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Introducing the ACD-11, The first CD player engineered to the Acurus standard of quality and value.

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ACD stands for Air Constrained Dampening, the highly advanced Acurus suspension system. At the core of our double isolation system is a newly developed microcellular elastomer which constrains the air within the cellular structure to dampen vibrations. The custom designed drive mechanism floats on two of these air suspension systems. The laser lens is made from fine optical glass versus the plastic lenses typically found in CD players. The clamping mechanism covers a far larger area of the disc than usual. This combination of technology yields a CD drive with unsurpassed laser focus and accuracy.

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A newspaper can float an advertiser... but if it alienates the buying public, it loses the one indispensable asset of its existence.”


I recently relaxed with a book that is essential reading for anyone involved in magazine publishing: Thomas Maier's biography of publishing magnate Si Newhouse (Newhouse, St Martin's Press, 1994). As well as Random House Books and a slew of cash-making local newspapers, the billionaire Newhouse family owns Condé Nast, which built its fortune with *Vogue*, its journalistic reputation with *Vanity Fair*, and its empire by acquiring *Architectural Digest*, *The New Yorker*, and a major shareholding in that demographic darling *Wired*. Mr. Maier goes into some detail on Newhouse’s takeover of *The New Yorker* because of the clash between *The New Yorker*’s set of values, where the strongest possible “Chinese Wall” existed between the magazine’s advertising and editorial departments, and those of *Vogue*, where the editorial content is often hard to distinguish from the advertising.

All publications have to decide how insurmountable that wall should be. *Stereophile* bases itself on the old *New Yorker* in that its wall is as high as it can be: the magazine’s two advertising representatives and even its Publisher, Larry Archibald, don’t see the contents of an upcoming issue until after it has been sent to the printer.

So how, then, am I to explain the misperceptions to be found in the letters from Toni Larson and Justin Havemann in this month’s “Letters” section (pp.24–27)? “You have ruined the magazine...” thunders Mr. Larson, adding that “the real business of Stereophile is to generate ad revenue...”. Gordon Holt’s first priority was to his readers. Yours is not.”

First, I don’t believe that a lack of commercial success necessarily equates with a publication being honest. Surely it is possible for a magazine both to turn a profit and to serve its readers’ best interests? Second, while it is true that most *Stereophile* reviews are positive — and Justin Havemann is correct when he states that most components we review show up in “Recommended Components” — this does not mean that we pander to our advertisers.

Even though *Stereophile* publishes more reviews of more components than any other US audio magazine, we can do no more than scratch the surface of what is available. The essential mechanism for winnowing down the list of potential review candidates is the enthusiasm of our writers. They seek out what excites them, the products that get their creative juices flowing. This automatically means that the products that get ink spilled on them tend to be the ones that hold the most promise of sounding good. Not surprisingly, most of them are recommended — though not always without reservation, as you can read.

Whether a company advertises or not in *Stereophile* is irrelevant when it comes to our choosing which products get reviewed. It is also irrelevant when the magazine’s reviewers arrive at their value judgments. *Stereophile* gives good reviews to products whose manufacturers advertise. We also give positive reviews to companies that have never shown any sign of wanting to advertise in *Stereophile*. We give negative reviews to companies who don’t advertise; *Stereophile* also gives bad reviews to companies that do. All that matters to our writers is the sound of the components they review. *Stereophile*’s highest priority is to its readers.

My mentor John Crabbe, the erstwhile editor of the UK magazine *Hi-Fi News & Record Review*, explained it thusly: If you tell the truth about components you review, there will always be a small percentage of companies at any one time who are not advertising in your pages. But if you publish the truth, you will have a good magazine. And if you have a good magazine, you will have readers. And as long as you have readers, disgruntled advertisers will eventually return. But if you don’t tell the truth, you won’t have a good magazine. And if you don’t have a good magazine, you won’t have readers, at least not for long. And if you don’t have readers, you won’t have advertisers. In publishing, as in all things, honesty is the best policy.” — John Atkinson

**Peter W. Mitchell**

One of the mainstays of *Stereophile*’s “Industry Update” column, Peter Mitchell, passed away on the eve of the 1996 Winter CES. E. Brad Meyer and Larry Archibald pay tribute to Peter elsewhere in this issue but I would like to add my own comments. Yes, Peter was one of the brightest people I have had the fortune to spend time with. His mind was as sharp and as speedy as his physical frame was slow-moving. I learned much from Peter, particularly regarding the art of recording, but to me, his greatest attribute was tolerance. Peter and I disagreed on many matters to do with audio, but he paid me the respect of taking what I had to say — and publish — seriously. In an electronic world where the enhanced freedom to communicate results more in flames than in light, arguments with Peter led to illumination rather than conflict. His technical knowledge underpinned *Stereophile* in a manner that I suspect was not widely appreciated. We shall miss him.

— John Atkinson

**Errata**

A couple of corrections: Wes Phillips’s crabbed scrawl caused him to cite Derek Henry as the helpful MB Quart technician who installed speakers in the Great White Rhino (Vol.19 No.2, p.79). It was, in fact, Derek Kenney. In Jonathan Scull’s interview with recording engineer Gabe Wiener in February (p.49), we unfortunately misspelled Gabe’s name in the text (although we did get it right in the photo captions). The composer mentioned was Ristori, not Restori. Sorry. — John Atkinson
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The Kevlar cones used in the new B\&W 600 Series reduce standing waves to minimize coloration – whether you're listening to music or watching movies.
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Stereophile, March 1996  Vol.19 No.3
SINGLE-ENDED CLASS A

CARY. A WORLD-WIDE STATEMENT IN AUDIO AMPLIFICATION.
If you're like most of us, recreating the emotions of a live musical experience in our homes is more a dream than a reality. The single-ended series of triode amplifiers from Cary Audio genuinely brings that dream closer to reality.

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A Cary Class A Triode is an amplifier you “feel”. An amplifier that delivers “goose-bumps” and “raised hair” as you transcend into the dream of live music in your home.

Please audition and look at one of the Cary Single-Ended Class A Triode Series Amplifiers at your favorite high-end authorized Cary Audio Dealer.
AMAZING
Editor:
Ever wonder why you can be listening to the car radio while you’re driving along, and just drift off into your feelings in the music? … thinking to yourself, I’ve gotta find out what piece this is. It was so good! I’m sure you’ve experienced this at one time or another. No high end! No accurate measurements to be worried about! A simple radio! Amazing! And to the point…

A “true audiophile” in the end learns that through all the tens of thousands of dollars spent, you truly only need to relax to “hear” the music. Sure, better equipment makes “better sound,” but not necessarily better music.

After spending $40–$50 thousand on audio and video over the past 10 years or so — and reading Stereophile, etc. — I’ve been unlearning my art as an audiophile.

Now I enjoy audio and video on whatever. It’s the music that truly draws us in — not the equipment. The feelings, even in live events, more than the violin or guitar used, amplifiers, etc. Music is as much life as is speech. It has depth, but not in an acoustic sense. Truth of the soul, not of timbre.

This debate of truth in measurement vs sense of music as we listen can only be answered in your heart. That’s why each designer’s pièce de résistance has its own “sound,” tube or solid-state.

Yes, Mr. McConnel (“Letters,” December, pp.17–21), you can argue, using technical analysis or your own, but that should never be the defining point of high-end. As you transcend your own life and philosophy, what really matters and lives on — is not the equipment.

Joseph Hohlman
Albany, NY

HELLO
Editor:
Is it just me, or are your readers getting ticked off reading an increasing number of letters from whiners? I purchased Stereophile at the newsstand for at least six months before deciding to subscribe. I was well aware of the equipment that was reviewed and the style of the various contributors. I would much rather read intelligent letters from people with something to contribute than some drivel from a person who buys his Home Theater from Circuit City to watch Married With Children in Dolby Stereo.

Andrew Patrick
Milton, ON
Patphoto@io.org

GOODBYE
Editor:
Thank you for a fun half-decade of sheer delight! It has been most enjoyable indeed. But I have purchased the Meridian 518 processor JA reviewed in January, some sound cards and music software for the ol’ PC, and am generally flying the flag of the Computer Camp. I’m not kidding myself, it’s not hi-fi … yet, but it’s one fun sandbox to play in! Anyway, it’s not goodbye. I’m sure that I’ll be seeing you guys again in five years when a fair portion of your advertisers will probably be selling computer software. I’ll then be about time for a nice hardware upgrade!

Please refund the unused portion of my subscription, and I’ll see you in the year 2000.

Steve Osborn
Irvington, NY

SORRY
Editor:
As a new subscriber, I am writing to say that I’m extremely disappointed. Stereophile is the best audio magazine available, bar none, but your mail subscription service leaves a lot to be desired.

In future, I will just buy the issues when they appear at my newsstand — that way, at least, I am assured of getting them on time (although I would have to pay more!). It’s very frustrating to have to wait about three to four weeks for my copy to arrive, long after Stereophile has already hit the stores. Calling and complaining about the late delivery has not been effective — so please cancel my subscription and kindly refund the rest of the money paid.

Margaret Fue
Richmond, BC, Canada

We value our readers and try to serve them efficiently, but it’s always possible for things to go wrong. If you’re having subscription problems, the first thing to do is to make a toll-free call to our subscription service at (800) 444-8908, 8am–4:30pm, P&T. Remember, however, that the number of operators is limited, and if you call at a popular time — 8am on a Monday, for example — you may have trouble getting through. If you can’t get satisfaction, then you can e-mail Stereophile’s Customer Service Manager, Molly Crowshau, at 103230.635@compuserve.com, or call her in person at (505) 982-2366. If the indefatigable Molly can’t resolve things, then it’s probable that no one can, but as a last resort, you can e-mail me at john.akinsson@tanet.com or 74472255@compuserve.com, or fax me at (505) 983-6327.

—JA

SERVICE
Editor:
I wanted to write to you to share the high degree of professionalism at Linn Hi-Fi in Chicago.

I recently bought a used pair of Celestion 100 speakers as an upgrade to my system. The speaker cables I had were good, but as the Celestions are bi-

Stereophile, March 1996
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Bring your key to HIFI '96 at the Waldorf Astoria, N.Y. in May 1996
for a chance to win the centerpiece of the EIGER sound system.

For a key call: 415.572.6170
wirable, I wanted to get a new set of cables. I went to several of the local high-end audio shops and the attitude was unbelievable. Although I cannot spend thousands of dollars at a pop for new equipment, I try to make intelligent decisions based on what I read in your magazine and word of mouth.

Anyway, I went to Linn thinking that if their equipment is as good as it is, the cables must also be good. I found the manager of the store to be very friendly and courteous, and he actually sat down with me and discussed their cables and Linn in general. These cables sounded unbelievably good. I waited a week and returned to the store and spent almost an hour discussing my future purchases, and talking about Linn and their equipment in general.

When I left I knew what I wanted to do this coming year, and even if it meant paying full price (something I almost never do), I would spend the extra money because of the time they took to explain Linn products and the advantages of buying high quality as a long-term investment.

These guys are real professionals, and I think they look at their customers as long-term investments — obviously a lot of other high-end dealers don’t. DONALD PATTISON
Chicago, IL

QUALITY
Editor:
Let me begin this letter by thanking and congratulating the staff at Stereophile for producing an enjoyable magazine of the highest editorial and production standards. I’ve been a consistent reader since 1987 and have found Stereophile’s chronicling of the technical advances in audio superior to that of any other magazine. Whether or not I’ve been able to participate in all of these advances (cutting-edge audio gear is usually beyond my financial grasp), “Industry Update” and your superb equipment reviews and feature articles have at least kept me conversant in things audio.

My somewhat limited credentials as an audiophile are buttressed by my professional training: I’m an orchestral conductor and performing musician (percussion and timpani), a teacher of music theory and instrumental music at a fine-arts high school, and a perennial student (I’ll complete a DMA in conducting sometime this year). It’s from this perspective that I find myself equally impressed with your writing staff, especially your record reviewers, on purely musical topics. In the December ’95 issue, Wes Phillips’s review of a recording of music by Henry Purcell (Fantasias for the Viols, p.247) provided enough commentary on Baroque harmonic language to satisfy a trained musician. I wonder if the eyes of the musically uninitiated glazed over at the sight of “...constant modulations...irregular resolutions, [a] plethora of appoggiatura, false relation, and such like...” the way mine do when trying to fathom JA’s technical assessments of reviewed equipment?

