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NOVEMBER 1991  VOL. 14 NO. 11

Stereophile, November 1991
We have been getting concerned that the advent of data reduction in digital broadcasting, DCC, and MD will mean that the Compact Disc will eventually become an unattainable target for sound quality rather than the minimum acceptable standard. We bundled Bob Harley off to England in September, therefore, to attend the 10th International AES Conference, which examined both this and the subject of digital audio in general. His full report, which will include a discussion of the subjective effects of data reduction, will appear in the December issue of Stereophile, along with the transcript of a talk on the reviewer's role and responsibilities from the 1991 Stereophile Writers' Conference, and an examination by Martin Colloms on the vexing subject of low frequencies—how much bass is the right amount of bass? Martin will also report on the sound of Audio Research's new solid-state amplifier, the D-240.

A Warning

Stereophile carried advertisements in its May, June, and July issues (pp.216, 310, and 213, respectively) that prompted a "900" telephone service enabling private buyers and sellers of used hi-fi components to get in touch with one another. The idea was that you phoned the 900 number, and a menu-driven computer system then allowed you to listen to messages advertising used equipment as well as leaving your own message about a component that you wanted to sell. We have received complaints that, while you could phone the number and leave a message, that message would not be posted. However, you would still be charged for the call at 99¢ per minute. I apologize to those of our readers who have been inconvenienced; we accepted these advertisements in good faith, but our subsequent attempts to contact the people responsible for placing them have proved fruitless.

—JA
THE DAY
THE MUSIC DIED

"Phonograph, n. An irritating toy that restores life to dead noises."—Ambrose Bierce

It is an essential rule of thumb when judging hi-fi equipment that the better component is one that opens your ears to new music. A sign that you have made a worthwhile improvement in your hi-fi system, therefore, is when you find yourself buying more records and CDs, spending more time seeking out garage sales for discarded LP collections, or browsing the aisles in that increasingly hard-to-find specialist record store. But even as you feed your recorded music Jones, doesn't it sometimes seem that the sound was more vivid, your involvement with the music deeper when you didn't have so many records, when you made do with a basic record player and cheap speakers? Didn't the music speak more directly to your soul when to be able to play records at all, perhaps just in mono, was a major achievement? I remember the first classical concert I ever went to, when I was 15, which included a performance of Dvorák's "New World" symphony. By the time it reached the walking boogie-bass passage in the final movement, I was on an emotional high that I can't remember quite ever reaching again, certainly not from any of the recordings I now own of that work and can play on my multi-thousand dollar system at the drop of a stylus or laser.

Stereophile's Music Editor Richard Lehnert has put forward the idea that being an audiophile is fundamentally un musical (as does Keith Yates in this issue). To become aware that there is such a thing as "Sound Quality" works against you responding to the music on as pure and open terms as when you were more ignorant. Me, I think that the increased difficulty in achieving joy through music is merely a sign of maturity, of the fact that you can never go back to a virginial state of mind.

But while you can never recapture your youth, it doesn’t hurt occasionally to try to turn the clock back a couple of decades. I write these words having just returned from an enjoyable afternoon's open-air music-making courtesy of Crosby, Stills & Nash, who lowered us into a warm bath of musical familiarity. The following weekend, we will be taking in a double-bill with Little Feat supporting the Allman Brothers, a concert that again will probably have more in common with visiting a museum than with moving forward the state of the musical art. In that sense, such events are not that different from attending a typical classical concert. But then I read the letter from Bowen Simmons on p.39 of this month's issue, accusing Stereophile of devoting its rock review section to "artists who are artistically dead, career-dead, and even dead-dead." I looked through a few issue's worth of our record reviews, and Mr. Simmons has a point. We do devote a lot of space to reviews of records by bands and singers who've been around a while; "wrinklies," as my teenage niece refers to them. Some have been making records as long as I’ve been buying them.

Stereophile is not alone in its concentration on rock music's past. The record industry is mining its own tailings, with box-set compilations apparently being where the hot sales action lies. The release of Eric Clapton's Crossroads set two years ago was followed this year by collections devoted to Chess artists Chuck Berry, Muddy Waters, and Willie Dixon, to the Stax/Volt singles, to Led Zeppelin, Bob Dylan, Robert Johnson, Jimi Hendrix, and the Byrds, with more to come from Crosby, Stills & Nash, Ray Charles, King Crimson, Howlin' Wolf, Phil Spector, and even Aerosmith, the Carpenters,

1 In The Devil's Dictionary, Dover, 1958.
3 Following Pink Floyd's cracking "Momentary Lapse of Reason" tour a few years back, my wife refers to such events as "pension tours."
and the Monkees! Graham Nash likens these box-set re-releases to "memory coffins": "You put on a tape and it's like somebody opened a door and all this memory comes flooding out." 4

"Why was the music of the '60s and early '70s so much better than what we are being offered now?" is a question Michael Ross offers in a record review this month, exploring the answer that it was more deeply rooted in the black blues and soul tradition that underlies American musical culture than the popular music of today. This thesis is echoed in David Marsh's excellent book on the American single, The Heart of Rock & Soul. 5 "The sixties are indisputably the most creative period in rock and roll," he writes, explaining why fully half of the 1001 singles discussed in his book are from that period. Radio, of course, was the prime mover in singles sales, but with the 45 dead in the '90s and the current polarization of radio into tight-format "narrow-casting" that downplays the new in favor of the safe, the predictable, the comfortable, 6 it would seem unlikely that there will ever again be the freedom for the unexpected, the unsafe, the uncomfortable to evolve into the new paradigm, as happened throughout the '60s. This is particularly true now that the Billboard Hot 100 is compiled from radio playlists as well as from sales figures. 7 Songs are now played on the radio largely because they are played on the radio. This may make it easier for record company executives to sleep at night, but it has turned a healthily divergent situation into one that is artistically and commercially convergent.

Classical music appears to be in not much better shape. Frank Zappa recently stated that a composer who wishes to be performed can no longer "just sit down and write because you know how to write and love to write and eventually somebody will listen because they love to listen and maybe somebody will play it because they'll want to play it." 8 Instead, he or she has to deal with a strict conformity imposed by the business of classical music, which at present means writing minimalist music: "It's the only way in which a composer can function in contemporary American life at all, that is to do this shallow, empty, repetitive, disposable stuff." Indeed, pianist Earl Wild confided to me during a visit to Santa Fe last summer that he feels live classical music to be a dying form. While classical records still sell in healthy numbers, he doesn't see anyone in his audiences under 40! And faced with an audience which generally seems opposed to music written within living memory—"I say it's 12-tone, and I say the hell with it," wrote J. Gordon Holt last August of Stephen Albert's "Tristopher Tristian"—orchestra managers are retreating into ever more conservative programming, something that is reflected in record company release schedules. As Bert Whyte pointed out in the October 1991 issue of Audio, with few exceptions the classical recording industry is devoting its efforts to massive duplication of the popular repertoire.

As for jazz, I find it alarming that the artists selling the most records are Wynton Marsalis and Harry Connick Jr. Both typify the new conservativism that is afflicting music in the '90s; both are recreating the music their fathers would have been familiar with; both are retreating into the museum.

But all is not gloom. Just when you think that there is nothing more to be said in the jazz piano trio vocabulary, along comes someone like Gonzalo Rubalcaba, whose Discovery album is reviewed by RL in this issue. And while symphony orchestras across America are churning out ever-more-mundane performances of classical orchestral warhorses, there are still diamonds on offer from the more imaginative musical directors. Under Neal Stulberg, the financially starved New Mexico Symphony has nevertheless been offering its subscribers adventurous programming, such as a superb 1990 concert that coupled Charles Ives's Three Places in New England with Samuel Barber's Knoxville: Summer of 1915, throwing in An American in Paris to get the crowds to enter the door. And as you are about to cast the major record companies into the pit for releasing yet another Four Seasons—60 performances currently available—along comes ECM with their superb recordings of the strange yet moving music of Estonian post-

---

4 In Rolling Stone No. 615, 10/17/91.
7 To quote David Marsh in The Heart of Rock & Soul, p. 561: "I once asked a friend who edited a music industry trade paper (not Billboard) why album charts were based on sales only while singles charts factored in airplay. 'Because if we based them only on sales, there wouldn't be anything but black records in the Top Ten,' he said."
8 Interviewed by Florindo Volpacchio in Telra No. 87, Spring '91.

Stereophile, November 1991
Evolution of Sound


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John Atkinson, Stereophile, Vol. 13 No. 11 (Nov '90)

"(The Studio 15) is good enough to meet and beat the best on offer, and in view of its exceptional build quality and standard of finish, it deserves and receives our unequivocal recommendation."

Hi-Fi Review (Jan '91)

*Gold dome tweeter technology and advanced metal-cone woofers act as one to produce stunning realism. *Cabinets are of the finest matched real woods or hand-rubbed black lacquer.
minimalist composer Arvo Pärt.

Perhaps it is healthier to put such left-brain musings to one side, therefore. As Woody Allen sort of said in *Hannah and Her Sisters*, as long as you can go to the movies to see the Marx Brothers life can't be all that bad. Corey Greenberg was visiting Santa Fe just before we all took off to the New York AES Convention in October and, together with Richard Lehnert and his singer friend Ursula Drabik, we spent an evening jamming on those great old songs with which David Marsh filled his book. We fooled around with the Bo Diddley beat. We worked through that soul-satisfying 1-4-5, tonic-subdominant-dominant, departure-discovery, return-and-reaffirmation black blues progression that lies at the heart of the great white magic of rock 'n' roll, from “La Bamba” through “Twist and Shout,” “Louie, Louie,” “Hang on Sloopy,” to the chorus of Crosby, Stills & Nash's “Southern Cross”—and even endows that Dvorák symphony with its Transatlantic feel. To play music live is to know that the currently morbid state of recorded music is merely a sign of transition, much as the condition popular music was in before Elvis blew it apart in the '50s, as jazz was before Miles, Bird, and Coltrane reshaped it in their image. As long as you can open yourself to what the music, any music, has to offer, nothing much can really be wrong with your world. But we miss you, Stevie Ray!

9 For a serious examination of why certain chord progressions seem to evoke universal responses in listeners, see Deryck Cooke's seminal *The Language of Music*, Oxford University Press, 1949
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The Matrix 801 Series 2 has been, since its introduction, the world’s most popular loudspeaker in its price range. The 801’s extensive use worldwide as the reference monitor for classical music recording is well known. The 801 is listed in Class A—“Best attainable sound”—in Stereophile’s “Recommended Components” (Vol. 14 No. 4, April 1991). The 801 is also the only loudspeaker ever to win the prestigious Audio Video Hi Fi Grand Prix three years in a row.

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The NAD Model 5000 Compact Disc Player, pictured above, is a great example of NAD design philosophy: elegantly simple front panel, ease of operation, and terrific performance! In a comparison with several CD players, costing over three times the 5000’s price, Tom Norton of Stereophile (Jan., 1991, Vol. 14, No. 1) writes: "If you're still awaiting the full evolution of digital, and believe that spending big bucks at present on an up-market player is money down the drain, the NAD might just keep you happy halfway to the next millennium."

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Where's the bass?
Editor:
I have been following with great interest Stereophile's recent reviews of inexpensive loudspeakers. I must conclude that after listening to some of your top choices as well as to some other similarly priced models, I agree with reader K. Fonseca who wrote you last January. Stereophile's reviewers are either deaf below 60Hz, don't have room for decent-sized speakers, or never listen to bass-heavy rock.

I was only somewhat impressed with one of your top choices, the Snell K/II. It is a smooth and very accurate speaker, and I think it would definitely make a great satellite for a subwoofer. Alone, it doesn't quite cut it. I kept asking myself, "Where's the bass?" as I auditioned a pair with a bass-rich mix of Milli Vanilli, Beastie Boys, and Madonna's "Dress You Up."

I challenge you to review some of the following speakers that I found to be very smooth and listenable and have a really solid low-end punch: Klipsch KS3, $530; Advent Legacy II, $460 list, $375 locally; Polk Monitor 1, $580; Allison Al, $600, $480 by mail order.

If you review even one of these speakers in the next few years I'll renew my subscription.

B. Stone
St. Louis, MO

Martin Colloms will be examining the question of how much bass is the right amount of bass next month. And Tom Norton may well include at least one of the speakers on Mr. Stone's list in his next affordable speaker survey.

—JA

Truly high-end?
Editor:
Although I highly respect RH's knowledge of things digital, he and I came to opposite conclusions regarding the Audio Alchemy DDE vs Meridian 203 comparison (see August, p.131). In listening tests comparing my CAL Tercet III with the 203, all of my regular listening group agreed that both units reached a similar level of performance. (This group includes my wife, who has unbelievable hearing: she can even pick which interconnects she prefers in blind tests!)

However, when we compared the DDE with the Tercet III, all listeners preferred the Audio Alchemy unit by an overwhelming margin. In no way do I intend to belittle RH's listening skills, but I do hope that listeners will treat this unit as truly high-end, despite its low-end price.

Also, I heartily agree with LL's opinion of Dick Shahinian's exhibit as expressed in his CES report in August. But when I visited the room, there was a slight difference in his setup from the way LL described it. Yes, the modified Philips was in use—as a transport only. An Audio Alchemy DDE was decoding the signal!

Robert Gash
Lees Summit, MO
Beginning with the first Mark Levinson® products, we defined quality in audio, using superior components and craftsmanship to heighten the experience of music in the home. Twenty years later we not only continue this tradition, but enhance it with state-of-the-art engineering and manufacturing, so that today's Mark Levinson audio equipment is a world-wide reference standard. The N° 23.5 Dual Monaural Power Amplifier is one example of this evolution.

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and danced and boogied my way to the fridge. Ahhh, Dos Equis, Mexico's high-end answer to Budweiser. Buuurrp!

Stereophile was more'n I could handle on just two beers, so I set it aside and dove into the latest catalog from Audio Advisor. "Touch sensitive switches right on the front panel let you conveniently select coaxial or optical input," it said. It was just about then that Madonna sang, "I'll settle for the back of your hand, somewhere on my behind.

Whew! All that foot-stompin' and thinking about touch-sensitive switches on the front panel and Madonna's exhortations were making me sweat. And so were the prices in the Audio Advisor catalog. "AQ Dragon Hyperlitz pure silver speaker cable, 17', $5195." Holy megahertzes, Audio Man! Five thousand one hundred and ninety-five dollars... for speaker wire? That's what it said!

I tried to drown my astonishment with another Dos Equis. "Five grand for (buuuurrppp) speaker wire?" I bellowed above the thundering subwoofer. "Are those guys full of it, or what?"

Cheddar cowered under the dinette set.

I briefly wondered what AQ Dragon Hyperlitz would do for my system. I mean, if it improved the sound enough to make me tap my foot any harder, I'd probably get a stress fracture or break the floor or something.

With three beers and a half-dozen Madonna fantasies under my belt, I was ready for Stereophile. "Just What is High End?" Robert Harley queried.

"It is when you feel a physical rush during a musical climax... It is when the physical world disappears, leaving only your consciousness and the music," he answered.

"Bullshit!" I roared. "What would give you a bigger musical climax, 17' of speaker wire or $5195 worth of new CDs? Hell, that's enough money to buy 346 CDs and have enough left over for a sixer of Dos Equis. Besides, I'd rather have a physical climax that would make my musical world disappear... wouldn't you?"

Cheddar, tail between her legs, slunk upstairs, presumably seeking a safe haven from the raving drunk in the living room.

A five-thou price tag for speaker wire, Robert Harley's dissertation in July, and half a sixpack really got me to thinking about this high-end audio stuff and about the ratio between what it costs compared to the enjoyment it provides, and if there is a way to quantify the relationship between enjoyment and cost. In other words, what's more musicality worth in terms of enjoyment? More important, is there a way to rate the musicality of a sound system in the kind of terms beer-drinkin' music freaks can relate to?

This would require some serious contemplation and some serious beer-drinkin'/musical-climax kind of music. I put Jimmy Buffett's A White Sport Coat and a Pink Crustacean (MCA MCAD-31090) in the Yamaha and programmed cut 6, "Why Don't We Get Drunk (and Screw)") for infinite repeat.

Lemme see now. First we need to consider the enjoyment or musicality factor and translate that into some kind of standard unit or increment of enjoyment. Well, a CD plays for about an hour. I stomp my foot at a rate of approximately once a second, or 3600 times per CD! Therefore, a CD creates 3600 foot-stomps of enjoyment (FSEs) each time it is played. Hey, now we're getting somewhere. So let's say, arbitrarily of course, that 3600 FSes is equal to one unit of musicality, or UM. Now to put a value on a UM! Umm, err... a CD costs about $15, so let's say one UM has a market value of $15. Now we're really getting somewhere!

OK, next we'll combine the concept of one UM and its financial value of $15 into one easily handled and understood unit of measurement. And just to tick off the analogophiles, we'll call it the Compact Disc Unit, or CDU. Divide the price of the component by 15 and you can have an approximation of how much enjoyment or musicality a component must produce to justify the investment. Now to apply the theory...

We'll need a no-holds-barred turntable and all the other stuff required for an analog musical climax that'll "make your physical world disappear." In this case it'll cost you about $13,235 (plus tax and shipping) to conduct the experiment and get your musical jollies. That much will buy you a Basis Debut Gold Standard turntable ($6900), an Airtangent tonearm ($4395), AudioQuest phono cartridge ($1295), a Tranquility Base to set them on ($245), and an LP vacuum cleaner ($400). Did I leave anything out? What? No, Mr. Harley, for only thirteen thou you don't get a dustcover. Be serious—this

1 The actual foot-stomping rate varies and is equal to the tempo of the music divided by the number of Dos Equis consumed. Foot Stompin' Rate (FSR) = Tempo of Music (TM) divided by Dos Equis Units Consumed (DEUs).

Stereophile, November 1991
The Future of Reference Amplification Defined Today by the Krell Audio Standard

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is big-end audio we’re talking about.

$13,235 divided by 15 = 882.33 CDUs, and 882.33 CDUs = 3,176,388 FSes. OK, to complete the experiment, put your favorite LP on the ol’ Basis Standard, crank up the volume, and see if you can stomp your foot over three million one hundred thousand times before you’ve played both sides. If you fail, you must answer this question: “What produces more foot-stomp units of enjoyment, a modest CD player and about 850 CDs or a $13,235 record player and one warpy-fuzzy-scratchy old LP?”

Hey, analog freaks, is that scary to think about, or what? And sure, you can shoot holes in this—that’s the whole idea! If it were an air-tight fact, how the hell could we enjoy arguing about it? You crank up the volume and I’ll pour the beer.

John Arrington
Arcata, CA

Don’t settle for Class D

Editor:

Due to an unfortunate bout with pneumonia, I spent 10 days at home listening to records, getting more and more uneasy about my poor old Thorens (once a Stereophile Class C product), and reading the July Stereophile.

Having heard a Sondek in 1984, I’ve listed after an improved turntable for seven years. I had the Thorens modified by Chadwick, which helped some. I really didn’t want to spend any more money, but Corey Greenberg’s review of the Linn Axis and Well-Tempered Record Player aroused my interest.

Thinking that the business downtown might make dealers give some on price, and thinking that my son might be very grateful for the gift of what is, in fact, a good ‘table, I thought maybe—maybe—either of the $1000 over-achievers might satisfy my desire and be within reach, especially since I knew where I could get a used and guaranteed Axis. So I went off to neighborhood dealers to hear what I could hear.

The Sonographe blew my Thorens away on rock, but was just a tad better on orchestral music, which is what I listen to almost all the time. I did think, however, that with the Sonographe, I’d sure listen to more rock! All in all, though, it didn’t really satisfy.

The Axis with the Basil arm wasn’t much better than the Thorens on rock, but was better than the Thorens and the Sonographe on classical. With the Akito, I initially felt unimpressed, except that I felt myself smiling, tapping my feet, and wanting to really listen to the records I had brought along.

But hold! The dealer had a used LP-12 on hand. Before starting to negotiate a deal for the Axis, I certainly wanted to hear the Sondek, particularly since the Axis’s list price was close to the LP-12’s used price. It would be foolish, I thought, to get the Axis if the Sondek was really much better. So the dealer hooked up the Sondek/Akito.

Corey, and readers who haven’t heard a Class C ‘table: Don’t settle for Class D without listening to Class C! To my ears, the LP-12 is simply an order of magnitude (at least) better than the Axis. And even from a dealer, a used LP-12 with current mods (excluding the Lingo, alas) will cost at most only a few dollars more than an Axis.

The difference between Class D and Class C, at least in turntables, is not subtle.

Philip Barry
Evanston, IL

Happy Listening!

Editor:

The August issue of Stereophile was noteworthy on two accounts. Lipnick managed to get through an entire review without saying “I am a musician . . .” or some variation on the theme. He did refer to his National Symphony colleagues, however, so he’s not completely cured. And Corey Greenberg proved that he’s an impostor.

How can we take seriously a guy who, in his CES report, goes to great lengths to demonstrate his heterosexuality, and then, in the review section, talks about how much he likes a pair of amplifiers that go both ways?

But what really gave him away was the description of his setup. Doesn’t everybody know that Horton Hears a Who is a left-channel amp-propping book? It’s a wonder he didn’t totally screw up the soundstage and cause an Identity Crisis in the poor little VTL. After all, it’s confused enough already, what with going both ways and all!

So what about a “Building a Library” on the Saint-Saëns Piano Concerto No.2? And while I’m at it, leave the triple-digit speakers alone for a while. Like for a year. Kindly devote more reviewing time to those in the mid-to-upper four-digit range.

There may also be salubrious effects in using

Stereophile, November 1991
The Mark Levinson N°28 Preamplifier is at once a continuation of the Mark Levinson traditions of musicality and enduring quality, and an entirely new implementation of technology that will set the pace for innovation in high-performance audio in the 1990's.

Mark Levinson products have offered the advantages of balanced interconnection for many years. The N°28 introduces a new execution of balanced circuitry called a DIDO (Differential In: Differential Out) that provides fully balanced operation throughout (not converting to single-ended for internal processing) while still rejecting common-mode noise from source inputs or arising within the unit itself. All versions of the N°28 have 2 balanced (XLR) inputs as well as balanced output connections. Even single-ended signals benefit from the DIDO, since it rejects common-mode ground noise as it converts single-ended signals to differential at the input.

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More important, you can hear for yourself how this preamplifier tips the balance in your favor.
a Faraday cage around digital components to help quell that pesky RFI.

Keep up the great work, though, and Happy Listening!

Stephen C. Levy
Los Angeles, CA

Music, measurements, & emotions

Editor:
The points Corey Greenberg made regarding [the “improvements” made to] Marvin Gaye’s music (Vol.14 No.8) were completely valid. I am a believer in the creative process of music in that what happens in the studio or concert hall should be what comes out on any given recording, regardless of technical and/or musical “imperfections.” I suppose such “synthnerds” would also remove Steven Tyler’s vocal improvisations near the beginnings and endings of his songs, as well as the “We’ve done four already but now we’re steady” line in “The Ocean” on Led Zeppelin’s Houses of the Holy. I have several master recordings of music that I have made at various times during my 16 years, none of which are even close to what is considered “the standard” for musical reproduction today. But all of these recordings are of excellent works done by local musicians. And that can never, ever be created (or re-created) on a digital answering machine.

So what if there is a bit much hiss? Who cares if the guitarist’s fingers did squeak a little as his hand slid across the frets? My main point is that music should be (and was originally) intended to convey an artist’s emotions to someone else in song. To digitally “clean up” or edit someone’s emotions is something that should be done only by the artist himself (if at all).

Having said that, I would like to thank JGH, JA, LA, CG, TJN, et al, for rescuing me from the likes of Stereo Review. There I would be, sitting in front of an article or review and thinking, “this must be the best component of its kind because it measures the best.” Then, one day in the mail, an unobtrusive little card proclaiming a trial subscription and a free Test CD arrived. To tell the truth, some other “audiophile” friends of mine had talked down on Stereophile and subjective reviewing. I, however, had to have the free Test CD, so reluctantly I sent my check to Stereophile.

I have been completely and thoroughly satisfied with this magazine from day one. And I’m probably also close to (if not the) youngest sub-

scriber to Stereophile. But I love it. JA: keep up the good work. Don’t change.

Samuel J. Bennett
no address supplied

You’re not quite our youngest subscriber, Mr. Bennett; we’ve received letters from 14- and 15-year-old audiophiles as well. —RL

RL, Keith Jarrett, & the Ghost of Buddy Bolden

Editor:
Interior, Richard Lehnert’s house, Night. Stereophile’s ace jazz reviewer types away at the keyboard. Heard in the background: Keith Jarrett’s The Sun Bear Concerts.

Richard Lehnert (voice over): “...sweaty gospel that grunts and groans with the birth-pangs of clean-washed souls dropping the karma of centuries...”

Lehnert stops, read the amber screen.

RL: Hee, hee. I’d better let the 286 cool a sec.

Suddenly, an apparition boldly Edison Cylinders appears.

RL: Are you the “spirit of Gershwin eternally singing his black and white blues”?

The puzzled spirit looks over his shoulder. Rolls bis eyes.

Buddy Bolden: No, I’m an “eagle furiously mating in flight,” you putzola. I’m Buddy Bolden. You know, the legendary cornet player.

Lehnert can hardly contain himself.

RL: Are those the long-rumored recordings you made? Can I review them?

BB: Are you kiddin’? The man who wrote “modal tribal chanting is visited by a simpatico, gone-native anthropologist (who used to be a piano player named Bill Evans).”?

RL: Leonard Feather’s got nothin’ on me.

BB: You got that right.

Bolden cocks an ear toward a speaker. His eyes widen.

BB: And to think they put me in an Institution in 1909. What ’bout this? Did you write “Jarrett rises to the stars, their soft, hard, cold, tiny voices high and pure, driving the galaxy in slow spiral...”?

RL: Great, huh?

BB: Must you sound like a evangelist in a Sinclair Lewis novel?

RL: What about “a silent shower of shooting stars piercing the barely-there curtains of the aurora borealis...”?

BB: I don’t think Whitney Balliett wishes he...
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Hi-Fi Review (Nov. 90)

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...Is Finally Fulfilled.
wrote that. I'm giving these cylinders to Martin Williams, Francis Davis, and Gary Giddins. Does the word "pontificate" ring a bell, Dickie? Bolden begins to fade.

RL: Wait.

BB: Don't expect me to "emerge from the echoes of those last dying, noble Valhallas of sound..." I'll be listening to Herbie Nichols. And reading Richard Cook.

Fade out.

Ed Richey
Los Angeles, CA

Gould's last recording?

Editor:
Richard Lehnert's review of Wagner: Glenn Gould Conducts and Plays (StereoPhile, September '91) was thorough and judicious: I appreciate such a fine analysis. I do, however, have one question. In his review he states that Gould's 1982 orchestral version of the Siegfried Idyll is his last recording. However, the liner notes to Gould's CD of Richard Strauss's Sonata, Op. 5, and Five Piano Pieces, Op. 3 (CBS Masterworks MK 38659) state that, "This is Glenn Gould's final recording, completed on September 3, 1982 at RCA Studio 'A' in New York." So which was his last recording? The Siegfried Idyll or these piano pieces?

Vanessa Vyvyanne du Pré
St. Louis, MO

Susan Schaifer of Sony Classical tells me that the Strauss works were recorded, as Ms. du Pré notes, in September of 1982, and the orchestral Siegfried Idyll in July of that year, making the Strauss disc Glenn Gould's final recording.

—RL

Sousa & Lehnert

Editor:
In his June review of Sousa CDs, Richard Lehnert thinks that because he played in a highschool band, he has an insider's perspective on how Sousa's marches should be played. He's wrong. "The guts of the parade ground? "Restricting the recording of Sousa's music to bands that lose a lot of shoe leather to the asphalt"? Oh really.

The Goldman Band of New York and the Eastman Wind Ensemble under Frederick Fennell, whose performances Mr. Lehnert admires so highly, were concert organizations, as was Sousa's Band itself. Mr. Lehnert dismisses Sousa's own performances, recorded between 1917 and 1923, as proof that "the March King was hardly the most thrilling exponent of his own music," which he claims is "all too common for composers."

Here Mr. Lehnert displays his profound ignorance and taste for cheap clichés. Sousa's Band was generally regarded as the finest performing organization of its kind in the world when the concert band was the most popular performing unit in the Euro-American community. Theodore Roosevelt and King Edward VII celebrated Sousa's Band, as conducted by Sousa, as absolute tops. So did millions of simpler folk whose idea of an after-dinner thrill was going down to the depot and watching the Limited roar through town at 60mph, picking up the mail without slowing down. Things were simpler and less hectic then, and media saturation had barely begun. The audience hadn't become glitzed out.

Mr. Lehnert sneers at Keith Brion's straight-up 2/4, d = 120 tempo, just like Sousa. He admires the Goldman Band's faster tempi. During a stretch at the Allen Military Academy I learned that the US Army marches at d = 120, and I suspect that the US Marine Corps did in the days when Sousa conducted its band in Washington. As for dynamics, the Sousa Band's recordings Mr. Lehnert scorns were acoustic recordings. Perhaps Sousa pulled his punches in deference to the limitations of recording technology at the time. Also, perhaps the more sedate late-Victorian and Edwardian audience, not yet saturated with media thrills, preferred to be stroked rather than slugged and goosed by the music.

Mr. Lehnert claims the guts of the parade ground but probably really means the macho of the gridiron. His preferred tempi and whatnot suggest a fondness for football half-time orgies, not the measured and sedate style of the parade. Before being shipped off to military school I played not only in the Hoover High Tornadoes but the Glendale Police Boys' Band under Arthur Babich, an elderly gentleman who had toured with Sousa's Band as a youth. More than once he remonstrated with the brasses to try to sound mellifluous and not so blatty hard.

Richard Franko Goldman noted that Sousa wrote his marches for dancing as well as marching; The Washington Post was America's favorite two-step shortly after its publication in 1889. Perhaps Sousa's recordings were intended for

Stereophile, November 1991
The Krell CD-DSP is the first integrated compact disc player to combine an updateable software-based processor with a high-end CD transport. The processor and transport are coupled to extremely flexible input and output sections, creating a product of unique function and value. Audiophiles can now gain the advanced performance capabilities of separate components in a single unit.

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dancing by people who rolled up the rug and wound up their Victor Talking Machines; I can easily imagine dancing to Brion's Sousa but not to the hyperkinetic Goldman Band concert performances.

There is also the delicate question of non-American bands' ability to do justice to Sousa. This was very nicely handled by E. T. Canby in the October 1989 *Audio*. Brion's Bainbridge recording was made in London in 1983; he accomplished something of a miracle by getting the local talent to sound American. By contrast the Kunzel *Victory at Sea*, with the Cincinnati Pops, sounds like the Berlin Philharmonic sight-reading the score.

Anyone wishing to get into Sousa should read Meredith Willson's *And There I Stood with my Piccolo*, then go out and find *Meredith Willson's Marching Band*, Capitol T-1100. Willson was a teen piccolo virtuoso with Sousa's Band for three years; listen carefully to the lyrics of "76 Trombones" and especially to the patter leading up to it in *The Music Man* to get the picture. Then get Brion's *The Sousa Legacy*, Vol. 1, Bainbridge BT 6250, in all-analog vinyl, or BCD 6250 on CD, and find how good the vintage Sousa style sounds in a decent recording. Good luck finding a dance instructor versed in the two-step.

Thirty years ago Frederick Fennell recorded a bunch of Civil War music with vintage instruments, most of which is now available on CD as Mercury 432 591-2. Perhaps he could record a large bunch of Sousa with vintage instruments now. Meanwhile, let's not denigrate what's very good and readily available.

\[\text{Reginald Stocking II} \]
San Francisco, CA

\[\text{Mr. Stocking, if I think a performance is uninteresting, boring, and unadventurous, I certainly will denigrate it. That's half of my job. Brion's and Sousa's conducting styles simply don't move me. No amount of historical correctness or authenticity of turn-of-the-century performance practice can make up for music that sounds dead in the water. If the musical opinions of Theodore Roosevelt and King Edward VII carried any weight with me (they don't; since when are politicians authorities on anything but duplicity?), I'd sooner take my Grandmother's word for it—and I don't even take hers. She saw Sousa and his band in Atlantic City, New Jersey one summer just before World War I, and loved it. I don't.} \]

\[\text{Authentic performance practice is always fascinating historically, but its musical worth is only as great as the inherent musicality of the individual practitioner. At the risk of tooting my own Sousaphone (which I played, in addition to flute and bassoon), my six years' adolescent experience in orchestras and concert and marching bands actually does constitute some small degree of "insider's perspective." I know what it's like to play Sousa dully and excitingly, even passionately, because I played under both types of bandleaders (and no, I do not equate passion with volume). I can only react to the evidence. Maybe Sousa did pull his dynamic punches in bowing to the limited capabilities of the primitive recording equipment of his day. Maybe he didn't. Who knows? To suggest that a relatively undynamic performance on record actually implies the opposite in live performance practice is quite breathtaking sophistry—a lack of evidence presented as evidence. You can't have it both ways, Mr. Stocking. I calls 'em as I hears 'em: On the evidence presented to my ears, Sousa was a great composer and an indifferent conductor, while Keith Brion is downright dull. A simple matter of taste—mine. —RL} \]

\[\text{A shame?} \]
Editor:
Thanks for [the Stereophile *Intermezzo* CD]. . . . I wonder why you went back to a 40-year-old technology for this? The old analog tape recorder is a charming antique, but it presents two inescapable limitations: the dynamic range is necessarily limited since tape just can't handle the range potential of a digital recording . . . and the tape hiss is unavoidable. Indeed, it's there, masking every quiet passage and swallowing the fainter echoes from the piano.

And what a shame for Silverman's piano artistry to be seriously throttled by this ancient technology. I hope you also made a good DAT recording at the same time so his performance won't have to be repeated.

We're recording piano pieces in [CD *Review*]'s new state-of-the-art studios, so I know how fanatical the attention has to be to details. Even the best of pianists has to work at it over and over to get every keystroke right . . . and then the interpretation the best possible.

Digital sound has pushed the bottleneck in sound back to the microphones. I think we'll
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**Dr. Wayne Green**

*CD Review*, Hancock, NH

A joke?
Editor: What kind of joke are you trying to make with the *Intermezzo* CD? Where are the lead transients of the felt hitting the piano strings? I knew something was wrong the minute I heard it. I found it in the CD booklet—AAD indeed. Since when does a magnetic tape head reproduce transients? This AAD stuff is rot.

I can point you in the right direction: Mozart piano sonatas with Malcolm Bilson. It's full of transients from the fortepiano, and it's DDD. Five times better than your AAD. There's no comparison! When I receive the LP it probably *will* sound better than the CD. The CD never had a chance. By the way, stay clear of the Bilson Mozart piano *concertos*. They have three levels of volume, with the fortepiano the weakest. If you adjust the volume for the loud orchestra, you'll never hear the fortepiano. I have yet to hear any good Archiv recordings.

Well, one mistake doesn't ruin your entire organization. But *please*—put that 128x-over-sampling black box you have right by the microphones. That's the only way to really compare disc and record.

**Gil Lytton**

Los Angeles, CA

As explained in the booklet, the residual biss on *Intermezzo* is due to the microphones, not to the analog tape. At a realistic playback level, this should not prove to be an audible problem. And my experience has been that the "DDD" label does not mean that a CD will sound "five times better" than the equivalent "AAD." In fact, as examined by Robert Harley in *The Review* (p. 81), many top recording engineers stick with analog recorders to capture their original tracks before mastering for CD release, particularly when it comes to the sounds of drums. In a sense, the use of an analog recorder can be said to "precondition" the electrical waveforms corresponding to the sounds of transient-rich instruments that would otherwise lead to audible problems when ultimately converted to digital. —JA

Service, please
Editor: In the past 17 years I have probably spent on the order of $100,000 on audio from probably a dozen retailers in several cities. *Only once,* in all those purchases, did I receive in-home support (or the offer of it) in setting up the equipment (a pair of Apogee Divas). I suppose if they could have put them in the trunk of my car they might have left me to my own devices on those as well.

Certainly the audio retailer serves a valuable service, but home setup sure doesn’t appear to be one of them—at least not for this guy. If the retailer expects to keep the high-end business he had best offer value, since he does not offer price. If I spend a few thousand of my hard-earned dollars on an audio component, then I would at least like the retailer to *offer* to help with setup even though most of the time I would not need the help.

**Chuck Gerlach**

Atlanta, GA

Price, not service
Editor: The article by Andrew Singer in the August 1991 issue was naïve. As with any consumer product, the value added to a product by a good dealer is important. [However,] . . . it is not plausible to expect the consumer to pay for a 40% markup just because the dealer’s sales staff is talented. I have not ever paid suggested price for a high-end item. The interesting thing is, there is no shortage of dealers who *will* discount. Just look around for a better price, because you can find one!

**Rob Cuttrick**

Birmingham, AL

Finding the best solution
Editor: Before I moved to Chattanooga, I had lived in New York, the Midwest, and various other parts of the country. My travels over the years have given me the chance to cover most of the rest of this country as well (very frequently the Dallas area, where my in-laws reside). When I arrive in a new place, I always look in "Where to buy *Stereophile*" and the phone book to find local dealers. I make time to go by and listen to new things, chat with sales people, and always buy a few records.

All too often, I have found one of two conditions exist. The sales people are either arrogant snobs who treat customers with contempt, or they are genuinely friendly but lack the knowledge imperative in helping a customer achieve the most from his or her system.
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I've found an exception. His name is Bruce Hinton, a principal at Chattanooga Valley Audio. Bruce has been working with and around audio electronics for many years. His broad knowledge of the industry allows him to help a potential customer find the best solution for his or her particular need. His honesty, transparent personality, and love for music mark a genuineness I've not found in a dealer before. It's not unusual for Bruce to go above and beyond the call of duty to help a customer, as he did for me when finding the right amp for my speakers.

If there is not a dealer in your particular area, I'd encourage you to give Bruce a call at Chattanooga Valley Audio, at (404) 861-0282.

Donald P. Theune
Chattanooga, TN

Ignorance & hi-fi snobs
Editor:
I am very concerned with the level of ignorance in the general public about high-fidelity sound reproduction. This lack of knowledge is partially the fault of our very own high-end community. It is our responsibility to inform and educate the ignorant no matter how cheap the equipment we may have to recommend. After all, there is plenty to choose from, with decent fidelity, at a low price.

There are too many audio stores pushing mid- to high-priced equipment that no novice could ever justify owning for the sake of greater detail, transparency, or palpatibility. It is our duty as audiophiles to inform the novice about the equipment he or she can buy for the same money as a rack system with flashing lights and an 80-band equalizer. A good system can be had for under $1000, like the Rotel RA840 integrated amplifier coupled with a Harman/Kardon HD7300 CD player and KEF C-15 speakers. Total retail price: $950.

As the owner of an Apogee/Threshold combination, I can tell you that my listening is a truly emotional experience, with a sense of realism bordering on hallucination. But to recommend such components to a novice shopping for a rack system would be ridiculous. The unfortunate truth is that many audio retailers neglect the budget-minded consumer who knows nothing about high fidelity. Most don't bother to take the time to research what is the best of the super-low-priced equipment, yet they seem to have plenty of time for the mid- and high-priced stuff. Stereophile's listing of Class D "Recommended Components" has obviously helped promote this price range of equipment somewhat. But most of the readers of Stereophile are way past that level of equipment anyway.

It is the responsibility of Stereophile's readers to do our best to inform the first-time stereo buyer about those companies that make great low-priced equipment, and where to buy it. It is the responsibility of hi-fi retailers to invest their time in novice customers to give these people, with their usual need to spend as little as possible, solid advice about what's best in the entry level of stereo sound. And last, but not least, it is up to Stereophile to review more entry-level components and, unlike Stereo Review, give its usual unbiased, honest opinions about how they really sound. This should include a new Class D "Recommended Components" listing for receivers and CD changers.

Many of today's entry-level buyers will be the Stereophile subscribers of tomorrow. They must be embraced by even the most elite of high-end stores. Those retailers who cannot accommodate them are not hi-fi stores; they are hi-fi snobs, and it is they who contribute as much as anyone to the sale of rack systems by scaring off the entry-level customer.

Arthur Lawson
Chattanooga, TN

Audiophiles as victims
Editor:
The underlying willingness not to challenge or explore the reasons why music is being reproduced in a particular fashion voided in JA's "As We See It," Vol.14 No.8, was downright scary. Stereophile has the responsibility of assuming the role of the "educated" audiophile who relays his findings both sensually and analytically, each equally well developed and in harmony. "Harmony" here demands a concrete relationship between what we hear and why we hear it. Granted, it's considerably more difficult, if not arguably impossible, to predict how a system will perform by first dissecting the technology used. But to listen to a system and then not to be able to localize the source of its successes or failures is simply indolent and/or incompetent.

There are scientifically predictable explanations as to why music is reproduced as such on a given system. For the average audiophile the
"Kinergetic's KCD-20... the first CD player to crack the Class 1 Sound barrier"
Peter Montcrieff
"International Audio Review", Hotline #43-45.

"...Kinergetics KCD-40 has become an integral part of my playback system. I recommend it very highly, especially to those who have had monumental difficulty coming to any terms with the CD format."
Neil Levenson
Fanfare, Jan/Feb 1990.

"...Kinergetics offers its purchaser more than a glimpse of what the best CD sound is all about."
John Atkinson
Stereophile Vol. 13, No. 1.

"A generation later, transistor designs by such companies as Levinson, Kreil, and Threshold have gained my respect as being eminently musical despite their silicon hearts. To this list I can now add Kinergetics Research."
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-Logon CLSes... 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.

We will continue to create improvements in areas of psychoacoustic that others have yet to discover.
The absence of understanding why music sounds as it does has its place, but for Stereophile reviewers there must be an unabridged understanding of both how the music sounds and why it sounds as it does. Audiophiles will always be victims in that they depend upon a science for the faithful reproduction of their music. Their weakness need not be magnified by the growing mysticism and utter bewilderment surrounding high-end audio. Stereophile must, in this reader's opinion, confront head-on this steadily worsening situation.

Jason Miller
New York City, NY

Subjective witchcraft or objective science?
Editor:
JA's "As We See It" in August says good things, but the semantics need work; and there may be a more succinct way to identify the crux of the problem.

First the semantics: He says, "The basis of scientific method is to look at how things are, then to design experiments to try to find the reasons why they are that way. . . when experiments give results which contraindicate reality, the experiment is rejected, not the reality:"_Au contraire_, the experiment is _identical _to reality. We design _hypotheses_ to try to explain reality, and when they contraindicate reality (the results of an experiment) we reject the hypotheses. An experiment may be poorly designed or misinterpreted, but that is another matter (and one very germane to the subject of the article).

Here's the crux: What perpetuates arguments between the likes of JA and Howard Fenstler is that they haven't clearly defined what hypotheses they wish to test, or what observables they wish to predict from other data. Clearer definition may reveal that there is little disagreement, or may elucidate exactly where the disagreement lies. For example, one theory says that the statistical results of objective double-blind listening tests are well correlated with objective measurements of THD, etc., and frequency response. That may be true (this theory has been tested with some success), and since the second measurements are easier to do, it's great—provided your goal is to predict the outcome of double-blind listening tests. Another hypothesis says that for many people double-blind listening tests (and THD) are poorly correlated with subjective long-term pleasure and goosebumps.

These two hypotheses are not contradictory in the least. The second, I think, has been well tested by countless people. But _objective_ observables relating to the second hypothesis (e.g., the statistical vote of many long-term listeners) are much harder to measure than short-term double-blind experiments. So most of the tests are individual and subjective, as are reviews based on this hypothesis.

That's not so unfortunate, because evidence indicates that there are big differences in listener sensitivities and preferences anyway. _Stereophile_ adds continually to our understanding of how objectively measurable variables correlate with subjective impressions, but we are not yet to the point where objective data can be used alone to determine what will sound best to a given individual. Subjective reviews, on the other hand, are extremely useful for deciding what to audition and what to listen for. You might even risk buying something without much listening, if you know and agree with the tastes of a reviewer who reports impressions after extensive listening. Nobody should complain when two pairs of "golden ears" disagree—that doesn't contradict Hypothesis 2, and it can make the reviews all the more informative.

What is unfortunate is that subjective information has such a bad reputation in some circles. There are two reasons, one justified and the other not. Promotions based on subjective claims or "religious views" are sometimes bogus, and Mr. Fenstler is right to be concerned about this. (Once I was trying to hear differences between two tape decks in an impossibly noisy showroom, and the salesman assured me that listening was not necessary—the more expensive one was tested by a magazine and it sounded better than all the others. "What do you mean?" I asked. Answer: The noise and distortion measured lower. Now that is superstition.) The illegitimate reason is the habit in our society of favoring qualities that are easy to measure over those that are not, independent of the real value of the qualities.

Stereophile, November 1991
ENERGY loudspeakers have become the personal favorites of discriminating audiophiles the world over. With more than $1 million in development, our Dual Hyperdome™ tweeter is one key reason why ENERGY recreates the original performance with uncompromised accuracy. Combined with the smooth, sculpted surfaces of our revolutionary SPHEREX™ baffle, diffraction is eliminated for superior soundstaging and positional imaging. And ENERGY's unique Interloc™ bracing system is built into every elegant, superbly crafted cabinet for incomparable rigidity and structural integrity. Simply put, ENERGY 22-Series and e-Series loudspeakers define a new standard of styling excellence and sonic precision.

Take a test drive today. Your ears will thank you.
It's a common fallacy to equate "unobjective" or "nonscientific" with "bad" or "false." Example: The phenomenon of lucid dreaming has been known for aeons, but it was hard to test objectively. Only recently did Stephen LaBerge "prove" objectively and scientifically that it even "exists," by inventing methods for the dreamer to communicate with the waking world via eye motions (S. LaBerge, Lucid Dreaming, Ballantine, 1981). Such methods help inquiry and enormously improve the quality of understanding and public agreement about the phenomenon, but to someone who knows the experience a scientific proof makes no difference in the truth of it. It is rather unscientific to imply that something is false just because it doesn't lend itself well to investigation by the scientific method, or to say that a subjective phenomenon does not exist for other people just because I haven't experienced it.

The second hypothesis makes the first somewhat uninteresting, doesn't it? Like JA, I'm personally interested in long-term pleasure and goosebumps, and for me that is not well correlated with quick impressions or THD. So because it is radically more pertinent to my goals, I read the subjective witchcraft in Stereophile instead of the objective science in Stereo Review.

Peter S. Lovely
Portland, OR

A little uncertainty is good . . .

Editor:
Over the past four or five years I have taken much pleasure from the great debate in Stereophile about the testing of audio equipment. It has been an almost textbook-perfect application of problems continually encountered in the philosophy of science. I had promised myself to keep out of it, but JA's "As We See It" in the August 1991 issue tipped me over the edge. Atkinson's arguments seem to me to be almost on the nose, but I think some of the underlying problems have been either assumed, or swept under the rug.

First of all, the staff of Stereophile is quite right about rejecting the primitive positivism which seems to underlie the "scientific" side of this debate. Ferster, et al., appear willing to accept simplistic and abstract measurements as substitutes for the phenomena which the measurements are supposed to explain; ie, the sound of audio equipment. The American philosopher Alfred North Whitehead referred to such poppycock as the "fallacy of misplaced concreteness." That is, while scientific method does use simplistic (sometimes elegantly) abstract measurements to help explain concrete phenomena, those measurements are in no way a complete representation of the phenomena themselves. Psychologists in the early part of this century made a fatal mistake by accepting IQ tests as sufficient definitions of intelligence. The result is that no one still has a good idea of what constitutes intelligence, and IQ tests predict little about behavior. (Well, except that a person with an IQ of 30 will perform about as well as a speaker with a frequency response of 80–500Hz ± 3dB. But no one with a modicum of experience will attempt to predict much about a person with an IQ of 110 or a speaker with an anechoic frequency response of 20Hz–20kHz ± 3dB.)

The audio reviewer has the task of communicating, first of all, what he or she perceived (heard) from a piece of audio equipment in a complex environment. Secondly, some scientific measurements can help to explain the why or how of some peculiarities or consistencies. These are of interest to designers and scientifically literate audiophiles as well, for some [of these measurements] eventually lead to useful understandings. Despite the fact that a single measure of intermodulation distortion by itself doesn't explain very much about the actual sound of a modern amplifier, designers certainly know better than to ignore it completely. The same is true of other measures, even the wonderful cumulative spectral-decay plots. They help to understand, but they do not constitute the sound of a component itself, the latter being much more complex than any measure of it. Even JGH's famous goosebump test could be the result of a Burmese cat's idea of good fun.

The problem for a reviewer, it seems to me, is similar to problems of science as viewed by the phenomenologist or existentialist. He wants to predict, understand, and communicate about how the "man in everyday life" (the audiophile) will hear a piece of equipment in the complex environment of his home. 

Stereophile, November 1991

3 It seems to me that the principal reason double-blind tests of audio gear don't show much is related to this point. Experimental methods work best when the dependent variable is simple or unidimensional. But once observers or judges begin making calls on multidimensional phenomena (complex behaviors), any semblance of agreement tends to disappear.
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KEF Uni-Q is an engineering breakthrough: the first truly coincident-source driver.

Many audiophiles know that an ideal speaker would be a point source; unfortunately, multiple-driver systems often fall far short of this ideal. With Neodymium-Iron-Boron, the most powerful of all magnetic materials, KEF has created a tweeter so small that it can be placed inside the woofer's voice coil. In effect, every Uni-Q driver is a point source.

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If you appreciate music, audition the Reference 105/3's. For any audiophile system, they are "standard" equipment.
problem is whether he will find the sound "superior" (to some equipment reference), "clean," "realistic" (as compared to some performance reference, eg, a concert or live performance), or "pleasing" in some aesthetic fashion. The sound one hears in a listening room is the concrete auditory (and sometimes gut-impact) result of a very complex series of events, as we know.

To reiterate, the actual sound is produced from a recording (at least one variable), a playback device (many variables), amplifiers (many variables), and speakers (too many variables), emanating sound waves into a reactive living environment. Lastly, and I note that Stereophile skirts this issue for the most part, the listener him- or herself is a very, very complex variable set, including how many Martinis he or she has consumed before a listening session. (Is anyone out there dabbling in psychoacoustics? Or, better yet, socioacoustics?) JA opens another can of worms when he starts on amp/speaker interactions, the discussion of which doesn't even mention cables.4 

Perhaps all of the variables which lead to a perceived sound can be measured satisfactorily one at a time, but then what do we do with all those measures? Add them? Put them in the blender?

After I moved from aeronautical engineering to social science many years ago, I was enticed into the wrongheaded notion that these sorts of complexities could be combined by the statistical magic of multiple regression into a more or less complete picture of why people or groups do or do not do certain things. It doesn't work, of course; social scientists still haven't the foggiest scientific notion of how to understand, much less control, human behavior, and that is a problem. Let me suggest that if someone proposes a run with factor analysis or regression on your audio measurements, give them your data and let them waste their own time.

On the other hand, a possible difficulty with the phenomenological approach to science is that the raw perception of anything is inherently subjective. (Which is why measurements are used in the first place: "That speaker is not peaky at 2500Hz; come look at this plot!") A number of writers to Stereophile have made this point in the past, so I will not belabor it. But it should be possible to sidestep Bishop Berkeley's famous solipsist quandary (which appears to enjoy better standing at TAS). I believe that your policies have produced the right moves, away from either purely objective or subjective methods, to an inter-subjective approach, which has been the solution to similar problems offered by most phenomenologists. When your reviewers feel unsure of their reaction to a component, they listen to each other's setups. They (usually) take a long listen before coming to judgments, and they consult with each other as much as possible. They use reproducible references. They seem to be honest about their uncertainties, give or take a few grams of ego. They go to great lengths to give the reader some sense of what they experienced. Most seem to be truly qualified technically and musically to give useful opinions. The sometimes-maligned measurements, if nothing else, give reassurance or a sense of mystery to perceived glitches or bad behavior. On top of this, the Santa Fe listening room promises the removal of other uncertainties.

One peculiar attribute of our science is that "sense" is equated with sight. Our scientific measurements stress visual cues, and generally distrust the other senses. But musicians learn absolute pitch. They also make fine and reproducible adjustments to the timbre of their instruments. So why should we be so timid about using the human ear as the final arbiter of high-fidelity sound systems? Despite all the objections of a few diehards from the Bridge- man school, all the practices outlined above constitute perfectly legitimate science, if of an applied nature. The AES crowd ought to pull their fingers out of their ears and listen.

This is not to say that I agree with half the reviews I read (I mean, what would happen if everyone thought Apogee Stages were the best speakers under $3000?), but I am satisfied that Stereophile is and has been moving in the right direction. A little uncertainty is good for what ails us, says I. This been a very long, maybe too complicated, way of saying, "Way to go, JA!"

Herb Barringer
Kaneohe, HI

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4. "Gad! How about speaker-listener interactions?
5. The anthropologist Francis Hsu used to complain that the ideal Asian method of knowing, which entails direct perception unencumbered by complex thought, simply produced moun- tainmups of Buddhist monks babbling incoherences at each other. That was Hsu, not me!

Sorry, Stanley
Editor:
I refer to your August editorial, in which (on
Build your audio/video system on a solid bass.

Velodyne subwoofers are already known as the finest in the world. Now, the same revolutionary patented technology is available in an exciting new design.

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p.9) you write “Many prominent engineers—Stanley Lipshitz, for example—have stated that if two amplifiers are found to be audibly different, then simple linear errors, such as a frequency-response difference or an inversion of absolute polarity, will be the cause.”

Where did I ever make such an oversimplified statement? This has never been my view, nor is it my view now. All sorts of nonlinear errors can and do produce audible amplifier differences—for example, harmonic and intermodulation distortions, and voltage, current, and slew-rate limiting effects. My claim has always been that, if both linear and non-linear errors (under operating conditions, measured across the load) are adequately low, no differences will be audible. This has been my experience. Please do not trivialize it by so blatant a misrepresentation of my view.

A corollary, of course, is that when audible differences are present, I have always found measurable linear or nonlinear errors which account for them. This is not a mystery. They are there for you to discover too if you seek them out. You will not, however, find them if the perceived difference is illusory, as my experience shows is often the case. Hence the value of blind testing to separate the real from the imagined. Or are you implying that they are one and the same thing, when on p.7 you say: “when experiments give results which contraindicate reality, the experiment is rejected, not the reality.” If you define reality to be what you perceive, then blind experimentation is pointless. On the other hand, if you don’t already “know” the reality or otherwise of your perceptions (ie, if your mind is not already made up), a blind test will convince you one way or the other. Stanley P. Lipshitz

University of Waterloo, Ontario, Canada

Regarding Stanley’s final point, it is somewhat of an oversimplification to state that I “define reality to be what I perceive.” What I am saying is that when an experiment is set up to prove a hypothesis, the results of that experiment cannot be accepted without being tested against other findings. There has to be a feedback loop involving the specific experiment and all the other experience the experimentor has in the same area, something that happens all the time when hi-fi components are measured, for example. When a piece of test gear is hooked up to perform a specific measurement, the result can’t be blindly taken on trust. Its implications have to be assessed against the tester’s complete experience of the component, and if there is a mismatch, something must be wrong. Sometimes the component being tested does turn out to be odd; but most often it is the test setup that is wrong—the tester is not measuring what be thought be was measuring.

This has been my experience with blind tests—and I have taken part in a good many. They do not have the resolving power to detect the kind of sonic differences that routinely exist between amplifiers, CD players, cables, etc. Consider the amplifier listening test that I ran at Stereophile’s 1989 San Mateo show, for example. I deliberately chose for that test two amplifiers—an Adcom GFA-555 and a pair of VTL 300s—which sounded very different. Whether this was due to their very different output impedances giving quite different frequency responses with the Bowers & Wilkins 801 speakers used—see Stereophile, Vol.12 No.7, July 1989, p.20—is open to debate, but different-sounding my prior tests indeed indicated them to be. Yet under the blind conditions of that specific test, there appeared to be no overall identification. (My original interpretation that there been identification was due to a statistical anomaly concerning the number of “Differ” and “Same” presentations.)

Stanley and Mr. Ferstler would therefore have me reject reality and conclude that the two amplifiers did indeed sound identical. Instead, the disparity between reality and the listening test results forces me to reject the latter: either the hi-fi show test conditions were flawed or the blind test methodology was not sufficiently discriminating, in which case the non-identification result only applied to that particular test. I find it significant that a repeat
Some people who sell hi-fi would just as soon sell you a food mixer, or a toaster, or a microwave. It's all the same to them, because they treat hi-fi as if it were just an appliance. Others, by way of contrast, are music enthusiasts. They specialize in hi-fi, and they enjoy helping you choose the right system. Your Linn hi-fi dealer fits into this category. Of course, he doesn't just sell Linn, so you can listen to our hi-fi and compare it with other good systems. You'll find it very easy to tell the difference, because you'll be mixing with the right company.

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of the blind test carried out by William Banks and David Krajicek of Pomona College under better conditions with single listeners (see Vol. 12 No. 11, November 1989, p. 93) did give statistically significant identification of the same two amplifiers by ear alone, which suggests that I was correct to reject the wider implications of the San Mateo results. —JA

The final word?
Editor:
At a time when the credibility of the "high end" is questioned constantly by the mainstream audio press, it is imperative that technical information and theories provided in reviews are accurate. I refer specifically to DO's review of the Lindsay-Geyer cables in the February 1991 issue and JA's "Follow-Up" on this same product in the June issue.

The major problem with DO's article is the confusion generated by the use of the word "signal" to describe both the voltage and the current. These quantities, although obviously related, must be described separately when explaining "signal" propagation in conductors. DO's failure to do so leads to some significant misconceptions.

The field behavior associated with cylindrical conductors has been well understood and documented since the 1930s... DO's description of the behavior of fields inside conducting materials seems to be based on uncritical readings of undergraduate physics texts. The simple case he writes about is the ideal case of an electric field incident on a plane surface of a conducting medium. The hypothesis about current "sinking through" the conductor is based upon this totally inappropriate assumption and is incorrect. When the field equations are correctly applied for a cylindrical conductor, no such effects exist, as JA verified by his measurements in June. This is due to the symmetry of the circular conductor around its axis.

The description of the skin effect in the article also showed a poor understanding of the basic physical processes involved. The skin-effect calculations quoted are only valid near the surface of a flat conductor. For a cylindrical wire, the mathematical description of the attenuation is much more complex. The skin effect is not simply due to resistive losses, but is the result of current distribution being determined by the interaction of resistive and magnetic effects. This leads to the attenuation...
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increasing with depth at a much lower rate. For example, at the center of a 1mm copper wire in a coaxial cable, a frequency about ten times higher is required to produce the same attenuation in current density as that for a flat plate.

The phase angle difference in the current density is also not as great as in a flat plate. At 17kHz, where the center of a 1mm copper wire is one skin depth from the surface, the shift in current-density phase angle is about 25° (not 57.3°, as stated in the article). The implication that the current density produces a phase shift of the voltage signal from the source to the load is incorrect. The actual phase shift in the voltage signal will mainly depend on the input and output impedances of the components connected and the characteristic impedance and length of the cable. In a typical audio circuit, this phase shift is less than 1° at 100kHz.

The attenuation and phase retardation DO refers to should clearly be identified as only affecting the current density, the magnetic field strength, and the very low electric field associated with the conductor resistive losses. The major part of the voltage signal propagates via the electric and magnetic fields within the insulation and air between the conductor wires. For example, with a 5m-long, 1mm-diameter copper wire supplying a 10k ohm load (simulating an amplifier input) at 1kHz, the proportion of the voltage signal residing within the metal of the wire amounts to only 0.001% of the total voltage.

Prompted by the original article, the transient response of an interconnect was extensively studied by the use of a well-proven transients analysis computer program. The results of this study confirm closely both conventional theory and JA’s measurements. No evidence was found to support the current echo or signal-“smearing” effects postulated by Dr. Lindsay.

The analysis concerned the transmission of a step-wave down a coaxial cable. This demonstrated negligible distortion in the transmitted voltage. (Please note that the cable dielectric was considered as ideal, and the cable was “matched” to the source and load to prevent high-frequency reflections. The low-level behavior of the conductor metal and any non-linearities were also ignored since these are not relevant to the subject of discussion here.)

Initially the current is all conducted down the outside of the wire (due to the skin effect).
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The final distribution of currents inside the conductor takes several microseconds, at which time there is a uniform current density established over the whole area of the wire. This time is considerably longer than that required to establish the voltage at the far end of the wire. The voltage shows absolutely no effects of the subsequent redistributions of current within the wire itself.

The computer simulation results for a Multifilament core conductor clearly show the major change is to increase the high-frequency resistance and the internal inductance of the core. For an applied step-wave, the major effect is to introduce a time delay (unimportant) and a highly damped oscillation in the MHz range. The copper cable clearly provides a superior performance in this regard at extremely high frequencies, although it is questionable whether any such difference would be audibly perceptible.

There are profound differences in the sound of cables. It would be better if more time was devoted to looking for the reasons why, using the considerable body of knowledge available, than inventing new theories which can readily be shown to be contrary to well-proven principles of physics.

I suggest there are at least two obvious areas requiring investigation to explain why DO found these cables sonically rewarding. The effect of the cotton and silk dielectric should be investigated. Further, as JA noted, the Lindsay-Geyer cable, with its high capacitance, may simply be acting as a low-pass filter in DO's system, stopping RF from reaching the power amplifier. With many wide-bandwidth amplifiers, this may reduce grain and give the system a more natural high-frequency reproduction.

Peter McIntyre
High End Audio, Sydney, Australia

Your rock reviews are dead
Editor:
As a regular reader, I wish to bring to your attention that an area of Stereophile is largely dead and in need of replanting—you rock music review section. I know that this is not the magazine's primary focus, which is perhaps why it has slipped into its current sad state without much notice.

Surely, if any area of your music reviews were to be devoted to new music it would be that one, yet all too many of its reviews are of artists who are artistically dead, career-dead, and even dead-dead. This is not to say that I don't respect the historic accomplishments of Bob Dylan or Taj Mahal or Jimi Hendrix or any of the other artists reviewed in your pages whose last major albums were made decades ago, but I think the appropriate forum for discussing them is a history of popular music, not a record-review column.

While attempting to do my homework for this letter and make sure I wasn't misrepresenting the composition of your reviews, I made a list of all the artists represented in your rock reviews within the last year, then looked up the date of their first recording (list enclosed). It was depressing the extent to which I was able to rely on one book—The Rolling Stone Record Guide—a book which hasn't been updated since 1982. In order to provide a compact form of my results that wouldn't take up undue space, here is a table showing the chronological makeup of the reviews by the date of the artists' first albums: pre-1959 (3), 1960-64 (6), 1965-69 (11), 1970-74 (8), 1975-79 (12), 1980-84 (4), 1985-89 (7), 1990+ (6). I have to point out that many of the newer artists reviewed are backward-looking even by their own descriptions.

The contrast of this state of affairs with Stereophile's hardware reviews, notable for being ever willing to look at new ideas, joyfully seeking out the not very well known in the hopes of finding gold, really could not be greater. The rock music column is almost totally without spirit or sense of adventure, much more concerned with reliving the past than discovering the future. If Richard Lehnert cannot bring himself to get out there and look around personally, he has a professional responsibility to find reviewers who will do it for him.

Here's hoping you can catch up at least to the '80s, if the '90s are out of the question.

Bowen R. Simmons
Dallas, TX

PS. The thought of Richard Lehnert waiting in line to go see a Bob Dylan concert at this point in his career is pathetic. He hasn't been worth it in a long time. Richard should take a chance and see a band he's never seen before instead.

JA addresses this issue at length in this month's "As We See It." See also Michael Ross's introduction to his review of Chris Whitley's debut album, Living With The Law, also in this issue.

—RL
Audition the B&K M-200s at a Dealer Soon:

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— Sam Tellig, STEREOPHILE, January 1991, Vol. 14, No. 1

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US: Peter W. Mitchell
The twice-yearly Consumer Electronics Shows, alternating between Chicago in June and Las Vegas in January, which celebrate their 25th anniversary year in 1992, have always been "trade" shows with admission restricted to manufacturers, dealers, and the press. (Of course, a few audiophiles and gadget-lovers usually manage to get in on the coattails of a friendly dealer, a phony business card, or an audio-society newsletter.) In other countries, new product shows accommodate both the industry and the interested public. Notable examples are the Japan Audio Fair, alternating every fall between Tokyo and Osaka, which used to pull in up to 100,000 hi-fi and video enthusiasts on weekends, and Berlin's vast late-summer Funkaustellung, which attracts crowds from all over Europe.

In recent years there has been increasing agitation from manufacturers who find that the high cost of exhibiting at CES twice a year doesn't pay off in proportionately greater dealer sales. Many have argued that one CES a year would be enough; some manufacturers already make that a de facto policy by attending only one and skipping the other—or cutting costs by exhibiting in a hotel not connected with the show. Other companies have argued that the value of exhibiting at CES would be greatly increased if their new goodies could be demonstrated directly to the public as well as to dealers and the press.1

As this issue is being put together, the Consumer Electronics Group of the EIA, which manages the CES, is voting on proposals to admit the public to next June's CES in Chicago. The show will run from Saturday, May 30 through Tuesday, June 2, but at previous shows many dealers have come only for the weekend; typically the halls are much less crowded on Monday and Tuesday. So the leading proposal is to admit the public on the last two days of the show, June 1 and 2.

US: Thomas J. Norton
A post-show press release from the EIA attempted to put the best face on what appeared to be rather disappointing attendance for this year's Summer CES. Official attendance figures were set at 55,629, which represents a minuscule increase over the 1990 show, though the still strong overseas market enjoyed by high-end US manufacturers was apparently confirmed by the over 4000 international attendees. Traffic was difficult to judge at the "specialty audio" exhibits in the Hilton because manufacturers were spread out over so many floors of the hotel, but it definitely seemed to be more crowded on the first two days (the weekend) than on the last two. The same was true of the "Zoo"—the main exhibit area at McCormick Place. I asked many high-end exhibitors how the show was going for them, and while most were upbeat, few were effusive.

US: Larry Archibald
We were stricken to learn in mid-September that Jim Bock, founder and proprietor of Swan's Speaker Systems of Swan's Island, Maine, has been diagnosed with inoperable lung cancer. Although no prognosis is immediately available, Jim's condition has made it necessary for him to hand production over to Frank Hale, who worked together with Jim to design Swan's latest model, the Cygnus. The new company is known as Swan's Speaker Systems (Canada), and is located in Pownal, Prince Edward Island.

1 I welcome such a development as I feel every opportunity for the High End to strut its stuff to the general public, who would flock to the CES to see the familiar names of Yamaha and Sony, should be exploited to the hilt. —JA
C0A 1Z0, Canada. SSS (Canada) will continue production of the Leda-Gemini (a sample of which was on our freight dock for shipment to Jack English to review until we just now learned of a few changes), in addition to the Cygnus. Frank Hale will be handling existing and prospective customers, and can be reached by phone at (902) 569-5220 or by fax at (902) 569-5123.

Jim Bock's patient impatience at our 1990 New York City High End Hi-Fi Show, in the face of true frustration, set an example for all exhibitors to follow, and his sense of humor lit up the small corner of high end inhabited by Swan's. (The company's name derives from the name of the island in Maine on which it has been located until now, just next to the more famous Bar Harbor and Mount Desert Island.) We wish Jim the best of luck with his unfortunate disease.

Germany/US/UK: John Atkinson

As well as mourning the passing of Miles Davis—our December issue will contain an appreciation by Michael Ullman—we were saddened in late September to hear of the deaths of a number of prominent high-end personalities: Klaus Renner, editor of the German magazine Das Ohr; Richard Ross, the talented designer of the British Rogers loudspeakers; Richard Schaun, the US distributor for Spendor loudspeakers; and Peter Hayward, co-founder of B&W Loudspeakers. Our condolences to their friends, colleagues, and families.

US: John Atkinson

An error inadvertently crept into October's "Recommended Components" listing. On p.118, we wrote that Theta Digital's highly regarded DS Pro Basic D/A processor was due to be replaced by the DS Pro Prime reviewed by Robert Harley elsewhere in this issue. Theta's Mike Moffat tells me that the Pro Basic stays in their line but is due to be supplanted by a version with balanced outputs.

US: Peter W. Mitchell

In previous issues, most recently June 1991, I have discussed some of the proposals in the works to provide a nationwide digital radio service. Digital audio broadcasting (DAB) would offer near-CD sound quality without the severe losses that are all too common in stereo FM. In view of the generally low state of FM it is tempting to dismiss it entirely. If you already have all the music you want to hear, or know exactly what recordings you want to buy next, perhaps you can ignore radio. I can't. I enjoy hearing recorded symphony concerts by a variety of orchestras, because they introduce me to varied interpretations and new works that I wouldn't get to hear otherwise.

(Televised concerts help a little. Case in point: Kurt Masur's inaugural concert as the New York Philharmonic's new music director. Their beautifully modulated Bruckner Seventh made me cry, despite the efforts of my local cable company and PBS station to mash the dynamics as flat as an AM broadcast of bubblegum rock.) I also like to hear new CDs and make up my own mind which ones to buy, rather than depending entirely on published reviews. But most FM stations mess up both the dynamics and the stereo imaging of live concerts and well-made CDs.

