Cambridge also has very good depth, but is a little soft in dynamics.

All in all, the Cambridge is an excellent machine, but at a price of $2500 it is not really competitive in a world where the Discrete Technology, PS Audio, and Sonographe offer virtually equivalent musical realism at a much lower price. It should be noted, however, that Cambridge has announced a totally different machine using 16-bit DACs and 16-times oversampling, and a cheaper CD-2 machine with the same system. This player—when it appears—may be able to eliminate nearly all conventional analog filtering, using purely first-order capacitive rolloff to eliminate any remaining enharmonic nasties above 20kHz.

**Meridian MCD (no longer current)**

The Meridian MCD is now badly dated in...
terms of dynamics and openness. Too many other players have, as the MCD was the first to do, removed the edge and irritation of the early CD players and provided more natural musical detail. If you own one, it is time for a trade-in or a total Mod Squad conversion.

**Meridian Pro and the Mod Squad Conversion (no longer current)**

The treble detail in the Meridian Pro is still excellent, but other machines provide a more musically convincing bass, more lifelike dynamics, and much better soundstaging at a lower price. They also provide more convincing upper midrange timbre and detail.

**Mission DAD7000R (no longer current)**

The sound of the Philips-system Mission 7000R is notably better than the hard and shallow sound characterizing many of the early machines using the Sony process. It is also better than most Philips-process machines which have not been heavily modified. Nevertheless, it is still too thin and light in the lower midrange, and is lighter still in the deep bass. The highs are good, but listening to the Mission DAD7000R is a little like listening to a good small monitor speaker when you want to listen to a full-range system.

The new 16-bit-with-oversampling version of the Mission is more dynamic, with better bass, and a deeper, more open soundstage. Nevertheless, in my opinion the better modifications of the machines using the original Philips 14-bit process are still better-sounding in virtually every respect, the Mission having a touch of the 16-bit sound problems encountered in the Philips CD-650.

**Philips CD-104B (around $300-$400 under the Marantz, Magnavox, and other brand names)**

The Philips CD-104B chassis is sold under many different names—some of which modify the unit and some of which don’t. Stock, it isn’t bad, sounding like a good mid-priced receiver. The bass in the run-of-the-mill Philips players lacks energy and the overall sound is weak in dynamics. The stock players generally have relatively poor depth, some problems in resolving low-level passages, and a bit too much upper midrange.

**Philips “16-Bit”: Price Still Undetermined**

Manufacturers who buy Philips machines and mechanisms have been reporting trouble with the new Philips 16-bit machines for months, and my own trials of a prototype in the US and several Philips 16-bit machines heard in the UK indicate that you should avoid any of them until all the kinks are worked out and it is clear they can compete with the better 14-bit with oversampling machines.

**Mission PCM7000: $999**

The new 16-bit-with-oversampling version of the Mission is more dynamic, with better bass, and a deeper, more open soundstage.
So far there seems to be a broad consensus that even when a Philips 16-bit machine bass working D/A converters—Philips are pushing LSI technology to the limit by trying to integrate two 16-bit DACs capable of operating at 176kHz on to one chip—and all its programming features are working silently, the new machines add low-level distortion to complex musical passages. I found that even the better machines in Philips' new 16-bit line—the Model 360 and above—have slightly more of a CD edge and more long-term listening fatigue than their 14-bit predecessors. Further, while the deep bass and soundstage width and imaging of the new Philips 16-bit machines were superior to the unmodified 14-bit machines, they were decidedly inferior to the bass and soundstage of the better high-end 14-bit Philips machines.

The new 16-bit machines also retain the relatively flimsy drawer mechanism used in all recent Philips machines, and one that can present loading and damping problems. While a Mod Squad or Sumiko damping disc can help, one would have expected more progress in this area.

**Technics SL-P1200: $1000**

The Technics SP-P1200 is one of the few high-end Japanese machines to hit the US. It has all kinds of tracking and programming features—even a pitch control—and a glorious display panel and set of switches. Its $1000 list price is softened by substantial discounting.

The sound is also pretty good, typical of the better (newer) Technics players. The SL-P1200 does well at the frequency extremes, but the upper midrange is exaggerated and a bit hard, and this machine does not do as well with soft passages—particularly on strings and choral music. The soundstage and imaging are better than earlier Japanese machines, but not up to their better US and European competition. The features, though, are great; it is the kind of machine an FM broadcaster would love. ⁸

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**Sony CDP-35, -45, -55: $270-$400**

No one can hope to review all the mid- and low-priced machines using the Sony 16-bit process, but it is important to note that these CD players are now much more listenable than the early generation of Sonys. This is true even of the machines that have a single D/A converter and a "brick wall" analog output filter, and which scarcely represent the height of what can be done with 16-bit sampling.

The single D/A Sony players have softened the upper-midrange hardness problem and improved performance in low-level passages, although these remain relatively poor in comparison with the better machines. They are perfectly suitable for the undemanding rock lover who doesn't care about occasional edge or "spit" in voice. Lovers of classical violin, brass, and natural voice will feel differently, as will jazz fans and the kind of rock fan who likes the 12-inch version or British cut of his or her music.

In contrast, the Sony machines with two D/A converters sound pretty much like the CDP-55. Gordon reviewed them in Vol.9 No.6. They are still too forward, a bit hard in the upper midrange, and constricted in soundstage relative to the better high-end machines using the Philips process. They are, however, notably smoother than the lower end of the Sony line, and the overall clarity is often superior to that of most Philips-process machines. In the best sample I've heard, the resolution of low level passages was superior to that of virtually any Philips machine I've heard. I do have to say, however, that the long-term result with strings can be difficult to listen to unless your system is relatively "soft" in the highs.

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**Sony CD-P552/DA-S702**

I don't know why I had to travel to Britain to get a chance to hear the duo that was Sony's top-of-the-line CD player until this Autumn. Now replaced by the CD-P650/DA-S703 combination reviewed by JGH in Vol.9 No.8, the CD-P552/DA-S702 is important because it showed that Sony can indeed make a very good high-end machine—at least if you like a slightly for-
ward sound with a lot of detail.

In fact, the overall detail in the CD-P552/DA-5702 combination is superior to that of the Sony CD552—the previous champion in this area—and to any other machine I’ve heard, although the soundstage tends to be a bit blurred compared to the best US and European modifications of Philips machines. As for the rest, the Sony does very well with the traditional problem areas: bass, depth, upper midrange, and low-level passages. The bass control is excellent.

Like the Cambridge, this Sony combination, or its replacement, would be on the list of recommended players if it were more widely available and didn’t cost so damn much. At its price, however, you have to pay attention to every weakness, and there are slight faults in the overall sweetness of the sound, in the coherence of the soundstage, and a tendency to handle sharp dynamic contrasts by adding a bit too much life.

Still, this machine(s) shows that the best Sony technology can challenge any Philips-based machine around. One can only hope that its key features become available in Sony’s midpriced machines and in high-end modifications just as soon as possible.

**The Recommended Players**

Now, at last, we come to today’s top picks—choices which will remain eternally valid until the products shown at the January CES actually hit the market, or something else happens. It is striking that all of these picks are modifications of one of the cheapest CD players made by Philips, the Magnavox 2041. This choice, however, is not necessarily the result of any merit on the part of Philips. It is the result of the fact that Philips is at least halfway human in dealing with high-end firms.9

It should also be stressed that the top-ranked machines are scarcely perfect. All had some problems with the loading-drawer mechanism and random faults in the reliability of their programming and switching—although none of these problems were consistent enough to complain about. All also have some problems in sound quality.

What these top-ranked players had in common—and what raised them above the level of the “also rans” just discussed—was:
- A halfway reasonable price;10
- Excellent long-term listenability;
- A consistently musically natural timbre and level of detail;
- Good to excellent dynamic range;
- A good soundstage with good to excellent depth, a wide arc of imaging, and no loss of centerfill;
- Deep, powerful bass;
- Good to excellent resolution without the introduction of unrealistic “extra” information, and consistently good resolution from the softest to the loudest passages.

Given these common strengths, the choice between the top-ranked players is very definitely similar to the choice between good preamps: you should choose the unit that suits your system and taste. After all, the technical differences between the top-ranked players are almost solely in the analog output stage. You are choosing between one designer’s concept of an analog output stage and another’s. The similarity in sound does, however, make prices a very serious consideration. If you can pay $695 for one of the top ranked machines, you should think long and hard over whether any sonic differences you hear in the most expensive machines are worth a difference in dollars that could make a major addition to your CD collection.

**California Audio Laboratories “Tempest”: $1895**

If anyone is still around who hasn’t been reading their back issues of *Stereophile* religiously, the California Audio CD player uses tubes—without overall negative feedback—for all of the analog circuitry. It uses triode class-A tube stages, operating in dual mono, for current-to-voltage conversion rather than IC op-amps. It also uses passive filtering for output-waveform reconstruction within the tube analog sec-

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9 But not all that human. The US audio industry is not filled with praise for the good manners and responsiveness of those they have to deal with in trying to work out OEM arrangements. It is just that most US firms find the Japanese utterly hopeless.

10 If you weren’t born rich, you have no one to blame but yourself!
tion, instead of the active low-pass networks used in other players, and uses passive de-emphasis rather than the active circuits. Further, it uses solid-state devices to monitor and optimize tube life. The internal components are of exceptionally high quality, the player uses oxygen-free linear crystal wire and Tiffany connectors, and has a separate high-performance power supply and transformer for the analog section.

That said, I do not believe the sound of the California Audioreally lives fully up to its price, components, and technology. If you like an old-style tube preamp with warmth—but a certain lack of resolution and detail—you'll like the California Audio. It has nice focus, good depth, and a very realistic overall timbre.

In fact, the California Audio Tempest CD Player just edges into the recommended category, and does so only on the basis of a second and improved sample. The first sample simply lacked sufficient resolution of complex musical passages to be acceptable. The second tended to be too sweet and forgiving, too often presenting a soundstage where the width seemed out of proportion to the depth, and produced some surprise in terms of musical detail that I didn't hear in the same performance on any other player. Further, while it is often lovely on fairly simple music, it never seems to have a fully realistic degree of resolution with massed string or choral music. A tube lover's CD player, but a notch below the following units in overall realism and resolution.1

Discrete Technology LSI Mark II: $1195

I have really been unfair in taking so long to review this unit. It was a breakthrough when it came out, and the only reason I never got around to praising it as such is that word-processing problems "ate" the draft of a previous review. In spite of these delays, however, the Discrete Technology is still quite excellent. In fact, overall sound character of the LSI Mk.II is like a California Audio with all the sweetness, but less loss of detail in complex and demanding musical passages.

The overall timbre is slightly warm, with a very pleasant midrange and upper octave performance, and an exceptionally convincing bass line. The soundstage is like that of the PS Audio—a bit too wide to be real—but is pleasant and convincing. The only problems with the unit were an occasional

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1 Check with California Audio. They have had problems in quality control with the 6DJ8 tube—a real pain in the kazoo for all companies who have used it. The improved model is not perfect, but is much better than the first. If you have real trouble with any aspect of the sound, a new set of tubes may be the answer.
difficulty with really loud and sudden transients (eg, Dafos and Barry Tuckwell's Mozart Horn Concertos), and the fact that other players provided more realistic detail in soft passages and in the upper octaves.

As for features and construction, the Discrete Technology uses the older, more solid CD-104 chassis with the metal drawer. There are two sets of outputs, including a pretty good variable one. The unit comes with its own Distech interconnects, and uses this wiring internally. The power supply is boosted, an analog filter has been added to the digital filter, and the analog gain stage has been extensively modified.

**PS Audio CD-1A: $799**

The PS Audio is still an excellent player, but it now faces very severe competition. Compared with the California Audio, Discrete Technology, and Sonographe, it is a bit thin in the midrange, and the stereo imaging is a bit too wide, with a lack of realistic focus and centerfill. These same characteristics may, however, ideally match many speakers, including such excellent ones as the Quad ESL-63s and Vandersteens.

All this simply reinforces the point that there is no one best CD player, and that the issue is one of matching the player you choose to your system and taste.

**Sonographe SD-1: $695**

The Sonographe is a Conrad-Johnson product which has been put on the market with remarkably little hype about its features or special technology. Its analog stages have, however, been very extensively modified, with the goal of making the player sound as musically realistic as possible. CJ exerts very high quality control over the players it converts, improves their damping, and perform a number of other tweaks, but the key issue here is the analog circuitry.

In spite of this lack of corporate technobabble, the Sonographe is, to my ears, the best CD player to hit the market. There is a slight loss of transient detail and resolution compared to the best competition, but the Sonographe is consistently musical. The depth and imaging is superior to that of any other player to date, and the timbre is exceptionally convincing. The soundstage is a bit wide, but just a hair. The bass and deep bass are very convincing and dynamics are excellent. It is forgiving, not in the sense of masking CD problems, but in that its overall
sound balance is so clearly aimed at musical realism rather than to conform to some technical theory or design concept.