Les Berkeley’s review of Anonymous 4’s recent recording The Lily and the Lamb (p.283) opened up several topics worthy of discussion. First, this quartet, which has been in the performing arena for the past decade, drew its name from an unmanned traveler whose written comments on and transcriptions of music he encountered in medieval Europe provide an important historical resource for musicians and musicologists.

Second, I would like to suggest that medieval choral music is not “...the least individual of all musical forms.” Medieval composers expressed themselves as abundantly through the forms available to them in their times as did Mozart, Beethoven, Schubert, et al in a later era with sonata, variations, and other procedures. It is only our lack of familiarity which prevents us from detecting variety of nuance and craftsmanship in the music of ancient composers.

Last, I’d like to suggest that the current popularity of Anonymous 4 owes more to the inherent beauty of this heretofore unexplored music, as well as to the quartet’s virtuosic performance of it.

Finally, in his readable and entertaining review of the Ruark Templar loudspeaker (p.217), Wes Phillips left me smiling and nodding my head when he opened one musical and one audio Pandora’s box: What is music, and what makes for a good loudspeaker? Pretty heady stuff to close a review!

May I suggest that a good default definition for music is time art — a definition that leaves out the word tone (which I assume WP uses to mean pitch) and thus does not impede discussion of music when we get to “noisy” musical entities such as percussion and other non-pitched sounds —? The production and arrangement of musical entities in elapsed time (which encompasses meter, rhythm, rubato, dynamics, articulation, phrasing, as well as other musical nuances) then not only describes the talent of a performing musician, but also the resolving powers of a loudspeaker system.

The job of resolving in my house is handled alternately by B&W and Magnepan loudspeakers, powered by PS Audio and B&K electronics, and front-ended by a Nakamichi CD player and a magnificent Oracle turntable.

GARY A. ROBINSON
Greenville, SC

QUALITY WE CAN AFFORD
Editor:
Thanks for Robert J. Reina’s and Wes Phillips’s reviews of the Creek 4240 Special Edition integrated amplifier and Ruark Templar speakers (December ’95). I hope to see more reviews of “value” components for those of us who want to put together a moderate-priced system of quality.

Yes — more on Arcam, Exposure, Spendor, and Mordaunt-Short (a speaker brand I recall from the past)!

MARVIN B. WINTER
Pittsboro, NC

QUALITY ANYONE CAN AFFORD
Editor:
“Holy Smoke! I gotta write to Stereophile about this!” exclaimed my husband after the latest improvement to his stereo. But, after his initial enthusiasm, he “jammed.” I told him if he wasn’t going to write, I would. So here goes, to the
best of my stereo knowledge.

The other day my husband read me another excerpt from your magazine. It was from Shannon Dickson's recent article on the Townshend Seismic Sink (November '95). He told me that the author said that the best way to isolate equipment is to float it on air. So a light bulb appears over Gerry's head. Like other stereo tweaks (ie: his amp clamps), he figures he can rig up something homemade for cheap.

But how? After explaining he needed something inflatable that would support a fair bit of weight, I suggested an invalid ring. This is an inner-tube-like device available at your local pharmacy for about $10. So we brought home a 14" ring and placed it under the ampl-clamped transport. We both couldn't believe how much life it infused into the system. So, enthused by the improvements, my husband decided to take his experiment one, or should I say two, steps further. He bought two more invalid rings and put them under the ampl-clamped preamp and processor. We sat back to listen. How! What a difference.

This concept of floating the equipment on air really works. We do realize that the products sold by Townshend Audio mentioned in the article are more effective, probably producing even greater gains in music quality. But we felt the need to share our story with the curious at heart.

My husband would have been much more qualified to write this letter, but he decided not to. I, on the other hand, felt the need to inform others about this. No longer will I give that look that says "Oh, yeah, right!" when my husband reads me something about some strange new audio device.

Thank you for producing exceptional magazines month after month, and thank you for listening.

KRISTINE BREDDEN
Nanaimo, BC, Canada

CD-PLAYER QUALITY

Editor:
I have been resisting buying separate CD transport and DAC units for some time, and will continue to do so for reasons of cost, jitter control, etc. I will continue to pursue high-end single-piece CD players where jitter control is an integral part of the design, rather than the mix-and-match, trial-and-error (although interesting) exercise with separates and cables.

I'm sure there are various reasons why the High End continues to push separates. I would speculate on some of these, such as more money to be made and differentiation from the mass market. But I will buy from those high-end companies that make high-quality, sonically superior CD players. If enough people prefer single-piece CD players, there will be money to be made.

DAVID WONG
Nepean, Ontario, Canada
wong@bnr.ca

DIGITAL QUALITY

Editor:
I recently found a little and inexpensive miracle in the form of the Theta Timebase Linque Conditioner (TLC). This is not a small tweak, but a major improvement for a mere $200. I haven't seen a review or even discussion of the TLC in your pages, even though it seems to be similar in function to the Audio Alchemy DT1 jitter attenuator, which you regularly mention.

I had both an ancient Magnavox Philips CD650 and a Kenwood 320 laserdisc player to feed CDs into my system, and I wasn't happy with either one. I added a Parasound DAC-1000, which improved detail and bass, but I still wasn't comfortable with either transport and still couldn't decide which was least worst! A friend brought a Theta TLC over to try on my system. There was an order-of-magnitude improvement in detail, smoothness, and comfort with the music. To my surprise, the Kenwood 320 now sounds much better than the Magnavox 650, which is now for sale.

Certainly I could get some improvement by joining the transport/DAC-of-the-month club, but not this kind of major jump. As HDCD® and DVD/HDAD develop, I may make some upgrades, but my music system has evolved to where I am quite pleased.

Some of your CD-hating reviewers should try a TLC in their digital front-ends. Oh, and two TLCs are even better than one!!! ROGER L. WEISS
Lynden, WA

MERIDIAN QUALITY

Editor:

When I purchased my Meridian system — DSP6000, L/R; DSP5000C; DSP5000, Rear L/Rear R; DSP5000, Side L/Side R; M2500 Sub; 562V; 565; 500 — Meridian's Ross Kim suggested I also get the 618 to use between the 562V and 565. Skeptically, I agreed. As it turned out, the 618 was a later arrival, so I had the opportunity to enjoy the system prior to the 618.

As was JA, I was stunned at the "magic" it brought to an already great music/theater setup. It's been in my system for six months. When the 518 was introduced, I wanted to trade-in the 618 for the 518 in order to take advantage of the communication functions it offers. Meridian suggested I buy the 518 to replace the 618, then use the 618 in front of the DSP6000 to further improve the sound. Not to be cheap (just how much magic can one guy take?), but I didn't bite on that suggestion. So, John, wanna trade your 518 for my 618?

I am continually impressed with what Bob Stuart and his team are able to produce with a Motorola DSP chip. God forbid they ever discover the Digital Equipment Corporation 64-bit, 350MHz Alpha chip!

DENNIS ERSKINE
Atlanta, GA
erskine@aol.com

JITTER QUALITY

Editor:
From Robert Harley's excellent report on jitter discussions at the October AES Convention (January '96, pp.41–49), it sounds like the industry is still locked into a cumbersome and expensive way of thinking about the problem. Since its inception, digital playback architecture has suffered unnecessarily from an analog paradigm, which assumes that everything must happen essentially in real time. A vinyl turntable gets just one pass at the data, and there's no place to buffer it. So the turntables for both cutting and playback must go at exactly the right speed and be very steady. The same applies to analog tape.

Digital playback introduces jitter at several unnecessary places beyond the original A/D conversion, because a flawed architecture requires essentially a real-time data stream. A small amount of buffering and re-clocking is used in D/A converter units, but this must still slave to the average rate of an imperfect "master" clock, which depends on the steadiness of the disc's mechanical rotation and on the evenness of the distribution of data on the disc's surface. Some of the jitter from these sources will inevitably leak through the "slave" clock circuitry in the DAC, as will jitter that's added in the digital interconnect scheme. So we're driven to fiber-optic
The digital dilemma answered at last.

Digital separates really do provide superlative sound. The only problem is that most of them begin by separating you from the contents of your wallet. That’s hardly an enticing prospect for those of us who constantly balance our quest for musical excellence with minor annoyances like rent and the IRS.

Fortunately, Rotel has the answer. Our new RDD-980 Compact Disc Transport and RDP-980 Digital Processor combine exceptional sound, unique convenience, and affordability. How affordable? Let’s just say that you’ll have enough money left over for some wonderful concert tickets...or that CD buying binge you’ve been putting off!

Synergy.

The RDD-980 CD Transport and RDP-980 Digital Processor boast circuit sophistication and sound quality far beyond their modest prices. They’re a perfect match. But, they’ll also work spectacularly on their own in your music or audio/video system.

Perhaps best of all, they’re from Rotel, where dependable excellence is a tradition. See and hear them both at your local Rotel dealer. And be prepared to believe.

RDP-980 Digital Processor

The RDP-980 reveals musical nuances with a faithfulness formerly reserved for only the most expensive processors.

That’s not the end of the RDP-980’s capabilities. It switches up to 5 digital sources using coaxial or optical links. It handles sampling frequencies of 32kHz, 44.1kHz, and 48kHz for compatibility with any digital source. And, it features full remote input selection, phase inversion, and output muting.

The RDP-980’s high isolation power supply includes two shielded transformers, one for the digital stages and one for the analog circuitry, and 17 individual local voltage regulator/filter capacitor arrays. The glass epoxy circuit board isolates signal traces and ground planes on separate sides for minimal interference.

Jitter? The RDP-980’s specially selected optical input modules and high speed, wide bandwidth coaxial amplifiers minimize it. Additional circuit stages precisely synchronize all digital inputs and outputs to the RDP-980’s master clock to effectively eliminate it.

Delta/Sigma modulation with 64x oversampling and fifth order noise shaping follows a high resolution 8x digital filter. A voltage-reference switched-capacitor D/A then converts the high density data stream to a constant voltage analog signal.

The analog stage features high precision metal film resistors throughout. Close tolerance polypropylene foil and epoxy-dipped ceramic capacitors complement the FET-based operational amplifiers.

The result? A spacious, detailed, and totally non-fatiguing presentation of all your digital sources.

RDD-980 CD Transport

Rotel’s RDD-980 CD Transport begins with Philips’ highly regarded CDM-9 laser mechanism, long respected by critical audiophiles for precise tracking and immunity from external vibrations.

We didn’t stop there. We suspended the mechanism in the center of the RDD-980’s substantial chassis for even better damping of resonances that could cloud delicate musical information. We thoroughly isolated the motors, tracking servos, digital circuitry, and the information display with a multi-segment, dual transformer power supply. We minimized minute internal supply variations with precise voltage regulators, oversized heat sinks, and high grade capacitors. We included both coaxial and optical digital outputs, full remote control capabilities, and housed it all in well-shielded heavy gauge all-metal chassis.

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The result? A spacious, detailed, and totally non-fatiguing presentation of all your digital sources.

RDP-980 Digital Processor

The RDP-980 reveals musical nuances with a faithfulness formerly reserved for only the most expensive processors.

That’s not the end of the RDP-980’s capabilities. It switches up to 5 digital sources using coaxial or optical links. It handles sampling frequencies of 32kHz, 44.1kHz, and 48kHz for compatibility with any digital source. And, it features full remote input selection, phase inversion, and output muting.

The RDP-980’s high isolation power supply includes two shielded transformers, one for the digital stages and one for the analog circuitry, and 17 individual local voltage regulator/filter capacitor arrays. The glass epoxy circuit board isolates signal traces and ground planes on separate sides for minimal interference.

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Just playing this CD will make your system sound better!

It's true! The all new XLO/Reference Recordings Test & Burn-In CD really will make your system sound better!