Three fundamentally different approaches to delivering digital audio code to the home presently vie for economic and political support:

1) Several companies are trying to set up nationwide services that would distribute digital radio via satellite relays and local cable-TV hookups. Each company's package uses a unique system of digital bit-rate compression and scrambling to mix a dozen or more stereo programs into the bandwidth of a single TV channel. Since the encoded package is treated as a pseudo-TV signal from the point of origin to your home, no time-consuming government approvals are required. But these services have been slow to get off the ground because of the need to persuade cable-TV companies to accept sign up subscribers, who would pay a monthly fee for the programs and for the required descrambler/decoder.

2) The National Association of Broadcasters (NAB), representing 9000 AM, FM, and TV station owners, opposes national coverage by a few digital broadcasts. It wants digital radio to be in the traditional mold—locally owned, diversified, featuring local news, reflecting local politics, and making pots of money by selling commercial time to local businesses.

The NAB has been promoting the Eureka-147 DAB system developed in Europe. It uses the Musicam digital bit-rate compression scheme, which is similar to the PASC system used for DCC tapes but with an even greater reduction in bit rate. As Martin Colloms reported on p.62 of the September Stereophile, the quality of the
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decoded sound is not quite equal to CD or DCC, but is close—and is light-years ahead of multiplex FM stereo. At NAB conventions this year in Las Vegas (April) and San Francisco (September), music was simulcast through FM and Eureka DAB transmitters on a hotel roof while listeners compared the received sound via headphones in vans roaming local streets. The DAB signal was not only free of FM stereo’s background hiss and birdsies, it also was essentially immune to multipath interference—while the FM signal became noisy, distorted, or collapsed to mono.

This DAB system is already developed, inexpensive to implement, and sounds pretty good. But it was designed to operate efficiently at UHF frequencies. In fact, all of the public demonstrations, both here and in Europe, used a locally unoccupied UHF channel. But in the US, the FCC has assigned the UHF band to television and is reserving the option to use UHF for high-definition TV. So the NAB has been promoting an untested plan to put DAB in a band of frequencies around 1500MHz (1.5GHz). But this risks reception problems that might require multiple “gap-filling” transmitters. More fatally, perhaps, this idea is firmly opposed by the Department of Defense, which has been using that band of frequencies for aircraft telemetry and “smart” bombs. (Remember the Iraq war?)

3) The newest, most surprising development is a batch of proposals for “in-band” DAB—schemes that would squeeze digital audio signals into the existing FM band. Of these, the best-known example is Project Acorn, jointly developed by CBS and Gannett Radio. Technical details have not been released, but the developers claim to be able to fit a CD-quality DAB signal into 200kHz of bandwidth. It may even be possible for a station to simulcast analog and digital versions of the same program within the station’s assigned FM channel.

Unlike as it seems, this really could happen—because the digital version of the signal can be transmitted at a much lower power level, minimizing the severity of the birdsies that would be added to the received analog signal. The digital code itself can be received with a “carrier/noise” ratio of only a few dB and still be decoded to produce audio with CD’s full 96dB S/N ratio.

Of course it remains to be seen whether any of the in-band DAB systems sound good. It may take a couple of years of competitive jockeying and testing for one to emerge as the best, and a couple more years after that for the NAB or FCC to authorize a single standard. So in-band DAB may not get off the ground until the mid-’90s, a full decade after digital radio began in Boston. If you don’t want to wait that long, your best bet may be to encourage your local cable-TV system to sign up now with one of the emerging satellite-borne DAB services.

**Denmark: Thomas J. Norton**

Under a European R&D funding scheme called Eureka, Bang & Olufsen of Denmark, KEF Electronics Limited of the UK, and The Acoustics Laboratory of the Technical University of Denmark have embarked on a project called Archimedes. They hope to find, first of all, if it is even possible, given current technology and funding constraints, to arrive at useful specifics and generalizations regarding the room/loudspeaker/listener interface. The ultimate hope is that a “smart” loudspeaker may be possible, one that will compensate automatically for its surroundings. Even a less ambitious outcome could be extremely useful. Manufacturers today cannot even agree on the appropriate directivity pattern for a loudspeaker, and studies which purport to tell them which is “best” still rely on a lot of educated guesswork.

There is no guarantee that Archimedes will come up with useful data, though the strong probability exists that at least *some* worthwhile results will emerge. The project has been set up in the anechoic chamber of the Technical University of Denmark, which, at 26’ high, 33’ wide, and 39’ long is one of the largest such facilities in Europe. It is effectively anechoic to below 50Hz. The initial portion of the study is designed to study timbral effects, and the simulation is therefore at present limited to a single loudspeaker reproducing an anechoically recorded monophonic signal.

In order to understand what is involved in this simulation, visualize a single loudspeaker suspended, oh, a mile above ground and a (preferably non-acrophobic) listener similarly suspended. Play back a signal through the
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loudspeaker and—absent the stray passing 747 or hang-glider—the listener will hear, effectively, a reflectionless or anechoic playback of the chosen program material. Given appropriate control of the signal's frequency balance, a blindfolded listener will be unable to accurately determine the distance of the source; a very nearby source played softly will seem to be at the same distance as a distant source played loudly. The surface reflections which provide us with critical cues to distance will be totally absent.

Now add a single wall a few feet to the listener's left—levitated in the same fashion. The listener will now hear not only the direct sound, but the sound from the loudspeaker as reflected off this single wall. But the latter will not be the same as the direct signal; it will, of course, be delayed in time, but in addition its frequency balance will depend not only on the frequency-related dispersion of the loudspeaker (which will determine the frequency balance of the sound at the wall just before reflection), but also on the reflection characteristics of the wall—also frequency-dependent.

Now add a second wall and you can add not only the reflections from the two walls, but any reflections which traverse both walls in turn before reaching the listener. You can see that this is getting awfully complicated awfully fast. Bring our intrepid astronaut-listener-in-training back down to earth and surround him or her with the usual six walls of a typical room, and you can begin to grasp the complexity of the problem that the Archimedes researchers have chosen to grapple with.

In order to attempt to simulate a real-world listening room, the listener is positioned inside the anechoic chamber at the center of a low-reflection, spherical gridwork three meters in radius. A large number of two-way loudspeakers are positioned on this sphere according to the room being simulated. The listening chair is motor-controlled so that the listener's head can be precisely located. Six of the loudspeakers are dedicated to simulating the late-arriving reflections which are generated by means of a multi-channel reverberator. The early reflections, those occurring within the first 30ms, are considered to be the most significant. After making several simplifications based on experimentally established psychoacoustic properties (one of the most noteworthy being localization blur, which enables one loudspeaker to represent multiple images coming from the same general direction), digital signal processing is used to generate the signals to be fed to the loudspeakers reproducing the "early arrival" reflections. The required signal-processor array, its associated interfaces, signal-routing hardware, and controlling software are collectively referred to as the "DSP Engine," without which this project would not be possible.

The loudspeakers used for the simulation incorporate coaxial two-way drivers—similar to the drivers used by KEF in their commercial UniQ line. The selection of such coaxial drivers was not incidental; spatially separated woofers and tweeters add an additional, unnecessary complication to the simulation process. Each driver is mounted in a spherical cabinet, the best shape for minimizing diffractive problems. The cabinets were originally designed as net floats used by Danish fishermen!

I was privileged to visit the Archimedes project last year along with a number of other journalists. At the time, the "DSP Engine" had not yet been put into the system; it had only just arrived at the university. For the preliminary stages of the project a less complex series of time delays and equalizers were used just to get the system up and running. That was the configuration we heard. Each of the journalists took a turn seated in the "hot seat." When I
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took my turn, what I initially heard was an anechoic cello recording played back near the tip of my nose. Or so it seemed, though I knew that the loudspeaker was actually several meters away. (An acoustically transparent screen surrounded the listening chair, hiding the exact loudspeaker positions and the rest of the chamber environment from the listener.) When the ‘room simulation’ was turned on, the cello moved back about 10', surrounded by a relatively natural room ambience and sense of space. The overall fidelity of the reproduction was only fair—at that stage of the study, fidelity was not the point. But it did indicate that, even without the sophisticated digital signal-processing equipment which by now is in place, the combination of chamber, critically placed loudspeakers, and processing could conjure up a believable sonic environment.

Archimedes will not be finished this month or next year. But at last an organized attempt is being made to apply current technology to the arcane subject of loudspeakers in listening rooms.

that the economy is on an upswing. Welcome though the rumor may be, it probably has about as much weight as the promise of an exciting new release from Bon Jovi. If it happens—great. But then I’d expect it to be followed by a downturn in the sales of and interest in tweaky accessories, the main refuge of the fiscally deprived.

I knew something was up—rather, down—when I went on one of my weekly ‘pre-owned disc’ forays in early September, making the rounds of the used-record shops and indoor markets. Finding a bootleg CD of Frank Zappa’s ‘Tis the Season to be Jelly, I fished out my £6 in the interests of my occupation; naturally, I abhor bootlegs. Zappa had just sanctioned the legitimate, commercial release of eight of his bootlegs through Rhino in the US and Castle Communications in the UK; finding an original copy meant that I could compare the illegal with the kosher when the review copies arrived.

Why compare a bootleg with a sanctioned copy taken off LP? According to a feature in Goldmine, the transfers were left pretty much in their natural state, bar some very minor housekeeping. It’s Zappa’s way of saying that ‘These are crap, but if you’re going to buy them, at least you can pay me.’ I was looking forward to A/B’ing the discs anyway, partly out of audiophilic curiosity (who among us can resist A/B comparisons of alleged like-with-like?), and partly to test the press releases.

But this was not to be.

Imagine my response: a mix of horror, delight, surprise, and—how do I put it?—satori. Here was a bootleg CD in the secondhand racks which the owner probably never wanted to sell. Ever met a Zappa nut? They’re as rabid as any Deadhead. For one of them to part with such a rarity could only mean hard times and pure desperation. My heart went out to this fellow music junkie. So much for the nearness of the economic recovery if Zappa fans are parting with cherished items.

That in itself was enough to inspire (horrific) wonder. But, upon opening the jewel box, I was in for one of the genuine shocks of my life. That CD was the first (and only) secondhand CD I’ve acquired which had been treated with a green pen!!!! I don’t know which stunner was the greatest: finding out that a Zappa fan was selling up, that a Zappa fan so nearby was also a hi-fi casualty, or that an audiophile was on the skids, or that I’d have to scrape off the green

UK: Ken Kessler
Election fever is rife in the UK, due to promises
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—Ken Pohlman, AUDIO, November 1987.

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—Ken Pohlman, AUDIO, November 1987.

"...the effective suppression of AC 'RF' hash' by the ACE-515 improved clarity and lowered noise in all three CD players. ...the significant improvements in instrumental and vocal harmonic retrieval and hall ambience are superb...it simply appears to allow musical information to be passed through to the listener with less veil and electronic 'haze.'"
—Lewis Lipnick, Stereophile, Vol. 11 No. 4, April 1988.
Recommended accessory in Stereophile, Vol. 12 No. 4, April 1989.

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paint if I wanted to A/B the discs in their natural state.

(As it turned out, the pile of official Zappa bootlegs which arrived for review did not include a copy of *Jelly*, nor could I find one in any of the shops I tried. Was it withdrawn at the last minute? Were the UK pressings faulty and fresh ones being prepared? Maybe time will tell.)

So, are times so bad that even cheapo tweaks are becoming luxuries? They must be if hardcore types (and only the hardcore buy bootlegs) are relinquishing their treasures. Will this rampant poverty cause Peter Belt to revise his pricing structure? Maybe so, if his most recent missive is any indication.

Yes, it's time for the latest revision of the Rainbow Electret Foil, those little strips of self-adhesive foil which look like the holographic stickers fitted to prerecorded video cassettes and credit cards to prevent piracy. Not that I've heard of anyone pirating Peter's paraphernalia.

In my current frame of mind, a mix of midlife and identity crisis as well as rampant alienation, I've better things to do than publicize Peter's predilection for the perverse. But the latest revision is almost a form of I-told-you-so self-justification by the Electret Guru, with Belt seeming to be stung by the far easier ride Tice has had with its equally bizarre claims for the big-bucks magic clock. (You know, the one you plug into the wall in your listening room for a sonic tonic.)

The letter accompanying the pack of foils said, and I quote, "I am sure that you will be very familiar with the controversy raging in the American Magazine *Stereophile* regarding the Tice 'Clock.' [Belt's quotes, not mine.] Attaching a strip of Rainbow Foil to *any* type of quartz-driven device, battery- or AC-powered, changes the device to a very beneficial 'Room Device'!"

Which means that I can leave my wholly mechanical 1947 Lemania Chronograph free of sticky bits. I don't know which aspect of this interests me more: the hi-fi or the horological. I've had it up to here (he said, indicating his receding hairline) with some tweaks, not because of the way they stretch my credulity but because they steal precious amounts of time which could be spent listening (or eating, or sleeping, or even staring at the ceiling in disbelief). Things that go tick-tock, though... I'm in heaven.

But back to Belt vs Tice. Or, amusingly, Belt defending Tice. Far be it for Belt to criticize another designer or manufacturer working in audio's Twilight Zone; for him to dismiss this new competitor would be tantamount to denying his own schtick. Instead, he argues that the foils, when applied to any quartz-driven device, will convert that object into an equivalent of a magic clock... at a fraction of the price.

Note, please, that Belt is not presenting a direct attack on Tice for the pricing of the clock. He's merely claiming to offer a cheaper way of achieving the same results. And this is something new; because Belt usually spends his time explaining why his products cost so much; *eg*, paying for his time and effort. Belt has never argued openly that his tweaks represent good value for money, other than through the implicit suggestion that any gain's worth is equal to whatever financial outlay the customer can justify. So, be it mere pennies or the price of three weeks in Cap Ferrat—if that's what it costs to improve the sound of your system and you think it's worth it, then so it is. With the Tice clock costing a few hundred dollars and a pack of Belt's latest stickers costing £20, you can see where this is leading...

...Especially when a single pack has enough foil to service 400 (yes, *four hundred*) clocks, CDs, LPs, turntables, digital watches, VCRs, cassette, tape decks, or anything else that may contain rotating parts or digital circuitry.

I just had a horrible thought: If one device treated with electret foil is equal to a Tice clock, and one £20 pack will treat 400 clocks, what would happen to Peter's business if one pack of foils cost him another 399 sales? I can see it now: one audiophile buying a pack of foils and selling off the wee strips at five pence a pop.

Then again, the destitute audiophile still needs regular fixes; one tweak, however magical, just will not satisfy. So which is the better value: buying ⅓ of a pack of foils, or scraping together the £20 for a whole pack and treating 400 "things"?

Methinks the former because of the serious anti-tweak backlash taking place in the UK, where budget remedies have always been the only egalitarian way of ensuring that audiophiles don't suffer from withdrawal symptoms when money is tight. The list of cheaper alternatives to popular, acclaimed accessories or the total denial of tweaks (from some previously tweaky quarters) grows daily.

- Two rival CD-player manufacturers have pooh-poohed CD mats, damping rings, and

*Stereophile*, November 1991

55
Golden Dragon Precision Audio Tubes

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**

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<td>KT77 coming soon</td>
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Each tube carries a three month warranty.

*Exclusive distributor for the United States:*

**Tubes by Design**

P.O. Box 48865, Sarasota, FL 34230-6865, Telephone 1-813-925-3483
green pens, suggesting that their players don't need them.
• A UK-made rival to the expensive solid-silver 75 ohm digital coaxial cables has appeared... for around £12.
• A rumored rival to the plexiglas Floaters, for suspending your cables, is made from toilet-tissue rolls and said to be just as effective.
• The slick ferrite rings some users are placing around cables used for digital transfer? Radio Shack (Tandy in the UK) offers a "non-audiophile" version for a humble £3.99.
• A blatant copy of the original green CD pen is making the rounds in the UK for 30-50% less. And some green-pen fetishists have gone back to source (thanks to the research efforts of Martin Colloms) by purchasing the Japanese-made UniPosca pen sold in art shops rather than hi-fi shops for under £2.
• Expensive spikes and cones? Forget 'em. Just launched in the UK are German-made cones finished to perfection and supplied in sets of four, height-adjustable and complete with little coasters to prevent damage to the surfaces on which they rest. Price: £25 complete.

What's it all mean? Is the above anti-accessory or merely anti-high prices? Are bluffs being called? This, of course, plays right into the hands of those who argue that everything is down to measurements, that the high end is a con, that all amplifiers sound alike, that special cables don't make any difference, blah blah blah.

Which is another way of saying that we need the likes of Tice and Belt, and not just to keep things interesting or amusing. We need 'em because they're more likely to discover genuine improvements than could all of the objectivists combined. But even if they only provide comic relief, in this climate they're a necessity. Because when the dreamers disappear, so do the dreams.

Unless you'd rather believe that all amps sound the same and that excellence is a figment of your imagination. In which case, why are you reading Stereophile?

US: John Atkinson
The LEAP loudspeaker design program, highly recommended by Dick Olsher last November, was inadvertently omitted from the October issue's "Recommended Components" listing. (Kevin Voeks of Snell Acoustics is also an enthusiastic LEAP user.) LEAP imports raw drive-unit data (it can accept Audio Precision and MLSSA files) and optimizes the speaker system's crossover network to meet the user's target specifications, either on- or off-axis. (It will also average a number of responses to give an idea of a speaker's power response.) The fully loaded version of the program, LEAP 4.1, which includes a SPICE-type passive network analyzer and an Active Filter Library, costs $895; a basic version, to which modular upgrades can be made, costs $299. Further details can be obtained from Audio Technology Inc., 7556 SW Bridgeport Road, Portland, OR 97224. Tel: (503) 624-0405. Fax: (503) 624-0194.

Taiwan: Robert Harley
It's quiz time. What country or region is the world's largest market for Jadis amplifiers—Europe, Japan, North America, or Taiwan?

If this hadn't been a show report from Taipei, I don't think many of you would have correctly guessed Taiwan. Before this trip, I had no idea that Taiwan was such a booming place for high-end audio. The fact that more Jadis electronics are sold in Taiwan than in any other country underscores just how big high-end audio is in this tiny island nation. And Jadis is just the tip of the iceberg: Taiwan consumes a wide assortment of high-end products from all over the world.

The thriving Taiwanese high-end business reflects the large numbers of enthusiastic audiophiles who buy and enjoy hi-fi here. In this country about half the size of West Virginia with a population the same as Canada's at 20 million, music and audio play a prominent role in daily life. The Taiwanese not only enjoy music, but treat audio components as something to prize and treasure. Indeed, pride of ownership and prestige play a large part in shaping this region's product mix and market character. There is a distinct disdain for run-of-the-mill mid-fi here; those unable to afford high-end buy very cheap systems, but those with money and knowledge of high-end want
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The taller Magneplanar® MG-1.5/QR at $1350 per pair, and the MG-.5/QR at $1075 per pair, are for those wanting ribbon technology in a smaller, more affordable design.

Line source ribbon models at $1950 per pair and $2850 per pair.

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to own something special.

To show off its emerging position in high-end audio and expose good equipment to more of Taiwan's people, the Taiwan Audio Association staged the High-End Hi-Fi Show at the Taipei Hilton on August 2-5. As LA reported a few months ago, Stereophile now has a Chinese-language edition—another reflection of the region's growing importance and the increasingly international scope of high-end audio—and the publisher of our Chinese edition, Audio Vertex, co-sponsored the show. Larry Archibald, Mark Fisher (Stereophile's Director of Overseas Operations), and I attended. Stereophile was also represented by a booth, signing up new subscribers and selling our LPs and CDs.

Attendance was huge; at times it looked like a contest to see how many people could fit in a hotel room. We're not talking mere crowds—these were throngs, vast seas of humanity packing themselves into hotel rooms and corridors, all in the enthusiastic pursuit of seeing and hearing high-end audio. The show's third day (Sunday) so teemed with people that I walked up to a room entrance, saw it was impossible to get in, walked to the next room, saw that room was jammed, and repeated that cycle all the way down a corridor. Good thing I saw and heard most exhibits during the show's first two days. Just for fun, I counted how many people were in one particularly popular 13' by 17' room (plus a 3' by 5' hall): 46! 2 I didn't mind—

2 Forty-six was the peak figure. The "RMS" value was more like 37 during the show's busiest time.

...was glad to see such a large turnout, and since I couldn't get in some rooms on Sunday, it gave me a chance to work on this report from my cool, quiet hotel room just one floor below the fracas.

Despite the huge numbers of people at the show, the jammed halls and rooms didn't reflect the show's true attendance; many show-goers would come for a few hours, see the exhibits, and leave. At US shows (Stereophile's and CES), people tend to stay the entire time. I can't begin to imagine what conditions would have been like had every attendee stayed the entire four days.

Working against this crowd-reducing factor was the low number of exhibit rooms. Although lots of brands were displayed, the fact that one distributor handles many brands meant that many products were grouped together into fewer rooms. For example, one distributor imports Wadia, Jadis, Apogee, Westlake, Ensemble, Day Sequerra, Cello, Classé, Basis, Graham, and Audiomeca. All told, the show included 28 exhibitors in 46 rooms representing 187 manufacturers.

While the Taipei show was like other hi-fi gatherings—rooms full of equipment and enthusiastic music lovers—this show drew a much broader range of people than I've ever seen at an audio event. I saw a group of fiftyish ladies carrying Stereophile bags full of brochures leaving a demonstration of MartinLogan CLSes driven by Aragon electronics. Right on! There were young couples, older couples, couples with kids in tow, single...
"...the listener is "massaged" gently but firmly, relaxed and soothed. While listening, I felt compelled to give in to the music, accepting it, letting its message through."

"What the Spectras get right - and only a handful of speakers I've heard do - is recreate a performance of music in a plausible space with proper rendering of width, height, and depth."

"Acoustat Spectra 1100s are very attractive loudspeakers and deserve to receive a warm welcome among music lovers."


"...these speakers are no wimpy audiophile electrostatics; they kick butt!"

women—everyone you could think of. Shows in the US and Europe tend to attract a narrower group: baby-boomer males. It was heartening to see such enthusiasm from such a diverse spectrum of people; high-end audio should break through demographic barriers and appeal to anyone who loves music, not just weak hobbyists.

No report from Taiwan would be complete without a little travelog on the country and culture. I had one day off before the show to recover from jet lag and see the city. What a city! The place was vibrant and bustling, with open-air food markets infusing the thick tropical air with a melange of smells, row after row of tiny shops, and lots of people.

And motor scooters. It seemed as though half of Taipei gets around on the little two-wheelers; hundreds of thousands of them weaving through dense traffic only inches away from disaster. As a motorcyclist, I was shaken by the sight of what appeared to be one near-miss after another. Entire families load themselves on the scooters: I saw one little 90cc motorcycle carrying five people—two kids on the tank, the husband riding, another kid behind him, and the wife on the back—with no helmets and in truly terrifying traffic conditions. I don't think that arrangement is approved by the Motorcycle Safety Foundation!

Getting over my shock at the courage (or insanity) of the cyclists, I made my way by foot through the heat and dense tropical humidity to the spectacular Chiang Kai-shek Memorial. Chiang Kai-shek is Taiwan's national hero, and was largely responsible for establishing the Nationalist government on Taiwan and putting Taiwan on the road to modern economic development. The sheer size and scale of the Memorial is a testament to how the Taiwanese revere the man. The grounds include two concert halls surrounded by beautiful gardens, with the Memorial itself in the middle. A huge structure of polished white stone, the Memorial is built around an enormous statue of a seated Chiang. I was struck by its similarity in spirit to the Lincoln Memorial in Washington, DC.

I spent the rest of the afternoon in the mercifully airconditioned National Museum of History. They have an extensive and well-preserved collection of artifacts going back to before 1000 BC. Ornate bronzed cooking vessels, ancient sculpture, and other cultural artifacts were displayed.

Going through the show early the next morning, it was immediately apparent that nearly every brand available in the US is available in Taiwan—and then some. The few companies not represented were the exceptions.

In addition to all the familiar names, I saw many products unheard of in North America, especially British tubed gear. Even Mark Fisher, an Englishman working in high-end, hadn't heard of some of these British companies. Everywhere I looked were previously unknown British tubed amplifiers. Tubed electronics in general are hugely popular here; I saw more tubed gear than at US shows. The tube brands familiar to Western audiophiles on display included VTL, Prodigy Audio Labs, Sonic Frontiers, Valve Amplification Company, Audio Research, Cary, Jadis, Convergent Audio Technology (CAT), Yakov Aronov, Counterpoint, Quicksilver, Milbert, Lazarus, and Esoteric Audio Research (EAR).

Many products with low profiles in the US are big in the Far East. The Taiwanese audiophile has a much wider assortment of products available to him than his North American or European counterpart. While US dealers are hesitant and cautious about taking on new lines, Taiwanese distributors readily bring in any product they like and think will sell. Further, Taiwan's relatively small size makes more lines accessible. The Taiwanese music lover can thus more easily select from brands not widely distributed, or even heard of, in the US. This arrangement supports greater product diversity and is a boon for the consumer.

I'll skip the products you already know about and concentrate on the unusual ones we never hear of. Most of these unusual brands were imported, but a few were designed and made in Taiwan. As you can imagine, there appeared to be some real bargains among the products made locally. With no import duty, comparatively low labor rates, no distributor markup, and no shipping costs, some Taiwanese products can enjoy a significant price advantage over imported goods.

Among these home-grown items was the MUSICatcher SEPP CL monoblock tubed power amplifiers. About the same size as a Dynaco ST-70, the SEPP CL puts out 35W and sells for $55,000 NT (about $2000)/pair. The English-language brochure describes a rumble-

3 For a full listing of all the products represented, see the ad on p.46 of the August 1991 issue of Stereophile.
BRYSTON UNVEILS A NEW GENERATION OF AMPLIFIERS.

THE INTENT: TO DELIVER THE TRUE EMOTION OF BEAUTIFUL MUSIC

An original oil painting is displayed in a frame without glass. The artist’s intent—the emotion and interpretation, should never be filtered through any kind of veil.

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removing subsonic filter in the feedback loop: “Because the low frequency shake can never be produced by the feedback the sound of the base will be more powerful and stable.”

There were also locally made loudspeakers, one of which looked remarkably similar to the Hales System Two Signatures, but in a vinyl cabinet. They weren’t demonstrated and the representative didn’t speak a word of English, so I found out little about them. I later discovered, however, that some locally made products are, shall we say, “inspired” by recognized designs.

“Is that made by Threshold for you?” I naively asked the man in the Usher exhibit room. “Made in Taiwan,” was the response. Puzzled, I looked inside the Usher Reference 2.5 and saw a Threshold S/550e. Yep, this was the same amplifier I reviewed a few months ago—same layout, transformers, four big filter caps in the back with a ground plate, same rows of transistors attached to aluminum heatsinks—everything said “Threshold.” Even the way the top plate met the chassis was identical to a

4 All prices are given in New Taiwan dollars (T) followed by a conversion to US dollars at the prevailing ratio of 27:1. An item’s price in US dollars is the equivalent Taiwanese price, not the price it would sell for in the US.

S/550e.

Taking a much closer look revealed that this was indeed not a Threshold S/550e with the Usher name plate. Although the workmanship was superb, it nevertheless lacked that last degree of finesse that characterizes Threshold products. I was very surprised by the price: $36,990 NT ($1370). I happened to be with an interpreter at the time and reconfirmed this extraordinarily low price. I find it hard to believe they can sell it that cheaply; perhaps there was a mixup in the translation.

British-built tubed amplifiers were everywhere at the show. The Audio Art Quintet, for example, imported by Tai Fu Electronics, is a little 25W class-A stereo amplifier using a pair of EL34s per channel. The Quintet sells for $45,000 NT (about $1650). Another British brand, Tube Technology, is distributed in Taiwan by Maintone, who also import a variety of British products including Ruark loudspeakers and electronics from Linx (a company now owned by Wharfedale), Orelle, and AV International (featuring an enormous and heavy machined-metal remote control). I had never heard of any of these British products, but they are very popular in the Far East.
Engineered Emotion

Hear it! Feel it! A new emotional dimension in music and movies. 500 lbs. of stereo soundfield perfection. 2000 watts of precision power. 19 drivers with 400 sq. in. of radiating area. The components have won 8 major audio awards. These are serious tools for serious listeners. The Shure IITS Theater Reference System shown is the audio purist's approach to Home Theater sound. It costs less than most compact cars, yet has all of the emotional impact to transport you to new worlds of entertainment. Shure's pro encoding and Acra-Vector logic decoding systems are used by major production facilities. Six years ago Shure introduced the now familiar "Home Theater" concept. Now Shure IITS systems and sub-systems are available in 23 configurations and price levels. They are equally awesome with Dolby Surround movies, Stereosurround television productions, music, and future HDTV programs. We will send you a wealth of fact-filled material that explains Home Theater, stereo soundfields, and Shure IITS Theater Reference System components. Call 1-800-25 SHURE for the name of your nearest dealer and how to obtain this free information package. Or write: Shure IITS, 222 Hartrey Ave., Evanston, IL 60202-3696.

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The British Harbeth speakers are distributed by a Mr. J. Yen, who also brings in lines more familiar to American audiophiles: Counterpoint, NRG amplifiers, Duntech, VTL, Arcam, Creek, Epos, Mordaunt-Short, Micromega, and Cardas. I was impressed by the little Harbeth HL-5s driven by a Counterpoint SA3000/SA-220 combination and the Micromega Solo CD player. The British sure have a knack for small two-way boxes. Going from one extreme to the other, the huge NRG monoblocks were driving Duntech Sovereigns to good effect in the adjacent room.

Other British tubed products on display included the Audio Innovations line. "The Second," as their top-of-the-line monoblocks are called, are 55W class-A units using four KT88s each and 6B4G drivers. Audio Innovations also makes the Series 500, a 25Wpc class-A integrated amplifier with a pair of EL34s per side. A power amp/preamp pair called the Series 200/400 features 12W of class-A power and a moving-coil input stage. "The Second" sells for $160,000 NT (nearly $6000)/pair, the integrated amp retails for $49,000 NT ($1800), and the preamp/power amp combination fetches $65,000 NT ($2400).

The Taiwanese are so crazy for tubes that the American-made Milbert tube electronics for the car are popular here. The BAM-230 power amplifier and TC-2 crossover were shown; the latter is a tiny unit with a 1" by 1" window to reveal the tubes inside. The BAM-230 sells for $95,000 NT ($3500), the TC-2 for $35,000 NT ($1300). The distributor described them to me as being "very high end."

Some gorgeous Swedish tubed equipment called Copland was shown and demonstrated. The 401 is a 53-pound integrated amplifier using two pairs of EL34s complemented by three ECC83 and two ECC82 tubes. The 45Wpc class-A amplifier had machined aluminum knobs and superb fit’n’finish. The 501 power amplifier features the same output stage as the integrated amp, omitting the preamplifier section. Both 401 and 501 retail for $89,000 NT ($3300). Both units were exceptionally well made. The distributor, who spoke very little English, attempted to convey the units’ precision build by pointing to where the chassis meets the faceplate and saying, “Not one hair” — meaning the tolerance was less than the diameter of a human hair. These things are important to Far Eastern audiophiles.

Copland, designed in Denmark, manufactured in Sweden.

Also shown by the same distributor was the Einstein amplifier called simply “The Amplifier.” The integrated unit from the three-year-old German manufacturer had a striking appearance, mainly due to the chrome chassis and very thick, curved front panel made from aluminum and coated in a gloss-black lacquer-like material — elegance and style are important attributes in this part of the world. The distributor demonstrated the unit’s “turbo” switch underneath the unit—which apparently did nothing more than increase the volume. (The language barrier prevented me from finding out more about this feature.) The Einstein, which is said to put out 60Wpc into 8 ohms and 400Wpc into 1 ohm, sells for $90,000 NT ($3350).

From France was the Audioanalyse A-9 power amplifier. The 65Wpc solid-state class-A unit had enormous, unusually shaped heatsinking. Price: $60,000 NT ($2200).

Another French product I hadn’t heard of was the $85,000 NT ($3150) NY-I hybrid preamplifier made by a company called DRG. No technical details were available (the person manning the booth didn’t know if it used tubes or not—I assume it does), but it was finished in beautiful gold plate.

The Lectron tubed amplifiers—units you don’t hear much about in America—were displayed. Jack English reported very favorably on the 30Wpc JH 30 in the October 1991 issue of Stereophile. The distributor was also very enthusiastic about the sound of these products. The JH-30 sells in Taiwan for $30,000 NT ($1100)—a figure that seemed low to me.

Wholehearted Enterprises, the Hong Kong-based distributor of Hales loudspeakers, demonstrated the System Two Signatures with some enormous German amplifiers called Restek. The Restek “Exponent” monoblocks...
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REPORTS FROM THE 1991 WINTER C.E.S. ON TESLA, POWERED BY SCIENTIFIC FIDELITY'S TRILLIUM AMPLIFIER AND AURORA PREAMP
STEREOPHILE, VOL. 14 NO. 5 - MAY 1991

Robert Harley — Wonderfully musical and visually stunning.

Robert Deutsch — Provides the listener with sound of exceptional realism.

Peter W. Mitchell — Attractively musical sound with bass extending solidly into the 35Hz neighborhood.

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Martin G. DeWolf — Best sound at show? Probably. A tight precise soundstage coupled to a sense of crystalline clarity. What purity!

ULTRA HIGH FIDELITY, NO. 30 - 1991

Gerard Rejskind — Some of the very best sound at the show.
Stereophile, November 1991

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can reportedly output 2500W into 2 ohms, feature a numeric display showing power output, and cost the equivalent of $21,000 US. This distributor also manufactures a tubed preamp and amplifier line called Sound Audio. The company plans to show the Sound Audio products at the next CES in Las Vegas for possible export to the American market. Projected US retail price for the amplifier/preamplifier pair is $1800.

Audio Research continues to manufacture the SP11 for the Far Taiwanese market, but in a special, gold-finished edition with balanced outputs. Surprisingly, it sells for only $150,000 NT ($5550), not much more than the plain version commanded in the rest of the world.

Many exhibitors sold CDs, with all the familiar audiophile labels represented: Sheffield, Dorian, and Chesky were the more high-profile companies on display. Another room showed their only product, a CD of beautiful traditional Asian music. The company, called Poem Culture, wasn’t selling the discs—people came in, listened, and left. I couldn’t figure out what they were up to.

If you think the name “Poem Culture” is interesting, you’ll get a kick out of some of the other exhibitors’ names: Tone Jar, 38° C, the previously mentioned “Wholehearted Enterprises,” Best Device, and Agape were some of the more unusual ones. I think it’s another case of something getting lost in the translation.

Among the distributors was the resident analog flag carrier, importing SME, Thorens, Nitty Gritty, a very expensive Ortofon phono preamp, and Esoteric Audio Research gear. He displayed (among other products) the Thorens Prestige two-tonearm turntable, a massive and unusual item that sells for $300,000 NT ($11,000). Asked how many he had sold, he replied, “Very few. Only 26.”

Although I considered that figure an enthusiastic vote of confidence for analog, CD is by far the dominant medium here, partly because LPs are much more scarce here than in Europe or North America. In fact, there was only one exhibitor using LP playback for demonstration: Audio Vertex, Stereophile’s Chinese-edition distributor. The system included a SOTA Star Sapphire (later replaced by a SOTA Cosmos) with a Clavis cartridge, and YBA electronics driving Thiel CS5s. Digital playback was provided by a Barclay Cabernet transport (a very popular item in Taiwan) and a Theta DSPre.
Generation II D/A processor. The sound was excellent and drew big crowds. They tended, however, to play the same music repeatedly: James Newton Howard and Ana Caram. Seeing the packed room, the distributor down the hall began playing nothing but James Newton Howard and Ana Caram!

YBA's Yves Bernard Andre, Stig Bjorge of Scan Tech who makes the Clavis, and Jim Thiel were on hand to assist in system setup and demonstration. I never got a chance to see Jim, though; he arrived late and the airline lost his luggage. I got a big kick out of the Clavis brochure in the Audio Vertex room: the headline above a photograph of the Clavis read “Proprietary Decoding Algorithm.” No question where they stand on digital!

It was more difficult to judge sound quality at this show than at other events. At CES or at Stereophile shows, the exhibitors recognize reviewers and accommodate their choices of music, listening position, playback level, etc. Since I was anonymous by sight in Taiwan, I didn't get to hear the systems under the best conditions. In addition, it's always necessary to sit down for any evaluations; many loudspeakers' tonal balances are radically different for standing listeners. Add to that the limited seating capacity, large crowds, and the fact that playback levels tended to be very low, and you can see why I was hesitant to make listening evaluations.

In the few rooms where I presented my Stereophile business card, the reaction was identical: the recipient would call his associates over and say to them, in Chinese, “unintelligible - unintelligible - unintelligible - Mr. Robert - unintelligible - unintelligible - Stereophile - unintelligible - unintelligible.” Then a small carton of cold and heavily sweetened tea would appear from nowhere, and an enthusiastically outstretched arm invite me to look at the products. This scenario's consistency from room to room was startling.5

Despite the less than ideal listening conditions, some systems clearly stood out as being musical. I was favorably impressed by the Apogee Centaur Minor driven by a Jadis Defy 30 with a Wadia 3200/X-32 transport/processor combination. Every time I've heard the Centaur Minor I've been amazed that a $1000 loudspeaker can be so musical. Watch for a review.

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Stereophile, November 1991

5 In Chinese, a person's last name is often written first. I thus became "Mr. Robert" on many occasions.
One of the best sounds at the show was from perhaps the smallest loudspeakers on display: the Acoustic Energy AE-1. Driven by Valve Amplification Company 90W monoblocks, CAT preamp, Barclay Transport, and a Theta DSPro Basic in a room treated with RPG Diffusors, the AE-1s really sang. Nor did it hurt that they played some music.

The Avalon Ascents driven by Jeff Rowland monoblocks produced some excellent sound and were big crowd pleasers. Adding to the experience, the room was separate from the distributor's product displays. This arrangement made for much better listening; there was lower background noise, more room for listeners, and fewer distractions. Jeff Rowland was there to answer questions and talk to customers—Taiwan is one of his biggest markets.

The Martin-Logan CLSes driven by an all-Aragon system (24K preamp, 4004 power amp, D2A D/A converter) sounded good, as did the Martin-Logan Quest driven by Coda electronics in the next room. Other good sound came from the ProAc Studio 1 Mk.11 loudspeakers driven by a Rotel RCD-855 and Aura VA-50, a little integrated amplifier from England. I was also impressed by the very inexpensive Mission 760 loudspeakers.

As I was sitting in demonstrations next to Taiwanese audiophiles, I realized that the language and cultural barriers between us had vanished, replaced by the universal language of music. Words became superfluous when the music started. Foot-tapping and head-bobbing mean the same thing in any language.

Throughout the show, one prevailing attitude toward high-end audio emerged: it is a source of prestige as much as a source of music. In fact, the Eastern audio magazines routinely assess how much prestige and status a product carries and factor that into their evaluation of the product. That is something never even considered in Western audio magazines.

An exchange with a distributor illustrated the importance of status in this part of the world. We were told about an owner of Infinity IRS Vs in Hong Kong who was unhappy with their sound and wanted to buy something else. When it was suggested that the gentleman might consider the Wilson WATT/Puppies/WHOW (at least $25,000 there), the notion was immediately dismissed. The Wilson system, it was explained, was neither large enough, unique enough (there are already about 60 systems in Hong Kong), or expensive enough for this customer.

If you wondered after reading about the $65,000 Apogee Grand in August's show reports who might buy such a system, wonder no more. In fact, the Apogee distributor disappointedly told Apogee's Jason Bloom that he could sell "only" about three pairs of Grands a year in Taiwan.6

During the show the Taiwan Audio Association scheduled a meeting between themselves...
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and visiting manufacturers and journalists to better acquaint us with Taiwan's audio market. They were concerned about the importation of grey-market goods into Taiwan, primarily from Hong Kong where there are no import duties and no value-added taxes. Consequently, products can be bought in Hong Kong for less money than in Taiwan. This practice, however, cuts out the Taiwanese distributor and retailer, making it less likely that they will be around to service them in the future. In addition, Taiwanese importers and retailers are reluctant to spend time and money promoting high-end if people end up buying the equipment outside Taiwan. The local SME distributor estimated that half the SME arms in Taiwan were bought outside the country.

This controversy parallels that seen in these pages over buying audio by mail-order rather than from specialty retailers. Stereophile has always advocated supporting the local retailer; he's the one to best advise you, help you get the most out of your system, and provide a long-term commitment. It's as true in Taiwan as in America.

I've saved the best for last. The trip's highlight was an afternoon spent at the home of a Mr. Liu, owner of Infinity IRS Vs driven by an Audio Research SP11 and a pair of Audio Research M300s. Mr. Liu's apartment building in Taipei looked like any other building—until we got inside. He has a beautiful big apartment with a dedicated listening room for his IRS Vs. Mr. Liu spends about eight hours a day listening to music and tweaking his system. Every detail—down to the position of the fans above the M300s—has been carefully optimized. This was clearly a system tweaked to its ultimate potential.

He played his favorite records and CDs, along with a few chosen by us. Although we spoke no Chinese and Mr. Liu spoke almost no English, that didn't hamper the proceedings; it was obvious from our expressions how much we enjoyed the music and the sound. The sound was spectacular—easily the best I've ever heard from IRS Vs. Mr. Liu also has excellent musical tastes—at one point he pulled out Stevie Ray Vaughan's Couldn't Stand the Weather—and we all enjoyed an afternoon of great music wonderfully reproduced. Thank you for your hospitality, Mr. Liu.

I'd have to say the first High-End Hi-Fi show in Taipei was a great success. It was superbly organized and run and well attended. There was also great enthusiasm about the show and high-end audio in general from exhibitors and attendees. I believe strongly that hi-fi shows are a great benefit to the entire industry: They show audiophiles a variety of equipment they're unlikely to see without visiting dozens of dealers. More important, however, shows like this expose large numbers of people to the idea that reproducing music well matters, and that a good hi-fi system can be a source of far greater pleasure than they had ever imagined.

That's a truism in any part of the world.
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If I may borrow from Sam Tellig, this report is about an Audio Cheapskate special: a portable CD player that is remarkably cheap and surprisingly good. I discovered it because I had to: my old portable died. I rely on a portable CD player and headphones for musical pleasure when I'm away from home. And when I'm testing loudspeakers or other products, I use a battery-powered CD player with a test disc as a wonderfully compact and portable source of test signals. The tracks on one CD can provide an array of stable and precisely calibrated signals (sinewaves, squarewaves, pink noise, transient impulses, and so on) that would require a shelf-full of generators and meters to match.

When I went shopping for a new CD portable in early July, my need was urgent because I was embarking on an eight-day journey to La Paz, Mexico to view the total eclipse. It was worth the trip: the eclipse was gorgeous, with two brilliant lavender-pink flames ("prominences") reaching up into the sun's atmosphere, each several times larger than the Earth. The pearly-white corona (luminescent atmosphere) had an impressively complex structure of short and long streamers whose subtle shadings seemed to have been painted in the sky by a great artist. Actually, of course, they were shaped by the sun's magnetic field and by the changing pattern of storms and sunspots in the layer of hot gas that serves as the sun's apparent surface.

I was prepared to pay top dollar for a first-class CD portable, to ensure that it would deliver both good musical sound and low-distortion test signals. So I spent an afternoon at the biggest stereo store in my area, testing every CD portable in sight. I brought music discs, a test CD to check low-level linearity, a pair of Beyer DT990 Pro headphones, and a homebrew headphone amp that drove the phones to a high level so that I could hear the low-level distortion that nonlinear decoding creates. (The headphone circuit of most CD portables is optimized for low-impedance headphones and can't drive the 990 to a decent level.) I value the neutrality of the 990 when listening at home or in recording sessions where I can bring a separate amplifier. For on-the-go listening I use the Koss PortaPro, a compact fold-up $50 headphone whose warm balance flatters bright CDs and whose high sensitivity yields ample volume levels from a portable CD or Sony Walkman Pro cassette recorder.

I might have bought the new Sony D-303 ($360), the first CD portable said to have one-bit decoding; but it was so new that it hadn't arrived in stores yet. So the prime candidate was Denon's $400 DCP-100, which Ken Pohlmann found to be the best of a group of CD portables that he tested last year. It's attractive, well-made, and relatively heavy for a portable, with a quiet transport and a solid textured-gray case that feels like you could drive a tank over it. It also sounded very good, with dual "20-bit" converters individually adjusted for good linearity. I decided to buy it, but since I was in the store spent some time testing other players as well.

I was disappointed, but not at all surprised, to discover that nearly every player on display exhibited plainly audible distortion and modulation noise due to nonlinear decoding. The "cancer" of inaccurate decoding, which we've discussed in the past, remains widespread among low-cost CD portables. This group of players included a Sony, a very slim Technics, a JVC, a Kenwood, a midprice Panasonic, a Fisher, and Denon's $250 DCP-50. One remained—the bottom-of-the-line $180 Panasonic SL-NP1A. I had no expectations remaining, but for the sake of completeness I figured I should check it out.

First impressions were pretty negative: the very thin stamped-metal case seemed flimsy,
Boulder AMPLIFIERS

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Stereophile, November 1991

and the transport made a loud grinding noise as it advanced from track to track. On the other hand, the transport controls were intuitive and logical in their operation (unlike some players, which seem designed to confuse and irritate the user), and it required only two AA batteries (disposable alkaline or rechargeable NiCad), so it would be cheap to operate. The surprise came when I plugged in the headphones: music sounded clear, detailed, and full-bodied. The linearity test (the low-level glide tone on the CBS CD-1 test disc) sounded as good as the $400 Denon, with no obvious modulation noise and a very small amount of low-level distortion.

Could this be a fluke? The well-known drawback of multibit decoders is that they vary greatly in performance from sample to sample, and even from channel to channel, so the accurate decoding of the SL-NPIA in the display case could be just a lucky accident. I asked the store clerk to bring out a second sample from stock and submitted it to the same tests. It was identical to the first—from the loud grinding of its pickup during track-access to its remarkable freedom from low-level noise and distortion. I was so impressed that I bought it.

I've owned the SL-NPIA for a month now, and I continue to enjoy its sound. Its lab measurements (assessed through the headphone socket) are mostly good but unspectacular: A-weighted S/N is 94dB, high-frequency twintone intermodulation distortion is 0.05%, and channel separation varies from 65dB in the midrange to 45dB in the top octave. The crucial measurement for a cheap player, of course, is the linearity of its decoding, and here the SL-NPIA is superb, with a maximum error of only 1dB at -90 and 2dB at -100. Spectrum analysis of a dithered -90dB tone reveals near-perfect behavior: smooth white noise with no unwanted peaks, just the fundamental tone at -89dB and a barely visible trace of second-harmonic distortion. Still more remarkable, the two channels are identical.

I am amazed that Matsushita can deliver consistently accurate decoding from multibit chips at this price level. I suspect that they may have pulled the same trick with this player that they did a couple of years ago with two low-cost Technics models—installing one-bit decoders without telling anyone. (If it were a desktop player I would take the cover off and look, but CD portables are put together so tightly I don't dare disassemble it.) Whatever the truth may be, its clean, wide-range sound makes me a happy camper. It probably doesn't match the sound of the best $500 players (the Rotel RCD-855 and NAD 5000), but at $180 list the Panasonic SL-NPIA is a steal.

The XBS (extra bass) switch injects a uniform 10dB bass boost below 100Hz. I wish it were adjustable, because for many recordings 10dB is too much, especially with the Koss PortaPro's strong bass; half as much boost would provide the right amount of low-end weight. But with many lightweight headphones which roll off in the bass, the XBS circuit could be a blessing. It's not enough, however, to turn the included Panasonic headphones into a useful accessory; they're truly dreadful and should be stomped on before their ugly, squawky sound infects anything else.

A point of clarification

There seems to be a widely circulated notion that nonlinearity in a digital decoder could have a useful side effect. The idea is that if a decoding error causes low-level test signals to reproduce at a higher level than they were recorded at, the resulting "compression" of the dynamic range will tend to raise the level of ambience and other background information in a recording, thus making the recorded ambience more obvious.

I believe the opposite is true: the "compression" of a digital decoder whose linearity curve turns up at low levels must actually cause recorded ambience to be obscured. Here's why. Whenever a transfer curve is nonlinear, it produces distortion, altering the shape of the waveform. Engineers usually measure this in terms of THD (Total Harmonic Distortion), the addition of false tones at multiples of the original signal frequency)—mainly because instruments to measure THD (or more accurately, the sum of harmonics plus noise) are widely available and relatively cheap. But to the ear, harmonic distortion is relatively unimportant unless the false tones occur at high-order multiples of the original frequency. "Low-order" harmonic distortion is inaudible in small quantities (below about 1%), and in larger quantities it merely adds to the harmonic overtone content that musical notes already contain. High-order harmonics are more obvious to the ear and are more destructive of musicality. The best engineers have recognized this by
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proposing that distortion measurements should be "weighted" to emphasize the high-order harmonics, but this idea has not yet caught on as an industry standard. It will be considered, however. The EIA has reconvened its Amplifier Standards committee to consider updating or revising the measurements used to specify amplifier performance. Two of the proposals on the table will be to weight harmonic distortion measurements according to their audibility and to select a better test signal for measuring dynamic power output (something more realistic than the short 20-millisecond toneburst originally adopted for the IHF dynamic headroom test).

The distortion measurement that matters most to the ear is intermodulation distortion. IM always accompanies harmonic distortion but is less convenient to quantify with a measuring instrument. IM distortion arises at frequencies that are sums and differences of the frequencies in the original signal. Since these don't correspond to the harmonic overtone frequencies in music, small quantities of IM distortion tend to cloud the background. Large quantities of IM alter the basic character of the sound, producing congestion or harshness.

A conventional IM test uses only two frequencies, f1 and f2, and measures only the first-order products, f1 + f2 and f1 - f2. High-order products occur at other frequencies such as f1 + 2f2, etc. More important, perhaps, is what happens in music where the original signal contains not just two frequencies but several (for example, two or three instruments playing harmonically related notes, each with its own pattern of overtones). In that case IM distortion will create a cloud of sum and difference tones at dozens of enharmonic frequencies.

And that's why the "compression" that may be produced by a nonlinear digital decoder doesn't enhance ambience. The nonlinearity produces a cloud of low-level IM distortion products that obscure all background information in the original signal, including its low-level ambience. When I got my first CD player with a MASH one-bit decoder, the first thing that struck me was the ease and clarity with which it reproduced the soundstage information in recordings (stage-area reflections and hall ambience). Earlier CD players that seemed to render low-level details in recordings with similar clarity did so in a context of exaggerated brightness and glare.

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<td>New VPI Mod KIT</td>
<td>Upgrades VPI HW-19 to HW-19 Mk IV</td>
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<td>VPI VTA Stabilizer</td>
<td>Arm base adds easy VTA height adjustment to AQ, Linn, MMT, FT3 &amp; Rega arms</td>
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**ENERGY ABSORBING FEET**

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**ARCI CI Superstructure**

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**SOUND ANCHORS STANDS**

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**SPECIALTY STANDS**

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<td>Dietrich</td>
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**CABLE ACCESSORIES & CONTACT CLEANERS**

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<td>Sumiko Tweed</td>
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**SONEX JR's**

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**STEREOPHILE, November 1991**

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**StereoHi, November 1991**
Are Audiophiles Music-Lovers?

Keith Yates argues that they aren’t

“Like many audiophiles I have often spent home from a concert to fire up the audio system, and then, to the sore vexation of my wife and guests, spent the rest of the evening plunged in the morbid contemplation of what, exactly, was missing.”

That’s how I led off a piece for Stereophile a few years back (Vol.11 No.4, p.58). Live, unamplified music—the sine qua non, the benchmark, the mantra, the mantra, no?

Most of us desperately want to believe in this “absolute sound,” but is it possible that for the majority of our tribe it remains a ritualistic chant, intoned by many and practiced by few?

Most of us desperately want to believe in this “absolute sound.”

There is fresh and troubling evidence. Peter McGrath, a friend, fellow high-end dealer, and noted recording engineer, estimates that, as a group, audiophiles spend 100 hours reading about tone cones, speaker cables, and audio miscellany for every hour spent in the company of a flesh-and-blood orchestra, chamber ensemble, jazz trio, or blues group. Says one industry guru, who insists on anonymity (nearly all of them insist on it), even disgraced televangelists show more integrity: They may have trash cans full of empty booze bottles, and bimbos scattered around town, but at least they show up to church every Sunday.

Dealers like McGrath, Jim Smith of Audition in Birmingham, Alabama, and speakermaker Richard Shahinian are easy to cite for their deep, active involvement in live concert music precisely because each must be considered, in the purely statistical sense, a rare bird indeed. Industry-wide, there is a shortage of concert-going and a surfeit of finger-pointing. High-end dealers complain that their suppliers never listen to live music anymore, and that even the factory’s listening rooms have fallen into desuetude or been converted to sales offices. The manufacturers grumble that many of their dealers are merely merchants in the merry position of having clientele with expensive habits.

High-end dealers and manufacturers concur—usually over drinks and out of earshot of the press—that most of their customers wouldn’t know the sound of live music if it reached up and bit their earlobes. For their part, consumers grumble that most dealers are hardware hawks, not music lovers, then shuffle off with their audiophile magazines and devour every page, footnote, and ad while the concert halls fill up with their neighbors—the ones who’ve never heard of Mark Levinson or J. Gordon Holt.

These charges and countercharges have been woven into the industry’s background noise ever since it transformed itself from garage roots to status as big-bucks business a decade or so ago. For the last ten years of my involvement in the industry I carried the growing grouings with faith and platitudes. “Put your customers in front of the real thing and you’ll see them blossom. You might even sell a few more good power amps because of it. Take charge. Lead the way. Get involved in live

1 The author was a founder-owner of both Keith Yates Audio, a high-end retail store in Sacramento, California, and Audio Verité Recordings, a small classical record label, from March 1981 through April 1991. He now designs Home Concert Halls and advanced Home Theater systems, and works as a consultant to high-end audio/video retailers and manufacturers nationwide. His writing has appeared in Stereophile, Audio, and many other magazines.

2 An importer of very highly esteemed gear used to invite his dealers to Chicago’s Orchestra Hall to hear the CSO every year at a June CES; interest was so low he finally abandoned it. A few years ago a well-known turntable manufacturer invited me to spend a week at their UK factory. Despite the company’s rhetoric about ‘humming along with the tune,’ my hosts and the rest of the dealer group except one preferred pub-crawling to my repeated suggestion that we spend an evening in a concert hall or jazz club. The exception, Jim Shannon, is now with Madrigal Audio Labs.
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music.” I told them I kept my bass trombone in the store for an occasional reality-check when no one was around. I told them I was serving on the board of directors of the Sacramento opera, and had a standing store policy of refunding the price of any ticket to the local symphony, opera, or ballet. I always beamed when I told my pals and peers about that policy, and exhorted them to follow suit. After dinner one year, another dealer, a stubby, hard-bitten entrepreneurial type, took a ceremonious puff off his cigar and fired back, “Ever had a customer take you up on it?” His brazen insolence struck me dumb. When I recovered my composure, I had to reply that, well, no, no one had—but give them just a little more time. Maybe I needed to spread the word a little better. In the meantime, here was this scrofulous character delegitimizing high-end audio from the inside out. He made his living off the high end—and a very handsome living, from the smell of things. He made my blood boil. And he filled me with a resolve.

In 1989 I undertook to set things right-side up, to do something that had never been attempted in the history of audiophile retailing: I designed and built an ambitious, state-of-the-art, high-end facility around a real live concert venue. Not a concert hall pieced together from leftover scraps of space in some remote corner of the building, nor merely a regular shoebox-style soundroom with space for 20 or 30 folding chairs that masqueraded as a concert hall, but a real, up-front-and-center, built-from-scratch Concert Hall. Accommodating up to a dozen performers and an audience of 140, my concert space was the store's centerpiece, its cynosure, its core. With input collected from concert-hall acousticians, computer models, and my own background in playing and recording live music, it took the form of a laterally symmetrical, fan-shaped affair with a stepped ceiling and deep, diffusive side-wall niches. To break up image-blurring ceiling reflections, I hung a massive, complex, triangular diffusor-soffit over the middle of the hall. To keep fan speed low and noise down, I shock-mounted six separate heating/air conditioner units on the roof, each controlled by a master touch-screen computer to keep the 7600ft² space at just the right temperature under concert conditions.

I designed and built
an ambitious, state-of-the-art, high-end facility around a real live concert venue.

An acoustical engineer specializing in low-noise HVAC systems was retained to oversee

Keith Yates Audio concert hall, looking toward audience area.
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installation of the ducting. I had the ceiling sheetrock—no flimsy ceilings going diaphragmatic in my concert hall—suspended from the rafters with hundreds of exotic, Sorbothanelike units for improved isolation, and hung with the aid of lasers. I installed adjustable, acoustically absorptive blinds so I could tune the room's reverberation characteristics—its RT60—for each musical program. I hung over $25,000 worth of Italian low-voltage lighting fixtures from the ceiling so they could be grouped, aimed, and dimmed to bathe the performers in just the right light. My acousticians swept the hall with sinewaves, warble tones, and assorted noises, then TEF'd and plotted it and subsequently proclaimed my baby the finest environment for chamber music in Northern California. When they were gone and the Zolatone paint was dry, I rolled in a magnificent Steinway concert grand—one that had been built for and used by the Chicago Symphony as a concert instrument, then lovingly rebuilt by Peter Clark with custom Ari Isaacs hammers.3

Over the next 18 months Keith Yates Audio staged regular chamber concerts by the leading musicians in the region—generally the concertmaster and assorted principals of the Sacramento Symphony. We did the piano and wind quintets of Beethoven and Mozart; string quartets of Haydn and Debussy; an evening of Bach with harpsichord, flute, and violin. There were duets, sextets, octets; little pieces by Vivaldi and Villa-Lobos, Poulenc, Scott Joplin, Pierre Boulez; virtuoso guitar works, cello showpieces. A joyful vocal recital with San Francisco Opera soprano Sara Ganz. If the composer was still alive, we tried to fly him or her out to attend. Terry Riley joined us in a 25th-anniversary performance of his In C, the landmark composition that launched minimalism. We brought Pauline Oliveros out from New York to perform in a composition of hers. Howard Hersh was on hand for the world-premiere performance of a shimmering, ethereal new work of his. Besides the guest composers, there were printed program guides, music-related art showings, and complimentary wine and refreshments at intermission. When these heady events made money, it was donated to local nonprofit music organizations.

Local musicians cooed over the splendid new venue with the great acoustics. The local papers and NPR radio station ran enthusiastic reviews. An editor from the New York Times phoned, trying to figure out whether their business or arts section would be the best place for the story. High-end retailers started showing up from around the world to see what the fuss was all about and to snap pictures for the staff back home. The UPS man brought LPs, CDs, and tapes of artists who wanted to perform in this dramatic space they were hearing about. Composers whose symphonic pieces I'd heard in larger concert halls called to see if we would be interested in doing a few new chamber pieces. Artists and gallery owners wanted to hang their best works. I tell you, this music-lover audiophile was on cloud nine. The town was buzzing. A national design magazine called the stereo-store-qua-concert-hall a "one-of-a-kind masterpiece." Asked whether they wanted to subsidize the venture by extending generous credit terms, our core suppliers—Madrigal, Krell, Vandersteen, KEF, Martin-Logan, Wilson, Adcom, and many others—called it a "go." The rest of the industry, excited but unconvinced, called it "The Grand Experiment."

Do I have to tell you how stimulating it was to be making history by bringing "the absolute sound" to the audiophile community itself? Do I have to remind you that our little concert hall formed the very heart—philosophically, architecturally, acoustically—of our enterprise? I probably forgot to tell you that making a six-soundroom high-end shop bend to the exigencies of a real concert venue for 140 lucky audiophiles added $100,000 to the cost of the build-out. But not to worry—I took out a second mortgage on the house to pay for it.

There was only one little hitch. My audiophiles—the ones who for a decade had been buying their gear and magazines from me, swapping favorite recordings with me, and reading my articles—never showed up. Oh, they came during business hours to audition the Levinsons and Krells and Wilsons and so on, but they were nowhere to be found during our evening concerts or even during the music-appreciation lectures put on by the symphony association. I tried everything: in-store signs; notices in the newsletters; a little story in the local classical station's magazine; private mail-

3 Ari Isaac, a blind piano technician in Toronto, manufactures hammers widely celebrated for their ability to elicit a richer palette of overtones from Steinway and Bösendorfer instruments. Contractual obligations prevent Isaac's iconoclastic and extensively researched designs from being factory-issue on the great concert grands of our day.
ings; personal appeals; phone calls in the night.
The excuses were richly varied—audiophiles
have fine imaginations—but somehow half-
hearted, and often sheepish, as if some unsavory
little secret had been dug up. I was stupefied.

Customers who'd spent thousands and tens of
thousands on state-of-the-art components to
"capture that elusive magic of live music"
wouldn't let me sell them a $15 ticket to the real
thing. I couldn't give them tickets. So who

"Why do you put on those live concerts in your store?"

In a technical business like audio, you get
a lot of abstruse questions.

But I want to tell you about a question
that about popped my internal fuse the other
day. It went: "Why do you put on those live
concerts in your store?"

Pardon me? Why do I put on live concerts
in my store? Because live music is
what it's all about. Because there's no better
way to spend an evening with 120 other
people. Because I want to expose friends
and customers to music they might not
otherwise hear. Because maybe I'll change
someone's life. Because I want my staff to
know the difference between the sounds of
the viola and the violin. Because I take
my job seriously enough to want to recalibrate
my aural measuring system now
and then. Because I think it'd be civic-minded
to raise a few bucks for KXPR, the Opera,
the Symphony. Because local symphony
players need the gigs. What kind of ques-
tion is this. Why do I put on live concerts
in my store? Who wouldn't want to put on
live concerts if they had a suitable space?
How can you be in the audio business and
not put on live concerts? Isn't it obvious?
A question like that keeps a guy like me
awake half the night. You toss and turn and
the responses keep swarming noisily out.
They buzz around, and some of them sound
high-toned and philanthropic, and some
sound harsh and irritated, and some come
out soft and fuzzy, like the sound of an old
amplifier that needs new tubes. And yet
each response somehow fails to nab the
core of why you undertake such a project—
a project that may give you back nothing but
a bad review in the morning papers if the
reviewer had too long a day or didn't fit in
his chair quite right or didn't like the chard-
onnay at intermission.

You stare into the dark and they buzz
around, and then, in the wee hours, the
core comes out. Eisenhower's in the White
House, and in a Fresno backyard my Aunt
Marsha—my other cousins and even the
kids from next door are calling her Aunt
Moonie—opens her battered guitar case and
one by one she sings us kids to sleep. That
voice, the guitar, the cool evening breeze
off the fields, the crickets, the old canvas
butterfly chair, and those songs—old folk-
songs and nursery tunes and protest
songs—and there I am, six, maybe seven
years old and I can't be sung to sleep
because I'm too damn alive to yield to sleep.
How can you put a kid to sleep when the
kid's heart is pounding so hard his chest is
squeaking, when his hide is peppered with
goosebumps, when the intensity of the
whole thing makes that kid's eyes fill up
with water like he's been chopping onions
for an hour? So he's frozen there in that but-
terfly chair, looking like he's playing the part
of someone in suspended animation for the
school play, and then Aunt Marsha sings
"Buckeye Jim" ("You can't go, go weavve and
spin, you can't go. Buckeye Jim"), and that
kid spins off into his own world where time
slows down and then stops dead in its
tracks and where, if he'd had a tape
recorder along he might have brought back the
sound of subatomic particles weaving and
spinning with photons.

Those sounds, those worlds, those intens-
ities, have haunted me for 30 years or
more. It wasn't just one magical summer
night—there were many other nights, and
afternoons, and mornings, spread out over
25 years, until just a couple years ago, when
Aunt Marsha put away the guitar for good.

Now she's got record albums to show for
her talent. The cousins and neighbors have
their memories. And I've got these concerts.

So that's it. It's your turn: want a ticket?

—Keith Yates

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August 1990 KXPR/FM91 Program Guide.
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Lewis Lipnick
Stereophile Vol. 13 No. 7, July 1990

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*MPR'S SUGGESTED LIST PRICE
filled the 140 seats? Regular people who read about it in the papers, people who went home to maybe $600 worth of ratty old Sansui gear driving epileptic speakers wired out of phase with 22-gauge zipcord.4

My audiophiles never showed up.

Customers who had spent thousands and tens of thousands on components . . . wouldn’t let me sell them a $15 ticket to the real thing.

Some months ago The Grand Experiment sputtered, then went bust, belly-up, bankrupt. A decade in the making, then gone—the store, the concerts, the house—the only winners the attorneys and liquidators. So what’s the lesson here? That undercapitalization, high overhead, 60% annual growth, and a war in the Gulf can bleed the life out of a company? That’s the obvious answer; any junior loan officer at a bank with a billion dollars in bad foreign debt could tell you that. But for me there’s something else—another resonance, lingering, more unsettling, closer to home. In the end I confused hardware aficionados and real music lovers. Most audiophiles, I was to learn, don’t “do” concerts. It’s part of the religion, but not part of the life.

Of course, the insiders, the survivors, those hard-bitten types, have had it pegged all along. With the experiment over, they’ll go back to making, selling, and reviewing the gear that honors the real thing. But they won’t expose the duplicity that runs deep and quiet in our community. That’s for me, the experimenter, who has now earned the right to suggest, ever so gently, to get thee to a concert hall. Or get a new mantra.

I confused hardware aficionados and real music lovers.

4 Perhaps Mr. Yates should have made audiophile recordings in his hall, for release on his Audio Vérité label. Audiophiles might then have attended the concerts in order to later compare them with their “real thing”: the recordings of the concerts. —RL.
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Aunt Corey's Homemade Buffered Passive Preamp

‘A n' then ya bring alla ground wahrs to uh, uh single po-wint...’

He looked just like I always pictured: jet-blueblack hair Royal Crown'd into that famous pompadour, the heavily lidded eyes, the .357 Magnum in case Robert Goulet appeared on any nearby TV screen... and the Weller temperature-controlled soldering iron.

‘...Ah think ya need to bypass them big ol' electrolytics, too...’

I knew I was dreaming, but it didn't matter; I'd been wrestling with the problems of purely passive preamps for months, and was nowhere close to any real solutions. I'd built my own passive preamp after reading Ben Duncan's how-to article in Stereophile, but the initial astonishment at how much better it sounded than my preamp at the time gave way to complaints of restrained dynamics and the absolute need to use short/low capacitance cables on the preamp's output. I was convinced that a conventional line-stage was far inferior to the sonic purity of a high-quality volume pot, but the highish output impedance of my passive preamp caused problems with the lengths and types of interconnect I wanted to use. So when the King of Rock and Roll sauntered into my dream with a handful of parts and a roll of SN62 solder, I listened up.

‘Gee, Elvis, where'd you learn all this stuff about audio design?’

‘Hot damned TAMALE, son, Ah wuz a 'lec-

1 Vol.11 No.2, pp.79-87.

Stereophile, November 1991
Year after year, always the same new thing.

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trician's apprentice 'fore I met Mr. Phillips, y'know... an' truth be told, Ah taught David Hafer ever'th'ang the ol' boy knows. Ah remember the day Ah showed him how to wahh-up his output transformers; 'Man,' Ah said, 'tap that ol' primary out, hitch it 'ween yer plate an' yer center-tap, an' you'll have a *wbble* of a tube ampl!' But ya think Ah *wanted* people to know Ah knew all that stuff 'bout audio 'lectricity? Ya thank Ah could've had Ann-Margaret covered with nuthin' but peanut-butter an' 'nanner slices if she knew I could hear absolute polarity?!

He wiped the Weller's hot, shiny tip on the wet sponge and ran a black unbreakable plastic comb through his hair.

"Man, the way Ah see it, ya got problems with a purely passive preamp\(^2\) in that the impedance changes... *beey*... now, w-wait a minute! Ya got *me* describing this thang jus' like that ol' Ben Duncan cat used *Alice In Wonderland* to lay out *his* DIY project! No way, baby! Ah'm *gonville*, man..."

He unplugged the Weller and wrapped the cord around the handle. I ran after him as he got back on his Harley and kicked the starter.

"But Elvis!" I cried, "What about my passive preamp?! What should I do?!"

He reached down to his jewel-encrusted belt buckle and wrenched two silvery, spider-legged baubles from their fittings.

"Here, man!" he drawled, tossing them to me over the roar of the engine. "And remember; don't ever let *nobody* tell ya you ain't no good. Cuz as long as you believe in the power of *The Sun Sessions*, there'll be a place for you at the table of The King. An' uh, Jes' Say No, too... ."

He gave his bike the gas and tore off into the blue night. And when I awoke the next morning to find a couple of metal-can buffers on my pillow, I knew why He had come. And now it's my job to tell you.

**Active vs Passive**

In a conventional system based on an active preamplifier, the signal source (phono stage, CD player, tape deck) is treated as a *voltage* source only; the high input impedance of the preamp enables the source component to drive its interconnect easily. In effect, the active preamp *buffers* the source component from the job of driving the interconnect feeding the power amplifier, tackling that job itself with its beefier output stage.

But a passive preamp has no such circuit; while the source component "sees" a moderately high input impedance (in most cases, 10k ohms), all the onus of driving the cables downstream of the control unit is placed *back* on the shoulders of the source, and most gear just isn't up to the task. Because when you use a passive preamp, the signal source has to work not only as a voltage source, but as a *current* source as well, and most phono stages and CD players (especially op-amp-based circuits) aren't designed to source much current. As a result, many listeners have complained about reduced bass impact and a lack of dynamic bloom to their systems' sounds with passive preamps.

