PHILIPS DCC IN DEPTH

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Robert Harley analyzes the implications of the decision to let "golden-eared" listeners decide when Philips's DCC had reached a sufficiently high level of audio quality.

A complete discussion on Digital Compact Cassette (DCC), Philips's intended replacement for the analog cassette, with Peter W. Mitchell on how it sounds, Peter Van Willenswaard and Peter Mitchell on how it works, Robert Harley on how it compares with DAT, and Barry Fox on its implications for the record industry.

Sam Tellig auditions a pair of Adcom GFA-565 monoblock power amplifiers and reports that the Brass Ear has put his new WATT/Puppies up for sale!

385 hi-fi components to buy at all levels of price and performance.

Stereophile's newest equipment reviewer signs on.

Esoteric P-2 CD transport (AB)

D. R. Martin talks with the conductor of the Minnesota Orchestra.

The Centennial Collection: Richard Schneider reviews an extraordinary album commemorating the one hundredth anniversary of the Chicago Symphony Orchestra.

Larry Archibald looks at the world of high-end audio from the Publisher's perspective.
Sounds Like . . .

Some of you are no doubt subscribers to one of Stereophile's smaller competitors, Sounds Like. . . Sounds Like . . . was started in 1987 by Jeff Goggin, Jack English, Robert Reina, and Mark Stern, the first three all alumni of The Absolute Sound. Sounds Like . . . subscribers will have noted that Issue Ten of the magazine has been delayed in its distribution; some people may have heard rumors that Stereophile was going to buy and resurrect Sounds Like. . . .

The facts of the matter are that yes, Larry Archibald has been talking to Sounds Like . . . in an attempt to keep the magazine publishing with an editorial message utterly separate from that of Stereophile. (If it were simply to become a "junior" version of Stereophile, what would be the point?) Unfortunately, however, the decision was made on February 20 to go no further with these discussions: Stereophile will not be involved in a resurrection of Sounds Like. . . .

We offer the best wishes to Jeff Goggin and his team of writers for their editorial future.

Congratulations . . .

. . . to Stereophile contributor Barry Fox, who was given both the UK Technology Press Award as News Journalist of the Year 1990 and that organization's Merit Award for Treatment of Technical Subjects, mainly, I understand, for his coverage of audio and video subjects in the British science weekly magazine New Scientist. Way to go, Bazzer!

My apologies are due for the nonappearance of the second part of Bill Sommerwerck's headphone survey in this issue. BS's paragraphs will appear in their entirety in the May issue, along with Gary Galo's report on the superb new HP-1 headphones from Joe Grado, and the first appearance of a column from retailer Andy Singer.

And double apologies to EMI, whose photo of William Walton on p.171 of the March issue we used first without permission, then without proper attribution. That tiny type to the right of Sir William's tie should have read "EMI Concert Classics Album", not "EX!".

—John Atkinson
The whole field of subjective audio reviewing—listening to a piece of equipment to determine its characteristics and worth—is predicated on the idea that human perception is not only far more sensitive than measurement devices, but far more important than the numbers generated by "objective" testing. Subjective evaluation of audio equipment, however, is often dismissed as meaningless by the scientific audio community. A frequent objection is the lack of thousands upon thousands of rigidly controlled clinical trials. Consequently, conclusions reached by subjective means are considered unreliable because of the anecdotal nature of listening impressions. The scientific audio community demands rigorous, controlled, blind testing with many trials before any conclusions can be drawn. Furthermore, any claimed abilities to discriminate sonically that are not provable under blind testing conditions are considered products of the listeners' imaginations. Audible differences are said to be real only if their existence can be proved by such "scientific" procedures.1

I remember taking part in a test where the "listeners" were asked to discriminate between Scotch, Cognac, and Bourbon under blind conditions. To my surprise, it proved impossible to do so. Should we take the results of this test to mean that there are no differences in taste or odor between these distilled liquors? Of course not! The real conclusion to draw is that the design and organization of a blind test that will detect real subjective differences is far from trivial. If such a test produces a null result, there are two equally valid conclusions: either there was no detectable difference, or the test was insufficiently sensitive to reveal a detectable difference. Neither can be dismissed out of hand—unless, of course, the reason the test was run in the first place was to prove there wasn't a difference, hardly a "scientific" attitude. —JA

1

**AS WE SEE IT**

**WERE THOSE EARS SO GOLDEN?**

Robert Harley

Human perception is not only far more sensitive than measurement devices, but far more important than the numbers generated by "objective" testing.
Fulfillment Through Technology

Fine equipment, carefully chosen...
an investment that provides a lifetime of pleasure.
Given the conviction of my belief in the validity of listening, it was with great interest that I learned of the process by which Philips determined when their Digital Compact Cassette (DCC) encoding scheme sounded good enough to become the basis for a whole new audio format—a format that may well become the primary music carrier during the coming decades (see Peter Mitchell’s and Peter van Wijlen’s “Industry Updates” in this issue).

During demonstrations and technical discussions for small groups of journalists at this last Consumer Electronics Show, a Philips engineer described how their encoding process was evaluated during DCC’s development. Without going over too much ground already covered by the Peters, DCC is based on drastically reducing the number of bits needed to encode an audio signal. While normal 44.1 kHz, 16-bit linear stereo digital audio (CD) consumes 1.41 million bits per second, DCC’s Precision Adaptive Sub-band Coding (PASC) generates only 384,000 bits per second. DCC’s encoding method thus depends on less than one quarter of the normal data rate to represent the same audio signal. The analog Compact Cassette’s inherent limitations of tape speed and width imposed these restrictions on the PASC encoding system.

Since PASC encoding relies on human hearing models to determine what information gets encoded and what doesn’t, Philips decided that trained, critical listeners must be the ultimate judges of the system rather than measurements or evaluation by the system’s designers. Philips thus organized the PASC development team into three groups: design engineers, critical listeners, and statisticians. The design engineers’ job was to keep refining the encoding process based on feedback from the listeners. The statisticians were to analyze listening-test results and reach meaningful conclusions about what the listeners could and couldn’t hear based on the data. The listeners were culled from quality-control inspectors at PolyGram.

The goal from the outset was to make PASC-encoded music indistinguishable from the CD source. The listeners could switch between CD playback and the CD after PASC encoding, performed in real time. If they could tell the difference between the two, the engineers were sent back to the drawing boards. Interestingly, even early versions of the system, with obvious sonic problems, sounded fine to the engineers.

Moreover, attempts by the “golden ears” to teach the engineers critical listening skills were unsuccessful.

Attempts by the “golden ears” to teach the engineers critical listening skills were unsuccessful.

Nearly all the listening was done without blind testing—the listeners always knew when they were hearing PASC-encoded material. When the Philips engineer told the group of journalists this, two members of the audience, Tom Nousaine of *The Sensible Sound* and Audio’s David Clark—both zealously anti-audiophile—were apparently shocked that Philips would rely on individuals’ judgments of sound quality without blind testing.²

After many iterations of the PASC encoding algorithm, some critical listeners still reported hearing differences between the CD and PASC encoding. When the listeners underwent blind testing and the data were analyzed, the statisticians concluded that there was no statistical significance to the results: the listeners could not distinguish between CD and PASC. However, the listeners vehemently asserted that they could detect differences, despite the supposedly infallible scientific proof that they couldn’t.

Now, the DCC project managers were faced with a monumental dilemma: were they to believe the “scientific” conclusion—that the listeners were imagining the differences—or should they accept the listeners’ impressions despite the lack of any “objective” proof. Indeed, not only was there no scientific evidence the listeners could hear differences, there was overwhelming evidence that they couldn’t hear differences.

This decision was not trivial. The Philips team wasn’t designing and evaluating a piece of equipment—they were setting the standards for an entire format that may become the most popular music-storage medium well into the 21st century.

On one hand, it would have been easy for

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² David Clark is a leading proponent of the view that all amplifiers sound the same. As designer of the ABX double-blind testing box, Mr. Clark regards blind testing as the great exposé of audiophile fraud and delusion. At an Audio Engineering Society conference in May 1990, he drew a parallel between audiophiles and believers in a flat earth.
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the project managers to accept the scientifically reached conclusion—that the listeners couldn't hear the difference between CD and PASC encoding. This decision would be highly immune to attack if sonic flaws were discovered later—the managers could point to the blind listening-test results as “proof” that PASC encoding was inaudible. In addition, believing the scientific evidence rather than the listeners would allow the project managers to move forward to the next stages of DCC development.

The encoding algorithms, once settled on, needed to be committed to silicon chips—a long and expensive process that had to be finished before the format could proceed.

However, if the managers chose to believe the listeners—who just knew they could hear the difference but couldn’t prove it—they could—would mean delaying the entire project, with the attendant expense. It would be difficult to defend the decision to spend that extra time and money, a decision based solely on listeners' unprovable impressions. Moreover, I suspect that further refinements in the encoding algorithm were yielding a diminishing return as the technology was pushed to its limit. Another round of improving the encoding process would likely provide few sonic benefits.

Philips project managers decided to believe the listeners.

After what must have been long and careful consideration, the Philips project managers decided to believe the listeners. Despite a number of factors, including the inability of others to hear these reported differences, the listeners' failure to pass blind testing, and the statisticians' conclusion that no differences were heard based on the data, Philips threw out the scientific evidence and went with the listeners' judgments. PASC encoding was subsequently refined until the listeners were completely satisfied that they couldn't tell the difference between the CD source and PASC—and not under blind conditions. If David Clark was shocked to learn that virtually all the critical listening wasn't done under blind conditions, one can imagine his reaction to learning that the scientific evidence—blind testing results—was thrown out in favor of unprovable and anecdotal listening impressions.

This remarkable episode represents a triumph of audiophile values. First, the decision to evaluate the technology with trained, critical listeners rather than measurement is in itself significant. Second, it can be considered a rejection of the all-too-prevalent view that anecdotal listening impressions are worthless and have no place in audio science. This closed-minded view asserts that if a phenomenon isn't scientifically provable, it doesn't exist. Furthermore, I see these events as an indictment of blind listening tests, whose validity has long been questioned by the audiophile.

Philips's approach to creating the PASC encoding system is exactly the way audio technology and equipment should be developed: with critical evaluation by trained listeners. However, this isn't a radical concept—ask any high-end designer how he develops a product. What makes the PASC development story so significant is that they entered the project with the expectation that the statisticians could be the ultimate judges of PASC encoding's audibility based on the listening-test data. Remember, these were scientists, not audiophiles. They had full confidence (at least initially) that application of scientific method would provide an incontrovertible answer to their question.

Moreover, the significance of Philips's decision to believe the listeners is heightened by other factors. Philips is a huge, sprawling bureaucracy, not a high-end designer in his lab. It must have taken a lot of explaining to convince the executives not directly involved that more time and money was needed, even though PASC encoding met the acceptance criterion established before the project was started; i.e., no statistical evidence of hearing a difference under blind conditions.

On the way down to the hotel lobby after the press session, I happened to share the elevator with Tom Nousaine and David Clark. For some incomprehensible reason, David Clark regards my writings as a complete rejection of rational, scientific thought and an embrace of mysticism, a view he had expressed to me the previous day during a chance encounter. Apparently feeling defensive after the press conference's revelations, he turned to me in the elevator and said, "What a remarkable system that produces CD quality sound with such a low data rate. And it was all made possible by science."

Somehow, I think he missed the point.
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What can you say?
Editor:
It was New Year's Eve. The bell rang and Casey McKee, of Brooklyn's Innovative Audio, entered my apartment to install the Linn Lingo in my LP-12. He espied the January 1991 Stereophile, still in its plastic wrap on my night table. Casey tore open the wrap and suggested I read the JA review of same while he worked. (I had auditioned the product in-store and was convinced this was a must-have.) What can you say about a guy who was doing Lingo installations not only on his wedding night! ("I know. I was there."—JA), but also on New Year's Eve?  

Harold Shapiro  
Brooklyn, NY

Congratulations!
Editor:
Congratulations! The January '91 issue was your best ever. Particularly striking was your emphasis on the best performance and sound of the music without the usual fuss over format. It's great to see such a diverse list of "bests" as well as some agreement among the editors on unquestioned ultimates such as Solti's Ring. I'm in total agreement with LA that the original Misa Criolla shames the Carreras version; it has been the Christmas album in our house for almost 25 years.

The Bernstein encomium was very insightful, but mentioning Das Lied von der Erde reminded me that the Klempener version on Angel with Fritz Wunderlich has to be in any serious collection of bests. And speaking of Bernstein, why not include the original-cast version (again, not Carreras's) of West Side Story?

Keep up the great work and tell Ken "yahad-abethere" Kessler I was there at the recording of Root Boy Slim's (aka Foster McKenzie III, Yale '63) debut album on Warner Bros. with the Sex Change Band, but better by far was the "live" version recorded the previous year on Lingo review, Vol.13 No.12, December 1990.

Georgetown University's underground radio station. That one rounds out my top five!  

Mark Smith  
Huntsville, AL

Not Carreras, please
Editor:
If Lewis Lipnick and Thomas J. Norton really liked Misa Criolla ("Records to Die For," January), I suggest that they immediately get a copy of the Philips LP PCC-619 (recommended by Larry Archibald in the same issue).

The Philips version was recorded in Argentina by the absolute best folkloric musicians (some with Conservatory degrees) under the direction of Ariel Ramirez, the work's composer. These musicians certainly knew what they were doing!  

José A. Fernandez  
Bayamón, PR

Records to Die For
Editor:
I have been reading Stereophile for many years and I wanted to compliment you and your staff for the January 1991 issue. The "Records to Die For" feature was very good . . . It was the first thing I read and I took it to Tower Records to find some of the recommendations.

Howard Geifman  
Walnut Creek, CA

Records to Die From
Editor:
"Records to Die From" in your January issue should have been titled "Records to Die From." The low and lopsided tastes of most of your reviewers was shocking.

I have sensed in the past the Anglophilia of your writers, and now I also see that despite their professions of critical discrimination, their inclination is mostly to pop music. I realize that English writers mention Elgar and Vaughan Williams in the same breath as Haydn, Mozart, Schubert, Beethoven, and Brahms, but I bristle when Peter Mitchell instructs me that the Elgar cello concerto is the greatest. Vaughan
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Williams gets three citations while Haydn gets none and Schubert just makes it by sharing one with Mozart. And as for vocalists, well... the list reeks of pop singers, with nary a classical one.

I had doubted somewhat your equipment and record reviews, but now, with this exposure of your staff's musical tastes, outside of about half a dozen men, I have lost all respect.

Daniel Waxler
Dover, NJ

Rock for a desert island
Editor:
Please cancel my subscription... I find your rock music reviewers to be out of touch with my preferences. Grace Jones? You've got to be kidding! I give you my ten records I'd need if stranded on that unknown island... in no particular order: Rolling Stones, Let It Bleed; Beatles, White Album; Steppenwolf, Live; Humble Pie, Rocking the Fillmore; Alice Cooper, Killer; Jimi Hendrix, Electric Ladyland; Jefferson Airplane, Bless Its Pointed Little Head; Jefferson Starship, Blows Against the Empire; David Crosby, If I Could Only Remember My Name; The Doors, Morrison Hotel.

What? No David Byrne? I will admit that I've learned a lot about equipment from your magazine, and what you consider 'good' sound. Stereophile is well-written, provocative, and I don't breeze through it the way I do with Stereo Review.

Kevin Marty
Amityville, NY

Here's my list
Editor:
Here's my list of choices for "Recommended Recordings":

1) Chick Corea: Akoustic Band (GRP), ADD;
2) The Rolling Stones: Beggar's Banquet (ABKCO), AAD/AAA; 3) Gustav Mahler: Symphony 4 (CBS) ADD, George Szell; 4) Mozart: Horn Concertos (Harmonia Mundi), AAD/AAA; 5) The Beatles: Revolver (Capitol/Parlophone), AAD/AAA; 6) Elvis Presley: The Memphis Record (RCA/BMG), AAD/AAA; 7) Handel: Water Music (Harmonia Mundi), AAD; 8) Howard Hanson: Symphonies 1 & 2, Elegy in Memory of Serge Koussevitsky (Delos), DDD; 9) Miles Davis: The Man with the Horn (Columbia), AAD/AAA; 10) Van Cliburn: Tchaikovsky, Piano Concerto 1; Rachmaninoff, Piano Concerto 2 (RCA); ADD.

Others may nitpick, as I left off Sgt. Pepper's Lonely Hearts Club Band. Most, however, agree that the real genius of The Beatles began with Revolver. As for including only one digital recording, that's where the recording falls. I know Wayne Green would be "tweaked" at that. In time, the list will change. But these are, in my opinion, the basics to start with.

Christopher Chandler
McAllen, TX

Thanks, Beth
Editor:
I want to thank Beth Jacques for her superb recommendations for her top five recordings. As an audiophile, I have been concerned about the lack of musicality on my gold MFSL Pink Floyd Dark Side of the Moon CD. Upon finally getting the Harvest CD per her recommendation, I was surprised to note a whole new level of sonics on my audiophile systems. Since both CDs are based on the same Harvest masters (which is, of course, a higher generation better than Capitol's horrible masters), I guess Mobile Fidelity did, in fact, screw up the transfer in some way. I have A/B'd the disc repeatedly with my friends and the non-gold Harvest wins every time. (Is The Wall also better on Harvest?) Please pass the information on to Kevin Conklin (no offense intended), who chose the MFSL (UDCD 517) CD (although it is superior to the Capitol version).

Now let me return the favor. Chesky Records is about to release a blues album by Natasha Turner. It is simply a performance and recording tour de force. I am admittedly biased since I worked as a member of the recording team. It is, however, even a level above the latest Ana Caram recording as far as sonics go. Chesky is also about to release a live Clark Terry recording (from a Village Gate performance). It is interesting to note Studio monitors were the inexpensive Cambridge SoundWorks Ensemble ($600/pair) for both recordings.

Lee Scoggins
New York, NY

In matters of taste...
Editor:
Your "Records to Die For" in Vol.14 No.1 has inspired me to share some sonic gems.

I have a special place in my heart for Sibelius symphonies, and one of the best-sounding performances is an old RCA Living Stereo of Sym-
How a little company from Huntingdon, England, consistently produces the world's best-sounding CD players.

Meridian's first CD player, the MCD, single-handedly opened the door to higher CD sound quality. Each and every Meridian CD player that followed—the PRO-MCD, the 207 and then the 206—set progressively higher standards for sound quality, winning the highest praise from audiophiles and critics alike.

This time, Meridian has refined a new type of digital signal processing to create the Dual Differential PDM BITSTREAM D-A Conversion System. Available first in the 208 CD Player, this breakthrough Meridian technology results in CD reproduction with unequalled clarity, resolution and accuracy.

For the technically-minded, this new Meridian conversion system employs two parallel, 256X oversampling BITSTREAM processors in each channel. Exclusive digital circuitry makes an inverted copy of each channel's signal and then sends this normal/inverted pair of differential digital signals to the converters. After conversion, a differential passive analog filter eliminates extraneous ultrasonic noise; then a differential amplifier combines the two audio signals into one ultra-low-noise, ultra-low-distortion signal. This system offers a phenomenal linearity of ±0.02dB, from 0 to -120dB, a range as wide as that of human hearing and greater than that of existing live recording systems.

Never satisfied with "good enough," Meridian always can be counted on to make the best sounding digital technology sound better.
phony 5 and the Karelia Suite (LSC-2405). Per-
formed by the London Symphony under the
command of Alexander Gibson, this album is
what a symphonic recording should be all
about.2 Resolution digs into the deepest re-
cesses of the hall, and Sibelius’s sonic colors
shine through flawlessly. Bass is strong and
depth, but never more than what you would
hear in a fine hall. Strings are classic RCA in
delicacy, and the brass sound has the detail
and immediacy reminiscent of the finest Mercury
productions. This disc was also released as Vic-
trola VICS-1016 and London Treasury Series
STS-15189. If you can’t find (or afford) the RCA,
these two are quite satisfactory.

Robert von Bath’s early BIS recordings (mid-
1970s) from Sweden were wonderfully musical
efforts. My favorite is the Prokofiev and Franck
cello and piano sonatas on BIS LP-35. Miked
very simply and recorded on the classical
Revox A-77, this record captures the sonorous
growl of the cello while keeping the piano per-
fectly balanced. This recording has given me
a better perspective on the psyche of these
composers than their more heralded sym-
phonic works. It is also distributed in this
country on the HNH label as HNH 4028, with
substantially the same captivating sound.

Scoff all you want, but Mancini’s Breakfast
at Tiffany’s soundtrack recording keeps find-
ing its way onto my turntable. Recorded by Al
Schmitt on RCA LSP-2362, this one’s readily
available still at used record stores and garage
sales. Forget “Moon River” and instead con-
centrate on the fine jazz-playing on such cuts as
“Something for Cat,” “Sally’s Tomato,” and
“The Big Blow Out.” The soundstage is wide
and instruments are superbly placed. Though
the recording was obviously multi-miked,
Schmitt refrained from spreading the drums
across the stage and other such horrors.

While producer Gary Katz is well-known for
his fine work with Steely Dan, in 1982 he pro-
duced a fine period rock album featuring a
singer named Deborah Berg. Eye to Eye (War-
ner BSK 3570) is dynamic, tense studio rock music
at its best. Veteran players such as Ian Under-
wood, Chuck Rainey, and Jeff Porcaro add pre-
cise, imaginative arrangements to some quirky
but thoughtful lyrics. Berg’s voice is distantly
reminiscent of Dionne Warwick’s, and the
whole effort follows in the best Steely Dan
production tradition. The subsequent Shake-
speare Stole My Baby, on Warner 23919-1, is
similar, but ultimately vacuous due to lost dig-
tal information.

Finally, I wouldn’t let them take me without
Joe Cocker’s 1982 Sheffield Steel. Released on
Island IL 9750, Joe Cocker meets Sly Dunbar
and Robbie Shakespeare for a reggae-tinged
romp through some classic rock ‘n’ roll songs
by the likes of Bob Dylan, Randy Newman, and
Steve Winwood. This album has sparse, dynamic
production values without suffering from the
recent propensity toward everything sound-
ing overly clipped. It’s really quite staggering
what an honest set of drums and a bass guitar
recorded analog in a real space can sound like.
This type of sonic experience is fast disappear-
ing for us.

Happy listening!

Siegfried P. Duray-Bito
Littleton, CO

... there can be no dispute

Editor: Warning.

You may be misinterpreting this publication’s
message. I will explain.

The editor, in one of his best decisions to
date, has in Vol.14 No.1 revealed something of
his contributing staff other than its transcen-
dent prose. “Records to Die For” at last gives
us a glimpse into this publication’s personal-
ities. Without getting to know these contribu-
tors “up close and personal,” they end up
resembling those “Guardians of the Universe”
of Green Lantern comics fame. When the guru
sits atop his perch, unavailable for close public
scrutiny, his pronouncements have no clear
context—they must be taken as gospel or
rejected summarily. However, the more one
knows about them as people, the better one
can evaluate their subjective judgments.

I urge every serious reader of Stereophile to
obtain one random recommended recording
from each on the list of Atkinson’s Murderers
Row, those heaviest of subjective hitters: Atkin-
son, Hartley, Norton, and Olsher. One might
also investigate those reliable Designated Re-
viewers: Lipnick, Colloms, Greenhill, Balgalvis,
et al.

Stereophile, April 1991 17
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Perhaps you'll find that your favorite contributor has aesthetic sensibilities antithetical to yours. What he calls a great musical experience you might find revolting. *Chacun à son goût!* The editor himself sums it up best in introducing his Vollenweider selection: "Some may dismiss the harpist's musings as New Age sewage..."

Since reviews are based upon word pictures and the precise, surgical use of adjectives, one had better understand what the writer truly intends (and hears). It may be said that a sound is worth a thousand words. A recent favorite is a preamp face-off by Mr. Lemco. "Deciding which is better is like taste-testing two apples, a Granny Smith and a Golden Delicious," Lemco ultimately prefers the Granny Smith. Earlier he compares the phono stages: "the SP9 struck me as mellifluous, the SA-3000, piquant." We readers usually nod in agreement, thinking all the while that we really fathom these asides. Sure it's fun, but does such prose help us choose a component?

Do you understand what is meant by: "liquid," "dry," "grainy," "loose," "fluid," "articulate" as they apply to sonic qualities? I recently read a description somewhere that a component's sound was "warm yet bright." If you feel your erstwhile guru to be out in left field as to what constitutes even great listening (his choice of the greatest album), beware of even subtler opinions! Sure, the guy writes with rare eloquence, but maybe he's nuts. Speaking only for myself, I will have severe problems in purchasing expensive interconnects (or anything else for that matter) based upon the reaction of someone who brings a *Scott Kreitzer* album to a desert island!

*Stereophile's* classical music-loving reviewers seem to have terrible trouble in isolating many well-recorded great performances of the greatest repertory standards. Or (frighteningly) perhaps they actually prefer, for musical reasons, works on the outskirts of the mainstream. Could they be so jaded? I suspect that they're simply driven to be different. Maybe, unlike the evaluation of audio components, there are no right or wrong aesthetic choices. Can this be? Is it all just a highbrow game?

Upon a digestion of the equipment reviewers' selections, I've gained a new respect for the thought processes of Bill Sommerer, Gary Galo, and Peter Mitchell; I'll have to read them more closely henceforth. As for Messrs. Balgalvis, Harley, and Kessler, I believe that they should contribute to the Audio Society of Jupiter. Come to think of it, that strange monolith of 2001 fame may well have been some Martin-Logan prototype. As for the glowing wisdom of Dick Olsher—how I've hinged on his every word in the past—it may be time to have his ears retubed and rebiased. *Andy S. Vitale*

Nesconset, NY

**Stick to equipment**

Editor:

After reading "Records to Die For" (Vol.14 No.1), it's plain these guys should stick to equipment.

*William Helmick*

Irvine, CA

**Why not more Jazz?**

Editor:

I was disappointed that only three of *Stereophile's* writers saw fit to include any Jazz in their lists of "Records to Die For" (January 1991). Jon W. Poses was wise to ignore the instructions to include only stereo recordings. He lists Thelonious Monk and John Coltrane's fine 1957 collaborations as well as Jazz recordings on the Blue Note label, many of which were made before the advent of stereo.

I wish to provide my own partial list, entitled "Records to Live For," which includes King Oliver's Creole Jazz Band of 1923, Louis Armstrong's Hot Five and Hot Seven of 1926 to 1928, Bix Beiderbecke's 1927 work with Frankie Trumbauer, Jelly Morton's Red Hot Peppers of 1926–1928, Jabbo Smith's Rhythm Aces of 1929, and Billie Holiday's late 1930s recordings with Teddy Wilson and Lester Young. These groups (except Oliver's) were not working bands as such, but were organized solely to record jazz. Hence these recordings present improvised music at the point of conception in performances that were never approximated before or hence. The history of Jazz, being primarily an improvisor's and performer's art, opposed to classical music, which is primarily a composer's art, cannot be discussed without reference to recordings. In effect, the recordings themselves are the art. They possess immediacy and urgency; their musical and historic values far outweigh any sonic imperfections.

The same can be said of early Blues recordings. Incidentally, thanks again to Jon W. Poses for his excellent review of Robert Johnson's...
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Leonard M. Weinstock  
Hilton Head Island, SC

That's Records, not CDs

Editor:

Most records are usually 13" in diameter, black in color, about ½" thick, with about a ½" hole in the center. Normally, they have two grooves, one on each side. Consequently, the sides are textured. Records are a product of analog music making. Compact Discs or CDs, on the other hand, are usually 4¼" in diameter, silver in color, about ⅛" thick, with about a ¼" hole in the center. The sides are smooth. All CDs have music only on one side, reserving the second side for program information. They are a by-product of the digital recording process.

If these characteristics are not enough to allow you to be able to tell the difference between them, more can be provided.

Next time, if there ever is one, Stereophile’s “Records to Die For” should not include “CD only” releases. It makes your writers look like they blew their assignment. And it reflects on your advertisers, who unfortunately have no control over your editorial policies. It’s only indicative of Stereophile’s gross misrepresentation, editorial sloppiness, and nonexistent professionalism. Maybe yellow paper is in order here.

Aloha.

Clyde Kanehiro  
Hawaii?

There seems to have been a fundamental misunderstanding of what exactly “Records to Die For” was supposed to be. I quote from my introduction: “a list of stereo recordings that are both musically and sonically impeccable.” What it was not supposed to be—and wasn’t—was a list of the Greatest Repertoire, or of the Greatest Recordings, or of the Greatest Performances, or even a Desert Island list—except perhaps for the hardest-coded of audiophiles. Each recording bad to be tops in both performance and recording. It’s hard to overstate how much this narrows things down. Little or no jazz? Great recordings of great jazz performances are extremely rare. Copland, but no Haydn? Perhaps no one could think of a great Haydn performance impeccably recorded; or perhaps, as is more likely, other combinations of stellar performance and stellar sonics simply won out. Few or none of your favorite records ended up on anyone’s list? Well, few of mine did either; that’s not what the feature was about. My favorite records hold that status because of the music they contain. “Records to Die For” is for those times when you listen to music and sound with equal ears.

In short, “Records to Die For” is not about musical or sonic taste per se; it’s about that extremely narrow ground where the best of both overlap. As I said in January, it makes for some very strange bedfellows, some very glaring omissions, some distinctly weird inclusions. Which is what made “Records to Die For” fun, unpredictable, and why we plan to do it again.

To answer Mr. Chandler: Actually, “most” would agree that the Beatles’ genius first reached full flower with Rubber Soul, after which Revolver was a bit of a let-down before Sgt. Pepper came along. And of the hundred or so Miles Davis albums out there, you’d honestly pick The Man With the Horn . . . ?

And Mr. Kanehiro: In my own usage, a “record” is simply that: a record—ie, a file—of information, in this case musical, whether it be a vinyl LP, a CD, a DAT, or a cassette. An “album” is a collection of works, likewise regardless of format. My Webster’s Ninth Collegiate defines “record” as “something on which sound or visual images have been recorded”; only after that is established do they further refine the definition: “specif., a disc with a spiral groove carrying recorded sound for phonograph reproduction.” Almost sounds like a CD, doesn’t it?

—RL

Mr. Waxler, you’re wrong; Peter Mitchell is correct. And the Jacqueline du Pré recording of the Elgar concerto is possibly one of the finest performances of any concerto on record. Mr. Marty, although you say that your tastes are different from ours, I note that two of your records—Jim Hendrix’s Electric Ladyland and David Crosby’s If I Could Only Remember My Name—were on my January list. Mr. Chandler, I challenge you to retain to retain your love for Tchaikovsky’s First Piano Concerto after listening to either of the Brabms piano concertos. And Mr. Kanehiro, for you to use the word “unfortunately” when discussing the fact that “advertisers . . . have no control over [Stereophile’s] editorial policies” is unfortunate in light of the fact that this has always been the magazine’s fundamental
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Stereophile Vol. 13, No. 1.

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Dick Olsher
Stereophile Vol. 13, No. 1.

“Kinergetics pulled off what I considered to be a near miracle. They successfully integrated a subwoofer with the twitchy Martin-Logan CLSe... the tonal balance through the lower octaves was just right. The deep bass and midbass were tight and well-detailed”
Dick Olsher
Stereophile Vol. 13, No. 3.

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premise. For the "record": advertisers have no control over the editorial content of Stereophile. None. Aloha. —JA

Dick opened his eyes!

Editor:
I was sitting here minding my own business, listening to the stereo with my golden ears and reading the February issue of Stereophile, when suddenly my entire life changed. What, you ask, could have had such a profound impact on my being? If you were to apply the principles of deductive reasoning, you would come to the conclusion that it must be the fact that my reading had brought me to p.160. My initial reaction when I reached p.158 was to skip over Dick Olsher's review of the L-G "Highly Magnetic" Cable, but for some unknown reason I continued to read. The simplistic reduction of my attitude that led to the dictum that resulted in my absorbing the fateful facts in question cannot be measured or explained by any scientific method familiar to me, but it did occur, and my golden ears will never be the same—not to mention the serious psychoacoustic problems I now must deal with. I may require the services of an acoustopsychologist!

My problem is basically this: I have copper interconnects in my stereo system. Now, I realize this is bad, but the fact that changed my life (as revealed on p.160) is that the signal propagates through my interconnect cables at the rate of "13 meters per second." I am aware of the constant that defines the speed of electromagnetic radiation in a vacuum as 299,792, 456.2ms, and I had assumed that my audio signals were speeding along my copper cables at approximately that rate. Now I must reevaluate my thinking. I measured the length of my cables from CD player to amplifier; from amplifier to speakers; and estimated the total length of all printed circuit conductors and metallization layers in all of the integrated circuits within my CD player and concluded that it takes approximately 10 seconds for the music to get from those microscopic pits and lands on the CD to my ears.

My intended course of action is to replace all those copper cables with highly magnetic barbed wire (barbs removed, of course), surrounded by a cylindrical Mu-metal shield capable of containing an absolute vacuum (to negate the dielectric absorption effects). My remaining problem will then be to replace the integrated circuits in my Philips CD960 CD player with devices that incorporate highly magnetic metallization layers. Any assistance you can provide with this last detail will be greatly appreciated. I doubt that Philips can provide modified devices. It may be necessary for me to set up my own wafer fab facilities to produce the needed ICs. Perhaps there are others out there who would like to form a joint venture for the purpose of developing and marketing a line of highly magnetic integrated circuits.

Thanks again for opening my eyes. I doubt, however, that my ears will ever be the same.  
Martin B. Korbitz
Owner, Spectrum Electronics, La Junta, CA

Dick's enlightening review

Editor:
Just a short note of appreciation for Dick Olsher's enlightening review of the Lindsay-Geyer cables in the February issue. Wanting to communicate my response as quickly as possible, I was especially thankful for Mr. Olsher's incisive analysis: it immediately led me to respond with this note rather than by telephone, secure in the knowledge that the US Postal Service would deliver it to you more quickly than my voice would have taken to propagate electromagnetically; at 13ms, through the telephonic lines from my home in Connecticut to Santa Fe.  
Alfred I. Wirtenberg
Weston, CT

It could be interpreted that the inestimable DO had been talking about the velocity of propagation of an electromagnetic wave along the direction of a cable when he introduced the 13ms figure in his introduction to the Lindsay-Geyer review. In reality, of course, this velocity will be a sizable fraction of the velocity of light (depending on the dielectric material around the conductor—it will only travel at the speed of light when the conductor is surrounded by a vacuum), and telephone messages do generally arrive at their destination quicker than it takes a letter via the US Postal Service or even via Federal Express.

However, the much lower velocity DO was referring to was how fast the current associated with that wave propagates into the conducting material, at a direction 90° to the cable's long dimension. His point was that textbook electronics theory appears to indicate that the initial wave propagating along the
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cable will be followed by a delayed version reduced in level due to the attenuated 90° current re-emerging after passing through the cable thickness. (Imagine a circle at the cable surface collapsing evenly through the conductor to a point at its center, then re-expanding back to a circle at the surface, all the while diminishing in intensity by a factor of 1/e for every skin depth.) With a 1kHz signal and a 1mm-diameter copper wire, this will take 0.001/13 = 77μs (microseconds), meaning that the main signal will be followed by increasingly attenuated “ghosts” at this 77μs spacing. I am setting up an experiment along the lines suggested by Ken Cowans (see Vol. 13 No. 1, p. 103) and by Michael Rudd in the next letter to look for the presence of such echoes. I’ll keep you posted on what I find. —JA

No, that’s wrong too

Editor:
I read, with interest, Dick Olsher’s February review on Lindsay-Geyer “Highly Magnetic” Cable. In spite of the comments at the beginning of the article, I took the liberty of applying a little scientific method to the discussion. There are three steps for inductive scientific reasoning. These are: 1) Propose a hypothesis; 2) Use that hypothesis to make predictions; 3) Verify those predictions.

When these steps have been successfully completed, the hypothesis can be accepted until disproved. Mr. Olsher has very nicely covered the first two steps in his article, but omitted the third. He proposes the existence of a slow transverse wave in a conductor which causes the dispersion, or smearing, of the signal. This is a perfectly reasonable hypothesis and he uses it to make a prediction of a delay of 70μs for a 1kHz signal. Such a delay should be easily measured by modern equipment. For example, inject a pulse into a cable and look at the output on an oscilloscope. To prove his hypothesis, Mr. Olsher needs to demonstrate this time delay.

The reason he did not do so is that it does not exist. Anyone who has used copper cables knows that dispersion, or time spreading of the signal, of this magnitude does not exist. Measure it for yourself! The fact that the phase of the current varies as one goes below the surface of a conductor does not necessarily mean that energy is flowing perpendicular to that surface. Indeed, a careful analysis of the problem shows that the direction of the energy flow is parallel to the surface. The audio signal travels parallel to the surface of the copper and at the speed of light.

However, there is a dispersion, or smearing, effect similar to the one described by Mr. Olsher. Only it is very much smaller than that proposed by Mr. Olsher and therefore is manifest at very much higher frequencies. Whenever there is frequency-dependent dissipation in a medium, such as is caused by the “skin effect,” then high frequencies will travel slightly slower than lower ones, just as hypothesized by Mr. Olsher. This smearing is a function of cable length as well as frequency. For a 50’ long copper cable it is noticeable at 200MHz. This is 10,000 times the highest audio frequency of concern. However, if one were to use a highly magnetic cable, such as one made from Mu-metal, then the skin-effect losses, and hence the high-frequency dispersion, will increase and be manifest at lower frequencies, possibly to as low as 20kHz. The effect is similar to adding a mild low-pass filter to the system. This can indeed give a pleasing sound.

I am willing to concede that Mr. Olsher may be hearing a real difference between copper and Mu-metal cables, and also that it may be due to the difference in the “skin effect” in the two materials. However, it is the Mu-metal cables which exhibit the smearing, and not the copper ones. If Mr. Olsher likes the sound of vacuum-tube amplifiers, then he will also probably like the sound of the Mu-metal cables.

Incidentally, since Mu-metal saturates at magnetic field strengths close to that of the Earth’s magnetic field, the Lindsay-Geyer cables are likely to be more effective when run East-West than when run North-South.

In conclusion, I would like to state that I have proposed a hypothesis which can be easily verified by anyone with access to a pulse generator, an oscilloscope, and a pair of copper and Lindsay-Geyer cables.

Just enjoy the music

Editor:
Goll-eee! Does this poor dumb country boy feel in-ar-tic-u-late? The esteemed and injured Mr. Johnsen (“Letters,” January, pp. 43-47) couldn’t seem to decipher this goober’s humble and obviously inadequate attempt to make a point with (hopefully) a bit of humor (in

Stereophile, April 1991

25
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October 1990’s “Letters”).

My intent was to point out just how totally subjective audio is and that our judgment is strongly influenced by our beliefs. It was my naive hope that some true believers might be tempted to abandon their audio faith and trust their own ears.

Chill out, Clark. There’s already more than enough audio system paranoia to go around. Just enjoy the music. It’s the only real re-connection.

L. Hepinstall
Batavia, IL

A mail-order LP connection

Editor:
I want to let fellow vinyl-lovers know about an excellent mail-order source of cut-out LPs.
It’s RPM Sales, P.O. Box 441348, Somerville, MA 02144. They have an 800 number too: (800) 388-1286. Their LPs are about 85% pop/rock, 10% jazz, 5% classical. They also sell cut-out CDs and full-price independent-label CDs.

I’ve ordered from them twice and received accurate, prompt delivery. They even had the courtesy to notify me when backordered items were back in stock so I could reorder.

Go ahead, vinyl junkies... have a fix!

Eric J. Anderson
Ankeny, IA

A Manhattan LP source

Editor:
Regarding JGH’s sad quest for LPs (see “A Bite of the Big Apple,” Vol. 13 No. 8, p.81), it’s too bad he never checked the quarter-page ad I have been running in Stereophile for two years.

There are over 125,000 LPs in mint and new condition at G&A, cleanly and clearly arranged by artist, and an audiophile section arranged by label. No RCA, Mercury, or even a Belafonte at Carnegie Hall approaches the $300 cost he found elsewhere.

As far as a “hole in the wall”—come take a look. We have airconditioning, sofas, two clean bathrooms, coffee, and a library to glance through.

Jerome Gladstein
G&A Records
139 West 72nd Street, New York, NY

St. John & Hard Cash

Editor:
In the December issue of Stereophile Allen St. John reviewed the Hard Cash recording and gave some special instructions for securing a copy. Unless I am mistaken, this recording is available on the Green Linnet label (SIF-3049, LP; GLCD-3, CD) and can be found in many fine stores—Spinners included. Schwann Spectrum also lists the Green Linnet version and not the special-delivery one AJJ mentioned in his review. Unless the two versions differ greatly, you might wish to recommend the more easily obtainable recording to your readers.

Roger Atwell
Spinners, Chagrin Falls, OH

Levine & Madama Butterfly

Editor:
Permit me to correct several errors in Robert Levine’s “Building a Library” survey of Madama Butterfly recordings in the December 1990 Stereophile:

The Björling de los Angeles version is not out of print; it is currently available at mid-price on Angel/EMI set #63634 (2 CDs).

The recording was made not in 1960 but in September/October 1959; I was privileged to attend EMI’s sessions in the Opera House, Rome.

Further, there is no “cracked high C from Björling at the love duet close.” Björling whitens his tone slightly during the course of this long-held note, but he certainly does not “crack” in any sense of the word, and to suggest that he does is to abuse this great tenor’s reputation. (If he had cracked a note, EMI and Björling himself would certainly have insisted on another take.) If any tenor ever possessed a secure high C, whether in the opera house or on record, it was Jussi Björling.

Brown Meggs
former president, Angel Records (1984–1990) (recently retired)
Pasadena, CA

The wrong piano!

Editor:
While it was a pleasure to find Ivan Moravec’s name cast alongside those of Alfred Brendel and Earl Wild, it was a surprise to find it linked to Bösendorfer (Stereophile, February 1991, p.96).

A pianist known to travel with his own set of piano tools, Mr. Moravec has maintained the strictest neutrality on the subject of piano makers. In an unflinching quest for the best pianos in any city, he selects the best available instrument, whether it’s Steinway, Bösendorfer, etc. In his native Czechoslovakia, he occasion-
When you listen to hi-fi do you find your feet tapping along with the music? Do you feel like humming or singing? If not, you're listening to the wrong system. Because obviously, the best system for you is the one that makes you feel most involved with the music. If you haven't found it yet, you should visit your Linn dealer. There, you'll be able to compare our hi-fi with other good equipment. You'll find it very easy to tell the difference. The best system will be the one that sounds best to you. And you can rely on your feet to tell you which one that is.

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ally plays a superbly maintained Petrov.

Earl Wild is a “Baldwin pianist,” Alfred Brendel is a “Steinway pianist,” but Ivan Moravec is not a “Bösendorfer pianist.” Since arrangements between a piano manufacturer (or, sometimes, a dealer) and an artist are often exclusive, as in the case of Mr. Wild and Baldwin, some of your readers might assume that such an arrangement exists between Mr. Moravec and Bösendorfer. His name appears on the Steinway Artist Roster, although it is not an exclusive arrangement.

For an upcoming all-Chopin disc on the Dorian label, recorded at the Troy Savings Bank Music Hall, Mr. Moravec used a Steinway (No.404, American-made). 

Randall Fostvedt
New York, NY

Although my connection between Brendel and Steinway and Wild and Baldwin was derived from first-band experience, I had based my Moravec statement on the fact that all the recordings of Ivan Moravec in my collection appeared to feature Bösendorfers. So much for circumstantial evidence: my apologies to Mr. Moravec and Steinway.

—JA

The VTL Book & free speech
Editor:

Having just recently resubscribed to Stereophile after a long hiatus (during which I read no audio magazines at all except Audio Amateur and its spinoff, Glass Audio)... I feel obliged to inform David Manley in public (since he doesn’t answer letters or phone calls) that his Vacuum Tube Logic Book is not an acceptable reference for servicing VTL equipment. Not even the stuff it calls “standard”: I hate to think of the average CET [?—Ed.] at a bench with the 211 or 845 triode blocks, this “book,” and a soldering iron. Even the hated mid-fi poseurs at McInflush have the decency to send you any schematic you want, for almost anything you say you have, free. (“Yeah, I just picked up an MI200 at a hamfest... and I have the MC3500 with that penta-file transformer and the sweep tubes”). And Mac’s stuff is legible and can be followed by anyone—hams, avionics techs, guitar-amp repairmen, etc.—who might have to fix the stuff. (No one can write clearly enough to enable TV fixers to work on anything worth fixing, though.)

Finally, I just have to comment on the 2 Live Crew deal. If the First Amendment says Luther Campbell can sell your daughter “As Nasty As...,” then the Second, you must surely agree, says I can sell your son an Uzi. A real, short-barrel, selective-fire, IDF-issue Uzi. It’s that simple.

Phil Johnstone
Roeland Park, KS

2 Live Crew & free speech
Editor:

In reference to the letter from Mr. Luiz G. Gutierrez published in your January 1991 issue, I take extreme exception to his remarks regarding 2 Live Crew and the definition of free speech, as well as his proclamation of being a dyed-in-the-wool liberal.

First, Mr. Gutierrez’s having been a former student at Berkeley during the Free Speech Movement, a former resident of Haight-Ashbury, former VISTA volunteer, etc., etc., does not automatically qualify him as an expert on liberalism or the First Amendment. His Hispanic surname is even less of an indicator of ideological direction (or whether he is “your usual Reagan-infected, WASPish troglodyte”). In fact, the individual who has made a recent career of arresting Luther Campbell and his 2 Live Crewmates, Sheriff Nick Navarro, just happens to be Hispanic (Cuban in this case) and a staunch conservative Republican. Moreover, the former Governor of Florida, Bob Martinez, who actually started the anti-2 Live Crew movement (as well as the movement against “thong” bikinis on public beaches), is also a conservative Republican of Hispanic descent. So don’t try telling us, Mr. Gutierrez, that your pedigree or the name on your diploma is proof of your liberalism or knowledge of Constitutional law.

Mr. Gutierrez’s credentials (or lack thereof) aside, let it be known that I also find the lyrics of 2 Live Crew’s As Nasty As They Wanna Be album to be offensive. I also don’t happen to like the music and message offered by rap groups such as NWA. In fact, while 2 Live Crew’s lyrics are purported to exhort its listeners to perform degrading and violent acts against women, NWA’s lyrics are purported to exhort its listeners to perform similar (and even worse) acts against police and white people. (It should be noted that both sets of performers have publicly indicated that they do not actually want their listeners to commit such acts.) More importantly, however, we live in a country that bases its laws on a constitution that
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allows for such freedom of expression. Just because Mr. Gutierrez, George Will, Sheriff Navarro, Governor Bob Martinez, or I find a particular recording to be offensive does not mean that it should be banned.

Nor does it mean that the performer should be garroted with speaker cable. Indeed, Mr. Gutierrez’s exhortation to perform acts of violence against these “reptilian cretins” is as offensive as 2 Live Crew’s depiction of violence against women. Fortunately for Mr. Gutierrez, such comments are also protected by the First Amendment. Above all, what we do in the privacy of our own homes, such as listen to filth like 2 Live Crew, is each individual’s inalienable right, just so long as we do not take to the streets and break the law by raping women, killing police officers, or garrotting people who offend our sensibilities.

Come to think of it, isn’t Mr. Gutierrez’s reaction to 2 Live Crew’s right to free speech somewhat akin to mainstream America’s reaction to Lenny Bruce, the Black Panther movement, the demonstrations at the 1968 Democratic convention, various anti-Vietnam War student riots during the ’60s, and his cherished FSM at Berkeley?

So take that in your newly brewed cup of coffee and half-forgotten memories, Mr. Gutierrez. In fact, maybe that is Mr. Gutierrez’s problem. His days at Berkeley during the FSM, former residency in Haight-Ashbury, etc., etc., etc., are only half-forgotten memories that need to be remembered more clearly and accurately. People like him need to spend less time bringing bloom to the sound of the Cowboy Junkies and more time pondering what it truly means to live in a free society.

B. Rothman
Sunrise, FL

Journalists & free speech?

Editor:
Thank you for printing Luiz Gutierrez’s letter. There currently exists a real danger that uninformed people will take seriously the complaints of the anti-moralists.

The arguments for personal respect and public dignity are intricate, and their cause-effect scenarios inhabit rather long time frames. These complexities preclude good judgment on the part of a great number of unfortunate people. Many such people happen to be journalists.

Study and experience often help provide the necessary scope. For the time being, let me present one basic truth: There are a few nuts in every camp, but most people of average adult intelligence can generally distinguish art from attack. This is why Faithfull, Lynch, and Pryor are appreciated while Mapplethorpe and 2LC are not. Now, if you attack a person or a society, don’t you think you’ll have to face a defense?

Critical authority begins with the realization that actions have consequences. You’ll notice that genuinely constructive people tend not to have problems with “censorship.”

Hillary Paprocki
Rochester, NY

P.S. One may see a parallel here with the ways in which we justify subjective reviewing.

Banned in Cincinnati?

Editor:
Do I again see people criticizing your magazine for standing up for freedom of speech?

Dexter Jones: The ACLU Journal?

Luiz G. Gutierrez: The credentialled liberal.

The defense of free speech is essential to any writer, speaker, or publisher; the defense of 2 Live Crew is only coincidental. (Their rights are your rights too.)

It is important to be able to speak or print what you want to, or need to, despite popular disapprobation . . . That silly song words promote rape is as absurd as the claim that an attractive woman invites rape.

Being banned in Cincinnati, or from the airwaves, will not create many sales for 2 Live Crew because they have no skill, no talent, nothing at all to say, and they say that poorly!

George Will or not, don’t sell your freedom of speech for such a worthless cause.

Donald Bisbee
Columbus, OH

Anti-digital histrionics & the high-end press

Editor:
After reading Robert Harley’s gushing “As We See It” in the December 1990 issue, I was expecting Dr. Lagadec’s paper3 to fall into the class of those of Nyquist’s Sampling Theory or Shannon’s Information Theory. Alas, it turned

3 “New Frontiers in Digital Audio,” Roger Lagadec, Audio Engineering Society preprint #3002. Available from the Audio Engineering Society, 60 E. 42nd Street, New York, NY 10165. Tel: (212) 661-8528. Fax: (212) 682-0477.
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out to be another small problem blown way out of proportion by the high-end audio press. Truncation and scaling of fixed-point numbers have constantly been pitfalls in the design and performance of the signal processors I have worked on, and I see no reason why audio hardware should be any exception.

If Mr. Harley is trying to prove that digital audio at present is imperfect, he's beating a dead horse. Reality seems to say that it is a very good medium, albeit with a few problems (no, not "perfect sound forever" marketing BS). What has gotten lost in all the anti-digital histrionics that come from the high-end audio press is that there is no audio reproduction system that is available now (or in the foreseeable future), analog or digital, that remotely resembles a live performance. So for now, one has to look at the digital shortcomings as tradeoffs for elimination of inner groove distortion, pops, ticks, warps, mistracking, hiss, limited dynamic range, etc. etc. Neither system has been shown to be sonically superior overall, but this has not stopped "digiphobes" from gomming on to abstruse technical data such as this paper, and using it to buttress arguments that are simply matters of taste.

As digital audio technology progresses, it shouldn't be surprising that new phenomena would be discovered that can have subtle sonic effects. Dr. Lagadec's paper is an example of this, but it is only evolutionary, not revolutionary, and the described effects on the sound are not enough to dislodge the underpinnings of sampling theory as Mr. Harley implies. Indeed, these are refinements, not radical transformations.

In the comparisons I've made of analog LPs and their CD counterparts, there is a slight but noticeable degradation in low-level information and some harshness on some (but not all) of the CDs. Nevertheless, I would hesitate to fix the blame on any specific areas without a thorough evaluation of all recording and reproduction aspects. This is not a trivial exercise, but a lack of thorough analysis has not stopped most high-end audio writers and manufacturers from tossing out unsubstantiated opinions and claims of dubious technical basis. Additionally, the near-exclusive dependence on non-blind testing seems to disregard the human tendency toward self-delusion. Is it any wonder that the technical establishment summarily dismisses the audio underground with disdain, even when you have legitimate criticisms?

What is most curious is that, amid the cacophony of CD rings, Armor All, Rain-X, green and black pens, voodoo cables, etc., it has never been proven that the 16-bit, 44.1kHz standard is inadequate (again, digitization in itself is not the problem, as some would like to believe). When working for Studer a few years ago, Dr. Lagadec stated in another magazine that the present sampling standards were only of mid-fi quality. Does this reflect just his opinion, or is it valid empirical or theoretical data? It certainly indicated some bias that Mr. Harley may not be aware of.

A reliable test would simply require an A/D-DA converter pair to be inserted between the preamp and amp. The devices must be monotonious, linear to at least 15½ bits, linearly equalized (frequency and phase), and properly aligned and scaled (ie, the test signals must be in the usable range of the converters). Various dither models should also be tried. A single or (preferably) double blind test by qualified (ie, no hearing anomalies), trained (apprised of the suspected problem areas), and unbiased listeners using material that best exposes the suspected problems (eg, soft, reverberant music) should yield acceptable results. If these sampling standards are shown to be sufficient for high-quality reproduction, then any problems, past or present, are the result of poor implementation and/or mechanization rather than intrinsic "digititis." Less than perfect comparisons, however, would only indicate that neither medium is perfect, not that analog is necessarily better.

What does seem apparent is that 16-bit/44.1kHz may not leave much margin for error in the recording process when compared to more forgiving analog systems, and recording and mixing engineers (I use the term loosely) had a penchant for screwing up long before the CD was a pipe dream. How much of the "digititis" we hear on CDs is simply due to poor recording techniques? If you hear only one A/D CD that is acceptable (or, better yet, identical) when compared to the master, than the CD medium itself should be vindicated.

Since we are pretty much saddled with CD, we don't need to confuse the issues with pseudoscientific speculations. Empirical data must correspond with theory. As in this case, loose ends sometimes require tightening up. But if we rely solely on observation, we tend to have

Stereophile, April 1991
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experiences like those that recently occurred with cold fusion. Listening experiments like the one described previously would be a far more productive endeavor for Mr. Harley than throwing out a few pieces of complex jigsaw puzzle to an audience who, for the most part, can't put them into proper perspective.

Paul B. Fargotstein
Thousand Oaks, CA

Digital technology &
the twisted truth

Editor:
I got a kick out of reading the writings of Robert Harley in December's "As We See It." As usual, the truth is a bit twisted. The truth is that if the so-called subjectivists can in a reasonably scientific manner verify that they really hear something, then we engineers can probably measure it. It is, however, pretty hard to hit a moving target. I do definitely agree with the idea that we engineers need to keep open minds about what can be heard. However, speaking for myself, I have long ago gotten tired of claims that can't be verified. Just because lots of people say it's so doesn't make it so unless it can stand up to the rigors of some scientific verification. Which brings me to the main reason for this letter: Dr. Lagadec's paper as discussed by Robert Harley.

Since the majority of readers will not have read Mr. Lagadec's paper, we will only be able to speak in very general terms. First, to briefly summarize the point of the paper—Dr. Lagadec strongly suggests that there are good technical reasons why some mastering engineers claim to hear degradation due to digital faders or gain controls.

Unfortunately, what Dr. Lagadec failed to mention in his paper is that the results of signal attenuation, whether done in the analog domain before the A/D or in the digital after the A/D, are essentially the same. So the technical problem pointed out by Dr. Lagadec is not the digital fader, but simply the well-known effects of a finite number of quantization levels trying to approximate a continuous signal resulting in an error signal or "quantization noise." This error or quantization noise is greater with fewer levels. Dr. Lagadec used as his initial example a 4-bit linear system which gives 16 quantization levels as compared to approximately 65,000 for a 16-bit system. The errors in a 16-step staircase look much more significant to the eye. In addition, his "perfect" example where the input transverses exactly one quantization level between each sample period is, in reality, a statistically unusual situation. In fact, for a 4-bit system (or, for that matter, any bit number) with real-world signals, these "glitches" will be much more the norm as the limited number of quantization levels make their best effort at approximating the continuous analog input.

So what's new that we didn't already know? Dr. Lagadec correctly points out the well-known fact that this "quantization noise" is more offensive than, say, the hiss (thermal noise) we normally hear. In addition, he points out that the short-term statistics of the quantization noise are signal-dependent. This, in fact, is the basis of Dr. Lagadec's statement that there is good reason to expect that quantization will affect sound quality. Now I did not do a literature search to see if any other analyses show that short-term statistics are signal-dependent, but I certainly don't find it surprising—in fact, it seems sort of obvious. Had someone asked me about quantization errors in the short term, I believe I would have said it was signal-dependent.

The real question here is whether it is audibly significant. My answer is, yes, under certain extreme conditions. Let me explain. This quantization noise in a normal 16-bit system is inaudible at any sane listening level. You can verify this for yourself (assuming that your CD player does not have any gross problems). If you have access to, say, the CBS CD-1 test disc, place your system volume control at your normal loud playing level and play the 1kHz tone on band 19, which starts at −70dB and goes down from there in 10dB steps to −100dB. Caution! Do not accidentally play another band, as you could blow your speakers! You probably will be shocked at how quiet the −70dB tone is. In fact, at first you may think that something is wrong with your system. You will likely not hear the quantization noise unless you are very young and keen-eared or very close to your speaker system (which is, of course, not fair). Now consider the quantization noise is another 20dB or so below −70dB and you have just the lowest level of music playing. The music will provide masking of the noise, and since you probably can't hear the noise without the music, I think that you will have to admit that any short-term varying of the quantization noise characteristics (statistics) will be inaudible. Now if you add

Stereophile, April 1991
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in another 30dB or so of system gain—an extreme condition—and you dial it in, you will be able to hear the noise and the nonlinearities of your CD player.

The gist of what Dr. Lagadec was attempting to show was, I quote, "that, based on a straightforward analysis, it is implausible that well-trained personnel would not detect differences beyond noise and signal level" (for digital gain control). I would add, based on my above comments, the following: "Provided that they had their overall monitoring levels at ear-shattering volumes." (Which, from what I gather, may well be the case.) This is like saying that if you turn up the gain of your all-analog system so that you hear the noise, you will hear the noise. Or if you put a magnifying glass to an excellent photograph, you will see the grain, or noise. Not particularly profound. Like everything else that we design, there are always tradeoffs. Digital is not perfect. By the way, I would like to know where that infamous statement "Perfect Sound Forever" was published. I don't recall ever seeing the original. I hope it wasn't an engineer.

The question that now comes to mind is, assuming that quantization errors (or digital fader artifacts) cannot be heard in a "normal" situation (obviously yet to be fully determined), should we add a few more bits so that the mastering engineers cannot hear it? I think not.

So, in summary, I would say to Mr. Harley that Dr. Lagadec said nothing, to the best of my knowledge, that would cause all engineers to suddenly jump up and start looking for problems in digital audio as it is configured today. It's a good review with maybe some pioneering analysis, though I believe somewhat misleading because it holds out a carrot that implies that we suddenly have found the problem with digital. Therefore, I think it would be naïve to think we will see the paper as a "turning point in digital audio's evolution," as Robert Harley suggests. I would presume, however, that it will be an entry point for a new "gadget of the month" from someone (maybe Sony).

Seriously, I would like to predict that (if it is not already obvious to many), when we look back at this present digital audio system, we will be very impressed with the astuteness of the design decisions. The system is much better than we think. Certainly, there has been little sonic improvement in CD players since the first generation in spite of all the technical improvements. I don't believe that it has yet shown that there is any audibly significant shortcoming, even for the most fanatic audiophiles. It's certainly "light years" ahead of LPs! The major problem still appears to be the variability of the source material.

John Koval
Santa Ana, CA

Lipshitz, Lagadec, & challenges
Editor:
I would like to comment on a number of issues raised in the "As We See It" columns of your 1990 November and December issues, and in December's "The Final Word."

1) First let me refer to the massive listening test described in November on pp.5–27. This blind test appears to have been generally well-designed and -conducted, and so the data should be amenable to meaningful statistical analysis due to the very large sample size. And indeed, the overall results (Table 2) show massive evidence that chance alone can explain the outcome—the probability of random guessing resulting in a success rate of at least 1556 correct responses, out of the total of 3222 trials reported, is greater than 97%. I have no argument with your conclusion here. However, note that this conclusion is valid only if one can assume either a) that, under conditions when the listeners could hear no difference, they voted "same" or "difference" equally often—that is, that they were unbiased listeners (not a safe assumption, as we shall see), or b) that the numbers of "same" and "different" were approximately equal. In your test, the latter condition was not terribly well satisfied (1672 "same" presentations vs 1550 "different" presentations overall—see Table 7), and, as I shall argue below, the condition a) was clearly violated since the listeners showed clear bias toward voting "difference" rather than "same.

One reason the null conclusion is indeed so powerfully supported by the data is that your listeners actually performed significantly worse than chance (48.3% correct overall) due to the fact that their bias was toward voting "difference," while there were in fact 122 fewer "different" trials than "same" trials. These two factors explain their worse-than-chance performance overall.

Even if we refer to the one large subset of trials in Table 7 for which the balance of "same" (1275) and "different" (1254) presentations is most nearly equal—namely the case of males,
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different transports—we still find the performance to be significantly worse than chance (48.2% correct), and again can conclude with greater than 96% confidence that chance alone is adequate to explain the outcome, due to the presence of listener bias.

Let me elaborate upon this listener-bias question. Consider the overall results in Table 7, which as we both agree show no proven ability to hear differences. Nevertheless, from this data we easily deduce that the listeners voted “same” in only 1408 (= 707+1550-849) cases and “different” in 1814 (=849+1672-707) cases; that is, they voted “different” 406 more times than they voted “same.” The point to note is that the number of “different” presentations was actually 122 less than the number of “same” presentations. This demonstrates clearly the listeners’ bias (probably to be expected, given their likely predisposition toward “hearing” differences) and shows why they scored worse than chance overall.

Consequently it is quite fallacious to attempt, as you do in Tables 4, 5, and 7, to examine the percentage “same correct” and “different correct” responses, and conclude that they show a highly significant ability to discriminate differences more reliably than samenesses. In fact, all your further statistical conclusions are quite unsupported and indeed are reflections of nothing more than the listener bias discussed above. This is a serious analysis error on Stereophile’s part, and I would like to encourage (nay, challenge) you to have your data properly analyzed, for you have a large amount of carefully gleaned data, and a detailed analysis of the bias question would throw valuable light upon the whole matter.

A simple, if extreme, example can serve to clarify my argument. Suppose a listener decides to vote “difference” at every trial. Then he will get all the “different” trials correct and all the “same” trials wrong. This performance would certainly not be indicative of his ability to aurally discriminate true differences, but only of the bias in his voting—his predisposition toward voting “difference.” It would certainly be inappropriate and wrong to point to his 100% correct score on “different” trials as indicative of any ability. But this is precisely the type of conclusion which you draw from your data! Note, by the way, that had the experiment included equal numbers of “same” and “different” trials, then even this terribly biased listener would have scored precisely 50% correct overall, properly reflecting his lack of discriminating ability. And had there been more “same” than “different” trials in the experiment, as occurred in your listening test, then such a biased listener would have scored less than 50% correct overall, as indeed happened with the less-completely-biased listeners actually involved. For these reasons, a properly designed experiment should have equal numbers of “same” and “different” presentations.

Having challenged you above to have your existing data properly analyzed, I would like to add an additional challenge. Since your test procedure was basically sound except for an imbalance between “same” and “different” presentations, and since you apparently still believe that some of you do have the ability to discriminate audibly between the two setups used in the test, you ought to conduct a followup test under relaxed, optimal conditions in which you attempt to gather statistical evidence for this belief, using only individuals who claim to have this ability. Conduct enough trials that the implications of the data become clear one way or the other, and publish the results in Stereophile. I believe that you have an obligation to take up this challenge, unless you are willing to give up your belief on the basis of the overwhelming contrary statistical evidence which your November article (properly analyzed) provides.

2) Second, I refer to Robert Harley’s editorial (December, pp.5–13) in which he comments on Roger Lagadec’s Audio Engineering Society preprint #3002 from last September’s Convention in Los Angeles. In his paper Lagadec discusses the nature of the roundoff error incurred in the use of a digital fader, and the influence of the use of dither on these errors. He presents graphs of the short-term error noise power, and claims that they expose a potential deficiency in digital signal processing and dither theory. These are the claims that RH latched onto in his editorial. The facts are as follows.

Lagadec’s statements about undithered digital faders are correct, but are certainly not new, and constitute one of the best-known illustrations of the need for properly applied digital dither. But he does not apply proper digital dither when he goes on to discuss this question in his paper. Indeed, his paper does not even identify the type of dither he used in his experi-
"Get out your checkbook, Michael." — Robert Harley, technical editor, Stereophile, in his Aug. 1990 review of the Theta DS Pro basic

Robert Harley on his friend Michael:
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ments, even though the nature of the dither is crucial. During questions after his presentation and in the course of a long subsequent discussion (at which I believe Robert Harley was present), I ascertained that Lagadec's experiments actually used rectangular-pdf (RPDF) dither of 1 least significant bit (LSB) peak-to-peak amplitude. As we have repeatedly pointed out in our papers, this represents an inadequately dithered situation, in that it does not eliminate the signal-dependent noise modulation caused by the arithmetical rounding operation, but only eliminates the signal distortion. The noise-modulation artifacts remaining are well known, are quite audible on suitable signals, and are the cause of the short-term error noise variance which Lagadec criticized.

I pointed this out to Lagadec, and emphasized that proper triangular-pdf (TPDF) dither of 2 LSBs peak-to-peak amplitude, as we have been recommending for years now, would totally eliminate the noise modulation and, I believed, also the short-term error noise power variance "problem." On the latter point I could not be definite until I had conducted the relevant experiment—see Larry Archibald's comment (December, p. 290). I asked Lagadec why he had shown results only for the known improperly dithered (RPDF) case, and his reply was that the TPDF-dithered case behaved similarly. I questioned this statement, but reserved judgment until I had had the opportunity to verify my beliefs.

This I did immediately upon my return from the AES Convention, and my experiments confirm what I hypothesized at the time—the "problem" does not occur when the proper TPDF-dither is used. I enclose the simulations which I ran at home on my HP-28S; they duplicate Lagadec's graphs for the RPDF case, and go on to show that the short-term error noise variance with TPDF-dither is no different from the expected behavior, and not at all like the short-term behavior with RPDF-dither which Lagadec criticizes. In other words, current theory correctly predicts the behavior of roundoff error in digital systems, and confirms the necessity of TPDF-dither for proper operation.

So why did Lagadec only show behavior in the known-deficient RPDF-case? I do not know. This is rendered even stranger by the fact that Sony's current digital editing system (the model DAE-3000) offers both RPDF- and TPDF-dither as user-selectable options, so that Sony is presumably aware of their relative merits/problems. In numerous experiments in our laboratory we have never found a case in which TPDF-dither produced any audible artifacts, whereas the defects of RPDF-dither have been repeatedly demonstrated. These conclusions apply to any input signals, whether subjected to digital fading or not. This is what I maintained in my discussion with Lagadec last September, and what I assert even more confidently now that I have conducted further confirmatory experiments. Lagadec's paper strikes me as a misleadingly incomplete analysis of a well-known problem, which implies the existence of a deficiency only because it (for some reason) investigates only the behavior of an inadequately dithered digital system. I am dismayed that the December editorial has given such publicity to what I view as a flawed piece of research. I must, however, point out that, contrary to the implications of RH's "As We See It" and Archibald's comments, Lagadec himself (in both his paper and your subsequent discussions) was careful not to claim that the "defects" which he thought he had uncovered were actually audible, but only to speculate that they might be inaudible. Our research shows that, with proper dither, these "defects" are nonexistent, and it is consequently not surprising that they should thus be inaudible. There certainly is equipment out there which does not use TPDF-dither, and suffers audibly from this omission, but this is due to an error in design and not one in the underlying theory.

3) Third, I was thrilled to see Larry Archibald agreeing with me regarding audible differences between amplifiers (December, p. 290), namely that if their measured imperfections are small enough they sound identical. Archibald characterizes this statement as a logical truism—I had thought that Stereophile's position was the opposite, that is, that amplifiers which measure similarly well do not necessarily sound indistinguishable. Indeed, you have in the past claimed to hear many such differences which are unrelated to well-known measurement criteria. Note the corollary to the above truism: if amplifiers do not sound the same, then there

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4 The initials "pdf" stand for "Probability Density Function." This is simply the way in which the spread of random numbers representing the digital dither is expressed. For example, if every random number between the nominal signal value and the ± limits is equally likely to occur, this is "rectangular" pdf dither. If the farther away from the nominal value the random number is the less likely it is to occur, this is a rough description of "triangular" pdf dither. —JA
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must be measurable differences between them. Welcome to the rationalist camp, *Stereophile:* Yes, there are no mystical differences between amplifiers.

4) Fourth, and last, it has not escaped my attention that you have studiously ignored the challenge which I issued at the end of my letter published in November (pp. 41–43). I have in this letter issued two further challenges to you to substantiate your expressed views. We shall see whether you are courageous enough to accept them.

**Stanley P. Lipshitz**
Audio Research Group, University of Waterloo
Waterloo, Ontario, Canada

Stanley et al, will you accept that these tweaks produce an audible difference if just one listener can reliably detect that difference under blind conditions? We will be taking you up on at least some of these challenges. Stay tuned, readers. Film at 11.

—JA

**Okay, yet one more on 78s**

Editor:
A letter in your October 1990 issue inquires about the availability of equipment for the playback of 78s.

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**Does anyone repair APTs?**

Editor:
My 12-year-old Apt/Holman preamp suffers from right-channel fade and dropout, and only from the main output, not headphones. Apt Corp., of Cambridge, MA, went out of business 3–4 years ago. . . Is there a repair source for this unit?

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US/The Netherlands: Peter W. Mitchell

The public debut of Philips's digital compact cassette (DCC) was the biggest event at the Las Vegas CES. It's a safe bet that every major audio magazine will be publishing stories about it this month or next. The debut began with a large press conference that drew a crowd of about 200 audio journalists. Philips executives laid out the logic underlying the DCC's design, how it will be marketed, and the technical principles of its operation. Except for an awkward moment when a cassette-well door on a prototype DCC deck refused to open, the presentation was persuasive and the free buffet supper—featuring sinfully delicious lamb chops—was the best I've tasted at any CES press conference in years. During the next two days audio writers were invited upstairs in smaller groups of 10 to 20, to ask questions and hear the system in a hotel-room setting.

There are three stories in the DCC debut: what it sounded like, how it works, and how its performance was refined. Of these, the last proved to be the most surprising.

Sound

A DCC recording uses only a fourth as many bits per second as a CD. Since the DCC is intended to be a mass-market product, and since the CD has already been accepted as the mass-market standard for sound quality, Philips set up a demonstration whose aim was to illustrate that the DCC provides CD-quality sound in a smaller and conveniently home-recordable package. For each group of a dozen or so audio writers, Philips played a comparison of CD vs DCC sound through a system of good but not ultimate quality, a system that might retail for between $5000 and $10,000.

The signal from the CD player was fed to a preamp and also to a prototype DCC encoder/decoder. By the time the system goes into production the DCC processing circuits will have been shrunk to a handful of ICs that will fit within a standard-size cassette deck; at present the circuits fill a cube about 2" on each side. The DCC signal was encoded for recording and then decoded for playback, but was not actually recorded on tape. (In principle, that should not affect the comparison, since the system has enough error-correction capacity to handle normal tape imperfections.) The output from the DCC unit was precisely matched in level to that from the CD, and a switch enabled an A/B comparison between the CD "original" and the encoded/decoded DCC "copy."

How did it sound? "It was not obviously flawed." This is an audiophile reviewer's cover-your-butt way of saying that he didn't hear any difference but doesn't want to go out on a limb and say that the sound was identical, because he doesn't want fellow reviewers to think him cloth-eared. In fact, most of the people I spoke with afterward heard no difference in most of the comparisons. Some of the invited writers challenged the system with their favorite CDs of music or test signals. Ironically, as I will explain later, two widely used test signals, pink noise and pure sinewave tones, are very useful for detecting faults in analog and conventional (linear PCM) digital products but are especially easy for the DCC to handle. The most challenging test may be simple music, a signal that has energy at several frequencies but also has empty spaces in the spectrum, in which the ear might hear low-level artifacts.

One writer felt that the DCC's noise floor was not quite as low as that of an optimally dithered CD (notably the low-level glide tone on the CBS test disc). Others felt that the DCC sounded slightly brighter and coarser than the CD. However, when the A/B switch was operated there was a switching transient (a short
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noise burst) and an audible time offset caused by slight delays in DCC encoding which might have produced an illusion of a sonic difference even where there was none. I remained after a group demo and was treated to an additional private A/B comparison in which I selected CDs that I thought would be particularly revealing, sat in the optimum stereo-center seat, and operated the A/B switch myself. I soon became convinced that I heard a slight difference (B was brighter than A). Then, after I deliberately lost track of the switching order, I found it easy to persuade myself that A sounded slightly brighter than B—indicating that my perceptions were indeed being affected by the switching transient.

Of course, conditions were not conducive to the most critical evaluation. The all-Philips playback system (Philips electronics and four-way Philips speakers) did not seem as transparent and revealing of subtle differences as, for example, a system based on Apogee Stage speakers. And while the Philips personnel thoughtfully switched off the room's noisy air-conditioning unit during the comparisons, the ambient noise level was still higher than in most homes.

So I tried to think of a way to enhance the audibility of any subtle flaw the DCC might have. Two possibilities immediately came to mind. First, since the DCC uses only a fourth as many bits as the CD, its handling of low-level hall ambience might be impaired, especially if the compressed digital bitstream is not optimally dithered to minimize quantizing distortion. Second, one historically popular way of boosting the apparent information-carrying capacity of a limited channel is to use matrix encoding.

For example, stereo FM radio produces an illusion of decent sound by combining mono FM (an L+R signal having inherently wide dynamic range and fairly low distortion) with an L-minus-R subcarrier that has high distortion and limited range. The poor quality of the L-R subcarrier is often masked by the much louder L+R portion of the composite signal. Similarly, the analog LP began as a low-distortion, wide-range medium that used purely lateral modulation for its mono (L+R) information; then it was converted to stereo by adding an L-R stereo "difference" signal as a vertical modulation that has much higher distortion and a very limited dynamic range.

This is mathematically equivalent to modulating the two walls of the LP groove at 45° with separate left and right signals. But the vertical/horizontal picture leads to a clearer understanding of the medium's limits. In the early days of the stereo LP there were great debates in hi-fi magazines about whether the improved perspective of stereo was valuable enough to offset the new distortions (pinch effect, etc.) that became a problem when the stylus had to detect deliberate vertical modulation.

Historically, one of the most important aspects of an LP mastering engineer's job was to artfully limit the vertical excursion of the stylus in ways that didn't obviously compromise the sound. It was crucially important to make sure that the cutting stylus could never rise completely out of the lacquer (producing a discontinuous groove) or penetrate all the way through to the bottom of the acetate and scrape the glass or metal backing plate that the lacquer was coated on. The stereo LP, even more than stereo FM, succeeded because most of the time the L+R (horizontal) portion of the signal is much louder than, and effectively masks the flaws of, the L-R (vertical) stereo difference portion of the composite modulation.

There's a very easy way to discover how well any audio medium handles low-level ambience, and also to learn whether it uses matrix encoding to mask its limitations: listen to the L-R portion of the signal separately, without the louder L+R portion. In this mode one can also listen for variations in the level or timbre of the L-R signal, which may be caused by the two channels going partly or wholly out of phase at high frequencies—a common fault in phono pickups, analog tapes (both cassette and quarter-track open-reel), and early CD players. In stereo playback this fault causes problems in soundstage imaging. In FM broadcasting it causes severe dulling of the highs (and, in severe cases, comb-filter coloration) when a stereo broadcast is heard in mono.

Anyone who still has the classic Apt/Holman preamp can do this test easily: just rotate the Mode knob from Stereo to the L-R position. To achieve an equivalent result, I asked the Philips folks to disconnect the speaker wires at the back of the amplifier and connect the wires from one speaker to the left and right "hot" terminals, so that the speaker would reproduce just the L-R portion of the stereo signal. After a brief hesitation while they won-
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dered if this connection might risk the amplifier's stability, they proceeded to do it.

I was impressed, and a little surprised, by this cooperative attitude. It suggested that although they hadn't tried this test themselves, the Philips people were so confident of the DCC's sound quality that they didn't expect to be embarrassed. Their implied vote of confidence was doubly impressive because by the time I suggested this rewiring of the demo system, the next group of audio writers had arrived—and when they heard about the proposal they were as eager as I to hear the result. This group included Michael Riggs, now an editor at Stereophile, and Ken Pohlmann, whose informed writings on digital audio are published in several big-circulation consumer and pro audio magazines. If the L-R test revealed a flaw in the DCC, the bad news would be published far and wide.

Not to worry; the DCC passed with flying colors. To challenge it, I chose a nicely recorded Philips CD of Schubert songs for solo voice and piano. In the L-R mode the soprano voice, imaged precisely in the center of the stereo stage, was substantially canceled out, dropping in level by about 20dB. The direct sound of the piano also declined in level. With most of the low-frequency and midrange body of tone removed, what remained were high-frequency harmonics and all of the recorded hall ambience, including the delicate tail end of the reverberation. Recall that the DCC encoder was still handling the full stereo signal; the L-R subtraction took place only at the amplifier output. As we listened alternately to the CD and to the DCC "copy," even the L-R mode did not reveal any clear difference in timbre, ambience, or low-level resolution.

Of course, a CD is not itself an absolute standard of sound quality, especially since most available CDs were recorded through the Sony PCM-1610 or 1630—digital processors with sonic limitations of their own. At the show the Philips folks mentioned that the next phase in refining the DCC encoder would involve comparisons with new CDs that were recorded with "20-bit equivalent" oversampling delta-sigma A/D converters—for instance, the Ultra-Analog (formerly dbx) converter used by Chesky1 and the Bitstream A/D that is now used in some Japanese studios.

To sum up: the DCC, while using only a fourth as many bits as the CD, successfully duplicates average-quality CD sound. If it isn't an exact match, the disparity is about on the same scale as the differences among CD players. We don't know yet whether it may prove unsatisfactory by high-end audiophile standards, or whether it will sound as good as the very best R-DATs. But it is better than it needs to be for the mass market—and is light-years ahead of the analog cassette that it is destined to replace.

Technology
The impetus to develop DCC came not from a technical breakthrough but from a marketing problem. When Japanese manufacturers launched the R-DAT format five years ago, they proclaimed it the digital successor to the analog cassette, just as the CD is supplanting the LP. An interesting idea, but is it likely?

At the high end of the home recording market, and among hi-fi hobbyists who are actively involved in taping, the answer is yes. It's worth remembering that Japanese hi-fi gear is developed first for the domestic market and is then sold to the rest of the world. Japanese audio hobbyists love tape recording. (Open-reel tape machines continued to flourish in Japan long after they died in every other market.) And because Japanese hi-fi buffs like to assemble their own compilations of favorite music, and to fool around with sound effects, the first DAT recorders were designed to facilitate easy digital dubbing from CDs. In early R-DAT brochures the new format was presented as the heart of a complete living-room digital studio for every hi-fi enthusiast. Of course, when major record companies understood this, they launched a legal and political war against DAT that is still going on.

Even assuming that R-DAT might someday capture the entire market for living-room tape decks, is that where the analog cassette market is? Not at all. This year Americans will buy more than 30 million cassette mechanisms, but only 3 million will be AC-powered living-room decks. The other 90% operate in motion: headphone portables, radio/cassette boomboxes, and car stereos. The majority of these are play-only; even those equipped for recording (eg, boomboxes and some headphone portables) are used mainly to play prerecorded tapes.

1 And by Stereophile for the CD transfer of their Brahms piano album in the form of the Manley A/D converter. See Robert Harley's report elsewhere in this issue's "Update." —JA
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In the US there are as many cassette mechanisms as people. The average household has three. Worldwide, a billion cassette mechanisms are in use. This year people will buy 180 million new machines and a billion prerecorded music cassettes. Another billion and a half blank cassettes are sold annually, many for non-musical applications (telephone answering machines, taping college lectures, journalist interviews, talking books for the blind, et al).

Philips invented the cassette format in 1963 and may be more aware than anyone else of its worldwide dominance as the leading carrier of recorded music. Looking at the numbers, Philips concluded that regardless of how successful the R-DAT might be among hi-fi hobbyists and living-room component systems, these account for only a tiny share of the market. There is no possibility that R-DAT could be the true digital successor to the analog cassette. It faces two fundamental obstacles: cost and software.

Sony and Panasonic have done an impressive job of shrinking the price of DAT recorders from $2000 to $800. But how much lower can they go? A DAT mechanism is a miniature helical-scan VCR, with many precision parts in exacting alignment. If mass-production is the key to getting the price down, consider camcorders; they sell in the millions and still cost $500 to $1000 apiece. Yet CD players sell for as little as $99, while analog cassette mechanisms add less than $50 (often only $20) to the retail price of a product. My teenage niece has a $180 boombox that contains AM/FM radio, cassette, and a CD player that proved surprisingly com-

petent when I connected its Line outputs to my brother's stereo component system. Could R-DAT conceivably have any future in this application, or in $40 headphone portables? Not a chance.

As for software, copying discs onto tape is OK for hobbyists, but most people don't want to bother. They just want to buy music in a convenient package and enjoy it. There are tens of thousands of software titles available on analog cassette but only a few hundred on DAT. Sony recently announced plans to double the production capacity for prerecorded DAT at its Indiana factory (see Robert Harley's report). But that will still be mainly for Sony Classics and a few independent labels that want to produce DAT recordings for sale. Sony hasn't even managed to persuade the pop-music division of CBS Records (which it owns) to release DAT versions of Michael Jackson and Bruce Springsteen hits, much less the other large record companies (RCA, Warner, Arista, et al) that remain united in their opposition to DAT.

Even if record companies accept DAT, recordings are duplicated by dubbing in real time onto racks of Sony DAT recorders, a slow and costly process. If enough demand developed, they could adopt Sony's $100,000 Sprinter, a high-speed duplicator that uses a magnetic "contact printing" process to transfer the magnetic pattern from a master tape to DAT duplicates. Still, while CDs now cost only a buck apiece to press, blank DAT cassettes cost about $5 in large quantities. Each DAT is a miniature videocassette, with a hinged door and a dozen internal parts, and the tape is a metal-powder formulation that is expensive to manufacture.

The bottom line is that prerecorded DATs (if record companies were willing to produce them) would always cost substantially more than the equivalent CD. That's enough to limit their appeal and probably rules out R-DAT as the digital successor to the analog cassette.

Philips concluded that the digital replacement for the analog cassette would have to be cheap enough to be a true mass-market product, be amenable to economical high-speed duplication, be supported by major record companies, and be readily adaptable to various physical forms (headphone portables, slot-load car players, and AC-powered home decks). So, rather than designing new mechanisms from the ground up, Philips decided to base the design of the DCC on analog cassette mechani-
This is especially true in the audio field where everyone, from studio engineers to manufacturers and reviewers, needs a solid benchmark for accurate sound.

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KEF Uni-Q is an engineering breakthrough: the first truly coincident-source driver.

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If you appreciate music, audition the Reference 105/3’s. For any audiophile system, they are “standard” equipment.
isms that manufacturers around the world already produce in vast quantities at very low cost—from the $20 headphone portable made of plastic parts to the slot-load car player and the high-performance dual-capstan home deck. Many analog cassette mechanisms can be converted to DCC use by substituting a different head and adding a few small parts.

The DCC cassette has the same exterior dimensions as the analog cassette, runs at the same 1¼ips tape speed, and has the same 90-minute running time (45 minutes per side). 120-minute tapes will also be produced, mainly to offer home recordists the same 2-hour capacity as R-DAT. But home recording is a relatively minor part of the product concept. More importantly, DCC cassettes have the same playing time as the CD (80-plus minutes), so prerecorded DCC tapes can be mass-produced from the same masters that CDs are cut from.

As a bonus, the DCC offers the mass market a painless transition to the digital age: DCC machines will also play the dozens of analog cassettes that every home already possesses. (Compatibility and worldwide standards have always been high priorities at Philips.) The idea is that when your present cassette machine wears out and you go to buy a new one, you’ll be tempted to upgrade to a DCC machine that will play all your old tapes and also provide CD-quality sound from new tapes. The analog playback will include Dolby-B since that is the world standard for prerecorded cassettes. Other manufacturers may include Dolby-S decoding, but Philips is reluctant because Type S is not a major factor in the prerecorded cassette market. (That may change by the time DCC decks arrive in 1992. Two large US tape duplicators recently converted their machines to Dolby-S encoding, which is said to be playback-compatible with Dolby-B.)

Of course, there are important differences between analog and digital cassettes. Analog cassettes have a bulge along one edge to accept the heads; DCC cassettes are uniformly slim, so it is easy to carry several in a shirt pocket. Analog cassettes are symmetrical, since in many machines you flip the cassette over to access the Side B tracks. All DCC machines will use dual-capstan auto-reverse mechanisms, so the DCC cassette is never turned over. It has reel hubs and access holes only on the bottom; the flat top face is covered by a big label.

A standard DCC machine will record and play digital tapes but won’t record analog cassettes; it is playback-only. Reason: it is bidirectional, and adding dual erase and record heads for both directions would be expensive for a capability that few people would use. For those who still want to record analog cassettes (for friends, or to play in the car), Philips suggested that the most cost-effective solution would be a dual-well dubbing deck, DCC in one well and analog record/play in the other.

Several years ago, when Apple introduced the first Macintosh computers, Steve Jobs began a presentation to the Boston Computer Society by tossing a handful of then-new 3.5" mini-floppy disks into the audience. Computer buffs, familiar with the vulnerability of conventional floppies, were startled and impressed by this cavalier behavior—especially when Jobs demonstrated that the mini-disk didn’t need a protective envelope but could be carried bare in a shirt pocket. The plastic disk housing contains a sliding shutter that seals the case shut when not in use, protecting the disk from fingerprints and dust.

Philips borrowed the same great idea for the DCC. Unlike analog cassettes, which are open along one edge and vulnerable, the digital cassette has a sliding metal shutter that protects the tape when it’s not in the machine—forever eliminating awkward and easily broken “jewel box” carriers. Prerecorded DCC tapes will come in a transparent sleeve with program notes, but away from the living room you’ll carry only the self-protected cassette. This fumble-free convenience is enough to make DCC the digital medium “for the rest of us.” The sliding shutter doesn’t add much to the cost of the DCC cassette; I paid only 39¢ for the 3.5" disks I use in my computer.

According to Philips, the metal-powder tape required for R-DAT is costly, not amenable to conventional high-speed duplication, and unstable at the high temperatures that may occur in a closed car on a summer day. So the DCC was designed from the ground up to use low-cost tape, specifically video-format chromium dioxide, which is produced in vast quantities for VCRs. A Philips spokesman mentioned that with CrO₂ tape and a housing that is not much more complex than an analog cassette, blank DCC cassettes may be priced only slightly higher than premium-grade analog tapes, around $5. (For comparison, blank R-DATs cost $8 to $15 at retail.)
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CrO₂ tape can reliably record wavelengths as short as one micron (1 μm or one-thousandth of a millimeter). At a tape speed of 4.75 cm/s, this is equivalent to a maximum frequency of 47.5 kHz. Since each cycle corresponds to two bits (a 1 followed by a 0), the corresponding data rate per track is 95,000 bits per second (bps). By recording on eight narrow tracks, the DCC records a total of about 760,000 bps. About half (384,000 bps) are audio data; the rest are used for error-correction coding. For comparison, the data rate in the CD is 1,408,000 bps (44,000 samples x 16 bits/sample x 2 channels). Thus the data rate in the DCC is about one-fourth that of the CD. Since the sampling rate is the same, the DCC records an average of only four bits per sample. Low-level noise is added to "dither" the signal and thereby minimize any quantizing distortion.

In addition to the eight tracks of digital data, a ninth track will contain subcodes, timing codes, a table of contents, and (optionally) up to 400 characters per second of text, which may be shown either on a built-in display or a separate video screen. The text could be used for song lyrics, program notes (synchronized with the music), multilingual opera librettos, background stories about the recording sessions, etc. Philips proposed a similar text display nine years ago for the CD, but the idea was ignored by record companies and most manufacturers, perhaps because it would require extra work to prepare the text for encoding with the signal when the master recording is cut. (Most CDs don’t even have indexing of the sections of a symphonic movement, which takes relatively little effort to implement.)

By monitoring the subcode track during fastwind, a DCC player can cue quickly to the beginning of a song, display timings, play songs in any order, and generally provide the same operating conveniences as a CD or R-DAT. Cueing to another song may require a few seconds, as with R-DAT, instead of the near-instant cueing that CD provides. Since all DCC tapes will be recorded in auto-reverse format, the last song on Side B will be in the same section of tape as the first song on Side A, requiring only an auto-reverse maneuver (reverse the direction of tape motion and rotate the head 180°) to access it. If you’re making your own recordings you’ll have to plan ahead so that the automatic reverse at the end of the tape won’t leave a two-second gap in the middle of a movement.

Fig. 2. The DCC digital/analog head, showing the reversible disposition of digital heads 0–8 and analog heads A1 and A2.

(In this respect R-DAT is superior, with up to two hours of continuous, uninterrupted recording time.)

The DCC combo head has gaps for the nine digital tracks in its upper half, plus two gaps for analog tracks in its lower half. When recording or playing Side B, the head is flipped to place the digital gaps on the bottom (fig.2). When you load an analog cassette, sensing pins automatically flip the head to put the analog gaps on top for side A. (Incidentally, since DCC tapes don’t turn over, Philips wants to call the two tape directions the A and B “sectors” rather than “sides.”)