Special fully surround-sound compatible XLO technical tracks will burn-in new stereo and home theater components and demagnetize existing ones, to ensure peak performance and freedom from electronic "glare." Detailed liner notes and the actual voices of XLO's Roger Skoff and Reference Recordings' guru Keith Johnson (possibly the most famous recording engineer alive today) will guide you in quickly and easily getting the most from your system and your acoustical environment—including verifiable proof that you've got it right! And, once your system is fully dialed-in, six sensational Reference Recordings music tracks will put your system through its paces so you can experience the amazing realism of HDCD sound!

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read digital data off a disk.

PETER S. LOVELY
Portland, OR
76507.671@compuserve.com

BACK TO ANALOG
Editor:
Okay. So. I'm reading my December Stereophile. Finishing Michael Fremer's "Analogue Corner." I think to myself that someone writing for Stereophile appreciates the virtues of analog as much as I do. Then, I turned to p. 73 (????). Nahhh. Stereophile editors haven't been listening to digital that long. Maybe the picture is of a Graham tonearm dedicated to playing Beatles albums. Yeah, that's it!
And yes, Michael, I've been purchasing more than my share of new vinyl—and enjoying it tremendously.

FRANK SUAREZ
Cincinnati, OH

We inadvertently "flipped" the image of the Graham tonearm in the December '95 issue. My apologies, but at least it was printed the right way 'round on p. 6 of the same issue.

—JA

ANALOG GUILT
Editor:
With his "Analogue Corner" column, Michael Fremer is "guilty" of having given me the last kick I needed to buy a turntable again.

Now I'm the owner of a Linn LP12/Ittok/Lingo/K18 combo, and this purchase was one of the best decisions I've ever made. "Analogue Corner" surely is the best new column to appear in your magazine since Sam Tellig started "Sam's Space."

Dear Mr. Fremer, may I recommend a special component to you at last? Please listen to the phono preamp made by the British company Audiolab [distributed in the US by Artch—Ed.]. In Germany this excellent preamp only costs DM2000—and I think it's more than worth the money and deserves a review in the precious pages of Stereophile.

M. BAUMGARTEN
Nürnberg, Germany

ANALOG BREAKTHROUGH
Editor:
Wow! I had a vinyl breakthrough tonight, and I don't even have a Rega Planar 3, a VPI 19 Jr., or the lowly Dual 1218. I'm off the chart. I have an old Technics direct-drive SL-Q102. I've been reading Michael Fremer's column halfheartedly, because every time I've put records on in the past they've lacked the dynamics I heard from CDs. And I only have a Nakamichi CDC-4.
I didn't want to put too much money into my record player, but I do have a bunch of old records, and I figured I'd give it half a chance. So I replaced my old Grado with a new Sumiko Blue Point P-mount cartridge, and I replaced my Radio Shack interconnects with low-end TARA Labs. Much better: records actually do have bass. But I figured with such a low-end setup, and given the fact that I'm using an old NAD receiver as my phone stage, I wouldn't even try to compare it to my CDs. Especially since I have expensive Sonoran interconnects from my CD to my Audio Research LS2.

But, what with the added oomph, I have been listening to old records more. The last few nights I've put on an old Julian Bream album, in which Julian plays Villa-Lobos Preludes. It sounded so immediate! At first I thought it was the wonderful duende of Julian (and it is that, too), but it suddenly dawned on me: no CD has ever sounded like that. Each time Julian wrenched emotion from the strings, playing back near the bridge of the guitar, pulling a heart-throbbing vibrato with his left hand or attacking a passage, it was right there. It wasn't brighter, just more there— "immediate" is the only word I can use to sum it up.

It occurred to me that part of the reason I was able to appreciate this analog sound was that I wasn't listening for bass thunder or imaging—just loving the instrument and the musician. My analog setup doesn't do much for bass; I think that cheap, light tonearm sucks up some of the dynamics. But in the relatively quiet midrange, with fantastic treble overtones, on my wonderful Apogee Slant 8 ribbons, I question whether I'll be able to duplicate this vinyl sound even when I buy a better CD setup.

Suddenly I was pulling out a bunch of old records and listening again—Miles Davis, Charlie Haden—and comparing their sound to CD sound. MP is right, something is missing! It's kinda like Invasion of the Body Snatchers. You see the same faces, they have the same voices, but they lack some essential personality. Because Michael had mentioned the album A Love Supreme by John Coltrane in his January column, I pulled it out. Lo and behold, I also had the CD version, because I've been buying CDs of my favorite albums. With a simple flick of a switch, and some volume adjustments because my turntable comes through louder, I
Problem Solved Today.
And Tomorrow.

The world is changing—an all-digital age is in our future. Yet much software remains analog. Is it possible to have the best of both worlds when the world itself is changing? Absolutely.

Multichannel Sound: Today & Tomorrow
The PAV has won praise from around the world for its quality. It is simply the finest way to reproduce today's audio formats. Still, there has been a lot of talk about coming digital surround formats. How does one retain the advantages of the PAV while adding new capabilities?

A companion digital surround adaptor for the PAV is being designed to complement its formidable abilities. The DSA will dock with the PAV while being housed in a separate chassis and enjoying its own dedicated power supply. The DSA will transparently add digital surround capabilities to the PAV while maintaining the isolation between analog and digital signals so essential for uncompromised performance.

High Fidelity Video
Uniquely, the PAV has always employed broadcast-quality video switching. In fact, the Proceed PAV is the first audio/video product ever certified by Joe Kane's Imaging Science Foundation as being utterly faithful to the video signal it passes. As such, it is the only choice for anyone who cares about picture quality as well as sound.

Finally...
You can have it all. Discover the difference outstanding design and advanced engineering can make at your local Proceed dealer. If you would like to add your name to our mailing list, please write or fax us at the address at right.

Visit us on the Internet at http://www.madrigal.com/madrigal
was able to go back and forth. It was like the CD version was wearing a condom on the body of the music. Color was sapped from it—even the image was narrower, with less depth, and sounded washed-out. I had expected that, because of my better interconnects and the restriction of the NAD phono stage, at least the imaging would be better from my CD player.

Whew, now I'm in a quandary. I've been putting aside some money to upgrade my CD player, but now I'm wondering if I can ever get that kind of sound from a CD player. I'm also wondering if I can do a few more inexpensive upgrades to my analog path—better interconnects, a better turntable—and if the money wouldn't be better spent. Like most aspiring audiophiles, I lack the budget to upgrade everything to the degree I'd like to. But I will start looking for used-record deals. Thanks.

DAVID DEL BOURGO
Woodland Hills, CA

CLEAN ANALOG
Editor:
I am delighted to read in Stereophile that music-lovers are returning to vinyl now that they know how much they've been missing in realism.

Despite frequent playing, my vinyl LPs are kept clean and remain in pristine condition. In part, this is because my turntable and stylus are of pretty good quality. Anyone complaining about worn vinyl should look in the mirror for an answer to their problem.

GREGORY BANGS
Vancouver, BC, Canada

WARM'N'FUZZY ANALOG
Editor:
I'm about to step right into a hornet's nest, but don't worry, I've preventively donned a gas-tight suit supplemented with a bulletproof vest. The subject I wish to contribute to is the controversy over CD sound vs vinyl (case: MF and others vs the World).

What I read in Stereophile as well as read and hear in other forums basically boils down to some form of "CD doesn't sound as nice" as vinyl, or is not as warm, or doesn't induce the same amount of foot-tapping, or isn't as romantic- or lyrical-sounding as vinyl.

My experience definitely substantiates these claims. There's a permanent "warm and fuzzy" feel to vinyl that CD sound, however advanced, simply does not offer. The fact of the matter is, though, that this has nothing, repeat, absolutely nothing to do with high fidelity.

True high-end audio should be faithful to whatever the program material happens to be, warts and all. If the singer had a bad day, so be it. If the recording engineer messed it up, tough!!!

Furthermore, who ever said that live music sounded "nice"? As an avid concertgoer, it's obvious to me how different various orchestras, pianos, and halls sound, let alone artists. Warm and fuzzy, hi ha hi! What you basically want, vinyl lovers, is to make Horowitz sound like Liberace, or Clayderman. I don't object; just don't call it true high fidelity.

The proper way—in my opinion—to evaluate reproduced sound is not to judge how "pleasant" it sounds or how much enthusiasm it generates, for these are very subjective definitions intimately linked with your emotions as well as the specifics of the program material. Greater definition in high-end components doesn't always sound "nice." Sometimes a little smear in timbre, definition, and image will in fact be quite pleasing and euphonious, at least for a while, until one recognizes that it's always the same whatever the program.

I much prefer to put equipment through a series of tests to see if it has the ability to render completely opposite sonic pictures when fed the right program material. That is: very dry room acoustics, as well as highly resonant; a very deep soundstage, as well as a very forward sound image; a very bright timbre, as well as a very dark one; etc. If your equipment can do that, the greater the contrast, the greater the fidelity.

Based on that method, CD will always and to all audiences outperform vinyl without any doubt. But of course it may not always win the warm-and-fuzzy competition. That is called entertainment or ambience music.

That being said, I say no means consider CD to be perfect. HDCD® offers great promise—I just bought a superb Classe DAC 1 HDCD processor—unless the forthcoming DVD supersedes it before we can get really good mainstream program material. What a great future to look forward to, unless you're caught in the romantic time-warp of LPs.

PHILIPPE BEREND
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DIGITAL OR ANALOG?
Editor:
I am writing to you with a hope that one day the Stereophile "Letters" column will be free from the kind of ignorant, non-audiophile, and incorrect ideas put ahead by people like Mr. Gabe Wiener (Stereophile, November '95, pp.20-21).

To sum up, Mr. Wiener referred to some (unnamed) physical laws and a childish experiment to tell us that his quest for sonic accuracy has led him to understand (not even believe) that CD is a more accurate reproducer of audio signals than is the LP. This is, according to Mr. Wiener, the naked truth; reality. But this leaves me wondering: in which respect is CD "more correct" than the LP? He can't possibly mean all respects?

Surely he doesn't mean phase distortion (or jitter), since CD obviously is full of such, while the LP has practically none. It couldn't be HF-reproduction/supersonic tone structure, since CD has none whatsoever above 22kHz, while a well-constructed turntable playing a quality LP stretches naturally way beyond 20kHz, often two octaves higher before rolloff.

I'm sure Mr. Wiener cannot mean frequency linearity, because he couldn't possibly detect nonlinearity in a high-end turntable feeding amps and loudspeakers in a room. The nonlinearities are often disappointingly small (compared to loudspeakers, room interactions, etc.), and are by no means an inherited fault in the analog system; there are no laws that predict their presence. I could continue to name areas where CD has no advantage over the LP, but it is really not very interesting. Mr. Wiener informs us that the output from a digital player is as close a reproduction of the original waveform as one is likely to find, and that this is an undeniable fact.

Well, it isn't. I most certainly deny it (on a subjective basis), because the output of a quality turntable to me is much more like music than is the output from any CD player (I've heard). I have a quite modest hi-fi system (in high-end terms): Linn LP12/Lingo/Electrocompaniet ECPI MC phono stage/ Audiolab Q and Ms/Monitor Audio Studio 10s, all properly supported and with quality cabling. I also have a Meridian 200/263 DS CD player. I've collected about 4000 records, mostly analog classical LPs, so to me it doesn't matter the slightest bit if a 1995 recording of any artist will reproduce better with CD. One undeniable fact sure is that the original '60s and '70s classical and jazz recordings sound far superior on original vinyl than they do on a remastered CD, and that's good enough for me.
"Some of the Sweetest Valve Amps in the World Come from VAC...

"In this age of 10-watters masquerading as real amps, the PA80/80 is something of an aminal, rugged enough to wear 2 ohm taps as well as 4 and 8...the fit and construction are superb...the PA80/80 looks expensive and, well, classy.

"Sonically the VAC is simply a dream...The bass is so well controlled that KT88 devotees will buy it just to flip the bird to 300B users...Imaging? It could teach the PC cretins a thing or two about virtual reality. Speed? Up there with some serious solid-state-sters. Composure? This baby could have been through Eton.