There are other drawbacks to a purely-passive preamp; one is the high-frequency rolloff it can introduce when asked to drive long and/or highly capacitive cables to the power amplifier. The output impedance of a preamp and the shunt capacitance of a cable form a first-order RC filter that rolls off the high frequencies at 6dB/octave. This isn't a problem with most active preamps, as their output impedance is sufficiently low to raise the RC rolloff point\(^3\) to well above the audio range, but some of the most highly regarded cables have fairly high capacitance, and using long lengths with a passive preamp can muffle the high end.

Passive preamps using a typical volume pot value of 10k have a worst-case output impedance of approximately 1.6k (depending on the position of the control), and this can also increase the cable's susceptibility to RF and noise pickup. Not only couldn't I use unshielded but otherwise excellent cables like Kimber KCAG with my passive preamp, but even fully shielded cables had to be positioned well away from AC cords, power transformers, etc., if I didn't want to hear a loud *HUMMM* from my speakers. In all, there are just as many reasons not to use a passive preamp as to use one, and it was this whole slew of limitations that started me thinking of A Better Way.

The passive preamp I had built was similar

---

1. Using the formula \( f = \frac{1}{2\pi RF} \), you can calculate the frequency at which the response will be down 3dB. An output impedance of 2.7k ohms feeding a cable with a shunt capacitance of 400pF will give a –3dB point of 147.4kHz, for example, which is of no consequence. But use three times the length of the same cable and the –3dB point will drop to 49kHz, meaning that some HF rolloff will appear in the audio band.

\(^2\) "An' he ready for them angry-ass Manufacturer's Comments from The Mod Squad, First Sound, and EVS, too, but Jes' tell 'em The King told ya it was alright, mama."

\(^3\) "Better Way" has been the direction of my gear choices for the last quarter-century...
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in most respects to those offered by the Mod Squad, EVS, and others: the signal source was brought to a Penny & Giles stereo 10k, conductive-plastic, audio-taper volume pot, and the pot fed the output jacks. Why does everyone use a 10k pot? Because it happens to be the best tradeoff between input and output impedance. Ideally, a preamp should have an infinitely high input impedance and an infinitely low output impedance, but as a volume pot's output and input impedances are directly related, you can't raise one without raising the other. Use a 100k pot so you don't load down your source components, and the output impedance becomes too high; lower the pot to a 5k unit to drive longer cables, and the input impedance becomes too low for most gear to comfortably drive.

So how could I simultaneously raise the input impedance and lower the output impedance? By changing my mantra from "Less Is More" to "Sometimes, A Little Less Is More Better," and using an active buffer.

**The mighty BUF-03**

A buffer is a unique device; among its many characteristics are an extremely high input impedance, an extremely low output impedance, hyper-fast signal-handling speed, and the ability to source a goodly amount of current. These devices are often called on to drive ultra-high-frequency video signals over great lengths of coax in 75 ohm circuits, and needless to say, a good buffer wets its pants with laughter at the thought of carrying mere audio signals; to call these devices "overkill" for audio would be an understatement!

But I happen to LOVE overkill, and so I began rifling through every data book I could get my hands on, looking for a suitable buffer. After listening to many promising units, I finally settled on the Precision Monolithics BUF-03. Offering a voltage gain of unity, this little FET-input, metal-can buffer boasts some pretty scary specs: 250V/µs slew rate; 63MHz bandwidth; 70mA peak current drive capability; an input impedance of 500 trilohms (5 x 10¹¹ ohms!); and an output impedance of only 2 ohms! Not long after I decided upon the BUF-03, I learned that Kinergetics uses it for the output stage of their KCD-40 CD player. Mike Moffat also uses it for the output buffer in his Theta DS Pre and Pro converters; according to Mike, the BUF-03 is internally biased to class-A.

So if you've marveled as I have at the sound of one of the Thetas, you've already heard audio through the BUF-03. It's fast, clean, and about as neutral as any single active device I've yet encountered. It's also expensive. [My 1986 edition of the TAB Books Linear IC Handbook quotes a small-quantities price-range of $11 to $35 each for the BUF-03, depending on specification—Ed.]

**I'm a widdle ALPS pot, short and stout**

By placing the BUF on the output of the pot, I achieved both of my original design goals: it lowered the output impedance to a couple of ohms, and since the BUF's own input impedance is so insanely high, it freed me up to go to a higher-value pot, thus raising the input impedance of the preamp. Of all the different pots I tried, the best-sounding was the high-grade black ALPS 100k pot. Joe Grado uses his HPA-IDC headphone amplifiers. Unfortunately, while Joe was very gracious to sell me one, he's not in a position to sell any more; it seems ALPS only wants to ship these super-pots in very large quantities, so now that Joe's got his stash, the only places they're going are in his headphone amps (and Melos's, who get their black beauties from—you guessed it—Joe). I feel bad telling you about this great pot that you can't get, so the second I find someone willing to sell them, I'll let you know. Other pots that worked well included the 10k and 20k versions of the Penny & Giles and, surprisingly, a $2 ALPS pot recommended to me by no less than John Curl! Radio Shack carries it under part #271-1732, and it's actually not bad at all; sure, the interchannel tracking isn't so great at lower volume positions, and it is a little grainy-sounding when compared with the P&G and the high-grade ALPS, but this little pot tied to a couple of BUF-03s kills a lot of highly regarded preamps out there for just a handful of change. And it's just the pot to use while you wait for me to figure out a way to get you the black beauty ALPS.

**I have only one itchin' desire: let me stand next to your wire**

More than any other part of the preamp, here's where I say, "Knock yo' bad se'f out," because

---

4 Though the BUF-03 is a little noisier than the best integrated-circuit op-amps, this will not be apparent in systems that don't use ultrasensitive power amplifiers driving horns. —JA
Announcing an amazing new amp and preamp from the world-renowned design wizard of PS Audio and Superphon, Stan Warren. You've never heard such natural sound—even at double the price! For a limited time you can get these high end components at incredibly low factory-direct prices through Audio Advisor.

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nobody agrees on wire! Whether 'tis nobler to use solid-core or multi-strand, copper or silver, twisted pair or coax, it's ALL UP TO YOU. I wired up my preamp with the twisted-pair inner conductors of Straight Wire LS1-Encore; with the white leg used for signal and the red leg tied to ground at the RCA jacks but left floating at the circuit board, isolation between conductors is higher than if I'd simply used single legs for all the hookup. Again, though, use whatever you like; most cable manufacturers will sell you a few feet of unterminated cable for you to use as hookup wire. And remember to ask the manufacturer the best way to tin the wire; some, like Straight Wire and Cardas, have each individual strand insulated in a high-temp varnish or Urethane, and these need special care during tinning.

Don't want to spend the money? Wanna wire this thing up NOW? My wire spy, a well-known cable designer who I'll call "Deep Dielectric," recommended to me yet another low-cost, good-sounding Radio Shack product: their 24ga solid-core "Rainbow Wire," part #278-857. This two-conductor ribbon cable uses good-quality copper solid-core and polyethylene insulation; just separate the black and white wires and twist them into a twisted pair, again tying the black to ground at the jacks but leaving it floating at the circuit. I tried the "Rainbow Wire" in the circuit, and it sounds real good; at 10¢ a foot, how can you lose?

I built my own "hi-fi" AC cord using a length of Kimber speaker cable and a heavy-duty AC plug, and it definitely improves the sound. You can build one like mine, or buy a ready-made AC cord from Ray Kimber which, unlike mine, sports a cool-man textile-weave outer jacket to protect the wire from nicks and other damage. Whichever route you take, spend some time listening to the preamp with the cord plugged in both ways; I found the correct AC polarity to be very audible with this preamp, and an incorrect plug orientation will result in shut-in highs and a reduction in soundstage width. And wars.

El cajon esta muy cheesy
As for the chassis, I used a pretty cheesy-looking aluminum "BUD box" I got at a local Surplus Hut which I swear gets all its salespeople from a prison work-release program. But their prices are right, and I can usually barter with cartons of Marlboros and girly mags. And although I don't usually care what my gear looks like, the bare aluminum box was just too "Junior's First Electronics Project"—looking, so I stuck a black 19" rack panel on the front to hide the preamp's cheesy origins. Again, whatever you want to use is fine, so long as there's enough room for the circuit.

The supply's the thing
I already beat this dead horse like Chuck Barris' gong in my PLG roundup elsewhere in this issue, so I won't get the soapbox out again. I'll just say that the quality of the power supply is so important, especially in such a simple circuit as this one, that if you aren't willing to take the time to build something a little better than a couple of 7815/7915s and some cheap 'lytics, don't even bother with this project; all the potential of this design will be wasted if you couple it with a mediocre power supply. In his column in the Four/90 issue of Audio Amateur,^ Gary Galo details a high-quality power supply, based on Linear Technology regulator chips and designed by Walt Jung and Rich Markell, that works extremely well in this preamp. I've included the schematic here, along with the suppliers for all the parts. I used AudioQuest Type 2 speaker wire stripped and tinned with Wonder Solder for the power-supply rails and ground, but any good heavy wire will work here; just be sure you guard it against oxidation by tinning it.

The bleeder resistors, R7 and 8, are there to ensure that the supply draws the minimum 10mA current it needs to work properly. They also make it possible to build and check out the power supply without having to have it hooked up to the buffer circuitry.

Switch it; switch it good
I found a really good, inexpensive switch to use: the Electroswitch model 900A. It's got silver-plated brass contacts and six positions, and it's held up to over six months of constant twiddling. I'm told this is the switch The Mod Squad used to use in their Line Drive, and after using it for a while I know why they switched

5 P.O. Box 576, Peterborough, NH 03458-0576. Tel: (603) 924-9464. Fax: (603) 924-9467. This issue is available as part of the complete 1990 set for $26 including S&H. Although some of its contributors come across as ham-radio geeks, Audio Amateur is always full of interesting DIY projects for those inclined to roll their own; AA also carries advertisements from a large number of parts suppliers. A one-year subscription (four issues) costs $20 and is worth it for the Classifieds section alone if you're a vintage-vulture.
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switches: it feels rather cheap. Even though it sounds great, the 900A feels like a lightweight, not at all like the Heavy Duty Judys on a lot of the high-dollar gear. If you must have a switch that feels like a mains breaker, there are plenty available, but they may not sound as good as the Electroswitch. And if you don't mind a separate toggle switch for each component, C&K makes a really good-sounding DPDT switch called the 7203 which also sports silver contacts and is widely used throughout the high end by Theta, ARC, and others.

**Star grounding is alive and well and living in Paris, TX**

One feature I've always incorporated into my self-built gear is star grounding; every point in the circuit that needs to tie to ground (RCA jacks, the pot, circuit ground, etc.) is taken via its own separate ground wire to a single point, where they're all connected and either tied to the chassis or left floating. Many designers feel that star grounding contributes to a more open, transparent sound, and I agree. Whether or not you tie the single ground point to the chassis is up to you; connected, the circuit is better shielded from RFI, but some designers like Mod Squad prefer the sound when the ground isn't connected to the chassis. Knowing as I do just how much RFI is swarming around at all times, I tie my chassis to ground, and it sounds fine.

**Construction details**

A design like this is pretty simple for the experienced constructor, so there aren't too many guidelines to lay out. Definitely make sure you use RCA jacks which come with isolation washers, like the Tiffanies or the Vampires, in order to keep the jacks from touching the chassis; the only ground point in the entire circuit should be that single point ground mentioned earlier. Mount the 470μF supply bypass caps (with their 1μF bypasses) as close to the BUF-03s as you can to ensure a solid path to ground for any noise. And even though they may look more "professional," printed circuit boards degrade sonics; hard-wire everything together with high-quality wire and you'll get far superior sound.

Resistors R5 and 6, 10 ohm Holcos, are optional. John Curl recommended them to me in light of the BUF-03’s tendency to ring at around 30MHz in the presence of highly capacitive loads, and the resistors are there to isolate the load and minimize the danger of ringing. Alternately, Mike Moffat uses the BUF-03 without isolation resistors in his Theta units, tying the BUF’s output lead directly to the output jack. I initially elected to go with the resistors, but an interesting situation recently arose when I got my hands on a pair of the new Grado headphones. Although my preamp seemed like a natural to drive the 'phones, the resulting sound quality was pretty underwhelming, not at all what I'd heard from them with other gear.

I couldn't for the *life* of me figure out why until I learned that the Grado headphones have a 40 ohm impedance; with the best 10 ohm Holcos on the outputs, my preamp had a 12 ohm output impedance, hardly the best match for the Grados. So I removed the resistors, tied the outputs of the BUF-03s directly to the RCA jacks, and ¡Dios mios! Now the Grados came alive; the bass became leagues tighter, more powerful, and the smeared quality I'd heard throughout the upper midrange to lower treble was gone, replaced with the extreme transparency I'd heard on previous occasions. Even the sound over my Spicas/Muse Model 18 was clearer, with an audible increase in detail. So...even though John Curl has a point about the potential for ringing, I recommend leaving the series output resistors out unless you plan to use very long, high-capacitance cables.

As you may have noticed, I didn't include a balance control in Aunt Corey's Homemade Buffered Passive Preamp. Personally, I've never needed one, but if you do, try using two mono pots for volume instead of adding a dedicated...
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Intermezzo, Op. 117, No. 1
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balance pot to the circuit.

Trimpots VR3 and 4 are there to null out any residual DC offset from the BUF-03s; after letting the unit warm up for an hour or so, measure the offset with a voltmeter set for DC volts on the lowest scale, with the red probe contacting the signal side of the RCA output jack and the black probe touching ground. Tweak the trimpot until your meter reads 0V DC, and repeat for the other channel. You may want to check the offset again in a few weeks to make certain it hasn’t drifted, but if you use high-quality trimpots like the specified Bourns unit this shouldn’t be a problem.

Make sure you attach heatsinks to the little BUF-03s, as these class-A buffers run real hot. You can find suitable TO-99-size heatsinks at most electronics huts including Radio Shack.

And lastly, use either Wonder Solder or the identical Ersin SN62 (available at Radio Shack, albeit in the tiny-tunes gauge, part #64-013) for all soldered connections; solder is audible, and Wonder/SN62 sounds better.

Good luck, and happy listening!

Editor’s postscript
Note that the homemade buffered preamp’s apparent simplicity is deceptive when it comes to its actual construction. If you have never built an electronic component before or if you
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have no soldering experience, successfully completing this project will be difficult. At the minimum, you will need a good 15–25W electric soldering iron, cable-strippers, needle-nose pliers, a small side-cutter to trim leads and wires, normally-closed tweezers to clip to the IC leads while you solder, a solder-sucker to undo erroneous connections, a multimeter, a steady hand and eye, and a willingness to learn from your mistakes. I also recommend buying one of those "third-hand" part holders from Radio Shack.

Part of the fun in constructing any electronics project is the hunt for the specified components or suitable alternatives. A minimum list of suppliers is mentioned in the sidebar, Stereophile cannot help readers obtain parts for Corey's buffered preamplifier. Nor can we help with faultfinding or repair of completed preamps that fail to work. However, Corey welcomes feedback from readers who have successfully constructed this design, particularly if they've achieved sonic success with different parts or cables, or even done something completely gonzo such as use a separate power supply for each channel. Write to him at Stereophile, P.O. Box 5529, Santa Fe, NM 87502. Fax: (505) 983-6327. with "Homemade Preamp" written prominently on the envelope or Fax cover sheet. —John Atkinson

### Parts List

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<thead>
<tr>
<th>Potentiometers:</th>
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<tbody>
<tr>
<td>VR1: Your choice of ALPS &quot;Black Beauty&quot; 100k stereo audio taper pot, Penny &amp; Giles RF15-2-20k: A 20k stereo audio taper pot or ALPS &quot;Budget Gourmet&quot; 100k stereo audio taper pot (Radio Shack part #271-1732).</td>
<td>VR2 &amp; 3: Bourns 3386-OT1 5k sealed trimmet miniature trimpot.</td>
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<td>Buffers:</td>
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<td>IC1 &amp; 2: PMI BUF-03AJ milspec version. (The ineptulous can experiment with the less-expensive BUF-03J and -EJ commercial versions, which have reduced slew rates and drive capabilities, but these have not been auditioned.)</td>
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<td>Switches:</td>
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<tr>
<td>SW1 &amp; 2: Electroswitch 900A two-pole six-position rotary switch (see text).</td>
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<td>Resistors:</td>
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<td>R1 &amp; 3: 1k</td>
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<td>R2 &amp; 4: 12.9k</td>
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<td>R5 &amp; 6: 10 ohms</td>
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<td>R7 &amp; 8: 1.5k</td>
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<tr>
<td>All resistors 1/2W metal-film such as Holco, Resist, Vishay, etc.</td>
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<td>Capacitors:</td>
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<tr>
<td>C1, 3, 8, &amp; 10: 4.700µF/35V Panasonic TSW C2 &amp; 9: 100µF/25V Panasonic HF C4–7 &amp; 11–14: 0.01µF/100V film-type C15–18: 470µF/35V Panasonic HF C19–22: 1µF/50V Panasonic V</td>
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<td>Diodes:</td>
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<tr>
<td>D1–4 &amp; 11–14: 50 SQ100 Schottky Barrier Diodes, or simply use one 6A, 100V bridge rectifier each for D1–4 and 11–14.</td>
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Stereophile, November 1991

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SIMPLE SOUNDS BETTER

Threshold’s Nelson Pass talks with Thomas J. Norton
The Claw was an astonishing piece of equipment—the police showed up every time we fired it up!

those products; just about every trick in the book that you might ever want to learn could be found somewhere in the internal workings

1 Peter Werbach went on to found Linear Power, the outfit that makes auto sound amplifiers. He died flying his plane in 1984, up in the area where I live—got caught in the weather.—NP
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and such. So we decided in late 1973 to start a company. Initially we didn’t really have a good handle on what it was we wanted to do. We certainly had some expertise in loudspeakers, but we wanted to put a little distance between ourselves and ESS. In addition, doing electronics puts you a bump up in a field where hundreds of people are building loudspeakers in garages and such. I think at the time there were some 180 loudspeaker companies, but there were much fewer in the way of electronics. So that gave us a little clearer field.

**Doing electronics puts you a bump up in a field where hundreds of people are building loudspeakers in garages.**

The 800A amplifier was our first product. It was in development for about a year prior to its release, which was at the beginning of 1975. Actually it arose out of a trip that we made in René’s bus down to Moaning Caves—

**TJN: Moaning what?**

**NP:** Moaning Caves. It’s south of Sacramento, going up into the foothills—a tourist attraction. It was a three-hour drive, and I was in the back of his bus with nothing to do. As is very often the case, creativity spins out of boredom. It was pretty clear from what was going on in the marketplace that amplifiers using class-A were starting to enjoy some attention. Some of the limitations in the products that were out there at the time were becoming recognized. The solid-state amplifiers of that time were poorly biased class-AB or even -B devices. And it was fairly clear that their sound suffered some serious limitations.

**TJN:** That’s what caused the rejuvenation of some interest in tubes in the early to mid ‘70s; the early solid-state amps weren’t that good. **NP:** I think it sustained the interest in tubes at that time. The amplifier I thought of as a reference subsequent to that was the Audio Research D-150—which I still wish I had a sample of. In any case, it was pretty clear that class-A was definitely the way to go in amplification, but it was also, from a physical standpoint, a very difficult proposition. People would want class-A performance but at the same time—this was in the heyday of Phase Linear—they wanted a lot of power.

**It was pretty clear that class-A was definitely the way to go in amplification.**

Just sitting in the back of the bus, the brainstorm I had was of simply being able to dynamically vary the bias. Having decided that a variable bias scheme would be appropriate to tackling that problem, it became quite apparent that there were several ways of doing it. So with René’s money we began researching that—building prototypes, listening to them, and playing around with them. By late 1974, essentially a year later, the design was done. That was the 800A.

**Threshold 800A amplifier**

There were a number of other things about the amplifier, actually, that were rather unique. It was probably the first triple-series amplifier, certainly the only one I’ve ever seen. Jim Bonigorno would undoubtedly call up and dispute this. It was triple-series, triple-parallel output stage, and that was one of the methods that we used to allow it to dissipate so much energy with the semiconductors available at the time.

When we were working with this first prototype, Phil Colelho of ESS—we maintained good relations with ESS—suggested that we go down and see this audio fiend he knew named Joe Sammut. Sammut had Dayton-Wright XG8 electrostatics—very difficult to drive—a stacked pair running in parallel, so it was doubly difficult. The 800A had some really complex circuitry to monitor conditions. We had set the current limiting where the 800A would deliver, I think, 30 to 40 amps for very brief periods of time—say, 10 milliseconds or so—and about 20 amps on a continuous basis. From all that.

2 Founder of GAS (now defunct) and Sumo (with whom he is no longer associated). He has an impressive track record of his own for innovative design, and is not known to be shy about defending his credits.

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Stereophile, November 1991
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we could see that was certainly more than anybody would ever need. So we hooked it up to Sammut's speakers and put on some music. It lasted about 15 seconds, then it shut down. We drove all the way back up to Sacramento, where I opened up the protection circuit, then we drove back down again.

Sammut was a really nice guy about all this. He was always available for us to test with the speakers—he was looking for something that would drive them. He had a bunch of old Mac tube amps at the time that were doing a pretty credible job, but he was looking for better. The second time around we probably lasted about a whole minute in this system. Finally, the third time around, I just simply clipped out the circuit that did the limiting, and it drove the speakers very well. Sammut was very pleased; very shortly after that he became the third partner of Threshold.¹

**TJN:** You stayed with the variable-bias design right up to the point where the Stasis products were introduced?

**NP:** Yes, we stopped using the sliding bias—actually, dynamic bias is the phrase we've always used—until the Stasis amplifiers were introduced. That would have been, I think, late 1978.

**TJN:** I've noticed recently that you have upgrades available for most of your early amplifiers. What do these upgrades consist of?

**NP:** Within the context of the chassis, the original power supply, the heatsinks and so on, what we do is we replace the sonic circuitry. In the case of the older product, which was non-Stasis, and even the earlier Stasis models—the 1, 2, and 3—we replace the output stages completely with a later design. And we replace the front-end circuitry associated with the amplifier. If the power-supply capacitors have exceeded ten years of use we replace them, and the rectifier diodes, and those things which have a tendency to wear over time, so as to keep the device reliable for another 10 years or so. Basically the program encompasses everything except the CAS-1 and the CAS-2. Those are products where we haven't really perceived that there's going to be a significant market of people looking for upgrades.

**TJN:** Do you have any particular priorities, other than the obvious one of sound quality, when you approach the design of an amplifier?

**NP:** Well, I suppose everyone, when they settle down to do creative work, likes to think of themselves as artists. In that regard I see myself as primarily a circuit topologist. That's what interests me—it's the basis of my patents, and it forms the central thrust of my design effort. I like very simple topologies—the simpler you can make an amplifier, the more likely there is be good correspondence between the sonic performance and what you measure on a bench. The more complex, the less likely that is to occur. Having been through other designers' amplifiers for years and years now, I've come to learn that the amplifiers everyone regards as classics—the ones that stand out over the years—if you look at them you find that they were fairly simple topologies. And they were elegant—they are elegant. So I strive for that.

I see myself as primarily a circuit topologist.

**TJN:** If the idea is correct, if the topology makes real sense, the amplifier will tend to function right off the drawing board.

But at the same time there's quite a bit of room for creativity. The dynamic bias was one such example, I think. The Stasis amplifier certainly stands out as probably the premiere example of a simple, creative topology that's done a very good job and stood the test of time. It's my fundamental belief that if the idea is correct, if the topology makes real sense, the amplifier will tend to function right off the drawing board with very little extra work required. So as a rule, we don't spend a lot of time tweaking the individual values of capacitors and such. You certainly have to go in and make all of those adjustments, but I've seen other manufacturers who start out with a design, then tweak it at length in an exhaustive series of adjustments until they finally get what they want. I'm a lot happier with a design if it rapidly converges on proper performance. If it doesn't, I think there's something fundamentally wrong with the approach.

**TJN:** I'm curious about the gestation process you go through designing an amplifier. How do you normally operate from, say, a clean sheet of paper? Though this is probably never the case because you're always building on

---

¹ Joe Sammut is now Chief of Operations for Krell Digital Inc. —JA

Stereophile, November 1991
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NP: Building on previous designs is an economic requirement. That is to say, there has to be a significant amount of continuity in how a designer's series of designs evolves. It has a lot to do with the success factor of the company. If you have a concept that you've taken to market and sold people on and which they're buying, you can't simply dump it and introduce a radically new idea every year or so. The instability would kill the company economically. So we look at what the market needs out of us. It needs an evolutionary approach to design, and that is what you see.

When I'm alone with a blank piece of paper, almost anything can come up. Quite a few of the ideas are perfectly workable, but they're not appropriate. If it's a truly good idea we'll find a way of slowly introducing it without a lot of disruption. But continuity is very important when you're turning millions of dollars in product. And the dealers don't want a radically different product every year.

Having said that—well, I find that ideas just kind of bubble to the surface. You don't push the river; it flows by itself. Basically the ideas take time to ferment. Quite a few of the things that we've done were thought of by myself or occasionally other people for quite a long time before the time was right to get serious about them. The Ion-Cloud loudspeaker had been bubbling around for years; the Phantom Acoustic Shadow is a product that we were talking about ten years ago. And there are a whole host of as yet unused ideas. Their time will come.

I find that ideas just kind of bubble to the surface. You don't push the river; it flows by itself.

There will be a time in which the company is poised to use them; there will be a point at which the market might be more receptive to an idea. It's a lot easier, as you might understand, to develop products which conform to popularly held ideas. High-current, high-powered class-A amplifiers are a perfect example. There's every good reason why they'd be popular! But to go out and pioneer a product is quite a difficult and expensive thing to do. And again, economic considerations keep you from doing quite a few things that are interesting.

TJN: You discussed your interest in circuit topology. It used to be thought—and still is outside the high end—that circuit topology, the actual circuitry itself and its layout, was the all-important parameter in amplifier design. Then along came a few rebels ten or so years ago arguing that parts—not just quality parts per se, but type-specific resistors, capacitors, and whatnot—were at least as important, if not more so. What are your feelings on the tradeoffs involved in the actual topology or circuitry vs the parts used to realize it?

NP: They're both important. Going beyond the recognition that high-quality parts give high-quality results, all other things being equal, the other thing is that the highest-quality construction and components represent the appropriate embodiment of what I consider to be exquisite ideas. But in terms of capacitors, wires, and such, first off, there's a lot in that. And there are the differences that people hear; it's highly appropriate that these items should be pursued.

There are times when I feel that there is a fair amount of overemphasis in those areas. Example: your capacitors, resistors, and all the elements that people are popularly replacing in, say, a power amplifier or preamp. When you look at the kinds of performance variations and the degradation offered by, say, a reasonable-quality capacitor, and compare that to, say, what a transistor might do, you recognize that the distortions of the transistor are going to be much higher than what you're going to be able to measure with a capacitor. The variations in tolerance are enormously higher. I mean, you're talking ±100% tolerances on transistors.

There is a reason why we go to the trouble of selecting devices as extensively as we do: When a manufacturer makes them in batches, he can't offer a selection process in any sort of economical sense. So there hasn't been enough emphasis on the quality of the semiconductors. For the most part they have an even greater influence in parts quality. People feel that they understand capacitors and wire better. It's true that a semiconductor is a fairly unfathomable black box with three pins, but I think that's where most of the action is. We use as high a quality parts as we consider to be reasonable, and always in the context of what we think people are willing to spend money on.

TJN: You mentioned earlier that you feel that a circuit topology is best when it comes toge-
ther rapidly. At that point, do some manufacturers tend to tweak more than you would feel to be desirable? At what point do you give up designing for available parts values and decide to bite the bullet and have custom parts made? You use custom transformers and capacitors in some of your products—I'd guess that price has a lot to do with this.

NP: Well, the transformers are all custom, and the heatsinks and metalwork are fabricated for us to our spec. We generally pick, for power supplies, computer-grade capacitors—I prefer Mallory as a vendor—and we try to pick powersupply capacitors that are reasonably common, because you can have supply problems in those areas. The lead times are very long. Twenty-week lead times do exist there, and if you find yourself with problems either in the quality or availability of a batch of capacitors, 20 weeks is a long time to not ship any product. For all intents and purposes, there's really not any such thing as a custom power-supply capacitor, and there really isn't all that much in the way of custom signal capacitors either. I mean, a couple of outfits are doing some interesting things. I don't put a lot of emphasis there. We do use WonderCaps in one of the preamplifiers, but as a rule I'm very happy with polystyrenes if I can get them, and polypropylenes and polycarbonates.

TJN: Is 20 weeks about typical for the parts you use in your products?

NP: That's the outside. Resistors can be obtained in a matter of a very few weeks. Twenty weeks is about as far out as it gets.

TJN: Is parts supply one of the reasons for the lag—sometimes over a year—between the showing of a product at a CES and the time the product actually appears in the dealer's soundroom?

NP: The delay is more associated with internal testing and documentation than supply lead time in and of itself. One of the reasons for that is that, in almost all cases, considerably before the design has been frozen and gets documented, you know what the longest-lead-time parts are going to be, and you've settled on them: heatsinks, power-supply capacitors, transformers, semiconductors. You can pick up five to ten weeks. The time for us between the finish of a design and its actual release is about four months.

TJN: Tell us a little bit about your new Forté amplifiers, the 4 and 5.

NP: They use a new output semiconductor called an IGBT—which stands for Insulated Gate Bipolar Transistor—which is a couple of years old as an n-channel switch device. Toshiba recently developed very linear complementary devices, specifically for audio. When we ran across those they looked extremely interesting; we acquired some and began working with them. I should point out too that I don't take the design credit on that particular product. The front end and some other pieces are mine, but the amplifiers are primarily the work of a Swedish engineer, Michael Bladellius—we brought him over a year ago.

The IGBT is a very interesting device. It's a hybrid, functionally between a MOSFET and a bipolar. It has more or less the input characteristics of a MOSFET and the output characteristics of a bipolar. Its input is characterized by transconductance—its transconductance is higher than you find normally with a MOSFET, but it's still a transconductance characteristic. It has a low output impedance, as is found in a bipolar, but wider bandwidth than you see with a bipolar. It's also quite linear, in this case sufficiently linear that the performance that we get on the Forté amplifiers is achieved without a feedback loop, much as in the Stasis amplifiers, but with a different approach.

Forté Model 4 amplifier

TJN: So you've been able to reduce the feedback considerably compared with the earlier Forté amplifiers?

NP: Well the Forté 1a and 3 had feedback loops around the amplifier; that is, the output of the amplifier went back to the input and was mixed with incoming signal. In these new amplifiers there is isolation between the input stages and the output stages, and each has far less influence on what the other might be doing. So they're independent. There's feedback around the front end itself, which sets the gain for the system, so there isn't any variation there. And there's a proprietary bias circuit which we have a pat-
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ent on. Then just simply the IGBTs used as followers. We run them in parallel sets.

TJN: MOSFETs have been touted as having both tube-like characteristics and self-correcting thermal characteristics with no need for real thermal protection. Do these new devices fall into these categories?

NP: They do have some secondary-breakdown characteristics so they're not completely as rugged as a MOSFET. There's a bipolar element to the power, and you do see some minor secondary-breakdown characteristics at high voltage levels, but it's nothing we have to worry about in devices in this power range—which is up to 200 Wpc. They're quite rugged.

The thermal characteristics are quite similar to that of a MOSFET. That is to say, they're thermally stable. It's interesting to note that, contrary to what people believe, a MOSFET itself starts out at low-current with a positive temperature coefficient. It's only at the higher current levels that it starts exhibiting a temperature characteristic where the current decreases with temperature. So if you're biasing-up a MOSFET amplifier in class-AB, you actually find yourself with a wandering bias in much the same way you would with a bipolar. When you get them up to class-A or near class-A conditions, then you start seeing the real effect of that negative temperature coefficient.

With a hybrid device, one would expect, and one gets, hybrid performance. They have some of the [same] kind of tube characteristics or MOSFET characteristics that have been associated with devices which have transconduction characteristics. But they also exhibit more dynamic range, and greater punch than I've come to expect of MOSFET designs.

[I asked Nelson if he'd like to delve into other areas...]

NP: The notion of simplicity ties in a bit to short- or long-lived trends—I don't want to call them fads—where the emphasis in electronics has been in one area over another. When Threshold first started out, back in the Phase Linear days, high power was the item that was going to deliver the performance that everybody really wanted. The emphasis was on high power. Then, high power and very little distortion, so that static figures—getting those double-o distortion specs—became very important to everybody. But people still weren't satisfied with that. "How come tubes still sound better?" was a very common refrain.

The focus then shifted to slew rate and TIM—low amounts of feedback and high-speed circuitry—the idea being that high-speed signals would somehow confuse an amplifier. People began building fast amplifiers and, lo and behold, quite a few of those fast amplifiers sounded significantly better. The interesting thing was that in order to achieve that higher speed, they had to make the circuits simpler. I don't think it was actually a cause-and-effect relationship. I think that for the most part the higher-speed circuits sounded better because it took simpler circuits to get high speed with stability.

I think the higher-speed circuits sounded better because it took simpler circuits to get high speed with stability.

However, there were some examples of very high-speed circuits out of some companies—who shall remain nameless—where they were doing 1000 V/μs but everybody thought they sounded pretty bad. And tube circuits aren't so fast, especially after they get through the output transformer. The notion of measuring slew rate on a tube power amplifier doesn't make a lot of sense because you don't ever get to observe slew as such.

After that, though, the focus shifted to class-A and high current. High current seems to have been the real thing that a lot of people began buying by. In other words, they stopped worrying about what the distortion spec and the slew rate were and simply wanted to know how many amps it would put out. And we, along with other high-end manufacturers involved in the race, have been able to demonstrate how much high current we can deliver. I believe we are the champions of that, and I say that only because we've publicly demonstrated output currents on amplifiers in excess of 200 amps. I haven't seen a similar demonstration elsewhere. But in fact, we do get output currents for brief periods of time that will go up to those levels, with fairly low distortion. I've got some examples of amplifiers where the output current is ± 100A sinewave into, say, a 0.1 ohm load, at about 1% distortion. Not bad at all. And there really isn't any limiting built into the amplifiers. In our latest brochure we published...
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the curves of all of our amplifiers at 8, 4, 2, and 1 ohm, and they actually hold up pretty nicely.

There is some reason to do this. Some loads that are out there do go below an ohm. Quite a few of the electrostatic designs have been observed to hit points below an ohm. Some of the woofers from major manufacturers go down below an ohm. And when you start looking at that you can see that there's some merit to having that much current. You can also view it from the standpoint of the engineer's bias. The engineer always says, "Well, if an amplifier is going to be called upon to do say, 10 amperes, then let's just put a 10:1 margin on it." This is a very common thing. I've heard John Curl say it, I've heard other designers say it . . . Well, 10:1 is pretty good. That sort of thinking was being used also when people were dealing in slew rate. A 1000V/µs slew rate was, at one time, obviously state-of-the-art, but it was also being touted as "you need this!"

One of the most fascinating tests I ever ran was one of those "let's go see how many teeth the horse really has," as opposed to discussing it, kind of things. By the way, Peter Walker of Quad did exactly the same thing at the same time—two minds, at least, thinking alike. We decided to find out in real life what kind of slew rates were really occurring. Then, operating off that basis, you can come up with your 10:1 figure that you need to achieve. So I built a differentiating circuit—this was pre-digital—and using a very high-quality moving-coil cartridge and step-up system that was certainly not compromised with regards to bandwidth, I simply played music into loudspeakers near the capacity of the amplifier, which was 200Wpc on various types of recorded material.

We decided to find out in real life what kind of slew rates were really occurring.

On record ticks and pops I could register slew rates as high as 20–30V/µs—real signals that were being processed through the differentiating network and then onto a storage scope. So it came time to play some music. Again, if you clipped the amplifier you could see 40 and 50V/µs recovery; that is to say, the amplifier, in catching up from clipping to get to where the signal was, would travel that fast to catch up.
So clearly the system—the amplifier and the measuring system—were capable of resolving 40 and 50V/μs transients. In playing music we were looking at piano, cymbals, violins—a large range of instruments all played loud, near the power capacity of the amplifier. And we were getting values like 0.1V/μs, 0.5V/μs. In fact, at that time in that series of tests, the highest transient we were able to achieve was about 1V/μs. So the 10:1 ratio would dictate that you would need at least 10V/μs performance. That was somewhat faster than some of the slow amps that were being criticized at that time, which were in the 4 and 5V/μs range. But clearly, I didn’t see where slew was overloading them as such.

**TJN:** You mention that the slew rate of record tickets and pops was quite a bit faster. Was their level so low that it didn’t cause problems?

**NP:** No, it was a factor. Subsequent to that, though, the Sheffield *Drum Record* was used in a test and we started getting figures into the 5V/μs ballpark. And those were rim shots. In fact, as far as I can make out, rim shots present the fastest transient that I’ve seen on a recording. The Sheffield *Drum Record* was the fastest example that stands out. I haven’t seen anything like it since. But given that you’re on the 5V/μs rate, we ultimately settled on approximately 50V/μs as a speed beyond which was fine, but it became a minimal figure that we deal with in our designs.

There are other design elements where we depart from the mainstream. One is that we use single-ended input stages and initial gain stages. The output stages are complementary; push-pull. That’s a necessity: a single-ended stage in that area would make class-A look efficient. Push-pull class-A has a 2:1 efficiency, a 50W output requiring an idle of 100W. But a single-ended 50W output requires an idle of 200W; not only that, it current-limits at exactly that point, no more, whereas a push-pull can at least extend in higher currents into class-AB.

So there is every reason in the world why nobody’s building single-ended output stages. But those conditions don’t constraining the rest of the front-end circuitry which doesn’t have to deliver a lot of current. The overriding consideration here—and this relates to people’s perception of absolute phase; audiophiles who believe in the importance of absolute phase are, I believe, essentially correct—is that air is single-ended and is not symmetric with regard to plus and minus. True, the nonlinearities and the asymmetry are quite small in the level that we normally like to think of, but in fact, when you’re in the high end you’re dealing with subtleties. This is a subtle thing, but it’s real.

It so happens that if you vary pressure around, say, a static 14psi pressure, you can’t go any lower than zero, but you can certainly go much higher than 28. The characteristic of air is not symmetric in both directions. This means that there’ll be a different characteristic off of say, a, bass drum pulse, positively phased versus negatively. I think that that’s one of the areas where absolute phase has some measure of importance. And because air is single-ended (I think that the ear is also a single-ended mechanical structure), single-ended distortions don’t stand out as much to the human ear and brain as symmetric distortions. And so I prefer even-ordered harmonics: second-order over third-order, fourth-order over fifth. That’s consistent with a slight asymmetry. We always set up the amplifiers so that the asymmetry of the front end is the same polarity as what we expect that of the signal to be. And what we expect to see in the case of the way the atmosphere will behave responding to the loudspeaker. Toward that end, that’s why we use single-ended gain stages in the earlier stages of an amplifier. This is in contrast to quite a few other people who go with push-pull symmetry, which has a way of lowering distortion but also pushes the distortion energy into the more-discriminable odd-order harmonics.

**TJN:** Have you ever been tempted to design tube products?

**NP:** I have designed tube products, but they’ve never wandered outside the lab. I like tubes; I have no problem with them. Because there are limited varieties and because they only come in one kind of device—what you think of as an n-channel type of device—you’re limited in the number of ways you can use them. So large numbers of potential topologies are not available to you. As a topologist, they become less interesting to me for that reason.

But I’ve designed tube amplifiers, preamps, and crossovers. To market them would not be consistent with the activities that Threshold is involved in, and we’re not really looking to have people ask me why I’m doing tubes when they’ve come to expect solid-state, and so on.

But I have a number of thoughts about tubes. The most fundamental is that they enforce, in
design, one of the basic tenets that I hold dear: that, all other things being equal, simple circuits sound better. You can't put 57 tubes under the hood of a preamp. But of course you can do so in an IC, which typically has a large number of devices, or even with discrete solid-state. I work very hard to enforce simplicity as part of the design process, and tubes can even take an inept designer and at least see to it that he doesn't make his design too complex.

TJN: What are your feelings about the whole digital/analog controversy?

NP: By the time this hits the stands, we will have a D/A converter of our own on the market. I haven't been deeply involved in the controversy so far, of course, because we don't manufacture or haven't dealt in anything that provides source. We've been very happy making amplifiers and doing what we do best. Solely from an economic standpoint, CDs have been a tremendous boon to the industry. We saw our sales quadruple over the period of time that CDs became popular, and I attribute much of that growth and the growth of our competitors to the heightened interest in audio that CDs have brought. So, whatever else you might think of them, they've been very good for the industry.

I like CDs and at this point I listen to CDs almost exclusively. I have some older vinyl that I treasure dearly, primarily for the material that's on it. I have heard examples of vinyl that sound better than their CD counterparts, and I'm not really surprised by that. But CDs are here, they seem to be the reference that everyone is using at this point. René Besne has always been a great believer and promoter of digitized signals, going back to when Thomas Stockham began Soundstream and began recording for Telarc. We became marginally involved in some of those activities. I joined the bandwagon somewhat later. But again, I don't have deeply held feelings about the sound of CD vs vinyl. They're different. And I suppose if I really had my druthers I would take a nice, high-speed, non-Dolby analog tape. Some of the best things I've ever heard came from that source.

If I really had my druthers I would take a nice, high-speed, non-Dolby analog tape.
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Audio Research Classic 150, a direct physical descendent of the M-300 monoblocks and a logical sonic evolution of the D-125 stereo amplifier, was the first of the "Classic" series of tubed amplifiers from Audio Research Corporation (ARC). ARC has quietly continued to improve the 150's performance (as well as that of all of their products). The big news about the 150s and 120s has been the change from 6550 output tubes to Chinese KT88s (which will soon appear in all Classic 60s and 30s as well). This change was made in early 1991 for the 150s. Nonetheless, the price of the 150s has remained the same at $4995 each ($9990/stereo pair). Finally, there is now an option for balanced operation available for all four of the Classic series of amplifiers ($400 for monoblock pairs, $300 for stereo amplifiers).

The Classic 150s are monsters, weighing in at 110 pounds each. The elegant and simple front faceplates are finished in brushed aluminum with black highlights and a raised ARC logo (optional black faceplates are available). On the front are toggle switches for power on/
off, mode standby/operate, and fan speed high/low. There are also LEDs indicating if the amp is on (green), the mode of operation (yellow = standby, green = operate), and high-voltage status (green = operate, dimmed green = Tube Saver circuit activated). There are also two fuse holders on the front faceplate (not on the back or inside) for power line and high voltage.

The standby mode increases the bias on the output tubes to put them into a nonconducting state, although sound, albeit grossly distorted and low in output, can come out of the amplifiers in this mode. In the standby mode, the amplifiers achieve operating temperature and circuit stabilization. ARC recommends leaving the units in standby for 30 minutes before use. To further prolong tube life, ARC recommends that the units not be left in standby 24 hours a day, but putting the units into standby with the fans in the High setting for five minutes prior to shutdown to ensure uniform cooling of internal components. I’ve consistently turned the units on in standby mode with the fans set High for 30 minutes prior to use, but have never followed the turnoff procedure; there have been no deleterious side effects.

Things become slightly more complicated on the rear of the unit. On standard units, the only available inputs are via RCA phono plugs— one input connection per monoblock. There is also a five-position input attenuator switch (actually a knob) which offers -6dB increments down to a complete mute. This particular feature is useful as a means of protecting speakers when changing inputs or speaker connections. The speaker-connection terminal block offers hookup alternatives for 2, 4, or 8 ohms balanced and 1 or 2 ohms unbalanced. The balanced outputs, suggested by ARC, drive both signal wires in the speaker cables with equal signal voltages of opposite polarities with neither wire connected to a common ground terminal. The balanced outputs cannot be used for speaker systems with a common ground connection (eg, some electronic crossover networks, center-channel subwoofers, servo-feedback-controlled speakers, headphone/speaker switching boxes).

Unusually, the circuit boards in each amplifier are mounted vertically (perpendicular to the bottom of the amps). Dual fans are located on the bottom of each amp, and the entire top is covered with a black protective cage to safeguard the innards. Under these cages are eight KT88s (four matched pairs) per channel. As you’d expect, only top-quality parts are used to complete the picture. Each amp is equipped with ARC’s Tube Saver circuitry—a comprehensive overload protection. If an abnormal overload condition is detected, the protection circuitry immediately shuts down the amplifier and dims the front-panel screen LED. The amp must then be turned off for 30 seconds and re-powered.

**Long-term performance**

Typically reviewers have very limited exposure to a product. We work like dogs for a couple of weeks or months to hear everything we can and test a component in every way we can manage. We do the best we can and move on to the next product. Not this time! I’ve owned a pair of Classic 150s since their original release. I’ve lived with these monsters a long time. As a result, there’s nary a blemish that I haven’t been able to look at under a magnifying glass. Though sonically this may seem unfair, I can accurately address questions of reliability, tube life, performance with a myriad array of other equipment, and long-term listening impressions.

I reviewed the original version of this amplifier (with 6550s) back in the sixth issue of the now-defunct *Sounds Like...* magazine. At that time I concluded: "The Audio Research Classic 150 power amplifiers are the most musically natural amplifier I have ever had the pleasure to audition." At that time I was particularly pleased that the Classic 150s were the fulfillment of the promise first offered by the ARC D-125—rich, lush harmonic structures; resolution of layers of midrange detail; and deep, controlled bass performance from a tubed amplifier—coupled with a significant increase in power (my most significant criticism of the D-125).

During my early listening to the 150s, which was the basis for that original review, I was convinced that the amp did everything well (to paraphrase Lewis Lipnick, I honestly felt there were no shortcomings). During the course of that review my system consisted of: Koetsu Rosewood Signature or Monster Alpha Genesis 1000 cartridges; SME V or Eminent Technology II tonearms; VPI TNT or Voyd turntables; Magnan Type V and/or Cardas Helixlink Series V interconnects; ARC SP-11 Mk.II or Melos 222 preamps; MIT 750 or Cardas speaker cables; and ProAc Studio Towers, Stax F-83s, or B&W
801 Matrix Series II speakers. As I listen to the Classic 150s today, nothing remains from that earlier reference system. Today, the system consists of a Benz Micro MC-3 (due for replacement; it's the second one I've had since that original review); Versa Dynamics Model 1.0 arm/table; Magnat Type VI interconnects; Convergent Audio Technology SL-1 Mk.II preamplifier; bi-wired ARC LitzLine 2 speaker cables; and ProAc Response Three speakers. In addition, I now extensively listen to digital (which rarely made an appearance in my earlier system) through a Theta Data or Esoteric P-2; Kimber KCAG or XLO RS digital cable; and Theta DS Pro Generation II DAC. The final pieces are a pair of Tice Power Blocks and Titans.

The 150s have outlived an awful lot of equipment over the last couple of years at my place. That alone says a great deal about these marvelous amplifiers. Nothing I've used has caused me in any way to reassess my original decision to purchase the 150s. In addition, they've always let me hear everything else that I've used with them. They have that elusive quality, often sought by reviewers, of being revealing—becoming, in effect, a reviewer's tool. But more important, they've always remained musical. All too often, ruthlessly revealing components are quickly gotten rid of as irritating over the long haul. The 150s, over time, have exhibited a remarkable ability to combine that cherished revelatory ability with the much more important ability (for all of us who love music) to remain musical.

Over the last few years I've reviewed a large number of very diverse speakers. In every case I've first asked the manufacturer if they would have any problem with my choice of reference amplifier, as this is something which often agitates speaker manufacturers. In every case, the manufacturers were very pleased with the Classic 150s driving their speakers. Not a single one suggested an alternative product. In my opinion, this is high praise from the people who should know best. It seems that the 150s, widely used at the biannual Consumer Electronics Shows, have earned high respect within the audio community.

I've used the 150s with virtually every imaginable speaker load from the wacky Stax F-81s and F-83s through the super-low-impedance Martin-Logan CLS IIAs to the relatively innocuous loads presented by the various ProAc. The 150s simply do the job. I've yet to find a combination that was problematic for the 150s. This is not the kind of conclusion that a reviewer can typically reach in a review. We usually lack the time to listen to a product in as many combinations as I've been able to place the 150s.

In the time that I have owned the amplifiers, I did replace output tubes in one channel. Prior to the KT88 update, I never had to replace a tube in the other channel! Unlike so many other tubed products, the 150s do not eat tubes. They are, in fact, very gentle to tubes (a critically important fact with a pair of amplifiers using 16 output tubes). The combination of the Standby mode switch for turn-on, dual-speed internal fans, and Tube Saver circuitry seems to work splendidly to preserve tube life and protect the internal circuitry/components of the amplifiers.

As a result of my own clumsiness, I did break off a toggle switch on one of the amplifiers; thanks to both ARC and the helpful folks at Woodbridge Stereo for a prompt repair. ARC has an extensive network of dealers, all monitored by ARC. The result for the consumer is, most likely, a readily available dealer who knows the products. This is a significant plus when dealing with megabuck products like the 150s. When I first received the amplifiers, they did blow a number of line fuses for the first few days. When re-tubed, they also blew a couple of fuses in the first few days. On rare occasion, I have tripped the Tube Saver circuitry. I simply checked my connections and/or replaced the fuses, re-powered the amps, and everything worked flawlessly again.

The 150s proved remarkably reliable when used properly. Admittedly, I always allowed them to warm up for 30 minutes before switching them into Operate with the fans on Slow, and always turned them on in Standby with the fans on High. If this small amount of concern is what it took to achieve the level of reliability I've experienced with the 150s, I implore you to do the same. By simply following the advice in the manual, I have had no significant problem with these amps. They have been trouble-free, and very reliable.

Prior shortcomings
There were some.

In my review of the early Classic 150s, I criticized them for excessive cost, power limitations, noisy fans, and awkward speaker-connection terminal blocks. After a few years I'm
forced to recant my comments on price. ARC has kept the 150's cost the same since their introduction. Other, more expensive amplifiers have been released and, obviously, ARC has had to deal with the same inflation as the rest of us. To their credit, they have not increased the price, which would have been easy to justify with the switch to KT88s in place of the sixteen 6550 output tubes that come with a pair of 150s. Granted, other manufacturers such as VTL, Cary, Melos, Music Reference, and Counterpoint have kept the pressure on for cost control with respect to high-powered tube amplification. All things considered, ARC has done us a favor in keeping the price of a pair of 150s (just) under the magical $10,000 point.

The actual power of the 150s has never been a problem for me with any of the numerous speakers I've used over the last couple of years. In fact, the amplifiers have been a wonderful match with everything I've thrown at them, from the behemoth Thiel CS5s through the diminutive Celestion Model 3s. However, there remains an open issue concerning the effortless power and dynamics evident with some truly monster power amplifiers. At some point, this particular aspect of the 150s' performance will require some head-to-head comparisons that I hope to address. Based on my experience to this point, I must leave the power of the 150s as a minor but open issue.

My third criticism of the original amplifiers remains unchanged. The fans can be noisy (especially in the higher speed setting). My solution has been simple. I never use the high-speed setting when listening to the system (the fans are always on—you simply have the option of selecting which speed). I use the high-speed settings when the amps are first turned on or put into Standby. Since I've experienced no other failure, the fans (and warm-up circuitry) apparently do their jobs quite efficiently. While I wish the fans were quieter, I value the role they play in protecting my investment. This is one area where a reviewer typically cannot adequately judge a component because we seldom have components long enough. The fans work. They make noise. So be it.

The last criticism in my original review concerned the terminal blocks. ARC hasn't changed them, and I still don't like 'em. There just isn't enough room for large spade lugs (the best way to connect speaker wires to an amplifier). I'll keep harping on this; I'm sure those creative ARC designers will eventually come up with something. While I understand and appreciate the value of the numerous connection alternatives, I still would like a bit more room for larger spade lugs.

Living with a product for a month or two is one thing; living with it for a number of years is quite another. Over the course of many months I grew increasingly dissatisfied with a slight thinness in the upper midrange of the original 150s. The change from 6550s to KT88s ameliorated this sonic shortcoming entirely and increased the 150's bass authority, making it quite remarkable in the bottom for a tubed amplifier. Read on.

**Sonic performance with KT88s**

The 150s, the biggest, most powerful sibling in ARC's "Classic" family, sound very much like the Classic 60 described so thoroughly by John Atkinson back in Vol.13 No.9 (an amp, by the way, still often found in JA's reference system). In a nutshell, he found the 60 to be a space champ with a deep, wide, stable soundstage and startling dynamics, less well-damped than his cherished Levinsons in the bottom but having superb bass definition, and having a slight thinness in the treble and a residual mid-treble brightness. He also voiced concern with the 60's power output and recommended extra care in choosing speaker cables.

Like the 60's, the 150's story began in the midrange. Its performance here was stunning, with a rich, lush, full presentation. Not only were sounds harmonically rich (as we've come to expect from the great tubed products), but the captivating resolution of midrange information (as opposed to the false sense of detail provided by elevated trebles) equaled or surpassed the best solid-state competition. The acid test of midrange performance continues to be the human voice; two of my favorite recordings amply illustrated the 150s' strengths in this regard.

One of my favorite vocalists for a number of years has been Anita Baker. Her best album, in my opinion, is *Rapture* (LP, Elektra E1 60444). With most amps, I find myself describing her voice as full or thin, immediate or distant, soft or hard—you know, equipment jargon. With the 150s, I heard Anita's voice cry, wail, scream, soar, growl, float, plunge, hit and run. Her uses of pitch bending, vibrato, chest/nasal mix, and intonation were wonderfully captured. I could easily
visualize the odd facial expressions and body movements she uses so purposefully. The 150s brought me very close to the live experience.

Another favorite is Chris Isaak. Oddly, it's also *bis* second, eponymous album that's my favorite (LP, Warner Bros. WI 25536). I continue to argue that his is the best current rock voice (at least when heard through the 150s). Listening conjured up images of Roy Orbison (there will never be another Orbison, don't get me wrong) or Elvis (Presley, not Costello). While the album is not the equal of the live experience, the sonics of the LP are certainly superior to the concert sound. Isaak was wonderfully recreated by the ARC monoblocks.

The 150s consistently riveted my attention to the music, getting entirely out of the way. If the music was marvelous, it sounded it. If the recording was dreadful, it sounded dreadful. Inevitably I reacted to the music, not the performance of the amplifiers. While superlative in conveying everything on the recording, they simply didn't add to or take away from the music. They represented a magical combination of musicality and revelation, always revealing but never ruthless, always musical but never euphonic. They simply made no excuses for themselves or my musical selections. If you get to audition the 150s, break tradition. In addition to bringing along favorite recordings for your personal evaluation, listen to some recordings you don't know. If you're like me, when you listen to the 150s your attention will shift entirely to the unfamiliar performances. You'll simply forget about the amplifiers.

As JA said of the 60 and I said of the 150's earlier 6550 version, the bass performance of the hybrid Classic series of amplifiers was quite a surprise. What was even more important was the improved bass performance of the 150s with the KT88s. While the bass was always powerful, extended, and articulate, it now had more fullness with no loss of control. In particular, the midbass had more punch (slap?). I heard a great example of this improved performance on the soundtrack to *The Commitments* (MCA MCAD-10286). For the most part, this soundtrack consists of covers of great '60s soul hits. The driving force in the music is the plucked electric bass. With the KT88s, the bass was full and rich, detailed and articulate, plump and powerful, obviously plucked and not picked.

The foundation of the music was abundant and immensely satisfying.

Of course, the additional power of the separately powered monoblock 150s allows the bass to sound more effortless than through the 60. The music can be played louder, as is often desired. The additional power adds even further to the amp's ability to recreate dynamic contrasts with ease. The 150 is a powerful tube amplifier (150W of *triode* tube power). A wonderfully satisfying new age/new music test of this bass/dynamics power combination is Patrick O'Hearn's *Ancient Dreams* (Private Music 1201). The recording is a fascinating combination of electronic and percussive sounds with gobs of deep bass information and attention-grabbing dynamics. The 150s get it all right with waves of deep bass dynamics, reaching far deeper in the subterranean regions than should be expected from anything with tubes. The KT88s dig deeper into the bass, as well as being fuller in the midbass.

Treble performance is up to the standards set elsewhere, with clarity and extension. Cymbals, triangles, and upper harmonics are abundant, never harsh or grainy. Returning to *Rapture*, the percussive speed and delicate decays of the cymbals were very realistic, as was the rustle of brushes on the snare. With Isaak's album, the (naturally) sharp overtones of the guitar were as they should be.

The second area where the KT88s made a major improvement was the upper-midrange/ lower-treble area. Both JA and I criticized earlier ARC Classic amps for their performance in this region. With the new tubes this problem was been effectively eliminated. No longer was there a residual brightness or thinness. Where this region had been weak relative to the rest of the amp's performance, it was now a seamless part of the overall musical fabric. The rich, full, detailed, grainless, delicate character of the earlier amps above and below this region was now consistent in character throughout the frequency spectrum. The newfound body in this region improved many things, from the vocal harmonics to the complex structures of string overtones.

Soundstaging remained stunning. This is one area where the 150s, due in part to their dual-monop design, were superior to the 60. With the revised Classic 150s there was a wide, deep stage with layer upon layer of both width and depth (if such width and depth exist in the recordings). Performers were placed with precision upon and within the stage with nary a bit of

Stereophile, November 1991
wander. The overall perspective was slightly distant or mid-hall in character. The stage itself develops behind, between, and around the speakers (which, if they were capable of it, could just sonically disappear). Unlike many other amps, there was no sense of the midrange forwardness or immediacy often associated with a front-row seat. While many, including JGH, downplay the importance of soundstaging *vis à vis* tonal accuracy, it is a captivating capability. While I agree with Gordon on the importance of tonal accuracy, I want both. With the 150s, I got both.

A wonderful musical example that has everything right on the recording (and which allows the equipment to pass or fail the ultimate test) is Rachmaninoff's *Symphonic Lieder* (LP, Athena ALSW 10001). This heavy vinyl monster has locked in its grooves the magic Rachmaninoff intended, from superb orchestral colors through rhythmic vibrancy. It has tremendous dynamic contrasts (making this a recording you are never going to hear on the radio), growling basses, mournful woodwinds, blatty brass, and lush violins. With the 150s I heard all of this, from the awesome transient punches to the clarity of a tambourine. The sound was extended at both ends, rich in the middle, dynamic, clean, detailed, and fast from a wide and deep stage with performers all over the place (as they should be on a crowded stage).

In fact, the 150s really seemed at home with large orchestral works. René Leibowitz and the Royal Philharmonic's performance of *A Night On Bald Mountain* (The Power of the Orchestra, Chesky RC-30) actually took over part of my home—the listening room. The stark nakedness of the witches' sabbath replaced whatever day it actually was. The "power of the orchestra" was just that—rich in tonal colors, with dynamic swings and crashes coming from an extremely wide stage with layers of depth (but that drum still sounds too mechanical—the performance, not the sound). The strings built the tension as the performers took on almost a 3-D physical presence. My purist heart was only slightly distracted by the left-right channel wind effects. Whew, a splendid performance on a wonderful recording given the respect it was due by a great amplifier.

**New shortcomings**

There are some, but they're different.

The KT88 version of the Classic 150 is indeed different; on balance, significantly better, but alas, still not perfect. The biggest improvement was the fleshed-out upper-midrange/lower-treble area. This was, in my opinion, the only significant weakness in the 6550 version of the amplifier. The other major change with the new tubes was the bass performance: Deep bass had better extension, and the midbass was fuller. Both are changes for the better.

However, the added extension and fullness in the bass did sound slightly less articulate than the less extended, less full bass of the 6550 version of the amp. Where the bass of the earlier version was less extended, it was remarkably clean. The KT88 version is stronger but slightly more tube-like in character—fuller, deeper, and slightly less well defined. A good illustration is the tympani rolls near the end of *Bald Mountain*; they're more powerful but less distinct with the KT88s.

I had described the 6550 version of the amp as having a "spooky" ability to resolve inner detail. With Joni Mitchell's *Ladies of the Canyon* (Reprise 6376), I was captivated by the pristine clarity of the sound of her pick on the guitar strings. I was able to very clearly hear this realistic effect. The results were identical on her *Blue* (Reprise 2038). The results were once again striking on Chris Isaak's "You Owe Me Some Kind of Love," each of the slowly strummed chords captivating in its realism. There was a pristine resolution of inner detail. Possibly as a result of the added fullness in the upper midrange/lower treble, the fine resolution of this detail, while still first-rate, was just slightly not as obvious.

Finally, the added deep-bass extension, more prominent midbass, and fuller upper mids/lower trebles gave the KT88 version of the amp a different tonal balance. In comparison, the high-frequency trebles were relatively lower in overall level (which is not to say they had changed at all in absolute terms). Very subtle, soft, and quiet treble sounds were now ever so slightly less obvious. The 6550 version, with a lighter tonal balance, had a trace more air and sparkle.

**An area of no change**

The negative comments I've just made are quibbles—a comparison with real music. Honestly, as great as the 150s are, they don't put live musicians into my listening room. But my criticisms must be understood in that context. Rela-
tive to other amplifiers, the 150s are superb. Let me use Chesky's stunning LP reissue of Scheberazzade (RC4) as an example. The fourth movement is loud and complex, with a full orchestra giving its all. With the remarkable 150s (6550 or KT88 versions) the dynamics were captivating as the music effortlessly reached crescendos with a musically natural ease; there was no added glare or hardness (something that often plagues lesser power amplifiers), and no added muddling or confusion of information. The music's rich inner detail maintained its natural character no matter how loud (or soft) it got. I suggest carefully listening to this splendid movement with your amplifier. Can you say it does the same things as the 150s?

**Conclusion**

At $10,000/pair, the ARC Classic 150s remain very expensive. However, plaudits are to be given to ARC for holding the line on price over two years, including the upgrade to much better tubes (KT88s vs earlier 6550s). ARC is also to be congratulated for listening to their customers and making a balanced option available for all Classic amplifiers.

The Classic 150s are not simply big boxes with inputs and outputs. The inclusion of the standby mode, dual-speed fans, Tube Saver circuitry, output attenuation (down to full mute), and an array of balanced and unbalanced outputs set them apart from most of the competition. Each of these individual features are both unique and meaningful. In addition, the 150s are true dual-monos, have protective cages, front-faceplate LED indicators and fuses, and the ability to handle a diverse array of challenging loads. I would still like to see a more usable terminal connection strip and slightly quieter fans.

The availability of an extensive and well-trained dealer network is not to be overlooked. You can probably find these amps at a dealer near you. That dealer will understand the product and stand behind it if you do have any problems. Based on my long experience with the amps, you aren't likely to have problems. They work well and continue to work well over time. They mate well with a broad array of other equipment. They are respected by other manufacturers within the high-end community. They don't eat tubes. As has been their custom, ARC will no doubt continue to offer upgrades to the amps if meaningful improvements become available. In short, this is one of the very few products I've reviewed where I'm very comfortable talking about long-range reliability and capabilities far beyond sonic performance.

Of course, the most important aspect of any audio product is sonic performance. In this regard, the Classic 150s shine brightly. They are, in my opinion, one of, if not the, best amplifier available today at any price. They are simultaneously musical and revealing while never sounding euphonic or analytical. They have a marvelously lush, detailed midrange; an extended, powerful, and articulate bass; delicate and full treble; remarkable dynamics and effortless power; superlative soundstaging with layers of width and depth along with precise placement; palpable images; and a state-of-the-art ability to convey inner detail. In short, the Audio Research Classic 150s are a Class A product if ever there was one.

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**VALVE AMPLIFICATION COMPANY**

**PA90 MONOBLOCK POWER AMPLIFIER**

**Dick Olsher**


Imagine that several tube amps are in a lineup, including this monoblock from the Valve Amplification Company. Also present are a VTL, an ARC, and a C-J. Your task is to judge the ampli-
fiers strictly on the basis of their "sexy" looks. As your eyes scan this fine assemblage of glass, the VTL is surely the first to be rejected. Industrial and "pregnant" looking, its image just does not equate with sex appeal. The ARC's appearance is competent and businesslike, while the C-J exudes an air of yuppie indulgence. This is really much easier than you thought. Finished in sexy polished black and gold, sans tube cover, and consisting of an entourage of four separate chassis, the VAC comes closer in my mind to being a work of art than an electronic device. Certainly, this is the sort of amp anyone would be proud to show off to friends and neighbors.

Each channel consists of a Model PA90 amplifier and a Model PS90 power supply connected together via a short umbilical cord. Standby and Operate switches are provided on the front of the power supply. The Standby switch powers the tube filaments and charges the bias supply. After a delay of some 45 seconds, the Operate switch may be turned on, providing full voltage (485V DC) to the plates of the output stage tubes.

Technical profile

In a nutshell, the VAC may be said to be a time-honored tube design executed with modern flourishes. Its basic circuit topology is not new: the input stage is fairly ancient and employs a high-gain, twin-triode, 12AX7 in a "paraphase" configuration as a voltage amplifier/phase inverter. This arrangement was chosen over the more typical cathode-coupled, differential-pair inverter for several reasons. First and foremost because, according to VAC's listening tests, it sounded better. Second, phase splitting is accomplished in the first stage while allowing overall loop negative feedback to be injected into the first cathode. Finally, each section of the splitter may take advantage of local degeneration by using independent, unbypassed cathode resistors. This linearizes the response of each tube section and reduces all distortion products, even-order as well as the more noxious odd-order harmonics. Unfortunately, the paraphase circuit does not possess as good a common-mode rejection as a differential-pair inverter. An AC balance control is provided, therefore, to allow precise balance of the two halves of the inverter. However, if the balance isn't perfect, the upshot of this in a push-pull amp will be an increase in even-order (primarily second-order) harmonic distortion, prod-
ucts which are consonant with the music.

The second stage uses a twin-triode 12AU7 as an amplifier/driver. The brand chosen is actually a CV4003 from Brimar, a British military version of this tube. This highlights a common theme throughout this amp: the careful selection of tube brands on the basis of extensive listening sessions.

The output stage uses two matched pairs of EL34 power pentodes in a push-pull configuration. However, KT77 beam power tetrodes may also be used, if you're lucky enough to find the genuine article. In both cases, an idle current of 54mA is used for class-A operation at a plate voltage of 485VDC. Bias-adjustment pots are provided on the front of the amplifier, allowing individual bias trim of each output tube. I highly recommend you purchase the Model PM1 Meter ($175) because you'll be checking and adjusting the idle current about once a month. The PM1 plugs right into the amp for easy current measurements. Complete instructions for bias adjustment are contained in VAC's Operation & Maintenance Manual.

The output transformer is said to be a proprietary design using bifilar winding techniques. Multiple secondary taps allow full power, it is claimed, to be delivered into loads as low as 1.5 ohms. The center tap of the secondary is grounded so that a portion of the load always appears in the section of the secondary from which feedback is taken. Overall loop feedback is a modest 8.3dB, fixed and independent of the output tap in use. The amount of feedback was chosen after many listening sessions as the best overall figure. But because of its rather low value, distortion is not reduced to vanishingly low levels and rises gradually with output power level. However, the shape of the distortion curve vs frequency is said not to change appreciably at higher power levels, thus leading to stable timbre as a function of power level. Another departure from sheer specmanship is evidenced in the omission of a phase compensation cap in the feedback loop. This results in slight ultrasonic ringing on transients but is said to ensure stability with highly capacitive loads.

The power supply includes independent 100µF capacitive reservoirs for each twin-triode stage. Separate transformers and independent regulation are provided for the heater/bias and plate high-voltage supplies.

In a final gesture toward the good old days, the amp is completely hand-wired in “three-dimensional space” for the shortest possible lead lengths. Printed-circuit boards, no matter how good, are probably not as sonically benign as point-to-point wiring.

**Output stage operating mode**

The output stage may be configured for operation in either a partial-triode (Ultralinear) mode or triode mode by simply turning a switch on the amp. The Ultralinear connection was popularized in the early '50s by David Hafler and Herbert Keroes as a means of extracting “triode sound” from a tetrode or a pentode without sacrificing the tetrode's higher efficiency or the triode's lower internal impedance. In short, it’s a means of having your cake and eating it too. In a power pentode such as the EL34 there are two additional grids beyond the control grid. The suppressor grid is easy to deal with: it’s almost always tied to the cathode or ground potential and acts to suppress secondary electron emission from the plate. The question considered by Hafler and Keroes was what to do with the screen grid to ameliorate that “pentode sound” so violently disliked by triode aficionados. Today we would characterize pentode sound as “transistory” in nature, but in those days BT—Before Transistor—the battle lines were triode vs pentode. The obvious possibility is to tie the screen grid to the plate, in effect obtaining a tube that would behave like a triode, including the limited power output. Experimentally, Hafler and Keroes found that connecting the screen grid to a special tap on the output transformer's primary, giving about 20 to 40% of the plate's voltage, would do the trick. This in effect combines the plate and screen currents in the output transformer for increased power output, and lowers the internal impedance of the tube. What one obtains in the end is a sort of hybrid: neither triode nor pentode, but a tube with intermediate characteristics.