The tiny head gaps are formed by a lithographic thin-film process similar to that used to create microscopic layered circuits and conductive paths in silicon IC chips. Philips took advantage of this to devise a clever trick. First, the nine digital recording gaps are formed in a row, each 0.19mm high so that tracks of that width will be recorded on the tape. A thin insulating layer is added, and digital playback gaps are formed on top. Each is aligned with the center of the corresponding record gap but is only 0.07mm high.
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Result: since the short playback gaps read less than half of each recorded track, the tape can be misaligned relative to the head by as much as 0.12mm (plus or minus 0.06mm) and still play correctly. With this much tolerance for slop, DCC machines can use ordinary cassette mechanisms; costly machined parts and precise alignment won’t be needed. (Incidentally, although the recording and playback gaps are separate, you can’t use them to monitor the signal off the tape while making a recording. The gaps are so close together that magnetic coupling occurs between them.)

A DCC machine communicates with the outside world through a standard Sony/Philips digital interface, using the same 16-bit PCM codes as a CD player or R-DAT. Thus its digital input accepts 16-bit data from a CD player, and its digital output produces normal 16-bit data that can be fed to an outboard D/A converter or may be recorded on any conventional digital device (R-DAT, recordable CD, et al). In principle, you could even record live music on a DCC deck and use its digital output to master a CD.

As in consumer R-DAT decks, digital dubbing is regulated by an SCMS circuit that allows any CD to be copied digitally onto tape but codes the copy so that it cannot be further copied. The analog input of a DCC deck is converted to PCM code by a normal 16-bit A/D converter, and the playback stage uses a conventional 16-bit D/A to generate its analog output. The choice of A/D and D/A circuits (conventional multibit, MASH, Bitstream, or whatever) will be up to each manufacturer of DCC machines.

The heart of the DCC is a complicated block of circuitry called the PASC (Precision Adaptive Sub-band Coding), which a few years ago would have required a roomful of computer power and hours of processing time to do its job— which is to compress the incoming 16-bit digital data to an average of 4 bits per sample for recording and, during playback, to re-expand the 4-bit data to 16-bit output codes. As explained on p.87 of the January issue, the encoding is done by a microprocessor programmed with information about the psychoacoustic limits of human hearing. The goal is to provide accurate coding of sounds we hear but not to waste bits coding information that we can’t hear.

The incoming 16-bit data stream is fed to a digital filter that divides the audio frequency range into 32 sub-bands, analyzes the signal content in each band, and uses only enough bits to encode the portions of the signal that are above the human threshold of hearing. The threshold varies with frequency (the Fletcher-Munson effect). A person with normal hearing can hear 2kHz at a very low 0dB sound-pressure level, but at 30Hz you can’t hear anything softer than about 60dB spl anyway.

More important, the threshold at each frequency varies from moment to moment according to the strength of sounds at neighboring frequencies (“masking”). Thus when an 80dB tone is present at 1kHz, your hearing threshold at 2kHz rises temporarily from 0 to about 50dB spl. Then, as long as the 1kHz tone is present, the system can safely discard any information below the 50dB level in the 2kHz sub-band—which may include the second harmonic of the 1kHz tone. If you wouldn’t have heard it anyway, you won’t notice its absence.

Music, unlike noise, usually contains energy at only a few harmonically related frequencies. So at any given moment many of the 32 bands are likely to contain little or no energy. That frees many unused bits that can be assigned to provide more accurate coding in the bands that contain strong signals. This dynamic reallocation of bits between sub-bands plays a large role in the reduction of the overall bit rate.

When fed a pure tone at a single frequency, nearly all of the available bits can be assigned to the sub-band containing this frequency, coding it with very low distortion. Conversely, when tested with pink noise, which contains equal energy in every band, all bands are active and only a few bits can be used for each; but since it is noise, high accuracy at each frequency isn’t important. The most challenging test signal might be music of moderate complexity, exercising enough bands to use up the system’s bit capacity while leaving enough “open space” in the sound that any faults could be heard.

Final development

According to Philips, the basic engineering design of the DCC system was completed two years ago. With a normal product the engineers would then measure a prototype to certify its performance with test signals, and would listen to it to make sure there was nothing obviously wrong. But since the DCC’s encoding varies dynamically according to masking thresholds and other psychoacoustic criteria, its perfor-
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formance cannot be judged with conventional test signals. In the final analysis its sound quality can only be judged by ear. It sounded OK to the engineers, but masking thresholds may vary, and it is well known that some people hear sonic faults more acutely than others do. Moreover, golden-eared listeners aren't just born; they are trained (or train themselves), learning what to listen for and improving their skill with long practice.

So, to evaluate whether the DCC could match the sound of CD, the designers turned to the trained listeners who are employed by the quality-control department at Philips Records. Listening to test signals and music, they did hear differences. So for the past two years Philips has been refining the PASC encoder, submitting it to listening panels, computer-analyzing the listening data with statistical programs to distinguish real differences from random chance and delusion, and fine-tuning the encoder again. Reportedly, after the latest round of refinements even the company's most golden-eared listeners can no longer distinguish the DCC from a CD source.

Thus one of the largest electronics companies in the world found itself in the unusual position of fine-tuning the performance of an important new product in the same way the smallest cottage-industry audiophile designers do—by listening to it, with recorded music. And the company's engineers found themselves in the slightly humbling position of having to improve a product's design because non-engineers said it didn't sound quite right.

The digital compression scheme has an interesting consequence. A DCC recorder accepts 16-bit PCM codes from a CD player, shrinks the bitstream to an average of four bits per sample for recording, then in playback regenerates 16-bit PCM output codes. The playback may sound the same as the original input signal, but the codes are not the same: the playback is a "cleaned up" version of the signal. The PASC processing puts the signal on a diet, stripping away the low-level musical harmonics that were below the dynamic masking threshold. Thus the playback signal, no matter how faithfully it may duplicate the original sound, is not a clone of the original code.

You may recall that when the record industry launched its legal war to prevent the R-DAT from being sold in the US, one of its alleged concerns was that, if consumers acquired an unlimited ability to make "clone" copies of the digital code in a CD, record companies would effectively lose control of their expensively produced digital master recordings. Hypothetically, pirates with R-DATs could swamp the market with perfect clone duplicates of master tapes, depriving the record companies of their economic base. Of course, this idea contained more paranoia than reality; anyway, for what it's worth, the DCC doesn't make digital clone copies. That may help to explain why some record companies, at least, have expressed support for the DCC and will be mass-producing prerecorded DCC tapes for sale.

Of course, the strongest support for DCC came from Philips's own PolyGram group of companies (Philips, DG, Archiv, Decca/London, L'Oiseau-Lyre, ECM, and Polydor), promptly followed by the EMI group (Capitol/Angel), BMG (RCA, Ariola, Arista) expressed interest in DCC but, like the rest of the record industry, wants Congress to impose a royalty tax on blank tape before the company will support any new recording medium. However, the momentum that seemed to be building in Congress to consider a royalty law was aborted by the Iraq war. Congress intends to devote itself to matters deemed more important than a squabble between branches of the entertainment industry.

Philips has acquired two major partners in the DCC project. In the US, Tandy Corp. announced last fall its intent to be the first licensed manufacturer of DCC machines and tapes. Tandy is already North America's largest electronics manufacturer and, through its 7000 Radio Shack stores, our biggest retailer of consumer electronics. The company is expanding its role still further by launching new store chains (Video Concepts, The Edge in Electronics) and by being first with new technologies like notebook computers and the DCC. The decks and their digital circuits will be produced at Tandy's computer factory in Texas, while the tapes will come from Tandy's (formerly Memorex's) magnetic media plant in California, a major producer of computer disks as well as audio and video tapes.

In Japan, Matsushita (parent of Technics and Panasonic), which has had a technology-sharing agreement with Philips for over a half-century, has also signed up for DCC. In fact, according to a Philips executive, Philips and

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2 See this month's "As We See It." —JA
Matsushita will be "co-licensors" of the DCC, in the same way that Sony and Philips are co-licensors of the CD. Companies that want to make DCC decks or tapes will have to get a license, pay royalties to Philips or Matsushita, and make sure that their products conform to the official design standard.

In contrast, standards for R-DAT were developed by agreement among several manufacturers and are unenforceable. Example: since Congress failed to pass an SCMS law last year, the inclusion of SCMS in R-DAT decks is essentially voluntary, enforced only by Japan's Ministry of Trade and Industry. Companies in Korea and Taiwan are free to make R-DAT decks without SCMS if they wish. But in the case of DCC the SCMS circuit is mandatory; it is a condition of the license.

All in all, the introduction of the DCC was the most impressive product launch since the CD, nine years earlier. If record companies get behind it—a crucial if—the DCC has a very good chance of knocking off both the R-DAT and the home-recordable CD as consumer products. Philips appears to have met its goal of combining CD-quality sound with the recordability, convenience, and compact size of the cassette.

The first DCC machines probably will be AC-powered home decks and may be priced in the $600 range when they appear next year. By that time R-DAT decks may also be selling for $600, so we could see a brief format war between the two digital tape systems. But it won't last long; second- and third-generation DCC machines, notably play-only portables, car decks, and DCC boomboxes, could drop to the $200 level within a few years. Audiophiles and tape recording hobbyists may continue to prefer R-DAT, if only for its longer uninterrupted recording time, but DCC is likely to prove the true successor to the analog cassette. It's what my sister—and everyone else—will want.

The largest remaining uncertainty is whether enough record companies will produce prerecorded DCC tapes to make it a mass-market success. At the moment the record companies that have committed to the DCC are all European. If the Recording Industry Association of America were to decide that the SCMS offers no protection and all digital recording formats must be fought until a royalty tax is passed, the US launch of DCC could be nearly as slow and painful as that of R-DAT.

If DCC gets the support of major record companies, and cuts the ground out from under R-DAT, Sony still has an alternative up its corporate sleeve: the tiny Digital Memo Recorder (DMR), a simpler and cheaper mini-DAT that uses stamp-size cassettes. The truly interesting format war between digital tape systems may feature DCC vs DMR. Stay tuned.

**France: Barry Fox**

Since taking over reins and reign at Philips, Jan Timmer (previously head of PolyGram, then head of Philips's Consumer Electronics Division) has given no personal interviews. The only exception was for the official magazine of the MIDEM music industry conference held in January at Cannes, in the South of France.

It would have been hard for Timmer to refuse the MIDEM organizers' request. This year was the 25th anniversary of the event, where record companies, music publishers, distributors, and music-industry trade bodies meet to do deals and sell each other the rights to sell records. This year MIDEM made Timmer "Man of the Decade," in recognition for his work in railroading through CD, and thereby revitalizing the record industry.

MIDEM is the world of the ever-young or the ever-would-be young. Balding men with pig-tails abound. Translated, "revitalizing" means a return to those halcyon days of the '70s when money for the record companies just grew on trees.

The journalist who interviewed Timmer in November had to undertake not to sell the story to any other newspaper. There was nothing particularly hot in the story, and no hint of the bombshells Timmer would drop when he gave the Keynote Speech at Cannes.

But first the background, which explains why what Timmer said has gone largely unreported.

Most of the deals made at MIDEM hinge on the rights to distribute music or music video recordings made by independent companies too small to have distribution networks of their own. The official venue is now the Palais de Festivals, home of the Cannes Film Festival, but much of the business is done at restaurants.
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This year the Gulf War took its toll. The major record companies—BMG, CBS/Sony, MCA, EMI, Virgin, and Warner Chappell, and many visitors from Japan—stayed home. The PolyGram stand was manned by a skeleton staff. A contingent from Sony’s UK Broadcast Division arrived before an edict from Japan said “no flying.” The Sony Brits showed DAT and HDTV but could not run the radio studio they had planned. And they had to hire a car and drive home, rather than fly.

Final figures showed that attendance was down from 8200 in 1990 to 6475 in 1991, with US participation down by at least 60%. Japanese attendance was also sharply down. Thirty stands remained shut or unoccupied. Organizer Xavier Roy admitted that he had thought of canceling.

But MIDEM went ahead. A posse of top brass from Philips and PolyGram flew in with Timmer for his Keynote Speech on “New Technology and the Market,” with an introduction by Sir John Morgan, President of IFPI. Earlier, a panel of ten experts and lawyers chewed the fat on the rights of authors (music composers) and what the industry calls “neighboring rights” (those of record companies). Most took far too long to repeat the same common claim—that there should be a tax on blank tape, to compensate for losses claimed due to home taping.

Timmer has clearly not forgotten how the record companies were either apathetic or actively opposed the idea of CD, ten years ago. CBS wanted to revitalize the LP with the CX noise-reduction system. CX sank without a trace and so, to all intents and purposes, did CBS.

At the dinner given in his honor, Timmer said he “forgave” those who had opposed CD. He also graciously acknowledged Sony’s work in making CD a world standard.

Timmer’s new mission is to sell the industry on DCC, the Digital Compact Cassette. Here history repeats itself. This time around CBS, now owned by Sony, is pushing DAT as the digital tape medium of the future. In his advance interview, Timmer had said:

“Now that we have the success of CD, the time has come to upgrade the good old cassette, which dates back to 1963. I believe a better digital version is what both the music and hardware industries need, and I am convinced this is going to happen. A digital tape can take off pretty quickly because a lot of the basic material is available in digital recordings anyhow. It’s only a matter of updating the machinery of the tape duplicators, and there we go . . .”

In his keynote speech, Timmer abandoned his script and paced the stage like a caged lion. He talked of “windows of opportunity” and how DCC offered a new one, like CD ten years ago. He then spoke his mind on home taping. Everything points to the fact that now that Timmer has joined Philips, he has finally lost patience with pigheaded attitudes in the record industry:

“The copying feature on a tape recorder is of benefit to both sides of the industry, hardware and software,” said Timmer. “Copying stimulated sales of hardware. So more prerecorded cassettes could then be sold. Recording represents not only a threat but an opportunity as well.

“We can’t put the clock back 30 years to a time when there was no cassette recording. Studies have shown that those who record the most also buy the most music. I believe that the advantages of the compact cassette in terms of copyright income far outweigh the disadvantages. Last year 1.6 billion blank cassettes were sold round the world, and 1 billion prerecorded music cassettes.”

Timmer spoke of the “spirit of Athens,” the IFPI meeting in 1989 when the hardware and

Philips President Jan Timmer, the man behind DCC.
The sole value of an audio system lies in its ability to evoke emotional pleasure through the accurate reproduction of a musical event.

Research by the community of individuals known collectively as Wadia, indicates that less than a billionth of a second of disturbance to the time-based information of the digital audio signal will cause listening fatigue and aural stress.

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software industries finally agreed on SCMS, which (as Philips's Solocopy) the record industry had previously rejected.

"The agreement proved very difficult to implement in the USA. The songwriters and music publishers (who have sued Sony for selling DAT) want to prevent the introduction of DAT. Personally I question the wisdom of that. I regret it. We must keep seeing things in perspective, not just in terms of how we divide the cake but how to make the cake grow.

"I have doubts about the wisdom of carrying the campaign to the extremes it has been carried. I hope my remarks will bring a sense of realism which is today missing. This futile debate overlooks the key issue that the ties between hardware and software must remain intact.

"It is also important to look at new technology as a way of giving a boost to business.

"I believe in the twin carrier concept, one a disc and one a tape. I believed that there was room for the LP and music cassette. I am convinced that the twin-carrier concept also applies to video. I am disappointed that the film industry missed the window of opportunity on video disc. But it is not too late. I now believe that in these times of digitization the good old compact cassette will increasingly be looked on as old-fashioned. The market is now ripe for the digitization of the cassette.

"Ten years ago, if we had listened to the skeptics on CD, the record industry would have missed its most important window of opportunity ever.

"In my view, recordable and erasable CD also fall within the scope of the Athens agreement. But there are over 20 different systems. In my view, the time has not yet come. We should not allow adventurers to take non-standardized products to the market. When we start to sell CD-R and CD-E, it must be with a well-thought-out plan on which all parties are agreed.

"I appeal to the publishers and songwriters to sit at the negotiating table and have discussions, not on what divides them but on working together. This is not a time for repeating the arguments of the past."

Why did Philips not name Matsushita as co-developer and co-licensor of DCC when the format was formally unveiled at Las Vegas?

"I don't deny that there were extensive discussions with Matsushita and other Japanese companies. But I don't feel that I should make a statement on their behalf. It is up to those companies to decide when to go public."

It becomes clearer every day that Philips expected Matsushita to make an announcement on commitment to DCC at the Las Vegas CES, but (under pressure from MITI, the Japanese government's trade body) Matsushita held back at the last minute. It is also clear that DCC negotiations with Sony still continue.

"It would be regrettable if we were to confuse the public with two competing systems. The announcement on DAT came too early. DCC is better for the public at large. I still hope that discussions with the Japanese will prevent this confusion."

It also became clear that Philips will launch DCC in Europe ahead of the US, to avoid a lawsuit like that which Sony now faces from the music publishers.

"We live by the spirit and letter of the Athens agreement. CD went late into the USA, after Japan and Europe. I do not exclude the possibility that if the debate in the USA is not resolved, we shall go ahead in Europe."

The music industry will not rest until it has won a slice of the blank-tape action. In Europe the record companies now pin their hopes on the EC, to implement European-wide legislation that will override the decisions of some governments (eg, the UK) not to tax tape. If this happens, it will inevitably put pressure on the US to come into line, too.

At the MIDEM copyright seminar, European Commission Administrator Daniel Franzione confirmed that the EC wants to have a package of legal measures—including remuneration for home taping—in place by the end of 1992.

Dr. Reinhold Kreile, President of the German copyright body GEMA, quoted diaries which showed that Mozart was worried about people copying his music 200 years ago. Kreile regretted that only half the EC population currently pays a levy on tape.

"He blames "the battle waged by the electronic, chemical, and hardware industries against the concept of a levy."

"Europe must not split on a levy," said Kreile. "The decision must be communal, on a community-wide basis. Royalties must be harmonized. Culture is putting its trust in the Commission."

Franzione warned that if individual governments could not agree to conform with the
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Berne copyright convention by the end of 1992, then the Commission might have to step in and consolidate rights throughout the EC. "Harmonization is a necessity," he emphasized.

This was music to the ears of Michael Freeguard, Head of the UK's Performing Rights Society. He accused the British government of being "hypocritical" for not having taxed tape when the UK's copyright law was recently reformed.

"Pressure from users swept away all concern for authors on the strength of talk about 'fair dealing.' It is only in the context of Europe that justice will be done. We look forward to the Community."

What Freeguard neglected to say was that the UK government had rejected the idea of a tax on tape because it saw no way of ensuring that artists whose work had been copied could be recompensated with the money collected on blank tape. Also, the IFPI's decision to lobby for Copycode (the CBS system which was supposed to prevent home taping) made it nonsense to tax tape to compensate for home taping.

Jean-loup Tournier, Head of the French rights body SACEM, complained that the public were "more stubborn today" over the issue of home taping. He admitted, however, that "We cannot know exactly what the public records. It is an impossible task. But we can make inquiries to find out what category of music is taped."

Michael Freeguard added, "This is no different from the situation we have at the PRS over collecting money from shops and restaurants and clubs that play music for customers. We can't detect. It's rough justice. But with experience we can make the justice far less rough than it would otherwise have been."

Significantly, not one of the ten people on the panel even mentioned the record industry's idea of using a smart card, or credit card to log recordings made, debit the taper, and route the money to the taped artist.

But in answer to a direct question on debit cards from a Finnish representative of the IFPI, Jan Timmer later made his views on the idea clear.

"I don't see it as a practical proposition. I must repeat my overriding argument that we should not concentrate too much on income that we think rightfully belongs to us, and we do not get. We should concentrate on the income we do get. It is simply not realistic to think of a device, a credit or debit card. It's a technical idea, not a sensible practical solution."

The Netherlands: Peter van Willenswaard

How can two channels of 16-bit audio be recorded on something similar to an analog cassette? The maximum bit rate in a linear track of a tape running at 4.76cm/s (standard compact cassette speed) is somewhere near 100kb/s which, as DCC offers eight parallel tracks, results in a total "space" of 768kb/s. Half of that space is consumed by Reed-Solomon interleaving, synchronization bits, and a 10:8 modulation scheme, so only 384kb/s are available for pure audio information. Now there is no way around Shannon/Nyquist, so in order to maintain 20kHz of audio bandwidth, sampling must be at slightly over 40kHz. (DCC supports both 44.1 and 48kHz sampling, but will also accept 32kHz-sampled digital broadcast.) 48 kilosamples/s and 384kb/s bit rate comes down to an average of 8 bits per sample for the stereo signal, so an average of 4 bits per sample remains for one channel. It all just had to fit in there to make DCC work as a digital successor to the conventional compact cassette! But how on earth . . .?

PASC

The answer developed by Philips is called Precision Adaptive Sub-band Coding, PASC. It is not an advanced form of data compression as used with computers or datalinks. Now traditional PCM systems try to create a total and near-perfect (given the limitations set by 16-bit linear coding) digital representation of the sound the microphone received. But PASC takes its point of reference at the other end of the chain: at the ear. The rule for PASC is to calculate what is audible and encode only that information, in a very efficient notation. Once it has done that, it reorganizes the digital infor-
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Philips converted an off-the-shelf analog cassette deck for their DCC demonstrations. Note the alphanumeric display on the machine's left.

information in such a way that it occupies the available space in an optimal manner (reallocation). Let us follow this process in more detail.

First the audio band is divided into 32 sub-bands. Surprisingly, these sub-bands do not follow a critical band topology (well known from certain theories modeling human hearing); they are all equally wide, roughly 700Hz each. DSP technology is now so advanced that (in the digital domain) it is possible to split the audio band into sub-bands and recombine them with a perfect result, without any time-domain or frequency-response errors. That is, with sheer unlimited computing capacity, in a lab. Implementation in a real-world chip is another matter; while Philips thinks that they have come far enough now to face the world, they feel even further improvements may be possible in the future.

Threshold of hearing and masking

The next step is performed in each frequency sub-band. The minimum loudness a signal must have to be at all detectable by the human ear is a function of frequency (fig. 3). This means that in each sub-band a certain threshold level can be defined and any information below that threshold can be discarded.

A second threshold phenomenon is masking. It is well known from research into human auditory perception under which conditions a strong frequency component will mask a nearby weaker one. A strong component will modify the threshold curve near its own frequency (more so above than below), thereby rendering nearby weaker components inaudible (fig. 4). You can hear a pen drop on the car-

4 A good overview of the material is given by Vaidyanathan in IEEE Proceedings, January 1990, pp. 56-93.
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softer one by a few milliseconds can mask that softer one. Even the reverse case applies: a soft sound preceding a louder may be masked by the louder one. If masking occurs, it depends on the difference in loudness and the distance in time, of course.5

As the sound is registered, the signal processor adapts the various thresholds in each sub-band according to the signal energy in that sub-band. The thresholds aren't static, but dynamically follow the signal content. This leads to a higher coding efficiency, as only what is above the threshold (i.e., what can be heard) is kept for coding.

It remains to be seen if PASC processing and coding take place on a strictly sample-to-sample basis. Gerry Wirtz of Philips refused to give conclusive answers here. My guess would be that this is not the case.

Be aware that sampling theory isn't primarily concerned with frequency but with bandwidth. Once the audio band has been divided up into 32 sub-bands of approximately 600Hz wide, during processing the sample frequency with which each band is scanned need only be a little over 1200Hz. (See Peter Mitchell's following discussion.) So despite the fact that quite a number of bands have to be looked into simultaneously, the total amount of data remains the same as for an un divided audio band. But there is no gain in efficiency here either.

Scale and mantissa

The next step is amplitude description of what remains above the threshold in each sub-band. Unlike PCM media, which use 16-bit linear quantizing, PASC uses a floating-point notation with a mantissa and a scale factor. The mantissa defines the resolution, and the scale shifts the reference point for the mantissa up or down the dynamic range. The mantissa is basically 15 bits long, but PASC may choose a shorter mantissa if it decides that there is no need for a full 15-bit word length, for signals near the noise floor, for example, or the threshold. The scale factor isn't simply linear along the dynamic range axis, but has been given a non-linearity which reflects the behavior of the ear in this respect. The ear doesn't care if a sound is exactly 118 or 120dB spl—but at the other end of the dynamic range a 2dB step would be coarse, as the ear is quite sensitive to such subtleties when dealing with quiet sounds.

The maximum mantissa length of 15 bits is reflected in the (theoretical) THD+N figure quoted for DCC: -92dB, which is 1 bit or 6dB above the -98dB of CD. But in the CD format there is no scale factor and therefore the THD+N floor remains at a constant absolute level; a -20dB signal will see its THD+N 78dB down. In DCC, because of the floating-point amplitude description, THD+N will remain 92dB below the signal until the system noise floor is reached. Philips quotes a 108dB dynamic range for DCC (where CD, or R-DAT for that matter, can never go beyond 98dB). Using floating-point notation instead of linear coding means another gain in efficiency. By the way, all internal computation in PASC takes place in a 24-bit-wide processor.

In the Philips literature the range controlled by the scale factor is described as 124dB. As mentioned, the mantissa can cover 92dB. One would be tempted to simply add these figures to find a total dynamic range of 216dB. That would be false because, as explained, the scale factor is of non-linear character. The consequence of that is that a mantissa bit at high-scale values is larger in voltage terms than at low-scale values. The scale must be seen as a multiplication factor. Because of the non-linear scale, the 15-bit mantissa will span 92dB at the top of the range but less and less as the scale factor zooms in at softer sounds (still using 15, but effectively smaller, bits). Philips claims that scale and mantissa together realize a potential resolution considerably beyond the -146dB noise floor set by the 24-bit-wide words used by the internal processor. The real bottleneck is in the A/D converter, which necessarily precedes all PASC (digital!) processing; the best converters to date won't give you more than 18 or 19 bits of reliable audio information.

The quoted dynamic range (108dB) is the wide-band noise-floor figure normally measured with a -60dB signal; ideally, one would find THD+N at -48dB; adding the remaining 60dB "headroom" then results in 108dB dynamic range.

Bits of reallocation

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5 A CD prepared by the Institute for Perception Research (IPPO) of Eindhoven Technical University and supported by the ASA demonstrates these effects. This CD can be obtained from DB Systems, Main Street, Rindge Center, NH. Tel: (603) 899-5121.

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Gerry Wirtz of Philips explains DCC's principles of operation to the assembled scribes.

ously. Which means that not all space in all 32 sub-bands would be fully in use; many might even be completely empty (above the threshold) from time to time. There is a certain coding space reserved for each of the 32 sub-bands. A temporarily not-so-busy sub-band thus wouldn't use all of its space, which would be a waste of efficiency. So PASC reallocates information from the busier sub-bands to empty or not-so-busy sub-bands (along with some address code for suitable re-reallocation at decoding to enable proper reconstruction).

It would be interesting to find out what happens if the system should come near or into overload (ie, all 32 sub-bands in full-orchestra climax). In view of the intelligence with which PASC goes to work, any hard overload phenomenon (clipping type) would seem unlikely. Instead, a temporary loss of detail would seem logical. Philips spokesman Gerry Wirtz explained that this is exactly what happens, but, as the ear will be overloaded in the same way (all the loud sound masking the quieter details), there won't be any audible degradation. He added that PASC's capabilities in this respect are equal to or better than the ear's, and that it is in fact much easier to correctly encode loud musical passages than soft ones.

The gain in efficiency resulting from this kind of signal processing surprised even the Philips people: from 16 bits per channel needed in linear PCM to 4 bits average per channel in PASC. Don't be tempted to think of such 4-bit codes as 4-bit samples containing amplitude data, because you'd miss the point entirely! The 4-bit code is a lot smarter than simply an amplitude representation. The 4-bit "samples" should rather be seen as pieces of a dynamically varying jigsaw puzzle that is to be solved by the decoder. It would seem as though the decoder would have to be a very intelligent piece of equipment, but that isn't the case either. The intelligence is in the code! It is the code itself that contains coding keys and reallocation keys; these keys have become part of a data stream consisting of 4-bit codes. Indeed it would have been an unnecessary limitation (and probably even impossible) to locate these keys in a ROM near the decoder because each sound is different, requiring its own unique PASC coding. (It seems unlikely that all routing, "key," information for the decoder could be added to a single 8-bit stereo sample that also contains full audio information; therefore it must be assumed that certain "handling instructions" are spread over a group of samples.)

The keys in the 4-bit codes tell the decoding computer what to do, how to reallocate what from where and where to, which scaling has

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6 The real situation is slightly different, but I preferred to keep this out of the main story to avoid unnecessary complications. PASC doesn't treat the stereo signal as two mono signals, but takes stereophonic channel correlation into account. This means that inside DCC there are no longer 4-bit codes referring to L- and R-channel information, but only 8-bit stereo codes. The input condition of two independent channels is said to be completely restored at the output after decoding. Philips's Gerry Wirtz added that this stereo-coding has not been an easy thing to get right (main problem: stability of the stereo image).
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been used for that sample, and what the mantissa looked like. The decoding computer just follows orders; it's the code that's intelligent. Therefore the decoding computer will decode not only DCC signals but any signal within the same family: DAB signals, for instance (Philips is taking part in Digital Audio Broadcasting experiments sponsored by the European Community's Star Wars counterpart, the Eureka project), or a lower-quality 2-bit signal if necessary; it could make the switch from one sample to the next if need be, because it isn't the decoder switching but the code giving different instructions.

Digital audio revolution

If PASC does what it promises and literally discards only what could never be heard anyway, we're in for a revolution in both professional and consumer digital audio. It may be too early for specific speculations, but a host of possibilities passes the mind's eye. One of the limitations in digital audio has always been data storage; a higher basic sampling frequency or more amplitude bits would unavoidably consume a lot more space. PASC helps out here with a considerable reduction in data rate, a factor of four.

One thing is clear in my opinion: if PASC works, there's no future for PCM in audio. 7

US/The Netherlands: Peter W. Mitchell

The digital input filter in the DCC's PASC encoder divides the audio spectrum into 32 sub-bands of equal width, but the initial announcement did not specify whether they are equal on a linear or logarithmic scale. I naturally assumed a logarithmic scale, which would make each sub-band about a third of an octave wide, as in an audio spectrum analyzer. But my Boston colleague Brad Meyer learned that they are equal on a linear scale.

To clarify the point I called Gerry Wirz, pro-

ject manager for DCC, at his office in Holland. He confirmed Brad's information. Dividing a total bandwidth of 22kHz by 32 yields a bandwidth of about 700Hz for each sub-band. All frequencies from 20Hz to about 700Hz are in the first band, which means that the PASC encoder is not making any use of masking thresholds at low frequencies. It also fails to take advantage of the steep rise in the threshold of hearing below 100Hz; but that may not matter, since coding low frequencies doesn't use up many bits anyway. Philips may have chosen this approach to preserve the phase integrity of the signal. The ear is known to be very sensitive to phase below about 700Hz and relatively insensitive to phase above 1500Hz.

At any rate, most of the sub-bands are located at high frequencies, spaced only 700Hz apart. Thus in the top octave there would be a band from 10.0 to 10.7kHz, one from 10.7 to 11.4kHz, and so on. With so many bands in the high-frequency range it is easy to understand why at any moment there might be strong musical overtones in only a few of them, leaving most of the others empty. And a great advantage in efficiency would be gained from the moment-to-moment reallocation of unused bits—borrowing bits from sub-bands that contain no energy above the dynamic masking threshold, and assigning those bits to sub-bands that contain strong overtones.

While I was thinking about how the system might work, it occurred to me that a dramatic reduction in bit rate could be obtained by taking advantage of the Nyquist Theorem, a principle that was enunciated back in 1928. Essentially it says that any signal can be accurately characterized by a sampling system whose frequency is equal to twice the bandwidth of the signal. In a single-band system like the CD or R-DAT, the bandwidth is the same as the highest frequency, and a 44kHz sampling rate is used to record a maximum frequency of about 22kHz.

Since I was assuming that the sub-bands were a third of an octave wide, I figured that the maximum sampling rate would be used for high-frequency bands, while the bands below 100Hz might be re-sampled at only 200 samples per second. As it turned out, I was right about the principle but wrong about the details.

In the DCC, each sub-band is only about 700Hz wide; so a sampling rate of only 1.4kHz is sufficient for accurate reproduction of the

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7 I'm not so sure. For original master recording, it will probably always be necessary to have the analog signal described exactly, as with a PCM system. One can then postpone the decision how to process the band digital data for a consumer medium until a later date, reserving the right to second-guess that decision if necessary.

—JA
signal in every sub-band. Wirz didn’t tell me what the actual re-sampling rate is; perhaps this is still a trade secret. But he did say that the system takes advantage of the Nyquist Theorem to re-sample the data in each sub-band at a relatively low rate.

At first glance this seems troubling, perhaps downright impossible. It’s easy to understand how a digital system can record a waveform by sampling it at several points during each cycle. But can you record a 10kHz tone using a sampling rate of only 1400Hz? After you capture one sample, seven complete cycles of the waveform will pass before you take the next sample. How can you hope to define the waveform accurately if you sample it at only one point in every seventh cycle?

The key to this conundrum lies in the central fact that any sampled system must also have both an input filter (often called the anti-aliasing filter) and an output filter. The input filter defines the bandwidth of the signal and therefore sets the required sampling rate. The output filter has the critically important role of reconstructing a continuous waveform from the discrete samples. Thus the output filter is not just an incidental “smoothing” filter; it plays an essential role in making the sampling theorem work.

Specifically, in the case of a 10kHz signal, remember that it falls in a sub-band whose entire bandwidth extends from 10.0kHz to 10.7kHz. Anything outside this range, such as harmonics or overtones that might give the waveform a different shape, were eliminated from this sub-band by the input filter. (They are handled by other sub-bands, and the complex shape of the original input waveform will be reconstructed when all of the sub-bands are recombined in playback. This concept comes from the Fourier Theorem, which says that any continuous waveform, no matter how complex, is the sum of a series of sinewaves at several frequencies.)

Therefore, as far as the 10kHz sub-band is concerned, any signal that falls within this narrow band must be a sinewave. The only question is what its frequency is: 10.0, 10.2, 10.7, or whatever. That can easily be determined by recording one sample every seventh cycle. There is a direct mathematical correspondence between the frequency and the point in the cycle where the second and later samples are taken.

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These ideas are unfamiliar, but they are just a different application of the same information theory that forms the foundation of all digital recording. As far as I know this is the first use in consumer audio of filters whose bandwidths in Hertz are small compared to the frequencies in the band—which leads in turn to the strange notion of sampling less than once per cycle.

In summary, any complex waveform above 700Hz is effectively Fourier-analyzed by the digital input filter, which breaks it down into an assortment of sinewaves at various frequencies. Each frequency component falls into a different sub-band. Each sub-band is so narrow that it can contain only sinewaves, and a low sampling rate is adequate to define the exact frequency of each sinewave.

Earlier in this month's "Industry Update," Peter van Willenswaard and I described the DCC as a system that records digital audio with an average of only four bits per sample. This picture is valid if we think only of the 44kHz sampling rate of the 16-bit PCM input circuit. We know that the system's data rate is 384,000 bits per second for stereo, or 192,000bps per channel. Dividing that by a 44kHz sampling rate yields an average sample size of 4.3 bits.

But the process appears in a different light when we see that the narrow bandwidth of the 32 sub-bands allows the signal in each sub-band to be re-sampled at a much lower rate, perhaps only 1.4kHz. Dividing the data rate of 192,000bps per channel by a sampling rate of 1.4kHz yields a total "bit pool" of 137 bits per sample in the 32 sub-bands. If all 32 were active, the sample size would indeed be only 4.3 bits for each sub-band. But if two-thirds of the sub-bands are empty at a given moment, 13 bits per sample can be assigned to each active band.

In playback the slow-sampled code for each sub-band is used to determine the exact sine-wave frequency of the signal in that band. Then the sinewaves from all active bands are combined to produce the harmonically complex output waveform. This is all done in the digital domain: the composite code from all of the sub-bands is oversampled and digitally refiltered to generate a conventional 16-bit PCM code that, after D/A conversion, yields the analog output.

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**US: Robert Harley**

Philips's recent announcement of the Digital Compact Cassette (DCC) (see Peter Mitchell's and Peter van Willenswaard's "Industry Update" reports in this issue) positions the new format in head-to-head competition with the other consumer digital recording system, Digital Audio Tape (DAT). Philips sees DCC as the logical successor to the analog cassette and the primary music carrier for the coming decades. One source of Philips's optimism for the new format is the support for DCC shown by the major record companies—the very same companies who rejected DAT.

Why would record companies vigorously oppose one home digital recording format—DAT—yet embrace DCC? The answer lies in the fact that prerecorded DCC tapes can be easily and cheaply duplicated using traditional high-speed techniques. This means record companies can sell huge quantities of prerecorded music—their lifeblood—in the new format, something they couldn't do with DAT. Indeed, ease of DCC duplication, coupled with the difficulty and high cost of DAT duplication, may be the deciding factor in which format achieves acceptance in the mass market.

A brief look at DAT duplication methods and manufacturing costs reveals why prerecorded DATs are so expensive ($20-$30 retail) and cannot be made cost-effectively, even in large quantities. First, all DAT duplication is currently performed in real-time, with rows of slave Sony DRD-100 DAT duplicators. Blank DATs are loaded and removed from the duplicators by hand, a labor-intensive process. The slave machines, like other rotary-head mechanisms, need regular head replacement and rebuilding, a cost that must be amortized over each duplicated DAT.

In addition to being slow and labor-intensive, raw material costs are very high: empty DAT shells, called R-0s, cost over $2 each in quantities of several thousand, dropping to $1.70 each at the tens-of-thousands level. The DAT shell's many parts and complexity account for this high cost. In addition, the empty shells must be custom-loaded with the correct length of tape for a particular title, a process that requires a DAT loading machine and an operator. Moreover, many DAT loading and duplication steps have to be performed in clean rooms to minimize data errors from dust-created dropouts. Clean rooms are expensive to build and maintain, and are a less productive work environment.

This slow and expensive manufacturing method is contrasted with CD manufacture. The polycarbonate in a CD costs about 3¢ and all the information is stamped directly in the polycarbonate rather than recorded serially in real-time as is DAT. CD manufacturing costs reflect the more efficient methods: CDs are sold by manufacturing plants to record companies for about $1 each, including the screenprinted label. High-volume companies pay even less—one major record company reportedly pays 78¢ per disc. With that kind of competition, it's easy to see how prerecorded DAT, with an empty-shell cost of nearly double that of a finished CD, will never be a cost-effective music carrier. Moreover, DAT has no advantages over CD as a playback medium—the use addressed by prerecorded product. In fact, it is far inferior, with tape and head wear, slower access time, and other limitations of tape.

At Digital Audio Disc Corporation (DADC), Sony's huge US CD manufacturing facility in Terre Haute, IN, DAT duplication capacity has recently been expanded to 700,000 units per year. Although 700,000 DATs a year may sound like an impressive figure, DADC ships more than that number of CDs a week. In addition to duplicating DAT for their Sony Classical label, DADC accepts orders from outside record companies. When I recently inquired about DAT duplication prices, I was quoted $13,450 for 1000 units, or $13.45 each! The same quantity of CDs would cost about a tenth that amount. I suspect that Sony Classical's $20 retail prerecorded DAT price is heavily subsidized in an attempt to gain wider acceptance for the format. Normally, the manufacturing cost is only a small part of the expense of recording and releasing a title.

Sony and other promoters of DAT had banked on Sony's Sprinter high-speed DAT duplication system to unplug the real-time duplication bottleneck and reduce prices. Sprinter is a contact printing system that transfers magnetic impressions from a "mirror mother" to a blank tape as the two tapes are pressed together. The duplicated music program is then cut from the large reel and wound into an empty DAT shell.
Sprinter’s duplication speed is 327:1, meaning that each 60-minute audio program can be duplicated in 11 seconds. A similar system is used successfully for video cassette duplication. At the October 1987 Audio Engineering Society Convention, a prototype DAT Sprinter duplicator was shown, with a scheduled delivery date of August 1988. At the time, I represented a potential Sprinter customer and was quite interested in the system. However, Sprinter has been plagued by technical problems and has yet to become a factor in DAT duplication.

By contrast, DCC duplication is very similar to conventional high-speed analog cassette duplication techniques. By all reports, DCCs can be produced in quantity for about the same price as analog cassettes. In addition, the DCC shell is relatively simple and inexpensive. Since graphics are attached directly to the DCC shell, and no outer plastic box is required (a sliding cover protects the tape), DCC duplication prices will likely reflect the lower cost of eliminating the “J-card” insert, plastic box, and assembly.

For all DAT’s limitations as a mass-market product, however, I believe it is a superior format for high-end consumer use as well as in professional applications. A DAT will make an exact data-to-data copy of another DAT or a CD, rather than having to be processed through DCC’s PASC-encoding process that cuts down the data rate. In addition, I have suspicions about any digital audio encoding scheme that creates less than one-quarter of the data needed by 16-bit linear PCM encoding. The bit rate generated by PASC encoding was dictated beforehand by limitations of the analog Compact Cassette format.

There is absolutely no doubt about DAT’s future as a professional digital audio format. Mastering houses report a meteoric rise in the number of projects that have been mixed to DAT. In Nashville, the third largest music-recording city in the US, DAT has virtually become the de facto digital standard.

JA and I appreciated DAT’s professional merits during a recent trip to California. We transferred the original ½” analog master tapes of Stereophile’s latest LP, Intermezzo, to digital for the CD release.8 The master tape was played (on the tubed Ampex MR70 on which it was recorded) into both David Manley’s new tubed A/D converter (based on the 128x-over-sampling UltraAnalog ADC module) and the Pygmy AD1 A/D converter. The digital outputs each fed two DAT machines, so that if any DAT was affected by a data dropout, it would be covered. The DAT served as a temporary storage medium for the data, which was later loaded into a hard-disk editing system (at Digital Brothers, in Newport Beach, CA) to make the PCM-1630 CD master. After the initial conversion to digital, the signal stayed in the digital domain.

For this application, DAT was the perfect format: lightweight, inexpensive, and compatible with playback machines at the editing/mastering house. By contrast, any other digital format would have been much less portable, far more expensive ($20,000 for an open-reel digital 2-track, $40,000 for a PCM-1630/U-Matic tape machine), and wouldn't have the universal compatibility made possible by DAT's low cost.

Philips’s Digital Compact Cassette may well become the digital replacement for the analog cassette. Extending this parallel, I envision DAT as the digital equivalent of the open-reel tape machine. Just as home recordists with higher standards turned to open-reel tape in the 1970s, DAT may find a solid niche in the 1990s among more discriminating listeners.

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8 See the advertisement elsewhere in this issue for the LP ordering information.
Recommended Recordings
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US: Jack Hannold

In a secret ballot on January 30, a few days too late to be reported in our March issue, the Democrats on the House Judiciary Committee elected Rep. William J. Hughes to succeed former Rep. Robert Kastenmeier as chairman of the newly renamed Subcommittee on Intellectual Property and Judicial Administration. Hughes represents New Jersey’s Second Congressional District, consisting of all of Atlantic, Cape May, Cumberland, and Salem Counties and part of Gloucester County, including Pitman.

As a member of the subcommittee, Bill Hughes did not support royalty taxes in the 99th Congress (1985–86), nor did he support Copycode in 1987, despite having had the Pitman CBS Records plant (now a Sony Music plant) in his district since 1982. (Before the last redistricting, Pitman had been represented by Jim Florio, who championed Copycode in 1987.)

I, for one, find Hughes’s record on home taping very reassuring. The fact that he could disregard the wishes of a major employer in his district during the ‘80s suggests that he should also be immune to the blandishments of showbiz lobbyists in Washington in the ‘90s. If so, he will be a worthy successor to Kastenmeier.

UK: Ken Kessler

High finance and mergers and buyouts are going to become more and more commonplace in the UK as the (relatively) healthy makes continue to absorb the weaker or simply smaller ones. Wharfedale, for example, now controls Cambridge and Linx, the same holding company owns both KEF and Meridian, the Goodmans group contains Mordaunt-Short, Epos, Tannoy, Goodmans, and Creek, and other liaisons are expected in ‘91. But the most amusing is the Mission/Sansui marriage, especially because it involves a mass-market Japanese company.

As I write, the affairs of the parent company, Polly Peck International, are in a state of flux. And I’m not even certain if Polly Peck is considered British or Turkish or merely multinational. But what we have is the unusual situation of an ostensibly British company (Polly Peck) holding a majority share of a Japanese company (Sansui), the latter itself owning a British company (Mission). For British jingoists, this means that a British company controls a Japanese firm—a real turnaround in fin de siècle finance.

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can still claim that Mission is British rather than Japanese, even if it really means “British once removed.” The British, like the Americans, are used to having their companies snapped up by foreigners, so it’s interesting and somehow heartwarming to find that something has been snatched from the world’s greatest Monopoly players.

But Polly Peck is in rough shape at the moment, which means that Sansui could quite possibly become Japanese again. Which would mean that Mission could become a Japanese company.

Despite Polly Peck’s troubles and a fire at the Mission factory in January, it’s business as usual in Huntingdon, the company eager to overcome the lack of confidence created by the former and the sheer inconvenience of the latter. And what Mission has initiated, in conjunction with Sansui, is just the kind of neat marketing maneuver which can pull a hi-fi company through a recession compounded by a war and the worst weather in four years.

Mission and Sansui have produced a package system aimed at attracting exactly the kind of consumer who fears hi-fi, hi-fi shops, retailers, magazines, and anything else that smells of solder, specifications, and speaker wire. By removing techno-fear completely from a system consisting of “real” separates, Sansui Mission Ltd. (as the company is now known) may be able to make a small dent in the market currently dominated by the one-piece or one-brand, snap-together midi system. This, however, presupposes that the very dealers feared by the man and woman in the street will have the good sense to treat it for what it is and not turn it into some self-defeating flat-earth exercise.

What the company has done is slap everything needed to get a CD-based system up and running into a single purchase. Nothing is left out or left to chance; there’s even a Mission demonstration CD to ensure that the customer has something to play when he or she gets home with the gear, having forgotten to nip into the local record—er, CD—shop on the way back from the hi-fi store.

Called, quite succinctly, The System, the package contains a Sansui CD-X111 remote-control 1-bit (MASH) CD player and the matching 35Wpc AU-X111 amplifier. Mission’s contribution, in addition to the demo CD, is a pair of 760 loudspeakers, which earned a “Best Buy” from Hi-Fi Choice the month The System was launched. Then come the little details which should get customers to part with just £379.90 including VAT (value-added tax) [$780 at time of writing—Ed.].

First, the box contains two 5m lengths of good speaker cable, thus preventing the novice from gravitating toward bell wire. (A phono lead for CD-to-integrated-amp connection is packed with the CD player.) Also packaged with the wire is a screwdriver, to allow for the rare household which may not own one. Two AC mains plugs are included, necessary because the UK is probably the only place on earth where electrical goods are sold without mains plugs.

(This is neither the time nor the place to catalog the disaster potential in a mains plug design which is screw-fitted by the customer and which contains live, neutral, and grounding strands. I’m willing to bet that there isn’t a single electrical retailer in the country who doesn’t have horror stories about singed customers who came back for refunds after wiring live to ground . . .)

Although speaker stands are not included, The System contains absolutely everything needed to put the gear together to produce music. But that presupposes that the customer is bright enough to understand the owner’s manuals. This sneering remark applies only to those who can’t figure out the owner’s manuals for Japanese mass-market hi-fi, because they’ve been produced with icons which make it all so damned simple. But still we find the knuckle-draggers who wire live to ground or fail to remove transit screws, so more help is needed.

Packed in with the hardware, speaker cable, screwdriver, and mains plugs is—I swear—a video tape leading the proud new owner through every step required to put the system together. Professionally produced and as clear as a view through Vanilla Ice’s skull, the video banishes fear of mistakes. Not that I have any hope that Sansui Mission will have a trouble-free aftermath to the sales, because I know that someone out there will screw up the installation.

But that shouldn’t detract from Sansui Mission’s efforts to take the pain out of hi-fi owner-

9 My favorite story regarding a total lack of common sense involves not hi-fi but an electric frying pan. Some schmuck bought one and used it over his gas burner, wondering why the plastic bits started to melt and the oil didn’t heat up too quickly. Naturally, he expected and received a refund, as UK consumer law doesn’t just protect the customer, it demurs the retailer.
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- John Atkinson | Stereophile Vol. 11 No.1 January. 1988

"... natural, open and clear... excellent depth... lots of ball sound... big, expansive soundstage... well defined... a rare achievement for any loudspeaker, but when the price is taken into account the Paradigm's performance must be considered as nothing short of remarkable."

- Sound & Vision Magazine

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ship, especially as this industry needs every sale it can make. We who live in a dream world of balanced, bi-amplified operation and retailers who know that there's a world of difference between a microwave oven and a CD player are sheltered from gross displays of ignorance or downright stupidity. There really are people out there who can't follow a simple "map" which shows "red to red" or "L to L" or "+ to +."

Why do we need to be concerned about these people? Because they outnumber hi-fi enthusiasts by a couple of million to one. And they're the only ones left to buy the hi-fi which will be piling up in warehouses around the world.

I can think of no other moves afoot to attract "civilians" into the hi-fi-buying fold. The Federation of British Audio seems quite incapable of doing anything about the situation, despite the talent and brains in its ranks; the "Good Guys" tend to be overpowered by characters straight out of Raffles. BADA, the retailers' organization, works mainly for its members and would be unable to mobilize a campaign of the size required.

Nor are magazines the solution; special-interest magazines are purchased only by enthusiasts. The one-time purchaser may buy a lone issue of a magazine like What Hi-Fi for its copious product listings, while Which (the UK equivalent of America's Consumer Reports) continues to demystify hi-fi for newcomers by dealing with only the lowest-cost products. To be fair to Which, unlike its US counterpart the magazine has started to talk about sound quality, it dismisses gimmickry with the same disdain elicited by tweaky types, and it does employ listening panels, but the magazine will never be allowed to deal with products costing above budget level.

To muddy the waters even more, the UK—already flooded with hi-fi magazines—is about to welcome another title when the best thing to happen would be the disappearance of one or two. Hi-Fi Review, the magazine founded by ex-Popular Hi-Fi editor and Linn acolyte Chris Frankland, has folded; in its place is ex-Hi-Fi Review technical editor Noel Keywood's new mag, Hi-Fi World. More of the same is expected, but perhaps with less blatantly slavish adherence to 1979 "political" values.

As for Frankland himself, rumor has it that...
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he may relaunch **Hi-Fi Review** as something called **New Hi-Fi Review Monthly**. Never a wizard with words, Frankland once promoted his magazine's editorial integrity by advertising that it wasn't "afraid to pull its punches." The unwieldy title for **Hi-Fi Review II** is par for the course.

Naturally, Frankland—should he not reappear—will be missed by those whose products he rammed down readers' throats for over a decade. He will not be missed by those companies whose products he damned. Nor will he be missed by anyone in this industry who realizes that attracting a new generation of enthusiasts and one-off purchasers should be a primary concern. Indeed, it's the main task ahead if hi-fi is to avoid becoming an adjunct of a Nintendo games console.

Unless, of course, you want to see a hi-fi industry where every small brand is gobbled up by a multinational.

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**US: Peter W. Mitchell**

One problem with recommending a product in print is that it may be a moving target. Designers just can't leave well enough alone. Case in point: In the April 1990 issue I recommended JBL's then-new XPL-200, the top speaker in a new series that combined excellent drivers with uncommonly solid, resonance-free cabinets. The XPL-200 ($3400/pair) had the traditional JBL ability to play loud, but it also had extended bass, airy highs, superb resolution of inner detail, and a wonderfully smooth, uncolored midrange.

At the Las Vegas CES JBL exhibited the XPL line in the Sahara Hotel, where high-end exhibitors were concentrated. Sadly, when I stopped in to hear them again, I was greeted by the JBL sound of yore: forward and brassy. The low end is still impressive, but the midrange no longer has the smooth balance that impressed me before. When I objected to the sound, a JBL person admitted that the speaker had in fact been "re-voiced." He didn't say why; perhaps JBL's regular dealers don't know how to sell a speaker that doesn't put the sound in your lap. Anyway, for what it's worth, I withdraw my recommendation.

A year ago I also praised Soundwave Fidelity's Soliloquy, priced at $2400/pair. In the context of an attractively neutral and uncolored balance, it exhibited exceptional resolution of detail without the exaggerated highs that usually accompany such detail. By comparison, the Soliloquy on display at this year's CES was profoundly disappointing—unacceptably aggressive and hard-sounding. Before I said a word about the sound, designer Jim Gala explained it: the company was in the midst of switching to a new European metal-dome tweeter.

Naturally they wanted dealers to see the speaker with the new tweeter, since that's what they would be selling this spring. But the speakers were shipped to Las Vegas in a hurry, and there hadn't been time to redesign the crossover to match the new tweeter's characteristics. That fine-tuning was done a couple of weeks after the show, and reportedly the lovely timbral balance that I liked has been restored.

In the February 1991 issue Tom Norton reviewed PSB's Stratus Gold speaker ($2000/pair). He found its highs overly crisp and etched, confirmed by measurements showing a rising response in the top octave. I have a pair of Stratus Golds in my living room, and I found their highs exceptionally smooth. Why the disparity? In this case I don't believe the design has changed. I think the difference is that I left the grille cloth in place, while Tom reviewed the speakers with the grilles removed.

When I wrote PSB's brochures I interviewed designer Paul Barton, and we discussed the grille problem—one that many speaker companies must deal with. Naked speakers are popular among bachelor audiophiles, but the custom often detracts from their Spouse Approval Factor. PSB is trying to sell speakers not only to high-end audiophiles but also to a broader market. So when fine-tuning the crossover Barton runs tweeters slightly "hot" to compensate for the grille cloth's absorption, especially at large off-axis angles. I suggested adding a tweeter-level switch to make this compensation user-selectable. Instead PSB put a recommendation in its owner's manuals saying that the speakers are designed to be used with the grille cloth in place. But the best recommendation, with any speaker, is to listen to it both ways and make up your own mind.
ROTEL RCD-855 COMPACT DISC PLAYER
Lewis Lipnick

16-bit, 4x-oversampling CD player with infrared remote control. Dimensions: 17½" W by 13¾" D by 3¾" H. Weight: 16 lbs. Price: $399. Approximate number of dealers: 100. Manufacturer: Rotel of America, P.O. Box 653, Buffalo, NY 14240. Tel: (416) 297-0595.

These are difficult times for the audiophile searching for digital hardware. On the one hand, he has the low-, and not-so-low-priced generic-sounding Japanese products offering lots of glitz but not much music. On the other, he has the medium- to very-high-priced CD players, digital drives, and outboard D/A processors coming from the high-end manufacturing community, with prices well above many enthusiasts' budgets. The constantly changing directions within digital audio technology over the past few years have produced a volatile and fluid marketing environment that has left many consumers in a state of confusion. What should one do? Spend big bucks for a Wadia or Theta D/A processor along with an expensive dedicated external digital drive? Or buy a medium-priced, fairly good-sounding CD player with marginal sonics that can be tolerated for the short term until something better comes along.

Enter the Rotel RCD-855. A most unusual product, since it offers much more than the paltry selling price of four hundred bucks would suggest. While it may not be quite the equal of the finest digital hardware currently available, it comes surprisingly close. We all know that you don't get something for nothing, but more often than not in high-end audio one simply gets something different, rather than something significantly better. In this case, one clearly gets a bargain. When I reviewed the Rotel RCD-820BX in Stereophile (Vol.11 No.8), it appeared that this UK-designed, Japanese-built product was clearly ahead of its peers not only in material value, but also in musical accuracy. The engineers at Rotel have obviously been very busy since that time, because the RCD-855 sells for about half the price of the earlier unit, and offers performance that can be compared to some much more expensive competition.

Technical highlights

Like Rotel's earlier efforts, the RCD-855 is built on a Philips chassis, and utilizes Philips's second-best transport, the CDM-4. Features include the standard infrared remote along with direct track selection, shuffle play, 20-track programmability, intro scan of each track, et al. There is a coaxial digital port on the rear panel, adjacent to the analog outputs, which allows this player to be used as a digital drive in conjunction with an outboard D/A converter, or as an integrated unit. The lighted display on the front panel is very large and easily readable from some distance, so you can actually read the selection and track number. No
more eyestrain. The loading-drawer mechanism is slower than most other current machines, but appears to be substantial, as does the rest of the machine. The only glaring omission is the absence of a headphone jack. Do you really need it? I'm sure that Consumer Reports would dismiss this machine on that item alone, just as they said that the Porsche 912 was impractical because one couldn't conveniently stand grocery bags upright in the front trunk. So much for informed journalism.

According to Chris Browder, Vice President for Rotel of America, the RCD-855 took two years to develop at the engineering center in Twining, England. He went on to list upgrades that Rotel included in order to turn this rather ordinary machine into a much more sonically refined product. Rotel opted to incorporate the Philips TDA-1541A chip (their second-best D/A currently available), as well as the same manufacturer's SAA7220/B digital filter (used in Philips's own machines). In the analog section, the original op-amp is replaced with an upgraded NE5532AN, enhanced by 1% metal-film resistors, polypropylene caps, and Rubycon Black Gate electrolytic caps. A significantly improved power supply, utilizing OFC (oxygen-free copper) winding, is also used. Output impedance of the RCD-855 is rated at 7 ohms.

Musical & sonic impressions

First of all, I should mention that it takes a long time for this machine to reach its sonic potential, so if you do buy one, plug it in, turn it on, and wait for at least three days before doing any serious listening. AC line cord polarity is extremely important, and the time necessary to ascertain lowest chassis-to-ground potential will more than pay for itself in a smoother, more open and dynamic sonic presentation. As with many other CD players I've auditioned, the 855 benefits substantially from the insertion of an AC line-level filter, such as the Adcom ACE-515 that I have in my system. Although the sound without such a device is acceptable, the addition of the ACE-515 helps to eliminate the slight grainy haze evident in direct wall-socket connection.

For this review I used my permanent reference system, which consists of a Mark Levinson No.26 preamp operating via balanced Madrigal HPC interconnect to a Levinson No.23 power amplifier. AudioQuest Clear speaker cable was run in bi-wired configuration to my beloved B&W 801 Series Two Matrix Monitors. Both AudioQuest Lapis and Madrigal HPC interconnects were used between CD player and preamp. Along with the active analog outputs from the Rotel running into the preamp, I simultaneously connected the digital output to the input of a Theta DS Pro (which has replaced the original DS Pre I reviewed in early 1989 via a Straight Wire digital coaxial cable. The Theta was then connected to the preamp with the same interconnects used between CD player and preamp, in order to gain an insight into the Rotel's abilities as a digital drive. It may seem inappropriate that one should audition a $400 component with such expensive ancillary electronics. However, the RCD-855 turned out to hold its own in such high-class company.

The first several days of auditioning (I usually listen to any component for at least a hundred hours before writing a review) were spent getting an overall impression of this newcomer, and listening to the two different combinations of interconnects. Although the relatively low output impedance of the Rotel would suggest that it would not be particularly sensitive to cables, sonic results proved otherwise. Both cables yielded satisfactory, albeit drastically different musical menus. The Lapis gave a meatier, fuller, more up-front perspective, favoring the midrange and midbass, while the HPC appeared to be more transparent, focused, three-dimensional, leaner, and harmonically neutral. While the Lapis produced a more impressive "hi-fi" spectral palette, I found that the HPC allowed more of the music through with a minimum of sonic intrusion.

Initial impressions of the RCD-855 were mixed: a nicely focused soundstage, but with a considerable amount of sonic haze, along with an irritating upper-midrange honk. Not good. After a week, however, the haze and honk all but disappeared, the frequency extremes broadened, and the overall presentation became more open and relaxed (it was almost a Jekyll/Hyde scenario; this machine just doesn't sound good at all straight out of the box). One of the 855's most impressive qualities was its amazing ability to throw a very deep and wide soundstage, extending well beyond and above the speaker boundaries. The soundstaging was natural, not overblown or frequency-dependent, dimensionally chang-
ing with each recording. In this respect, the Rotel exceeded several more expensive digital audio products, including the California Audio Labs Tempest II, which is certainly no slouch at soundstaging!

Musically, the RCD-855 is very refined, with a degree of transparency and harmonic neutrality usually found only with the real expensive stuff. Some listeners may find the lack of artificially added fullness in the midbass and attenuated upper midrange not pleasant enough for their tastes. Perhaps they’re looking for something not indigenous to the musical material. It should be mentioned that the RCD-855 is not necessarily a pleasant-sounding machine, but, as I have mentioned before, live music is not always rosy. As a matter of fact, live music can get downright nasty (massed brass instruments playing full-tilt in an overly reverberant concert hall can be painful), and if you want to hear what is really in the recording, a thick covering of sonic molasses is not going to help. So if you like your music predigested and processed, the RCD-855 will probably not be your cup of tea.

The Rotel is one of the few CD players, at any price, that appears to adequately resolve the resonant envelopes surrounding instruments and voices, as well as the natural resonance present in the recording venue. In this respect, the 855 places the listener in the recording acoustic, often producing a forward and open perspective that may not appeal to those who want to be further from the soundstage. This machine also clearly differentiates natural ambience from artificially induced digital delay, the latter often sounding hollow and metallic. Some listeners may also find the 855 a bit too lively on overly reverberant recordings, but they should keep in mind that the more reverberant the recording space, the harder and brighter the sound.

While preparing to write this review I had two other CD players on hand: an Adcom GCD-575 ($600) and a California Audio Labs Tercet III ($1295). It’s interesting to note that, although both of these products sell for more than the Rotel, both ultimately fell short of the 855 in the area of musical accuracy. The Adcom is a basically good-sounding player with a tendency to add an unnatural midbass fullness to the final musical product. Compared with the Rotel it sounds rather thick, more two-dimensional, and slightly congested. Individual instrumental voices within large ensembles clearly heard with the Rotel are harder to discern with the Adcom, and full orchestral climaxes tend to become hard-sounding and brittle. The Rotel appears to track the extreme dynamics (loud and soft) of a full orchestra more accurately than the Adcom, and sound-stage remains consistent at all volume levels (aggressively recorded and complex musical material causes the Adcom soundstage to collapse into a two-dimensional plane). A very good example of this can be heard in the beginning of Eliahu Inbal’s performance of Mahler’s Symphony 5 (Denon CD-1088). Both Rotel and Adcom sound okay through the opening trumpet solo, until the first orchestral climax, when the latter compresses the soundstage into a sonic pancake and takes on a nasal, artificially raspy quality. Using the AudioQuest Lapis interconnect helped ameliorate some of this, but not to a significant degree. Of course, the Adcom offers at least two features not available with the Rotel: a headphone output and absolute phase reversal (which really should be included with all digital hardware, regardless of cost). But in spite of this, on strictly musical grounds, I would have to say that the Rotel blows the Adcom out of the water.

The next comparison is not so much a matter of better or worse, but more of a difference in sonic philosophies. The CAL Tercet III is a solidly built, very good-sounding machine. But again, I must say that it is simply not as musically transparent or accurate as the Rotel, which sells for about a third of the price. This product from CAL shares the same sonic trademarks of their earlier offerings: deep soundstaging, liquid harmonic textures, and an overall smooth presentation. But do you want to hear a velvety version of the music, or do you want it served straight up? I prefer the latter. The casual listener may find the sweetness of the Tercet to be initially alluring, but that insistent “fog” covering the sound eventually gets in the way, for me, and imparts a general gray coloration to the music. The Rotel, while not necessarily as pleasant, changes character more with each recording. Perhaps the most significant musical difference between these two products is in the delineation of the leading edge of attack. This is probably the most important area of musical reproduction, since it provides the listener with a great deal of information regarding the size of the instruments or voices, depth of soundstage (how far the musician is from the microphone), amount of energy being expended by the performers, and the volume of
air pressurized by each instrument or voice. The Rotel does an impressive job of reproducing all of the above, allowing the natural life and immediacy present in the performance to be passed through to the listener. The CAL, on the other hand, rounds off the leading edges of attack, is less transparent, and tends to create an artificially laid-back perspective that produces a less involving, detached perspective. In noncritical listening, I really like the euphonic colorations produced by the Tercet III. But in strictly subjective musical terms, I would have to say that it is bettered by the less expensive RCD-855.

After several weeks of listening to the analog output of the 855, I decided to try it as a digital drive in conjunction with an outboard D/A processor (Theta DS Pro). The Rotel/Theta combination was unquestionably more dynamic and open than the Rotel alone, but a wiring mistake on my part demonstrated that, although the differences were obvious, the Rotel could hold its own against the much more expensive Theta. In order to make more room in my equipment cabinet for some new arrivals (Proceed CD player and Micromega CD-1 digital drive), I had to move my preamp within the equipment cabinet. After relocating the preamp, I resumed my listening with the Rotel/Theta combo (or so I thought). It did appear to sound somewhat less dynamic and open, but otherwise very musical. After a few days, I went to disconnect the digital link between the Rotel and Theta and found, to my chagrin, that during the move I had disconnected the digital link, put the analog output from the 855 into the previous Theta input, and had been listening to the analog output of the Rotel. Could the Rotel by itself be in the same class as the Rotel/Theta combination? Unlikely. But considering the price differential between the two products ($400 vs $3200), these sonic results were indeed surprising.

Given the above scenario, could the RCD-855 be considered a viable choice for an outboard digital source with much more expensive ancillary D/A converters? As an integrated unit, the 855 is truly extraordinary. And it does function credibly as a digital source. But after auditioning a now-deceased sample of the Micromega CD-1 digital turntable, I would have to say that if one is going to spend the bucks for a really good outboard D/A, a high-quality dedicated digital drive such as the Krell or Teac would be a better investment. After hearing the Micromega/Theta combination, there is no question that, given a superior source, the Theta really is much better than the Rotel. Well, for $3200 plus about two to four more grand for a good digital drive, it certainly ought to be. But is it worth the difference? It all depends on your priorities, as well as your bank account.

**Shortcomings**

Sonically, there are darn few. Two problems, however, are clearly apparent. First of all, this machine should be less sensitive to cables, since the purchaser is likely to spend almost as much on interconnects as on the machine itself. Second, Rotel really ought to include an absolute phase reversal switch. To offer a product that sounds this good, without such an important feature, appears to be penny wise and pound foolish.

The 855 is not a tank. The sheet-metal work is not up to the standard of either the Adcom or CAL Tercet III, and the overall physical presentation is certainly less than elegant. But considering the price, and the superior sonics, who cares?

**Conclusions**

It's fair to say that the Rotel RCD-855 is the steal of the century. If it were priced at $800 or so, I'd consider it a good value. But for $400 it's practically a giveaway. This machine competes favorably against rivals costing up to three times as much, and is quite happy in the company of a $20,000+ ancillary system. While musicians like myself will undoubtedly appreciate this product's honesty (about 20 of my colleagues in the National Symphony plan to purchase 855s), many audiophiles searching for sonic glitz will probably find it lacking in the sizzle-boom category. Too bad—their loss.

This CD player is not the best available, and I must admit that after having such products as the Micromega and Theta in my system, it would be hard to settle for less. But if you're looking for a digital front end that gives great sound for a peanuts price, the RCD-855 is the best deal around.

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Other Manufacturers Have Been Fishing For Our Chips.

Each Altis Audio Bitstream digital decoding processor incorporates the exclusive, proprietary Altis Chip. This Altis Chip is the mirror image of our encoding chip developed for the recording industry. With an Altis decoder, you can have Bitstream in, Bitstream out.

You see, Bitstream single-bit encoding is the way the recording industry is going. Soon most digital recordings will be Bitstream encoded and it's only a matter of time before Bitstream decoding will be the standard, too. Other manufacturers have been fishing for our chips. Altis Audio has them now!

Benefits you can hear!

Technology aside, listen to the music! Compare the Altis Audio Bitstream decoding processor with any multi-bit processor. The music sounds more natural... less artificial. Low level details are clearly and delicately reproduced. Images are precise and stable! The overall sound is smoother and more musical.

Decide if less isn't more!

There are cost-savings, too! With simpler circuits, fewer parts and shorter signal paths than multi-bit processors, Bitstream is easier to execute. And Altis Audio passes this savings on to you.

You can hear that it's right!
Hello, it is I, C. Victor Campos."

It was Adcom's Director of Product Development on the phone. He had just read my January review of the B&K M-200 monoblocks, in which I noted how Anthony H. Cordesman always seemed to rave about Adcom, Adcom, Adcom. Maybe there was an element of sour grapes on my part: Cordesman getting first crack at the Adcom GFA-565 monoblocks.

"The reason we didn't send you the amps earlier," Victor explained, "is that you wanted balanced inputs and we didn't have them ready. Now they're ready."

"And now Tony's tied up with Iraq," I said, referring to Mr. Cordesman's distinguished service as ABC News's defense analyst. "Send the amps. Excuse me, Victor, Tony's on the telly again."

Lars was sitting next to me as we watched Tony on the tube. During a lull in the fighting I told the Swede the Adcoms were coming. Meanwhile, we heard on the news that there was a small earthquake in Cleveland and some citizens of that Ohio city feared they were under attack by Iraqi Scud missiles.

"Things are looking up," I said to Lars.

"What happens if the Adcoms are terrific?" wondered Lars. "You have just praised the B&K M-200 monoblocks as the best sound around for under $3000 a pair."

"I'll have to praise the Adcoms, too. I don't like all this praising, as you well know from the stinging praise I have lavished on your system. But if the amps are good, they're good. And if Cordesman is correct, it won't be the first time. He seems to be pretty good on Iraq, too." I paused. "Did you catch that? Peter Jennings and Tony are on a first-name basis."

What you want to know is which pair of monoblock amps is better: the Adcoms or the B&Ks. And that's tough — like asking whether Jeff Rowland Design Group amps are "better" than Krell.

Consider the Jeff Rowland amps. I haven't heard any of their models lately, but there was a time when a dealer friend handled the line and I listened a lot. Jeff's designs — his amps, in particular — tend to be rich, warm, dimensional: remarkably tubelike for solid-state amps. They tend to be excellent choices with speakers which "need" tubes but can benefit from the dynamic authority of solid-state: Avalons, for instance.

I had a chance to live with VTL 225 monoblocks for several months — the amps Bob Harley finds heavenly with his Hales Signature Two speakers. The Hales tend to be on the lean side of neutral. The VTL amps are rich, warm, generous, full, with lots of bloom in the bass. Perfect match for the Hales, perhaps, but not for my own reference Spendor S100 speakers.

The VTL 225s tend to sound too much like the Spendors, which may be why, when you mate the two, you get too much of what is usually a good thing: richness, warmth, and a sweet, forgiving quality to the treble. I needed more bite, more balls.

The Adcom GFA-565 amps arrived promptly as promised and I let them warm up while I attended a meeting of the Westchester Audiophile Society. The following day, Victor was on the horn again, close after the crack of dawn.

"Cock a doodle doo. It is I, C. Victor Campos. Is this Tom Selleck?"

"Tom Selleck?"

"I mean Sam Tellig. Is this Sam Tellig?"

"Yes, Victor, I got the amps. They sound good but I haven't had much time to listen yet."

"When I first heard the Adcom GFA-565 mono amps," Victor said, "I couldn't believe my ears. This is the best sound I have ever heard."

"You haven't heard a Krell KSA-250," I shot back. To date, the Krell KSA-250 is the best solid-state amp that I have heard, all things con-
sidered.

"I don't know how the Krell could be better than a pair of Adcom GFA-565s," Victor crowed. "The dynamics, the detail, the transparency. This amp is our masterpiece."

Only Victor Campos can get away with hype like this.

"The amp is my swan song," Victor continued.


"No, I'm leaving for Massachusetts tonight. I'm not going anywhere, really. But I don't know how I could improve on the GFA-565. It's our masterpiece," Victor declared.

"Newt will think of something else for you to work on," I said. (Newt Chanin is Victor's boss—head honcho of Adcom.)

"I don't know any other amp I would rather listen to," Victor continued to crow, before I cut him off.

"We'll see how it compares to a Krell KSA-250," I said.

"You have a KSA-250? I thought you told me you decided not to buy one."

"That's true. But Lars has a KSA-250. So does The Brass Ear. Since they've spent the money, I don't have to."

I can understand why Victor toots his own horn.

There is no cult—or camp—of C. Victor Campos. No Campos brand of electronics. No "Signature Editions." No Campos camp followers. I've never heard anyone say, "Gee, Victor Campos has designed a new amp. I gotta have it."

Mario knows of Victor, though.

"Oh yeah, C. Victor Campos," said Mario, scratching his chin. "He used to be the chief engineer for a New York City radio station. Never met him. Wild man, from everything I hear."

"That's the guy," I said.

The Adcom GFA-565 is a mono amp, the same size as a stereo chassis GFA-555. It is available in standard version for $1700/pair and $1900 with balanced inputs. Victor wanted to know if I wanted my amps with fans installed, which costs $200/pair extra, but I told him I didn't think I needed a blow job.

Each amp is rated at 300Wpc into 8 ohms, 450Wpc into 4 ohms, and 850Wpc into 2 ohms—a bargain, wattwise. My favorite measurement of value for an amplifier is cost per pound. On the basis of last October's Audio annual directory issue, a Krell KSA-250 costs $39.86 per pound—not bad, actually. A B&K M-200 monoblock costs $22.45 per pound. Good deal. An Adcom GFA-565 mono is a mere $19.31 per pound, which isn't much more than I paid yesterday for some particularly fine salmon fillets.

I find the Adcom amps plain, but handsome. Heatsinks are in the back and hardly ever got more than mildly warm. Terminals are provided for two pairs of speakers, but no switching. This is handy for bi-wiring. The terminals are inconveniently recessed between the heatsinks, which might be a problem with some cables. Rail fuses and main AC fuse are conveniently located on the back—no need to open the chassis. On the balanced version, a switch lets you switch between balanced and unbalanced. Also in balanced mode, you can change the input sensitivity of the amps, but this is probably of interest more to professional users. The AC line cord is hard-wired, sparing you the temptation to experiment with $200/pair accessory power cords.

"We've had little demand for the balanced version," Victor told me. Undoubtedly because Adcom hadn't made it available.

"Wait. I'll stir up trouble. I think balanced is better. It was with the B&Ks. How about a balanced Adcom preamp to go with it?"

"We don't have one."

"It says in your ads that you do."

"We haven't had any great demand."

"I think you're going to get it now."

"Do you have to make life difficult, Tellig?"

"Do you have to ask, Victor?"

I used a balanced, 25' run of AudioQuest Quartz Hyperlitz from the B&K Sonata Pro 10 balanced preamp to the mono Adcoms. If Adcom won't sell you a balanced preamp, B&K cheerfully will. (Now that ought to get Adcom geared up for balanced preamp production!) CD transport was a Philips CD60 into a Meridian 203 processor. AR ES-1 turntable with SME 309 arm and various cartridges, mainly the Kiseki Blue Gold. Spendor S100 speakers, of course.

The first thing I noticed, right off, even with the amps cold, was that the bass was deeper, tauter, tighter than with the B&K monos. This

1 The amps are available in black or white, by the way, but I wouldn't recommend the white: tends to discolor unless kept scrupulously clean.

Stereophile, April 1991
Counterpoint's new PAC (Pure Power) AC Mains Filters are the first AC processors that audibly, in an instantly recognizable fashion, improve musical reproduction. Both the PAC-5 and the high current PAC-I5 (designed for power amplifiers) accommodate four audio components.

PAC's proprietary resonant storage technology releases energy to your audio components in synchronization with incoming AC, while filtering high-frequency powerline distortion and blocking low-frequency phase "jitter."

Of course, like any reputable power processor, both Counterpoint Pure Power PAC's protect your valuable equipment from voltage surges, dips and spikes, as well as powerline RFI and EMI noises.

And PAC's Peak Current Unlimiter insures maximum dynamic range and bass impact by "opening up" when your components demand power during those dramatic, power demanding musical peaks. The Counterpoint PAC's offer increased transparency and soundstaging while preserving music's dynamic gradations. Your musical enjoyment will be enhanced for years to come.
is what these British speakers like: a proper American amp to grab 'em by the balls and lift 'em in the air. The Spendors can sound a wee bit heavy, even soggy, with certain amps—the VTL 225s, for instance. Not these. The Adcoms take the Spendors and make them fly. Big speakers, with satisfying bass, the Spendors actually sounded fleet of foot with the Adcom amps.

Not that the B&K M-200 monos are slouches on the Spendors. I found that the B&Ks produced reasonably tight, well-articulated, but not especially ample bass. Remember? I complained about that earlier. The Adcoms do much better in the bass, having a balls-to-the-wall quality that comes close, very close, to the Krell KSA-250, which is probably the last word when it comes to *cojones*.

Two days into listening, Victor called again to put ideas in my ears.

"A characteristic of high-powered amps," lectured Victor, "is that they have tended to lack detail and resolution of low-level information. We designed the GFA-565s to have low-level resolution which compares with the best of the best."

I told you in an earlier column that the B&K M-200 monoblocks have "transparency in spades." This is true. What makes things awkward for me now is that the Adcoms have even more—at least in my system, with my Spendors.

The Adcom sounds neutral. The midrange and treble are exceptionally smooth for solid-state, but just a tad less sweet than the B&Ks. But the biggest difference is that the Adcoms sound more powerful. Indeed, by the wattage ratings, they are more powerful: 300Wpc vs 200.

"I bought a lot of speakers when I designed the GFA-565s," Victor said, and added, "I destroyed most of them." Not that you're likely to do so unless you're reckless. But beware: these are extremely powerful amps and the potential for speaker damage is quite real, especially if you do something dumb like remove an RCA plug while the amps are powering your speakers!

Detail is excellent. With the Adcoms, I can hear separate instruments, even to a greater extent than with the B&Ks. What's more, these instruments were even more precisely localized and their position seemed to stay stable. With the B&Ks, the sound, particularly of a symphony orchestra, was spacious, but more diffuse, more blended, less defined than the very precise sound of the Adcoms.

So, the Adcoms are "better" than the B&Ks, right? Not so fast. The B&Ks strike me as more tubelike than the Adcoms, in almost every sense. The sound is round, blended—dimensional. The Adcoms, while not sterile, are lean, clean, and very tight in the low end. The B&Ks simply did not dig down with the gusto that the Adcoms could muster on my Spendors.

Because the Adcoms have such detail, they reveal the differences among recordings quite readily. If a recording is overbright, shrill, watch out—the Adcoms will let you know. If a recording is too densely packed, over-reverberant, too laid-back, the Adcoms will let you know that. If the imaging is confusing, confusion is what you'll hear. If a recording is magnificent, on the other hand, the Adcoms will reveal the recording in its full glory—assuming you have a good enough speaker. I found that the B&K M-200 monos were less revealing of recording quality differences. On the other hand, you might say that the B&K monos are more forgiving.

On the Spendors, particularly, I prefer the Adcoms. Because there is such excellent resolution of low-level detail, the Adcoms are almost always interesting to listen to. By contrast, the B&Ks tend to cover the music with a slight haze—or whale, as Lars calls it, perhaps being a vestige of the infamous MOSFET mist. This is not something I become overly aware of or irritated by—until I compare the B&Ks with the Adcoms.

"Get ready to sell your Krell," I advised Lars, proud owner of a pair of WATT/Puppies and a Krell KSA-250. "When you hear what the Adcoms can do, you'll want to sell your amp, buy these, and pocket the change."

"Okay, bring over the amps," chimed Lars. "Lou can be the final arbiter."

Lars helped me bring the amps from the driveway into the house.

"So small. Not like Krell. One person can carry them without suffering a rupture. They can't be any good."

"Shut up, Lars. Yust listen."

We warmed up the amps and drank beers, with music in the background. Cables and interconnects were the Aqueous Maximums from Jim Aud, of Purist Audio Design—the "Texas water cables," which some say are the best.

2 I know I told you that the B&K M-200s do a good job of letting go of the notes. They do. The Adcoms on the Spendors are even better: cleaner, crisper. But the Adcoms will not satisfy someone looking for a solid-state substitute for tube-amp sound.
With its remarkable stability, high dynamic headroom, and extremely low noise, the NAD 2400THX is the first power amplifier good enough to meet the rigid standards for home THX® certification. (THX is a set of technologies and specifications designed by Lucasfilm to replicate the authentic sounds of a motion picture.)

While modestly rated at 100 watts/channel RMS, the 2400THX is capable of producing an astounding 400 watts/channel for the dynamic peaks that occur in music and movies.

In a more conventional use as an audiophile-quality power amplifier, the NAD 2400THX can be bridged to be used as a “monoblock” amp, tripling the rated output power and achieving musical details usually found only in amplifiers costing two or three times its price.

Come visit your local authorized NAD dealer to audition this remarkable power amplifier. We think that you will discover that despite its modest price, the NAD 2400THX is one of the finest amplifiers in the market today.
Golden Dragon
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To attain a premium tube, sonic quality must be designed in from the start. As with any fine audio component, vacuum tube design is both an art and a science. With the closing of the legendary tube manufacturers it seemed that the magic combination would be forever lost.

Fortunately, a group of British audiophiles and engineers, formerly with such tube greats as M-O Valve, Mullard, Brimar, and Hi-Vac, have worked diligently with the Shuguang tube factory in China to create tubes of the highest sound quality and reliability. No aspect of design or performance has been neglected. Countless prototypes were auditioned in the creation of custom audio tubes that rival the finest ever made. The results of these efforts are now available as Shuguang Golden Dragon audio tubes.

Most of the design features responsible for superior sound and reliability are not visible upon external examination, but are detail variations of dimension and material within the metal structure of the tube. By exclusive contract with Shuguang no other tube may incorporate any of our unique design details.

You will hear the difference.

Golden Dragon Precision Tube Prices

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
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<td>EL84/6BQ5</td>
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<td>2A3</td>
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<td>EL34/6CA7</td>
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<td>12AX7A</td>
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<td>6DJ8</td>
<td>$15.00</td>
<td>6550A</td>
<td>$60.00</td>
<td>300B coming soon</td>
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<td>KT88</td>
<td>$80.00</td>
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thing from the Lone Star State since the Chainsaw Massacre. Digital source was Mike Moffat’s big Theta Generation II processor.

Soon we began our serious listening—starting with the Shostakovich First Symphony with Leonard Bernstein and the Chicago Symphony on DG. Other goodies followed, including some awful jazz that only a Swede could love, and Wilson Audio’s CD version of *Winds of War and Peace*. Lars also played some CDs he had just bought at the new Tower Records store in “Jonkers.”

“Jonkers?” questioned Lou.

“Yonkers, Yonkers,” I said. “It’s this crazy Y and Y business. Don’t ask me why.”

You can see what we did. We put the Adcoms on $10,000 speakers, replacing an amplifier which cost nearly three times the price. Then we threw on the most demanding source material we could find. In other words, we tried to get the Adcoms to poop out or distort or overheat...or do something that would reveal their limitations. (I didn’t have time to try the B&K M-200 monos on Lars’s system.)

“Not bad,” said Lou, as the Adcoms sailed—or sled—through the Shostakovich.

Lars grunted.

“Crank it up,” I yelled.

Lars did so, but it was obvious not that the amps were straining but that the music was just too loud. Lars scaled back a bit. On disc after disc, the Adcom played without the slightest hint of being overtaxed. The soundstage was excellent, as it can be with the WATT/Puppies at their best—deep and wide, and not shrinking when the music gets loud.

Lars now signaled his approval. “These are very good amps, amazingly good for the price. But we’ll have to see whether they are as good as the Krell KSA-250.”

“Who cares? They cost roughly a third the price. And they won’t heat up the listening room in summer.” It’s true. Despite running the amps as hard as we could into the WATT/Puppies, the amps got no more than slightly warm. I can’t imagine anyone actually needing the optional cooling fans for regular home use.

“These amps really dig down in the bass,” said Lou.

“Balls!” I roared. “Krell balls in an Adcom amp!”

“We’ll see about Krell balls,” said Lars, as he poured another round of New England Brewing Atlantic Amber Beer, brewed in Norwalk, Connecticut—probably the best American-brewed beer I have ever tasted.

We switched the Adcom amps for Lars’s resident Krell.

And yes—as I mentioned to C. Victor Campos—the Krell was better. Noticeably so. Lars, Lou, and I agreed. But the three of us also agreed that the difference, while noticeable, was not very great. Like they say on Wall Street, the spread was very narrow.

“I could live with the WATT/Puppies and the Adcom amps very nicely,” said Lou.

“Me, too,” I chimed in. “Wanna sell the Krell, Lars?”

Lars emitted a strange Scandinavian snort. This was mischief, and he knew it.

Compared with the Adcom monoblocks, the big Krell stereo amp had even more authority and weight—not a lot, but enough to be noticeable. Also, transients were slightly more convincing with the Krell—crisper, cleaner, more lifelike. Again, the difference was slight and subtle...but there. Finally, the Krell was slightly smoother, more creamy-textured, richer than the slightly threadbare (by comparison) Adcoms.

Still, this was astonishing performance—roughly 90%, maybe 92% of the performance of the Krell for a little over ½ the price.

“Soundstage is good. No collapse. Tonality is excellent,” opined Lars. “The amps are neutral. And their authority, their control, is almost as impressive as the Krells.”

“You save $3700,” I said, “and you don’t have to listen in your underwear during Yune, Yuly, and August.”

Lars turned to Lou: “This guy never stops.”

“Lars,” I said. “You know how this pains me. If I could hear something wrong with your system, I would pounce.” I hesitated. “No, I would slowly, surely, plant seeds of uncertainty and insecurity in your mind, the way I do with the Brass Ear, to the point where he starts going insane. I would love to do this, but I can’t. Your system is absolutely superb, and the Krell KSA-250 is a killer amp.”

“Thank you,” said Lars, waiting for the other shoe to drop.

I waited a moment before turning to Lou.

“It’s amazing what Lars can do with one hand tied behind his back,” I said.

---

3 Lou thought that the B&K amps have some of the creamy-textured richness the Adcoms seem to lack. Lou also thought that the slightly cleaner, crisper, clearer transients of the Krell, over the Adcom, may have lot to do with the Krell amp’s pure class-A operation.
# The New Spring Collection

**Preamps, Poweramps & Tuners**

<table>
<thead>
<tr>
<th>Model</th>
<th>Amp Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>Krell Altair</td>
<td>100W stereo amp</td>
<td>$3,500</td>
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<tr>
<td>Krell MDA-300</td>
<td>300W mono differential balanced amp</td>
<td>$9,000 pr.</td>
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<tr>
<td>Krell MDA-500</td>
<td>500W mono differential balanced amp</td>
<td>$12,400 pr.</td>
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<tr>
<td>Jadis JPL</td>
<td>Tube line stage</td>
<td>$5,000</td>
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<tr>
<td>Jadis DEFY 7</td>
<td>100W stereo tube amp</td>
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<tr>
<td>Jadis JA200</td>
<td>200W mono tube amp</td>
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<td>Jadis JA500</td>
<td>500W mono tube amp</td>
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<tr>
<td>Quicksilver</td>
<td>Silver mono tube amp</td>
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**Speakers**

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<tr>
<td>Wilson Audio</td>
<td>Watt III*</td>
<td>$6,650 pr.</td>
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<tr>
<td>Martin Logan</td>
<td>The Quest</td>
<td>$3,995 pr.</td>
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<tr>
<td>Vandersteen</td>
<td>Model III*</td>
<td>$2,395 pr.</td>
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<tr>
<td>Mirage</td>
<td>M-5</td>
<td>$1,495 pr.</td>
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<td>Monitor Audio</td>
<td>Studio 15*</td>
<td>$3,995 pr.</td>
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<tr>
<td>Apogee Centaur</td>
<td>Minor</td>
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<td>Apogee Centaur</td>
<td>Major</td>
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**Digital Components**

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<tbody>
<tr>
<td>Krell CD-DSP</td>
<td>compact disc player</td>
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<tr>
<td>Audio Research</td>
<td>DAC-1</td>
<td>$2,995</td>
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<td>Barclay Digital</td>
<td>Cabernet</td>
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<td>Altis DAP</td>
<td>Bitstream decoder</td>
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<tr>
<td>Cal Audio</td>
<td>System 1</td>
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<td>Museatex</td>
<td>D to A converter</td>
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<td>Meridian 606</td>
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<td>Meridian 602</td>
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<td>Meridian 206B</td>
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<td>Denon DTR 2000</td>
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**Miscellaneous**

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<td>Tice Clock</td>
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<tr>
<td>Lyra Clavis Cartridge*</td>
<td>$1,500</td>
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</tbody>
</table>

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*Stereophile, April 1991*
“Now what does that mean?” inquired Lars.
“No analog. Only digital. Yust think what you could achieve with analog. Why, you’d have even more followers than you have now; you’d have a whole army of disciples, like the Gindian.” (Lars—and the Gindian—take their roles as gurus very seriously.)

Speaking of the Gindian, Lars read me his first review in TAS. Some business about his Jadis JA-500 amplifiers being magicians that can pull rabbits out of hats—I mean, speakers. I guess.

“Funny,” I said to Lars, “I was over the Gindian’s and the sound was really good. Still, I didn’t hear no rabbits.”

It was a good afternoon, because everyone was pleased. Lars was pleased with what he had achieved with his system—proof, as I said to Lou while we walked out the door, that you can achieve good results with almost anything if you try hard enough. Lou had enjoyed himself. And all of us were impressed both with the Krell—that wasn’t news—and with the Adcom—that was news.

Of course, there was more fun to be had. Lou has a pair of Apogee Stages—a purchase which I helped to engineer. I got Lou all fired up about the Stages, so he would buy them and then I would have easy access to a pair without having to own them. Diabolical, huh? Lou’s wife, Anita, does not like to let me into the house. “Here comes trouble,” she says when she sees me.