"This stuff is too nice to ignore."

Ken Kessler, HiFi News & Record Review, September 1995
Regarding Mr. Wiener’s criticism of Mr. Freller’s thoughts about the “infinite” resolution of analog, I must strongly support Mr. Freller. He is quite right; the analog principle doesn’t have any limitations of resolution—in most cases it’s simply the recording-chain equipment quality or the engineers that set the limitations. Mr. Wiener obviously does not understand the analog principle. It might surprise Mr. Wiener to know that he’d need about 100 CD’s to carry all the sonic information that lies in a late-’50s Decca SXL LP.

CD is a dead end because of its many faults, and will be exchanged for other formats in time. This will, of course, keep the music industry happy, since we’ll have to exchange our records for whatever new “perfect sound forever” format the industry invents.

I can’t help wondering where the analog technology would have been now, 15 years after the digital recording “revolution,” if it had been left to develop freely these last 15 years. Because of its enormous potential, the LP will prevail among music lovers for a long time.

Vidar A. Pedersen
Oslo, Norway

Mr. Wiener’s point was that if you compare a digital recording and an analog recording against a live mike feed, it’s very hard to distinguish the digital, perhaps even impossible; while the analog version is audibly different. Far from this being a “childish” experiment, it appears to indicate that analog is less accurate. However, that does not mean it’s not possible for the LP to sound more enjoyable than a CD. Following some comparisons between Mr. Linn’s Sound/PC1/P2/3/4/5/6/7 (except RIAA standards or, in another case, just a lousy pressing). But I now have a choice of sources.

So I say to the digital or analog fanatic, the path to perfection is fraught with shortcomings. Thankfully, choices in recording selection have made the pursuit less frustrating. Now if your old favorite (but worn) record is re-released in CD or audiophile LP; you have digital to thank. And the emergence of quality LP’s has also spurred on a bonus, the further development of the digital format. So it’s up to you: to find the best performance, the best recording, the best format for that specific recording, and finally, the little tweaks you can make at home to adjust that sound to suit your tastes.

The role of Stereophile is merely opinion. Yours is never put down, because there’s no right or wrong with perception in the arts. But Stereophile’s opinion is a critical input if yours is to grow. Remember, beauty remains in the ear of the beholder.

In any case, it’s “discovery” that is the continuing pleasure and satisfaction with this hobby.

Eric Hansen
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The watt is great?

Editor:
WATT is going on? Did the Puppy bite the dust? Not necessarily so!

Wes Phillips’ review of the popular Wilson WATT/Puppy System V (Stereophile, November ’95) was loping along, seeming all the bushes, when—oops!—at the last minute, the reviewer was overcome by a compelling urge to devest himself of the comment, “yet this is not the speaker that I would necessarily choose to just listen to music through, hour after hour.” He then raises the question, “does focus on accuracy (95 time alignment) somehow miss the musical point?”

Stereophile, March 1996

21
FINALLY, REVENGE FOR EVERYTHING IN LIFE BEING ONE BIG COMPROMISE.

When we introduced the C.E.C. TL 1, a funny thing happened. Critics – by and large known for their skepticism – went bonkers. *Stereophile* said, "The C.E.C. is unquestionably a remarkable transport. Its smoothness, ease and liquidity set a new standard in digital playback." It even continues to earn their rare Class A Recommendation again and again. The TL 1 was the first, and only, CD transport to take advantage of the stability and smoothness of belt drive. The results, not surprisingly, are remarkably similar to experiencing the best vinyl recordings on the finest belt-drive analog turntables. With a depth and richness never before heard from compact discs. And now, the TL 1 has company. Introducing the TL 0 and the TL 2. The TL 0 is to the audio world as Michelangelo’s *David* is to the world of art. With a price tag of $17,500, it should be. On the other hand, the TL 2 is the less expensive alternative designed to open up the wonders of CD belt drive to almost anyone. But whichever model you choose, rest easy. You can be assured that you’ll never, ever feel like you could have done better. C.E.C. Available only at the finest audio dealers.

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I'd suggest that these comments may reflect a lack of recognition of an important issue that can go to the heart of a common high-end dissatisfaction.

Recently, I had occasion to spend upwards of four hours with Mark Levinson in his Cello home in New York City while members of the Chicago Symphony Orchestra string sections and a soprano from a New York opera company were individually recorded through Mark's B&K microphones and then played back by his Cello Grand Masters, Performance amplifiers, and Audio Palette system, at matched volume levels. The experience was truly awesome in that the re-creation of the real experience was undeniably "accurate" and emotionally devastating — devastating in the sense of re-creating the same intense listener involvement that was present in the live performance. (Isn't this what we all seek?)

During the same listening session, we auditioned a mono RCA CD I'd brought along, of Toscanini conducting a performance of Verdi's Un Ballo in Maschera (recorded in Carnegie Hall, 1954). Mark deftly twiddled his Audio Palette to re-quantize the bizarre characteristics of this RCA recording and to match in to our listening environment. Presto—all of us, including the musicians, were suddenly transported into front-row seats where we again sensed that time and electronics were somehow removed and we were experiencing the live performance.

Other, contemporary CDs almost invariably benefited from some balance adjustment with the Palette, usually by no more than 1-2dB in varying frequency regimes, to finally and convincingly engage the listener. It can be done! What does all this have to do with Wes Phillips's Wilson review? Lots!

It's a postulate of this letter that loudspeaker accuracy (including time-alignment and good placement, as addressed by David Wilson, Mark Levinson, and others, are by themselves necessary but frequently insufficient requirements for Nirvana.

While David Wilson has established a reasonable and logical procedure for speaker placement (apparently followed religiously by Wes Phillips), this may be only the first step in many rooms to establish a transfer function between a good loudspeaker and listener that transports the correct timbre of musical instruments, the spectral balance that carries the hallmark of "being there," to the ear. "Neutrality" of loudspeakers and the presentation of the correct timbre as perceived by the mind are not necessarily one and the same thing.

I believe that Mark Levinson recognized this issue years ago, leading him to the development of the Audio Palette. Such an equalization system, used with discretion (and considerable experience), can help to compensate for the unruly characteristics of some listening rooms (and for different recording venues).

Thus, in response to Wes Phillips's lament that "on some level something I demand from musical reproduction remains tantalizingly out of this speaker's reach," I'd suggest that he reflect on whether he might now wish to replace "this speaker's reach" with "this room's reach." If he was satisfied that the room had some potential that was not being realized, then he should have continued to seek a different speaker placement and/or, more reasonably, augment his system with the small amount of quality equalization control that can often re-establish the correct timbre balance so important to the quintessential emotional reaction, "I'm there!" We can't expect a speaker response for every room, even taking into account all possible speaker placements.

I suspect that audio purists have spent, collectively, multi-man-years of dissatisfaction and unnecessary megabucks replacing components in their search for truth. They could have remained much richer financially and emotionally if they'd adopted the simple but elegant room (and recording playback) equalization procedures routinely used by mastering studios and professionals.

I suggest that the time has come for high-end manufacturers, providers, and reviewers to promote high-quality electronic equalization for the individual listening room, thereby to augment quality loudspeakers to bring out and sustain the best music recreation experience for a reasonable investment.

JOHN BOUVYOCOS
Pittsford, NY

THE GRAND SLAMM IS GREAT

Editor: Having spent some time listening to the Wilson X-1/Grand SLAMM, I certainly concur with Stereophile's 1995 Product of the Year award. The SLAMM redefines the state of the art for loudspeaker systems. However, after doing a reality check with my wallet, I'm left to only cogitate about them.

If one were to pick up a loudspeaker design book from the '50s or '60s, it would instruct you to 1) make it efficient, 2) make it an easy load to drive, 3) take care of all those nasty resonances by making the cabinets good and solid. Typical designs from that era had two 12" or 15" woofers. If separate drivers were used for the midrange, they would be either horn-loaded or used in multiples; likewise for the tweeter.

There was good reason for the designers to believe all of this. The Krell had not yet landed on planet Earth, and having the capability to move a lot of air kept distortion levels low. Now we throw in some '90s technology and we're left with something looking a lot like the Grand SLAMM, and it's a sonic revelation for all of us.

Jon Pawlikowski
Chicago, IL

THE CS7 IS NOT SO GREAT

Editor: I found TJN's review of the Thiel CS7 last October a complete sell-out. It was a crass understatement for him to say that the speaker's top-end was a bit sharp, unforgiving but not etched! The CS7's top end is not only unforgiving but downright strident, devoid of air and space, and yes, etched. On some cymbal crashes, the Thiel's top end verges on biting and bleeding, to say the least — and all this with Mark Levinson electronics driving a speaker that costs nearly $9k!

If painfully incisive detail at the cost of much precious air, depth, and natural sibilance is what TJN considers uncicolored, then indeed the CS7 is colorless. However, from the lower midrange and below, the CS7 is exemplary, and here I agree with TJN: the CS7 has one of the most articulate and seamless midbass performances besides the B&W Nautilus.

Interestingly, I've had similar experiences with Stereophile's 1994 Product of the Year, the Dunlavy SC-IV. I have never found this loudspeaker musical in any setup; it sounds just as incisive and forward with Jadis JPL and Defy 7 as it does with Threshold and Krell electronics! At least the obscene, coffin-sized Dunlavy [SC-VI] is much better in this regard.

I was curious as to why I found these speakers unmusical while reviewers at Stereophile pen nothing but accolades. Then suddenly I realized that these speaker companies are much more marketing-savvy than I had given them credit for. These speakers are obviously designed for men who are older, post-45, and wealthy, and may have little or no response left in the upper ranges of their hearing. By making these speakers extra-
incisive they're compensating for hearing loss in the treble region; as a result, all these men hear is a wealth of detail and none of the stridency. I would be curious to know if only your older reviewers find these speakers musical or if the younger ones, and readers as well, share the same view! I wonder how Stereophile's female listeners find the balance!

Rizwan A. Rahmani
hm0501@hands.net.org

THE CS7 IS GREAT
Editor:
I am fortunate to have acquired a pair of Thiel CS7s since May '95. These speakers reproduce music to such a pleasurable degree that it's intoxicating. Thus we passed the nights with my wife listening to Latin piano by Cuban composers. I would have thought that piano duo fxop would have been sick of piano while competing at the Fifth Murray Dranoff International Two-Piano Competition in Miami, but instead they chose to listen to the Thiel speakers several of the nights they spent at our home. fxop paid the greatest compliment to the CS7s when they exclaimed, "It sounds like a piano." Thus it was perplexing to me to read TJN's review of these speakers last October (p.183). The response by Thiel in their "Manufacturer's Comment" letter (p.337) provided some explanation, confirmed by Wes Phillips's Follow-Up in January '96 (p.261). If anyone is looking to purchase a $10,000 speaker system, it's imperative that they listen to the Thiel CS7! Anyone with an interest in reproduced music who has listened to these speakers in my house walks away amazed at the ability of these speakers to reproduce the recording with all its ambient information. And you don't need fancy wire or $30,000 of electronics to achieve these results. My present amplification is a pair of Audio Van Alstine Omega III amps in a balanced bridged configuration ($2000). My dealer in town wants me to try alternatives in amplification, but so far I've resisted the temptation.

Thiel needs to be congratulated and rewarded for the tremendous value they offer in the Thiel CS7 speaker. They hit the bullseye.

Andres R. Palomo
Miami, FL

AGAIN AND AGAIN
Editor:
I was astonished to see the December '95 issue of Stereophile devoid of Thiel or Audio Alchemy product reviews! Did you run out of their products to review? Of late Stereophile was beginning to look like a product catalog for Thiel and Audio Alchemy (not that they aren't fine companies). What outraged me most was the fact that each of these companies was represented twice in the same issue — Audio Alchemy in September '95; Thiel in November. And to add insult to injury, the Thiel CS1.5, which had already been reviewed by Sam Tellig sans specs (in August '94) before his much-bemoaned departure from Stereophile, was reviewed again ad nauseam. (However, I am jubilant to see "Sam's Space" again adorns your pages.)