The VAC Manual offers some advice concerning operating mode selection. The triode connection reduces available power to about 60W while offering a subjectively more natural sound. You are advised to listen to both modes and select the mode most pleasing in your system. I would certainly agree with VAC's assessment, but would carry it forward more emphatically. Based on my experience, there is no question that the triode mode is far preferable—at least with 8 ohm or higher nominal impedance.
loads. In fact, if it weren’t for that little switch that allowed me to escape to triode land, the VAC would not rate a recommendation. In general, I found the Ultralinear mode more veiled, lacking the transparency and immediacy of the triode connection. Neither were musical textures as sweet or pure-sounding in UL mode, so that the overall effect became more electronic than natural. Yes, with the Sound-Lab A-1s, there was more power available to deal with the dynamics of, say, the Beethoven Ninth, but much of the drama and tension of the midrange were drained away in UL mode. It was that difficult to penetrate to the core of the music. There were certainly no goosebump-inducing episodes.

The above should not be construed to mean that the UL mode is always inferior to the triode connection. Based on theoretical considerations, the UL connection should work better into low-impedance loads, though these sort of loads (4 ohms or less) are not really vacuum tube territory. According to VAC’s designer, Kevin Hayes, the Apogee Stage is best driven in UL mode from the 4 ohm tap.

**Sonic impressions**

It should come as no surprise to you that what follows is based almost entirely on my auditions of the PA90 in triode mode, with KT77s (see later) used for the output stages about a third of the way into the listening sessions.

For some unknown reason, the bias had been set at only 42mA at the factory. I cranked it up to 54mA per the Manual’s guidance. The VAC required a considerable break-in period for its personality to fully assert itself. The Manual points out that an additional 100 hours beyond the 48-hour factory break-in is beneficial; a slow process to be sure, but, from my own experience, a necessary one.

The VAC PA90’s full glory unfolded slowly. It began life in my system sounding a bit mechanical and somewhat tentative in imaging precision. The maturation process culminated after several weeks when it justly earned my highest honor—the “maestro” appellation in revealing musical nuances.

My first serious exposure to the VAC came via the Nestorovic Type 5AS Mk.IV loudspeakers that I reviewed in September. Somewhat unusual for dynamic loudspeakers, the Type 5AS actually sounds best with tube amps. That’s probably because Mike Nestorovic des-

signed this speaker around his own tube amp. This listening session was particularly meaningful because the VAC followed on the heels of the hugely expensive Threshold SA12k monoblocks. While the Threshold kicked butt in the bass and in no way obscured low-level detail, the VAC highlighted just how handicapped the SA12k was in dynamic bloom and expressing the depth and breadth of the soundstage.

A flair for the reproduction of dynamic scale should not be confused with the ability to play loud (i.e., headroom) but rather should be equated with an uncompressed reproduction of the music’s dynamics, particularly from soft to loud. The 12k can play very loud and has no problems going from loud to very loud, but it failed to inject dynamic life into the range from soft to loud. Julius Berger’s cello (Max Bruch: *Collected Works for Cello and Orchestra*, ebs 6060) should expand and bloom, and in general sonically emulate a time-lapse film of a blooming rose. The evocation of the *Kol Nidrei* prayer should carry it from the depths of its bass-register soul to the upper-register cry of the heart like a breath of fresh air. This the VAC did very convincingly. In addition, it was able to elicit the full dimensions of the soundstage, consistently displaying a terrific feel for the recording venue. The choir on *Laudate!* (Proprius PROP 7800) was resolved within a deep and wide soundstage, the size of the hall immediately obvious. Soprano upper registers were naturally reproduced, and male voice was uncolored.

It was obvious, however, that low-end definition and impact were not in the class of the Threshold 12k. But which tube amp is? I would characterize the PA90’s upper bass as excellent, the midbass as very good, the deep bass adequate when confronted by a moderate bass impedance, and probably poor when the bass range impedance dips below 5 ohms.

But Holy Cow! The dynamic shadings of a large chorus and orchestra (*Belshazzar’s Feast*, EMI SAN 324) were never so wonderfully electrifying. Massed voices soared from soft to full voice without congestion or compression. That this was done with individual resolution of voices and image palpability made for an astonishing impression of real people singing in real space. The VAC also showed admirable fineness in handling midrange textures. Anna Moffo’s voice (*Selected Arias*, RCA LSC-2504) was exquisitely sweet, velvety smooth, and
tightly focused in space. Not surprisingly, violin overtones were reproduced with just as much sweet caress and focus. Pedro Aledo (Old and New Chants, Pierre Verany PV12793) fared just as well. Spanning as it does the heart of the midrange, his voice was not only properly pitched but also texturally edgeless, without the irritating brightness that afflicts so many solid-state amps.

The ability of the VAC to combine dynamic muscle with soundstage transparency, 3-D imaging, and purity of tone typically translated into a quick, detailed, and musically moving presentation. "Cajun Moon," on Herbie Mann's and Cissy Houston's Surprises (Atlantic SD1682), came through with spine-tingling sensuousness.

Treble transients were uniformly quick and well-behaved, but without the razor-sharp etched quality often mistaken for musical realism by terminal audiophiles. Unlike many tube amps, the VAC did not soften, dull, or turn transient attacks into Jello. The extreme treble sounded well extended and airy.

After concluding the listening sessions with the Nestorovic loudspeakers, it was possible for me to take a mental step backward and formulate an interim perspective of where the VAC sits in the bigger scheme of things. Clearly, the sound of the VAC fit into the mold of what I have dubbed "renaissance" tube sound. Unlike classical tube sound, which tends to be tonally ripe, lush, and romantic, texturally thick or syrupy, soft, dull, or rolled off in the treble, the renaissance sound is typified by more accuracy and less euphonics. The VAC's tonal balance sounded quite neutral, if anything a tad laid-back through the lower midrange where it did not provide the Nestorovic with the romantic color it inherently needs through the orchestral power range. The sound of the VAC was always pure, smooth, and liquid, with harmonic textures neither too thick nor too hard—the perfect musical tapestry. In common with other great tube amps, it masterfully constructed a believable soundstage populated by 3-D image outlines. The treble quality was closer to solid-state in speed, detail, and extension, but without the grain and grit of the average transistor wonder amp.

The Quad USA Monitors were next in line for the VAC. It stood to reason that an ESL would be an easy load to swallow for a tube amp, and that turned out to be the case, but it took the Acrotec 6N1030 speaker cable to get the sound just right. Using the 8 ohm transformer taps, the mids sounded suave and the imaging was as good as I've ever heard from the new Quads. Image outlines were carved out within a generous soundstage. At this point I introduced the solid-state Classé DR-8 amplifier into the chain to get a comparative reading on the VAC's bass performance. The DR-8 did in fact outperform the VAC in this area. Its low-end pitch definition and impact were clearly better, but overall it sounded much more mechanical than the VAC; in the long run, the Classé would be a less good mate for the Quads.

The necessity to mate the VAC with a fairly sensitive load was highlighted by my experiences with the Black Dahlia System and the Sound-Lab A-Is. The Black Dahlia, operated as a three-way system with a new subwoofer on the bottom (a forthcoming DIY project), has gained solid bass extension to 25Hz, but the overall sensitivity is still quite low. While the VAC elicited a startling level of clarity and harmonic purity from the Dahlias, the sound became congested and a bit rough as the amp all too often redlined into clipping.

I observed much of the same behavior with the Sound-Lab A-Is in my new listening room. With small-scale music, the mids were as detailed and sweet as one could ever want. The soundstage was wide, deep, and palpably portrayed, and harmonic textures were felicitous. However, dynamic shadings were constrained with orchestral recordings, and the amp plain ran out of gas during loud passages. Sixty watts of triode power proved an insufficient reservoir. The Sound-Labs really need a high-power tube amp to sound their best.

**Choice of tubes**

Kevin Hayes related to me that more than 140 permutations of tube brands were auditioned prior to establishing the tube complement currently shipped with the VAC amps. The low-level tubes presently consist of a Golden Dragon 12AX7a and a Brimar CV4003 (12AU7). I don't think it's really possible to improve on these choices. The Golden Dragon 12AX7, for example, is sonically the absolute best I've ever heard. A simple substitution of Golden Dragons into the Air Tight ATM-2 for the Siemens 12AX7s made for an astonishing sonic improvement. Textural clarity and inner detailing improved dramatically; an improvement worth hundreds of dollars for only $10.
Incidentally, Tubes by Design, a Division of VAC (Tel: (813) 925-3483) is the exclusive US distributor of Golden Dragon tubes. Judging by the quality and sonic superiority of the Golden Dragon 12AX7 and EL34, this venture is the best thing to have happened to tubes since the heyday of the likes of M-O Valve and Mullard. Fueled by a group of British audiophiles and old-timer valve specialists working together with the Shuguang tube factory in China, the Golden Dragon goal of premium tubes rivaling the best ever made appears to have been realized.

As mentioned earlier, either a KT77 or an EL34 may be used in the PA90's output stage. Although both of these tubes share essentially the same plate resistance and transconductance, they are physically different. The KT77 is a beam power tetrode featuring (in common with other beam power tubes) an electron beam-confining electrode. The EL34, however, is a power pentode which doesn't sound as sweet as the KT77. The sound of the KT77 is richer in second-harmonic distortion and possesses less third-harmonic distortion, making the KT the prime candidate for the VAC amp. The VAC Manual has quite a bit to say about the attributes of the various output-tube candidates available, and clearly comes out in favor of the KT77. Without question, the top choice here is the M-O Valve Company Gold Lion KT77. Of course, this tube has long been out of production, and the worldwide supply is extremely limited, but it's clearly in a class by itself.

I completely concur with VAC's sonic assessment of this tube. Kevin Hayes was kind enough to loan me eight Gold Lion KT77s, vintage 1979, from his personal cache for an audition. The switch from the East German EL34s typically bundled with the amp to the KT77s proved embarrassing for the stock tubes. The imaging potential of this amp was pushed to the limit. The 3-D capability of the VAC was greatly enhanced, to the point where image outlines were much more palpably focused within the soundstage. The entire soundstage became more transparent, with low-level detail less fuzzy and much better resolved. Cleo Laine's voice (Live at Carnegie Hall, RCA LPL1-5015) was portrayed with spatial detail that at once revealed her broad-brush outlines as well as the nuances that characterize her throat and chest. Treble transients were also better defined. Dynamic bloom was enhanced and bass lines were more robust. Loud choral passages soared more cleanly, while individual voices in the chorus remained spatially distinct. These were areas where the German tube congested, obscured detail, and turned slightly grainy. The KT77 proved nothing short of magical in its ability to project me into the flow of the music.

Next I switched to the Golden Dragon EL34s. Interestingly, the "Golden Dragon" that graces the glass jacket is similar to the Gold Lion mascot of the defunct M-O Valve Company. Though its sound resembles that of the KT77, this EL34 regrettably proved merely a distant cousin, sonically falling midway between the German EL34 and the Golden Lion KT77. The treble wasn't as smooth as that of the KT77 and image outlines weren't as palpable. On an absolute scale, I would have to judge the Golden Dragon EL34 as very good, but what I missed the most was that dynamic bloom and 3-D projection of the vintage KT77. Although they were better in every respect than the German tube, I would have been disappointed had I been forced to return to either EL34.

The good news is that a KT77 is in the works from Golden Dragon. Judging by the success of their 12AX7, the forthcoming KT77 may prove every bit the Gold Lion's equal. Do stay away, as the Manual warns, from both the Russian-made and the Gold Aero "KT77." Both are, in fact, EL34s. As an owner of several of Gold Aero's "KT77" tubes, I can personally confirm VAC's finding. In my opinion, such mislabeling of tubes in this fashion redefines deceptive marketing. Buyer beware!

Summary
Operated in triode mode and carefully mated to a fairly sensitive loudspeaker load, the VAC monoblocks proved absolutely delightful and musically incisive. The VAC sound was tonally quite neutral, without "tubey" romantic emphasis through the lower mids. The mids sounded consistently sweet and liquid, never reverting to an overly soft or Jello-like presentation. Treble transients were impressively quick in attack, with natural decay. The emphasis here was on accuracy over euphonics. My overall impression was of a slightly lean, airy sound, pristinely pure through the midrange, with a superbly crafted soundstage. The feel for the original recording space was exceptional; the spatial extent of the hall was readily discernible; and image outlines were spatially convinc-
ing in the best tradition of tube gear. Dynamic contrasts were gloriously reproduced without compression, especially from soft to loud.

For a considerably higher price, the VAC PA90 appears to combine the best attributes of both the Music Reference RM-9 and the Quicksilver monoblocks. The VAC is a beauty, and while its level of parts and construction quality are commensurate with cost, its asking price does represent more than a fistful of dollars for a mere 60W. But what 60W! In the final analysis, the VAC transcends the performance level of its less expensive cousins. Although it will not flesh out or pretty up the sound as some romantic tube amps do, its levels of transparency, spatial resolution, and dynamic shading combine for a much more convincing illusion of live music. For precisely that reason, it deserves a place at the top.

**TJN does some measuring**

This wasn't going to be easy. With three output taps (for 2, 4, and 8 ohms) and two separate modes of operation (triode and ultralinear), measuring the VACs was roughly equivalent to measuring six conventional amplifiers. Obviously, space (and readers' patience) will not permit us to print all of the resulting graphs, but we'll give what we feel to be a representative sample, and comment on others where appropriate.

The amplifier was non-inverting when connected to the loudspeakers as recommended— with the positive connection to the single tap marked "+2, +4, +8" and the negative lead to one of the three taps marked "-2, -4, or -8." Voltage gain into an 8 ohm load measured 28.9dB, 26.5dB, and 23.9dB from the 8, 4, and 2 ohm taps, respectively, in the triode configuration, the ultralinear mode giving an additional 2dB of gain in each case. DC offset was unmeasurable.

Fig.1 shows the frequency response of the VAC PA90, which was fitted with KT77 output tubes for the measurements, from its 8 ohm output tap. There's little worth comment here; the curves are effectively flat across the audible band in either operating mode, though the rise of the ultralinear mode above 30kHz or so possibly indicates the presence of an ultrasonic peak in this mode. This is also revealed in fig.2, which shows the 10kHz squarewave response into an 8 ohm load in ultralinear mode, with a small degree of ringing visible at an approximate frequency of 109kHz. This is reduced in the triode mode (not shown), as expected from the increased ultrasonic rolloff in fig.1, but not entirely eliminated.

The PA90's input impedance measured around 90k ohms in both modes. Output impedance varied, as expected, with the selected output tap, but also somewhat with operating mode. It was, however, consistent from 20Hz to 20kHz and with output load (4 or 8 ohms) in any given configuration. In ultralinear mode, output impedance measured 1.6 to 1.7 ohms from the 8 ohm output tap, 0.95 to 1.0 ohms from the 4 ohm tap, and 0.6 ohms from the 2 ohm tap. In triode mode, it measured 1.3 to 1.35 ohms from the 8 ohm output tap, 0.7 ohms from the 4 ohm tap, and 0.4 ohms from the 2 ohm tap. These figures are typical for vacuum-tube amplifiers except from the 2 ohm tap, where it is lower. I would expect the PA90's sound to be neither more nor less dependent on the loudspeaker load than that of most tube amps from the 4 or 8 ohm tap, slightly less dependent than is typical from the 2 ohm output. But using the 2 ohm tap may not be the best choice for a given loudspeaker for other reasons. Read on.

Table 1 gives the power outputs measured in various configurations for the two amplifiers (arbitrarily labeled L/R). The line voltage here ranged from 113.5 to 120V, depending on the degree to which the amplifier loaded down the line. (We do not use a Variac to maintain a fixed output voltage for our measurements because we know of no one who uses such a device while actually listening to their amplifier.) Note that this table can be misleading because it indicates the outputs at 1% distortion. With most solid-state amplifiers, 1% distortion is either in, or rapidly approaching, the clipping level, and we arbitrarily define it as the clipping point for that reason. With a tube amplifier, however, at or near 1% distortion can be a normal operating mode over a broad output range. To take this into account, an additional column in Table 1, labeled "Knee/THD," indicates the knee of the THD (+noise) vs power output curve (only one channel is shown, this value taken from the THD vs level curves made in the course of the measurements, not all of which are shown here).

The knee is the point at which the distortion begins rising most rapidly, and at which further attempts to generate output result in precipitously rising distortion. In other words, in most
cases it is the maximum practical useful output of the amplifier, even if it lies (as it does in most of the cases in Table 1) below the 1% THD+noise point. In the cases where the knee occurs above the 1% distortion point, I’ve included the approximate distortion (read from the curves) present at the knee. Note, for instance, that in the worst case shown, a 2 ohm load driven from the 8 ohm output tap (triode mode) will reach 1% distortion at 3.5W (left channel), but will still be capable of 52W output—though at 2.2% distortion at that level. In other words, the distortion will range from a low of 1% to a high of 2.2% from just under 4W to 52W in this mode.

Figs. 3 and 4 show the actual THD+noise vs power output curves in ultralinear mode for the 2 ohm and 8 ohm output taps respectively; fig.5 shows the same for the 2 ohm output taps in triode mode. The bottom line here is that matching the output tap to the nominal impedance of the loudspeaker (or, as some recommend, the minimum impedance of the loudspeaker) is a configuration which will normally result in a reasonable balance of high power and low distortion. You may wish to experiment with other settings and perhaps may find that they provide better sound in your situation—

![Fig.1 VAC PA90, frequency response, from top to bottom: at 1W into 8 ohms and 2W into 4 ohms, ultralinear mode; at 1W into 8 ohms and 2W into 4 ohms, triode mode (0.5dB/vertical div., right channel dashed)](image1)

![Fig.2 VAC PA90, ultralinear mode, low-level 10kHz squarewave)](image2)

![Fig.3 VAC PA90, ultralinear mode, L/R, 2 ohm tap, distortion vs output power into 8 ohms (L/R top), 4 ohms (middle), and 2 ohms (bottom)](image3)

![Fig.4 VAC PA90, ultralinear mode, L/R, 8 ohm tap, distortion vs output power into 8 ohms (L/R bottom), 4 ohms (middle), and 2 ohms (top)](image4)

**Table 1 VAC PA90: Power output at 1% THD+noise**

<table>
<thead>
<tr>
<th>2 ohm output tap</th>
<th>Load</th>
<th>W (L/R)</th>
<th>dBW (L/R)</th>
<th>W/%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultralinear</td>
<td>8</td>
<td>29.3/ 29.8</td>
<td>14.7/14.7</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>52.0/ 54.0</td>
<td>14.2/14.3</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>87.0/ 89.0</td>
<td>13.4/13.5</td>
<td>72</td>
</tr>
<tr>
<td>Triode</td>
<td>8</td>
<td>21.9/ 22.4</td>
<td>13.4/13.5</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>35.6/ 36.2</td>
<td>12.5/12.6</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>49.1/ 48.3</td>
<td>10.9/10.8</td>
<td>44</td>
</tr>
<tr>
<td>4 ohm output tap</td>
<td>Load</td>
<td>W (L/R)</td>
<td>dBW (L/R)</td>
<td>W/%</td>
</tr>
<tr>
<td>Ultralinear</td>
<td>8</td>
<td>54.5/ 54.7</td>
<td>17.4/17.4</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>89.7/ 90.0</td>
<td>16.5/16.5</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>124.0/122.0</td>
<td>14.9/14.8</td>
<td>110</td>
</tr>
<tr>
<td>Triode</td>
<td>8</td>
<td>36.4/ 36.6</td>
<td>15.6/15.6</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>50.8/ 50.1</td>
<td>14.0/14.0</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>17.8/ 18.3</td>
<td>6.5/  6.6</td>
<td>57/1.6</td>
</tr>
<tr>
<td>8 ohm output tap</td>
<td>Load</td>
<td>W (L/R)</td>
<td>dBW (L/R)</td>
<td>W/%</td>
</tr>
<tr>
<td>Ultralinear</td>
<td>8</td>
<td>92.2/ 92.8</td>
<td>19.6/19.7</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>127.0/126.0</td>
<td>18.0/18.0</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6.3/  6.8</td>
<td>2.0/  2.3</td>
<td>110/2.7</td>
</tr>
<tr>
<td>Triode</td>
<td>8</td>
<td>52.1/ 51.1</td>
<td>17.2/17.1</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>13.8/ 16.0</td>
<td>8.3/  9.0</td>
<td>50/1.6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.5/  3.7</td>
<td>0.6/-0.35</td>
<td>52/2.2</td>
</tr>
</tbody>
</table>

Recall now the potentially reduced loudspeaker/amp interaction with the 2 ohm tap.
because of the latter's lower output impedance. Table 1's data will help you prevent, for example, inadvertently choosing a hookup which seriously limits your available power output and/or results in your listening to a consistent 1–3% THD+noise throughout most of that usable power range. But bear in mind that loudspeakers vary, sometimes wildly, from their nominal impedances with frequency, so it would be rash to be dogmatic about this. Again, as VAC recommends in their thorough instruction manual, experiment.

The above power vs level measurements were taken at 1kHz. Fig.6 shows the distortion vs frequency at low power output in triode mode, from the 2 ohm output, into 2, 4, and 8 ohm impedances (top to bottom). This is the best case; distortion from the 4 ohm and 8 ohm taps is higher into each respective impedance. Though the latter curves are not shown, the worst case is from the 8 ohm tap, though the distortion there still remains largely under 0.5% (but above 0.4%) from 60Hz to 9kHz into a 4 ohm load (less into 4 ohms), rising to 0.8% at 20Hz and 0.7% at 20kHz (worst channel). From the 8 ohm tap driving a 2 ohm load, however, the THD+noise is above 1.25% across the entire range, and I do not recommend that configuration. Fig.7 shows the best-case configuration for the ultralinear mode. Note that the distortion here is respectably low below 20kHz into all loads. As was the case in the triode mode, the 8 ohm output tap (curve not shown) gives the highest distortion into all loads with the maximum between 1% and 1.2% into 2 ohms from 20Hz–20kHz. In general, good distortion figures were obtained in all situations except when attempting to drive a 2 ohm load from the 8 ohm tap. Even then they were not gross, hovering around the 1% mark. In its THD+noise measurements the PA90 is completely competitive with other good, high-end tube amplifiers, and better in many when the appropriate output tap is used for a particular load.

Figs.8 and 9 show the high-frequency IM spectrum with an equal mix of 19 and 20kHz tones driven at 60W (fig.8, ultralinear mode) and 30W (fig.9, triode mode) into 2 ohms from the 2 ohm tap. The signal source for this test was a test CD played on an NAD 5000 CD player; for reference, fig.10 shows the spectrum of the player's output. Note that the 1kHz component is at about -54dB in the ultralinear

Stereophile, November 1991
mode, -45dB in the triode—below 1% in both cases. There are also some minor artifacts present at 17 and 18kHz in both curves (and at 16kHz in ultralinear), and others above 20kHz. Into higher load impedances at this same output tap (curves not shown), the 1kHz distortion improved considerably in ultralinear (to about -65dB into 4 ohms, or below 0.1%), and somewhat in triode (to about -50dB into 4 ohms, or 0.3%).

Figs.11 and 12 show the spectrum of a 50Hz sinewave driven at 60W (fig.11, ultralinear) and 30W (fig.12, triode) into a 2 ohm load from the 2 ohm taps. Note fairly strong second, third, and fourth harmonics in both cases, a fairly high-level third harmonic of the power-line frequency at 180Hz, and other artifacts at higher frequencies further down in level. These curves, as in the case of figs.7 and 8, are worst cases; some improvement was noted with the same tap into higher-impedance loads (the 100Hz component was about 10dB lower into 4 and 8 ohms). I have not seen DO's review as I write this, but the distortion components noted here could contribute to an added (and inaccurate) sonic warmth.

Observation of the harmonic distortion products for a 1kHz tone on a 'scope indicated the second-harmonic to be predominant (fig.13), though some visible third-harmonic product did appear in ultralinear mode driving a 2 ohm load. There was also a degree of low-frequency noise present in the amplifier's output evident on the 'scope trace, leading me to perform an analysis of the PA90's residual noise. Fig.14
shows the spectrum of that noise from 10Hz to 1kHz: many harmonics of the 60Hz AC supply frequency can be seen, which would give the noise a "buzzzy" character. (The amplifier's input was shorted to ground for this measurement and was plugged into the wall using a two-prong cheater plug to get the lowest possible hum.) The marker shows the strongest noise component present, the 120Hz full-wave rectification frequency. Summed together, these power-supply-related components gave an unweighted, audio-band signal/noise ratio of 48dB below 1W into 8 ohms, which is surprising given the complexity of the amplifier's power supply and probably just acceptable subjectively.

I also noted the tendency of the PA90's bias levels, once set, to drift. On the day I did most of the measurements, I re-tweaked each tube's bias frequently throughout the day. I had them pretty well spot-on the recommended value of 54mA when I shut down for the night. The next day I turned the amplifiers back on to recheck a few measurements, and, without touching the bias from the previous day, let them warm up while I worked on other things. Other things took longer than anticipated, and when I finally checked the bias after about a three-hour warmup, I found that all the settings on both amplifiers had dropped into the high 40s and had to be reset. Fortunately, VAC has made this a relatively painless operation provided the amplifier's owner invests in the optional bias meter.—Thomas J. Norton

THETA DATA
UNIVERSAL DISC TRANSPORT

Robert Harley

Videodisc-based "universal" transport (CD audio, 8" and 12" Laservision videodiscs) with full-function infrared remote control. Outputs: One digital audio (S/PDIF), one video, one stereo analog audio pair, one S-video, one RF on F-type jack. Dimensions: 19" W by 5½" H by 17½" D. Weight: heavy. Price $2400 ($2800 with optional AT&T glass fiber output). Approximate number of dealers: 90. Manufacturer: Theta Digital, 5330 Derry Avenue, Suite R, Agoura Hills, CA 91301. Tel: (818) 597-9195. Fax: (818) 597-1079.

"In the fields of observation, chance favors only the mind that is prepared."

When Louis Pasteur uttered these words more than a hundred years ago, he must have speculated that they would apply equally well to future circumstances as to the events of his day. What he couldn't anticipate, however, was the technology to which his insight now seems so appropriate.

Finding himself by "chance" without a CD transport at home one night, Theta Digital designer Mike Moffat borrowed a videodisc player
from his video system and hooked its digital audio output to a digital processor.

His "observation" was that it sounded better than the high-end CD transport he had been using. Being a designer of D/A converters and having a "prepared mind," he began looking into the mechanics of videodisc players to find out why they might sound better than his high-end CD transport.

The result of this fortuitous confluence—the "favor"—is the Theta Data transport reviewed here. After listening to different videodisc players and studying how they work, Mike became convinced that they were inherently superior to the CD-only machines used in high-end systems. Theta then picked the best-sounding videodisc player they could find, developed a data-clocking circuit to further increase its sonic performance, and put it all in a solid chassis with the Theta nameplate on the front panel—all for $2400 retail. And it plays videodiscs too.

Intrigued?
So was I.

**Technical description**

**Huge.** That's the only way to describe the Data. At 5½" high, 19" wide, and 17½" deep, the Data is imposing next to any equipment. Moreover, the chassis is nearly as high as the front panel, making its volume about three times that of the Esoteric P-2 transport. If I thought the chassis was big, I was in for an even bigger surprise when I opened the drawer. Being a videodisc player, the Data has a 12" drawer made to accommodate 12" and 8" videodiscs as well as CDs.

The Data is as slow as it is big. It takes a full 17½ seconds to load a CD and begin playing. In addition, its track access time is much slower than CD-only machines, taking nearly four seconds to search for a selected track.

The Data is based on a Philips CDV-400, a so-called "combination" player that accepts a variety of optical disc formats. Consequently, the Data can be hooked up to a TV or video monitor and play videodiscs just like a normal videodisc player. One difference, however, is that unlike most videodisc players, the Data has no built-in D/A converter for the digital audio soundtrack encoded on nearly all videodiscs. The videodisc's analog audio tracks appear at the analog audio output jacks, but to hear the digital tracks, an outboard D/A converter must be connected to the coaxial digital output.

The rear panel holds a variety of output connectors. In addition to the standard digital audio coaxial RCA output for connection to a digital processor, the Data provides video outputs in normal, RF, and S-Video formats. An antenna input, looped to the antenna output, is also provided. This allows your TV to get the antenna signal or the videodisc RF signal without switching. A pair of analog audio outputs allows connection to an amplifier for listening to a videodisc's analog audio tracks.

Most of the Data's controls are found on the remote control, not on the front panel. The remote is generous in features, including all the usual amenities plus a mode display option, random play, and index search. The front-panel display shows what kind of disc has been inserted, whether the videodisc has digital audio tracks, track number, and elapsed time. The remote is covered by 42 buttons of identical size and shape, making the Data more difficult to control than many CD players and transports. In addition, the remote's videodisc-related functions interfere with the Data's primary role—as a high-end CD transport.

But what makes the Data different from a normal videodisc player is the addition of a small printed circuit board attached to the rear panel near the digital output jack. This circuit relocks the data with a crystal oscillator, reportedly lowering jitter in the digital datastream appearing at the digital output. This relocking circuit also includes an output line driver, specifically designed for driving 75 ohm coaxial cables used to connect digital processors. A small output transformer completes this relocking output driver circuit. The final output appears on a high-quality RCA jack. For an additional $400, Theta offers an AT&T fiber optical output in addition to the coaxial jack.

The front panel is ¼" machined aluminum and the chassis is bent steel. A spike that threads into the bottom rear of the unit is supplied, presumably supporting the chassis weight. Theta claims better sonics with the spike installed, and recommends its use. Build quality is good, but the Data's look and feel are decidedly utilitarian rather than the elegant.

**Why a videodisc player?**

Before getting to the musical impressions, a little background on videodiscs may shed some light on why a videodisc player may be inherently superior to a CD-only transport. Looking at the Data as a CD-only machine, it is clearly
over-engineered; the design requirements for a videodisc player are far more rigorous than for a CD player. Here's why.

A CD spins at a constant linear velocity (CLV) of between 1.2 and 1.4 m/s (meters per second — the linear velocity is chosen according to program length). As the laser head moves toward the end (outside) of a disc during normal play, the disc rotation gradually slows down to maintain a constant data speed as seen by the laser. A CD player's rotational speed thus varies from about 200 rpm (outside) to about 500 rpm (inside). The player's focus servo system that keeps the laser at the precise distance from the disc is designed for these speeds. Similarly, the CD transport's other circuits and mechanisms — tracking servo, rotational servo, and drive mechanism — are all designed around a lightweight disc that spins to give a constant linear data velocity of 1.4 m/s.

A videodisc player, however, has a much more difficult job. For starters, a 12" videodisc weighs 200 grams, about 11 times more than a CD's 18 gm. The rotational drive must be strong enough to accommodate this additional mass. On top of that, a CLV videodisc (also called "extended play") with 60 minutes per side) spins with a Constant Linear Velocity of 11.4 m/s, about 10 times greater than a CD's linear velocity (the videodisc's larger diameter, however, means that the actual rotational speed is less than ten times faster). In addition, the videodisc player's rotational drive must also respond to rapid changes in playback radius when searching different areas of a CLV videodisc. Scanning from an outside disc area to an inside disc area means the player must accelerate the heavy disc quickly to very high speeds. The combination of the videodisc's faster rotational speed, much greater mass, and the fact that much of that mass is far away from the rotational axis when compared to CD, means the inertial energy is vastly greater than that of a 4½, 18 gm CD.

Further taxing the player, a Constant Angular Velocity (CAV) videodisc (30 minutes per side) spins at 1800 rpm regardless of its playback radius. This means that at the outer edges, the disc is traveling at over 60 miles per hour (28 m/s) in relation to the laser (over 20 times faster than a CD). Remember, the laser pickup must maintain a constant distance from the disc to stay in focus, putting enormous demands on the focus servo electronics and mechanism at these high speeds. When playing a comparatively featherweight CD at snail-like speeds, a videodisc player is operating far below its design parameters. Consequently, there theoretically will be less servo interaction with the power supply, and the focus and rotational drive systems will maintain a greater precision. Playing a CD in a videodisc player is like shipping a phono cartridge in a freight truck.

Finally, the videodisc medium is much more demanding on the playback system than the CD format. Unlike CD, the data stored on a videodisc result in an analog video signal, without the benefit of error correction. Slight changes in the signal reflected from the disc caused by player imperfections will show up as poor video quality. These factors force videodisc players to perform to a much higher standard than their CD-only cousins.

All this seems good in theory, but how does the Data sound as a CD transport in a demanding high-end audio system?

Music
The Theta Data has been my primary CD transport for the past two and a half months, replacing the Esoteric P-2 that had been returned to Esoteric. Although I never had the P-2 and Data for side-by-side comparisons, the Wadia WT-3200 and Meridian 602 — both known in relation to the reference P-2 — were still on hand.

Digital processors used with the Data included the Meridian 203, Theta's DS Pro Prime (also reviewed in this issue), a PS Audio SuperLink, a Wadia 2000, and an Audio Research DAC1-18. Digital interconnects were the Aural Symphonics Digital Standard, Theta's own cable, or the TARA Labs Digital Reference (all three excellent interconnects).

The digital processors fed an Audio Research LS2 line-stage amplifier which drove the Muse Model 18 subwoofer's crossover and a pair of VTL 225W Deluxe Monoblocks connected to Hales System Two Signature loudspeakers. Interconnect was either Straight Wire Maestro or AudioQuest Lapis, and loudspeaker cables were either bi-wired pairs of AudioQuest Dragon/Clear or Straight Wire Maestro.

I might as well come clean up front and avoid any ambiguity: the Theta Data is the best CD transport I've heard — and by a wide mar-

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1 The lens is attached to a voice-coil-like structure suspended in a magnetic field. The focus error signal is amplified, driving the voice coil/lens in the correct direction to maintain focus.
gin. The Data is not only the best transport I've auditioned, but it brings digital playback one step closer to the elusive goal of mimicking analog replay.

What makes the Data special is its ability to render an analog-like ease to the presentation. The forwardness and tension of lesser transports were contrasted with the Data's smoothness, liquidity, and musicality. In fact, the Data's sound can be summed up in one word: musical. It invited me into the music with a laid-back comfort and relaxation reminiscent of good analog. In this regard, it was very similar to the extraordinary Esoteric P-2—but clearly a notch above the $4000 reference transport.

Specifically, the Data has an uncanny ability to present natural instrumental and vocal timbres. The glare and hardness associated with digital playback were significantly reduced with the Data. There was a velvety smoothness to instrumental textures not previously heard from digital playback. Timbres just sounded right, infused with their natural harmonic richness, yet lacking the brittle edge of overly emphasized upper harmonics so common to digital playback. The mids in particular had a sense of ease and liquidity rivaled only by analog. The Steinway D on Stereophile's Intermezzo CD (STPH003-2) had a warmth and lushness not heard from other transports.

The treble was equally impressive. Of all the transports I've auditioned, the Data presented the least offensive top-octave reproduction. Again, the word "smooth" aptly describes the Data. The treble was devoid of hash and grain, instead presenting high-frequency-rich instruments with their natural tonal balance and delicacy intact. Cymbals had much less of that spittiness associated with digital, instead having a rich texture. Most recordings, in my opinion, have too much treble energy. This situation is exacerbated by digital's tendency to make the treble sound hashy. With the Data, however, a more natural rendering was restored to high frequencies. In every comparison, the Data had a softer, more lifelike treble presentation.

What I Listen for in Digital Components: an example

The Clark Terry Live at the Village Gate CD (Chesky JD-49) is particularly revealing of many aspects of a digital source component's performance. This recording of all acoustic instruments is remarkably transparent, tonally accurate, and has a stunning sense of instrument placement within a three-dimensional soundstage. Here's what I listen for on track 2:

The audience applause and laughter at the beginning should have a sense of immediacy and palpability. With the right components, the audience can seem to wrap around the loudspeakers and almost surround the listener. Some digital processors and transports narrow the soundstage, squashing the audience between the loudspeakers. In addition, individual voices in the audience are more distinct and separate from others with the better digital sources.

The drum introduction is a good indicator of a processor or transport's transparency. The drums should be set distinctly behind the rest of the band, with a nice sense of air surrounding them. There should be a feeling of crystal-clear space between the listener and the drums—like crisp, clean mountain air. Some digital source components add a veiling haze to the presentation—like looking at the drums through a layer of smog. Switching to a better digital processor is like washing months of winter off a picture window.

The sax solo is revealing of glare, forwardness, and the unpleasant pushiness characteristic of digital audio, especially brass instruments. The sax is a little prominent in the mix for my tastes, but through some processors and transports it can be overbearing. The sax's texture should be round and smooth rather than hard and edgy. It is very common for digital components to make this sax sound aggressive. The instrument should, however, still have a little bite and maintain its detailed harmonic richness.

You should be able to visualize the placement of each instrument within the soundstage during the ensemble playing. Good processors and transports will throw a focused soundstage, each instrument occupying a distinct position. In addition, there should be a feeling that the instruments are spatially distinct from each other, both laterally and from front to rear. The instruments should be clearly defined individual
Don’t be misled by this description into thinking the Data sounded overly soft and romantic at the expense of detail and liveliness—far from it. In fact, the Data’s lack of unnatural artifacts allowed much more detail and nuance to emerge. The absence of detail-obscuring grain in the mids and treble allowed the finely woven inner detail of the instrumental or vocal fabric to suddenly become immediate and palpable. Direct A/B comparisons with other transports revealed just how much better the Data was in this regard. A wealth of nuance and subtlety returned to the music, making the musical presentation through the other transports somewhat uninvolving. In addition, long-term, single-presentation listening was more involving through the Data; I had the feeling that there was just more music there.

There is one other remarkable characteristic of the Data—its spectacular presentation of soundstage. In many ways, the Data’s soundstage presentation and its spatial characteristics were very similar to Theta’s digital processors: big, spacious, three-dimensional, and precisely focused. I found it fascinating that a designer could shape the sound of a transport to reflect his sonic priorities—priorities evinced by the family resemblance of Mike Moffat’s previous creations. The Data threw a sense of size and space that was truly remarkable. Listen how naturally miked recordings—*Pictures at an Exhibition* (Dorian DOR-90117), *Intermezzo* (Stereophile STPI1003-2), and *Three-Way Mirror* (Reference Recordings RR-24CD)—seem to make the listening room’s walls vanish, to be replaced by the recording site’s spatial characteristics. Switching to the Data made the soundstage bloom, creating a convincing feeling of size and space.

In addition, there was superb resolution of subtle spatial cues. The nuances that greatly add to a feeling of instruments existing in the room were bountiful through the Data. The presentation was wide and deep, maintaining a sense of width toward the soundstage rear. All these characteristics added up to a sense of

objects surrounded by air rather than just more sounds in a synthetic continuum. The image should be tight and compact, not large and diffuse. Each image, however, should have a delicate bloom around it as the sound is launched into space. With a toptnotch digital front end, the sense of individual instruments existing in the room is stunning.

The cymbals on this recording tend to be a just a little forward, but they have a natural tonal balance free from spittiness and the feeling that they are overlaid with white noise. Cymbals have a “gong”-like component that gives them a sense of body. All too often, cymbals’ delicacy is obscured by hash and grain. Listen for texture, detail, and a sense of pitch; if they sound like bursts of featureless white noise, it’s time to upgrade.

The acoustic bass can sound a little lightweight on some D/A converters. The better processors will create a greater sense of rhythmic drive and urgency. Listen for a feeling of solidity, clear pitch definition, and a driving bounce in the low end. There is a big difference in what Martin Colloms calls “pace” between digital processors, transports, and digital interconnects. How energetic the band sounds is often related to a digital converter’s bass performance.

Having said all that, I must add a caveat: I listen for these specifics because it is my job to discover and describe the differences between components. The best way to evaluate audio equipment for your own use is to forget about specifics and let the music itself speak through the playback system. How easily do you forget about the electronics and concentrate on the music? Does the system make you tap your foot? How compelled are you to keep pulling out more and more of your favorite music? Are other activities subordinated to the need to keep listening? Finally, and most important, how much are you enjoying the music? In many ways, you are the best audio critic for choosing your own components. Believe what you experience firsthand.

I often discover more about components when I go into the listening room at night as a music lover than during the day as a reviewer with a notepad. I believe that focusing on specific aspects of a product’s performance excludes a sensitivity to the most important aspect of equipment quality—the ability to convey the music’s meaning. Watch for a further discussion of this phenomenon in an upcoming “As We See It.”
life, air, and vibrancy—the antithesis of cardboard sterility.

What don’t I like about the Data? I’m hard pressed to find any criticisms of its musical presentation—except in relation to analog. It outperformed every transport previously audition in virtually every area. The Esoteric P-2 had a similar analog-like ease, the Meridian 602’s soundstage depth was very close to the Data’s, but for overall musicality, no other transport approached the Data for sheer enjoyment of the music. It’s that good.

Incidentally, the Data works well as a video-disc player. I experienced one slight glitch, however: a slight flashing phenomenon on the TV monitor after the Data had been playing for a few hours.

Finally, this review is incomplete in two respects. First, Theta was unable to get me an AT&T glass fiber-optical interface in time for this review. How much better does the Data sound with glass fiber? Is it worth $400 more?

Second, I didn’t have a standard videodisc player with a digital audio output on hand to compare to the Data and to other CD-only transports. It’s possible that many of the Data’s musical characteristics are inherent in all videodisc players. I’ll have a follow-up in the next issue to resolve these important questions.

**Conclusion**
The Theta Data redefines what we can expect from a CD transport. It is a sonic quantum leap above any transport near its price range, in my opinion even exceeding the performance of the $4000 reference Esoteric P-2. In addition, it made a bigger difference to my system’s overall musicality than I have previously experienced with CD transports.

What the Data does well it does extraordinarily, presenting an unrivaled smoothness and liquidity to instrumental textures, a remarkable freedom from hash and grain, and throwing a huge sense of transparent space before the listener.

My only complaint is that the Data is big, clunky, slow, and generally not as user-friendly as other transports. The remote is similarly clumsy, with so many identically sized and colored buttons, many of them having nothing to do with CD playback. This is a small price to pay, however, for the Data’s musical qualities.

In short, the $2400 Theta Data is an unprecedented bargain. It is clearly at the top of the transports I’ve auditioned. The fact that it costs significantly less than many high-end transports is exciting; more music lovers can realize the benefits of a Class A CD transport in their systems.

I have previously advised readers to put most of their digital budget into a digital processor and not the transport. The Data, however, provides such a high level of performance for such a reasonable price that it should be considered by audiophiles on any budget.

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**THETA DS PRO PRIME D/A CONVERTER**

Robert Harley


In hindsight, it was inevitable that two sophisticated digital audio technologies—software-based digital filters and Bitstream D/A converters —were destined to be married in one product. The software-based D/A converters offered by Krell, Wadia, and Theta all used multi-bit ladder DACs, and Bitstream-based units have previously relied on off-the-shelf digital filters.

Having auditioned both types of technologies individually, I’ve always wondered how they would sound together. This is an important question; fewer and fewer IC manufac-
turers will make multi-bit DACs as the world—for better or worse—switches to 1-bit type converters.

There are several good reasons why Bitstream converters have never been used in software-based processors. First, the complexity of software-based processors meant long development times—a situation not conducive to adapting products to the quickly changing Bitstream technology. Second, the high cost of developing software-based processors led their designers to use the best DACs available, not the least expensive. Finally, software-based processor designers tend to believe the conversion method was less critical sonically than the filtering method.

All that has changed with the introduction of the new Theta DS Pro Prime digital processor. The Prime incorporates a 4x-oversampling digital filter performed by a Digital Signal Processing (DSP) chip under software control, coupled with a Philips 7350 Bitstream DAC. Theta's reason for using the Bitstream DAC was price: a 7350 is far cheaper to implement than a pair of multi-bit DACs with their attendant Most Significant Bit (MSB) trimer and need for individual calibration at the factory.

The lower cost of using Bitstream technology is reflected in the Prime's $1250 price—far lower than any other DSP-based processor. Theta's design goal was to make a moderately priced unit that could still use their proprietary filtering technology. They also pulled a few other cost-saving tricks I'll tell you about later.

But first, let's take a closer look at what makes this fascinating amalgam of digital audio technology tick.

**Technical description**

The Prime looks remarkably like Theta's DS Pro Basic D/A I reviewed in Vol.13 No.8—no frills, but nice appearance and good build quality. The narrow front panel has just one switch that selects between the Prime's coaxial and optical inputs. Two red LEDs indicate if AC power is connected and if the Prime has locked to an incoming digital signal. Unlike the rest of the Theta processor line, no absolute-polarity reversal switching is provided.

The rear panel is similarly minimalist, holding an RCA digital input, Toslink optical input, a pair of RCA analog outputs, and an IEC AC power cord socket. The addition of an optical input is new for Theta; they believe Toslink optical is inferior to coaxial transmission, but included the jack for compatibility with other products. Many Far Eastern CD players (and videodisc players) are being shipped with only Toslink output in an effort to reduce parts cost. The average consumer believes optical is inherently better, but virtually everyone who has listened critically finds Toslink optical inferior to even the worst coaxial digital interconnect.

My first impression on opening the Prime was surprise that I was looking at a $1250 processor. The apparently high parts cost, sophisticated circuit topology, and build quality would have looked at home in a unit costing twice as much.

This is especially true when considering that the Prime, like all Theta processors, is software-based. This means that the digital filtering is performed by a Digital Signal Processing (DSP) chip under the control of instructions (the software) encoded in a programmable Read-Only Memory (ROM) chip. The DSP does the math on the digital datastream under the control of the decoding algorithms (software instructions) contained in the ROM chip. A single DSP chip runs at 4x-oversampling, contrasted with Theta's
other products that use two DSPs to operate at 8x-oversampling (software-based filters can run at up to 64x-oversampling). The digital filter outputs 16-bit words 176,400 times per second, four times the CD's sampling frequency of 44.1kHz.

This software-controlled, DSP filtering approach is contrasted with the digital filtering found in most D/A converters—a single inexpensive filter chip connected with a minimum of additional parts. Many very expensive converters use an off-the-shelf digital filter chip. The software-based approach requires an expensive DSP chip (in the Prime, the ubiquitous Motorola 56001), a programmable ROM chip, additional PCB work to accommodate the DSP's 120 closely-spaced pins, and finally, the filter algorithm must be written and tested—a job requiring lots of expensive skilled programing hours.1

The Prime's input receiver is the popular Yamaha YM3623B chip. This IC receives the incoming data, strips out the subcode, generates a new clock by phase locking to the incoming signal, and formats the data for input to the digital filter.

A Philips SAA7350 Bitstream DAC handles the D/A conversion tasks. As previously mentioned, this is the first time in a commercial product that a Bitstream chip has been mated to a software-based digital filter. The 7350 partially accounts for the Prime's low price; a single Bitstream chip is cheaper to implement than a pair of DACs with their MSB trimmers and associated circuitry.

Each half (left and right channels) of the stereo DAC's differential outputs is summed by a Linear Technology LTI028 op-amp. Any noise common to both polarities of the differential signal will cancel at this summing op-amp. An Analog Devices 707 IC then acts as a DC servo, and an LM6312N op-amp serves as the output driver. There is one set of these output circuits per audio channel.

The power supply uses two transformers, both of which are mounted to the Prime's single printed circuit board. The first transformer powers the +15V rails for the analog output circuitry and +5V for the analog portion of the Bitstream DAC. The second transformer is used exclusively to supply +5V to the digital circuits—the DSP chip, digital portion of the Bitstream DAC, and associated logic. Power-supply smoothing is provided primarily by four 4700µF and two 2200µF electrolytic capacitors. The +5V digital supply is regulated by a large TO-3 regulator (the same package usually seen in power transistors), and the analog supply rails are regulated by three small-can type regulators attached to heatsinks. This last technique is a Mike Moffat hallmark: he favors metal-can regulators over the more commonly used and less expensive TO-220 plastic regulators.

Parts quality is very high. The capacitors associated with the Bitstream DAC are primarily polystyrene, all resistors are 1% metal-film types, and four of the resistors in the feedback loop are $3 non-inductive wirewound types. These resistors reportedly had a huge effect on the Prime's sound quality. In addition, a few Teflon capacitors (very expensive) are used in critical audio stages. The metal work is zinc over copper over steel, and the PCB is glass epoxy.

Overall, the Prime is an engineering marvel for its modest price. There is far more inside the unit than one would expect for $1250. Theta was reportedly able to keep the Prime's price low by several techniques: buying parts in large quantities with the expectation of selling lots of units, minimizing internal wiring and thus reducing labor costs, using the Philips Bitstream chip instead of a pair of multi-bit ladder DACs, ordering all the metalwork at one time for a lower price, and cutting their profit margin on each unit with the hope of recovering it by quantity sales.

Music
I didn't know what to expect musically from the Prime. On one hand, Theta's DSP-based multibit-DAC processors have always had common family traits: deep and driving bass, spectacular soundstage resolution and three-dimensionality, and dynamics galore. On the other hand, Bitstream-based D/A converters I've auditioned tended to have the opposite characteristics: somewhat soft bass, limited dynamics, and less resolution of individual instrumental outlines. Even the best of the Bitstream processors—the Meridian 203, in my opinion—has these Bitstream-like sonic qualities but is eminently musical in its own way. The Theta processors grab the listener, the Meridian Bitstream converter coaxes him. What would the software-based, Bitstream DS Pro Prime sound like?
The Prime took center stage in my digital front end for the past two and a half months. It was driven primarily by Theta's CD transport (reviewed this issue) through Theta's own digital interconnect. The preamplifier was either the extraordinary Audio Research LS2 reviewed last month or the EVS Stepped Attenuator, a passive level control. Loudspeakers were the Hales System Two Signatures augmented by the Muse Model 18 subwoofer, driven by VTL 225W Deluxe Monoblocks. Interconnects were the AudioQuest Diamond and Lapis or Straight Wire Maestro, and speaker cable was bi-wired runs of AudioQuest Dragon/Clear or Maestro.

It was immediately obvious that the Prime was much closer in sound to Theta's previous processors than other Bitstream products I've heard. In fact, the presentation was instantly identifiable as a Theta: a huge transparent soundstage and stunning sense of space and depth. Switching to the Prime transformed the presentation; it was like going from hearing the music through a rectangular frame to having the frame removed, leaving only the music.

This sense of size and space was clearly the Prime's forte. Listen to Jack DeJohnette's Parallel Realities (MCA MCAD-42313). The spacious and ethereal drums moved back about 20', making the rear wall seem to vanish. The percussion on "Dancing" suddenly seemed to exist on its own in space, rather than fused with the rest of the performance. In addition, there was a crystal-clear transparency nothing short of stunning. The Prime provided a huge, clear window on the music, unfettered by any sense of haze or veiling. In addition, the Prime threw clearly focused image outlines in three dimensions, infusing the music with a sense of realism. The presentation was anything but flat and sterile.

I could go on, but you get the idea. In short, the Prime's soundstage presentation and resolution of spatial cues were rare to hear from any digital processor, never mind one that costs $1250.

After getting over the Prime's stunning soundstage, the next aspect that grabbed my attention was the unit's dynamics. The Prime presented an effortless feeling of power, allowing the music's dynamics to more fully express themselves. There was a razor-sharp edge to transients, coupled with an ability to reveal wide dynamic contrasts. The result was a sense of suddenness, immediacy, power, and life. These qualities tended to make listening an active participatory experience, rather than a casual endeavor. In this regard, the Prime sounded very "un-Bitstream."

In the area of bass reproduction, there was no mistaking the Prime's lineage. Like other Theta processors, the Prime presented a rock-solid low-frequency foundation for the music. The bass was tight, punchy, deep, and very well defined. Kick drum had an impact that rivaled that of the extraordinary Wadia 2000, and bass guitar had a tautness that gave the music a sense of drive. The combination of bass solidity and effortless dynamics gave music a powerful sense of drive and urgency, the antithesis of bland, sluggish, and plodding. In addition, LF pitch resolution was superb by any measure, revealing tonal nuances obscured by other processors. Again, the Prime sounded like no other Bitstream-based converter I've auditioned.

The Prime's treble was smooth and less hard than many other processors, but lacked the ultimate sense of ease heard from analog and some D/A converters, albeit more expensive ones. I found the treble smoother and more natural than the SuperLink, for example, but not as delicate and refined as the Audio Research DAC1-18. There was also less inner detail revealed through the Prime than the DAC1, the latter processor tending to resolve another layer of musical information. This gave the Prime's treble less of a lifelike quality, especially when reproducing instruments with significant high-frequency content. The DAC1's superior resolution of fine detail also gave it an edge in reproducing a sense of soundstage depth. While the Prime was superb in rendering three-dimensionality and depth, the DAC1 seemed better at presenting an ultimate sense of distance, a phenomenon perhaps related to the DAC1's better ability to discern the finest of inner detail.

I found the Prime's rendering of instrumental textures good, but not outstanding. There wasn't that lushness in the mids that characterizes the VTL D/A and Audio Research DAC1-18. While instrumental textures were detailed and well fleshed out, they lacked the naturalness, ease, and liquidity that characterize digital processors based on the UltraAnalog DAC. Remember, though, that these comparisons are with converters costing two and a half to nearly six times the Prime's price. There's always a tendency to compare a modestly priced superachiever like the Prime to more expensive prod-
ucts rather than those in its own price range.

The bottom line is that I enjoyed listening to music through the Prime. During direct comparisons with other processors, I repeatedly felt a strong desire to return to the Prime and enjoy the music. I felt compelled to listen to entire CDs through the Prime, rather than continue the comparisons with the same track of music. This is a sure sign that a product is fundamentally right musically—a sign that was unmistakable with the Prime.

**Measurements**

This is the first set of measurements using *Stereophile*’s Audio Precision System One with the new "Dual Domain" upgrade. Unlike a standard System One, the Dual Domain can generate and analyze signals in the digital domain. Previously, digital signals for testing D/A converters were read from suitable test discs and taken from the digital output of a CD player. With the Dual Domain, we can generate a variety of chosen signals rather than being stuck with only the signals of test CDs. In addition, the Dual Domain has waveform capture (with 16-bit resolution) and FFT functions. Since the upgraded unit arrived just a few days before these measurements needed to be made, we haven’t begun to explore its potential. We will, however, keep you apprised of our continuing efforts to find measurements that correlate with what we hear.

The Prime’s output level when decoding a full-scale 1kHz sinewave was a hefty 3.46V (right channel), 1.46V above the standard 2V output level (the left channel’s full-scale was 3.44V). This translates to nearly 4.8dB greater output level, meaning that the Prime will sound a lot louder in side-by-side comparisons unless care is taken to match levels. Theta processors typically have very high output levels (the Basic’s output voltage was a whopping 7.2V).

Frequency response, shown in fig.1, was flat, but with some negligible HF rolloff, the response being down 0.1dB at 10kHz and 0.4dB at 20kHz. This amount of HF droop may just be audible as a slightly smoother treble presentation. Note in fig.1 that the right channel’s output level is slightly higher (0.08dB) than the left’s—again a negligible amount. De-emphasis error (fig.2) is virtually nonexistent, the apparent HF negative error being due to the Prime’s frequency response on which the de-emphasis plot is overlaid.

Linearity was exceptionally good, there being about 1.5dB of positive error at −100dB (left channel) and a very low 0.8dB error at −100dB
in the right channel (fig. 3). This performance is typical of Bitstream DACs like the Prime’s Philips 7350. We have found, however, little correlation between low-level linearity and sonic performance. Indeed, measurements of the Wadia 2000 seem to indicate an inverse correlation between linearity and sound quality (see my “Follow-Up” on the Wadia 2000 in the October ‘91 issue).

Crosstalk (fig. 4) was also excellent, measuring 110dB at 1kHz, dropping only slightly to 96dB at 20kHz. The Prime’s output impedance was low, measuring 51 ohms at 1kHz and 20kHz, and 49 ohms at 20Hz. Looking at a positive-going impulse revealed that the Prime does not invert absolute polarity.

Fig. 5 shows a dithered, -90dB, 1kHz sinewave as captured by the Audio Precision Dual Domain. There is a moderate amount of audio-band noise overlaying the signal, but it generally looks quite good. It should be noted that the bandwidth for this measurement was 20kHz: removing the out-of-band noise has improved the sinewave appearance. Performing a spectral analysis of the Prime’s output under the same conditions produced the plot in fig. 6. The low level of noise and excellent linearity is apparent. There is some 60Hz AC line noise present on the left channel, but this is still negligible at -116dBFS.

Fig. 7 shows a spectral analysis of the Prime’s intermodulation products when decoding a 1:1 combination of 19kHz and 20kHz at full scale. The 1kHz component and the 24.1kHz product are both very low. This is one of the best-looking intermodulation plots seen in a digital converter.

The Prime reproduced a 1kHz, full-scale squarewave (fig. 8) with a shape typical of linear-phase digital filters, and had no trouble locking to a variety of sampling rates, including 48kHz.

Overall, the Prime performed very well on the bench. There is nothing in the measurements, however, that begin to describe its sonic character.

Conclusion
At $1250, the Theta DS Pro Prime represents another significant increase in the price/performance ratio of digital processors. It clearly outperformed every processor in its price range, and rivaled those costing much more. Its overall performance was better than that of Theta’s DS Pro Basic, a unit that itself brought a new level of performance to a sensible price. In fact, processors with the Prime’s sound and costing as much as $3000 would still receive a recommendation.

Fig. 5 DS Pro Prime, dithered 1kHz waveform at -90.31dB (20kHz bandwidth)

Fig. 6 DS Pro Prime, spectrum of dithered 1kHz tone at -90.31dB with noise and spurious (1/3-octave analysis)

Fig. 7 DS Pro Prime, HF intermodulation spectrum, 300Hz–30kHz, 19+20kHz at 0dB (linear frequency scale)

Fig. 8 DS Pro Prime, 1kHz squarewave at 0dB
The Prime's strengths are many: robust and powerful bass, smooth tonal balance, and best of all, a stunning presentation of soundstage. This last quality is the Prime's highlight. Its ability to reveal spatial cues within a huge, transparent soundstage was remarkable, and easily superior to processors costing many times more.

I must add a caveat: The qualities that I find appealing in the Prime (and other Theta processors) may not suit all listening tastes. The razor-sharp soundstage focus, vivid tangibility of instrumental images, and slight forwardness may be less musical to some music lovers than the more laid-back, relaxed, and softer presentation provided, for example, the Meridian 203 and Audio Research DAC1-I8. In addition, the Prime is not the last word in portraying textural liquidity.

In addition to its superb sonics, the Prime is solidly built. It does, however, lack such features as polarity reversal and multiple coaxial inputs. Given the choice of better sonic or inclusion of these functions at the same price, the music enthusiast must choose sonics. Incidentally, the Prime works very well with Theta's Data transport (also reviewed in this issue). With a retail price of $3650 for the pair, it is, in my opinion, the best value going for a transport/processor combination.

If you're in the market for any digital processor, the Theta DS Pro Prime must be auditioned. Your ears and your bank account may be in for a pleasant surprise.

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**B&W MATRIX 804 LOUDSPEAKER**

Thomas J. Norton


My first exposure to a B&W loudspeaker was not to a complete loudspeaker, but to a pair of B&W tweeters. To be specific, to a pair of the only electrostatic tweeters that (to my knowledge) B&W ever manufactured. This tweeter was incorporated into the DM70, a dynamic/electrostatic hybrid design; for some reason its owner wanted to sell his pair sans woofers. I had no idea why he would do such a thing, but in any event I bought them in 1974. I mated each of them to a home-brew woofer, forming a gawdawful ugly combination—a clunky-looking, unfinished particle-board woofer cabinet holding two CTS 10" bass drivers with an unadorned DM70 tweeter perched on top. (The latter were sold to me without the DM70's cosmetic housing.) I didn't keep the tweeters long—they were returned to their erstwhile seller. I couldn't quite get the combination to gel (looking back from my less-naive present, it isn't hard to see why), and he agreed to buy the tweeters back. The most fun I had with them was watching the reactions of visitors to the hand-lettered signs I had thoughtfully posted atop the wide-open tweeter circuitry: "DANGER, 10,000 VOLTS" was intended to command respect, and it did.

Two years later I got to hear the full line of B&W loudspeakers, intact, at the 1976 Summer CES. The DM70 was by then history, if memory serves, and the star of that show was the DM6. The B&W demonstration remains my most vivid memory of that show. Aside from providing striking sonics and a polished presentation (the latter remaining a feature of B&W demos to this day, though I have to say that, in my opinion, they've been less consistent since the late John Bowers departed the scene), B&W seemed to be a company on the verge of banishing the dreaded "'box" from the listening room. Whatever else the DM6 was (and though not flawless, it was a very fine loudspeaker for its day), it was no block of wood. Described as everything from a pregnant pengui to a robot, it could not be ignored. Sonically, it defined—for me at least—the hallmarks of B&W loud-
speakers. Models have since come and gone, and though this reviewer has certainly not heard them all, in general they have had the ability to throw a striking image with clean, exaggerated highs, and lows which have tended, shall we say, to a warmer than neutral quality—especially in the midbass.

But it was that flair for radical styling that was unique for its day, and remains so to this. Other manufacturers have been by no means napping, but can you name a loudspeaker with a more unique and striking appearance—love it or hate it—than the current Matrix 800 (reviewed by LL in the June 1991 issue)?

**Description**

Having said all that, B&W's new Matrix 804 looks almost conventional, except for the fact that the tweeter is perched atop the tall, floor-standing woofer enclosure rather than being enclosed within it. The uninitiated might think that B&W perhaps forgot the tweeter, realized its mistake at the last minute and, faced with scores of pre-cut enclosures, stuck it on the outside. But those familiar with the 804's lineage will immediately recognize the technique, which dates back to the DM7 of the late '70s and continues up through the current Matrix 801 and 802. Placing the tweeter free of the enclosure (or at least as free as possible, given physical and commercial constraints) minimizes panel reflection and diffraction, thus producing, according to B&W, a more spacious image.

The Matrix 804's tweeter is itself a modification of the tweeter used in the Matrix 801, and incorporates the ferrofluid-damping of the latter's latest incarnation. An integral phaseplate in proximity to the dome fine-tunes the response at the very top end of its range, and a metal screen protects the diaphragm—metal domes are very prone to deformation and, once dented, cannot be repaired. The outer shell of the tweeter is sculpted to soften a number of potential reflecting surfaces, though it lacks the cute little "pillow" that sits under the front of the Matrix 801's high-frequency driver. The entire tweeter assembly sits back slightly from the front of the cabinet for time-alignment.

Both of the 6.5" low-frequency drivers operate in tandem up to 150Hz, at which point the lower driver begins a gradual rolloff. The upper driver continues the response up to 3kHz, above which frequency the tweeter takes over. The cone of this upper driver is made of Kevlar, a material which has come into increasing favor of late for its favorable acoustic properties, especially for use in midrange drivers. It isn't exactly a new material, however. In fact, B&W
has been using it in loudspeakers since at least 1976, when they incorporated it into the midrange driver of the above-mentioned DM6. The lower woofer, which operates at the lowest frequencies only, is made of Cobex, a polymer material used in the woofers of a number of other B&W loudspeakers.

The 804’s bass-loading technique will be familiar to those versed in B&W-ese over the last few years. By means of a (supplied) outboard bass-alignment filter, the normal fourth-order reflex system response is converted to a sixth-order Butterworth. 1 To pare this down to its bare essentials, the filter provides a degree of boost in the bottom octave while rolling off the response below the boost frequency, preventing low-frequency overload of the woofer. (It is, strictly speaking, both a filter and an equalizer, but B&W refers to it as a filter, and I will therefore use that terminology here.) Such an arrangement should, in theory, allow the lowend response to be extended by half an octave, in this case about 10Hz in the frequency range of concern.

The Matrix 804 is ready for bi-wiring, with two pairs of good-quality binding posts (superior to the posts provided on my three-year-old pair of Matrix 801s). My only complaint about these posts is that they are designed for finger tightening; there are no flat surfaces to provide a grip-point for a wrench or nut-driver. At least this insures that the user won’t overtighten them. Internally, the high- and low-pass sections of the crossover are physically separated to reduce any chance of component interaction.

Internally, the Matrix 804 enclosure is, as you’d expect from the name, built using the same network of honeycomb-structure braces used in the rest of the Matrix series. Damping material fills the individual cells within this honeycomb. The resultant assembly provides rigidity without the use of extreme mass or exotic materials. Yet B&W has backed off a bit, undoubtedly to reduce manufacturing complexity, from the full matrix configuration of the earliest Matrix designs. Two full-length cross-braces run the length of the cabinet from front to back, and two more from side to side, but none in the short dimension connecting front, back, and sides. It is therefore perhaps less than fully accurate to call the internal structure a honeycomb. Well-braced, yes, but the original matrix concept has apparently proven impractical to manufacture; even the 800, seen in cutaway at last June’s CES, while extensively braced, does not use a full internal honeycomb.

Cosmetically, the 804 is attractively finished on all sides (except the bottom). The grille edges are rounded internally and externally to minimize diffraction. That, plus the separately mounted tweeter, means that listening with the grilles in place should entail less potential degradation than is normally the case. Despite this, I did all of my listening with the grilles removed.

Listening

Associated equipment used in the listening tests of the Matrix 804s included the Rowland Consonance and Consummate preamps, Krell KSA-250 power amplifier, Oracle Delphi Mk.IV turntable, Graham arm, Dynavector XX-1L cartridge, and Wadia WT-3200 transport driving either the Audio Research DAC1 (new 20-bit version) or the California Audio Labs System 1 D/A converter. Interconnects were AudioQuest Lapis and Cardas Hexlink. AudioQuest Clear was used in a bi-wired configuration. The loudspeakers were positioned well out from the rear and side walls.

Immediately after I first fired up the 804s I knew that this was going to be a rewarding relationship. But all was not smooth sailing from the outset. The sound was basically good, but a little bright and lacking in coherency. Neither of these problems was severe, but further tweaking was clearly in order. After a brief period of experimenting with displacement in the horizontal (which helped some), I realized that I was, from my not-all-that-high listening seat, looking down on the 804s—not exactly a balcony perspective, but the tops of the cabinets were clearly visible. Recalling that my preferred positioning of the Matrix 801s places the tweeter well above ear level, I decided that elevating the 804s above their floor-standing position might just prove to be rewarding.

1 Those unfamiliar with the gobbledygook casually tossed around in discussions of bass-alignment schemes need only know that the response of a driver in a box is analogous to the response of an electrical high-pass filter (with, of course, a very low cutoff frequency). The response of a sealed box may be simulated by a second-order filter (rolling off at 12dB/octave below its cutoff point), that of a standard reflex design by a fourth-order (24dB/octave drop below cutoff). Variations and permutations on these alignments are possible, the sixth-order Butterworth being one which requires externally applied response shaping. Okay, equalization and filtration. Butterworth (along with Chebychev, another mathematical guru whose name is attached to filters which follow the dictates of the math function he discovered) never dreamed his concepts would be applied to loudspeakers. Come to think of it, he probably never dreamed of loudspeakers.
First I tried placing them on Merrill Elephant Feet. This raised them about 3½". Better. Nirvana was knocking at the door. Then I spied the pedestals for the Hales System Two; the latter loudspeakers had long since gone back to the factory, but their bases had somehow been overlooked and were still lurking about in the hall outside the listening room. After filling the bases with about 40 pounds of sand each, I set the Matrix 804s on top. The latter were tipped back just slightly by placing two SimplyPhysics short Tone Cones between the front of the loudspeakers and the Hales base, and one (slightly shorter) small Tiptoe at the rear. B&W does provide spikes for the 804s, but I didn't use these initially. The Hales base itself was, in turn, spiked to the floor providing a solid foundation for the 804s. The latter were now about 9" off the floor, placing ear level somewhere at the lower part of the upper woofer cone.

Nirvana burst through the door, blowing kisses and strewing rose petals about the room. Well, OK, it wasn't Nirvana, but her sister Satisfaction. And if those weren't rose petals, they certainly pleased the senses.

The Matrix 804 reminds me of nothing so much as a miniature Matrix 801 Series 2—but with a sound in no way miniaturized. I haven't had the 801s in my listening room for several months now—they're somewhat midbass-prominent in this room, though not in the larger rooms in which I'd used them previously. But if you take an 801, reduce the bass output (a plus in this room in the midbass, a loss in the bottom octave and in the sheer feeling of majesty at which the 801s, but not the 804s, excel), open up the lower midrange a bit, and add a trace of forwardness to the rest of the midrange, you'll have the 804. It doesn't hurt that the smaller enclosures of the 804s, being less prone to getting in their own way, throw out a soundstage which, in my judgment, is better than that of the Matrix 801.

I do need to qualify the above remarks to the extent that the 801s with which I am very familiar, and thus the sound to which I refer, do not include B&W's latest changes to the design—deletion of the APOC (overload protection) network and replacement of the tweeter with the new, ferrofluid-loaded model.

Of course, none of this description will be of use to those with no firsthand experience of the Matrix 801 Series 2s, so I'll back up and discuss the 804s on their own. Most of my listening involved the loudspeakers without their external filter. Later I'll get to why this was, I believe, the right choice.

I was immediately impressed with the open, generous, and large (yet realistic) soundstage of the Matrix 804s: layered and three-dimensional. Their lively, immediate, up-front quality left a favorable impression of tactile presence rather than a less desirable excess forwardness. Lateral focus was also precise, extending beyond the boundaries of the loudspeakers—at least on selected recordings. This is not, in my experience, all that common, especially with direct-radiator loudspeakers well clear of the sidewalls.