The Stages are said to be amplifier-unfriendly—tough to get along with, ampassly. Strangely, I have not found this to be the case. Maybe I’ve had good luck. Lou, for instance, drives the stages quite well with a Croft tube preamp and a pair of 105Wpc Croft OTL tube amplifiers. The Stages also did quite well with the B&K M-200 monoblocks, as you’ll remember from last month.

This time it was the Adcoms’ turn with the Stages.

Once again, the Adcoms did very well—controlling the bass of the Stages with greater solidity and authority than either the Croft OTL tube amps or the B&K M-200 solid-state monoblocks. On the whole, I preferred the Adcoms on the Stages to the B&K, but it was a closer call than it was with the Spendors, where the bass authority tilted the scale, for me, decisively in favor of the Adcoms. Here, with the Stages, the treble sweetness and the added apparent dimensionality—or spaciousness—of the B&K amps had a definite appeal. Especially for Lou.

The Adcoms sounded more authoritative than the B&Ks, but leaner, saved from sterility and dryness, perhaps by the presence of the Croft tube preamplifier in Lou’s system. Lou liked the Adcoms but wasn’t sure he preferred them to the B&K M-200s... on the Stages.4 Still, the Adcoms are another item on the list of amps which can be made to work well with the Stages. If you have Stages, or plan to get them, this is where I’d start my search for affordable amplification: B&K M-200 monoblocks and Adcom GPA-565 monos.5

Lou agrees with me about the relative performance of the two amps in the bass. Lou thinks the difference between the amps may have a lot to do with power supply. Each GPA-565 has a very large transformer feeding a storage bank of 70,000μF of filter capacitance. I’m sure you don’t want to hear from me any of the technontalk that Adcom provided. My eyes glaze over when I read, “The output stage, driver, and pre-driver are in a triple-Darlington configuration.” One point is worth noting, I think: all internal point-to-point wiring is oxygen-free copper. Also, high-quality film capacitors have been used in the “specially critical” circuits. I do not think there would be any benefit whatsoever in having your GPA-565 worked on by any of the many mod services.

Lou was headed off to the opera the night that night, lucky Lou, so I left early, intending to take the Stages directly home. I figured, though, that I had time to stop off at the Wolf Man’s before dinner. You haven’t met the Wolf Man yet.

No sooner had I arrived at the Wolf Man’s than I bumped into my buddy Howie Hyperfy. Howie invited me over to hear his new Avalon Eclipses, just arrived.

“Fine, I have the new Adcom monos in the car.”

The Avalons were barely 24 hours old and obviously not broken in. Moreover, Howie had not had opportunity to experiment with speaker

---

4 If a tube sound is what you’re after, take a tube preamp like the Audible Illusions Modulus and run it through the B&Ks or the Adcoms. Of the two, the B&Ks will sound more “tube-like.”

5 Too bad I didn’t have access to a pair of Martin-Logan electrostats. These have tended to do particularly well on B&K amps, which seem to ameliorate what may be the hyper-detailed quality of the speakers. B&K amps have also tended to do very well on speakers equipped with bleedie-ears, metal-dome tweeters. Do not assume that just because I preferred the Adcoms on my Spendors, you will prefer the Adcoms on the speakers of your choice. Listen to both pairs of amps and decide for yourself.
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placement and all the other tweaks, including cable changes, which can make such a difference in speaker performance. Nor did Howie yet have his Jadis JA-200 amps.

The sound of the Adcoms on the Avalons was not promising—although I shall be paying Howie a return visit. As Howie said, "The sound is dry." However, as JA has already pointed out, this is a speaker which seems to demand a tube amp. The Adcoms weren't terrible on the Avalons; the sound was somewhat clinical, cold, not enough body. Not enough weight, either. Again, I think it's the speakers, not the amps.

"Howie is living in hi-fi hell," said Wolf Man a few days later.

Tentatively, then, I would say that the Adcoms are ideally matched with a speaker which is already endowed with some of its own body, warmth, and sweetness. The Adcoms with the Spendor S100s is one of the great combinations of hi-fi. I would imagine that the Vandersteen 2Ci and B&W 801 Matrix mate well with the Adcoms, although I have not yet had the chance to check out these combinations.

What's noteworthy about the Adcoms, aside from bang for the buck, is the combination of delicacy with authority. These are no slash-and-burn amplifiers—impressive at first, then boring when you notice a lack of delicacy and detail. They are as neutral as can be, and totally free from any graininess. I found these amplifiers to be virtually unflappable. Also, they don't run hot or buzz or consume gobs of electricity when quiescent.

They warm up fast, sounding quite good even cold, and close to their best after about an hour. Leaving them on all the time—not out of the question since they consume less than 100 watts each when idling and do not run hot—makes them sound perhaps only slightly sweeter and smoother. Victor maintains there is no improvement at all after the amps are on for an hour or so. I leave my amps on when I'm home and turn them off when I go out.

When Lou heard the GFA-565s on his Apogee Stages, he said, "They have closed the gap between the low end and the high end."

I agree with Victor: the Adcom GFA-565 may be the best amp that he's ever heard.

Judge for yourself. Be sure to audition both the B&K and the Adcom amps—preferably with the speakers you own or intend to buy. Don't run out and buy a small but expensive single-chassis stereo amp before you hear what Adcom and B&K can give you for less.6

And Tony Cordesman, I apologize. The Adcom amps are as good as you said they were. Maybe even better.7

I sold the B&K monos to my good friend Scott and made the Adcoms my reference. Yes, the Adcoms were "better"—for me, with my Spendors, for my tastes. I repeat: this does not mean the Adcoms will be "better" for you.

The Brass Ear puts his WATT/Puppies up for sale!

I told you this would happen. I rushed to tell Yason Bloom, of Apogee, the news. The Brass Ear has put his WATT/Puppies up for sale. He's probably sold them by now.

"I hear you're selling your WATT/Puppies, Brass," I said on the phone, early one morning—to harass the Brass, before he started his day selling cars.

I cannot print his response. It was the hump that bothered Brass.

Brass feels, and I agree, that there is something not quite right about the tonal balance

6 You might consider Forté Audio, too. They have a new pair of class-A monoblocks—the Model 7—retailing for $2990/pair. If these amps are as good as the Forté Model 2 preamp, one of my favorites, then they, too, are contenders to be reckoned with.

7 Since I'm keeping this pair of Adcom amps, a separate pair is being sent to Santa Fe. I'm sure these amps will make "Recommended Components." The question is, where? John, if you put them in borderline Class A, which is where I feel they belong, won't people think they're nuts to consider the other, more expensive Class A-rated brands? Heh-heh.
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Stereophile, Vol. 13 No. 4, April 1990

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of the WATT/Puppies—one reason, perhaps, why David Wilson is now coming out with the WATT Series III. Anyway, the problem, as perceived by Brass and others, is that the speakers have too much upper-bass energy—around 80 to 100Hz (I'm guessing), and not enough bass really deep down below. (If you want bass from hell, you have to buy a Wilson WHOW sub-woofer, and now we're talking big, big bucks.)

Every time I see Brass, I ask:

"How's the hump? Has Lars helped you get over the hump? Have you found cables or a speaker placement that eliminates the hump?"

When this doesn't get to Brass, I say, "I don't know how you can live with the hump." Or, "That hump would bother me if I owned these speakers." After I tweaked Brass about the hump, I would start on the update, "Are you going to have your WATTs updated to Series III? You wouldn't want to own a pair of obsolete WATTs now, would you? Maybe that's why you bought them so cheap—the person who sold them knew the Series III was coming. Someone has sold you a lemon, Brass." (Which I really didn't mean, but I knew that would get him.)

"Did Lars tell you I was selling the speakers?"

asked Brass.

"You can't wipe your ass, Brass, without my finding out. No. It wasn't Lars. It wasn't Lou. It was Scottso."

I asked Lars, "What's Brass Ear planning to buy when and if he sells his WATT/Puppies?"

"WATT Series III with Puppies," Lars replied.

"But he could have them updated."

"You miss the point. Brass just likes to sell equipment—it's in his blood, from a lifetime of car dealing. He's not happy unless he's selling something...anything. He'd rather sell the Series II, get a new series III."

"Oh."

"Actually, the hump aside, Brass is quite taken with the WATT/Puppies—loves the dynamics, the imaging, the soundstage."

Brass will probably have his Series IIIIs by the time this article appears. If you want to make an offer on them, let me know.

8 One of these days I'll have to tell you about Motorhead, an enthusiast for industrial music and proud owner of a WHOW.
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- AR ES-1 turntable w/RB-300 arm $735.00
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Stereophile, April 1991
components about which we have found to be among the best available in each of four quality classes, and whose purchase we highly recommend. Following each listing is a brief description of the product’s sonic characteristics and a code indicating the Stereophile Volume and Issue in which that product’s report appeared. Some products listed have not yet been reported on; these are marked (NR). We recommend that any product’s entire review be read before purchase is seriously contemplated (products without reviews should therefore be treated with more caution): many salient characteristics, peculiarities, and caveats appear in reviews, but not here. To obtain back issues of the magazine, see the advertisement in this issue. (We regret that we cannot supply photocopies of individual reviews.)

In general, discontinuation of a model precludes its appearance here. In addition, though professional components—recorders, amplifiers, monitor speaker systems—can be obtained secondhand and can sometimes offer
performance which would otherwise guarantee inclusion, we do not generally include such components. Apart from that exception, Stereophile's "Recommended Components" listing is almost exclusively concerned with currently available products offered through the usual hi-fi retail outlets.

**How recommendations are determined**

The ratings given components included in this listing are predicated entirely on performance—ie, accuracy of reproduction—and are biased to an extent by our feeling that things added to reproduced sound (flutter, distortion, various forms of coloration) are of more concern to the musically oriented listener than things subtracted from the sound, such as deep bass or extreme treble. On the other hand, components markedly deficient in one or more respects are downrated to the extent that their deficiencies interfere with the full realization of the program material.

We try to include in "Recommended Components" every product which we have found to be truly excellent or which we feel represents good value for money. Many different tastes are represented. The listing is compiled after extensive discussion among Stereophile's reviewing staff, editors, and publisher, and takes into account continued experience of a product after the formal review has been published. In particular, we take account of unreliability and defects that show up after extended auditioning. The fact that a product received a favorable review can't therefore be regarded as a guarantee that it will continue to appear in this listing.

We indicate products that have been on this list in one incarnation or another since the "Recommended Components" listing in Vol.11 No.4 (April 1988) with a special symbol: *. Longevity in a hi-fi component is a rare enough commodity that we felt it worth indicating (although, as in the case of pickup cartridges and separate MC head amplifiers, it can apparently indicate that the attention of design engineers has moved elsewhere).

We are not sympathetic toward letters complaining that the Symphonic Bombast A-123 Mk.IV, which we recommended heartily two years ago, no longer makes it into "Recommended Components" at all. Where deletions are made, we endeavor to give reasons (there always are reasons). But remember, deletion of a component from this list does not invalidate a buying decision you have made.

**How to make use of the listings**

Read carefully our descriptions here, the original reviews, and (heaven forbid) reviews in other magazines to try to put together a short-list of components to choose from. Carefully evaluate your room, your tastes, your source material and front end(s), your speakers, and then yourself: with luck, you may come up with a selection to audition at your favorite dealer(s). "Recommended Components" will not tell you just what to buy, any more than Consumer Reports would presume to tell you whom to marry!

---

**Class A:**
Best attainable sound, without any practical considerations; "the least musical compromise." A Class A component should bring you close to the music without you feeling that there is some mechanical process intervening. A Class A system is one where you don't have to make a leap of faith to believe that you are hearing the real thing.

**Class B:**
The next best thing to the very best sound reproduction; cost is a factor, but most Class B components are still quite expensive.

**Class C:**
Somewhat lower-fi sound but far more musically natural than average home-component high fidelity; products in this class are of high quality but still affordable.

**Class D:**
Satisfying musical sound but significantly lower fidelity than the best available. Many of these products have obvious defects, but are inexpensive and much better than most products in the price category. Bear in mind that appearance in Class D still means that we recommend this product—it is possible to put together a musically satisfying system exclusively from Class D components. Below this level, system colorations start to become so great that guidance becomes almost impossible and any recommendation is out of the question.

**Class K:**
"Keep your eye on this product." Class K is for components which we have not tested (or have not finished testing), but which we have reason to believe may be excellent performers. We are not actually recommending these components, only suggesting you take a listen. In certain cases, though the report has yet to be published, the reviewer and Editor feel confident enough that the review opinion is sufficiently well-formed to include what otherwise would be a Class K entry in one of the other Classes, marked (NR).
Turntables

Editor's Note: Any audiophile worth his or her salt (unless they are exclusively committed to CD) should consider at least one of our Class D recommendations or, preferably, one of the Class C turntables and their variants as the essential basis of a musically satisfying system. An in-depth audition as part of a preferred turntable/arm/cartridge combination before purchase is mandatory. The point should also be made that these are lean times for turntable manufacturers—"Buy while you can" is Larry Archibald's advice. If an expensive, less expensive turntable has not made its way into Class D or is not listed in Class K, do not assume that it is recommended by default. Underachievers are more common in the world of turntables than in any other area of hi-fi.

A

Basis Debut Gold Standard: $6900

"A natural for a Class A recommendation," said AB of this thoroughly worked out, beautiful-looking suspended-subchassis design. Interchangeable armboard has been designed in an ingenious manner that doesn't compromise structural rigidity: A natural mate for the Air tangent tonearm. (Vol.13 No.12)

Versa Dynamics 2.0: $12,500

Ingenious vacuum holddown, air-bearing, suspended-subchassis turntable with integral air-bearing tonearm. JGH felt the complete player to give the "best sound from analog disc" that he has heard, particularly in its presentation of silent backgrounds and tight low-bass response. Only drawback is the need to house the air-compressor in a separate room. (A noise-reduction housing for the pump is included in the price.) Despite a report in April 1990 that the 2.0 was no longer in production, this does not appear to be the case—see the letter from Versa's John Bicht in Vol.13 No.9's "Manufacturers' Comments." (Vol.10 No.8, Vol.11 Nos.1 & 4)

B

Goldmund ST4: $7150

Martin Colloms's long-term reference, this integrated turntable/parallel-tracking arm LP player offers an almost unrivaled combination of speed and pitch stability, midband neutrality, and inner musical balance and drive. (Vol.13 No.3)

Linn Sondek LP12 with Lingo power supply: $2690

Compared with the basic Valhalla model, the Lingo-equipped version minimizes the LP12's propensity for a slightly fat mid bass and subjectively extends the low frequencies by another octave, resulting in a Class B rating overall. The upgrade alone costs $1295. (Vol.14 No.1)

SOTA Cosmos: $4000

A more contrasty sound than the SOTA Star, thought TJN of the Cosmos, with greater inter-transient silence. The subjective result was that small details were better resolved with the more expensive turntable. The low end, too, betters the Star in detail and clarity: TJN did feel, however, that using the supplied SOTA "Groove Damper" mat led to a small loss of openness, "a slightly more closed-in sound that tempered that feeling of an unrestricted top end that is one of the Cosmos's principal strengths." A high-gloss black finish adds $500 to the price. (Vol.13 No.7)

VPI TNT: $3300

Sophisticated belt-drive turntable with two idler pulleys in addition to the motor pulley to give a more even belt tension. "Soul" was an ingredient that TJN felt impelled to mention as being part of the big VPI's sound, as was "midrange liquidity, with a self-effacing high-frequency sweetness." The sounds of the cartridges and arms he used became a little richer on the VPI when compared with their sounds on the SOTA Cosmos and Star. Compared with the sound of the standard VPI HW-I9, the TNT features a greater degree of palpability. West Coast price is $3400. A dust cover and dedicated stand add $1100 to the price. (Vol.15 No.7)

C

Linn Sondek LP12: $1495

The standard against which newer turntable designs have been measured for 15 years now, the Linn is felt by some to be more colored than the other Class C tables (particularly in the upper bass). Latest version has a laminated armboard which, with Zener mods to the Valhalla board, results in a considerably more neutral sound. Certainly it is harder to set up and more likely to go out of adjustment, though with the latest springs and glued subchassis, it is now much better in this respect (low-bass extension suffers when the LP12 is not set up correctly). Superbly low measured rumble and excellent speed stability reinforce the feeling of musical involvement offered by this classic turntable. Good isolation from shock and vibration—essential in view of the fact that JA's cats like to use his LP12 (with the lid down) as a springboard to jump onto the equipment cabinets! (This application is not recommended.) While the felt mat doesn't offer the greatest degree of vibration suppression within the vinyl disc, what absorption it does offer is uniform with frequency. Despite flirtations with other decks, JA remains true to the basic design he has used now for over 12 years. As an integrated system, with Linn's Ekos tonearm and Troika cartridge, approaches Class B performance overall. (Vol.7 No.2, Vol.13 No.3)

Roksan Xerxes: $2100

Unusual but well-made design that eschews a conventional sprung suspension for a semi-rigid construction. Easy to set up and align, therefore, but a stable support essential. Excellent pitch stability, though the bass is a little lightweight. Provides a firm musical foundation for the SME V, Rega RB300, and Eminent Technology ET Two tonearms. (Vol.13 No.3)

SOTA Deluxe Star Series III: $1795

A synergistic match with the SME Series V tonearm, the Series III Star, complete with the acryllic Supermat, is significantly better than earlier versions, due to its use of an aluminum armboard, new motor drive pulley, new suspension springs, and ribbed platter construction. Compared with the standard SOTA Sapphire, the vacuum holddown significantly improves bass range and detail, as well as resolution across the audio range. The basic SOTA Sapphire at $1550 lacks vacuum disc clamping—the Series II Reflex clamp is supplied as standard—but is easy to set up and use, attractive, ingenious in design, and sonically excellent. (Vacuum clamping is available as a $695 upgrade.) SOTA "Groove Damper" mat now supplied as standard, costs $40 as accessory. The SOTA "Electronic Flywheel" line conditioner ($300, Vol.9 No.2) improves performance very
slightly further. If you find the cost-no-object “super-decks” tantalizingly out of reach, JGH recommends that you set your sights on the SOTA Deluxe Star. “The best turntable performance you can buy for anywhere near its cost,” quoth JGH, though it must be noted that LA, LL, and JA find its sound a little uninspiring compared, for example, with the Linn, Well-Tempered Table, or VPI. A Class C rating would seem appropriate, therefore. (Vol.10 No.5, Vol.11 No.1)

**VPI HW-19 III: $1200**

The Mk.III version of the VPI 'table, cosmically more elegant than the original, achieves a standard of sonic neutrality that puts it close to the latest SOTA Star Sapphire, and at a significantly lower price. The HW-19 readily accommodates a wide range of tonearms—the ET 2 air-bearing design in particular—and is very stable. The $300 Power Line Conditioner (see Vol.12 No.2) is an essential accessory. New as of 1991 is an upgrade path to the TNT. (Vol.8 No.4, Vol.9 Nos.4 & 9, Vol.12 No.11; see also Vol.13 No.7, p.112)

**Well-Tempered Turntable: $1795 (inc. arm)**

An integrated belt drive turntable/tonarm combination featuring an acrylic platter and a unique four-point wobble-free bearing. Lacks a suspension, but designed with attention to detail, particularly concerning the maximizing of speed stability and the rejection of motor noise. Most obvious sonic characteristic is stability, both in speed and harmonic structure, coupled with clean-up sound quality: “The quiet between the notes is suddenly more silent,” said AB in his review. In addition, dynamics seem to be enhanced, though the sound is more lightweight than that of, say, the VPI. Only significant drawback, as far as mix’n’matchers are concerned, is its dedication to the Well-Tempered Arm. No other can easily be fitted—we’ve had reports that the Wheaton works well—but it’s available w/o arm for around $1000. (Vol.11 No.3)

**D**

**Acoustic Research ES-I: $550**

Although an increase in price means that it is no longer the bargain it once was, this is still a turntable we can heartily recommend. Compared with the original AR, this has much better cosmetics, comes with its own arm (for $725), or can be fitted with yours—Sam Tellig just loves the AR with either the Rega RB300 or the SME 309, while Guy Lemco enjoyed the sound with the AudioQuest PT-5. Intrinsic character is a bit fat in the upper bass, but is nevertheless musical. Availability is limited, but The Audio Advisor has supplies. The AA’s metal armboard should be regarded as mandatory (Vol.11 No.4), the Anarchist then feeling the sound with a felt mat to be Class C and rivaling the Linn LP12. Merrill’s modifications of the Connoisseur are also said to be worth investigating. (Vol.8 No.7, Vol.11 No.4, Vol.12 No.8)

**Linn Axis: $995 (inc. Akito tonearm)**

Versatile, “turnkey operation,” two-speed belt-drive deck with electronic speed control and ingenious suspension. “Smaller” sound than the Sondek. Latest version fitted with the new Akito tonearm, which is said to be much improved compared with the original arm. (Vol.10 No.1, original version, but a review is underway)

**Rega Planar 3: $599**

Synergistic mix of no-nonsense deck with superb arm. Lack of environmental isolation may be problematic; some recent reports of variable wow & flutter; limited cartridge compatibility; but a safe Class D recommendation, nevertheless. Can be obtained in a dedicated version for playing 78s. (Vol.7 No.1, Vol.8 No.6)

**VPI HW-19 Jr. turntable: $600**

Well-constructed belt-drive turntable featuring an excellent disc-clamping system. No suspension, due to upgrade path to fully fledged HW-19 being incorporated into design. GAG therefore recommends a wall-mounted isolation shelf to get the best performance from the Jr. Available for $900 ready-fitted with AudioQuest PT5 tonearm. West-Coast price is $25 higher. (Vol.12 No.10)

**K**

Duniop Systemdek IIX, Michell Gyrodek, Oracle Delphi Mk.IV and Alexandria Mk.III, Revolver Mk.II, the Well-Tempered Record Player.

**Deletions**

Sonographe SG3 not auditioned in a very long time; Space & Time Aura due to currently uncertain state of distribution in US.

**Tonearms**

**A**

**Airtangent: $4500 (with lift/floor)**

Setting a new price level in this listing, this beautifully made Swedish parallel-tracking tonearm, distributed in the US by Basis, was felt by AB to achieve new standards of transparency, smoothness, and retrieval of detail with every cartridge with which it was used, coupled with the ability to present a "billowing" soundstage and a well-defined bass. Better in the highs than the SME, it’s a little lean in the bass compared with the English arm. It does, however, allow for easy adjustment of VTA and features interchangeable, prebalanced arm-tube assemblies to allow easy cartridge changes. (Vol.12 No.2)

**Graham Model 1.5: $2340**

Beautifully engineered unipivot design using an SME-type armboard cutout that offers interchangeable armwands and easy adjustment of VTA, azimuth, and geometry. Superb bass definition, though not as much ultimate weight as the SME, but astonishingly good retrieval of midband information due to a very low resonant signature. (Vol.14 No.3)

**Linn Ekos: $2295**

Cleaner-sounding than the Ittok, upon which it is loosely based, the Ekos rivals the SME in overall neutrality while offering a somewhat brighter, more energetic presentation of the music. The treble is nevertheless superbly transparent. The Ekos also provides a much better match with the Linn LP12 than the English arm, which loses control of the bass when mounted on the Scots turntable. Martin Colloms also found the Ekos’s bass to be more tuneful and “open” than that of the original Ittok. Azimuth adjustment is not possible. (Vol.12 Nos.3 & 4, Vol.13 No.3)

**SME Series V: $2550**

Extraordinarily neutral pivoted tonearm, with the lowest resonant signature of any (though DO feels the Graham to offer slightly more midrange detail). Easy to set up, VTA and overhang are adjustable during play, but no azimuth adjustment, something that DO feels to be a significant drawback. The best bass perfor-
A SONIC REFERENCE!

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a reference-standard recorded sound.

Tired of commercial recordings that stubbornly refused to deliver accurate sound quality and soundstaging, Stereophile’s editors commissioned Water Lily Acoustics’ Kavi Alexander to capture the sound of flute and piano with accuracy, honesty, and integrity. (See Stereophile, September 1989, Vol.12 No.9, p.66, for the full story.)

The result, they believe, is a recording that is true to both the original sound and the music—flute sonatas by Prokofiev and Reinecke and Charles Griffes’ Poem.

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mance on the market, says SWW, but JGH, DO, and LL feel that the whole bass range is somewhat exag-
erated. Certainly JA feels the latter to be the case when used with the Linn LP12. Some compatibility prob-
lems with cartridges having low height. Ergonomically and aesthetically a work of art with a finish worthy of
Tiffany's. A less versatile version, the IV, appears to offer many of the V's sonic virtues at a lower cost ($1500).
(Vol.9 No.6)

**Wheaton Triplanar III: $1995 ★**

Limited-availability, unusual-looking pivoted tonearm with logically thought-out VTA and azimuth adjust-
ments. While not as neutral as the SME V, and not hav-
ing as much bass—the balance is on the lightish side—
the latest version of the Wheaton excels in its ability to
enable the cartridge to retrieve spatial information and
present a detailed, solid soundstage. AB particularly
recommends the Wheaton for use with the Rowland
Complement cartridge. Latest version has larger-diam-
eter headshell tube, Cardas wiring, and a trough for
silicone-fluid damping. Standard version fitted with
output box. Comes equipped with a 1m tonearm-
preamp cable for $2150. (Vol.11 No.1)

**B**

**Eminent Technology Two: $950 ★**

The ET Two corrects its predecessor's cueing difficul-
ties and comes up with a host of ingenious extras, in-
cluding VTA adjustable during play. More important,
it has "an extraordinarily live and open soundstage," according to Anthony H. Cordesman, and gets the best
results from a wide range of cartridges. Idiosyncratic
nature of low frequencies precludes a Class A rating.
Fussy to set up and use and needs a very stable
subchassis turntable—VPI, for example—to give of its
best. MC also reports excellent performance with the
ET Two mounted on the Roksan Xerxes. Surpassed
overall by the SME V, which has as neutral a midrange
and significantly better bass definition and extension.
At less than half that fixed-pivot arm's price, however,
the ET Two is an excellent value. Latest version in-
corporates a visco-damping trough. GL reports excel-
ent results—"almost Class A on the VPI HW-19"—with
Herb Wolf's modified Wisa air pump and surge tank,
and is currently working on a review of a version fea-
turing a revised manifold to take advantage of the
higher pressure offered by the Wisa pump. (Vol.8 No.7,
Vol.13 No.3)

**Linn Ittok LVIII: $1195 ★**

The original Ittok LVII had slight resonant colorations in the upper midrange compared with the best arms,
which could add both hardness and a false sense of
"excitement." Its bass and lower midrange were still
among the best, however, and superior to the similarly
priced competition in these areas. New version incor-
porates refinements based on the Ekos and is signifi-
cantly more expensive but not yet auditioned: this
recommendation must be regarded as provisional.
(Vol.8 No.7)

**SME 309: $1195**

Preliminary rating following the Audio Anarchist's con-
tinued use of this detachable-headshell arm on an AR
turntable. (NR, but see Vol.11 No.10, p.53, and Vol.12
No.12, p.63)

**Well-Tempered Arm: $825 ★**

One of the most neutral arms available, according to
JGH, this odd-looking arm is hard to fault on any count.
Superb highs, stereo soundstaging, and midrange, plus
excellent compatibility with MC cartridges that put
a lot of energy back into the arm. Some deficiency/soft-
ness in the low bass and; according to some listeners,
an undynamic sound, but virtually no other problems.
Good value for money. Removing the armrest, which
adds a thickening in the lower midrange when the arm
is mounted on the Well-Tempered Turntable (see Vol.11
No.6), further improves the sound, as does replacing
the standard counterweight with a more massy one
nearer the pivot. (Vol.8 Nos.4 & 7, Vol.9 Nos.3 & 5)

**C**

**AudioQuest PT-5: $350**

Medium-mass tonearm with straight aluminum arm-
tube wrapped in clear polyolefin and nondetachable
headshell. Pivot damping optional, while VTA adjusta-
ble with setscrew at base, but no azimuth adjustment
possible. Works well with AR and VPI Jr. turntables,
with which it can be supplied as a package: at reduced
cost. AudioQuest Sapphire cable adds $95 to price,
but should be regarded as essential, says Gary Gato,
the sound with the basic cable being rather veiled, if
not totally muted. (Vol.12 Nos.8 & 10)

**Rega RB300: $299 ★**

The Rega offers very good detail, depth, midrange neu-
trality, ambience, and precision of imaging, almost
creeping into Class B. Works well with the Rega and
Roksan 'tables, but also recommended by the Audio
Anarchist as an ideal substitute for the arms that come
with the AR and Sonographe 'tables. (The Audio Advi-
sor offers it as a package with the AR.) Lacks any form
of height adjustment, however: VTA can only be ad-
justed by adding spacers under the base. Even-cheaper
RB250 dispenses with the spring downforce adjust-
ment and the sintered tungsten counterweight, but
sacrifices little in sound quality. (Vol.7 No.7, Vol.10 No.1)

**K**

Morch DP-6, Naim ARO.

**Pickup Cartridges**

**A**

**Benz-Micro MC-3: $1500**

Low-output MC from the manufacturer of the van den
Hul and Madrigal Carnegie cartridges that TJN thought
to be overall the best he had heard to date in his sys-
 tem. Possessing a similar balance to the vDH MC One,
the Benz MC-3 offers a slightly more transparent view
into the soundstage. More warm-sounding than the
Rowland Complement, feels DO. US distribution cur-
cently uncertain but retained in this list as dealers
should still have stocks. (Vol.13 No.3)

**Dynavector XX-1: $1000**

"Easy on the ears," said AB in his review of this high-
output MC which features a switchable "Flux Damper.
Soundstaging, too, was an area where the Dynavec-
tor excelled, producing "a panorama with quality." Highly
detailed presentation perhaps slightly offset by a
feeling that the sound was slightly larger than life in
being too harmonically rich from the upper-
bass downward. Benefits significantly from regular
"Flux-Busting." A low-output version is now available.
(Vol.12 No.6)
Jeff Rowland Design Group Complement: $2500
The high-mass Complement, which lacks any kind of cantilever, sets a new standard for performance above our existing Class A, felt AB in its review. "Astonishingly" ability to replicate transient attack is coupled with an almost unique ability to decode spatial cues within the recorded information, as well as the low-frequency extension. However, it needs a tonearm with a secure mechanical foundation to achieve its best—the Wheaton Triplanar was a better match than the air-bearing Airtangent, for example. Stereo separation dependent on downforce: 3.5gm or more shifting the coils from their optimum position, effectively resulting in mono reproduction. (Vol.12 No.7)

**KOETSU ROSEWOOD SIGNATURE: $1950**

The latest version of Martin Colloms’s reference pickup "matches the Troika for bass definition and overall definition." It offers a superb balance between the ability to decode space and perspective and to present a detailed retrieval of groove information, and allowing the listener to be swept away by the music. (Vol.13 No.3)

**LINA TROIKA: $1995**

Lightish balance, but musical integrity not compromised by superb retrieval of information. As good as the Koetsu Rosewood at presentation of the soundstage, in JAS’s opinion, with one of the best-defined bass registers in the business. Unique three-point fitting maximizes mechanical integrity but means that it can only be easily used in the litok and Elos tonearms. (Vol.10 No.6, Vol.13 No.3)

**MONSTER CABLE SIGMA GENESIS 2000: $1200**

Early samples seemed to be very arm-sensitive, but when mounted in an optimum tonearm—the ET Two, for example—the Sigma Genesis offers an airy and open sound with superb dynamics but a rather soft bass. Rather a forward if detailed presentation of soundstage information, as though the 2000 "seemed to turn up the contrast ratio a notch," thought MC, perhaps that it would not be the best choice for systems that are already a little larger than life. (Vol.13 No.3)

**ORTOFON MC-3000 II: $1500**

The "second most neutral cartridge" JGH knows of. This ceramic-bodied, higher-output child of the MC-2000 has a slightly warm balance, with silks highs producing a sumptuous sound from massed violins. Lateral imaging excellent but presentation of depth not as good, paradoxically, as the more forward MC-2000. Matching T-3000 transformer not in the same sonic class as, for example, the Vendetta Research phono preamplifier (which renders the transformer unnecessary). (Vol.11 Nos.1, 10, & 11)

**TALISMAN VIRTUOSO DT1: $1200**

Warmer balance than the Talisman S, with first-rate imaging and excellent harmonic contrast. One of the champs when it comes to retrieval of HF detail, with a top end free from the problem of fuzz and haze that plague many MCs. According to SWF, it has the "uncanny ability to reproduce the natural weight and authority of live music," with DO concurring that spatial detail "is sketched out with exquisite dimensionality." vdh stylus requires careful setup; output a little on the low side for some MM inputs. Somewhat forward balance, but up with the best in terms of transparency. With the cartridge optimally set up, the music emerges from a near-silent background akin to CD. (Vol.9 No.4, Vol.10 No.5, Vol.12 No.4)

van den Hul MC One: $1125

Not particularly cable-fussy, but does require attention to arm clamping. Works very well in the WTA and SME. Carries the vdh MC-10’s resolution of soundstaging, total neutrality, and naturality of midrange timbre a stage farther to compete with the best. Bass a little slow, perhaps, when compared with best performers in this region. (Vol.9 No.8, Vol.10 No.3, Vol.12 No.2)

B)

**AUDIQUEST 4041-L CARTRIDGE: $595**

A slightly forward treble and a minor lack of image depth didn’t prevent TJJN from enthusiastically recommending this MC, the sound being naturally detailed without any HF exaggeration. Current production samples have FPC-6 “Functionally Perfect Copper” coil windings, said to improve the sound of the low-output version slightly but that of the “H” high-output version to a significant extent. (Vol.12 No.3)

**GRADO SIGNATURE TLZ II: $500**

The only MM model to break out from the confines of Class C, the TLZ features slightly more open highs than the AudioQuest 4041-L, an open, lively midrange, a taut midbass, and expansive low frequencies, according to TJJN. Latest version is said to be a little flatter in response than the review sample. "A sweetheart," feels GL. (Vol.12 No.7)

**MONSTER ALPHA GENESIS 1000 II: $800**

Almost as sweet in the top five octaves as the Koetsu Red Signature but more detailed. For a long time one of Dick Olsher’s favorites, while DAS finds it “to play a wider variety of material with superb detail” than any cartridge he had heard up to February 1990. Still GL’s current reference. (Vol.10 No.5)

**SIGNET AT-OCC: $400**

"The best ever from Audio-Technica," said TJJN of this MC, until early 1989 only available in the US as a “gray” import. Neutral through the midrange, the OCC is less sweet and three-dimensional than the Class A vdh MC One, but not by much. Highly recommended (and an excellent tracker). A point worth noting is that it has very high output for a low-output ‘coil, minimizing phono-stage noise. (Vol.12 No.2)

**TALISMAN VIRTUOSO BORITY vdh: $850**

A neutral sound, coupled with good retrieval of inner detail and a smooth, well-controlled treble, thought DO of this high-output MC. Less good soundstaging than the more expensive DTI version, which offers a greater sense of depth, a more palpable image, and a less "exciting" sound. (Vol.12 No.4)

van den Hul MC-10: $825

The first vdh to provide midrange and bass extension to match the typically excellent vdh high-frequency extension and detail. Tonal balance more like CD than the Koetsu. Superb decoding of recorded detail, but requires careful setup. (Vol.9 No.6, Vol.10 No.5)

C)

**AUDIQUEST RUBY: $200**

High-output MC, available only from The Audio Adviser, offers excellent retrieval of detail without sounding too forward or bright. Mates well with the AudioQuest PF-5 tonearm. (Vol.12 No.8)

**GRADO SIGNATURE MCZ II: $300**

Although basically similar to the more expensive TLZ, the MCZ is less "fast"-sounding, with less well-extended
INTERMEZZO
Brahms
Piano Sonata in f, Op. 5
Intermezzo, Op. 117, No. 1
Robert Silverman, piano

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Stereophile, April 1991
highs and a less-focused sound. A "steady shortstop" rather than a "home-run hitter," said TJN. (Vol.12 No.7)

Linn K9: $295 ☆
Remarkably neutral, clean-sounding MM fitted with a good diamond, features good transient response and bass dynamics, though slight tendency to edginess and upfront balance will favor systems optimized for non-classical music reproduction. (Vol.10 No.1)

Ortofon X5-MC: $300
This high-output MC features tight, extended low frequencies, and the Gyger-profile stylus retrieves more detail from the groove than the similar X3-MC. Somewhat forward-sounding, however. (Vol.11 No.7)

Shure V15 Type V-MR: $297 ☆
Very neutral midrange and bass, slightly soft high end, high compliance. You sacrifice a bit of detail both compared with good MCs and the more expensive ($400) Shure Ultra 500. A "budget reference," according to Sam Tellig and Larry Greenhill, who, given their druthers, would place it in Class B. Recommended for its unsurpassed tracking ability, excellent reliability, and listenability. Excellent value, frequently available at significant discount. (Vol.7 Nos. 5 & 8, Vol.10 No.5, Vol.12 No.11)

Signet AT-F5: $250
Somewhat laid-back, not at all forward or peaky, said the Cheapskate of this gray-import MC, available from Music Hall and Lyle Cartridges. Add the fact that it "plays tunes" without being too overdone in the bass, and you can see why ST prefers it to the Shure V15 V-MR. (Vol.II No.7)

D

Grado ZTE-1: $25 ☆
The best buy in a really cheap cartridge, this $25 MM has excellent traceability and sounds rather like a good MC. Readers of this magazine should consider spending more than $25 on a cartridge, but when they are asked by friends what they would recommend for an old Dual or Garrard, this "system saver!" is the one to mention. Will hum if used with older AR decks (an "AR" version is available); lack of suspension damping can lead to woofer pumping, even flutter, with higher or even medium-mass arms. (Vol.7 No.8; actual review was of an earlier version, the GTE-1+)

Shure VST III cartridge: $105
Sounding best when used with its integral damping brush, this inexpensive MM lacks transparency and detail, but tracks superbly and offers a neutral tonal balance. (Vol.12 No.3)

K

AudioQuest AQ7000, Koetsu Irushi and Pro IV, Sumiko Blue Oyster, vDH MM1, Lyra Clavis.

Deletions
Clearaudio Gamma not currently distributed in the US; Krell KC-100 discontinued; A&R P77Mg, Denon DL-160, Goldring Epic II, Linn Karma, Nagakura MP10 and MP11 Boron, Ortofon MC-10 Super and MC-20 Super not auditioned in a long time.

CD Players & Digital Processors

Editor's Note: The class ratings are a little different for CD players: whereas the phrase "state of the art" can be interpreted literally for other categories, here it means the best CD sound available as of the time of writing. We urge caution to someone about to purchase an expensive "state-of-the-art" CD player, particularly with the rapid adoption of "Blisster" technology, and note that perhaps the wisest strategy these days would be to buy separate transport and DAC units, eventual replacement of the latter being the best way to stay abreast of continuing development. However, it now seems that deficiencies in the A/D converters used to master CDs may well be the limiting factor in CD sound—see Robert Harley's interview with Doug Sax in Vol.12 No.10. It's also worth comparing the performance of the industry-standard Sony PCM-1630 with Chesky's 128x-oversampling ADE on the appropriate tracks on the Stereophile Test CD.

A

Esoteric P-2 CD transport: $4000
Robert Harley, Arnis Balgalvis, and Peter Mitchell all swear by the improvement wrought on CD sound when this expensive, beautifully constructed transport is used. Astonishingly low measured jitter, found RH (see Vol.13 No.5, p.87), lower even than that intrinsically typical of a CD. Internal clamp renders it incompatible with CDs fitted with damping rings or the central retainer disc for the Mod Squad Damper, however. (Vol.13 No.12, Vol.14 No.4)

Esoteric D-2 D/A converter: $4000
"A highly detailed yet unfatiguing presentation, a smooth and silky treble, tight, powerful, and effortless bass reproduction, ability to reveal subtle tonal shading and nuance, and resolution of wide dynamic contrasts" were the reasons RH put forth in his review as to why the D-2 allowed him to forget the hardware and become immersed in the music. (Vol.13 No.10)

Krell SBP-64X D/A processor: $8950
A review is planned, but the Krell offers the finest sound from CD that Sam Tellig has heard. Larry Greenhill also recommends this processor, though Martin Colloms points to excessive distortion at high frequencies and high recorded levels. Don Scott feels that the Krell processors work well with the inexpensive Luxman D113-D transport. (NR)

Stax DAC-X1 D/A converter: $12,000
A tube output stage, superb dual-mono construction, and expensive, hand-adjusted, 20-bit UltraAnalog DACs lead not only to the finest-measuring D/A processor Stereophile has encountered, but also to the best-sounding such unit, in the opinions of LA and JA. RH puts the Stax up there with the VTL processor, both sounding "more like analog than any other digital processor I've heard" (and he's heard a lot). Lacks low-frequency impact compared with the Thetas and Wadias, but its fatigue-free sound easily becomes addictive. Note that its balanced outputs are polarity-inverting. (Vol.13 No.8)

 Theta DS Pre Generation II D/A preamplifier: $4500
Providing extensive digital-domain functions, including a tape-monitor facility, this massive processor features user-replaceable ROM chips containing the coefficients for the digital filter. The analog section includes one additional set of line-level inputs. LL felt the sound to
be the best he has ever heard from CD, with a vividly three-dimensional soundstage and superb transparency. Found the best sound from the DS Pro is to be had from its Tape Out sockets. Less expensive DS Pro dispenses with the preamplifier functions. Preliminary auditions of Generation II versions by AB, LL, and DS DO suggest that this performance has been taken one step further. (Vol.12 No.3, original version)

**Theta DS Pro Basic D/A converter: $1995**

RH felt the sound of the DS Pro Basic only to be outclassed by the $12,000 Stax. Its resolution of fine detail and soundstage depth was among the best he had heard: "vivid" was his word to describe its overall presentation. Nevertheless, he felt it lacked the ultimate sense of ease so typical of good analog replay. Maximum output level is 11dB higher than the industry standard 2V, which will optimize the PRO's use with passive control units. (Vol.13 No.8)

**VTL Reference D/A Converter: $7000**

Like the Stax, this teted unit features the UltraAnalog 20-bit DAC used in a differential mode: "A complete freedom from hash and grain," said RH. Though he noted that the Stax better defined image outlines, he found the VTL's warm presentation ultimately to be more musically believable. Review sample had a large de-emphasis error, said to have been corrected in subsequent production. (Vol.13 No.12)

**Wadia Digital WD2000 D/A decoding computer: $7995**

This processor features a digital filter that differs from just about every other around in that it uses an algorithm different from the ubiquitous (sine x)/x impulse-response reconstruction filter; intended to more closely synthesize the original analog waveform before sampling. (See "Manufacturers' Comments," Vol.13 No.8, p.191.) AB thought the Wadia 2000 to be a "sonic knockout," particularly when fed a digital signal from the expensive Esoteric P-2 transport. He also enthused at length about the Wadia's ability to throw a deep, detailed, and stable soundstage, and felt that the balanced outputs give the most musical sound. High frequencies are a little rolled-off in comparison with the other Class A contenders, which might mean more-than-usual care in system matching, while relatively high levels of ultrasonic and RF spurious present in the analog output might lead to trouble with some pre- and power amplifiers. As with the Theta and Krell processors, the Wadia's DSP program is held on replaceable ROM chips, allowing for relatively inexpensive performance upgrades. Low-level linearity of the review sample of the WD2000, surprisingly, was quite poor compared with the other Class A recommended units. A "Follow-Up" review of a current production sample is underway. (Vol.13 No.1)

**Arcam Delta 70 CD transport: $14000**

A high-quality CD transport using Philips's top mechanism with optical and coaxial serial digital outputs. (Vol.12 No.10)

**Bitwise Musik System One Digital Audio Processor: $1991**

Two-box processor that DO felt to sound relatively "analog-like." Resolution of detail was not up to that offered by the similarly priced Theta DS Pro Basic, but while the Theta can sound a little unforgiving with less-than-optimum amplification, the Bitwise processor presents harmonice textures with "a round, liquid, edgelesss quality." Latest version (as of 2/91) has revised isolation and synchronization of the digital signals (registered owners of older units can have their units upgraded free-of-charge). (Vol.13 No.12)

**California Audio Labs Aria Mk.III: $2395**

Though he felt that in absolute terms its highs lacked a little air and its bass was too warm in balance, "it's music," wrote TIN after his first listen to this tubed player, feeling that it's sound combined a striking three-dimensionality and palpable bloom with a sense of tactile presence. MC demurs, feeling that the Aria sounds too soft, lacking pace and dynamics. (Vol.14 Nos.1 & 2)

**California Audio Labs Tercet Mk.III: $1295**

A very involving sound, thought GL, with a palpable bass, analog-like handling of dynamics, and a superb soundstage presentation. (Vol.14 No.2)

**Esoteric D-10 D/A converter: $2000**

"An open, spacious, and lively presentation," wrote RH, with good retrieval of detail, a round, liquid bass, and a deep soundstage, while falling somewhat short of the standard set by the otherwise similarly balanced Theta DS Pro Basic. (Vol.13 No.10)

**Kinergetics KCD-40: $2295**

Quite the best single-box CD player JA had heard until the multi-bit Meridian 206 came along, the KCD-40 offers a rather laid-back balance, but with a superbly detailed soundstage. Less soft-sounding than the Wadia, the KCD-40 lacks a little image depth in absolute terms, but not to the detriment of the music, which never fails to communicate. Current version differs from that reviewed in having "Platinum" cosmetics. (Vol.13 No.1)

**Meridian 203 D/A converter: $990**

Sam Tellig feels that this relatively inexpensive but beautifully made basic Bitstream processor is perhaps the best, in terms of being the most musical, he has heard; Martin Colloms is also mightily impressed—"the 203... [is] something of a revelation compared with the average standard of CD replay"—but points out that a high-quality transport is required for the 203 to achieve its sonic potential, when he feels it betters the 208 and the Esoteric D-2. RH agrees that, along with the PS Audio SuperLink, the 203 is one of the best values around in digital processors and adds that the sound, which initially can have a slightly hard, forward treble, improves significantly after the unit has been on for a week or so. (Vol.13 Nos.9, 10, & 11, Vol.14 No.2)

**Meridian 208: $2950**

Unique combination of Bitstream CD player and remote-control preamplifier that JA and MC found to offer a very musical sound. A somewhat laid-back balance and a slight diminution of soundstage space compared with the $12,000 Stax but more open-sounding than the 203 processor, JA found. With the 203, the 208 is the only unit JA has so far heard that delivers the promise of Bitstream DAC technology. Preamp has a good sense of LF weight and is free from solid state "glare," but sounds veiled when compared with the best passive control units. It also lacks a balance control, though its "Comma" data link allows it to be controlled by the remote control for the Meridian D600 and D6000 active loudspeaker systems. Phono module (untested) costs $250. (Vol.13 No.12)

Sterophile, April 1991
Museatex Mellor Digital Control Center: $2250
A "digital" preamplifier in that its volume control operates in the digital domain, the DCC sounds similar to the Meridian 203 but with a slightly sweeter treble. Overall, however, there was a somewhat uninvolving nature to the DCC's sound, felt RH. (Vol.13 No.11)

Proceed PDP 2 D/A converter: $1595
Although it has a similarly tight and punchy bass, similarly excellent dynamics, and similarly good soundstaging, the original version of the PDP had a musically much more involving sound than the Proceed PCD which uses the same digital electronics, RH found. Not the least, this was due to the processor having a less forward treble than the CD player, with a sense of ease and liquidity to its sound that slightly betters the excellent Aragon D2A in these areas. Preliminary auditioning of Mk.II version suggests that the PDP maintains its excellent performance. (Vol.13 No.6)

PS Audio Superlink: $1195
(See RH's review in this issue.)

Sony CDP-X177Es: $1700
A bitstream player with a vibrant, lucidous sound. Transient leading edges were a bit softened compared with the Esoteric D-2, felt TJN, and the overall perspective more forward, but he still found the sound "entrancing," particularly on vocal recordings. JA feels the Sony's treble to be a little grainy compared with the Cal Aria, but agrees that it is still a superb-sounding player. (Vol.14 No.1)

Wadia Digimaster X-32 D/A converter: $1995
Lows were almost as dynamic as the Class A Wadia 2000, RH felt, but its soundstage wasn't as deep as those of the big Wadia or the Theta DS Pro. The extreme treble sounds a little rolled-off—it means that way too—but this is offset by a forward, almost bright presentation in the mid-treble and a rather dark-sounding midband. Nevertheless, the X-32's sound is very musical, with excellent dynamics and a good presentation of transient detail. Coaxial digital inputs use BNC sockets. (Vol.13 No.8)

C

Aragon D2A D/A converter: $995
Borderline Class B sound from this inexpensive but well-constructed, Mike Moffat–designed processor when it is used with the optional $250 IPS power supply. RH felt that when used on its own, the D2A lacked low-frequency definition and visceral impact, leading to rather a lean balance. Robert Deutsch also preferred the D2A's sound with the IPS, in which case he feels it betters the Proceed PDP. Strengths include a relative freedom from high-frequency harshness and grain and an excellent presentation of musical detail. (Vol.13 No.6)

California Audio Labs Icon: $695
Rather than picking out aspects of the Icon's sound that impressed him in his review, GL preferred to concentrate on the Icon's ability to present music with an excellent across-the-board balance. When pressed, he pointed to the player's natural presentation of instrumental tone and its lack of "hi-fi" glare. Digital output module costs an additional $95. (Vol.13 No.4.)

Esoteric D-500 D/A converter: $1000
A smooth sound but sounding rather closed-in compared with the twice-the-price D-10, with a slight diminishment of recorded ambient information. Will favor systems that have an over-forward treble presentation. (Vol.13 No.10)

JVC XLZ-1010TN: $700
An open, well-defined soundstage presentation, with a superb sense of space, and an excellent degree of transparency were among the strengths of this modestly priced but well-constructed player, thought both RH and GL. A rather forward upper treble makes the Class C recommendation rather borderline, however, and will also make system matching a little difficult. Model was apparently discontinued this Spring, but there should still be stocks at dealers for a while. (Vol.13 No.4)

Music And Sound DCC-1 D/A preamplifier: $1195
A versatile line-level preamplifier that offers digital decoding, the DCC-1 throws a narrower soundstage than the Meridian or Theta processors and lacks ultimate transparency, but still manages to present a good illusion of image depth. Low frequencies are a little lean and highs a little dark-sounding, though the midrange balance is smooth, not thrust forward at the listener. (Vol.14 No.3)

NAD 5000: $499
Very listenable sound, but with slightly etched highs compared with the Sony 77 and CAL Aria III. Well-extended low frequencies and a well-defined soundstage led TJN to give a Class C recommendation to this inexpensive MASH-system player. (Vol.14 No.1)

Rotel RCD-855: $399
This inexpensive player—based on Phillips's 16-bit, 4x-oversampling chip set and CDM4 transport—so impressed LL that he recommended it to 20 other fellow members of the National Symphony Orchestra. "Great sound for a peanuts price" was the thrust of his review's conclusion. Very sensitive to the cables with which it is used, though in the right context LL finds the '855 offers "a degree of transparency and harmonic neutrality usually found only with the expensive stuff." Fitted with a digital output. RH agreed that the '855 offers a sound that is musically involving and adds the opinion that its sins are ones of omission rather than commission. MG points out that the '555 sounds better than Rotel's more-recent Bitstream RCD-565 due to a better developed sense of dynamics. (Vol.13 No.7, Vol.14 No.2)

D

Adcom GCD-575 CD player: $600
This relatively modestly priced player offers superb resolution of detail. Dynamics a little restricted, however, and balance may be too lean for some tastes, though LL finds its midbase to be a little too full. (Vol.12 Nos.3 & 6)

Arcam Delta Black Box: $799
Outboard digital processor with optical input that uses a selected Phillips 4x-oversampling, 16-bit chip set and a custom LSI to look after the digital signal handling. Tonal quality a little forward in the midrange, with slightly "tizzy" highs, and upper bass rather soft; nevertheless, a very musical sound. (Vol.12 Nos.2 & 10)

Harman/Kardon HD7500 II: $529
JAs and GLs auditioning convinced them that this inexpensive "bitstream" player deserves a Class D recommendation, but see RH's review for a contrary opinion.

Stereophile, April 1991
The debate essentially concerns whether the 7500's glare in the treble is acceptable within the context of a Class D recommendation or not. All agree, however, on the quality of this player's low-frequency weight and impact. Overall presentation is somewhat forward in the midrange. More expensive HD7600 identical apart from digital output and more varied features. Sample reviewed was the Mk I; Mk II incorporates rear-panel remote jack, improved transport, more chassis damping. (Vol.13 No.4)

Sansui AU-X911DG D/A amplifier: $1100
Very expensive for Class D, but LG feels its excellent-sounding MASH D/A section to be justification for recommending this full-featured integrated amplifier. RH demurs, so careful reading of the reviews is essential before making a final purchasing decision. (Vol.12 No.11, Vol.13 Nos. 5 & 7)

Krell MD-I CD turntable, Meridian 602, Esoteric P-10 and P-500 CD transports, Meridian 206B and Proceed PCD II CD players, Wadia X64.4 processor.

Deletions
Meridian 206 replaced by 206B Bitstream version, Proceed PCD by Mk II version, neither yet auditioned.

Preamplifiers

A

Mark Levinson No.26: $5450
The No.26 has a more laid-back presentation of the music than the Krell preamps, coupled with superb definition of detail and soundstage delineation. One of the two finest solid-state preamps JA has heard, the other being the Vendetta phono unit. With internal switches set for minimum gain, the sound lacks dynamics, however. Has both balanced and unbalanced outputs, a choice of internal balanced line-level input or high- or low-gain phono input, and front-panel-switchable signal polarity. The price quoted is for the version with the balanced input module. Digibuffs can obtain a basic version without phono stage. Should they change their minds, an outboard phono unit, the No.25, is available. More expensive "S" version, available in Spring '91, features Teflon circuit boards and sounds significantly more transparent. (Vol.11 No.5)

Mark Levinson No.25: $2150/$2050
(High/Low Gain)
$3220/$3140 with PLS-226 power supply
MC-line-level phono preamplifier featuring circuitry identical to the phono section of the No.26 and conventional unbalanced outputs, the No.25 can be powered from the No.26's PLS-226 supply or from its own, with which it achieves a stunning degree of transparency, neutrality, and musicality. JA has obtained the best results from the No.25 with the latest AudioQuest Lapis connecting it to the No.26. Madrigal's own HPC interconnect renders the sound more forward, more real, more vivid, but this will make the sound rather unforgiving unless the system is rather laid-back overall. Needs careful positioning to avoid hum being induced into its circuitry from the power supplies of other components. (NR, but see the No.26 review in Vol.11 No.5)

Jeff Rowland Design Group Consonance: $3340
TJN's current reference, the remote-control Consonance offers a superbly clean, neutral, transparent tonal balance with a treble that is open-sounding, airy, and detailed. A more laid-back midrange balance than the Klyne SK-5A, but with more top-octave air, and more detailed overall than the Audio Research SP14. Price includes phono stage, line-level-only version costs $2990. Balanced and unbalanced outputs are provided. (Vol.14 No.3)

Threshold FET Ten: $5700
A two-box unit with separate High-Level ($3200) and Phono ($2500) sections, each with its own power-supply module. While its soundstage depth was a little shy of that provided by the best tubed preamps, DO, that well-known tube enthusiast, was sufficiently impressed by the Threshold's superb presentation of musical detail and lack of grain to make it his reference preamplifier. "An exceedingly pure and pristine window on the sound," was how he summed it up. Balanced and unbalanced outputs are provided. (Vol.13 No.6)

Vendetta Research SCP-2B phono-preamp: $2495
A dual-mono MC-line-level RIAA equalizer and preamp from John Cull that redefines the definition of "quiet." JGH felt that this well-made unit imposed less of a signature on the signal than any other preamp he has heard. An ideal partner for a passive-preamp-based system, though its lowish output means that the power amplifier or speakers used must be quite sensitive if musically acceptable levels are to be achieved. Current version is non-polarity-inverting. (Vol.11 No.6)

B

Adcom GFP-565: $8000
An excellent preamp with superb parts quality, buffered tape outputs, low output impedance, and high-current, low-impedance power supply, that incorporates Walt Jung's designs. GAG feels the '565 should convince even the most skeptical listener that IC op-amp circuits can sound both musical and accurate. Full-featured, but purist outputs are supplied that bypass tone control and filter switching. MM phono preamp is one of the quietest ever, with accurate RIAA EQ. The best under $10000 preamplifier, according to GAG, offering stiff competition to far more costly units. GAG felt Class B was the most suitable rating for the '565, this confirmed by further auditioning in Santa Fe provided the listener uses the bypass outputs. Otherwise the sound quality drops to good Class C. (Vol.13 Nos. 2 & 10)

Audio Research SP14: $2995
Borderline Class A sound for this versatile hybrid tube/FET preamp. The SP14 is one of those rare components that lays every sonic detail clear without destroying the essential sense of musical wholeness. It allows the listener to hear into the soundstage in an additive manner, without having individual instruments thrust forward at him or her, though that soundstage is a little less wide than with the best preamps. The quality of its line stage matches that of the phono, GL enthusing that at last he "could hear through the electronics to the music itself." JA feels the SP14's treble is perhaps a little more etched-sounding via its phono stage than, say, that of the Conrad-Johnson PV9, but both, as GL noted in his review of the SP9 Mk.II in Vol.13 No.11, share a similar quality—"magic." (Vol.13 No.6)

Conrad-Johnson PF-1: $1295
Moderately priced FET preamp that offers a pure-
soundling treble, a slightly crisp, well-delineated midrange, and excellent soundstaging via its phono input. Limited headroom would seem to dictate that high-output MM pickup cartridges are best avoided, and a highish noise level mandates careful matching with low-output MCs. More importantly, felt MC, what lifted the PF-1 out of its price class was its superb presentation of musical dynamics. Via the line input, the overall balance was a touch lightweight, but again with a realistic sense of scale and natural dynamics. (Vol.13 No.12)

**Counterpoint SA-3000: $1895**
The sound from LP of this well-made tube preamp bore a resemblance to the Vendetta Research, felt GL, with a superbly transparent midrange, excellent soundstage depth, and well-extended lows. The line inputs, too, seemed to add very little to the sound of CD. However, a rather clinical overall balance—"piquant" rather than mellifluous, said GL—leads to care having to be taken with integrating the Counterpoint in a musically satisfying system. A line-level—only version, the SA-2000, is also available. (Vol.13 No.11)

**David Berning TF-12: $2950**
"Incredible liquidity" and "an impressively wide, spacious soundstage," said JGH, but ultimately he found the TF-12's phono stage to be too mellow, feeling that it erred from neutrality in the opposite direction from the Klyne SK-5A by about the same amount. JA feels, however, that this tube preamp's unique combination of musicality and remote control of volume and balance deserve a guarded recommendation, particularly in systems verging on too bright a presentation. (Vol.11 No.7)

**Electrocompaniet EC-1: $2195 ★**
A clean and detailed sound, especially at low frequencies, with realistic dynamics. Balance a little on the warm side. "Excellent value for money." and "An outstanding recommendation." proclaimed SWW, if not quite reaching the standard set by the more-expensive Klyne. EC-1A ($1895) is identical to the EC-1, apart from lacking the MC-2 MC board, and will accept MM and high-output MC cartridges, as well as low-output MCs down to 0.3mV output. The EC-1A, however, does not offer the adjustable loading and impedance matching of the EC-1. (Vol.10 No.9)

**Klyne SK-5A: $3450 ★**
Incredibly clean, quick, detailed, smooth, open, and solid, with superb imaging and soundstaging. One of the most neutral preamplifiers, but a lack of sympathy for systems having a forward balance precludes a Class A rating. TJN's long-term reference. Particularly suitable for moving-coil (includes a variable-gain head amp and HF rolloff switching). (Vol.10 No.6)

**Krell KSP-7B: $2700**
According to the Audio Anarchist, you used to have to pay $4–5k for a preamp this good. "Neutral, sweet, and above all dynamic," he says. AB feels that high Class B is the KSP-7B's natural home. (NR)

**Meitner PA6i: $2395**
Fully remote-control solid-state preamplifier that scores in low-frequency extension and soundstage presentation. Absolute polarity switchable from the listening seat. Somewhat bright balance—"zest and sparkle," noted AB in his review—but a relative lack of detail and dynamics precludes a Class A rating. Best used with the Meitner "Translink" line-level isolating transformers. Price includes wired remote and phono module; $2495 with IR remote and phono module. (Vol.11 No.6)

**The Mod Squad Phono Drive: $1695**
Beautifully engineered, stand-alone MC/MM phono stage with line-level output. Includes low-output-impedance line stage with volume and balance controls. Excellent delineation of detail; superb soundstaging; only a rather high noise level with moderate-output MCs precludes a Class A recommendation. Also now sold in conjunction with the Mod Squad's Line Drive Deluxe as the Duet. EPS version with external power supply costs $1895. Owners of Phono Drives manufactured before 1990 can have them updated by the factory to current specification for $250. A "Follow-Up" review is underway. (Vol.12 No.1)

**Music Reference RM5 Mk.II: $1150**
Tube design unique in offering user-adjustable line-stage negative feedback. DO found the music to sing with the preamp's overall feedback set to give 18dB of gain; with the RM5 in this condition he felt there were no sonic weaknesses, apart from a slight lack of dynamics. Otherwise, soundstaging was excellent, the treble free from grain, the lows tight and extended. Best suited for a good MM or a high-output MC, the RM5 represents superb value at an affordable price. (Vol.13 No.4)

**C Audio by Van Alstine Super-PAS Three: $595**
Owners of vintage Dynaco PAS2, -3, and -3X tube preamplifiers can send them to Frank Van Alstine to be modified for $350, or can rebuild them themselves with a $200 AVA parts kit; otherwise, AVA offers Super-PAS preamps constructed on new Dynaco chassis for $595. Featuring rather a lean tonal balance with less well-defined low frequencies than should otherwise be the case, the Super-PAS Three has excellent soundstaging and is still the least expensive way for an audiophile who prefers to use MM cartridges to acquire Class C preamp sound. Limited LF headroom on phono input mandates careful matching of cartridge and tonearm. Now uses gold-plated Tiffany connectors and Chinese 12AX7A tubes with 25% higher gain. Optional "Omega" output buffers (not yet tested) cost $150. (Vol.11 Nos.10 & 12)

**Audio Research SP9 Mk.II: $1995**
Offering an almost identical tonal balance to the excellent SP14, the latest version of the '9 has a rather soft overall presentation but a grainer midrange that detracts from what would otherwise be a superbly musical, Class B sound. A recent tube update is said to significantly improve the sound; a "Follow-Up" review is underway. (Vol.13 No.11)

**Hafler IRS: $900**
Ingenious, all-FET remote-control preamp designed by Acoustics' Jim Strickland, with analog volume and balance controls. Line stage a little on the dry, wispy side, with slightly restricted soundstaging, but fundamentally neutral tonal balance. Low-noise phono stage (MM and MC) is lightish-balanced, resulting in a sound that overall doesn't quite approach the PS-46/ M-500 combination, although more musical than the Class D contenders. DAS disagrees, feeling the IRS to belong in Class B. Version without the remote control has

Stereophile, April 1991

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and IR receiver card is available for $700. (Vol.12 No.6)

Linn LK1: $1295
Unusual but exquisitely made solid-state preamp with digitally switched volume control and all-XLR input/output sockets apart from phono (MC and MM). (Linn dealers can supply suitable adapter cables.) Line stage is polarity-inverting. Only four line-level inputs may be a drawback. Fundamentally on a par with the PS Audio 4.6 sonically, with a similar slight veil drawn over the sound (though less bright overall), the LK1 is far more civilized. At its best with the matching LK280 power amplifier, when it provides "fit-and-forget" high-quality sound, particularly from LP Owners of high-output MMs should note that the MM input has limited headroom, particularly at high frequencies. Remote control—essential—adds $120 to price. A separate power supply, the Dirak, is now available. (Vol.12 No.7)

Music And Sound DCC-1 D/A preamplifier: $1195
Versatile switching unit for analog, digital, and video sources includes an excellent DA section and a line-level preamplifier that, while slightly veiled in absolute terms, is free from the thickness or murk that obscures the sound of many inexpensive preamps. Passive preamp mode is more transparent than the active, though the sound is still less sharply focused than the best passive control units. Excellent value for money. (Vol.14 No.3)

NAD 1300: $399
Full-function preamp with versatile tone controls. Superbly quiet, delicate-sounding MC input; excellent dynamics; extended highs; slightly forward tonal balance better suited to rock or jazz than to classical music. Rather lightweight bass makes the 1300 an unsuitable match with the NAD power amplifiers, which are also a little lightweight. (Vol.11 No.12)

PS Audio 4.6: $699
Excellent phono stage (switchable between MM and MC), if both a little bright and lacking air when compared with the Class B contenders. Line-section is sweet, though a little wispy in the highs, rather than punchy and dynamic, but can be switched out. Tjn suggests that the overall performance is of almost Class B standard when the 4.6 is coupled with the M500 power supply (which raises the price to $1104). (Vol.11 Nos.9 & 12)

PSE Studio SL: $850
Inexpensive solid-state preamp with balanced and unbalanced outputs that sounds its best after 72 hours' warmup. Includes a mono switch! Good transparency, dynamics, and rendition of instrumental tonality, but the PSE can sound rather cold with some power amplifiers. MM input has limited headroom, so high-output types best avoided. (Vol.13 No.1)

D

Adcom GTP-400: $380
GAG enthused at length in his review over this inexpensive IC-based tunerpreamplifier combination that has had op-amp guru Walt Jung's nagging sound笼 waved over it. Very low noise on all inputs; euphonically warm-sounding rather than accurate phono circuit; reasonable soundstage depth; line stage rather laid-back in the top; not the ultimate in inner detail; the overall sound, however, is musical and enjoyable. Errors are of omission rather than addition. Tuner section, although not offering the ultimate in selectivity, will be good enough for most users and, again, offers musically satisfying sound. (Vol.12 No.9)

Parasound P/FET-900: $425
Neutral line section with good dynamics; MM-only phono stage has slightly astringent treble. Version to be introduced this Spring features improved parts quality and design input from John Curl on its phono stage. A "Follow-Up" review is planned. (Vol.11 No.12)

K

Audio Research SL1, Classe DR-5 and DR-6, Counterpoint SA-95A-11 and SA-5000, Quicksilver, Convergent Audio Technology SL1, Coda, Mark Levinson No.28, Threshold FE79, MFA Magus, Jeff Rowland Design Group Consummate, Conrad-Johnson PV9A and PV11.

Deletions
MFA Magus replaced by significantly more expensive revised version; Forté 2 and Superphon CD Maxx discontinued; Conrad-Johnson PV9 has had phono section significantly revised.

Passive Control Units

A

Electronic Visionary Systems Attenuators: $60–$675
RH enthused over the transparency offered by these passive control units, sold by mail-order only. Ranging from the dual-mono Ultimate Attenuators, which plug into the power amplifier's input sockets ($60 with single input, $175/pair with 12-position attenuator, $350/ pair with 31-position attenuator), to the more conventional stereo Stepped Attenuators available in balanced versions and with two or three–five inputs, those primarily interested in CD replay should investigate these well-made units. (Vol.13 No.7)

The Mod Squad Deluxe Line Drive AGT: $1150
Its passive nature places demands on upstream components to be able to drive a fairly demanding load, but if that's the case, the Line Drive Deluxe offers the most transparent, least colored way of achieving Class A sound from CD and other line-level sources. Must be used with short interconnects, however. (The improvement offered by the Deluxe over the conventional Line Drive is not subtle.) Sets a new standard for Class A sound at an unreasonably low cost, as well as offering considerably more versatility than the bare-bones EVS units mentioned above. JA's reference for (lack of) preamplifier sound. The latest version, with Cardas jacks, revised internal wiring, and a new volume pot is astonishingly transparent even when compared with the bare-bones EVS Ultimate Attenuator. (Vol.12 No.1)

C

The Mod Squad Line Drive AGT: $650 ☆
The ideal Class C "preamplifier" for a CD-based system, given that its passive nature will mean that cables must be kept relatively short. Latest version has AGT (Advanced Grounding Topology) feature. (Vol.10 No.3)

D

QED PCC passive preamplifier: $250
Unusually styled but well-made passive control center. Lacks transparency and dynamics when compared with good active preamps, however. (Vol.11 No.12)
Moving-Coll Step-up Devices

A

Expressive Technologies SU-1 transformer: $2500
A 35 lb step-up transformer that offers “utter transparency” and “exquisite resolution,” according to RH. JA agrees, finding his LP sound with the SU-1 feeding the Mod Squad Phono Drive’s MM input to be deliciously transparent and musical. A review is underway. (NR)

Mark Levinson No.25: $2130/$2050
(High/Low Gain)
MC-line-level phono preamplifier featuring identical circuitry to the phono section of the No.26. Above price includes PLS-226 power supply. See “Preamplifiers.” (NR)

Vendetta Research SCP-2B: $2495
Ultra-quiet dual-mono phono preamplifier includes RIAA equalizer to give line-level output. See “Preamplifiers.” (Vol.11 No.6)

B

Electrocompaniet MC-2: $450 *
Deleted from “Recommended Components” in 1986 due to lack of availability in the US, this solid-state head amp is now distributed by Music & Sound Imports. In the original review, AHC felt it to be better than the Klyne in terms of openness and dynamics, though less universally applicable. Must be used with cartridges having less than 50 ohms source impedance, so essential to audition with your chosen cartridge before purchase. (Vol.8 No.5)

Klyne SK-2a: $750 *
A close rival to the Counterpoint SA-2, the basic difference here being solid-state vs tubes. Superb bass, very deep and tight, excellent high-frequency extension, excellent imaging. It still lacks the three-dimensionality of tubes, but only slightly. Adjustable high-frequency rolloff and cartridge loading are boons for those with several MC cartridges. A bargain at $750. (Vol.7 No.3, Vol.8 No.5)

The Mod Squad PhonoDrive: $1695
Matches both MM and MC cartridges with versatile loading options. Line-level output. See “Preamplifiers.” (Vol.12 No.1)

Deletions

Conrad-Johnson Premier Six, Counterpoint SA-2, Music Reference RM-4C not auditioned in a very long time.

Power Amplifiers

A

Editor’s Note: Class A amplifiers differ sufficiently in character that each will shine in an appropriate system. Careful auditioning with the user’s own loudspeakers is therefore essential.

Air Tight ATM-2: $5950
A classic stereo tube design from Japan that eschews the use of printed circuit boards in favor of point-to-point wiring, Dick Olsher’s reference for midrange accuracy: “the most refined tube amplifier money can buy.” Though its highs are free from grain or hash, the Air Tight does have rather a shut-in high treble when compared, for example, with the Audio Research Classic 60, a point which bothered ST. “Sounds like a more refined Quicksilver,” says RH. Its low bass, too, is less well-defined than the other Class A amplifiers and it really needs to be used with speakers having 8 ohm impedances. Nevertheless, in an appropriate system—DO thought the combination of the ATM-2 with the Ensemble Reference monitors was particularly synergistic—the Air Tight will give superbly musical results. (Vol.13 No.5)

Audio Research Classic 60: $3495
The sound of this relatively low-powered stereo design that combines tubes with FETs is a little forward in the treble, yet never fails to sound musical, thought JA. Superbly delineated soundstaging. The midrange is presented with a natural tonality, and though the low frequencies are not as tight or as extended as the Krell or Mark Levinson competition, they have a musically appropriate fullness. (Vol.13 No.9)

Krell KSA-250: $5900
This powerhouse of a stereo amplifier is perhaps the best Krell yet, despite the fact that it is also the first Krell not to run its output stage in class-A all the way up to the 8 ohm clipping point. It combines an effortless delivery of power into difficult loads with traditional Krell clarity but a seamlessness from the lowest bass to the highest treble that is almost tubelike, noted LL. He also described “a soundstage so real one can reach out and touch the performers,” the Krell besting the M-L No.20.5 in this respect. RH agreed with LL’s assessment of the KSA-250’s sound, mentioning its natural midrange textures, the lack of grain, and the general sense of musical ease compared with the superseded KSA-200. LA found it to be the best amplifier with which to drive the demanding Thiel CS5 loudspeakers. (Vol.14 No.1)

Mark Levinson No.20.5 monoblock: $13,000/pair
Class-A 100W monoblock with fully regulated power supply for output stages. Until the appearance of the KSA-250, the No.20.5 was the finest solid-state power amplifier JA has used, particularly regarding soundstaging and the authority of low frequencies. The original No.20 had a somewhat soft treble balance. Auditioning of the No.20.5, which differs from its predecessor only in the AP-4 input and driver card—an upgrade costs $1000/pair—indicates that the performance of its predecessor has been improved upon, particularly with respect to the soft treble balance, though the amplifier’s basic “forgiving” nature, once warmed up, remains. Before fully warmed up, the treble can be somewhat grainy. Offers both balanced and unbalanced inputs. Some say that two pairs of No.20.5s operated in bridged-mono mode is the ultimate stereo amplifier! (Vol.12 No.9)

Mark Levinson No.27: $3995
Borderline Class A compared with the Mark Levinson No.23 and No.20.5, due to an overall less transparent, less sweet sound, the 100Wpc No.27 nevertheless offers what LG felt to be typical M-L smoothness through the audible spectrum without the No.20.5’s softening of the highs. In fact, he found its speed, dynamics, and vividness to resemble the No.23, concluding that it was his “first choice in its price range.” (Vol.13 Nos.6 & 7)
Prodigy 150 monoblock OTL: $7000/pair
Monstrous OTL tube amp, developed from the Futurman designs once sold by NYAL. Tonal balance very dependent on load impedance presented by loudspeaker. Bass a little lightweight, despite well-extended small-signal LF response, and the sound can take on treble stridency with highly capacitive loads, but the Prodigy's main strength is the depth and width of the soundstage thrown by a pair with appropriate speakers. (Vol.12 No.9)

Threshold SA/12e monoblock: $14,400/pair
"A gorgeously clean, natural high end" and "an open, lively midrange," said TJN after auditioning this expensive behemoth of a pure class-A amplifier. Perhaps the most authoritative low frequencies of any amplifier, but image depth not quite to the standard shown by the Krell KSA-250. (Vol.13 No.12)

Threshold S/550e: $6300
A more forward midrange and treble balance than the similarly priced Krell KSA-250 or Mark Levinson No.23.5, found RH, of this very powerful stereo amplifier, but with a similarly impressive reproduction of low frequencies and soundstage depth. (Vol.14 No.1)

Vacuum Tube Logic 225W DeLuxe monoblock: $4200/pair
Of these classic tube designs, Robert Harley commented that they are "easily the most musical and enjoyable amplifiers" he has heard. A wealth of detail is presented in a natural manner without the listener feeling that he should run for cover, while the soundstage has a transparent, see-through quality. Low frequencies have a punch more like that of a solid-state amplifier, though it must be noted that the big Thresholds and Krells still offer considerably more weight and authority. Latest version, using VTLS new KT90 output tubes, appears from RH's preliminary auditioning to be at least as good. (Vol.13 No.1)

Vacuum Tube Logic 300W Deluxe monoblock: $4900/pair
"HF magic," said JGH in his review, commenting on this high-powered tube amp's ease in the treble, an attribute that is not obtained by dulling the music's HF content. This is coupled with well-defined low frequencies and a neutral midrange that mates well both with JGH's Sound-Lab electrostats and with Infinity IRS Betas. (Vol.11 No.10)

B
Adcom GFA-565 monoblock: $1700/pair
Balanced inputs add $200 to price per pair. (See ST's column in this issue.)

B&K Sonata M-200 monoblock: $1800/pair
Sam Tellig found this relatively inexpensive amplifier to drive his Snendor S-100s to perfection, despite a rather lean tonal balance in stock form. Output stage bias can be increased, the sound then warming up to give tubelike smoothness and sweetness. "A wonderfully sane product," declared ST, stating that it should give more expensive amplifiers a hard time justifying their existence. Price is for version with unbalanced inputs; balanced versions cost an additional $200/pair. (Vol.14 Nos.1, 2, & 3)

Boulder 500: $4299 ★
This powerful solid-state stereo amplifier, based on the late Deane Jensen's 990 discrete op-amp module, ex-
tends the traditional strengths of solid-state amplifiers throughout the frequency spectrum. Transparent sound and tonally very neutral, though with possibly a trace of hardness in the mids, possibly reddened by recent, unauditioned circuit refinements. JGH thought the sound of Sound-Lab A36 driven by the less-featured but otherwise identical Boulder 500AE was a highlight of the 1990 WCES and is currently working on a follow-up review. (Vol.9 No.5)

Classé DR-9: $3495
First classic-AB design from this Canadian manufacturer, the DR-9 gives up little to the DR-3 and scores highly in its ability to deliver high power into low-impedance loads. "Its strong suits are definition, detail, depth, and dynamics," said AB, to which must be added transpar-

tency and an extended spectral response. Less robust in the lows and leaner than the Krell KSA-200, the DR-9 excels at the reproduction of a convincingly real soundstage. Now features balanced and regular operation. (Vol.11 No.10)

Jeff Rowland Design Group Model One: $3100
(See TJN's review in this issue.)

Kebuschell S/70 monoblock: $2595/pair
West German, low-powered tube monoblock that DO preferred to the Quicksilvers, Klino Kents, and VTL stereo 75/75 when driving both old and new Quads. Plent of midrange detail "but not at the expense of textural liquidity," timbral accuracy, and excellent soundstaging with a "feeling of precision and solid-
ity about image outlines and timbres." ST feels that DO correctly described the Kebuschell strengths, but points out that its low power and limited ability to drive some awkward loudspeaker loads to any respectable level will make system matching very critical. (Vol.12 Nos.6 & 10)

Mark Levinson No.29: $2800
(See TJN's review in this issue.)

Meitner MTR-101 monoblock: $3400/pair
Beautifully styled all-FET monoblock with "Floating Charge Current" power supply. Excellent dynamic contrasts, well-controlled, tight low frequencies, if, ultimately, not quite the overall authority of a Class A design. Would appear to give its best in an all-Meitner system. AB reports that current production is better than the vintage reviewed. (Vol.11 No.6)

Muse Model One Hundred Fifty monoblock: $2280/pair
Powerful and well-constructed MOSFET design from a pro-sound company that sounds on the upfront side of neutrality without losing the ability to present a recording's musical values intact. "Tight, well-con-
trolled bass and a very natural, liquid midrange," said Robert Harley. See also CG's review of Muse's $1200 Model One Hundred stereo amplifier in this issue. (Vol.13 No.1)

Music Reference RM-9: $2450
The price quoted refers to the version outfitted with EL34 output tubes; KT88s add $300 to the price but improve the performance significantly, thought DO of this stereo Roger Modjeski design. With less of a sonic signature than the KT88-equipped Quicksilver, the RM-9 "does very little to interfere with the essence of the music," and the adjustable gain/threshold fea-
tures mean that the amplifier can, to an extent, be "tuned" for a particular loudspeaker. (Vol.12 No.12)
Quicksilver monoblock: $1895/pair  
KT88 output tubes eliminate a residue of glare in the upper mids, giving more of a "see-through" quality. The Audio Anarchist found the mono Quicksilvers to be ideal with the Quad ESL-63s. Others have found them to work beautifully in a lot of low-power situations: reports from the field suggest that the Quicksilver is a happy choice for driving Vandersteen 2Cis as well as Acoustats of various vintages. Wonderfully tube-like, superb, tonal-standards-setting midrange; can drive low impedances due to an excellent output transformer; but low frequencies still rather soft and ill-defined in the classic tube amplifier tradition. Stereofile's reviewers are divided on the Quicksilvers' merits. LA feels that, despite the Quicksilver offering an overall "pleasant" sound, it is still a "low-resolution" design. "It just doesn't cut it in the bass," says DO, "and the amp is soft and muted on top." DO concluded his review by pointing out that the Quicksilver has too much of an old-fashioned sound for a Class B recommendation in these days of highly neutral amplifiers. GL, however, disagrees strongly with both LA and DO in his "Follow-Up," feeling that the Quicksilvers should remain in Class B on musical grounds: "It doesn't do anything to actively interfere with the music." Extraordinary long-term reliability for a tube design. Mr. Tellig parenthetically points out. (Vol.7 No.3, Vol.8 Nos.2 & 4, Vol.12 No.11, Vol.13 No.5)

Vacuum Tube Logic 100W Compact monoblock: $2650/pair
A rather forward midrange is allied with excellent bass control for a tube design, and clean highs. Dynamics a little more limited than the 100W rating would imply. Conservative operating conditions for its four EL34s should endow this VTL monoblock with long tube life. (Vol.11 No.11)

Vacuum Tube Logic Stereo 90/90 Deluxe: $1950
A slight midrange bloom and fullness reduce the clarity of its imaging, thought TJN of this tubed stereo design, and push images forward a little too often. Nevertheless, despite a slightly soft high treble, this relatively modestly priced amplifier offers good bass extension and control and proved capable of generating an extremely musical sound, particularly with Vandersteen 2Cis. (Vol.13 No.5)

B (Integrated Amplifiers)
Ensemble B-50 Tiger: $1980
External phono module costs $390, $490 with adjustable loading option. (See Guy Lemcoe's review in the next issue.)

Naim NAP 140 power amplifier: $1295
Naim NAC 62 preamplifier: $895

Though the Naim components appear to be a separate pre- and stereo power amplifier, their idiosyncratic natures mean that they are best described as an integrated amplifier in two boxes—three if you count the Hi-Cap preamp power supply ($1195). Naim speaker cable must also be regarded as part of the package, the 140 being only marginally stable into some highly capacitive "audiophile" cables. The sound of the combination, however, is astonishingly musical, being smooth, transparent, detailed, and involving. With the Hi-Cap power supply, the $3385 Naim system offered an excellent ability to keep musical threads distinct within the overall texture, though RH did feel a lack of midband immediacy was sometimes noticeable. The 140 power amplifier works best into higher-impedance speakers. "If you want a music system you don't have to think about, and don't need lots of power, [the Naim] offers a superbly musical experience," was how RH concluded his review. (Vol.14 No.2)

Adcom GFA-555 II: $750  
While the original '555 was one of the best-selling power amplifiers of all time, some felt its rather hard treble to be its weakest point. The Mk.II version sounds significantly sweeter, though still with rather a forward sonic signature, while maintaining its predecessor's superbly well-defined, authoritative low-frequency performance and excellent sense of dynamics. It also throws a deeper soundstage. A lot of power for the money—200Wpc! Fan-cooling is available as a $100 option for those with very insensitive or low-impedance loudspeakers. (Vol.8 No.4, Vol.12 No.12, original version; Vol.13 No.10)

Hafler XL-280: $725  
Though JGH doesn't agree with the claimed neutrality of this solid-state model, finding it a little dry and not quite as sweet in the treble as he would like, he still felt that it had "as nice a high end as any solid-state power amplifier in its power class." Excellent performance for a modest price. (Vol.10 No.1, Vol.11 No.7)

Kinergetics KBA-75: $1795
Powerful, silent-running, fan-cooled, class-A stereo design that, with the exception of a slightly dry upper midrange, has very little editorial effect on the music, in particular lacking any high-frequency glare. Doesn't appear to be cramped by any particular loudspeaker, handling dynamics, electrostats, and hybrids with aplomb. Restricted soundstage depth keeps this relatively modestly-priced amplifier from attaining a Class B recommendation. Latest version differs from that reviewed in having "Platinum" cosmetics. (Vol.13 No.1)

Linn LK280: $1695
Representing a considerable improvement over its predecessor, the LK2, this hot-running, almost dual-mono power amplifier (only the power transformer is shared between channels) is unusual in having fully regulated power supplies for the output stages. It offers an authoritative sound, with a more neutral treble than, for example, the Mk.I version of the Adcom GFA-555, but can really only be recommended for use with the LK1 preamplifier, due to its very low input impedance (3k ohms) and idiosyncratically wired XLR input connectors. An optional dedicated separate power supply, the $1295 "Spark," was launched in June 1990. (Vol.12 No.7)

PS Audio 100 Delta: $1195
Actual review was the 100C, the Delta being cosmetically different. GL felt the 100C to be able to handle any kind of loudspeaker load with ease: "bass was full, tight, and extended . . . treble was pristine," he wrote, after auditioning the amp with Spica TC-50s. The Audio Anarchist got less satisfying results with the PS Audio driving Martin-Logan Sequel IIs, the sound becoming rather brittle, which suggests that the 100C should be carefully auditioned with the speakers with which it is to be used. (Vol.12 Nos.9 & 12)

PSE Studio IV: $950
A lot of watts for the money from this modest-looking
solid-state amp, coupled with a detailed, dynamic, neutral, yet never over-aggressive sound. "Small in size, but big in sound," enthusiastically wrote GL in his review, commenting on the PSF's ability to present the power of bass instruments without blurring the leading edges of their sounds. (Vol.13 No.1)

C (Integrated Amplifiers)

Naim NAIT 2: $875

Somewhat expensive, almost totally lacking in features, and very low-powered (21Wpc), the diminutive NAIT 2 would appear to be poor value for money. But when you listen to it, it offers much better sound than the Class D integrated amplifiers, featuring an expansive soundstage with a smooth, natural tonal balance and a liquid midrange. Lacks bass authority, however, low frequencies being neither extended nor tight, and the line stage is somewhat rolled-off in the highs. (A slightly tilted-up treble in the RIAA response ensures that LP reproduction is more neutrally balanced.) Best suited for sensitive minimonitors like the Celestion 5 and Monitor Audio Monitor 7. Sam Tellig thinks the NAIT 2 is "the best integrated amplifier he has heard." (Vol.8 No.5 original version, Vol.12 No.9, Vol.13 Nos.5 & 7)

Sansui AU-X911DG D/A amplifier: $1100

Full-featured integrated amplifier with what LG feels to be an excellent-sounding MASH D/A section. RH demurs, so careful reading of the reviews is essential before making a final purchasing decision. (Vol.12 No.11, Vol.13 Nos.5 & 7)

D (Separates)

Adcom GFA-535: $330 ▲

"Extraordinarily clean, detailed, and musical... Far more detailed than I would ever imagine a $300 amplifier could be," said Sam Tellig of the '535's sound when this budget amplifier drove his ESL-63s. While not a powerhouse, it works well with speakers which usually demand a more expensive amplifier. Only negative point is the nonstandard output connectors. Some feel that the inexpensive '535 is actually the best-sounding Adcom amplifier—"Amazingly good" at its price, says Peter Mitchell. (Vol.10 No.8)

B&K ST-140: $498 ▲

The 105Wpc MOSFET '140 costs little enough to make it into Class D, but the sonics, after extensive auditioning, convince ST that it belongs in Class C. LA disagrees, feeling that it should be "high Class D," and after his auditioning, JA also disagrees. The ST-140 features deep but not extraordinarily powerful (if mushy) low bass, and a tube-like tonality with a smooth, sweet midrange. Despite the Anarchist finding the '140 not to have "too much MOSFET mist," the amp's high frequencies can become a little tizzy, thought JA, while GL found disc surface noise to be somewhat accentuated. Latest production features a detachable IEC AC cable and gold-plated RCA input jacks. An important caveat to our continued recommendation of the ST-140 concerns the ability of the current version to drive real-world loudspeakers. With loudspeakers whose impedances drop much below 8 ohms, the amplifier is thermally limited from delivering much power without a significant increase in distortion, with a resulting hardness to the sound. More powerful ST-202 ($659, reviewed in Vol.10 No.8) has very similar sonic signature, according to ST, and is therefore to be recommended with a much wider range of loudspeakers than the '140. (Vol.7 No.4, Vol.10 No.7, Vol.11 No.10 mono version, Vol.12 Nos.4 & 12, Vol.13 No.1)

NAD 2100: $429

Though as a conventional stereo amplifier this inexpensive NAD has a rather lightweight balance with a shallow image, a pair used in bridged-mono mode offers high power, excellent soundstage depth, and an open, spacious, detailed sound. (Vol.12 No.12, Vol.13 Nos.1, 5 & 12)

Parasound HCA-800 II: $395

Less image depth than the Adcom '555 II and a touch of treble grain at high levels, but "More than a touch of high-end sound," said JA of this modestly priced 100Wpc amplifier, due to its sweet midrange presentation and good sense of dynamics. (Vol.11 No.2, Vol.12 No.2, original version; Vol.13 No.10)

D (Integrated Amplifiers)

Arcam Alpha 2: $399

Inexpensive, the Alpha 2 sounds dry and bright in the treble, with a lack of soundstage dimension and "wooden" low frequencies, according to RH. Nevertheless, it represents a considerable improvement in sound quality compared with the mass-market Oriental norm, and therefore scrape a recommendation. (Vol.12 No.9)

Creek 4140 S2: $595

Excellent soundstaging, with a sense of air and openness, coupled with "satisfying" bass reproduction, lead to a recommendation for this inexpensive British integrated. Top octaves a little forward, but not to the extent of the Audiolab or Arcam models. An excellent foundation for a musically valid budget system. (Vol.8 No.5 original version, Vol.12 No.9)

K

Audio Research Classic 120, Classé DR-8, Mark Levinson No.23.5, Forté Model 4.

Deletions

Mark Levinson No.23 replaced by No.23.5; Aragon 4004 and Audiolab 8000A replaced by revised versions not yet auditioned; Classic Audio CA 260, NAD 2600A, and Forté Model 1a discontinued; Classé DR-3B, Bedini 150/150 Mk.II, and Discrete Technology LS2A not auditioned in a long time.