Although Stereophile prides itself on a very ethical and kosher policy for the selection of products for review, one cannot help but wonder how Thiel and Audio Alchemy have proven themselves worthy of having literally all of their product line reviewed — I don't know about other readers, but I certainly find this practice unsanitary.

Why doesn't Stereophile give other deserving budget products a fair chance? Products like KEF's Coda 7 and 8 (Coda 7 is a remarkable budget speaker at its price point), the newer Mission 729, Musical Fidelity E10, Diapason, Harbeth Compact 7 (a honey of a speaker), the newer Quick-silver Classic 60 MBs (with none of the extra-ripe bass of yore), and many other fine products too numerous to list don't get their due coverage, while Thiel and Audio Alchemy rake in the reviews! Rizwan A. Rahmani
hm0501@hands.net.org

With the best will in the world, we still occasionally get equipment "trashies," as in the examples raised here. One thing the two companies mentioned do have in common, however, is that they're not backward in coming forward to offer review samples, thus significantly increasing the odds that any issue of this magazine will include a report on one of their components. But we'll try harder in future to avoid this problem, as well as perhaps reporting on some of the components mentioned by Mr. Rahmani.

—JA

ALL CHANGE
Editor:
From time to time you mention, with respect to Stereophile's "Recommended Components" listings, that J. Gordon Holt objects to the inclusion of such a large number of components. I have read Stereophile since the early days of irregular publication and no advertising (and have actually borrowed, at the time of publication, several of the original large-sized issues of the first two volumes of the publication).

Nearly every review these days is a "rave" or at least a "qualified rave" that contains plenty of quotable praise for the manufacturer to use in his advertisements. In my opinion, this is the real business of Stereophile these days: generate ad revenue; build subscriber base; make money. Well, after all, it's a magazine you're putting out, and these are the goals of magazines. But they weren't the goals of the original version of the magazine.

I'm happy to see Stereophile succeed; I'm glad to get it 12 times per year, on time, with lots of articles to read. And I am glad that J. Gordon Holt can profit from this success and see his creation prosper. But... you have ruined the magazine.

I hate to say this, because your magazine remains my favorite audio magazine. And I continue to use it as best I can when I consider the purchase of new equipment. But I've had to learn to remind myself that I cannot read it in the same light as the old Stereophile: Holt never hedged his bets, never minced his words — and never made much of a profit, either.

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Stereophile, March 1996
But, JGH’s first priority really was to his readers. Yours is not.

What will kill Stereophile is that its unrestrained praise of new, high-priced equipment — nearly all new, high-priced equipment — will leave your larger readership cold. (I see the magazine at the supermarket now, and wonder just how many people are willing to shell out $6.95 for a copy.) And, maybe, manufacturers — your advertisers, your real first priority — will see that very few succeed in the long run, and that those who do have had to bow to a price/performance criterion that your magazine has, for the most part, left in the dust.

Let your reviewers continue to take their deep discounts from the manufacturers, watch your revenues grow, and hold Holt to a contract that surely must prevent him from starting up an audio magazine on his own again.

**All the Same**

Editor:

I’ve been a loyal Stereophile reader for the past two years and am generally very happy with your magazine. (I must confess a certain tendency to enjoy Stereophile more for the editorial and letters than for the reviews.) However, I was flipping through last October’s “Recommended Components” issue and a few rather curious things jumped out at me. The explanation of Class D components reads as follows: “Bear in mind that appearance in Class D still means that we recommend this product — it’s possible to put together a musically satisfying system exclusively from Class D components.”

With this in mind, one assumes that every component, even the ones at the bottom of Class D, are recommended by Stereophile. This, in and of itself, is fine. I have no doubt that even products in the low price range are capable of making very musical sounds. I have no doubt that many of them are worthy of recommendation. Regardless of the Class a product is put into, there’s no doubt that many of them are truly worthy of recommendation. But the value of a list like the one you support is found not only in the merits of the products that it contains, but also in the exclusivity that arises from the rejection of products it does not contain. With this in mind, why, might I ask, does virtually every component you have reviewed show up on the “Recommended Components” list?

My collection only goes back about a year, but with a cursory look through my back issues I’ve come to realize that you recommend, in one way or another, virtually every product that you have reviewed. There are exceptions, of course, but the recommendation rate is certainly up near 95%. I cannot say that this trend extends beyond a year ago, but I suspect it does. This is especially curious when a reviewer looks unfavorably upon a product in the full review, which happens quite a bit, and yet that same product is recommended in the biannual survey.

I’m not writing to suggest a new way for you to review products. That is your business. But when you elevate every product you’ve reviewed to the exalted “recommended” status, you do a grave disservice to your readers. Are we to assume that Stereophile has not reviewed a product in the past year and a half that is not worthy of being recommended to its readers? Don’t you think that a journal like Stereophile, and others that seek to review products, should endeavor to delineate products that are favorable and products that are not? You, perhaps, make the good-faith effort to fill this gap with your
In an industry where consensus is rare, the editors of eleven European audio journals elected to give the N°36 the European High End Audio of the Year Award. The N°36 is the third Mark Levinson component in the last four years to have been so honored.

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The Mark Levinson N°36
But technological dissertations do not begin to describe the experience of employing our Intelligent owning these fine instruments. The FIFO™ technology, dual sense of natural ease with which they differential 20-bit reproduce even the most complex conversion, and HDCD™ musical passages is rarely duplicated. decoding capability.
The intelligent interaction of these The N°37 benefits from a and other Mark Levinson components Closed-Loop Jitter-
simplifies and enhances the Reduction™ system that enjoyment of music in the home. The uses a five part-per-
jewel-like precision wrought by hand-
million custom clock to craftsmanship makes every touch a reduce jitter to pleasure of its own. Experience unprecedented levels, the difference quality makes.
"Recommended Components," although its value must be found in the notion that some products are better than others and that some products are not worthy of recommendation. But when every product makes the list, and when there is little or no attempt to limit the scope, truly good products—products that are worthy of recommendation—lose out.

This is a call for Stereophile to begin a more critical attempt at recommending components. It's a call for Stereophile to limit the scope of "Recommended Components" in an effort to give more meaning to the products that are truly the cream of the crop, whether regardless of their price, or with a keen eye to value. As it stands right now, your canonical list is more of a ranking of the products that your magazine has reviewed, not a list of truly recommended components. It should be labelled so.

Justin Havemann
Cleveland, OH
jwh6@po.cwru.edu

See this issue's "As We See It" on p.3 for my comments on the letters from Mr. Larson and Mr. Havemann.

—JA

FULL OF IT

Editor:
JA, I do have the utmost respect for you —really, I really, really do. But even you, once in a while, must be told that you're full of... (don't take it personally —I, myself, am full of it, at least as often as most people I know).

So here's the rub. In your "Editor's Choice" section of the "Products of the Year" article (December '95, p.75), when raving about the Wilson X-1 Grand SLAMM loudspeaker (which I've never heard, but I am sure, based on your word and that of many others I respect, is great), you actually said, "The bass guitar... thundered forth from the speakers' big Focal woofers in a way I had previously experienced only from live rock."

I hate to break this to you, but when you are listening to live rock, you are listening to speakers. If this is a criterion for determining speaker quality, you should be recommending that your readers save a lot of money. Instead of buying the $67,500 X-1s, we should be buying public address systems.

Bebop X. Lateef
Mill Valley, CA
blynn@wellsfargo.com

When you use a PA system to play back recordings, you are involved in a creative act, which is not what the concept of high fidelity is about. However, when recorded faithfully, the big, underdamped roar of live bass guitar through a PA rig is just as much an authentic acoustic source as any other. It is also one that almost all hi-fi speakers other than the big Wilsons get wrong in trying to re-create.

—JA

BEATLES RECORDINGS

Editor:
I just read JA's "Nothing is Real" column in the January '96 Stereophile. I feel that he tried to apply preconceived ideas to a situation that doesn't support them —that in the case of Beatles recordings, solid-state technology and analog-tape-track width degraded audio quality.

In preparation for critiquing the later Beatles recordings, he praised early Beatles recordings for their basic sound quality, noting their extended response at the frequency extremes. True, the highs were there, but the bottom end was sorely lacking in many early Beatles recordings —mainly because EMI was terrified of their records skipping, and therefore wanted very little bottom on their product. You can't even hear bass guitar on With the Beatles or A Hard Day's Night, it's so buried. On top of that, it was the policy of the EMI cutting rooms to cut off everything below 60Hz. The Beatles wanted the kind of bottom that American records had, but didn't get it until Geoff Emerick, a very young engineer willing to push the envelope, took the engineering helm. Finally there was a good, punchy bottom on Revolver (1966) and the accompanying single from that era, "Paperback Writer"/"Rain" —and George Martin had to fight with EMI to get those recordings cut to disc because, again, EMI was so afraid of skipping records. Well, enough about the bottom end.

JA then pointed out the lack of highs, lack of dynamic range, and "graininess" of the Let It Be-era recordings, suggesting that reducing track width and solid-state consoles were responsible for this. Incidentally, the majority of consoles were still tube at this point. They did move from 1" 4-track to 1" 8-track in the middle of the "White Album" —yet much of that album is 4-track (and still tubes), yet seems to suffer in recording quality anyway. (And for what it's worth, no Dolby-A was used on Beatles recordings.)

Yet the later Beatles recordings used far less compression and had far more dynamic range than the early recordings. JA might be mistaking increased isolation between instruments, and drum damping (stylistic for the late '60s). Do keep in mind that although the dynamic range is narrower on 1" 8-track than 1" 4-track, they did far more bouncing of tracks when using 4-track, which would reduce the dynamic range through tape-generation loss rather than through narrowness of track width.

Being a recording engineer and Beatlemaniac, I'm curious to hear when JA felt that the "rightness" started to go away. I'm wondering if it's when the Beatles started to push the envelope of 4-track recording (many mixdown reductions). This would have been around Sgt. Pepper. And I'm also wondering how much was technical (recording engineering) and how much was musical (less complete basic tracks to start with, but more overdubs). Musically, I do notice time discrepancies happening more when more overdubs occurred. It's amazing how delicate a balance the Beatles were, in every aspect.

If anything, I feel that many of the early recordings are shrill, thin, and overcompressed by comparison to Abbey Road and Let It Be. But my point is that I feel JA gives too much weight to the equipment used, and not enough weight to the changes of engineering styles and practices. The changes he hears are probably due to closer miking, more isolation in the studio, and things like the deadening of individual drums with cloth, rather than changes in the equipment itself.

Daniel Caccavo
74204.2053@compuserve.com

Good points, Mr. Caccavo. In the 1000-word space available for "As We See It," I'm afraid I tend to paint with a broad brush. I accept your arguments (particularly concerning the changes in engineering philosophy), but I still think there is a rightness to the overall sound of the early Beatles recordings (up to Revolver) that is missing from the later ones. And to exaggerate to make the point, compare the CD releases of Buddy Holly's From the Original Masters (MCA MCAD-5540), recorded in 1956–1959, and Steve Winwood's eponymous solo album (Island 422 842-774-2), recorded in 1977. Both are favorites of mine, but one sounds open, clean, extended; the other sounds shut-in, band-limited, compressed, and fuzzy. No prizes for guessing which is which. In my opinion, it wasn't until the mid-'80s, and then not all the time, that the fundamental sound quality of rock recording got back to where it had been a quarter-century earlier.

—JA
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little time for the heated and repetitive arguments that sometimes divide the audio industry. He was very skeptical of subjectivism, but he was also skeptical of objectivism. Most of all, he had no time for the cultivation of enemies, and he left behind not one that I know of.

Because of his obesity, Peter's friends consulted each other regularly about his health, and we all (including Peter, it must be said) knew the time would come when we would be making the mournful round of phone calls and e-mail messages that has been our sad duty this holiday season. This foreknowledge did not make the news any less wrenching, or the job one bit easier. We will miss him often.

Donations in Peter Mitchell's memory may be sent to Vermont Academy, P.O. Box 500, Saxtons River, VT 05154.