All in all, the Sonographe is a clear "best buy." I am not going to wax at length over the sound of this unit; it is simply musically right. It equals any other CD player I have heard in overall sound quality regardless of price, and outperforms any analog front end you can hope to buy for under $1000. Only the very best analog front ends, and semiprofessional open-reel and digital tape machines, will be consistently superior.

The Tandberg uses zero negative feedback, has its own headphone amplifier and volume control, and is exceptionally well built—rivaling the California Audio Labs in overall construction quality.

The Tandberg 3015A also has a different sound character from the other players in this section. It has the highest resolution of detail at all dynamic levels. It has particularly strong—sometimes slightly overstrong—deep bass. At the same time, it's more two-dimensional and lacking in depth, and the upper octaves are more prominent. The upper midrange is not hard, but it is very much more apparent than in any of the US-made players discussed above. The transient and dynamic response is excellent, and the centerfill and overall imaging is very good.

The Tandberg 3015A will, therefore, be best suited to the audiophile who likes detail and a forward, live sound. At the same time, it is worth noting that the 16-bit prototypes have more depth, and a sweeter upper range. If Tandberg can solve the 16-bit problem, its CD player is likely to be even more competitive than it already is.
All's Well DAT Ends sWell
In broad terms, it is clear that the good news outweighs the bad if you are careful in making your selection, and that you now have some very musical options to listen to. There are also some new machines with excellent reputations that I have not heard—like the Accuphase DP80/DC81, the Meridian 207 Pro—and many more wait in the wings.

You also should not be too troubled if my comments on the inherent distortion and uncertainty in the CD recording and playback chain are unfamiliar. The same chain introduces a great deal of garbage in analog records and tapes. You simply need to be realistic in expecting a fair amount of veiling in any CD you listen to, and a certain amount of unpredictability. The message is not to avoid CD; it is to ignore the advertising hype, listen hard and long before you buy, and match your choice to your system.

In fact, if there is anything about CD that should trouble the street-smart audiophile, it is how soon the new digital audio tape (DAT) machines will hit the market, and in what form and with what reliability. Some people in the industry feel $1000-$1200 machines may be around this spring, and the prototype machines already compete with CD in most respects. Others feel that DAT will reproduce all the problems of compact disc. The fact remains, however, that firms will be showing prototype machines at the January '87 CES meeting in Vegas, and Onkyo has Keith Johnson of Reference Recordings fame acting as a consultant and providing musical material. It seems doubtful that Johnson would be involved if the machines weren't top drawer.

This uncertainty may affect your investment decisions if you are thinking of spending over $1000, and you want record capability. Be aware, however, that it will be at least two years before there is a reasonable selection of DAT tapes available, and about the same time for enough machines to be made to both bring the price down and make OEM units available to high-end companies who will get the most out of the sound. Ah well, wasn't life wonderful when RCA used to try to get us to buy the wrong-sized record, the wrong tape cassette, the wrong form of four-channel sound, and the wrong videodisc format? In those days, you didn't have to worry about any new formats succeeding!

12 The key issues are (a) the protests of Philips and some recording companies against pushing DAT too soon, at a time when CD really isn't doing all that well, and (b) the fact that Sony apparently still has problems in producing the VLSIs necessary—although Technics seems ready to roll.

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THE GREAT STEREOPHILE CARTRIDGE SURVEY
Ken Kessler

This should have had a title like "Budget Cartridges—a Survey," but I nailed that on the head when Audio's annual product roundup arrived. You could count the under-$50 cartridges on two hands and a foot, and the total under $100 wasn't anywhere near as impressive as the quantity available above that price. To make this survey interesting, therefore, we've pushed the limit up to $200—which is more than you'd pay for one of today's more mundane CD players. It looks like soldiering on with analog could grow more and more expensive . . .

Originally, I was asked to whip through 20 cartridges in less time than it takes to run in a Superphon preamp; I managed to convince J A that it would be better if I split the review into smaller, more digestible groups. At last count, I had something like 23 cartridges to examine, the pile growing like Tribbles, so this survey could end up with as many installments as Pam Ewing's dream. I tell you this only to dispel any notion of selectivity; the cartridges reviewed here are the first eight I grabbed, presented in alphabetical order. Next time around, there'll be another eight or ten, again

Stereophile 139
chosen at random.

Every cartridge was auditioned with the AR Legend turntable and arm, a typical mount, I feel, for cartridges costing less than $200. The rest of the chain consisted of Croft or Superphon preamps, Ortofon T5 transformers where appropriate, Monster Interlink Reference A interconnects, Lumley or Beard power amps, the new Monster MI speaker cables, and Celestion SL-600 speakers on Partington stands. All cartridges were set up according to the manufacturer's requirements, using the Allen-headed bolts from Heybrook's cartridge set-up kit. Lateral tracking error was minimized with the Garrott protractor, and VTA was set up by ear. All measurements were taken through Ortofon's excellent TC3000 computer at 20°C ± 1°C; this enabled me to ensure that capacitance and the LF resonance were within the preferred bounds.

Hellish though it may seem, I auditioned every single cartridge with the same LPs; you'd be amazed how quickly you can tire of favorites. The discs included Sheffield Lab's Track Record, Juice Newton's Juice, and the vinyl version of Papa Doo Run Run's California Project. To keep from going mad, I broke up the repetition by listening to whatever review LPs arrived during the sessions. Between the time I started and the time I finished, over 60 other LPs, running from heavy metal to Bessie Smith, were played by these eight transducers.

Oh, and one other thing; I refuse to pick winners. I've learned that just about every cartridge (bar one) can excel in the right system. At these price levels, compromises are inevitable; you don't get near-perfect all-rounders until you start talking Koetsu-Carnegie-Kiseki, et al. To make these reviews of some worth, I've highlighted the overriding strength of each model; the one which best deals with your top priority, be it stunning bass or killer transients, is the one to try first.

Audio Technica AT-F3

The newest cartridge in the group, Audio Technica's AT-F3 moving-coil, aims at low mass and high structural rigidity by virtue

of its solid alloy body and fixed stylus assembly. The company has fitted a square shank, nude, bi-radial stylus of fine polish to an aluminum pipe cantilever, and used LC-OPC cable throughout. Output is low enough to require a step-up device, but it may be worth trying it directly into MM stages of preamps with fairly high gain.

The shape of the cartridge and the confidence-inspiring body made it an easy item to install and mount securely. I'm not of the torque-wrench school of cartridge fitters, but I do realize that the ability to mount cartridges with Charles Atlas force levels appeals to many. VTA adjustment proved critical with this cartridge, and I got the best results when the nose of the cartridge pointed very slightly downward. With the top of the cartridge absolutely parallel to the LP, the sound lost a trace of sparkle.

The overall character of the AT-F3 was joyously neutral, characterized by sweet, nonaggressive treble, open midrange, and the kind of bass performance which will seduce those who find CD-type hammering a bit too much. I found that this cartridge was an ideal choice with systems needing a bit of taming, especially those incorporating slightly bright speakers; I was worried that it wouldn't blend too well with the already smooth SL-600s. As it turned out, the two products worked as beautifully together as Fred and Ginger.

Why? Because the AT-F3's main strength is its superb imaging and soundstaging capability.

One soon learns that the SL-600s are champions when it comes to portraying the spatial characteristics of a musical event. After you've heard what they can do with cost-no-object hardware, you'll judge all lower-priced components heard through them by their capacity for exploiting this virtue. The AT-F3, more so than any other cartridge I tested in this survey, reached the limits of the Celestions' front-to-back depth and image height. There were wider soundstages available, and cartridges which provided more control over the occasionally soggy bass driver, but 3-D fanatics won't even think about that when they hear how this sucker puts everything in its place.

1 I'd like to thank Nigel at Ortofon UK for letting me hold on to the TC3000 computer.
I hate singling out a virtue to characterize a product, but affordable goodies generally attain a certain level of competence overall, reveal a couple of minor failings, and excel in one or two areas. It's the area of exceptional performance which makes the compromise less painful, and helps the customer who knows his or her tastes and sonic priorities to choose one budget item over another. The AT-F3 is the cartridge for the listener who hates harshness and thinks that trompe l'oeil is the highest of art forms.

Denon DL-160: $115

If the Audio Technica is the cartridge of choice for the soundstage lover, then the DL-160 is the choice for people who think of hi-fi in Detroit terminology. “Longer, lower, wider” could have been conceived for this cartridge, which provides a stage as w-i-d-e as t-h-i-c-k, and bass that seems bottomless.

The DL-160 was the first high-output moving coil from this most experienced of MC manufacturers. Its output, at least from the sample I tested, easily exceeded its advertised figure, and never showed any of the signs of strain I usually associate with high-output coils. Sporting the kind of cubist bodywork for which the marque is famous, it also suffers from those long, open slots which make it a bitch to fix securely. Oh, well—that's a small price to pay, because the ergonomics are otherwise impossible to fault. The pins are spaced far enough apart to make fitting the leads a minor chore, the parallel sides make set-up a doddle, and the stripe down the front is a boon for cueing.

Denon fits a nicely polished, solid diamond, elliptical stylus to a dual-construction cantilever; motor generator is Denon's traditional cross-shaped armature with fine-wire suspension system.

I've been using Denons off and on for eight years, and I was overjoyed to hear that this cartridge retained the signature stage width of those longstanding classics, the various 103 models. Less “solid” sounding than its older siblings, the DL-160 is nonetheless a composed performer, ruffled only by exceptionally tough passages which may tax its tracking ability. In the batch of tests I ran, both the California Project and The Track Record had moments which just pushed the cartridge into mild mistracking, but none of the commercial (that is, non-audiophile) releases contained anything quite so threatening. I would imagine that the only listeners who would find this aspect of performance unsatisfactory would be those who listen to a lot of opera, have a penchant for the Kings' Singers, or own a lot of LPs with solo soprano voice on the innermost tracks.

The Denon's other weakness is its top-end roll-off—not a problem with overly bright systems but hardly the recipe for success with a system already smooth in the extreme. When heard through the 600s, or through older tube electronics, the sound was too soft, too lacking in the kind of edges which give upper-register transients their snap. Still, that won't stop lovers of big sound from opting for this otherwise delightful performer.

Goldring Epic: $50

Live and learn: This moving-magnet market leader in the UK budget sector is produced in a different form for US consumption. Knowing that the British penchant for low compliance and highish tracking forces is not shared by most Americans, Goldring has modified the Epic for the States by raising the compliance, lowering the tracking force from 2gm to 1.5gm, increasing the resistance from 450 ohms to 720, and changing the stylus type from a Diasa ellip-
tical to a nude elliptical. The result is a smoother performer with better channel balance and flatter frequency response, justifying its higher price and making the Epic more like some of the OEM variants the company manufactures.

Aside from a change of stylus-holder color from red in the UK to clear in the US, the cartridge is still the same chunky affair beloved of bolt-tighteners; Goldring even supplies the hardware worthy of a BBS wheel. But while the UK version is a cheap-and-cheerful beer-budget special, designed to extract the most from a down-market system, the US version is a much more refined creature, one which will not be well-served in too down-market a package. Think of it as being as unlike the original UK Epic as identically bodied mid-priced Grados are from their cheaper relatives.

While the UK Epic is almost deliberately dull-sounding, to ameliorate the kind of aggravating top one associates with really basic systems, the US model is refined enough to warrant inclusion in systems with a $1500 price tag (turntable/amp/speakers). Tracking ability is excellent, detail is abundant, and coloration is refreshingly low in level. The bottom octaves are virtually identical to its British counterpart, well-controlled and extended without too much damping (which can create a synthetic sound even on acoustic bass). The US Epic, though, trades the recessed mid and dim top for a more upfront sound, ideally suited for the challenge of The Track Record.

If the Epic has a noticeable weakness, it is the compressed soundstage, resulting in less front-to-back depth than the moving-coils in the survey—though it's hardly what I'd call 2D.

With its highish compliance and fairly forgiving nature—the Florence Nightingale trait carried over from the original version—I'd expect the Epic to serve nicely in packages where the tonearm is not of the current "massive girder" variety—some Thorens models with their own arms, for example.

**Linn Basik: $50 (see text)**

I've been dreading this one like a visit to the dentist. If I damn it, I'll be accused in the UK of Linn-bashing—something attributed to me for these many years because I don't own a Sondek. If I say anything good about it, I'm doing a genuine disservice to Stereophile readers. But first, some background.

The Basik is the cartridge which comes "free" when you buy a Linn LV-X arm. Of course, it's not really free, because it's costed in the way you pay for the box which contains your Cocoa Puffs; but that's beside the point. Psychologically speaking, you paid for the arm; the cartridge just happens to be there. But this cartridge is available as a separate purchase, and it is rated by Linn camp followers as the biggest bargain on God's Good Earth. One UK reviewer reckoned—in print—that it blows away Koetsus, while another of the acolytes calls it a "Best Buy."

It is nothing of the sort.

Sourced from Audio Technica in Japan (though the Linnies deem it "British"), the Basik is an undistinguished moving-magnet, neither better nor worse than the cartridge you'd find fitted to a $79 Japanese plasticdek. It bears what looks like a spherical stylus, has average channel balance, average separation, excellent tracking ability, and fairly even frequency response. It is no great shakes.