Loudspeaker Systems

A

Editor's Note: The argument among Stereophile's contributors as to whether the B&W 801 Matrix—see entry—should be included in Class A leads me to emphasize to prospective purchasers of Class A loudspeakers that five of the following six models make great demands that the amplification and source components also be of Class A caliber if the sound is not to be compromised. It should also be noted that there are potential Class A loudspeakers—the Avalon Ascent, Infinity IRS V, Wilson Audio WAMM and WATT 3/Puppies—that we have not heard in familiar surroundings and therefore cannot include in this listing.

Apogee Diva: $8995/pair

That classic, idiosyncratic Apogee balance—full bass and depressed treble—doesn't detract from AB's feeling that this three-way, full-range ribbon has the finest
ability to communicate the essence of a musical event that he's ever heard. Seamless transitions between the drivers, vivid, stable imaging that envelops the listener, and an ease in handling wide-range, dynamic peaks lead to a Class A recommendation. Dedicated electronic crossover—the $3995 DAX or less-featured DAX II at $1995, reviewed in Vol.13 No.8—leaves the matter in no doubt. West Coast price: $8400/pair. (Vol.11 No.8)

B&W 801 Matrix Series 2: $5900/pair ⊕
A complete redesign of the classical recording industry's standard monitor loudspeaker—aluminum-dome tweeter, extension to 15Hz with the help of a line-level equalizer, and B&W's patented "Matrix" enclosure, where the cabinet is effectively transformed into a solid body—has resulted in a moving-coil speaker capable of competing with the best planars. As LL put it, "a true musician's reference transducer." Strengths include excellent low-frequency definition and weight, a highly detailed midrange, and unrestrained dynamics. Bass alignment filter now included in purchase price. Best used with stands: we have had good results with the Sound Anchors and with the wooden, sand-filled Arciris. (Also see Vol.12 No.10, p.45, and Vol.13 No.2, p.217, for discussions of a simple crossover adjustment that improves the sound.) There is strong disagreement among Stereophile's reviewers whether the 801 is a true Class A loudspeaker system. LL makes a strong case that it should be on the grounds that its flaws are nowhere near as extreme as the other speakers in this class, meaning that it is more likely that an 801 owner will get Class A sound than owners of the other recommended models. This is particularly true if the bass filter is replaced by one of the after-market models, such as those from Discrete 'Technology and Denver dealer Listen-Up (the Maugham-Box). AB, however, strongly feels that the 801 doesn't come close to the Apogee Diva in overall recreation of a musical experience, while DO (without having heard the 801 in his own system, it should be noted) is scornful of the notion that a dynamic speaker can belong in the same class as the electrostatic Sound-Lab. BS and TNJ, who own 801s, share RH's opinion that the B&W more properly belongs in Class B. All of which suggests that those with wallets capable of stretching to accommodate a putative Class A loudspeaker should listen to the 801, then make up their own minds. (Vol.10 No.9)

Hales System Two Signature: $5600/pair
A beautifully made two-way, dual-woofer design with a resonance-free cabinet featuring a 4" baffle and a physically separate crossover, the 181 lb System Two Signature displaced the B&W 801 from RH's listening room. His characterization of the Hales's sound: "precise, controlled, detailed, mucilaginous, exact, finesse." Though the treble is both clean and transparent, a slight propensity for on-axis brightness can be ameliorated by experimenting with toe-in. Compared with the 801, the Hales offers superior dynamic detail, even though it lacks the British loudspeaker's low-frequency weight. In fact, the main fault of the Hales is a lightweight, rather over-damped bass balance which can be unfor-giving with some ancillaries and in some rooms. (Vol.13 No.7, see also RH's review of the Hales System 'Two in this issue)

Infinity IRS Beta: $11,950/pair
Full-range, five-way, electrodynamic area-drive system with separate stereo, moving-coil subwoofer towers and servocrossover electronics. Capable of being fine-tuned almost ad infinitum. At its best with tube electronics on the panels (ARC preamp and VTL 300 and 500 power amplifiers, for example), which will ameliorate the tendency for the upper octaves to be somewhat exaggerated in level, and needing a big room to allow sufficient distance for the sound from the individual drive-units to properly integrate, the Beta is the best speaker JGH has auditioned in terms of transparency, harmonic accuracy, and the ability to convey the dynamic scale of a recording. (In this last respect, the Beta is the best speaker system JA has auditioned.) Extreme versatility offered by low-bass controls helps in getting flat, high-level, extended (to below 20Hz), in-room LF response, provided that a beefy amplifier (Krell, Mark Levinson, etc.) is used. Lower treble can sound rather "zingy" with the wrong ancillaries, but this can be significantly ameliorated by covering some of the tweeter and super tweeter radiating areas with tape. Imaging precision on the original review samples was less good than expected, due to a slightly out-of-spec crossover and drive-units on one side. Infinity promised that good QC would be a major concern of theirs from then on. In the most recent samples to be auditioned in Santa Fe, this appears to be the case, though a thorough reread of the "Follow-Up" reports is a prerequisite, as it is in-store audition, prior to making a purchase decision. (Vol.11 No.9, Vol.12 Nos.1, 6, & 12)

Sound-Lab A-3: $7410/pair ⊕
JGH's referred reference loudspeaker, this big, curved-panel, full-range electrostatic features a stunningly natural midrange. Warm-balanced, the treble is sweet and musical. DO feels the A-3 to be the best electrostatic speaker he has heard, though he does point out that its imaging is less well-defined than that typical of a good minimonitor. Sensitivity and dynamic range are on the low side. Latest version has a revised HT power supply, resulting in slightly higher sensitivity and an improved dynamic range. The previous Class B ranking for this speaker was due to JA feeling that it persistently lacked mid-treble transparency, being rather aggressive and grainy in this region. Recent auditioning with the VTL 300 amplifiers revealed that this had much more to do with the solid-state amplifiers with which JA had heard it in JGH's system, leading to a consensus that the A-3 does deserve a Class A recommendation after all. Latest version features optional "wings" to lower the baffle cancellation frequency and thus extend the bass, as well as improved power handling. (Vol.9 No.6, Vol.11 Nos.6 & 11)

Thiel CS5: $9200/pair
A 180lb, five-way, six-drive-unit speaker with a cast "marble" baffle, the CS5 is the most expensive and complex loudspeaker ever to come from Jim Thiel's drawing board. Needs to be listened to at least 8' away; then, on the upper-midrange axis, the sound is neutrally balanced, superbly uncolored, astonishingly detailed, and completely time-coherent, leading to possibly the most accurate, transparent, vivid presentation of the soundstage JA has ever experienced. This transparency is not achieved at the expense of the CS5's ability to present the music in all its glory. LA felt the CS5s to be "immensely American...in their willingness to accept all comers"—with old recordings, "the music rang through," he found. Horizontal dispersion is wide and even, leading to a lack of fussiness about toe-in,
though vertically things are rather more critical: above and below the optimum axis, the sound can become too bright, while it can also lack body in the upper midrange. Both of these latter characteristics can be emphasized by unsympathetic room acoustics, which leads to great care having to be taken in selecting cables and ancillary components. With the appropriate amplification—the speaker's 2-ohm impedance in this region makes great demands on the amplifier—the low frequencies are extended and powerful, if not quite as well-defined in the midbass and below as the best Class A competition. The CS5 does need great care taken in room placement, however, if the upper bass is not to become uneven and lumpy. While it isn't a loudspeaker for Everyman and every room, in optimum surroundings and with the best matching ancillaries the CS5 is overall the finest moving-coil loudspeaker in current manufacture, feels JA (perhaps matched only by the Wilson WATT 3/Puppy combination). (Vol.13 No.6)

B

Editor's Note: I make no apologies for the wide variety of loudspeakers listed in this group. Polling Stereophile's reviewers resulted in a total lack of consensus, implying that all the following speakers will, in the right room with the right ancillaries, give true high-end sound. Following the protests of many readers and, more important, pressure from JGH that small speakers should automatically be excluded from Class B because of their lack of LF extension, I have split Class B into two sections—full-range and monitormonitors. To be included in Class B, a small speaker has to be at least as good in every other area as the full-range competition. (Note that all the full-range recommendations, with the exception of the Hales, Infinity, Quad, Spen dor, and Vandersteen, are floor-standing models.)

B—Full-range

Apogee Stage: $2195/pair (stands optional)
The diminutive Stage has one of the most neutral, seamless midbands around. Recorded voice is reproduced with an uncannily lifelike quality. Imaging, too, is superb—"in terms of stage-size transparency, it rivals any loudspeaker money can buy," said DO—as is the speaker's presentation of recorded dynamics. The Stage works particularly well with Classé amplification and SYMO cable, but prospective purchasers should be prepared to experiment with room position and toe-in to get the optimum sound. Matching stands are also available for those who prefer a higher listening seat. A real honey. . . . an eminently musical transducer," said MC. Stereophile agreed sufficiently with that conclusion to buy the review pair. (Vol.13 No.8, Vol.14 Nos.2 & 3)

Avalon Eclipse: $5600/pair
A warmer balance than the Hales System Two Signature is coupled with astonishing midrange transparency, beautifully delineated soundstaging, and a relative freedom from coloration that generally allow the music to communicate most effectively. However, this is only true when the Ellipses are driven by good tube amplifiers, the sound with even good solid-state amplification—Mark Levinson, Jeff Rowland—being too bright. Though provisionally rated in Class A last October, the Ellipses have been downrated due to their limited dynamics, which can lead to an unacceptable hardness. Price refers to a faux granite finish; a non-rainforest veneer finish adds $1600/pair. (Vol.14 No.1)

Hales System Two: $3000/pair (stands necessary)
(East Coast price is $50 higher; stands cost $300/pair. See RH's review in this issue.)

Infinity Modulus with Modulus subwoofer: $3300 (stands necessary)
Although the diminutive, beautifully made Modulus satellite has too restricted an LF response and too limited dynamics to be recommended at its $1000/pair price, the combination of a pair with the matching Infinity Modulus active subwoofer fully deserves a Class B recommendation, easily being the most neutral sound JA has heard from any Infinity model. Totlally, the sound lacks a little clarity, being over-polite in balance, though with a refreshing lack of midrange coloration and a superb sense of space. JA had hum problems with the subwoofer controller; be sure to audition the Modulus system with your own components to make sure that this won't be a problem. (The price quoted includes matching stands—essential—for the Modulus satellites at $300/pair.) (Vol.15 No.11)

Magneplanar Tympani IVa: $3750/pair *
Offering excellent performance for their price, the IVas have exceptional high-frequency performance and a delicate midrange with excellent harmonic accuracy. Room considerations and placement are more important than with most speakers for proper imaging. Bass is good, but requires an amp with high current capability. Most serious weakness is a lack of impact, particularly in the lower midrange. (Vol.18 No.6)

Martin-Logan Sequel II: $2650/pair (oak or black finish)
The revised version of this bi-wirable electrostatic/dynamic hybrid is a paradox, as from the midrange on up it offers seamless imaging, natural tonal colors, and clean, grit-free highs, almost reaching Class A quality in these regions were it not for a definite dynamic threshold above which the sound becomes considerably more hard and brittle. But from the lower midrange down, to an extent very dependent on the power amplifier used and on the chosen listening axis, the sound can be anemic, leaving the mids and highs unsupported. This leads to a "threadbare" overall balance that particularly irritated Sam Tellig, though we understand that listening to the speakers from more than 15' ameliorates this problem somewhat. As supplied, the woofer and the electrostatic panel have the same acoustic polarity, which is strange in view of the symmetrical 12dB octave crossover slopes—DO found the sound to be significantly improved for close-seated listeners if the woofer polarity is inverted. To an even greater extent than usual, prospective Sequel purchasers should listen for themselves with their chosen ancillaries before making any decision. (Vol.12 No.1, original version; Vol.12 Nos.8, 9, & 10)

Mirage M-1: $5000/pair
Tall, dark, and handsome, bi-wired, bi-ampable, bipolar design from Canada that resembles (though not in sonic signature) the B&W 801 and Vandersteen 2Ci in that its fundamental sound quality seems much less sensitive than usual to amplifier characteristics. The bass is extended, the extreme highs perhaps a little wispy, but LA found the M-1 to be exceptionally well-balanced tonally, with the rare ability to draw the listener into the music even at low levels. (Vol.12 No.6, see also TJJ's review of the Mirage M-3 in Vol.13 No.11)

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Mirage M-3: $2500/pair

TJN found the bipolar M-3 to have a more laid-back midrange than the larger M-1 and a more lush LF balance, still with excellent bass extension. Striking, however, was the speaker's sense of image depth and the height of that image—no Munchkin orchestras here! Excellent value for money. (Vol.13 No.11)

Nelson-Reed 8/04B: $3250/pair

One of the few moving-coil loudspeakers to get a recommendation from J. Gordon Holt, the three-way, reflex-loaded 8/04B combines high sensitivity and astonishing dynamic range with deep, tight low frequencies and well-defined imaging. Overall balance is somewhat forward, while treble is not quite up to the standard set by other Class B contenders. A version with a metal-dome tweeter, the 8/04C (not yet auditioned), costs $3650/pair. (Vol.11 No.4)

Ohm Walsh 5 Revised: $6000/pair

Unusual in being the only omnidirectional loudspeaker to be recommended, the Ohm Walsh 5, with its unique inverteco-cone, almost-full-range driver, has clarity and transparency to rival the best minimonitors, according to DO. "A special loudspeaker;" he said. Bass, with near-wall placement, is deep and full, coloration levels are low, and the soundstaging, though very sensitive to room positioning, is excellent. Piano-black finish adds $2000 to pair price. (Vol.10 No.4, Vol.11 No.8)

PSB Stratus Gold: $2000/pair

A large three-way design, the Stratus Gold offers a fundamentally neutral midrange balance, coupled with very low levels of coloration, a lively yet unfatiguing treble, and a generous, powerful bass. The treble is less prominent when the user is seated with the grilles on, when the sound takes on an appealing accessibility. Excellent value. (Vol.14 No.2, see also Peter Mitchell's "Industry Update" in this issue.)

Quad ESL-63 US Monitor: $3990/pair ★

(stands necessary)

Very musical sound, with very low midrange coloration, natural, precise imaging, excellent soundstaging, and very good resolution of detail when listened to on the optimum axis. The highs roll off considerably off-axis, which can lead to a dull, lifeless sound in overdamped rooms. The low treble is a little resonant, which bothers some listeners (LA) more than others (ST, LG, DO). Low frequencies are tight but not very deep, while maximum volume capability is somewhat limited. (In Santa Fe, with its 7000' altitude, this is a strict 97dB on peaks.) Later models are less dry-sounding than early production. Can really come alive with the right amplifier, and benefits from modifications, most especially suitable stands (we have found Arciic to work well). JA feels that aficionados should investigate the Celestion dual-mono subwoofers, which, being dipoles, stand a good chance of integrating in-room with the dipole Quads, while TAS's HP has achieved excellent results mating the Quads with the woofer panels, also dipoles, from the Tympani IVa. (LG disagrees, feeling that the omnidirectional, servocontrolled Velodyne ULD-18 gives the optimum match.) The current version, the "US Monitor," has a stiffer steel frame, a revised protective grille, and a reduced plate gap for higher sensitivity. (Vol.6 Nos.4 & 5, Vol.7 Nos.2 & 7, Vol.8 No.3, Vol.10 No.1, Vol.12 Nos.2 & 6)

Snell Type A/III Improved: $4680/pair

Ultraflat frequency response is coupled with a superb coupling of the low frequencies with the room acoustics, which leads to extended, powerful lows. Replacement of the original's Audax tweeter with a cleaner-sounding Vifa unit leads to the "Improved" being added to this large floor-standing speaker's designation and a strong recommendation from Larry Greenhill, who feels it should be a Class A contender. A lack of treble transparency coupled with somewhat restricted image depth, however, mean that high Class B is probably the most suitable rating. Bi-amplification via the dedicated electronic crossover from DB Systems ($602) significantly improves performance. (Vol.7 No.6, Vol.9 No.3, Vol.10 No.6, Vol.13 No.3)

Snell Type C/IV: $2190/pair

(See RH's review in this issue.)

Spendor S100: $2500/pair (stands necessary)

Somewhat self-effacing quality compared with "audiophile" loudspeakers, thought ST, but the outstanding bass, smoothness and lack of coloration through the midrange, and the sweetness of the treble make this beautifully constructed British three-way a natural Class B recommendation. "No significant flaws," say both Martin Colloms and Mr. Tellig. $175/pair Chicago Speaker Stands speaker stands should be regarded as mandatory. (Vol.13 No.6)

Spica Angelus: $1275/pair ★

The first floor-standing model to come from this New Mexican manufacturer, this idiosyncratically styled speaker has much in common with the TC-50, including a superbly defined if lightweight bass register, a basically neutral if occasionally "cardboardy" midrange, and the ability to throw an astonishingly accurate soundfield. Treble transparency is a little lacking when compared with the best Class B speakers, but still one of the best loudspeakers Sam Tellig has heard. LA demurs, due to the Angelus's slight departure from midband accuracy, while Martin Colloms points out that the speaker's unusual styling results in a somewhat deeper than usual "floor dip" in the lower midrange which can lend the bass a rather disembodied character. (Vol.11 No.2, Vol.13 Nos.1 & 4)

Synthesis Reference System: $7350/system

Close to achieving a Class A recommendation, this four-enclosure dynamic system was felt by JGH to have a slight lack of energy in the midrange which robbed orchestral crescendos of their full power. Nevertheless, extraordinarily precise yet spacious imaging and the deepest, smoothest bass he has heard in his listening room led JGH to label the SRS "superb," almost rivaling his beloved Sound-Lab A-3s in overall performance. (Vol.11 No.8)

Thiel CS3.5: $2650/pair ★

One of the finest US-designed box speakers, the 3.5 is the result of a long collaboration between designer Jim Thiel and the drive-unit manufacturers. Combines superb transparency and imaging with excellent low-bass extension—an active equalizer is used—though it relies on music having a normal spectral balance if the woofer is not to run out of excursion capability. (Organ recordings with sustained high-level pedal passages are to be avoided, for example.) A balance opposite to that of the Apogee Duettas, with a slight tendency to a tilted-up HF, makes careful system matching crucial.

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Its Dynaudio tweeter is perhaps outclassed in clarity by the SEAS unit Thiel uses in the new CSI.2, but the design's real Achilles Heel appears to be the equalizer, which compromises HF neutrality somewhat and is often outclassed by the electronics with which the 3.5 is used. (Vol.10 No.1, Vol.12 No.1)

**Vandersteen 2Ci: $1195/pair (stands necessary)**

After 12 years of continual refinement, an excellent full-range box speaker. Balance of the 2C was a little rolled off in the highs, according to Audio, but the Ci revision has full measure up to 16kHz or so (though it lacks ultimate transparency in the high treble). Superb delineation of recorded detail, a neutral, tuneful midrange (apart from a degree of character emphasis in the presence region), and low frequencies that are extended without the bass becoming too exaggerated, lead to a borderline Class B rating, but the fact that it would seem impossible to get anything less than a very musical sound from this speaker mandates a confident recommendation. TJN said it best in Vol.13 No.5: "The Vandersteen... is that rarest of audio products: a highly musical and accurate reproducer at a bargain price." ST demurs, feeling the Spica Angelus is a better buy overall, the 2Ci being too "Vandersweet." $260/pair dedicated Sound Anchor stands push the speaker's performance envelope further. The latest version—review in progress—features a metal-dome tweeter and necessarily revised crossover with no apparent diminution of the speaker's quality. (Vol.9 No.6, 2C; Vol.12 No.5, Vol.13 Nos.1 & 5, 2Ci)

**B—Minimonitors**

**Acoustic Energy AE1: $1500/pair (stands necessary)**

Tiny reflex box with metal-dome tweeter and unique metal-cone woofer. Redefines the art of miniature speaker design, according to JA, due to its high dynamic range capability, electrostatic-quality treble, and see-through, if somewhat forward-balanced, midrange. Now supplied ready for biwiring with gold-plated binding posts. Price with Alloy stands is $2150. (Vol.11 No.9)

**Celestion SL600Si: $1999/pair (stands necessary)**

Though lacking the bottom octave-and-a-half of bass extension, and possessing slightly depressed mid- and extreme treble ranges that make system optimization difficult, the SL600Si combines lower-midrange transparency and holographic imaging (areas where it sees off most of the moving-coil competition) with a musical, if dark-sounding, balance unique for a box speaker. Worth using with high-end electronics. Latest Si version has revised crossover layout to allow biwiring and is more transparent in the treble, though a touch of midband congestion remains. Good stands, such as Celestion's own $300/pair R8" SLSlites, are mandatory. (Vol.10 No.2, original version; Vol.12 No.5)

**Celestion SL700: $2999/pair (stands included)**

Once considered very expensive for a small speaker, price includes excellent stands. Improves over the SL600Si in the areas where that speaker excels, and sets new standards for a box loudspeaker in transparency, neutrality, and upper-bass clarity. In contrast with the SL600Si, overall balance is rather on the bright side—a little like a moving-coil CLS—which demands careful system matching. Auditioning of the current "Special Edition" version reveals better integration between the tweeter and woofer and an even cleaner upper bass, though the tradeoff appears to be a less involving sound overall. Though the SL700 is deficient in low bass in absolute terms, rate of rolloff in-room is slow enough that it almost qualifies for inclusion in the "full-range" Class B category. But only almost. (Vol.11 No.9)

**Ensemble PA-1: $2980/pair Ensemble Reference: $4650/pair ($4950/pair with bi-wiring option) (stands necessary)**

Two almost identical-lookinominimonitors from Switzerland combine an excellent soft-dome tweeter with an unusual laminated-cone woofer and a rear-facing passive radiator. Both sensitive to being overdriven by subsonics, but provided a good high-pass filter is used, the Ensembles generate a neutrally balanced if bass-shy sound with better imaging—"spatial resolution was outstanding," according to DO—and less upper-bass congestion than the Celestion SL600Si. The Reference betters the PA-1 in every way—at a cost. Both speakers require a considerable break-in period to reach their optimum performance. The sound of the References in the Rowland room at the 1991 WCES was outstanding, according to JA. (Vol.13 No.6)

**Monitor Audio Studio 10: $3000 (stands necessary)**

Mating M-As excellent 1" metal-dome tweeter with a metalceramic-cone woofer, the Studio 10 offers a warmer balance than the Celestion SL700, with a riper bass. An unfailingly musical sound, however, with a neutral, uncolored midband and a good sense of dynamics. Matching stands cost $750/pair. (Vol.13 No.11)

**C**

**Acoustat Spectra 11: $1099/pair**

Inexpensive floor-standing hybrid which combines a single Acoustat electrostatic panel with a moving-coil woofer. On the optimum listening axis, which is too high for a listener sitting in a normal chair, a clean treble and midband are offset by a slightly dull balance overall, while there is a bit of character in the presence region and the bass can be a little excessive in level in too small a room. "Unfailingly "musical," said TJN, however, of this "entry-level high-end" speaker system. (Vol.13 Nos.1 & 2)

**Acoustat Spectra 2200 loudspeaker: $2250/pair**

The Spectra 2200 uses two Spectra 11 electrostatic panels with electronic contouring applied to reduce the effective radiating width with frequency, thus minimizing that bugbear of wide-panel electrostats, limited HF dispersion. With amplifiers of 100W output or more, the Spectra 2200 throws a wide, deep soundstage, though DO felt the mids to be a little recessed. Low bass is missing, but SPW-1 dual-mono passivewoofer module ($560) usefully extends response to below 35Hz. Actual model reviewed was the Spectra 22; the 2200 sounds identical but is cosmetically somewhat different. (Vol.12 No.10)

**Dahlskist DQ12: $1200/pair**

Unusually styled three-way design, with midrange and tweeter mounted on a separate baffle atop the sealed-box bass bin. Low frequencies are rich and full, the soundstaging and imaging superb. The original review samples, however, had a rather exaggerated treble re-

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Epos ES-14: $1295/pair (stands necessary)
A speaker that has long been a Cheapskate favorite, the ES-14 seems to be typical of small British speaker designs in that it features a metal-dome tweeter in a well-braced cabinet with a minimal crossover and the option for bi-wiring. The result is a superbly coherent sound that, according to TJN, kept drawing him into the music. Ported bass is both a little lightweight and somewhat soft, but the upper bass and midrange are very low in coloration, with excellent transparency. Matching stands are available for $200. (Vol.13 Nos.4 & 10)

Icon Parsec: $1795/pair
Large, three-way speaker from the pen of David Fokos, once the loudspeaker designer at Conrad-Johnson Synthesis. Excellent dynamics, the ability to throw a well-defined soundstage, and very good low-bass extension are let down by a rather too generous upper bass and highish levels of coloration in the midband, due to a too-lowly cabinet. Only sold direct, price includes shipping via Federal Express. (Vol.13 No.12)

Image Concept 200: $1000/pair
"The deepest bass per dollar," thought JA of this elegant, floor-standing, two-way design from Canada. An otherwise excellent soft-dome tweeter is a little siz-zy in the upper treble, with a slight tendency for the sound to harden at very high levels. Sensitivity on the low side, which, coupled with the low impedance, will mean more careful amplifier matching than usual. Excellent image definition, however, and overall, an impressively neutral balance. (Vol.11 No.8)

Mission Cyrus 782: $900/pair (stands necessary)
A fundamentally uncolored midrange is combined with good imaging ability and the ability to present musical detail without tonal exaggeration, despite a somewhat forward balance overall. Low frequencies are taut rather than generous. (Vol.13 No.10)

Monitor Audio MA952 Gold: $1950/pair
High Class C performance with the right ancillaries from a floor-standing English loudspeaker equipped with twin woofers and a fine aluminum-dome tweeter (anodized a gold color in the latest version). Coloration levels are mild, apart from a somewhat lively box, though the balance is a little forward in the presence region, which is particularly unkind to CD. This is offset by highish sensitivity and an astonishing transparency in the midrange and treble, presumably due to the minimalist crossover. Sealed-box bass is lightweight but articulate, with reasonably good extension. (Vol.11 Nos.1, 2, & 5)

PSB Stratus: $1500/pair
Another fruit of the excellent facilities provided to the Canadian loudspeaker industry by the NRCan facility in Ottawa, the first sample we received of the Stratus was found by JGH to have a veiled sound, lacking impact, despite being "eminently listenable." The second sample, however, which conformed to the manufacturer's spec, was impressively neutral, with excellent dynamic performance. (Vol.11 No.5)

Rauna Balder: $1500/pair
Unusually styled two-way floor-standing design with cast-concrete enclosure (which can be painted to match room decor) and a rear-mounted port. Though said to be a transmission line, bass loading is more akin to reflex and a little loose. High treble is dull, but apart from those minor defects, this speaker has a superbly neutral midband and clean mid-treble. (Vol.11 No.6)

Rogers LS7c: $999/pair (stands necessary)
Well-finished two-way, reflex-loaded dynamic speaker with a classic "British" balance—uncolored midband, superb imaging, and a rather ripe upper bass. Good stands are mandatory, as is placement well out in the listening room. Sounds best with grille on. Tendency to hardness in the lower treble will make demands on matching electronics. (Vol.12 No.12)

Rogers LS3/5a: $799/pair (stands necessary)
A major revision of the crossover in 1988 was meant not so much to "improve" this venerable design (first seen and heard in 1975!) as to bring production back on target. Still somewhat compromised concerning overall dynamics and HF smoothness and clarity when compared with Class B miniatures such as the Acoustic Energy AE1, Celestion SL600Si and SL700, and having a distinctly tubby midbass, the 1989 version of the LS3/5a still has one of the least colored midbands around, throws a deep, beautifully defined soundstage, and has a slightly sweeter top end, with less nasality apparent than it used to have. The sound, however, is sometimes not as musically involving as it could or should be. The LS3/5a is also being manufactured by Spendor, Harbeth, and Goodmans, and differences among any current LS3/5as should be cosmetic only. (Vol.3 No.12, Vol.4 No.1, Vol.7 No.4, Vol.12 Nos.2 & 3)

Signet SL280: $900/pair (stands necessary)
Designed by an ex-AR engineer, the two-way SL280 was found by TJN to rival the Epos ES-14 in being musically satisfying at a modest price. Good bass extension is coupled with excellent midband transparency, though the treble has a tendency to be a little bright-sounding. (Vol.13 No.10)

Snell Type Q: $780/pair (stands necessary)
Small speaker which successfully takes on the British on their own ground. An open, airy quality, excellent delineation of soundstage depth and width, low levels of midrange coloration, though treble is perhaps a little unforgiving compared with, for example, the Epos ES-14. Matching stands cost $120/pair. (Vol.11 No.6)

Spica TC-50: $550/pair (stands necessary)
The coherence and imaging of the mid-to-upper midrange rival the Quad and LS3/5a and would be considered excellent in a speaker of any price; at $550 they're a steal. Only significant drawback is the absolute need for the listener to be sitting with his or her ears on the optimum axis, the sound otherwise becoming too lean. On the optimum axis, the high frequencies roll off above 16kHz, the midband is rather forward-balanced, and the low end is designed to be very controlled down to the lower limit of about 55Hz. This latter aspect makes the TC-50 perfect for matching to a subwoofer—a pair of Kinergetics BSC-5W100s with their stands and matching amplifier are ideal. Easily damaged by amplifier overload. Latest version features

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a cross-brace between front and rear panels. (Vol.7 Nos.2 & 3, Vol.9 Nos.5 & 7, Vol.11 No.1, Vol.12 No.10)

**TDL Studio 1:** $1445/pair (stands necessary)
Midband and upper bass have a little too much character in absolute terms, felt JA, but the transmission-line Studio 1 features excellent bass extension for what is basically rather a small two-way loudspeaker. Dynamics are somewhat limited, but the Studio 1 features a very clean treble and excellent soundstage presentation. Matching stands cost $180/pair, but should be considered essential in order to place the listener's ear on the optimum axis, the sound being otherwise too hollow-sounding. (Vol.13 No.2)

**Thiel CS1.2:** $1250/pair
Borderline Class B, lacking only ultimate dynamic range, this modest-sized floor-standing speaker offers an outstandingly detailed sound with superbly precise if a little shallow soundstaging, a neutral midband, and a less critical treble balance than the older CS2 (although VTL monoblocks produced rather a "hissy" sound). ST reports that the Electrocompaniet AW100 sounds terrific with the 1.2s. Low frequencies are full, but only become too ripe when used with, say, a tube amplifier, states JA. ST demurs, feeling that the bass was a little lightweight, which might suggest some room dependency in the low-frequency balance. A best buy at the price, nevertheless. (Vol.12 Nos.1, 6, & 11, Vol.13 No.1)

**Thiel CS2:** $1650/pair
The CS2 is more amplifier- and front-end-fussy than the other Thiel speakers—anything too extended or peaky preceding the speakers will make the sound too relentless. It will be harder to get the CS2 to perform at its best than, say, the CS1.2, but in the right system the '2 will offer remarkable coherence, excellent imaging, a natural midrange, and extended highs. (Vol.8 No.6, Vol.12 No.1)

**Triad System 7:** $1000 (stands necessary)
Three-box system comprising two tiny satellites and separate woofer module. The System 7 offers low levels of midband coloration and excellent bass extension at this price level, though RH found it hard to properly integrate the woofer with the satellites, leading to a somewhat threadbare upper bass. Exaggerated on-axis treble balance means that best sound is obtained with satellites firing away from the listening position. (Vol.13 No.10)

**D**

**Cambridge SoundWorks Ambience:** $250/pair (stands necessary)
Tiny, well-finished stand-, wall-, or shelf-mounted two-way speaker available only via mail-order (S&H add $10 to the quoted price). (Full customer support is provided.) Midrange rather forward in balance, accented by rather shut-in but lispy highs and a necessarily limited bass extension. The mids also lack clarity. Nevertheless, the Ambience offers a surprisingly musical sound overall, and can be recommended for second-system use or as ambience speakers in a video-surround setup. Oak cabinets are available for an additional $48/pair. (Vol.13 No.3)

**Celestion 3:** $280/pair (stands necessary)
Intended to be sited near a rear wall on a stand or shelf, which usefully reinforces its limited low-frequency output, the diminutive 3 has a rather "cardboardy" coloration in the midband but a clean, open-sounding treble unusual in this price range. (Vol.12 No.10)

**Dana Audio Model 1:** $179/pair (stands necessary)
By far the least expensive loudspeaker listed in "Recommended Components," Dana's Model 1 is only available via mail-order. A rather warm bass and a rather lifeless, depressed treble lead to a forgiving balance offset only by a degree of resonant coloration in the low treble. "Squeezes the most music out of the least money," according to RH. Slight changes to the tweeter balance have been made since the review appeared. (Vol.13 No.9)

**Fried Q4:** $498/pair (stands necessary)
Excellent low-frequency performance from such a small, inexpensive speaker, though some might find it overtone in this region. A smooth, laid-back sound overall, with low levels of midrange coloration. West Coast price is $523/pair. (Vol.13 No.10)

**Magneplanar SMGa:** $575/pair
Musical sound, with relatively well-extended low frequencies, considering the size of the panel. Not that transparent in the midband, and high frequencies recessed, but a musical bargain nonetheless. (Vol.10 No.7)

**Monitor Audio R300/MD:** $599/pair (stands necessary)
A forward midrange and slightly indistinct upper bass are offset by excellent imaging and a generally smooth, detailed treble. Should work well with inexpensive amplification. (Vol.12 No.4)

**Monitor Audio Monitor 7:** $449/pair (stands necessary)
The Monitor 7 is "smoother through the treble than the Celestion 3, better focused, and better finished too," says the redoubtable Mr. Tellig, JA concurs, feeling that its midrange is also less colored, but points out that the 7s more peaky treble balance will be fussier regarding matching amplifiers and CD players, and adds that he finds its reflex-loaded low frequencies to be fuzzier, less well-defined, than the sealed-box Celestion's. (Vol.13 Nos.1, 2, & 3)

**NHT 1.3:** $480/pair (stands necessary)
Unusual styling but a superb level of fit'n'finish distinguish this small, inexpensive loudspeaker. Its midrange is neutral, its high frequencies clean and free from resonant hash, though low frequencies lack a little weight. Sound quality overall is borderline Class C with the right ancillaries—"the NHT 1.3 excels in those areas that are most important musically," stated RH. (Vol.13 No.9)

**Paradigm 5se:** $369/pair (stands necessary)
A rather soft midbass, a slightly colored midband when compared with the better Class D loudspeakers (including the Paradigm Control Monitor below), and a typical soft-dome tweeter, but excellent performance at the price. A well-balanced design. Needs to be used on good stands. (Vol.11 No.1)

**Paradigm Control Monitor:** $680/pair (stands necessary)
A rather loose upper bass and a cold tonal balance do not detract from this Canadian speaker's having an excellent performance overall at this price level. Neutral midband but rather shallow imaging. (Vol.12 No.12)
**Phase Tech PC-80: $650/pair (stands necessary)**

Similar to the Fried Q4 in having a rather exaggerated bass region, the well-made PC-80 also offers excellent imaging specificity and a clean treble, spoiled only by a slightly nasal upper midband. A review is planned of the matching subwoofer. (Vol.14 No.1)

**Rauna Freja: $725/pair (stands necessary)**

This concrete-enclosure two-way features rather a forward midband but throws a wide, deep soundstage with low levels of resonant coloration. Verge on Class C sound quality with the right ancillaries. (Vol.12 No.1)

**Snell Type K/II: $465/pair (stands necessary)**

A tight, tuneful, articulate bass, thought RH of this modestly priced two-way design, though with less weight than the Phase Tech PC-80. The mids are neutral, the highs open and airy, but there is a trace of hardness in absolute terms that can’t altogether be ameliorated with the tweeter level control. Nevertheless, RH enthusiastically recommends the K/II for its musically natural presentation. (Vol.14 No.1)

**Tannoy E11: $369/pair (stands necessary)**

A basically flat response with a coloration-free midrange, an open, expansive soundstage, and a well-defined bass is offset by a degree of treble hash. “Eminently musical for its price,” thought RH. Bi-wiring recommended. (Vol.13 No.9)

**K**

Acousat Spectra 1100, B&W 800, Nestorovic Sas Mk.IV, ATC SCM20, KEF R105/S and R107/2, Vandersteen 3, Wilson WATT 3/Puppies, Magnepan MG3.3 and MG2.6, Meridian D600B and D6000, Shahinian Diapason.

**Deletions**

Meridian D600 active loudspeaker replaced by Bi-stream version; SR Bolero now perhaps a little expensive for the sound quality offered; Synthesis LM-210, Rauna Tyr 11, and Spectrum 208B not auditioned in too a long time considering the rapid pace in inexpensive loudspeaker development; Focal Aria 5 kit on the grounds that it is impossible to ensure that the builder of a kit will end up with the potential quality inherent in the design.

**Subwoofers & Crossovers**

**Editor’s Note:** You will see from Dick Olsher’s mini-survey in Vol.12 No.1 that true subwoofers, capable of reproducing the bottom two bass octaves at realistically high sound levels, are rare and expensive beasts. In addition, the problems of integrating one or two subwoofers with high-quality satellites are major if the integrity of the upper-bass/lower-midrange region is not to be compromised. There are no Class D subwoofers listed: we strongly recommend those trying to subwoofer on the cheap to instead look at the possibility of acquiring more expensive full-range loudspeakers.

**A**

**Threshold PCX electronic crossover: $1800**

Available in two versions, offering either selectable crossover frequencies from 75Hz to 160Hz or 750Hz to 16,020Hz, the PCX offers fixed 18dB/octave slopes and matches the Threshold FET10 in appearance. Sonically the most transparent crossover DO has yet auditioned. (Vol.12 No.1)

**Velodyne ULD-18 subwoofer: $2595**

(inc. crossover, amplifier, and servo electronics)

LG felt this well-finished, servocontrolled subwoofer system to offer the best bass performance he had experienced, extending his Quad US Monitor’s low frequencies to 20Hz even at high levels, and adding a considerable degree of dynamic contrast. Though Peter Mitchell would agree with a Class A rating for the ULD-18, DO disagrees, feeling the Velodyne belongs in Class B due to an overall lack of absolute definition. It is fair to note, however, that DO derives his opinion from auditioning the Velodyne at hi-fi shows where the subwoofer undoubtedly have been turned up too high. (Vol.12 No.10)

**B**

**Celestion System 6600: $2999/pair ☆ (inc. crossover)**

20Hz bass extension, though not at high levels, with excellent transient performance and dynamic range due to its using four 12” drive-units. Dipole radiation pattern makes system optimization a less thankless task than usual (Celestion can supply detailed setup data to System 6600 owners who send the company a diagram of their room). Though expensive, not even including the need for a separate stereo power amplifier, the System 6600 is worth auditioning with both the Quad ESL-63 and the Martin-Logan CLS to endow those systems with bass extension and low-frequency power handling (though DO and LG feel that the system’s fundamentally excellent performance is compromised by the quality of the line-level controller/ equalizer). Note that LG feels the System 6600 to be incapable of competing with the Velodynies in terms of being able to reproduce the power of live low frequencies. (Vol.10 No.2, Vol.12 Nos.1 & 10)

**Infinite Modulus Subwoofer: $2000**

(inc. crossover, amplifier, and servo electronics)

A small, handsome, well-made and well-thought-out servo-controlled design that offers considerable flexibility in matching the satellites with which it is used. JA got excellent results with the Monitor Audio Studio Tens, though couldn’t eradicate a residual hum that appeared to be due to the subwoofer controller comming the grounds of the two channels. See also the entry for the complete Modulus loudspeaker system. (Vol.13 No.11)

**Nelson-Reed 1204/P subwoofer: $1200 each**

Four 12” drive-units in an IB enclosure, with two used in stereo, gave flat extension to 20Hz with high dynamic range in J. Gordon Holt’s room, though with a less smooth characteristic, despite careful positioning, than the Synthesis Reference System’s against-the-wall towers. Latest version has improved drive-units. “P” revision can be run in 2-ohm mode. The high-pass satellite feeds of Nelson-Reed’s all-active AC-1204 electronic crossover ($570) are veiled; the same company’s PC-1204 passive high-pass unit ($100) should be regarded as essential. (Vol.11 No.4)

**Velodyne ULD-15 subwoofer: $1795**

(inc. crossover, amplifier, and servo electronics)

A smaller version of the Class A ULD-18, the ’15 imposed more of a signature on the music, thought LG, shrinking his quad’s soundstage and somewhat diminishing their depth. (Vol.12 No.10)
Audio Concepts Saturn subwoofer: $499/pair (kit)
Using two 12" woofers in a compound configuration, the Saturn achieves moderate extension and in kit form offers good value for money. The drive-units have sufficient dynamic range to make it worth experimenting with equalizing the Saturn's response to be flat to 20Hz. (Vol.12 No.1)

Audio Control Richter Scale Series III equalizer: $349
Versatile six-band, half-octave, low-frequency equalizer and analyzer incorporating 24dB/octave crossover factory preset to 90Hz. Slightly "muffled" in sound quality when compared with the Threshold, the Richter Scale nevertheless offers the woofer fan an excellent chance of achieving a successful integration between subwoofer(s) and satellites. (Vol.12 No.1)

Kinergetics BSC SW-100 subwoofer system: $990/pair
Kinergetics BSC SW-200 subwoofer interface and stereo bass amplifier: $725
Using a pair of 10" drivers per side, the Kinergetics system achieves true 20Hz extension but at the expense of a limited dynamic range. In the right circumstances, however, particularly with Spica TC-50s, it can work very well, producing a full-range sound that can be intensely musical. (Vol.12 No.1)

Sumo Delilah stereo electronic crossover: $550
Featuring independently switchable high- and low-pass crossover frequencies, Bessel-type filters, lowpass slope selectable between 12 and 18dB/octave, low-pass level control, a bypass switch, and both mono and stereo inverting and non-inverting subwoofer amp outputs, the Delilah is one of the most versatile means of integrating one or two subwoofers into a system that JA has found. High-pass output is not as transparent in the treble as a straight-wire bypass. (Vol.11 No.4)

K
Bryston 10B electronic crossover, Muse programmable subwoofer.
Deletions
Sumo Samson subwoofer replaced by new version not yet auditioned.

FM Tuners & Antennae
Editor's Note: Larry Greenhill recommends that those interested in purchasing a good FM tuner read J. Gordon Holt's and Donald A. Scott's discussion on reviewing and measuring FM tuners in Vol.7 No.7, pp.54-57. (See the advertisement elsewhere in this issue for information on ordering back issues of Stereophile.)

A
AudioPrism 7500 indoor FM antenna: $190
Low-VSWR (Voltage Standing Wave Ratio), vertically polarized, omnidirectional indoor passive design that, like the Day Sequerra, will prove optimal in urban high-signal-strength areas. 89.5" height. (Vol.12 No.5)
BP FM-9700 active antenna: $40
Excellent directional indoor antenna offers 6dB improvement over conventional T-shaped dipole antenna. (Vol.11 No.10)

Day Sequerra FM Studio Monitor: $3800
With a styling similar to the same company's FM Broadcast Monitor, the FM Studio Monitor is a completely new design, built to the same exacting standard. Balanced outputs are provided. Compared with the Broadcast Monitor, selectable IF bandwidth leads to improved adjacent-channel selectivity and lower audio THD. The sound, however, was where this tuner scored, being, according to LG, "as good as any source I now have in my system," with a "see-through quality that just doesn't happen with any unit I have ever heard in my system." LG also commented on the Studio Monitor's "extraordinary" dynamic range and enhanced presentation of inner detail. (Vol.13 No.1)

Day Sequerra FM Urban indoor antenna: $285
Low-VSWR, omnidirectional, vertically polarized, 5'-high indoor passive design optimized for metropolitan reception in areas of high signal strength. (Vol.12 No.7)

Magnum Dynalab 205 FM Booster: $279
Not a tuner, but an excellent RF amplifier to optimize selectivity and reception in areas of poor signal strength. (Vol.10 No.6)

Magnum Dynalab Etude: $1295
Based on the well-established FT-101A, the Etude features a machined faceplate, WBT output jacks, audio-quality passive components, and two extra hours of component selection, matching, and testing during its manufacture. The result is a tuner that sounds only slightly noisier than the extraordinarily expensive Day Sequerra Broadcast Monitor with the same antenna and station, and features a distortion-free midrange with strong dynamic contrasts. "The sound was wonderfully free of hash, distortion, grit, and glaze," said LG. His overall conclusion? That the Etude "represents one of the better balances of price and performance you can find in FM tuners today." (Vol.15 No.8)

B
AudioPrism 6500 FM Antenna: $90
(wood cabinet)
If you don't have the room for an external FM antenna, then the diminutive 6500 could be a good substitute, offering good reception except for DX-ing purposes. A lot more effective than the small, active, omnidirectional antenna offered by some companies, thought BS. Vinyl-covered version costs $60. (Vol.13 No.9)

Denon TU-800: $500
Excellent sound—"smooth and tubelike"—coped with good RF performance, particularly adjacent-channel selectivity, and very low distortion in super-narrow mode. (Vol.11 No.5)

JVC FX1010TN: $480
Very quiet backgrounds, coupled with excellent RF performance, apart from image rejection. Model reviewed was the almost identical FX-1100 BK. (Vol.12 No.4)

Luxman T-117: $600
"One of the best-sounding tuners ever!" said DAS in his review of this extremely sensitive tuner, pointing out its very low distortion. Borderline Class A. (Vol.11 No.2)

Magnum Dynalab FT-101A: $775
An analog tuner, the FT-101A is superb from an RF
standpoint, particularly in selectivity. Superiority is bettered only by the Onkyo, Denon TU-800, and Citation 23, but the '10A consistently sounds superior on most stations. Examination of three different samples confirmed good quality control as of February 1988. Latest version has instant-on feature, defeatable stereo blend, and new board. (Vol.8 No.4, Vol.10 No.3, Vol.13 No.10)

Onix BWD1: $975
Minimalist design with separate power supply, but a sound "transparent to the music source," with good soundstaging. Will give excellent sound, as good as that of the Luxman T-117, with classical stations broadcasting a clean, uncompresed signal, but not as good at snatching signals from the ether. Among the best-sounding tuners. (Vol.10 No.8)

Onkyo T-9090 II: $750
This Mk.11 version of an old favorite is an excellent-sounding tuner in its Wide mode, offering very low noise and superb stereo separation, though switching to Narrow or Super-Narrow noticeably degrades audio quality. Bass response is quick and dynamic. RF performance is excellent, though not as good as the Luxman T-117 in fringe reception areas. (Vol.11 No.5)

Proton AT-670: $400
"Exceptionally smooth" sound on FM, with a natural tonal quality and a wide soundstage, thought DAS, especially with weaker FM stations. Lacks ultimate selectivity and AM section has poor sensitivity. Features Schott noise reduction. (Vol.13 No.7)

Revox B-260-S: $1675
Ergonomics are initially daunting—there are 60 presets—but once set up, this beautifully constructed, very sensitive, very selective tuner was among the easiest to use. Audio quality on the Narrow IF bandwidth setting was excellent—"no harshness, no SCA 'birdsies'"—though not in the class of the Day-Sequerra models, felt LG. B208 remote control costs an extra $160. (Vol.12 No.7)

C

Harman/Kardon Citation 23: $699
Excellent selectivity—"it can separate closely spaced stations where others fail"—but sensitivity rather on the low side. Excellent AM section, FM fine-tuning, topnotch sound. (Vol.10 No.8)

Magnus Dynalab FT-11 FM tuner: $449
Borderline Class B tuner, according to DAS in his review, that lacks transparency when compared, for example, with the more expensive FT-101. This is perhaps due to its having a single, narrow IF bandwidth. Has good selectivity and a very effective high-blend circuit for receiving weak stations in acceptable stereo. (Vol.12 No.10)

Mission Cyrus: $649
"An accomplished performer on FM," DAS said of this remote-control tuner (though he was less impressed by its AM section) due to its signal-snatching dexterity. It may not offer the ultimate in FM sound quality, but it does offer acceptable quality on weak stations that other tuners would miss altogether. (Vol.13 No.10)

Onkyo T-4700: $450
Superb "signal-sniffing ability," noted DAS, which, combined with excellent adjacent-channel selectivity, leads to a "tuner that will miss few... signals delivered to its antenna jacks." Sound quality not quite up to the standard set by the other two Onkyo tuners recommended in this listing, however. (Vol.13 No.5)

Quad FM4: $695
Good-quality construction, though only eight presets. Very sensitive with flawless audio if properly aligned. Lacks high adjacent-channel selectivity, switchable IF bandwidth, and monostereo switch. (Vol.8 No.4)

D

Adcom GTP-400: $380
Excellent budget-priced preamplifier, with integral FM/AM tuner offering good sensitivity but only reasonable selectivity. (Vol.12 No.9)

Arcam Alpha 2: $399
Warm tonal balance, excellent stereo separation, but only average RF performance. (Vol.12 No.7)

AudioSource TNR One: $229
A basic, no-frills tuner that DAS felt to offer a basically good sound for its price in areas where FM signal strength is moderate to high. (Vol.14 No.3)

Hafler Iris: $450
Remote-control FM tuner that connects to the matching Iris preamplifier via a ribbon-cable link and can be controlled by the preamp remote. Having much in common circuit-wise with the DH-330, it offers audio with exceptionally low distortion and a slightly dry balance. Tuning is clumsy, however, requiring two buttons to be pushed, while DAS was also disturbed by the fact that it tuned in 50kHz intervals. RF performance is only average, with limited selectivity and poor immunity to SCA and FMX spurious. (Vol.13 No.2)

Marantz ST-54 AM/FM tuner: $420
Very sensitive, particularly in mono, but limited adjacent-channel FM selectivity. Ability to tune in 10kHz steps makes it suitable for receiving cable signals. Gold finish and rosewood end panels add $80 to price. (Vol.12 No.10)

Proton 440: $300
An excellent Schott noise-reduction tuner. Superior fringe performance when high adjacent-channel selectivity is not needed. Audio OK. (Vol.8 No.1)

Bogen TP-100A: $270
Very clean sound, good stereo. Small size, good looks make it a good choice where space is at a premium. Usable only for medium-strength signals. Sensitive AM. (Vol.9 No.3, see also Magnum review in Vol.12 No.10)

Signal Processors

Editor's Note: I feel that to continue to recommend dynamic-range expanders, compressors, aural exciters, equalizers, ambience extractors, etc., is not in the true spirit of high fidelity, where the reproduction should be true to what the engineer and producer intended. The only processors I would recommend are those which can prove useful in rendering acceptable the playback of historical material. JGH, however, disagrees forcefully, feeling that equalizers, in particular, should be given high-end respectability for the correction of program deficiencies in the almost ubiquitous absence of tilt controls; as does BS, who states, "What this country needs is an audiophile-quality, $1000 equalizer." Peter Mitchell also disagrees, on the grounds that "the
true spirit of high fidelity” could mean either “recreating a lifelike illusion of music, by whatever means necessary, or literal reproduction of what is on the disc—no matter how falsely equalized, compressed, or colored that signal may be.” He goes on to say that “with the best recordings, these goals may coincide, but not as a general rule. Case in point: Apogee speakers are inaccurate reproducers, but their fat bass and rolled-off top are partly responsible for their ability to recreate the sound you hear at a concert. Without the aid of equalizers or other modifiers of tonal balance, how can the radically different-sounding Apogee Diva and Acoustic Energy AE1 both be called ‘high-fidelity’ reproducers? If either is regarded as plausibly accurate, the other will need radical help from an equalizer to sound OK.” OK?

A

Accuphase G-18 graphic equalizer: $5450
Very expensive 33-band equalizer has less deleterious effects on the signal than any other such device JGH has tried. Constant-Q bandpass cut filter design leads to minimum overlap between adjacent bands. Best used for system EQ rather than for program. (Vol.11 No.4)

Packburn 323A noise-reduction device: $2650
Quite expensive, and frankly intended for professional (archival) use, the Packburn is the best such device made. It can remove the maximum of surface noise—ticks, pops, and hiss—from shellac or vinyl discs with a minimum of signal degradation. (Vol. 5 No.8)

B

Cary Audio Design CAD-5500 analog CD processor: $1295
Though advertised on the grounds that its “Reverse Phases Canceling” circuitry eliminates RH hash from a CD player’s output signal, the CAD-5500 is actually an equalizer in that it rolls off the highs, adds a small degree of bass boost, and gently compresses signal dynamics. Its high output impedance will also roll off the highs with very long or capacitive interconnects. DO feels, however, that it is an essential purchase for those like him who dislike the bright, hard sound typical of CD. Note that both sets of line inputs are processed, not just the one marked “CD.” Optional Penny & Giles volume control pot adds $255; version without preamp section costs $995. (Vol.13 No.11)

K

Cello Audio Palette.

Dolby MP Surround-Sound Decoders

Editor’s Note: Although BS argued cogently against the use of a Dialog-channel center speaker in his Dolby decoder reviews, it must be pointed out that when several listeners are involved, as will often be the case with movies, a center speaker will be essential if those well off the central axis are to receive a sound localized at the screen position.

A

Shure HTS-5300 Dolby surround-sound processor: $999
Full logic action and remote control. Individual trim-pot level controls are provided for all six outputs, but can only be accessed from underneath. Only processor “to preserve the width, depth, and spaciousness of the soundfield,” said BS, with a clear and open sound quality and stable, crosstalk-free decoding action. (Vol.12 Nos.8 & 11)

B

Lexicon CP-1 processor: $1395
Uniquely, Dolby Pro-Logic decoding is performed in the digital domain, making what is basically an ambience synthesizer also an excellent buy for home video surround-sound use. Doesn’t quite reach Class A for Dolby sound, a rather brash, “transistory” coloration being noticeable. Unique in being able to correct for tape-azimuth errors. (Vol.12 Nos.1 & 8)

Lexicon CP-2 surround-sound processor: $895
Less well-featured version of the CP-1, that keeps the all-digital processing of the Dolby surround information and the auto-balancing circuit. (Vol.12 No.12)

Surround-Sound Synthesizers

A

JVC XPA-1010TN digital acoustics processor: $1200
Differents from other synthesizers in how it distinguishes between the way in which wide soundsources excite the reverberant field from narrow ones, the result being an enhanced sense of realism to the synthetic space being produced compared, for example, with the Lexicon CP-1. The JVC is “unmatched,” said BS, in its ability to give the listener “exactly the kind of ambience” he or she wants, perhaps due to the fact that its synthesis action doesn’t duplicate the early reflections already present on all but anechoic recordings. Its artificial ambience thus seems to fit much better with that on the record, thought BS. (Actual model reviewed was the XP-A1000BK, identical apart from being finished in black rather than “titanium.”) (Vol.12 No.12)

B

Lexicon CP-1 digital audio environment processor: $1395
Until the JVC came along, the CP-1 was the best-sounding hall simulator BS had heard, but with only three room models. Versatile choice of reverberation parameters, however, although less flexible overall than the Yamaha DSP-3000. Includes a reasonable Dolby surround decoder which can cope with video tape-azimuth problems. (Vol.12 Nos.1 & 8)

Yamaha DSP-3000 surround-sound synthesizer: $1899
Superb remote control; 18-bit D/A converters on main channels; needs full six-speaker system to work at its best; specific Hall models synthesize early reflections only, relying on reverberation already present on recordings to flesh out the illusion. Doesn’t produce quite as believable an illusion of a real acoustic space overall as the Lexicon, felt BS, due to the failure of some of its room models to synthesize ambience. However, some models, the Cathedral and Chamber, are better than the American unit’s equivalents. (Vol.12 No.9)

Deletions

Sony SDP-777ES discontinued.

Stereophile, April 1991
Home Recording Equipment

Editor's Note: With the exception of the Rostex listed below, none of the microphones listed has been formally reviewed. However, Robert Harley, Stereophile's Consulting Technical Editor, has had extensive experience with many professional models and has compiled most of the thumbnail sketches of each's sonic signature. Other professional models to look out for on the secondhand market are cardioids from Sony (C3TP & C500), Milab, and Calrec (AMS), figure-eight ribbons from B&O and Coles, omnis from Schoeps and B&K, and PZM mikes from Crown (though it is very easy to get a rather colored midband with these latter mikes). The Shure C81 cardioid is also reported to have quite a flat response. Anyone about to undertake serious recording should ignore all "amateur" microphones; as a rule of thumb, you should spend as much, or more, on a good pair of mikes as you do on your recorder.

A

EAR 824M stereo mike preamplifier: $3150
Extremely neutral, very quiet, all-tube, balanced preamp from Tim de Paravicini, with switchable level controls and 48V phantom mike power. Used by Water Lily Acoustics and also to make Stereophile's first commercial recording. (NR)

EAR "The Mic": $4000
Using a single 6DJ8 tube and a fist-sized output transformer, this rectangular-capsule (sourced from Milab), switchable-pattern—omni, cardioid, figure-eight—mike is a little shut-in in the highs, but has extended low frequencies and a midrange that is extremely true to the original sounds. "No trace of edge or glare," says RH. The most natural-sounding microphone JA or RH has heard. (NR)

Nakamichi 1000 R-DAT recorder: $11,000
Easily the most expensive R-DAT machine around, this two-box Nakamichi lives up to its Model 1000 analog cassette predecessor in being perhaps the finest digital recording system available to the amateur recordist. Records digitally at 44.1k and 32k and from analog at 48kHz. Superb, quiet tape transport, unique fast-spooling mode, and exceptional ergonomics make it a joy to use. Treated as a DA processor, the sound was not up to such Class A contenders as the Theta DS Pre, being less transparent. The Nakamichi 1000 was used to master the Stereophile Test CD. (Vol.12 No.11)

Panasonic Pro 3500 R-DAT recorder
One of the best sounding DAT decks on the market, according to PWM, with MASH oversampling encoders and pretty good analog circuitry. Recent units (with a blue dot on the box) contain a switch that enables digital recording at 44.1kHz; these will copy CDs digitally, also 44.096kHz PCM-FL tape played through an Agere-modified FL or Sony PCM-601. A bargain, considering it's widely discounted to below $2500. (NR)

AKG The Tube: $2295
One of the few currently produced tube microphones. Smooth, open, and uncolored, The Tube captures detail without solid-state stridency. (NR)

AMS (Calrec) Soundfield Mk.IV: $5850
Having used both Mk.III and Mk.IV versions, JA feels that the highly praised, variable pickup pattern of this stereoAmbisonic mike is let down by an overall "grayness" and lack of midrange detail, coupled with a slightly hard lower treble. Nevertheless, it's excellent at capturing a true stereo image with width and depth. 100m of cable adds $140 to price. (NR)

Neumann U-87
A perennial mike favorite among recording engineers. Wide, flat response gives it a similar sound to the 414, but with more "reach" in live, stereo miking applications. Used extensively on vocals. (NR)

Panasonic Pro 255 portable R-DAT recorder
Very good sound, with the same MASH encoders as the Panasonic 3500. Less flexible, hence lower rating, and lacks digital inputs. Amazingly tiny for what it does —far and away the best-sounding recorder small enough to carry in a coat pocket. Built-in mike preamp, while not the ultimate, is good enough for serious use. (NR)

Tandberg TD20A SE Open-Reel Tape Recorder
☆
The best buy in an open-reel deck, this now-discontinued model offered professional-caliber performance at a relatively modest ($1695) price. Better sound than many professional decks, but ergonomics less good than the still-current Revox B77 III. (Vol.7 No.7)

Telefunken 251t
Classic tube mike with a sweet, warm sound. No longer made, but available in the used market at many times its original price. Smoother HF than the 414 or U-87. (NR)

C

AKG C451EB/CK1: $495
AKG C460B/ULS/CK61: $550
Two small-diaphragm condenser mikes with removable cardioid capsules (omnidirectional, hypercardioid, vocal, and shotgun capsules are also available). Sound is very detailed, but the C451/CK1's tonal balance leans toward the thin and bright, and it has significant off-axis peakiness, making it a less-than-optimal choice for realistic two-mike stereo. Good on drums, however. Omnidirectional CK2 capsule is somewhat colored, but a 20Hz resonance provides an attractive emphasis for pedal fundamentals. Same diaphragm as CK1 used in C44 stereo mike, which has similarly bright balance. Newer C460/CK61 said to be much improved. (NR)

Crown SASS-P microphone system: $899
This is a stereo pair of omni PZM microphones in a head-sized foam block that produces ORTF-like natural stereo imaging. Extended bass response, unlike most directional mikes. Weighs only 1 lb, making it very easy to hang from cables or to mount on a rail stand. "One SASS-P unit, one stand, and a Panasonic Pro 255 DAT make a complete but amazingly portable recording system with very satisfying performance," reports PWM. (NR)

Fostex M22RS/P S-MS microphone: $1095 ☆
Integrated ribbon M-S stereo microphone. While not quite as open at the top as the best capacitor mikes, and
possessing a lightweight bass, the M22RPS captures the original soundfield extremely accurately. Stripped-down version, the M20R, costs $700. (Vol.11 No.3)

JVC TDV711BK cassette deck: $620
AG reports that this three-head deck marries an excellent transport to fundamentally excellent sound quality, particularly when Dolby noise reduction is switched out of circuit. (Vol.11 No.11, “Pure Gold”)

Revox B-215-S cassette deck: $2900
Automatic bias adjustment, superb transport. According to JGH, “A superb cassette recorder, for the person who wants and is willing to pay for the best quality cassettes to have to offer.” AHC emphatically disagrees. The latest Nakamichi, with their automatic play-azimuth adjust, probably get a slight bit more off pre-recorded tapes. Less expensive B-215 ($2600) cosmetically different but otherwise identical in performance. (Vol.8 No.7)

Sony TC-D5M: $750
This decade-old portable will handle metal-particle tape but only offers Dolby-B noise reduction. It is probably still the best location cassette recorder available short of an R-DAT. (NR)

D

Sony WM-D6C Pro Walkman cassette system: $400
A pocketable stereo recording system of surprising quality and versatility. AG feels that to spend more on a cassette deck would be a waste of money. Less expensive WM-D4 ($270) half the size but keeps most of the quality. Higher wow & flutter, however. (Vol.7 No.6, Vol.10 No.6)

TEAC V-970X cassette deck: $800
Excellent dual-cassette, three-head deck with Dolby-HX headroom extension and comprehensive noise reduction (dbx, Dolby-B and -C). Somewhat grainy highs keep it from Class C. More expensive R-919X ($890) features bidirectional record and playback but has less good speed stability, noted George Graves. (Vol.11 No.6)

Any cheap Dolby-C cassette deck
Buy the cheapest with the longest manufacturer’s warranty; don’t expect to get high-end sound quality from it; use it to make tapes for your car or Walkman until it breaks; throw it away; buy another one, advises The Cheapskate in Vol.10 No.9.

K

Manley Analogue-to-Digital Converter, Pygmy ADI A/D converter.

Deletions
NAD 6300 cassette deck discontinued.

Accessories

Adcom ACE-515 AC Enhancer: $180
Effective AC power-line filter with RF and spike suppression, five accessory outlets (300W capability), and two heavy-duty outlets (1500W)! Does not seem to limit current demands of power amplifiers. (Vol.11 No.4)

Archidi Dee TNX turntable stand: $200
Italian open-frame turntable stand that gives a lighter tonal balance with a better-defined bass, when used to support the Linn Sondek LP12, than the Sound Organisation table. (Vol.13 No.9)

Arcidi Quad ESL-63 stands: $195/pair
Latest and greatest method of getting the Quads to perform as God and Peter Walker intended. Clamps the ESL-63 in a rigid embrace, also raising it an optimal 16" off the ground. (Vol.10 No.1)

Arcidi Lead Balloon Turntable Stand: $325
The opposite approach to that of the Sound Organisation table, with lead used to provide mass sufficient that nothing short of an earthquake will disturb the tranquility of the groovestylus interface. Enthusiastically recommended by DO. A matching light is available for $30. (NR)

Arcidi Superstructure: from $150
Versatile, well-made, metal equipment rack system. Not recommended for turntable use, however, due to insufficient torsional rigidity compared with Target or Sound Organisation equivalents. (NR)

ASC Tube Traps
Relatively inexpensive—prices range from $166 to $436 depending on size and style—but remarkably effective room-acoustics treatment. Tube Traps soak up low-to-high bass standing-wave resonances like sponges. (Vol.9 No.3)

Audio Control Industrial SA-3050A Analyzer: $995
Portable (battery-powered) and inexpensive, 1/8-octave analyzer with pink-noise source and accurate calibrated microphone. Parallel port can be used with any Centronics-compatible printer to print out real-time response. (Vol.11 No.6, Vol.12 No.3)

Audio Express NoiseFrapper: $299
Available by mail order from Audio Express, this six-outlet line conditioner was felt by R1 to offer an improvement over his raw AC outlets. Premium version, the NoiseFrapper Plus, costs $379. (NR)

AudioPrism CD Stoplight: $14.95
Green acrylic paint for coating the edges of CDs. The green color—it absorbs the laser’s infrared wavelength—is presumably significant, but at present we have no idea why this tweak should so improve the sound of CDs. That it does so, however, seems to be beyond doubt. Martin Colloms reports that a water-based poster pen, the Uniposca from Mitsubishi, has a very similar effect. Martin also notes that the CD should first be destaticized before the green paint is applied. (NR, but see DO’s and TJN’s WCES reports in Vol.13 No.3 and Sam Tellig’s and Robert Harley’s feature article on CD tweaks in Vol.13 No.5)

AudioQuest DM-1000 cartridge demagnetizer: $80
(NR, but the similar and more expensive Sumiko FluxBuster was reviewed in Vol.9 No.4, Vol.10 No.5, Vol.12 No.4)

AudioQuest Sorbothane Feet
The best means of isolating components from vibration. A set of four big feet costs $50, four CD feet costs $30. (NR)

CALSOD loudspeaker system optimization program: $65 (5½” disk), $67.50 (3½” disk)
DO’s favorite loudspeaker crossover optimization program. User enters measured drive-unit response, impedance and sensitivity and target response; program designs appropriate crossover filter networks. (Vol.13 No.11)
CD Saver ☆
Eliminates scratches from CDs and LaserVision discs, rendering the unplayable playable. (Vol.10 No.8, Vol.11 No.8, see also Vol.13 No.9, p.11)

Cramolin Contact Cleaner ☆
The right stuff for cleaning up dirty and/or oxidized plugs and contacts. (Vol.10 No.6)

DB Systems DBP-10 Protractor: $30 ☆
Fidckly but accurate guide for setting cartridge tangency: JA's and JGH's preferred alignment protractor. (NR)

Inouye Synergistic Power Line Conditioner: $525
Expensive, dual-channel AC line conditioner, with sophisticated filtering and spike protection and four AC outlets, cleans up the sound from CD players, reported JA, but had variable effects with preamps and amplifiers. (Vol.12 No.3)

LEAP loudspeaker system optimization program: $199
Effective loudspeaker low-frequency alignment program. (Vol.13 No.11)

The Listening Room: $34.95
Inexpensive but excellent computer program for PCs from Sitting Duck Software, P.O. Box 130, Veneta, OR 97487, that allows an audiophile to move simulated loudspeakers and simulated listening seat around a simulation of his or her room (in three dimensions) in order to find the position giving optimum performance below 200Hz or so. The suggestions made by TJN in his review have been incorporated in the latest version. (Vol.13 No.12)

Meitner Translinks: $325/pair
Signal transformers with a 1:1 ratio, these isolate the preamp ground from that of the power amplifier. In the context of the Meitner preamp/power amp combination, these seem to improve low-level dynamic performance. Must be driven by a source impedance of 100 ohms or less. (Vol.11 No.6)

Merrill Stable Table turntable stand: $1047
Exotic wood finishes add $100 to price; granite top adds $60; an appropriate amount of lead shot will cost around $100. Exceptionally stable support but too massive for sprung floors unless some means—jacks, for example—is found to support the floorboards. (Vol.12 No.10)

Mobile Fidelity Geo-Tape: $15 ☆
A valuable test and shopping aid for cassette decks. (Vol.8 No.5)

Monster Cable Footers
Effective Nacvic isolation feet.

Music And Sound POWER master AC cord: $125/6' cord, $142/8' cord, $170/10' cord
Replacement AC power cord that AB found to make a worthwhile difference to the sound of power amplifiers. (NR)

Nestorovic Labs Moving-Coll Cartridge Network: $300
Passive network intended to optimally load an MC cartridge. An "Audiophile" version is available for an extra $250. (Vol.13 No.9)

Phantom Acoustics Shadow active LF acoustic control (RH): $2500/pair
The first instance of active noise-control techniques being used to modify listening-room acoustics. Robert Harley reports that these tall, corner-placement cylinders do a fair job of minimizing low-frequency standing-wave problems. (Vol.12 No.12)

RPG Diffusers & Absorbers
The first effective method of adding diffusive surfaces to a listening room, these remarkably effective panels join Sonex foam and Tube Traps in helping to tame the so-far untamable—room acoustics. RPG Diffuser Systems Inc. offers a complete room-treatment system, called the "RPG Home Concert Hall," available in almost any finish and size to enable audiophiles to get optimum performance from all types of loudspeakers. (Vol.11 No.4)

Signet SK-302 Contact Cleaner Kit: $25 ☆
Contains abrasive plastic tools for effective inner cleaning of phono plugs and sockets in combination with Cramolin. (Care must be taken to not twist the cleaner and break the RCA socket's internal center connection.) The RCA phono plug and socket cleaners alone cost $10. (Vol.10 No.6)

SOTA & Goldmund record clamps ☆
Though these clamps have somewhat different sounds, they are the best record-clamping devices on the market. They can both improve top- and bottom-end extension and reduce resonances on any 'table, including those employing vacuum clamping systems. Well worth their cost in a high-resolution system. The SOTA Series II Reflex clamp ($135) gives a somewhat richer, warmer sound and is more effective against upper-midrange and lower-treble resonances. The $150 Goldmund shapes up a flabby lower midrange and controls the more serious lower-treble/upper-midrange problems.

Sound Organisation Turntable Stand: $235
The mandatory ancilliary to the Linn turntable, though, as with the more expensive RATA stand, its low height may prove bothersome in a listening room that has to be shared with cats and children. (A taller version is now available.) (NR)

StylLast Stylus Treatment ☆
StylLast won't make a difference every time you put it on, but it will help provide smoother high-end sound, and is claimed to extend stylus and cantilever life. (NR)

Sumiko Fluxbuster: $180 ☆
Excellent cartridge demagnetiser, though more expensive than new AudioQuest model. Recent availability at a discounted price suggests that it is being phased out. Be sure to remove the stylus assembly when using any of these devices to demagnetize a moving-magnet cartridge. (Vol.9 No.4, Vol.10 No.5, Vol.12 No.4)

Sumiko Navcom Silencers: $70/four
Robert Deutsch finds these damping feet to provide superior isolation to Mission's Isoplats. (NR)

Sumiko Tweek Contact Cleaner: $19 ☆
This contact enhancer for use on plugs and terminals actually does improve the cleanliness and resolution of the sound of an already excellent system. Keeps freshly made contacts fresh. (Vol.10 No.6)

Sumiko Reference Band: $17.95/dozen
Molded, non-adhesive band that fits around the periphery of a CD to produce much the same aural benefit as CD Stopleight. (NR, but see the Audio Anarchist's column in Vol.13 No.9)
Sound Mathematics is the use of superior quality components, innovative circuit design, and hand built craftsmanship resulting in sonic excellence. Hafler products employ high gain, wide bandwidth J-FETs with vacuum tube characteristics. The power supplies utilize low stray magnetic field transformers and high-energy storage capacitors for massive power reserves. In the Hafler tradition our amplifiers use lateral MOSFET output devices to deliver the midrange clarity and musicality of tubes with the improved bandwidth and speed of transistors.

Pure. Refined. Natural...The Hafler SE100 J-FET Preamplifier, SE130 AM/FM Tuner, SE150 CD Player, SE120 and SE240 MOSFET Amplifiers represent the new line of Hafler products. We await your listening evaluation of Hafler’s SE series components. Sonic Excellence at an affordable price.
**Target equipment racks: $150–$300**

Finished in basic black, these useful but inexpensive racks feature rectangular steel-tube construction, with price depending on height and number of shelves. Spiked feet supplied, with top shelf resting on upturned, adjustable spikes to optimize it for turntable use. Target’s wall-mounting turntable shelf possibly the best way of siting your turntable out of harm’s way. (NR)

**Tiptoes**

The Mod Squad’s greatest invention. The least expensive way of improving the bass and midrange definition of virtually any loudspeaker.

**XOPT loudspeaker crossover optimization program: $199**

Similar in concept to the CALSOD program. XOPT allows the user to rapidly optimize the design of crossover filter networks. (Vol.13 No.11)

**Watkins Echo-Muffs: $149/pair**

Effective means of reducing amplitude above 200Hz of early reflections of loudspeaker from nearby surfaces, thus improving imaging. Whether or not the aesthetics will be domestically acceptable will be up to personal taste. (Factory-direct only.) (Vol.10 No.4)

**WBT RCA plugs**

The best, although original steel locking collett, now replaced by brass, gave rise to neurosis. (NR, but see “Industry Update,” Vol.12 No.9)

**Good Speaker Stands**

There are too many possibilities, but, briefly, a good stand will have the following characteristics: good rigidity; spikes on which to rest the speaker, or some secure clamping mechanism; the availability of spikes at the base for use on wooden floors; if the stand is steel, provision to keep speaker cables away from the stand, to avoid magnetic interaction; and the correct height, when combined with your particular speakers (correct height can be anything from what you like best to the manufacturer’s design height for best drive-unit integration). Though Stereophile has neglected to review speaker stands, it doesn’t mean we think them unimportant—for speakers that need stands, every dollar spent on good stands is worth $5 when it comes to sound quality. Brands we have found to offer excellent performance are Chicago Speaker Stand, Arctici Rigid Riser, Celestion SLiS, Target, Heybrook, and Linn.

**K**

Triplicate line conditioners, Kontakt.

---

**Headphones & headphone accessories**

**A**

**Grado HP-1: $595**

(See Gary Galo’s review in the next issue.)

**Stax SR-Lambda Signature: $2000**

A diaphragm one-third thinner (1µm) than the Lambda Pro, and a drive amplifier (SRM-TI) with a tube output stage distinguish what BS termed “the best headphones around” in his review. As good as the Pros are, the Signatures better them in terms of air and space around instruments, having a more forward midrange and less, if you can believe it, of a “mechanical” quality. (Vol.11 No.8)

**Stax Lambda Pro 3: $1200**

The latest version of the flagship Stax headphones, supplied with a dedicated class-A solid-state amplifier, the SRM-1 Mk.II, the Pro 3 features a totally transparent sound with, according to BS, “oodles of detail.” Unlike most ‘phones, the listener gets a true idea of the surrounding ambience on a recording. Balance is laid-back and bass is a bit fat, not quite blending with the rest of the range, but distortion levels are astonishingly low, and the Pros have a remarkable dynamic-range capability. As delivered, the Lambda suffers from upper-midrange suckout, which becomes less bothersome after some hours’ use. Very comfortable. (Vol.13 No.5, Vol.10 No.9; see also headphone reviews in Vol.12 No.4 and Vol.14 No.5)

**B**

**AKG K-1000 headphones: $895**

Superb resolution of detail and a sense of effortlessness to the sound of these expensive dynamic headphones, which have hinged earpieces to allow the soundwaves to strike the ear pinnae at a natural angle. BS, however, was bothered by an excessive nasal coloration. JA offers another opinion in next month’s “Follow-Up” section. (Vol.14 Nos.3 & 5)

**Stax Gamma Professional headphones: $700**

While not quite approaching the Lambda Pro in terms of image focus and transparency, the Gamma still offers a superbly clean presentation with airy, delicate high frequencies and excellent low-frequency weight. (Vol.14 No.3)

**Stax Gamma headphones: $400**

A slightly thicker diaphragm than the Gamma Pro leads to a darker, less transparent sound overall. (Vol.14 No.3)

**Stax SR-5 NB: $350**

More colored in the midband and above than the Stax SR-34 or Signet models, and balanced a little on the bright side, the ‘5 scores when it comes to reproduction of low frequencies and overall transparency. (Vol.10 No.9)

**Stax SR-34 Professional headphones: $200**

A new 4µm diaphragm gives these inexpensive electrostatic headphones a liquidly transparent midrange without any trace of grain or dryness, offset by a sometimes slightly hard edge to their sound that BS felt was due to the SRD-4 step-up transformer. (Vol.14 No.3)

**Stax ED-1 diffuse-field headphone equalizer: $800**

Equalizes headphone sound to compensate for the fact that headphones fire the sound straight into the listener’s ears, whereas in real life the sound has to negotiate the audio obstacle course represented by the listener’s head and outer ear. “The entire audible spectrum sounds more coherent and seamless,” quoth BS. (Vol.12 No.4, but see also Gary Galo’s headphone review in Vol.14 No.5.)

**C**

**Beyerdynamic DT990: $235**

One of the two best dynamic headphones on the market. (The other is the Sennheiser HD540.) A less detailed sound than the electrostatic models and a slightly bass-weak, midrange-forward balance preclude a Class B rating. For $55 more, the DT990/Pro features a more neutral balance and more extended low frequencies,

Stereophile, April 1991
The more things change the more they stay the same

META RESEARCH
by Goldmund

In 1979, Goldmund razed standards for analogue record playback accuracy with the Studio Turntable and T3 Tonearm...

...In 1990, Goldmund turntable systems remain unsurpassed, and Meta Research by Goldmund raises the standard for CD playback accuracy with the Laser 1 Transport and Convert 1 D/A Converter.

US Distribution
INTERNATIONAL AUDIO TECHNOLOGIES Ltd
13897-J Willard Road Chantilly VA 22021 (703) 378-1515
raising the performance to borderline Class B. (Vol.10 No.9, Vol.14 No.3 Pro version)

**Senheiser HD540 Reference:** $199 ★

One of the two best dynamic headphones on the market. Slightly less neutral than the Beyer DT990, being more laid-back with a "wispy," even bright, high end. The new HD560 has a more musical balance, lacking the $540's top-octave brightness. (Vol.10 No.9)

**D**

**Beyerdynamic DT320 Mk.II headphones:** $93

Transparent sound, with reasonable LF extension. Some listeners may find its balance too bright, however. (Vol.12 No.4)

**Sony MDR-282 Turbo ★**

Best of the in-the-ear cans, with LC-OFI wiring, excellent bass response, and a relatively uncolored treble, despite a somewhat overbright balance. Latest E484 version ($80) said to be slightly better. (NR, but see headphone review in Vol.12 No.4.)

**Sony MDR-C6D: $120 ★**

A little expensive for the sound quality offered—too much midbass, sound somewhat unshaded—but recommended on the grounds that BS feels these to be the ideal cans for location recording, due to their high sensitivity and good isolation. (Vol.10 No.9)

**Sony MDR-S101 Mk.II:** $30 ★

A light balance with a lively, open sound, but free from coloration and distortion. A bargain! Mk.II version features gold-plated jacks. (Vol.10 No.9)

**K**

Senheiser HD560.

### Record-Care Products

**A**

**LAST record-preservation treatment ★**

This actually works. It significantly improves the sound of even new records and is claimed to make them last longer. (Vol.5 No.3)

**Nitty Gritty Mini Pro 2 record cleaner: $725 ★**

This semiautomatic wet cleaner cleans both disc sides at once. Slightly less rugged than the VPI, but both do an excellent job and the Nitty Gritty Pro II is faster. Significantly better design than earlier Nitty Gritties. You may be surprised that the main sonic effect of cleaning LPs is not primarily a reduction in surface noise but a cleaning up of midrange sound. (Vol.8 No.1)

**Nitty Gritty 2.5FI record cleaner: $519 ★**

Instead of a vacuuming tonearm as on the professional Keith Monks machine, the NG cleaner uses a vacuum slot. Cleaning is efficient and as good as Nitty Gritty's Pro, at a significantly lower price, though it takes twice as long, cleaning each side of an LP in turn. (Vol.7 No.5, Vol.8 No.1)

**Nitty Gritty Hybrid 2 Record/CD cleaning machine:** $629

Basically a Nitty Gritty 2.5FI with an adapter that allows CDs to be buffed clean in a non-tangential manner. (Vol.12 No.3)

**Rozoli Gruv-Glide ★**

Record destaticizing agent that also leads to better sound. Apparently doesn't leave a film or grunde-up the stylus. (Vol.9 No.8)

**VPI HW-17 record cleaner: $740 ★**

Clearly an industrial-quality machine of reassuring quality, the VPI does one side at a time, semiautomatically, and is slower than the Nitty Gritty. "A highly functional and convenient luxury." Latest version has a heavier-duty vacuum system. (Vol.8 No.1)

**B**

**VPI HW-16.5 record cleaner:** $450 ★

Manually operated version of HW-17 (above), noisier motor; less money. Adjusts automatically to thickness of record. (Vol.5 Nos.7 & 9, review was of earlier but substantially identical HW-16.)

**D**

**Decca, Hunt-EDA, Goldring, or Statibrush record brush ★**

Properly used (held with the bristles at a low angle against the approaching grooves and slowly slid off the record), these are the most effective dry record-cleaners available. (JGH strongly disagrees, feeling that they leave the dust on the record.) No substitute for an occasional wet wash. (Vol.10 No.8)

**DiscWasher record brush ★**

If you don't have a cleaning machine, the DW system will do an adequate job on relatively clean records, but won't get out the deep grunge. If you begin to accumulate lots of gunk on your stylus after cleaning your record with an older DW brush, the bristles are worn out; send it back for resurfacing or buy a new one. A high-torque turntable is required. (NR)

### Loudspeaker Cables & Interconnects

**Editor's Note:** Previous "Recommended Components" listings for speaker cables and interconnects were mainly derived from Dick Olsher's surveys in Vol.10 No.2 (March 1987) and Vol.11 No.7 (July 1988). As many, perhaps nearly all, of the models recommended have changed to a greater or lesser degree since those reviews appeared, we decided from this issue onward to list those cables that members of the magazine's review team either have chosen to use on a long-term basis or have found to offer good value for money. They are therefore implicitly recommended. Where a cable has been found to have specific matching requirements or an identifiable sonic signature, these are noted in the text.

Bear in mind that, to a far greater degree than with any other component, the sound of cables depends on the system in which they are used. Before parting with possibly large sums of money for a cable, it is essential to audition it in your own system. "Drinking by the label" is always a bad thing to do in hi-fi, but it is both unforgivable and unwise when it comes to speaker-cable purchases. In addition, in JAS's opinion, the virtues offered by the most expensive cable may well only be audible in the context of a topflight, very expensive system. What is the "best" in absolute terms is not, therefore, necessarily the best for your system.

Arnold Baldwin points out that mixing `n matching interconnects and speaker cables is a well-worn route to sonic disappointment. Always use interconnects and speaker cables from the same manufacturers, is his advice. Peter Mitchell strongly makes the point that...
less is more when it comes to speaker cable, recommending that a mono power amplifier be placed as close as possible to the speaker it drives. This does pass the buck, however, to the preamplifier, which must then be capable of driving long lengths of interconnect. Peter uses Canare Star Quad microphone cable for interconnect.

Sam Tellig, the Audio Anarchist, and his associate Lars have been impressed by a recommendation for speaker cable from Dave Magnan, the maker of Magnan Series V interconnect: specially prepared Mogami Neglex 24/7, which retails for under $1.50/foot. (A double run is required, which brings the cost up to just under $3/foot.)

Sam writes: "Cut off about 6" of the black outer sheath, exposing the outer wires, the shield. Peel back this wire—beautiful oxygen-free copper—and twist it together. Now cut off about 3" of the inner sheath, exposing the inner wire. Wrap some electrical tape around the bottom 3" of the outer shield. It's important to leave about 3" of the center sheath intact to help prevent the wire from shorting out when you do what I'm going to describe next."

"Do what I just said with two runs of the Mogami. Now, carefully combine the inner core of one run with the outer shield of another, making sure that the words 'Mogami Neglex' run the same way on both outer sheaths, because this stuff is highly directional. The word 'Neglex' should face the power amp; in other words, the words on the sheath should run toward the speakers. Crimp on some spade lugs and tape over any exposed wire.

"The problem with the Mogami, aside from the pain in the butt of preparing it, is that the bottom end is not so good. So here's a cable you can perhaps use if your system has too much bass: a tone control, if you will."

A note is in order on the Lindsay-Geyer 4-40 interconnect that so impressed Dick Olsher in Vol.14 No.2. We are uncertain of the exact extent to which this high magnetic, idiosyncratic-sounding cable is currently available in the US. An inclusion in this listing would be inappropriate, therefore.

### Interconnects

**AudioQuest Lapis Hyperlitz:** $400 1m/pair terminated with RCA plugs

Tonally, the latest version of Lapis (which uses RCA plugs made from FPC, with the gold-plating applied directly to the copper) seems to fall midway between the "mellow" cables—MIT, Monster—and those that are rather upfront in the treble, such as Madrigal HPC and Straight Wire Maestro. JA feels, however, that its outstanding virtue is a lack of grain that allows correct instrumental textures to flow freely, and a deep, well-defined soundstage to develop. Preliminary auditioning of current-production Lapis (as of 2/91), which uses Teflon insulation and long-grain, solid-silver conductor, suggests that this is the best AudioQuest interconnect yet, apart from their ultra-expensive Diamond.

**AudioQuest Diamond:** $600 1m/pair.

Superb resolution of detail coupled with a musically natural midrange and excellent low-frequency weight.

**Cardas Hexlink-5:** $500 1m/pair terminated with RCA plugs or XLRs

Essentially a very neutral sound, without any tendency to hyper-detail or etching. If it deviates at all, it leans slightly to the rich (rather than the lean) side of neutral. Lucid and open, especially in the midrange, with believable body and texture to voices and instruments. Physically bulky, and fairly flexible, its bulk and large connectors may cause problems with closely spaced and/or weak input jacks.

**Esoteric Audio Enamel Litz interconnect:** $65 (Tech 2), $35 (Superlink) 3' pair terminated with RCA plugs

Don Scott recommends this interconnect—"after it has been seasoned for about a month"—for "taking the nasties out of often gritty FM." He does mention, however, that it is not the optimum choice for overall transparency.

**Expressive Technologies IC-1:** $415 1m pair terminated with RCA plugs

Robert Harley is currently using samples of this interconnect, with positive results, particularly with the same company's SU-1 step-up transformer. "Despite the fact that these cables are bigger around than a garden hose, ridiculously bulky, unwieldy, and stiff, the musical rewards they offer are well worth the trouble," he says.

**Jerrold RG-6**

Don Scott fits this inexpensive generic cable with Radio Shack plastic-shell RCA plugs, modified to fit the wire diameter, and feels that the result is remarkably uncolored.

**Kimber KCAG:** $350 1m pair terminated with RCA plugs

Unshielded but astonishingly transparent.

**Kimber KCl:** $68 1m pair terminated with RCA plugs

**Krell Cogelco interconnect:** $610 1m pair terminated with RCA plugs

$530 1m balanced pair terminated with XLR plugs

Arnis Balgalvis recommends this Krell-distributed interconnect for use with Krell electronics. In combination with Krell's The Path speaker cable, he finds that the sound is "very transparent and balanced, with detail galore."

**Magnapi Type VI:** $595 4' pair terminated with RCA plugs

Robert Harley's auditioning suggests that this one is a winner.

**Monster Cable Sigma:** $750 1m pair terminated with RCA plugs

Used by both Larry Greenhill and Arnis Balgalvis, the latter characterizes the Sigma interconnect, when used with Classe and Rowland electronics, as giving low frequencies "proper weight and extension, the overall sound being very open and detailed." The Sigma also "throw a soundstage of vast proportion, the results being alive and musically involving." With Krell amplification, however, Arnis notes that the "sound gets too dark" with Monster Sigma, and "loses sparkle and glow."

**Siltech 4-24:** $360/first meter w/RCAs, $280/additional meter or unterminated

Astounding transparency and imaging, feels JA. Distributed by SOTA.
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Bryston 4B amplifier.
Power amplifiers range from 50 to 800 watts.

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- Fully complementary, fully discrete circuitry
- TL circuit allows MOSFET output with low feedback
- All-aluminum chassis with massive heatsinking

Sumo equipment is, as always, handcrafted entirely in the United States.
Straight Wire Maestro: $272 1m pair terminated with RCA plugs or balanced with Neutrik gold XLRs
Less laid-back than AudioQuest Lapis, with superb presentation of detail. May be too bright in some systems.

TARA Labs Space & Time Pandora S: $295 1m pair terminated with RCA plugs
van den Hul D-102 Mk.II: $125 1m pair terminated with RCA plugs
Excellent treble but less good focus.

**Loudspeaker Cables**

Acrotec 6N-1030: $19/m
Distributed by Edge Marketing, this “six-nines” pure copper cable is recommended by DO as good value for money:

AudioQuest F14: 79¢/ft
Inexpensive flat-twin solid-core cable that Robert Harley enthusiastically recommends as excellent value for money:

AudioQuest Clear Hyperlitz: $1095 10' pair terminated
Very expensive but solid bass reproduction with a clear (but), open midband and treble. Can sound rather lightweight in some systems, but almost defines the term “neutrality,” feels JA. Uses “6N” pure copper bundles in a complex lay that brings every conductor to the surface to the same extent.

Cardas Hexlink-5: $800 10’ pair terminated
TJN’s current fave rave.

**Kimber**

Kimber 4AG: $100/ft
A very expensive hyper-pure silver cable that resides in Larry Archibald’s and Dick Olsher’s systems and can offer a glimpse of audio heaven. Significant system sensitivity, points out DO, so be sure to check for compatibility before you buy.

Kimber Kable 8TC: $7.80/ft
A double run of 8TC greatly improves the sound, feels DO. Excellent bass.

Kimber 4TC: $4.40/ft

Kimber 4PR: $1/ft

**Kimber**

Least expensive cable from Kimber was found to have good bass, but a “zippy” treble and poor soundstage; according to DO. With inexpensive amplifiers, however, its good RF rejection compared with zipcord or spaced-pair types will often result in a better sound.