Even without the outboard filter, the 804s' low end was clean and extended. Don't get me wrong; the bottom octave was not particularly impressive—no surprise, given the size of the drivers and enclosure. But the sound of the 804s never advertised the fact that they don't plumb subwoofer territory; there was no feeling at any time of a thin or shallow low end. The bass seemed neither pervasive nor missing, neither profound nor anemic. It was simply there, providing a solid foundation when needed. I'll have more to say on the bottom end a bit later in discussing the pros and cons of the filter. Suffice it to say here that while the bottom of the 804 won't knock you off your chair, and did edge slightly to the soft side of neutral rather than being hair-trigger tight (at least partially attributable to a similar quality in my listening room), it could at times startle with a surprising degree of impact and at least subjective extension. It gets the job done.

I initially heard a tendency toward warmth in the B&Ws' mid- and upper bass. That proved to be the case more often with CDs than with the somewhat lean and cool Oracle/Graham/Dynavector combination. I felt that this analog setup mated extremely well with the 804s. With CD playback there was more body, warmth, and fullness—and a less transparent quality. That's not to say that the 804s were not also convincing with CDs, only that they were less compelling than with the analog system.

This was nowhere more evident than with Tuxedo Cowboy's Woman of the Heart (Audio-Quest AQ-LP-1002), a superlative new recording of solo female voice, guitar, cello, and flute, engineered by Kavi Alexander using his by-now
well-known purist recording techniques. The high end sparkled here, demonstrating the 804 tweeter’s subtle, airy, open qualities. Guitar fingering details were delicate, the flute simply there. But nothing on this recording was more “there” than Debra Anne Bishop’s vocals—fully rounded, three-dimensional, and firmly anchored in the soundstage. The only flaw which gave me any pause whatsoever was a rather covered, nasal quality to the voice. I was not certain as to whether the source of this lay with the loudspeakers or elsewhere—perhaps in the recording itself—further listening was definitely required before attributing this to the B&W’s.

The “problem” proved elusive. It recurred on several other recordings, but was not present on most of the program material sampled. It was also present on the same recordings, to roughly the same degree, on another pair of competitive loudspeakers, the Snell C/IV, but was less evident over the new Koss E/90 electrostatic headphones. Finally I brought out the tie-breaker, a recording I’ve used for over 20 years (in both LP and CD formats) for natural reproduction of close-miked, ungimmicked, pop male vocals—Gordon Lightfoot’s If You Could Read My Mind (Reprise 6292-2), specifically “Me and Bobby McGee,” “Sit Down Young Stranger,” and “The Pony Man.” No midrange coloration problems here.

My hypothesis: Of the three transducers mentioned above, the B&W is the most forward-sounding, the Koss headphones the most laid-back. Any nasal quality present in the program material will be less evident when the playback system is more laid-back. While I couldn’t rule out the possibility that the Matrix 804s were contributing a trace amount of coloration, it was never a consistent or serious concern; on the majority of program material used, the B&W’s demonstrated a clear, open, lively, and unmuddied midband—a tribute both to the mid/ bass driver design and the Matrix enclosure.

The Matrix 804s’ vibrant soundstage continued to impress on Clannad’s Magical Ring (LP, Tara 3010). Part of the credit here must certainly go to the recording, clearly an artificial studio product but no less striking for that. Closing my eyes, the 804s transported me to an entirely different environment. The sense of space was dramatic. The imaging was tightly focused and precise, both in width and in depth. The kick drum was surprisingly clean and solid, the highs pristine, if certainly less natural and more prominent than with the previous, more neutral recording. Pulling out another obvious studio mix, Simply Red (LP, Elektra 9 60452-1), I noted a somewhat more prominent but cleaner high end, with a trace of bite but no fizzle—qualities I feel to be inherent in this generally superior pop recording. Clarity and inner detail were outstanding, and I noted no obvious midrange colorations. The sound had fine punch and dynamics, but without exaggeration.

As I moved on to more naturally miked recordings of acoustic instruments, the 804s continued to pile up positive points. Jazz at the Pawnshop (LP, Proprius 7778-79), that old reliable (if perhaps by now overplayed) audiophile favorite, was strikingly detailed, with a detailed sense of space. The sax was immediate, the instrumental interplay crisply defined but without a sign of excess. The applause and ambient background noise on this recording are particularly revealing, from the conversations going on (though no loudspeaker I have heard has yet allowed me to actually listen in—and it would be in Swedish in any event) to the sounds of clinking glasses. The 804s presented it all in a natural, believable fashion, as they did another fine LP from the same label, this time of a mixed chorus: Flöjten spelar—dansen gar (Proprius PROP 7759). The vocal body and weight in this recording were “on,” neither too lean nor too rich.

With CDs, as I’ve already stated, the 804s did well, but were just a bit less arresting than with the analog setup. The main differences were a bit more weight and warmth (sometimes a plus, sometimes a minus, depending on the recording) in the mid- and upper bass, a rather less open extreme top, and a slightly denser, less immediately transparent sound. Digiphobes will argue that this is precisely what you might expect, for which one can hardly blame the loudspeakers. I won’t argue, except to note that I’ve heard the Oracle/Graham/Dynavector combination sound a bit too cool and detached through loudspeakers which themselves lean in that direction. Regardless, the 804s more than held their own with the best CDs.

Clark Terry’s Live at the Village Gate (Chesky JD49) was slightly forward but airy and open. The highs were simply there, self-effacing, and didn’t call undue attention to themselves. Jennifer Warnes’s Famous Blue Raincoat (Cypress YD 0100/DX 3182) displayed a first-rate depth.

3 The Stereophile Interview with Kavi Alexander in Vol. 12 No. 9 goes into some detail on this.
To Align or Not to Align

It was only in the final stages of auditioning that I sought to determine the effect of the external filter—or, as B&W calls it, the 800 Series Variable High-Pass Alignment Filter. I placed it in the tape monitor loop of the Rowland Consummate preamplifier, making it possible to switch it in or out from the listening position. I first selected Michael Hedges's *Taproot* (Windham Hill WD-1093). This may seem like a strange choice, but there is a very deep, low-frequency foundation on band 2 of this recording (“The Jealous Tunnel/About Face”) that only one loudspeaker has fully reproduced in my listening room with both extension and clarity—the PSB Stratus Gold. The 804s did not do it without the filter; with it I noted no particular improvement. I was also vaguely aware of perhaps a trace of added crispness in the highs and slight loss of fluidity with the filter in the circuit, but it was barely worth commenting on and could as easily have been due to the leads connecting the filter to the preamp (first-generation AudioQuest Lapis) as to the filter itself.

Reference Recordings' *Fiesta* (RR-38CD) has some whacking great bass drum strokes near the beginning of the first cut, the initial movement of Owen Reed's *La Fiesta Mexicana*. The performance of the 804s on this selection was surprising. While I have heard clearly more powerful impacts from this recording over, most recently, the Genesis IM-5200/Servo 10 satellite/subwoofer system I reviewed recently and the Snell Type Bs, on the whole the 804s left little to be desired. At conversation-discouraging—though not stomach-churning—volume levels in my moderately large listening space, the drum hits were full, solid, and reasonably tight. With the filter, I sensed no particular improvement in the low-bass extension, but a notable degradation in the speaker's output-level capability. It took nearly a measured 3 dB reduction in output level with the filter in-circuit to equal the same overload-free performance as the 804s were capable of without it. Put another way, inserting the filter into the system proved a serious negative on this recording. The *Glory* soundtrack (Virgin 91329-2), on the other hand, caused the equalized 804s no distress, but didn't profit significantly from the use of the filter either. Even by themselves, the 804s do very well with this recording's excellent low end—which can actually sound overblown on some loudspeakers in some rooms—including the subtle but deep organ pedal at the end of the second band. The latter was subtly enhanced by the filter, but I wouldn't waste the stamp to write home about the difference. A very slight added grain to the high end with the filter was similarly worth little ink.

I was rather amazed to hear the 804s not only hold up to, but also convincingly portray, the low-end pyrotechnics on *Défis* (Reference Recordings RR-12CD). Even at a reasonably high level it showed only a trace of strain without the filter. But with it, again, the volume had to be reduced considerably to prevent nasty rattles as the woofers bottomed out. All of this agony produced no major subjective improve-
ment in low-end extension, especially since the volume had to be reduced to a less than satisfying level to prevent potential woofer damage. Without the filter, however, this recording was reproduced in a most convincing fashion, with only a slight feeling of congestion in the midbass to lower midrange region as the going gets furious and the natives restless in the last band. Also notable here was the fully detailed yet unfrazzled high-frequency response.

Only with full-fledged organ recordings did the filter add a noticeable—though still far from dramatic—margin of low-end growl, more felt than heard. But organ also came through the 804s with a bit too much mid- and upper bass, an effect that the filter seemed to exacerbate.

Incidentally, the filter provided with the 804 is an “all-purpose” filter, designed to be used with any of the 800 series loudspeakers. It was factory preset for the 804, but may be easily reset (using internal switches) by the user for any of the other 800 models. I do not recommend experimenting with any other settings except perhaps that for the 805, the only smaller loudspeaker in the series.

The bottom line is that I cannot recommend using the filter network with the 804, and do not feel that it adds to the loudspeaker’s already more than respectable low end. It does not, in my judgment, make the low-end extension of the 804s equal to that of some of the competition—the Snell C/IV and PSB Stratus Gold come immediately to mind. The 804 will have to compete with these and similar loudspeakers on other grounds than sheer bottom-octave power and reach. And it can.

Bring on the competition

The B&Ws are playing in a rough neighborhood; competition in this price range is intense. Restricting myself only to loudspeakers with which I have spent significant time, the Snell C/IVs, PSB Stratus Golds, and Genesis IM-5200/ Servo 10s will dig noticeably deeper into the bass. The last two have the more subjectively extended top ends, though both exhibit on-axi s rises which can make that a problematic plus under less than ideal circumstances. All have clean, open midranges, the Genesis being the most laid-back of the group.

In an attempt to draw more specific comparisons and rely less on memory (on which the comments in the above paragraph are based), I substituted the Snell C/IV into the reference system after spending a considerable period of time with the B&Ws. In a nutshell, the Snells go deeper at the very bottom—which was no surprise. Warmer and fuller in the midbass, they have less apparent neutrality in my room in this region, but by no means carry it to excess. The Snells are slightly less forward in the midband, a perspective that many may find more “right,” but also one which gives a less palpably immediate, alive sound. Yet both loudspeakers are admirably low in midrange coloration. The 804s have a slightly more liquid, integrated top end. Both loudspeakers generate a good soundstage, though the 804s seemed to “disappear” more convincingly into that soundstage. And the 804, perhaps because of its free-space-mounted tweeter, was the more open and spacious. The Snells will generate more sheer volume, but neither loudspeaker had any trouble generating clean, reasonably high listening levels in my listening room.

I felt no particular need to break out the Apogee Stages for a firsthand comparison, having probably logged more time over the past year with this loudspeaker, in this room, than with any other. The 804s probably come closer to the Stages than any of the other loudspeakers mentioned here in terms of midrange immediacy and palpability. Compared with the Stages, the 804s have the more open extreme top end, with wider dispersion, giving them a airy extension which the Stages cannot match. In fact, for my money, the treble response of the 804s is the best of this group. And the bottom end of the 804s, while less profoundly gutsy than that of the Stages, is certainly more linear, lacking as it does the strong, narrow peak which the Stages exhibit in the low 40Hz region—right where it can help the latter produce a robust yet “realer than real” bass drum sound. Overall, the Stages, as JA and DO have noted, sound “darker” than the 804s. But the Apogees present a tight, focused soundstage with an irresistible reality all their own, particularly in the midrange. They are also the most seamlessly convincing of the loudspeakers mentioned here in presenting challenging large-scale material. But they are also the most demanding in terms of placement requirements (they tend to visually dominate all but the largest spaces), and are the most expensive of the group.

Measurements

Measurements of the B&W Matrix 804, all MLSSA...
derived (except for the Audio Precision–measured impedance shown in fig.1), were made without the bass alignment filter. Note that the magnitude of the impedance stays above 4 ohms at all times, as specified. The port is tuned to a low 24Hz, indicated by the saddle minimum between the two low-frequency-impedance peaks typical of the impedance curve for a reflex box. The A-weighted sensitivity of the Matrix 804 measured around 86dB/W/m, high enough to provide a comfortable output margin with moderately powered amplifiers. It certainly didn’t need the full capabilities of the Krell used in most of the listening tests!

Fig.2 shows the speaker’s impulse response on the tweeter axis. This is a good response, with little overshoot and some ultrasonic ringing typical of metal-dome tweeters. In fig.3 the average of five such impulse readings across a 30° lateral “window” is shown (after conversion to the frequency domain), combined with the nearfield response of each of the woofers and the port. The long, continuous curve indicates the response taken at 44”, spliced at 200Hz into the nearfield response of the upper, Kevlar-coned midrange/woofer. The second curve, which peaks at about 80–90Hz and trails off gradually at higher frequencies, is the nearfield response of the lower, Cobex-coned woofer. Below that, peaking just above 20Hz, is the output from the port, whose level relative to the rest of the curve can only be roughly estimated. It is shown here with its maximum 3dB below that of the woofers for clarity. I would anticipate that the actual port output is lower than that shown; the usable output of the Matrix 804 does not extend to anywhere near 20Hz!

Note that the overall response of the Matrix 804 in fig.3 is mainly very flat. The rise from 12kHz–20kHz is slight, innocuous, and well above the range where it is likely to bother anyone but the family dog. Note the sharper peak at about 26kHz, the frequency at which the

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**Fig.1 B&W 804, electrical impedance and phase (2 ohms/vertical div.)**

**Fig.2 B&W 804, impulse response at 44” (5ms time window, 30kHz bandwidth)**

**Fig.3 B&W 804, anechoic response on tweeter axis at 44” averaged across 30° horizontal window, and nearfield response of upper and lower woofers and port**

**Fig.4 B&W 804, horizontal response family at 44”, normalized to the tweeter-axis response, from back to front: reference response; difference in response 7.5° off tweeter axis; 15° off-axis; 30° off-axis**

**Fig.5 B&W 804, vertical response family at 44”, normalized to the tweeter-axis response, from back to front: difference in response 7.5° above tweeter; reference response; difference in response level with cabinet top; on woofer axis; 7.5° below woofer axis**
metal-dome tweeter has its primary ringing mode. There are a few minor resonances between 6kHz and 10kHz which are small in amplitude and high-Q enough to be of little concern; altogether this is one of the best-behaved tweeters we have tested. Note a small rise at 3kHz which may relate to the slightly forward, lively quality of the sound; it may be an artifact of the mid/tweeter crossover.

There are no aberrations in the low to upper bass evident from fig.3 which will not be swamped by the artifacts of any real listening room. The only area of concern—and an area for potential improvement—in the curve lies with the slight rise and sharp dip, the latter about -4dB, around 1kHz. While the dip would seem to suggest a slightly laid-back quality, note that the gentle rise before it, while of slightly lower magnitude, may be more prominent to the ear, which is known to be considerably more sensitive to response peaks than to dips. It might well correlate with the slight tendency to nasality noted during the auditioning.

Fig.4 shows the anechoic response measured laterally about the tweeter axis—normalized to the tweeter-axis response (it shows what the responses on the other axes would be if the response on the tweeter axis were flat; i.e., it shows only the changes in the response as you move off-axis). It is clear that the Matrix 804 is better than well-behaved; its response is superbly consistent across a broad lateral window. This not only contributes significantly to the open, spacious sound of the 804, but will minimize the potential off-axis spectral aberrations coloring the overall in-room response. Fig.5, the vertical response family, is also consistent from the tweeter axis down to the mid/woofer. As is typical in the vertical plane of most multi-way loudspeakers with vertically configured drivers, interference effects between the two overlapping drivers at crossover creates significant artifacts when well below or above this window. The symmetry of the off-axis, 3kHz dip indicates a high-order crossover network. While it is unlikely that any reasonable listening position will put the listener below the lower woofer (the floor is out as a critical listening seat), the curve for the response from an above-cabinet location indicates why I settled on a speaker placement which raised the Matrix 804s several inches above the floor, and why I feel they need a set of low stands to perform their best with the listener at a typical listening height.

The cumulative spectral-decay plot of fig.6 shows a well-behaved response, with a mild amount of hash around 9–10kHz, though less than we have measured from many tweeters in other good systems. There is a mild resonance at about 4.5kHz which I could not relate to any audible artifact in the response, and a degree of spectral lumpiness around 1kHz. However, on rechecking the response of most of the dynamic, multi-driver systems we have reviewed over the past few months, the spectral-decay

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4 All of our frequency-response plots are corrected for the known response of our B&K measurement microphone—see "Follow-Up," Vol.14 No.10, October 1991—except for the spectral decay, which is based on the uncorrected microphone response.
plot of the Matrix 804 is at least their equal and, in many cases (particularly in the rapidity of the initial decay below 2–3kHz), the B&W is superior. 

Finally, I measured the frequency response of the outboard alignment filter as set up for the 804. As you can see in fig.2, it peaks at 29Hz with a boost of just under +6dB, dropping off rapidly below that point.

Conclusion

About the only real negatives that the Matrix 804 has to contend with are price, perceived value (it’s smaller and less exotic or complex than much of its potential competition), and bottom-octave extension. But if you’re shopping in this price range, only the latter should count for anything when you balance the scales. Think of the Matrix 804 as a miniature Matrix 801 Series 2—or at least the 801 Series 2 prior to its latest incarnation—giving away points to the latter only in output capability and low-end grunt-power, but gaining in terms of midbass clarity in many potential environments and in domestic acceptability—not to mention price. It is one terrific little loudspeaker, and I highly recommend it. Now if someone would just consider making matching stands for it about, oh, 9” high.

VIETA PRO-5 PRESTIGE LOUDSPEAKER

Dick Olsher

Dynamic two-way design, with bass-reflex loading. Drive-units: 5.5” cone woofer, 1” soft-dome tweeter. Nominal impedance: 8 ohms. Minimum impedance: 5.6 ohms at 17kHz. Sensitivity (pink noise): 88.9dB/W/m. Frequency response: 51Hz (−12dB) to 22kHz (−6dB). Dimensions: 11.5” (292mm) H by 7.6” (192mm) W by 7.3” (185mm) D. Internal volume: 5 liters. Weight: 5.1 kg. Price: $587/pair. Approximate number of dealers: 11. Manufacturer: Acutres s.a., Bolivia 239–08020, Barcelona, Spain. US distributor: Keats & Associates, 14038 Tanglewood Court, Dallas, TX 75234. Tel: (214) 243-5905. Fax: (214) 620-0083.

With an internal volume of five liters, the Spanish Vieta is truly a miniature loudspeaker, and a cute one as well. The two drivers, a white 5.5” pulp-cone woofer1 constructed on a diecast chassis and a 1” soft-dome tweeter with ferrofluid cooling, both drivers fabricated in-house, are hidden behind a black cloth grille which matches the enclosure’s black lacquer finish. Although both drivers are rabbeted into the baffle, the grille itself is set in by some 8mm (0.33”), which will introduce some image smearing (due to early reflections of the sound) and some cavity effects. When the grille is pushed into place, this doesn’t improve things as its heavy wooden frame merely brings the acoustic obstruction of the 8mm lip a little nearer the drive-units.

The limited space on the front baffle means that the bass-reflex vent is located in the rear. The electrical crossover network is basic, with a series capacitor and a shunt coil forming a second-order high-pass network tuned to around 3kHz to drive the tweeter. (There is also a series resistor in the second sample, see later, to drop the overall tweeter level.) The woofer is connected directly to the 4mm input terminals, meaning that its natural HF rolloff is used to implement the low-pass filter of the crossover. (A small slotted bolt head on the inset terminal/crossover panel looks like a HF trim control. Don’t repeat JA’s mistake and turn it to see what happens. It actually is a nylon bolt holding the tweeter filter coil in place.)

Preliminaries

Listening sessions were analog-based, using the

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1 It was explained to me during a visit to Vieta’s Barcelona plant in late ’79 that the white color of the woofer cones was due to their being formed from a cotton pulp rather than the otherwise ubiquitous cellulose (paper) pulp.

--JA
Aura turntable, Graham Model 1.5 tonearm, Rowland Complement cartridge, and Threshold FET/10e preamp. I used the Air Tight ATM-2 and Classé DR-8 amps throughout, with primarily Lindsay-Geyer and Kimber KCAG interconnect cable. Speaker cable was TARA Labs Phase II/Return.

The Vietas were mounted on 24” Chicago Speaker Stands for most of the evaluation. I found it desirable to listen to the tweeter off-axis to ameliorate a rising HF response. This was done by using a significant toe-in that caused the axes of the speakers to intersect in front of the listening seat.

Listening impressions: first sample
You don’t have to be a “golden-ear” audiophile to quickly realize that the Vieta is severely handicapped by tonal colorations. Of course, there is no deep bass. The box is tuned to about 63Hz, and as is typical of vented designs, the bass rolls off rapidly below resonance. Between 70 and 50Hz, the bass in-room goes south a whopping 13dB. Because I didn’t expect any deep bass, that in itself was not a sonic disappointment. But I did expect some semblance of reality over the power range of the orchestra; between, say, 200 and 600Hz. The upper bass and lower midrange were deficient in relation to the middle and upper mids, conveying a consistent lack of warmth and body.

Orchestral textures throughout Walton’s Beethoven’s Feast (EMI SAN-324) were lean and cool, and John Shirley-Quirk’s baritone timbre was lightened to the point of being less dark, less coffee-like than it ought to have been. The male members of the chorus in Laudate! (Proprius PROP-7800) suffered a similar fate. Here, too, the lack of lower-midrange warmth lent the music too much of an analytical flavor.

Bruch’s Kol Nidrei (ebs 6060) depends for its conviction on the cello’s fervor and emotion. Through the Vieta, the cello lacked body to the point of sounding hollow and diminished in intensity. “Anneli,” my favorite track of the River Road CD (Opus 3 CD8017), was also adulterated by the Vieta to the extent that much of the chesty quality of Eric Bibb’s voice went missing.

Moving along to the upper mids, to the transition region between the woofer and tweeter, I found musical textures to be a bit grainy and lacking in sweetness. A good example of this is Neville Marriner’s LP of Rossini overtures (Philips 6500 878). Not only were the bass lines barely audible, but string overtones were not smooth and lacked a sweet sheen, to the point of sounding a bit steely. Neither did the music breathe and bloom as it should have, and compression during orchestral peaks was very much evident. Instead of appearing to flow smoothly, the music was injected with enough mechanical artifacts to distract my attention. After a while, I found it difficult to stay focused on the music.

It’s interesting to contrast Marriner’s interpretation with Benzi’s on an old Mercury LP (SR 90386). Although Benzi rushes the orchestra along—a definite no-no, by Rossini standards—the lusher textures were really welcomed by the Vieta. The formerly lean lower mids took on a hint of warmth—an indication that the Vieta would definitely benefit from being partnered by a romantic-sounding tube amplifier.

The presence-region response was exaggerated to the point where sibilants were spitty, applause took on a frying-pan sizzle, and transients were overly etched. The character of the upper octaves, as might be expected from a speaker with a rising treble response, always sounded bright. The tweeter in general tended to sizzle and spit, and when pushed hard took on a shouty, grainy quality. Female voice was
not treated kindly. Soprano voices on track 12 of Grundig's *Fine Arts* CD (MD&GL 3322), "Komm, Jesu, Komm," failed to soar sweetly and naturally, sounding instead like wounded ducks. The Lesley Test, track 13 of the *Stereo- phile* Test CD, fared no better. Lesley's upper registers sounded bright and grainy to a degree that engendered active annoyance. The extreme highs, on the other hand, sounded closed-in and lacking in air.

Finally, we come to the area of imaging. A rising treble response together with a lean lower midrange is a sure-fire recipe for enhanced soundstage definition and transparency. In the case of the Vieta, and especially with the Air Tight tube amplifier, I definitely got the impression of being able to see deeply into the soundstage—depth and width were reasonably well-developed. However, it was often difficult to get a fix on hall size because hall reverb tended to get lost or muddled in the translation. Because of the presence-region peak, lots of low-level nuances came through the fabric of the music. Massed voices were nicely resolved, as were instrumental outlines in complex orchestral passages. The Vieta was very good in providing a pinpoint spatial outline of a distantly miked orchestra. While it was easy to localize instruments from a distant perspective, as is the case with many other minimonitors, image outlines were collapsed to a size smaller than the real thing: a miniature or toy-like representation of soundstage events. This is very likely a direct result of the Vieta's tonal-balance aberrations.

Quite the opposite result was observed for closely miked instruments. The size of the space surrounding the instrument was no longer a problem, but it became difficult to focus on the core of an instrument. Give a listen to Julianne Baird on the "Greensleeves" cut of her Dorian CD of the same name (Dorian DOR-90126). The Vieta confused hall reverb and direct sound to the point where Julianne's voice appeared to be coming from a large space to the left of center stage. Yet it was difficult for me to precisely pinpoint her exact location in space. The center of gravity—the chest and throat—of the voice was impossible to determine. There was a similar problem with the reproduction of the Lesley Test. Lesley's image was of the correct overall size, but the focus of the image was diffused so that her diaphragm and throat were impossible to delineate.

**Listening impressions: second sample**

This report underwent an unusually long gestation period. JA felt it appropriate, therefore, to request a second pair of Vieta Pro-5s more representative of current production from the new US distributors. According to Vieta, these second samples (SN 101-0149 and 150), which were sent directly from Spain, incorporate a redesigned crossover.

I did find the revised Vieta a step, albeit a rather small step, in the right direction. While the speaker's essential sonic character was unchanged, the sound through the upper registers was slightly less bright.

One of my favorite interpretations of the Dvorák Ninth, Horenstein's 1962 reading with the RPO, reissued on Chesky CD31, did not fare well through the new Vietas. Orchestral bass lines were severely curtailed. The tonal balance through the power range of the orchestra was thin to the point of anemia. The upper bass and lower midrange failed to muster height and body, and brass didn't sound right: nasal and still on the bright side of reality. However, having just finished listening to the same piece on the Wharfedale Diamond IV (reviewed in July), the Vieta impressed me as a clearly preferable alternative. The Vieta's transition between drivers was better, with smoother midrange textures and more in the way of soundstage transparency and dynamic range.

Nevertheless, the piano's tonal balance was not treated well. Take, for example, the Chopin Scherzo in h-flat, Op.31 (track 10, *Stereo- phile* Test CD) with Anna Maria Stanczyk at the helm of the Steinway. The sound was too forward, bright, and lacked much of the body and grandeur of a concert grand.

The treble, even in this slightly "tamed" version of the Vieta, continued to irritate me. Violin overtones sounded a tad steely, and the lower-treble tonal emphasis pushed the soundstage forward. There was also considerable evidence of ringing through this range. Treble transients sounded a bit spitty, and handclaps reproduced with a healthy dose of "frying pan" sizzle. Soprano upper registers were artificially brightened. The intrusiveness of the tweeter on female voice appeared to be a function of signal level; what was merely bright during soft or only moderately loud program material was pushed well beyond the comfort zone during loud passages. Cleo Laine's G# above high C

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during “Ridin’ High” (Live at Carnegie Hall, RCA LPL-5015) turned into a shriek of terror. And poor Anna Moffo—whenever she let loose on Selected Arias (RCA LSC-2504), her high notes consistently turned as shrill as the whine of a dentist’s drill.

Massed voices, as in Belshazzar’s Feast (EMI SAN-324), were nicely resolved. But when the chorus hit full stride, the upper registers lost any semblance of civility with a shouty and etched quality that made me cringe. I should point out that this level of treble performance was achieved despite the presence in the chain of Valve Amplification Company 90W monoblocks operated in pure triode mode. In triode mode, these amps sound about as fresh and liquid as a mountain stream. And they’re much more forgiving in the treble than, say, an inexpensive solid-state amp—the kind of amp with which these speakers are likely to be used.

**JA adds some measurements**

The original Vieta’s impedance amplitude and phase are shown in fig.1, with those that for the second sample shown in fig.2. With the first sample only dropping below 6 ohms in the extreme treble and the second sample staying above 6.5 ohms, the Vieta should be an easy load to drive, particularly by the kind of romantic-sounding tube amplifier with which it should sound best. The reflex port tuning is revealed by the minimum value at 63Hz—this is definitely a minimonitor! The sensitivity, assessed with an octave-wide band of pink noise centered on 1kHz, was high for such a small box, at approximately 90dB/Wm, which will not have been achieved without some sacrifice of bass extension.

This was revealed by looking at the FFT response averaged across a 30° lateral window centered on the tweeter axis (fig.3, first sample; fig.4, second sample). The first sample features an overall rising response, from the upper bass to the high treble, with a significant excess of energy in the top two octaves and a ragged response in the crossover region. It’s no surprise that DO disliked its treble balance so much. The second sample appears much better behaved, though there’s still a slight upward tilt to its balance. DO mentioned that he preferred the speakers toed-in so that he was sitting off the main frontal axis. Fig.5 shows how the second sample’s response changes as the listener moves sideways off-axis. It can be seen that the high treble does roll off once the listener moves away from the main axis, the soft-dome tweeter being quite beamy above 10kHz. Pointing the speakers straight ahead will also give the optimum high-treble balance, but the excess of presence-region energy that develops 30° off-axis could make the in-room sound too bright when reflected off the side walls. Excess toe-in is probably best, as DO found. Vertically, as long as the listener’s ears are between the woofer and the baffle top, the response doesn’t change too much. But if he or she sits so that the top of the cabinet is visible, a suckout in the
energy region appears that will exacerbate the speaker's thin tonal balance.

Returning to figs. 3 and 4, the left side of each graph shows the nearfield responses of the woofer and port of each sample, their levels plotted only approximately with respect to the quasi-anechoic traces to their right. Again, these VietaS are definitely minimonitors, with-

out much bass extension below 70Hz or so.

Turning to the time domain, fig. 6 shows the second sample of the Vieta's impulse response taken on the tweeter axis at 48", which gives rise to the MLSSA "waterfall" plot in fig. 7. (The long ridge at 16kHz is the computer monitor line-scan frequency and should be ignored.) Though the speaker is well-behaved in the mid-range, the tweeter is quite lively in the presence and treble regions and there is also a resonance noticeable at 2575Hz, most probably a woofer-cone breakup mode. (Remember that the woofer is allowed to roll off naturally, with no low-pass crossover filter to tame its high end.)

Finally, all measurements were taken with
the grille off. Fig.8 shows the changes to be expected when the tightfitting grille is pushed into place. In general, the slight peaks and dips introduced by the grille do smooth out the mid-treble somewhat.  —John Atkinson

**DO sums up**

Even in its revised version, the Vieta Pro-5's
tonal balance is thin, bright, and forward to the point of denying any serious music lover a realistic semblance of a live orchestra. Is it a good value? Not really. At nearly $600/pair, it cannot match the similarly priced JM Lab Micron or the less expensive Spica TC-50 in terms of overall musicality.

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**MAGNEPAN MG2.6/R LOUDSPEAKER**

John Atkinson


Ask anyone in the street what they think of when they hear the word “loudspeaker” and odds are they'll describe a wooden box with moving-coil drivers sitting in its front. But ask a *Stereophile* reader and it's quite possible that he or she'll describe a large, flat panel reminiscent of a room divider. In our 1988 reader survey, the most widely represented brand of loudspeaker was Magnepan, with a significant lead over Infinity and Vandersteen, the second and third most common speaker brands. This represents considerable commercial success in a generally conservative marketplace for a company whose products are so different from the norm.

The subject of this review, the $1950/pair MG2.6/R, falls in the middle of Magnepan's range, above the Minnesota company's new quasi-ribbon models introduced at the 1991 June CES but below their top-line MG3.3 and Tympani IV designs. A two-way speaker, it uses a 40"-long version of Magnepan's ribbon tweeter, which features a ¾"-wide strip of corrugated aluminum foil, 2.5μm thick (¼ of an inch) hanging between two rows of magnets, with the edge clamped every 1.5" on opposite sides. The "Magneplanar" panel bass/midrange driver consists of wire conductors—in effect a flat voice-coil—bonded to a Mylar diaphragm positioned behind an array of bar magnets mounted on a steel supporting frame. This gives single-ended electromagnetic drive. Placing the diaphragm behind the magnets might be thought to obscure the sound, but the long vertical gaps between the strips of magnets should be acoustically transparent. The diaphragm is clamped at strategic points to minimize its resonant behavior.

Although it looks rather different, the 2.6 is basically similar to the MG2.5/R that J. Gordon Holt and I reviewed in *Stereophile* some three years ago.1 In fact, the ribbon unit is identical but the speaker's crossover has been extensively revised to give a higher sensitivity coupled with a warmer tonal balance. The crossover between the two drivers operates at approximately 1kHz; whereas the 2.5 used first-order electrical slopes, those in the 2.6 are second-order high-pass for the tweeter, which appears to be connected with inverted polarity, and third-order low-pass to the woofer/midrange. The crossover utilizes three air-core inductors,2 two paralleled plastic-film capacitors in series with the ribbon, and one non-polarized electrolytic capacitor shunting the woofer feed, these components somewhat untidily glued to the rear of the speaker's frame to the left of the input terminals. These are 4mm sockets with a locking hex-head screw. A second pair of 4mm sockets holds a shorting bar which can be replaced by a low-value power resistor to attenuate the ribbon output

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1 In Vol.11 No.6, June 1988.
2 One of these inductors on the righthand loudspeaker had become detached in shipping, but was still connected and functioning correctly.
if desired. The somewhat fragile ribbon (fragile, that is, with respect to a typical moving-coil dome tweeter) is also protected against overload by a series 2.5A fuse. Replacing the tweeter unit is no problem, however.

Both drivers are mounted in supported by a fiberboard baffle; the radiation pattern is fundamentally that of a dipole, with low-frequency extension governed by the baffle size. (When the wavelength of the sound is equal to the baffle dimensions, cancellation between the direct sound and the backwave will roll off the low bass in a gentle, nonresonant manner.) Hardwood strips (light oak, painted black, or unfinished) run down the edges of the baffle, these 2.5" wide and not as narrow as those of the MG2.5; the replaceable grille cloth is available in off-white, black, and gray. The bolt-on feet offer good support and extend both in front of and behind the speaker.

Listening
Equipment used during the auditioning of the Maggies included Mark Levinson No.23.5, Audio Research Classic 60, and YBA 2 power amplifiers, hooked up to the speakers with 2m lengths of AudioQuest Dragon or YBA Diamond cable. The main preamplifier used was the French YBA 2, with the latest version of the Mod Squad's Line Drive Deluxe occasionally pressed into service, both feeding the power amplifier via 15' lengths of AudioQuest Lapis unbalanced interconnect. Source components included a Linn Sondek/Lingo/Ekos/Troika setup sitting on an ArchiDee table to play LPs, a Revox PR99 to play 15ips master tapes, and either the VTL D/A processor driven by a Meridian 602 transport or the Krell SBP-64XMDI combination to play CDs. The trumpet tracks on the Chesky Test CD (JD37) indicated that the sound was both more natural and more palpable with the speakers connected in inverse polarity: ie, with the speaker terminal marked "+" wired to the amplifier ground terminal.

Though its dipole nature means that it will excite room resonant modes less efficiently than a typical box speaker, a panel speaker needs more careful positioning with respect to the rear wall, due to the reflection of the out-of-phase backwave interfering with the direct

3 This can be heard very easily by standing outside the listening room door with the speakers playing full-range music. The bass region sounds very much less lumpy in the bass with a pair of dipole radiators in the room than with conventional loudspeakers.
sound. Setting up the MG2.6/Rs to sound at their best therefore took some time, and, as might be expected from a large panel speaker featuring side-by-side drive-units, getting the optimum balance between the midrange one side of the crossover point and the treble the other side was also tricky. Ultimately, I settled for using the speakers with the ribbons on their outside edges—ribbons on the inside edges gave a sound that was too bright—toed-in slightly to the listening seat so that I was sitting about 15° off the ribbon axis. Each panel was about a third of the way into the room from both rear and side walls, which meant that I was just over 8' from the speakers, rather closer than most listeners would sit. I therefore ended up placing brass German Acoustics cones under the ends of the MG2.6's rear feet to tilt the speakers a little toward my listening chair, which places my ears 36" from the ground.

I very much enjoyed my time with the MG2.6/Rs. They offered a big-boned, accessible sound that was pretty true to whatever kind of music I played on them. This overall excellence should be remembered while I describe what they do into the various areas of audiophile performance.

• Midrange: Both J. Gordon Holt and I felt the original MG2.5/R to sound a little cool. The 2.6 is quite different, having a warm tonal balance that could occasionally become too much of a good thing. The left-hand register of the piano on my recording of Anna Maria Stanczyk playing Chopin on the Stereophile Test CD, for example, was a little too thickened in absolute terms with the speakers driven by the solid-state Levinson amplifier. Substituting the tubed Audio Research amplifier gave even more lower-midrange emphasis, to the point where I felt the sound was too much different from what it should have been. Live pianos don't sound that warm. (But the warmth did add a frisson of believability to Gary Karr's somewhat out-of-tune double bass on his Albinoni/Giazotto Adagio arrangement, Seven Seas K 28C-170.)

Nevertheless, with all the amplifiers I used, there was a delicious smoothness to the MG2.6's overall midrange presentation, a seamless quality in the transition region between the two drivers, that enabled individual instrumental textures to be easily differentiated. In JGH's

4 Available for $8.95 including S&H. We have recently changed to a new handling service for Stereophile recordings. See the advertisement in this issue for ordering details.

recording of the Järnefelt Praeludium, again from the Stereophile Test CD, there is a passage after the bridge where oboe, clarinet, bassoon, clarinet again, flute, then French horn all toss around the same little rising fragment of tune. The MG2.6's lack of coloration allowed the differences between those instrumental identities to be laid clear, even between bassoon and horn, which can sound astonishingly alike alive. (I shall ignore the fact that an extra clue to each instrument's identity is given by the fact that the horn player drops a clam on this recording, as horn players are wont to do.) The wide range of instrumental tone colors on William Mallock's arrangement of Bach's Art of Fugue (The Art of Fuguing, Sheffield Lab SLS-502) was also beautifully delineated. (If you've always felt Bach's serious work to be more mathematics than music, this delightful recording will give you easy access to his genius.)

And when it came to palpably seamless playback of voice recordings, this Maggie is up there with the best.

• Treble: At playback levels below 90dB (see later), the MG2.6's ribbon is one of the least aberrant, most transparent transducers I have heard. I was hard put to hear any fizz, sibilance, or any other aspect that could be laid at the ribbon's feet. However, in absolute terms, particularly with the Audio Research amplifier, the top octave was a little depressed, leading to a lack of air to the sound in my room. Placing the speakers with their ribbons to the inside edges made the sound brighter, but with too much energy in the mid-treble. It's possible that in a room that has very lively high frequencies—though my room is reasonably live in the lower treble, it is well-damped in the top octave and a half—this lack of top-octave air will be minimal. In my room, however, it was only a problem with older rock recordings, where the ear-damaged engineers had so overmodulated the tape that the highs were mainly missing in action. Even so, the speaker's transparency still allowed you to hear considerable musical detail in what highs remained.

• Bass: The 2.6/R is not a speaker for bass freaks. While it respectably reproduced much of the orchestra's power region, the bass both rolled off rapidly below 40Hz and seemed a little shelved-down below 120Hz, perhaps in contrast to the slight emphasis in the region above that frequency. The organ pedals on Peter Mitchell's and Brad Meyer's organ recording on

Stereophile, November 1991
the *Stereophile* Test CD, for example, lacked sufficient weight to make complete musical sense of the resolution at the work's close. The speaker also lacked a little transparency in this region, bass instruments sounding more alike than they ought to. But this criticism is relative: on the new Robert Lucas Luke and the Locomotives LP (AudioQuest AQ-LPI004), the amplified Fender bass had the appropriately loose quality to its sound on its A and E strings. Be warned, however: Magneplanar bass differs in quality from box-speaker bass. If accustomed to the latter, you may take some time to accommodate to the panel's cabinet-resonance-free but rather loose presentation.

**Imaging & Soundstaging**: In terms of image precision, the Maggies were excellent when optimally set up. While not quite up to the best speakers in image depth, the MG2.6/Rs' excellent upper-midrange and treble transparency allowed a considerable amount of recorded ambience and reverberation to be decoded.

It's said by some that the impressive imaging possessed by panel speakers is merely due to the reflected backwave adding a heightened sense of space. Yet this reproduced ambience varied, as it should if it were real, with every record played. Whether it was the old stone acoustic of Santa Fe's Loretto Chapel on track 12 of our Test CD, the live studio sound on the new Robert Lucas album (rush out and buy this if you have any love for the sound of real electric instruments playing in a real space), or the vast space of Liverpool Cathedral on the most real-sounding organ recording I know of, *Ian Tracey plays the Henry Willis III Organ of Liverpool Cathedral* (Michael Woodward LP MW931), there was just the appropriate amount of space made audible. Very dry recordings, such as the soprano voice of Dick Olsher's wife Lesley on the Test CD, remained very dry (although her voice image was more palpable than I remember from most other speakers).

The diagnostic LEDR tracks on the Chesky Test CD played over the Maggies with exquisite precision (although when the image is intended to fall beyond the speaker outlines, it acquired a rather phasey, buzzing-in-the-ears quality). The "Up" and "Over" tracks, where a sampled cabasa sound has its spectrum fooled with to give the impression of a sound-source that first moves up from the loudspeaker positions, then up and across to the other side, were also reproduced superbly. This excellent presentation of image height is perhaps due to the speaker's dipole radiation pattern minimizing the effects of boundary reflections that would otherwise destroy the illusion.

**Dynamics**: Perhaps due to its tonal balance, the MG2.6/R sounds a little polite overall. While free from compression effects or any sense of strain at reasonably loud SPLs, below 90dB or so, I did find its sound to harden up in the low treble when I tried to take it to the limit on a continuous basis with the Levinson (which will pump out 400W into the 2.6's 4 ohms). This ultimately fatiguing behavior in the lower region of the ribbon's passband proved to be the loudness-limiting factor rather than the Magneplanar woofer running out of excursion, which is what I had expected. Note, however, that this happens with the speakers being asked to play loud. A Mahler symphony played at an average (not peak) level of 90dB at the listening seat is quite uncomfortable.

**Measuring**

Fig.1 shows the MG2.6's electrical impedance magnitude (solid line) and phase (dashed line). With a value averaging 5 ohms in the bass and 3.5 ohms in the treble, with a rise in between due to the crossover, the speaker is a reasonably demanding load in terms of current draw, though the phase curve indicates it to be resistive—i.e., not significantly departing from a 0° phase angle—over much of the audio band. The MG2.6s shouldn't give good tube amps any problems as long as they're driven from the 4 ohm output taps. The very slight wrinkles at 50 and 60Hz presumably indicate the Magneplanar panel's fundamental "drum-skin" resonances. Its A-weighted sensitivity measured around 86dB/W/m, which means that a 100W amplifier would provide more than enough drive to raise satisfyingly loud levels in normal-size rooms.

5 Fred Davis and Don Keefe have recently pointed out that some of *Stereophile's* loudspeaker impedance phase curves produced by the Audio Precision System One are upside down, with positive and negative phase angles reversed. (Negative phase angle, the current leading the voltage, is due to the load being capacitive; positive phase angle, with the current lagging the voltage, is due to the load being inductive.) This has puzzled me for some time, as I can see no physical reason—such as an inadvertently reversed connection—in our testing techniques for this to happen. I've corrected the dashed phase curves for the loudspeaker reviews in this issue, but it is a trivial matter to adjust our previously published curves: simply look at the righthand side of the graphs and assume the phase angles above the 0° line to be negative and the ones below to be positive, rather than the other way around.
Given the quite different sounds produced by the Maggie with the amplifiers with which I used it, I looked at the frequency response of my source and amplification components measured at the loudspeaker terminals (fig. 2). The response with the Audio Research amplifier (solid line) can be seen to droop slightly in the treble and further emphasize the entire midrange region as a result, though the lack of HF air when compared with the Mark Levinson No. 23.5 (dashed line) was more audible than...
the 0.5dB difference above 10kHz shown in the
graph would indicate.

Turning to the MG2.6/R's frequency response,
the top curve to the right of fig.3 shows the
quasi-anechoic response averaged across a 30°
horizontal window midway up the ribbon at a
44° distance. (The B&K measuring micro-
phone's response has been subtracted mathem-
atically from this curve to give the true
speaker response. The sharp notch at 20kHz
is an interference effect and should be ignored.)
Drawing inferences from such measurements
of large panel speakers is fraught with difficulty,
particularly at the relatively close distance
mandated by an FFT measurement technique when
performed in a room. The fourth edition of
Martin Colloms's High Performance Loud-
speakers, pp.147–151, examines this problem
using the 1986 work of Stanley Lipshitz and
John Vanderkooy, and indicates that the close
microphone distance will result in a measured
mismatch between the speaker's on-axis out-
put above and below 1kHz, the treble region
apparently being shelved down. Remember,
however, that I did find the 2.6/R to sound
somewhat warm and thinned in the mid-
range. There is probably still a residual mis-
mash, therefore, in the speaker's mid and high
treble compared with its low treble and upper
midrange (though it's possible that this will
diminish as the size of the listening room
increases).

The lower curve shows the low-pass rollout
of the Magneplanar panel, with its level approxi-
ately matched to that of the complete speaker.
Coupled with the fact that the electrical drive
signal to the ribbon is down 6dB at 750Hz, this
indicates that the actual crossover frequency
appears to be around 700–800Hz. Though this
is lower than the 1kHz specified, it seems sen-
sible in that most instrumental and vocal musi-
cal fundamentals will be handled by the panel,
most of the harmonics associated with those
fundamentals by the ribbon.

To the left of fig.3 is the low-frequency
response of the Magneplanar drive-unit mea-
sured with the microphone capsule almost
touching the grille cloth in the dead center of
the panel. Again, interpretation of such a mea-
surement with such a large diaphragm is dan-
gerous, but it would seem to indicate that the
fundamental bass tuning at 60Hz is of reason-
ably high Q, with a rapid rolloff below that
frequency. While all but the lowest notes of the
double bass will be satisfactorily reproduced
by the MG2.6, this curve implies that it will
never be a speaker for low-bass freaks, again
something that was observed during the audi-
tioning.

Remember that I found the exact degree of
toe-in to be critical with this speaker when it
came to getting the optimum balance between
the midrange and treble. I therefore inves-
tigated the manner in which the speaker's re-
sponse changes as the listener moves to either
side of the ribbon axis. Fig.4 shows the differ-
ences in response that occur as the listener
moves from 15° off-axis on the ribbon side of
the speaker to 7.5°, 15°, then 30° off-axis on the
bass panel side. (To produce this graph, the
response on the ribbon axis has been sub-
tracted from all the other curves so that just the
differences that would occur if the ribbon-axis
response were perfectly flat are revealed; the
latter therefore appears as a straight line.) Ignor-
ing the spikes and dips due to innocuous inter-
ference effects, it can be seen that moving to
the panel side of the speaker—placing the
speakers with the ribbons to the speakers' out-
side edges and carefully adjusting the toe-in—
 alleviates the midrange prominence by
introducing a degree of suckout at the cross-
over frequency. (With side-by-side drivers, such
crossover lobing appears in the horizontal
rather than the vertical plane, which is usual
with conventional dynamic speakers.)

Fig.5 shows a family of curves analyzing
what happens as the listener moves from a
position with his or her ears level with the base
of the ribbon—an unrealistically low listening
height of 30°—to one level with the top of the
ribbon—this representing a tall person stand-
ing. Again, just the differences are shown: they
imply that the speaker will sound too shrill for
a standing listener and too dull for someone
sitting too low. The best balance would appear
to be the second curve from the front, this
representing a listening height of 40", with
again a lack of energy in the upper midrange
compensating for what would otherwise be
too "thickened" a tonal balance.

One can draw inferences about how a speaker
will sound in a room from the anechoic response
and response differences in figs.3 through 5,
but there's no substitute for actually measur-
ing the perceived in-room balance. This, taken

in my listening room, spatially averaged to minimize the effect of low-frequency room resonances, and with the microphone response compensated for, is shown in fig.6. Admirably smooth and flat from the upper midrange upward, which doubtless correlates with the speakers’ seamless presentation of instrumental and vocal colors, an excess of energy in my room can still be seen in the mid-to-lower midrange; this corresponds to the warm tonal balance noted. The in-room bass appears well-balanced and drops off rapidly below 38Hz or so, as implied by the specification.

Turning to the time domain, fig.7 shows the speaker’s impulse response, which supports my suspicion that the ribbon is inverting. Processing the time data to show how the speaker’s response changes as the impulse decays gives the “waterfall” plot in fig.8. This appears somewhat hashy in the treble, but I’m not sure whether this is due to the presence of HF resonances in the ribbon or to the physical nature of the driver.7 The Magneplanar panel’s time-domain behavior in the midrange also appears from this graph to be complicated. I did note some treble hardening of the sound at very high levels with music program, as well as a somewhat “dirty” sound to pure tones in the low treble, so I looked at the speaker’s dis-

7 It has been postulated that though large, nonrigid diaphragm drive-units such as electrostatic, ribbon, and Magneplanar designs are driven uniformly, their actual behavior can be chaotic (in mathematical terms). In effect, each little part of the diaphragm “shivers” about the panel’s average position as the latter moves back and forth under the influence of the electromagnetic or electrostatic drive signal. The corrugation that Magneplanar and other manufacturers of ribbon units apply to the diaphragm acts to keep it moving as a whole. The ribbon’s motion is still complex, however. Shining a flashlight upon its rear surface with music playing reveals a degree of local twisting behavior, this excited by high levels of lowermidrange energy and bass-rich transients but constrained by the ribbon’s alternate side clamping.
tortion performance in this frequency region. The MG2.6/R appears to be a very linear loudspeaker at sound pressure levels below 86dB at 1m, with the main distortion component, the third harmonic, being below 0.3%, or -50dB, over most of the audio band. Raising the SPL of a tone at the bottom of the ribbon's passband (at 1.6kHz, where the woofer drive is 27dB down) to a very loud measured level of 96dB at 1m, however, just under the point where the 2.5A tweeter fuse would blow, gave around 1.4% of third-harmonic distortion with around 0.5% of sub-harmonic content present, centered on 1kHz.

This behavior seemed confined to a span of an octave or so in the low treble, as can be seen from figs.9 through 11, which show the distortion spectra of 800Hz, 1.6kHz, and 5kHz tones, respectively, all taken at an indicated 91dB at 1m. The MG2.6/R reproduces the 800Hz (fig.9) and 5kHz (fig.11) tones at this high SPL with just 0.3% (-50dB) of distortion in total. By comparison, the distortion of the 1.6kHz tone in fig.10 is three times as high, at 1.0% THD (-40dB), with the third harmonic at 0.6% being joined by appreciable amounts of second and fourth harmonic, as well as some sub-harmonic content. While the 800Hz and 5kHz tones did sound relatively pure—though the third harmonic of the latter at 15kHz is still within my hearing range, its level was below audibility—the third harmonic of the 1.6kHz tone at 4.8kHz, an octave-and-a-fifth above the fundamental, was surprisingly audible (perhaps not so surprising, considering the fact that the lower harmonics of a 1.6kHz sine wave fall in the region where the ear is most sensitive). The presence of subharmonics lent the tone an unmistakably buzzy quality.

Remember that these distortion measurements were made at a very high level, not too far below that at which the speaker's tweeter fuse blows. However, they reveal that Magnepan had to compromise ultimate dynamic range to produce a relatively affordable Magnepan loudspeaker that incorporated a ribbon drive-unit. Magnepan's necessary decision to make the MG2.6/R a two-way design means that the tweeter has to be taken to a sufficiently low frequency to meet the panel woofer, but it then runs out of excursion capability relatively early. (I'm reminded of the similar dynamic-range problems possessed by the Avalon Eclipse and Celestion 3000, both two-way speakers that again cross their high-frequency drivers over below 1kHz.) If you like the sound of the MG2.6/R but find that it doesn't quite go loud enough for your tastes, you should turn to the three-way MG3, 3/R at $2850/pair, which features a dedicated Magnepan driver covering the midrange from 200Hz to 1kHz.

**To sum up**

Warmer-balanced than its predecessor but with a much better managed transition between its two drive-units, the MG2.6/R offers an excellent balance of performance at a relatively affordable price. Its tendency toward lower-midrange thickness will mean careful system matching, and its owners must remember its need for careful setup and room positioning. But when set up optimally, while other loudspeakers will play louder without strain and plunge deeper in the bass, I'm hard put to think of one that offers a similarly well-balanced combination of midrange smoothness, treble neutrality, and overall musicality that doesn't cost considerably more. If you're thinking of trading in a pair of dynamic two-ways for expensive "audiophile" loudspeakers, do yourself a favor and check out the MG2.6/R. You'll be pleasantly surprised.

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**WE TRIED TO DRIVE HIM INSANE AND SUCCEEDED:**

Corey Greenberg listens to a gaggle of power-line conditioners from Audio Express, Counterpoint, Ensemble, API, PAC, and Tripplite.


API Power Wedge Model 1 Isolation and filter unit for amps and line-level components. Dimensions: 15" W by 5" D by 5" H. Price: $439. Approximate number of dealers: undisclosed. Manufacturer: Audio Power Industries, 2624 S. Rousselle St., Santa Ana, CA 92707. Tel: (714) 545-9495. Fax: (714) 545-4607.

PAC IDOS filter unit for amps and line-level components. Dimensions: 7" W by 2" D by 2" H. Price: $150.


"BLECH! This tastes like dirty feet!" I sputtered as Cesar said something in Spanish about mi madre and poured out the rest of the pitcher. I was there at the art-house again to see Slacker for the fifth time, and Cesar and I were going through another round of "What's My Libation?" Here's how you play: go to your local cinema and order the lemonade. If it sucks, spend 20 minutes or so with the guy trying to mix a Better Pitcher. If you can, you win; if you can't, you lose, and have to make do with flat Coke to go with your Ju-Ju-Bees.

Cesar handed me a new cup. "Try this, vato!" I tossed it back and spat it out like Danny Thomas over his newspaper when Bud told him he was a crossdresser.

"Hey-ZEUS, Cesar, how about some lemon with that sugar-water?!

"But if I don't add all that sugar, you always tell me it tastes like dirty feet!" Cesar yelled, and he was right. Then it occurred to me that maybe the problem wasn't in the mix, but in the main ingredient.

"Cesar, pour me a glass of the tap water you use for the lemonade." I tasted it; BLECH!! L'essence d'irity feet. "Tell you what, Cesar; let me go get some water from next door, and we'll make some lemonade from that instead." I did, we did, and when we tasted the new batch, we both fell to our knees and praised the wise and benevolent Higher Power that gave us the miracle of life known as good lemonade over and over again until we realized that everybody in the lobby was staring at us like we were escapes.

Now just what the hail does LEMONADE have to do with HI-FI, you holler? Well, look at it this way: you can't have truly great lemonade unless you start with clean water. And no matter how much sugar/cables or lemon/gear you have in your baths/system, it's never going to be tasty/kick-ass unless you start

1 This film defines what Austin, Texas is about more vividly than any tourist bureau hack could ever hope to. See it with someone you love.
with good juice/juice.

One of the best-kept secrets of audio is the Importance Of The Power Supply; audiophiles can later on for hours about the latest caps, op-amps, tubes, and MOSFETs, but who gets excited over power supplies? Transformers and rectifier bridges just don't seem to have the sex appeal of audio circuits, and yet all the audio circuitry does is take the DC rail from the power supply and bend it into the musical waveform; even the "best" audio circuit can't do very much with a mediocre power supply. Simply put, a power supply transforms the 120V AC coming out of your wall into the DC that your amps, preamps, and signal sources use as the raw clay with which to mold the music. And believe me, audio circuits like their DC clean; no noise, no ripple, no nothing except smoooth, steady DC.

Unfortunately, we live on the planet Earth.

**Me and you and a dog named RFI-EMI**

RH described RFI and EMI and their detrimental effects on the audio chain back in the April 1990 issue, so for a fleshier description, check it out. Briefly, RFI is very high frequency noise, everything from the RF signals coming from FM radio transmitters to the radiated noise from LEDs and Zener diodes. EMI is lower in frequency, and is usually caused by machinery that's connected to the same AC line as your gear; everything from electric motors to refrigerators to air conditioners. These types of interference, especially RFI, are ever-present to a startling degree; if RF was opaque, you'd think you went blind.

Needless to say, both RFI and EMI are polluters of the AC line and the power supplies of all your audio gear. Some of the effects are directly audible; EMI can sometimes be heard as a hum with a frequency of any multiple of 60Hz. RFI, consisting as it does of signals far too high in frequency for you to hear, can nevertheless do *many* nasty things to your gear: directly amplified when masquerading as the music signal, it can drive many audio circuits into gross distortion; infiltrating a feedback loop, it can cause outright instability.

**Don't buy any of these power conditioners...**

...until you first have an electrician install a 20A dedicated AC line behind your equipment rack, that is; trust me, you will FREAK at the across-the-board improvements a good dedicated line will make to your system. I've heard costs ranging between $100 and $500; it only cost me 80 clams to have mine installed in my small two-bedroom house. Make sure your electrician uses at least 12ga wiring for the new line, and *definitely* spring the extra bucks for hospital-grade outlets; these grip your AC plugs *much* tighter than standard-grade outlets, and some are even cool-man orange-colored! I hung around and watched my electrician while he did the work, and was blown away by how dirty the old outlet contacts and wire were; the wire was so oxidized it was *black*. I was amazed at the improvements, especially in the bass, that a dedicated 20A line made to my system; it was the kind of upgrade in sound that I normally associate with a much better amplifier. If you don't already have one, I urge you to take that moo-lah you were planning on dropping for the next gear upgrade and have your very own dedicated 20A AC line installed; you may find you don't need that new amp after all!²

**Badges?! We don't need no steenkeeng badges!**

My playback system hasn't changed all that much since last we met: speakers were the Spica Angeluses with the Muse Model 18 subwoofer, which continues to amaze and delight me; see my follow-up to RH's review in October. Driving the Spicas above 75Hz were the VTL Compact 160 tube amplifiers, and all line level gear was routed to Aunt Corey's Homemade Buffered Passive Preamp.³ Digital source was the JVC XL-Z1050 (review forthcoming), used as a transport only, driving a Theta DSPro Basic with Straight Wire Videolink coax digital cable. The Well-Tempered Record Player, fitted with the Sumiko Analog Survival Kit⁴ and either an AudioQuest 404i or a Sumiko Blue Point, fed an AR CSP-14, which was hot-rodded via the tape-out jacks to my buffered preamp.

² But that feeling of contentment will pass quickly, and you'll go and buy the new amp anyway; there's no fun in statics. Unless you're Nelson Pass.

³ I see if I don't turn in my DIY article on how you can build my active-buffered unity-gain preamp for this November issue, I have to sleep in my car at the next writers' conference. You'll find it elsewhere in this issue, I gnu-run-tee.

⁴ This two-part kit, only 50 clams at your local hi-fi hut, consists of a paper-thin mat designed to hyper-couple vinyl to acrylic platters, and a high-tension plastic strip that you wrap around the tonearm to reduce resonances. What I got, when used on the Well-Tempered Record Player, was a lot more than $50 worth of improvement: better image stability and a clearer high end were the two most noticeable gains.
All interconnects were Straight Wire Maestro, and the VTLS were connected to the Spicas with 1.5' lengths of AudioQuest Clear. As before, the left monoblock sat on Tom Wheeler's American Guitars; I gave Horton *Hearts A Whod* to my niece Alix, so the right-channel amp now sits on the transcendent tome Elvis World.

**Audio Express**

**NoiseTrapper Plus:** $379 & **NoiseTrapper 2000:** $1099

The Audio Express NoiseTrapper line of power-line conditioners marry a single isolation transformer with two Corcom® RFI filter modules; the Plus, for line-level gear, has a rating of 500VA, while the new amplifier-ready 2000 can safely support 2kVA of wall draw. In each NoiseTrapper, the AC signal is first filtered by a single Corcom unit, then taken to the isolation transformer, then filtered again by an identical Corcom filter before being sent to the six paralleled AC outlets; NoiseTrapper designer Steve Giunta claims that running the two filters directly in series creates adverse oscillations that the sandwich-style arrangement avoids. On the Plus, the outlets are standard-grade 15A Levitons; on the 2000, Audio Express has opted for the higher-quality hospital-grade outlets with the cool-man orange-colored plastic.

Internally, the two NoiseTrappers appear quite similar aside from the obvious differences in transformer size and filter type; both have excellent build quality, and both utilize star-grounding (all grounds are taken to a single point on the chassis, to minimize multiple ground paths). There's a single red LED mounted to the front of both NoiseTrappers which serves as a static-ground status indicator; if the static ground (third pin) of your home's AC wiring isn't correctly hooked up, this LED won't light. While most newer homes should have proper static grounds, many older homes do not; if

5 Sumiko scores again; I finally got some of their Kontak contact cleaner/reenhancer, and MAN does this stuff work! I've used Cramolin' Red and Blue for years both at home and in the studio, but this Kontak stuff is in a different league altogether. In fact, I used it to clean some RCA plugs that had been thoroughly Cramolin'd only two weeks prior, and came up with all sorts of green crap on my pipe cleaners. Most dramatic effect? Phono cartridge pins, but clean out every RCA plug and jack in your system anyway; the gains in transparency and treble purity are startling. I view an evening spent cleaning all my contacts as I would an evening with Richard Simmons, but I'm hooked; Kontak is for real.

6 If you've already bet your friends that I'll turn in a review without mentioning Elvis at least once, forget it; pay up.

7 Well-known to electrical engineers, Corcom is the industry standard in self-contained RFI AC line filter modules.

Audio Express NoiseTrapper Plus and NoiseTrapper 2000

Audio Express NoiseTrapper Plus

Audio Express NoiseTrapper 2000

there isn't a true static ground for the NoiseTrappers to plug into, you won't get any isolation from the transformers. No on/off switch is provided on either the Plus or the 2000; Steve feels that both units, meant to be left on continuously, sound their best after at least three days' warm-up, this due to the transformer's core and the RLC components in the filters stabilizing. Like the Ensemble Isostats and the PAC-IDOS/DIF, the NoiseTrappers lack an MOV (Metal-Oxide Varistor) to clamp high voltage spikes.

Interestingly, the NoiseTrapper 2000 has a two-position switch located on the rear of the unit; up = the center-tap of the secondary is grounded, down = the center-tap is left floating. Why include a switch for this, when floating the center-tap reduces the effective isolation from 60dB to 40? Because in listening tests, Audio Express preferred the sound of some systems with the center-tap floating! They recommend you try both positions of the switch and go with whatever sounds best to you.

**Counterpoint PAC-5:** $295 & **PAC-15:** $425

The Counterpoint PAC “Mains Filters” are filters only; there is no isolation transformer in either

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unit. The PACs are quite different in execution from the other conditioners reviewed here; while all the units under review here filter out AC line noise above 60Hz, the Counterpoints are the only products that also filter out signals below, with a high-pass filter operating below 20Hz. Counterpoint’s promotional literature introduces a new AC gremlin previously unknown to me: “Powerline Jitter.” They claim that the actual frequency of the AC line is never exactly 60Hz, and that this frequency instability “may lead to image wandering and transient uncertainty.” Needless to say, Counterpoint claims to combat this problem with a “unique resonant energy storage system tuned to 60 cycles,” which “relieves power to your audio components in synchronization with the powerline’s target value of 60 cycles, averting out jitter.”

AC is taken to each PAC by a detachable 18ga line cord. Opening up the units, I was struck by the similarity in build quality and component layout to the Counterpoint SA-100 amplifier I reviewed in the April ’91 issue; all share outstanding workmanship. Both PACs also sport on-board AC line status indicators, three red neon bulbs that light up in different combinations to alert the user as to whether or not a static ground is present, hot and neutral are reversed in polarity, etc. Standard RLC filters are used in the RF filter section, but it was unusual to see large electrolytic capacitors (four 1000µF caps in the PAC-5, eight 1800µF caps in the PAC-15) in AC powerline conditioners; these are used in the high-pass filter section, Counterpoint basing this filter topology on loudspeaker crossovers. A nice feature both PACs share is the use of MOVs, or metal-oxide varistors. These disc-shaped components help protect against the high-voltage transient spikes common to most AC lines, and are especially helpful in protecting the sensitive ICs in many digital components. I routinely install MOVs in all of my electronic projects for safety as well as good karma, and I was glad to see Counterpoint include them in their PACs.

**Ensemble IsoTrans: $1000**

The Ensemble IsoTrans is, simply, an isolation transformer in a box; the boys in Switzerland feel that the resistors, caps, and inductors that make up RFI filters introduce problems of their own, so in a nutshell, a’buh-diya buh-diya buh-diya THAT’S ALL, FOLKS! One 460VA isolation transformer. In a box. No RFI filters, no MOVs. Just a transformer. In a box. Uhm . . . it’s got a lot of copper wire wound ‘round its core . . . er . . . the box is a nice shade of Lake Placid Blue . . . uh . . . did I mention all the copper wire?

As currently shipped, the IsoTrans has a curious wiring scheme; to plug it into the wall, a standard AC cord identical to the detachable IEC types is provided, but instead of providing even a single AC outlet to plug a component into, the IsoTrans sports a female IEC outlet which won’t mate with your gear’s AC plugs! Instead, Ensemble supplies another AC cable, this with a male IEC plug on one end and a single AC outlet on the other, to allow the connection of your components. Which means that unless you spring for a good multiple-outlet power strip like the NoiseRapper Power Strip, you can only plug one piece of gear into the IsoTrans. I find this arrangement puzzling, and hope Ensemble’s new US distributor can sort it out vis ze volks back home.
API Power Wedge Model 1: $439

The Power Wedge is manufactured by a company that makes its own high-quality versions of the industry-standard Corcom RFI filter modules for computers and other electronics. As API's Les Edelberg is an avid audiophile, he wanted to offer the fruits of his company's expertise to his fellow 'philes, and thus the Power Wedge line of AC conditioners was born. There are currently eight different Wedges available, with varying target uses such as audio/video systems, etc; the unit reviewed here, the Model 1, sports six line-level outlets and four high-current ones to supply AC to your amplifier(s).

While the Power Wedge is similar in concept to the Audio Express NoiseTrappers in that both employ isolation transformers and EMI-RFI filters, the Wedge's execution is quite different. Whereas the NoiseTrapper uses a single 500VA isolation transformer to feed all six of its AC outlets, the Power Wedge contains three transformers, each with dual secondaries; this gives the Wedge the equivalent of six 75VA transformers, one for every line-level outlet (other than the high-current ones, which are only filtered). In addition, the Wedge has one of its line-level outlets wired in reverse polarity, allowing the user to experiment with different polarities to achieve the best sound without defeating the static-ground pin.

Internal construction is excellent, with good wiring and layout. An MOV is included to absorb high-voltage transients on the line. As each individual line-level component has its own 710A fuse, API has installed by each outlet these cool little push-in fuse holders that house not only the inline fuse, but a replacement as well; a nice touch at this price point. One important consideration to make when using the Power Wedge is that API stresses that all components must be plugged into the unit. Les says you shouldn't plug anything directly into the wall if you use the Wedge; otherwise, the benefits of the unit are severely diminished.

Perfectionist Audio Components IDOS: $150 & DIF: $250

The PAC IDOS and DIF are quite different from the rest of the powerline conditioners reviewed here; while the others filter out RFI from the incoming AC, the IDOS and DIF filter out the internally generated RFI present in nearly all digital playback gear.

How do they do this? The IDOS looks like a common five-outlet AC strip, but the first outlet is wrapped in bright red plastic tape with the word "DIGITAL" on it; this outlet is for your CD player, digital processor, or any other component with a clock or switching circuit in it (like the VPI turntable power supplies). The "digital" AC outlet is designed to bleed off the RFI coming down the digital component's AC cord, and route it safely to your home's "third pin" static ground. The other four outlets are for the rest of your system, including your amps; as with the Power Wedge, PAC stresses that you must plug all of your gear into the

8 In fact, PAC recommends that when using the IDOS, you don't use a fancy "audiophile" AC cord on your CD player, processor, etc. According to them, "regular" AC cords such as Belden have lower impedance at RF frequencies; normally, you'd want your AC cord to have restricted bandwidth in order to filter RFI somewhat, but using the IDOS means you want as clear a path as possible for all that CD-generated RFI to pass to ground with. Of course, using a Belden AC cord means you'll probably get laughed out of your circle of audiophile friends; might just be the best thing that ever happens to you.
IDOS, which means, like me, you'll probably need tuva. The four "analog" outlets are isolated from the digital outlet by series inductors on the hot and neutral AC legs; static ground, or the third pin, is internally disconnected on all four "analog" outlets to keep the drained-off RFI out of the system.

But even if you give the RFI a clean path to ground and shunt it away from the rest of the system, there's still a direct path it can use to infiltrate the rest of the system: the ground/shield of your CD player's interconnects! Enter the DIF, a small cast-aluminum box with:

- a pair of chassis-mounted RCA jacks;
- a pair of RCA plugs sticking out, connected to inch-long lengths of interconnect;
- a single insulated ground wire, which is attached to two inline contraptions PAC makes by sticking an RCA jack and plug end-to-end.