Sonzically, the Basik yields mediocre imaging, barely discernible front-to-back depth, and midrange punch that will astound those who prefer Dr. Pepper to Poland Spring Water. It is a Cadillac with vinyl roof and opera windows in a world of Mercedes 300Es. It is devoid of subtlety, suitable only for LPs from the likes of Megadeath, Def
Leppard, or Motley Crue. It is harsh, edgy, and unnaturally aggressive. It is crude.

I have sincere doubts about the sonic perception of any retailer or reviewer who can endorse it in any form other than as a freebie with the very fine LV-X tonearm. Those who do so are more concerned with politics than with hi-fi, especially when similar lucre will purchase cartridges from Grado, for example, which will deliver immeasurably more pleasure, more accuracy, and more music. The Linn logo has graced products which have set international standards; I can only judge the Basik cartridge as an aberration, and its adherents as unaware of what constitutes accurate sound reproduction.

Linn K9

Linn K9: $175

This came as a much-welcomed relief after the decidedly unpleasant Basik. Again from Japan, the K9 is housed in a metal bodyshell made, I believe, in Linn's own precision machine shop. It represents Linn's moving-magnet offering in the hotly contested area where moving-magnets rule, but where the least expensive moving-coils first appear. I'm under the impression that it has its roots in the Basik, but if that's true, then the transformation is a real case of turning Hyde into Jekyll. Mass is up, suggesting, perhaps, that the body is more substantial, and the stylus is a well-finished Vital Elliptical. Whatever other changes have been incorporated, the results speak for themselves, with one of the flattest response curves I've measured, only veering noticeably with very mild rolloff above 18kHz, and an overall improvement so drastic that you'd be hard pressed to acknowledge that the two cartridges emanate from the same stable.

The K9 was remarkably neutral and clean, without suffering so much of a spruce-up as to be branded clinical. Of all the moving-magnets in the batch, this one had the lowest tracing noise ("vinyl whoosh"), on a par with the moving-coils, and was the antithesis of the Basik when it came to conveying air and ambience. It was not as open-sounding as the Denon DL-160 or the Audio Technica AT-F3, nor as convincing in portraying three dimensions, but it did yield enough front-to-back depth to avoid the 2D epithet.

Mercifully, the K9 did retain the one aspect of the Basik which many would validly call a virtue, albeit in a far more sensible measure. It is refreshingly lively, slightly forward and exciting, but thankfully not in the way of components which sound exciting in quickie A/B demos designed to hook the customer (who finds out, once the component has been in use for a few hours, that the pizzazz leads to fatigue). Rather, this is the excitement of excellent transient response, bass with ample snap, and instruments and players with body.

Sadly, the Linn K9, like the Basik, is the subject of the kind of worship which recalls Jimmy Swaggart followers or other lobotomized tucbus lekkers. Again, it is not the ultimate purchase its adherents would have you believe. What it is far more honorable, a valid contender in a field including some distinguished MM cartridges and the newer generation of affordable MCs. It can be purchased with the expectation that it will perform admirably in any number of systems, rather than suffer the restriction of having to balance out gross weaknesses: for example, the way a dull cartridge will benefit a bright system (or vice versa). It favors rock music over classical, which may suffer slightly from very minor traces of edginess on strings or piano, but that's less of a restriction than Gramophone readers would have you believe. After all, rock and pop outsell classical worldwide something like 10:1.
**Ortofon X1-MC/X3-MC:**

$75/$140

I've written up these cartridges as a pair because they differ only in body color and stylus profile. It's a textbook example of what a difference a stylus shape makes, and probably the best advertisement ever for the likes of van den Hul, the Garrett Brothers, and others who fit alternatives, as well as inspiring users to move up a grade at stylus replacement time when the range includes various stylus options for a given body type (e.g., Shure, A&R Cambridge, etc.).

The newest cartridges in the Ortofon fold, the X-MCs are the first MCs from this company—who share with Denon the longest history of MC manufacture—to combine low mass and usably high output. This is achieved by virtue of the company's experience in low-mass technology through their long-serving Concord and OM-series moving-magnet ranges. The internal components were selected as much for their low mass as for their performance, and the results are something of a watershed in affordable, universal MC design. As the Cheapskate remarked in Vol.9 No.8, a shame it happened so late in the game . . .

What the cartridges share sonically are sweet, nonaggressive behavior, freedom from vinyl whoosh, and an openness ideal for portrayal of atmosphere and ambience. In some ways, they're almost too polite—they won't spice up a bland system—but that's more of a virtue than a curse. If your system is that colored, you shouldn't have purchased it in the first place.

From there, it's uphill for the X3 and downhill for the X1. Simply replacing the X1's elliptical with the X3's Fine Line produced improvements in channel balance, separation, and tracking ability only slightly short of staggering. The measurements may not paint such a bold picture, but the audible results do.

While the X1 had a hard time coping with
the 'audiophile' recordings’ more vicious passages, the X3 sailed through with ease. The bastardly thwacks on Papa Doo Run Run’s version of “Surfin’ USA” were flabby and underdamped via the X1; the X3 rendered them chest thumpers of the highest order. This was as much a product of the superior bass control as of the speed and recovery. The transient edges of Sheffield Lab’s Track Record were lacking crispness and cut-glass delineation with the X1; the X3 restored absolute definition.

More important—for me, at any rate—was the X3’s vastly more convincing portrayal of space, more precise image placement, and overall superior retrieval of ambience; it really is a marked improvement. This is sad in a way, because the X1 isn’t bad or undistinguished. It’s just that the X3 is so much better.

A word of caution: I was warned by Ortofon’s UK distributor that these cartridges need 15-hour break-in periods. I measured them before and after, and he was absolutely right. (This led me to doing all of my measurements at the end of listening sessions rather than at the start.) Another thing to watch out for is VTA adjustment with the X3; it was as critical as with the Audio Technica AT-F3, and—if set incorrectly—capable of transforming the X3 into a clone of the X1. With this design, incorrect VTA will squash the soundstage and wreak havoc with the uppermost registers, so take care.

For those of you who have a psychotic, unreasonable, irrational fear of record wear, now that we grow closer to the closure of pressing plants, note that the X3 is a much better groove tracer. But I say this with my tongue in cheek, because I sincerely doubt that record wear has been an issue for a decade or more. Do you honestly think that you’ll give more than 300 spins to every LP in your collection? It would take me something like a year of nonstop listening just to play my entire collection once through, and I somehow don’t see myself reaching 2287.

Whatever, the X3 will do justice to systems costing way beyond its price category, while the X1 won’t quite satisfy those desiring utter refinement. As for the transformation wrought by shaving down a minuscule utter refinement. As for the transformation wrought by shaving down a minuscule

**RATA RP40: $100**

When this first arrived, I figured, “Uh-oh—this is a badge-engineered US Epic.” The RATA was one of the first OEM Epics produced by Goldring, but there was no mistake for the UK version with Goldring’s label on the box. Then I looked closely and learned that the mass was higher, the

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**Stereophile**

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compliance lower, and Lord knows what else might have gone on inside. Listening bore this out, and the two have to be regarded as rivals rather than mildly differing clones.

The RATA RP40 behaves so differently that I would have questioned my setting-up abilities, had I not already learned what a marked change could be effected merely by altering the diamond's profile, as with the Ortofons above. If a stylus could work a Pygmalion act, why not mass and compliance?

This time, however, the results were not as clear cut. The RATA both improved on the US Epic and lost out in certain areas, and it means that the tradeoff will have to be more carefully assessed; with X1 vs. X3, it was night and day. First, go back to the Epic review. Add to it a thickening, like cornflour to gravy, and you pretty much find out what the RATA RP40 sounds like in comparison. It isn't veiling per se; rather, it's a case of fattening up the sound, with a balance which tips heavily toward the lower octaves. As you can see, this rolls downward like a drunk falling off a park bench, pushing the upper registers a few rows away from the listener. It does tend to make the RP40 a forgiving cartridge, but not in the way a low-pass filter simply chops off the nasties. What the RP40 does is bury them in the mix.

That aside, the RATA is very good at retrieving detail, and so non-fatiguing as to resemble Huxley's Soma. However, this renders it the polar opposite of, say, the more exciting K9. It does do a much better job with smallscale works, however, the kind of delicate stuff over which the K9 might ride roughshod. These cartridges are thus mutually exclusive—if you like one, you won't like the other. The RATA is harder to match to a system than the more "universal" (US-spec) Epic, but I have a feeling that this cartridge will wow those who don't like sound which grabs them by the throat.

**First Time-out**

Whew! What a chore, this cartridge reviewing... I have on hand cartridges from Shure, Apature, and Mission, more from Ortofon, RATA, and Goldring, and a nasty feeling that even more are on the way. Stay tuned.

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Implicit in every *Stereophile* equipment review is the assumption that the reader is aware of the reviewer's likes and dislikes in both hardware and music. The forgotten factor in audio—the state of the reviewer's listening room—will also have a significant effect on his value judgments. Writers can only hope that the reader can adjust a review's conclusions to allow for his own room and tastes.

Unfortunately, the information to make this possible is very often missing from reviews; in truth, to reiterate it each time would lead to boring, redundant reading. What we are presenting, therefore, in this and the next issue of *Stereophile*, are thumbnail sketches of our reviewers’ musical tastes, the evolution of their systems, and how they manage to extract basically good sound from the rooms they use for serious listening. If, in the past, you’ve been puzzled why your experiences have not tied in with those described in a review, the reasons why should be revealed in the following pages. So, with an acknowledgement to *The Absolute Sound* (who first published such a feature), we start—appropriately enough in this first issue of *Stereophile*'s 25th anniversary year—with the father of subjective reviewing, J. Gordon Holt . . .
J. Gordon Holt

I have two “listening” rooms, one for audio only, the other for video/audio. The audio room, in the basement of my home, is a 19 by 24 by 9-foot rectangular space with a concrete floor, cinderblock walls at front (behind the speakers) and sides, and the fourth wall made of frame and sheet rock. Most of the floor is carpeted and underlined with Ozite, the ceiling is covered with 4-inch fiberglass batting, and the room has been completely treated for standing waves with 62 ASC Tube Traps, ranging from 9” to 16” in diameter.

An 80”-wide sofa is located (as of now—the position varies from time to time) 15 feet from the cinderblock wall behind the loudspeakers, midway between the side walls. All lightweight electronic components—preamps, CD players, PCM-F1 digital recorder, etc.—are on free-standing metal shelves at the left end of the sofa, allowing easy access to the controls from one side and the interconnects from the other. The main (reference-of-the-moment) power amplifiers are located right behind the left end of the sofa, and the turntable is on a stand at the right of the equipment shelving as you face it.

As of now, the “reference” system—all except the PCM-F1 on extended manufacturer loan—consists of an Ortofon MC-2000 cartridge (whose persistent hum problem I finally licked just a few months ago) mounted in a Well-Tempered Arm on a SOTA Star turntable, a Sony CD-P650ESD II/703ES CD player combo, an Audio Research SP-11 preamp, a pair of Threshold SA-1 power amps, and the Sound Lab A-3 full-range electrostatic loudspeakers.

The “video room” is a mini-theater (seating 8) built around a Kloss One-A 6.5-foot projection monitor, with a full five-channel Dolby-surround audio system. The surround decoder is a Fosgate 3601, and the main (front L and front R) channels are reproduced by Watkins WE-1A loudspeakers driven by an Electron Kinetics Eagle 2A. The Fosgate’s internal rear-channel amplifiers drive a pair of the flat, square Technics SB-R100 honeycomb-disc loudspeakers mounted at a 5.5-
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AUDIO MAGAZINE
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AUTUMN, 1984

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foot height toward the ends of the rear wall. A small JBL 18Ti two-way speaker directly under and in front of the projection screen handles the dialog channel from the Fosgate, via one channel of a souped-up Dynaco Stereo 120 power amp. A dbx 120X-DS sub-bass synthesizer fills in below the 40Hz stone wall low-end limit of my old but reliable Pioneer PR-8210 laser disc player.

Because the big screen is best viewed from some distance away, the video “theater” actually occupies two adjoining rooms. The 14-foot wide, 18-foot long living room (8-foot ceiling) houses the seating area, the projection module, LV player, all the audio electronics, and the rear surround speakers. The projection screen and dialog speaker are in the adjoining (via a wide doorway) 14 x 11-foot “dining room.” Both rooms are carpeted over most of the floor areas, but the walls and ceilings are bare. (Additional sound treatment is planned.)

Regarding my taste in sound, I won’t pretend that I worship “accuracy” in sound reproduction because I don’t. (Who knows what the recordings we listen to are really supposed to sound like, anyway?) What we all want, ultimately, is something that sounds “good,” and what sounds good to me is the kind of colorations I hear in a good concert hall at a live performance: a certain amount of richness and warmth, with sweet/soft rather than prominent highs; tremendous detail yet delicacy across the board; deep, powerful low end which clearly individualizes the cycles of a bowed double bass; and enough midrange to project the full power of the cellos and brass instruments which gives a full symphony orchestra its feeling of tremendous power.