Krell The Path: $680 10’ pair terminated
Works optimally with Krell amplification, the result being, according to AB, “more heft and a gratifying glow around the performers.”

Monster Cable Sigma: $1000 12’ pair terminated
See AB’s remarks about Monster’s Sigma interconnect.

Naim NACAS: $9.45/m
Inexpensive cable that the Audio Anarchist found to work well with the Spendor S-100 loudspeaker. Worth investigating as a good-value cable, thinks JA.

Radio Shack 18-gauge solid-core hookup wire: 11¢/ft

Ridiculously cheap way of connecting speakers, yet Sam Tellig reports that this cable is OK sonically. You have to choose for yourself whether to space or twist a pair for best sound (or even whether to double up the runs for less series impedance).

**Straight Wire Maestro: $200 2’ pair with gold spade lugs, gold pins, or wire pins**
The cable that LA found to work best between Krell KSA-250 and Thiel CS5s.

**TARA Labs Space & Time Phase II TFA Return: $195 10’ pair terminated**
Guy Lemcoé’s preferred speaker cable.

**TARA Labs Space & Time Phase II cable:** $6.95/ft

Featuring twisted solid-core construction and “Australian copper,” this inexpensive cable is Dick Olsher’s workhorse speaker cable.

**SYM0 LS55X cable:** $28/ft with gold-plated spade connectors
Distributed by Apogee Acoustics, this relatively inexpensive cable works well with, you guessed it, Apogees. TJN’s reference for use with the Stages.

**Digital data interconnects**

**Editor’s Note:** Extensive auditioning by Robert Harley suggests that all the coaxial data cables listed below are better than conventional, Toslink-fitted, plastic fiber-optic cables, which in general don’t give as tight a bass or as focused a soundstage. “You don’t get that essential sharpness of image outlines, the sound becomes more homogenized,” quoth he.

AudioQuest Video Z: $70/1m single cable with welded RCA plugs
The tonal balance is tilted upward in the treble, while midrange textures are less velvety-smooth than some of the other data cables, with a softened soundstage focus, felt RH. DO found this relatively inexpensive cable to work well with the Bitwise DA.

**Aural Symphonics Digital Standard:** $195/1m, $292.50/1.5m single cable
Neutrik RCA connectors with a sliding shield make ground before signal connection. Vivid and forward rendering, with sharp soundstage focus. Somewhat restricted image depth overall.

**The Mod Squad Wonderlink:** $195/0.5m, $225/1m single cable
Exceptionally transparent presentation, thought JA, with excellent soundstage depth and natural midrange. Clunky gold-plated plugs are actually old-fashioned RF connectors with an RCA adaptor.

**Music And Sound master LP (Gray):** $400/3’ pair with gold-plated Teflon dielectric RCA jacks

Less smooth treble than Space & Time cable but comparable soundstaging ability. Very transparent and detailed, with excellent dynamics. RD finds it to work well between his Philips player and Aragon D2A.

**TARA Labs Space & Time Digital Reference:** $195/1m terminated

Laid-back, relaxed presentation with excellent resolution of soundstage depth. Smooth treble adds to pleasing analog-like warmth. Silver-plated RCA plugs slightly undersized, making connection difficult.

Stereophile, April 1991
PS AUDIO SUPERLINK D/A CONVERTER

Robert Harley

PS Audio SuperLink D/A processor

Specifications: 18-bit Digital/Analog Converter with 8x-oversampling digital filter. Frequency response: 20Hz-20kHz ±0.5dB. THD: <0.01% (no level specified). Inputs: one coaxial on RCA jack, one optical on TOSLINK jack. Outputs: one stereo analog audio pair on RCA jacks. Dimensions: 17" W by 2½" H by 11½" D. Shipping weight: 17 lbs. Price: $1195. Approximate number of dealers: 100. Manufacturer: PS Audio, P.O. Box 1119, Grover City, CA 93483. Tel: (805) 481-4844. Fax: (805) 481-6892.

"I Had Space Alien's Baby!"
"Statue of Elvis Found on Mars!"
"Moonlighting Medical Doctor Designs Breakthrough Digital to Analog Converter!"

Two of the above headlines (I'll let you guess which two) have actually appeared on tabloid covers, while the third, much as it appears to belong with others, never really blared forth at lines of innocents pushing shopping carts. The third headline also has a distinction that can't be claimed by the others: it has at least the possibility of being true.

The medical doctor is named Bob Odell, and the digital/analog converter he co-designed is the PS Audio SuperLink. By day, Doctor Bob practices internal medicine. But once he takes off his green gown and replaces it with a white lab coat, Bob the MD turns into Bob the audio designer. When not diagnosing unpronounceable ailments, he pours over schematics, listens to different capacitors, and wields a mean soldering iron.

Bob and his collaborator, PS Audio's Paul McGowan, set out to build an affordable digital processor that was significantly better than those near its price range. The way they went about creating the SuperLink is a fascinating story. Once a basic circuit was conceived and put together, the real work began. For the next two years, Bob and Paul tried different components, different circuit topologies, and different layouts in the SuperLink, all by trial and error. Dozens of output op-amps were listened to before deciding on one. Power-supply configurations and components were exhaustively auditioned. Even the tiny power-supply decoupling caps on the digital chips' rails were evaluated. Rather than design with data books and a pencil, Bob's and Paul's tools were a large parts assortment, soldering iron, high-resolution playback system, and, most important, two good pairs of ears. By this process, the design gradually evolved. Parts or circuits that sounded good were kept, while those that didn't cut the musical mustard were abandoned. To reduce any bias about their own designs, Bob and Paul often evaluated each other's work independently.

Such a process provides the designer an invaluable education. Besides teaching him what components or topologies sound better than others, listening to so many variations can also reveal a few surprises. Such was the case with the SuperLink, whose somewhat unorthodox design reflects the unexpected discoveries made by critical listening.

Now, does "Moonlighting Medical Doctor Designs Breakthrough Digital to Analog Con-
verted!” have as much truth to it as “Invisible Aliens Live Among Us!,” or is the PS Audio SuperLink really a breakthrough product?

C’mon, you should know that the secret is never revealed on page one.

FULL STORY INSIDE!

Technical description

The PS Audio SuperLink is housed in a 2 1/2”-high, 17”-wide black chassis. The 1/8”-thick machined aluminum front panel holds four touch-sensitive “buttons” and four green LEDs. The gold-plated switches on the unit’s left-hand side operate by sensing the 60Hz hum transmitted when touched by a person. These switches select between coaxial and optical inputs, absolute phase inversion, and power on/off. Although the “on” button appears to power down the SuperLink (the front panel lights go off), it actually mutes the output and leaves the circuitry off so the listener doesn’t have to wait for the unit to warm up before sounding its best.

On the left-hand side, four LEDs indicate if the SuperLink has locked to the incoming data, if the pre-emphasis circuit is engaged, and if the CD has its copy-protect flag on. The last LED is turned on by the “On” button, indicating that the unit is active.

The copy-prohibit flag indicator is an unusual feature that I’ve never seen on a CD player or outboard converter. The flag was originally designed to prevent digital-to-digital copying of CDs, but no digital recording device I know of looks for this flag to inhibit the record function. The flag is set when the CD master tape is “PQ encoded” before the CD master glass is recorded.1

The rear panel holds a pair of Tiffany RCA output jacks, a Tiffany RCA digital input, a TOS-LINK optical input, and a captive power cord.

I was quite impressed by the SuperLink’s build quality. The unit has a solid, well-made look and feel. In addition, there were several nice touches to the fit and finish. The metal cover’s screw holes had been countersunk so that the screws didn’t protrude, for example, and the chassis had pem-nuts welded to the underside to accept the screws, a much better method than just tapping holes in the sheet metal. I found the SuperLink’s appearance quite attractive.

The SuperLink’s circuitry, including power transformers, is carried on a single printed circuit board that covers the entire chassis bottom. I’ll start the technical description with the SuperLink’s most unusual design aspect, its extensive power supply.

The supply consumes about two-thirds of the large pcb’s real estate, and is far more elaborate than any I’ve seen in an under-$5000 digital processor. According to Bob Odell, the power-supply topology and components have a very large influence on the SuperLink’s sound, even more so than digital or analog signal-handling components.

Three independent transformers step down the AC line voltage before filtering and regulation. The first transformer is dedicated to the DA converter chip’s 5V analog supply. The second transformer forms part of the digital circuit supply, and the third is used exclusively in the output op-amp supply.

After the stepped-down AC voltage is converted to DC by a full-wave bridge rectifier, each transformer’s output is heavily filtered with many large electrolytic capacitors and, curiously, an expensive Solen polycarbonate cap. It’s unusual to find such expensive caps used for power-supply filtering (except in Conrad-Johnson products), but according to Bob Odell, this cap made a big improvement in the SuperLink’s sound. The Solen caps reportedly filter out high-frequency noise from the transformers’ secondary windings. The whole power supply features nine fully regulated stages (with three-pin regulators), as well as additional “regulation” performed by diode/resistor droppers. PS Audio claims in their brochure 22 “regulation stages,” a term used perhaps too loosely.

The amount of power-supply filtering is extraordinary. Looking inside the SuperLink, one is struck by just how much pcb area is consumed by the many filter caps. For example, the

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1 The copy prohibits flag is one of four control bits in the Q-channel subcode recorded on a CD. The other three indicate if the disc contains audio or computer (CD-ROM) data, if the audio is two- or four-channel (not used), and if the audio has been pre-emphasized. This pre-emphasis flag is what triggers the CD player or digital processor to engage its de-emphasis circuit.

The Q subcode also contains all the time and display data on the disc. When you see your CD player counting elapsed time, remaining time, track number, or tell it to find a certain track, it is reading the Q subcode.

For you techno-nerds, the CD has eight subcode channels, called P through W, each of which has a capacity of 7350 bits per second. Subcode channels R-W are used for graphics on some discs. The P-channel bits simply go high two seconds before a track begins. Early CD players used the P flag to locate track start points. Modern players, however, ignore the P subcode channel and read the more precise Q channel for track location.
digital supply alone has 8800µF (2200µF × 4) of filtering before the regulator, and several 470µF decoupling caps after the regulator. The negative logic rail for the DACs has 2200µF after the regulator. In addition, all electrolytic caps are bypassed by 0.1µF Mylar types. Multiply these figures by three (the number of transformers) and you've got one serious power supply.

Obviously, considerable attention and cost have been spent on the SuperLink's power supply, an area where the biggest sonic benefits were reportedly gained by trying different parts. The power-supply topology and components underwent the greatest number of iterations in the design process, during which the designers discovered some interesting quirks. For example, the digital circuit's decoupling caps (a small cap between the supply rail and ground, located right next to each chip) were found to have a significant sonic effect. PS Audio ended up using a military-grade ceramic cap, which they found to be superior to off-the-shelf ceramic types.

Overall, the SuperLink's power-supply design and implementation is unprecedented in a digital processor at this price.

The digital section uses the ubiquitous Yamaha YM3623B S/PDIF (Sony/Philips Digital Interface Format) receiver chip. This chip receives the incoming data, regenerates a clock signal from that data, strips out the subcode, and presents the raw audio data to the digital filter. More and more attention is being paid lately to the receiver circuit and its effect on the musical presentation. Absolute polarity inversion, selectable by a front-panel switch, is performed in the digital domain by inverting the data at the input buffer.

Digital filtering is handled by a relatively new chip, the Yamaha YM3434 8x-oversampling unit. The 3434 is smaller than typical Philips, Sony, or NPC digital filters, much less expensive, and, according to some reliable designers, is the best sounding. It also has more filter taps than any other chip except the expensive Sony CXD1144B. I won't be surprised to see the Yamaha digital filter starting to appear in many new digital processors.

Digital-to-analog conversion is handled by two Burr-Brown PCM61PK 18-bit DACs. The PK designation indicates the highest grade of the PCM61, selected for lowest distortion (not low-level linearity, as in the Philips TDA1541). Each DAC has a Most Significant Bit (MSB) trim pot next to it for optimizing the DAC's low-level linearity. MSB trimming is done by hand at the factory on each unit.

After the digital code has been converted to an analog signal by the DACs, the current output representing that digital code must be converted to a voltage. Typically, an op-amp is used for current-to-voltage (IV) conversion. Unusually, however, the SuperLink gets rid of the op-amp with a passive IV converter. Each DAC simply drives a 68 ohm resistor connected to ground, and the voltage is taken across this resistor.

This method has tradeoffs, however. The signal is greatly attenuated because it sees such a low impedance to ground (68 ohms), resulting in a very low voltage across the resistor. This in turn requires additional gain later in the circuit, degrading the signal/noise ratio. Critical listening during the design process revealed, however, that a passive IV converter was superior to an active IV conversion stage. In PS Audio's opinion, the slight noise increase was worth the sonic advantages of removing an active stage. In addition, a resistor is much less expensive than an op-amp and its attendant components.

The IV converter output must then be low-pass-filtered both to reconstruct the signal between sample periods and to remove high-frequency junk and the repetitive image spectra that appear at multiples of the sampling frequency. Since the SuperLink uses an 8x-over-sampling digital filter which shifts the periodic images eight times higher in frequency than a non-oversampled design, the analog filter can be quite gentle and have a cutoff frequency farther away from the highest passband (audio) frequency. The SuperLink uses a very simple passive first-order filter consisting of just a resistor and capacitor in series to ground.

Similarly, de-emphasis is performed passively, with a metal-film resistor and polystyrene capacitor. The de-emphasis circuit is switched in by a pair of relays (the "Q" subcode at work again). Note that all the processing after the DACs has been done without any active gain stages. Many digital converters have as many as three active stages throughout this processing: IV converter, analog low-pass filter, and de-emphasis.

Finally, an Analog Devices AD847 op-amp forms the output driver. This device was cho-
stereophiles, distinguished long-term is. The AD847 is driven in class-A (up to 4mA of output) with a FET current source at the output. Most op-amps run very little current (200µA) through the output, to keep the temperature low. By pulling more current from the device (4mA), the op-amp is forced into class-A operation. Since the FET current source has a high input impedance (several meg ohms), the op-amp isn't loaded down and can still drive current into the load. With a rated output of 32mA, the AD847 still has 28mA left for the audio signal. This is a very unusual technique, but makes sense provided the op-amp doesn't get overheated.

The output stage is also unusual in that it has very high gain (30dB) necessary because of the passive I/V converter, passive de-emphasis, and passive analog filter. However, an advantage of running an op-amp with lots of gain is the reduced need for negative feedback. Coupled with the AD847's very low open-loop (no feedback) gain, the output circuit can be run with a minimum of feedback. Incidentally, the AD847 was compared with a variety of discrete stages and found to be sonically superior. Finally, a relay disconnects the output stage from the RCA jacks when the unit isn't locked on to an incoming data stream. The relay is not in the signal path when playing music. The entire circuit has no coupling capacitors and all resistors are high-quality 1% metal-film types.

Incidentally, the SuperLink has the same circuit topology and components as PS Audio's $799 Digital Link converter but with a much more elaborate power supply. I'll be interested to compare the two to hear exactly what a $400 less power supply does to the SuperLink.

But let's move on to what's really important: how the SuperLink sounds.

Listening

The SuperLink faced some tough competition in my listening room. On hand for comparison were the new Proceed PDP 2, Theta DSPro Basic, Meridian 203, and VTL digital processors. All these excellent converters have distinguished themselves in their respective price categories. Moreover, this group of processors is the cream that has risen to the top, somehow managing to remain in my listening room as long-term references (JA still has the Stax.)

The playback system varied somewhat since I auditioned the SuperLink during the evaluation of the Snell Type C/IV and Hales System Two loudspeakers reviewed in this issue. Amplification was VTL 225W deluxe monoblocks (the new KT90 output tube version) or the excellent Threshold S/550e. Preamplification was provided by an Audio Research SP-11 Mk. II. I did spend some time with the SuperLink driving my usual reference system: VTLs driving Hales System Two Signatures, with the EVS passive control unit providing level control.

The digital source was provided by the Esoteric P-2 CD transport. Interconnects were AudioQuest Lapis between preamp and power amp(s), and AudioQuest Diamond between digital processors and preamp. Digital interconnects included Aural Symphonics Digital Standard, TARA Labs Digital Reference, and AudioQuest Video Z. AC power to the processors, preamp, and transport was conditioned by the magazine-owned Tice Power Block and Titan. Incidentally, PS Audio recommends using a power-line conditioner with the SuperLink. When making direct comparisons between processors (as opposed to long-term listening in isolation, both methods being essential), levels were matched to within 0.1dB.

The very first listen to a new product often is a reliable indicator of how good it is. While one's opinion may evolve after long and careful listening, molded by greater insight into the product's character, the first impression is usually a lasting one.

Such was the case with the SuperLink. After leaving it turned on for a few days, I thought I'd give it a brief listen—my insatiable curiosity about things digital at work. Other products demanded my listening time; I wasn't prepared quite yet to seriously audition this moderately priced new processor.

Or so I thought: the SuperLink had other plans. It immediately grabbed my attention, forcing me to put the planned listening schedule on hold. I had to keep listening to the SuperLink to find out if it was really as good as this first impression indicated.

It is.

No, the SuperLink isn't a Class A killer, but it has many qualities that distinguish a Class A digital processor. My first impression was that it sounded a lot like the Theta DSPro Basic, one of my favorite DA converters.
What distinguishes the SuperLink from other low-priced (read: non-megabuck) digital processors is its ability to present individual instrumental lines as separate entities rather than blurring them together into a synthetic continuum. Instrumental and vocal outlines were sharply defined and clearly delineated within the soundstage. Instruments occupied a distinct and clearly focused position in the presentation, with a feeling of air and space around them. There was a certain bloom that surrounded instrumental envelopes.

In addition, the soundstage was big, open, and stretched laterally beyond the loudspeaker boundaries. Listen to the new Chesky CD of Clark Terry Live at the Village Gate (Chesky JD49). The audience, far left and far right in the soundstage, appears to almost wrap around the listening position, with the musicians presented in a believable space between the loudspeakers. The SuperLink resolved these spatial cues the way few processors can—regardless of price. I thought the SuperLink's soundstage width was superior to the Meridian 203 and the VTL. In these areas, the SuperLink was among the best I've heard.

The SuperLink was slightly less adept at throwing a credible feeling of depth, however. Although there was a superb sense of three-dimensional layering—the result of spatial distinction between images—the soundstage didn't extend as far back as can be achieved with the best digital converters. In this regard, the 203 and VTL clearly provided a deeper view into the soundstage's innermost recesses. Adding to this impression was the SuperLink's more forward rendering in relation to the VTL and Meridian 203. The VTL and 203 had a laid-back perspective by comparison, with a greater feeling of ease. The result was a drier perspective, especially on purist recordings with natural reverberation. The SuperLink didn't convey the feeling of size and space heard through the 203, VTL, or DSPro Basic. The SuperLink puts the listener in row 10, and the 203's presentation is from row 25.

Dynamics were among the best I've heard in any digital converter. This, along with soundstage focus, are the SuperLink's greatest strengths. Music was punchy, "big"-sounding, and had a feeling of weight and power. Drums had a razor-sharp attack backed up with a solid slam. Transients seemed to leap effortlessly from the presentation, and decay just as suddenly. High-frequency transients were similarly quick and clean. Percussion instruments, cymbals, the attack of a piano's hammers on strings, were all sharply defined and crisp. In addition, low frequencies had a dynamic authority that was like the difference between a good solid-state power amplifier and a Krell. Gutsy, robust, and powerful are all appropriate descriptions of the SuperLink's ability to reproduce low-frequency dynamics.

Bass control and articulation were similarly impressive. There was an agility and precision to the bass that was superb by any standards. The entire low-frequency range was pulled taut like a trampoline, providing clear pitch resolution. In addition, the SuperLink clearly followed the dynamic envelope of low-frequency instruments, rather than presenting the bass as a plodding continuum. The clarity, resolution, and focus in the bass were superior to the 203 and VTL, and more on a par with the DSPro Basic, perhaps even surpassing it. These qualities infused music with a toe-tapping rhythmic drive that was greatly satisfying.

All the SuperLink's excellent qualities would be wasted if the treble were harsh, overly prominent, or otherwise unmusical—the Achilles' heel of many digital products. Fortunately, the SuperLink had quite a smooth, transparent, hash-free treble. The high-frequency presentation wasn't overly forward and had clean, pure quality. In this regard, it bettered the 203 whose treble can sound a little solid-state-ish. The SuperLink rendered instrumental timbres with a natural softness. Cymbals had the quality of brass being struck rather than sounding like a burst of white noise. There was a clarity and lack of grain in the treble that made long listening sessions unfatiguing—a critical requirement for musical digital playback. Despite the treble's lack of etch, it was remarkably detailed. The SuperLink doesn't have a rolled-off top end in an attempt to sound "musical" at the expense of detail and nuance. The lack of obscuring grain allowed musical detail to emerge naturally without sounding aggressive. The SuperLink struck just the right balance between an airy top end and correct presentation of high-frequency timbres.

The mids had a nice sense of bloom, coupled with the ability to resolve fine inner detail and nuances that made instrumental textures palpable and believable. However, I felt the midrange presentation was a bit too forward;
not glaring, by any means, but just a little too up-front for my tastes. Consequently, there was less sense of analog-like ease than heard through the 203, and especially the VTL. On The English Lute Song (Dorian DOR-90109), Julianne Baird's voice was slightly dry and overly prominent in relation to the gorgeous reverberation that surrounds her. Through the 203, she seemed to move farther back into the hall and become enveloped in the ambience. In addition, I felt her voice was softer and rounder through the 203. In this regard, the VTL was a runaway winner, with a lushness in the mids heard though no other processor. However, the distinction between her voice, the lute, and the surrounding reverberation was far better resolved by the SuperLink. The lute suddenly became an individual entity within the soundstage, rather than just another component melded into the presentation. This impression was consistent with a wide range of music, but was more apparent with naturally miked recordings.

Beyond these descriptions, I found the SuperLink musically involving and a joy to listen to. I had the urge to extend the listening sessions and hear more and more of my favorite music. This is perhaps the most fundamental—and meaningful—indicator of a product's value.

I do have two very minor complaints: the SuperLink put out a moderately loud click when the de-emphasis circuit switched in, and the background noise level was higher than that heard through other digital processors. This noise wasn't apparent during program, but could be heard between tracks with high playback levels.

**Measurements**

The SuperLink put out 3.3V when decoding a 1kHz, 0dB (full-scale) sinewave. Though this is 4.1dB higher than the standard 2V output level, it is a benefit when driving a power amplifier through a passive level control. Frequency response, shown in fig.1, exhibited a slight high-frequency rolloff starting at 10kHz (0.2dB down) and reaching 0.6dB of attenuation at 20kHz. This minor rolloff may have contributed to my impression of a smooth treble balance. The right channel (dotted trace) was about 0.1dB lower in output level.

De-emphasis error (fig.2) was significant but not as severe as is sometimes seen. The error was +0.4dB at 4kHz, +0.8dB at 10kHz and 16kHz. Although the graph seems to indicate less error at 16kHz than at 10kHz, the high-frequency rolloff seen in fig.1 must be factored in. The de-emphasis plot is the device-under-test's frequency response when decoding an emphasized set of test signals. Consequently, the de-emphasis error plot must be considered in relation to the frequency response. However, a high-frequency rolloff without the de-emphasis circuit, coupled with an equal positive de-emphasis error, will yield flat response when playing emphasized discs. Ideally, no amplitude variations should exist in frequency response.

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*Stereophile, April 1991*
or the de-emphasis circuit.

The fairly high noise level heard in the auditioning was confirmed by fig. 3, a spectral analysis of the SuperLink's output when decoding a -90.31dB, 1kHz dithered sinewave. Oddly, the left channel's noise floor (solid trace) is about 10dB higher than the right channel's (dotted trace) below 1kHz. I repeated this test, but this time played a test CD track that contained "digital silence" (all data words are zero). This is also shown in fig. 3, and confirms the first measurement, though it can be seen that the presence of a signal raises the HF noise floor slightly. I've never measured such a great difference in noise levels between channels. While the right channel is fairly well behaved below 1kHz apart from some 120Hz hum at a still-inconsequential -110dB, the left channel's noise is some 15dB higher in this region.

The high noise level corrupted the left-
channel linearity measurements. Figs. 4 and 5 show the left and right channels' respective departures from linearity. Note how the left channel appears to have a much greater positive error at very low levels. This is the result of the noise floor swamping the audio signal, not the DAC's non-linearity or poor MSB trimming. Although the right channel's error is not that great, the deviation begins below −80dB, a moderately high level. Interestingly, the right-channel linearity error changed slightly when the incoming data stream was inverted (fig.6), a phenomenon that has also been reported by Martin Colloms in a review of a Wadia processor.

Channel separation (fig.7) was only fair, achieving 68dB of isolation through most of the band, but decreasing with rising frequency to 56dB at 10kHz. The left-on-right separation appears to decrease at the rate of 6dB per octave, indicative of capacitive coupling between channels. The right-on-left plot, however, has a more gradual slope, indicating that perhaps capacitive coupling is not the only reason for the increasing crosstalk at high frequencies.

A 0dB, 1kHz squarewave (fig.8) is typical of digital processors using linear-phase Japanese digital filtering, but reveals a slight high-frequency rolloff. Looking at the waveform of a −90dB, 1kHz dithered sinewave, it is hard to discern any periodicity due to the high level of audio-band noise (fig.9). An FFT-derived spectrum of this signal is shown in fig.10, confirming that the 1kHz signal is indeed present but overlaid with noise. Fig.11 shows the intermodulation spectrum created when the SuperLink played a signal consisting of equal amounts of 19kHz and 20kHz sinewaves, the composite waveform peaking at full modulation. The 1kHz product is very low as are the sidebands at 18 and 20kHz. Note, however, the rise in noise below 1kHz.

Looking at the SuperLink's output on an oscilloscope with no input signal showed about 30mV of very-high-frequency noise, with a major component obvious at 5MHz. I also measured 14mV of DC at the output jacks (right channel) and 10mV of DC on the left channel. This DC level seemed to constantly shift, suggesting that it is actually very-low-frequency noise.

Output impedance was very low at 9 ohms across the audio band. This low source impedance, coupled with the high output level, make the SuperLink ideal for use with passive level controls. The unit is non-inverting when the LED above the front-panel "Invert" switch is off.

Overall, the SuperLink's measurements were mixed: good linearity and low distortion somewhat compromised by noise ranging from the infrasonic region to the MHz region. However, its performance in the listening room—playing music—is far more meaningful. I've yet to see a digital processor measurement that reveals the converter's intrinsic musicality (or lack of it). Maybe one day Audio Precision will send me a test file called MUSICLITY:TST. Until then, our ears remain the best judge of a component's ability to convey the musical experience.

**Conclusion**

The PS Audio SuperLink has many special qualities not previously available in this price range. In many ways, it clearly outclassed the competition and provided solid Class A performance—a remarkable feat for an $1195 digital processor. In its strong areas, the SuperLink is a killer: dynamics galore, rock-solid yet detailed and agile bass, exceptional soundstage transparency and image focus, the ability to separate disparate instrumental textures, tons of detail, and a smooth, unfatiguing treble. In these aspects, the SuperLink approached—and in some ways exceeded—the Theta DSPro's performance.

What keeps the SuperLink in Class B, however, is its less than impressive soundstage depth and somewhat dry, forward midrange—both of which reduced the sense of musical ease. In these two areas, I felt the Meridian 203—my reference in $1000 digital processors—offered a more musical rendering. Although the SuperLink had a remarkable feeling of three-dimensionality, it was confined to the front of the presentation rather than providing a clear view into the soundstage's innermost depths.

Despite these few criticisms, the SuperLink is a stunning product. That an $1195 digital processor can achieve Class A performance in so many areas qualifies the SuperLink as a "breakthrough" digital processor. Adding to its value, the SuperLink's build quality, appearance, and fit 'n' finish are first-rate.

Maybe there really is a statue of Elvis on Mars...
Jeff Rowland Design Group Model 1 stereo power amplifier. Power output: 60Wpc into 8 ohms (17.8dBW), 120Wpc into 4 ohms (17.8dBW), 215Wpc into 2 ohms (17.3dBW). Bridged power output: 240Wpc into 8 ohms (23.8dBW), 360Wpc into 4 ohms (22.6dBW), 500Wpc into 2 ohms (21.0dBW). Power bandwidth: 0.3Hz to 30kHz. Slew rate: 70V/µs. THD+noise: under 0.035% at 1kHz, rated power into 8 ohms. Damping factor: greater than 200, 20Hz–20kHz into 8 ohms. Output current: 22A peak, continuous, 55A peak into 0.1 ohm for 20ms at 1kHz. Input impedance: 100k ohms, 20k ohms, or 600 ohms (user selectable). Input sensitivity: 136mV for 1W into 8 ohms. (Voltage gain: dealer adjustable, 26dB standard.) Common mode rejection ratio: greater than 90dB. Power dissipation: 175W (idle). Dimensions: 15” W by 5.75” H by 15” D. Weight: 48 lbs. Price: $3100. Approximate number of dealers: 30. Manufacturer: Jeff Rowland Design Group, P.O. Box 7231, Colorado Springs, CO 80933. Tel: (719) 473-1181.

Michael, who might be termed our typical audiophile (if anything in Santa Fe can be termed "typical"), may have found his digital processor, but he's still in a quandary about choosing the right power amp to drive his new loudspeakers. He has listened to a number of them over the past few months, and has been unable to find one which satisfies him in every way. I suspect he has a lot of company. The thorny problems of room acoustics and placement aside, loudspeakers are easier. Their signatures are pronounced and generate strong feelings one way or another; it's usually no problem to narrow down one's choices in this category.

But amplifiers? Even "experts" differ as to the degree and importance (or even the existence) of audible differences between them, though only a few would argue that they vary in sound as much as do loudspeakers. Still, no one here (and not many of our readers, I suspect) would contend that the only things that matter in an amplifier are to be found in the spec sheet. For most of us, the right amplifier in the right system can poke a significant hole in the curtain which continues to separate merely good reproduction from convincing recreation.

The two amplifiers under consideration here both do just that, but do not sound alike. While two separate reviews would be the traditional way to review them, the arguments for writing them up in a single, combined review were compelling. Both have roughly the same power output. Both are in the same price range. Both offer balanced and unbalanced inputs. Since they were evaluated during the same time period, using the same associated equipment, comparative comments between them were inevitable; to place these comments in two different reviews would have been redundant at best, confusing at worst.

There's a school of thought which argues for the sonic superiority of lower-powered amplifiers—when used within their power limitations. A compelling case may be made for this. Freed from the problems which must be solved just to put out high power, the designer is able to concentrate more fully on sound quality. The entire amplifier is under less stress, and pressures pushing up costs are reduced. But would these advantages outweigh the sonic sacrifices that might result from modest power output?1 I had hopes that perhaps this review would provide an answer.

1 The term "modest," when applied to power output, is admittedly vague. I would specify it as, very broadly, output between 40 and 100W (into 8 ohms). At one time, 60W was considered to be high power. No longer.
Mark Levinson No.29: $2800
I still remember reading about my first Mark Levinson product 14 or 15 years ago. It was a preamp. The model number escapes me, but it sold for over $2000. It was soon followed by the JC-2, designed by John Curl, which was a bit less pricey but still astonishingly expensive for a mid-'70s preamp. We've come a long way since then. The man, Mark Levinson, left the company that bore his name in the early '80s and founded a new company, Cello. The company Mark Levinson became the core of Madrigal. It is a mark of their continued dedication to uncompromising high-end products that their bread-and-butter line remains the high-priced Mark Levinsons. They no longer have the Rolls-Royce of the audio market to themselves (in their early years, they made the never exactly inexpensive Audio Research products—ARC was certainly a contender for the same title—look like bargains), but they are certainly a leading player.

The Mark Levinson No.29 is Madrigal's lowest-powered, lowest-priced amplifier. Externally, it resembles their other power amps, though the huge heatsinks of the larger designs are missing—shrunk dramatically in size and banished to the inside of the chassis since they have an easier job to do with this 50Wpc design. The only features of note visible on the outside, aside from the obvious power switch front and center, are the rear-panel jacks and fuses. The former include both balanced and unbalanced inputs, the latter using Levinson's trademark Camac connectors requiring either special interconnect cables or RCA-to-Camac adapters. These Camac connectors are superb devices, far superior to RCAs, but Levinson has been using them for over ten years without convincing anyone else in the industry to do likewise. Madrigal certainly believes in them, but I've always been bothered by the fact that their use requires the Levinson owner to replace all of the interconnects in his or her system, or else demands the purchase of RCA-to-Camac adapters for every connection point, thus making most virtually all of the advantages of the Camacs, not to mention doubling the number of system contacts. The advent and growing popularity of XLR balanced connections may thankfully put a stop to the RCA-Camac confusion, at least at the preamp-to-power-amp interface.

Two pairs of five-way binding posts are furnished on the rear panel of the No.29, making bi-wiring a breeze. These posts are too far apart for double banana plugs for those who may still be fond of such connectors, but the open layout provides plenty of room for use of the more popular spade-lugs—with no cramped spaces and resultant concern for inadvertent short-circuits. You'd have to be a world-class klutz to accidentally short together any of the No.29's output terminals.

Technical details: The No.29 is a dual-mono design; it is essentially two separate amplifiers on a single chassis. Two 320VA toroidal power transformers are mounted on the inside of the front panel, well removed from the amplifier's low-level circuitry. The only disadvantage of this layout is that the amplifier is front-heavy; care must be taken when picking it up to allow for this significantly off-center weight balance.
The entire bottom of the chassis is filled with very accessible, neatly laid-out circuit boards. There are three pair of Motorola output devices per channel; four flat, modestly sized aluminum plates both act as heatsinks and convey the heat to the chassis, with three output transistors attached to each.

The No.29’s input voltage is capacitively filtered for RF before the power transformers. Surge protection at the transformer primaries minimizes turn-on stresses. At the output of each transformer’s secondary and subsequent voltage rectification, power-supply filtration is provided by a pair of 15,000µF filter capacitors. Because these capacitors are smaller than those required in high-powered amplifiers, they can be mounted directly next to the output transistors on the audio circuit board, avoiding the need for buss bars to deliver the power supply’s 33 available joules of stored energy. DC blocking capacitors are used at the 29’s input and in its feedback loops. Levinson argues that with proper design this need not result in sonic compromise, and may help avoid a catastrophic malfunction from using a signal source with a high DC offset.

The No.29’s low-level gain section consists of two bipolar, differential amplifiers biased into class-A. In the power output stage, local feedback is used both around each output device and around the entire output stage. A high damping factor at all audio frequencies is claimed. Proprietary circuitry protects the amplifier against overloads without, the makers say, degrading the sound. External and internal fuses (the former designed to blow first) provide additional protection, as do circuits designed to shut down the amplifier if DC appears on the outputs or if the heatsinks overheat. Soft-clip circuitry is also incorporated.

Jeff Rowland Design Group Model 1: $3100

The Jeff Rowland Design Group, in the few years that they have been internationally visible in the audio high-end, have become solidly entrenched as one of the industry’s heavyweights. But their Model 1 amplifier is almost petite, a significant departure from their flagship—the three-men-and-a-(husky)-boy-required-to-lift monoblock Model 7’s. I couldn’t help but think when I first laid eyes on it that this is the size an amplifier ought to be. Not, perhaps, a practical objective, since increasing the power output of an amplifier extracts its own penalties in size and weight. But there’s something to be said for an amplifier that one person can carry around. The same holds true for the Levinson No.29, of course, but the latter amp is physically larger and not so, well, downright cute as the Rowland.

The front panel of the Model 1 is devoid of what in Japanese styling parlance is known as “visual entertainment,” save for the Rowland logo and the single, pushbutton on-off switch. This is not actually an on-off switch at all, but switches between standby mode, in which the low-level stages of the amplifier are powered-up, and full-on mode, which also powers the output stages. A true power switch is located on the rear panel of the amplifier, and is designed to be left on continuously (with the amplifier in standby when not in use). Also on the rear panel are all inputs (normal and invert-
ing single-ended and balanced), DIP switches for selecting from the three available input impedances, a bridging switch which permits easy configuration of the Model 1 to a monoblock, and two pairs of output connectors per channel, making for easy bi-wire hookups. These connectors are heavy-duty, screw-type barrier strips. I did have an occasional problem in attaching loudspeaker cable having unusually broad spade-lugs to them, but these could usually be crimped slightly to fit.

I can't fail to mention the outstanding fit and finish of the Model 1's exterior. I especially appreciated the rounded heatsinks flanking the amplifier on both sides. These were completely devoid of sharp edges, eliminating the risk of pinched fingers in moving the Rowland around, even without using the small, rack-mount-style handles attached to the rear panel. Inside, the Rowland appeared to be equally well built. The compact design means a rather fully packed interior (though not unreasonably so), with the single 600VA power transformer and two large, 32,000µF filter capacitors taking up much of the space. Much of the circuitry is encased in two sealed modules encapsulated in thermally conductive epoxy, mounted on two circuit boards, one on each side of the chassis. Switches mounted on the underside of these modules allow the gain to be reset (from the factory setting of 26dB) to 20, 29.5, or 32dB. Rowland recommends that any such adjustment be made by a Rowland dealer (incorrect reinsertion of the modules is not covered by warranty).

Technical details: The design concepts and circuit topologies of the Model 1 are similar to those of Rowland's higher-powered amplifiers. The smaller physical size and reduced power-supply capacity—reflected in the more modest power output—are the only significant differences. Even so, the Model 1 was designed from the bottom up to be able to perform in the bridged mode as a 250W mono amplifier, with its power supply and output stages designed to avoid sonic degradation when used as a monoblock.\(^2\) The main power supply feeds the output stage, with its 12 150W bipolar transistors per channel. These transistors are mounted on a 13mm (over 0.5") thick, solid aluminum plate on the inner surface of the heatsinks. An additional secondary winding on the main transformer, suitably filtered, separately drives a "housekeeping" power supply which operates the turn-on logic control and protection circuitry. A further set of secondary windings supplies current to a high-voltage DC supply dedicated to the front-end circuitry.

The latter consists of two stages. The first, located near the rear panel inputs, Rowland refers to as a "differential transconductance" stage. It derives a single-phase proportional current from either the amplifier's single-ended or balanced input. Rowland calls the second stage a transimpedance mode amplifier, a voltage gain stage which responds directly to this current output from the first stage. Rowland claims that this circuit implementation provides desirable improvements in dynamic characteristics and high-frequency performance compared with more traditional topologies.

The Model 1 is direct-coupled from input to output, using a DC servo to compensate for long-term drift. Local feedback is used, but the amplifier does not employ overall or global feedback. Protection circuitry shuts down the amplifier in the event of damaging failure modes, including DC on the outputs and overheating.

Just before serious auditioning of our Model 1 was to begin, we were notified of a design change to the amplifier, including modifications to the input stages (specifically to the "transimpedance" circuitry within the encapsulated modules, discussed above), a change in the output stage bias current, and minor modifications to the power supply. We returned our Model 1 for a replacement. I had been very favorably impressed by the initial sample, but since the old and new versions were not available to us simultaneously for side-by-side comparisons, all of my sonic observations here relate to the latest sample, which is typical of Model 1s manufactured after November 1990.

I encountered two minor operational problems with our samples of the Model 1. First, blown fuses. This occurred twice, once in normal operation and a second time when I encountered a static-electricity problem with the Consonance preamp (subsequent to the March 1991 review of that unit). On the first occasion, a single power-supply fuse blew for no apparent reason. On the second, all four power-

\(^2\) Time and space did not permit evaluation of the Model 1 in the bridged mode for this review, but as two of the amplifiers remain on hand, a Follow-Up assessing its use in this mode will be published at a later date.
supply fuses went south and had to be replaced (the fuses are mounted internally). No surges or pulses were audible through the loudspeakers in either case; replacement of the fuses restored full, normal operation, and there was no subsequent recurrence of either event.

The second problem was that of "frozen" screws on the output barrier strips. One of the screws on the first version and two on its replacement jammed to where they could not be tightened or loosened without the use of excessive force. Fortunately, redundant terminal strips for bi-wiring prevented the amplifier from going out of action. I recommend care in making connections to these terminals, though I do not feel that I stressed them in any unusual fashion.

**Matters of Balance, Impedance Matching, and other Related Stuff:** Both Levinson and Rowland now provide balanced outputs on all of their preamplifiers and balanced inputs on all of their power amplifiers, and are strong proponents of the practice (as are many other manufacturers). A paper discussing the concept and the reasons for Rowland's endorsement of it is available from that manufacturer, and is bound into all of their owners' manuals—they refer to it as differential-mode technology.

As I mentioned in my recent review of it (Vol.14 No.3), I found the Rowland Consonance preamp's performance to be on an equivalent level in my system with either balanced or unbalanced connection to the power amp. The advantages of balanced operation will very much depend on the system and its environment—its main advantage is, after all, improved rejection of outside noise. I would also expect it to be of more importance in low-level signals—phono to preamp especially—which the preamps on-hand did not permit. It would be, in my judgment, unwarranted to assume that balanced lines will improve the sound in *all systems and all situations*, and I have not yet convinced myself that, in the preamp-to-power-amp link, balanced operation provides a real improvement in *my system*. Nevertheless, like chicken soup, there is no reason not to use balanced interconnects, if and where the system provides for it. All of my listening observations of both amplifiers in this review were therefore made with balanced lines between the preamp and the power amp.

The Rowland Model 1 also provides for adjustable input impedances of 600 ohms, 20k ohms, and 100k ohms. Rowland makes a case for 600 ohms input impedance being the proper load when used with a source capable of driving it (their own preamps are designed to do so). They believe that this improves the interface between line-level components by treating the cable as a transmission line and maximizing power transfer. There is, of course, strong justification for this during the transmission of, for instance, microwave energy—when you're feeding power from a radio transmitter to an antenna, you don't want to lose any more of it than you have to. But in line-level audio signal transfer, you're relaying a *voltage*, not power, from one line-level device to another, a voltage which will act as a control signal to, in effect, modulate the output voltage of the second device. The current between the two devices, except in certain special circumstances (loudspeakers being a major example), is of no importance and in fact may be a detriment if the first device is unable to provide the current. That's why line-level devices in audio nearly always feed into a high impedance; the resultant current flow between the two devices is thus kept negligible. (A different set of considerations results when the source or the load is passive, not active.) We are not attempting to transmit power until we need to drive a loudspeaker. If both the source and the load devices are designed to be compatible with such a loading arrangement, I see no reason why it can't be used, but neither do I see the theoretical advantage. But then, I've always been dubious about attempts to apply transmission-line theory—which is designed for RF transmission—to audio frequency design.  

Still, there's much that we don't yet understand. I did experiment with using the 600 ohm input impedance of the Model 1, comparing it to the 20k ohm setting. My general preference was for the 20k. The main difference I noted was in the high frequencies. In the 600 ohm position, the sound was a trace brighter and more detailed, but the highs were also somewhat grainier. I did not consider the net result to be a plus. If you should invest in a Model 1 and have a preamp which will work properly into the 600 ohm load, it will cost nothing for you to try it and come to your own conclusion.

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3 Some have held that forcing line-level interconnects to carry a relatively sizeable current will minimize diodic effects in the metal-metal contacts in the connectors. —JA

Stereophile, April 1991
But I used the 20k setting for the bulk of my listening not only because I preferred it, but because my results will be more generally applicable to users who might use other than 600 ohm–load compatible preamps.

I have to remark here on the importance of proper level matching when comparing balanced to unbalanced operation (the former provides a theoretical 6dB increase in gain) or various input impedances (the 600 ohm setting results in an equivalent loss when compared with the 20k ohm). On a number of instances during my auditions, I found that one setting or another sounded a trace more dynamic or bright, only to find that it was playing less than 0.5dB louder. And we are not talking direct A/B comparisons here, but comparisons with a brief time gap required to reconfigure the setup and reset the level. The significance of this for casually level-matched listening tests cannot be ignored.

Sound
The reference-system equipment used with both amplifiers included the Rowland Consonance preamp and the Apogee Stage loudspeakers. Program sources were the Oracle Delphi Mk.IV turntable and Oracle 345 tonearm with the Dynavector XX-IL cartridge and the Sony CDP-X77ES CD player. Other equipment used included the Mirage M-3 loudspeakers and (briefly) the Coda Technologies FET Preampifier 01. The Threshold SA/12es and Muse 100 amplifiers were pressed into service where needed. Loudspeaker cables were Symo (for the Stages) and AudioQuest Clear (for the M-3s). Interconnects were Cardas Hexlink (preamplifier to power amp, balanced) and AudioQuest Lapis (CD player or processor to preamp).

Rowland Model 1: The Rowland Model 1 may just be too self-effacing for its own good. It refuses to jump out and grab the listener by the throat. It grows on you slowly. When Stereophile’s equipment reviewers gathered in the Stereophile listening room last summer to hear the Apogee Stages, the original version of the Rowland was on hand to do the honors. Peter Mitchell reported on this event in his column in Vol.13 No.11 (November 1990). To make a long story short, he (and many of those assembled) felt the sound to be too dark, and the system restricted in ultimate output level with the Rowland 1 in the chain. I was not in a position to disagree at the time—my listening seat that night was on the floor, stage left, about 5′ in front of and just to the outside of the left loudspeaker. But I will observe that a dozen or so “6’, biological Tube Traps” (listeners) in an already moderately well damped, 15’ by 20’ listening room, will do a number on high-frequency detail and “air,” as well as significantly increase the required power output. As a frequent solo listener in that room to the Rowland Model 1–driven Stages in the month prior to the writer’s conference, I had been struck by the Rowland amplifier’s ability to perform superbly with this load. But shortly after the conference, I was informed that an upgrade to the Model 1 was in the works. It was put aside temporarily to move on to other equipment.

When the time came at last to put the new version of the Model 1 through its paces, I wrestled with the choice of loudspeaker. The experience of the conference with the Stages was not far from my mind, but neither was my personal experience listening to the combination. Since I’ve done more listening to the Stages in the last several months than to any other loudspeaker, I decided to put the latest version of the Rowland to the challenge. The very different-sounding Mirage M-3s were also selected for use to provide an alternate load.

Where should I begin? With the observation that the Model 1 is one of those components which encourages prolonged listening. The musical flow from this amplifier is fluid and virtually without grain, characteristics which make its sound, initially, not at all dramatic. But you soon begin to notice things. You notice that there is no hard “edge” to the sound. You observe how subtle and delicate its high-frequency response is: the silky hi-hat on Reference Recordings' new LP, The Oxnard Sessions (RR-37); the precisely “right” percussive timbre to the piano accompanying Radka Toneff on the Fairy Tales CD (Odin CD-03); the feel of natural air and ambience surrounding the voice on the same recording. You note the naturally expansive soundstage: there is no obvious “editorializing” here by the Model 1. Neither depth nor lateral image focus call obvious attention to themselves, yet neither seems lacking. On Julianne Baird’s Songs of Love and War CD (Dorian DOR-90104), the harpsichord sparkles, the voice and instrument set back in a natural acoustic which complements them and
brings the event to life. You notice also, however, a low end which, though deep and powerful, could not be called tight and punchy through the reference system. But you hear a low end which, though somewhat short of the room-shuddering power of more powerful amplifiers, can still hold its own with them on 90% of program material in reasonably sized rooms at high but not ear-shattering volume levels. If the deepest bass on *Rhythm Devils Play River Music* (Wilson Audio Specialties W-8521, LP4) is a bit grumbly, it is nonetheless deep and powerful—and certainly conjures up visions of more than 60W at work. Which there are, of course, into the near–3-ohm load (over most of the range) of the Stages. Still, those who seek a lean, hair-trigger tautness in the nether regions will need to figure the Model 1's softer, fuller LF response into their decision equation.

But not its way with the midrange. This is the special glory of the Rowland. Voices have a gripping rightness. The voices of the King's Singers on *The Beatles Connection* (EMI CDC 749556 2, CD) are full, rich (though never to an unnatural degree), and vibrant. Instruments, too, appear fully formed, from the believable body sound behind the reed in the sax on the classic (some would say warhorse) audiophile LP *Jazz at the Pawnshop* (Proprius PROP 7778-79), to Hopkinson Smith's woody, rounded, yet realistically detailed lute on band 6 of the Astrée Sampler CD (E 7699).

Discounting its mildly soft and fulsome bass, which bothered me little, and its power output, which may be a disadvantage to some users, the Model 1 has only one real weakness: its tendency to be almost too sweet. There are times when you know that a recording is full of hard-driving, transient-rich energy. When these recordings sound as if their punches are being pulled, however slightly, a certain dynamism gets subtracted from the sound. Too many amplifiers (though thankfully fewer today than in the past) err in the direction of almost always sounding punchy and up-front, constantly acting as cheerleaders for the music until the listener screams for mercy. But you should at least occasionally, on some recordings, get this feeling. The Rowland doesn't seem to want to do this, at least not with the Apogee Stages. That may well have been, in the final analysis, what the group was reacting to on that warm, early August night, aggravated as it must have been by an overly damped listening-room acoustic. I've since found this characteristic of the Mirage M-3s as well, though to a lesser degree.

But ultimately I couldn't get very worked up about the Rowland's "limitations." Even the best amplifiers (in whose company the Model 1 certainly belongs) have them. I found this amplifier a joy to listen through.

**Mark Levinson No.29:** Focus, depth, and detail. The Levinson No.29 excels in all three of these vital characteristics. It makes a strongly positive overall impression, but it's hard to miss its strengths in those areas.

Focus—the quality that rivets images to their proper position in space, and which presents them in their proper size. Time and again I noted the Levinson's ability to pinpoint images and tighten the soundstage. Voices and instruments were sharply placed, not spread into some generalized "area." To a certain extent, this was loudspeaker-dependent; it was more apparent on the Stages than on the M-3s, which was not surprising since the former have, in themselves, a more focused sound. But it was not lost even over the more expansive, less immediate-sounding Mirages.

Depth—the No.29 presented the best sense of depth I've yet heard from the Stages. Ana Caram's *Amazonia* CD on Chesky (JD45) vividly demonstrated both the Levinson's depth and focusing ability, with a liberal helping of that third characteristic—detail—thrown in for good measure. One might argue with Ana Caram's intonation. Frankly, though I'm usually driven up the wall by off-pitch singers, it didn't bother me at all on this recording until GL pointed it out to me—probably because I was concentrating more on the style. And on the sound, which is one of Chesky's usual fine efforts. With the No.29 driving the Stages, the lead-in percussion is sharp and vibrant. Inner detailing is sharp and crisp—in the best senses of those words. Individual "rattles" in the softly played maracas were clear. At 1:14 into "Antonio's Song," the voice is doubled by a softly played trumpet—which had not been obvious to me before. It wasn't that other amplifiers failed to reveal it, but that I became fully aware of what it was on its *first* play with the Levinson. The beginning of the title track is an excellent test for soundstage focus and depth, with

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4 This is, to my knowledge, no longer available through Wilson.
very softly played, subtle detailing evident around, between, and behind the loudspeakers. The No.29 passed those details in a first-rate manner; they were convincingly and precisely focused laterally and sharply layered in depth, with a natural sense of air and space surrounding the whole.

The Levinson's low-frequency response lacked the drive and power of more powerful amplifiers, but within its power limitations, which are not at all as restrictive as you might think—like the Rowland Model 1, the 29 will put out well over 100Wpc into the low-impedance Stages—it is taut and well-defined. Taut, that is, within the context of the listening room and Apogee and Mirage loudspeakers, which tend to warmth. There's nothing about the LF response of the 29 which really grabs the listener without making direct comparisons to other amplifiers, except that it does not detract in any way from the openness and clarity of the rest of the amplifier's range. When compared with the far more powerful and expensive Threshold SA/12e, the Levinson does seem to have a slightly leaner, more transparent low end, but at some sacrifice in fullness and weight—especially the weight of orchestra or organ operating at full bore.

For all of its pristine clarity, detail, rendition of depth, and well-defined low end, the Levinson on occasion seemed to be somewhat laid-back, especially through the region of the lower midrange which lends body and fullness to instruments and voices. It lacked some of that "there" quality which provides for fully formed, three-dimensional performers. This was usually a subtle thing, most evident on voice. On *Amazonia*, Ana Caram's voice was somewhat cool and lean. The combined voices of the King's Singers on *The Beatles Connection* emphasized the separate voices at the expense of the resonance of the overall blend.

Despite that, when I compared the No.29 with the Threshold SA/12e over the Stages I found myself thrashing about trying to decide on a "winner." The amplifiers did not sound alike, but each had definite strengths in areas which did not always overlap. The Threshold was more "palpable" and immediate in sound, with a fuller, richer quality and a gutsier lowest octave. The Levinson was superior in the already mentioned areas of depth, detail, and focus. I have to say that the Levinson more than held its own in this comparison with a pair of monoblocks costing almost six times as much.

**Musing with the Rowland:** It's a cruel world out there, what with high-end amplifiers, even modestly powered ones, fetching prices that once bought a respectable car. How do such amplifiers compare with more "affordable" (in a manner of speaking) products? First of all, that question can never be definitively answered. By the time we had scoured the mid-priced landscape for everyman's amp champ, the landscape would change—in both the mid- and high-price ranges. But there are some pretty decent performers available for a lot less cash than either the Rowland or the Levinson. How does one of the better ones stack up?

I chose to compare the Muse 100 (reviewed by CG elsewhere in this issue) with the Rowland, driving the Mirage M-3s. The Muse has a quick, open, somewhat lean and crisp sound through the Mirages. While I didn't compare it directly to the Levinson, it appears to resemble that amplifier in general sonic balance more than it does the Rowland. But it did not have quite the pristine cleanliness, lack of grain, and depth that makes the Levinson appealing. It was a bit "processed"-sounding next to either of the amps under review here. That does not take away from its essential strengths; it merely recognizes economic realities.

**Measurements**

**Levinson No.29:** As can be seen from fig.1, the Levinson No.29 exhibits a very slight rolloff at the frequency extremes, to a degree which should be audibly insignificant. The 10kHz squarewave (fig.2) indicates a small rise-time, with very slight rounding of the leading edge reflecting the gentle HF rolloff above 20kHz. Polarity of the Levinson was non-inverting, the 1kHz input impedance of 57k ohms was just slightly above spec, and 140.2mV were required to give 1W into 8 ohms—a gain of 26.1dB. Unweighted noise was 89dB below 1W into 8 ohms. Channel separation was better than 108dB below 1kHz (nearly 115dB below 200Hz), decreasing smoothly to 85dB at 20kHz.

The output impedance of the No.29 was uniformly low, ranging from 0.043 to 0.073 ohms across the audible range. Distortion at low power was uniformly low, as is clear from fig.3, which plots THD+noise against frequency at 2.83V into 8, 4, and 2 ohms (bottom, middle, and top traces, respectively). As expected, the
distortion increases into the lower-impedance load and rises somewhat at high frequencies, but remains negligibly low in all cases. The waveform of the distortion in fig.4 (1kHz at 1W into 8 ohms) shows a predominantly second-harmonic characteristic overlaid with very low-level noise. A similar curve for a 1kHz signal into a 4 ohm load, 2W out (not shown), was similar but with less noise.

Fig.5 shows the spectrum of a 50Hz sine-wave driven at 67W into 4 ohms. The second harmonic is down 79dB; a couple of higher harmonics are still visible but down even further in level. Fig.6 shows the high-frequency IM spectrum with an equal mixture of 19 and 20kHz tones driven at 67W into 4 ohms. The 1kHz product lies at ~76dB, a negligible 0.0015%, which is pretty much the residual in the output of the CD player used to drive the amp for
this measurement. A similar measurement for 33 W into 8 ohms was virtually identical—actually slightly better at -79dB (0.001%).

Fig.7 indicates the THD vs power for 8, 4, and 2 ohms at 1kHz, one channel driven (bottom, middle, and top curves at 10W, respectively; line voltage of 117V). The maximum output power at 1% THD was 66W (18.2dBW) into 8 ohms, 120W (17.8dBW) into 4 ohms, and 180W (16.5dBW) into 2 ohms. These figures all lie well above the “knee” of the distortion curve. In my opinion, the highest useful power output of an amplifier with a sharply defined distortion “knee” is at the knee itself; although an amplifier will still put out power above this point, in reality the distortion is rising rapidly. In the case of the No.29, that knee is at 59W into 8 ohms, 95W into 4 ohms, and 160W into 2 ohms. At these outputs the distortion is still very low; the Levinson power output is specified at a slightly higher 0.3%, and it meets or better the specification. Again, however, that distortion figure falls above the knee of each curve.

With both channels driven, the No.29’s output power was 65.3W (18.1dBW) into 8 ohms, 111.8W (17.5dBW) into 4 ohms (both for the right channel—the left was marginally higher). Because the No.29 is a totally dual-mono design, the power output should be identical to either one or both channels driven. The discrepancy here probably results from a slight droop in the AC supply with both channels driven rather than one. In any case, these figures can only be approximate because the output power is read directly off the computer display “meter” on the Audio Precision test set. Because the arbitrary 1% THD mark lies on the steep distortion slope above the knee of the curve in fig.7 as the output level is increased, zeroing-in precisely on the 1% distortion figure is prone to a 5–10% error.

Finally, DC offset in the No.29 was 7mV in the left channel, 8mV in the right. The Levinson also operated moderately warm to the touch after its 1-hour, ½-power preconditioning into 8 ohms.

None of the measurements indicate that the Levinson should sound anything but first-rate. This doesn’t always prove to be true, but in this case it definitely did.

Rowland Model 1: As can be seen from fig.8, the Rowland exhibits a virtually ruler-flat frequency-response curve. The 10kHz square-wave (fig.9) indicates a fast rise-time, with no significant rounding of the leading edges. Polarity of the Rowland was non-inverting, and input impedance at 1kHz was 20.8k ohms, 95k ohms, and 750 ohms at the 20k ohm, 100k ohm, and 600 ohm input settings respectively. It required 142.4mV to give an output of 1W into 8 ohms, a gain of 26dB. Unweighted noise was 75.3dB below 1W into 8 ohms. Channel separation was better than 105dB below 1.5kHz (actually better than 110dB across much of that range), decreasing linearly to 92dB at 20kHz.

The output impedance of the Model 1 was uniformly low, ranging from 0.056 to 0.065 ohms across the audible range. Distortion at low power is shown in fig.10, which plots THD+noise against frequency at 2.83V into 8, 4, and 2 ohms (bottom, middle, and top traces, respectively). The consistently low distortion increases as the impedance drops—not unexpectedly. What is interesting is the slight reduction in distortion into both 4 and 2 ohms at higher frequencies, which is unusual, suggesting perhaps that the amplifier’s VHF bandwidth narrows a little with increasing output current. The waveform of the distortion in fig.11 (showing a 1kHz, 2W output into a 4 ohm load) indicates a predominantly third-harmonic characteristic overlaid with noise. The equivalent waveform for a 1kHz, 1W output into 8 ohms (not shown) was dominated by noise.

Fig.12 shows the spectrum from a 50Hz sine-wave driven at 80W into 4 ohms. The second harmonic is negligible; the third harmonic is stronger (as expected from fig.11) but still down 75.8dB. Fig.13 shows the high-frequency IM spectrum with 19 and 20kHz tones driven at 80W into 4 ohms. The 1kHz product is down 83.5dB; well under 0.001%. A similar measurement for 40W into 8 ohms is not shown since it was, if anything, slightly better at -85.3dB. (As with the No.29, these figures are at the residual level in the test signal, suggesting that neither amplifier adds anything—compare these results with those JA found for some of the less-expensive amplifiers CG reviewed elsewhere in this issue.)

Fig.14 indicates the THD vs power for 8, 4, and 2 ohms at 1kHz, one channel driven (bottom, middle, and top curves respectively; line voltage of 113V). The maximum output power at 1% THD was 84W (19.2dBW) into 8 ohms,
Fig. 8 Jeff Rowland Model 1, frequency response at 1W into 8 ohms (right channel dashed, 0.5dB/vertical div.)

Fig. 9 Jeff Rowland Model 1, 10kHz squarewave at 2W into 8 ohms

Fig. 10 Jeff Rowland Model 1, THD+Noise vs frequency at 1W into 8 ohms (bottom), 2W into 4 ohms, and 4W into 2 ohms (top) (right channel dashed)

Fig. 11 Jeff Rowland Model 1, 1kHz waveform at 2W into 4 ohms (top), distortion and noise waveform with fundamental notched out (bottom)

Fig. 12 Jeff Rowland Model 1, spectrum of 50Hz waveform at 67W into 4 ohms

Fig. 13 Jeff Rowland Model 1, HF intermodulation spectrum, 300Hz-30kHz, 19+20kHz at 48V p-p into 8 ohms (linear frequency scale)

Fig. 14 Jeff Rowland Model 1, distortion vs output power, one channel driven, into 8 ohms (bottom), 4 ohms (middle), and 2 ohms (top)

140W (18.5dBW) into 4 ohms, and 220W (17.4dBW) into 2 ohms. These figures all lie well above the "knee" of the distortion curve. As stated in my discussion of the Levinson No.29, I consider the "knee" of this curve, when well defined and followed by a rapidly increasing distortion above it, to indicate the highest practical useful power output of an amplifier. In the case of the Model 1, the knee falls at 67W (8 ohms), 130W (4 ohms), and 215W (2 ohms). In the latter two cases, I choose as the knee the break-point before the steepest slope of the distortion curve.

With both channels driven, the Model 1's output power was 76W (18.8dBW) into 8 ohms and 126.8 (18dBW) into 4 ohms (both for the right channel—the left was marginally higher). The power-supply fuses blew (twice) at 190W.
into 2 ohms, before clipping could be reached.

DC offset in the Rowland was 2mV in the left channel, 3mV in the right. It operated quite warm to the touch following its 1-hour, \(1/2\)-power preconditioning, but not hot.

Finally, I measured both the frequency response and the low-power THD+noise vs frequency for the Rowland set for a 600 ohm load. Except for the input impedance measurements, where all three settings were checked, the above measurements were made into the amplifier's 20k ohm setting. The curves have not been shown because they did not differ at all from the equivalent curves for the 20k ohm setting.

As was the case with the Levinson No.29, attempting to relate the outstanding lab-test results of the Rowland Model 1 to its equally rewarding sound was a hopeless task. As to why these two amplifiers sounded different from each other, which they did, the measurements provide no real clue. Their distortion spectrums differed, as did their frequency responses, but the level of that distortion was so low in the first case, and the differences in frequency response so small in the second (and at the extremes of the audible spectrum), that the measurements in this case merely indicated that these are both, from any objective measure, solidly designed amplifiers.

**Further thoughts & Conclusions**

First of all, it must be emphasized that I was more than somewhat surprised that I never really felt the need for more power with either the Levinson or the Rowland in driving either the Apogees or the Mirages. I wasn't blowing out the walls with the sound pressure, but I was definitely using levels which seriously compromise attempts at conversation. Nevertheless, it's impossible, from my vantage point, to determine if 50–60W (into 8 ohms) will be sufficient in your system under your listening conditions. Only a home trial will decide that.

With that important factoid on the record, it should be evident from my comments up to this point that while the Levinson No.29 and the Rowland Model 1 both made strong positive impressions, they also differed sonically. The Levinson excelled in those things which make a strong first impression, but never went overboard. Its sound was spacious and open, with a real sense of see-through transparency and a strong feeling of depth. Transients were alive: Michael Hedges's *Taproot* CD (Windham Hill WD-1093) had a vital drive and incisive attack which the Rowland insisted on softening. This sweetening was not unpleasant in this recording, which seems to have an inherent, electronic edge to it, but it did seem to lose a bit of its musical texture in the process. But on "I Carry Your Heart," the only sung track on the disc, the Rowland conveyed a vocal warmth and natural richness which the leaner sound of the Levinson slighted. And despite its tendency to soften hard transients, I found myself, with the Model 1, listening to bands on this disc which I had avoided before.

The slight softening of the Rowland was less in evidence on LPs than on CDs. But its delightfully musical timbre was evident on all good program material. It was never analytical or etched. Neither was the Levinson, though it was definitely more overt in its presentation of detail. The fingering details on Leo Kottke's *My Father's Face* LP (Private Music 2050-L-P) were more alive with the Levinson, yet the Rowland excelled in conveying the guitar's subtlety and warmth of tone.

When I tell you that the Levinson presented a more convincing sense of depth but that I felt the Rowland to be more three-dimensional, you may find yourself confused. [Yes—Ed.] Depth is front-to-back layering—distancing from the loudspeakers. Three-dimensionality is the sensation that individual instruments and voices have front-to-back depth within themselves and a natural, resonant timbre. Of the two, I consider the latter the more musically important.

The Model 1 also excelled in the reproduction of ambience. On "Lady Madonna" from *The Beatles Connection*, the cut opens with the King's Singers firing off a series of sharp, staccato notes. Over the Rowland, you can clearly hear the buildup of ambience as reverb from later notes builds on that remaining from the previous ones. With the No.29, though the ambience is still clearly evident, it seems somehow prematurely damped out, never quite building to the same level as it does with the Rowland.

As to how my sonic impressions of the two amplifiers varied with the loudspeaker in use, I had the most difficulty coming up with a hard preference with the Apogees Stages, perhaps reminiscent of DO's difficulties in finding a
totally happy match for those loudspeakers. But I found my glass 90% full with both amplifiers. The definition and focus of the Levinson was a powerful draw. The palpable quality of the Stages themselves compensated to some degree for a reduction in that quality in the Levinson, making for an overall performance which was detailed, well-defined in width and depth, and appealingly transparent. The Rowland, on the other hand, was a bit more relaxed, less obviously detailed, but with highs which could, with the right recording, be almost breathtakingly delicate and silky-smooth. The Rowland also had a midrange which was lucid, strikingly tactile, and musically convincing. Not an easy choice.

With the M-3s, I had a clearer preference for the Rowland. These speakers have more top-octave energy than the Apogees, making the crispness of the Levinson less appealing. Fortunately, the warmth of the M-3s somewhat balanced out the general coolness of the No.29. But with both loudspeakers, the more effective amplifier depends to a certain extent on the program material. If the latter demands a hard-driving intensity and hair-trigger HF transients, the Levinson excels. If it responds better to a more lyrical quality—to a warmth, fullness, flow, and three-dimensional rendition of instruments and voices—I'd have to come down on the side of the Rowland.

In the interest of fairness, I elected to listen briefly to both amplifiers using a different preamp. The Rowland Consonance was used for the bulk of the auditions for the simple reason that it is my current reference, but one might certainly argue that it could very well be ergistic with the Model 1. When DO (with whom I currently share the Stereophile listening room) wasn't looking, I borrowed the Coda Technologies FET Preamplifier 01 he is currently auditioning and inserted it into my front-end. Everything else in the system was kept the same (at this point the M-3s were in use).

I had listened to the Coda very briefly during the final stages of my review of the Rowland Consonance preamp, and my general impression was that it was an excellent preamp with a somewhat "darker" sound than the Rowland. My general feelings of the relative merits of the two amplifiers didn't change, although with the Coda the Rowland edged a bit further into the "warmth" region, which suited even less material dependent on crisp transient leading edges for its full impact.

You might have figured out by now which way I lean. While I was delighted with the lively, deep soundstage conveyed by the Levinson, and even came to prefer it over the Threshold SA12es for driving the Stages (with most program material), I was ultimately won over by the rich, fluid, naturally textured sound provided by the Rowland throughout the auditioning over both the Mirages and the Apogees. But both of these amplifiers are compelling performers which belong solidly at the top of our Class B "Recommended Components" list. I pondered long on nominating them both for Class A status; neither misses that level by much, and on a given day I could be persuaded to promote them both to the top ranks. For a given listener, in the right system, either is capable of Class A sound.

5 DO keeps his front-end on one side of the room, I keep mine on the other, and we rotate amplifiers and loudspeakers in and out of position as required.

AMPS! AMPS! CALIFORNIAN AMPS!

Corey Greenberg listens to the VTL Tiny Triode monoblocks and the Muse Model One Hundred, Counterpoint SA-100 and Sumo Polaris II stereo power amplifiers.


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Counterpoint SA-100 power amplifier. Hybrid stereo power amplifier. Power output: 100Wpc into 8 ohms (20dBW), 170Wpc into 4 ohms (193dBW). Gain: 30dB. Frequency response: 5Hz–100kHz. S/N ratio (20Hz–80kHz, ref 85W): 92dB. Distortion (1kHz, 8 ohm load): 1% at 100W, 0.7% at 10W, 0.3% at 1W. Output impedance: 0.9 ohms. Maximum current available: 25A rms, measured 1kHz gated On for 20ms, Off for 480ms, into 0.1 ohms. Damping factor: 8.9, referenced to 8 ohms at 1kHz. Input impedance: 100k ohms, 100pF. Signal polarity: non-inverting. Dimensions: 19" W by 4.46" H by 12.68" D. Weight: 28 pounds. Price: $1295. Approximate number of dealers: 140. Serial numbers of review samples: 21H03 (first sample), 91H41 (second sample). Manufacturer: Counterpoint Electronic Systems, Inc., 2610 Commerce Dr., Vista, CA 92083. Tel: (619) 598-9090.

Sumo Polaris II power amplifier. MOSFET stereo amplifier. Power output: 120Wpc into 8 ohms (20.8dBW), both channels driven, from 20Hz–20kHz with less than 0.05% THD; 200Wpc into 4 ohms (20dBW), both channels driven, from 20Hz–20kHz with less than 0.1% THD. SMPTE IM distortion: less than 0.05% (0.25W–120W, 8 ohms). TIM: unmeasurable. Hum and noise: 105dB below rated output, 90dB below 1W. Frequency response: –0.1dB from 20Hz–20kHz, –3dB from 1Hz–200kHz. Input sensitivity for rated output: 13V; for 1W: 130mV. Input impedance: 47k ohms. Damping factor: greater than 500. Risetime: less than 2μs. Separation: greater than 80dB. Dimensions: 19" W by 5.25" H by 11.5" D. Weight: 30 lbs. Price: $799. Approximate number of dealers: 100. Serial numbers of review samples: none (first sample), 3200166 (second sample). Manufacturer: SUMO-Music Communications Systems Inc., 9829 Independence Ave., Chatsworth, CA 91311. Tel: (818) 718-8381. Fax: (818) 718-0267.

During the time of the Native-American Comanches, a young brave had to undergo many trials by fire before he earned the respect of the tribe’s adults. He was violently beaten by the men, humiliated by the women, and forced to endure physical torture such as the slow faying of the foreskin with smoldering pine saplings drawn from the fire. Alienated from the tribe, exiled until he proved his manhood, he had to survive on wriggling cream-colored larvae and infrequent rainwater. Legend speaks of these Indian youths, dehydrated and disoriented, crawling around on their hands and knees and baying like wolves at the moon.

It was at this nadir that the young brave experienced spiritual enlightenment: hallucinations in which a Great Chief rode down from the sky on a brilliant white Appaloosa stallion with flared nostrils and burning red eyes. This Great Chief produced a painted arrow from his headress, with scenes of the birth of man, the struggle for survival, and the horrors of the Apocalypse intricately carved along the wooden shaft. The arrowhead was a flint piece, razor-sharp and glinting in the bright yellow sun, and this he plunged deep into the boy’s heart until it was shoved clear through his chest and emerged out of his back just beneath the shoulder blade.

The young brave cried out, but no blood rushed forth; rather, he saw visions of the Great Plains, of the Comanche Nation leading a union of all tribes against the tyranny of Larry Storch and Forrest Tucker, of himself in full war-paint, his gangly limbs and clumsiness replaced with rippling red muscle and oneness of spirit. As the storm clouds burst open and green lightning danced across the valley, the young brave pulled the arrow from his chest in one long, triumphant gesture and held it aloft for the Great Chief to receive, but when he turned to offer it, the Great Chief had vanished into the blue night sky, leaving only the frenzied hoofprints of the stallion in the steaming mud. Thus, the brave returned to the tribe a man, and was welcomed back with much celebration and wild mushroom tea.

This is why, when JA suggested I listen to a handful of amps for my very first Stereophile review, I instinctively clutched my chest; the Great Chief had ridden right up to my doorstep, albeit in a rented Oldsmobile, and this was my trial. I knew what he was thinking: let’s send this young brave a bunch of amps, all in the same general price range, and we’ll just see if he doesn’t start gobbling caterpillars and barking like a dog.
VTL Tiny Triode monoblocks: $1200/pair
When I saw the single small box from VTL marked "Tiny Triode," I was crestfallen; the other one must have been lost in shipping. To my astonishment, I opened it up to find both amps! You can read the dimensions, you can look at the picture, but you simply cannot get a feel for how tiny these babies are until you hold one in the palm of your hand; they're so cute you want to *burp* them. And it would be no more difficult than with the average infant, as the Tiny Triodes weigh only ten pounds each! In fact, they seem almost too tiny to be "real" tube amps, but that's getting ahead of the story.

The styling, while mostly similar to the larger VTLs, departs from the rest of the line with handsome red-anodized side panels that extend all the way to the top of the amps. Running between the side panels in front of the tubes is a small-diameter metal "nose-guard"; this presumably protects the tubes from being trampled by mice, sea monkeys, etc. VTL usually mounts their power and output transformers above the chassis in full view; here, they've opted for an "L-shaped" chassis, with a raised rear section concealing these parts. Only a single 47µF decoupling capacitor, two 6201/12AT7s, and four EL-84s stick out of the chassis. The actual B+ reservoir capacitors are two 350µF electrolytics hidden in the "tunnel" between the two transformers. Curiously, while VTL has fitted a very high-quality Tiffany-style RCA jack which is gold-plated, the 5-way binding post is not. A nondetachable three-prong power cord is fitted with each Triode; I found it necessary to use a cheater plug on one of the amps to break a ground loop; with both amps grounded they hummed like Druids.

Internal construction looks much improved from various VTL amps and preamps I've seen in the past, although there is still some solder flux present bridging high-impedance printed-circuit traces; the boards really should have been washed. Also, a number of the components are "tack-soldered" to the main PC board. Tack-soldering means that rather than providing a plated hole in the board to secure the component's leads through before soldering, they've simply been soldered on top of the traces. Strictly speaking, this is not good engineering practice, as solder should never be used to provide structural support; only electrical continuity.

I used the same listening system for all of the amplifiers reviewed here. The signal source was a reworked Philips CD-50, the preamp was my active-buffered passive preamp, and the speakers included my Spica Angeluses as well as the Thiel CSI.2s. Interconnects were Straight Wire Maestros, but David Manley also sent along some of the new and unique VTL cable. I say "unique" because the VTL was designed for use as both interconnect and speaker cable!1

1 The VTL cable consists of a twisted array of five Teflon-insulated conductors: three legs of 18ga OFC solid-core and two of 20ga stranded silver-plated OFC, all ensconced in a braided

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Speaker cables were 8' runs of Maestro or Cardas Hexlink Five for the stereo amps; for the Tiny Triode monoblocks, I used 1' runs of the VTL cable. All line-level components were plugged into the Audio Express NoiseTrapper Plus.

Like most amplifiers, the Tiny Triodes sounded overly bright and rough at turn-on; however, this congestion was gone after I let them cook overnight, and thereafter only a half-hour or so was needed for them to sound their best.

And how do they sound at their best?

Considering their size, amazing. Used Within Their Limits (more on this later), the VTL Tiny Triodes are some of the most musical amplifiers I've yet heard. I've always felt the true mark of a great system is when you notice how nice it sounds when you're not really paying any attention to it; I found myself constantly jerking my head up from the table as the Triodes played background music during a meal, struck by a sense of "What the—?! That sounded like a real brushed cymbal!" Or voice, or acoustic guitar, etc. There were nights when I literally couldn't finish reading a book's paragraph because my subconscious kept pricking me in the boot-socks with a syringe labeled "REAL!" In fact, I'd decided early on that it would be useful to write my reviews while listening to music with the specific component I was writing about; I even went and bought a "breakfast-in-bed" laptop tray with legs so I could use my laptop while sitting on the couch in my listening room.

Well, this may sound absurd, but I actually had to replace the VTLs with another amp because I couldn't concentrate on writing their review! Every time I began to write, my mind would wander like it used to in algebra class, only now I was free to blow my work off and kick back without getting beared in the head with an eraser. I tried putting on CDs I don't even like (Merry Christmas From Wayme Newton, Curb D2-77348. Seriously.) to try and focus on the review, but my attention kept snapping back to the music. As good as some of the other amps may have been, only the VTLs were able to consistently and not unpleasantly distract me from the matter at hand, whether it was flailing away on the laptop, reading Bukowski's Post Office, or eating pork ribs from Sam's BBQ.

This startling sense of palpability was most readily apparent on track two of the Groove Holmes/Gene Ammons CD Growin' With Jug (Capitol/Pacific Jazz CDP 7 9293/0 2), the ballad standard "Willow Weep For Me"; on this track, Groove lays out and lets Jug float the after-hours melody out over the candle-lit tables, the golden tone of his tenor punctuated by the clacking of the keys under his fat and nimble fingers. At the end of the song, the rest of the band pauses to let Jug wrap it up solo, and the VTLs put him in the room, as in, here's Jug Ammons, his blue-black hair fried, dyed, 'n' laid to the side, standing dead center and a few feet in front of the speakers. John, you were here, you heard the man; kin ah git uh witness?!

Another good example of the Tiny Triodes' remarkable ability to breathe life into the music was Kris McKay's What Love Endures CD (Arista ARCD-8586); my favorite track is the last, a stunning cover of Billie Holiday's "Don't Explain." This is one of the most realistic recordings of the female voice I've ever heard, and a track I can listen to a hundred times in a row. Unfortunately, producer Barry Beckett (of Muscle Shoals Rhythm Section fame) hoes Kris down with some rather icy digital reverb, but the VTLs placed it farther back in a space distinctly separate from the direct vocal, so I could pretty much ignore it and concentrate on Kris's beautiful singing. As with Jug Ammons's sax, the Triodes uncannily put her in the room; I heard the same effect with Margo Timmons on the Cowboy Junkies' Trinity Session (RCA CD 8568-2-R), which was even more realistically portrayed than the multi-miked Kris McKay CD. With these three recordings (Holmes/Ammons, Kris McKay, Cowboy Junkies), the VTLs came alive to a degree no other amp in this review could even approach.

2 Which is the only way I can use something as an evaluation tool... I gotta like it! I'm sorry; no matter how well-recorded Ana Caram's voice is on the Chesky Test CD, that stuff just isn't my cup o'chamomile. I once had a dream that the Chesky Brothers hitched along with Sherman and Mr. Peabody back in Nashville on '55 and helped Owen Bradley record Patsy Cline with all that 126x-sampling voodoo; that'll teach me to eat pickled okra before bedtime with "I Fall To Pieces" on infinite repeat.

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Unfortunately, it was only these three that made magic with the VTLS; almost everything else I listened to revealed one or more of the amps' weaknesses in ways that made enjoyable listening difficult, if not downright impossible. Anything with a wide dynamic range and/or strong bass (hell, midbass even) caused the sound to collapse in a decidedly abrupt manner; no "soft clipping" spoken here. You've heard the classic line, "Mama don't 'low no gitar"? The Tiny Triodes don't 'low no bass, which means I didn't get to play any Miles, Sly & The Family Stone, or Red Hot Chili Peppers; these are definitely not the amps for the urban dancefloor guerrilla on your Hanukah list.

Earlier, I alluded to limitations with the baby VTLS, and here it behooves us to break down their very name: Tiny Triode. Triode, of course, is the operating mode in which David Manley has chosen to run the output tubes, and, in my opinion, the main ingredient behind the sense of vivid presence. As Manley points out in The VTL Book, there are "triode-phies" silently walking among us who listen only to triode amps and nothing else; there's a certain seductive and engaging quality triode amplifiers seem to have in common, and the VTLS are definitely in that camp. In terms of fleshing out the outlines of instruments and vocals, soundstaging, depth, and that startling sense of "there," the VTLS were far and away the most impressive amps of the group, and the only ones that consistently distracted me from doing other chores around the house!

But as always, every yin has its yang, and here it's the word "tiny." As impressive as they may sound, there is a very real and mostly frustrating ceiling of operation with the Tiny Triodes, and this is where the dream meets reality. I was somewhat skeptical of the 25W VTLS' ability to adequately drive my Spica Angeluses, which have an average sensitivity for sealed-enclosure speakers of 87dB/W/m; David Manley suggests the Triodes be matched with higher-efficiency speakers like Klipsches and JBLs, but he was excited at the marriage of the Triodes and Spicas, and encouraged me to introduce them. And they did sound fantastic together, unfailingly musical even. But whenever I put on a CD with real bass and/or a wide dynamic range, the soundstage collapsed and audible distortion across the band could clearly be heard. The most striking example of this was JA's piano recording of Anna Maria Stanczyk on the Ste-reophile Test CD; even at lowish volumes, the Steinway was robbed of body and low-end extension, and the distortion was audible and amusical. This was not "tube warmth," the euphonic distortion so beloved by many audiophiles; this was IM and odd-order distortion if I ever heard it.

There has always been the tendency of some audiophiles and manufacturers to separate "tube watts" from "transistor watts"; "Tube watts are louder," says this camp, and while it may be a romantic notion, it just ain't so. Watts is watts, shoot they out of a tube pin, a transistor lead, or fully grown out of Zeus's split skull. The reason for tube amps' greater apparent loudness is their Grace In Overload; most tube amps clip very gradually and gracefully when driven beyond their limits. Most transistor amps, on the other hand, reach a point where everything's hunky dory right up to rated-output, then WHAM, the distortion suddenly shoots up into many tens of percent of mostly odd-order products; this edgy, unpleasant behavior when driven into overload is why transistor amps of the same rating usually don't sound as dynamic as their tube brethren.

The Triodes tended to run out of steam more like a transistor amp than a tubed one; that is, they reached a point where the gently rising distortion just shot up into the rafters, scattering some nesting bluebirds who were grooving to the Ammons CD. The Tiny Triodes are rated at 25W and they sound as if they meet that spec and no more. Don't push them beyond those 25W; they, and you, won't like it.

Conclusion
I have always had a tendency to label things "The X of Y's," as in "The Dr. Seuss of riot guns," "The macaroni and cheese of sports cars," "The duck-billed platypus of the Third Reich," etc. Well, these Tiny Triodes are, to my way of thinking, "The Spica TC-50s of amplifiers": they don't go low in the bass and you can't play them very loudly, but when Used Within Their Limits, they sound utterly terrific! This is the best way I can describe them in terms of what they do so well vs where they fall short.

At $1200 the pair, the Tiny Triodes come under some stiff competition, most noticeably from the Muse Model One Hundred reviewed in this issue. The Muse is a more capable amp all around, and I suspect it would be

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the better choice for most audiophiles interested in a wide range of music. Also, for nearly the same amount, a pair of B&K ST-202s or Adcom GPA-555 IIs can be had, delivering far more power and better bass capability. I haven't heard the B&K, but JA sent along the new Adcom for me to listen to in comparison with the other amps, and I agree that it is much better than the original 555. However, in direct comparison with the Triodes, only the VTLs drew me into the music. The Adcom never flinched, but neither did it seduce; the Triodes made me put down a barbecued pork rib with Sam's spicy sauce dripping down my arm in mid-bite to stare slack-jawed at the Spicas teleport Jug Ammons into my living room!

I asked the same question of everyone who came over and heard them: "Would you buy these $1200 25W amps that have no bass and don't like to be driven hard?" It was like asking them if they'd buy little Scotch terrier pups that whizzed on the carpet and chewed the upholstery: "But they're so cute," often babys, talked with one or both of the amps resting in the palm of their hand.

Now, would I buy the Tiny Triodes? Hard call. Of all the amps I listened to here, the VTLs had the most uncannily realistic sense of space and presence, but were ultimately frustrating to listen to with most of my favorite music; Elvis was not put here on Earth to sing "Do The Clam" at 65dB. The Triodes make me want to hear VTL's larger amps in my system, particularly the larger triode models like the 300B models and the Deluxe 225 monoblocks that have RH so entranced. At $1200, the VTL Tiny Triodes must be considered specialty amps; that is, for the select few who aren't particularly bothered by the low power and lack of real bass. If this applies to you, I can definitely recommend them. They are, limitations aside, a whole mess of fun!

**Muse Model One Hundred:**

$1200

"I've known I've seen this amp before," I thought to myself when I lifted it out of the box, and I wasn't thinking of RH's review of the identical-looking Muse Model One Hundred Fifty reviewed in Vol.13 No.1, either. No, I'd seen this amp before, somewhere else, in some other magazine, but with a different manufacturer's name.

I knew it! It was in an issue of Home & Stuido Recording, but I'd just thrown it out with a bunch of other old magazines. And trash pickup was today! I threw open the door to watch the garbage truck blunder down the street, my trashcan lid still rolling across the front lawn. As luck would have it, I was wearing my Nike hightops; "Just do it," they seemed to sing like the sirens who had lured so many brave sailors to their watery graves. But my name's not Popeye.

I sprinted down the street after the truck, shouting, "Stop! Please! Stop!" The driver saw me in his rearview mirror and slowed down. Just as I reached the back of the truck, he gave it the gas and the truck lurched forward, the driver's leering face framed in the rearview like some abstract work called Early Hominid in Grey Overalls. Panting like a dog, I chased after him again, and this time when he slowed I sped up, and before he realized what happened I was right alongside the driver's seat, with a head like a caveman's glaring at me from under a dirty maroon baseball cap with the message, "Muscatel: It's Not Just For Breakfast Anymore."

I went back around the garbage truck and peeked inside; there was the issue of HESR I was looking for, nestled comfortably between a pair of size 72 men's underpants and what I will swear on a stack of Radio Shack Electronic Bibles was a human skull with a bit of hair still on it. Holding my nose with one hand, I reached in with the other and slowly extracted my magazine, a little damp and stained but still in one piece. I walked back to the front of the truck to thank the garbage man, but he just grunted something that sounded like "Truckfluidyeti" and drove off.

I got the mag home and there it was, a picture of the Muse's identical twin: Sound Code Systems. And, as I often find out later, the information I just busted my ass for had been right under my nose the whole time, in the letter from Muse's Kevin Halverson. Aw hell, it's not every day you get to meet Piltdown Man.

RH covered the MuseSound Code Systems story in his review of the Model One Hundred Fifty, so I won't repeat it in detail here; in short, SCS builds rugged, conventional amps for sound reinforcement and recording studio monitor systems, and Muse builds more refined, high-end amps for the audiophile market. And while the two companies are indeed separate entities, Muse is able to take advantage of their shared lineage (and manufacturing site) in sev-
eral important ways. For starters, both amp lines use the same chassis, so this part of the design cost for the Muse amps was nil. Also, their combined purchasing power allows Muse to obtain higher-quality components at the same prices most other two-year-old companies pay for run-of-the mill parts. Kevin stresses, though, that while the two amp lines may look alike, their designs reflect their very different markets.

Now wait a minute, I hear you saying; why don’t recording studios use audiophile amplifiers?3 Shouldn’t they use the best, so they can better judge what their mixes sound like? And why don’t dogs dance the rhumba with cats?

One word: reliability. For various reasons, most broadcast and recording studio engineers feel that audiophile amplifiers a) break down, and b) don’t sound any different from the Crown and Peavey amplifiers most of them swear by. I happen to disagree on both counts. While there have been certain audiophile amps that have had poor reputations for reliability, I would say that this has been an area of great improvement. And quite frankly, I’ve never heard a pro audio amplifier that I could ever call “musical”; most are rather hard-sounding, with an overly bright high end and glassy mids. Ironically, it’s this kind of “golden-ear” nonsensical babble that makes most recording-studio engineers chortle into their copies of Mix magazine.4 Monitor amplifiers used in pro environments need to be absolutely reliable; failures translate to expensive downtime, resulting in blown sessions and irate producers and performers. Pro amps tend to be built to a tougher standard than most audiophile units; these amps have to work even after falling out of a moving truck, sitting under water in a flooded facility, or worse. Additionally, most pro amps have elaborate protection circuits that guard against dead shorts in the outputs, overheating, and continuous overload. Unfortunately, most of these circuits degrade the sound, but the pro user is more than willing to make that tradeoff as he doesn’t believe in audible differences between amps anyway! I feel that the reliability of many high-end amps is in the same class as the “ol’ faithful” pro monitor amps, the Muse Model One Hundred certainly looks as rugged and reliable as any Crown I’ve seen, and sounds substantially cleaner and less fatiguing.

The Model One Hundred (henceforth called the 100) reviewed here is actually a redesign of Muse’s original amplifier of the same name. The engineers at Muse, after extensive listening with electrostatic speakers revealed serious limitations in the older amp, decided that two areas needed improvement: the number of output MOSFETs and the feedback scheme. The results of this rethinking were the Model One Hundred Fifty monoblocks which so impressed RH. After hearing the improvements in the mono 150s, Muse decided to go back and implement these changes in the stereo 100 as well. The number of output MOSFETs was doubled to six per channel (three complementary pairs of Hitachi J50s/K135s), but perhaps even more interesting was the change in feedback topology.

In the original 100, Muse used global feedback exclusively. With global feedback, the entire amplifier is treated as a single gain stage, with a portion of the output fed back to the

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3 As in most generalizations, there are always the exceptions: some engineers, like The Mastering Lab’s Doug Sax, have used high-end tube amps in their monitor systems for years. It’s been my experience, however, that they’re far outnumbered by studios equipped with the likes of Crown, Peavey, et al.

4 And it’s that kind of attitude that makes audiophiles chortle into their copies of Stereophile . . . round and round and round we go; where we stop is the subject of an AES preprint, “How I Stopped Worrying And Learned To Love The Double-Blind Test.”