Confused? Wait; there's more! You see, you unplug your interconnects from your CD player's output, and plug the DIF into your player instead. Then you plug your cable into the RCA jacks on the DIF, and plug the other ends of your interconnect into those end-to-end RCA doohickeys, which in turn plug into the CD input of your preamp. Why? Because the DIF isolates the ground of your CD player interconnects by placing an inductor in series with it. Faced with the tough road an inductor poses, all that RFI inside your player will instead choose to exit stage left via the AC cord, where, volta! the IDOS is there to bid it a "Later, dude!" from the rest of your system.

Both the IDOS and the DIF were well-constructed, with decent components and good solid build quality. In addition to the series inductors, the IDOS has several small-value caps across the AC line to filter incoming RFI; these are much less ambitious than the LCR filters used in the other PLCs, although they will offer some level of attenuation at RF frequencies. The DIF uses what appears to be a home-brew hookup wire for the internal audio interconnect; each leg is made up of several separately insulated strands of solid-core wire.

**Tripplite LCR-2400: $459**

The Tripplite is the only unit in the Group Of Nine that offers active voltage regulation; that is, it employs a ferroresonant autoformer that steps the voltage up or down, depending on how low/high your wall AC may get at any given time. There are fourteen outlets on the Tripplite; two on the front, twelve on the rear. Ten of the outlets, including the front pair, are black, and are intended for use with either amplifiers or source components; the remaining four outlets are white, and have additional RFI filtration via dedicated series inductors and a 0.1 µF cap/MOV combo across hot and neutral. Tripplite recommends these four "enhanced" outlets for more noise-sensitive equipment.

The fact that the unit recommendations mention mixers, keyboards, and digital effects leads me to believe that the LCR-2400 was designed more for pro-sound reinforcement than home audiophile use, although Audio Advisor does carry the Tripplite, albeit with their own faceplate and special power cord.

Opening the unit up revealed no surprises. While not as elegantly wired as the other conditioners reviewed, the build quality was good enough for the job; Tripplite has an excellent reputation for reliability in the field. Most of the space is taken up by the big autoformer and its associated regulation circuit. Aside from the active voltage regulation, all outlets are filtered by at least one set of inductors, caps, and MOVs; the four "enhanced" outlets have another set of filters as well. The front panel has a five-LED display to show the AC line status before the active regulation; a red LED for "very high," a yellow for "high," green for "normal," yellow for "low," and red for, you guessed it, "very low." In all the time I used the Tripplite, none of the LEDs ever came on except for the green "normal" indicator, even when I purposely induced brownouts with my big-ass window air-conditioner unit.

**Enough already; how do they sound?**

Before I begin describing the sonics of these units, I would like to take a moment to salute the floor-scrubbers of the world, for they are truly the unsung heroes of human suffering. I spent most of my time with these conditioners on my hands and knees like some demented road-boy, unplugging all my system's AC plugs and plugging all my system's AC plugs.
and unplugging and plugging and unplugging and plugging until crazy-slobber was sloshing around in my mouth and I was so confused I'd plug a conditioner into itself, cussing the damn thing out when the system wouldn't turn on. Floor-scrubbers of the world: you have my undying respect.

**Audio Express NoiseTrapper Plus & NoiseTrapper 2000**

Actually, there's a third Audio Express product that I also used in my PLC roundup; the $150 NoiseTrapper Power Strip, basically an all-out version of the el-cheapo six-outlet strips that are definitely not the bee's knees when it comes to high-end audio. The NTSP sports eight beefy hospital-grade Leviton outlets, high-quality internal wiring, star-grounding throughout, and a detachable IEC power cord. As I could detect absolutely no difference between plugging gear straight into the wall and into the Power Strip, I designated it as the "raw AC" for my listening comparisons.

With all line-level gear plugged into the NoiseTrapper Plus but with the VTL Compact 160 amps and the Muse subwoofer plugged directly into the raw AC, I heard a distinct "cleaning-up" of the whole spectrum from bass to treble, as well as a much clearer and detailed midrange. The tonal balance became less bright, but there was an increase in high-end detail with the Plus that rendered image outlines more vivid and 3-D. On JA's piano recording of Anna Maria Stanczyk performing Chopin on the Stereophile Test CD,9 the attack of the piano was smoother than with the raw AC, with less grain throughout the upper midrange and highs. Depth was pleasantly increased as well, offering a much more vivid image of the rear of the hall than with the raw AC. Soundstaging, too, was wider with the NoiseTrapper Plus, placing reverber tails and echoes farther to the sides of the stage. In fact, after hearing this track through the NoiseTrapper Plus a few times, returning to the raw AC was a serious drag! Because what the NoiseTrapper Plus does is clear away so much crap through the piano's "power range" that the inherently bold and brash sound of the hammers striking the strings is finally rendered without all that amusical hash riding along with the signal. The bass, too, is improved with the addition of the Plus; on Lyle Lovett's nicely recorded version of "Friend of the Devil" on the Grateful Dead cover-tune disc Deadicated (Arista ARCD-8669),10 Leland Sklar's electric bass-line is much fuller and well-defined. The heavy bass pressure in the opening of the Cowboy Junkies' Trinity Session (RCA 8568-2-R) was more powerful as well, allowing the interior of the church to come through more fully "seen" than with the raw AC. The net effect of the cleaner mids and highs, coupled with the pronounced increase in bass clarity and weight, was to make any music I played with the NoiseTrapper Plus much easier to get lost in; what more can you ask for?

Well, for starters, you could ask for the NoiseTrapper 2000! Plugging the two VTL monoblocks and the Muse 225W powered subwoofer into the 2000 extended the virtues of the NoiseTrapper Plus even further, along with a dramatic firming-up of the bass. When Anna Maria Stanczyk really started kicking out the jams on the lower registers of her Steinway, there was less "furriness" to the low-frequency bombast and more outright oompb; an already exciting performance, good ol' track ten really came alive with the addition of the NoiseTrapper 2000. The 2000 seemed to open up the reservoir of power when it came to bass reproduction, whether it was Anna's piano or Butt-Mon's subterranean reggae bass on Dread Zeppelin's 5,000,000* (IRS X2-13092). And with the greater ease through the bass, music became more natural in its flow, more closely mimicking the feel of a live performance.

The only complaint I had was the amount of mechanical noise coming off the big 2000. This is to be expected somewhat; big transformers generally make a lot of noise! The 2000's transformer was specifically designed

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9 At the June CES, a man approached me in one of the rooms and asked if I could hear the difference between cryogenically frozen CDs and regular ones; when I explained that I hadn't heard any frozen CDs yet, he couldn't believe it: "But your Test CD is available both ways!" he cried; he thought that all the Stereophile writers lived in little numbered cabins on some audio-compound owned by LA, where we spent our days and nights diligently evaluating audio gear, obeying our vows of celibacy, and getting all the latest tweaks like frozen CDs YEARS before any of the public ever even heard of such things. Uh-huh. Ashamed, I went directly to the Stereophile suite and got a frozen copy of our Test CD to take back home with me. The verdict? The frozen copy sounds smoother, more dynamic, and gutsier on the low end. Thanks, Mr. Whoeveryouwere, for kickin' my ass into pickin' it up!

10 I was surprised to find out that this excellent track was produced and mixed by George Massenburg, who's been responsible for some very bright-sounding mixes in the past, the Ronstadt/Parton/Harris Trio album, for example. Perhaps it is possible for the leopard to change his over-hyped spots into musically more natural stripes. —JA

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for low mechanical noise, and it is mounted on rubber decoupling washers, but even then there's a bit of audible buzz that I sometimes noticed during the silence between CD tracks and low-level passages. Of course, where you sit the 2000, how quiet your room is, and how little the rest of your system's transformers buzz will make all the difference as to whether or not this will be a real problem.

Taken on its own, the NoiseTrapper Plus represents excellent value for the money. I can't imagine any system, at any quality level, that wouldn't benefit from the improvements it provides; at $379, the Plus can be considered for any setup from Class D entry-level to the wildest megabuck fantasy rig. The 2000 is quite a bit more expensive at $1099, but the improvements in bass quality and slam are, in my opinion, worth the cost. My system had the best bass and the most ease with the amps plugged into the NoiseTrapper 2000 than with any of the other units tested, and while I can't picture owners of Adcom 535/Dana Model 1/Rotel RCD-855 systems plunking down another grand for one, more ambitious systems will certainly benefit from the 2000's cleanup job on the AC supply. Recommending the NoiseTrapper Plus and the NoiseTrapper 2000 is just about the safest recommendation I'll ever make; as I don't know of any part of the country that doesn't suffer from dirty AC; highly recommended.

Counterpoint PAC-5 & PAC-15

And they waited with bated breath, all the Counterpoint SA-100 owners who'd stuck long, gleaming needles into their CG voodoo dolls for his review in the April issue...would be try to right the bad blood by praising the PACs? Would be trash them simply because Michael Elliott had told him to stuff jalapenos in his ears? Or would be just be true to them all and accurately report what be heard?

I guess that depends on how you see the situation, because I felt that both the PAC-5 and the PAC-15 fell short of the mark set by both the Audio Express NoiseTrappers and the API Power Wedge. While they did offer a somewhat cleaner presentation in the midrange than the raw AC, I found the PACs to both soften the bass and truncate the highs of my system. Either unit had much the same effect by itself; combining the two compounded the problem, making for a less-involving sound than the other two PLCs. In addition, I noted none of the improvements in the depth or soundstaging that I heard with some of the other PLCs. The PACs didn't degrade depth or soundstage width, but neither did they improve it over the raw AC.

As with all of the units reviewed, I burned the PACs in for roughly three weeks, powering my main system as well as the one in my bedroom. But compared with the raw AC, the Counterpoints reduced the bass impact, as well as its intrinsic tightness, to a large degree. On the Lyle Lovett track, the bass line was much more restrained and difficult to pick out—as if someone had turned down the bass tone control a couple of notches on a receiver. Anna Maria Stanezyk's piano, too, lacked the low-end authority that came through so viscerally on the NoiseTrappers and even on the Power Wedge, which had a slight reduction in bass impact as well, although not nearly as large as the PACs. Using either PAC alone reduced this bass deficiency, but there was still a reduction of bass with a single PAC.

At the other end of the spectrum, the highs were a bit shut-in, lending the system a rolled-off character I know it doesn't have! The lack of air was like a step in the wrong direction from the raw AC; while the AC was too bright and hashy, the PACs were too soft and muted. Again, this effect was lessened considerably by removing either the PAC-5 or PAC-15 from the system.

In their defense, the PACs did improve the midrange, offering a clearer picture of Lyle Lovett's voice, as well as Margo Timmins's on Trinity Session. Compared with the raw AC, there was much less spittiness to the close-miked Lovett track, and a smoother tone on the acoustic guitars. In this area alone, I felt the PACs offered a large audible improvement over the raw AC.

The Counterpoint PAC-5 and PAC-15 are very different animals from the other PLCs reviewed here; alone among the group, they not only filter signals above the 60Hz powerline frequency, but below it as well. Perhaps this is why I found them to sound the way they did: very different from the others. In any case, I didn't care for the sonic changes they made to my system. I suggest you audition them in your system, and decide for yourself if you think they improve the sound of it.
Ensemble IsoTrans

Since the IsoTrans has only one outlet available on the end of its plug-in output cord, I plugged it directly into the wall and plugged the eight-outlet NoiseTrapper Power Strip into the Ensemble. While this worked, it looks dumb! A chassis-mount AC outlet or six would've made much more sense, especially at the Ensemble's asking price of a cool grand.

With the IsoTrans in the system, I noticed a striking similarity to the overall sound of the NoiseTrapper Plus throughout the bass and lower midrange; honestly, the differences were small to insignificant. Bass lines became tighter, more prominent, while there was a slight increase in image focus. Anna Maria Stanczyk's piano on track ten of the Stereophile Test CD came across as closer to the listener, while the rear of the hall moved farther back with the Ensemble, showing a similar degree of depth improvement to the NoiseTrapper Plus.

One important area in which the IsoTrans lost out to the NoiseTrapper Plus was the range from the upper midrange to the highs: brighter and very slightly grainier, the Ensemble more closely resembled the raw AC in this range than the much-smoother Plus. It was a bit more tidy than the raw AC, but nowhere near as clean and clear as the NoiseTrapper.

In their literature, Ensemble suggests that the 460VA IsoTrans be used for power amplifiers as well, with one unit for the line-level components and one for the amps. I'm not sure this is such a great idea; while 460VA is adequate for a handful of preamps, turntables, and CD players, it's not up to supplying enough current to any but the smallest amplifiers out there, and I don't recommend it for such use.

Mechanical noise from the IsoTrans was impressively low, and totally inaudible from the listening chair. The similarly rated NoiseTrapper Plus and Power Wedges both had higher levels of mechanical buzzing than the IsoTrans, which was effectively silent for all practical purposes.

The Ensemble IsoTrans presents me with a problem: How do I recommend a good-sounding, effective product that's poorly thought-out (the lack of multiple AC outlets) and, even more important, surpassed in performance by units less than half its price? The answer is, I can't. While the $1000 IsoTrans works well and does nothing wrong per se, I got much better sound with the $379 NoiseTrapper Plus and the $439 Power Wedge. Add in the cost of a good multiple outlet strip, and the IsoTrans doesn't appear to offer good value for the money. It works, but it's too expensive.

API Power Wedge Model 1

The $439 Power Wedge was the biggest over-achiever of the group, as it not only provided a "cleaned-up" AC outlet for every piece of gear in my system, but dramatically improved the sound from top to bottom. Plugging my system into the Wedge, with the VTLs and the Muse plugged into the high-current outlets, I heard two immediate changes: first, the apparent bass level was slightly but audibly reduced, tightened, and given a much greater sense of ease and detail. Bass lines became a bit more restrained, but at the same time they were easier to follow. I often think of the bass line as the horse that I'm riding, bareback of course, through the wild jungle brush of the music; more often than not, the drummer's a spaz, and you can never trust a guitarist to lead you down the safest path. But the trusty bass line not only moves the whole caravan along, it points the way toward musical resolution.12 By clearing up the muddiness and congestion in the bass my system had when plugged into the raw AC, the Power Wedge made it much easier to just kick back, forget about the system, and enjoy the music.

The Power Wedge had a similar effect throughout the rest of the audio range, stripping away layers of harshness through the mids and highs, with an attendant increase in apparent detail. Depth, too, was improved; the drums on The Trinity Session were more fully delineated in their front-to-back positioning relative to Margo Timmins's vocals. When the Power Wedge was first hooked up, there seemed to be not only a loss of bass, but a softening of the highs as well. After extended listening, it became obvious that the highs hadn't been softened per se, but simply cleaned up. The

11 As with all the other PGCs, I'm going to send the Counterpoints off to the other writers for Follow-Ups; I think this will offer a broader take on what these things do in a wide variety of systems. Even more so than amps, speakers, and front-ends, I think it behooves us to report on what these PGCs do in more than one system.

12 That's certainly the way I felt about JA's bass playing at PAX Mondial in June! Jazzbo-drummer Allen Perkins was over there, rock-drummer Neil Sinclair was over there, and that lunatic with the pink Stratocaster was all over the place; the only real anchor amid all this gleeful madness was JA's solid Fender P-Bass. "Creaking digits" my butt cheeks!
additional focus and clarity through the midrange and high end were anything but "soft"; image outlines became much sharper with all the components plugged into the Wedge. The Lyle Lovett track on Deadicated was a good example of this; the acoustic guitars and Lyle's voice really acquired a sense of body and dimension with the Wedge, whereas with the raw AC they seemed to be much flatter and confined to the speaker plane.

The only complaint I had about the Power Wedge was the same one I had about the Noise-Trapper 2000: at times, the mechanical buzzing of the isolation transformers was audible enough to become distracting. I have the same problem with the power transformers on the VTL Compact 160s, but as they're located directly behind my Spicas, the speakers effectively block this noise from the listening area. Careful experimentation with location should reduce or even eliminate this problem with the Wedge.

Naturally, I spent a great deal of time comparing the sound of the Power Wedge to the combination of the NoiseTrapper Plus and 2000, as I felt that the Wedge and NoiseTrappers were the best of the bunch. The biggest difference to my ears was in the bass; where the Plus/2000 combo seemed to both tighten and increase the apparent level of low to midbass, the Power Wedge actually seemed to reduce this range slightly. Going directly from the NoiseTrappers to the Wedge, I was struck by how different their bass presentations were, and how much the whole feeling of the system changed with each unit. With the Plus/2000, the bottom end had a rich, powerful character, with a very tight low register and plenty of clarity. Switching to the Power Wedge seemed to result in an even further damped low end; if an analogy can be drawn, the NoiseTrappers had somewhat of a "ported" sound while the Power Wedge was more akin to a sealed-woofer alignment. Tonally, this had the effect of radically changing the system's balance; I preferred the fuller sound of the NoiseTrapper Plus/2000 combo, but I've heard plenty of setups that could definitely benefit from the leaner low end of the Power Wedge.

The Power Wedge was the biggest surprise of the group: at $459, it offered performance virtually on a par with the $1478 NoiseTrapper Plus/2000 combo. Given that the Power Wedge not only accommodates line-level gear but amplifiers as well, I'd have to say that the Model 1 is a bell of a bargain! Highly recommended.

PAC IDOS & DIF

PAC stresses that all of your gear be plugged into the IDOS, but it only sports five outlets and I needed eight, plus I needed two "digital" outlets to accommodate both the JVC XL-Z1050 I used as a transport and the Theta DSPro Basic; along came a second IDOS, which I plugged directly into the Audio Express Power Strip along with the first.

I found the PAC IDOS to be the most subtle of the group in its effect on the sound of my system; while there was an audible sweetening of the mids and highs, it was extremely slight. I just didn't hear the dramatic increase in low-level information, widening of soundstage, and reclamation of "analog coherence" that the promo lit said I would. If I heard anything, it was a very small decrease in the edginess that still shows up in digital playback when directly compared to good analog. When listening to LPs with the system plugged into the IDOSes and the raw AC, the improvement was, again, very small; mostly a slight smoothing of the highs. The quality and quantity of the bass was unchanged from the raw AC, but then the IDOS is far less ambitious in its execution than either the NoiseTrappers or the Power Wedge. I tried listening to the JVC XL-Z1050's analog outputs as well as the Theta driven by the JVC, and detected no change in the amount of improvement heard in the high end; minimal.

Then I unplugged the Straight Wire Maestros from the Theta, plugged the DIF between the DSPro Basic and my preamp, and plugged the Maestro into the female RCAs of the DIF. Now I heard a real difference; suddenly, all this babbling about redirected RF noise and isolated grounds started making sense! With the addition of the DIF, the system sounded more open, with a greater sense of ease than with just the IDOSes. Transients no longer bored tiny little holes in my teeth (sorry, TJN), just alerted me to all the fun going on in the microtis. The highs didn't sound rolled-off, however; just more natural. The Lyle Lovett cut on Deadicated was reproduced with much less stridency, and the body of the acoustic guitars and Lyle's vocal came through with a greater sense of ease. LP playback was improved as well, along the same
lines as digital, but to a smaller degree; the DIF
did make an audible difference with analog
playback, but it was smaller relative to its effect
on the Theta.
Are the PAC IDOS and DIF worth $150 and
$250 respectively? Hard call; taken by itself, I
felt the IDOS’s effects were too slight to be
called a real improvement. But with the addi-
tion of the DIF, the presentation is indeed
smoother and more like analog, with a decrease
in the edginess that puts so many off from CD.
I consider the IDOS and DIF to be an insepa-
ble duo; the IDOS alone made very little audi-
ble difference, and I couldn’t hear any changes
using just the DIF, but together, they do
improve the sound.
At $400 for a single IDOS and DIF, and $550
for a two-IDOS/DIF set, the PAC units
come under very stiff competition from both
the NoiseTrapper Plus and especially the API
Power Wedge. In my system, both units far sur-
passed the IDOS/DIF combo in terms of overall
sonic improvement. I didn’t feel that the
“sweetening” effects on digital playback of the
IDOS/DIF were any different from that of either
the NoiseTrapper Plus or the Power Wedge, and
with both of these PLCs, I found the degree of
improvement to be much higher.
The PAC IDOS and DIF can offer a real and
audible improvement in the sound of your sys-
tem, while I felt that the more ambitious PLCs
using isolation transformers and full-blown RFI
filtration offered more improvement for the
dollar, the IDOS/DIF duo deserves an audition
in your system.

**Triplite LCR-2400**
I’ll cut to the chase with this one; I didn’t like
the sound of my system plugged into the Tripp-
life LCR-2400 at all. It didn’t matter whether I
plugged everything into the black “normal”
outlets or plugged the digital gear into the
white “enhanced” outlets—the Triplite put
an electronic-sounding glaze over my system,
with an edginess through the midrange and
highs that made LPs sound more like first-
generation CD players. The highs were almost
completely stripped away from the overall
sound, and the overall sense of dynamic range
seemed congested and depleted. About the
only area of performance that wasn’t degraded
was the bass, which was firm and strong, but
here too was a loss in clarity and ease of pace.
With the air stripped away and the rest of the
range edgy and confused, I found myself vir-
tually ignoring the music, thinking about any-
ting but what I was listening to. My monkey
bone, to say the least, was dormant.
Whether or not it safeguards against voltage
fluctuations in a live sound-reinforcement sit-
uation, the LCR-2400 significantly degraded
the sound of my system, rendering it not only
boring to listen to, but very annoying in the
long term. As the Triplite was the only PLC of
the group that I thought sounded worse than
the raw AC, I can’t possibly recommend it for
high-end audio use.

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**SOUNDSTREAM T-1 FM/AM TUNER**

Don Scott

Measured specifications (all measurements taken with Sencore SG80 test set): FM stereo/AM
tuner with digitally synthesized tuning. Usable sensitivity: $8uV/10.3dBf mono, 4.5uV/18.26dBf
stereo. 50dB stereo quieting sensitivity: 30uV/99.74dBf with noise reduction, 32uV/35.30dBf without
noise reduction. Capture ratio: 1.5dB. Selectivity: 65dB alternate channel, 6dB adjacent channel.
S/N ratio at 65dBf: 80dB mono, 78dB stereo. Stereo THD: 0.15%. Stereo separation: 50dB. SCA
Soundstream is a US company mostly renowned for its topnotch auto sound equipment. Although it has halfheartedly dabbled in home electronics over its seven-year history, it is only this year pursuing the home market. New products include multiroom/multisource audio equipment and reemphasis of the System 1 components first introduced in Fall 1988. The T-1 is part of this system.

The T-1 does not look as out of place when mated with high-end components as many Far Eastern tuners. Its heavy metal case did not wince when I placed a 50 lb. amplifier directly atop it. Additionally, its rounded corners and lack of excess lighting add to its pleasing deco- rum. On the front panel, from left to right, are Power On/Off, Memory, 8 AM and 8 FM presets, Mute, Blend, Mono, Search DN/UP, and AM/FM pushbutton switches. On the extreme right is an analog-feel, weighted-flywheel tuning knob with green back-lighting. The main display has a red dual-function center-tune (green off-tune) and four-level signal meter. The frequency display is 4–5 digits and tuning is in 50kHz steps on FM and 10kHz on AM. AM or FM mode is shown in green, Stereo in red. All other functions are displayed with two-color LEDs in each respective button (green “on,” “red” off). No direct short-route 107.9–88.1MHz tuning is provided. The rear panel has gold-plated RCA audio jacks, a threaded F-type FM aerial connector, AM antenna terminals, and remote-control daisy-chain jacks for other Soundstream components.

**FM RF performance**

Soundstream claims a phenomenal 1.62µV/9.3dBf usable mono sensitivity. While this may be true at certain frequencies—88.50, 89.30, 102.10, 94.70MHz, for instance—there is some residual noise at other frequencies that decreases effective usable sensitivity. I measured a typical 1.8µV/10.3dBf to a rather poor 3µV/14.7dBf. This aberration is surprising; the T-1 has separate power supplies, with separate power transformers, to ward off leakage between audio and digital switching circuits.

The tuner has limited selectivity. While adequate for alternate-channel stations, it will not receive adjacent stations unless both are weak. However, the single, rather wide bite of the frequencies it receives contributes to its excellent fidelity. I noted no unusual birdies, tweaks, problems with image reception, or distortion from overload on excessively strong signals.

**FM audio quality**

The T-1 uses a full-range blend rather than a straight high-blend for noise cancellation. The assumption is made that it’s equally important to cancel out-of-phase low and midrange noise components as well as the hiss-producing high frequencies. (McIntosh also used this scheme in the MR-80.) I agree with the merits of the full-range approach because there are some positive side effects besides noise cancellation: usually there is a longer signal path in a tuner for the L–R (left) channel recovery. This can cause a 20–30º phase difference between channels and result in poor center imaging of common-mode material such as a singer’s or announcer’s voice. Of course, there are tradeoffs with any blend: loss of stereo separation is less noise. In the T-1’s case, noise is reduced 10dB on weak signals while still maintaining good subjective stereo imaging. In fact, some stereo was present even on weak signals as low as 4.5µV/18.26dBf. Boosting the signal level to a still weak 10µV/25.20dBf produced 40dB quiet stereo. Full quieting using the blend was achieved with 28µV/34.14dBf. These are all low-level signals that normally would require mono listening. This indicates the T-1 should be ideal for apartments, where weak signals are generally the rule. The internal blend adjustment was set to automatically disengage above 30µV/35.03dBf even if selected. My preference is for an all-manual variable blend because it allows the user, not the tuner, to decide the exact blend vs noise for best reception. To my knowledge, this feature is not available on any current FM product.

Ultimate stereo separation (without blend) is not particularly outstanding, being average. Bass and treble extension, however, are excellent, not being overweighted on either end. The T-1’s audio strength is low intermodulation distortion. Stringed instruments, particularly
individual guitar notes, are strikingly clean and distinct. There is slightly noticeable transistor third- and fifth-harmonic distortion not found, for instance, on the Kenwood L1000/T (my current favorite) reviewed in Vol.14 No.6. But overall, the T-1’s audio is good, not overly bright or excessively gritty; in short, quite listenable.

AM section

Measurements revealed basic news quality with above-average sensitivity and poor selectivity. Apparently, Soundstream incorporated AM as an afterthought with no thought of approaching the T-1’s FM capabilities. In practical operation, I found it impossible to separate a local station at 1150kHz from a desired strong station at 1080kHz. The lower portion of the dial was masked by digital noise and on the verge of regenerative oscillation.

Conclusion

No doubt many imported tuners will equal or exceed the Soundstream T-1’s performance for half the price. But for how long? The T-1’s build quality indicates that it should last and maintain proper alignment longer than you possibly want to listen to FM. It appears that user-end results are potluck, depending on whether the tuner is needed to perform at its extreme on a desired station or not, subject to its own self-inflicted, frequency-dependent interference. The T-1 is recommended highly for a trial evaluation; its FM sound quality may be just as pleasing as its cosmetics, providing its RF criterion can be met.

RACKING IT UP

Thomas J. Norton helps get your system off the floor with reviews of equipment stands from Arcici, Sanus Systems, and SimplyPhysics.

Arcici Superstructure I. Dimensions: 36” H (plus height of spikes or casters) by 22” W by 14” D. Satin black finish. Prices: frame, $140; component shelf, $2750; isolation platform, $70; record rack, $50; light, $30.

Arcici Superstructure II. Dimensions: 42” H by 22” W by 16” D. Satin black finish. Prices: frame, $165; component shelf, $30; isolation platform, $75; record rack, $65; light, $30.

Arcici Lead Balloon. Dimensions: 32.5” H (plus height of spikes) by 20” W by 17.75” D. Satin black finish. Prices: frame, $325; component shelf, $27.50; isolation platform, $70; record rack, $50; light, $30.

All three above: Approximate number of dealers: 73. Manufacturer: Arcici, Inc., P.O. Box 1502, Ansonia Station, New York, NY 10023. Tel: (212) 724-6021. Fax: (516) 581-7006.

SimplyPhysics Isostand. Dimensions: 34” H by 22” W by 19” D. Semi-gloss grey, black, or white (other colors, types, optional). Prices: $600 (includes two shelves). Optional shelves: $65 each. Approximate number of dealers: 40. Manufactured by SimplyPhysics, 13158 Veterans Memorial Parkway, Dept. B, Houston, TX 77014. Tel: (713) 537-5083. Fax: (713) 537-9618.

Sanus Systems Model CF45 Component Foundation. Dimensions: 22” W by 18” D by 45” H. Flat black finish. Prices: $359 (includes five shelves). Video Bridge, $75; Video Bridge Leg, $85. Trim kits: black lacquer, $25; solid walnut or solid oak, $39; Fountainhead, $85. Approximate number of dealers: 100. Manufacturer: Sanus Systems, 2885 Country Drive, Little Canada, MN 55117. Tel: (800) 359-5520. Fax: (612) 482-0536.

I know what’s obsessed you recently—“One of these days I’m going to get something decent to stash my equipment in.” Until then, that old coffee table, or block-and-board bookcase, or the floor, will do nicely. That’s what I used to say. Whenever I got the urge to purchase cabinets, there was always something else to divert the funds—like a new preamp or a new pair of loudspeakers. Or even (gad) something completely unrelated to audio.

Back in 1982, I began to seriously accumulate cabinets for my audio system—the terrific
stuff manufactured by Custom Woodwork and Design. It grew like Topsy until I had ten cabinets, enough for one very large “media” wall, or two or three smaller ones. But such an arrangement is not only expensive, it’s unwieldy. It’s great for a fixed system, but for a reviewer it’s simply too inflexible—hard to move, and too hard to access the rear of the equipment. And about that same time rumors started flying (mostly from England) that heavy wood cabinets—sideboards and such—were less than ideal for siting a turntable; the CWD stuff outsideboards a sideboard any day of the week.

Open racks were the answer. Today my collection of CWD cabinets (when they come out of storage, which is another story entirely) will be relegated to video use somewhere other than in the listening room.

It seemed about time we looked into some of the equipment racks available to the audiophile at approachable prices. Here my primary concern was their functionality, suitability, and convenience. You won’t find much said here about how the various racks affect the sound of a system. This is a highly controversial area except as it relates to turntable support and, perhaps (and to a lesser degree), tube equipment and CD players. In the case of turntables, there’s little doubt that the location of the loudspeakers relative to the turntable, the suspension of the turntable, the resonant characteristics of the arm and cartridge in relation to the turntable suspension, the characteristics and construction of the room, and the rigidity and mass of the turntable stand and support all may have a complex influence on extraneous signals picked up by the phono cartridge in the form of airborne or structureborne feedback.

Before completing this review I toyed with the idea of performing some sort of rudimentary but perhaps revealing test (using an external signal) of the feedback to a given turntable on each of the stands. That signal should ideally be rich in low frequencies. Generate the signal from a CD, place the stylus on a stationary record, and evaluate the output from the turntable system by recording it for later assessment. Fine, except that because of all the above complicating factors, the results will not “travel” well at all—they would be applicable to our situation only. As an extreme example of this, consider that when DO had the Aura turntable in the Stereophile listening room on an older Lead Balloon, he never had any problem with footfalls disturbing it. When the Aura was placed on the massive Merrill Stable Table in the same location, he had to tiptoe to the turntable to keep it from skipping. (The Merrill is now used by RH, whose listening room is built upon a concrete slab.) When I set up the Oracle Delphi Mk.IV initially on a basic Arcici Superstructure alongside the Aura/Stable Table, it never gave me any problems at all. The situation is, shall we say, fluid. There are simply too many variables to justify Draconian conclusions.

The best that can be said is that, for a turntable stand, rigidity is definitely desirable. Mass probably is, to a point. The disadvantage of mass is that once you get it excited, it tends to give off its stored energy slowly! That, in any event, is the theory behind the light, rigid turntable stands popular in the UK (and in JA’s listening room). And they may indeed be the best approach...again, in a given situation.

**Arcici Superstructure I and II**

The only difference between the Superstructures I and II is size. The Superstructure I will hold up to six shelves spaced every 6.5”. The II will hold up to ten shelves on 4.5” centers. The shelves of the II are 2” deeper. Both racks come with spikes to rigidly fix them to the floor. The racks come ready-assembled, greatly aiding rigidity and simplifying setup. Simple plastic shelf supports are provided with the shelves. A lowboy version of the II is available, as are stacking kits to enable you to put one Superstructure atop another and expand your system up rather than out. Also available are a special record rack shelf, a CD holder (called a Caddy here), a special light bar, and casters. The Superstructures offer the greatest setup flexibility of the racks discussed here. They are also the least expensive.

**Comment:** When I set about reworking the Stereophile listening room on my arrival in Santa Fe last year, my first choice for equipment stands were the Superstructures, largely because

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1 When mathematically modeled, mass behaves as a reactance, either capacitive or inductive depending on the situation, and as any engineer will tell you, you cannot dissipate energy with a reactance. Only resistance will do that, and the mechanical analog of electrical resistance is frictional loss. By itself, therefore, an undamped massive support, such as a sideboard, is no less resonant than an undamped lightweight one, and in fact, by acting as a bigger capacitor, can make the situation very much worse. Mass and damping is what is required, with the latter being argued by some as being more important. —JA
two pieces of MDF, leaving a largely hollow core between them. I feel that a full damping layer is more appropriate in this application, though I'd expect it might make the Platforms more expensive.

Arcici will hate me for saying this, but if you're handy with, and have access to, the appropriate power tools, I see no reason why you couldn't make your own shelves out of MDF or another suitably heavy, strong, low-resonance material. This would not only be more cost-effective, but would give you the option of as many different shelf finishes as your imagination can dream up—there's nothing simpler for the do-it-yourselfer than making shelves.

In theory, the support pillars of the Superstructures may be mass-loaded. But we didn't do this. The supports are quite thin and will not hold very much sand or lead shot; plus, it's necessary to plug up the unused shelf support holes to retain the sand.

While Arcici does not specifically recommend the use of the Superstruc-
structures to hold a turntable—they make the Lead Balloon (see below) for this purpose—I used the Superstructure I for an extended period to support the Oracle Delphi Mk.IV. At no time did I feel that I was compromising the potential sound quality. The Superstructure I is quite rigid when spiked; not absolutely rigid, but a very good approximation. Unfortunately, the II, due to its taller, deeper frame, is considerably less so. It is certainly strong enough for everything from CD players to moderately heavy amplifiers, but I do not recommend the II for turntables.

Unfortunately, you will likely find that the top shelf of the Superstructure I is too shallow for many turntables. The Oracle is a fairly compact device, but the VPI HW19 Mk.III proved a shade too deep, and it is not an overly large turntable. Before planning to use the I as a turntable support, make certain that it will fit. The latter was less of a concern with almost any other equipment; I found very few items that really needed the extra depth provided by the II.

I can strongly recommend either of the Superstructures, though only if you need the extra shelves (and don't plan to use it for a turntable stand) will the II, I feel, offer any real advantage over the smaller model. And the latter is, I feel, a bit more elegantly proportioned. If you need a lot of space, two or three Superstructures side by side provide a very efficient, reasonably priced, and attractive way to house even an elaborate audio system.

**Arcici Lead Balloon**

The latest version of the Lead Balloon is substantially the same as the earlier version, only different. It is designed around three steel support columns, each of which may be filled with the user's choice of materials—generally sand or lead shot. Welded crossbeams support the three columns. There are now provisions for shelves within the triangular structure (the same shelves used in the Superstructure I fit in the Lead Balloon), supported by bolts screwed into the vertical supports; up to four such optional shelves may be accommodated, although as a practical matter three shelves (including the bottom one), with clearance of about 8.5” between each one, form the most usable configuration. Spikes are provided for the bottom of the columns. Small discs close off the top of each column support, and a welded framework structure, itself fitted with spikes, sits at the top of these discs. Atop this structure are placed a pair of massive lead bars, and the turntable is placed on these.

**Comment:** The entire structure of the Lead Balloon is both massive and rigid, and forms a reassuringly solid support for a turntable. The lead-bar support configuration is not necessarily the most convenient to use, however. It works fine on turntables with four feet, but mounting turntables with three supports (such as the Oracle) can result in some odd arrangements of the lead bars. And you wouldn't believe the Rube Goldberg setup DO had to use with the multi-feet, multi-chassis Aura. But it works. Both GL and DO have more extensive experience with the Lead Balloon than I, but DO was not happy having to move for a few months from his older Lead Balloon (which did not allow for shelves) to the Merrill Stable Table, as I've already related. And though GL was a happy camper when he had the Merrill, he has lived for months now with a new Lead Balloon, and has no complaints. His main problem with the Merrill was that he couldn't move it! The several pieces of the Lead Balloon can be han-
dled by one person, but be careful of those lead bars—I dropped one (fortunately not on anything like my foot), and have still not gotten it back to a perfectly flat configuration!

The shelves within the frame of the Lead Balloon are not all that convenient to use; however. There's only about 15.5" clearance between the front pillars. This not only means that the equipment must be slipped in from the side (a lot of units are around 17" wide without rack handles, which increases the width up to 19"), but also that it must be less than 13.25" deep. Because the rear support is in the center, and because the front clearance is narrower than the front panel of most equipment, components cannot extend out from the front or the back of the shelf. And there will be situations in which that rear pillar will interfere with access to the jacks on the rear of equipment mounted on it as well. When the Lead Balloon was redesigned to permit shelves to be mounted, this tight fit was apparently not taken into account, or was deemed unimportant. The whole unit should be a couple of inches larger all around, although this might compromise rigidity.

**SimplyPhysics Isostand**

With its three column supports, the Isostand superficially resembles the Lead Balloon. The differences are significant, however. In place of spikes at the bottom, SimplyPhysics furnishes three of their Tonecones. At the top, instead of the Lead Balloon's frame—and—lead-bar structure, is a more conventional MDF laminate board. Its 22" by 18" dimensions should support most turntables, and its 1.5" thickness makes it reassuringly solid. Underneath this removable top shelf, three short Tonecones fit into machined recesses in the level-adjustment devices which cap off the top of each support column. SimplyPhysics calls these devices Isojusters, and they make leveling a turntable mounted on the top shelf a breeze. GL noted that these Isojusters also fit into the columns of the Lead Balloon; they are available separately from SimplyPhysics.

The Isostand is also slightly larger than the Lead Balloon; the depth of the shelves themselves (SimplyPhysics calls them Innerspace shelves) is a reasonably generous 14.5". But, like the Lead Balloon, the center rear support does not allow equipment to overhang in the rear and also may possibly interfere with rear input and output jacks. To help make up for this, the front-pillar clearance of just over 17" allows most equipment to be inserted from the front and to overhang the front of the shelf slightly to give more rear breathing room to deeper components. Two shelves are provided with the Isostand (apart from the standard top shelf); additional shelves are available if needed. Shelf supports are provided every 2.5" to allow flexible placement of equipment; I would judge that three to four shelves—including the bottom shelf but excluding the top turntable shelf—would be the practical maximum to accommodate most equipment of average height and still allow for ventilation.

**Comment:** At first glance, the Isostand appears to be an almost ideal turntable support and all-purpose equipment rack. Its top shelf is heavy and nonresonant, and there is provision for easy leveling of a mounted turntable. It's far more flexible than the Lead Balloon in accommodating components.

With the Isostand loaded up with suitable equipment, I had the initial impression that it was less rigid than the Lead Balloon. Grasping one of the columns and shaking it vigorously resulted in considerable motion of the struc-
ture. I later found that a considerable amount of this flexing seemed to be due to the Tonecones themselves or to the metal plates at the bottom of the columns into which the Tonecones were screwed. I also tried substituting regular spikes for the Tonecones, and they were even more flexible. The matter was about to rest there; with the "give" in the spikes or cones, it was difficult to judge the absolute rigidity of the structure. Then, shortly before press time, I elected to remove all of the spikes, set the Isostand down on a concrete slab, load it up with equipment, and check for rigidity. Well, it wasn't. Perfectly rigid, that is. I was disappointed to find that there was a noticeable amount of shake in the Isostand itself. I can't claim any adverse operational effects in my environment from this lack of rigidity—when I moved the Oracle Delphi Mk.IV turntable from the Superstructure to the Isostand, I noted no real difference in the sound. But, as I've already discussed, variations in system/room interactions are the critical factors here.

And for the price being asked, I really feel that SimplyPhysics needs to look into the rigidity problem. Too bad, because in every other respect the Isostand is an excellent piece of work.

Sanus Systems CF45 Component Foundation

The Sanus Component Foundation was the only one of the stands considered which arrived in a flat, knocked-down pack. The assembly instructions are clear, but allow yourself a couple of not exactly fun-filled hours for assembly. Perhaps you can talk your dealer into doing it.

Each of the Sanus's five large, sturdy shelves is suspended on tiny, spiked supports. The bottom of the stand is also spiked. Unfortunately, the location of the shelves is fixed, somewhat reducing flexibility. From bottom to top, shelf clearance is 10", 8.75", 8.75", and 8" (rounded down to the nearest 0.25"). Trim pieces finish off the fronts of the top and bottom shelves. The trim is not structurally necessary, but the stand looks much better with them.

The Sanus stands may be sand-filled (though we did not do so here). The filling must be done from the bottom, which is somewhat inconvenient—especially if you decide to do so sometime after you've set up your system. Sanus also makes a Video Bridge Kit ($75 plus Trim Kit), which forms a span between two racks and provides a suitable support for a video monitor. It's the only one of the units here designed for such an application.
Comment: Our Sanus Rack came with the Fountainhead (an artificial marble similar to Corian) Trim Kit—an $85 option. I recommend one of the less expensive wood kits ($39 for oak or walnut) or lacquer ($25). The Fountainhead was smooth but unpolished and rather drab looking. Overall, however, the Sanus was the best-looking of the units under evaluation.

In the more important functional area, the Sanus Rack comfortably accommodated anything we wished to place on it. But I felt it lacked enough overall structural rigidity to preclude an unqualified recommendation for use as a turntable support. There will undoubtedly be situations in which it will serve this function perfectly well, but the fully loaded stand's fore-and-aft “racking” when shaken made me more confident in recommending it only for non-turntable use. Don't misunderstand this—the Sanus is solidly built. But with a full complement of moderately heavy equipment on board, it could be set into a quite obvious fore-and-aft swaying motion which took several seconds to die out. I rechecked all the fasteners used in assembly, including the lock nuts on the spikes, and all were tight. There are not enough horizontal structural members, in my judgment, to ensure complete rigidity. The well-known Target TT stands, for example, have such members and do not have this problem. Sanus does make a shorter, four-shelf stand which may possibly be more rigid (shorter stands tend to be inherently more so). All that's really needed to stiffen the Sanus is solid front-to-back side diagonal bracing, or perhaps permanently fixing the shelves to the frame—since they're not adjustable in any case.

Conclusions
None of these racks had the structural rigidity you'll find in a Merrill Stable Table or a Sound Anchors turntable stand, but they're all considerably less expensive than those units. Still, each had serious limitations:

Turntable Stand: Of the five racks considered here, I can only recommend the Lead Balloon without real reservations for use with a turntable. Its inherent structure is acceptably stiff and rigid. A structure with a triangular cross-section is, incidentally, inherently more rigid than one with a rectangular cross-section.

If you want the most flexible access to accommodate a wide variety of equipment, the Isostand would appear initially to be the better bet. The only problem is, it's significantly less rigid than the Lead Balloon. Its tendencies to "give" when excited, and to take a noticeable period of time to die down, are only slightly better than the Sanus—worse if used with the furnished Tonecones. Until I confirmed this, I was ready to give it my recommendation as the best overall turntable/equipment support in this group. But its tendency to give, together with its relatively high price, have discouraged me from doing so. There is an excellent turntable support here waiting to get out; it needs more work to make it as rigid as it needs to be.

The only thing keeping the Lead Balloon from an unqualified overall recommendation is its cramped shelf space. When I loaded both it and the Isostand with the same equipment to check for rigidity, three of the four items were too deep to fit squarely on the shelves of the Lead Balloon. I had to mount them at an awkward angle to get them to stay on the shelves at all. A slight redesign of the Lead Balloon to widen and deepen its internal shelf space (if it could be done at no sacrifice to rigidity or increase in price) would make it a clear winner.

If you're really pressed for space and funds, the Superstructure I (not the II) is a good, all-purpose stand, rigid enough to serve reasonably well as a turntable support and accommodate most other components. But be certain that your turntable will fit the rather shallow 13.5" top shelf. And, though I did not try it, I strongly suspect that stacking two of them with a stacking kit would compromise the rigidity too much for turntable use.

The door is still open, however, for a strong, rigid, top-quality turntable stand with adequate shelf space for other components. JA still recommends the Target TT, Sound Organisation, and Archidee stands, and I would not disagree, although their light yet rigid structure differs in technical philosophy from that of the Lead Balloon.

General Equipment Storage: If you don't need a turntable stand, the Lead Balloon and Isostand would not be the best choices. I'm sure that Arcici and SimplyPhysics would be glad to sell them to you for other purposes, but why put up with the cramped shelf space of the Lead Balloon or the expense of the Isostand (plus the rear center column restricting rear
access on both of them) if you don't have to?

Either of the Superstructures will do a first-rate job of supporting your gear, and they have the virtue, when filled with equipment, of looking more expensive than they are. I prefer the Superstructure I: it simply looks a bit better and takes up less room. But if you don't like to see your equipment hanging out an inch or two over the back of the I's narrow shelves, or need more shelves than I will handle but don't need enough of them to invest in a pair of Superstructures, the II is, well, super.

If you have an older Lead Balloon, by the way, the Superstructures are a pretty fair cosmetic match for it (the cross-sectional area of the support beams is similar). They don't, however, match the new Lead Balloon quite as well.

That leaves the Sanus Systems rack—not exactly a wallflower. The CF45 is better-looking than the Superstructures, and its frame is made of heavier steel. But it does lack flexibility (in shelf placement), and must be assembled by the buyer. The Sanus is not much more expensive than a comparably equipped Superstructure II, but the latter will hold more shelves. The CF45 is, however, the most suitable as the support for a full-up audio-video system (with two of the racks and the optional Video Bridge).

And that's more than I really wanted to know about levitating my equipment, thanks.

TO TWEAK OR NOT TO TWEAK

Peter van Willenswaard investigates gadgets and gizmos, creams and unguents, intended to improve CD sound.

The world of hi-fi is becoming flooded with gadgets meant to improve the sound quality of CD reproduction. In this article I'll be examining a number of them. I'm well aware of the fact that my list isn't complete; I knew from the start that, even though I'd planned to perform a number of standard measurements and a few special ones, I probably wouldn't come up with a definite answer as to why these accessories work as they do. But there's no progress without venture, and I hope this report will stimulate the discussion.

Impossible?

I more than once regretted having started this project. It proved enormously time-consuming, and there was constant doubt; the matter is so elusive and frequently borders on the illusive. On the other hand, the claimed effects intrigued me. Isn't it weird that a CD sounds different after you paint its edge green? Or after you've treated its surface with some silicone liquid? It isn't just weird, it's also most unlikely, especially in view of our present understanding of CD technology.

Let's first define our field of operation. An electrical audio signal can be fully described in two dimensions: amplitude and time. All other signal parameters (like phase, group delay, rise time, slew rate, frequency response, distortion, envelope) are direct first-, second-, or even higher-order derivatives of one or both above-mentioned basic dimensions. Even stereo doesn't add a new dimension; it just adds a second channel of amplitude vs time, although it is undeniable that a simultaneous replay of both channels means something special to us if the signals in these channels properly correlate.

In a gramophone record amplitude is determined by the deviations of the groove (as most cartridges are electromagnetic devices, it would be more precise to describe these deviations as the velocity with which the groove amplitude thrusts the stylus sideways), and the time dimension is fixed by the rotational speed of the platter. The more faithfully the groove deviation is translated into an electrical signal and the more constant the rotational speed, the better the reproduction. (That sounds pretty trivial, but most of us know it ain't that easy!)

With CD, the amplitude is given by consecutive 16-bit words (capable of describing 65,536 discrete levels) and the time factor is taken care of by the clock signal controlling the retrieval and processing of these 16-bit words. The most crucial step in the timing process is at the DAC; that's where every 16-bit word is converted into a corresponding analog current (or voltage) value. The accuracy with which this is executed is determined by the clock signal offered to the DAC.

Amplitude errors

In CD reproduction, amplitude errors caused by an imperfect readout of the disc are
rare. The 16-bit words do not simply follow one another along the spiral on the disc, but are interleaved, meaning that they have been cut into smaller pieces which, along with a few control bits, have been spread out in different clusters. If a minor scratch or a dust particle should make one or even several of these clusters unreadable, other clusters containing related information are located elsewhere and are thus unharmed; the player's reconstruction electronics, using a powerful correction algorithm, almost always succeed in rebuilding the exact original 16-bit words.

If this first level of error correction fails, a second mechanism becomes active. The demodulator sends a signal to the digital filter that a few 16-bit words couldn't be reconstructed. The digital filter then interpolates: it takes a look at the 16-bit words preceding and following the missing ones and invents up to eight new data words that "fit." The music will play on without any clicks, but the information is—in places—not exactly identical to what was on the disc. That might result in an audible effect.

To get an idea of how often perfect error correction fails and the digital filter is instructed to perform an interpolation, one can connect a counter to the HFD—or alternatively the EFAB—pin of the demodulation IC. HFD means High-Frequency-Defect and gives a logical pulse if the reflected laser light received from the CD drops below a predefined minimum level for reliability. The HFD signal is generated in the microprocessor controlling the reading photodiode and its lens. An HFD alarm tells the demodulator that bad data in need of reconstruction is on its way. EFAB is the Error Flag the demodulator sends to the digital filter if a reconstruction failed and interpolation is called for.

I built a counter for such signals and hooked it up to an older Philips CD-160 (the HFD and EFAB point are easily located in players with the SAA72xx chip set). A perfect CD gives no HFD alarms, a well-treated, mildly scratched CD anything from ten to several hundred. EFABs happen only on roughly treated CDs or on bad pressings. Most CDs I took at random from our collection gave no EFAB interpolations, even if the number of HFD alarms far exceeded 1000; this means that the error-correction was perfectly successful—all the original information had been totally recovered with no interpolation proving necessary.

In third-generation Philips chips (SAA73xx, used mainly in Philips clones with Bitstream DA Conversion) error correction is so powerful that the HFD alarm isn't even connected any more. The reflected laser light is allowed to become four times weaker still (temporarily) than the minimum level necessary for the second-generation players, implicating that a modern player plays on happily even when the detected reflection drops to a few percent of its nominal level. You'd have to drill holes in excess of 2mm in a CD before uncorrectable errors would occur.

Despite all this immunity, it would be interesting to see whether CD accessories do have any influence on the activity of the error-correction circuitry. Such would be possible with a readout of the Block Error Rate (BLER), an indication of how many clusters could not be read without fault. There is, however, no BLER readout point in CD players (record companies have special equipment to measure BLER for their quality control).

But even when the digital information is 100% correct, there can still be amplitude errors in the analog output signal because of nonlinearities in the DAC; a well-known and frequent error is the MSB mismatch occurring at the zero-transition. This is of no consequence to judging the effects of CD accessories: you treat the discs, not the DACs!

Timing errors

The best illustration of how timing errors distort the eventual analog signal is given in a drawing by British manufacturer Arcam (see fig.13). In the center is the ideal situation: amplitude steps and time steps perfectly regular. At the left, timing is 100% regular but the amplification was totally recovered with no interpolation proving necessary.

2 If there are too many missing codes for the digital filter to cope with, the output is muted for as long as necessary.

3 I used this drawing in my discussion of jitter in "Industry Update," November 1990, but I'll save you the trouble and print it again here.
Fig.1 Comparison of DAC output levels, showing how poor clock timing (jitter) can produce effective amplitude non-linearity in the reconstructed analog waveform.

tude steps aren't (due to converter non-linearity), resulting in a distorted waveform. At the right, the increment in amplitude is 100% regular, but due to a distorted clock timing the amplitude samples reach the converter output a bit too soon or too late, also resulting in distortion of the waveform. Such an unstable timing is called "jitter."

Chances that jitter would be a direct product of clock instabilities are disappointingly small; disappointing in view of our search of differences in sound, that is.4 In a CD player the clock is generated by a crystal, resulting in a very stable clock controlling all digital processing. Long-term stabilities of a few ppm (<0.001%, or < -100dB), and short-term instability due to phase noise (also < -100dB), are unexceptional.

An indirect effect, however, can produce small problems. The D/A converter is fed with a bit clock, a word clock, a latch-enable (a "green-light" signal allowing the conversion of a digital word into an analog value), and the 16-bit audio data via different copper tracks on the printed circuit board. Although all four of these signals are sternly controlled by the central crystal clock, they may experience different delays on their way to the D/A due to differences in copper-track topologies or non-ideal functioning of digital transmitters or receivers at the ends of the respective tracks, resulting in a less-than-optimal conversion process (see Robert Harley's interview with Richard Cabot, Stereophile, January 1991, Vol.14 No.1).

In a recent letter to Hi-Fi News & Record Review (April 1991), Stan Curtis pointed out that once the digital signal has left the error-correction system it is totally unprotected from degradation or corruption. In view of the above, it is not unthinkable that if a CD accessory leads to a decrease of electronic activity in the laser control and/or error-correction circuitry, these circuits emit less interference that could otherwise be picked up by the unprotected clock and data lines to the converter. The result would be better sound. This might also explain why a separate D/A converter connected to a CD transport tends to sound better than an integrated CD player of comparable technology. The separate converter is theoretically at loss: it must first regenerate the clock from the incoming digital signal, using a PLL circuit which is less stable than a crystal clock. But the separate converter has its own power supply and is in its own housing, and is thus well protected from what is going on in the CD transport.

Measurements

Hypotheses are nice because thinking is nice, but hypotheses are just hypotheses. I tried to find some proof, and started with some basic measurements, systematically performed with different discs first untreated, then treated with

all the CD accessories reviewed here. I didn’t expect much from these simple measurements, but someone has to do them, if only once. Others may pick up the trail from here. (I’m already thinking about a less orthodox measurement myself.) Here’s what I did this time:

1) The THD+N of a 1kHz signal (ie, everything present in the analog output other than the 1kHz tone) was plotted over a 30 second period (see fig.2). This is in contrast to the normal single measurement: I thought that a long series of measurements (4 per second) might show up fluctuations. Each curve measured from a "treated" disc was compared to the curve taken from the same but untreated disc. To avoid unnecessary repetition later on while reviewing each product, I’ll give you the results right away: nil (no differences).

2) I shot an FFT spectrum of the same 1kHz tone, in a 0–20kHz bandwidth, with resolution down to -120dB (see fig.3). Spectra before and after treatment were compared. Result: nil.

3) I looked for intermodulation distortion resulting from a mix of 19 and 20kHz tones with a 0dBFS (Full Scale) combined amplitude. The measurement looked at the amplitude of the second-order 1kHz difference tone over a 30-second period (see fig.4). No differences.

4) To be able to quantify the 19+20kHz IM product with great precision, I calculated the average of ten measured values. Again, there were no significant differences (variations of 0.02dB on a mean -80.81dB IMD result).

5) The 19+20kHz IMD was also measured in the digital domain, by connecting the digital output of a CD player to the S/PDIF input of the Audio Precision Dual Domain analyzer. (The AP’s DSP was programmed to act as a very narrow 1kHz bandpass filter). I know this seems crazy—no one would expect distortion in the digital domain—but trying doesn’t hurt. Result: a very stable -129.5dB figure (probably the level of bandpass-filtered digital quantizing.)
The amplitude of a -80dB 1kHz test signal was very precisely measured (0.1dB) during a 30-second period (see fig.6). (A -90dB signal would excite only 2 LSB steps, so I opted for the 6-LSB step -80dB, which is still sensitive enough to zero-crossing MSB errors.) Result — I'm getting monotonous — nothing.

(As I said, I didn't expect much. With the Audio Precision you can automate the test work by stringing different tests together in a so-called "procedure." I filed this procedure in the computer's memory under the name "despair." A 0.0 result, even when using an older CD-160 CD player, still felt discouraging.)

7) All that was left now was to count the HFD and EFAB pulses from the CD player's inners. A CD known to pose notorious difficulties in replay was placed into the CD-160. During the first two minutes an average of 230 HFD pulses were counted, meaning that the laser lost contact with the disc rather frequently. No EFAB interpolation flag was produced, however. Only when I tried the Delta Mat (a kind of metallic clamp?) did the count change significantly and repeatably, to an average of 224 — though the difference is significant, this is far from a dramatic change. All other tweaks applied to or around the CD, chemical or mechanical, brought no noticeable deviation.

A possibly different position might be taken for the green pens, which I took to the Technical University of Delft for further research. A spectrophotometer can tell you about the absorption and transmission properties of a particular dye applied to a particular transparent material. This test did produce a remarkable result. See the report on the green pens later on.

**Listening tests**

I used two different CD players for the evaluation of the different CD treatment products. The first was a Marantz CD-80, which is one of my favorites in its price range (about $1000) and widely appreciated by reviewers in Europe. It is a classical but thoroughly designed 16-bit device using the Philips SAA72xx and TDA1541A S1 Crown chip sets, and although there's a trace of the usual high-frequency harshness found in 16-bitters, it has a very sweet midrange and its musicality is hard to beat at any price. For the second player I chose a Kenwood DP-7030 (roughly $700). Kenwood was one of the first companies to recognize jitter problems in CD players. They designed a chip two years ago that realigns the timing of all signals sent to the DAC converter. As I explained earlier, jitter might be the main field to look into when it comes to increases in sound quality following a mechanical or chemical treatment of a CD; it would be interesting to see whether a player equipped with a second generation of their proprietary jitter-suppression chip would react differently to the accessories under test. In comparison to the CD-80, the Kenwood DP-7030 slightly emphasized sounds, the bass was somewhat heavier, the stereo image was slightly smaller in all directions, and the midrange was a fraction lighter in timbre. There was no wide gap in musicality and emotion between the Kenwood and the Marantz, and when it came to focus, the Kenwood was even slightly better.

Amplification used for the tests were the Sphinx PJ 12 for power and PJ 2 pre- (the Sphinx is designed and built by Siltech), with Siltech 4/24 Interlink and Ribbon loudspeaker cables. Loudspeakers were from Lyric, also a Dutch brand (we have used their type III speakers for over two years now).

**Felt-tipped green pens from CD StopLight, Staedler, & UniPosca**

The CD StopLight by Clear Image Audio is, of course, the original; most of you know that its purpose is to paint a CD's outer and inner edges green. The water-based paint contains no funny chemicals trying to find their way to the CD's aluminum backing. Applying the paint is easy because of the cutout ring on the felt tip. The cut weakens the tip, however, so care

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5 The Delta Mat, from Winzer, Germany, is a triangular clamp made of thin steel with springy little brass hooks at its three corners which hold the CD. The Delta's underside is covered with a thin layer of felt, avoiding steel-to-CD contact. The sonic effect of the Delta Mat was minor in comparison to that of the green pens. There was a certain increase in all three dimensions in the stereo image and even some extra air, but the music sounded too sweet, almost boring, and to a certain extent was stripped of its rhythmic coherence.

6 It is important for those who want to experiment with painting the edges of their CDs green to ensure that they use water-based, acrylic-paint pens. Plain magic markers or other pens that might use some kind of alcohol-based solvent should be avoided as they may attack the layer of varnish over the aluminum coating on the label side of the CD, the result being the inevitable oxidation of the aluminum and eventual damage to the area of the CD carrying the data. (It's fair to point out, however, that with the exception of CDs with playing times upward of 60 minutes, the data area is quite a long way from the edge.)

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should be taken while "pumping" for new paint. Drying time is about two minutes.

It has been hypothesized that stray laser light traveling horizontally through the CD is normally reflected at the CD's edge. When so reflected, the light hits the "hills" in the aluminum layer and is reflected upward, distressing proper signal readout. (Remember that the recovery of the signal from the CD is an analog process.) If the edge is painted green (the infrared laser's color complement), the light is absorbed and no longer reflected; the reading diode is thus no longer bothered with light that shouldn't be there.

I cut up a CD (not an easy thing to do, as a CD's polycarbonate is rather brittle) and selected some blank, transparent pieces. StopLight was applied to them, and at the University of Delft we measured light reflection and light transmission with a Beckman spectrophotometer over a wavelength range of 770 to 790 nanometers (nm); a CD laser operates at 780 nm. Reflection went down from 7% for untreated polycarbonate to 2% for StopLight-treated polycarbonate, while transmission through the treated polycarbonate dropped from 93% to 0% (no light went through). The sum of transmission, reflection, and absorption is 100%, meaning that absorption of the infrared light was estimated at 98%—CD StopLight is quite effective at its stated task. If we compare the reflection for both cases, StopLight improves matters by a factor of 3.5; not spectacular, but welcome enough.

Does StopLight improve sound quality?

Yes. I do not consider the difference to be gigantic, but it does help. The stereo image becomes a bit laid-back (usually a pleasant effect, as it enhances stereo depth), the sound becomes more detached from the loudspeakers, and more detail can be heard. Silences between instruments are less dead. There are simply less traces of "digital," inviting you to listen longer. Effects seemed slightly greater with the Kenwood DP-7030 than with the more expensive Marantz CD-80. And the effects depended on the CD (or recording or pressing) used: some reacted more gratefully than others.

Many a reader will have thought: I'm bound to have a green felt tip somewhere, couldn't I use that one? Well, yes, but there's a risk. Normal felt tips don't have the circular cutout that makes StopLight so easy to use. So chances are that you'll slip off the edge every once in a while, making a paint stroke across the CD; if you don't succeed in removing that within seconds, the CD (or part of it) may become unplayable. In my experience, the least dangerous procedure is as follows: Place the CD in its opened case, hold the felt tip against the edge, and turn the CD with a finger of the other hand.

The question remains: which felt pen? In England, the dark-green, water-based UniPosca PC-3M, from the Mitsubishi Pencil Company, seems to be popular. Be careful while "pumping" this one when wetting the tip becomes necessary, as the paint may come out in huge drops.

Analysis of the UniPosca in the spectrophotometer showed the reflection to be somewhat greater (5%) than with StopLight. Transmission was 4%, resulting in a calculated absorption of about 90% (equal to that of untreated polycarbonate). But if the theory is right, it's the reflection that matters: In that respect, the Posca falls between untreated and StopLight-treated polycarbonate. In the Marantz CD-80, CDs treated with Posca sounded almost as good as when treated with StopLight. When played in the Kenwood DP-7030, it tended to depend on the CD in question. In some cases Posca did little, while StopLight meant a welcome difference; I was unable to detect any specific correlations here.

Another alternative has been proposed by some audio enthusiasts working at the Technical University of Delft: B. Hillen and H.L. Han (the latter may be known to some of you through AES preprints). They treated CDs with a dark-green Staedtler Lumicolor 317, normally used for drawings on overhead projection sheets. Staedtler is a manufacturer of anthroposophic tendency and uses only natural, chemically neutral paints. The dissolving agent is alcohol, so drying time is a few seconds. The 317's tip is quite small; the 357 possibly has a bigger tip, but I haven't been able to find one.

The Staedtler sounds less laid-back, but nevertheless results in greater image depth. Reverberation becomes remarkably clear. As a whole, the sound is pleasant, civilized, and relaxed. I rate the Staedtler a little above its competitors. (My friends in Delft tell me that
the gain is even greater if you apply a layer of black Staeckler over the green. I haven't tried it—I decided to stick to the basics—so you'll have to see for yourselves.)

In the spectrophotometer the Staeckler proved very different on transmission of infrared light: almost 90%, which is close to totally transparent. Equally striking was that reflection was slightly greater with the Staeckler-treated polycarbonate (10%) than with the untreated material (7%). Apparently nothing (0%) was absorbed by the Staeckler green pigment. We noticed further that outside the infrared, toward the visible spectrum, transmission dropped rapidly, attaining 0% at 680nm and staying there except for a narrow 50% transmission band around 490nm (green!). Would blocking out visible light help a better readout of music from CD?

Conclusion: All three green felt-tipped pens made a sonic difference. StopLight has been tried worldwide and can be applied easily and safely. The other two require some skill, but have the advantage of being a lot cheaper. And who knows? Maybe your CD player has its own preference.

**Allsop Stabilisers**

I had heard about the Sims CD Rings, but had never come across them. Now Allsop has added them to their catalog. Steve Sims has specialized in fighting vibrations of all kinds for over ten years. He has consulted on many projects, including one for Boeing, as well as for Chesky during the construction of their studio. Sims is heavily interested in audio, and more an inventor than a businessman. Some years ago he invented a rubbery substance, Navcom, that is claimed to be an order of magnitude more efficient in vibration absorption than materials like Sorbothane. Curious what this could mean for CD, he first made Navcom rings, marketed by Euphonic Technology, AudioQuest, and Monster Cable, that could be glued to the label side of the silver discs. He then developed a different kind of ring that could be attached to the perimeter of the disc. Many people showed interest, but Sims had trouble keeping up with demand. That's where first Sumiko, then Allsop, jumped in.

I had the Allsop version to hand for this report. The Allsop/Sims rings (both names are mentioned in the accompanying literature) are U-shaped in cross-section so they won't slip off the CD edge, and weigh only 1.3 gram. The theory is that vibrations in the disc are being damped so the CD player won't have to apply brute force to keep the laser tracking. (The black ring most likely absorbs and blocks light as well.) Allsop points out a second advantage: If you put down a CD on a table, it is supported by the ring, avoiding direct contact and thus decreasing the danger of scratches.

Placing a ring around a CD for the first time isn't easy. It just seems too small, but with a little exercise and some studied pulling, you will succeed. You can pull really hard on these rings: When I tried to destroy one I had to stretch it to more than three times its normal length. Be careful, though, not to bend the CD; it won't break easily, but microscopic cracks might occur (air and moisture can then creep under the polycarbonate and harm the aluminum). Avoid fingerprints, but if you should make any, wipe them off with a soft cloth in radial motions, never parallel to the "grooves" as when cleaning an LP.

The first noticed effect of the Navcom ring in the Marantz was a clear increase in reverberation reproduction. Bass became unexpectedly deeper and more solid. Localization improved, and high frequencies gained in subtlety. Similar progress was made with the Kenwood CD player; as a bonus, the above-mentioned emphasis on s sounds nearly disappeared.

I consider the sonic difference made by the felt-tipped pens to be rather subtle. The All-

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7 Reinforcing this idea is a report that Philips has been experimenting with a totally black CD material—i.e., one that is opaque at optical wavelengths—that is nevertheless transparent at the CD laser wavelength of 780nm. The idea behind this is presumably to increase the carrier/noise ratio in the analog FM signal produced by the CD player's optical pickup.—JA
sop/Sims rings, however, have a clear, easily audible effect. The nice thing about these rings is that they’re ideal for experimenting; there’s no glue, they don’t stick, and you can take ‘em off and put ‘em back on as often as you like.

Cleaners
I won’t go to unnecessary length describing exactly what the CD cleaners look like or giving all the details of how they should be used; you’ll find all that in the manufacturers’ literature. I’ll restrain myself to a short description of what each cleaner is, what it sounds like, and, where useful, a practical tip.

I took a number of CDs that hadn’t been treated with anything, removed dust and occasional fingerprints with a soft cloth, listened to each before I applied the liquid cleaner to be evaluated, then listened again, in both CD players. A minimum of three CDs was used for each treatment. I also treated a number of CDs carrying test signals and measured before and after, but no technical differences showed up except in the case of CD-Repair (see below).

During the pressing of CDs a chemical substance is applied to prevent the CD from sticking to the mold. A number of CD treatment manufacturers have devised liquids to clean away the residue of mold release that remains on the CD’s surface when its leaves the factory. So even cleaning a brand-new CD could be useful. Finyl, marketed in the US by Transparent Audio Marketing, belongs to this group, but also leaves a silicone liquid that attaches to the CD surface, filling microscopic scratches and thus minimizing the diffraction of stray light within the body of the disc.

Similar claims are made for Pro Sona CD Enhancer, which includes a second spray bottle containing a cleaner that can be used first if the CD should be heavily marked with fingerprints. The British Hunt EDA P3 CD Cleaner was also developed to remove the mold-release residue.

Finyl proved quite effective, the sonic effect being on a par quantitatively with the Staedtler pen or even the Allsop rings. Finyl didn’t remove digital artifacts (eg, hardness on sounds), but did make the sound more open, direct, and dynamic, with improved reverberation and better low-level detail; music became more alive, more arresting. Hunt P3 and Pro Sona Enhancer were less effective (in that order), and resulted in a laid-back rather than more direct rendition; here, too, sound gained in openness and detail.

Cleaners whose literature doesn’t mention mold-release removal are those by Allsop and LAST. LAST Formula 6 claims enhanced immu-
nity of the treated (under) side of the CD against scratches and fingerprints. It is not said explicitly in their literature that the CD surface is hardened, something that is said about LAST’s Formula 2 and LP Allsop sells its cleaner in combination with a kind of rotating device: hand-driven brushes make circular movements across the CD placed in the device; the movement is almost perfectly perpendicular to the CD’s data spiral (as it should be). The audible effect of the Allsop cleaner is comparable to that of Pro Sona. Apart from producing a slightly increased emphasis on s sounds, LAST did relatively little.

CD-Repair, by Bundee, takes a somewhat different position: Bundee claims that scratches which trip CD players can be polished away. According to the manufacturer’s accompanying information, CD-Repair is supplied together with a Cleaner and a Protector, but my pack contained two bottles of Cleaner and one bottle of Repair. Both the (pink) soap-like cleaner and the (yellow) repair liquid tend to leave a residue that must be thoroughly wiped off. The cloths supplied with the pack become fluffy after repeated use; a bit impractical. I had three candidates for the Bundee Repair test: CDs that weren’t normally playable. Two skipped or stuck at various points; the other wouldn’t even play. Treatment of the first helped, but not all the way: there were fewer clicks and jumps, and 20% fewer HFD alarms, but it still wouldn’t play faultlessly. Repeated polishing of one particular area of the CD removed one obstinate click but created another. On the other two damaged CDs the treatment proved entirely successful! One vicious scratch even became less visible to the eye.