I like instruments to sound the way I remember them sounding live, and I am not really all that passionately concerned about imaging or soundstaging (although do not like either to be really bad). I would prefer that instrumental imaging be vague but stable, rather than hear it pinpointed at one location one moment and another the next.

My current audio-room system does the things I want far better than any combination of components I have used previously. Nevertheless, I could do with a somewhat deeper, tighter low end, slightly more headroom (95 to 100dB spl is about all the current system can manage), and a bit more contribution from the 500-2000Hz midrange.

Musically, I am, always have been, and probably always will be, an emotion buff. I like symphonic music, which does not have to be “classical” as long as it stands my hair on end, hypes me, relaxes me, or reduces me to a blubbering wreck.

My favorite composers and kinds of music have changed many times through the years, but I started with Wagner (whose Prelude to Act III of Lobengrin first got me hooked on symphonic music) and have since gone through phases of Tchaikovsky, Mahler, Stravinsky, Tjomkin, Beethoven, Ravel, Bax, both Strauss, Debussy, Copland, Holst, Carpenter (not Charpentier), Newman, Schubert, Hermann, Delius, Prokofiev, Berlioz, Chadwick, Rosza, Franck, Sibelius, Rimsky-Korsakov, North, Elgar, Rorem, Steiner, Rachmaninov, Mussorgsky, Bartok, Liszt, Saint-Saens, Falla, Poulenc, Goldsmith, Honegger, Dvorak, Bliss, Gershwin, Khachaturian, Brahms, Mozart, Rodriguez, Arnold, Schmidt, Shostakovich, and both of the Williamses: John and Ralph Vaughan. Currently, I am heavily into the symphonies of Vaughan Williams and the film scores of Jerry Goldsmith (Explorers, Alien).

I enjoy all early jazz, most “soft” rock, and some pop material, and I despise with a passion all “soul,” modern jazz, punk rock, and gospel hootin’-n-hollerin’. I find Renaissance and earlier music boring; I can enjoy baroque music in small doses; and I find practically all contemporary “serious” music to be precious, pretentious, trendy, and self-indulgent. The only worthwhile symphonic music being written today is for films!

I also think wired music in public places (“audible wallpaper”) is the worst thing that ever happened to music in the Western world—worse, even, than creative mimicking—because it debases our favorite muse, makes a captive audience of us all, and diminishes our ability to enjoy music when we choose to listen to it. (People who would shivel up and blow away if they had nothing to listen to in a restaurant should take a Walkman with them. Those who play ghetto blasters in public places should be sentenced to listen to Pachelbel’s “Canon”
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True linearity has always been the goal of audio designers. The perfect amplifier has been described as “a straight wire with gain”—having no distortion. How close we come is a measure of accuracy—either to the ear, or by standards of measurement. Some critical listeners have always claimed that measurements, no matter how good, are inadequate to define differences they hear between highly regarded designs. The technocrats insist that any differences must be quantifiable, and thus measurable. Now we have a listening test for audible accuracy which reconciles those divergent viewpoints. It is extraordinarily sensitive, does not require instruments, yet satisfies the engineer’s demand for logic. It is the straight wire differential test—the SWDT—a comparison of an amplifier’s output with its input. The ideal amplifier will have no difference; subtracting output from input gives a perfect sonic null. Any difference will be a signal you can hear—the sum total of all audible distortions. The XL-280 has inaudible distortion on this definitive test.

The XL-280 has been designed with the goal of excellinearity—with the purpose of achieving the best possible null—the least audible distortion—using your own loudspeakers. Every aspect of the circuit has been refined to yield the lowest SWDT null. And the perfectionist’s touch has been included—a ‘tweaking’ adjustment for each channel which maximizes the amplifier’s linearity with the chosen loudspeaker. This ‘golden ear’ exclusive can make a barely perceptible improvement—or so small it defies measurement—but the null test’s sensitivity and precision can define it. The XL-280 is factory set for the typical speaker. And you can improve on that for your own loudspeaker if you choose.

Partial technical specifications below provide some particulars. The SWDT test procedure, in the XL-280’s manual, will be sent on request. A Hafler XL-10 Switchbox will be available to facilitate comparative testing, ‘golden ear tweaking’ of the XL-280, and an amplifier A-B test with a straight wire. The latter confirms the accuracy of the XL-280.

Compare this exceptional amplifier on its aural merits. Independent of the test, the ‘tweaking,’ and the specs, its accuracy will command your attention. Hear how it powers the most difficult speakers with ease. Listen to its clarity; its almost limitless power reserves; the separation; the imaging; and the silence in between. And if your lust for power is unquenched, take two. In bridged mono that’s 400 watts each, for the hard to satisfy.

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- Into 2 ohms, per channel: 360 watts
- Into 1 ohm, per channel: 325 watts

*Continuous duty cycle across the audio band. Depending on impedance, time may be thermally limited to several minutes.*

**Frequency Response @ 1 watt into 8 ohms:**
- ± 0.1 dB, 10 Hz to 50 kHz
- ± 3 dB, 0.1 Hz to 500 kHz

**Power Bandwidth:** greater than 100 kHz

**Phase Shift from 20 Hz to 20 kHz:** less than 15 minutes

**Damping Factor:** 300 to 1 kHz: 250 to 10 kHz: 180 to 20 kHz

**Slew Rate:** 10 kHz, 60 volts peak to peak square wave: 75 V/µs

**Rise Time:** 10 kHz, 60 volts peak to peak square wave: 10% to 90%: 0.7 µs

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32,000 times in succession at 95dB with their hands tied behind their backs.)

At the venerable age of 56, my hearing remains in much better shape than my tolerance for bullshit, but details about my acuity are none of your damned business! I am still an avid audiophile, but my patience for mysticism in audio has been wearing very thin of late. I think I feel a hellfire-and-brimstone Editorial coming on.

Excuse me while I get started on it.

Dick Olsher

I suppose that this is Stereophile's version of "up close and personal." Remember the vignettes about star athletes during TV coverage of the 1984 Summer Olympics? I hated those things. Rather than find out how wholesome or hard-working these athletes were, I wanted to see more live coverage. In this case, however, I do agree with JA that putting reviewers under the microscope is essential in helping readers interpret value judgments and make sense of conflicting opinions.

For as long as I can remember, the human voice has carried a special attraction for me. The expressiveness of voice evokes in me a fifth dimension, beyond the ordinary four of pitch, volume, rhythm, and vibrato. It establishes for me a telepathic channel of communication with the performer that eases the flow of emotions. Voice conveys feelings of joy, sorrow, anger, hurt, and comfort more directly, and touches my soul with more impact, than can any other musical instrument. Female voice happens to be a favorite of mine, and dames such as Ella Fitzgerald, Cleo Laine, and Kiri Te Kanawa rank high on my list. Coincidentally, my wife Lesley is an excellent soprano and has certainly influenced my musical tastes—at least to some degree; Motown, darling, is still not my cup of tea. My LP collection is, therefore, weighted heavily toward jazz and folk vocals, choral music, and operatic songs. In addition, master tapes of Lesley, recorded on the Sony PCM-F1, figure in my listening tests. Local concerts of choral ensembles, jazz and chamber-music groups, and an occasional trip to the Santa Fe Opera constitute my routine diet of live music.

Other musical priorities involve chamber music, violin concertos, and some of the classics, especially the music of Sibelius. I'm
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slowly making my way through a pile of recently purchased CDs. Two of my favorites to date, that figure prominently in my listening tests, are Kiri Te Kanawa's *Chants D'Auvergne*, Volume 1 (London 410-004-2), and her *Blue Skies* (London 414-666-2). I should add that, for consistent musical enjoyment, I keep returning to analog; it is like coming up for a breath of air after being submerged in a sea of bits and bytes. Just recently, however, the gap between analog and digital has closed dramatically with the addition of the Moffat CD player to my system (see below).

My listening room is 20 x 20 feet, with a tall vaulted ceiling. Heavy carpeting, drapes, two plush sofas, and a smattering of acoustic foam located behind the speakers, provide the acoustic damping. Speakers, whenever possible, are positioned away from the back and side walls, and are usually toed-in toward the listening position. This arrangement normally provides the best soundstage presentation, with optimal focus and depth characteristics. I find it useful to be able to adjust the position of my listening seat with respect to the back wall, because tonal balance (at least in my room) is affected by rear-wall reflections. The technique I use is somewhat humbling: I get on my knees and search for a sweet spot where the mid-treble balance is to my liking, then move the sofa to that spot. Speaker placements close to the front wall provide for a smoother and more powerful bass response in my room, compared with the "isolationist" placements described above, but at the expense of imaging. The imaging suffers enough with near-wall placements to the point of eliminating them from serious contention.

An idiosyncrasy of my room is a standing-wave reinforcement around 50Hz, which does nothing for speakers with a flulent low end, and is a response anomaly I have learned to deal with when conducting in-room frequency-response measurements.

The System: let me begin with the front end. Any doubts I may have had about the impact of the turntable on sound quality were simply shattered by the substitution of the Sao Win turntable for my old Pink Triangle. There was an amazing improvement in low-end stability, detail, and clarity. Layers of resonant mud were washed away, and bass lines magically firmed up. All of this happened a couple of years ago, yet these events still stick in my mind as some of the most memorable of my audio career. My present reference tonearm is Bill Firebaugh's Well-Tempered Arm. It mates extremely well with the Sao Win table and complements it in terms of focus, stability of image, and wonderful treble transient control.

My love affair with Sao's strain-gauge cartridge finally ended when my fourth sample went sour in a mere nine months; apparently the suspension goes brittle fairly quickly. To appease me Sao sent me his moving-coil cartridge, which is almost as quick as the strain-gauge, but lacks the midrange lushness and stentorian bass of the latter. As compensation, however, the tracking force requirements have been reduced to a mere 1.4 grams from the strain-gauge's bone-crushing 3-4 grams. Within the last six months I've added the Nestorovic Moving-Coil Network to my system as a buffer between the cartridge and the preamp. This device aims to control the ultrasonic resonance common to all moving-coils. These resonances contribute to the bright, etched highs typical of the average 'coil. The benefits with my system are clearly audible, and involve enhanced upper mid and treble smoothness and clarity.

The final link in my phono system is Mike Moffat's Theta-Z preamp. The "Z" designation is my own, and denotes the latest in a long series of modifications. The Theta's phono stage is world-class, excelling in retrieval of low-level detail and dynamic contrasts. Its high-level section, unfortunately, is not as good, and keeps the Theta from competing with the likes of the Audio Research SP-11.

Turning to the digital side, the Sony PCM-F1 sees occasional duty with master-tape playback and recording of local events. My reference CD player is the Moffat Deluxe, Mike's no-hold-barred creation with external power supplies, improved filtering, denoised RF stages, and a host of other goodies. The output from the D/A converter is fed directly to an external tube high-level stage which Mike claims is even superior to that in the SP-11. I hope to review the line-

Stereophile

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stage and the player very soon; they are incredibly good.

For some reason I’m always inundated with power amplifiers. Solid-state amps that I use routinely are the Boulder 500, and more recently the Krell KSA-100 (thanks Dan). Although a little more laid back than the Boulder, the purity and sweetness of the Krell’s upper octaves are far superior and strike me as even better than the Threshold SA-1s. My stable of tube amplifiers includes such classics as the Luxman 3045s, the Michaelson and Austin TVA-10, and the Radford STA-25 Series III. (A pair of the Jadis JA-30s have also just arrived for review.) I usually prefer tubes because of their harmonic rightness and palpable portrayal of midrange textures, but the Krell may change my mind. We’ll see.

Finally, the back end. I’m a fanatic (or obsessive-compulsive as suggested by some speaker manufacturers whose speakers I’ve reviewed) about midrange purity. I’m even willing to forgive some tonal balance aberrations as long as the mids are right. Speakers that distort timbres, have fuzzy textures, obscure transparency, and (God forbid) tamper with the character of voices rank very low in my book. A good speaker must also be capable of properly reproducing the dynamic shadings of music, from soft to loud.

The old Quad ESL excels in precisely these areas and has recently taken up center stage in my listening room. This speaker is a true classic, and JA has suggested that I do a retrospective evaluation of it—something I look forward to very much. Other speakers I use routinely include the Audiostatic ES-240, the KEF R107, and, of course, the Dahlia. The Apogee Calipers have not quite yet made it to Los Alamos, but I hope I can wrest them soon from JA for a quick listen. I’m curious if I can reproduce that same magic I heard at the recent Summer CES.

A few words about cables would seem appropriate. My favorite speaker cable as of now is Brisson’s MIT Music Hose, although I also use the new black and blue Kimber cable. The Music Hose has performed well in a number of diverse systems, and provides the cleanest and most cohesive treble of any speaker cable I’ve heard to date. As far as interconnects are concerned, I’m in the final stages of the fairly comprehensive survey due to appear in the next issue of Stereophile. This review reveals several rather incredible new cables that revolutionize the field. Read it before you buy.