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input to cancel distortion and lower output impedance. While it does both well (at least on steady-state signals like sinewaves), global feedback tends to make for a less-stable circuit, especially when driving reactive loads like electrostatic speakers. The alternative to global feedback is local feedback; that is, each individual stage of the circuit is given its own separate feedback loop, the result being better sonics and increased stability.

The downside to purely local feedback, however, is a higher output impedance; Muse discovered they could combine the superior sonics of local feedback with the lower output impedance of global feedback by using both. Feedback from three separate points in the circuit is sent to a simple resistive mixer, which allows Muse to vary the ratio of global vs local feedback to achieve the best of both worlds. Muse calls this approach "Mixed-Mode" feedback, and Kevin feels it's largely responsible for the sound of the new 100.

If there's one word that sums up both the external and internal construction of the Muse 100, it's "clean." The internal parts, what few there are, include high-quality metal-film resistors and film capacitors. Interestingly, the film caps bear the "SCS-Muse" name, and appear identical to the excellent Rel Caps. The brushed aluminum front panel, with its eight shiny hex-bolts, exudes a feeling of understated solidity.

I have only two complaints, one practical and one personal. On the practical side, Muse should have provided the 100 with binding posts that could be tightened with a nut-driver; the round, ridged posts on the 100 are difficult to really tighten down by hand, and will most certainly be disfigured if a wrench is taken to them. On the personal side, the red lighted on-off switch on the front panel was too bright and distracting for my tastes; I stuck a piece of black electrician's tape over it, and decided not to invite Mr. Blackwell over to hear the new Iggy Pop.

As with the other amplifiers on review here, my listening system included my reworked Philips CD-50 and my buffered-passive preamp. All line-level gear was plugged into an Audio Express NoiseFrapper Plus. Speakers were the Spica Angeluses and Thiel CS 1.2s. Interconnect was Straight Wire Maestro, with 8' runs of both Maestro and Cardas Hexlink Five speaker cable. Whereas the Maestro sounded smoother and more natural, the Cardas gave a brighter presentation that was welcome on some CDs, annoying on most. As I felt the overall sound to be more neutral with the Maestro, I stayed with it for the listening sessions.

I hooked up the Muse right after finishing up with the VTL Tiny Triodes, and suddenly there was bass! And this was good. Now I could haul out all the dynamic music that had given the smaller VTLs so much trouble and roll up the rug! And this was even better.

The Muse 100 immediately made a good impression, with an effortless sense of dynamics that would delight in any circumstance; coming as it did directly after the 25W VTLs, listening to music with the Muse was like finally filing off too-tight handcuffs. Coupled with the Spicas, the 100 sounded fast, accurate, and highly musical.

Just to make sure I wasn't overly enthusiastic over the Muse's bass after listening to the smaller VTLs, I compared it with the Adcom GFA-555 II. While this amp is mostly pleasant but not exactly stirring to my ears, its bass is awesome. Listening to both amps, I felt the new Adcom to have the slightest of edges in the bass. While the Muse sounded extended and tight, the 555 II was so tight it was almost anal-retentive! The overdamped bass of the Angelus was perfect for this comparison; while the Adcom locked the woofers in a full-nelson, the Muse's presentation tended to be slightly warmer, and actually more realistic overall. The tympani rolls on the first movement of Hanson's Symphony I in e on the fine-sounding Mercury Living Presence CD (Mercury 432 008-2) came across as weighty and taut on the Muse, while the cellos were reproduced with appropriately satisfying "growl." On recordings with strong electric bass, the 100 fared exceptionally well: Flea Balzary's thumb-slapped intro to "Behind The Sun" (Red Hot Chili Peppers, The Uplift Mojo Party Plan, EMI/Manhattan CDP 7 48036 2) pulsing deep and true, with excellent pitch definition as he slides down the neck toward the tonic E. In addition, the finger-squeaks and fret rattles are reproduced as part of the bass-line, not disassociated spurious. As I mentioned before, the Adcom had marginally tighter bass, but it was only in the bass that the Adcom was a real challenger; the twice-as-expensive Muse 100 bettered it in every other area of music reproduction.

While the 100 didn't quite have the vivid

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5 Not that I'd know what this feels like, of course.
sense of “there” of the VTL Tiny Triodes, it
came much closer to them than the other amps
reviewed. The music, while not quite in my lap
as with the Triodes, was slightly forward and
alive; definitely akin to the better tube ampli-
ifiers I’ve heard. The Muse acquired itself brilli-
antly with recordings that depend on low-
frequency weight and definition to recreate
the original acoustic. On the Cowboy Junkies’
*Trinity Session*, the first track begins with noth-
ing save for the ambient noise of the church:
there’s some massive low-frequency noise
accompanied by some random tapping in the
distance, and the 100 decoded this information
in a 3-D manner that made it very easy to hear
the rear wall of the church. The Muse’s excel-
alent soundstaging capabilities were also dem-
onstrated on this recording, as well as on the Chesky
Test CD; the ever-funky Bob Enders could
clearly be heard both behind and beyond the
speaker positions. And during the guitar solo
on the *Trinity Session*’s “Blue Moon Revisited
(Song For Elvis),” the reverb of the softly ampli-
fied guitar can be clearly heard bouncing off
the rear and side walls of the church, creating a
huge sense of depth well behind the plane of
the speakers. This sense of depth is accompa-
nied by what I feel is the Muse’s strongest suit:
its incredible detail.

Now, I have to admit to rereading RH’s review
of the Muse 150s after my listening sessions but
before hunkerling down to write this review;
I didn’t want to cover the same technical ground,
and I definitely didn’t want to sound like I was
merely repeating his sentiments on the sonic
characteristics. But reading his review in Vol.13
No.1, I saw that he’d heard from the 150 mono-
blocks exactly what I was hearing from the 100:
an extraordinary sense of detail, but thankfully
devoid of the hardness and sterility that usually
go hand in hand with this trait. In fact, the high
end is quite open and smooth, again more like
a good tube amp than solid-state.

Listening to music on the 100, I was hearing
things buried in mixes that I’d never been aware
of before. On the Vaughan Brothers’
*Family Style* (Epic CD ZK-46225), the aptly-
named “Hillbillies From Outer Space” features

Jimmie Vaughan playing a too-cool Bob-Wills-
meets-Jimmy-Smith riff on a lap-steel played
through a Leslie rotating-speaker cabinet, over
a loping groove both Spade Cooley and
Booker T. and the MGs would’ve been proud
of. Since purchasing this killer disc, I must have
listened to it hundreds of times; It’s that good.
But until I played it with the Muse 100, I never,
ever heard the “Whew, ha!” at 1:44 into the
song! At first I thought, as is usually the case,
it was my next-door neighbor finally getting
a question on “Jeopardy” with his doors and
windows open. Playing the track again con-
formed that the shout was indeed buried way
down in the mix, but easily heard with the
Muse. Also, I went next door and saw that he
was instead watching “Hollywood Squares,”
and was thus thoroughly stumped into silence.

This sense of detail was extraordinary. The
easy clarity of the Muse consistently revealed
nuances and tidbits heretofore hidden. Another
CD that’s seen it’s share of time in my player
and then some is the Neville Brothers’
*Yellow Moon* (A&M CD 5240), by far my favorite
of their post-Meters output. On the beginning
of Sam Cooke’s “A Change Is Gonna Come,”
Aaron Neville can be heard counting off the
song, “One, two, three…” all by himself.
Listening with the Muse revealed what sounds
like a very faint electric fan in the studio, proba-
ably there to cool off the not-insubstantial
singer from the not-insubstantial Louisiana
humidity. Again, the Muse was able to reveal
detail that had been obscured by the other
amps, and this exciting aspect of the 100’s per-
formance was noticeable even during casual
listening, inviting the listener to focus in on the
music and get “lost in the fractals.”

**Conclusion**

Tonally, I have no complaints with the Muse;
it bonded synergistically with the Angeluses,
offering a detailed and neutral sound that
changed character completely with each new
recording. All too often, a component’s signa-
ture can be gleaned, after a few hours’ list-
ening, from the “samey” sound heard when
many different recordings are played. The
Muse is one of those rare products that’s dif-
ficult to fault; the excellent performance across
the board makes it very easy to forget about it
and concentrate on the music; a higher com-
pliment I can’t pay.

Up till now, I haven’t heard a solid-state amp
I could live with for under $3000; I definitely prefer tube amplifiers for their more natural presentation and lack of hardness in the midrange and high end. I've heard solid-state amps with fantastic bass but ragged highs, sweet highs but depressed midrange, tubey midrange but flabby bass, etc., and it seemed like you couldn't have it all for under three grand or so. The Muse Model One Hundred is an amp that I could not only live with, but do so very happily. I'm extraordinarily picky when it comes to amps, especially solid-state, but the Muse never failed to enthrall and involve me in the music without a hint of strain or coloration. Perhaps in the company of superamps like the Krells, Levinsons, and Thresholds, the Muse 100 might sound more limited; I can't say. But I can say that in its heavily populated price range, the Muse is the most impressive I've heard by a wide margin. Highly recommended.

**Counterpoint SA-100 power amplifier: $1200**

The Counterpoint SA-100 amplifier came up to bat fourth in my listening sessions, behind (in order of appearance) the Adcom GFA-555 II (not reviewed here, but sent along by JA for comparison purposes), the VTL Tiny Triodes, and the Muse Model One Hundred. Thus, my progression went from bipolar solid-state to tube to MOSFET, with a wide spread of sonic characteristics between them: stygian bass from the Adcom; uncanny spatial presentation and vocal reproduction from the VTLs; and an overall superior sound from the Muse. I was therefore eager to see where the tube/MOSFET hybrid Counterpoint would fall in this group of very different-sounding amplifiers.

The external appearance of the SA-100 is conservative and simple, the brushed black (silver is also available) front panel simply carrying the on/off switch and the status LED; this last glows red at turn-on, green once all systems are go. It takes a full minute for the LED to change from green to red; as with traffic lights, this is one of the longer minutes you'll encounter. The back panel sports gold-plated binding posts and RCA jacks, as well as the nonremovable AC line cord. I have a problem with the size of this cord; 18ga cable may suffice for preamps and CD players (many designers would opt for a heavier gauge even with these line-level components), but I feel that the power-line cord of a power amplifier, especially one rated as powerful as the SA-100, should be larger for better current delivery to the power supply. In comparison, both the Adcom and Sumo have 16ga AC line cords, with half again as much conductor diameter. The Muse comes supplied with a hefty 10ga AC cable.

Removing the top cover revealed a most impressive interior: parts quality, layout, and construction were all superb. Wima metallized-polypropylene and Wonder caps, Resistta metal-film resistors, and several small-value polystyrenes populate the circuit board. The main power supply consists of two rectifier bridges, one for each channel, smoothed by separate cap banks totaling 32,000uF per channel. Since both rectifier bridges are fed by the SA-100's single power transformer, I guess the power supply can't be considered dual-mono by those totalitarian separatists who insist upon complete isolation between channels, and frowned upon using the same Q-tip to clean both ears. An interesting aspect of the SA-100's design is the material used for its chassis: copper-plated steel. In the promotional literature and owner's manual, Counterpoint makes much of the contribution of this unique chassis material to the overall sound quality, due to the copper plating shorting out the current-induced hysteresis distortion of the steel. "Listeners report that a copper-plated chassis makes the bass tighter, offers increased transparency, and removes a 'dark overhang' that was clearly audible when
compared against the same circuitry in a chassis of more conventional material," says Counterpoint's White Paper #2 with a straight face; I would have liked to hear two identical SA-100s, one with the copper-steel chassis and the other in a conventional all-steel or aluminum one in order to verify these claims; however, manufacturers such as Superphon and DNM have also spoken loudly of their special chassis materials as contributors to sound quality.

The Counterpoint's hybrid circuit uses two 6DJ8 dual-triodes per channel for its input and driver stages. The SA-100's tubes are Counterpoint's own selected parts; according to the owner's manual, every tube that leaves the factory in an amp or preamp has had over 200 hours of burn-in and 35 individual tests and measurements. As used in the SA-100, voltage amplification is derived from the two sections of a 6DJ8 configured in a cascaded common-cathode arrangement. Local feedback is used to improve linearity, and global feedback is returned to the cathode resistor from the first stage of the cathode-follower driver stage, this consisting of one section of the second 6DJ8, the other section serving as its current source. Counterpoint feels that using a section of the 6DJ8 as a current source achieves better linearity than the more common resistor-loaded topology. This driver section is AC-coupled to the output MOSFETs with 1μF Wima metallized-polypropylene caps.

The output section consists of two paralleled N-channel and P-channel MOSFETs per channel, biased for class-AB operation. Counterpoint states that these devices are biased to a very high standing current; I can definitely attest to this, as the amp ran extremely hot even during idle; with music material, the heatsinks were too hot to leave my hand on.

In the Counterpoint SA-100 we have a well-built circuit using selected tubes in a high-linearity topology for the delicate input and driver sections, right where we want tubes to be for their superior voltage amplification abilities; MOSFETs in the output section, devices that combine the sound of tubes with the current drive of solid-state, biased heavily into class-A; the finest passive components available in Wonder and Wima film caps and Resista high-quality resistors; heavy copper pcb traces, good layout, superb construction; and even the chassis is all-out, its copper-plated steel designed to improve the sound beyond that which the exact same circuit would achieve in a steel or aluminum box.

So why did it sound so bad?

I wasn't prepared for this. I mean, I was really expecting something special from the Counterpoint; everything about its design and construction points toward superlative sound. Counterpoint's flagship SA-4 amplifier has an excellent reputation, as do the various Counterpoint preamps. If ever a product had a background of sonic excellence, it was this one, but I absolutely could not believe how flawed the SA-100 sounded, from top to bottom. The amp had been left on continuously for a couple of days before I listened to it, but with no music playing; in order to give it the benefit of the doubt, I put the soundtrack to Superfly on infinite repeat before leaving for work the next morning. When I came home that evening, I wiped my mental slate clean and listened to the Counterpoint again. No difference. Ten straight hours of "Freddy's Dead" and "Junkie Chase (Instrumental)" hadn't improved a thing besides my mailman's day.

Where to begin? The bass was boomy and distorted, with extremely poor pitch definition. The Counterpoint rendered the low end as a separate, disconnected entity from the rest of the music; without the bassline implying movement, music lacked the tension and release so vital to the emotional ebb and flow that must be there for my monkey bone* to vibrate.

The midrange was the least satisfying I have heard from any amplifier in a long time. Vocals came across as harsh and congested, with a throaty coloration apparent on both male and female voice. On the Trinity Session, Margo Timmins's ultra-clear voice sounded gravelly and dry, almost as if the Cowboy Junkies were suddenly fronted by Koko Taylor. The midrange and high end shared the most amusical characteristic of the SA-100: a hard spittingness

7 Curtom Cuz 2002-CD. One of my all-time favorites and probably not in stock at your local music emporium, so call Ichiban Records at (404) 926-9377 to order a copy. I paid $25 for the LP at a used-record store three years ago, but the Curtom CD sounds much better. On a sadder note, Superfly's composer, soul great Curtis Mayfield, was paralyzed by a falling lighting rig at a concert last year. He is reportedly doing well, but it looks like the paralysis is permanent.
8 The monkey bone is the structure that encompasses the spine, skull, and hip bone. As there is a wide variation among monkey bone resonant frequencies between different people, so is there a wide variation in musical tastes. Some monkey bones sympathetically vibrate the strongest in the presence of classical music; my monkey bone has the letters R&B branded on the pelvis like a can of Mighty Dog.
9 Now there's a visual...

Stereophile, April 1991
that laid a halo of hash over everything. This was not a subtle effect; it rendered even my favorite discs unlistenable.

The high end of the Counterpoint was bright, grainy, and painful to listen to at any but the lowest volume levels. On the Ray Charles/Milt Jackson cut "How Long Blues" off the Soul CD (Atlantic Jazz 7-81708-2), Milt’s vibes and Billy Mitchell’s tenor are the only bright-sounding instruments on this slow, soulful blues; everything else is vintage Atlantic Ahmet’n’Nesuhi smooth. Brother Ray’s piano (bless Tom Dowd, again) was miked from a good distance and sounded that way with the Muse. The Counterpoint added a tinely quality to the piano that sounded very unnatural. In addition, Connie Kay’s brushed hi-hat, normally very much in the background and softly rendered, became harsh and distracting. The effect was very similar to the infamous Aphex "Aural Exciter"\(^{10}\) circuit so abused by many pop producers, and one which never fails to set my teeth grinding. I can listen to dull, sterile amps all day long, but the SA-100 was so irritating in so many different ways that I dreaded my sessions with it during the month and a half I had to evaluate it.

After swapping cables, lifting the ground pin, changing the AC polarity, changing the absolute polarity, anything to get it to sound decent, I decided to give the SA-100 my Ultimate Test; I lit the five blue candles in the shrine, said a silent prayer, and slowly placed Elvis’s Sun Sessions (RCA CD 6414-2-R) into the player.

Most music-lovers have several records they call their favorites, in no particular order. Ask them to choose just one and they’ll likely whine that it’s impossible; how can you possibly choose between the Beatles and the Stones, Basie/Ellington, Muddy/Wolf, Monkees/Banana Splits? For me, there’s no contest: *E*L*V*I*S*S* *S*U*N*S* *S*E*S*S*I*O*N*S*. Everything else comes in a distant second. Suffice it to say, if any CD was going to sing to me through the Counterpoint, it was going to be Sun Sessions.

Oh my God in Heaven . . .

Bill Black’s doghouse slap-bass sounded like a tuba along with someone playing the spoons on their knee, and Scotty Moore’s guitar solos had a stridency I know isn’t on the CD. But worst of all, Elvis’s vocals became harsh and steely, with distorted sibilance and that throaty coloration I mentioned earlier. I still can’t quite believe it even now, but for the first time ever, I couldn’t listen much more than halfway through “Blue Moon of Kentucky”; the Counterpoint’s time was definitely up.

Conclusion

Reading this review, one is mightily tempted to discount it outright; no amp could be that bad. Surely I exaggerate, perhaps put off sufficiently by one or two areas of weakness to dump on the whole spectrum of performance. Unfortunately, that’s not the case here.

I’ll leave a conditional opening here, as I find it hard to believe any established high-end manufacturer would let something this flawed out the door. I suspect that something is very much amiss inside this amplifier; if it’s defective or broken in any way, then I would welcome the chance to hear a properly functioning unit. But if the amp I listened to represents a fully functioning SA-100, approved by Counterpoint as a sterling example of their line, then I can’t possibly recommend it for music listening. Until I hear from Santa Fe or Vista that the SA-100 I listened to was defective, that’s where I stand.

Counterpoint postscript

Shortly after my review hit Santa Fe, TJN called to say that he’d arranged for Counterpoint to send along another SA-100; evidently, the amp I heard was one of the first hundred off the line, and Counterpoint’s John Fermín felt that it might not represent a typical SA-100 as well as a current unit. The new amp arrived a few days later, but just as I was about to listen to it after a few days’ burn-in, TJN called back, telling me that Counterpoint had sent it with the wrong input 6DJ8s, and that the new tubes were en route. But didn’t Counterpoint subject these tubes to a couple hundred hours of measurements and listening tests, as they said they did in the manual? Why hadn’t they found out they had the wrong tubes then? No matter; the new tubes arrived a couple of days later, and after swapping them out and letting the amp cook for a week, I sat down to listen. At my request, the original SA-100 I had sent back to Santa Fe for measurements was returned to me, in order to compare it with the new version.

The new Yugoslavian tubes definitely looked

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\(^{10}\) An Aphex “Aural Exciter” is, pure and simple, a distortion generator. It takes the incoming audio and generates a second signal comprised of low-order harmonic distortion, which is then mixed back with the original audio, the ratio of course being adjustable by the “Excitement” knob on the front panel. And they called Caligula mad.
different from the Chinese 6DJ8s in the original amp. They looked identical to the tubes that came in the second SA-100, but I switched them out anyway for my listening. The new amp appeared to be identical in circuitry and parts to the original SA-100, with one curious exception: on the original amp, the ground lugs of the input RCA jacks were taken to circuit ground via insulated solid-core wire directly to the pc board below, while the second SA-100 took a different route to ground, winding between components across the board toward the middle and finally terminating at a different location. As far as any operating differences went, the new amp was slightly more sensitive than the first, although this could have been due to many factors other than the change in input tubes. The levels for the two amps were matched using a digital multimeter at the speaker terminals, with track one of the Stereophile Test CD serving as a -20dB, 1kHz reference tone.

To start things off, I listened to the original SA-100 playing JA's recording of Anna Marla Stanczyk's piano on the Test CD. For about a minute. Then I switched to the new Counterpoint, and it was immediately obvious that something was very, very wrong with the first amp. But was there something very, very right with the second?

The new SA-100 sounded clearly better than the original, virtually across the board. That's not to say it was a great amp, though; there were still traces of the grain and indistinct imaging and soundstaging I heard with the first amp, although to a much smaller degree than before. What was once an intensely irritating halo of hash surrounding each note was now simply a bit of grain no worse than, say, the original Adcom GFA-555. Which wasn't great news, but at least a step in the right direction.

The bass was leagues better, however. No longer did it disembowel the bassline from the rest of the music; firmed-up and drier, it sounded quicker and cleaner than SA#1. The midrange, too, was much improved, cleaned up almost to the point of reticence. While SA#1 spat vocals and instruments like sax and piano at my face in disgust, SA#2 presented the midrange with more finesse and much less edginess. The difference in midrange presentation was, aside from the large reduction in audible distortion, the most noticeable improvement in the newer Counterpoint. Again, though, it should be noted that these improvements are relative to SA#1; the midrange of SA#2 was considerably more veiled than the Muse Model One Hundred, and just slightly less musical than the less-expensive Adcom GFA-555 II. Again, it was a huge step up from SA#1, but still short of the mark set by not only the Muse but the Adcom as well.

The highs were listenable, but still carried a tiny bit of the glare I heard from SA#1. Cymbals were much, much smoother, but never came alive as they had with either the Muse or the VTL Tiny Triodes. Whether it was due to the reduction in distortion or some other aspect of the new tubes' influence on the overall circuit, SA#2 had a more laid-back presentation through the highs than its predecessor. Definitely more musical, but not really all that involving on my Angeluses.

I'll tell you what, though: I could and did listen to SA#2 for hours, enjoying old favorites and new raves alike with nary a complaint, while I couldn't even listen once to Elvis's Sun Sessions on SA#1. And I can listen to The King on wheezing truck-stop Rockolras without thinking about anything but how good that chicken-fried steak feels in my belly; that's how bad SA#1 was, and how much better the second amp sounded.

So is the current Counterpoint SA-100 a contender? I'd have to say that, even with the large improvements wrought by the Yugo 6DJ8s, no. Not with the Muse Model One Hundred available at exactly the same price. The Muse betters the Counterpoint in every area, and not by a small margin. The Muse 100 is by far the most musical solid-state amp I've heard anywhere near its price range, and the Counterpoint just couldn't begin to compete in my system in the areas of musical involvement, dynamics, and freedom from grain and coloration. If the Muse sold for twice what the Counterpoint goes for, I might be tempted to recommend the SA-100. After all, it's really no worse than most of the other $1200 solid-state amps I've heard, and in some areas it's quite competitive. But the Muse Model One Hundred doesn't cost twice as much; at the same price as the SA-100, it's a stunner, without equal until you get up into the high two-thousands, low threes. And that's why the Counterpoint doesn't get the nod. I would suggest, however, that current SA-100 owners check their input tubes. If your 6DJ8s are the older Chinese versions, replace them with the new Yugos ASAP.
Sumo Polaris II power amplifier: $799

What's in a name? Quite a bit, when you stop and think about it. Would you rather have prostate surgery by Dr. Steadyhand or Dr. Whoops? Names imply a lot, even if we don't consciously make the connection; that's why your Polo shirt was made by Ralph Lauren instead of Ralph Lipshitz.

Which brings us to the amp in question: the Sumo! Now, what picture pops into your head at the word "Sumo"? For me, it's two words: BUTT CHEEKS. I see huge, rolling, shuddering butt cheeks spilling out of black cotton Pampers while two Japanese Michelin Men alternately hug and gut-slam each other out of the ring and solemn judges in identical black business suits seated at the dais score what looks like the dancing hippos scene from Fantasia. I see rushes the size of Land Rovers, with laughing dimples deep enough to store grain. Lower-case letters simply don't do my mental image justice; I see BUTT CHEEKS.

So what does all that have to do with the Sumo Polaris II amplifier, you ask? Quite a bit, actually. The words butt and cheek figure strongly in the sonic character of the amplifier. But first, the diapers.

Externally, the black brushed-aluminum chassis looks very solid, with the gold-lettered words "Sumo," "Polaris II," and "MOSFET" flanked by two wide rack handles. On the backside of the Sumo can be found the usual 5-way gold-plated binding posts, fuse holders, and detachable IEC-style three-prong AC cord. Looking at the gold-plated RCA input jacks, I was surprised at such a cheap-looking part on an otherwise well-built amp; closer inspection revealed these to be very good jacks indeed, with an internal spring that grips the RCA pins tightly. In comparison, the RCAs of the similarly priced Adcom GFA-555 II I had on hand, while more impressive-looking, had extremely low contact pressure and offered almost no resistance to the insertion and removal of interconnect cables. RCA plugs and jacks are already less than ideal for audio signal interconnection; high contact pressure is mandatory for good sonics and reliable operation.

The interior of the Polaris is modest, with decent components11 and soldering work. A couple of things bothered me about the construction and wiring, though: first, many of the connections in the signal path and power supply are made with tin slip-on connectors. I would have much rather seen good soldered connections here, especially in the audio signal path. For example, the hookup wire carrying the output signal to the 5-way binding posts is connected to the board with these low-grade tin slip-on connectors; I question the benefit of high-quality gold-plated binding posts when the entire music signal has just passed through a cheap tin-tin contact junction. The other anomaly I found was with the output wiring's layout; each channel's output MOSFETs are mounted on the opposite side of the board to their output binding posts! This means that the hookup wires taking positive signals to their respective posts travel the entire width of the board and crisscross each other in intimate proximity. Contrast this with the Muse Model One Hundred, which dispenses with output wiring entirely; its air-cored output inductor is the output wiring, with one end soldered to the board and the other soldered to the output binding post. Finally, the owner's manual states that the Polaris's inputs are AC-coupled with

11 I did see two 741 op-amps; these appear to be part of the servo circuit that prevents DC offset on the outputs.
Mylar caps shunted with polystyrenes; I saw a single 2µF Mylar cap per channel, with no bypasses. Needless to say, even with a good polystyrene bypass cap, Mylar is hardly the best-sounding dielectric to use as the input coupling cap. Without a bypass, it will surely degrade the audio signal as compared with the high-quality Wonder, Sidereal, and Rel polypropylene caps used by most high-end manufacturers. Sumo shouldn't have scrimped here.

The Polaris's circuit couples an all-discrete bipolar class-A input stage with a MOSFET output section. Sumo's "TL" circuit, said to provide Transconductance Linearity, is employed to improve performance without resorting to high levels of negative feedback. In addition, a slip-on connector can be switched inside the amplifier to convert it to bridged mono operation; according to the manual, this provides 400W, with no load specified. As I only received one Polaris, my audition was of the amp in stereo mode only.

The listening setup remained the same as with the other amps on review. My self-modified Philips CD-50 fed my buffered passive preamp, this connected to the amplifiers under review. Interconnects and speaker cables were Straight Wire Maestro. Speakers were either Spica Angeluses or Thiel CSI.2s; all line-level gear was plugged into the Audio Express Noisefrapper Plus.

Now, what of the significance of "butt" and "cheek"? These seemingly ordinary words take on great import when discussing the sonic characteristics of the Polaris, as they represent the opposite poles of its performance axis.

First, the good news. In my "Audio Glossary," "butt" means bass, and this is where the Polaris shines brightest. Like the Adcom GFA-555 II, the Polaris has very deep and tight bass, with excellent pitch definition and clarity. On "Big Enough," the first track on Keith Richards's Talk Is Cheap (Virgin CD 7 90973-219), there's some powerful kick drum courtesy of Steve Jordan, along with some truly demented bass throb'n'gurgle from the master his own self Bootsy Collins. Through the Polaris, the bass was deep and taut, with excellent control and detail. I felt the bass of the Polaris to be only slightly more diffuse than that of the Adcom, and on a par with the more expensive Muse. In addition, the deep bass "ambience" noise at the beginning of the Cowboy Junkies' Trinity Session was at once imposing and solid. So the Polaris has definitely got its butt covered; what of the cheek?

The first time I went to London, I was called on more than one occasion by the pale and lovely English women "cheeky." I thought they were referring to my actual cheeks, which, like a chipmunk's, were filled with enough American pizza, chicken-fried steaks, and Chinese food to last me the week I was there. A British friend explained that "cheeky" meant forward and aggressive; exactly what I heard from the Sumo's midrange. The Polaris's presentation here is somewhat of a rollercoaster, with a peak in the lower midrange followed by a dip in the upper mids. This deviation in the range where most of the music resides made for some unnatural imaging with instruments and vocals whose ranges spanned the full midrange spectrum. A good example of this phenomenon was the Holmes/Ammons CD: on "Willow Weep For Me," Jug Ammons's sax kept lurching forward when he blew his lower register and receding when he squealed. On the much more neutral Muse Model One Hundred, Jug's image was very stable, with no back-and-forth motion throughout the track. On instruments that only occupied a portion of the midrange, image placement from front to back was distorted, with harmonicas being reproduced as farther away than normal and guitars pushed too far forward. In addition, there was a glare to the upper frequencies that made certain instruments like Clark Terry's trumpet (on his Chesky CD) too brash. In comparison with the similarly priced Adcom 555 II, the Sumo's midrange was more forward overall, but with marginally more grain. The forward midrange of the Polaris might be welcome in a system that tends toward a reticent presentation; in my system, it was not.

The high end of the Polaris was extended, but lacked the ultimate delicacy of the Muse. Cymbals lacked the air I'd grown accustomed to with the Muse, as well as some good tube amps I've had in my system. The Polaris had some trouble unraveling strong cymbal crashes without an accompanying thickening in the upper midrange, a problem absent in the Adcom and the Muse. As with the midrange, the Sumo's highs were slightly grainier than that of the Adcom, lending the presentation a bit of hard-

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12 I think it's hilarious that, of all people, Keef Riff-hard is on Virgin Records!

13 One of the few studio rock recordings I know of with a realistic and live drum sound; guess it pays to let the drummer co-produce.

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ness, especially during loud passages, that made the amp sound a bit smaller than its power rating would suggest. The high-end grain was even more distracting when the Sumo drove the Thiel CS1.2s; their metal-dome tweeters mercilessly revealed any and all roughness, making them a poor match for the Sumo. If I were to assemble a system around the Polaris, I'd choose much softer-sounding speakers than the Thiels.

Soundstaging was, laterally, quite good for the money; it essentially equaled the Adcom in this respect, offering a wide and distinct panorama between and beyond the speakers. As I mentioned before, the midrange variations made accurate depth reproduction difficult, sounding shallower than the Adcom. The Trinity Session, in particular, came across as sounding much smaller than with the Adcom or the Muse; the reverber tails all bunching together without spreading out to imply the depth of the church.

Sumo's Mike Custer explained to me that while their more expensive Andromeda was designed to be as neutral as possible, the Polaris was given a more "tube" sonic signature to endear it to fans of this particular sound. As this revelation came after my listening sessions, it makes better sense to me why the amp sounded the way it did, although "tube" isn't really what comes to mind. I must say, though, I have a hard time with this kind of "boutique audio" thinking; designing gear to purposefully deviate from neutrality is My-fi, not Hi-fi.

Conclusion
In the $800 price range, you really can't expect sonic nirvana, and you certainly don't get it with the Sumo. What you do get is a decent, forward-sounding amp that might be just the thing for the rock fan graduating from the '70s Japanese receiver he hauled around through college. However, any amp in this group has to face comparison with the standard-bearing Adcom GFA-555 II. I felt, overall, that the Adcom was tonally and dynamically a more neutral amp. While more laid-back than the Polaris, it imposed less of its own sonic fingerprint on the music, which is a good thing at any price and fairly remarkable at the $800 level. What it ultimately comes down to is personal taste and choice of ancillary equipment; those who've been trying cable after cable in hopes of adding some "bite" to the midrange might do well to audition the Sumo in their system. In more neutral or even forward setups, I'd wager the Adcom would be the better choice.

As with every single purchase an audiophile makes, an extensive in-home audition is essential, but I can't stress this enough in the case of the Sumo Polaris II. While I found it to sound as I've described, I think the colorations of this amp might lend themselves better to different-balanced systems. Even at the highest price ranges, there's always a certain amount of "compensation" among the separate components that make up the total system; as you go down the price ladder and the colorations start getting more severe, careful matching is all the more important in getting satisfying sound. There are undoubtedly systems in which the Adcom would sound wimpy and the Sumo alive and kicking; in my system this was not the case. Prospective buyers in this price range would do well to include the Sumo Polaris II in their auditions. Neither neutral nor harsh, it offers a very distinct tonal quality that may appeal to many systems and listeners.

Turning the other cheek
After I sent the Sumo off to Santa Fe for measurements, I got a good news/bad news call from JA: "The Polaris you listened to was not only a pre-production sample, but definitive as well." Its distortion on one channel was much higher than spec, and one of the TL-circuit trimpots had a bad wiper. A production sample is being Fed-Exed to you as we speak; could you give it a listen and write a followup by Monday?"

The good news? "I saw an Elvis movie on TV the other night!"

I also received a fax from Sumo's Mike Custer, who wanted to address some points I had made in my original review. For starters, the output wiring that spanned the full width of the board was a production error; future...
Polarises would have their output stages wired directly to the 5-way post closest to them. Also, the absence of the polystyrene bypass capacitor across the Mylar input-coupling cap was an error, too; production units would indeed include this bypass cap. Mike also stood up for his use of tin slip-on connectors in the Sumo's audio path and elsewhere, arguing that they were preferable to good soldered connections.

I disagree with this; I've found that a correctly soldered connection, using Wonder Solder or the equivalent, is superior to many gold-gold connections, much less a junction of tin-tin as found at numerous points in the Polaris.

Well, Mike was correct on the two construction revisions: removing the cover revealed that both the output wiring connection and the polystyrene bypass cap (0.01 µF) were there. However, the output wiring effectively swapped the left/right identities of the output connectors, the red and white plastic inserts identifying the input RCA jacks were now wrong! Sumo has silkscreened the letters A and B by both the input and output connectors, and a signal applied to input A will result in an output signal at binding post A, but as the left RCA jack is red and the right white, I suspect that many users would hook up their system with the channels reversed. I'm sure Sumo will correct this, but for now, it's very confusing.

There were two construction problems with the second Sumo. First, there was a great deal more power-transformer buzz emanating from the chassis than the first amp; removing the cover revealed this to be due to a transformer mounting screw missing from one corner, which let the transformer vibrate more freely against the aluminum chassis. Second, a large blob of brown translucent glue engulfed the open back of the pc-mounted input RCA connector assembly, ostensibly to brace it against the board. This glue bridged the four adjacent conductors (signal left and right, ground left and right) along their entire length from jack to board, acting as an additional dielectric. This is most undesirable, and an anomaly that was absent from the first, pre-production sample.

As the original Polaris wasn't available for direct comparison as was the case with the two Counterpoints I received—JA had broken it while doing his measurements—I used the Adcom GFA-555 II as a sonic yardstick by which to judge the new Sumo. It was immediately obvious that this Polaris bore very little sonic resemblance to the pre-production sample. While the grain in the highs was much lower (although still greater than the Adcom), the midrange sounded quite smeared and veiled. While the midrange of the first Sumo had a very forward character but still allowed spatial information to be decoded well, this second Polaris blurred the soundstage to a significant degree. The Stanczyk piano recording on the Stereophile Test CD reproduced more like an amorphous assortment of notes, rather than as a distinctly outlined piano. With the Adcom, it was easy to pick out each individual key on the piano; the Sumo blurred these locations sufficiently to make the piano's image difficult, if not outright impossible, to make out. On the plus side, the midrange exhibited little of the lower-midrange accentuation and upper-midrange attenuation of the first sample; however, given the choice, I'd take the tonal-balance colorations of the latter over the image inspicuity of the former any day.

And now for something completely different: a Sumo with no butchbeaks! The bass of this Polaris was altogether changed from the first amp; where the original Polaris competed quite favorably with the outstanding bass of the Adcom, Sumo II just wasn't up to the fight. The low end was neither as tight nor as extended as the Adcom, lending JA's piano recording a much smaller sound. Bass-happy CDs like Lenny Kravitz's Let Love Rule (Virgin 91290-2) sounded less powerful than on the Adcom, with greatly reduced impact and extension.

In short, this second amp has me thoroughly puzzled; while one area has been greatly improved—ie, the reduction of high-end grain—the others have gotten worse. And in the case of the midrange, a lot worse. I have no idea why the malfunctioning amp had better bass and midrange performance, and significantly better soundstaging, but that's what I heard.

The first, defective Polaris was almost a legitimate alternative to the Adcom GFA-555 II, but this production sample falls well short of the mark. While I stated in my review that prospective buyers in this price range might include the first Sumo Polaris in their auditions if a more forward tonal balance is desirable, I can't recommend the second sample I received. Its questionable sonics, coupled with the construction defects of the missing power-transformer mounting screw and the glue blob in the RCA block, remove it from my consideration.
Who is Corey Greenberg, and why is he saying these things?

If you're looking for trouble... you came to the right place
If you're looking for trouble... just look right in my face
I was born standing up... and talking back
My daddy was a gree-yeen eye-yied mou-ow-ountain jack
Because I'm Evil...
my middle name is Misery
Well I'm Evillllll...
so don't you mess around with me.

—Elvis Presley, "Trouble"

Writing my own bio ranks somewhere between eating wax fruit and giving Ed Meese a high colonic; maybe it's simple modesty, or merely that the bulk of my memories from fetus to young adulthood cover my back and chest in raging red hives. Also, I have a hard time believing that you, the reader, give even the slightest damn about my lives, loves, and dreams. However, JA told me he was holding my checks until I wrote it, so hey, where do we start?!

My father has been in radio broadcasting since before I was born, so I literally grew up with music all around me. He would bring stacks of records home, and I got exposed to the Beatles and the Stones at an age when most children are still playing with their feces. This led to Muddy Waters, then Elvis, then Hendrix; then I had to have a guitar. Actually, my whole family is very musical; Dad and Jennifer play the piano, and Mark plays the drums (Mom's the exception; she plays the horses).

I was always a curious kid, especially about the magic boxes that made the music. I removed the woofers from my dad's Criterions, took apart my Lafayette quadraphonic receiver, and taught myself electronics by working on my various tube guitar amps. This led to my interest and professional involvement in audio electronics; I currently work as audio engineer for KBTS-FM raconteur in Austin, Texas, and my days are spent working with and repairing professional broadcast and studio recording gear. The requirements and capabilities of pro gear are very different from the high end, and my job has given me a lot of insight into where exactly the weaknesses lie in the chain from artist's lips to listener's ears, and believe me, it ain't half-meter pairs of silver interconnect.

Because of my technical background and attitude about most commercially available equipment (I adhere to Keith Johnson's tenet, as described by RH: "If you can buy it, it's no good"), I've always built a lot of my own gear, both for my own home recording studio and my playback system. Among my self-built gear, my current CD player is a heavily modified Philips CD-50, with too many mods to list here; major improvements include a separate analog power supply, Sidecar output coupling caps, and a reworking of the RC filters in the HF signal lines. The custom-built modules to replace the dual op-amps in the analog stages use an Analog Devices AD-845 for I/V conversion, and a Linear Technology LT-1010 for the output driver. The digital and servo power supplies have been beefed up as well, and the player has impressed me and others who've heard it as a highly musical and involving source. I'm contemplating an outboard DA unit, but until then my player is more than sufficient as both a reviewer's tool and as a party muh-cheen.

Probably the most stunning improvement I've made to my system in the past several years has been the design of Aunt Corey's Home-made Buffered Passive Preamp, a unit that has redefined what I can expect from a line-level section. The preamp grew out of my interest in purely passive preamps, which I was introduced to right here in the pages of *Stereophile* way back in Vol.11 No.2. I built my own passive with a Penny & Giles stereo 10k pot and some silver C&K switches, and was very happy with the transparency as compared to many commercial line stages I'd heard. But when I acquired a pair of Dynaco Mk.III monoblocks, I wanted to put the amps right behind my Spica Angeluses; this meant that the interconnect between the preamp and the amps needed to be over 10' long. This presented a problem, as the cables I liked the best were too capacitive to keep the high-frequency rolloff well above the audio range, and the cables low enough in capacitance didn't sound too good. I started investigating active buffer devices, and after many weeks of comparisons chose the Precision Monolithics BUF-03. This beefy lil' class-A metal-can buffer is an amazing device; if you've heard one of the Theta processors, you've heard the BUF-03. In a nutshell, my design simply places the BUF-03 on the wiper of the pot; signal source feeds the pot, pot feeds the buffer, buffer feeds the output RCA jacks. Since the
output impedance of the DC-E.T. BUF-03 is an extremely low two ohms, my preamp can not only drive cripplingly high-capacitance cables of any length, but is flat up to madder carmine. I’ve compared this preamp with the line stages of the class-A–ranked Levinson No.26 and the Audio Research SP-14, and it was superior in every way. Stereophile has suggested I write a DIY article on this remarkable preamp; look for it in the coming months.

When JA asked me to join the magazine’s reviewing staff, I was very flattered, but at the same time a bit apprehensive; I’m not sure I’m really an audiophile. I mean, I love good sound and all, and sure, I’ve spent many long hours inhaling Wonder Solder fumes in that pursuit, but the music is so much more important than the sound that I feel I fall somewhat outside the typical Stereophile reader’s Gestalt. To my monkey-bone, Ana Caram on a $20,000 audiophile dream setup doesn’t even compare to Link Wray on a Yorx rack system. In my personal hierarchy, even the best playback gear falls below the worst, most viciously godawful commercial Tiger Beat kiddie ear-porn; the electronics NEVER take precedence over the music, ever. I’ve known audiophiles who, after having finally assembled a topnotch system, are loath to play some of their older records because “they aren’t up to my system”; that attitude is what’s wrong with the youth in this country, by gum, and if there’s anything I want to get across during my stay here, it’s that this whole business is about Having A Kick-Ass Time, and if that means playing an old scratchy Wilson Pickett record on your Koetsu’d Basis, then GO DOG GO! I fully understand that to some of you, putting Sorbothane between your butts and your turntable is some kind of Kick-Ass Time; that’s cool with me. Everybody’s got a favorite position, and in the coming months, you’ll find out more about mine.

JA and RL, toes crossed and rosaries hung, have asked me to write about hardware and software, and I couldn’t be more excited at the prospect of including reviews of a $50,000 transcription turntable and Funkadelic’s Maggot Brain in the same issue. I’ll try and write up the best music I can possibly uncover; it’s JA’s view that the coolest part of being an audio reviewer is turning people on to great music, and I couldn’t agree more. I’m honored to be here, and I think it’s going to be a fun ride. I hope you enjoy it. —Corey Greenberg

JA adds a buncha measurements15

Vacuum Tube Logic Tiny Triode: The VTL’s input impedance at 1kHz was a hair over 100k ohms, while its sensitivity was high, at just 71.6mV for 1W into 8 ohms, both factors making it suitable for use with passive preamps. The lefthand amplifier was 0.5dB less sensitive, however, as can be seen from the Tiny Triode’s frequency response at 1W into 8 ohms (fig.1). This showed a slight rolloff in the extreme treble, reaching ~0.4dB at 20kHz. The limited HF bandwidth can also be seen in the shape of a 10kHz squarewave (fig.2), which features a mild droop to the leading edges.

Unweighted noise was low in level, lying some 67dB below 1W into 8 ohms. Signal polarity was non-inverting while the amplifier’s output impedance was typical for a tube design in being quite high across the audio band, at 0.85 ohms (left) and 0.67 ohms (right). This will give some modification of a loudspeaker’s frequency response, as well as leading to a lack of control of the low-frequency box resonance.

Distortion levels were moderate, however. Fig.3 shows THD+noise plotted against frequency at 2.83V into 8 ohms (equivalent to 1W, lower two traces) and 4 ohms (2W, upper two traces). The Tiny Triode definitely has to work hard into lower impedances, particularly at higher frequencies, though the added distortion harmonics here will be above human hearing. The midband and bass distortion is predominantly third harmonic, as can be seen from fig.4—which shows a 1kHz waveform and the distortion waveform left after the fundamental has been notched out, and fig.5, which shows the spectrum of harmonics and AC mains components imposed on a 50Hz sinewave at a level of 12.5W into 4 ohms. Again, the cute little Tiny Triode is having to work hard in the bass, with THD reaching ~44.7dB, or 0.6%. Even though this is mainly the relatively subjectively benign third harmonic, this

15 All the measurements were made after each amplifier had been preconditioned by running it at one-third full power into 8 ohms for an hour. This thermally stresses the amp to the maximum, though none of the models tested overheated. The Muse and Counterpoint headamps, however, did get too hot to touch.

—John Atkinson

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will lend low frequencies a "furry," poorly defined character.

High-frequency intermodulation was fairly good considering the rising THD in this region. A mixture of 19 and 20kHz tones at a p-p voltage of 30V into 8 ohms produced a 1kHz product at ~58.4dB, or just over 0.1% (fig.6).

Regarding maximum output power, fig.7 shows the way in which distortion rises against output power into 8 ohms (lower trace) and 4 ohms (upper trace). (The line voltage was 117V for these measurements.) The Tiny Triode is definitely tiny: defining clipping as the 1% THD point, the TT raised 21.9W/22.2W L/R into 8 ohms (13.4dBW/13.5dBW), and just 21.2W/17.4W (10.3dBW/9.4dBW) into 4 ohms. But as can be seen from fig.7, the rise in distortion with level is not nearly so on/off as with a typical solid-state amplifier. Although it might be expected that the Tiny Triode will behave more like a Bantamweight Triode, with spec-
trally pure sounds such as piano, the added distortion is audible. Why did CG find the TT’s clipping to be objectionable? Probably because it doesn’t take much more drive signal to take the little amp into full clipping.

Looking at these measurements in total, the Tiny Triode does surprisingly well, compromised only by its restricted output power and the high levels of distortion in the low bass, the sonic consequences of which were well-described by Corey. Tell you what. The Tiny Triode would make a great headphone amplifier!

—John Atkinson

Muse Model One Hundred: Compared with the VTL, the Muse has a somewhat restricted low-bass response, as can be seen from fig.8.

However, 1dB down at 28Hz could give the Muse’s bass a tight rather than lightweight character. Certainly CG found the Muse’s bass to be AOK quality-wise. The highs were pretty
flat, as confirmed by the 10kHz squarewave shape (fig.9), which reveals a fast risetime on the leading edges. Polarity was non-inverting, input impedance at 1kHz was to spec at 51k ohms, while sensitivity was a little lower than the VTL, 86.5mV being required to give 1W into 8 ohms. Unweighted noise was the same as the VTL, at 67.5dB below 1W into 8 ohms. Channel separation varied from 79dB in the midrange to 58dB at 20kHz, this adequate.

The Muse was tube-like in that its output impedance was quite high, averaging 0.6 ohms across the audio band, while its distortion signature echoed the VTL in being moderately high (both factors due to the lowish amount of global negative feedback used). Fig.10 shows THD+noise plotted against frequency at 2.83V into 8, 4, and 2 ohms (bottom two, middle two, and top traces, respectively). It can be seen that the right channel (dotted trace) is a little worse than the left (solid trace), and that the distortion level increases with increased output current, the 2 ohm figure reaching 0.9%. Though this is high, it can be seen from the shape of the waveforms in fig.11 that this is predominantly benign in being second harmonic in nature at low levels, with an increasing amount of odd-order harmonics at higher levels, as shown by fig.12. This shows the spectrum with a 50Hz sinewave driven at 72W into 4 ohms. (The cursor shows that even at this high level, the power-supply 120Hz component is still a respectable 79dB down.)

High-frequency intermodulation at high levels was a little higher than I would have liked, as shown by fig.13, the spectrum produced by a mixture of 19 and 20kHz tones at 44V p-p into 8 ohms. The cursor shows the 1kHz product to lie at ~51dB, or 0.3%.

The gentle rise in THD for increasing output power shown in fig.14 is also tubelike, though the manner in which the maximum output power substantially increases with reducing load is most untubelike. (The line voltage was 114V for these measurements.) With one channel driven, the maximum output power into 8, 4, and 2 ohms (1% THD) was 145.5W (21.6dBW), 240W (20.8dBW), and 320W (19dBW), implying a goodly stiff power supply. Note from fig.14, however, that the 2 ohm figure is after the "knee" in the power curve: as suggested by fig.10, the THD actually rises significantly at lower levels into this low load. With both channels driven into 8 ohms, the maximum output dropped by 0.5dB or so, to 130.4W/132.2W (21.2dBW/21.6dBW), though I couldn't test the simultaneous clipping of both channels into lower-impedance loads because the 5A line fuse would blow. Nevertheless, the Muse 100 satisfactorily outperformed its power spec. I was somewhat disappointed with one measured aspect, however. While the left channel's DC offset was a reasonably low ~39mV, the right channel's appeared to be way off at ~260mV. This will gently bias a loudspeaker voice-coil away from its rest position, limiting dynamic range. Though this is undoubtedly a sample fault, it suggests that Muse's QC needs a little attention.

Overall, these measurements would suggest that the Model 100 offers a tube-like sound character, though its highish distortion into very low impedances would suggest caution when using it to drive Apogees or Infinity IRS Betas, for example.

—John Atkinson

Counterpoint SA-100: The review logistics meant that all the measurements were performed on the first sample. I was a little surprised by the Counterpoint's small-signal frequency response; it showed a rising trend in the top audio octave (fig.15), which results in a degree of overshoot on the 10kHz squarewave shape (fig.16). Reaching ~0.75dB at 20kHz, it actually peaks at +1.4dB at 70–80kHz. Note also from fig.15 that the two channels don't balance very well, the right (dotted trace) being 0.75dB less sensitive than the right. Overall gain of the left channel was a high 31.9dB, suggesting a 1W/8 ohms sensitivity of 72mV, while the input impedance at 1kHz measured as 95k ohms. Channel separation was excellent, being greater than 75dB across the audio band, dropping to 95dB below 800Hz.

Like the Muse 100, the SA-100 featured a high, tubelike output impedance, this implied by the specified damping factor of 8.9 at 1kHz. (Damping factor is the load impedance, nominally 8 ohms, divided by the amplifier output impedance.) This was a little better than spec, averaging 0.65 ohms at 20Hz and 1kHz, rising very slightly to 0.72 ohms at 20kHz. This will still result in some modification of a loudspeaker's response depending on its impedance curve—dips in impedance value will result in gentle suckouts in the sound at the relevant frequencies.

Fig.17 shows the Counterpoint's THD+noise...
plotted against frequency at 2.83V into 8, 4, and 2 ohms (bottom two, middle two, and top traces, respectively). While lower in level in the midband than the Muse, the distortion can be seen to rise significantly in the bass. Fig.18 shows the harmonic spectrum produced with the SA-100 playing a 50Hz tone at 50W into 4 ohms.

While lower in level in the midband than the Muse, the distortion can be seen to rise significantly in the bass. Fig.18 shows the harmonic spectrum produced with the SA-100 playing a 50Hz tone at 50W into 4 ohms.

A regular, decreasing series of harmonics can be seen, totaling -42.6dB or a shade over 0.75%, with the second harmonic the strongest. While the ear is relatively forgiving of low-frequency distortion, this would still be expected to blur the sound somewhat and might well correlate with CG’s dislike of the amplifier’s low-frequency quality. In the midband, the predominant distortion is also second harmonic, as can be seen from the waveforms in fig.19. Though both Corey and the listeners in Santa Fe felt the SA-100 to have a grainy quality to its sound, the distortion in itself will be relatively
euphonic. High-frequency intermodulation (fig.20) was only a little better than the Muse, however, with the mixture of 19 and 20kHz tones throwing a number of sidebands and lower-frequency products.

With a 116V AC line voltage, the SA-100's maximum output power (1% THD) with one channel driven was an inconsequential shade below specification, at 95W into 8 ohms (19.8dBW) and 151W into 4 ohms (18.8dBW). Testing into 2 ohms blew the series A fuse in the output at 125W, below what the SA-100 will probably deliver into this load under dynamic conditions. With both channels driven, the maximum output power dropped a little, to 86.4W (19.4dBW) and 127W (18dBW) into 8 and 4 ohms, respectively (this time at a 115V AC line voltage). Fig.21 shows the manner in which the distortion into 8 and 4 ohm loads rises with output power with one channel driven. Better than Counterpoint's spec, in that the overall THD levels are considerably lower, the somewhat gentle "knee" in the curves is reminiscent of tube amplifier overload (see fig.7, which shows the VTL measurements).

Overall, I found the SA-100's measured performance to be a puzzle. With the exception of the bass frequencies, from its quite similar distortion footprint and output impedance it might be expected to sound somewhat similar to the Muse Model 100. Yet, from both Corey's auditioning and my own, it sounded significantly more grainy. Perhaps—and this is a monstrous "perhaps"—that ultrasonic peak in this sample of the SA-100's response frequency is indicative of a deeper-rooted problem that my simple measurements failed to reveal.

—John Atkinson

**Sumo Polaris II**: The first sample of the Sumo's small-signal frequency response (fig.22) showed no surprises; neither did the shape of a 10kHz squarewave (fig.23). Both indicated a flat response, which is as it should be for a power amplifier. The input impedance at 1kHz was a reasonable 45k ohms while the signal polarity was the same as the other three amplifiers tested: non-inverting. The sensitivity was significantly lower than the other three, it taking 138mV at 1kHz to give 1W output into an 8 ohm load, this equating to 26.2dB overall gain. Unweighted noise, too, was low at 76.2dB below 1W into 8 ohms, while DC offsets were a little high at -35mV/-75mV (L/R). Channel separation was excellent at better than 100dB below 600Hz, this worsening via capacitive coupling to 67dB at 20kHz.

Unlike the other three amplifiers, the Polaris's output impedances were typical of a solid-state design in being low. The right channel, for example, measured 0.09 ohms at 20Hz and 1kHz, rising to 0.11 ohms at 20kHz. The left channel was higher, however, at 0.15 ohms and 0.2 ohms at the same frequencies, which might suggest a problem. My suspicions were confirmed when I measured the way in which distortion and noise changed with frequency (fig.24). From bottom to top at 100Hz, the traces represent THD and noise at 2.83V output: right channel into 8 ohms; right channel
into 4 ohms; left channel into 8 ohms; left channel into 4 ohms; right channel into 2 ohms. While the right-channel figures are very low—much lower, for example, than any of the other amplifiers in this report—there is a significant rise in left-channel distortion with frequency, which could well correlate with the graininess CG noticed in the Sumo’s sound (although the somewhat forward midrange balance, in my experience, could well have something to do with the amp’s Mylar coupling caps).

The individual distortion waveforms of the right (fig.25) and left channels of the first sample (fig.26) show why this should be so: While the right channel offers almost pure third harmonic with a bit of hum, the left channel features significant spikes at the sinewave zero-crossing points. It turned out that the distortion-trim control on the left channel didn’t work—Sumo hand-trims the distortion-canceling circuitry of every Polaris before it leaves the factory—and had probably been damaged during the amplifier’s travels around the US. (The review sample had been heavily used for demonstration purposes before we received it.) All subsequent measurements were performed on the right channel, this being assumed to be typical of production.

Looking at the low-frequency distortion performance, fig.27 reveals this again to be primarily third-harmonic in nature—the cursor position reveals the 150Hz component to lie a good 56.3dB down from the fundamental—while the Polaris also did quite well on the high-frequency intermodulation test (fig.28), there being no appreciable LF components above the measurement system’s 12-bit noise floor.

With one channel driven, the maximum output power (1% THD) measured a hefty 145W

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![Fig.25 Sumo Polaris II, right channel, 1kHz waveform at 1W into 8 ohms (top), distortion and noise waveform with fundamental notched out (bottom)](image1)

![Fig.26 Sumo Polaris II, left channel, 1kHz waveform at 1W into 8 ohms (top), distortion and noise waveform with fundamental notched out (bottom)](image2)

![Fig.27 Sumo Polaris II, spectrum of 50Hz waveform at 72W into 4 ohms](image3)

![Fig.28 Sumo Polaris II, HF intermodulation spectrum, 300Hz-30kHz, 19+20kHz at 48Vp-p into 4 ohms (linear frequency scale)](image4)

![Fig.29 Sumo Polaris II, distortion vs output power, one channel driven, into 8 ohms (bottom curve below 10W), 4 ohms (middle curve below 10W), and 2 ohms (top curve below 10W)](image5)
(21.6dBW) into 8 ohms and 210W (20.2dBW) into 4 ohms, as shown by the plot of THD vs output power (fig.29). Unfortunately, I was unable to measure the 2 ohm clipping power as the right-channel ± voltage-rail fuses blew at 153W (the point where the 2 ohm trace stops in fig.29). After replacing the fuses, the channel's intrinsic distortion had risen by a factor of 10, suggesting that I had broken something and that further measurement would be unrepresentative.

I find it interesting that the least expensive amplifier of this group measured the best (at least in one channel). As the original review sample turned out to be out of adjustment, we agreed that Sumo could submit a second sample. Corey described his reaction to its sound earlier; I managed to run a quick set of measurements before we sent it to CG for auditioning.

While the output impedance of the two new channels was unchanged, the distortion signature was very different from the left channel of the first sample, as can be seen from fig.30, which plots THD+noise vs frequency at 2.83V into 8, 4, and 2 ohms. A comparison with fig.24 shows that the distortion-canceling circuitry drastically improves linearity below 1kHz. The rise in THD above that frequency to still sequential levels is apparently due to the fact that that canceling circuitry cannot be made to act too fast, otherwise it starts to chase its own tail. This change in distortion performance can also be seen in fig.31, which shows the spectrum up to 1kHz of a 50Hz tone at 65W into 4 ohms. Unlike fig.27, the only harmonics that can be seen above the measuring system's noise floor are the third at a minuscule ~75dB (0.015%) and the fifth at an even lower level. And the two-tone intermodulation spectrum of the second sample (fig.32) shows only a slight accentuation of the 18 and 21kHz spurs, with no real 1kHz product present.

Finally, the new sample's maximum output power was a little lower than the first's. With an AC line voltage of 115V rather than 116V, the 1% clipping points with one channel driven into 8 and 4 ohms were 124.7W (21dBW) and 195.5W (19.9dBW), respectively. These figures are shown graphically in fig.33, which plots THD+noise at 1kHz vs output power. (The incomplete trace is the 2 ohms delivery, the 4A rail fuses blowing at a hair over 200W into this load.) Note the very different manner in which THD increases with level compared with fig.29.

The reduced levels of distortion and the way

![Fig.30 Sumo Polaris II (second sample), THD+Noise vs frequency at 1W into 8 ohms (bottom), 2W into 4 ohms (middle), and 4W into 2 ohms (right)](image1)

![Fig.31 Sumo Polaris II (second sample), spectrum of 50Hz waveform at 70W into 4 ohms](image2)

![Fig.32 Sumo Polaris II (second sample), HF intermodulation spectrum, 300Hz-30kHz, 19+20kHz at 48V p-p into 4 ohms (linear frequency scale)](image3)

![Fig.33 Sumo Polaris II (second sample), distortion vs output power, one channel driven, into 8 ohms (bottom curve below 10W), 4 ohms (middle curve below 10W), and 4 ohms (top curve below 10W)](image4)
those levels change with output power could well explain why CG felt the new sample to offer lower levels of grain. But as to why the second sample’s lows were weaker in impact or why the stereo focus was poor, I have no idea.

—John Atkinson

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**HALES SYSTEM TWO LOUDSPEAKER**

Robert Harley


Last July I reviewed the $4850/pair Hales System Two Signature loudspeakers and enthusiastically recommended them. In fact, they displaced the B&W 801 Matrix 2 as my reference loudspeaker, and have become a fixture in my listening room. Over the past seven months, my impressions of the Signatures have been largely confirmed: transparent and uncolored midrange, resolution of fine detail, precise imaging, superb transient abilities, and, most importantly, an ability to thoroughly involve the listener in the music. These qualities earned the Signature a Class A recommendation in Stereophile’s “Recommended Components.” I’ve greatly enjoyed the many hours spent with the Signatures.

Hales Audio makes another loudspeaker—the System Two reviewed here—that is very similar to the Signature, but much less expensive.1 Because the System Two is such a close relation to the Signature—it uses identical drivers, a nearly identical crossover, and similar cabinet construction—and costs nearly 2 kilobucks less, I was eager to hear what the smaller system had to offer. Because the Signature was recommendable at $4850, the System Two just might be a bargain at $3000 if it even came close to the Signature’s musicality.

I was further encouraged to review the System Two because the Signature is a cost-no-object refinement of the original System Two design. In any engineering endeavor, including loudspeaker building, there is a diminishing return in performance as more and more money is lavished on the design. This is especially true in the Signature’s case, where the intent was to squeeze the greatest possible performance from a given design without regard to cost. This approach is exemplified by the Signature’s crossover: it is mounted externally in a sand-filled, spiked enclosure. The rest of the design is similarly elaborate. How much musical difference these things make in relation to the cost is debatable. But the Signature wasn’t made for cost-effectiveness: it is more of a “statement” product. The System Two, however, cuts out the budget-busting refinements. Consequently, the System Two appears to have the potential of offering similar performance at a price much more accessible to a wider range of music lovers.

**Technical description**

The System Two employs the same driver complement as the System Two Signature, but in a smaller, less ambitious cabinet. At 38" high and 16" deep (compared with the Signature’s 48" height and 21" depth), the System Two has the appearance of a truncated Signature. The tall, narrow profile gives the appearance of a smaller loudspeaker when seen on-axis. The review samples were finished in light oak veneer, which, coupled with their smaller size, made them much less imposing in the listening room than the stained walnut Signatures. The System Two’s cabinetry is beautiful but less elegant than the Signature’s, the result of the latter’s rounded, solid walnut edges. A grille covered in black cloth conceals the drivers and the top two-thirds of the enclosure front.

Hales Audio has recently made available

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1 Hales Audio showed a prototype of the $12,000 (approximate price) System One at the most recent CES.
stands for the System Two that bring the tweeter closer to a typical listening height. These are better described as bases, as they are short (8”) and have a solid exterior. They screw into the System Two from the bottom and can be filled with dry sand or lead shot. I opted for sand (about 35 lbs in each base), although I auditioned the System Two with and without bases. My review bases were the first pair made of the finalized design, and weren’t finished in black lacquer as will the production units. Eight screw-in inverted cones were supplied with the bases.

The rear panel holds two pairs of a new Cardas termination that looks similar to the Edison-Price Music Posts used on the Signatures. The Cardas posts have no screwdriver slot, relying instead on a five-sided nut for tightening. There have been problems with the Music Posts, including those on my Signature review sample, in which the nut no longer tightens sufficiently on the speaker cable’s spade lug. The Cardas posts seem to have fixed this problem, as well as providing a method for making a tighter connection with a wrench rather than a screwdriver. The posts also accept banana plugs. For single-wire operation, a removable copper bar connects the two input pairs. Four spikes per loudspeaker are supplied and can be screwed into threaded inserts in lieu of bases.

The System Two is a two-way design, employing two of the popular Dynaudio 17W75EXT woofers, a driver chosen for its mid-band characteristics as well as bass performance since it must reproduce quite a wide band of frequencies (up to 2kHz). The driver is noted for its large (3”) voice-coil, and magnet inside the voice-coil. The two woofer/mid-band drivers are wired in parallel in this two-way system. The popular MB Quart MCD25 titanium-dome tweeter reproduces frequencies above 2kHz. This tweeter is found in a wide range of loudspeakers, from the Avalon Eclipse to Dick Olsher’s do-it-yourself Black Dahlia. It has a smooth response as well as a very high “oil can” resonant frequency.

Like the Signatures, the System Two’s three drivers are mounted in a D’Appolito configuration, with the tweeter in the acoustic center of the two woofers. This arrangement simulates a point-source radiation characteristic as well as reduces lobing (variations in vertical radiation patterns) for smoother dispersion and
reduced sensitivity to listening height.

The crossover is second-order electrical, resulting in effective third-order slopes when combined with the drivers' acoustic rolloff. The Butterworth filters feature Wonder Cap and Solen polypropylene capacitors, Solen 14-gauge air-core inductors, and a tweeter padding network. The System Two's crossover differs from the Signature's in that the diffraction-loss compensation network is missing, and the crossover is mounted inside the loudspeaker enclosure, rather than outside as in the Signature.

There are other significant differences between the System Two and the Signature besides cabinet size and crossover. The System Two's 2" front baffle and 1½"-thick side walls are contrasted with the Signature's 4"-thick front and 2" sides. Both enclosures are made from MDF, though the less-expensive loudspeaker has a fewer number of internal braces. The System Two's cabinet design and construction are nevertheless extraordinary.

Other than these differences, the System Two is remarkably similar to its $1850-more-expensive brother. Both use Cardas internal wiring, identical crossover components, identical drivers, similar design philosophy, and both are built with a high level of workmanship.

One interesting aspect of the two Hales loudspeakers, discussed in my review of the Signatures but warranting reiteration here, is the extraordinary attention and cost devoted to making the enclosure rigid. Designer Paul Hales, a mechanical engineer by education, spent considerable design effort to minimize the enclosure's contribution to the loudspeaker's sound. In addition to starting with a 2"-thick baffle and 1½" sidewalls, the System Two's four internal braces (compared with the Signature's five) make the enclosure less prone to vibration. Further, the various panel section lengths between braces has been optimized so that one section's resonant frequency and harmonics don't coincide with another section's resonant frequency. In addition to reducing the amplitude of spurious resonances, this technique also distributes the energy evenly so that remaining resonances are surrounded by other modes rather than nulls. This renders the resonances less audible.

Removing the cabinet's contribution to the energy launched into the listening space is, I believe, a significant factor in the Signature and System Two's performance. The cabinet's audible contribution can be significant. The acoustic output of a vibrating surface is a function of that surface's area and excursion. Although a loudspeaker enclosure's excursion is tiny in relation to the drive-unit's motion, the comparatively large panel size results in its output being audible. The sonic effects of enclosure resonances include spectral coloration—the panel moves more at certain frequencies—and time smearing: the enclosure stores acoustic energy momentarily as mechanical energy before converting it back into sound. These phenomena result in annoying tonal aberrations, loss of image specificity, and smearing of transient detail—all of which serve as constant reminders that one is listening to reproduced rather than live music.

Listening

The System Two replaced the Signatures in the listening room, and were located in the same place and position as their big brothers. They were 50" from the rear wall and 34" from the side walls in the 14.5' by 21' dedicated listening room. I should note that this position will produce the least excitement of room resonance modes (as calculated by Snell's computer program), and provide the least amount of room-added "warmth" to the low frequencies. Without stands the System Two's tweeter axis was 27", much lower than the Signature's 36" tweeter height. This placed my ears a full 9" above the tweeter, a condition that one would expect to produce audible consequences. Without stands, the sound lacked immediacy and was somewhat threadbare. My comments in general refer to the sound of the System Twos sitting on their dedicated stands.

Amplification was my standard reference, the VTL 225W Deluxe monoblocks, but a new version employing KT90 output tubes instead of EL34s. The collective experience of some Stereophile reviewers—JA, DO, and me—has been that tube amplification seems to work best with the MB tweeter found in the System Two and other loudspeakers. JA found both the VTL 500s and the Audio Research Classic 60 to be a synergistic combination with the Avalon Eclipse, and DO liked the Air Tight ATM-2 with his DIY Black Dahlia design. I concur, finding

2 See the interview with VTL's David Manley in Vol.14 No.5.

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the VTLs a good match with the System Two. Another amplifier that works well with both Hales models is the Krell KSA-250. Besides the VTLs, I auditioned the System Two with the excellent Threshold S/550c reviewed in December. A pair of Snell Type C/IIV loudspeakers ($2190/pair), also reviewed this issue, was used as a basis for comparison.

Speaker cable was 3’ runs of bi-wired AudioQuest Clear Hyperlitz or 10’ runs of bi-wired AudioQuest Green Hyperlitz. The preamp was an Audio Research SP-11 Mk.II, driving the VTLs through AudioQuest Lapis interconnect. Digital sources included, at one time or another, the VTL D/A converter, Meridian 203, MAS DCC-I, Melior Bitstream D/A, PS Audio Super Link, and a Proceed PDP 2, all driven by an Esoteric P-2 transport via 3’ runs of Aural Symphonics Digital Standard. The analog front end was a Well-Tempered Turntable with a WT Tonearm modified by LP Research and Development Lab,3 fitted with a Signet AT-OC9 moving-coil. An Expressive Technologies SU-1 stepped up the moving-coil output before driving the SP-11’s phono input. Expressive’s IC-1 interconnect was used throughout the phono path, while AudioQuest Diamond connected the digital processors to the preamp. All power to the system, except the power amplifiers, was conditioned by the magazine-owned Tice Power Block and Titan. A pair of Phantom Acoustics Shadows, an active low-frequency control system, was turned off during the auditioning. The dedicated listening room has optimum dimensional ratios for room-mode distribution.

After breaking in the System Two (during which they sounded overly bright and hard), I began the serious listening. It was immediately apparent that there was more than a casual similarity between the System Two and its more expensive brother. I have become intimately familiar with the Signature and was able to quickly recognize the two loudspeakers’ similarities and differences.

Starting with the similarities, the System Two had an overall tonal balance nearly identical to the Signatures—lean and overdamped bass, exceedingly smooth and pure midrange, and a slight tendency toward tizziness in the treble.

In addition, the System Two shared another characteristic of the Signatures that wasn’t immediately apparent: a very slight impression of top-end rolloff. I don’t want to suggest that the System Two lacks treble energy: I’m talking about the extreme treble that doesn’t seem to contain any musical information, but conveys a sense of air riding over the presentation. Some loudspeakers have an intentional rise in the top octave designed to impart a false sense of space and airiness that I find fatiguing and unnatural. Although the System Two is open and spacious, there was not the feeling of infinite treble extension heard through the Snell Type C/IIV (reviewed elsewhere in this issue).

The System Two’s treble had a tendency toward tizziness, the degree of which is highly dependent on the amount of toe-in toward the listener. Pointing the System Two nearly straight ahead with a little toe-in somewhat ameliorated the slightly excessive mid-treble energy. There is a tradeoff between best imaging (listener on-axis) and treble smoothness (listener about 20° off-axis). With a little experimentation, I was able to strike a good balance. Another factor that contributes to a fizzy top end is the amount of treble energy in the recording. The System Two is highly revealing of everything in the path before it—including overly bright recordings, of which there are many. This is just what a good loudspeaker should do, however, and the slight brightness noted may be more an indictment of most recordings than of the System Two. Despite these mitigating factors, however, I would have preferred a little less energy in the 10kHz region.

The slightly forward treble presentation notwithstanding, I found the entire high-frequency presentation exceptionally pure, clean, fast, detailed, and musically engaging. There was a complete absence of the hashy grain in the treble that can obscure natural instrumental textures. The treble was like a clear pool of mountain water: transparent, crystalline, and pure.

The System Two’s ability to reproduce the transient attack of percussion instruments was stunning. Leading edges of the musical waveforms were sudden, clean, razor-sharp. This was especially apparent with Latin percussion, which I happen to like. This characteristic gave the impression of a highly detailed rendering, but the detail was never hyped or fatiguing.

3 Many readers have called me inquiring about this modification. The Well-Tempered arm mod is offered by Larry Pederson at LP Research and Development Lab, 208 Pepperwood St., Hercules, CA 94547. Tel: (415) 799-3858, 11am-2pm PST.

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Instead, the wealth of transient detail—where so much music lives—riveted my attention on the music. It was difficult to be a casual listener with the System Two: music became so compelling that it was hard to think of anything else. Despite the highly revealing and transient rendering, the treble never sounded unnaturally etched. With some highly detailed loudspeakers, transients grate on the nerves and music quickly becomes fatiguing. Not so with the System Twos: they consistently revealed a wealth of musical detail without fatigue or a desire to turn down the volume.

Another aspect of the System Two's presentation that adds to the feeling of speed and quickness is the lack of transient smearing and overhang. The steep musical wavefront seemed to disappear as suddenly as it was reproduced. The dynamic contrast between peaks and silence was stunningly realistic. This contrast contributed to a greater feeling of inter transient silence—the spaces between notes weren't contaminated with the residue of the previous sound. The music wasn't superimposed on the loudspeaker's "noise" of stored energy. I believe the System Two's (and the Signature's) remarkable feeling of precision, speed, and clarity are a result of their ability to correctly reproduce the dynamic envelope (both attack and decay) of musical signals. In this regard, the Signature had a marginal edge over the System Two: transients were slightly more dynamic and clean.

Another aspect of the System Two's presentation that created an involvement with the music was the transparent, uncolored, and pure midrange. There were no artifacts to remind me that I was hearing mechanically reproduced music rather than just music. Instead, there was a smoothness, a delicacy, to the mids that one rarely hears from dynamic loudspeakers. The System Two rendered instrumental textures naturally, purely, and most important, believably.

Besides being tonally accurate, the midrange was highly detailed, revealing even the finest nuance in a recording. Finely woven textures were resolved with the clarity and precision of a perfectly focused magnifying glass. But I don't want to imply that detail was hyped or forced on the listener. On the contrary, the rendering of inner detail was subtle, apparent on a conscious level only when one listened for it. This resolution of fine detail and nuance is perhaps what makes music through the System Two so believable and thus musically involving.

The System Two also excels in its ability to throw a wide and deep soundstage. Although the Two doesn't have the feeling of depth and space of some loudspeakers (the Ensemble Reference, for example), it has a remarkable three-dimensional quality. Instruments are spatially distinct from one another, facilitating the impression of front-to-rear layering. In addition, image outlines were sharply focused and rock-solid within the soundstage. There was a pinpoint precision to the imaging, instruments occupying definite points in space. Significantly, the solidity of images was laterally uniform across the soundstage, with a strong center channel. Female vocal became a pinpoint image exactly between the loudspeakers, with a concrete rather than amorphous quality. In terms of sheer soundstage size and depth, however, the System Two falls short of many planar designs.

These qualities were heightened by the Two's transparency. The finely woven detail, spatial distinction between instruments, and three-dimensional layering were all clearly apparent through a soundstage devoid of opacity, grain, veiling, or other characteristics that prevent a clear view to the back of the soundstage.

Like the Signatures, the System Two has an unusual low-frequency character. Both loudspeakers lacked extension or a feeling of weight, and just didn't provide that visceral impact important to much music. However, the bass the System Two does produce is fast, precise, and exquisitely detailed. Although I much prefer this type of performance to a tubby, bloated, or colored LF presentation that constantly calls attention to itself, the System Two nevertheless left me wanting some meat and power in the bottom two octaves. Bass drum lacked the lowermost component that is the rhythmic foundation of some music. Large-scale orchestral climaxes didn't convey the weight and impact present in the recording as revealed by the Snell Type C/IV. The Type C/IV had far deeper extension, with a satisfying "kick" in the extreme bottom end. In addition, the ported loudspeaker had a punchy quality in the bass that made low-frequency dynamics seem effortless. The Type C/IV was so good in this regard, and so different from the System Two, that it made the latter sound anemic by comparison.
However, the *quality* of the System Two's bass was nothing short of stunning. Every minute detail was clearly audible, infusing the reproduced instrument with a palpability and realism. For example, on José Neto's acoustic fretless bass on *Three-Way Mirror* (Reference Recordings RR-23CD), the System Two revealed so much more of this instrument's sound. Every nuance—finger noises, the attack of the string, etc.—was immediately apparent. This profusion of inner detail made music so much more intellectually compelling, but at the expense of a raw, visceral satisfaction. The Type C/IV's bass had far less inner detail, sounding instead somewhat "flat" (not in an amplitude sense) and bland.

The System Two's low-frequency presentation was *interesting*, while the Type C/IV's was *satisfying* in a primal way. When listening to the Two, I missed the C/IV's extension and effortless dynamics. When listening to the C/IV, I felt less illusion of instruments existing in the listening room.

Interestingly, the System Two seemed to have *more* bass than the larger Signature, even though the Signature has a lower specified -3dB point. I suspect that this is due to two factors: the System Two's woofers are closer to the floor (without stands), providing a greater degree of boundary reinforcement, and the System Two's enclosure is less rigid, allowing the cabinet to contribute some LF energy to the presentation.

Finally, I'll comment on the effects of different power amplifiers on the System Two's sound. Clearly, the Threshold S/550e brought out the System Two's best low-frequency performance. With this solid-state powerhouse, the bass was tighter, deeper, punchier, and more detailed than with the VTLs. This isn't surprising considering the System Two's lowish impedance and the Threshold's ability to drive current into such loads. However, the feeling of depth, ease, and liquidity were superior with the VTLs. Considering that the System Two worked well with these two very different amplifiers, these loudspeakers should be happy with a wide range of amplifiers, provided they are of sufficient quality. The high resolving power of the System Two mandates the use of the highest-quality electronics, front ends, and cables. Like all loudspeakers, it is best to audition the System Two with the electronics with which they will be used.

Incidentally, I've heard that some listeners and dealers are less impressed with the Signatures than I have been. Indeed, I heard them at three shows and never thought they were anything special. However, careful attention to placement (especially toe-in) and upstream components are essential to getting the best performance from these loudspeakers. Arnis Balgalvis, who had heard the Signatures at dealers, was far more enthusiastic about their sound in my listening room during his visit last August for the *Stereophile* writers' conference. (The system was a Theta DSP Pro Basic/Esoteric P-2 driving VTL 225W monoblocks through an EVS passive attenuator.)

**Measurements**

The Listening Environment Diagnostic Recording (LEDR) on the Chesky Test CD produced an impressive feeling of the image moving above the loudspeaker. The "over" test was similarly good, with a continuous "rainbow"-shaped arc traced between the loudspeakers.

Driving the System Two with a sinewave oscillator and feeling the cabinet for resonances revealed the enclosure's rigidity. Very minor resonances were felt and heard at 65Hz, 200Hz, with the strongest at 500Hz. The System Two was noticeably less inert than the Signature, but far more solid than most loudspeakers.

The System Two has an impedance magnitude and phase curve (fig.1) nearly identical to the Signature's. Throughout most of the low-frequency region, the impedance drops to 3 ohms, averages about 5 ohms through the midrange, and reaches 6.5 ohms at 20kHz. This is a challenging load for an amplifier; I recommend one with the ability to drive current into low impedances. It's no coincidence that the Krell KSA-250 and Threshold S/550e, both rock-solid powerhouses, coax the best bass performance from the System Two.

The impulse response, measured 48″ away on the tweeter axis, is shown in fig.2. Note the metal-dome tweeter's ultrasonic ringing. Unusually, several tiny reflections, shown as bumps and dips in the straight line following the tweeter ringing, are visible between the 4.5 and 5.5ms markers. (The large reflection at 7.5ms is that from the listening room ceiling.) This is indicative of very early reflections, perhaps from the 12 hex bolts that secure the woofers to the baffle. After performing a Fast Fourier Transform on this time-domain plot to

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get a frequency-domain plot, we will see the effects of these reflections.

With the System Two on the floor without stands, the listening axis is much higher than the tweeter axis. In fact, my ears, at 36" above the floor, were a full 9" above the tweeter axis. I noted during the auditioning that the sound without stands lacked immediacy and was somewhat threadbare. This impression is confirmed by fig.3, the FFT-derived frequency response measured on the upper woofer axis—my listening axis without the stands. There is a slight but very broad dip in the amplitude between 1kHz and 4kHz—exactly where the ear is most sensitive to amplitude changes. This dip will certainly be audible, both because of...
the ear's sensitivity and the great amount of musical information that lies in this important band.

Measured on the tweeter axis (the listening axis with the stands), the frequency-response curve looks quite different. This is seen on the right-hand side of fig.4, the FFT-derived frequency response spatially averaged over a 30° lateral window. The low-treble dip is gone and the overall response is much flatter. When I first auditioned the System Twos without stands, I thought they sounded noticeably inferior to the Signatures. The stands, however, brought the System Twos' presentation much closer to that of their big brothers.

Remember those very early reflections seen as tiny bumps in the impulse response? Looking at their effect in the frequency domain, it appears as though they are creating some minor comb-filtering in the treble. These are not severe dips, but tiny ripples caused by constructive and destructive interference between the direct sound and the slightly delayed sound reflected from the woofer mounting bolts. I doubt these ripples are audible because of their very low amplitude: the comb filtering generated by the listening room's sidewalls would be far more severe (although at a much lower frequency).

Looking at the System Two's individual response curves directly on the horizontal axis, at 7.5° and 15° off axis (15° plot shown in fig.5), the slight excess of treble energy diminishes greatly even a few degrees off-axis. In other words, the loudspeaker is flatter in the treble when it isn't pointed directly at the listener. This was suggested during the auditioning when I noted that the HF balance was smoother with the System Twos toed-in slightly so they pointed past the listener.

Another correlation between listening impressions and measurements is the top-octave rolloff seen in fig.5, the response 15° off-axis. I observed that the System Two didn't seem to have a feeling of infinite HF extension. Although I detected no differences in instrumental timbres, I felt less sense of "air riding over the presentation"—exactly what one would expect with an extreme HF rolloff off-axis caused by the tweeter's increasingly narrow dispersion as frequency rises. In addition, reduced high-frequency reflections from the listening room's sidewalls will also contribute to the lessened feeling of air and extension. This is why the Type C/IV incorporates a rear-firing tweeter, compensating for the front tweeter's narrower dispersion at high frequencies.

To the left of fig.4 is shown a nearfield woofer measurement. A microphone is placed directly in front of the woofer (nearly touching the dustcap), and a swept signal from the Audio Precision System One drives the loudspeaker via a power amplifier. The rolloff slope below 50Hz, typical of sealed-enclosure design, correlates with my impression of the System Two's lack of LF extension.

Finally, the System Two's cumulative spectral-decay or "waterfall" plot is shown in fig.6. This is the anechoic frequency response at discrete time slices, revealing the loudspeaker's decay characteristics. The decay is very clean, but with some hash around 5kHz, the same frequency as the peak in the initial response (shown by the cursor position).

**Conclusion**

The Hales System Two does many things exceptionally well—things that I find musically important. These include not only an accurate and uncolored midrange, but also the ability to recreate the transient envelope of instruments, resolve finel y woven inner detail, and throw pinpoint images within a transparent soundstage. Most importantly, I enjoyed listening to music through the System Two immensely. They have the ability to create an intimacy with the music—at least for this listener—that is difficult to describe. Whenever I listened to music through the System Two, I immediately forgot about the playback system and became involved in the music. This is perhaps the highest goal to which an audio component can aspire, and one that the System Two achieves. Based on these attributes, the System Two has earned a Class B recommendation in Stereophile's "Recommended Components."

The System Two comes under minor criticism for the slight excess treble energy that produced a forward upper-treble balance. Its main flaw, however, is the low-frequency reproduction: it just doesn't have enough bass. I would gladly give up a little low-frequency speed and detail for a warmer, fuller tonal balance. In addition, I missed the weight and power in the lowermost octaves provided by the Snell Type C/IV's excellent LF extension and dynamic ease. Many other Class B loudspeakers have

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more satisfying bass reproduction than the System Two. 4

Clearly, the System Two will not suit all tastes. What one music lover finds most important sonically may be less critical to another. Despite the System Two's relative lack of bass—which I miss greatly—there is something compellingly musical about this loudspeaker that allows me to overlook such a major deficiency. The overly lean bass may be an Achilles' heel for some listeners, however, and careful auditioning is recommended. Stands should be considered mandatory: without them, the presentation appears too low to the floor and suffers a loss of immediacy through the midrange.

4 Muse Electronics has just developed a crossover board for their powered subwoofer designed specifically to mate with the System Two. Subwoofers aren't really a reviewer's favorite product, but I jumped at this one. Although I approach subwoofers with caution, the Hales/Muse combination could be stunning. I'll be reviewing it along with other subwoofers in the June or July issue.

Now, to return to the question that prompted this review: how close to the reference $4850 System Two Signatures does the $3000 System Two come?

Very. The two loudspeakers are nearly identical in character, but with the Signature achieving a slightly higher level of performance. No, they're not identical, but the ways in which the Signature excels are areas where even the System Two is an overachiever: tonal purity, transparency, resolution of detail, and imaging. I consider the differences insignificant in light of both loudspeakers' excellent performance. In addition, I actually preferred the System Two's slightly warmer, if marginally less detailed, bass. There is no doubt, however, about which pair will remain as my long-term reference.

On that basis, the Hales System Two gets a hearty recommendation. They offer the essence of what makes the Signature so musical—and at a far lower price.

SNELL TYPE C/IV LOUDSPEAKER

Robert Harley

Specifications: Four-driver dynamic loudspeaker. Driver complement: one 10" woofer, one 5" midrange, one 1" metal-dome tweeter, one 3/4" dome rear-firing tweeter. Frequency responses: 65Hz–20kHz, ±1dB; 34Hz–22kHz, ±3dB (both responses specified on-axis or up to 25° off the horizontal axis); 37Hz–15kHz, ±3dB total radiated. Crossover frequencies: 275Hz and 2.7kHz, 24dB/octave slopes. Nominal impedance: 8 ohms. Sensitivity: 88.5dB at 1W (2.83V) at 1m, anechoic (sensitivity higher in a normal environment). Power requirements: suitable for use with amplifiers rated from 20Wpc to 250Wpc. Finishes available: matched grain, hand-sanded and-oiled pairs in oak or walnut veneers, or black-finished veneer. Dimensions: 14.5"W by 46"H by 11.75"D. Shipping weight: 180 lbs/pair. Price: $2190/pair. Approximate number of dealers: 120. Manufacturer: Snell Acoustics, 143 Essex Street, Haverhill, MA 01832. Tel: (508) 373-6114. Fax: (508) 373-6172.

The Snell Type C/IV's design has been highly influenced by both the testing methods and philosophy of Canada's National Research Council in Ottawa. Other well-known loudspeakers to have benefited from the NRC's testing facilities include the Mirage M-1 and M-3, PSB Stratus Gold, the Waveform, and Camber 3.5. The NRC provides a variety of services to loudspeaker designers, notably use of their testing facilities which include a full-sized anechoic chamber. In addition, the NRC is heavily involved in carefully controlled blind listening comparisons between loudspeakers, used to aid the loudspeaker designer while the product is under development. The NRC doesn't provide design services, but rather the means of testing and evaluating work in progress and finished products.

Despite not offering design aid, many loudspeakers created with the NRC's testing and listening laboratories share some common philosophies. Chief among these is the belief that flat amplitude response is far and away the most significant factor in listener preferences and thus should be the paramount design goal. Many NRC-influenced loudspeakers share steep crossover slopes, wide dispersion, smooth off-axis response, and pay considerable attention to the way the loudspeaker interacts with the listening room.
The Snell Type C/IV is no exception: it features fourth-order crossover slopes, a very flat frequency response that varies very little off-axis, and a rear-firing tweeter to compensate for the front tweeter's increasing directivity with rising frequency.

Technical description
The Snell Type C/IV is a large ported floorstanding system employing a 10" woofer, 5" cone midrange, and a 1" metal-dome tweeter. An additional rear-firing 3" dome tweeter is mounted on the enclosure back, but can be turned off with a toggle switch. Despite being a box 46" tall and 14 1/2" wide, the Type C/IV projects a slim, streamlined, elegant appearance. My review samples were finished in oak veneer (other finishes are available) with a black grille cloth stretched over a wooden frame that completely covers the front baffle. A 1"-thick base, slightly smaller than the Type C/IV's dimensions, lifts the loudspeaker off the floor. Four carpet-piercing spikes (supplied) thread into the base.

The input terminals are about halfway up the cabinet rear. The recessed terminal block has two pairs of five-way binding posts for bi-wire or bi-amp operation. The terminal plate also holds a tweeter fuse, rear tweeter on/off switch, and a front-tweeter level control. Although I don't usually like recessed terminals (it's often hard to connect thick bi-wired cable), the Type C/IV's terminals were quite accessible.

Rather than mount the drivers on a flat front baffle, the Type C/IV's drivers are sited on a panel that protrudes 3/4" from the enclosure. The protruding baffle has the same shape and thickness as the grille frame. Consequently, the grille frame fits around rather than in front of the baffle, and is thus invisible to the drivers. Snell calls this technique the "Zero Diffraction grille." Designer Kevin Voecks tried a variety of baffle shapes, including curved baffles, before settling on this design. He found that even obstructions as small as 3/16" affected the off-axis response. To further reduce diffraction, the drivers are rebated in the front baffle.

The Type C/IV's three forward-firing drivers are all Vifas. The custom-made treated pulp woofer is mounted midway up the cabinet and features a cast basket frame. The 5" midrange was chosen for its flat response both on- and off-axis. The rear-firing 3" dome tweeter, by virtue of its small size, has excellent dispersion characteristics.

Crossover slopes are quite steep at 24dB/octave (fourth-order), with crossover frequencies of 275Hz and 2.7kHz. The rear-firing tweeter comes in gently at about 6kHz with a first-order slope. This additional driver compensates for the reduced power response in the room as the front tweeter becomes more directional. It isn't designed to contribute to the front tweeter's energy, but rather to provide a
sense of air and spaciousness lost by the front tweeter's increasingly narrow dispersion as frequency rises. The fourth-order slopes were chosen for several reasons: least driver interaction and lobing effects (constructive and destructive interference caused by two drivers reproducing the same frequency), higher power handling, and lower distortion. After experimentation some years ago, Kevin Voecks decided that trying to improve the phase response by using first-order filters wasn't worth trading off the higher-order filters' advantages.