US: Wes Phillips

Dealers promoting manufacturer and designer seminars should fax (do not call) Wes Phillips the when, where, and who at (505) 983-6327, at least eight weeks before the month of the event — ic, if you’re putting on an event in May, 1996, please get the information to Wes no later than March 1. Mark the fax cover sheet “Attention: Wes Phillips — Dealer Bulletin Board.” Promoters of hi-fi shows and audio societies promoting manufacturer visitors should also fax Wes the details as soon as possible.

Austria: The Marriott Hotel in Vienna is the site of the inaugural Sound & Vision ’96, to be held March 21–24. More than 400 brands are scheduled to be on display, including such well-known high-end names as XLO, Mark Levinson, Spectral, Wilson Audio Specialties, Linn Products, Krell, Forsell, Audio Physics, Theta, Accuphase, and Naim, as well as global brands like Sony, Panasonic, and Philips.

Florida: Sunshine Stereo (5825 Collins Ave, Suite 3C, Miami Beach) will host an evening with Stereophile's Robert Harley on Saturday March 16 at 7pm. Bob will discuss a variety of topics, from loudspeaker placement to the latest in digital audio. Bob will also sign copies of his book, The Complete Guide to High-End Audio. Call Steve Zipser at Sunshine Stereo, (305) 864-0715, for the exact location and to reserve limited seating.

Georgia: Terry Dorn and Mike Harvey of Audio Research will conduct a music audio and video seminar, under the joint auspices of The Atlanta Audio Society and Audio Solutions (5576 Chamblee-Dunwoody Rd., Dunwoody) at 2pm Sunday February 18. Call Ed Scruggs, (770) 804-8977, or Chuck Bruce, (404) 876-5659, for details.

Sunday March 17 at 2pm, John Oevis of Waveform will conduct a seminar for the Society on his latest speaker designs. The event will take place at 8695 River Bluff Lane, Roswell. Call Chuck Bruce for details.

The Society, in conjunction with Audio Solutions, will conduct an audio and Home Theater seminar featuring Ken Kantor of NHT on Friday April 12 at 2pm. Call Chuck Bruce for details.

Pennsylvania: Classic Records and Balanced Audio Technology will showcase the sound and audio delights at Philadelphia's Adams Mark Hotel on February 25. Soundex and the Philadelphia Audio Society are cosponsoring the event. Mike Hobson of Classic Records will describe the mastering process and the sound of Classic's recordings. Victor Khomenko and Steve Bednarski of BAT will showcase their new 400-1b, solid-state behemoth power amplifier, as well as their highly respected tube products. Door prizes will be presented, courtesy of Classic Records.

The Philadelphia Single-Ended All-Star Symposium will be held Sunday March 24 at the Adams Mark Hotel — (215) 581-5000 — starting at 1:00pm. The event will feature the best and brightest single-ended designers, including Dennis Had of Cary Audio, John Stronczek of Bel Canto, and Nori Konuro of Konuro Audio Labs. Major distributors will also be there with their amplifiers: Herb Reicher with Audio Note, Victor Goldenstein with YAIC, and Harvey Rosenberg with Nobu Shishido's spectacular WAVAC amplifiers. Also featured will be Ken Stevens with the latest CAT Signature, John Kukulka and David Golstein with Timbre Technology's digital products, and Frank and Margie Hale with Swans Speakers' high-sensitivity Allure speaker. The event is open to the public and sponsored by the Philadelphia Audio Society. Tel: (610) 265-5700.

Dynatek Audio/Video and Home Cinema has a new address: 1390 Industrial Boulevard, Southampton, PA 18966. Their new phone number is (800) DYNATEK. Their e-mail address is: sales@dynanet.com.

Ohio: Paragon Sound (5450 Monroe St., Toledo) will sponsor a seminar on Tuesday February 20 from 6:30pm to 9pm. The good people from Audio Research will be on hand to answer questions about their highly revered equipment, as well as on the state of the High End in general. Come help them celebrate 25 years of great ARC products. Space is limited; call (800) 873-6873 to reserve space or for information on future events.

Texas: Friday February 16 at 7pm, Krystal Clear Audio/Video (2501 Oak Lawn, Suite 440, Dallas) will host an evening with Metaphor Acoustic Design Ltd.'s Bill Peugh, who will discuss Metaphor's "Compleat" approach to loudspeaker design and demonstrate Metaphor's highly praised 2s and 5s. He will also introduce the lowest-priced Metaphor yet, the Metaphor 6, as well as the Metaphor CCR Center Channel Speaker. Call (214) 520-7156 for further information.

US: Larry Archibald

Just as we were going to press at the end of January, the following letter was received from The Academy for the Advancement of High End Audio. The letter was sent to Toshiba, Philips, and the AIA, the committee in Japan which is responsible for setting a standard for a high-density, audio-only version of the DVD:

"The Academy For The Advancement of High End Audio, a trade association comprised of manufacturers, distributors, retailers, and members of the audio and home theater press, recognizes the importance of the standardization of high quality audio for the Digital Versatile Disc and is committed to that implementation.

"The Academy believes that how the new High Density Audio Disc (HDAD) is implemented will have a dramatic impact on its ability to reproduce sound and in flexibility. It is important to set standards that will insure high quality.

"Therefore, The Academy urges the standards setting committee to proceed without haste, giving careful consideration to designing a disc that can carry us into the next millennium without having been burdened with today's assumptions regarding the limits of human perception.

"The Academy is aware that utilizing
the HDAD to its fullest capability will likely result in performance that will exceed that which is possible with today's technology. The Academy is confident that audio designers will welcome the challenge, knowing that their efforts will not be compromised by the disc format.

"The Academy believes that the best possible sound quality will be obtained from a disc that provides: 88.2kHz and 96kHz sampling rates; multichannel capability providing a minimum of six channels expandable to as many as the producer feels necessary to achieve the desired artistic goals; a minimum of 20 bits of resolution per channel, expandable to 24 bits; audio data stored on the disc using acoustically lossless techniques that will assure complete recovery of the original information; data encoded using pulse code modulation or any technique that offers equivalent or better performance; and consideration given to maximizing bandwidth, i.e., that the amount of data 'overhead' devoted to non-audio information be reduced to the absolute minimum.

"The Academy urges that the data be encoded using pulse code modulation (PCM) or any technique that offers equivalent or better performance, rather than the bitstream method. While The Academy recognizes that bitstream offers the possibility to manufacture lower cost disc players, we feel that bitstream fails to address several points required for high accuracy sound.

**Bitstream Fails to Address Several Points Required for High-Accuracy Sound.**

"The Academy has examined the ARA proposal and compliments this organization for making it public domain. The Academy feels that the ARA proposal fulfills many of the desired requirements, especially in the areas of frequency response, dynamic range, data integrity, and especially its position that high-accuracy sound should be the primary goal of the next generation HDAD. The Academy acknowledges the need for a proposal such as the ARA's allowing the producer flexibility in allocating number of channels, precision, frequency response and playing time.

"The Academy urges that a wideband digital interface be adopted which will allow the use of outboard audio decoders with existing DVD players, that this interface be designed to keep timing and data errors to a minimum, and that this interface be incorporated into the design of first-generation DVD players.

"If so implemented, purchasers of first-generation DVD players will be assured that they will be able to play the HDAD regardless of what disc format has been selected.

"In closing, the entire membership of The Academy would like to thank you for your consideration of these statements and express confidence that true high quality will prevail in this most important audio standard..."

**US: John Atkinson**

According to figures released by the Electronic Industries Association at the recent Winter Consumer Electronics Show, 1995 set a new record for audio component sales, at just under $12.3 billion, a growth of 8.6% over 1994. AC-
player sales continued to rise, with 32.5 million units sold compared with 26.5 million in '94. Sales of separates in 1995 were estimated as being worth $1.94 billion, about the same value as portable CD products, while total factory sales of consumer electronics products were worth $62.3 billion.

US: Thomas J. Norton
In my February '96 "Industry Update" on DVD (pp.35-37), I made two statements that need clarification. First of all, I stated that the signal on the DVD was recorded in component video. That is true, but the signals aren't pure RGB. They are, instead, Y, R-Y, and B-Y. Y is the luminance (black and white) signal, which is made up of a known ratio of R (red), G (green), and B (blue). (The actual equation is $Y = 0.3R + 0.59G + 0.11B$.) Pure RGB signals are volatile — phase shifts between them can occur quite readily — whereas Y, R-Y, and B-Y signals are much more robust. Nevertheless, there are major advantages to a Y, R-Y, B-Y component signal, including decoding to RGB within the video monitor by a simple mathematical calculation, without requiring the carrier frequencies present in all composite video signals.

Less significant, but still important, I stated that the 5.1 channels of AC-3 sound will be combined into a Pro Logic mix within the player. D/A-converted, then fed to the left and right analog outputs on the DVD player for subsequent Pro Logic decoding. I should have said that the 5.1 discrete channels are combined within the player to create a Dolby Surround mix; Dolby Pro Logic is a playback steering enhancement of Dolby Surround, not a separate recording process.

In news relating to the above, at the recently completed Winter CES, Toshiba committed itself to producing one of its upcoming DVD players with component video outputs (in addition to the standard composite video out). They also committed to producing at least two widescreen sets with corresponding component video inputs. Joe Kane of the Imaging Science Foundation was reported to be doing hand springs in the halls. This is an important breakthrough (the component video, not the hand springs) which you'll be reading more about in our complete CES report next month, and also in the next issue of the Stereophile Guide to Home Theater, due to hit the newstands in April.

US: John Atkinson
Music For Others, the importer for the English Rega company, informed us in late December that they would no longer be distributing Rega products in the US. However, they will now be importing the English Moth turntables and tonearms. The latter, in fact, are said to be virtually identical to the well-regarded RB250 and RB300 tonearms from Rega. Music For Others can be contacted at Mos4ple@aol.com.

US: Wes Phillips
On August 1, 1995, SoundSite debuted on the World Wide Web. SoundSite's stated goal is to enhance users' knowledge of A/V concepts and products, enabling them to improve their listening and viewing experiences. The site is said to be designed so that both novices and seasoned audiophiles can benefit. A/V manufacturers' and distributors' World Wide Web presentations are maintained at SoundSite, making it easy to access information from firms like Acorn, Definitive Technology, Boston Acoustics, Creek, Epos, and van den Hul. SoundSite also features monthly updates on new technologies, as well as glossaries and troubleshooting tips. The site is best viewed
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Other new audio-related web sites include Linn Products — http://www.linn.co.uk/linn/ — and HeadRoom — http://headroom.headphone.com/.

US: John Atkinson

In a surprise announcement on the eve of the 1996 Winter Consumer Electronics Show in Las Vegas, Recoton declared that it was to take over International Jensen. As well as being a major manufacturer of OEM (Original Equipment Manufacture) in-car products, particularly for Ford, Jensen manufactures consumer audio products under the AR, NHT, and Advent brand names. Recoton makes a large number of accessories, including Discwasher products and remote audio products using 900MHz technology. According to a report in Audio Week, Jensen’s automotive OEM division will be sold to Jensen Chairman-CEO Robert Shaw, who will also become President-CEO of the new Recoton Audio Corporation.

Until the deal is finalized, Recoton is licensing the AR/Acoustic Research brandname to use with a new line of loudspeakers designed by Cary Christie of Christie Designs. (With Arnie Nudell and John Ulrich, Christie was one of the co-founders of Infinity; his most recent design was the Infinity Epsilon loudspeaker, which found favor with Stereophile’s Tom Norton in January ‘95.) Although responsibility for the AR brand passes from NHT’s Benicia, CA headquarters to Christie Designs in Chatsworth, CA, current AR models (including the AR 303, which impressed JA last September) will remain in production.

The very keen visitor might have found some McIntosh components at the Clarion booth, but there was just a single spot at the Show where big names and beautiful finishes could be found, that being Z-Audio’s exhibit. Newcomer Z-Audio were displaying high-profile products from companies such as Gryphon, Swan, Classé, Apogee, van den Hul, and Counterpoint. This exhibit was led by new audio dealer Dominio Acústico, headed by two of the principal names in the Mexican high-end community: Gabriel Romo Rizzo and Luis Sahudo (formerly with Sala Chopin); they were launching a new line of “Hocus Pocus” high-quality electric accessories.