**Sam Tellig**

Tastes in music? Primarily (80%) classical, the rest largely jazz, with an occasional rock album courtesy of the kids. I have over 3000 records and nearly 300 CDs, and I do not play the same discs over and over. My Mozart and Haydn symphony discs get extra wear because I can’t start the day with any music written after 1790.

I average two to three orchestral or chamber concerts a month. Most of the orchestral concerts are at Carnegie Hall; most of the chamber concerts are at local churches, libraries and homes. I go to the opera five or six times a year.

My listening room is almost square, and because of the room layout, sloping ceilings, and position of the windows, I have little flexibility in placing the speakers. They are about two feet out from the back wall and about four feet in from the corners, which means I don’t get terrific bass. The ceiling is low—7 feet 5 inches—which may result in speakers sounding brighter than they otherwise might. I haven’t found any way to compensate other than by using the tonal balance controls on a Quad 34 preamp!

My system at the moment consists of a JVC QL-Y5F turntable (hee-hee) with its own servo-controlled arm, and Shinon Red and Shure Ultra 500 cartridges in Audioquest headshells. The 'table has been carefully set up, and sits on a Target shelf (modified so the JVC will fit). My CD player is a Euphonic Technology-modified Magnavox 1040 (see Vol.9 No.7, p.65); preamp is a Conrad-Johnson PV5; power amplifier, a Conrad-Johnson MV50. (I’ll be writing about the C-J equipment shortly.) FMS Blue connects the CD player to the preamp. Tape deck is a Nakamichi LX3. No tuner. Speakers are Quad ESL-63s in, not on, Arcici stands. (I’ve just written about them, in this issue’s “Cheap-skate” column.) Speaker cable is Kimber’s most expensive stuff, but I have a special fondness for 29c/foot Romex solid-core house wiring—I believe it’s the same stuff.
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Audiofile have long recognized that the best sounding turntables are belt driven, suspended sub-chassis designs. However, these have usually been extremely difficult to set up and expensive. The new Dual CS5000 fulfills the need for a belt drive turntable that is both easy to set up and economical. A combination of a solid block base, belt drive, and suspension make the CS5000 the ideal combination of performance and value.

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Equipment acquisition plans? None. But that could change in an instant.

Musical areas yet to explore? That depends what shows up in the cutout bins at Tower Classical Annex, Berkshire Record Outlet, J&R Jazz Outlet, Rose Records, and for one ruble, forty-five kopecks at the Melodiya shop on Kalinin Prospekt or Nevsky Prospekt (I'm going again in April). Also, what's released on CD that sounds interesting. I'll buy virtually anything if the price is low enough.

Equipment tastes. I have gravitated steadily toward tubes and away from solid-state. I do not mind weak bass, but I can't tolerate screechy highs or instrumental and vocal timbres that don't sound right. After having lived a while with the Conrad-Johnson MV50, I may never be able to live with solid-state again.

I still prefer LPs to CDs, but I like CDs because you don't have to get up and turn over the damned record. This makes them worth the extra cost and possible sonic sacrifice.

Since you're asking for personal preferences, let me put in plugs for the Toshiba T1100 + laptop computer, Word Perfect 4.0 word processor, Laphroaig single-malt scotch, Gruziński Extra (Georgian) Tea (available wherever Russian immigrants can be found), and the Connoisseur Pipe Shop, on West 46th Street, between 5th and 6th Avenues in New York.

Ken Kessler

750-1500 words to describe my all-consuming passion, the venues where I indulge, and a collection of 5000 LPs, 2500 singles, 400 tapes, and 100 CDs? Better I should go to work for Reader's Digest, condensing Don Quixote to a short story . . .

It's easier to tell you what I don't like rather than what I do, for my tastes are embarrassingly catholic (which ain't bad for a Yiddishe bocher brought up in Maine). I listen to everything except classical, opera, New Age, and ethnic music of the Polka/Irish dirge/Hungarian/Chinese/French, etc., variety. Just about everything else resides in my collection, including traditional jazz, blues, funk, rock, soul, C&W, show tunes, disco, boogie, big band, folk, Latin, punk, psychedelia, pop, Dixieland, MOR, AOR, reggae, R&B, surf, ballad, heavy metal, rock-
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ability, crossover jazz, gospel, hip-hop, Cajun, and even comedy. (JA has seen my collection, and can testify to the truth of this description.) If my refusal to listen to music written prior to 1900, or of a cultural background of which I have no comprehension, makes me narrow-minded or uncivilized in your opinion, then all I can say is that the most analytically retentive lowlifes I've ever met—musically speaking—are those who deem any music other than classical to be garbage. Read "Letters" in Hi-Fi News & Record Review for outbursts of a highly illustrative nature. (Conversely, I've never heard a pop- or jazz-only fan insult a classically-oriented buff.)

With all these riches at my command, I must admit that a disproportionate amount of playing time—almost entirely via LP—is allocated to Ella Fitzgerald, Sam and Dave, Juice Newton, Jackie Wilson, Robert Cray, Buddy Holly, Katrina and the Waves, Howard Tate, the Kinks, the Beatles, Aretha Franklin, the Yardbirds, Marshall Crenshaw, the Buffalo Springfield, the Bangles, Mel and Tim, and Squeeze. (Our cats, by the way, are named Ella and Aretha; had they been males, it would have been Sam and Dave.) I feel that the overabundance of artists which I adore precludes any accusations of my having limited tastes.

1 "Fraid I have Ken; the operative vilifying adjective is "intellectual." Only in America. —Copy Editor

(Note: My first-ever purchase, made at 11, was "Da Doo Ron Ron" by the Crystals. If that ain't a precocious show of good taste, then I don't know what is. I knew all the lyrics to the Gigi soundtrack and three of Mickey Katz's Capitol LPs by age 7, as well as the names of Glenn Miller's backing musicians. Thanks, Dad.)

I don't get to as many "name" concerts as I'd like, but the local wine bar has a terrific run of live bands, and there's a busker's haven just outside the HFN/RR offices—though the clarinetist with the ghetto blaster and the old guy with the homemade upright bass are getting on my nerves.

Part II of JA's brief called for the description of my listening room. He knows I use three—one each for budget gear, mid-priced, and exotic—so shouldn't I get 3000 words? Whatever, each has a permanent system, into which review items are substituted; some items suit more than one room/system, and I try to audition gear in at least two setups to rule out synergy problems.

Room C, 13 x 11.5 ft., is the "real world" room, where I review budget equipment, in which the total price of the system (using one source) wouldn't exceed $1500. That equals £1000, which is about what the British consider to be the uppermost limit before you need to seek serious psychiatric assistance or suffer higher taxation. The permanent system consists of a Thorens
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TD-147 turntable, Denon DL103 cartridge, Marantz PM4 integrated amplifier, and Goodmans LS3/5A speakers on Partington stands, connected with Monster Cable. Total cost is just under the £1000 mark, and it's ideal for auditioning speakers up to £250 per pair, cartridges below £50, amps under £400, etc.

I call it my "real world" room because it's set up like the vast majority of rooms in normal homes, as opposed to the other two rooms I use, which make no concessions to domesticity. There's a TV in between the speakers, a large sofa and chair, coffee table, walls lined with books, cat basket, ad infinitum. It tells me more about affordable gear's performance than any bespoke hi-fi salon's demo room ever could, because most people install systems in similar conditions. I do about 10-15% of my listening here, depending on the products. I should add that, unlike most "normal" installations, the system is set up with all the care a hi-fi loony can lavish, the speakers positioned for performance rather than aesthetics. The "hot seat" places the listener's ears about nine feet from each speaker. The main limitations of the system are maximum level, which doesn't interest me in the least, and bass extension, the need of which I can satisfy elsewhere. What the LS3/5As do, especially with the PM4's sweet class-A power, is provide pinpoint imaging and soundstage worthy of the very best, and reproduction of vocals that speaks volumes for the BBC mavens who approved the design. If all the other goodies to which I have access were to vanish, I could live quite happily with this set-up.

Room B is the mid-market room, and the only reason I have use of this 14 x 11.5-ft. room—one day to be our dining room—for hi-fi only purposes is the current state of chaos in the Kessler household: we're midway toward total redecoration, and I'll lose access to Room B in mid-1987. My current reference system for reviewing packages costing above £1000 but below the level for audition in Room A (see below) consists of the AR Legend turntable/arm, myriad cartridges, Croft Micro Preamp, Beard and/or Lumley mono tube amps, and Celestion SL600 speakers. The system rarely stays untouched for more than a week at a time, as this system best suits the bulk of the products I review. Typical substitutions would include integrated amps above £400 or cartridges over £50.

The room is nicely sized—ears are 10 feet from the speakers when in the "hot seat"—and laid out, but hardly "normal," as the non hi-fi contents consist only of bookcases, a near-defunct upright piano, and piles of hi-fi equipment about to be reviewed. The room is very slightly on the live side, but superb for assessing bass response (it suffers no problems in this area). I'll hate to give it up—unless one of you can recommend a truly collapsible dining table and chairs which don't look like folding stuff when in use. Like the system in Room C, imaging is delightful, and nasties are kept at bay, but bass performance and headroom are of a whole class or two beyond. While the sound is not even within spitting distance of the absolute state of the art, it is representative of very serious hi-fi reproduction, and needs only a ludicrously, disproportionately expensive front end for major upgrading. But that's reserved for Room A.

Room A is my pride and joy, home of the killer stuff, but usable only for assessing sources and preamps. Why can't I review speakers and power amps in Room A? Because I use Apogee Scintillas, and I sure as hell am not moving them in and out of that room to make space for other speakers. Should the day come when I have to review speakers "too good" for the system in Room B, I'll change the components there rather than shift the Scintillas. They also rule out assessing most power amplifiers because of their 1-ohm impedance. In the two years (as of this month) I've been using them, I've only been able to test in fairness a half-dozen amps through the Scintillas. As I write, a pair of Krell KMA-100s has pride of place, and I can think of no other amplifiers I'd rather use.

The other permanent components consist of an Oracle Delphi somewhere between Mk.I and Mk.II status (with high-capacity power supply courtesy of JA and his electronic components box), Sumiko Premier FT3 tonearm, and Koetsu Rosewood
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Signature cartridge, connected via Audio Research cable to a heavily tweaked Counterpoint SA7 preamp. JA turbo'd the beast, and it is—despite the noise and microphony—about as good as I'm gonna get until I can afford my dream of an SP-11. The SA7 drives the Krells via Monster M1000, and the Krells drive the Apogees through Siltech. Again, the system is rarely undisturbed for more than a week at a stretch, especially as I do all of my cable and preamp testing there; I use Room A for all of my "pleasure" listening, and about 50% of my LP review listening.

The room is surprisingly neutral—JA could only identify a slight bass boom at stage left—but small; I definitely sit in the near-field, with my eyes 7.5 feet from the center of each speaker. Still, it works, and I have had second, third, and fourth opinions from Apogee experts to confirm the quality of the installation. (A certain Stereophile contributor who visited didn't appear to like it, but he can go pound sand up his ass.)

This little oasis of mine is such that I hate leaving it, whether to go to work, eat my meals, or succumb to biological dictates. The system is optimized for my preferences, especially for portrayal of ambience, three-dimensionality, and uncveled midrange, with listener fatigue absolutely eliminated. This is of prime importance to me as a full-time reviewer, as I often have six- or eight-hour sessions, usually listening 30 or 40 hours per week, and have a dread of migraines. If the sound is to be criticized, it would have to be the slightly over-rich bass. Having heard some of the finest systems on the planet—including those of Dave Wilson, Harry Pearson, Arnie Nudell, Jason Bloom, Harvey Rosenberg, Dan D'Agostino, and Bill Johnson—I can sleep easy knowing that what I hear when I review a product is "world-class." I say this not to name-drop, but to reference this system against known examples of the very best. I didn't design or build the components; all I did was put them in the same room. Again, JA has heard the system at various times and in various forms, and it was deemed by him when he was my editor at HFN/RR as good enough to support my findings in reviews. If there's any sense of the defensive here, it's only because—on this side of the pond—such a reference system is still considered by many as unworthy because of the lack of a Linn LP12. Of such people, I can only feel sad that their politics have prevented them from expanding their horizons.

Fortunately, Rooms A and B overlap enough that I can try high-end components in two different environments; few would argue that the Celestion SL600s aren't worthy of whatever you feed them, and I don't feel hindered at all in using them to assess amps not up to the needs of the Scintillas. Both rooms needed nothing in the way of modification; I selected components which suited the rooms rather than opt for environmental surgery, and learned quite quickly that careful selection of cables is a far simpler way of fine-tuning a system than hiring an architect with a degree in acoustics.