The C/IV's crossover was designed with a computer program after all the drivers had been measured in the enclosure in which they were intended to work. Crossover development programs are much more accurate at predicting real-world behavior when given the precise driver responses measured in a cabinet. The fourth-order slopes are achieved by a combination of crossover rolloff and the drivers' acoustic rolloffs. The woofer circuit uses non-polarized electrolytic capacitors and air-core inductors, while the midrange circuit uses electrolytics bypassed with Mylar caps. Tweeter filtering is provided by Mylar capacitors.

Because raw driver responses vary greatly from one unit to the next, a particular pair of loudspeakers may sound quite different from the next pair off the assembly line and in relation to the prototype. Snell overcomes this problem by measuring each driver and tweaking crossover components to compensate for driver variations. Capacitor, inductor, and resistor values are adjusted for the particular drivers in each pair of loudspeakers. The goal is to make each loudspeaker identical in performance to the prototype—within real-world limitations. Snell guarantees that each loudspeaker will have a frequency response within 0.5dB of the design goal. In practice, Snell loudspeakers typically achieve 0.25dB matching.

Although some speaker manufacturers match drive-units between stereo pairs—essential for good imaging—Snell's exacting procedure is, to my knowledge, unique. This procedure is performed on all Snell loudspeakers, including the $465/pair Type K/II. Besides ensuring that all loudspeakers will sound the same, this method allows exact matching of replacement drivers in case of failure. When Snell sends a replacement driver, relevant crossover components are also sent so that the repaired loudspeaker still matches the prototype (and its companion) to within 0.5dB.

The enclosure is made from ¾" high-density particle board, except the front baffle, which is 1¼"-thick particle board. Two horizontal braces add rigidity to the cabinet. The midrange is mounted in a cylindrical sub-enclosure, rather than in a sealed cabinet section as was used in the Type C/III. This change between the III and IV version added volume to the woofer enclosure, smoothing bass response and extending the low-frequency cutoff point. Although some Kevin Voecks designs use a sealed enclosure (the Type K/II, for example), the majority of them—including the Type C/IV—are ported. A 3" port toward the lower rear of the enclosure vents low-frequency energy outside the loudspeaker.

The Type C/IV's fit and finish is excellent. Cabinet pairs are made from veneers taken at different depths from the same wood, ensuring matching grain. Once the veneer is cut, the cabinets stay in pairs throughout the manufacturing procedure.

Snell's design philosophy is based on using cost-effective components that can be shown to make an audible difference rather than spending money on esoteric parts that Snell feels may make a marginal improvement. This approach is contrasted with Hales Audio's ideology of using the best components money can buy, paying careful attention to the smallest details, and letting the product's retail price reflect this less-cost-conscious approach. (The Hales System Two is reviewed elsewhere in this issue.) An example of these disparate schools of thought is found in the Type C/IV's and System Two's internal wirings. The Type C/IV uses regular 16-gauge wire to connect the drivers, the same wire you'd buy off a reel in an electronics store. The System Two is wired with Cardas cable, with the lengths from crossover to drivers identically matched. In addition, the Type C/IV uses electrolytic crossover caps, the System Two expensive Solen caps. These are just a few examples of the two companies' divergent approaches to building loudspeakers. These differences, however, are reflected in the prices: $2190 for the Type C/IV, $3000 for the System Two.

Listening
I used the Type C/IV as my primary loudspeaker.

1 See Tom Normon's interview with Kevin Voecks in Vol. 13 No. 3.
for three weeks before conducting direct comparisons with the Hales System Two, which I'd listened to during the previous month. Both loudspeakers were driven by VTL 225W Deluxe monoblocks or a Threshold S/550e through 10' runs of bi-wired AudioQuest Green Hyperlitz. Preamplification was provided by an Audio Research SP-II Mk.II, which drove the amplifier(s) through AudioQuest Lapis. The analog front end was a Well-Tempered Turntable and Tonearm fitted with a Signet O-9C moving-coil cartridge. The arm has been modified by LP Research and Development Lab. An Expressive Technologies SU-1 step-up transformer, connected with Expressive Technologies IC-1 interconnect, stepped up the moving-coil output before driving the SP-II. Digital sources included the VTL DA converter, Meridian 203, and a PS Audio SuperLink, all driven by an Esoteric P-2 CD transport through Aural Symphonics Digital Standard interconnect. Analog interconnects were AudioQuest Diamond.

A pair of Phantom Acoustics Shadows, an active low-frequency control system that normally resides in my listening room, was turned off during the auditioning. The dedicated listening room has optimum dimensional ratios for room-mode distribution.

I positioned the Type C/IVs in accordance with Snell's computer-generated recommendation for my room. Snell has developed a program that suggests rear- and side-wall distances (best, better, good) to minimize resonant-mode excitation. I have used their recommendations, with successful results, for some time with other loudspeakers. The C/IVs were positioned 50" from the rear wall (middle of woofers to wall) and 34" from the side walls. I toed-in the C/IVs a little more than halfway between pointing straight ahead and pointing directly at the listener. My listening chair positions my ears at 36", 3/2" below the tweeter axis. All auditioning was done with the grilles in place.

I began with the rear-firing tweeter turned off. When I threw the switches that turn them on, one of the tweeters didn't work. It turned out that a bad solder joint on the rear tweeter was to blame: a few minutes with a screwdriver and soldering iron cured the problem. After some experimentation, I decided to leave the rear tweeters on. They didn't seem to change the overall tonal balance, but did add a sense of spaciousness and air to the presentation.

My first impressions of the Type C/IVs were confirmed throughout the auditioning: a big, lively presentation with surprising tonal neutrality and excellent low-frequency extension. It was apparent that the Type C/IVs were quite flat; no surprise, considering their designer's priorities. I detected very little coloration that could be ascribed to amplitude irregularities. The critical midrange was free from anomalies that often cause loudspeakers to be called "nasal," "forward," "mucky," "hooded," "recessed," "honky," or other such adjectives descriptive of midband colorations. Instead, the Type C/IVs' presentation was smooth, open, and neutral. Instrumental timbres were quite true to the recording.

The standards for midrange accuracy have gone way up in recent years. This is one thing all good loudspeakers seem to have in common: a midrange that doesn't constantly remind the listener he or she is listening to reproduced music. The Type C/IVs exemplify tonal neutrality in loudspeakers.

The treble was exceptionally smooth, with excellent extension. The Type C/IV seemed to have less energy in the range from, say, 6kHz to 12kHz, than the System Two. Consequently, cymbals had a little less sizzle and violins less sheen and edge through the Type C/IV. In this respect, I felt the Type C/IV to be more neutral than the System Two, which introduced a slight fizziness to the top octaves. Despite its softer treble balance, the Type C/IV provided a greater feeling of air and extension in the extreme treble.

However, I felt that the Type C/IV had a somewhat grainy texture, especially through the mids. It just didn't have the purity and pristine delicacy of the System Two. Some instruments and vocals seemed to be overlaid with a trace of roughness that gave instrumental textures a slightly gritty sound. When listening to the Type C/IV, I was reminded of "asperity noise," a phenomenon that occurs in magnetic tape recording. If you listen to certain instruments recorded on a single track on a multi-track tape recorder at a fairly high level, the recorded signal can be heard to modulate the noise floor (modulation noise) and create a fuzziness or roughness that rides on the instrument's envelope (asperity noise). It is most audible on instruments with simple harmonic structures—flute, for example. Similarly, the Type C/IV imparted a slight roughness to instrumental textures that seemed to follow the
instrument's dynamic envelope. Joe Farrell's flute on *Light as a Feather* (Polydor 827 148-2), for example, had a slightly coarse edge to it rather than a round liquidity. In addition, the Type C/IV had a somewhat bleached or whitish character in the midrange and lower treble. This gave the impression of a livelier—but not more forward—presentation. The result was that the Type C/IV didn't have the sense of ease and velvety smoothness through the mids heard through the System Two. In addition, I felt that the midrange was a bit lacking in warmth, with less impression of fullness and body in comparison with the System Two. Julianne Bard's voice on *The English Lute Song* (Dorian DOR-90109) tended to have a trace of "lightness" rather than a round, full quality.

If the System Two has a midrange and treble like a crystalline pool of sparkling water, the Type C/IV's mid and treble presentation was like that same pool, but with some sand suspended in it. The C/IV wasn't cloudy, murky, tinted, or otherwise polluted, but there was some grit within the uncolored rendering.

During the auditioning, the Type C/IV played at high levels without a sense of strain or compressed dynamics. The full impact heard at low levels was preserved even at higher volumes than one would normally listen. Consequently, dynamic contrast was exceptional, with a feeling of effortlessness.

I found the C/IV's bass presentation tight, punchy, and well-extended. They didn't have the sluggishness and boom that often characterize ported loudspeakers. In fact, one would be hard-pressed to identify the Type C/IV as a ported design by listening. The bass was well-controlled, free from overhang, and had no annoying peaks that emphasize some notes more than others. I find left-hand piano lines particularly revealing of low-frequency colorations, and the C/IV did well with *Dick Hyman Plays Fats Waller* (Reference Recordings RR-33CD). The piano's lower registers were smooth, extended, and had a rich body. I listen quite frequently to this disc and found the C/IV particularly adept at conveying the weight and power of the Bösendorfer. In addition, I heard the instrument during the recording, and felt that the C/IVs accurately presented the piano's lower registers. By comparison, the Hales sounded lightweight and thin, failing to convey the instrument's power.

The Dorian organ *Pictures at an Exhibition* (DOR-90117) was reproduced with stunning weight and authority while at the same time providing precise pitch resolution. The C/IVs effortlessly produced low frequencies that the System Two only hinted at. In fact, the Snells did the most credible job on this recording of any loudspeaker I've had in my listening room, with the exception of the massive $7000 TDL Reference Standard. In comparison with the B&W 801 Matrix Series 2, the Type C/IV's bass was a bit leaner, tighter, and better controlled.

Despite the more viscerally satisfying bass reproduction, the Snells didn't convey the detail and nuance in low-frequency instruments I've grown accustomed to in months of listening through the Hales Signature and System Two. Fine textures, minute detail, and other aspects of low-frequency-rich instruments just weren't there through the Type C/IV. Because of this, there was less impression of palpability, of the instrument actually existing in the listening room. Consequently, some instruments sounded somewhat artificial and dead rather than believable and alive. This feeling was perhaps exacerbated by the contrast with the System Two's highly detailed and precise bass presentation. One designer chose to provide LF extension, weight, and dynamics, while the other chose refinement, articulation, and control.

The Type C/IV's low-frequency dynamics were excellent by any measure. Dynamic impacts were fast, effortless, and powerful. Bass drum, in particular, was punchy, well-defined, and provided a strong rhythmic foundation. On rock, jazz, and fusion, the Type C/IVs were immensely satisfying in terms of punch and kick. Orchestral climaxes accompanied by kettle drums—like those in much of Stravinsky—conveyed the orchestra's power and, by extension, the music's force. It was a delight to revel in the full weight of a symphony orchestra reproduced without a sense of strain or effort. The Type C/IV's exceptional bass extension and control were realized best with the Threshold S/550c. The VTLs provided greater warmth in the bass, but less extension and punch.

One aspect of the Type C/IV's presentation

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2 The new Chesky release (CD42) of *Perotucci* with the Royal Philharmonic Orchestra conducted by Oscar Danon, and *The Rite of Spring* with René Leibowitz conducting the London Festival Orchestra, is a "must-have" recording. Both performance and sound are excellent. The original tapes, recorded by Kenneth Wilkinson in the early 1960s, were transferred to digital by Bob Katz with his 128x oversampling A/D converter. Watch for JGH's review in an upcoming issue.
that didn't match its excellence in other areas was imaging and soundstage depth. Even after experimenting with placement and toe-in, I just couldn't get the soundstage to gel. Images remained diffuse, lacking precise focus. Instrumental outlines tended to be somewhat blurred together and amorphous. In addition, there wasn't clear differentiation between instruments: the presentation tended to become somewhat homogenized and synthetic. Perhaps this contributed to the Type C/IV's less than impressive depth. There must be clear differentiation between individual instrumental outlines before the illusion of three-dimensional layering can occur. Percussion instruments normally toward the back of the soundstage were "stuck" in instruments at the front. The woodblocks at the beginning of the tune "Past Ports" from the Yellowjackets' Four Corners (MCA MCAD-5994) lacked the clarity and individuality heard through the Hales System Two. I never got the feeling of discrete instruments existing in space, despite repeated toe-in and room-placement adjustments.

Chesky's new Clark Terry Live at the Village Gate CD (Chesky JD49) was particularly revealing of the two loudspeakers' spatial presentation. This recording can provide an uncanny feeling of being in the room with the musicians and audience. The System Two painted a vivid, clearly defined sonic picture—where each musician was, where the audience sat, room size, and other information. This picture was less distinct through the C/IVs, with poorer resolution of the spatial information that makes this recording special.

The Type C/IVs' imaging problems were thrown into sharp relief—perhaps unfairly, considering the price difference—by the System Two's excellent imaging. The Hales threw palpable images with pinpoint precision, all within a deep and transparent soundstage. Again, the System Two represents a substantial jump in price and doesn't have nearly the bass extension and power of the Type C/IV.

**Measurements**

The LEDR test on the Chesky Test CD produced a fairly good "up" impression, but with the image turning inward toward the top of its extension. The "over" and "lateral" tests were reproduced quite well, with solid images moving between the loudspeakers. Driving the Type C/IV with a sinewave oscillator revealed cabinet resonances at 65Hz, 200Hz, 500Hz, and 660Hz, the last being the strongest.

Even in the worst case, with the HF control at maximum and the rear tweeter on, the Type C/IV presents a fairly easy load to a power amplifier, evinced by the impedance magnitude and phase plot of fig.1. Although the impedance dips narrowly to just over 4 ohms at about 100Hz, and more broadly between 4kHz and 10kHz, the impedance is much higher through most of the band. Most amplifiers should have no trouble driving the C/IV. Turning the HF control to its minimum setting gave the impedance plot shown in fig.2—a benign load through the treble. The woofer and port tunings, evinced by the impedance peak at 35Hz and the minimum at 22Hz, are very low in frequency, accounting for the C/IV's excellent feeling of extension.

Fig.3 shows the C/IV's MLSSA-derived impulse response on the tweeter axis at 48", taken out of doors on a high stand to eliminate the floor reflection. The ultra-high-frequency ringing is typical of metal-dome tweeters, the general shape consistent with that of other loudspeakers using high-order crossover slopes.

![Fig.1 Snell C/IV, electrical impedance (solid line) and phase (dashed), HF control maximum, rear tweeter on (2 ohms/vertical div.)](image1.jpg)

![Fig.2 Snell C/IV, electrical impedance (solid line) and phase (dashed), HF control minimum, rear tweeter on (2 ohms/vertical div.)](image2.jpg)
Looking next at fig.4, the Type C/IV's frequency response—FFT-derived from the anechoic portion of the impulse response and averaged over a 30° lateral window—we can see that the loudspeaker is very flat. There is, however, a very slight depression between 1kHz and 8kHz. In addition, a crossover-related dip around 3kHz is apparent, and the treble has a slightly rising response above 6kHz. These measurements were made with the grille on, the tweeter-level control at “Optimal.” For comparison, fig.5 shows Snell's own measurement of the C/IV, averaged spatially across 30° lateral and vertical windows at the Canadian NRC facility and frequency-wise with a 1/3-octave window. Again, there is a suggestion of a broad but shallow depression between 1kHz and 8kHz or so.

Fig.6 shows the C/IV's on-axis frequency response with the nearfield woofer and port responses appended, measured with an Audio Precision System One. As can be seen, the port, its 23Hz tuning revealed by the LF minimum in the woofer's response, really extends the sys-
tem's low-frequency output below the woofer's rolloff. Note the extreme flatness between 60Hz and 300Hz, but with a very slight peak between 70Hz and 100Hz. These measurements confirm the impressions of good LF extension and smoothness noted during the auditioning.

For comparison, Snell's measured frequency response of the C/IV in fig. 5 also shows respectable LF extension, though this anechoic measurement reveals that the rear-mounted port's output doesn't quite match the woofer overall. (The matching of the separate woofer and port traces in fig. 6 is only approximate.)

Finally, the Type C/IV's "waterfall" plot is shown in fig. 7. The decay is quite clean initially, but with a bit of "hash" through the midrange and lower treble, especially around 4kHz. The dark ridge at 16kHz is an artifact of the computer monitor's display.

Overall, the Type C/IV measured very well, with a strong correlation between measurements and listening impressions.

**Conclusion**
The Snell Type C/IV is a very neutral loudspeaker, without serious tonal colorations that could interfere with the listening experience. The mids were open, uncolored, and clear. In addition, the treble successfully struck a very good balance: the treble presentation was open, lively, and detailed, yet was never overly aggressive or forward.

For me, the best part of the Type C/IV was its remarkable bass extension, coupled with an ability to convey the weight and power of low-frequency-rich instruments. The bass was quite taut and punchy, lacking the sluggishness that often characterizes ported designs. When combined with the smoothness and lack of coloration throughout the lower registers, the Type C/IV provided a satisfying foundation to music that I greatly enjoyed.

In these aspects, the loudspeaker has realized its design goals. However, I felt that the Type C/IV had some weaknesses. First, soundstage depth and image specificity were not quite impressive. I never got the Type C/IVs to create a credible impression of soundstage depth, or to throw well-defined, focused images. Second, the mids and treble had a slight graininess that made the presentation seem somewhat bleached and chalky. My final criticism is of the Type C/IV's tendency to obscure finely woven instrumental detail.

In one aspect, the Type C/IV's presentation was very similar to the System Two's: both speakers had very low levels of coloration, especially through the midrange. In other ways they were quite different. The Type C/IV had far better LF extension, more satisfying feeling of weight and power in the lower octaves, and a slightly less forward upper treble—all measurable quantities. However, the System Two easily excelled in textural purity and freedom from grain, soundstage depth and imaging, and ability to reveal finely woven textures—all unmeasurable qualities.

Could these last factors cited in the System Two's favor be partly a result of Hales Audio's attention to passive components like wire, terminations, capacitors, etc.? I wondered what the Type C/IV would sound like with audiophile-type internal wiring, no fuse and level control in the tweeter circuit, brass input terminations instead of five-way binding posts, and audiophile-grade caps in the crossover. Of course, these refinements would add considerably to the cost. As stated earlier, the System Two with stands costs half again as much as the Type C/IV.

The Type C/IV has earned a solid Class B recommendation in *Stereophile*'s "Recommended Components." It does many things well and its shortcomings should be considered in the context of its moderate price tag and the importance of those factors to the particular listener. I can imagine some people preferring the C/IV over the System Two on the basis of low-frequency performance alone, while others may prefer the System Two's more refined presentation. I generally preferred the System Two, but did enjoy some music much more through the Type C/IV. Both loudspeakers are excellent in their own ways, and I'm sure a market for each exists.

The Snell Type C/IV is a "must audition" product for anyone shopping for loudspeakers near their price range.

**FOLLOW UP**

**Esoteric P-2 CD transport**
You can't be too rich, too thin, or praise a great product too much. The P-2 transport has impressed me at least as much as it did Robert
Harley in Vol. 13 No. 12. I would like to accentuate his positive impressions with a few of my own observations.

I was impressed when I encountered the transport that started it all, the Esoteric P-1, and it happened again when the P-2 arrived—each time a transport of this caliber was included in my system the sonic signature took a turn for the better.

I'm not talking subtleties. The improvements immediately sprang to life in a very perceptible manner. For specifics, I defer to RH's apt descriptions of the particular sonic gains one can expect from the P-2. He's right on the money.

But there's more. As much of a surprise as it may be to those who read Bob's P-2 review, additional sonic gains lie ready to be coaxed into pleasing us.

Some call it art, some call it science—I call it tweaking. Those of you who longingly look at all the fun our happily tweaking analog con-padres have should not despair—as you'll see, digital is holding its own.

After all, tweaking is something we can do ourselves to control the sonic outcome. (For further information, consult Robert Deutsch's comprehensive "System Tweaks and Sonic

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Stereophile, April 1991
Tonics” article in that same December 1990 issue of Stereophile.)

First of all, the obvious—don’t hesitate to experiment with different digital cables. Borrow from friends, dealers, and your fellow countrymen and listen for yourself.

Here's the best part. The P-2 just happens to provide multiple outputs for the digital signal, making it uniquely suited to digital cable-comparison adventures. Two coaxial and two optical outputs appear on the P-2’s rear panel on two RCA and two standard EIAJ Toslink jacks, respectively. Things really fall into place if the Stax or Esoteric D-2 processors or the Wadia Digilink 30 or 40 digital interface is also available. All of these products have digital input-selector switches permitting the user to choose among one of several coax inputs, as well as at least one plastic fiberoptic input. The Digilink 30 handles coax cables only.

To proceed, just plug in any two coax cables—you can even add a fiberoptic cable if you have a D-2, Stax, or the Digilink 40—and switch away. This is about the best digital cable-comparison facility I know. So far, my experience with digital cables is somewhat limited, but, as of now, I’ve found the Theta digital cable to be a real honey.

A word of caution, though: If an input is not terminated on the Wadia Digilink, a loud pop will be heard in the speakers when an open input is selected. Of course, to avoid grief, mute the preamp—or switch to an unused input—while going through the empty digital input.

My next tweak concerns the AC power: It helps to use a fancy AC cord like the Music And Sound Power Master cable. I heard a fairly modest improvement in soundstaging, but it was there. Don’t forget to listen for the best orientation of the AC plug. More details and dynamics are the likely rewards of that effort.

But power-line conditioning is the way to go. All my low-level and front-end components are fed by a Tice Power Block. On top of that, I retained the Music And Sound Power-Master AC Line Cord from my pre-Tice days. Again, the polarity of the AC plugs was as important as ever.

The last and most rewarding area of tweaking has to do with placement and support of the CD drive-unit. In general, everything discussed applies to all transports and players, but unfortunately there is no universal cure-all. I have found that desirable results can be expected when CD transports and CD players are supported by Navcom pucks or Monster Cable Footers. A minimum of three, but usually four pucks or footers will do the job.

On the whole, gains in soundstage spaciousness and detailing, overall definition, and timbral rendition can be expected when the suspension qualities are altered in this manner. But don’t count on making progress in every case. With some CD players and transports I was disappointed to discover veiling—usually in the midrange—and restricted dynamics when suspension pucks were introduced.

The P-2 gave its best in my system when supported by a Monster Cable Tranquility Base. Once again, the results were far from subtle. For example, when the Audiophile Society executive committee members recently heard my system, the most asked question was what was responsible for the improved sonics since the last time. The only change was the Tranquility Base under the P-2.

Of the gains, most prominent was the musicality. Playback was simply more palpable. No, strings were not devoid of digital glaze, but they were rendered more delicate and airy. Massed strings occupied more space, and the inner makeup of the soundspace was more distinct. It was easier to become involved with the performance; less listening effort was required. To paraphrase RH, music became the predominant preoccupation, subduing the inclination to criticize.

If the soundspace was exciting before, you should hear it now. The whole stage became even more alive with spatial artifacts. Focus and delineation within the stage were more refined, details easier to pick out, instruments had better presence, and lateral and front-to-back dimensionality had more certainty.

That’s it so far. The Esoteric P-2 transport has refined CD playback capabilities significantly and is a major contributor to the ongoing saga of digital developments. I’m happy to report that this already outstanding product can be coaxed to perform even better sonic feats, raising the enjoyment of CDs to a more satisfying level.

—Arnis Balgalvis
B&K Sonata Series M-200s: The Critics Choice!

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I'm back!
I don't know how often. I'm still nervous about seeing my name featured as "Senior Contributing Editor." It implies that I'll be writing regularly, and I'm not sure about that. I'll be covering the Winter CES, though—even as we speak.

No sooner had I announced my retirement than I received the B&K Sonata Series M200 Monoblocks. Boy, I wish I was still writing the column so I could tell you all how good these amps are. Well... why not? I felt almost an obligation after reading AHC's latest raves about Adcom products in the October Audio. Why is it that Tony raves only about Adcom? Has AHC ever met an Adcom he didn't like? You see the situation. Reviewers are not exactly falling over themselves to review B&K equipment. They'd rather review Air Tight, Jadis, Audio Research, Mark Levinson, Krell—all the "good stuff." So it's very easy for them to miss the fact that B&K now is the "good stuff." That's the big news with the Sonata Series M200 Monoblocks: they are real high-end amps, not very far short of the best solid-state amps available. And like I was telling Apogee's Jason Bloom the other day, "What a bargain!"

I'm getting ahead of myself, as usual.

Several years ago, I heard a certain manufacturer of high-end gear say that he could sell his products for 40% less if he didn't spend so much on the cosmetics—bulletproof faceplates, etc. I believe it. You look at the typical product from Threshold, Levinson, Jeff Rowland, Krell, and you know you're paying not just for all the nasty parts inside but also for the superb exterior cosmetics.

Until now, I would never have classified B&K products with the aforementioned brands. I remember listening to a pair of B&K ST-140 monoblocks or a pair of Jeff Rowland Model 5s. The Jeff Rowland amps sold for roughly ten times the price. The B&Ks didn't fare badly, but the Rowland amps easily outclassed them in terms of transparency. (I'll explain what I mean by transparency in a moment.) With the B&Ks, there was something of a veil—or a haze, as my Swedish friend would say.

I've not heard a recent production of the ST-140 (either the standard stereo ST-140 or the mono version), but I understand they have been upgraded by the addition of another pair of output transistors. This should make the amp better suited to 4-ohm loads. It may also mean that the amp loses some of its slightly warm, fuzzy, phasey, a-little-grainy-in-the-treble sound. The classic ST-140—particularly the very early ones, which were rated at 70Wpc rather than 105Wpc—sounded like classic tube amps.

The B&K Sonata Series M200s sound nothing at all like the ST-140s I remember. (I repeat: I have not heard the current version.) They have the same smoothness and sweetness, but they're much more transparent. They sound like high-end amps. This may be very bad news for certain high-end manufacturers. The

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1 In fairness to Adcom, I haven't met an Adcom I didn't like, either. At least I try to review both Adcom and B&K. I've also tried to review various other budget brands, but the wretched sound usually has me packing up the boxes within hours. If not minutes. There's a good reason why Adcom and B&K own the low end of the high end.
M200s offer potentially very stiff competition for single-chassis stereo amps in the $2000-$3000 price range.

I'll put this in the starkest possible terms: for less money than you would pay for a stereo amp from "expensive" brands like Classe Audio, Mark Levinson, and Krell, you can have a pair of very powerful mono amps from B&K—two totally separate chassis, the ultimate dual-mono amps. Mono amps can offer significant advantages, particularly in soundstaging; the image doesn't collapse during rough-sledding passages. You know, like Tchaikovsky's Fourth Symphony, or almost any work by Mahler, Bruckner, or Shostakovich. A pair of B&K Sonata Series M200 monoblocks will set you back only $1800/pair unbalanced. For an additional $200 each, you can get them balanced—with the same XLR inputs you find on the expensive brands.

Now let me explain what I mean by transparency, because the B&K Sonata Series M200s have it—in spades. By transparency, I mean a certain see-through quality: clarity combined with a wide, deep soundstage plus precise imaging. Some amps will give you clarity, lots of detail, but no air—that isn't transparency, in my book. Other amps will give you air—specious spaciousness, perhaps caused by some funny, fuzzy phase effects—but will lack the ability to precisely locate vocal and instrumental soloists, who may sound like they are singing or playing surrounded by a fog. That's not transparency, either.

The B&Ks have this see-through quality. If they are lean—and I believe that's their main fault—they are also clean. And lean, by the way, does not mean mean. There is nothing nasty about the sound of the M200s—nothing metallic or shrill or clinical. The sound is smooth and sweet. There is a total absence of grain in the treble.

The bass is tight, too—something else that differentiates the M200s from the ST-140. The B&Ks have what the Britcrits like to call slam—good timing, tightness, rhythm in the bass. To put it another way, the B&Ks "let go of the notes" (a useful phrase borrowed from Alvin Gold). There's a refreshing, bracing crispness to these amps: they're quick. Quickness is one reason I usually become dissatisfied with tube amps, like Quicksilvers: most tube amps don't have it. The B&Ks are quick—almost to the point of being lean. On the whole, this is a sound I like because it is quick and does not obscure detail.

The B&K M200s have excellent clarity and definition in part because there isn't any muddiness in the bass. The clarity and hard thing to get right, and these amps do get it right.

Are these the best solid-state amps I've heard? Not quite. The M200s do not have the same balls-to-the-wall quality I hear, for instance, from the Krell KSA-250. Nor do they have the same dynamic authority I've heard from the Krell KSA-80, now superseded by the KSA-150. Along with this slight lack of authority goes a soundstage which is not quite the widest and deepest I have heard. But you have to put this in perspective. Look at the price of the B&Ks!

After years of complaining that the B&K ST-140 is a little bit fat—overly warm with a flabby bass—it's ironic that I now complain, mildly, that the M200s sound a little lean.

I wonder if this has to do with the way they're biased. As supplied by the factory, these amps run very, very cool. Perhaps I'm conditioned to believe that amps which run cool will sound a little cool, but this is how I feel about the M200s. I talked with Ed Mutka of B&K, and he tells me the bias can be set higher so the amps run hotter. As supplied, the amps are biased to run to about 60W class-A. Ed says this can be juiced up to about 100W, and as I write this column, the amps are back at B&K for rebiasing—goosing up the juice. I'll let you know what happens, by way of a postscript to this column. It's hardly an academic question, since any dealer can order you these amps from the factory with the bias set higher; or you can return them to the factory for heating up if the amps leave you feeling a little cold. Incidentally, if you don't own a preamp with balanced outputs, you can order the B&K M200s unbalanced, save $200, and then have balanced outputs added later on by the factory. If you buy them balanced, you can go from balanced to unbalanced at the flick of a switch on the back of each amp—no internal adjustments needed.

Is balanced better? I can't say for sure, since I do not have comparable-quality cables in both balanced and unbalanced.

\^ As supplied with the standard factory biasing, the M200s lack what I call the preamplifier quality—that is, they're somewhat deficient in flesh and you can't get great satisfaction out of pinching their behinds. I'm sure I'll get howls of protest over this one, but there's no saying that a woman can't pinch a man's butt.
modes. But my listening points to a tentative conclusion. Balancing, for some reason or other, appears to improve dynamics, at least subjectively. There is less noise, less hash. The sound is more immediate, more direct. Much of this, though, might be ascribed to the excellent AudioQuest Hyperlitz cable I've been using in the balanced mode. It's certainly worthwhile having balanced XLR connectors as opposed to RCA jacks!

As for the leanness, or slightly cold quality of the B&K M200s, you can mitigate this with a moderately priced tube preamp—from Audible Illusions, MFA, RAM/Music Reference, or Conrad-Johnson. I tried an Audible Illusions Modulus 2D and found that its tubelike qualities came through, giving the B&K amps a warm tone. . . a little more body. None of these tube preamps is presently available with balanced outputs.

I'm waiting, though, to see what an increase in the bias current will do for the sound of these amps, because I have to tell you: the new B&K Sonata Series Pro 10 preamp is a fabulous unit, easily the best solid-state preamp I have heard for under $1000. This new version of the Pro 10 is available unbalanced for $698, balanced for $898. Among its features are one of the finest moving-coil stages I've encountered in any preamp, regardless of price, and a defeatable line stage. Again, this is exactly the sort of thing that should give B&K's competitors fits.

By the way, the B&K M200s are said (by B&K's John Beyer) to drive just about any speakers in existence, including all Apogees, Avalons, Martin-Logans, Wilson WATT/Puppies, B&W 801s— you name it. The amps are certainly up to driving my reference Spendor S100s. I have the Spenders tri-wired with Kimber Kable (4TC to the midrange and treble drivers, 8TC to the woofers).

These amps are an amazing value. Before purchasing any amps in the $2000–$3000 range—particularly a single-chassis stereo amp—I would carefully audition the B&K Sonata Series M200 Monoblocks. I believe these set a new standard for value and performance in a price range which, until recently, has not had very much competition.

One problem, from a dealer's point of view is that these amps are so embarrassingly good that you may be persuaded to part with less money! (You can see how I love to rub this in.) But it's true: Dealer enthusiasm tends to grow as the price gets higher.

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"Now let me explain what I mean by transparency, because the B&K Sonata Series M-200s have it—in spades. By transparency, I mean a certain see-through quality: clarity combined with a wide, deep soundstage plus precise imaging."

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Don't let a dealer talk you out of auditioning these amps with a very, very expensive pair of speakers. If your B&K dealer sells Martin-Logans or Apogees or Avalons, ask him to hook them up. Tell him John Beyer says they'll work fine. Tell your dealer that the Devil—ah, I mean Sam—is making you do it.

I can just see you walking into the dealer. Hello, I want to hear the Wilson WATT/Puppies with the B&K Sonata M200 Monoblocks:

'No way. You need a real amp to drive those speakers.' (The dealer wants to make a $20,000 sale.)

'Sam says I can drive them with a pair of B&Ks.'

'You believe Sam?'

'Yes.'

'The B&Ks are in the other room, with the cheaper equipment. You can't hear them with the WATT/Puppies.'

'I'll help you bring them in. The amps aren't that heavy.'

Good luck.

By the way, B&K has a history of protecting the consumer's investment by not changing its model numbers every 18 months, the way some high-end manufacturers do, taking a cue from the way professors revise their textbooks to wreck the resale value. Not that you'd be likely to trade in these B&K amps.

The M200s won't sound their best until they've been left on, preferably all the time, for at least a couple of weeks and perhaps up to a month. Out of the box, new, they can sound a little raw. Once burned in, they take about half an hour to an hour to start sounding real good. Leaving them on all the time (after they've burned in) does not seem to offer much sonic advantage. Cheers!

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3 My friend, Silent John, recently traded in his VTL 30s for an expensive solid-state amp. He's not so sure he prefers the solid-state. Yes, there's better control—higher bass, better dynamics, quicker response. But he misses something of the musicality and warmth. I mention this because coldness seems to be characteristic of almost all solid-state amps. Having an amp run class-A, or he heavily biased into class-A, helps alleviate this coldness, in my experience. This is why I've asked Ed Mutka to try turning up the juice. (Richer biasing into class-A may be one reason some of the newer Adcom amps have been getting such favorable press.)

4 This is as good a place as any to tell you that B&K and Adcom are two of the best companies in the business when it comes to customer service. Neither company seems to regard repairs and updates as an additional profit center, the way many high-end companies do. Some companies aggressively promote updates by direct mail to registered owners, which I'm sure helps fatten company coffers. I don't particularly care for this. Dealers, too, might get upset since they make nothing on such direct-from-the-factory transactions.

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In the 1970s Edo de Waart was one of a quartet of yeoman conductors who made Philips among the most reliable, if not the most passionate, of classical recording labels. He, Colin Davis, Bernard Haitink, and Neville Marriner were not particularly noted for wearing their hearts on their sleeves; commonsense North European rationality almost always prevailed. Ironically, the best, most emotionally engaging work de Waart did for Philips was a handful of chamber music pieces with the Netherlands Wind Ensemble, most of it now sadly out of print. The Dutchman's "Gran Partita" is still a wonder, and can be had on mid-price CD. He conducted the Rotterdam Philharmonic for a number of years, then moved on to the San Francisco Symphony, where his housecleaning efforts are credited with sprucing up a faded orchestra. But the sometimes barb critical response to de Waart's early efforts in San Francisco was a big change from the adulation he was used to in Rotterdam.

While in San Francisco, de Waart teamed up with composer John Adams and began a series of recordings that are essential to any collector of new American music. He also made some fine recordings of general repertoire, especially his collaborations with Dutch soprano Elly Ameling.

In 1986 de Waart left San Francisco for another American ensemble slightly down at the heels, the Minnesota Orchestra. His predecessor (and colleague from Philips days), Neville Marriner, though famous for his ubiquitous Academy recordings, hadn't done much for the orchestra's quality or reputation. (In fact, Marriner was living proof of the Peter Principle.) de Waart once again got out his broom, swept out some marginal players, hired some sharp new ones, and now has an orchestra fit to compete with the best of America's second rank. Their first recording, of Strauss's Alpine Symphony, was recently released on the Virgin label.

de Waart has also taken on the Music Directorship of the Dutch Radio Philharmonic, and has been named Principal Guest Conductor...
of the Santa Fe Opera.

D.R. Martin: You said when you came to Minnesota that you were going to strive for an orchestra that was a cross between the Concertgebouw and the Cleveland Orchestra of George Szell—a pretty ambitious statement. Are you approaching that territory yet?

Edo de Waart: I think there are moments when either of the two, or both, can be recognized. Obviously four seasons here is not enough to emulate orchestras that took 50 years to get those qualities. I said that not because I want to sound like that, but because I am impressed by those two possibilities. The Cleveland because it played like a big chamber-music group, and the Concertgebouw because it can play many styles really well. So those are guiding lights rather than examples I want to copy. I think if we played tomorrow's performance of Domestica in the Concertgebouw, in that gorgeous acoustic, people would say, wow, those Minnesotans aren't bad. The precision of the Cleveland takes a long time to achieve; everybody has to be right on the mark.

DRM: I remember that when Marriner succeeded Skrowaczewski, he gave Szell's Cleveland as his ideal. Which, obviously, he never accomplished. But what is it about the Cleveland Orchestra and Szell that holds a fascination with conductors?

Edo de Waart: You can't help but listen to the Cleveland Orchestra on record or live—I once spent a month there—and you have the score and you see that they played what's written. And they didn't just give a boring performance, either. Szell was a wonderful musician on top of everything else. The sense of ensemble, of listening together, the textures, the balancing of the voices, the colors. It's just like someone playing a huge organ with a hundred stops, who was able to bring out this and that. For those of us who not only look at the big picture, but the details, listening to Szell and Cleveland was like being a child in a toy store. It was so great what those guys would do. I haven't heard Cleveland in a while, but I'm sure they can still play terrifically.
**DRM:** Does the name change from Minneapolis Symphony to Minnesota Orchestra [a late-’60s marketing gambit aimed at local and regional audiences] still hurt the orchestra? Does it still hurt to have so obscured the recording legacies of Mitropoulos and Dorati?

**EdeW:** I think so. Because changing the name was one thing; by itself it wasn’t a big problem. But it should have been surrounded by a big push to publicize the change and make clear that this was the same orchestra as the Minneapolis Symphony. "Minnesota," even "Minneapolis," doesn’t mean a lot in Europe. They don’t know if it’s in Canada or the south or where. But there was a certain identification with the Minneapolis Symphony, even if they didn’t know where it was. I’m often asked if the Minnesota Orchestra is the same as the Minneapolis Symphony. Had we recorded more and made important tours then, we might right off the bat have established the name change. As it is, in certain quarters that still remains to be done.

**DRM:** Are you going to be able to accomplish that?

**EdeW:** The recordings with Virgin will obviously help a great deal. If we get a steady stream of CDs of high quality coming out, that will help.

**DRM:** That’s the secret, isn’t it? Establishing a steady stream of recordings that builds a following. Because Stanislaw Skrowaczewski made a number of recordings for Mercury and Vox-Turnabout, some of them quite fine, but erratically and in relative obscurity. Marriner made just a few for Philips and EMI, and they disappeared without trace. How is this going to be different?

**EdeW:** That’s up to both Virgin and to us, whether we can furnish the quality required at the pace at which the recordings would be brought out, to have recording repertoire ready every time on a level that you want . . . That’s not easy.

**DRM:** So tell me about your plans with Virgin. There’s a Mahler cycle and what else?

**EdeW:** There’s a Strauss cycle. We’ll also be recording an American record of Gershwin and Bernstein, six pieces. And hopefully there’ll be some other things in the future. But Mahler and Strauss, big orchestral works, that’s a lot of CDs, and a lot of rehearsal and a lot of concerts to play.

**DRM:** I’d like to put in a plug for the Strauss wind music that you did with the Netherlands Wind Ensemble—the Serenade, the Suite, and the others. Exquisite music.

**EdeW:** On the first Strauss recording, the Alpine Symphony will have the Wind Serenade as the filler; the Symphonia Domestica will have the Suite. So instead of the songs that Jarvi does, we have the wind pieces.

**DRM:** So I have my wish.

**EdeW:** It’s already done. See how easy it is?

**DRM:** Can you tell me why record companies and conductors are so keen on doing Mahler? It seems like every label, every conductor of consequence does Mahler, many of them complete cycles. A lot more Mahler than the world needs, I think.

**EdeW:** If you are a symphony orchestra in the 20th century and you want to be judged by what you can do, you should be looking at pieces like Mahler’s. Let’s face it, there’s the greatest challenge in that music. There is so much to be found, so many personal feelings about how the music should be played. Bern-stein does it one way, Abbado does it another, Haitink does it another way . . . I have my own way. Every one of us gives certain answers to the pieces, and that’s the reason.1

**DRM:** A rite of passage for conductors, maybe?

**EdeW:** Maybe. And orchestras. I think when you can do those symphonies well and do

If you are a symphony orchestra in the 20th century and you want to be judged by what you can do, you should be looking at pieces like Mahler’s.

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1 After this interview was edited, there appeared this notice in Michael Anthony’s “Classical Music” column in the Minneapolis Star Tribune, November 9, 1990:

> "The Minnesota Orchestra has canceled its recording sessions next month of Mahler’s Symphony No.2 and is likely to put its projected Mahler cycle on hold. The reason, in part, is the recent death of Leonard Bernstein. CBS Records plans now to reissue Bernstein’s Mahler cycle from the 1960s, and Deutsche Grammophon is expected to speed up the release of more recent Bernstein discs, including some Mahler recordings that Bernstein made in the year before his death.

> "Given the fact that other labels are also reissuing their early Mahler performances on compact disc, Virgin Classics, for which the Minnesota Orchestra has been recording, has decided that the record store-glutes with Mahler at the moment.”
I have to say that the AE1 is one of the finest, most transparent cone speakers I have heard.
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them in a way that moves people and tells them something, yes, it’s like you have become master of your craft.

**DRM:** Are you doing any more work with John Adams?

**EdeW:** There is nothing foreseen at the moment. He might be writing a violin concerto for our concertmaster, Jorja Fleezanis. We would record that, I’m sure. But John, more and more, is getting into conducting. I’m sure he’ll conduct more of the premieres of his pieces. Which is fine. But I think it will lend contemporary composers more believability if someone else conducts it. That’s the truth, even though the composer might conduct it better than anyone else. John is doing really well. He will conduct here, as well.

**DRM:** Are there any other contemporary composers you’d like to champion? At one point I read that you planned to do a lot of Sessions.

**EdeW:** We haven’t been at all successful in getting that project funded. For recordings we need a lot of help, and there’s not much of that. America’s not doing a whole lot for its own culture. There should be a fund to record and perform contemporary American composers, because it’s a losing financial proposition. You know you’re not going to sell 20,000 copies of a symphony by Roger Sessions, Elliott Carter, whatever. You would have to find someone so crazy to give you the money. It would be nice.

**DRM:** One of the major challenges facing American symphony orchestras is that they’ve become little more than museums. The average symphony program comprises music that probably averages a century old. Apart from old, mainline art museums, no other artistic medium lives so much in the past. What’s your perspective on that? Do you agree?

**EdeW:** My perspective is that we’re in trouble, that because of the ever-growing need to rake in the audience, we have to lower the standard of programming. Because those people who don’t need to be in the concert hall and are brought in by us—almost struggling—they only want to hear popular pieces. As soon as you play something a little out of the ordinary, forget it. There is an audience getting older and older that doesn’t want to be bothered with anything dissonant. I get letters. “This dissonant music, I’m not paying my money for this!” And we played some little eight-minute piece. It’s a big problem and I think we should not retrench, pull back, and become more conservative, because then we’ll die with the audience. We need to find the audience that goes to [contemporary theater] and cinema and art galleries. People who like art that deals with modern, living issues. We are not getting those people enough.

**DRM:** It’s not even just a question of Carter or Sessions, which is tough, demanding music. Just try putting Arnold Bax on a program, or Szymanowski, or Martin… somebody who writes melodic, accessible music but has an unfamiliar name…

**EdeW:** Very often when we play something like that, somebody of whom you didn’t expect it will come backstage and say how much they liked that music. Sometimes you will play something people don’t like, but so what? Life is not just about everything you like.

**DRM:** The unfortunate thing is they’ll see that name on the program and they won’t buy the ticket. So they won’t even open themselves up to the chance of hearing something really beautiful.

**EdeW:** Exactly.

**DRM:** You studied to be an oboist, and in fact played in the Concertgebouw for a little while. Was there any conflict between conducting and oboe?

**EdeW:** Very quickly I knew that, if I had the talent and the chance, I wanted to conduct. The oboe was too limiting, you could play only one line, and you needed other people to play a piece with you. There was the constant struggle with the reeds, where you have to be a craftsman before you are an artist. There was never a real problem choosing. I won the Mitropoulos Competition in 1964, but I had to play one more month in the Concertgebouw. I remember the first of February, 1965: I cleaned my oboe, put it into the case, and almost never played it again, just for fun a few years later. I don’t even have one now. I don’t miss it, either. If I want to make music myself I play the piano. Repertoire for the oboe, of course, is very limited. I really admire

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—Peter W. Mitchell, Stereophile, Vol. 13 No. 4, April 1990

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people who play an instrument their whole lives and still love doing it.

**DRM:** When we talked a couple of years ago, Philips had just issued the first CD of the Netherlands Wind Ensemble. Have any more come out?

**EdeW:** They have never even sent me the one that did come out.

**DRM:** You’ll have to go to the record store like everyone else.

**EdeW:** I’ll call them one of these days and have them send me a couple.

**DRM:** You made seven or eight LPs with the Wind Ensemble, right?

**EdeW:** Gounod, five Mozarts, three Strauss. Nine or ten.

**DRM:** I think it’s safe to say that those are some of the most lovely wind performances ever recorded. How did the Netherlands Wind Ensemble come about?

**EdeW:** It was started around ’61 by the principal bassoon of the Concertgebouw Orchestra. We had a wind quintet in his ensemble class at the conservatory. He added some players and started playing octets. And finally it got more and more expanded. After I gave up oboe playing I couldn’t be in it anymore. But he got sick and in a year and a half it deteriorated to nothing. By the time I came back, he had died and I was asked to lead it with his student, who is now the principal bassoonist of the Concertgebouw. This would have been ’67. We rented the small hall of the Concertgebouw and rehearsed for three months and gave our official debut. I still have some of the reviews. It was an incredible explosion of people saying how good it was. And I wasn’t expecting that. Three months later we got a recording contract, for which we did the Mozart that is now on CD. Then I did 60 or 70 other recordings for Philips with various orchestras—San Francisco, Rotterdam, a lot in London, the Concertgebouw, Dresden State Orchestra, Leipzig Gewandhaus, some Gershwin in Monte Carlo, which was a long time ago.

**DRM:** Did leading the Wind Ensemble give you any particular advantage as a conductor, any particular skill?

**EdeW:** You have to listen a lot, which can be a problem because as an orchestra conductor you shouldn’t always listen. Sometimes in different places you should just beat and not react to something that goes wrong. You learn as a chamber-music player to give each other room.

You don’t overconduct standing in front of a few people who are very good; you don’t need to beat every bar to a pulp. A lot of things happen by themselves. You get very spoiled because you will never have another handpicked orchestra in front of you who are all first-rate. I learned a lot from leading the Wind Ensemble. And rehearsing with such good people all the time is wonderful. We started at a level where most groups stop.

**DRM:** Didn’t you study with Haitink and Bernstein early in your conducting career?

**EdeW:** I didn’t work closely with either of them. I saw both of them conduct a great deal. I think if I had to single out two people I learned a lot from... One of them was the bassoonist who gave us those lessons, Thom de Klerk, principal under Mengelberg. He was fantastic, a wonderful player. I learned a lot from him. And then I learned a lot from Franco Ferrara—he was an Italian conducting teacher. Half the people who conduct today have had some dealings with him. He was an incredible man. I only had one course with him, in Holland, for six weeks, but I think I learned more about music-making and what it’s all about in that little time than I ever learned from anyone else. Many times I contemplated going to Sienna to study with him. I didn’t because it’s in Italy, and it’s crazy and unorganized. But I didn’t and now he’s dead. He was supposedly the successor to Toscanini. With Guido Cantelli, he was the hope of Italian conducting. But he had seizures when he was on the podium, and he would collapse. It was an untreated condition. But he would sometimes stand by the podium and do a little conducting, and boy, it was unbelievable what he could do with his hands.

**DRM:** You must have been around Amsterdam when Van Beinum was conducting the Concertgebouw; at least as a student.

**EdeW:** I didn’t see him much. But he was an incredibly elegant, beautiful conductor. He didn’t use the baton, and had very plastic hands, like a dancer’s. The orchestra loved him a lot.

**DRM:** Were there any other conductors you really admired?

**EdeW:** I saw Otto Klemperer almost never, but his records I loved. I thought he was a great conductor. Still do. He gave a wonderful shape to the music. I saw a dress rehearsal at the Holland Festival in 1962, which means I was 21;

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and it was *Falstaff* under Giulini with the Concertgebouw. It was a great cast, including Freni. That dress rehearsal was just fantastic.

**DRM:** I've always wanted to ask a conductor of your prominence whether or not your generation of conductors, and the generation of Solti and Bernstein, are as good as the generation of the '30s and '40s, the Walters, the Klemperers, the Furtwänglers? How do contemporary conductors compare?

**EdeW:** It's very hard to say, because we live in a totally different time. They lived in a time when there were few recordings, and for better or worse they had to trust their own instincts. Now, whatever we do, we are held against their recordings, almost like a litmus test. Though far less now, I was in awe of those guys when I was young and just starting. It was more difficult then to prove that one conductor was more interesting than another. The world was much smaller, there maybe weren't as many conductors, there weren't as many high-class orchestras, opera houses. So I think the whole way of learning your craft has changed, for my generation and those a little bit older. I think I'd leave it to the next generation to judge whether our generation is less good than the others. There is no doubt that some of those older recordings are tremendously crusty and wonderful and sprightly. If you listen to *Rosenkavalier* under Erich Kleiber, it's a wonderful recording, just incredible. Whether we can still do stuff like that, I don't know.

**DRM:** One thing many critics have observed is the homogeneous quality of much of the music-making that goes on today. There's not a lot of character in most performances, live or on record.

**EdeW:** It's the same homogeneous quality that you see in cars. They all look alike. Why is that? Because all the information is shared. There are no longer pockets of isolation. And with the demise of the Iron Curtain—which makes me tremendously happy—the last pocket of forced authenticity will be gone, because they were so much in their own world. But there are no longer schools of Italian, Dutch, English, German conducting. It's the world. Because of TV, because of airplanes, because of recordings, you no longer grow up in your own country's style. And of course, that's one of the big problems. It's very hard to have the guts to do something totally different from those other things.

**DRM:** I guess it's human nature not to want to climb out on a limb, take a big chance.

**EdeW:** It's not even taking a big chance. So much has been done with the repertoire. Those pieces have been chewed, and chewed, and chewed, and only someone like Norrington and Harnoncourt and some of those come up with some new Beethoven. And what do they do, basically? If you listen to them, they play as fast as Toscanini did. I'm not saying they don't add something else to it; I particularly like Norrington's guts and sense of humor. But I don't see, with a Beethoven or Brahms symphony, that there's that much left to do that would make it totally new.

**DRM:** So the prospects aren't good for another Bruno Walter to come along.

**EdeW:** I don't know. He might be there, and we just don't recognize him, because of the big forest. And the funny thing is that when you listen to some of his recordings, I don't think that they're all that much better than what we have today. His Mahler symphonies, they're fast, usually, the orchestra playing is sometimes crummy, not always great. Is it really wonderful music-making? Or do we say, "It's Bruno Walter so it's great"? I always wonder if we sat in a room and played a modern recording with scratches on it, and hiss, so people would think it's an old recording, whether we would think it's Bruno Walter or we would think it's Inbal. Would we really be able to hear? I'm not so sure of that. Perception, hype, what is truth? I'm sure if we put a lot of my colleagues together with a lot of critics, and made the sound quality of the recordings the same, so we couldn't discern whether it was a CD or a 78, and do it double-blind, just judge the performance and try to say who it was, I'd bet my head that you'd have the most unbelievably diversified results.

**DRM:** Can you think of anybody we have who's unquestionably better than those old boys?

**EdeW:** I think there's one who's probably greater than any one of them: Carlos Kleiber.

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**But there are no longer schools of Italian, Dutch, English, German conducting. It's the same homogeneous quality that you see in cars.**

*Stereophile, April 1991*
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Granted, he has a very small repertoire, but I feel that whenever he records something he almost inevitably sets a standard that surpasses what I've ever heard. There are some by Rudolf Kempe. I think his Strauss recordings are fantastically fine. He was not regarded as a world-class conductor because he never came to America, so the Americans never knew him. His \textit{Lobengrin}, to my money, is one of the greatest opera recordings ever made. Spectacular playing and singing and music-making. And his Strauss, I don't think any one of us can surpass that.

\textbf{DRM}: Among the many recordings that you've made, which are your personal favorites?  
\textbf{EdeW}: I think \textit{Rosenkavalier} worked out really well. I very much like the Rachmaninoff piano concertos with Kocsis. The Netherlands Wind Ensemble recordings. I hope when you ask me this in five years I will say the Mahler cycle with Minnesota is really a high point.\footnote{Kevin Conklin reviews Edo de Waart's Mahler 1 elsewhere in this issue.} There are some I'll be glad if I never hear again. There are others that are fun, Rachmaninoff symphonies with the Rotterdam Philharmonic, and the Ravel \textit{Shéhérazade} with Elly Ameling and San Francisco worked out really well.

\textbf{DRM}: A couple of years ago you said you were eagerly awaiting DAT. Have you got one yet?  
\textbf{EdeW}: Yeah.

\textbf{DRM}: How do you like it?  
\textbf{EdeW}: It's okay. I must say that with most CDs, when I really listen to them closely, I'm not terribly impressed with the sound. It's high-strung. It's clean, it's not gorgeous or opulent, like old gold. It's shining new plastic. I miss the warmth of LPs. DAT is wonderful, it works very well. They ran some tapes last year when we recorded the Mahler First. I can play them and it sounds amazing, that a slow-turning tape could make such a sound. But I think we still have a lot to learn in digital recording.

\textbf{With most CDs, when I really listen to them closely, I'm not terribly impressed. I miss still the warmth of LPs.}

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Sometimes products are too cheap for their own good, and people don’t take them seriously: the Superphon Revelation Basic Dual Mono preamp, Rega RB300 arm, AR ES-1 turntable, Shure V15-V MR cartridge, and the B&K ST-140 power amp. They can’t be any good because they cost so little, right?
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Now if this amplifier were imported from England and sold for $599.95, then maybe it would be taken seriously. And highly praised, no doubt.
For the baby Adcom is one of the finest solid-state amps I have heard. No, not the best; I’m not sure what is the best. But it’s an amplifier that is so good for so little money as to be practically a gift.
Actually, when Rob Ain from Adcom called, I was about as enthusiastic about the GFA-535 as you were before you finish reading this piece. But Rob insisted, “You’ve gotta hear this amp.”
He brought it over the next day, along with the GFP-555 preamp ($499.95), and we put both pieces into the rest of the system: a Shure Ultra 500 in a Rega RB300 arm on an AR ES-1 table, with Quad ESL-63 speakers on Arcici stands. Then we chatted for a half hour or so while the electronics warmed up.
And then, simultaneously, the two of us decided to shut up and listen.

“I’ve never heard the Quad ESL-63 sound better,” Rob said. Of course, he was hardly an impartial observer, but the sound was extraordinarily clean, detailed, and musical. If it wasn’t the best sound I have ever heard from Quads, it was pretty close.
This humble $300 amplifier was driving a pair of very revealing $3000 speakers and giving a very good account of itself. (We listened first to some Goran Sollscher classical guitar.)
“So how come this product isn’t flying off the dealers’ shelves?” I asked Rob.
“I don’t know. Everyone wants the GFA-555 with 200 watts per channel. Including people who don’t need it.”
“Does the GFA-555 sound any better?” I asked.
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Rob pointed out that while the GFA-535 is rated at 60Wpc, it puts out more like 80. And while I did not do any measurements, my experience with other amps tells me Rob’s right. I suppose Adcom doesn’t want to steal sales from its GFA-545, rated at 100Wpc and selling for $200 more.
After a couple of hours, Rob left, grinning from ear to ear, and I later sat down to listen alone. True, when I tried certain Telarc and pushed hard I could get the amplifier to clip—two LEDs quickly light up (very useful). But the Quads were running out of the ability to use the power anyway. My first impressions
were confirmed: the GFA-535 is one of the best amplifiers around for driving Quads. Spendor SP-1s, too.

Suddenly, it hit me what this meant. Conventional wisdom had been dealt a severe blow. You know, the old saw that you should never power a good pair of speakers with a

**“The GFA-535 reminds me of...amplifiers that sell...for about three and five times the price.”**

cheap amplifier. Here was a cheap amp—one of the cheapest on the market—that sounded good with Quads, Spendors, later Vandersteens. Probably Thielis, too—at least the CS1. What it means is you can stretch your speaker budget a bit and get the speakers you really want, then economize by buying an Adcom GFA-535 for $299.95. True, you may be a little power shy, but probably not much. And to say the least, the GFA-535 would make a decent intermin amp.

What does the GFA-535 sound like? (You thought I’d forget that part, right?) Well, this is one of the most neutral amps I’ve heard.

**“...the baby Adcom is one of the finest solid-state amps I have heard...so good for so little money as to be practically a gift.”**

While it doesn’t sound particularly tubelike, it avoids the typical transistor nasties through the midrange and into the treble. I wouldn’t call it sweet—there’s no euphonic coloring—but it isn’t cold or sterile. What it is, is smooth. And detailed. Far more detailed than I would ever imagine a $300 amplifier could be. The GFA-535 reminds me of the Eagle 2A and PS Audio 200C, amplifiers that sell, respectively, for about three and five times the price. Of course, they have more power. And they are more detailed. The point is, the Adcom comes close. Very close.

The bass, like everything else, is neutral, certainly not fat and overdone. But it’s here where you notice that this amp is not a powerhouse. You just don’t get the solidity and extension you get with a very powerful (and expensive) solid-state amp. Nor do you get the breadth and depth of soundstage that you often find with a very powerful amp. The Adcom GFA-535 sounds a wee bit small, which it is.

My only criticism, and it’s more of a quibble, is that the speaker connectors are non-standard and unique (so far as I know). You insert bared speaker wire into a hole and twist the connector tight a quarter turn. Most speaker cables will fit, but some will not. Certainly MIT won’t. Neither will the best Kimber, the kind with eight clumps of strands. The less costly four-clump Kimber will, and proved an excellent choice. My sample amp was quiet—

**“This amplifier is so good and so cheap that I think any CD owner who buys an integrated amp is nuts.”**

no hum—and ran cool. There are selectors for two sets of speakers. And the 535 looks nice.

And talk about economy: If you’re not into LPs anymore, you could buy a Mod Squad, dbx, or Old Colony line-level switching box—or possibly a B&K Pro 5 preamp, with its switchable line amp section (only $350), or the Adcom SLC-505 passive preamp ($150)—and run it with a CD player. In fact, if you are into CD only (no tape, no tuner, no phono), you could buy a CD player with a variable volume output and run it directly into the Adcom. This amplifier is so good and so cheap that I think any CD owner who buys an integrated amp is nuts.

In its price category, the Adcom GFA-535 is not only an excellent choice; it’s the only choice. The real question is whether you should buy one even if $299.95 is much less than you planned to spend for an amp—ie, whether you should put the money into a better CD player or pair of speakers instead.
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RCA has its own embarrassment of riches in early CSO recordings, but in putting together this 3-CD mid-price set they have fulfilled the definition of a camel: a horse designed by a committee. The Stock selection is apt and substantial, Defauw's and Rodzinski's typify them but are merely tips of the icebergs. The Kubelik borrowed from Philips certainly typifies him, but only serves to tease collectors who long for the complete recording. With the Reiner selections we get one which has been available on CD for several years, and one which hasn't but could have been and may yet be. The Martinon selection is one of his best CSO recordings, but it too deserves release in its own setting, as does the Morton Gould. The Stokowski is scheduled for independent release—on a budget CD.

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Stereophile, April 1991
Richter/Leinsdorf, and Heifetz/Hendl, the set becomes a sampler bordering on a marketing tool for back catalog.

Including the 35-minute "Dies Irae" from Solti's 1977 RCA recording of Verdi's Requiem, an easily obtainable complete recording, seems to be more of a political gesture to the incumbent Music Director and his management than an enlightening gesture to music collectors. Five minutes or so of the "Sanctus," a brilliant double fugue, would have served the same purpose and left more room for another early, rare recording. Ironically, the Verdi, in its stupefying length, is one of the worst-sounding selections in the set, a textbook case of console-itis multimono, and, considering the forces involved, an incredibly pedestrian performance.

Ravinia Music Director James Levine's 1984 Tchaikovsky 6 is the only fully digital recording to be excerpted in the set; the complete 6th is available. So are the far more interesting ones of Solti, Reiner, and soon, I hope, Kubelik. For my taste, Levine's best RCA is the '75 Mahler 3; the fifth movement, at about four minutes, would have been ideal. Former Ravinia Music Director Seiji Ozawa is represented by an okay Night on Bald Mountain, not yet available elsewhere, but Reiner's more-than-okay one is, coupled with the Nutcracker excerpts. One of Ozawa's finest RCA moments in Chicago was Britten's Young Persons Guide to the CSO—now that would have been an apt choice. So, for that matter, would have been a movement

from Bartók's Piano Concertos 1 or 3, or Schönberg's Piano Concerto, each with Peter Serkin. Twentieth-century music was Ozawa's specialty during his Ravinia tenure. Where are these recordings?

The 1968 Schumann Piano Concerto with Rubenstein/Giulini is not yet available, but soon will be. This recording, an early attempt to tape in Orchestra Hall following the 1966 renovation, in its brittle piano and shrill woodwind sound, shows all too well what has been lost, especially in comparison with the first movement of Brahms's Piano Concerto 2 taped by Leinsdorf/Richter in 1960, a particularly luminous, open-sounding recording, very beautifully transferred to CD, as it is in the complete Papillon Series version, which includes Richter's performance of Beethoven's "Appassionata" for 10 bucks.

It gets more interesting. The "sampler" portion closes with the Finale of Sibelius's Violin Concerto played by Jascha Heifetz with Walter Hendl conducting. This recording has been available on CD since 1985, along with the Prokofiev Second with Munch/BSO and the Glazunov with Hendl/RCA on a full-price issue. This was one of those CDs that fueled the digiphobe movement with the usual things: flat, dull, timbreless sonics. Well, the difference in

Fritz Reiner

Stereophile, April 1991
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the Finale as excerpted in this set is your proverbial night and day. I found myself drawn into this performance as never before, marveling at Heifetz’s willingness to employ a sense of manic ugliness at appropriate moments, as well as his venerated beauty of tone. No wonder he’s a legend!

Here’s the scoop. I could never find a good pressing of the original vinyl. The aforementioned CD with its couplings wasn’t any better. For the CSO set, the Finale has obviously been remastered again by RCA’s recent staff of good attentive ears with discreet little fingers just tickling those dials. RCA has undertaken the process of taking Heifetz, along with Reiner, Rubenstein, and other vintage artists, out of full-price CDs and placing them in their own dedicated mid-price collections. Has RCA pondered the implications of telling consumers the muddy 15-buck CD they may have already bought is about to be vastly improved by a 10-buck CD? My advice: don’t get the $15 version even at the cut-out price. Just you wait—you’ll see a $10 issue.

Reiner’s 1954 Strauss Don Juan has also been available at $15, coupled with Mahler 4. This too has been remastered anew, with improved clarity and space, although there was far less to complain about. I think the 2-channel to 2-channel dupes were better than the 3-to-2 mixdowns. However, this little experience only serves to reinforce my feeling that it’s time to go back and remaster those early CD reissues all over again.

Reiner’s performance of Bartók’s Hungarian Sketches is a further source of mixed feelings. This work should have been included on the CD which bears Bartók’s Concerto for Orchestra and Music for Strings, Percussion, and Celesta. It wasn’t in 1985 because Denon, RCA’s exclusive manufacturer at the time, was asking its clients not to push the 74-minute play time to its theoretical maximum, but to remain just a minute or two under. By 1989, when RCA converted five Reiner titles to the mid-price Reiner Collection Gold Seal Series, we had 80-minute CDs in this world, but RCA did not even redo any of the 5 titles. They merely redesigned the package and lowered the price. Thank you very much.

All that said, Hungarian Sketches is one of Bartók’s great minor masterpieces, and this is a typically brilliant Reiner recording. This, along with Music for Strings, Percussion, and Celesta, is one of the recordings I have on a Japanese Victrola pressing. These were truly phenomenal products. For their consumers, the Japanese were able to produce budget LPs using what we would consider premium-grade vinyl, flat as a pancake, quiet as a mouse, beautifully cut, and packaged with a soft plastic inner sleeve. However, the source is not the studio master, but a copy, maybe a second-generation copy. It’s clean, but it’s hissy as hell. It’s a collector’s item, but the CD version is the revelation.

We come now to three titles which had their origins as Dynagroove LPs. Morton Gould’s recording of Schuman’s orchestration of Ives’s Variations on America was by far the most offensive. It seemed to be multimiked beyond all plausibility, with impossibly close-up percussion whose mallet instruments and tambourine were nothing more than sibilant blurs. Well, guess what. Dynagroove was in the cutting, not the mixing. The Ives sounds great, so c’mon, RCA, cut the crap and let’s have the rest of Gould CSO, right away please.

Stokowski’s Russian Easter Overture used to strike me as overly eccentric, even for him, somewhat less so in the CD version. Shostakovich’s Age of Gold would have been a better choice. I’m told a Stokowski series is in the works.

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Varèse’s *Arcana*, was a wonderful pre-renovation LP which recalled the best of RCA’s pre-Dynagroove days as well, tough competition for CD conversion. But the crew has done a great job. If you love vinyl and have an original, bless you, but the CD version shows what can be done. In his notes, Thomas Willis gleefully informs us that of the CSO principals who recorded the work in 1966, all but one remain on the job: Donald Peck, flute; Ray Still, oboe; Willard Elliot, bassoon; Dale Clevenger, horn; Adolph Herseth, trumpet; Jay Friedman, trombone; and Donald Koss, timpani. His annotation is the only place in which their names appear. He also mentions former concertmaster John Weicher and former principal cellists János Starker and the late Frank Miller. He has neglected to inform his readers that the principal clarinetist in the Martin is Clark Brody (retired), who played with distinction throughout the Reiner and Martinon eras, and about half of Solti’s. Anyone who played his part so beautifully in the Martin, not to mention the Strauss and Bartók works under Reiner, deserves name recognition.

RCA could scarcely leave out Rafael Kubelik, although including him in the set meant borrowing something from Philips. Taken from his first, and some feel still his best of many *Ma Vlast*, is “The Moldau,” not as it will someday be remastered for CD by Wilma Cozzta-Fine, but as it has been run off on a digital tape by technicians in Baarn. A little congested in the climaxes, not quite as clean as Mercury got it for *The Kubelik Legacy* in 1971, but not bad.

Now we come to the truly archival part. RCA could have saved itself a lot of needless duplication and dispersed with obsequious gestures by “thinking old,” as in *The Centennial Collection: The CSO Before 1950*. Even though Columbia (aka Sony) has about half of the early CSO recordings, RCA still has enough for at least 3 CDs.

We probably shouldn’t hold our breaths for *The Frederick Stock Collection*, although I think RCA should give it a shot. Of all the currently lionized, sanctified, and defiled conductors of the pre-1950 period, Stock may be the most unjustly underrated. Engaged by Germany by CSO founder Theodore Thomas to play viola, Stock was quickly promoted to assistant conductor. When Thomas died suddenly in 1904, Stock took over. The CSO undertook a star search, but in those days, the big guys wanted to work as near to where the boat landed as possible, not settle in some inland hinterland. Stock inherited the CSO by default, but cherished and cultivated it for the rest of his days.

This 1929 recording of Schumann's “Spring” Symphony reveals Stock to embody a powerful intensity of temperament and honesty of purpose. The CSO is only slightly less polished than it would later become, but with the same incisiveness and depth for which it has continued to be renowned. There is not the lush Stokowski/Philadelphia sound, nor the fervent passion of Koussevitzky/Boston, nor the flagrant hyperbole of Mengelberg/NYP. Aside from some string portamento, Stock's Schumann is not the muddy, fulsome spectacle one would expect from that period. Stock/CSO did Schumann lean’n’clean, the way Reiner, Szell, and Monteux would do it. Also by 1929, Victor engineers had figured out how to record the hall as well as the orchestra. This recording appeared as a 78 album only during the '30s. Its only LP reissue was for the WFMT/CSO Marathon in 1979 as a donation premium. That version was a bassless travesty. This version, by Seth Winner, is correctly equalized, pitched, side-joined, and does full justice to the original, and state-of-the-art 1929 may be better than you think.

If we hold our breaths for *The Desire Defauw Collection*, we’ll surely asphyxiate ourselves. But not, I promise you, if we merely listen to whatever Defauw comes our way. When Stock died in 1942 after 37 years on the CSO podium, the CSO was forced to replace him in the middle of WWII, and they came up with this wild card. After nearly four decades of Stock's kindly and avuncular autocracy, Defauw was not destined to fit in for more than a few years at Orchestra Hall. What Willis doesn’t tell you is that Defauw never left Chicago. He stayed to head up the Chicago Youth Symphony, and found himself involved in numerous regional youth orchestra functions in the Midwest. That's how he spent the rest of his life, providing inspiration and training to generations of young musicians, including, briefly, this one.

WFMT's Don Tait recently pointed out that in the CSO's history, the only Franck works other than Monteux's recording of the D-minor Symphony were recorded by Defauw. *Redemption*, recorded in 1946, was available as a 78 single only. This is its first reissue. Although it's
A
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of the least played of Franck’s orchestral works, I would have preferred Defauw’s recording of Chasseur Maudit; more fun, and clearer sound. You may compare Defauw’s Redemption to Toscanini’s on the recently issued video, and decide for yourselves how underrated Defauw was by the public, the critics, and perhaps even the orchestra.

Artur Rodzinski came to the CSO with a major-league background, but was viewed by highly conservative CSO backers as far too extravagant, outspoken, and eccentric, and lasted for only one season. The Wagner Liebestod, excerpted from Prelude and Liebestod, reveals Rodzinski to have cultivated a darker sound for this type of music than his predecessors or successors, but does not reveal the light virtuosity he was also able to draw from the CSO. Liebestod was available simultaneously on 78, 45, and 33. Listening to the original 33, it sounds as though it’s a dubbing and joining of 78 parts, not a tape or a 16” acetate. Seth Winner’s transfer is taken from the 78 album. The side join between sides 3 and 4 of the original is tricky, and Winner’s is slightly more awkward than the 1949 RCA LP. However, Winner must be credited with a first-rate job with each of the 78s in this collection. For overall honesty to the sources, and bringing out the best sound contained in them, this is the way to go.

If RCA’s A&R folks had done their jobs as well as the technicians who put CSO together, we could have had a real overview of a neglected period of American orchestral history. From RCA’s 1941-42 period, we might have had Stock’s recordings of Dvorák’s In Nature’s Realm, the Chausson Symphony in B-flat, Beethoven’s Piano Concertos 4 and 5 with Artur Schnabel, and I haven’t mentioned the singles from either 1926-29 or ‘41-42. And from Defauw, Respighi’s The Birds, Prokofiev’s Scythian Suite, Borodin’s Symphony 2, and Franck’s Psyche, to mention only a few. From Rodzinski, Mendelssohn’s “Scottish” Symphony, Khatchaturian’s Gayne Suite, and that’s not all. The more recent stereo material all deserves release in its own right, and probably will appear as such in due course.

By the time this sees print, the CSO may have released its own set. The number of CDs is up to ten, and they plan to combine broadcast performances, rare recordings, some never before issued, and at a reasonable price. We’ll see what they come up with.
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RECORD REVIEWS

BERNSTEIN'S final composition, Arias and Barcarolles, in orchestral and chamber versions (p. 251)

HUGO ALFVÉN: Symphony 2
Yevgeni Svetlanov; Swedish Radio Symphony Orchestra Musica Sveciae MSCD 627 (CD only). Lars Hedh, eng.; Tage Olghagen, prod. DDD. TT: 65:00

One of the nicest things about the digital age is that it has brought with it a proliferation of independent recording labels that are giving us music by good composers whom the giants have for too long elbowed from the stage. Hugo Alfvén (Swedish, 1872-1960) is one such overlooked composer, but thanks to Musica Sveciae, we now have a bold new recording of his rich Symphony 2.

There are those who do not deem Alfvén's voice a particularly distinctive one, but I take issue with them. Symphony 2 is of a scale that calls to mind Mahler's belief that a symphony should encompass the entire world; it is derivative only in that regard. I find the music fresh and rewarding.

Completed in 1899, this is unmistakably a late-Romantic work. It opens with a bright, optimistic movement that gives way to a dark, plaintive Andante, then regains its vivacious, bounding athleticism in the third-movement Allegro. The finale neatly pieces together a quiet prelude followed by a fugato and a robust choral. Throughout, the work is held together with assured, confident craftsmanship and is visited by inspired melodies and rhythms. All in all, it's quite a find.

Yevgeni Svetlanov and the Swedish Radio Symphony Orchestra give us a highly polished performance and an interpretation expansive in scope. The reading is all Wordsworthian sweep, compared to the Homeric swiftness of Neeme Järvi and the Stockholm Philharmonic Orchestra on Bis. Svetlanov gives us brighter brights and darker darks, while Järvi's unwavering energy and enthusiasm de-emphasize the contrasts but elevate the excitement. The two versions are distinctly different but equally valid. Svetlanov commands a bit more orchestral refinement and precision; Järvi's troops, though disciplined, run with the spirit of the interpretation, and we hardly miss the polish for the bravado.

The sound of the Musica Sveciae disk is highly detailed and just a shade on the bright side. In keeping with the contrasts of the performances, the Bis is less detailed but has more depth and hall ambience. It's a darker overall sound, with highs just slightly reined in.

I would recommend either of these recordings for Alfvén's music alone. When we have two such beautiful yet different performances, it's difficult to choose between them. If I had to, I'd take the Svetlanov, but I'd dearly miss the Järvi.

—Robert Hesson

BAX/BLISS: Quintets for Oboe & Strings
BRITTEN: Phantasy Quartet for Oboe, Violin, Viola, & Cello
Pamela Woods, oboe; Audubon Quartet
Telarc CD-80205 (CD only). Thomas Knab, eng.; Elizabeth Omrow, prod. DDD. TT: 54:54

The Brassworks of Garry Dial and Dick Oatts—not brass, but pure musical gold (p. 271)
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The warm, melded sound produced by Pamela Wood with the Audubon Quartet, sympathetically mirrored by this Telarc recording, creates just the right mood for maximum enjoyment of these delightful, idyllic English works. All were written especially for, or were given their first performance by, Leon Goossens, so their coupling is particularly apt too.

Despite the exotic colors of its first movement, Bax’s Quintet is woven together by strands of original yet distinctly Irish-flavored themes. Bliss was directly influenced by the work, and although his ideas are more impressionistic, his composition also has an Irish tang, particularly in the jig rhythm of the third movement and its interlaced authentic folk tune, “Connelly’s Jig.”

Britten’s Phantasy Quintet is an amazing work for a composer of only 19. Although the title suggests the imaginative freedom of the English consort music of the 16th and 17th centuries, it is in carefully constructed arch form, a lyrical melody for the oboe framing a sonata-form structure, the development section of which becomes the slow movement at the center of the arch. The performers here approach the work in the relaxed manner they afford the quintets, and although a more strongly characterized reading, with biting rhythms and dramatic emphasis of sectional contrasts, is the norm, this interpretation still has much to offer.

—Barbara Jahn

BERNSTEIN: Arias and Barcarolles, Songs and Duets
Judy Kaye, soprano; William Sharp, baritone; Michael Barrett, Steven Blier, pianos
BARBER: Overture to The School for Scandal
BERNSTEIN: Arias and Barcarolles
GERSHWIN: An American in Paris
Jane Bunnell, mezzo-soprano; Dale Duesing, baritone; Seattle Symphony, Gerard Schwarz
Delos DE 3078 (CD only). Adam Stern, prod.; John Eagle. Andrew Dawson, engs. DDD. TT: 61:37

Arias and Barcarolles, Bernstein’s ultimate composition, is an entertaining, resourceful piece lavishly embossed with the protean musician’s precocity. As his last musical work, however, it does fall a little short of the masterwork standard that his admirers—including this one—had every right to expect.

Comparable in many respects to A Quiet Place and Songfest, with Arias and Barcarolles Bernstein once again seems more determined to impress by massaging the intellect than to titillate by appealing to the emotions. That signature eclecticism (the descriptive category he enjoyed) reveals a host of stylistic echoes ranging from 12-tone rows with shades of Alban Berg lyricism, via Shostakovian desolation interspersed with Mahlerian pathos, to satirical allusions to Wagner’s Tristan und Isolde, to identify just a few. From this master of melody, one expects and gets attractive tunes. None, though, really qualify as the haunting can’t-get-it-out-of-my-mind variety of so many vintage Bernstein melodies. Yet again, I feel (as I did when I reviewed the recording of A Quiet Place, Vol.11 No.9) that he shows off his compositional skills at the expense of creating more sensuous auditory stimulation. In this opinion, Arias and Barcarolles is a highly enjoyable, but possibly evanescent, pastiche and not the masterpiece of maturity most of us wished for.

With the exception of the diverting Off Mayn Kbas’neb (At my wedding), by the Yiddish poet Yankev Yitzhok Segal, and Little Smarmy, attributed to his mother Jennie Bernstein, the composer also wrote the lyrics in his unmistakably impressionistic, sometimes campy idiom. The cycle’s theme is love, the emphasis being on the domestic variety, and both words and music are totally compatible bedfellows.

The multifarious creative influences necessitate a wide range of performing styles from scat-singing to soaring, contemporary romanticism and Coplandesque ballads. Both teams of singers are well up to the task. The Koch International Classics disc—an auspicious label debut furnishing nonpareil engineering, performance, and production values—also offers eight vintage Bernstein songs from On the Town, Wonderful Town, and Peter Pan, and the above-mentioned Songfest. All are performed with musical, vocal, and theatrical distinction by Judy Kaye (winner of the Tony Award for Phantom of the Opera) and William Sharp. Similarly, duo-pianists Barret and Blier—who also provide literate, insightful program notes—contribute absolute musicality and rock-solid support. As these four artists constituted the team that introduced Arias and Barcarolles at the New York Festival in 1989, their performance should be—and certainly sounds—definitive.

The Delos album, also a highly creditable production, presents the first recording of the orchestrated version of the cycle. Bright Sheng, a friend and protegé of Bernstein’s, has created attractive orchestral settings for the songs. Atmospherically and technically, they sound so correct that one wonders whether the composer’s input was greater than indicated. If, however, you prefer your Lieder piano-accompanied (as I do), Sheng’s shimmering strings, xylophone interpolations, etc., might prove too luscious a framework for Bernstein’s simple
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musings on the vicissitudes of domestic love.

While the Seattle Symphony plays with precision, Gerard Schwarz's leadership is on the mechanical side. This is also apparent in his reading of Samuel Barber's School for Scandal Overture and George Gershwin's An American in Paris, which comes complete with a few bars that the composer chose to excise, but Schwarz, in his infinite wisdom, has reinstated. These renovations include such musically significant reversions as restoring the ratchet in place of the snare drum: ah well! In any event, there are a number of preferable recordings of both works. The two Delos singers can be recommended, although Jane Bunnell, a true mezzo-soprano with a fine voice, doesn't project the textual nuances quite as effectively as Judy Kaye. Between the baritones there's little to choose; Sharp sounds louder and, perhaps, a shade more resonantly virile. Duesing, with international operatic and Metropolitan credits, seems fuller-voiced and more sonorous. Both are highly recommendable; as are both recordings, with my vote going to the Koch. —Bernard Scol

BRAHMS: Piano Concerto 2
Stephen Hough, piano; Andrew Davis, BBC Symphony Virgin Classics VC 7 91158-2 (CD only). Mike Clements, eng.; Andrew Keener, prod. DDD. TT: 51:00

BRAHMS: Piano Concerto 2
Cyprien Katsaris, piano; Eliahu Inbal, Philadelphia Orchestra Teldec 2292-44936-2 ZK (CD only). Michael Brammann, eng.; Martin Fouqué, prod. DDD. TT: 50:43

Though different in many ways, these performances share a rhapsodic, at times excessively free, view of this towering masterpiece. Both pianists favor an application of rubato that tends to fracture the long lines of Brahms's tautly organized score. As a result, each account, despite having moments of great beauty, fails to cohere, the constantly fluctuating pulse in both performances causing the music to fragment into disconnected bits and pieces.

Still, for those who favor such an approach, the Hough reading should prove preferable. His tone, considerably fuller than Katsaris's, is free of the clangorous unpleasantness that mars Katsaris's sonority. Then, too, Hough's gearshifts, though far too frequent for Brahms's structured Classicism, have an expressive power that makes them seem less arbitrary and more carefully thought through, Katsaris sounding eccentric in comparison.

But neither version can match the best among a wide variety of currently available editions: Gililis/Reiner (RCA) and Horowitz/Toscanini (soon to be reissued by RCA) for vibrant intensity and structured coherence; Gililis/Jochum (DG) for grandeur, breadth, and rhapsodic flexibility; Magaloff/Otterloo (Preludio) for power and poise; and Serkin/Szell (CBS) for tonal leaness and a superbly molded Classical whole.

Both the Hough and Katsaris accounts are very well-engineered, Teldec offering the widest and most realistic dynamic range I have ever heard in a recording of this work, with the piano appropriately distant from the microphone. Virgin Classics, in contrast, provides a closer, more traditionally phonographic perspective on Hough, realistic enough in its hi-fi-ish way, but not what one hears from most seats in a large hall. —Mortimer H. Frank

BRAHMS: Symphonies 1 & 4 (original versions for piano, four hands)
DuO Croommelynck, pianists Clare CD 50-9012 (CD only). Momosuke Tada, eng.; Gunishiro Hino, prod. ADD, DDD. TT: 76:24

Unlike Liszt's (admirable) arrangements for keyboard of the Beethoven symphonies, these original four-hand versions have the authentic stamp of the composer behind them. Interestingly, when Brahms performed this four-hand version of 4 with Ignaz Brill for a small select group just before the work's orchestral premiere, the distinguished critic, Eduard Hanslick, remarked sarcastically, "it sounds like two tremendously witty people arguing."

One can understand Hanslick's reservations. Put simply, neither of these scores comes off successfully as a four-hand duet. Nevertheless, one can learn a good deal about Brahms and the music from hearing this disc. Most significantly, it reveals, contrary to once-popular allegations, that Brahms was a brilliant orchestrator, not, perhaps, in the bright, sometimes flashy style of a Mahler or Berlioz, but rather in the sense that his instrumentation not only fits the spirit of the music, it clarifies it. As heard in these four-hand arrangements, the haunting legato longing of the opening of 4 and the throbbing intensity and pounding timbres of the introduction to 1 (to cite but two of many examples) are utterly lost. Lost, too, is one of Brahms's sublime strokes of orchestration: the entrance of bowed strings in the slow movement of 4. Here, the change in color and the relief it provides from the reiterated woodwind and pizzicato timbres is an absolutely essential complement to the soaring ethos of the emerging melody. Certainly musical sense is also compromised in these transcriptions; the important descending countermelodies of the winds in the opening of 1, for instance, simply cannot be heard. Absent, as well, are the exposed syncopated strokes for timpani and violas in measures 435 and 438 of the coda of the finale of 1. Indeed, one wonders if conductors like Weingartner and Toscanini, who

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excised those timpani and viola strokes, did so as a result of knowing this transcription. In short, there is a good deal to be learned from this release about how Brahms conceived these works and how he thought orchestrally.

Purely as performances, 4 is more persuasive than 1, the latter sometimes being fuzzy and disjointed, especially in its first movement (where an exposition repeat is observed). With 4, the Crommelynck Duo offers a more integrated reading, with occasional tempo adjustments sounding less arbitrary. Throughout, the recordings are close and clear. One curiosity: the jacket specifies an all-digital production for both symphonies, but the notes claim that 4 is an analog product. Whatever, for anyone interested in how Brahms used his orchestra, these two arrangements (like the original version of the composer's Haydn Variations) are a revelation.

— Mortimer H. Frank

**BUSONI: Piano Concerto**

Peter Donohoe, piano; men's voices of the BBC Singers; BBC Symphony Orchestra, Mark Elder.

EMI CDC 7 49996 2 (CD only). John Rushby-Smith, Andrew Keener, engs.; Christopher Marshall, prod. DDD. TT: 74:22

My first comment was: What, again? Yet another performance of the five-movement Busoni Concerto with its choral finale, and from the same company that not so many months ago reissued John Ogden's 1967 path-breaking and heaven-storming interpretation on CD! Much as I appreciated what that late pianist delivered to this monolithic work, the superior sonic definition revealed in Telarc's 1989 recording, with Garrick Ohlsson and Christoph von Dohnányi directing the Cleveland Orchestra, made the latter my first choice. (Both recordings were reviewed in Vol.13 No.12.) Hearing the work again, I will gladly admit, has given me a greater appreciation for the more than 70-minute-long grandly conceived score, each time revealing new details and attributes. This newest performance, a highly impressive and exciting one, has great propulsion as well as some exquisite, sensitive moments, and stems from a live August 5, 1988, Promenade concert in London's Royal Albert Hall. As a reproduction of that event, the sound of the orchestra with the solo piano emerging from within the ensemble, rather than in front of it, is not unlike listening from a semi-distant balcony. The result is realistic enough, and that includes the natural effect of the solo instrument lacking some bottom; the sound of the chorus emerges particularly successfully, although perhaps not as veiled as Busoni apparently specified. In any case, as good as this British rendition is—and Donohoe plays the solo really splendidly—my preference remains with Telarc, which comes off both as more grandiloquent and more praiseworthy in matters of revealing detail. Each of these versions, however, is powerful in its own way, the differences being mainly a matter of perspective.

—Igor Kipnis

**HAYDN: Seven Last Words of Christ**

Benita Valente, soprano; Jan De Gaetani, mezzo-soprano; Jon Humphrey, tenor; Thomas Paul, bass; Juilliard String Quartet


Haydn originally composed his Seven Last Words of Christ for orchestra, without words, in 1786. The following year, it was arranged for string quartet under his supervision. In 1795, he heard a "new version" of his work, with chorus, put together by Joseph Freibert, and realized that he could do what Freibert had done, only better. He augmented the orchestra, adding trombones, clarinets, and contrabassoons, and altered the vocal lines. What we have here is yet another alteration, and a gorgeous, moving one at that.

The Juilliard has had the string quartet version in its repertory for quite some time, but decided a few years ago to call in musicologist Warren Jones to assist in the addition of four vocal soloists. The string parts remain intact; the soloists sing an arrangement (and abridgement) of Haydn's oratorio reworking. All this fuss aside, the bottom line is good: a very successful outing, one filled with reverence and feeling for this austere work.

The vocal soloists sing with great passion, with particular praise going to Benita Valente, who seems born to sing with this milieu. The Juilliard offers a very lyrical reading, with the legato line never overlooked, and with great tonal beauty; indeed, the string parts appear to be singing as well.

The recording is a bit harsh, with all eight contributors pushed to the fore, as if they were competing with one another. Playing the disc at a low volume helps, but still, it's an unwelcome fact. (It was recorded in 1987 and just released—could this mix be the reason for the delay? And why name the "post-production" engineer unless there's trouble?) Notes and texts are included. A nice rarity, highly recommended.

— Robert Levine

**KAPPSBERGER: Il Tedesco della Tiorba**

Paul O'Dette, lute, chitarrone

Harmonia Mundi (France) HMU 7020 (LP), 907020 (CD*). Robina Young, prod.; Peter McGrath, eng. AAA/AAD. TBS: 58:13, 69:27

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one to play for our wedding. The poor fellow showed up on time and, by way of making small talk, asked what I did for a living. "I review early-music performances," I replied. After a few deep breaths, he decided to see if Paula was safer to talk to. "You know," said he, "a lute is a very quiet instrument." (He feared it would not fill our living room.) "Oh yes," responded my devious-minded spouse, "I know the sound very well. The last lutenist who played for us was Paul O'Dette." After removing his lower mandible from the carpet, our musician proceeded to miss about half the notes in his first 30 minutes of material.

I suppose that the above says everything necessary about the abilities of Paul O'Dette. Many young lutenists mention him as a major influence on their playing, though O'Dette himself is still under 40 (vide Ronn McFarlane). His technique and sensitivity never fail to astonish, and his ability to completely absorb a composer's unique idioms is perhaps unequalled. Here he takes up his odd-shaped cudgels for Giovanni Girolamo Kapsberger (c.1580–1651), a man evidently much admired by his contemporaries who has been neglected in subsequent musical history. To judge from this selection, Kapsberger deserves a revival. His works are not complex in structure (you might mistake some of the melodies for folk tunes), but they are filled with delightful turns of phrase, inventive variations, and gracefully Baroque ornaments.

Of the works performed here, I especially liked the Aria di Firenze, a suite of variations on the famous "Ballo del gran duca" (unfortunately absent from the LP), and several of the more exotic tunes: a Bergamasca and a Canario (the latter intended to represent the dance tunes of the Canary Islanders, whom doubtless no Renaissance composer ever saw).