The last item was unique in appearance: CD Lens Cleaner from Discwasher, consisting of a CD equipped with six tiny brushes arrayed in a spiral. (A similar product is also available from AudioSource.) The supplied bottle of liquid is meant for wetting the first (and only the first) tiny brush; the other five dry the CD player’s lens. The CD is then placed in the player and started: a kind of Muzak® emanates from the loudspeakers during the action, and after ten seconds the player stops (cleaning accomplished). Does it do something? To my surprise, yes! At least on our Marantz CD-80, which had been used for 1.5 years in a rather dusty environment. (Fortunately we recently moved to cleaner digs.) The stereo image became deeper, it was easier to “look” at things at the back of the stage, localization was better. Quantitatively, the sonic enhancement was just below that offered by Finyl.

**Tips & conclusions**

Does this mean that you’ll have to treat all your CDs? Well, I wouldn’t. (I didn’t treat all of my LPs with LAST Formula 2 either.) I treat recordings that I play often, or that are especially dear to me—my best discs. A recording must be of hi-fi caliber to start with (too many aren’t) to make further preservation action worthwhile. My favorite CD accessories: Staedtler pen, Finyl, Allsop rings, incidentally Lens Cleaner, and for emergencies, CD-Repair.
For those who hate to go through the trouble of wiping discs radially, the rotating Allsop device might come in handy. Don't, however, use it with Pro Sona Cleaner and Bundee Cleaner or Repair, as these leave residues that are only smeared around by the rotating brushes. The method I used with these cleaners: Place the CD upside down in its case, one finger against the CD's edge to make it rotate, and wipe radially (from inside to outside) with a soft cloth in the other hand.

A systematic research as to the effects of combining two treatments was beyond my possibilities (although I found out by chance that Staedtler ink can be removed with Pro Sona Cleaner). I had to draw the line somewhere; I'd already invested some 70 hours and several dozen CDs in the project.

**FOLLOW UP**

**MC's September Diary**

I can't believe my luck this month. A reviewer's existence can be a sorry one when chance deals him a bad run of equipment. At the end of such a run he or she can end up feeling depressed. One may momentarily doubt one's ability to judge sound quality or to give anything but a negative opinion. At such times a good novel is infinitely preferable; a review unit's final writeup gets left to the last possible moment.

However, every once in a while everything goes right, the equipment submitted for review is both a challenge and a delight, and the exercise is such a pleasure that it makes all the many hassles worthwhile. I have just enjoyed such a month, and felt moved to share the experience with Stereophile readers.

September kicked off with the Martin-Logan Quest, big brother to the Sequel II. While there is much to admire in the Sequel, in the event I found the contrast between the top-class mid and treble and the slower, boxy bass rather hard to accept. However, the bigger, more costly Quest seems to have gone some distance toward addressing this conflict. In formal review the Quest proved an entertaining loudspeaker. The last noun is entirely appropriate—this speaker could really play loud! With a sensitivity rated at 90dB/W, and notwithstanding a rather tough load impedance dipping to 2 ohms, 200W of input from a Krell KSA-150 enabled it to produce a surprisingly effortless and highly dynamic result. The Quest could blat heavy rock with the best of them, while its delivery on classical music was impressive, if rendered with more theatrical than true concert-hall emphasis. This memorable speaker was followed by a foretaste of Meridian's new 605 monoblock power amplifier, first seen at the June Chicago show. I don't want to preempt the formal review except to say that, from preliminary listening results, the 605 looks set to establish new standards for definition and dynamics. I keenly await full production samples.

The pleasure continued with the trial of two new digital products from Daniel Schar, ex-MLAS and founder of the French company, Micromega.1 So far his track record has been a good one; these latest products comprised his 1992 series of the ultracompact Duo converter and the Leader CD player, the latter looking like a midrange plastic Philips/Magnavox at $300 US but boasting an inbuilt Duo converter. When I tell you how well acquainted I became with the Duo, you'll realize how significant this unprepossessing CD player is.

First things first: The current Duo is Micromega's equivalent of the Meridian 203. Daniel's first multibit Duo was eminently recommendable, while the second was significantly better with Bitsream, though not to established 203 standards. What a surprise, then, when this the latest Duo overtook the lot, reaching deep into US high-end territory. So what if the treble focus is not 100%? So what if a bit more rhythm and bass slam would not go amiss? The result is still delightful. This modest decoder has what Daniel calls communication, and I can only agree. The sound is natural yet vivid, detailed yet easy on the ears, and in musical terms competes directly with some of the industry's best offerings.

Enter the Micromega Leader. Yes, it does largely replicate the quality of the Duo, a little coarser perhaps but with better focus in the treble. I reckon to call it quits between these two, which by implication makes the Leader one of

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1 Micromega products are distributed in the US by Versa Dynamics Inc., 10 Pennsylvania Avenue, Malvern, PA 19355. Tel: (215) 251-2512.
the best CD players made at anything remotely near the price.

The foregoing would have been enough for any reasonable appetite, but this special month I was served a banquet. The best I have saved till last. Three years ago a quality producer with no particular claim to digital replay fame produced a CD player of unexpectedly high performance, so high in fact that it became a reference for my reviews in *HFN/RR*. The company was Accuphase of Japan, the admittedly costly product the DP80-DC81 (Vol.9 No.8, Vol.10 No.6, Vol.12 No.3). This month its single-box replacement arrived on my bench, in real terms nearly half the price and called the DP70-c. There is no way that I could have predicted the outcome, so unexpected was the DP70-c's extraordinary mastery of digital replay, both on direct CD and on outside digital sources when working in its decoder mode. It is most definitely the best I've tried; the next step is to check it out against the big Stax DAC-X11r processor (Vol.13 No.8).

The Accuphase DP70-c² is my new reference, with a listening test score substantially ahead of the nearest competition and a level of pure clarity and stereo image scale to match. It represents considerable proof that multibit is by no means dead. This 8x-oversampling, 20-bit implementation with discrete DACs of Accuphase design has one additional virtue: an excellent-sounding digital volume control, remote of course, 40dB in 1dB steps and operative on all the digital inputs.

Now who said the DP70-c included a digital preamp? With a power amp of good sensitivity such as the Meridian 605, the DP70-c benefited from a direct connection without the intervention of a passive or active analog preamp. It was at this point that, had my eyesight required the aid of glasses, they'd have steamed up!

There better not be too many months like this one, or the industry will decide that I've lost my critical edge. —Martin Colloms

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2 Accuphase products are distributed in the US by Madrigal Audio Laboratories, P.O. Box 781, Middletown, CT 06457. Tel: (203) 346-0890. Fax: (203) 346-1540.

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Stereophile, November 1991
Igor Stravinsky, exultant with the success of his 1910 Firebird ballet, planned two more major works—Petrouchka and Le Sacre du printemps ("The Rite of Spring"). After the brilliant Paris premiere of Petrouchka a year later, the young composer began serious work on The Rite of Spring. The impresario Sergei Diaghilev had produced Stravinsky's two earlier ballets, and was eager for his Ballets Russes company to present the premiere of The Rite.

Stravinsky has written that he imagined a solemn Slavic pagan rite: Wise elders, seated in a circle, watch a young girl dance herself to death as a sacrifice to the god of Spring. For Stravinsky, "the Russian Spring...was the most wonderful event of every year of my childhood," during which "the whole earth cracked." Stravinsky wanted to capture this cataclysmic effect in his music, and collaborated with Nicolas Roerich, a painter who specialized in "pagan" subjects. Leopold Stokowski suggested that Roerich visit New Mexico and Arizona to observe Native American dances and costumes, which Roerich did. The designer later related his experience to Diaghilev and Stravinsky, which doubtless had considerable impact on both of them.

The Rite is composed of two parts, both beginning in mysterious calm and building to violent culminations. Complexities of rhythm, other than melody, are the prime force. After the prelude to Part I, "The Fertility of the Earth" (which Stravinsky preferred to translate as "A Kiss of the Earth"), seven dances represent puberty, ritual abduction, the exorcising of Winter, rival challenges, a processional assembly, and a violent dance about the earth's reluctance to break into Spring. Part II, "The Sacrifice," begins with an eerie interlude followed by five dances, during which the sacrificial maiden is chosen and tribal ancestors and ancestral spirits are evoked. The ballet ends in a violent sacrificial dance.

The Rite is scored for a big orchestra: 4 oboes, English horn, piccolo clarinet, 3 clarinets, bass clarinet, 4 bassoons, contrabassoon; 8 horns (7 and 8 alternating on Wagner tubas), piccolo trumpet in D, 4 trumpets in C, 3 trombones, 2 tubas; 2 timpani, bass drum, tam-tam, triangle, tambourine, ratchet, antique cymbals, cymbals; and an unspecified number of strings.

Pierre Monteux was chosen to conduct the premiere, although at first he found the score utterly confusing. It has been reported that he conferred frequently with Stravinsky on the work's orchestration during its many rehearsals, and that some of his suggestions found their way into the completed score. Rehearsals became a battleground between the choreographer, Vaslav Nijinsky, and the composer, the former claiming that the music was too fast, the latter insisting that it had to be. The first of four performances took place at the Théâtre des Champs-Elysées on May 29, 1913, a premiere voluminously documented as a fiasco although it was, in fact, a major musical triumph. Strangely,
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there are no known reports of audience reaction to any of the subsequent premiere performances.

According to Stravinsky, there were mild protests even during the quiet Introduction of The Rite. When the "Dance of the Adolescents" began, which Stravinsky later described as a group of "knock-kneed and long-braided Lolitas jumping up and down," the seething audience erupted into chaos. Critic André Capu denounced The Rite as "a colossal fraud," but Ravel called Stravinsky a genius. Camille Saint-Saëns, by then an arch-conservative, left the theater indignantly. Members of the audience beat upon each other. The Princesse de Pourtalès declared, "This is the first time that anyone dared to make a fool of me!" Roland-Manuel, French composer and critic, had the collar torn from his shirt for defending the music. Debussy pleaded with the audience to be silent and listen, but was shouted down. Later Puccini would call the music "the creation of a madman.

The Rite has since been seldom presented as a staged ballet; orchestral demands and the sheer complexity of stage movement are forbidding. In September 1987, after years of research, the Joffrey Ballet presented a production that returned as much as possible to the original 1913 sets, costumes, and choreography. Seen last year on PBS, it was a triumph.

Following the Paris premiere, Serge Koussevitzky conducted the work's first concert performance in Moscow in February 1914; two months later Monteux conducted it in Paris. Stokowski gave the American premiere at the Academy of Music in Philadelphia on March 3, 1922. Stravinsky himself didn't conduct it until February 28, 1926, with the Amsterdam Concertgebouw. Stokowski also conducted the first staged performance in the US on April 11, 1930, with new choreography by Massine; Martha Graham danced the sacrificial virgin.

From the start, The Rite of Spring has challenged orchestras and conductors. The meter changes nine times in the first 13 bars; throughout the score there are seldom more than a few bars in the same time signature. The final "Sacrificial Dance" changes meter 154 times in 275 measures! But The Rite is now presented practically as standard repertory. A survey by the American Symphony Orchestra League of larger American orchestras indicates that the 35 orchestras that responded to the inquiry scheduled The Rite 52 times in the last four seasons.

Stravinsky's score, with its rhythmic pulse, masses of sound, and dissonance, fits the barbaric subject. Any performance must reflect that tension and savagery. A placid Rite is a boring Rite; unfortunately, most recordings of it are boring.

The popularity of The Rite is reflected by the sheer number of recordings over the years. Many great performances in the past have long been out of print, and it remains puzzling that the famous first stereo version, by Ernest Ansermet and the Suisse Romande Orchestra, has not yet been reissued. But Mercury will soon reissue its vivid stereo version with Antal Dorati and the Minneapolis Symphony. Eduard van Beinum's 1946 recording with the Amsterdam Concertgebouw for London/Decca would make a welcome reissue, as would Ferenc Fricsay's with the RIAS Orchestra for DG.

The latest Schwann/Opus lists more than 30 recordings, four of which are keyboard versions. With the sudden flood of CDs on the market, inventory problems plus lessening consumer sales, and economically stressful times, many companies have deleted or are recoupling versions currently listed, reissuing them at lower price and with different couplings. Claudio Abbado's fine DG version, for example, has been withdrawn and is not currently scheduled for reissue. Herbert von Karajan's original CD of The Rite (coupled with Apollo) has been withdrawn and reissued at budget price coupled with Mussorgsky's Pictures at an Exhibition. One of the finest recordings, Karel Ancerl's with the Czech Philharmonic, has gone the way of all Japanese Denon/Supraphon CDs, but Czech Supraphon probably will reissue it.

Almost half of the CDs under consideration band The Rite properly, with a separate band for each of the 14 sections, but a majority provide only two bands, and several use indices instead of bands. This information can be found on the accompanying chart, which also gives other pertinent information about each recording. Boosey & Hawkes's score suggests a performance time of approximately 33 minutes. Stravinsky's 1929 recording took 32:47; his 1960 stereo version was 31:31. Others range from 31:25 (Monteux/BSO) to 37:44 (Goossens/LSO).

On the premise that any recording of The Rite should have more than a touch of barbaric
intensity, masterful orchestral playing, and complementary sonic quality, many currently available versions can be eliminated from serious consideration because they are deficient in one or more of these requirements. This group would include those by Daniel Barenboim, Dorati/Detroit, Sixten Ehrling, Goossens, Elahu Inbal, Rafael Frühbeck de Burgos, René Leibowitz, Charles Mackerras, Zubin Mehta, Seiji Ozawa, Simon Rattle, Gennady Rozhdestvensky, Essa-Pekka Salonen, and Yuri Temirkanov.

Pearl has recorded the first recordings ever made of The Rite of Spring; both have enormous historic interest. There was apparently some competition between the composer and Monteverdi to make the first recording. Stravinsky made his for French Columbia at the Théâtre des Champs-Élysées between May 7 and 10, 1929, and it was issued shortly thereafter. He'd given two concert performances in February 1928 with the Orchestre des Concerts Walter Stratham, founded in 1926 chiefly for playing contemporary music. For contractual reasons, however, this orchestra was identified on Stravinsky's recording as "Orchestre Symphonique." The Orchestre Symphonique de Paris was founded by Monteverdi in the fall of 1928;
Monteux conducted a concert performance of The Rite with them, and French Gramophon took advantage of this to make their recording. Although dates are not definitive, Monteux’s recording apparently was made either in late May or early June 1929, and issued early that summer, several months before Columbia issued Stravinsky’s. For contractual reasons, Monteux’s orchestra was called “Grand Orchestre Symphonique.”

In both recordings, the score’s challenges and pitfalls are obvious: each orchestra has problems coping with the notes and tempo changes, with sloppy attacks and releases, mistakes, and faulty intonation. Monteux’s performance, in spite of a shaky “Sacrificial Dance,” is clearly the better; Stravinsky eventually became a proficient conductor, but not until years later.

Stravinsky’s recording includes overlaps on many of the 78rpm sides, using a bit of what ended the previous side at the beginning of the next. Collectors at the time heard all of these repetitions and perhaps imagined this was the way the music was written. The overlaps have been skillfully removed on Pearl’s CD, and the filler is Stravinsky’s recording, with the same orchestra, of a suite from Firebird, recorded in November 1928. Pearl’s Monteux CD also has Stravinsky conducting an abbreviated version of Petrouchka from 1929.

Monteux never managed to record a definitive Rite. His stereo version with the Paris Conservatory Orchestra was poorly played; a live performance with the Boston Symphony has a demonic finale, but the orchestra was not in top form, nor is the sound particularly acceptable; and Monteux’s RCA studio recording with the BSO is better played, but sonically lightweight.

Anyone interested in The Rite must have Stravinsky’s 1960 stereo recording with the “Columbia Symphony Orchestra,” a hand-picked ensemble of the finest players. By this time Stravinsky knew how to get what he wanted from an orchestra: He is straightforward, but in many passages evokes a blazing intensity that eludes most other conductors. The essential demonic quality is there in abundance, and the sound is some of Columbia’s finest.

Pierre Boulez made a specialty of The Rite during the 1950s–60s, and a recording of it with the French National Orchestra won a Grand prix du disque. But his 1969 recording with the Cleveland Orchestra is much better played, and far better recorded.

Any discussion of The Rite must include Igor Markevitch’s recordings; his first commercial recording was an early ’50s mono HMV disk, followed by a vivid stereo recording in 1954 with the Philharmonia Orchestra, recently reissued in a 2-CD compilation of early Markevitch EMI recordings. Although the label states “mono,” this definitely is stereo, and easily one of the better recordings of the score. Also recommended is his 1982 live performance with the Suisse Romande Orchestra.

Karel Ancerl’s Rite with the Czech Philharmonic, originally issued on a budget-priced Parliament LP (PS 602), has long been a favorite of mine. It is an electric performance of great imagination, with carefully balanced orchestral textures and plenty of sound in climaxes. “Evocation of the ancestors” here is, for me, the most impressive of all readings of this brief interlude. Stravinsky’s timing is 0:44, Boulez and Colin Davis only 0:39; Ancerl is the slowest of all at 1:07, but what new light he sheds on these inspired pages, with smashing timpani and bass drum as bass clarinet, cellos, and doublebasses undergird an ominous stage on which we hear the rock-solid brass/woodwind chords. Another vivid point made by Ancerl is the dynamic punctuation of the timpani for 11 bars during “Glorification of the Chosen One” (beginning at 114 in B&H score). The score shows an accent (poco sf) on the first beat of each eighth-note group, but only Ancerl really brings this out. Some might feel it overdone, but there’s no question of the exhilarating effect.

Over the years I’ve heard Bernard Haitink and the Concertgebouw give superlative concert performances of The Rite. Unfortunately, Philips gives us a studio recording with the London Philharmonic. As usual on records, Haitink is precise and neat, but boring. The shallow Philips sound doesn’t help matters any.

Colin Davis’s recording with the Concertgebouw is magnificent; a refined reading perhaps, not as abandoned as I’d like, but impressingly majestic. Orchestral playing is spectacular, and the engineers have provided one of Philips’s finest sonic achievements with this orchestra—the sound is massive, warm, and spacious, with biting edge on brass and plenty of impact in percussion.
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Audio Advisor

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At CE Shows, Telarc's version with Lorin Maazel and the Cleveland Orchestra has been a perennial display piece, with its thunderous bass and wide dynamic range. But the conception is destroyed by Maazel's perverse treatment of the 11 pounding chords that precede "Glorification of the Chosen One" in Part II. This lethargic approach has no justification, and fails utterly to work.

Karajan recorded The Rite in 1964 and again in 1977. Of Karajan's first recording, Stravinsky wrote that it was "a pet savage rather than a real one," with a "tempo di hoochie-koochie" in the final dance. In the 1977 remake there's never a question of the Berlin Philharmonic's magnificence, but this overly romantic approach takes much of the edge off the score. There's no denying that the tam-tam, gong, and timpani smashes during "Spring Rounds" inspire awe; so do the trombone glissandi at the beginning of the final dance. Basically, though, Karajan is so intent on details that he tames the music; his is a gentle giant of a Rite. Karajan's 1977 version was issued on DG 423 211, coupled with Apollo, but this has been deleted. His 1964 recording, which provoked Stravinsky's comments, has been issued on their budget Musikfest series coupled with Pictures at an Exhibition.

Charles Dutoit's Montreal recording features typically realistic, wide-range Decca/London sonics. I assume the light textures are Dutoit's preferences rather than the engineers'. Dutoit generally is unimaginative, more effective in the two introductions than in the many big moments, which are undernourished; this is a placid Rite with a skimpy filler.

A Philadelphia Orchestra version conducted by Riccardo Muti is a virtuoso tour-de-force, splendidly played, but, as with almost all Philadelphia recordings of the last three decades, reproduction doesn't do this superb orchestra justice. EMI's sound lacks weight and impact; mas- siveness simply isn't there.

Sir Georg Solti's Chicago Symphony recording is spectacular; the Hungarian conductor seems possessed in an extraordinary performance with frenzied yet controlled playing. Kenneth Wilkinson engineered it, although even he had problems with the acoustics of Medinah Temple: horns are too distant, bass sometimes murky. Still, this is a powerhouse performance, brilliantly played. One would never suspect that the same orchestra heard in Solti's recording is the one led by Ozawa on RCA; the sonic quality is lackluster at best, the performance superficial.

One would have expected Leonard Bernstein to excel in The Rite, but such proves not to be the case, at least not on CD. His first recording, with the New York Philharmonic, has yet to be put to silver, although Schwann Opus lists it. The CD version actually is Bernstein's second recording, made in 1972 with the London Symphony during CBS's ill-fated quadraphonic days. There was nothing barbaric in the performance, and the sound is resonant mush, with little impact or clarity. Bernstein's third recording, for DG during live performances with the Israel Philharmonic ca 1982, is phlegmatic and antiseptically recorded. As typical during Bernstein's terminal decade, this is a drawn-out reading (37:02). Only Goossens, in a reading even more tedious, is longer (37:44).

Rozhdestvensky's recording on Nimbus can't be taken seriously; obviously there was insufficient rehearsal time, and the engineering is bass-heavy and murky. Rafael Frühbeck de Burgos made one of the better recordings of The Rite for Angel many years ago, but his recent Collins Classics CD is prosaic, and the congested, small-scale sound achieved by the engineers hardly suggests that Walthamstow Town Hall was the venue.

My first hearing of Riccardo Chailly's Rite with the Cleveland Orchestra was on a live radio broadcast. Shortly afterward they made this recording, but the drive that distinguished the live performance is missing. No question, however, that sonically this is one of the most impressive Rites on record. Fine sound can also be heard on Dorati's London recording from Detroit, but the high-voltage reading that distinguished his earlier Mercury recording in Minneapolis is absent here. Stanislav Skrowaczewski's recording with the same orchestra (now called the Minnesota Symphony) is among the finer versions. Initially issued on Moss Music Group, it is scheduled for reissue on one of their other labels.

Which to own? The composer's 1960 recording on CBS is essential, while those by Colin Davis/Concertgebouw, Boulez/Cleveland, Markevitch/Philharmonia, and Solti/Chicago are clearly superior to all of the others. And, if you can find a copy of the Ancerl/Czech Philharmonic version, this continues to be the most imaginative performance of all.

Stereophile, November 1991
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### Classical

**BEETHOVEN: Symphony 9**

Brigitte Poschner-Klebel, soprano; Margareta Hintermeier, alto; Robert Tear, tenor; Robert Lloyd, bass; Vienna Symphony, Eliahu Inbal

Denon 81757 66422 (CD only), Hiroshi Goto, eng.; Yoshiharu Kawaguchi, prod. DDD. TT: 68:31

Recorded at concerts that took place on December 30, 1989 and January 1, 1990, this 9 is contemporary with Bernstein's celebrated Berlin-Wall performance. In every way, it is superior. Free of mannerisms, taut but unhurried, and conveying the music's wide emotional range, Inbal's reading is similar to the distinguished 9s of Weingartner, Walter, Schmidt-Iserstedt, and Wand. The first movement may lack the cataclysmic legatos of Karajan's great recordings, the doomsday urgency of Toscanini's, and the metaphorical musings of Furtwängler's. But it is at once grand, intense, yet lyric, suggesting far better than many other accounts the inherent ambiguity in Beethoven's specification of *un poco maestoso.* And Inbal is especially successful in clarifying passages of crabbed polyphony that in lesser hands emerge as garbled hash. The second movement (both repeats observed) features sharply etched textures and wonderfully clear projection of Beethoven's three-against-two rhythmic counterpoint. Moreover, with tight, well-focused timpani but without the brass reinforcements favored by many conductors, it retains its demonic edge. Equally impressive is the great Adagio, sustained with just enough breadth to heighten its ethereal sense and to allow every note in its recapitulation to be clearly articulated, but never stretched to the point of sounding distended or sentimental.

As often happens, even in the finest performances, problems occur in the finale. The double-bass recitative is a bit blurred rhythmically, and the soloists are not always first-class. But of greater import, Inbal sees this grand cantata whole, fusing its contrasting sections and projecting the mystery, ecstasy, and joy that lie at its core. Significantly, too, he gives the closing *prestissimo* its due, avoiding the hysterical melodramatic frenzy lesser conductors permit.

Typical of many in-concert productions, Denon's engineering is refreshingly distant, the soloists sounding as if they are really in a big hall rather than in one's living room; timbres are true, string tone free of harshness. In short, a 9th that can take its place among preferred editions.

—Mortimer H. Frank

**BERLIOZ: Fantastic Symphony**

With Overtures: *Roman Carnival, Les Frères Juges*
This is Telarc's second CD of the Fantastic Symphony. The first (1982) featured Maazel with the Cleveland Orchestra, whose players recently offered a version under Dohnányi on Decca/London (reviewed September 1991, Vol.14 No.9). I mention this because Zinman's approach is to some extent different from the Hungarian's. Telarc's recording less solid than Maazel's, and it offers less impact, but it is not as empty as the Hungarian's. Overall, however, I feel a greater sense of immediacy, of rawness, in Zinman's performances.

I mention this because Zinman's approach is in many respects at the opposite pole from the Hungarian's, exhibiting less restraint for the Berlioz idiom and paying less attention to the symphony's more subtle, introvert aspects, while at the same time emphasizing the work's drama and dynamics. Zinman offers impressive climaxes in the last two movements and follows more closely than usual the score's occasionally extreme pianissimo markings. Regarding the latter, I confess to being caught off-guard at first by the barelly perceptible horn that, when it echoes the woodwind's repeated monotone motif (plus slide) near the beginning of the "Witches Sabbath." These eerie responses are duly marked ppp and pppp, and my only complaint would be that the second actually seems slightly less inaudible than the first! Also very effective is the genuinely offstage sound of the oboe as it answers the English horn at the start of the pastoral movement.

However, despite these positive points, and noting some fine orchestral playing and observance of the repeat in (i), Zinman's performance strikes me as, in the main, rather routine. The March, for instance, adopts a tempting (but inappropriate) briskness of tempo, and long stretches of (iii) verge on the tedious due to an absence of the loving attention to rhythmic shaping so notable from Dohnányi. The two overtures parallel the symphony in offering competent but in places rather oddly paced performances.

Sonically, Baltimore's Meyerhoff Hall sounds somewhat too small and/or unreverberant for this music, thereby adding a touch of hardness to some tuttis. But Telarc makes the best of the venue in accordance with their recording philosophy, avoiding the analytically immediate yet acoustically overblown sound which some companies would produce in such circumstances with close miking and added reverb. The bass in (v) adopt the usual octave-high pitches; but do I detect a faint gong, or something of that ilk, beneath them? Orchestral bass could perhaps be fuller, but the timpani offer a wonderfully crisp impact, the bass-drums are superb, and the big brass outbursts are very grandiose. Indeed, I guess that not a few stereophiles will ignore my musical reservations and pre-set their players to bludgeon friends with Satanic Selections from this CD.

—John Crabbe

CHOPIN: Piano Music
4 Ballades; Polonaise in F
def. Op.44; Fantasie-Polonaise, Op.61

Vlado Perlemuter, piano
Nimbus NJ 5209 (CD only). DDD: 57:11

CHOPIN: Piano Music
4 Ballades; Nocturne 20 in cf, Berceuse; Tarantelle; Andante Spianato & Grande Polonaise

Bernard d'Ascoli, piano
Nimbus NJ 5249 (CD only). DDD: 61:07

CHOPIN: 24 Etudes, Opp.10 & 25

Ronald Smith, piano
Nimbus NJ 5223 (CD only). DDD: 62:43

CHOPIN: Piano Music
Sonata 2; Nocturnes 5, 13, 18, & 20; Barcarolle; Scherzo 2

Mikhail Pletnev, piano
Virgin Classics VC.7 9073-2 (CD only). Mike Hatch, eng.; Andrew Keener, prod. DDD. TT: 68:10

As one might have expected, Vlado Perlemuter, now in his mid-80s, exhibits an older style of playing in his four Ballades and the two Polonaises. This can be heard in the occasional stressing of inner voices, but above all in the amount of romantic temperament displayed here. Yes, if one is looking for them, there are a few smudged passages, even some inconsequential wrong notes, and the pianist's fingers are not always able to achieve the degree of velocity required in this demanding music (though the difficult fourth Ballade is managed most effectively). There is much poetry and passion in his enjoyable playing of these works, which I find overall more idiomatically rendered than in Perlemuter's Preludes and selection of Nocturnes. Based on his turbulent Op.44 Polonaise, one might hope that he has recorded the remaining Polonaises. Nimbus's slightly echoey reproduction has the benefit of a full-bodied, uncluttered instrument.

Nimbus has provided even better sound for its other attractive recording of the Ballades, one in which there is both nice room presence and, surprisingly, a lack of exaggerated reverberation. The pianist in this case is the blind Frenchman, Bernard d'Ascoli, now just over 30. His technically admirable Ballades, rendered as though the pianist were actually telling a story, have the advantage of analystical sensitivity, finely graded dynamic shading, and great expressivity. Interestingly, they are interspersed by a variety of other pieces rather than played in numerical sequence, a novel and remarkably effective idea. It is an enjoyable compilation of repertoire, expertly performed in a straightforward, unecentric manner that at the same time is just fractionally reserved in its impetuosity.

Ronald Smith, the 68-year-old British pianist known for his advocacy of the music of Chopin's contemporary, Alkan, provides idiomatic,
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Stereophile, November 1991

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objective playing of the 24 Etudes of Opp.10 and 25 (could not the three extra ones have been accommodated?), often with considerable digital excitement. So far as emotional expression is concerned, in spite of some really impressive moments (for example, the histrionics of the Revolutionary Etude), the poetic elements tend to remain somewhat restricted; that the dynamics are monochromatic may be due to Nimbus's usual distant microphone placement, certainly of no help in providing the requisite pianistic color.

Mikhail Pletnev, Russian-born and 33 at this writing, impressed me greatly with his brilliant Virgin Classics recording of the Rachmaninoff Paganini Rhapsody and Concerto I. The Sonata 2 which opens his new Chopin album reveals the same arresting personality (perhaps Rachmaninoff-influenced?), a superb technique, wide dynamics, and, seemingly, an understanding of the character of each musical phrase. There are a great many awesome moments in this performance, but, as one hears the disc through, an equal number of times occur when the playing appears merely willful. Worse, no matter how poetic the intent, the distending of tempo and the choice of exceptionally slow speeds for slower passages (causing the second Scherzo, for instance, to time out at 11:04) cause one to pay more attention to the idiosyncratic exaggerations of the interpreter than to the thrust of the music itself. The piano, slightly distant and perhaps not the most glamorousounding instrument imaginable, nevertheless reproduces cleanly and with excellent perspective.

—Igor Kipnis

Furtwängler: Piano Concerto
David Lively, piano; Alfred Walter, Czech-Slovak State Philharmonic (Kosice)
Marco Polo 8.223333 (CD only). Rudolf Hentzel, Gejza Toperczky, prods. DDD. TT: 62:32
Furtwängler: Symphony 1
Alfred Walter, Czech-Slovak State Philharmonic (Kosice)
Marco Polo 8.223295 (CD only). Teije van Geest, Günther Appenheimer, prods. DDD. TT: 77:50

Marco Polo has dedicated itself to becoming the Neeme Järvi of record labels, recording works that no other company in its right mind would bother with. This has simultaneously won them the love of librarians, musicologists, and completists everywhere, and guaranteed that virtually none of their recordings will ever do much better than break even. It's evidently a labor of love; where else (and why else) would you find the complete works of Johann Strauss? The symphonies of Joachim Raff? Wagner's Kaisermarsch? Or the immense, brooding, difficult works of Wilhelm Furtwängler, a man much better known as a conductor?

In Vol.11 No.10 I recommended Alfred Wal-ter's performance of Furtwängler's turgid, toil- ing Symphony 3 as being of interest only as a historical oddity; a footnote to a great conduc-tor's career. Glumly listening for the first time to the very long first movements of the Piano Concerto and the Symphony 1, I was prepared in each case to repeat that huge qualification, if I reviewed the works at all. For here is music written as if the First World War had never hap-pened, but with all the High German Serious-ness of Brahms, Bruckner, and Mahler. Here is grand musical gesture without cultural follow-through, rhetoric without context, the lan-guage of a man at odds with the reigning musi-cal tongues of his times. The symphony seems a dead end, written in a doomed language by a man who no longer had the ears of his peers, or knew, as a composer, where he was. Through-out Symphony 1's Largo and the grim second-movement Scherzo: Allegro I heard a suffocat-ing loneliness almost too painful to bear, a lon-elessness never relieved, never resolved, never worked through, howsoever meticulously crafted. The whole reminded me of an excel-lent production of Parsifal staged as the Sec-ond Coming itself takes place just outside the theater's doors: unnecessary, redundant, and strangely, sadly pathetic.

Throughout Symphony 1 (1938–41), Bruck-ner and late Mahler are Furtwängler's strongest influences, Bruckner the easy victor. There's an uninspired doggedness to the first two movements, with little to surprise except for two wonderfully unexpected major cadences in the otherwise dark Scherzo.

The third-movement Adagio is far more satisfying—as it is so often in Bruckner as well. There's real emotional thrust here, even if it's more nostalgic than immediate. And again, Furtwängler made me laugh out loud when, after 18 minutes of harmonically complex minor-key storm & stress, he resolves on the simplest major chord. The Finale: Moderato assai is even better, with more of Furtwängler's sly, ecclesiastical cadential humor (!), solo horn passages reminiscent of the finale of Brahms 1, and a triumphant (if unimaginative) ending right out of early Mahler.

The Piano Concerto (1925–36) adds Russian romance to the mix; I kept thinking I was hearing Bruckner's Tenth with piano obbligato by Rachmaninoff. Except in the Adagio, the piano part seems hardly essential to this "Symphonic Concerto" obviously heavily informed by the concerti of Brahms. The long (32:00), opaque-ly scored first movement is built on an ominously ascending, open-keyed motif that climbs without hope of destination or resolution; there seems only dark at the top of these stairs. The Adagio occasionally possesses true serenity,
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peace, repose; a kind of heavy grace married to an astonishingly melting bittersweetness; of these two works, this single movement comprises the 12 minutes I will return to. The thanklessly dense piano writing of the final "Allegro moderato" further cements the impression of a Brahmsian symphonic concerto ghosted by Rachmaninoff, soloist and orchestra locked in a pitched battle more like protracted trench warfare than a brief, decisive battle. But after an hour of dark turmoil, the work ends quietly in a curious caress, endearing if exhausted.

All of Furtwängler's work that I've heard shares a strange, smothered, irredeemable hopelessness; little wonder it never caught on. His work is not tragic, but constitutes tragedy in and of itself. (The distinction is as important as that between an actor brilliantly playing the role of a boring character, and a merely boring performance.)

I don't mean to be cruel; Furtwängler's considerable feeling, craft, and very blood are evident in every minute of these works. But I recommend these discs only to hard-core collectors of big, splashy, heavy, post-romantic music, for this is the stuff in its paradoxically most generic, most indiosyncratic form, full of empty (if sincere) piano and orchestral rhetoric. Ultimately the orchestra is not facile in Furtwängler's hands. Nor was it in Bruckner's, but Bruckner didn't care. Furtwängler obviously did: his woodwind writing, as in the Piano Concerto, is careful and interesting, but almost always unnecessary. Like Howard Hughes's Spruce Goose, these immense birds eventually do get airborne, but only just—Furtwängler can barely transcend his own raw materials.

But who knows how the Symphony might have sounded under Bernstein, Inbal, Jochum, Karajan, Klemperer, or Furtwängler himself? Alfred Walter and the CSSPO do a decent enough job with your standard 1½-hour, post-romantic, encompass-the-world symphony, but they're hardly a world-class team and are plagued by string ensemble problems. The sound is dry and not very lively, which adds to the general stuffiness. Playing and sound are considerably improved on the Piano Concerto, Walter and orchestra perhaps now more familiar with, more sympathetic to Furtwängler's idiom. David Lively attacks the dense score with an intensity and gusto that take the work perhaps more seriously than it deserves; I'd love to hear him in established repertory—like (surprise) Brahms or Rachmaninoff.

A tough call: these works are intermittently interesting and moving in their own brooding, phlegmatic way, but erratic, unbalanced, neither inspired nor inspiring, and hardly cathartic. But both are better than Symphony 3.

—Richard Lehnert

| GIBBONS: Cries and Fancies |
| Fantasies, In Nomines, Cries of London |
| Fretwork, viols consort; Red Byrd, vocal ensemble; Paul Nicholson, organ |
| Virgin Classics VC 7 90849-2 (CD only). Roy Mowatt, prod.; Tim Handley, eng. DDD. TT: 68:23 |

Orlando Gibbons (1583–1625) is best known as an organist and composer of keyboard works; here we have some of his less-recorded pieces, including four remarkable six-part fantasies, a beautiful In Nomine à 4, and three inventive fantasies for the "Great Double Base" which will give your woofer a workout. Along with these (and others) are the Cries of London, an imaginative setting of street cries arranged around the In Nomine tenor. Compositions which include such street cries are not unusual in the Renaissance—they constitute, in fact, a sort of sub-genre—but Gibbons's contribution is unique in being based on a melody usually reserved for more serious subjects. In any event, this is an excellent representative selection of Gibbons's writing for viols; if for no other reason, it can be confidently recommended.

Fretwork is an ensemble which appears to get better with each successive recording. Here they play with warm tone, accurate ensemble, and deep sympathy for their material. Paul Nicholson has worked with Fretwork before; his playing is once again sensitive and articulate, both solo and providing the ground for a number of the consort works. (He plays on far more tracks than credited.) The vocalists of Red Byrd have great fun with the Cries, and their stage accents fit better than most I've heard.

Sonically, this is another Virginal success. (Why don't they record Trevor Pinnock or someone on virginals, so I can say things like "the virginal version on Virgin?"") Balance is about perfect, and the impact of that "Great Double Base" can truly be felt. It will be a good test of your system to hear whether the sound of the bass can be easily distinguished from that of the lowest organ pipes. (Incidentally, I probably should say that this is one of the noisiest organs on records—mechanical tracking with a vengeance.) I should also issue some kind of Audiophile Alert: the Cries of London tracks are as good a soundstaging demonstration as you will find on record. Precisely placed voices appear every where from slightly in front of the plane of my Vandersteens to somewhere in the next room. On most recordings, this would be unnatural and annoying; here it is just plain fun.

—Les Berkley
This work, whether in German or English (it was originally set to an English libretto presumably for Handel, who never used it; it was then translated into German and, some believe, translated back again), has always been popular. Haydn had been overwhelmed in London in 1791 by performances of some of Handel’s works at Westminster Abbey in which 100 (!) performers took part, and was hot to compose something big in English. The Creation was an instantaneous hit at its first performances at Prince Schwarzenberg’s palace at the end of April 1798. By the time of its first public performance in Vienna a year later, the size of the orchestral and vocal forces had grown from an already abnormally large (for its time) number to a gargantuan 120 instrumentalists and “60 to 80” singers. Haydn had, essentially, out-Handeled Handel.

Before this current spate of recordings, The Creation (or Die Schöpfung) had appeared on discs over 30 times. One would think that in any way other than sonically these four new interpretations might therefore be redundant, but one would be wrong. With one exception, all are important readings, and Christopher Hogwood’s is sui generis and therefore crucial in its own way.

Hogwood’s comes close to duplicating, in every way possible, one of the “big” early-19th-century performances. The instruments are authentic (pitch is, happily, A = 440), the seating plan is the same as was used in 1808 (an oil painting and notes of the occasion have been used for guidance), and the forces are enormous: 18 each of first and second violins, 12 each of violas, celli, and double basses, 6 each of flutes, oboes, and bassoons, a con-trabassoon, 6 horns, 4 trumpets, 5 trombones, two sets of tympani, and a fortepiano. (The prospect of such large forces on modern instruments is nauseating.) They, along with the large chorus, make a grand, bright, crisp sound, well-captured by the L’Oiseau-Lyre engineers. The tympani thwap, the winds are reedy, the strings glisten, the brasses blare. You’ll find it necessary to turn up the volume, but otherwise the engineering job, in the face of some real adversity, is splendid. So is the performance.

Hogwood’s pacing is ideal for instruments with such short decay times, and though quick, he never misses a telling moment. The sheer majesty of utterance, say, in “In splendor bright is rising now the sun,” is remarkable, and here, as elsewhere, Anthony Rolfe Johnson is exemplary. Emma Kirkby is her usual luscious self, although she lacks some of the allure required for Eve’s less ethereal statements. Michael George is impressive as Raphael and Adam. There are embellishments galore, by the way, and not everyone will agree with them. As suggested, the recording, after the boost, is terrific, although in none of these four releases is the madcap coloratura of tenor and soprano audible in the fabulous “The Lord is great.” I recommend this without hesitation; it’s a new and wonderful experience.

Sir Neville Marriner’s reading, in German, is also worthy. This may not be the most exciting of the four performances, but it is the most natural. The recording is richer than it is bright (the Hogwood, it could be said, is the other way around), and it nicely suits Marriner’s way with tone painting; the “foaming billows” are practically visible here. The instruments are modern but the touch is light, particularly in the airy strings. Rootering delivers Raphael’s recitatives with great drama, although he has some pitch problems with a aria or two. Barbara Bonney is an exquisite Gabriel, and Edith Wiens and Olaf Bär make a very sensual Adam and Eve. (Oddly, theirs is the only music which is embellished—a nice touch, announcing that Man and Woman will go their own ways.) Hans Peter Blochwitz’s career continues to amaze me—this is a vaguely sweet voice with one decent octave in it, nothing more. Chorus and orchestra are impressive. This is a fine outing; I just can’t get as thrilled over it as I can over others.

Simon Rattle’s English performance comes close to being a lemon. It starts 20 seconds into the disc—are the engineers keeping us in suspense?—and throughout there are fakeries: the majestic moments are puffed up and grate on the nerves, while the embellishments are polite enough to try to pass for “proper.” David Thomas sounds like an old oratorio singer, with
over-pronounced words, and Augér sounds uncomfortable and breathy, and is not helped by the close miking. Philip Langridge is good (his “In native worth” is very handsome), but Rolfe Johnson, above, has a more natural grace. The orchestra and chorus sound uninvolved. I wonder what it took to make Rattle so uninterested.

DG’s new set is glorious. It’s the opposite of “authentic,” but it works. Sung in German, it’s hugely grand (look at the timings), but never gets bogged down in Romantic mire. Levine reads every nuance, paints every picture, and relishes every dissonance. There are no embellishments; this is serious business.

The three soloists almost fit the approach. Battle’s voice, ideally, should be larger, but her perfect focus makes up for the lack of breadth. And her sound qua sound is out of this world. Gösta Winbergh has the perfect voice for this music: warm, light, and capable of great exclamation and fluidity. Kurt Moll is a bit too cavernous at times, but he can lighten up when he has to. The Swedish choruses are spectacular, and so is the Berlin Philharmonic. The recording is the loudest and deepest of the four—the tympani will knock your socks off. Like the Hogwood, it’s a perfect marriage of musical and technical approach.

The Levine and Hogwood are must-haves, for their differences, and the Marriner is sure to please. Forget the Rattle. —Robert Levine

HINDEMITH: Die Harmonie der Welt, Pittsburgh Symphony
Herbert Kegel, Dresden Philharmonic

Often when little-known works by well-known composers are revived, scrutiny reveals the neglect to have been justified. In the case of this recording, we may have to rethink that premise, at least with regard to Die Harmonie der Welt.

The three-movement symphony follows in the footsteps of Mathis der Maler—symphonic music from an opera—but in reverse: the symphony was completed first, in 1951, the opera in 1957. The maturity of Hindemith’s career as a composer could be framed by Mathis and Harmonie, works in which he sought to embody the highest qualities of Germany’s cultural and philosophical heritage, in stark opposition to the very lowest elements which had taken power during the ’30s, and driven him into exile.

The subject of Harmonie was nothing less than the life and times of astronomer Johannes Kepler. It was under the Latin title, Harmonices Mundi, that Kepler published his third law of planetary motion in 1619. The German title of Hindemith’s work has been translated into English, not literally, but evocatively as The Harmony of the Universe. The opera has had a few productions in Germany, though it would seem that any company of international status which can mount Wozzeck, Billy Budd, Dialogue of the Carmelites, or A Quiet Place should give this one a shot.

Though less labor-intensive, the Symphony is rarely programmed, but has appeared in two recordings led by the composer: a 1954 DG mono with the Berlin Philharmonic, and a rather bogus-appearing Everest fake stereo with the “Festival Orchestra.” The DG, distributed in the US during the ’50s on the American Decca label, is a sturdy, competent performance, about which more could possibly be revealed if DG were to reissue it on CD, as they did with PH’s Greatest Hits a while back. Leave the hideous-sounding fake stereo Everest in the cut-out bin. One of the most interesting recordings of the piece was a live performance from the Great Hall at Moscow Conservatory, 1963, by the Leningrad Philharmonic under Evgeny Mravinsky. The orchestra’s style was not idiomatic, and Hindemith’s haunting modulations and organlike sonorities were seriously undermined by horrendous intonation problems in the low brass. Even so, it was Mravinsky, on this rare Soviet Melodiya stereo LP, who defined this piece, and set a standard for other conductors to follow. A Fonit Cetra CD features a 1954 Salzburg Festival performance in which the VPO reverses the legendary saw and plays like a village band for Furtwängler. A.S. Disc has the 1954 CBS American broadcast premiere by Mitropoulos/NYPO, an edge-of-your-seat performance, but in very poor sound.

Now, thanks to those great folks at Ars Vivendi (the new German heirs to the old DDR’s VEB Schallplatten), we don’t have to put up with bad sound or faulty playing in order to hear this music. Any major label would be proud to have a recording such as this in their catalog. The performance by Kegel/DP provides all of the elegant, sturdy idiomatic style of Hindemith’s own BPO recording, with a very close measure of the energy and spirit of the Mravinsky. The sound, from a production taped at Dresden’s Lucas Kirche, is ideal in terms of space, detail, texture, and dynamic, all of which will aid in our appreciation of this virtually unknown work, a tour de force of orchestral and formal mastery, and a valedictory statement from a leading 20th-century composer.

All that said, Pittsburgh Symphony, commissioned for that city’s bicentennial in 1959, may well come as an anticlimax. Premiered by the PSO under Hindemith in 1959, this is its first recording. One of Hindemith’s busiest pieces,
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it seems to contain numerous highly advanced formal and orchestral challenges, as though the veteran musician were attempting with all his might to surpass himself. It must be borne in mind that his greatest works, certainly, and especially Harmonie, were behind him. Hindemith was embarked upon what was becoming a substantial and important conducting career, and was composing less. After pondering the many layers of Die Harmonie der Welt, Pittsburgh Symphony unhappily seems hardly more than a study in rhubarb counterpart.

There is at least one highly enjoyable episode, a variation setting in the second half of the second movement of the Pennsylvanla Dutch tune “Hab luminumwewel mit me lumbeschatt,” along the lines of the Turandot Scherzo from Symphonic Metamorphoses, but with style all its own. Otherwise, Hindemith fulfilled his commission but seems to have had very little to say.

Harmonie alone is more than worth the price of this disc. In addition to audiophiles, this recording deserves to be heard by musicians, most especially conductors, concert managers, and orchestra board members, who should be encouraged to add Die Harmonie der Welt to the performance repertoire.

—Richard Schneider

MAHLER: Symphony 6
Evgeni Svetlanov, USSR Academic Symphony Orchestra
Arts & Electronics AED-10206 (2 CDs only). Vaidam Ivanov, Vladimir Schuster, engs. DDD. TT: 79:59

MAHLER: Symphony 6, Lieder eines fahrenden Gesellen
Jessye Norman, soprano; Bernard Haitink, Berlin Philharmonic
Philips 426 257-2 (2 CDs only). Cees Heijkoop, Willem van Leeuwen, engs.; Volker Strauss, prod. DDD. TT: 103:06

My cynical side takes note that these are the fourth and fifth new Mahler Sixths to cross my disc player in less than a year. (My cynical side is named Nick. A quantitative sort, Nick perches on my right shoulder, the better to converse with my left brain.) Nick points out that cracking out Mahler performances like Ninja Turtle cartoons will hardly correct past neglect, can only compound the error by trivializing the terrible vision this symphony can reveal in a really special performance.

By the numbers, Nick is of course right. But sometimes he mouths off before listening carefully. He ignores the two among those five recordings that are special, forgetting Bernstein’s apocalyptic account from Vienna, and also this Svetlanov, recorded at a Moscow concert in December 1989, which is pretty terrific.

The Russian musicians play their hearts out in a forthright performance. It lacks the ambition of Horenstein’s, or of either of Bernstein’s, all of which are filled with apprehension of our schizophrenic century. Thus Svetlanov’s rhythms in the Scherzo are less diabolically eccentric, played more as a straight three-beat. Svetlanov makes up for this with his ardency: when the drums beat out the “fate” motif in the first movement, they wall on the skin’s like it really means something. An unashamedly sentimental recap of the “Alma” theme closes the movement, making the contrast all the more chilling with the skeletal woodwinds and xylophone of that Scherzo, Svetlanov conducting it with a deceptively light and fast, thoroughly evil touch. (He may conduct this movement a little too fast—my one substantive criticism of his splendid performance.) Svetlanov and orchestra are at their best in their romantic reading of the Adagietto, playing with a rich, Eastern European vibrato on strings and brass. No isolated interlude, this movement is clearly linked to the rest of the interpretation in defining a protagonist who is anything but a world-weary 20th-century neurotic, who passionately loves life and clings to it with every scrap of energy. Tragedy here is born of human suffering, not historical abstraction.

When the last, heavy notes died away to close the record, I was left with the feeling of having heard musicians who, remarkably, are not jaded about Mahler’s music, who can still embody the composer’s ideal of heroism without imposing their own irony. Sincerity is a quality we often distrust (remember, we elected Reagan over Carter). But sincere is exactly what Svetlanov’s reading is.

The recording can better be described as detailed than atmospheric—you can hear every violinist’s bow go “wooh-wooh” on the tremolos of the “cloud” motif after cue 21 in the first movement. Drummers and timpanists make great noises, but the last-movement hammer is a bit of a dud. Soundstage is flat: myopic audiophiles need not apply. A&E’s packaging is a bit stingy: it is no longer acceptable to offer this symphony on two discs without a fill-up work.

But it’s worse to include an inappropriate fill-up, as Philips has by appending the Wayfarer songs to Haitink’s new Sixth. The engineers compound the error by inflating Jessye Norman’s voice to absurd proportion atop an already outsized (and apparently separately recorded) orchestra. Big, beautiful voice, big conducting; wrongheaded overinterpretation of Mahler’s youthful material.

Haitink and the Berliners play the symphony with astonishing execution. The strings are a velvet-gloved dynamo compared to Svetlanov’s Russians; the German brass could blow their counterparts off the stage. But, despite making

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all the right moves, Haitink leaves me with no trace of the effect I get from the Russian disc.

If you've read my reviews of the two previous issues in Haitink's new Mahler cycle,1 you know how I feel about his approach, so there's little need to go on. The Gramophone crew will no doubt hold true to form and praise him for his refinement, even if they won't like this as much as the Karajan. I see that refinement is all right in its place, but here its pursuit utterly robs the music of meaning.

As for sound, the good news is that these Philips CDs are not nearly as annoying as earlier digital copies of that source. The bad news is that they sound as undifferentiated as Philips analogs once did. (I believe it was a TAS writer—can't remember who—who compared Philips's analog sound to chocolate syrup.) If the music were different, this might make a good sleep aid. But making a lullaby of Mahler 6 is sorta like making a domestic comedy of Arnold's Terminator.

So Haitink provides a sop for my cynical side, the unnecessary Mahler record Nick was expecting. My advice is to ignore Nick and consider the Svetlanov for your shelf as a second version to Bernstein, Bernstein, or Horenstein.

—Kevin Conklin

MENDELSSOHN: Symphonies 3 & 4
Roger Norrington, The London Classical players
EMI 7 54000 2 (CD only); Mike Clements, eng.; David R. Murray, prod. DDD. TT: 64:34

Although not without shortcomings, these performances, in their prevailing musicality, stand among Norrington's finest efforts in the studio. Tempos are generally well judged, and with an ensemble supported here by six double-basses, textures are clear, timbres colorful. But the sonority, in contrast to that in many of his other recordings, does not spill over into tasteless garishness, the brass having become more refined, the strings, if still purged of vibrato, lacking the unpleasant nasality they had in Norrington's Beethoven.

Of the two symphonies featured here, 4 is the more successful. Indeed, were it not for a gratuitous accelerando in its first-movement coda that produces a rhythmic whiplash far removed from the piu animato poco a poco specified by Mendelssohn, this performance might rank with the best, notably those of Szell (CBS) and Karajan (DG). Norrington's approach is vibrant but unhurried and, when appropriate, touchingly lyrical. Gorgeously recorded without a trace of harshness, it is far preferable to the other period-instrument edition featuring the Hanover Band (Nimbus).

In 3, Norrington is less convincing. His tempos, to be sure, remain well-chosen and aptly animated, but he is somewhat inept in integrating the modifications of the basic pulse that Mendelssohn calls for, modifications that Karajan, for example, effects with far greater smoothness. Also, the sound in this symphony is a bit harsher and more boxy than in 4. Defects notwithstanding, this release augurs well for Norrington's growth as an artist. All exposition repeats are observed. The enclosed booklet is marred by one page of notes intended for Norrington's recording of Beethoven 7.

—Mortimer H. Frank

MOZART: Symphonies 28, K.200; 29, K.201; 34, K.334
Sir Colin Davis, Dresden State Orchestra
Philips 426 236-2 (CD only). Cees Heijkoop, eng.; Volker Strauss, prod. DDD. TT: 66:59

In a career that has spanned about three decades, Sir Colin Davis has gained recognition as one of our foremost Mozart interpreters. It is therefore unfortunate that his new recording of K.334 comes at a time when his readings seem to be veering with increasing frequency toward a ruminative, even occasionally stodgy style. This is certainly not a bad performance, but it is just a bit too polite and restrained, failing to capture the music's vibrant, festive spirit. Granted, the hall, which shrouds the orchestra in a soft-focus, detail-blurring resonance, may be partly responsible for neutralizing the color of Mozart's writing for trumpets and drums. But Davis simply does not dig into the score with the kind of zest displayed by such eminent Mozarteans as Beecham (in a newly reissued EMI transfer of a magnificent pre-World War II recording) and Szell (in a stirring account with the Concertgebouw Orchestra that was superbly recorded and has been reposing far too long in the Philips vaults). Only in the beautifully balanced, touchingly sung slow movement does Davis show the kind of stylistics that one has come to expect of his Mozart.

The two earlier works—here receiving their first CD release—were produced in 1982 and issued on LP. Both embody remakes, this K.200 being Davis's second recording of the score, the K.201 his third. The former is especially distinguished: crisply executed, judiciously balanced, and phrased so as to convey all of the music's sparkle and wit. In contrast, K.201, though boasting some lovely cantabile phrasing, lacks the liveliness that stamped the conductor's two earlier recordings of the music, themselves more relaxed and expansive than what one usually encounters. Still, this latest version will appeal to those favoring a gentle, gemütlich approach to the work. Those prefer-

1 Symphony 1, Vol.12 No.5; Symphony 5, Vol.13 No.6.
ring more intensity, with crisper allegros, should investigate Levine's accounts of all three scores. And perhaps before too long Phillips will recognize that the Szell K.334, for my money one of the finest Mozart orchestral recordings of this century, should be returned to circulation.

—Mortimer H. Frank

MUSSORGSKY/RAVEL: Pictures at an Exhibition STRAVINSKY: Pétrouchka
Claudio Abbado, London Symphony Orchestra DG 423 901-2 (CD only), Klaus Hiemann, eng.; Rainer Brock, prod. DDD. TT: 67:38
MUSSORGSKY/RAVEL: Pictures at an Exhibition STRAVINSKY: Firebird Suite
Carlo Maria Giulini; Berlin Philharmonic (Pictures), Royal Concertgebouw (Firebird)
Sony Classical SK 45935 (CD only), Michael Shady, eng. (Pictures); Andreas Neubrunner, eng. (Firebird); David Mottley, prod. DDD. TT: 60:32

The recordings of Mussorgsky's Pictures at an Exhibition (Ravel orchestration) that I find most rewarding are invariably those with the shortest running times. So it came as no surprise, after listening to these renditions by Abbado and Giulini, to find that the former was nearly three and a half minutes shorter than the latter. I preferred the Abbado by a similarly comfortable margin.

Abbado's work ranks with readings by Mehta and the Los Angeles Philharmonic (London LP) and Szell with the Cleveland Orchestra (Columbia Odyssey LP) as among the most compelling and incisive I've heard. And, yes, among the shortest. I know it's not popular, in this country at least, to consider Mehta as having produced the definitive version of anything, but I often feel he is not given his due. His Pictures remains the most picturesque and keenly shaped performance I've heard. Abbado, in this 1981 recording, is very much in the same league, and in some ways puts an even finer accent on the remarkably rich composition.

For instance, in the "Gnomus" section, the descending violin portamenti are boldly prominent, lagging just a hair behind the rhythm to add a chilling, otherworldly feel. The small accelerandi between the introductory two-note phrases in "Tuileries" bring out an impish impetuosity missing in other realizations of the score. Also, the delicate dynamic shading of the "Ballet of the Chicks" imparts a childlike bashfulness that is unusual but entirely appropriate. These are just a few examples of the subtle originality throughout Abbado's reading. The overall momentum of the piece is never lost, and each phrase seems to arise causa sui from the extraordinarily transparent orchestral textures.

Giulini's view of the piece is more ponderous and sanctimonious. The slow pace produces an enervated, sometimes directionless feel to the phrasings. Indeed, "Bydlo" sounds as though it is about to go into a halit through its own drowsy inertia. "Baba Yaga" lacks virtually any trace of momentum as it leads to the transition to the "Great Gate at Kiev," which itself almost becomes a parody in its laggard pomposity. The reading's high point is the spellbinding tranquility of "With the Dead in a Dead Language," but this is too small a gem to overcome the dullness of the whole.

The complement to Abbado's Pictures is his robust Pétrouchka. Along with a marvelous realization of Stravinsky's rhythmic effects is the same sharp sense of contrast found in Pictures. The waltz of the Moor and the Ballerina is especially noteworthy for its poignant mix of delicacy and sinister undercurrents.

Giulini's Firebird Suite is a bit more satisfying than his Pictures, though here again, I find the melodic lines to carry better when framed in a faster tempo. The reading is lushly romantic and on the whole fulfilling, except when it leads to an aura of false luxuriance, as it often does.

It's unfortunate that the disc with the better music has the worse sound. Abbado's work was recorded in 1981, the early days of digital, and suffers from a slightly shrill cast, though not to an ear-frying degree. Nicely detailed, though without much hall ambience, the orchestra benefits from the vividness. But things go just slightly over the edge with an occasional high-violin screech and trumpet glare. Giulini's Berlin and Concertgebouw orchestras both benefit from a superb combination of direct sound and mid-hall ambient perspective. The sound is slightly warm but still transparent, with admirable spaciousness and depth of image.

The rather bright sound of the Abbado DG disc in no way detracts from my overall preference for it. Just as the superior sonics of the Sony Giulini recording do not make up for what I believe to be comparatively weak performances.

—Robert Hesson

SIMPSON: String Quartet 9
Delmé String Quartet
Hyperion CDA66127 (CD only), Antony Howell, eng.; Robert Simpson, prod. DDD. TT: 57:49

No matter how revered composer Robert Simpson is in England, I still approached this work with some doubt when I realized that it was based on what could so easily be seen as a gimmick, let alone a certain amount of compositional scaffolding: the hour-long piece is a set of 32 variations and a fugue on the palindromic minuet theme from Haydn's Symphony 47. As if this weren't enough, each of Simpson's variations is a palindrome in itself. This seems, of
course, all too easy—just compose the first half of the variation, then write it out again backwards. The problem is it has to sound good, too, and the turning point in the middle mustn't be too obvious. Well . . . Simpson has done a remarkable job. The work progresses, is absorbing, and is full of invention. And the Delmé plays it as if they know it back to front!

The players actually approached Simpson for this work, commissioning him to write a piece to celebrate their 20th anniversary in 1982. As that year was also the 250th anniversary of Haydn's birth, Simpson responded with a work that would celebrate both occasions. This recording demonstrates the skill of both composer and performers to grasp the nettle and produce a powerful and lengthy musical statement that never once allows imagination or interest to flag. The recording could be considered just a touch too forthright for the genre, but this fine work demands attention.

—Barbara Jahn

TCHAIKOVSKY: Symphony 5, Romeo & Juliet
Leonard Bernstein, New York Philharmonic

TCHAIKOVSKY: Symphony 5
KODÁLY: Háry János Suite
Rafaél Frühbeck de Burgos, London Symphony
Nimbus NI 5194 (CD only). DDD. TT: 69:34

TCHAIKOVSKY: Symphony 5
BLACHER: Orchestervariationen, Op. 26
Elisha Inbal, Radio-Sinfonie-Orchester Frankfurt
Denon 81757 6364-2 (CD only). Detlev Kittler, eng.: Yoshiharu Kawaguchi, prod. DDD. TT: 60:30

In my role as an instrumental teacher, I'm constantly advising my pupils that it is not enough to give an accurate, safe performance. Something, even if only a spark of originality, is necessary in the opening bars of any piece to capture an audience's attention and keep it. Once two-way communication has been established, then there is every possibility that a performance will catch light and burn with relentless intensity. A comparison of the three recordings here supports that view perfectly.

Maybe Bernstein has an advantage from the outset—his recordings were made live (from the Avery Fisher Hall), and there can be no question that he was one conductor who definitely played to his audience. But Inbal and Burgos appear to be playing out too, doing very little wrong, and certainly taking nothing like the number of liberties with the score that Bernstein does. And yet their very qualities are at the root of their downfall; their middle-of-the-road readings really should upset nobody, and yet are unlikely to provoke great enthusiasm either.

Burgos doesn't even go in for those excesses that have now become tradition in this Symphony: the unmarked slowing of tempo at the bridge passage in the first movement, the unabashed wallowing in second-subject material, etc. Rather, his performance searches out balletic tendencies and thus favors lifting rhythms and legato phrases. In terms of Nimbus's recording, all goes well until the final chord of the third movement, where a brass gaff remains unedited. Worse still is the sudden fade and distancing of the Finale's recapitulation, which successfully bleaches out previous, attractive recording color. The effect is too unpleasant to be reconciled by a genial performance of Kodály's Háry János Suite.

Inbal's reading for Denon is more exciting and gutsy, but his orchestra is not first-rate: it doesn't always display perfect coordination, and string tone is raw at climaxes. And although the brass section is big and powerful, it overpowers the ineffectual woodwinds. Blacher's Paganini Variations are competently played, but I can't help feeling that they are a strange, if not restless, bedfellow for the Symphony.

What ultimately ruins Inbal's performance for me is the disconcerting manner he has of creating hiatuses mid-phrase: he sets a theme going at a steady pace and then, quite unexpectedly, brings it to its knees in a manner that, aurally, takes a few seconds to comprehend. By contrast, Bernstein, having set a tempo, albeit an extreme one more often than not, will make ebb and flow within phrases totally natural. Predictably, Andante introductions are extremely slow, dark, and weighty, expositions are fast and explosive, and the moderato assai after the G.P of the Finale's codetta, for example, is milked to the last drop. But it all works; it's exciting and, most of all, enthralling. The NYPO string sound is quite sumptuous too; in fact, the entire orchestra is outstanding. With a predictably stormy, heart-rending Romeo & Juliet, this disc is the one to consider.

—Barbara Jahn

Classical Collections

ENSEMBLE ALCATRAZ: Dance Royale
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Elektra Nonesuch 79240-2 (CD only). Peter Clancy, prod.; Jack Vad, eng. DDD. TT: 52:12

There would definitely appear to be an “American School” of early-music performance; it eschews the unaccompanied style of English groups like the Gothic Voices while at the same time avoiding the over-embellishment com-
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mon to folks like the Clemencic Consort. This is a horrible oversimplification, of course, but groups like Ensemble Pan, the Folger Consort, and the present Ensemble Alcatraz (from Old Spanish Alcatraz, "pelican," or so they say) do seem to share some stylistic elements. There's no way to know which is right, or indeed if any modern performance approximates a medieval one, but this certainly sounds right. (In fairness, the other groups I mentioned also sound right on a great deal of material.)

Susan Rode Morris's remarkable voice is the linchpin of Ensemble Alcatraz's seamless blend of sound. The liner notes indicate that they've been touring together for some time, and I can easily believe it. This collection of music from the Courtly Love tradition is not "accessible" in the usual sense, but the inmates of Alcatraz put it across with charming directness without compromises to the supposed taste of "modern ears." Even the mysterious track entitled "DS II:11," which would seem to be an improvisation on medieval themes, is more than a mere attempt at cleverness. This is one of the most effective and affecting performances of medieval music I have heard, and Morris is a genuine find.

The sound on this CD is as transparent as the performance, which is saying a good deal. The notes say it was edited on the Studer Dyaxis system, which sounds damn good for a digital editor. The Dyaxis allegedly allows for a great deal of digital manipulation; if there is any, I don't hear it. I do hear a realistic representation of musicians in a real space; if it's not up with the very best of analog, it's not at all far behind, and for sheer timbral accuracy it equals all but a couple of LPs I've heard. And I haven't got the Processor of the Week either.

Dance Royale is one of those recordings that opens a window on a past age. The fact that there are more and more such being released makes this one no less special. Highly recommended for lovers of the Middle Ages and audiophile alike.

—Les Berkley

IGNACE PADEREWSKI PLAYS
Works by Beethoven, Schubert-Liszt, Liszt, Debussy, Mendelssohn, Wagner-Liszt
Ignace Jan Paderewski, piano
Klavier KCD-110108 (CD only). Keith Johnson, eng.; Bruce Leek, digital production; Harold L. Powell, prod. ADD. TT: 46:36

In the teens and twenties of this century, Paderewski made about 30 piano rolls for the Duo Art company, including the ten selections contained here. I mention this with some emphasis, for nowhere is any information provided that the sources contained here are rolls rather than disc recordings, neither in the album, label copy, or in the purplish prose of the booklet annotations. With all the caveats that prospective listeners must be aware of with regard to the medium of the reproducing piano, it can be admitted that there is in fact some very impressive playing to be heard here, including an exceptionally stimulating Second Hungarian Rhapsody of Liszt, in which the usual rhythmical barnacles attached to roll reproductions are not evident. Thus one might be surprised that there is little lumpiness, pedaling that is not obfuscated, and dynamics that reveal considerably more than just monochrome.

Yet, especially in the first and last pieces of the program, the "Moonlight" Sonata and the Wagnér-Liszt Liebestod, there are defects that must be pointed out. The opening movement of the Beethoven reveals some mechanism problems in the reproducing piano, some notes sounding as though the hammers were not striking or repeating correctly. Furthermore, the duration of that first movement is a few seconds over four minutes, rather overfast especially when one compares it with the Pearl recording of the 78 disc version, playing for 4:55 and recorded at the same time (1926). Both the opening and closing selections feature notes that poke out too loudly at times, but throughout all the disc there is also some very soft distortion, a kind of buzzing or shattering sound that may indeed be the fault of the piano or the quality of the rolls. I rather suspect that it could be the actual sound of the reproducing mechanism, which admittedly can contribute noise. In any case, it is one valid reason why this release cannot receive wholehearted endorsement.

—Igor Kipnis

Show Music

MICHAEL FEINSTEIN Sings the Burton Lane Songbook, Vol. I
Michael Feinstein, vocals; Burton Lane, piano
Elektra Nonesuch 79243-2 (CD only). Robert Cubbage, eng.; Michael Feinstein, prod. ADD. TT: 57:12

In this recording's liner notes, Michael Feinstein argues that "nothing compares to hearing a creator interpret his own work." Well... maybe. It's certainly interesting to hear how a composer plays his own music, but does the composer's rendition provide the best guide to how the music should be performed? When the composer is an accomplished all-around musician—say, a Leonard Bernstein—the answer would seem to be "yes," but not many composers of show music could make livings as musicians or conductors (and, for that matter, Lenny's recording of West Side Story was not exactly an artistic triumph). Generally, I think most composers are sufficiently constrained
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by technical limitations in the performance realm that it’s difficult to know whether they play its music the way they do because that’s the way they intend it to be performed or because they just can’t do it any better.

There’s no more reason to expect the composer’s performance of his own music to be the last word than to believe that the playwright’s reading (or direction) of his play necessarily represents the play at its best.