THERE MAY NOT BE A CES-MÉXICO IN 1996.

At the US’s Consumer Electronics Shows, companies who want to show their products in a hotel environment rather than in the middle of a big, noisy auditorium, but who, for various reasons, do not want to support the official Show, “outboard” in the city’s hotels. But such nonofficial exhibits weren’t to be found accompanying CES-México ’95.

The reason this didn’t happen is more complex than it seems: it’s attributed in part to a natural reaction to the Mexican economy crisis (the money exchange rate doubled in December ‘94). It’s partly explained by the fact that stereo equipment sales dropped by some 60% in 1995 compared with ‘94. In addition, the CES organizers offered an aggressive 60% discount policy (even though some exhibitors still refused to participate). And part of the answer was a kind of local boycott of what appeared to be the non-high-end policy displayed by the CES. A final part of the reason can be found in the poor organization and coordination displayed by local high-end distributors and manufacturers — most of them had decided to invest their funds in the disappointing Feria de la Música, held in the same facilities as CES-México but some weeks earlier.

Whatever the reasons, this CES was a failure. Some exhibitors pointed out what they felt to be strategic errors on the part of the organizers:

• Partly as a reaction to the fact that there had been no consumer shows for two years, the 1994 CES-México was open to the public. This year, however, the CES was intended to be “for trade only,” in a country where every major distributor already knows about 98 of the 100 faces to be known.

• The show was scheduled on the worst days of the week, avoiding the weekend. And yes, it was only open during regular working hours.

• The entrance fee was very high, and twice what it cost in 1994; a $30 fee is really excessive right now for Mexico.

• As there appeared to be almost no showgoers, the entrance guards were advising visitors to get any business cards (not theirs, of course) as a way to avoid the entrance fee. As a result, the quality of the attendees was the lowest I have ever seen at a Show.

• The advertising program was too late, too short, and confusing. The radio spots were unintelligible and badly recorded.

• The printed invitations featured a long list of participating companies who at the end chose not to exhibit, leaving the attendees bewildered.

What’s next? Nobody knows in Mexico, and there is no certain answer, but the evidence points in a very sad direction: There may not be a CES-México in 1996.

US: John Atkinson

After nine years, first at Celestion US, then at KH America, the subsidiary of a Hong Kong–based corporation which distributes KEF, Celestion, and NAD products in the US, Executive VP Peter Wellikoff recently became President-COO of the Equity Group. Equity distributes products from B&W, Rock Solid Sounds, Rotel, and Custom Woodwork & Design. Chris Browder, Executive Vice President, and Mike Bartlett, Rotel VP-General Manager, remain in their current positions. (Browder is also the current President of the Academy for the Advancement of High End Audio.) Ray Lepper, Managing Director of KEF Audio in the UK, will be KH America’s Acting President until a successor for Wellikoff is appointed.

México: Julio Lamadrid

Almost every Mexican audiophile holds some good memories about the 1994 Mexican CES — see Stereophile, Vol.17 No.12, pp.39–41 — but CES-México ’95, held last Fall, was a big disappointment, particularly for lovers of high-end equipment.

The location was the same as for the ’94 Show, the so-called “Zoo” of the Sports Palace convention facility. But the organizers had decided not to make use of the Airport Ramada hotel, where the high-end exhibits had been in 1994.
Sparks to move the heart. Introducing the new line up of power amplifiers from Sonic Frontiers · headed by the Power 3 Mono Amplifier. Through progressive and unique circuitry, these amplifiers bring tube audio amplification performance to a new and higher level.

Resolution, the reproduction of subtle nuances that make the musical images believable and lifelike. The Power 3 excels in this area. Through careful parts selection, selections made through proven sonic merit · with no room given to preconceived impressions or brand loyalties. Through innovative circuit techniques, a creative approach to implementing feedback in the Power 3 reflects Sonic Frontiers' desire to develop original circuit designs utilizing tubes. This approach avoids the sonic downfalls that are associated with traditional feedback designs. With these factors contributing greatly to the resolution and detail of the Power 3, the listener will hear and feel music exposed with incredible detail and emotional impact.

Control, the Power 3 Amplifier has the ability to take hold of the music and loudspeakers they are driving. Tube amps have been accused of not delivering good low frequency performance. The lower octaves are often criticized as slow and ill-defined, coloring the vital midrange. The Power 3 renders this to be a gross misconception, bass performance excels and the midrange snaps into focus. Boasting a damping factor of greater than 50, this amplifier treads on ground never touched by tube amplifiers. Its ability to start and stop loudspeaker drivers is only rivaled by the very best solid state designs. Leading to a precision, liquidity and warmth never attained by amplifier designs of the past.

Power, rated at 220 watts off the 8, 4, and 2 ohms taps, the Power 3 has the muscle to deal with very demanding loads. Speaker selection is suddenly not a crucial, limiting issue. The 6550 power tubes, operating in partial triode, remain sensitive to the loads loudspeakers demand. This new Sonic Frontiers amp responds very much like a voltage source providing greater current as load impedance drops, or less as it rises. All these benefits can be fully experienced through any of the Power 3's taps.

Extensively tested, including a 100 hour burn-in, repeated on and off cycling, and conservative component ratings ensure the Power 3's reliability. A fully balanced design, input through output, as well as single-ended inverting and non-inverting inputs, permits great flexibility with corresponding preamplifiers. A stand-by feature ensures the tubes are warm and ready to perform. A mute feature, when activated, enables easy and convenient interchange of cables and biasing of the Power 3's 6550 power tubes.

To find out more about their notable new line up of power amplifiers, contact Sonic Frontiers. To hear life beat in your heart, audition the Power 3 Mono Amplifier today.
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DESIGNED AND MANUFACTURED BY SONIC FRONTIERS INCORPORATED
I f you’ve seen Capitol’s latest “lim-
ited edition” Beatles vinyl reissues,
and you’re wondering, don’t bother!
It doesn’t say “digitally remastered” on
the jackets, so I bought The Beatles (the
“White Album”) to hear what gives.
Slicing open the shrink-wrap and open-
ing the gatefold revealed a small box that
read: “This album has been Direct
Metal Mastered from a digitally re-mas-
tered original tape to give the best pos-
sible sound quality.”

Best possible sound quality? What
planet are these people living on? Yer
anus? DMM and digital: two guaran-
tees of worst possible sound from vinyl.
But you can’t blame DMM for this
sonic disaster because, although it says
DMM, it ain’t. Capitol has reproduced
the artwork from the British vinyl reis-
sues, which probably were DMM. The
American LPs were mastered by
“Wally” (Traugott) at Capitol, and Cap-
itol didn’t have a DMM lathe last time I
checked, which wasn’t that long ago.

I compared my original British press-
ing of The Beatles (played a zillion times
since 1968) with the new reissue, and
if you want to hear music cut off at the
knees — hard, grainy, two-dimensional,
antiseptic, and generally annoying as
hell — knock yourself out and buy
these “limited edition” LPs. What’s
more, my 28-year-old pressings were
quieter. Virgin vinyl? How about “nym-
pho” vinyl? At least I only paid $18 for
that two-LP privilege.

CLOTH EARS
“I’ll play that again, but before I do, I’m
gonna do something to your turntable
… don’t look!” I don’t know how you
feel about letting other people fiddle,
unsolicited, with your front-end, but
I’ve never been a fan. It’s like having a
houseguest say, “Hey, I’m gonna go
through your medicine cabinet now,
o.kay?” If you ask a friend to help you set
up your table, that’s one thing, but
when someone waltzes in and tells you
he’s gonna start twiddling, it’s kind of a
violation. Nonetheless, sometimes you
submit.

Whatever it was my friend did to my
turntable took only a few seconds.
“Did you change the VTA?”
“No.”
“Then you changed tracking force.”
“No.”
“Well what did you do?”
“I cleaned your stylus with this piece
of cloth.”

Piece of cloth? Yes. Not cheesecloth,
fortunately, or a piece of denim, which
has a weave density of 100–300 threads
per square inch. My friend had wiped
my delicate stylus with a square of
“1000D” camera lens-cleaning cloth,
which has … right.

DMM AND DIGITAL:
TWO GUARANTEES
OF WORST POSSIBLE SOUND
FROM VINYL.

The increase in clarity and focus was
quite pronounced, as if a layer of fuzz
had been lifted not just from the stylus
tip, but from the soundstage as well.
Now I do a quick swipe about once a
week. How do you do it without rip-
ning the diamond tip from its moor-
ings? Very carefully!

The trick to not snagging the cloth
on the stylus is to fold it over once and,
holding the folded end taut between
your hands, pull it forward with the
stylus just grazing the top of the cloth,
in a gentle but deliberate motion. I do
it quickly three times.

I’ve never caught the cloth on the sty-
lus, but that doesn’t mean you won’t. So
neither I, nor my heirs or successors or
assignees, nor this magazine shall be
responsible if you try this at home and
suffer cantilever decapitation. You can
get a 1000D lens-cleaning cloth at a
camera store — if you dare. And Armor
All is available …

Another little game worth playing is
with stylus tracking force. It’s not
even enough to set it in the middle of the
manufacturer’s recommended range
and, if it sounds good, forget it. I’ve
always found the higher end of the
range produces the best sound, but the
only way to find out is to experiment in
small increments up and down from the
middle point.

Increasing pressure usually increases
focus and lowers distortion, but at the
expense of “speed” and transient snap.
Decreasing it usually adds high-fre-
quency “sparkle” and air, but clarity and
focus diminish. In most cases I find the
ideal setting to be just below the man-
ufacturer’s maximum tracking force.
Finding that “sweet spot” can spell the
difference between satisfaction and
distraction when listening to a cartridge.

One more thing: a reader who doesn’t
want to be identified by his real last
name because, if we use it, it is so iden-
tifiable he’s afraid someone will track
him down and steal his hi-fi (are things
that bad in Chicago?), wrote to tell me
he’s had no trouble with StyLast
“migrating” up the cantilever. His car-
tridge’s cantilever is gold-plated boron,
which discolors slightly from the appli-
cation of StyLast. Since the discoloration
stops about 2mm up the shaft, it’s not
“migrating” to the motor assembly.

He writes that the trick to preventing
StyLast from gumming up the works is
to not apply it with the long, soft-bris-
tled brush that comes attached to the
cap. Instead, he suggests “impregnating”
one of those stiff-bristled, round stylus-
cleaning brushes which comes with
LAST products such as StyLast, and
using that brush to apply it to the stylus.
The short, stiff bristles make it almost
Reverend Brown trembled with anticipation as dark cellos entered the room.
impossible to gunk up the motor, and you can use the brush many times before you have to dip into the bottle and "re-impregnate" it. Good tip.

He "strongly recommends" the use of StyLast to "... reduce stylus wear, record wear, and improve tracking." Like me, he hasn't worn out a stylus since getting a record-cleaning machine and using LAST products.

He also describes a novel azimuth adjusting technique, which I'd like to pass on even though I haven't tried it yet (his letter arrived close to deadline). First, you "eyeball" the cartridge so the cantilever looks perpendicular to the record. Then you use a calibration tone from a turner or tape deck (or CD test disc) to make sure your tape deck meters are calibrated equally. That done, you play any stereo test record with a lateral frequency sweep to 16kHz or higher. Now watch the meters: if the left channel reads higher at the highest frequencies, rotate the cartridge counterclockwise (as viewed from the front). And vice versa. Now that sounds like a really good idea.

**Fifty ways to leave your CD**

It doesn't take a genius to understand that it's software that drives hardware sales. People only buy stereo equipment because they have stuff they want to hear on it. No wonder turntable sales almost came to a standstill a few years ago. Today, with a great deal of new vinyl available, sales are up, both in the high-end and plastic turntable markets.