For the record, the most important components in my possession—my ears—are tested regularly. The last examination, in September 1986, was conducted at the local hospital; unfortunately, they only test what the law requires, that is, enough to distinguish human voices (200Hz-8kHz). My results revealed hearing flat throughout this region within ±1.5dB, with a slight dip at 2kHz and a slight peak at about 3kHz; channel balance was within 1dB. The tester, a 19-year-old female, said that my results were better than hers, though I reckon she could hear beyond my limit of 16.5kHz. By the way, my charts were better than any of the speakers in the latest edition of Hi-Fi Choice: Loudspeakers, including Quad ESL-63s, so any complaints about my reviews should be based on bow I use the tools to hand, rather than the tools themselves.

The only things which would enhance my listening pleasure would be some ASC Tube Traps, a room measuring 30 x 40 feet, no neighbors within earshot, an SP-11, Air-Tangent tonearm, and an Oracle Premier. Other than that, I'm pretty much glutton on hi-fi, and look forward to the day when I no longer have to regard hi-fi with the ear of a critic. As I write, I have 21 cartridges, a tonearm, four types of cable, three integrated amplifiers, three CD players, two preamps, two power amps, two sets of
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headphones, and 19 LPs to review. I’m beyond being overwhelmed by the tasks at hand, and beyond the annoyance of having my home commandeered as someone else’s warehouse or as a rest-stop for roving manufacturers. I’m past the anguish of listening, not for pleasure, but for work. But at least once a session, I take out something I want to hear, and play it on components about which I don’t have to write—just to remind myself how I got into this business in the first place.

Christopher Breunig
At school, visits to afternoon orchestral concerts provided a means of avoiding rugby football: my interest in serious music started there. I also used to enjoy reading music criticism and, as an articled pupil learning architecture in a small office, I was lucky enough to work under someone able to point me in the direction of import and broadcast pieces: Liszt’s Sonata, the Brahms D-minor Concerto, Walton’s Symphony, and so on. The radio satisfied a hunger for music, and I enjoyed the pianoforte repertoire especially. My first LPs (acquired in 1956) were Arrau in Beethoven’s 4th Concerto, the earlier Philharmonia/Klemperer “Eroica,” and Gieseking in Opp. 109/110. Even now, when I keep between 7000 and 8000 records, one-quarter of these are of Beethoven.

Having persuaded a provincial newspaper editor he needed record reviews, my journalistic career began in 1963, finally replacing my work as an architect as of last year. Now Music Editor of Hi-Fi News & Record Review, I feel like a child in a toyshop as the new issues flood in for review! My interests have thereby expanded a little into early music and obscure releases, though I remain faithful to the 19th century/mid-20th century orchestral repertoire, with Bartok, Mahler, Brahms, Ravel, and Stravinsky as favorites—Lutoslawski remains a problem, however! I am not a lover of opera or vocal works or, among English composers, Delius. I relish a label spotted on a Delius album in a London dealer’s: “music to fall asleep to.”

Equally, I remain faithful to the old Quad Electrostatic. My first pair was acquired in 1963 and, as they are no longer in production but sell at foolish prices, I bought some almost-mint replacements for $355 a few months back. They sound best with all the hessian and felt stripped out, on spiked stands. (I use nylon-dipped heavy welded-steel stands, 15” high, with shot-dust grade lead column fill—by Foundation Audio). The listening room is at garden level in a late 1800’s home bordering London’s
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Hampstead region; like most old properties, it was built without damp-coursing. Consequently, the walls are lined with a proprietary bitumenised corrugated lathing with an average 1" of vermiculite plaster. Besides considerable thermal benefits, this also helps the sound. Rumor has it the old wooden floor was replaced with 18" solid concrete. Put your ear on the carpet and the subterranean rumble of the London Underground system can be clearly discerned!

Floor-to-ceiling height is 9 feet, and absorbent surfaces include the bay-window curtaining, a three-seat sofa, and a large chair. My listening spot is fairly close, and the speakers are set on the long axis of the room (21 feet into the bay). The alcoves are shelved for record-storage. The equipment comprises Linn LP12/Well-Tempered Arm/van den Hul MC One cartridge; Meridian MC-PRO CD player; DNM Series 3 solid-state preamplifier; and a six-year-old Naim 250 power amplifier. This is a remnant from a Linn/Naim system (ESLs excepted), which started as a 12S/160 combination, with Grace 707/Supex 901 on the first of three or four LP12 decks I have owned. The current one has a RATA subchassis and armboard; a conversion I'll be reviewing in the next issue of *Stereophile*.

I've done a lot of cable experimentation, and electronics and players all stand on RATA Torlyte isolation boards, or stands. Mains plugs are Inca Tech gold-plated (available through *Hi-Fi News*, in standard US sizes, may I say?), with most fuses hard-wired where safe. I don't use an FM tuner or cassette deck nowadays—and I don't really get on with Compact Disc. Since I began reviewing these, I've only amassed around 120; recently a couple of Deccas almost fooled me into thinking they were more listenable than their equivalent LP pressings!

Perhaps the most interesting item here is Denis Morecroft's preamp. He first "appeared" as a supplier of improved-performance power-supply units for the Naim range (much to their annoyance); recently his researches into thin single-strand interconnects and speaker cables—both now marketed in the UK by DNM—and split-foil capacitors have provoked attention. His units are essentially minimalist: the 3A preamp with full power supply complement costs no more than the Conrad-Johnson PV5 in the UK. It offers separate gain controls for each channel (marvellous—eh, JA?), function selector, and tape-monitor only. The cases, unusually, are in black Perspex to minimize magnetic field effects.

I am excited at the prospect of his matching power amp, just coming into production. Built to the uncompromising DNM standards, yet to retail at only $850, it should be in demand in the UK (there is no US distribution at present), for the prototype has exceptional resolution and a magical "liquidity" of presentation. It's a two-box design, compact, with separate PSU. Morecroft's rigorous pursuit of true star-earthing and component quality leads to solid-state designs well suited to the typical UK listening environment, where lucidity and focus are perhaps more realistic goals than scale and power output.

Products I have enjoyed in the past include the Zeta tonearm, van den Hul's monocrystal cables, and the Garrett-modified Decca "London" cartridges. (I often wonder just how my pre-transistor system could be made to sound today: ESLs, Quad II/22, Garrard 301 with Worden articulated tonearm, ADC 10E/IV.) Accessories in everyday use are the Mod-Squad CD damper disc, the Audio Technica electronic stylus cleaner, and Discwasher SC2 fluid. I also like the "cleaning up" effect a cartridge demagnetizer gives.

As the system gets more and more listenable, so one's music appreciation widens. I have noted this particularly with contemporary music, Second Viennese School or whatever, and with opera, or music, say, for solo violin. (It took Zeffirelli's *Otello* to take me one step beyond the Verdi *Requiem*!)

If the Editor is agreeable, I'll set out the arguments for single-core interconnects during 1987.

**John Atkinson**

My listening environment has been subject to considerable change in the last year, what with the traveling on behalf of *Stereophile* and rather more changes of address than I would have liked. The fundamentals have remained unchanged, however, hopefully
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leading to a continuity in my value judgments.

But before I list the constituents of my peripatetic system, I had better tell you what I value most in sound reproduction. There are three aspects of live sound that must be reproduced in my system for me not to become impatient. For JGH, the midrange must be right; AHC apparently

considers transparency and low-bass extension to be paramount; as for me, the first thing I need is for a system to reproduce the true sense of "space" encoded within the grooves. Not for me the amorphous, vaguely focused imagery typical of so many speakers; I want a stable image with impressive depth, realistic ambience, and the ability to replace the end wall of my listening room with the recorded acoustic. This is not to say that I don't want the other aspects of performance to be as good as possible, but I must have that space. Wall-placed speakers inherently throw away this ability, which is why I have resisted their temptations.

I also want, for the want of a better word, the "thunder." When you go to a live concert, the low frequencies can be frightening—your chest tightens, your involuntary muscle system prepares your body for flight—bass becomes a physical experience. To reproduce this "thunder" from a hi-fi system is not just a matter of low-frequency extension, it involves speed as well as weight. I'm talking midrange clarity, a lack

of upper-bass garbage, and overall low-frequency transparency. A loudspeaker lacking in these facets of reproduction can have an output down to DC for all I care; its bass sound will be a soggy, puddingy noise. One truly excellent in these areas can compensate for lack of bass extension. This is something Linn speakers have always done well; unfortunately, it was the only thing they did well, in my opinion.

Finally, I'm a big fan of the ability of hi-fi equipment to "play tunes," by which I mean that notes are given their true pitch and time values, that no notes are forced by the equipment's resonant or response problems to stand out more than any other. The major improvement in hi-fi reproduction in the last decade or so, in my opinion, lies in this area, as the ubiquitously sizzly soft-dome tweeter has been ousted by more civilized designs. And planar speakers have always scored well in this area, something that I used to love from the original Quad.

The system that has followed me around, therefore, has been chosen because of its quality in these three areas. My preamplifier
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is an Audio Research SP-10, recently updated to the latest spec. This preamp I feel to be more true to the spatial information on a record than any other I have heard; it also has a generous, admittedly less than neutral, bass performance which complements my preferred speakers. Power amplifier has been until recently a Krell KSA-50, bought some years back with money originally earmarked for a downpayment on a car. I am presently auditioning the awesome KSA-100 which, like all of Dan D'Agostino's amplifiers, is a fearsome beast capable of getting the best from loudspeakers in terms of dynamics and transparency.

Which brings me to my preferred speakers: given my druthers, I would have Apogee Scintillas, the most musically satisfying speakers I have ever used. As my disposable income doesn't run to such luxury, however, I have been content to stick with Celestion SL600s. Holographic imagery when the speakers are away from early-reflection-inducing room boundaries, a relatively uncolored midrange, and one of the sweetest dome tweeter trebles around, go a long way to putting this speaker up there on my list of all-time favorites. The clincher is that on good stands—the British Foundation Pi are the best, but at present I am using the more transportable Heybrooks—spiked to the floor and kicked along by a Krell-type amplifier, the SL600s deliver the requisite degree of thunder. Admittedly there is not much extension below 50Hz, but the lack of boom, the tightness of the upper bass/lower midrange, and the realistic bass tonality from double bass, drums, and Fender bass, all make the adrenalin flow. Of course, the illusion is shattered when I put on an organ music recording—the speakers just can't reproduce organ pedals at high levels with any kind of low-frequency verisimilitude—but I'm happy to live with that compromise. In my current room, the Celestion's slightly depressed high end is more obvious than in the lighter-backgrounded rooms I have used in the past, but not to the point where I feel that musical detail is lost. I have always liked the sound of Quad ESL-63s when driven by a good amplifier, maybe I'll try a pair. Certainly I am going to try out in my current room the Apogee Calipers I reviewed a couple of issues ago.

Regarding levels, I regard artificial limiting of dynamic range as anathema—I listen between 95 and 100dBa when "serious"—and take the matter of neighbors complains into consideration when choosing somewhere to live.

Front end has been based on a Linn for nine years now; yes, I know the upper bass is less transparent than it should be, but this deck—when properly set up—delivers more music than any other I have heard. I've tried clamps and different mats over the years, but have always returned to the original felt mat. The biggest improvement in recent months came from placing the Linn on a RATA Torlyte stand. Space, thunder, and tunes—I got more of my favorite flavors! I used an Ittok for a long while; aware of its liveliness in the treble, I was not satisfied enough with supposedly better arms to replace it until I heard the SME V. With the exception of a particularly fine Apogee Asak, the cartridge of choice has been one of the Koetsus for about five years, following a torrid affair with Dynavector Ruby Karats. Two Koetsu Blacks, then a Red, got worn out in the service of music. Now on my second Red, I find the balance of warm midrange, meaty bass, and transparent top tickles my funny bone.

Other sources? I have built up a collection of about 250 CDs since the medium's launch nearly four years ago, and with most of my 2500 LPs packed away in storage, CD has been bearing the brunt of my recent classical listening needs—much of the time succeeding musically. Partly this is due to the players in recent use, the California Audio Labs Tempest and Meridian Pro, but the discs have definitely been getting better.

When it comes to radio, however, the quality of FM in the New Mexico area is so bad that a good tuner is an irrelevance. In the days when I lived within reach of quality broadcasting, a Quad FM4 and a Marantz ST-7—the last great analog tuner—gave the right balance between musical quality and

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2 I believe in reviewers buying hi-fi equipment for their permanent systems; that way, they can be free to point out the warts of gear they love without worrying about upsetting anyone—or having to send it back.

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the ability to snatch signals from the ether.

Tape used to mean open-reel and live recording, rather than cassette—I own Revox A77 and G36 machines for serious business and a TEAC 2340 with simul-sync for such inanities as recording Rachmaninov's Vocalise arranged for treble recorder, four electric guitars, and bass guitar, all overdubbed. Sadly, all three decks are at present in storage. Cassette is purely a convenience medium, for car and Walkman use only. I am not a videophile, but I do like quality TV—I use a NAD MR20 monitor with built-in stereo decoder, an AMP-01 solid-state preamp (the version with LT1037's and fully-loaded power supply), and Robertson 4010 power amplifier driving a pair of DO's excellent Mk.II Dahlias, which use the West German MB titanium-dome tweeter (until my LS3/5As arrive). (The FM4 also resides in this system.) What is important is not to have the TV in the same room as your serious music system—that way lies disaster, both when it comes to the reproduction of space and of tunes.