I was officially sent only the CD version of this issue for review; I happened across the LP in Tower Records, where a forlorn little rack of vinyl still hides behind the forest of longboxes. The digital disc occasioned a call to Peter McGrath to find out how he and Robin Young managed to produce the most analog-sounding CDs (I also include Arias for Montagnana, review forthcoming) I had ever heard. McGrath is still using his faithful Stellavox, but A/D conversion is handled by the Pygmy AD-1 that LA so admired. Output from this goes to a Sony 2000 R-DAT for storage and is converted to 1630 code for mastering. Whatever the process, the results are stunning. The LP is equally well done, courtesy of Doug Sax and TML. With my front ends, differences were so small as to be insignificant, although I spent a great deal of time listening for them. However, the LP surfaces were a bit less than perfect, and my copy was dished (sigh). And the CD does have that additional track; on the other hand, if we don't buy LPs... Oh, pick one or the other, but buy this recording.

—Les Berkeley

MAHLER: Symphony 1
Edo de Waart, Minnesota Orchestra
Virgin 91096-2 (CD only). John Newton, eng.; James Mal- linson, prod. DDD. TT: 55:45

This is the second recording of the Mahler First in the short history of Virgin Classics, coming just two years after their release of Andrew Litton's RPO performance, highly regarded by yours truly. Before listening, I expected that de Waart's performance would be yet another generic Mahler product. It isn't, though, and is good enough to stand out a bit from the pack. de Waart's first movement is especially well-spun, opening at a true Langsang, almost as slow as Bernstein/DG. The effect is of control and integration, with evident attention to dynamics, save for the usual tendency of a digital recording to render pianissimo as mezzopiano. The various instrumental parts disclose themselves without confusion. The movement concludes with energy, fleet but still controlled.

The second movement features a most graceful trio, but the bracketing Ländler sections seem determined to avoid roughness at all cost, and as a result lack connection to their folk-dance heritage. Bernstein and Litton do much better in this regard. The third movement, too, sounds so refined as to lack the composer's signature sense of kitsch and burlesque, though again de Waart's building of tension and dynamics merits attention.

de Waart's strings display a skillful, sensitive use of portamento in the finale, not a touch I expect to hear from an orchestra from the American Midwest, but a poignant indication of how internationalized the performance of Viennese classical music has become. The finale's climax follows the manner of the preceding movements: broad, high on refinement, low on adrenaline.

Litton's earthy, youthfully romantic reading of this symphony remains preferable on grounds of superior performance, and also because his CD includes Ann Murray's reading of the Wayfarer Songs. The de Waart disc, however, has better sound, though it must be termed more agreeable than natural; while clear and precise, it captures little sense of the hall. Presentations of overtones on strings and winds are uninteresting by comparison with 1960-vintage analog (and specifically with the cheap CD reissue of the Bruno Walter/Columbia SO Mahler 1, which I pulled out for a second opinion).
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Decent though de Waart's performance is compared to most others, it's not good enough in the company of Litton, Bernstein/DG, Horstein/Unicorn, Kubelik/DG, and Walter/CBS, especially with the last two available as bargain CDs. (Incidentally, it is reported that this Virgin CD was to have launched a de Waart Mahler cycle, since canceled by Virgin because of a flood of competing issues dumped to market in the wake of Leonard Bernstein's death.)

—Kevin Conklin

MOZART: Great Mass in c, K.427
Barbara Hendricks, Pamela Coburn, soprano; Hans-Peter Blochwitz, tenor; Andreas Schmidt, bass; Rundfunkchor Leipzig; Staatskapelle Dresden, Peter Schreier Philips 426 273-2 (CD only). Horst-Dieter Kappler, eng.; Bernd Runge, prod. DDD. TT: 55:01

MOZART: Great Mass in c, K.427
Arleen Auger, Lynne Dawson, sopranos; John Mark Ainsley, tenor; David Thomas, bass; Winchester Cathedral Choir; Winchester College Quiretist: The Academy of Ancient Music, Christopher Hogwood L'Oiseau-Lyre 425 528-2 (CD only). John Pellowe, eng.; Peter Warland, prod. DDD. TT: 51:27

Almost all Mozart's works for the church were written to commission during his early years in Salzburg, but this Mass was started at around the time that Mozart left the service of the Archbishop (1781) and was intended to be a thanksgiving offering for the recovery to health of his betrothed, Constanze. Soon after the couple were married on August 4, 1782, Mozart planned to give the first performance of the work in Salzburg, during a conciliatory visit to his less-than-pleased father, Leopold. But pressure of work, and Constanze's pregnancy, delayed the reunion until July of the following year. Although the Mass was still incomplete, it was, nevertheless, performed in fragmentary form on October 26, with Constanze singing the taxing soprano part that was later deemed more suitable for two female singers. In the event, Mozart never did get around to finishing the work, although the reworked "Kyrie" and "Gloria," plus two new arias, were to become the sacred cantata Davide penitente (K.469) in 1784.

Both these recordings present the work in its original, incomplete form—there is not an "Agnos Del," and only two parts of the "Credos" are extant. Yet it is still a work of great substance and reverential fervor, dressed, as usual, in the most exquisite lyricism. It is interesting to hear tenor Peter Schreier on the podium: although when heard in isolation his performance would be considered a great success, by comparison with Hogwood's it lacks fluidity and a true sense of the work's scale and balance. Barbara Hendricks is in quite splendid voice but lingers too lovingly just once too often, and in duet with Pamela Coburn, their "Domine Deus" has nothing like the seamless blend of tone and line that Arleen Auger and Lynne Dawson manage for Hogwood. Schreier then, with his soloists, his choir (including women's voices), and his general approach, has gone for the large-scale, Romantic production, but often the weight of the beast makes it leaden and lacking in vitality. Hogwood keeps the work buoyant, with boisterous rhythms and wide but uninfated dynamic range, and an altogether more apt handling. With little to choose between the reasonable sonic qualities of both recordings, Hogwood and his authentic-instrument band must be considered the more persuasive advocates of this delightful work.

—Barbara Jahn

MOZART: Die Zauberflöte
Franz-Joseph Selig, Sarastro; Gösta Winbergh, Tamino; Sumi Jo, Queen of the Night; Luba Organosova, Pamina; Hakan Hagegard, Papageno; Martina Bovet, Papagena; Alfred Muff, Speaker; others; Choeur du Chambre Romand et Pro Arte de Lausanne, Ensemble Orchestral de Paris, Armin Jordan Erato 2292-45469-2 (2 CDs only). Michel Garcin, recording supervisor. DDD. TT: 2:18:50

Like a certain brand of cakes, pastries, and pies, I'd be willing to swear that nobody won't like this Magic Flute. For one thing, it's very pretty to listen to—there's not an unappealing voice in the cast, and the orchestra plays lusciously. For another, because it so perfectly balances both comic and serious sides of this tricky opera, it won't get in anyone's intellectual way. Occasionally a tempo is bizarre (the "Wie, wie, wie" quintet is so fast it sounds like runaway horses), but more often the beat is completely comfy and expected. In other words, this is a non-challenging Flute, and I, for one, after hearing non-entertaining but deep performances of this opera for years, find it a pleasure.

Armin Jordan makes it all sound new. He's scraped away the heaviness and has even chosen a relatively light-sounding Sarastro—a bit too light, in fact. He sees the opera as an entertainment, and frankly, since I've never really understood the Masonic symbolism, it's nice to hear it played and sung as if it was understandable. I'm not saying that it comes across as frivolous, but there's a sense of joy in this set which has been absent in many others.

Aside from the slightly-less-imposing-than-needed Sarastro, all of the singers are excellent. Gösta Winbergh's Tamino is full-bodied and finely tuned, and Luba Organosova (a singer new to me) is a lightish but very impressive Pamina. Sumi Jo is a Queen of the Night to reckon with: her pinpoint accuracy is almost too good to be true, and she reads the text commandingly. Haken Hagegard's Papageno is wonderfully engaging, and so is the Papagena,
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though her voice is far from memorable. The Three Boys are sung—and sung very well—by actual boys, and the Three Ladies are striking, even at occasionally breakneck speeds. All of the other players are effective.

Oddly, the recording is a throwback to an earlier age in its casting of actors for the dialogue. Yes, I can tell that they're different voices, and people whose German is better than mine will notice it and object even more strongly. The sound is warm and presents an honest picture of singers and players. I recommend this highly—it's a real beauty.

—Robert Levine

**MOZART: Piano Sonatas K.310, 33, & 545**

Maria João Pires, piano
DG 427 768-2 (CD only). TT: 61:00

**SCHUBERT: Piano Music**

Piano Sonata, D.784: Moments Musicaux, D.780; Two Scherzos, D.593

Maria João Pires, piano
DG 427 769-2 (CD only). TT: 63:11

*Book*: Helmut Burk, eng.; Christopher Adler, prod. DDD.

In an age often damned for spawning an increasing number of technically polished but musically mechanical and indifferent performers, these CDs should prove refreshing. Pires (who recorded some of these Mozart works previously in very early digital sound for Denon) is clearly a pianist with ideas, conviction, and strong musical impulses. The degree to which one may embrace her style, however, will depend upon how far one is willing to accept the unusual freedom she favors.

In general, the Mozart disc is the more successful of the two releases. Here the tone is lean, the articulation crisp, with the sustaining pedal rarely used. As a result, textures are generally well-defined, the music's buoyancy and wit well-conveyed. Equally impressive is Pires's sensitivity to the darker side of these pieces: their frequent dissonance and—in K.310—a Sturm und Drang intensity. Given these virtues, it is surprising to hear how, at times, she stresses melody over harmony, emphasizing right-hand articulation at the expense of the left. Alberti basses, for instance, which help to clarify harmonic motion, are underplayed to the point of violating aesthetic sense. And some may feel that structure is sometimes threatened by the pianist's rhythmic freedom. To my ears, this freedom, at least as she applies it to Mozart, is managed with taste and expressiveness, if without the intellectual discipline of a Schnabel or Lipatti. My major reservation concerns Pires's dogged observation of every last repeat Mozart specified, a practice that adds disproportion (rather than balance) to her readings, the slow movement of K.310 being a case in point as it lasts more than three times as long as the work's finale.

It is with Schubert, however, that Pires's freedom tends to spill over into license. Here the pulse, at times, is utterly lost, the music's life consequently threatened. The two Scherzos are prime cases in point, their line broken with a rhythm that does not so much pulsate as limp. Similar lapses occur in the Moments Musicaux and the great A-minor Sonata. The latter is one of Schubert's most striking creations, its opening movement a huge structure redolent of a grand funeral march (despite Schubert's tempo indication of Allegro giusto). Pires grasps its haunting ethos well, but her breath-pauses and free-wheeling rubato undermine continuity and cumulative impact. In contrast, she is superb in the work's brief, markedly agitated finale, underscoring how the movement is in some ways a forerunner of the finale of Chopin's "Funeral March" Sonata. Those comfortable with the kind of extreme freedom Pires brings to Schubert may well find her playing admirable. Others, however, should look elsewhere, especially in the sonata, to which Tod Crow (on a Bridge CD) brings far more discipline while also projecting the music's spooky intensity. And to discover how rhythmic freedom may be applied with more stylishness than Pires displays, anyone who cares about the Moments Musicaux should make a point of hearing Schnabel's magnificent 78rpm account ably transferred to an Arabesque CD. DG, incidentally, has accorded Pires splendid sound: close but not overbearing, with a bite and color that one hears from a concert grand in a very large listening room.

—Mortimer H. Frank

**SOONG: Paul Rutman Plays Soong**

*Deep in the Clouds; Jin Ke on the River; Nostalgia; The Wind is Fast, the Sky is High; Midnight Mood*

Paul Rutman, piano
Musical Heritage MHS 512555K (CD only). Gregory K. Squires, eng. & prod. DDD. 41:52

This release provides little biographical information about the contemporary composer, Soong Fu Yuan, other than to mention his Chinese upbringing, piano background, and the influences of both his oriental heritage and that of classical western music. The album photograph of him standing next to American pianist Paul Rutman would seem to put him somewhere in his mid- to late 40s, but perhaps it would be wiser to describe his music, which, as a glance at the titles would indicate, is highly atmospheric. Consisting at times of Debussy-like tonal washes, these improvisatory-sounding pieces, most often lyrical and poetic although sometimes restless and stormy, are derived in the main from ancient Chinese poetry. The music, profound yet introspective, gives the impression of formlessness, at least by stan-

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dards of Western compositional techniques. Yet a considerable amount of variety, even when sequences are utilized, prevents the works from overextending their welcome; and the experience of hearing these accessible pieces is largely a pleasurable one. The sound of the piano, almost too closeup, is quite dry but also extremely realistic.

—Igor Kipnis

Classical Collections

MIRELLA FRENi: Verdi & Puccini Arias
Mirella Freni, soprano; Philharmonia Orchestra, Giuseppe Sinopoli

Is there an operatic grinch out there who isn’t invariably happy to encounter Mirella Freni, whether on stage, disc, or video? Is anyone left cold, embarrassed, insulted, or bored by this singer? Would anyone guess from this disc that she’s in her 50s, and that she’s been singing professionally for 35 years?

The arias from Butterfly and Manon Lescaut come from her previously released complete recordings of these operas, and they still sound great. Liu’s last-act aria is moving and girlish, Mimi’s first-act introduction is tender and warm. All of these selections (save the Butterfly, which is a stretch) fit her like a glove, and we shouldn’t be surprised at the high quality of both the singing and interpretations. It’s the rest of the program that amazes.

No, she’s not a natural for the four Verdi operas, but by intelligently husbanding her resources and singing with individuality rather than an imitative or competitive spirit, Freni makes each aria her own. “Ritorna vincitor” is urgent and thrilling, “Eccio l’orrido campo” is atmospheric and spooky, “Tu che le vanita” has a resignation one always looks for in this grand scene, and Desdemona’s “Willow Song” and “Ave Maria” are ravishing. Sinopoli is, as usual, an oddball—the Ballo and Don Carlo arias are slower than I ever would have dreamed possible (indeed, Freni has to breathe between the words “il pianto” and “mio” in the latter just to stop from suffocating), but somehow, each selection works.

Freni doesn’t sound as fresh as she did in the ’60s, nor has she ever had the insights of Callas or the sheer lushness of tone of Caballé. Nonetheless, this is potent, beautiful stuff that it would be hard to do without. The sound is stunning, by the way—rich and clean from bottom (rare for DG) to top. You can’t spend a better hour with another soprano.—Robert Levine

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Yevgeny Kissin, piano

Sony Classical SK 45931 (CD only). Keb-ichi Hands, eng.; Juko Yokoyama, prod. DDD. TT: 73:13

Now 19, the Russian-born Yevgeny Kissin has been receiving rave reviews for his American concerts, both solo and with orchestra, and is obviously well launched on what is already a spectacular career. I had previously reviewed Kissin’s Rachmaninoff Concerto 2 and six of the Op. 39 Etudes-Tableaux (RCA 7982-2-RC, Vol.12 No.5), of which Nos. 1 and 5 are duplicated here. As an example of technically formidable, powerhouse projection, the pianist’s playing impressed me, but his lack of warmth, emotional involvement, and tendency toward onslaughts of top-volume sound, with a resulting unmalleable tone, did not. The present recital stems from May 12, 1987 in Tokyo’s Suntory Hall, when Kissin was 15½. It is often exciting as well as brilliant in execution, but throughout (with only a few exceptions, such as the gentler Scriabin Mazurka, Op.25 No.3), I was put in mind of a musical Robocop. The recital is exhausting to the sensibilities. Whether in the Liszt Etudes de concert 2 and 3, Chopin’s Op.44 Polonaise, or the Prokofiev Sixth Sonata, there is relatively little tonal subtlety, insufficient charm, and no elegance. Rhythmically, also, he tends to be far too literal: an eighth note followed by two sixteenths emerge precisely with those exact values (I am not talking about general speedups or slowdowns or an overall rubato, which he utilizes well, but rather about the slight bending, or humanizing, of the rhythm in a passage; in other words, a strict, internal, between-the-beats rubato). This may be a minority report, but his playing, at least in this earlier stage of his career, gave me little cause for enjoyment. Sony reproduces the sound of the live recital, including the harder edge of Kissin’s extreme forte dynamics, accurately; applause has sporadically been left in.

—Igor Kipnis

VARIous: Il Cornetto
16th- & 17th-century music for cornett, keyboard, & strings
Jeremy West, cornett; Jürgen Hübcher, lute, guitar; Adina Scheyhing, viola da gamba; Alfred Gross, harpsichord, table organ

“The instruments used in Elizabethan music were few and tended to sound like they came from the K-Mart toy section.”

—Tom Weller, Culture Made Stupid

The cornett, or zink, was, I am forced to admit, one of the most limited instruments devised by the craftsmen of the Middle Ages.

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Based on the ancient hunting horn, it was usually made of wood with a mouthpiece of bone, ivory, or metal. Its range, both tonal and dynamic, was small, and at best it sounds somewhat raspy and overblown. Apparently the producers of this recording were well aware of these limitations, and have wisely chosen to include several lute and keyboard solos to vary the program.

In fact, however, the sound of the cornett in these works, divided about equally between Italian and English composers, is by no means unwelcome. Jeremy West is a genuine virtuoso on his cantankerous instrument,¹ and he wrings flights of ornamentation from it that I would not have thought possible. His cohorts are equally skilled, and the sweeter tone of their instruments makes the cornett stand out to good advantage. Ensemble playing is excellent, and both Gross and Hübscher are standouts in their solos. I especially enjoyed Hübscher’s performance of a Prelude and Fantasy by Laurenzini di Roma, and Gross’s harpsichord solo on Peter Phillips’s “Amarilli di Giulio Romano.”

One quality which I have noted in previous Open Window releases is equally present here: the obvious and infectious enthusiasm of the performers for the music. This comes out especially in the five English masque dances which close out the program in vigorous and idiomat style. This is not music to be played in a studied or mannered fashion, and it is good to hear the Open Window ensemble let out all the stops.

The sonic news on this release is rather strange. The CD has all of the usual qualities I associate with Open Window issues: excellent instrumental timbre; clean, well-defined transients; and realistic soundstaging. In particular, the harpsichord tone is as perfect as I have heard in any format. This must truly be one gorgeous-sounding instrument. The LP, alas, tells another tale. Soundstaging and imaging are not as well-defined, the harpsichord sounds a bit furry, and most significantly, the attack of plucked lute strings is clearly softer and less true to life. When comparing another analog-derived lute recording of superb quality in LP and CD versions, I found no such difference. Even when I “biased” the comparison in favor of LP by increasing its level, the Open Window digital was clearly superior to the analog. To be honest, I could imagine someone becoming a digiphile based on this comparison. (“See? Wayne Green is right!”)

¹ As an ex-cornett player, I would like to point out that “cantankerous” is a very kind word for Les Berkley to use, the cornett being impossible to play in tune for more than 10 seconds at a time unless you have lungs and lips of uncanny power! Give me a treble recorder for my early-music hit any day.—JA

I have not yet acquired any of the other Open Window CDs to compare them to the LPs (the entire catalog is now on silver disc), but I would be surprised indeed if the difference is so marked in favor of digital (could Italian Violin Music get better?). Nevertheless, I suggest that if you want Il Cornetto, go for CD.

—Les Berkley

Show Music

KISS ME, KATE: 1990 Studio Cast
Music & lyrics by Cole Porter
John McGlinn, Ambrosian Chorus, London Sinfonietta
EMI CDS 7 54033 2 (2 CDs only), John Fraser, prod.; John Kurlander, eng. DDD. TT: 1:50:85

John McGlinn is on a roll: first, his monumental “authentic” Show Boat (EMI CDS 7 49108 2), followed by Anything Goes (EMI CDC 7 49848 2), and Sittin’ Pretty (New World 80387-2)—all essential items for every show-music-lover’s collection—and now a recording of Kiss Me, Kate, generally acknowledged to be Cole Porter’s masterpiece. McGlinn’s approach is characterized by use of the original orchestrations, adherence to the music’s note values and marked tempi (what a radical concept!), and recording the entire score, including, where possible, numbers cut in tryouts. Since Kiss Me, Kate is a more recent show than any of the others on which McGlinn has lavished his attentions, he has not had to engage in as much musicological sleuthing to come up with an authentic version, but it’s good to have the original orchestrations; the movie soundtrack and some of the studio recordings made in the ’60s have “modernized” orchestrations that now sound much more dated than the originals. Also, two of the numbers in the appendix, “It Was Great Fun the First Time” and “We Shall Never Be Younger,” are, in their somewhat bittersweet way, as splendid as “Wunderbar” and “So In Love,” songs that replaced them prior to the show’s opening.

The leading roles of Fred/Petruchio and Lilli/Kate are among the most difficult to cast in musical theater; ideally, each role should be played by a real singer, with the technique to sing operetta, who is also a real actor, able to play Shakespeare convincingly. (Singers who sort of act and actors who sort of sing need not apply.) For a recording, the acting requirement is perhaps a little less important, but it still has to be there. Thomas Hampson is one of the hottest young operatic baritones around; all things considered, he succeeds admirably here. As an actor, he does not have the panache of Alfred Drake, the role’s originator, but he is not altogether wooden (Samuel Ramey, on the Car-

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ousel studio cast recording, MCAD-6209, sets the lumber standard), and his voice is gorgeous.1 Josephine Barstow is more problematic, albeit in an unexpected way. The British diva actually comes across as quite a good actress (she has a great time with "I Hate Men"), but her vibrato borders on becoming a wobble, "So In Love" straying over that border. The rest of the cast is topnotch, with Kim Criswell—whose Reno Sweeney (Anything Goes) I didn't care for very much—the best Lois/Bianca I've heard: a smooth, sexy voice, and simply bursting with life. The sound has some characteristic digital harshness in orchestral climaxes (especially noticeable in the brass), but is otherwise fine.

—Robert Deutsch

**WEILL/BRECHT: Die Dreigroschenoper (The Threepenny Opera)**

René Kollo, Macbeth; Ute Lemper, Polly; Milva, Jenny; Mario Adorf, Peachum; Helga Dernesch, Mrs. Peachum; Wolfgang Reichmann, Brown; Susanne Tremper, Lucy; Rolf Boysen, Ballad Singer; RIAS Berlin Sinfonietta, RIAS Chamber Choir; John Mauerci, cond.

London 430 075-2 (CD only). Stan Goodall, eng.; Michael Haas, prod. DDD. TT: 73:54

**WEILL/BRECHT: Mack the Knife (Original Soundtrack)**

Dow Seltzer, cond.

CBS MK 45630 (CD only). Dave Hunt, eng.; Dow Seltzer, prod. DDD. TT: 63:45

The London Threepenny is an attempt at a compromise between two performance traditions: the old one, giving prominence to words rather than music, with a vocal technique of the "Brechtian bark" variety, and the more contemporary one, giving music its due by using singer-singers, but, according to some critics, shortchanging the dramatic aspects. This project features some singers with bona fide operatic credentials, such as Helga Dernesch and René Kollo, some actors with "serviceable" singing voices, and, right in the middle, Ute Lemper, a real singer (though non-operatic) who is also a serious actress. The conductor is John Mauerci, at home in both operatic and Broadway idioms.

The first two numbers are a distinct disappointment: an overture taken at what seems like too leisurely a pace (supposedly authentically), followed by a routine "Motirat," performed by Rolf Boysen, whose singing is neither attractive enough nor possesses the weird/creepy quality of Wolfgang Neuss on the well-known 1958 recording (now available on CD, CBS MK 42637). However, things improve considerably when Ute Lemper appears, her "Pirate Jenny" a girlishly-gleeful ode to revenge that may please even those devoted to Lenya's rendition. Helga Dernesch is another standout, most notably in "The Ballad of Sexual Obsession," projecting the words with great relish without compromising the vocal line. René Kollo does fine when he is content just to sing, but he has an unfortunate habit of using a sort of half-shout for "dramatic emphasis." This hectoring quality is particularly evident in the "Cannon Song," which also suffers from mismatched voices: Kollo, an operatic tenor, with Wolfgang Reichmann, who hardly sounds like a singer at all. Milva's Jenny is very much in the non-operatic tradition, but she is a gifted performer, with a voice in the Marlene Dietrich mold, and she convincingly creates a character who has seen and done all. In a dubious bid at authenticity, they have her sing the "Solomon Song" in the original key but an octave lower than written. (Would it be better for tenors who lack a high C to sing "The Gelida Manina" an octave lower rather than down a semitone?) My occasional quibbles about tempi aside, John Mauerci provides idiomatic leadership; the RIAS Sinfonietta play with great precision, and the sound is up to Decca/London's best. I still prefer the 1958 recording for overall atmosphere, but this new effort is well worth hearing, if only for Lemper and Dernesch.

The soundtrack for Mack the Knife, described as "based on" The Threepenny Opera, is in startling contrast to the scholarly approach to authenticity evident in the Decca/London Threepenny. The movie played for about a day and a half locally, so I did not get a chance to see it, but, on the basis of the record, a good subtitle for it might have been The Threepenny Opera for People Who Hate the Threepenny Opera, or, The Threepenny Opera for People Who Really Wanted to See Oliver. (I can't wait to see the review in the Kurt Weill Newsletter.) The lyrics are mostly of the Blitzstein version, with significant alterations by Golan and Seltzer, going even further than Blitzstein did in dulling Brecht's satirical edge. The orchestrations, by a variety of people, bear little resemblance to Weill's originals, being much more "Broadway." (The "Jealousy Duet" features—I'm not kidding—maracas!) The Broadway/Music Hall style is evident throughout: "The Cannon Song" becomes "The Army Song," has a chorus and a big ritard near the end that makes the number sound like something by Jerry Herman ("The Best of Times," from La Cage Aux Folles, comes to mind); listening to "You'd Better Use Your Head," with its chorus ofurchins, I kept wondering when they were going to sing about "picking a pocket or two." Richard Harris's Peachum seems to have an identity confusion with Alfred

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1 Rumor has it that McGinn wanted Davis Gaines, singing the minor role of Gromio in this recording, to be Fred/Petruchio, but he was overruled by EMi top brass, who wanted a more "bankable" name. That's the record biz, I guess.
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P. Doolittle, and Julia Migenes sounds at times as if she's auditioning for Eliza D. Roger Daltrey's Street Singer (aka Ballad Singer) is all over this place, butting in on "The Barbara Song," and even "Polly's Song." Raul Julia manages to bring a measure of dignity to the role of Macheath, and the sound (engineered by Dave Hunt, responsible for several fine show recordings from First Night) is a cut above what one might expect in a soundtrack.

Despite the obvious inauthenticity of the approach, I must admit that I rather enjoyed listening to this recording. It may not be The Threepenny Opera, but it is kind of fun. But then, I like Oliver, too. —Robert Deutsch

Jazz

CHESKY JAZZ SAMPLER & AUDIOPHILE TEST CD, Vol.1
Chesky JD37 (CD only). Bob Katz, eng.; David Chesky, Bob Katz, prods. DDD. TT: 61:21

The Chesky Sampler has been on the market for a while now, but if you haven't yet been exposed to it, you should be—it's one of the best such samplers on the market. Chesky has been doing some outstanding original jazz recordings on CD of late, in addition to their valuable LP reissues. The first nine bands on this disc will let you know what they've been up to if you haven't already discovered it for yourself: nothing less than some of the best sound to be found on CD; absolute demonstration-quality material which I used frequently in my recent CD player survey review.

Guy Lemcoe has already critiqued the musical excerpts in his reviews of the complete discs, so I'll speak here of the last half of the CD. This is devoted to a series of tests, all but the last three usable without test instruments. The most interesting of these is the LEDR (Listening Environment Diagnostic Recording) described in our December 1989 issue. This is a series of special computer-processed tones which, when reproduced over a pair of loudspeakers capable of accurate imaging—and in an environment which does not compromise that capability—follow specific paths vertically and laterally in space between the loudspeakers. Additional non-instrumented tests include a depth test—with recorded voice and tambourine receding into the distance—absolute polarity tests, a demonstration of the results of multiple-generation (digital) copying, and CD player low-level linearity tests. One of the latter—the "Bonger" test—has been much used by RH recently in his evaluation of DA converters.

The LEDR test alone is worth the price of the disc—previously it was only available on a far more expensive test CD. But you can consider it, and the other tests here, as a bonus on a superb music sampler. —Thomas J. Norton

BLUESIANA TRIANGLE: Bluesiana Triangle
Art Blakey, drums, piano, vocals; Dr. John, piano, Hammond organ, guitar, vocals; David "Fathead" Newman, saxophones, flute; Essiet Okon Essiet, bass; Joe Bonadio, percussion
Windham Hill WH-0125 (CD only). Peter Deneberg, eng.; Joe Ferry, prod. AAD. TT: 43:01

It was only hours after this compact disc showed up on my doorstep that I flipped on the evening news to hear that Art Blakey had died.

My thoughts turned to a cold Chicago night six or seven years ago at the Jazz Showcase when I saw Blakey and his Jazz Messengers for the first time. What stays with me most about that night isn't how the band cooked, or Blakey's inspired drumming, but the smile he wore on his face through the whole set. There was no trace of the scowl adopted by so many of his contemporaries who viewed their gift as a burden. And this was no talk-show-host smirk. It was simply the smile of a man who was doing just what he was meant to do and realized how lucky he was to have the chance.

It's this kind of infectious good feeling that pervades the first and last Bluesiana Triangle album. Blakey is joined by New Orleans piano legend Dr. John (aka Mac Rebennack) and R&B horn player David "Fathead" Newman in a cross-genre summit that meets on the common ground of jazz/blues standards. Recorded on a Sunday afternoon in March 1990, this album has an after-hours jam-session feel. And despite Blakey's senior-statesman status, it's an equal-opportunity collaboration. Blakey's backbeat is the foundation, Dr. John's piano provides the propulsion, and Newman's horn parts float atop the beat. Whether they're rolling through a chestnut like "Shoo Fly Don't Bother Me," or improving on an original composition like Newman's "Heads Up," when these guys hit a groove they don't let it go.

A tip of the hat, too, to Windham Hill for bringing us this special record. There's not a wind chime in sight, and this is definitely music to stay awake to. The excellent live sound of this CD-only release captures the undoctorred immediacy of a live mike feed. Compared to the Chesky jazz releases, this disc does lack that last degree of air, inner detail, and imaging precision. But if even half the new releases I receive sounded this good, I'd be a happy reviewer indeed.

This joyful album closes on a bittersweet note with Blakey's rendition of "For All We
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Know.” It’s one of those “life meets art” moments where you don’t know if you should turn it off or play it again. Blakey’s gruff voice is stretched to the limit, and you can hear him fighting against his illness. When he sings “For all we know/This may be the end,” he really means it.

Thanks for everything, Art. We’re sure gonna miss that smile.

—Allen St. John

HENRY BUTLER: Orleans Inspiration
Henry Butler, elec. & acoustic piano, vocals; Leo Nocentelli, guitar; Chris Severin, bass; Michael Goods, synthesizer; Herman Jackson, drums
Windham Hill Jazz WD-022 (CD only). David Farrell, Jay Gallagher, engs.; Al Evers, exec. prod.; Henry Butler, prod. DDD. TT: 47:00

I was hoping there’d be more meat to this date. While Orleans Inspiration, with its gumbo of jazz, blues, and R&B explorations, starts out on a high note with pianist Henry Butler expounding upon not only the Crescent City’s multiple musical sources, but also the likes of Don Pullen, the live performance slips—then rolls—downhill. In fact, I’m hard-pressed to call this a jazz record at all; it’s one thing for musicians to take offense at being pigeonholed, it’s quite another for Windham Hill, everyone’s favorite New Ageists, to have the audacity to include this mostly pop-tinged, electric, funkified endeavor, recorded live at Tipitina’s, as part of its jazz line.

If this qualifies as jazz, so does G.E. Smith and the Saturday Night Live band. “Mama Roux,” engulfed in a synthesizer, slapped electric bass, rock backbeat, and searing electric guitar lead, is not what I expected to hear from this gifted pianist. Nor is the instrumental rock-blues boogie “Come Back Jack.” Nor is the Korg-1, heard on such ditties as Butler’s “Dixie Walker,” an absolutely horrendous and ultimately cornball tune. George Winston can rave about Butler all he wants—and I believe Butler can be a hell of a pianist (“Dr. James,” after the late James Booker, for example)—but most of Orleans Inspiration is a wash. To make matters worse, while the sound quality for a live remote receives high marks, some of the segue editing, applause between cuts for example to assist sequencing, is much too obvious, even downright sloppy at points.

Butler’s vocals, heard periodically, are harsh in tone, adding little to what, at their lowest point, sinks into fiasco; he’s a poor man’s Elvis, a poor man’s Arthur “That’s Alright Mama” Crudup and, most assuredly, a lesser performer—at least at this point—than Professor Longhair (“Tipitina”). Orleans Inspiration, with bombastic readings of such show tunes as “Somewhere,” does not bring the best out for or from Butler. Even the acoustic solo blues effort on “Goin’ Down Slow” suffers from heavy-handenedness. His style? Maybe; still it’s too much, as if Butler’s trying to prove a point.

The session, it appears, is a clear case of a popular record company with a sophisticated marketing strategy acting selfishly, convincing one of its artists to record material that serves it rather than the performer. —Jon W. Posey

GARRY DIAL & DICK OATTS: Brassworks
Garry Dial, piano; Dick Oatts, saxes, flute; Jay Anderson, bass; Joey Baron, drums; brass ensemble arranged & conducted by Rich DeRosa
DMP CD-477 (CD only). Tom Jung, eng.; Gary Dial, Dick Oatts, Tom Jung, prod. DDD. TT: 60:39

Since the early 1960s, a growing number of jazz musicians have explored ways to broaden their expressive horizons through elements, forms, and sometimes instruments not normally associated with jazz. Among the most recent to stretch out in this way are pianist Garry Dial and saxophonist/flutist Dick Oatts, first with a 30-piece string section on Dial and Oatts (DMP CD-465), and now with a complement of trumpets, horns, and trombones on Brassworks. The result of this latest endeavor is just over an hour of pure musical gold.

For the most part the collaboration does not veer very far from what is now generally accepted as the jazz mainstream, and you’ll find nary a trace of the academicism or harmonic sterility that marked so many earlier fusion efforts. You will, however, find an abundance of strong, impassioned blowing.

In comparison with the earlier album—fine as it is—the brass choir figures more prominently in the overall texture than the strings did and is more convincingly integrated. This is not so much due to the fact that brass instruments are more indigenous to jazz as it is to Rich DeRosa’s masterfully crafted arrangements and orchestrations. Bravo.

Indeed, right at the outset—on Dial’s “The Great Divide”—the brass contingent sets the tone for the album’s chemistry. Functioning here as a marvelously spacious and intensely atmospheric intro to some straight-ahead swinging by the quartet, the writing is richly idiomatic and more Kentonesque than—as described in the liner notes—Coplandesque. To be sure, there are moments when the brass mainly provides color and big-band-type fills, but on such tracks as “The Great Divide” and Oatts’s “Weatherman” the synergy between the assembled forces is striking. Equally striking are the 11 pieces of original material by the two leaders, including a pair of lovely ballads, Dial’s lush yet swinging “Danish Beauty” and Oatts’s “The Tailor”—a soulful lament dedicated to the

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late Mel Lewis, in whose orchestra both men worked. If neither of the two soloists breaks any stylistic molds, each is an exciting, frequently inspired improvisor. Oatts's sometimes muscular, sometimes plangently lyrical, and occasionally snarling soprano and tenor excursions are a consistent joy. He's at his whailing, hard-edged best on his own "Solidarity," with Dial making a particularly powerful solo statement on his "The Greed Factor." Drummer Joey Baron deserves special mention. Definitely of the "busy" persuasion, there are only a few junctures when one wishes he'd chill out a bit. More often he reacts, supports, and inspires with almost palpable rhythmic urgency and keen sensitivity.

The sound quality of the string CD was excellent, though I am not particularly fond of the extra reverb added to the soloists. That's mostly gone in Brassworks, and in every respect (except for a drum set whose apparent width would require Plastic Man or Kareem Abdul Jammar in the driver's seat) the all-digital sonics are wonderful. Skip a night out before you miss this one.

—Gordon Emerson

ARTIE SHAW & HIS ORCHESTRA: 1949
Musicmasters CJJD6 0234 (CD only). AAD. TT: 56:34

When I first heard about these previously unreleased recordings of Artie Shaw's short-lived 1949 band, my expectations were unusually high. First, there's the personnel, including saxophonists Al Cohn, Zoot Sims, Herbie Steward, and Danny Bank, trumpeter Don Fagerquist, and guitarist Jimmy Raney. Cohn, Sims, and Steward had, of course, all been members of the legendary "Four Brothers" reed section in Woody Herman's Second Herd, while Fagerquist had provided numerous bright moments in Gene Krupa's forward-looking aggregation. And Raney would be one of those to help set a jazz guitar standard with Stan Getz's quintet. Then there are the considerable arranging talents of modern jazz pioneers Tadd Dameron and George Russell, Kenton stalwart Gene Roland, and the multi-faceted Johnny Mandel, whose compositional gift would later crystallize in such timeless ballads as "A Time for Love," "Emily," and "The Shadow of Your Smile." Finally, there's Artie Shaw himself, arguably (at least I would argue it) the finest and most imaginative of the swing era clarinetists—Benny Goodman included.

In many respects I wasn't disappointed in these resurrected tracks; one can only fantasize about the extent to which the band might have realized its full potential had it stayed together longer than a mere three months. During that brief period, however, it did make several radio transcriptions, 16 of which comprise this CD.

The '49 group was clearly a transition unit in which lingering swing elements were infused with heady doses of the striking harmonies and rhythmic twists that had become trademarks of the bop revolution. Cool breezes were also part of the mix, most notably in the refined work of the near-vibratoless sax section.

Shaw is heavily featured throughout and, as usual, he's a wellspring of melodic invention. It's obvious as well that he was absorbing the new currents in a way that Goodman never did—despite Goodman's own excellent bop-flavored band, also of 1949. Unfortunately, however, except for Al Cohn—who is responsible for several wonderfully laid-back solos—other bandmembers seldom get a chance to blow. Fagerquist turns in a brief burst of Dizzyish fire on Mandel's "Krazy Kat," and Sims is allowed only six bars during "I Cover the Waterfront." But you'll definitely recognize the sweet, swinging Sims sound. Dameron's "So Easy" and Mandel's "Innuendo" are compositional standouts that show the band at its crackling best. The then-current Afro-Cuban explorations of Dizzy Gillespie, Chano Pozo, George Russell, and others also found a resonance in the '49 band with Russell's pungent, jungle-flavored treatment of "Similau" among those tracks that make one wish Shaw's '49ers had stayed together long enough to mine more gold.

Given the brevity of its existence, the group did not develop as compelling or as unique a voice as some of the other bop-influenced bands of the day, including Herman's, Dizzy's, Kenton's, Charlie Barnet's, and Claude Thornhill's. But the ingredients were there, and Musicmasters should be congratulated for giving us the opportunity to savor them.

Not having heard the original transcriptions, I can't compare them with their CD transfers. However, the sound is pretty much vintage, with little depth, splatterly cymbal crashes, and weak bass. None of which should seriously impede any true jazz maven's enjoyment of a fleeting moment in one of jazz's most exciting and tumultuous periods. —Gordon Emerson

Spoken Word

JOHN GIELGUD/MARK ISHAM: The Emperor's New Clothes
John Gielgud, narrator; Mark Isham, music
Windham Hill WD-0719 (CD only). Stephen Krause, eng.; Mark Isham, Mark Sotnick, Beth Polish, prods. AAD. TT: 35:45
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JONATHAN WINTERS/LEO KOTTKE: Paul Bunyan
Jonathan Winters, narrator; Leo Kottke, music
Windham Hill WD-0717 (CD only). Paul Martinson, eng.;
Leo Kottke, Mark Sotnick, Beth Polish, Doris Wilhousky, prods. AAD. TT: 49:41
MEG RYAN/ART LANDE: Red Riding Hood and Goldilocks
Meg Ryan, narrator; Art Lande, music
Windham Hill WD-0718 (CD only). George Cournas, eng.;
Cookie Marenco, Mark Sotnick, Beth Polish, Doris Wilhousky, prods. AAD. TT: 43:20
DANNY GLOVER/TAJ MAHAL: Br'er Rabbit and the Wonderful Tar Baby
Danny Glover, narrator; Taj Mahal, music
Windham Hill WD-0716 (CD only). Michael Sena, eng.;
Taj Mahal, Mark Sotnick, Beth Polish, Doris Wilhousky, prods. AAD. TT: 50:00
TAJ MAHAL: Shake Sugaree
Music for Little People MLP D-272 (CD only). Michael Sena, Louis Rodriguez, engs.;
Taj Mahal, prod. AAD? TT: 35:45
NATALLIA MAKAROVA/PROKOFIEV: Prince Ivan and the Frog Princess
Prokofiev: Music for Children, Op.65
Natalia Makarova, narrator; Carl Rosenberger, piano
Delos DE 6003 (CD only). John Earle, eng.; Bejun Mehta, Rudi Simpson, prods. DDD. TT: 57:50
NATALLIA MAKAROVA/TCHAIKOVSKY: The Snow Queen
Tchaikovsky: Album for the Young, Op.39
Natalia Makarova, narrator; Carl Rosenberger, piano
Music by Gail Kubik, Bernard Rogers, Adam Stern
Werner Klemperer, Carl Reiner, Alecia Grebner, narrators;
Xtet, Adam Stern
Delos DE 6001 (CD only). John Earle, eng.; Andrew Dawson, prods. DDD. TT: 48:51

It's been a while since we checked in on Windham Hill's Storybook Classics series, but after
some indifferent or downright dull and awkward pairings over the last year or so, they're back on track: at least three of these new story discs are as good as their best. But Delos's are even better (more on that later).

Even the least of the Windhams, Red Riding Hood/Goldilocks, has its charms. Meg Ryan is
annoyingly cutesy and schoolmarmish narrating "Red Riding Hood," but her devilishly
French wolf is de-li-cious. Without being at all overt, Ryan neatly emphasizes Tom Roberts's subtly modernized story adaptation, not avoiding the sexual currents running just beneath the surface of this tale of the dark woods. (The moral, remember, is "Never wander from the path!") Art Lande's music for chamber jazz combo is slick enough to rival Claude Bolling's Third-Streamlined burblings, if you like that sort of thing, and, uniquely in this series, errs in constantly trying to be deliberately cute, comical, and, I think, condescending to children.

"Goldilocks" is far better, narrated by Ryan's wonderfully insufferable Southern earbender. Goldilocks herself is a terminally spoiled Southern princess, sort of a Shenandoah Valley Girl (her response to Mama Bear's porridge: "Don't they have a spice rack?"); while Lande's music tastes of gospel and blues.

In the suite of music that follows the tales (all of the Storybook Classics and Delos releases are set up this way: narration with music, followed by music only), there's plenty of material not found in the tale itself: Ron Miles's nasty, dirty, wolfish trumpet, some very lyrical bassoon passages, and a real delight: the neo-Victorian parlour ballad "Little Red."

Jonathan Winters does a much better job with Paul Bunyan than he did on last year's Peter and the Wolf (with Efrem Kurtz and the Philharmonia on EMI). Bunyan runs a close second in this series to the Robin Williams/Ry Cooder Pecos Bill (Vol.11 No.7), the award-winning jewel in Windham Hill's crown. Winters pulls out voice after voice from his stock supply, plus a few new ones, Teddy Roosevelt among them. When first listening to this story, I was increasingly uncomfortable with a folk hero who does nothing but level whole acres of virgin old-growth forest with a single swipe of his immense axe (made, I hear tell, of a hammered-flat locomotive). But Brian Gleason's adaptation of this tall tale about tall Paul ends with an ecologically aware twist: After logging off the Dakota Territories one winter at Teddy's request, and carving out Mt. Rushmore so's folks would have something to look at now that the trees were all gone, Paul looks out over the clear-cut expanse and feels—remorse! He gives up logging and now spends his time planting trees—billions of 'em.

Thanks, Windham Hill, for recycling this piece of American folklore.

Leo Kottke's 12-string guitar music has all the harmonic richness, contrapuntal density, and
rhythmic double-joint edness you'd expect from this immense Minnesotan with a voice he
himself has described as "sounding like goose farts on a foggy day"; his hands dance over the strings like a ten-legged spider in five pairs of tap shoes. "The Man in Plaid" would be perfectly at home on the late, lamented "Prairie Home Companion," on which Kottke was a frequent guest, and "Enderlin" is so good-natured you'll want it to just keep on a-goin' (that's Procol Harum's B.J. Wilson, of all people, on drums). Duck Baker's guitar-slide odes to Babe the Blue Ox are poignant, but mainly this disc is just good, wholesome, fun music with a rough-hewn disregard for stylistic niceties and,
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Stereophile, April 1991
for a children's record, musical sophistication that is surprising but completely accessible.

But things just keep getting better: The casting of John Gielgud as the narrator of *The Emperor's New Clothes* is a level of class that Windham Hill has approached only once before, when Jeremy Irons's plummy voice did such a bittersweet job with *The Steadfast Tin Soldier* (Vol. 10 No. 9), also with music by Mark Isham. Gielgud is marvelous—at 82, he has the energy and spirit of a man 30 years younger. Isham amuses himself by experimenting with all sorts of rollicking High Renaissance dance forms à la Praetorius, and grand trumpet-and-tympani fanfares à la Mouret (that's "Masterpiece Theatre" to you). Exotic percussion and instrumental combinations like harpsichord with soprano sax freshen the standard dance suite, which here includes accurately realized 16th-century European musical snapshots of middle-eastern dances—a common enough sort of aural travelogue even then. Isham is astonishingly versatile: this is his fourth Storybook soundtrack for Windham Hill, and all are quite different. (The day I listened to *Emperor*, I also saw *Reversal of Fortune*, starring Jeremy Irons and with a score by Isham; again, very different music, and entirely appropriate to the film.)

Finest of all is *Brer Rabbit and the Wonderful Tar Baby*, the tale of two tricksters outfoxing—and outrabbiting—one another. Danny Glover is a natural at this, and it's obvious he's having the time of his life telling this Joel Chandler Harris story. *Tar Baby* is every bit as delightful as Glover's *How the Leopard Got His Spots* (Vol. 13 No. 2), and Taj Mahal provides accompaniment just as natural as Ladysmith Black Mambazo did for *Leopard*. Glover is unique in this series in not only making every word, but every syllable count deeply. And anyone who have painful memories of Disney's 1946 *Song of the South* adaptation of the tales collected by Harris, and who might associate Glover and Mahal with a certain Uncle Tom, should rest assured that this is Black American culture at its most delightful.

Virtually no one these days makes banjo music as immediate, vital, and funky as Taj Mahal. The half hour of mostly instrumental music which follows *Tar Baby* may as well constitute the "next" Taj Mahal album (*Shake Sugaree*—see below—is only a few minutes longer). Taj followers (like LA) will be happy to know it's just him here whistlin', moanin', and playin' acoustic guitar and banjo (with Michael Sera's occasional bass). "Nani's Tune" has Taj's trademark winsomeness, an open-air feel, and "Brer Rabbit" is yet another variation on the primordial banjo riff (like "Ricochet" on *Recycling the Blues* and "Cheraw" on *Sounder*). Not many of these days record music so simple, so basic, so elemental, so wholesome. Two songs don't appear at all during the story: "Brer Rabbit Courtin' Song," a slow country blues, and the downhome "Briar Patch," with a vocal that'll appeal to those who remember 'Taj's' 1970 album *De Ole Folks at Home*.

Shake Sugaree: Taj Mahal Sings and Plays for Children is only the third Taj Mahal album released since 1980. He's recorded half of these songs before, there's only one new original (the self-explanatory "Funky Bluesy ABC's"), and there are some gawdawful programmed drums, but so what? Taj picks traditional songs from all over the world, bending them and his own voice to each others' purposes. "Quavi, Quavi," a Gambian fruit-seller's song, will lighten your young children's hearts, while "Little Brown Dog" is full of sad whimsy, and "Fishin' Blues" is infectious to a fault. Taj introduces most of the songs, sometimes awkwardly.

More bothersome are the sonics, which shift wildly from track to track and cut off ambience left and right. To be expected from such a home-made production, I guess. On the four story discs, Windham Hill still seems intent on leaving audible every one of the studio seams. Music and narration are, of course, recorded separately, but there seems very little attempt at any kind of seamless marriage of the two. The narration is punched crudely in and out, and ambiences are invariably mismatched. The recordings sound just like what they are: collages of tiny snippets of tape amateurishly spliced together. There's a mysterious, relentless pounding noise throughout much of Paul Bunyan's music, but the worst is *The Emperor's New Clothes*: John Gielgud's narration master is plagued by horrific hiss and print-through and a low rushing-water sound. Sounds like someone just turned on a Nagra in a carpeted bathroom with a running toilet and let 'er rip. Too bad. There's a lot of talent underneath all that noise.

But disappointing as the sound might be, the stories and music of these releases more than make up for it; I doubt your children will mind. Thanks, Windham Hill; keep up the good work, but *please* take more care in the studio—it's not that much harder to do a good job.

And that's proven in Delos's new "Music for Young People" series, of which the three releases reviewed here are the first story discs. Sonics first: In each case, Delos has recorded the narration in the same hall as the music, and with matching mike distances; tapes were stored properly, eliminating print-through; and editing was done with something sharper than a blunt machete—compared with Windham...
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Stereophile, April 1991
Hill's work, these are flawless, seamless productions. But then, with John Eargle as engineer, that's about what you'd expect.

These were ballerina Natalia Makarova's very first sessions as a storyteller, though she's acted on Broadway and narrated for the BBC. As I write, she's just taped the story of The Firebird, which she has already performed as a dancer; Delos will intercut the tale with Gerard Schwarz's recording of the Stravinsky ballet and release it within the year. But the present releases—virtual cold readings by a neophyte tale-spinner—are marvels. What Makarova lacks in mike experience she more than makes up for in sheer heart and commitment; she seems determined to make true every cliché you've ever heard about those immense, passionate Russian souls. It's all here, with an audibly palpable smile and a voice rich, deep, knowing, and wise. Makarova comes on like a force of nature, and makes every Windham Hill performance but Danny Glover's sound like just that—a performance. Makarova herself sounds like the real thing, a genuine Russian grandmother (she speaks of her own grandmother here) overheard in some snug hut in Finmark while the winter winds howl outside; she's a natural. I was absolutely, totally charmed; in fact, the first time I listened to these discs I didn't even hear the stories, so filled was I with the richness and musicality of Makarova's voice, her Leningrad accent as thick as caviar, as heavy and warm as a bearskin coat. I could listen to her recite Korean rack-system assembly instructions by the hour.

Tchaikovsky's effortlessly melodic Album for the Young fits The Snow Queen, Hans Christian Andersen's archetypal children's version of possession by the demon lover, as composed especially for it. This dovetailing is due in no small part to Carol Rosenberger's deft, limpid, carefully nuanced playing on both this and Prokofiev's Music for Children, which accompanies Prince Ivan and the Frog Princess, and which has, as far as Delos knows, never been recorded before. In both cases, the Russian composers wrote music perfectly accessible to children, both as listeners and players, without the slightest condescension. The Prokofiev is delightful, long on wit and short on his usual acerbity, always simple, melodic, and to the point.

Prince Ivan and the Frog Princess, Russia's gender-turnaround of the classic Frog Prince tale, has a finger-wagging moral: don't judge by appearances. Like The Snow Queen, it is richly picturesque, hardly the streamlined, minimalist, high-concept junk with two-digit vocabularies that nowadays fills the "KidLit" marketing niche. And Delos has done the buyer a favor: if, inconceivably, you don't like Makarova's readings, you can read your children the stories yourself—their complete texts are printed in the illustrated booklets.

The trio of tales, composers (all American), and narrators that make up the third disc are less successful. Dr. Seuss's clever "Gerald McBoing Boing" seems out of place among the more timeless "The Musicians of Bremen" and "The Fairy's Gift." Werner Klemperer's (Otto's son; Col. Klink to you) somewhat overdoes the honors on "McBoing," to Gail Kubik's over-written music from the animated TV show of the early '50s about a boy who only makes percussion sounds when he opens his mouth. Alecia Grebner, a 16-year-old black girl from California who has made quite a splash in L.A. theatrical and storytelling circles, unfortunately sounds like a teenager trying to sound grown-up on "The Fairy's Gift," as she plays everyone's eldest sister taking over her parents' tale-telling duties. For better or worse, she sounds her age. Still, her authenticity in this variant of "Cinderella" is undeniable when she impersonates the wicked mother and sister persecuting the blameless Rose.

But Carl Reiner turns in a masterful, resonant, unaccompanied piece of work on the longest tale on the disc, "The Musicians of Bremen," sounding as if he'd rehearsed long and hard to get each phrase, each inflection just right. A revelation—I had no idea Reiner had this kind of work in him.

The unsentimental music of Bernard Rogers ("Bremen") and Adam Stern ("Fairy's Gift"), always interesting and never cloying, sounds as if it could have been written by Copland at various points in his career. Though written especially for these tales (Delos producer Adam Stern's score was written for this recording), it nevertheless seems awkward, overdone, trying too hard to tell the stories too graphically, and not meshing nearly as well as the Tchaikovsky and Prokofiev did for Makarova. Xet (called that because it draws from a pool of players, becoming an octet, quintet, or trio as needed) performs with effortless virtuosity throughout.

If you can buy only one or two of these seven story discs, make both of them Makarova, or one Makarova and one Glover. You won't regret it.

—Richard Lehnert

(A TRIBUTE TO) ROKY ERICSON: Where the Pyramid Meets the Eye
Sire 9 26422-2 (CD only). Bill Bentley, production & album supervision. AAD. TT: 75:06

Stereophile, April 1991 279
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Since 1925. We must be doing something right.
Gee, maybe all those drugs weren't such a good idea. Among the guys who left early for lunch—Roky Ericson, The Seeds' Sky Saxon, Spirit Randy California, and Pink Floyd's Syd Barrett—an astonishing number were founder members of the Psychedelic A-Team, gifted musicians working in the heyday of '60s Flower Power but clearly flying without nets. "Gosh, Roky," asked a much-younger Bill Bentley, the long-time fan who put together this innovative, if patchy, tribute album, "What is psychedelic music?" "Don't you know, man?" replied the Master. "It's where the pyramid meets the eye."

As California goes, so goes the nation. In the '60s, straight outta Haight-Ashbury, the middle class went hippie and turned on to drop out of a society they didn't much buy. However silly the psychedelic visions of the age could become—and in garage punk cartoons like the Strawberry Alarm Clock, very silly indeed—it behooves us to remember that musicians like Ericson turned on to tune in.

The current middle class grooves to acid house like Nick Charles (or Nick Cave) makes a martini. Take *this*, kids. The power, vision, and energy spurtin' out of the reinterpretations here will clear those sinususes of self-absorption and shake the barely-living dead.

If you're 40, you know Ericson. Formerly the lead vocalist of Austin, TX–based troupe The Thirteenth Floor Elevators, his tracks stand up and kick, even though the man himself has been in and out of institutions, the ministry, and alien nations since 1968.

But remember the tracks: "Reverberation (doubt)"; "If You Have Ghosts"; "She Lives (in a time of her own)"; "Red Temple Prayer (two headed dog)"—music like this is timeless. Where one-time *Rolling Stone* writer Lenny Kaye archived the best of '60s garage rock and psychedelia in the important *Nuggets* collections (issued via Rhino Records and Capitol Records in the early '80s; a Rhino 3-CD "Best of" series is still available*), today Bill Bentley turns in his own special chapter, with a twist.

So, why? "Looking back, at the peak of their powers, the Elevators gave off a brief but lasting light which still shines in certain minds," Bentley writes. His own bright idea was to search out musicians for whom Roky's light still shines and get them to cut their own track of an Ericson original. Contribute they do, in droves, from the peerless professionalism of ZZ Top on "Reverberation" and the crystal shimmer of original Creedence Clearwater rhythm player Stu Cook (now of Southern Pacific) on "It's a Cold Night for Alligators" to fellow Texan traveler (and sometime producer) Doug Sahm, with his sons, on "You're Gonna Miss Me." And even John Wesley Harding.

As for accomplishment are also turned in by Primal Scream ("Slip Inside this House"), Chris Thomas and Tabby Thomas (a soul version of "Postures"), and simple production from T-Bone Burnett, on his own contribution and "Don't Slander Me" from Lou Ann Barton.

Less successful cuts come from stylists like the Butthole Surfers and REM who, unlike ZZ Top, simply won't play in the chorus for the evening. Other weak sisters derive from Bongwater and Poi Dog Pondering, whose production skills are limited. Poi Dog's "I Had to Tell You" and Bongwater's "You Don't Love Me" are tiresome, straight mixes, loaded in Bongwater's case with reverb on the vocal. Like a couple of others, they sound like straight transfers from a MIDI studio; they completely miss the point that if ever there were a musical style designed for a mix engineer to show off his tricks, this is it. Little-known Judybats understands that psychedelia is the ultimate "Don't bother-me-Mom-I'm-under-the-'phones" experience, but international trendsetter Julian Cope blows it.

A, nevertheless, for concept. *Where the Pyramid Meets the Eye* is an eccentric album and the quality varies from track to track, but it's honest, it's fun, and it deserves to be heard. It's a resurrection, of a sort, for the best parts of Ericson's truly original visions. "If you have ghosts," he wrote, "then you have everything."

—Beth Jacques

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*BOBBY KING & TERRY EVANS: Rhythm, Blues, Soul & Grooves*

Rounder 2101 (LP), CD 2101 (CD). Brian Levi, eng.; Bobby King, Terry Evans, prods. AAAAAD. TT: 49:53

"I ain't askin' for favors/ I believe in hard sweat and labor." So begins the first cut on Bobby King's and Terry Evans's second album, *Rhythm, Blues, Soul & Grooves*. The song is "One Way Ticket to Memphis"; they're home by song's end, and stay there until the end of "Boogie Jam," the last cut—hard sweat and labor are evident on every single track.

It's hard to believe anyone's still making music this vital, this direct, this *good*. King & Evans' first album, the Ry Cooder–produced *Live and Let Live*, was predictably more roots-centered; on it, King & Evans mined the bottomless shaft of soul sunk years before by Wilson Pickett, Otis Redding, Sam & Dave, Sam Cooke, and the Staples. *Rhythm, Blues, Soul & Grooves* is simultaneously more contemporary, more mainstream,
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and more primal than the first record. The title says it—all four elements are here in equal quantities on each track. The ballads—"I'll Be Strong," "You and Me"—hit me the hardest, but that's just taste. Hard-driving funk grooves like "One Way Ticket" (the only non-original), "I Fancy You," and "I'm In Love" are just as strong. In fact, I can't think of a single cut I'd want to do without; King & Evans—surely their hearts are a size or two larger than normal—fairly explode with joy on every one, just like the blues is spouz to be: you get out of feeling the blues by singin' em. These consummately musical guys sound not only like they've been making this music forever, but like they could easily go on making it for another forever or two.

Ry Cooder plays on eight out of ten cuts, though he's hardly showcased in the mix; truth to tell, he played much better on Live and Let Live!. Hence Powell's horn arrangements are classic functional Stax-Volt, and Buzzy Feiten (who used to play with Paul Butterfield) plays a strong, innovative lead guitar. King & Evans produced this one themselves; the recording is not nearly as natural as their first album, which sounded as if recorded live in the studio with more or less minimal miking. The mix is standard just-where-are-those-instruments-anyway? multi-mono. LP/CD differences are tiny enough that I'm hard put to describe them, important enough that the LP sounds like a jolt of reality after listening to the CD.

This is great stuff—timeless, deeply American music of which we cannot have too much. Invest in integrity—buy this record.

—Richard Lehnert

**NEVILLE BROTHERS: Brother's Keeper**


To paraphrase George Bernard Shaw (by way of Monty Python's Flying Circus): the only thing worse than being pigeonholed is not being pigeonholed. It's precisely because they don't fit easily into the musical ghettos that radio stations and record companies love so much—rock, soul, rap, blues, reggae—that the Neville Brothers have spent the better part of 20 years as one of the best-kept secrets in American popular music. Even Keith Richards was touting them a decade ago, but, for once, no one listened. If you heeded RL's rave review of Yellow Moon in Vol.12 No.7, you're already in on the secret. If not, this might be an appropriate time for a trip to the record store. (We'll still be here when you get back.)

*Brother's Keeper* picks up right where *Yellow Moon* left off. While harder-edged than its predecessor, the new album still flaunts the eclecticism that's been the Brothers' trademark as well as their commercial cross to bear. Befitting their New Orleans upbringing, the Nevilles don't pay no nevermind to musical boundaries. They juxtapose the reggae-tinged "Jah Love" with "Sons and Daughters," a rap song that owes as much to Gil Scott Heron as Ice T, while shoehorning Link Wray's "Running Water" in between. They pay tribute to their roots with a cover of "Mystry Train" (as amended by Bobbie Robertson), and "Witness," embellished with Allen Toussaint-style horn arrangements. And the album ends with, of all things, Aaron's version of Leonard Cohen's "Bird on a Wire." Familiar to all you Famous Blue Raincoat fans, this unlikely closer soars on its own and is enriched by everything that precedes it.

The common thread that runs through this wide-ranging group of songs is a steadfast religious faith tempered by the hard-won realization that the Lord helps those who help themselves (and their brothers). In the Nevilles' world-view there's no contradiction between the grim realism of a song like "Sons and Daughters" ("They're passing out the weapons to each other/Brass knuckles/Pipes/Chains/Half a bricks/Broken bottles/Switchblades") and the religious allegory of "Brother's Keeper" ("Jesus said if you love me/Then you'll feed my sheep/But like Jesus we've been betrayed"). This is rap without the misogyny, reggae music for the streets of America's Trenchtowns. *Brother's Keeper* is the kind of '90s album that might have been made by Marvin Gaye, Motown's resident radical, or maybe Bob Marley, had he grown up on gumbo instead of jerk pork.

And it sounds pretty good too. I prefer this recording to the otherwise excellent *Yellow Moon*, because it dispenses with Daniel Lanois's atmospheric touches in favor of a more straightforward sound. The all-analog LP is the hands-down winner here, with a remarkable illusion of depth and more precise placement of instruments in the soundstage.

So when you do head down to the record store, you'll probably have to ask the clerk where to find *Brother's Keeper*. But you record stackers should have no such problems once you get home. This one belongs at the top of the pile.

—Allen St. John

**THE POSIES: Dear 23**

DGC 9 24305-2 (CD only). Produced & mixed by John Leckie & The Posies. AAD. TT: 48:25

**SHADOWLAND: The Beauty of Escaping**

Geffen 9 24286-2 (CD only). Pat Moran, prod., eng. AADD. TT: 44:27

Nice teeth. Shame about the hair. Or, in *The Posies* case, the post-adolescent identity crisis
THE DIFFERENCES ARE NOT SUBTLE

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and the Nehru jacket. Yes, it’s another ’90s take on Flower Power, this time courtesy of a group which clearly thinks it’s a cross between REM and the Beatles. Fortunately for them, John Leckie’s mush-brained, unimaginative production, which takes everything straight across the board and turns it into aural glop the consistency of oatmeal, isn’t anything a lavish budget won’t overcome. The press handout salutes Dear 23’s “wash of squirming sounds,” but I’m not sure I’d brag.

They’re a pure-pop buzz in Seattle, where their first effort, Failure, was released by indie label PopLima. Using the guitarist’s Dad’s home eight-track studio, the guys wrote, arranged, engineered, and produced all 12 tracks and performed all the parts themselves!

Since Posies label owner David Geffen, the man with the Midas touch in spotting college chart trends, has single-handedly rediscovered the ’60s, watch The Posies cash in. That’s fortunate, as none of them can sing more than pleasantly. They’re Geffen’s Off-Off-Broadway entry into the Flower-Power/Pop revival stakes, and if this major-label debut takes off, listen to how fast they sound professional.

Still, the boys are tryers. They clearly stayed awake in English 201 (Poetry), and the album’s singles contender (“My Big Mouth”) is carefully overwritten. Their mentors XTC may get away with wry and rueful wordplay, but to The Posies verses like “The lines across your face are drawn with hate/Cause I’m drawn to someone else/... You wouldn’t like what you find inside my big head/Don’t make me open my big mouth” are High Art.

Their real skill, however, may turn out to be getting themselves signed to a major label in this, the post-Milliken, post–Clive Davis, post–2 Live Crew era of “Will it sell? Really? Prove it” era of yellow-bellied artist development. In a campaign worthy of an MBA, the group got their indie concept written, produced, released, market-researched (Seattle liked it! Cash Box liked it!), and before the ears of a big A&R scout. The rest will be history. Literally.

The Posies may be gauche and sound pretty mediocre, but at least they sound honest. Shadowland (The Beauty of Escaping) sounds terrific, but it’s as honest as a three-dollar bill. This is Geffen’s Broadway production of The ’60s—beautiful immigrant Angelenos in “British invasion” leather caps and Cuban heels, photo manipulation on the lovingly tinted floral art on the cover, no expense spared on production (sampled banjos! 12-string Rickenbackers! strings conducted and arranged!), and, yes, a budget for UK recording sessions (Rockfield) and guest artists like Irish folkies Anthony Thistlewaite and Colin Blaney, and, oh Jesus of cool, Robert Plant—not for something as unholy as actually singing, but for blowing harp!!

It looks great and it sounds wonderful, but it’s hollow as the heart of hell. (“Yo, Pat! What kind of guitar did The Byrds use?”) Lots of boy-hates-girl songs in Bob Dylan’s “Leopard Skin Pillbox Hat” tradition, but worse: “Miss Yesterday” (“Hey there Mrs. Yesterday/You just killed me in my favorite way”); “She’s Shooting Fireworks” (“She’s making plans to kill/She’s making plans to shoot for thrills/... She pulls the trigger tight/It goes bang-bang and she falls down”), or hey, how about even a cover of “It’s All Over Now, Baby Blue” on the teaser EP Shadowland (Geffen 9 24273-2)?

The good part is that the group can sound like the Bodeans. The bad is they dedicate tracks to Kerouac and remark, on their semi-obligatory drug lyric (“Heroin Eyes”), “The nice thing about addicts is they inspire a lot of nice literature and songs that hopefully inspire less addicts.” Since the year dot, artists have walked it like they talked it, for better and for worse. Shadowland is cynical, soft-core, Henry & June–style product: born-again psychedelia and safe cheap thrills with its sticker of parental approval right there in the art-directed lyrics. Shadowland is to Jim Morrison, William Burroughs, Tom Waits, and M.C. Hammer what Milli Vanilli is to music. Catch ’em soon on Broadway.

—Beth Jacques

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Stereophile, April 1991
MANUFACTURERS' COMMENTS

Jeff Rowland Design Group
Model 1 power amplifier
Editor:
I would like to thank Thomas J. Norton for his review of the Model 1 amplifier. Mr. Norton's observations of the amplifier's sonic qualities accurately reflect my design objectives. His remark that he "found this amplifier a joy to listen through" succinctly describes the goal we desire for our customers.

Since I only learned of the mysterious fuse-blowing episode while reading the Model 1 review, I am puzzled as to its cause. I suspect that some unusual AC line or operational condition occurred, since fuse replacement solved the problem.

The second difficulty was with the stripped or "frozen" output terminal strips. This was probably caused by the use of speaker-wire spade lugs which were slightly wider than the output terminal "barrier" dimension, thus creating excessive side thrust on the screw when tightened. In order to eliminate this potential interface incompatibility, we are encouraging various specialty wire companies to standardize their spade lugs.

Thanks again for the well-balanced review of the Model 1 amplifier. I look forward to the upcoming report on these amps operated in the "bridged mode."  

Jeff Rowland  
President, Jeff Rowland Design Group

Mark Levinson No.29 power amplifier
Editor:
Thank you for publishing Thomas J. Norton's review of the Mark Levinson No.29 amplifier. I would like to underline what is pointed out in the review, namely that both the No.29 and the other amplifier reviewed performed very well into a variety of speakers, even when compared with amplifiers with much higher power ratings. I guess we can thank the effectiveness of mid-fi marketing techniques for the common misconception that hundreds of watts are needed for great sound.

I would also like to compliment Stereophile magazine on its efforts to audition products in a variety of circumstances. Too often, a product under review is merely inserted into a system that has been optimized for a different product. Clearly you are more sensitive to the fact that, given a basically high level of quality, the ultimate performance of an audio product will be affected by its interaction with associated hardware and software. While we have a design goal of making our products as widely compatible as possible, we are aware that fortuitous synergisms occur, as well as specific incompatibilities that cannot be avoided given the diversity of design approaches available to contemporary audio engineers. It is unfortunately uncommon for subjective reviewers to be as aware of this as the writers for Stereophile.

If Stereophile were read by a few million people every month, the wider distribution of honest information would result in more people having better-quality sound reproduction in their homes. Of course, with that high a circulation Stereophile would have difficulty retaining its character, and small high-end companies would have to search for a more affordable advertising venue, so I guess there are no easy answers. We in the high-end community can only continue to do our best to provide continuing improvement to the home-music experience.

J. Michael Wesley  
Madrigal Audio Laboratories, Inc.

VTL Tiny Triodes
Editor:
You have recruited a refreshing and able new writer in Corey Greenberg; we are delighted to have been included in his "debut review" project. He certainly seems to have enjoyed our "Tiny Triodes" and, no doubt, your readers will enjoy this and future writing from Corey.

Of course he is right when he points out that an amplifier of this (by today's standards) modest output can only be viable with truly high-sensitivity loudspeakers—92, 95dB, and up is the whole idea. The Spica Angelus at 87dB (a very fine speaker, in our view) probably just squeaks through in a small(er) room if the listener has only typical "apartment-with-touchy-neighbors" playing levels in mind. Triode amplifiers of this output power are, would you believe, regarded as being pretty powerful among that very select band of triode aficionados, who often go as low as 8W single-ended (!) to drive their 95–105dB speakers, which commonly include, inter alia, Klipsch,
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Jeffrey E. Morris
JBLs, and ARs of older vintage, Wharfedales, Goodmans, Lowthers, etc. In case anybody is
snorting derisively, I can assure you that this
lower-power/higher-efficiency triode syndrome has a lot of seductive (and musically involving)
merit going for it. We do, of course, build triode amplifiers that go “way up there” in the
power game—45, 90, and 135W using 300Bs,
and 200 and 300W using KT90s, which will drive anything and retain the “triode experi-
ence” in music reproduction.

One last thing re. Corey’s comments on pcb washing: VTL does not and will not wash any of
our printed circuit boards, either in our
domestic or studio equipment. We have proved
conclusively that the solvent/water mix (any ratio) does seep in and mar the performance
and reliability of many components that are
hopefully deemed by their respective manufac-
turers to be impervious to water and chemical
pervason.

Welcome aboard, Corey, and thank you!
David and Luke Manley
VTL

Muse Model 100
power amplifier

Editor:
The other day after returning from a visit with a
local dealer, I was handed a rather long fax;
it was from Stereophile. I knew that it must be
the galley copy of a review! I immediately
looked for a chair. I was compelled to read the
entire document in one undisturbed sitting. As
designer, this is always one of the most nerve-
wracking moments. It’s something akin to
watching your newborn being scrutinized by
the delivery-room doctor. Is everything OK?
Is there anything wrong? Anything missing?!
I almost had to remind myself to breathe.

While Muse has always received good
reviews, reading one for the first time is still an
anxious moment. What happened this time
was quite a different matter. I started reading,
and within the first few paragraphs I found
myself smiling. After the first page, I realized
I was having a good time, even laughing out
loud and thinking to myself, “Hey, this is really
funny!” I was actually enjoying myself and for
a few moments I almost forgot I was reading
a product review, let alone a review of one of
my products. I remember saying to myself,
“Damn, this guy sure can write.” All too often
we audiophiles take ourselves a little too seri-
ously. Remember, listening to music is sup-
posed to be an enjoyable event. This is, after
all, the reason why most of us were drawn into
hi-fi in the first place. Reading Corey Green-
berg’s writing was a lot like listening to a fine
hi-fi system. His review was detailed, accurate,
and downright enjoyable. Regardless of the
outcome of the review, I knew John Atkinson
had made a fine choice in adding Mr. Green-
berg to the Stereophile staff.

I finished reading the review, set my copy
down, and got up smiling. I can’t remember a
more enjoyable reading experience. The vis-
ual imagery and humor Mr. Greenberg conveys
is quite refreshing. It was then that I reminded
myself why I’d been given this fax in the first
place: I had been given an opportunity to
respond to a product review.

So here goes. . . Thank You! It’s nice to find
that our hard work does not go unappreciated.
What more could we ask for than “Highly
recommended”? Yes, we like detail, it’s why we
design audio products the way we do. At Muse,
we feel that reproducing all the feeling and
emotion of a musical event is the ultimate goal
for any piece of audio equipment.

Regarding Mr. Greenberg’s two small com-
plaints: As for the practical complaint, Muse has
been using a hex-head-style binding post on
all amplifiers for the last few months. No more
pliers marks from tightening the old-style post.
As for the personal complaint, we are still using
the illuminated power switch. However, for
anyone who asks, we are more than happy to
spring for a whole roll of black electrician’s tape.

John Atkinson’s discovery of a moderately
high DC offset in the left channel of the ampli-
ifer is, in fact, out of our specification limit of
100mV. At least this is proof that we don’t use
the “Sunday Sample” approach to magazine
review requests; we just grab a product from
stock and ship it. Rest assured that the party
responsible for checking DC offset will be
justly punished. However, we’re having trouble
locating an adequate supply of “smoldering
pine saplings.”

For myself and everyone at Muse, I thank
you.

Kevin Halverson
Muse Electronics

Counterpoint SA-100 power
amplifier

Editor:
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in Mr. Greenberg's trial by fire, and welcome him to your masthead. He writes well. His comments on the superb parts quality, layout, and construction details are shared by other enthusiasts. He also correctly identified the strategy of our design, with a circuit using tubes and MOSFETs each doing what they do best.

Puzzlingly, his findings totally disagree with virtually every other comment we have heard about this amplifier's performance. I can only conclude that the amplifier was defective.

We shipped this amplifier to Stereophile in December of 1989. In violation of our normal QC procedures, it was yanked from the production line and shipped on a rush basis, omitting our normal 48-hour burn-in, 100% post-burn-in AC testing, and final listening steps, which every Counterpoint product routinely and unfailingly receives.

Why would we do such a silly thing? Because we were told by Stereophile that the unit would be quickly checked out and if it were not a significant change from its predecessor, the SA-12, the SA-100 would be automatically included in the upcoming "Recommended Components" issue. But only if the unit were received in December, the same month the then-new SA-100 first began shipping.

So, with this promise (and deadline) in mind, we shipped the SA-100 the day before we closed our doors for the holidays. In our desire to make the list, we took a risk and rushed an amplifier in a fashion that we normally never do.

Of course, I'm only speculating that the first SA-100 is defective; more than a year has gone by since we last laid eyes on it. It would have been swell if Stereophile had returned the amplifier by this late date, thus giving us a chance to check it out before granting us the traditional five days in which to respond to the review.

On the other hand, we are thankful that someone at Stereophile thought enough of us to request a second sample. Perhaps this is because the SA-100 (and/or its predecessor, the SA-12) is so highly thought of by several members of the Stereophile staff, including Martin Colloms, Ken Kessler, and Sam Tellig. It is also praised by others, including Peter Moncrieff of iAR, Judy Davison of Hi Fi Heretic and TAS, and Neil Levenson of Fanfare and TAS, to name a few.

So, if the first unit was defective, what about the second unit? Is the SA-100 a significantly poorer design than the SA-12? We think not: we have 140 dealers who, to a man (or woman), consider the SA-100 to be better than its predecessor. Customers appear to agree: the SA-100's sales are double that of the SA-12.

I don't think it was even a bad match to the speakers Mr. Greenberg used because both John Bau and Claus Whiteacre of Spica use the SA-100 as one of their references. Perhaps at this point we are dealing with a matter of taste. Which is fine with us, as the majority of customers, dealers, and reviewers love the unit.

Michael Elliott
President, Counterpoint

PS. Mr. Greenberg expresses mild doubt about the sonic benefits of our copper-plated steel chassis technology. We're willing to grant his wish: we'll supply Stereophile with two identical SA-100 amps, one with the copper-steel chassis and one with just a plain steel one. Any takers? You gotta agree to actually get around to listening to the amps within 1991, but, heck, a magazine with writers who can hear the difference between frozen and unfrozen CDs should be able to hear this one with peppers stuffed in their ears.

Sumo Polaris II power amplifier

Editor:
I would like to state for the record what we believe has caused the tremendous inconsistencies in Corey Greenberg's review of the Polaris II.

Upon further audition by the Stereophile review staff, and with a reasonable break-in period, we know from countless auditions by ourselves and others that the production sample of the Polaris II will not only sound as good as the pre-production sample, it will sound better.

It is extremely unfortunate that there was not time in this issue to get to the bottom of the inconsistencies in the review. But I have myself, not Corey or Stereophile, to blame for this. The pre-production sample of the Polaris II was shipped to Stereophile about six months ago. The sequence of events that led to Corey's complete turnaround in his opinion of the Polaris II took just four days.

Good grief, I hope I can look back at this some day and laugh. Here is what happened: On Wednesday afternoon I received a copy of the first set of measurements taken by John on

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the pre-production sample. One channel was so far out of spec that I knew something had broken. So that same day I had a Polaris II Fed-Ex’d from stock to John, John tested the unit on Thursday and Fed-Ex’d it to Corey. Corey plugged in the unit on Friday night, [started playing music on it,] auditioned it Sunday, and turned in his follow-up review to John on Monday.

A new out-of-the-box Polaris takes several days of playing music to sound right. This is the only difference between the pre-production and production Polaris IIs that Corey auditioned. There is no electrical difference. The parts used in production Polaris IIs are the same values and made by the same manufacturers as the parts in the pre-production sample. As Corey pointed out, we did add polystyrene bypass caps on the input coupling caps, but this would certainly have been to the benefit of the production unit, not the pre-production sample.

There is no way Corey could have gotten enough music-playing time on the production sample to allow a reasonable comparison to the pre-production sample or his reference amplifier. I know that Polaris II owners will recognize Corey’s comments as exactly consistent with the sound of a Polaris II in the early stages of break-in.

At this point, until Stereophile can review a Polaris II that has been run in for a decent amount of time, I can only suggest to the readership of Stereophile that they audition the Polaris II for themselves.

Michael Custer
Sumo

Hales System Two loudspeakers

Editor:
Thank you, Stereophile and Bob Harley, for a thorough review of our System Two loudspeaker. Overall, I find Bob’s assessment of the System Two’s musicality very accurate. He raises some important points concerning their bass performance, however, that I feel warrant further discussion.

I am very convicted and passionate about my beliefs and opinions regarding low-frequency reproduction typical of audio systems. I guess I just feel that it is in the bass, more than anywhere else, where too many speakers sound like speakers and not like music. Many people in this industry who know me well know better than to get me started on this subject...

Our loudspeakers have, as Bob puts it, “the ability to create an intimacy with the music... that is difficult to describe.” I think that this quality is what some people term “musicality.” (That special something that allows an audio component to communicate music as well as sound.) Throughout the review he refers to music made believable and involving, to “the illusion of instruments existing in the listening room.” Indeed, Bob found it “difficult to be a casual listener with the System Two: music became so compelling that it was hard to think of anything else.”

As the principal designer at Hales Audio, I guess it follows that Hales products excel in the areas which I feel are most crucial to achieving this wonderful musical illusion. I attribute much of our loudspeakers’ musicality to their transient performance, complete anechoic and actual in-room (this is important) tonal neutrality, and a top-to-bottom transient and tonal coherence. By transient coherency I mean an integrity of transient performance throughout the product’s bandwidth. When joined, these things lead to the illusion of a real musical event and not just good hi-fi. When listening to the System Two, Bob concluded that “there were no artifacts to remind me I was hearing mechanically reproduced music rather than just music. Instead, there was a smoothness, a delicacy to the mids that one rarely hears from dynamic loudspeakers.” I am convinced that this performance is not limited by, but rather is a partial result of, the loudspeaker’s bass characteristics. Please allow me to elaborate.

In the review, Bob asserts that “many other Class B loudspeakers have more satisfying bass reproduction than the System Two.” I think that more appropriate (and fair) wording might have been: “more satisfying quantity of bass than the System Two.” And because the System Two is flat to 50Hz, I must assume he meant more satisfying extension. Remember, Bob found that “the quality of the System Two’s bass was nothing short of stunning.”

There are, in fact, many loudspeakers that have greater bass extension than the System Two; one is cited in the review. Most of them make for impressive hi-fi. Some of these speakers are substantially less expensive than the Two. To achieve this extension, however, nearly all of them sacrifice, in one way or another, accuracy. And whenever accuracy is sacrificed (and it is usually,
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sadly enough, grossly sacrificed), it results in an audible artifact or clue that a speaker is playing, and the illusion is destroyed. Hi-fi. I believe Bob used the word "bland." It becomes, then, a choice between a lot of "bland" or a little "stunning."

I believe that it is the combination of the Two's accurate bass response to 50Hz and its superlative performance elsewhere that allows it to get out of the way and let the music happen. I am convinced that if the System Two had the bass characteristics of the loudspeaker Bob found to be "satisfying in a primal way," he would have found it more difficult to "create an intimacy with the music." In loudspeakers that sacrifice bass quality for quantity, the low frequencies call attention to themselves—"Listen to me, I'm a woofer!" "Listen to me, I'm a port!" "Listen to me, I'm the enclosure!" —the illusion is lost and the music destroyed. Once again, just really neat hi-fi. Sort of throwing the baby out with the bathwater, don't you think?

All of this discourse is not intended to prove that Hales speakers really do have "more bass" than Bob says. Nor is it intended to imply that they are right for everybody. Its purpose is to highlight the concept of low-frequency musicality (and its importance to convincingly reproducing music in the home), and to emphasize my belief that Bob found the System Two so musically satisfying due (in part) to their bass performance.

Bob's words: "Whenever I listened to music through the System Two, I immediately forgot about the playback system and became involved in the music"—and—"It was difficult to be a casual listener with the System Two: music became so compelling that it was hard to think of anything else"—and—"Most importantly, I enjoyed listening to music through the System Two immensely"—would seem to indicate that, 20Hz bass or no, the System Two is an unqualified success at providing the essence of musical pleasure.

What other essence is there?

L. Paul Hales
Hales Audio

Snell Type C/IV loudspeaker

Editor:
Thank you for your review of our Type C/IV loudspeakers. I appreciate your pointing out our general design procedure, and our unique production standards, and especially for saying "The Type C/IVs exemplify tonal neutrality in

Stereophile, April 1991
loudspeakers." I would like to comment on a few specific points.

RH describes my research into diffraction, and how the Type C/IV utilizes a unique baffle configuration that was found to provide the most freedom from diffraction. For those unfamiliar with acoustical diffraction, it is a condition where sound rays propagating along the surface of the baffle are scattered upon encountering an edge. This produces a secondary sound source at the edges which is 180° out of phase with the exiting ray as it reaches the edge, and severely colored in amplitude response, from being influenced by the length of the radiating edge! The effect can be seen as poor off-axis response and increased roughness in on-axis response. It is clearly an undesirable degradation of fidelity.

In describing my diffraction research to RH, I failed to point out an interesting finding. The more diffraction, the more overemphasized image depth becomes, along with exaggerated image specificity. I suspect the increased depth results from the secondary diffraction output reflecting off nearby walls. While some audiophiles may cherish these qualities, they are often found to exclaim: "There was much less specificity and depth in the real thing!" after hearing a live symphony. The C/IVs are intended to be as honest as possible; not just in spectral balance, but also in terms of imaging. That could contribute to the reason they are preferred by many symphonic performers, and used as recording monitors for major symphony orchestras!

RH states that we don't spend money on estoteric parts that would only make a marginal improvement. In fact, we spend the money for parts that will sound as good as the most estoteric ones, when compared under the scrutiny of double-blind listening tests. The point is to avoid wasting the customer's money, but I assure you that it is not expensive, and is used mostly because it is available in several colors, a convenience in production.

Please note that my anechoic measurement from the Canadian National Research Council (fig. 5) is from the front only. Since the port is on the rear, only a portion of its output contributed to fig. 5 (as noted on my supplied curve). Since the chamber is not fully anechoic at very low frequencies, some of the port's output can be seen. Your close-mike measurement in fig. 6 gives a better indication of the C/IV's actual low-frequency performance.

We certainly agree with RH that "The Snell Type C/IV is a 'must audition' product for anyone shopping for loudspeakers near their price range."

Kevin Voecks
Chief Engineer, Snell Acoustics, Inc.

SimplyPhysics

Editor:

We are pleased that Steven A. McCormack ("Manufacturers' Comments," February 1991, p. 237) is gratified that a company our size could successfully develop a full disc-clamping mechanism of the type we have in our Isodrive. The Mod Squad's disc-laying-on-a-disc method of disc damping had indeed pioneered the eventual development of many tweaks currently in vogue, such as CD damping rings, CD mats, Monster stabilizer, etc. Unfortunately, the Mod Squad unit did not enhance the disc clamping at all, a development which our Isodrive has brought to the forefront, and made obtainable to the average audiophile unable to spend $4k on a transport such as the Esoteric.

Mod Squad's patent is indeed only for a disc damper that uses a centering ring in a two-part configuration. Our Isodrive uses no such crude alignment, and is a complete redo of the concept of clamping started in the stock mechanism by the original manufacturer—Phillips.

Hopefully this will clear the air a little more! We also remain gratified that Stereophile is open-minded enough to delve into such matters that seem to evade the general press. Keep up the good work.

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Stereophile, April 1991
Records

Best thing this month: an agency wrote in to cancel advertising because our editorial was inimical to his client. As a high-end magazine, of course, we welcome such news! I was glad because I knew the editorial policies cited by this advertiser weren’t really ours. The advertiser, G&A Records in Manhattan, was protesting both Peter Mitchell’s rejoicing in the fact that he no longer had to listen to LPs, and JGH’s cursory dismissal of NYC used-record stores in Vol.13 No.8 (see “Letters”).

It happens that I’ve spent the last three weeks immersed in LPs. Right now I’m making the final pressing-sample approvals for Intermezzo—we inadvertently had three masters made for each side, which means six whole sides to audition, each with two pressing samples.

Then last weekend I chanced upon an announcement in the paper: “Estate Sale—1000 classical LPs.” Wow! Through great self-control I limited myself to the purchase of only 130 LPs.

And, though most were in great condition, they were pretty expensive: $195 for the lot. Why, I thought to myself, I could have purchased 10 or even 15 CDs for that amount, and availed myself of the latest technology. And each CD with over one hour of playing time!

Still, I think I came out okay. None of the CDs I’ve seen available have Hermann Scherchen doing Bach cantatas, none of them have Wilhelm Backhaus in his first New York concert in 28 years (live from Carnegie Hall back in 1954), and none of them are worth as much as the virgin set of Bach cello suites by János Starker on Mercury, all of which I gleaned from this sale.

And three weeks ago I received a package from Delmark, the company that released Hoodoo Man Blues (see “Records to Die For,” Vol. 14 No.1, p.120). They’d heard of my HMB recommendation and thought I might like some of their other records. But they sent CDs! Fortunately, this is a progressive, forward-looking company: they also sent a complete list of all recordings, of which every one is available on LP. They subsequently sent LPs of each CD, plus some. Hallelujah!

Delmark’s address is 4243 N. Lincoln Ave., Chicago, IL 60618, (312) 528-8834. The records I’ve listened to so far (The Legend of John Estes, Slidewinder with J.B. Hutto, All for Business with Jimmy Dawkins, Nine-String Guitar Blues with Big Joe Williams, and Magic Sam Live) are all great, though Magic Sam Live has excruciating sound. The performance is so good it doesn’t matter. Many of the other records are superbly recorded, including Hoodoo Man.

I’ve told Delmark they should create a special price for Stereophile readers who agree to buy the entire catalog of LPs—there’re only 45 (blues only) in all. No response yet.

So I could not but smile2 when talking to Jerry Gladstein of G&A. Yes, Stereophile has writers who love CD, who embrace it whole-heartedly and listen to (almost) nothing else. But spend a little time in the Stereophile atmosphere and analogophiles come crawling out of the woodwork. Our analog credentials are in order.

By the way, those of you who haven’t yet ordered the limited-edition Intermezzo LP have made a mistake. Yes, a CD will be available in short order (June is predicted), but the LP is better, better, better. There are the undeniable advantages: readable print on the jacket, much larger reproduction of a gorgeous Gene Newmann painting on the cover, a much nicer physical object. This is also our first LP to be produced on two pieces of vinyl, one for each side (since all our albums are gatefold, they fit just fine). But also, whether due to the beneficial addition of groove noise cited by Peter Mitchell in March’s “Industry Update,” or just because of the inherent superiority of analog, the LP grabs on to you and locks you into Robert Silverman’s stunning, majestic, tender performance of Brahms’s Op.5 Sonata for Piano. After multiple listens to 12 sides, you tend to get a little jaded, but even at the end I could feel the air in Santa Barbara, remember the temperature when we made that recording, relive the mood. The CD isn’t quite as good. Don’t miss the LP.

—Larry Archibald

1 I picked up a mint, limited-edition, RCA Reiner Don Quixote from 1960 for $1.50 at the same sale, as well as the original Schwarzkopf/Sell LP of the Richard Strauss Four Last Songs.

2 Identify and complete the limerick which ends: “Professor Twist could not but smile. ‘You mean,’ he said, a crocodile.”

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