Actually, Burton Lane plays his own music somewhat better than one would expect from a septuagenarian composer, although, ironically, Michael Feinstein, who only sings on this recording, is a technically much more accomplished pianist than Lane. As a singer, Feinstein has some limitations of his own (a voice that’s a bit too nasal and wavers too much for my taste), but he’s able to transcend these limitations through his enthusiasm and feel for the material. Lane’s output over his long career in Hollywood and on Broadway has included some exceptionally lovely songs; Feinstein has put together a pleasing assortment of the familiar (eg, a Finian’s Rainbow medley, including “Old Devil Moon,” “How Are Things in Glocca Morra,” etc.) and the relatively obscure (eg, “One More Walk Around the Garden,” from Carmelina). Sound quality is above average, with a good balance between voice and piano. My preference in show music performance is for a theatrical (ie, full orchestra, original arrangements, “legit” voices) rather than the cabaret (piano, pop/jazz singing) approach offered by the likes of Michael Feinstein and Bobby Short, but I know that the latter approach has many adherents. Readers who are among them are likely to enjoy this recording even more than I did, and, if they want another Burton Lane fix before Vol. II in the Feinstein series becomes available, I can heartily recommend Maxine Sullivan Sings the Music of Burton Lane, recently re-released on Mobile Fidelity MFSL MFCD 773.

—Robert Deutsch

THE MARRYING MAN: Original Soundtrack
Hollywood Records HR-61105-2 (CD only). Gary Lux, eng.; Tim Hauser, prod. DDD; TT: 40:56

In The Marrying Man, Neil Simon’s new mold-breaking script about a rich, handsome, cocky young heir who manages to marry the same nightclub singer four times, Kim Basinger plays — and, amazingly, sings — the singer. Though this talented actress/comedian has always been in danger of being typed as an archetypal dumb blonde, here she grasps all of Bimbohood by the neck and shakes it till it’s dearer than Vaudeville.

On screen her singing scenes are sumptuously shot, beautifully choreographed — Basinger can more, even if I got tired of watching her feel herself up (well, not that tired). Such cinematic derring-do added a great deal, but even listening at home, the CD is a lot of fun. Certainly Basinger does a lot better with this repertoire than does Carly Simon or Linda Ronstadt, not to mention Michelle Pfeiffer’s noble attempts in The Fabulous Baker Boys.

Basinger attacks these seven standards (“Let’s Do It,” “Satisfy My Soul,” “Why Can’t You Behave,” etc.) from jazz, honky-tonk, R&B, and Broadway strictly as prime Bad Girl material, and it’s impressive if anachronistic: in the ’40s and ’50s, when this film is set, the only women singing in public like this were black, and not many of them. This is hot, horny stuff — as Basinger smirks à la Mae West in the outro to “Let’s Do It”: “Love’ll come later.” (And check out her X-rated fondling of the third syllable of “Honeysuckle Rose”.) Of course, you could also nail these performances as calculatedly overbusy vocal handlings by a non-musician who trusts neither her voice nor her musical impulses enough to do without all the vocal bumps and grinds, the come-hither lips, the Vaughan-esque arubesques. Still, most actors don’t even have such choices as options. Great job, Kim.

The big-band arrangements, by such stalwarts as Alan Broadbent and Don Menza, are entertaining fun, with surprisingly accurate soundstaging on those by David Newman. Players include the late Stan Getz and the ubiquitous Ray Brown, plus those veterans of a thousand sessions: Chuck Findley, Harvey Mason, Jack Sheldon, Ralph Humphrey. And singer Alan Paul turns in a letter-perfect Sinatra sendup on “You’re Driving Me Crazy.”

Don’t take it too seriously, but don’t pass it up — it may not be clean, but it is good fun.

—Richard Lehnhert

Jazz

BILL MAYS & RAY DRUMMOND: One to One 2
Bill Mays, piano; Ray Drummond, bass
DMF CD-482 (CD only). Bill Mays, Tom Jung, prod.; Tom Jung, eng. DDD; TT: 60:36

In his notes to this, his second disc of duets with bassist Ray Drummond, pianist Bill Mays lists his influences: among pianists, they include Ellington, Jimmy Rowles, Ray Bryant, Tommy Flanagan, Sonny Clark, and Hank Jones. He doesn’t mention Bill Evans. Perhaps
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Mays is tired of hearing about him. We hear touches of Ellington in Mays’s right hand playing the shattering downward arpeggios in the introduction to “Someone to Watch Over Me” — they ring like bells. We hear touches of the other pianists throughout, but, generally, the relationship between piano and bass here — especially the relative independence of the bass, and Drummond’s willingness to take over the melody — comes out of Evans’s great performances with Scott LaFaro and, later, Eddie Gomez.

Drummond’s warm, oversized sound is inflated somewhat by the recording here, especially when he is accompanying a Mays solo. Then it is hard to picture just where Drummond might be standing — he seems to have the piano surrounded. On the other hand, a jazz piano has rarely been this well recorded. The bass octaves sound tight and warm, the treble has remarkable presence without any tininess. Mays plays more persuasively than did Evans, yet produces a lovely sound that complements Drummond’s expansive tone.

The tunes are tastefully chosen, the players sympathetic, adventurous, and swinging. In their first chorus of “Isn’t It Romantic,” they burst into the bridge, dancing where lesser musicians merely grind through the changes. They’re eloquent on Charles Mingus’s “Goodbye Porkpie Hat,” and wittily offhand in Jimmy Rowles’s “502 Blues.” Drummond plays the first half-chorus of Bronislau Kaper’s “Invitation” alone in a contemplative mood that Mays sustains — these people listen to each other and respond instantly to the best ideas they hear. Only “Round Midnight,” played in a loose, open-ended, musing fashion, disappoints. Monk’s composition requires a more definite touch. — Michael Ullman

GONZALO RUBALCABA: Discovery
Gonzalo Rubalcaba, piano; Charlie Haden, bass; Paul Motian, drums
Blue Note CDP 7 95478 2 (CD only). Charlie Haden, prod.; David Richards, eng. DDD? TT: 54:06

Couldn’t figure out what jazz release to review this month. Nothing, as Elvis said, moved me; I wanted to get real, real gone this time. I stopped into Nick Potter’s Books & Used Records. Nick was waiting for me.

“Ever heard of Gonzalo Rubalcaba?”

“Who?”

“Gonzalo Rubalcaba — 28-year-old Cuban pianist. This is his first recording outside Cuba. Lissen to what he does with ‘Well You Needn’t.’”

He hit Play on his store’s CD player. Was I moved? Well, it was kind of hard to tell, the earth was moving so much . . .

Just do what I did: “Well You Needn’t.” You’ll be convinced that, well, you do need to. Gonzalo Rubalcaba has things to say.

I almost wish Nick had given me a blindfold test so I could’ve made a fool of myself in a noble cause: I defy anyone to listen to this disc and not think of Keith Jarrett in his gospel-fugue prime. (Course, it doesn’t hurt to be backed up by Jarrett’s old rhythm section.) But Rubalcaba is no mere Jarrett clone imprisoned by awesome chops and hero worship. This guy zaps out lines, runs, and aikido-chop chords that I’ve never even heard the King of Chops himself pull off. And no empty pyrotechnics either: Rubalcaba’s senses of humor, wit, grace, rhythm, harmony, and variation are simply breathtaking. This musician will consistently surprise you with gifts of time in places where other jazz musicians don’t even have places.

Rubalcaba shares with Jarrett a long classical training, a love of gospel voicings, a passionate romantic bent, and an ability to make the piano speak with a full, lush voice. But his playing is more sharply etched than Jarrett’s, his emphasis more on savagely meticulous articulation than on Jarrett’s long architectural gaze. Rubalcaba’s playing is full of fierce joy, and his relationship to the piano is one of pure, absolute mastery — unlike Jarrett, who often seems to be trying to become the piano. The Cuban’s “Prologo Comienzo” sounds simultaneously through-composed and divinely inspired, so exactly, feelingly placed is each of the thousands of notes in its bed of rhythm. Compare Rubalcaba’s “All the Things You Are” with Jarrett’s in the Standards series; Jarrett’s is a wistful, bittersweet lament; Rubalcaba assaults the tune with barely contained passion.

Charlie Haden, who is to be thanked for “discovering” Rubalcaba and producing this excellently recorded disc (great piano sound!), provides his usual earnest, unornamented accompaniment, the intonation problems that plagued him in his Jarrett days entirely cured. Paul Motian’s loose, open drumming is the embodiment of “free time” — he doesn’t really drive, but his grooves fully support anyone behind the wheel.

This is only the beginning; Rubalcaba’s 2 is being released as I write. Who’d have thought there was anything more to say? This man says a lot, and I’m happy to hear him out. You will be too. —Richard Lehner

WORLD SAXOPHONE QUARTET: Metamorphosis
Oliver Lake, alto & soprano sax, flute; David Murray, tenor sax, bass clarinet; Hamiet Bluiett, baritone sax; Arthur Blythe, alto sax; Mor Thiam, percussion, vocals; Chief Bey, percussion, Mar Gueye, percussion; Melvin Gibbs, electric bass (on “The Holy Men,” “Lullaby,” “Africa”) Elektra Nonesuch 9 79258-2 (CD only). Malcolm Pollack, eng.; Peter Scherer, prod. DDD? TT: 61:54

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Saxophone Quartet has been a high-stepping, boisterous group whose broad sound, based on the shattering richness of Hamiet Bluiett's baritone saxophone, seemed to defy the limitations of its instrumentation. Many of their pieces are simply arranged: while Bluiett, or another bandmember, anchors the band with funky bass patterns, the band plays bluesy riffs or squawking mid-tempo dances. Or perhaps the quartet will play, impassively, a solemn melody in block chords, which they will subsequently open up for group improvisation.

When, several years ago, Arthur Blythe replaced alto Julius Hemphill, the WSQ found a new urgency in Blythe's throbbing tone and neo-romantic phrasing.

We hear something of that urgency, and something more of the easy bounce of Afro-pop, in Metamorphosis, where the quartet is joined by three Senegalese percussionists, including lead vocalist Mor Thiam, and, on three numbers, by electric bassist Melvin Gibbs. As the stage is usually set up on this recording, the quartet, with Blythe and Bluiett on the right and Murray and Lake on the left, are surrounded by the three percussionists. On the opening track, "The Holy Men," the saxophones are grouped close together. Their sound is captured accurately, but without the precise imaging that would help clarify the strands of their group improvisation. Here and on the title number, "Metamorphosis," the result is confused—the rhythm section sounds unfocused, the saxophone improvisations without clear direction.

What a difference on such numbers as "Lullaby" and "Feed the People," with its declamatory theme and alert group improvisations. "Lullaby" begins with the percussion and singer Thiam—when the saxophones enter with their version of this gentle theme, they seem to flood the stage warmly. On "Feed the People," the quartet begins, setting the tone with a boppish line that alternates with stuttering staccato sections. In both cases, rhythm and saxophones work graciously together, as they do on "Lo Chi Lo," which actually seems to be a parody of the tearjerker, "The Old Rugged Cross."

On the ballads, the Africans sound lost. That is regrettable, as on "Ballad for the Black Man," Murray's distinctive ballad style—his use of the whole range of the tenor including some barely articulated squeaks, his midrange growls, and his habit of landing on a note with a suddenly expanded vibrato—is displayed in a performance that draws attention to his technique without destroying the lyrical flow.

Metamorphosis isn't a perfect album—the sound of each saxophonist should be more carefully placed, if the music is not to feel cluttered—but it's frequently a joyous one.

—Michael Ullman

Rock

PAUL McCARTNEY: Unplugged. The Official Bootleg
Capitol CH1-96413 (LP), C21Z 96413 (CD). Geoff Emrick, eng.; Joel Gallen, prod. ADD. TF: 58:28

Every once in a while you buy a record that shakes your whole epistemology. Until now, my understanding of popular music has rested on a single bedrock premise, a fact that ties George Harrison to Michael Jackson and Peter and Gordon to Eastman Kodak: Paul is dead. You remember—the Abbey Road album cover, 281E, "Tell Me on, Deadman," the barber turned be-alike, William Campbell, a/k/a Billy Shears. Sure, they backed off and claimed it was just a hoax, but how else do you explain "Ebony and Ivory"? I believed John when he sang "I Buried Paul" backwards, and I still do. Or I did until I heard Unplugged.

Courtesy of those purveyors of subtlety, decorum, and good taste at MTV, this "official bootleg" sounds altogether like the Paul we knew and loved from his life-before-death period. Cheeky as ever, he quips his way into "San Francisco Bay Blues," announcing "Here's a song by Ramblin' Jack Elliott. Son of T.S." So don't try to tell me it wasn't an impostor in New York, December 1989, who introduced "Got to Get You Into My Life" with this immortal line: "Now we're going to do a song that [guitarist Hamish] Stuart wrote in his Jacuzzi." And returned to the Meadowlands nine months later to pull out the same lame punchline. It's roughly the difference between A Hard Day's Night and Give My Regards to Broad Street, folks, and it sounds to me like the modus operandi of one Billy Shears.

Live, alive, and amply, on Unplugged the seemingly undead McCartney gives us a taste of what it must have been like at the Cavern in Liverpool, ca 1961. Part of the credit must go to the "Unplugged" format, a TV-Land replica of a small club that couldn't pay its electric bill. It even made Don Henley sound almost alive.

After his round trip 'cross the Styx, Paul seems relaxed, well-rested, and none the worse for wear. This is a Paul McCartney album for Paul McCartney fans. It's a testament to McCartney's talent and to the art of recording, and a demonstration that he still has a few tricks up his sleeve. It's a record you can play over and over, and still find new things to enjoy.
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Stereophile, November 1991
for wear. He resurrects half a dozen Beatles songs, but Beatlemania this ain’t. No “Hey Jude,” with “Let It Be” for an encore. Paul seems to realize that some things ought not to be dug up. He even forgets the words to “We Can Work It Out”—death’ll do that to you. My vote for the best cut here goes to his reworking of “And I Love Her,” but “Blackbird” and “Here There and Everywhere” pale by comparison with the originals. His voice isn’t what it once was—death’ll do that to you—but that never stopped Frank Sinatra. Of historical interest is “I Lost My Little Girl,” the first song McCartney ever wrote, but the thing that sets this set apart are the covers of songs that were hits before Paul even hooked up with the Quarrymen. As he gamely runs through “Good Rockin’ Tonight,” you can almost hear that Mystery Train in the distance with Elvis as a pullman porter.

While I doubt that expediency had something to do with it, engineer Geoff Emerick wisely decided not to mess with the live mike feed. It’s all here: false starts, audience clamor, and between-songs re-tuning. The sonics have a bootleg feel, minus, of course, big-time tape hiss and other sonic strangoliosities common to the form. The dynamic range is compressed and the top and bottom octaves are a little rolled off, but it’s a lot better than the other way round. The lateral placement on the soundstage is quite good, just like on the cover art (or, for that matter, the video), although the depth on the CD is somewhat constrained.

In sum, this is probably the best McCartney album, since, well, since he died. So how do I explain Unplugged and at the same time mend my shattered world view? Remember those words of wisdom from the credit of “The Six Million Dollar Man”: “We have the technology. We can rebuild him.” —Allen St. John

THE POTATO EATERS: The Potato Eaters
Real 3scan BRD 005 (CD only). Oliver DiCicco, Steve Savage, Jim McKee, eng.; Potato Eaters, prods. AAD. TT: 43:54

Remember back in the 60s when music was new and fresh and there was Cousin Brucie with the Beach Boys and white-boy remakes of Motown singles on AM; and on FM there was Alternative Radio, where, boiling out of San Francisco, long before the concept crystallized into a format, mostly dropout grade students put on whole sides of weird and seditious stuff like Frank Zappa, Quicksilver Messenger Service, and it’s A Beautiful Day, and mumbled about Grace Slick flashing the audience at some festival? Music was wonderful and radio was wonderful and every new album was a surprise and a joy and that’s where I first heard Jefferson Airplane’s eerie, lyric tenor Marty Balin. That brings us to the San Francisco of the 90s. Here the first indie CD (and cassette) from The Potato Eaters features lead singer and lyricist Ben Guy delivering the melody in as otherworldly and haunting a fashion as Balin redux; co-lead, alto Laurie Amat, punches up the female line with the control and enthusiasm of Heart’s Ann Wilson. Pedal steel, acoustic, and electric guitars, plus a dog toy, develop texture, feel, and whimsy in the spirit of the best and earliest Jefferson Airplane—without the drugs or self-indulgence.

Sure, some—alright, many—of the tracks sound like the styles of other bands; glimpses of Talking Heads and 10,000 Maniacs, for instance, can also be spied in tracks like “Fine Life” and “As You Are Now We Once Were.” But so what? What sets The Potato Eaters apart is strength of composition and harmony and maturity of content. Mysticism, observation, and wisdom gained over time and through loss inform these songs; the use of language is adroit and compelling, and too much is never said, so stand-out songs like “Casey” (if love doesn’t change, people do) and “Crowned” (a Grand Guignol interpretation of something like Keats’s “The Eve of St. Agnes,” where Laurie Amat contemplates a reunification with the animus) bear much repeated play.

Critical listeners will note, however, a few technical problems: What makes this CD fine and charming—fe, its lack of slick technique, expensive overdubs, and EQ to the max—also makes it a little wobbly in dynamics. For instance: Either Amat, whose voice in general seems a little light, stepped back from the mike for a phrase in “The Crowning” and they left the drop in level deliberately, or someone missed it. Words are often hard to make out. (Was that “friends” or “plans” in “It’s a Fine Life”? Headphones help.) Other tracks ache for a big-time record producer to snap up tempo and pull out more contrast (the instruments, for example, sometimes sound like they’re laboring uphill in second).

That’s a risk: Production and performance could certainly be tighter (Amat reportedly has recently left the band), but a major-label deal could also turn this genuine, touching, and fragile debut into Chris Isaak Meets Linda Ronstadt. Beware—and buy now, from Tower Records on the West Coast and Dutch East India back East. —Beth Jacques

CHRIS WHITLEY: Living With The Law
Columbia CK 46966 (CD only). Mark Howard, Malcom Burn, eng.; Malcom Burn, prod. AAD. TT: 47:02

6 To avoid an obvious conflict of interests, I didn’t tell Beth that The Potato Eaters’ guitarist is none other than Michael Ross, who also writes record reviews for Stereophile. Beth will learn about this as and when you do: by reading this footnote. —RL
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At various times over the last ten years, in conversations about popular music with people in their early 20s, a recurring theme has been their nostalgia for my past. “Why,” they ask, “was the music of the ’60s and early ’70s so much better than what we’re being offered now?” The answer most often bandied about was that it was all so new back then. New sounds and musical ideas were being absorbed by pop music at an astounding rate. I admit that this is the answer I grabbed at myself, when pressed.

Lately this explanation no longer rings true to me. For one thing, it fails to explain the longevity of the ’60s artists and their appeal to a generation to whom they are far from new. No, of late I’ve come to feel that it was not its newness but its “oldness” that made the pop and rock of the ’60s more exciting and apparently more durable than the more current stuff.

The major artists of that era had one important thing in common—their music had basic roots in American blues and soul music. And I’m not just referring to such obvious examples as Jimi Hendrix, Cream, and the Rolling Stones.

Jethro Tull, Roxy Music, the Who, and Genesis? as well started off their careers playing blues and R&B, even if they quickly developed styles that seem far from those roots. It really appears that, with few if any exceptions, the important music of that era grew directly out of Black American traditional and popular music.

Of course, these are the same roots that spawned rock and roll in the first place (along with a dash of C&W). But the important factor is that the bands of the ’60s went back to the source. They didn’t study Elvis, Ricky Nelson, and Dion as much as Robert Johnson, Muddy Waters, Jimmy Reed, Fats Domino, Larry Williams, and Otis Redding.

For the most part, today’s popular music traces its roots back to last week’s charts or, if the group is particularly adventurous, all the way back to Led Zeppelin or the Beatles. Even supposedly cutting-edge college radio rarely features anyone whose influences can be traced back further than R.E.M. or the Sex Pistols.

What touched off all this revelation and ranting was the release of Chris Whitley’s debut record, Living With The Law. That Whitley’s music is blues-based is undeniable. He plays and writes his songs on a steel-bodied resonator guitar favored by Delta blues artists past and present. His voice is a multi-colored instrument that whoops and hollers, with a falsetto that can raise chicken skin in an instant. It stops just this side of overly mannered, but any excesses can be forgiven in this age of artifically enhanced singing dancers and whining English angst-mongers.

What makes Whitley truly interesting though, and kin to the aforementioned artists of the ’60s, is that for him the blues is a point of departure. He draws on the power of that tradition to give songs like “Big Sky Country” added resonance, but it is without doubt a pop song. His lyrics have the earthy poetry of Robert Johnson and often reach for the more sophisticated imagery of Robbie Robertson or even Dylan.

Malcom Burn’s production modernizes without sterilizing. Instruments seem to eddy out from Whitley’s voice and guitar, enhancing without distracting. The accompaniment is often powerful without being overpowering. When Whitley plays unaccompanied or with minimal backing, the analog recording captures that warmth and “back porch” intimacy best delivered by a man and a guitar. However, the music is equally as effective when surrounded by the electronic maelstrom that Burn is capable of conjuring, and that’s the highest praise I can give a production.

With his first record, Chris Whitley stands at his own crossroads. He can get slicker and possibly more saleable (there’s nothing sadder than selling out and no one buying). He can emphasize the funky, rockin’ sexy side of the blues and go for the roots market. Or he can push the limits of his poetic potential and build on the groundwork he has laid here. He can further explore the mystery and atmosphere of the blues that he has successfully captured and turn it into something uniquely his own—much as they did in the ’60s. —Michael Ross

Frank Zappa has steadily cranked ‘em out for nearly 26 years now: RL has remarked in these pages that Zappa releases more recordings in a given year than the total that most people buy.® Well, be’s at it again. Despite some recent

7 My hand played support for the fledgling Genesis at a couple of gigs around the time of their first, Jonathan King–produced, album in early 1970 or so, and I have to say that they owed nothing to the black American tradition. Peter Gabriel was into some uniquely weird schrick right from the start. —JA

8 I find it interesting that both his publicity and his clown-prince image lead many to feel that FZ is no more than a cynical idiot-savant with a genius for self-promotion but nothing to say. As well as being one of the more inventive lyricist-guitar soloists around, able to weave long melodic lines that roam across the entire range of his instrument’s fretboard, FZ’s arrangements and lyrics are joyfully intelligent, simple-sounding yet complex, and deliciously ironic. Even as he mocks jazz, for example, as in Make A Jazz Noise Here, he does so within a musical context that would stand on its own as good jazz. Serious music from a serious musician is my verdict. And I, apart, I am the last member of Stereophile’s staff who could ever be regarded as a Zappa-head.

—JA

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grousing by FZ about the music business in general, 1991 has seen a virtual motherlode of new releases:

**FRANK ZAPPA: The Best Band You Never Heard In Your Life**

Barking Pumpkin D2 74233 (2 CDs only). Frank Zappa, prod.; Bob Stone, eng. DDD. TT: 2:11:36

_The Best Band You Never Heard In Your Life_ (the 1988 ensemble that disbanded before the world tour was complete) had a veteran rhythm section in Bob Martin, Chad Wackerman, Scott Thunes, and Ed Mann. The addition of Wing, Carman, Kurt McGettrick, and the Fowler brothers provided a power and bite (not to mention swagger) that Zappa’s groups had not enjoyed since the 1976 _Zappa in New York_ band. Paul Carman’s gem of a soprano sax solo on “Inca Roads,” and Zappa’s concise and imaginative workout on “Zomby Woof,”9 are two examples of _Best Band’s_ excellence. The reggae/waltz rearrangement of Ravel’s _Bolero_ is thoroughly unique and so seamlessly appropriated by the band that it sounds like a Zappa composition. The Swaggartization of “Lonesome Cowboy Burt” is hilarious, and the cover versions of “Purple Haze,” “Sunshine of Your Love,” and “Ring of Fire” are the kinds of burlesque sendups that only FZ seems capable of conjuring. “The Eric Dolphy Memorial Barbecue” is especially noteworthy for the horn soloing and controlled improvisational abandon of the arrangement. This piece must have been held together by the leader’s conducting. As always, the discs have been painstakingly, lovingly sequenced and organized to take maximum advantage of musical as well as thematic continuity. Each selection seizes into the next, always in perfect cadence. The sound quality of _Best Band_, and indeed all of the 1988 recordings, is balanced, detailed, and natural.

—Carl Baugher

**FRANK ZAPPA: Make A Jazz Noise Here**

Barking Pumpkin D2 74234 (2 CDs only). Frank Zappa, prod.; Bob Stone, eng. DDD. TT: 2:17:04

I’m sure to raise the hackles and draw the ire of many a long-time Zappaphile with a preference for the likes of Jimmy Carl Black, Roy Estrada, _et al_., with this comment, but I’ll say it anyway—the 1988 Zappa band was the best ensemble FZ ever assembled. Want proof? Listen to any 5 minutes of _Jazz Noise_. Now I wouldn’t think of calling this Zappa’s finest recording (there are simply too many great works in the catalog), but it would be difficult to pick out a better all-around example of his art. The compositions are performed with technical skill and enthusiasm, the recording is superb, and _Jazz Noise_ offers genuine, meaty, jazz improvisation. Go directly to the section that starts with “Eat That Question” on disc one. After the brief keyboard intro and the big-band theme, there’s a gorgeous, bluesy rendition of “Black Napkins” that is nothing like the original on _Zoot Allures_. Next is an incredible “Big Swifty” (from whence the CD’s title came) that has, among other things, quotes from Bizet, Wagner, and Tchaikovsky, free-jazz interludes, and some of the tightest ensemble execution extant. Just when you thought it couldn’t get any better, there’s a reggae version of “King Kong” that has sparkling contributions from all the horn soloists, notably an exciting, probing baritone sax exploration from Kurt McGettrick. “When Yuppies Go to Hell” (previously known as “Dessicated”) effectively demonstrates this band’s jazz instincts. It’s also a fine example of Zappa’s extended compositional approach. There are, of course, many other highlights (this whole set is a highlight) too numerous to mention in this limited space. For the jazz-minded Zappa collector, there really is little competition for the magnificent _Make A Jazz Noise Here_. If you have even a passing interest in Zappa’s work, run to your nearest non-socially retarded record store (thanks, Gerald Fialka) and get this set.

—Carl Baugher

**FRANK ZAPPA: You Can’t Do That On Stage Anymore, Vol. 4**

Rykodisc: RCD 10087/088 (2 CDs only). Frank Zappa, prod.; Bob Stone, eng. DDD, ADD, AAD, A/DDD. TT: 2:14:10

Zappa’s 12-CD Rykodisc series documenting live recordings of the past 25 years continues with _YCDTOSA 4_. To get right to the meat, the original 1976 live version of “The Torture Never Stops” turns out to be a completely different song. This one was a blues, with Captain Beefheart’s unique vocals/harmonica and Denny Walley’s slide guitar as the main components. Elsewhere, there’s a hilarious 1969 “Tiny Sick Tears” with a spoken monologue by Zappa that culminates in a parody of the famous Doors opus, “The End.” The descriptive detail on this piece sounds like a precursor to “The Dangerous Kitchen,” which was to surface on _Man From Utopia_. There’s also a priceless bit of heckler-baiting called “Are You Upset?” that reveals FZ’s warm, good-natured side—a side often overlooked. Of particular interest is Archie Shepp’s solo from “Let’s Move To Cleveland,” _ca_ 1984, and a blistering “Stevie’s Spanking” duet between Zappa and Steve Vai. There are also two tracks from the ’88 band, “Take Me

Stereophile, November 1991 239
Out to the Ball Game" and a gripping "Filthy Habits," with Zappa's monster guitar solo. The set ends with a '50s doo-wop medley from 1982/84 that is brisk, virtuosic, and vocally impressive. Except for YCDTOSA 2 ("The Helsinki Concert"), YCDTOSA 4 is the best of the series so far. I can't imagine a serious Zappa collector who wouldn't insist on adding this set to his or her collection. Rightly so.

—Carl Baughner

FRANK ZAPPA: Beat The Boots!

Including: Tis the Season to Be Jelly (Rhino 2 R7 0542), The Ark (Rhino R2 70538), Freaks & Motherf u*r!*@%/(Rhino R2 70539), Piquantique (Rhino R2 70544), Unmitigated Audacity (Rhino R2 70540), Saarbrücken 1978 (Rhino R2 70543), Any Way The Wind Blows (Rhino R2 70541, 2 CDs), As An Am (Rhino R2 70537)

Rhino Records R1-70907 (Limited edition box set, 10 LPs; 9 CDs available individually, as listed above). Frank Zappa, prod.; Bob Stone, eng. AAAAAD. TE: 01:04

Disgusted with the extensive bootlegging of his music over the years, Zappa decided to strike back.10 None of these recordings derive from original master tapes, folks. That's right; they sound exactly like the often miserable boots themselves because, well, that's what they are (Bob Stone mastered them directly from LPs). Presumably there's been some attempt to re-EQ them, but I doubt Stone spent much time on this project. I hear little difference between any of the LP and CD versions. My own original boot copies sound pretty much the same, too. No surprise. At least the new LP surfaces are reasonably quiet. How 'bout the music, you ask? Fortunately, there are some treats. I'll address them chronologically:

Tis The Season To Be Jelly was recorded on 9/30/67 in Sweden. A brief version of Stravinsky's Petrouchka that segues into "Bristol Stump" is worth hearing, as are live versions of "You Didn't Try To Call Me" and "Big Leg Emma." The long "King Kong" has a spoken intro by FZ that collectors will prize, but this performance tends to ramble toward the end. The sound is thin and distorted but listenable (hey, these are bootslegs, after all).

The Ark is from Boston, July 1968. These tracks must have been originally planned for authorized release because the sound quality is quite good (a big improvement over Jelly). "Some Ballet Music" evokes contemporary chamber music (with a great flute part), which Zappa prefaches by telling the audience that the music is "good for them." Kind of like a dose of caster oil, I guess. The Ark is highly recommended.

The same cannot be said for Freaks & Motherfu*r!*@%/. These recordings come from the Fillmore East (5/11/70) and feature an early lineup of the "vaudeville" band with Jeff Simmons on bass and vocals. I'm not a huge Flo & Eddie fan, but the addition of Simmons and a live version of "Wonderful Wino" (called "Wino Man" here) does increase the historical value. Whether you'll want to put up with the horrendous sound is another story; the music is hard to appreciate because of the severe distortion. Hard-core collector appeal only.

Piquantique is a combination of August 1973 concert material performed in Stockholm and Sydney. Jean-Luc Ponty's violin solo on "Redund!" is a marvel of technique, speed, and imagination. Elsewhere, live versions of "Kung Fu" and "Dupree's Paradise" make Piquantique a must-have. Sound quality is not as bad as some of the other discs—there's actually some bass response here.

Unmitigated Audacity was recorded on 5/12/74 at Notre Dame University. The sound is pretty miserable, which is a shame because this disc has some outstanding material. The medley from Zappa and the Mothers' first album, Freak Out, is exceptional (this is the only live version of "Hungry Freaks, Daddy" that I know of), and the band turns in adroit performances.

Saarbrücken 1978 sports varied material and an excellent band. As always, this group sounded tight and rehearsed to death, although never at the expense of spontaneity. "Easy Meat" has an arrangement quite different from the one on Tinsel Town Rebellion. A rare, live version of "Magic Fingers" (from 200 Motels) is also included. Saarbrücken is on two LPs in the box but can be obtained separately on a single CD, albeit at a higher list price than the other CD releases, except for...

. . . The double-CD/double-LP Any Way The Wind Blows, from 2/4/79, taped in Paris. Here, again, sound quality is poor, but the musical rewards are many. A great—and I mean great—version of "Brown Shoes Don't Make It" blows away any live version of this piece I've ever heard, but both discs are consistently excellent. Peter Wolf and Tommy Mars contribute heavily to these recordings.

The last disc, As An Am, is from the 1981 Halloween concert in New York and a May 1982 Köln concert. It's arguably the best of the lot. "Young & Monde"11 was always a standout in

10 Zappa has complained loudly in print and on radio about how much money he's lost to bootleggers over the years, but I don't buy it. A bootleg collector myself, I know of no one willing to spend $20 to $50 per album for awful bootleg sound on lousy vinyl, with no possibility of a refund, who wouldn't gladly spring for the official releases as well, no matter how redundant in program. I doubt if Zappa's lost a single red cent to concert or studio bootleggers. Large-scale commercial piracy—le, duplication and sale of already-released official albums—is another story, however.

11 This composition is generally known as "Let's Move to Cleveland."
the repertoire, and this was the rhythm section that was to stay with Zappa throughout the '80s. The leader's solos are good examples of his well-known control, inventiveness, digital dexterity, and preference for the guitar's lower register. The New York show offers a truncated "Black Napkins," "The Black Page," and a protracted, Halloweenish "Torture Never Stops."

It should be pointed out that none of these formerly unauthorized recordings are up to the level of any of Zappa's authorized releases. His careful, intelligent approach to choosing material based on continuity and musical merit is completely absent from these boots. The die-hard collector will insist on owning them all, of course. The LP box is the way to go, particularly since it's reasonably priced (about $60 retail), but As An Am, Piquantique, Saarbrücken, and The Ark are the best of the lot and could be picked up separately on CD should your interest fall just short of obsessive.

OK, Frank, assuming you won't be too busy being the next President of the United States (yes, believe it or not, he's declared for 1992), let's have the new synclavier stuff, the rest of YCDTOSA, The Lost Episodes, Lumpy Gravy Phase III, and anything else that might be laying around the Utility Muffin Research Kitchen. Come on, now—we gotta have 'em—we're waiting...

—Carl Baughers

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VAC PA90 monoblock power amplifier

Editor;
Many thanks to Dick Olsher for his thoughtful review, and especially to Tom Norton for measuring above and beyond the call of duty.

After such a thorough review we have little to add, save some comments that may be of interest to VAC owners and potential owners.

1) VAC power amplifiers are designed to deliver maximum power somewhat below the marked output impedances. For example, more power is available into 1.33 ohms on the 2 ohm tap than into a 2 ohm load. This is an outgrowth of our experience that it is generally most important to match a speaker’s minimum impedance rather than its nominal impedance.

2) Amplifiers with multiple impedance taps offer the flexibility to better match widely varying loads than is possible with single-tap amplifiers, even going beyond the initial powerdistortion issue. For example, we have found that the Martin-Logan Sequel II and Quest are best driven bi-wired, with the panels to the 2 ohm tap and the woofers to the 4 ohm tap. While a speaker’s stated nominal impedance is a good starting point, experimentation with the taps is strongly encouraged to optimally tune the system.

Further auditioning leads us to recommend the triode mode with the Apogee Stage. We tend to prefer triode operation for many of the reasons Dick notes. However, some owners have reported better results with ultralinear, even where power does not seem to be the issue. Perhaps the best way to view the situation is that triode operation is generally superior, but the inclusion of ultralinear increases the system’s flexibility and is sometimes of benefit. System matching continues to be a complex and black art, and VAC’s extensive flexibility greatly enhances one’s ability to tune one’s system.

3) Our rated triode power for the PA90 is actually 45W. That Dick considers it to be a 60W amplifier is a reflection of our belief that audio equipment should be conservatively and honestly rated. Reliability is also part of our philosophy, with registered VAC amplifiers warranted for three years.

4) On final QC we routinely measure greater than 70dB unweighted S/N referenced to 1W. The value of this is borne out by one VAC owner, who uses PA90s on the highly efficient Klipschorns and finds them to be significantly quieter than his previous solid-state gear.

5) VAC amplifiers are now delivered with a full complement of Golden Dragon vacuum tubes. The recently available 12AU7 delivers better overall definition and bass impact than the Brimar CV4003 previously fitted as standard. As Dick noted, the Golden Dragon EL34 is a significantly superior tube to the German EL34 (Siemens, etc.) formerly supplied. We are truly fortunate to have these tubes available to us.

6) All areas of the PA90’s performance can actually be improved by the addition of the new PEI energy-storage modules (approximately $2000/pair). They triple the energy storage of the VAC system, building upon the sonic strengths already present. Most noticeable are increases in subjective power and bass definition.

Finally, a few notes of historical interest on ultralinear (partial triode) operation. While popularized in the US by Hafler and Herpes, it was actually invented and patented (UK) by EMI’s Alan Blumlein in the 1930s. There is a longstanding engineering debate about this technique, which may be accurately analyzed as a large application of local negative feedback to the screen grid of the tube. Excellent measured performance does indeed result. However, the relationship between the screen grid and the control grid is not perfect, and thus the feedback itself is applied in a non-linear manner. Interested readers should see the analysis published in Wireless Engineer, August 1955 (available from VAC for $1). This non-linearity does not exist when a pentode or beam power tube is fully triode-connected (as in VAC’s triode mode), and the results obtained are often better than with the older filamentary (directly heated) triodes, such as the 300B, 2A3, 211, and 845. Kevin M. Hayes

President, Valve Amplification Company

 Theta Data
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Editor:
It is difficult to respond to a review as positive as the one written by Robert Harley on the Data. We are, however, very pleased to know that our radical approach of using a laserdisc transport has been well received. The months of R&D that went into the design of the Data confirmed the sonic superiority of the videodisc transport to all others. A nontrivial bonus is that you get laserdisc capabilities for free. 1
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We are pleased that RH liked the Prime better than the Class A-rated Basic. However, many people will continue to prefer the Basic's soundstage, detail, and dynamics. The new balanced Basic, which will be available by the time this is in print, offers a substantial increase in performance over the original Basic. Basic owners may contact their dealers for upgrade information.

Robotic assembly, surface-mount technology, and statistical analysis of units shipped since May are responsible for a decision to offer a ten-year warranty on the Prime. This warranty is retroactive to all Primes ever sold by Theta.

Mike Moffat
Theta Digital

B&W Matrix 804 loudspeaker

Editor:
We at B&W would like to thank Stereophile and Tom Norton for a most thorough and favorable review of the Matrix 804 loudspeaker. Given Tom's longstanding familiarity with B&W's Class A-rated Matrix 801 Series 2, his assessment that "the Matrix 804 reminds me of nothing so much as a miniature Matrix 801 Series 2—but with a sound in no way miniaturized" is very high praise indeed. More important to Stereophile readers, it is authoritative.

As is usually the case, some minor points of further clarification are in order. While Tom pointed out that B&W used Kevlar cones way back in 1976, it should be noted that it was John Bowers who discovered Kevlar's marvelous properties, especially in midrange reproduction, and that B&W pioneered its use long before anyone else dared to try it.

Further to Tom's comments regarding B&W's sixth-order bass loading and the high-pass alignment filter (and his recommendation not to use it), we would suggest that the very satis-

factory results Tom got without the filter point to the desirability and flexibility of the sixth-order alignment. Further bass extension is achievable with the filter, but many (perhaps most) audiophiles choose not to use it. Readers should know that the "filter issue" is system- and room-dependent as well as a matter of personal preference.

Tom's comments regarding the benefits of a short stand are "duly noted." We at B&W intend to address this issue, and our aftermarket friends (Sound Anchor, Arcel, and others) are, I'm sure, already at their respective drawing boards. After all, "nirvana" is at stake here!

As Tom rightly points out, the competition in this price range is very stiff indeed. The bigger Snells, three-piece Genesises, and Apogee Stage ribbons do their "things" well, but given the major-league levels of performance which Tom accorded our Matrix 804, the practical considerations of system matching and cost, economy of size, and placement flexibility should record even more points in favor of the Matrix 804.

Chris Browder
B&W Loudspeakers of America

Soundstream T-1 FM/AM tuner

Editor:
It is important to note that the T-1 tuner was designed to perform at its best with strong FM stereo frequencies and the use of a high-quality FM antenna. With the goal of providing a very musical sound, and remote control through our Simulsource whole-house system, several design compromises had to be made. Overall, we believe that the listener will be very pleased with the sound quality and the ability to remotely control the tuner through the use of remote keypads and infrared repeaters.

Scott A. McAllister
National Sales Manager
Home Audio Division, Soundstream

Audio Express
NoiseTrapper Plus & 2000 power-line conditioners

Editor:
One point we should clarify in CG's review: isolation transformers (like we use in the NoiseTrapper Plus and 2000) eliminate the need, or even desirability, of using MOVs to suppress voltage spikes. MOVs have some measurable response time to voltage spikes, while isolation transformers have a zero response time, because the transformer itself isolates the output from the voltage spike. This is textbook stuff—if you have an isolation transformer, you don't need MOVs.

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per Plus and 2000 in combination was the best in this group. Predictably, *we* also think the Plus/2000 is the best combination available.

Finally, let us put in an extra plug (hah) for the NoiseTrapper Powerstrip used throughout the testing procedure. As Corey says, it is an "all-out version of the el-cheap0 six-outlet strips" (besides, the Powerstrip has eight outlets). We think it is bizarre to have multi-thousand-dollar amplifiers and crossovers plugged into an $11 outlet strip that is not even as good as the wall outlets.

Thanks for the kind words and the space. **Steve Giunta**

... and the rest of Audio Express

P.S. Isn't it time that power-line conditioners were given their own category in "Recommended Components"? The best-value line conditioners are very nearly "universal products" — which, to us, puts them out of the accessory category.

---

**Audio Power Industries**

**Power Wedge Model 1**

**power-line conditioner**

Editor:

Thank you for the fine review of our Power Wedge power-line conditioner. We're well aware that the words "highly recommended" are not accorded lightly, and we are deeply appreciative.

We were impressed by the parallels between your experiences and the reactions of others who have installed Power Wedges in their systems. There can no longer be any doubt that power-line problems cause significant degradation, and that a well-made, properly designed device like the Power Wedge can make a profound sonic difference.

We’re delighted to be able to contribute to the enjoyment of music by our fellow audiophiles. **Gerry Daunt, Les Edelberg**

Audio Power Industries

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**Counterpoint PAC 5 & PAC 15**

**power-line conditioners**

Editor:

We thank Mr. Greenberg for taking the time to review the Counterpoint PAC Filters.

We designed the PACs to meet two goals: *protection and purification*. As Mr. Greenberg suggests, Metal-Oxide Varistors can offer a substantial degree of protection from high-voltage power-line "spikes," but readers interested in following Mr. Greenberg’s lead by installing MOVs in their own equipment should approach this project with extreme caution, as they should any project involving modifying (or even touching) the AC Mains circuitry of any electrical device.

Further, the PACs accomplish their goal of purifying the power line of both high- and low-frequency rubbish by using a sophisticated low-impedance bandpass filter tuned to 60Hz. This is a unique approach quite apart from the common isolation-transformer-with-Corcom-RFI-filters, and will therefore offer a sonic presentation different from the other filters; as Mr. Greenberg noted. So his advice to interested parties that they listen for themselves is, as always, the best advice.

Finally, it should be noted that we never told Corey to stuff peppers in his ears, though this idea, like many, is not entirely bad, and indeed has a certain amount of appeal. (Just kidding.) **Michael Elliott**

President, Counterpoint Electronic Systems, Inc.

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**Ensemble IsoTrans**

**isolation transformer**

Editor:

Times a-changing—"libations" are not offered up any more but are "sucked" by the believers. Small wonder that even "lemonade" causes great carousing among them. Who are these indiscriminate gods?

Readers of Corey Greenberg's review will be grateful to learn that a transformer has "a lot of copper wire wound 'round its core," and that the Ensemble IsoTrans is just one of them. But how can CG have overlooked that, with its two legs, the Ensemble IsoTrans is a real babe of a transformer? Shall we thank "Zeus" that this has spared our product a shower of "hot-rod," "monkey-bone"—shaking language?

There are transformers and transformers. The Ensemble IsoTrans is one built to the highest possible standards. Vacuum-impregnated and housed in a welded steel case, coated with a resistant lacquer, the IsoTrans has low induction, low noise, and lowest magnetic radiation. It’s constructed in a symmetrical configuration; *i.e.*, with primary and secondary windings on either leg, each winding isolated from the next. Power consumption in idling is thus only a very low 5.6W. It would not be difficult to offer a transformer at half the price buzzing audibly, radiating 6–8 times more, and consuming 30W in idling.

Ensemble on purpose decided against integrating one of the commonly available RFI filter modules, such as the Corcom, as quite a few products already incorporate a filter unit, and it is generally not recommendable to put noise filters in series.

The IsoTrans has internationally standardized IEC sockets on both the in- and output sides. The male IEC on the input side is standard practice on most gear these days. On the output

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*Stereophile, November 1991*
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side is the corresponding female IEC socket. The fitting male plug comes supplied with each ISOTran, allowing the user to wire it on the power strip of their choice. As much as the ungrounded razor-type socket is international practice in CD players, cassette decks, and tuners, Ensemble follows an international standard with its IEC sockets.

The reason for not providing multiple outlets on the transformer is one of intended practicality: the use of a separate power strip allows for more flexibility and does not dictate the positioning of the ISOTrans in relation to the hooked-up components.

CG's idea that the ISOTran is "not up to supplying enough current to any but the smallest amplifiers" does not hold up against reality. Both at WCES and SCES this year, Ensemble had one ISOTran feeding a 100W stereo Ensemble Corifeo and a 50W B-50 Tiger amp simultaneously.

After all, a transformer can be more than just a few copper wires 'round a core. The Ensemble ISOTran certainly is a lot more.

The Boys in Switzerland
(with the nicest girls around blowing kisses to CG)
Ensemble, Inc.

Tripplite LCR-2400
power-line conditioner
Editor:
We must congratulate Corey Greenberg on his diligence in evaluating so many power-line conditioners. We were curious where Corey got the Tripplite, as we hadn't sent him one. We contacted Stereophile and Tom Norton told us he had purchased the unit over a year ago directly from Tripplite.

Having discovered this, we agree with Corey's criticisms of this older unit. We also tested several early production units and were not satisfied with their performance. At our suggestion Tripplite made a variety of internal and external improvements. The newer units we sell look and sound much better. We will be happy to send Corey one of our new units to test.

Strictly speaking, Tripplite power conditioners were not designed to enhance audio sound or video picture. We discovered these side benefits by accident. Most customers purchase the Tripplite to protect valuable equipment from voltage fluctuations and power surges. Tripplite power conditioners are designed to maintain 120V ± 5% during low- or high-voltage conditions and suppress dangerous surges and spikes.

Here's an important note for anyone thinking of using a Tripplite with high-end audio equipment: Tripplite power conditioners are designed for continuous operation. Like many audio components, they don't sound great when cold. Tripplites sound best when left on all the time.

Wayne Schuurman
President, Audio Advisor, Inc.

Arcici Superstructures & Lead Balloon
Editor:
We are most pleased with Tom Norton's laudatory review of the Arcici Superstructures and Lead Balloon. We thank him for the time and effort he put into his report.

There's little to add to Tom's thorough evaluation, but there are just a few points that we feel require clarification.

The Isolation Platform was designed as much for tube products as for use as a turntable base. In numerous tests that we and others have conducted with tube components, the sonic improvement is unquestionably significant. Arcici, to my knowledge, is the only component-stand manufacturer to provide, as an optional part of the stand, damped isolation for tube equipment.

Incidentally, we experimented with using a full layer of Zorbex between the MDF shelves as the peripheral strips we currently use. The improvement we could hear with either turntables or tube components was, we felt, inconsequential. Therefore, we elected to go with the peripheral method as being far more cost-effective. Zorbex is expensive but, fortunately, a little goes a long way.

Regarding consumers making their own shelving, we have absolutely no objection. In fact, we'll be glad to supply the Lexan shelf supports at $2.40 for a set of four.

As to the lack of rigidity of the Superstructure II that Tom was using, we agree. The present Superstructure II has more full welds at the joints, which now make the SSB II almost as rigid as the Lead Balloon. This additional welding made it necessary for us to increase the price of the Superstructure II to $190.

By the way, if an audiophile is contemplating buying the SSB II only because of the additional 2" depth he may require for his turntable, we would suggest using an IP-2 (the deeper isolation platform) on a Superstructure I by merely placing the IP-2 across the top of the SSB I.

The Lead Balloon was originally conceived as a dedicated stand for a turntable. We still believe that, sonically, this is the most desirable way to mount a turntable. Most, if not all, turntable designers share this view. However, we are well aware that, because of constraints of space and/or budget, compromise may be called for. Therefore, after a number of requests by consumers we decided, as an accommodation, to provide the means for adding shelves.
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In addition to BxW, we are proud to offer components from the following: Bryston, Madrigal, Magnepan, Magnum Dynalab, Mark Levinson, Theta, Vandersteen, Wilson Audio and others. Each one, musically accurate—the Definitive difference.

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or isolation platforms within the Delta Tower of the Lead Balloon. But even this was essentially for such things as records, outboard power supplies, or components that were not in use while the turntable was being played (such as a tuner or CD player).

Finally, the Superstructure Ila Lowboy, at 25" high, makes an excellent TV stand. In addition, it has space for four shelves for a video tuner, VCR, video disc player, or storage for video cassettes. It can be placed between two Superstructures, or next to one, to form a home entertainment center.

Our goal, at Arcici, is to make component housing part of the audio system, providing sonic benefits as much as convenience (watch for our new RF Screen/Shelf!). We value Stereophiles as a forum in which to present our products, and thank you for including us in your survey.

Ray Shab
President, Arcici, Inc.

SimplyPhysics Isostand
Editor:
I would like to make a few comments on the fine review of the stands Tom Norton analyzed in the “Racking It Up” article.

1) First let it be said that in Tom Norton, Stereophile has one of the top reviewers being published today. Congratulations to you, Tom, for being one of the most accurate and believable writers extant. I personally enjoy reading your reviews; keep up the most excellent work, dude!

2) The Isostand™ was actually designed to be the base to our DarkStar™ phono system. Due to customer demand we adapted the Isostand for use as an isolation stand for other turntables. I have also found that placing sensitive CD transports or players on the Top Plate and leveling them can offer amazing sonic results. Digiphiles should consider maximizing the isolation of their gear also! The inclusion of the inner shelves was considered so that the audiophile could place the phono preamp as close as possible to the turntable, minimizing the length of the phono cable—a very critical sonic parameter. In digital, this would relate to a shorter digital link from transport to processor. The fact is, most preamplifiers do fit inside the Isostand. Where the depth-clearance problems arise is usually with large video or digital components. To address this problem, we also manufacture a wider, deeper, four-post isolation stand called the Maxistand™. This stand is not as rigid as the Isostand (as Tom noted with the Arcici Superstructure as well), and it is harder to adjust for level. SimplyPhysics recommends the Isostand, therefore, for use with “front-end components” and sensitive preamplification electronics. Larger components, video disc players, cassette decks, etc. should be placed in a separate Maxistand, or in a stand such as the Arcici or Target.

3) Tom Norton and Dick Olsher, the Hans und Franz of Stereophile—they are not such girly men after all! I bet you could snap the Isostand in half like a chicken bone. It pleases me that you and Olsher have been pumping up again. Arnold would be proud!

Kidding aside, there really is no cost-effective way of making the Isostand more rigid at this size and at the price level. And as Tom notes, there really was no detrimental sonic effect found. As I stated before, the intent is to put preamps, CD players, and D/A converters in the Isostand—basically lighter-weight stuff. Loading it up with massive gear is not recommended. Custom Isostands can be ordered with additional crossbraces at the middle of the stand for $100 extra if you feel the need, but then we start inching toward the price of the top rigidity champ—the Sound Anchor Stand—and I’d rather you bought one of their stands if you need the extra stiffness—he has an excellent design, and why should I duplicate that at the same price? What we have accomplished here in the stock Isostand is a niche product perched between the expensive super products and the cost-effective but compromised Lead Balloon. If you’re pumped up like Tom and Dick, custom-braced Isostands can be ordered. However, readers should note that out in the field are many satisfied Isostand customers with $5k+ phono systems displayed upon stock Isostands with no detrimental results . . .

4) The Arcici Lead Balloon can be improved with our products in three ways. Order the ¾-20 Small ToneCones™ for under the Lead Belly instead of the small metal spikes. Next use the Isojuster™ machined-alloy levelers instead of the stock caps and bolts at the top of the tubes in the Delta tower. Then buy the Large Tonecones™ to use on the bottom of the stand as feet. Arcici has done an excellent job of making minor tradeoffs to keep the Lead Balloon cost-effective; these SimplyPhysics “tweaks” will be cost-effective improvements to the Lead Balloon at any point after purchase.

Thanks again for the enjoyable review and the opportunity to make these comments!

Rick Roberts
President, SimplyPhysics, Inc.

Sanus Systems
CF45 Component Foundation
Editor:
We would like to thank Thomas J. Norton for his review of the Sanus Systems CF45 equipment rack. We certainly agree that the CF45 is
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not a wallflower. It is pleasing to us that Tom found our design the best-looking of the reviewed units. Avoiding the utilitarian look associated with performance furniture was one of our primary design objectives for the Component Foundation line. We are also pleased that he made special note of the modular design of our line, and found it the most suitable choice for full-up audio-video systems. The one point that we felt was not clearly made in the review is that Component Foundations have the widest and deepest shelves and will accommodate larger components than other models tested.

The only strong criticism for the CF45 was in regard to ultimate rigidity for an unqualified recommendation for turntable use. Tom noted that shorter racks are inherently more rigid, and also that our shorter CF35 may be a good choice for a turntable stand. We are a bit confused by the choice of our 45"-tall CF45 for this review. Our 35" CF35 would have been a better selection in terms of comparing rigidity since it is the same height as the other units tested. We feel the best height for a turntable stand is between 2' and 3'. Our model CF35 and forthcoming model CF25 are more rigid and stable than the CF45. For this reason they _may_ be a better choice for upscale turntable use if there is significant activity in the room during serious listening sessions.

Although Tom did not want to draw any draconian conclusions from rudimentary tests, it appears that to some extent he has done just that. The only way to make the CF45 achieve a fore-and-aft swaying motion that takes several seconds to die out is to give it a very hard rap in the upper portion of the structure or to grab it near the top and shake it very hard. This rapid impact in the upper part of the rack is not similar to the more gradual type of motion that is transferred to the bottom of a rack through wood floors. Certainly statements such as "to preclude an unqualified recommendation for use as a turntable support" cannot be drawn from "grasping one of the columns and shaking it vigorously." This procedure obviously is not going to be encountered in normal use and does not relate to how solid and quiet a turntable stand is. Again, we would have suggested a CF35 or CF25 if we had known the review would be focused on this procedure for performance evaluation; their shorter columns make them much more rigid.

The other performance area that is addressed by some of the tested designs is freedom from resonance. Little comment was made about this aspect of the various racks in this review. It was mentioned that the Fountainhead Trim Kits had an "unpolished and rather drab" look.

We have altered our finishing process, and product shipped since June 1 is significantly more glossy. People who have purchased Fountainhead Trim Kits or Reference Foundation loudspeaker supports prior to June 1991 and would like a higher-gloss finish may call Sanus Systems at (800) 359-5520 and ask for Customer Service. We have a simple technique for giving the Fountainhead a very polished look.

We are very pleased that _Stereophile_ has given some deserved attention to this often overlooked product category. Our only criticism is that the performance comments were not based on any type of standardized test procedure or, more importantly, on listening experience. Thank you for the review, the recommendation for general equipment use, and the qualified recommendation for turntable use.

Jim Wohlford
Sanus Systems

AudioPrism CD StopLight

Editor:

We would like to thank Peter van Willenswaard and _Stereophile_ magazine for their thorough and objective reporting on CD StopLight.

CD StopLight was designed to improve the sound of CD playback. In the design of this product, we used three pieces of test equipment: the Hewlett-Packard 11P3561A, a spectrophotometer, and our ears. The result of our efforts is that CD Stoplight is safe to the polycarbonate disc, applies easily, and improves the sound.

The world would not be what it is today had it not been for the quest for increased knowledge and experimentation. However, tinkering with products that are not designed for treating the edge or surface of a CD can be, at best, a hit-or-miss proposition without the proper test equipment.

It is our opinion that a subjective improvement can usually be correlated with technical findings and possibly some quantifiable measurements. We say "possibly" because we cannot always measure what we hear. Either the equipment or methods with which to test may not exist at the present time. Looking back 20 years ago, we could not dream of testing and measuring with the degree of accuracy we have today.

We were impressed with the fact that Mr. van Willenswaard went to the great length of doing an objective test on CD Stoplight. We quickly came to the same conclusion: The Audio Precision test equipment for this particular test would not give us the results needed.

It was decided that a different piece of test equipment was needed to do our measurements. After exhaustive testing, we were able
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to measure an improvement in the signal using the HP 3560A signal analyzer. Making this measurement was not easy because the signals on most test CDs only last 30 seconds, which made it more difficult to average the results given by the test equipment.

We made these test results available to Robert Harley and John Atkinson before and during the 1990 Summer CES Show. These test results indicated an accumulative improvement to the analog output of a Sony X7 CD player. In addition to the signal-analyzer measurements given at this time, we also presented them a graph, made using a spectrophotometer showing the absorptive and reflective qualities of CD StopLight.

The improvement in sound quality when you use CD StopLight will vary from disc to disc due to differing edge contours. CD StopLight will show greatest improvement on CDs that have straight vertical edges. Slightly irregular or rounded surfaces will usually not show as much improvement. But it is certainly worthwhile treating at 10¢ a disc, and with the peace of mind that this product has been engineered, tested, and is completely safe to use on your discs.

CD StopLight should be applied to a pristine disc. We recommend washing the disc to remove body oils and the mold release used in the manufacturing process. Should you desire to apply a surface treatment, it is recommended that CD StopLight be allowed to cure at least two hours. Normal drying time for CD StopLight is two minutes at room temperature.

We recommend pushing the CD StopLight applicator straight down against a paper blotter and holding it in place to wet the tip. Pumping the applicator may cause the tip to collapse. Free replacement tips are available on request. Should your applicator need a new tip, or any other questions arise about this product, please contact AudioPrism at (206) 222-4295.

William Rasnake, Byron Collett
Clear Image Audio
Sam I. Lewis, Victor M. Tiscareno
AudioPrism

Finyl

Editor:
As a long-time audio lover, I am always delighted to read an article as informative and objective as Peter van Willenswaard’s “To Tweak or Not to Tweak.” His inclusion of amplitude-error and timing-error distortions, as well as products manufactured to deal with digital retrieval, should be useful for everyone in audio. There is still so much to learn. Mr. van Willenswaard has taught the audio industry much in this article.

One thing that was not included on the
application of Finyl is that Finyl comes with an edge-treatment buffer. Just as the article said that Finyl "did make the sound more open, direct, and dynamic," edge treatment will give an additional (and similar) improvement for no additional cost. Finyl edge treatment acts much like Finyl surface treatment, as Mr. van Willenswaard states, "minimizing the diffraction of stray light."

A great article. Bravo!

Douglas Blackwell
VP Sales, Transparent Audio Marketing

LAST Formula 6
CD Protective Treatment

Editor:
Our hats are off to Peter van Willenswaard for the depth and breadth of his review of CD accessories. The preparation of the article required a great investment of time and effort.

One point should be clarified. LAST System Formula 2 does not harden the surface of vinyl records. It does stabilize the vinyl surface and reduces the free surface energy at the vinyl/stylus interface. Similarly, LAST System Formula 6 CD/Laserdisc Protective Treatment does not harden the surface of the polycarbonate plastic. It does clean and protect the surface from fingerprints, minor scratching, and scuff abrasion. No one, other than equipment reviewers, drills holes in their CDs. Many listeners do, however; listen to CDs in their cars, on portable machines, or in other less than ideal environments. And, they do not always give their discs the care that should be given them. A clean disc has the potential for always sounding better than a dirty or damaged disc.

All of us who care about music owe a vote of thanks to Mr. van Willenswaard for his research and to Stereophile for publishing the results. It is important to remember, though, that even in the digital domain, we can hear and perceive differences at the end of the audio chain which we are currently unable to measure or correlate. Regarding digital audio, we (collectively) are still on the steep part of the learning curve and will be for some time to come.

Walter Davies
The LAST Factory

Reference Recordings

Editor:
Reference Recordings has one correction to Arnis Balgalvis's "Industry Update" column in the September issue. We do not intend to reissue any of our existing catalog in new mastering. There would be no benefit to remastering our existing titles. Many of them were half-speed mastered originally; others are excellent real-time masters done by Doug Sax and other great cutting engineers.

Our modified half-speed mastering lathe will be used for all new Reference Recordings LPs (starting with RR-38, Fiesta!), and, whenever possible, for LP reissues made from licensed masters.

Marcia Martin
Marketing Director, Reference Recordings

GinS loudspeaker

Editor:
I am president of Gin Sound Co. in Korea, and also invented the Gin Sound speaker system by myself.

First of all, I appreciate your interest in our GinS speaker by writing the article on "Chicago CES 1991" in Stereophile [August 1991].

Also, I am sorry for your discomfort while you were watching and listening to our products.

Our product is not a perfect one. Therefore, you might be right.

I had not been an electronic engineer for speaker systems at all. I am a conductor of a choir now and was a music teacher in high school until last year.

By pursuing better sound for many years, I came to make the speakers.

But our current model seems to be coarse and loose from the viewpoint of professional people.

For your reference, I would like to inform you of the following:
• Our speakers have neither the network nor the driver inside. That has only two coaxial units for sound generating and the back sound coming out from the brass horn through the collecting tube being U-turned. It is the same principle as the musical instruments.
• The more important thing is we never used a piece of tuba horn for our speakers because our horn was designed and made by my own invention which was the first thing in the world.

We already have patents from the US and UK.
We [exhibited] at the International Audio Fair three times before we went to Chicago Summer CES.

Many people came to see our GinS speakers and they were very interested in our speakers for the unique design as well as the sound itself.

I want your criticism in the future continuously, and look forward to having your reply as soon as possible.

Thank you.

G.K. Jung
President, Gin Sound Co.

Audile ACT I loudspeaker

Editor:
My thanks to Peter Mitchell for mentioning our ACT I digitally corrected loudspeaker system in his CES report (Vol.14 No.9, p.51). I am par-
icularly proud that it was mentioned in the stratospheric company of the new Apogee Grand. I also appreciate the fact that Mr. Mitchell and others at Stereophile share our excitement over the DSP measurement and correction technology we have developed here at Audile. It is unfortunate that he was unable to make it to our room prior to the last 45 minutes of the show, as I would have enjoyed spending the additional time explaining the finer points of the operation of our system. As it was, I was only able to briefly touch on the design principles and measuring techniques we use.

There are several things from the report, therefore, which I feel require some clarification. First, a minor point. The name “Audile” is an actual psychological term no longer in common use. If you locate an older dictionary you will find a definition along the lines of: “one in whose mind auditory images are particularly distinct.” This name was chosen because we feel that the capability to represent an accurate soundstage is one of the highest priorities for a sound reproduction system.

Of course, everyone here agrees that DSP will allow us to move into the future of sound reproduction for both the high end and with hi-fi-sounding, mid-fi-priced systems. We hope that, just as the word “digital” became overused when it was introduced and has settled down now to represent what it really is, the term DSP will evolve from its present connotation of a “flashy” accessory to represent the umbrella technology it really is.

As to Mr. Mitchell’s concerns over the availability of measurement microphones with high-resolution response curves: Brüel & Kjær’s model 4143 calibration device is capable of plotting the response of their microphones to within 0.005dB, as attested by the accompanying data sheet. This is a pressure-response measurement which must then be corrected for free-field response using mathematical models of the change in response.

Our ACT 1 speakers are measured at two meters for the correction procedure. Because the ACT processing module is also correcting for diffraction and occlusion effects caused by the tweeter’s forward mounting, as well as cabinet diffraction and resonances, measurements that are made more and more closely to the face of the speaker will cause the response to change. These changes are subtle at further distances but become quite noticeable at very close ranges. I have provided measurements at various distances obtained here at Audile’s testing facility, utilizing a testing room large enough to provide more than 10ms of “clear” time before the first reflection. These plots depict the relative effects of measuring too near the surface of the speakers. The measured anomalies at this range are caused by diffraction between the corners of the enclosures and the drivers themselves. Because of our unique geometric enclosure design and the processing technology applied, these anomalies disappear entirely at a distance of 4.5’—much nearer than any reasonable listening distance.

I have also included the same measurements in a normal listening environment not unlike our room at CES (same dimensions, wall treatments, etc.). When the reflections are included in the measurements, as they would be with a third-octave analyzer such as Mr. Mitchell’s, it becomes obvious that it is impossible to accurately measure the response of our system. This inability to accurately measure in a listening room with a 1/3-octave analyzer is caused at near ranges by the distortive effects addressed above, and at further distances by various reflections off floors, wall, ceilings, etc., which pollute the measurements.

The problems associated with any nearfield speaker measurements are exaggerated by the application of our processing technology. The subtle cancellations and reinforcements which occur in the near-soundfield around the speaker and move outward to become the speaker’s direct and polar response do not measure as they would in conventional systems, because conventional systems do not take into account the contributions of cabinet vibrations and diffraction to their final response curves. Our unique DSP technology allows us to utilize this additional energy to augment the direct sound. The result of this capability is the “nicely focused soundstage” which caught Mr. Mitchell’s attention, and that of nearly every other visitor to our room as well.

Again, we appreciate your interest, and look forward to getting review samples of the ACT 1 to you as soon as possible. Robert Kay

President, Audile Inc.
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Ralph—The Real Dog

Ralph died last week (September 11), his great and faithful heart stopped in the aftermath of an affliction not too uncommon for older, larger dogs—a gastric torsion. He was approximately 12 years old.

I’m finding it very hard to get used to the post-Ralph era. My history with Stereophile was only four months old when my daughter Rachel and I happened across Ralph at the Santa Fe Animal Shelter in June 1982. I was still operating my repair shop for needy Mercedes-Benzes, Porsches, and BMWs, and can well remember the fateful message from the Animal Shelter that “Ralph” (as Rachel and I had named him before even getting to take him home) had not been picked up by his owner during the Shelter’s three-day waiting period. Our joy at this new and exceedingly friendly animal was hard to contain, though Rachel had a hard time handling her anxiety that Ralph would abandon us in the same manner he had abandoned his previous owners—or had they abandoned him?

We didn’t know, but her anxieties proved unfounded. Ralph enjoyed a rambunctious nine years with me, Rachel, Laura Chancellor, Stereophile, and all visitors, spending only four days “at large” back in 1987 when he got side-tracked by a kind man on Santa Fe’s plaza, perhaps led astray by a gourmet hot dog. (Ralph was not the kind of fellow who looked a gift hot dog in the mouth, not to mention seriously lesser fare.) Ralph’s absence those four days provoked near-paralysis at Stereophile, with virtually the entire staff doing shifts on tour around Santa Fe and on patrol at the plaza, in hopes that Ralph would reappear. Fortunately, the $75 reward proclaimed on numerous posters caught the attention of Ralph’s “captor,” and he came home.

His presence since has been an anchor for Stereophile and for me. Once, when asked about my relationship with Ralph, I responded that we were mutual role models. He picked up a lot from me, and I was entertained, sustained, and loved by him. He tried to respond to my provocations and playing; I tried to model myself after his enormous tolerance and good humor.

Stereophile’s relationship with Ralph was more strange. After all, how many magazines about high-end audio (or anything else, for that matter) incorporate articles by the Publisher about his dog, or feature that dog on the covers of two separate issues (Vol.8 No.4 and Vol.10 No.12), or record that dog’s bark for posterity on a Test CD?

Our fascination with Ralph’s uniqueness may be a bit over-the-top, but he was an OTT dog if ever there was one. Ralph’s voice on the Test CD is there just as a lark, but, other than successfully identifying in no uncertain fashion your left and right channels, it turned out to be an excellent test signal for midrange loudness capability! I couldn’t figure out why no loudspeaker could come close to duplicating the live sound of Ralph—he would graciously chime in with howls identical to the test signal whenever we played the Test CD bark repeatedly on a good enough system—until JGH noted that Ralph’s live bark hit 108dB measured at a distance of 6’. Neither home loudspeakers nor home amplifiers feel very comfortable producing 108dB in the midrange.

Ralph was more than a loud voice at Stereophile, though. During our 1107 Early Street years (through March 1987), he lay in the dirt of the parking lot out front, a great slab of dog. Periodically he would reenter the office, shedding the dirt he’d acquired—JA liked to refer to Ralph’s job as moving the dirt in the parking lot into JA’s office, a job Ralph took most seriously.

Since moving to our current quarters at Delgado Street, Ralph has been content to lie on his L.L. Bean dog bed by the front door and greet visitors. This was appropriate, as the first person most visitors wanted to see was Ralph! Although soundbites would have been more appropriate in this case than in most, he was more likely to grant photo ops. Sonic demonstrations were reserved for Stereophile birthday parties, when Ralph’s howl would come forth during the middle of the birthday song.

Life is different now; there seems to be less unreserved tolerance and goodwill in the world. Mark Fisher, Stereophile’s Director of Foreign Circulation Development, Schwann’s Publisher, and one of Ralph’s great friends, said it best: “Ralph always epitomised for me how all dogs should behave: he was a devoted hound, never one to miss a good meal, loyal, and always good humoured.” I, my family, the entire Stereophile staff, and visitors past and future mourn his passing. He was The Best.

Larry Andron

1 The booklet cover illustration is the waveform of Ralph’s bark.

—JA

Stereophile, November 1991
The sole value of an audio system lies in its ability to evoke emotional pleasure through the accurate reproduction of a musical event.

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Over the last 12 years AudioQuest has continually improved and refined its cable designs to reduce all types of cable-induced distortion — and, to do it cost-effectively. Many different constructions and grades of copper and silver are used depending on the budget.

AudioQuest F-18 speaker cable is one of three very flat cables which use multiple-solid conductors. The sound is sweet and clean because strand interaction is eliminated, while skin-effect and resistance minimized.

AudioQuest Indigo Hyperlitz® speaker cable uses geometry similar to our most expensive cables, yet is very affordable. The spiraled solid conductors maintain an absolutely consistent position and are far enough apart to prevent magnetic interaction. The clarity, dynamics and sense of acoustic space are incredible.

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