As for the minutiae of the system, I can vouch for the abilities of Siltech interconnect, the new Monster M1 speaker cable, Tube Traps, TipToes, WBT phono plugs, Goldring stylus cleaner, Mission Isoplat, and the Decca carbon-fiber record brush. You note that, with the exception of the latter, there are no record-cleaning salves and unguenets listed: in my opinion, all the fancy gunk just moves the rubbish around without removing it; the stylus does the best job in keeping the playing areas of the grooves clean.

But what about the room? The latest is a weird-shaped, adobe-walled space, with longest dimension around 27 feet, a 10-13-foot wooden-beamed ceiling, and a minimum of parallel surfaces facing each other. This should lead to a freedom from standing waves, but a thick carpet, rugs on the walls, and Tube Traps were all eventually required to create an evenly decaying room sound. This is very much a work in progress, which is why you haven't seen any equipment reviews from me in the pages of Stereophile for a couple of issues, but the room does hold great promise.

The fact that I have left my musical taste until last doesn't mean that I hold hardware to be more important; the opposite is the case. As befits an ex-professional musician who would play any kind of music if a cheque was to be found waiting at the end, my tastes are catholic, encompassing rock, soul, and classical, with an emphasis on Paul Simon, Aretha Franklin, Van Morrison, white '60s American rock, and good disco on the one hand, and Bach, Brahms (chamber), Beethoven, Mozart, Sibelius, and Mahler on the other. I have a particular passion for music from the continuing school of English excellence—Elgar, Delius, Finzi, Vaughan Williams, Britten, and Tippett—and I am intrigued by Percy Grainger.

An early infatuation with the baroque led paradoxically both to an appreciation of Irish traditional music, where the rules for ornamentation are as complex and as strict as those for "serious" music, and to a fondness for American music from the golden age: the music of Irving Berlin, the Gershwin brothers, Rodgers & Hart, Cole Porter, and Harold Arlen. To hear Ella Fitzgerald, Frank Sinatra, or Fred Astaire—but not Mel Torme, Night Court fans notwithstanding—caress the lyrics of "Small Hotel," "Nancy," or "All the things you are" is to witness high vocal art, very different from the powerhouse techniques of operatic singers, but equally complex in the hands of a master like Ella. The piano is an increasing fascination, but notable areas I have yet to explore are opera, jazz, and the classical human voice. I suspect that life may be too short.

Once an inveterate concert-goer, live music has always been very important to me, in some ways more than recorded, and I am sad that the pressures of joining the Stereophile team has temporarily lessened my orchestral concert-going, particularly when it comes to the Romantic repertoire. While hi-fi can be extremely fulfilling for rock (ie, artificially recorded) music, I have to admit that large-scale classical music does not work as well on record for me as it does live. Once you have heard something like Mahler's 8th in the concert hall, records just don't make it.

In Vol.10 No.2, rooms from LA & AHC to DS & BS.
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It is interesting to speculate whether, had they lived longer, Bruno Walter and Otto Klemperer might have been persuaded to attempt complete Mahler cycles (Walter left two versions of Symphonies 1 and 9, three of Das Lied von der Erde, one each of 2, 4, and 5; Klemperer recorded two versions of the Resurrection—three if you count the live Amsterdam version with Ferrier—and of Das Lied, and one each of 4, 7, and 9). As it is, Leonard Bernstein (followed by Kubelik) was the first conductor to record all the symphonies with a single orchestra, and is now starting a fresh cycle for Deutsche Grammophon with three orchestras associated with the composer: the New York Philharmonic, the Vienna Philharmonic, and the Amsterdam Concertgebouw.

His televised performances with the VPO, from the '70s, did not find their way onto disc (unlike the Tel Aviv Das Lied, and the Ely Cathedral Resurrection). More recently, Bernstein said he sees as the essence of the Mahler’s music “not the overblown, over-harmonized chorale music, or the over-contrapuntal academic fugues, but the stunning quietude and sparseness, of Mahler in his maturity.” These are the most memorable qualities of his reading in the finale of the Ninth Symphony, taken from live performances at the Concertgebouw in May and June ‘85 (2 LPs: DG 419 209-1, 2 DCs: 419 209-2).

Mahler was deeply superstitious about allocating the number nine; he did not live to hear the first performance, given in Vienna in 1912, under Bruno Walter.
The work was the subject of one of Bernstein's 1973 Norton Lectures, he saw in it a symbolic farewell both to tonality, and to Europe as Mahler knew it—prophetic of the disasters to especially bewail its Jewish populations. Klemperer, too, left a description in a program note for his New Philharmonia concert performances of 1967 (which led to a memorable recording, by EMI). His words have just been reprinted in a collection (Klemperer on Music, Toccata Press, London WC2E9JY). He wrote that the finale brought solution to the work: "no more irony, sarcasm, or resentment. Only the majesty of death." Bernstein took a different view: "There are no solutions. Between the surges of prayer there is intermittently a sudden coolness, a wide-spaced transparency, like an icy burning—a Zen-like immobility of pure meditation."

In their recordings, other conductors, Giulini and Bruno Walter, have suggested "solutions." With a very different response to tempo, Klemperer conveyed the full irony and the intricacy of the Rondo Burleske, the third movement which Mahler headed "To my dear brothers in Apollo"—his unloved colleagues. In this movement Mahler wrote a double fugue, the rush sweeping aside a preview of the final Adagio. It seems to me that Bernstein's driving speed at the beginning dilutes this irony somewhat, and it is not surprising to find that his previous NY recording (CBS) has a slower tempo. The problem there was that the subsequent pages then sounded almost jubilantly affirmative. No other conductor has so pointed up the similarities with the "hooves scudding" episode in Das Lied von der Erde's "Von der Schönheit." No other conductor has given us quite the blackness as oboe (twice) and muted trumpet introduce the consolatory motif, only to be swept along in Mahler's crazily jostling Allegro assai, as Bernstein does here. And the Concertgebouw Orchestra's virtuosity in the final Presto is stunning. Textural clarity is remarkable. At precisely the same speed, Karajan, in his Berlin studio Ninth, created just a blur: it is as if no-one there really understood this music, or what to aim for.

The slides into the chasms of the first movement, the etiolated expressions of pain accepted in the finale—not to mention the force and ambiguity with which Bernstein gets the strings to dig into their accented eighth-notes at the Pesante marking, page 5 (hope? despair?)—these resonate in the memory.

The only "respite" in this symphony without consolation comes in the second movement. Even here, in the sequence of Austrian dances (and Klemperer wrote of the third: "they rage as if driven by evil spirits, calling it joy, and calling it song," quoting Goethe's Faust), you may experience a lip-biting feeling that Mahler was distancing himself from the superficially earthy cast of the notes. Bernstein had added 1m 36s to his NY timing for the whole movement; that earlier version was seriously undercharacterized, the opening Landler taken at too smart a clip. Now it is easy to visualize the horse-and-carriage street life of Vienna, the horns' whooping and trilling perhaps from those distant barracks.

The sound produced by DG is exceptionally analytical and dry, but extremely lacking in both scale and integration. And yet the orchestration is laid bare in a very telling way: tremendous weight to the timpani, brass rasps rude, harp pulses in the first movement sinister in the extreme. The Klemperer view is a complementary one, but, more than any rival version Bernstein's strikes me as the most complete. It not so much "searches" as "defines" the Ninth, in much the same way that Klemperer, on records, defined Beethoven's Missa Solemnis.

Unquestionably, this set preserves the atmosphere of a very remarkable musical event. I wish I could say the same for Bernstein's new version of Mahler's Seventh Symphony (2 LPs: DG 419 211-1, 2 CDs: 419 211-2). This was a particular success in the old CBS cycle: the NY orchestra was in virtuosic form for Mahler's extravagantly conceived five-movement symphony, with its two inner Nachtmusik interludes. And the work had not been adequately done on LP before Bernstein recorded it.

The recording team for the new Seventh, with the NYPO at Avery Fisher Hall (November and December '85), is the same as for the Concertgebouw Ninth, but the dry acoustic works against the engineering approach,
which somehow withholds any sense of scale from the listener. For instance, in the
finale, where Bernstein at basically a fast speed gives us each episode for all it is worth,
the exaggerated focus on orchestral sections fails to cohere at any point, depriving the lis-
tener of an overall grasp of the movement. You can just about tell that Bernstein's vigor
draws the threads together at the very end. But does it?

That the finale need not sound as episodic as this is illustrated in Lorin Maazel's VPO
Seventh, produced last year by CBS (2 LPs: 12M 39860). The Musikvereinssaal recording
is somewhat murky and clouded; Maazel's approach is more measured and Germanic
(20m 05s, versus Bernstein's 18m 21s), yet as the ideas are set out with dazzling profu-
sion, the listener is somehow given the reassurance that, musically, it all hangs together.
The New York concert hall is notoriously unfavorable—the new DG recording of Cop-
land's Symphony confirms this—but it is indicative that where the technical approach
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Thiel CS3.5 loudspeaker

Editor:
I would like to address the matter of overall tonal balance raised by Tony Cordesman in his review of the Thiel CS3.5 loudspeaker. He states, correctly, that I design speakers to measure accurately using a microphone distance of three meters. He suggests that testing at this distance may result in a brighter balance than designing with a one meter distance. This would be true if the measurements were taken by normal means, because the room adds reverberant energy to the middle frequencies but normally not to the high frequencies. For a speaker to measure flat in such conditions, more high frequency energy must be generated to compensate for the lack of reverberant reinforcement of the highs.

However, my design measurements are not taken in a reverberant environment but rather in an anechoic one that does not provide reverberant reinforcement of any frequencies. In these conditions, the speaker balance measures the same at 3m as it does at 1m. The benefits of using a greater distance include the fact that the microphone can accurately “hear” all the effects of cabinet and driver integration, and that it represents the way a listener will hear the speaker. I believe it is necessary to design speakers in an anechoic environment so the measurements represent the true response of the speaker itself, independent of interactions with a room. These anechoic measurements are the most relevant to what we hear because the initial primary sounds, directly from the speaker, are heard independently of the secondary reflected sounds of the room. In order for the initial sound to be correctly balanced, it is necessary for the anechoic response of the speaker to be accurate.

It is possible to determine by ear if the speaker is accurately balanced or not with a “straight wire bypass” comparison. By inserting an additional amp/speaker/mike chain into a playback system between the preamp and power amp, the sound of this additional chain in an anechoic environment can be compared with the sound of a wire. In this way, inaccuracies in balance can be heard and accuracy can be objectively verified. Speaker tonal accuracy is just as objective as amplifier accuracy.

I certainly agree that some recordings sound more pleasing if their high frequency distortions are de-emphasized. However, if a speaker is designed with a reduced high frequency balance, this inaccuracy will be imposed on all recordings and will make good recordings sound soft or muffled. I do not think it possible, practically speaking, to design tweeter level controls that do not compromise driver integration or cause colorations. In any case, I don’t think most people would like to readjust their speakers for each recording.

If compensation is desired for poor recordings, bright cartridges, etc., it makes more sense for the preamp to offer it. Contouring controls such as are found in the Quad electronics are useful for such purposes. Most audiophiles, however, abhor the idea of altering the sound with tone controls. This feeling is based, I believe, on the correct perception that accuracy provides the most musical enjoyment in the long run. I firmly believe this to be true and therefore design our speakers to be as accurate as I possibly can.

Jim Thiel
Lexington, KY

Hafler XL-280 amplifier

Editor:
It is evident that our XL-280 and the Excelinear technology have put J. Gordon Holt on the horns of a dilemma. Gordon intellectually acknowledges that the amplifier which shows up best on the SWDT (Straight Wire Differential Test) is the most accurate, but he may prefer the sound of another amplifier. Could it be that his reference for good sound is flawed—or does the combination of an inaccurate amplifier and an imperfect loudspeaker produce compen-
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sating benefits with resulting better sound? If that is the case, then every combination will be different. The value of "expert opinion" would seem to be limited to specific combinations, and further diluted by individual preferences. It seems to me that progress in hi-fi must not depend on two wrongs making a right.

We have not claimed that our XL-280 amplifier is perfect. What we do say is that an amplifier which is indistinguishable from a straight wire has no audible flaws, and cannot be improved in audible accuracy using present musical sources and associated equipment. One does not have to reach infinity on the SWDT to have an amplifier with undetectable distortion. Gordon mentions that with a 90dB SPL and a null of 70dB, we still have a residual level of 20dB. Aside from the appreciably higher levels found on every other amplifier we have tested, the null on the XL-280 is below the ambient noise level of any place except an anechoic chamber, and is, for practical purposes, inaudible. This is clearly demonstrated when listening to the monitor speaker's output.

Gordon writes about the null, but he did not mention the other aspect of our evaluative technique—an A/B comparison of the amplifier against a straight wire. This provides corroboration of the thesis that a substantial null (on the order of 60dB) in the SWDT gives performance which is indistinguishable from a straight wire. We can demonstrate this with any program material. We prefer to use a noise source, which is a very sensitive test, and, we believe, a much more definitive test than music. An amplifier which is as accurate as the XL-280 passes this test. If some other amplifier sounds different from the amplifier which cannot be distinguished from a straight wire, it is less accurate. Our own tests of a sampling of other amplifiers on the SWDT confirms this.

If any listener prefers a sound which is less accurate, that is his privilege. However, he should not use an inaccurate amplifier. He should use an equalizer or a filter, or whatever it takes to achieve the sound he prefers, but the amplifier should be as nearly

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perfect as possible.

Gordon is quite right in stating that loudspeaker manufacturers should design their loudspeakers using accurate amplifiers. Each element in the hi-fi chain should be developed and tested with accuracy as the goal. It can only lead to better sound overall.

I do not understand the relevance of a comparison with the newest version of the B&K ST-140 which Gordon has not yet tested. The “sweetness” which Gordon attributes to its predecessor model may be due to the 0.5dB drop which we found at 20kHz on the sample we tested. Such a drop in response shows up as gross inaccuracy on the SWDT.

I am confident that as Gordon becomes more acquainted with the sound of a high accuracy amplifier, his references will shift and he will find less accurate amplifiers intolerable.

David Hafler
Pennsauken, NJ

Ortofon MC-30 Super cartridge

Editor:
Thank you for your recent review of our new MC-30 Super. However, I feel that there are several points which should be made in the interest of accuracy and fairness.

First, JGH claims to be “dubious” that the MC-30 Super had no “visible resemblance” to our MC-2000. I feel your readers should be informed that armature and cantilever assemblies, while not “visible,” are critical components of a phono cartridge design, and the MC-30 Super shares these components with the more expensive MC-2000. Furthermore, while the two cartridges have different body shapes, the design concept of having a rigid assembly is maintained. While the MC-2000 uses a solid aluminum body cut by a laser (a rather massive and expensive technique), the MC-30 Super uses two aluminum extrusions designed to maintain high rigidity.

Now on to the stylus force gauge. JGH correctly points out that it is calibrated in milliNewtons. However, I fail to see the need for four paragraphs of “mindless improvisation” discussing a tracking force gauge which was designed by us over four years ago.

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ago, and has been provided with over 100,000 of our cartridges worldwide (including JGH's reference MC-2000) without a single complaint. (Interestingly enough, in JGH's review of the MC-2000, he noted then the calibration of the stylus force gauge in milli-Newtonsh with little fanfare.) And, as he points out it, "works jes' fine." In addition, a gram is a unit of mass, and has been used to indicate force with some degree of inaccuracy in the past. In any event, most audiophiles are aware that a milliNewton is equal to the gravitational force produced by one tenth of a gram (at sea level).

Finally, there seems to me to be an inconsistency in your reviewing technique. All the reviewers at Stereophile seem to agree that CDs should be used as an "accurate" reference to set up their systems. I would assume that Mr. Holt has done this with his reference system prior to auditioning the MC-30 Super. Then he concludes that when compared with the sound of CD, the MC-30 Super "makes the equivalent CDs sound a bit hard, steely, brash—exactly the qualities which those whose systems are geared to other similar-sounding cartridges have attributed to "problems" with CD sound." My question is, if the MC-30 Super did, in fact, sound less "hard, steely, and brash," then how has his system been "geared?" To "other similar-sounding cartridges," or to a CD player? If a cartridge/turntable system can reproduce sound with less hardness and harshness, why must the reader be led to conclude that the problem must be elsewhere in the system? And why is this ability in a cartridge "of an age whose time is past?" Someone at Stereophile seems to be writing reviews on less than his best days.

Kevin Byrne
Plainview, NY

Altec Lansing 301
Editor:
In his review of the Altec Lansing 301 loudspeaker which appeared in Vol.9 No.7, JGH did his usual fine, thoroughly holistic assessment. However, there are small factual errors concerning cabinet construction and loudspeaker connections. The problem JGH had with the speaker lugs is one for
which I must accept responsibility since Gordon did not receive the Owner’s Manual, which was being printed at the time the units were sent to Gordon. The booklet has several diagrams covering the speaker connections. The terminals are specifically designed to accommodate “banana plugs” and heavy conductor speaker wire (such as Monster Cable), in addition to standard speaker cable, having oversized holes for the purpose.

Regarding cabinet construction, these are constructed of 3/4-inch (not 1/2-inch) high-density, furniture-grade, particle board, surfaced with oiled walnut wood veneers on all six sides of the enclosure. As JGH is no doubt aware, 3/4-inch construction is standard throughout the industry for most speakers. But Altec has also added interior bracing and damping to produce really solid construction. A woofer cutout leftover, constructed from particle board, is attached to the inside of the cabinet on the back panel opposite the tweeter. This dampens the cabinet so that resonance is minimized.

Fran Dym
New York, NY

**Magnum Dynalab Ft-101 tuner**

**Editor:**

We were particularly gratified to note that our FT-101 FM tuner was listed in the “A” category in *Stereophile’s “Recommended Components”* (Vol.9, No.7) for the third time running.

In response to DAS’s comments on unreliability; sure, we had to work through a few problems. Every manufacturer has to from time to time. We also understand that DAS must have felt just as duty-bound to mention this, as he has on occasion about other products he has tested. However, it is equally important to mention that we took care of any reported problem quickly and effectively. Now that we have our office and warehouse in the US, we can do so even faster. Also, with the warranty on the FT-101 being for five years, readers can rest assured that the problem was dealt with at the production level as well.

The most important thing to us is that our customers get the quality and value they are expecting and that our dealers continue to feel confident that we do take care of business.

Many thanks for continuing to express your confidence in our products...and doing it with integrity.

M.C. (Marv) Southcott
Brampton, Ontario, Canada

**Eminent Technology 2 tonearm**

**Editor:**

*Stereophile’s* most recent “Recommended Components” (Vol.9 No.7) rates the Linn Sondek LP12 as class A, but remarks: “It also is not compatible mechanically with the Eminent Technology or Well-Tempered tonearms.”

We disagree with this assessment. About 200 of the 2000 Eminent arms now in use are on LP12 turntables, and we have had zero reports from Linn owners of any dissatisfaction. At the 1985 Summer CES, one of our active demonstrations used an LP12, and today top Linn dealers are offering our arm for use on the Linn table. Sonically, the matching is exceptional.

We understand that the “Recommended Components” judgment was based on concern that the travel of the arm across the record affected the Linn suspension and threw the arm out-of-level, creating undesirable side-forces. Actually the effect of the change of balance can be largely neutralized by the opposing force generated by the lead wire connection.

Other people have raised questions about the side-forces of the arm. The forces that result from the slight unlevelness are far less than the irredcible skating forces that remain after even optimal adjustment of any pivoted arm. We are preparing a carefully documented analysis of this which we will send *Stereophile* in the not-distant future.

Ediscn Price
New York, NY

**Magnat loudspeakers**

**Editor:**

As US distributor for Magnat and Magnasphere loudspeakers, I was distressed to read Ken Kessler’s recent report from the Frankfurt High-End Show (Vol.9 No.7). The primary source of my concern is the caption below the photograph of our Magnasphere
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Delta, Gamma, and Beta on page 46, which read: "Magnat's Magnaspheres, treating the ozone layer to a fill up." This apparently is a reference to Ken's earlier (and slightly erroneous) statement that "Scattered here and there were various systems using ion tweeters, Magnat being the best known..."

I would first like to point out that Magnat Electronik GmbH & Co. KG, of Cologne, W. Germany, owns all worldwide rights to omnidirectional plasma ionization technology and at this time there are no other companies in the world licensed to use this technology. There do exist, of course, ion horns. But to lump these two into one statement, implying they are of equal caliber and characteristic, is as erroneous and ill-informed as saying that Stereophile magazine and Stereo Review magazine can't be differentiated and are of equal intrinsic merit.

My primary concern, however, is the sarcastic and misleading caption. The spherical drivers atop these speakers are dynamic drivers, operating on exactly the same electrical principle as any other dynamic midrange and tweeter. To imply these are ozone-generating ionic drivers is misleading, incorrect, and potentially damaging.

It's stupid remarks like these that fuel the fire of the critics of Stereophile magazine, who would describe your reviewing staff as irresponsible elitists.

Lastly, perhaps the biggest tragedy of all is that Ken stood in the presence of one of the most significant advances in loudspeaker transducer design in the last 30 years and couldn't see the forest for the trees. In terms of dispersion, Magnasphere loudspeakers come closer to mimicking the action of the age-old theoretical ideal of the "acoustically pulsating sphere" than any other loudspeakers on Earth, with essentially perfect omnidirectional dispersion all the way from 28Hz to 27kHz. What a shame KK got so close to something truly important, but didn't expend the time or energy to get the facts on such a significant development. I'm sure both he and your readers would be better off if he had.

As US distributor for these products, I feel that Stereophile's irresponsible editorial practices have tainted the image of Magnasphere loudspeakers and without a fully informative correction, could hurt my business.

Jeff Myers
Marblehead, MA

Martin-Logan CLS
Editor:
So many omissions and information weighted toward a particular bias are included in the review that it is impossible to respond point by point unless I were to develop a complete treatise on ESL technology. This is neither the time nor place to do so. Other than that, I found Mr. Colloms' style and presentation absolutely enjoyable and delightful reading.

Gayle Sanders
Lawrence, KS

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Linn cartridges
Editor:
I see little point in commenting on Ken Kessler’s findings on the Linn cartridges: he didn’t like the Basik, but did like the K9. Fair enough. However, I think some comment is in order concerning the way in which his findings were presented.

Mr. Kessler starts off the Basik review: “...I’ll be accused in the UK of Linn-bashing—something attributed to me for many years because I don’t own a Sondek.”

Given enough time phone books, I could name several billion non-owners of Linn Sondek turntables. Hundreds of them are reviewers. A few dozen of those reviewers have said unkind things about various products manufactured by Linn Products. Nevertheless, most of those reviewers are not referred to as “Linn-bashers.”

You don’t have to read between the lines to see that Ken just might have a slightly biased attitude regarding Linn. He refers to people who don’t share his opinions as “Linn camp followers” or “Linnies,” and categorizes them as similar to “Jimmy Swaggart followers or other lobotomized tucbus lekkers.”

Comparing his comments on the Basik cartridge with others that appeared in the UK (“Best Buy...goes much further in delivering the goods than its price level might suggest”) or in the US (“We were quite favorably impressed by...the obvious quality of the Linn Basik cartridge...the cartridge proved to be outstanding”), we see that there is some discrepancy between Ken’s views and those of these reviewers. Normally, this would not be a matter of great concern. In light of Mr. Kessler’s other comments, however, I wonder if there isn’t some factor other than the merits of our products entering into his assessment.

It is no secret that Mr. Kessler was once involved in the retail side of the hi-fi business as the manager of a shop in Canterbury, England. Several things he has written lead me to believe that some conflict developed during that time, which colors his view of our products. In this Stereophile review, he refers to Linn dealers who endorse the Basik cartridge as “more concerned with politics than with hi-fi,” and, in an article for The Absolute Sound, he wrote that “To work in a [British] Linn/Naim dealership and make sales, you all have to do is operate the cash register.”

I don’t think Mr. Kessler deliberately sets out to “bash” Linn’s products. It’s just that some of his attitudes seem to have been formed in years when he was engaged in a very competitive aspect of the business; these attitudes seem to have unfortunately been carried over to his present occupation.

If my branding of Mr. Kessler’s comments as “sour grapes” sounds like sour grapes, please excuse me. Ever since my lobotomy, I find things very confusing. Have to run now. Jimmy Swaggart will be on the tube in just a few minutes...Gary Warzin
Indianapolis, IN

Flying Into Los Angeles
Continued from page 63.

Linn’s long-awaited CD production facility in Los Angeles is now on line, and the company is moving aggressively to get its products out there to the public. Teldec, however, has developed a version of its direct-metal mastering (dmm) process, so that a CD master can be cut—or rather, embossed—in real-time, using a piezo-electrically driven diamond stylus, on what looks like a miniature LP-cutting lathe. The blanks consist of a sputtered-copper layer on a glass disc; once cut, these can apparently be shipped and handled like LP masters. The pits produced by the process are differently shaped from those produced optically in that they have boat-shaped beginnings and ends, but Teldec is confident that this will not affect compatibility with laser pickups. (The detection of the digital data on a CD depends not on the presence or absence of a bump but on the transition between the two.) The benefits are many: CD mastering can be cheaper, thus making it economically feasible to produce small numbers of minority-interest CDs, particularly if the first metal part “grown” from the master is used directly as the stamper; many lathes can be driven in parallel to facilitate the quick production of large numbers of a “hot” disc; and, most importantly to the engineers attending the show, LP-cutting engineers can apply their skills to the production of the silver disc. Teldec say that CDs produced using the dmm process will be released this year.
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