There's also a steady stream of people rediscovering the joys of analog. One New York-based mastering engineer told me last week that he'd taken his turntable down from the shelf and hooked it up, and was enjoying all of his old records again. "I just might be ready to believe you," he told me. Audiophiles are often accused of listening to music because of how the recording sounds rather than for its intrinsic musical value. Most of us are guilty of that at one time or another. But sometimes we discover great music because we've been drawn to it for the sound. In a previous column, I cited an appreciation for Duke Ellington's music, which grew out of my enthusiasm for the sound of one of his later Columbia "six-eye" LPs, *Piano in the Foreground.*

So now, to tear you away from your CD player, here are 50 new, readily available records you can buy today that make owning a turntable worthwhile. I've heard the CD versions of almost all of these titles, and they only hint at the listening pleasure the vinyl issues provide. The 50 I've chosen cover virtually every genre of music — I have no tolerance for narrow-minded elitists.

**Miles Davis: The Complete Plugged Nickel Sessions** (Mosaic MQ 10-158). We knocked a fifth off the 50 with just this boxed set, and another 12 with John Coltrane's *The Heavyweight Champion* (Rhino R1-71984). That's 22 discs down and we haven't really gotten started. I understand there are people buying the Sony/Columbia Davis CD set and calling Mosaic begging to buy the lavish 12-by-12 book that comes with the LP set. (Send for Mosaic's LP and CD catalog, 35 Melrose Place, Stamford, CT 06902.)

Look, if the CD sampler I've got is any indication, and I have no reason to think it's not representative, Columbia's digital sound is hard, glazed, and mechanical compared to the all-analog 180gm LPs. On the LP set Miles is standing in the middle of your listening room in three dimensions. His horn has a burnished brass presence that's eerily real. The quartet's focus is equally impressive, though because of off-miking (rumor had it Columbia engineers were instructed to off-mike artists not signed to the label), they sound distant much of the time.

On the LPs, you're in a nightclub — you can "see" the people sitting at the tables in the offstage darkness, you can "sense" the room, smell the smoke, taste the beer. You're there. On the CD, the experience takes place behind plate glass. It's no contest.

The Coltrane reissue, which gives you all of his Atlantic recordings as originally issued, only exists on LP. The CD box gives you the same material, but ordered chronologically — a totally different perspective, which some might say is more instructive. Maybe so, but to have all-analog 150gm facsimiles of the original LPs is to own a piece of history, and the sound of Coltrane's horn — the brass, the column of air, the reed, the picture of the man playing — is much more convincing on vinyl. I did an "A/B" for an unnamed employee of an all-digital record label, who'd come over to drop off the CD-R of a new release. No comparison, he agreed. These reissues better the originals in most ways too.

Over at AudioQuest, there are a few dozen outstanding all-original Joe Harley-produced titles available on 180gm vinyl, some of which are essential to any fine analog collection. They include: Doug MacLeod's *Come to Find* (AQ LP-1027), Mighty Sam McClain's *Give It Up To Love* (AQ LP-1015), Janes Newton's *Suite for Freda Kahlo* (AQ LP-1023), Sasha Matson's *Steel Chords,* i-5 (AQ LP-1013), and Terry Evans' *Puttin' It Down* (AQ LP-1038).

You get white-boy blues, soul, one of jazz's finest flute players, a triple concerto for pedal steel guitar, violin, and strings, and Terry Evans, backed by Ry Cooder, et al, recorded in a way that lets you really know what he sounds like. All of these superb AudioQuest analog recordings sound more real on LP, and all feature music that rewards play after play. Admittedly, the Sasha Matson is only for the musically adventurous.

Once you've got your turntable cooking, you can hit the used bins and look for *The African Flower,* a mid-'80s James Newton album (Blue Note BT 85109) on which he plays the music of Duke Ellington and Billy Strayhorn. Why doesn't someone reissue this RCA Studio B recording on vinyl? That's one of the great things about having a good turntable — you're then open to millions of pieces of software priced from a quarter up.

Last week my sister's neighbor was selling three to four hundred brand-new, unplayed classical Columbia Records promo albums from the '70s, which he'd been storing for a friend — a former Columbia employee. Few if any of them have collectible value, so the whole assemblage will only fetch about 50¢ apiece from a used record dealer or from a vinyl enthusiast. But there were some outstanding records, including about 50 "Great Performance" reissues that were analog remastered and pressed in the Netherlands. One I noticed was Robert Craft's musical and sonic spectacular *Music of Edgard Varese.*

Someone will pick these up for a few hundred dollars and have an instant classical music collection featuring soloists like Rudolf Serkin, Zino Francescatti, and Glenn Gould, and orchestras like the Philadelphia Orchestra and the New York Philharmonic conducted by the likes of Ormandy, Bernstein, Walter, and Copland.
Back to my list: we're at 27 and counting. Over at MoFi there's Muddy Waters: Folk Singer, John Hiatt's Bring the Family, Traffic's The Low Spark of High Heeled Boys; Bob Marley and the Wailers' Exodus and Catch a Fire; Duke Ellington's Anatomy of a Murder soundtrack; Getz/Gilberto; Collins/Cray/Copeland's blues-guitar summit, Shadown; The Fantasy Film World of Bernard Herrmann, which includes his stupendous The Day the Earth Stood Still; Gerry Mulligan Meets Ben Webster, and pick an MJQ album or two of your choice. I like the one called plain old Modern Jazz Quartet, with the velvet-curtain cover; and with Sonny Rollins, at the Music Inn. And if you're a Cat Stevens or Moody Blues fan, MoFi's got outstanding LPs for you.

That's 12 more. DCC's vinyl "must haves" include the Beach Boys' Pet Sounds, Sonny Rollins' Saxophone Colossus, Jazz Samba with Charlie Byrd and Stan Getz, Ray Charles's Greatest Country and Western Hits, Elton John's Greatest Hits, Blues Hoot with Lightnin' Hopkins, Brownie McGhee & Sonny Terry, and pick at least one of the three Everest 35mm Stokowski classical releases. That's seven more, and if you want a flat-out sonic spectacular that's musically better than you might have suspected, try the two-LP original Raiders of the Lost Ark soundtrack performed by The London Symphony Orchestra and recorded by Eric Tomlinson at Abbey Road.

**While new Reference LP releases will be limited, there's an outstanding catalog still in stock.**

That's 48 records. Chad Kassem's Analogue Productions offers two superb-sounding original recordings, one of which is indispensable: bluesman Jimmy Rogers' Blue Bird. Jazz, blues, folk, and pop LP reissues include Janis Ian's Breaking Silencer, The Bill Evans Trio's Waltz for Debby, An Pepper Meets the Rhythm Section, Cookin' with The Miles Davis Quintet, The Real Mc: Johnny Adams Sings Doe Pomna, and Chico Freeman's Spirit Sensitive (originally on India Navigation). There are also the label's classical reissues from the Vanguard catalog.

We're over 50 and I haven't even touched the Classic Records 180gm catalog. There's 50 there alone. Music for Strings, Percussion and Celesta, Pictures at an Exhibition, Also sprach Zarathustra, Song of the Nightingale—all classic Reiner/Chicago Symphony reissues.

Classic's jazz reissues include Bill Evans at the Montreux Jazz Festival, Duke Ellington's and Johnny Hodges' Side By Side and Back To Back, Ella Fitzgerald's Clap Hands, Here Comes Charlie!, Hawkins Alive! Coleman Hawkins at the Village Gate, Sonny Stitt Blows the Blues, and Dave Brubeck's classic Time Out complete with "six-eye" label and sound. And we've left out Classic's extensive RCA jazz and pop titles (Sonny Rollins, Belafonte, etc.), and the label's other worthwhile Columbia jazz issues. If you still need to prove to anyone that recording technology really hasn't gotten that much better since 1958, pick up a copy of Dick Schory's RCA classic Music for Bang BaoRoom and Harp and let 'em hear the final frontier digital hasn't conquered: s p a c e.

Let's not forget Discovery Records' superb 180gm reissue of Oregon's Out
of the Woods, MCA's 180gm Who's Next, Buddy Guy's I Way Walking Through the Woods, and Buddy Holly.

There's worthwhile vinyl from Clar- icy, Chesky, Athena, and Reference. You can compare two versions of RCA's 1954 sonic spectacular Gaite Parisienne, the Classic issue with the original cover, mastered with solid-state gear by Bernard Grundman, or the Chesky version with new cover and all-tube cutting by Tim de Paravicini. Chesky also has the pot- boiler The Power of the Orchestra, mas- tered by de Paravicini.

Athena's Piano Works of Debussy and Ravel, performed by Ivan Moravec and originally released on Connoisseur Society, and Stravinsky's Petrouchka with Ansermet and L'Orchestre de la Suisse Romande—a Decca original—are also well worth owning.

Even though it's been digitally "cleaned," ABKCO's gatefold reissue of Sam Cooke's Lightfoot, an RCA original recorded by Dave Hassinger, offers you a chance to hear one of the great soul/ gospel/pop voices of this or any other time, properly miked in an intimate setting, backed by superb musicians. The original issue was Dynagroove, so if you have to choose your poison, pick the one that's readily available and pressed on super-quiet 180gm vinyl—unless you run into a clean original for a rea- sonable price.

Over at Reference, while new LP re- leases will be limited, there's an out- standing catalog still in stock. Worth auditioning: Nojima Plays Lisz, Pomp and Pipes with Frederick Fennell and the Dallas Winds, L'Histoire du Soldat (45rpm), and Ebory Concerto. And there are superb EM and Decca classical re- issues from Alto, Cisco, and others. Al- most forgot Blue Note's Connoisseur Series of 180gm jazz reissues.

You want new stuff? The vinyl of Verau Salt's American Thighs on Minty Fresh creams the Geffen CD. Classic has been issuing new and recent vinyl from CD-only labels like Razor & Tie and Zoo, Graham Parker's Twelve Haunted Episodes and Sonny Landreth's outstanding Outward Bound among them.

The "indie" vinyl scene is very strong right now (Eric Matthews's pop classic It's Heavy In Here on Sub Pop vinyl is one of my top records of 1995), and there's new domestic vinyl from Sonic Youth, k.d. lang, Bruce Springsteen, Meat Puppets, Southern Culture on the Skids (B-52's meet Creedence Clearwater Revival), Green Day, Jayhawks, Soul Asylum, Alice In Chains, P.M. Dawn, and on and on and on.... And don't forget vinyl imports.

I could easily take it up to hundreds of records, even counting the Miles and Col- trane boxes as two instead of 22. The point is, vinyl's back, and if you have the eclectic tastes of the typical music-loving audiophile, now is the time to invest in a good turntable. You can keep it spinning for weeks without repeating anything—if you've got the money to buy all the outstanding soft- ware being issued.

If you haven't heard a good analog system in years, do yourself a favor and take a listen. And if, as a reader wrote in a Stereophile letter to the editor published a few months ago, you do listen, and the records sound awful—all noisy, distorted, and compressed—go listen someplace else—at a store where they know how to set up a turntable, for instance.

Admittedly, you have to go looking for the records I've listed; they're not coming to you. But if you're an audi- ophile into high-quality gear, you're not finding the stuff at Circuit City, The Wiz, or Incredible Universe. You have to find it.

Another point: if you're an analog lover and you're thinking about pur- chasing any of these titles, do it now! The only way this flood of black plas- tic is going to continue is if you buy them. GRP, which has been issuing some nice-sounding Impulse! jazz titles on CD and LP, recently discon- tinued the vinyl due to "disappointing" sales. (Actually, with a few exceptions such as Coltrane's A Love Supreme, the 20-bit CDs sound better—because, while they were generated from master tapes, the LPs were sourced from 15ips Dolby-A copies mastered by "Wally" at Capitol.)

I don't think MCA has been too happy with sales of its Heavy Vinyl series, though the numbers I'm hearing aren't too bad for a new line of vinyl. It's diffi- cult getting retailers to stock records. Many don't have bins wide enough to accommodate 12" by 12" product. Some who've tried records have been disappointed with the results. What do they expect after 10 years of neglecting the market? Instant gratification? An- swer: yes.

Every time I buy a new record at Tower—or wherever—I know it's be- ing reported to the SoundScan system, which gathers sales statistics for the record industry. It's like going to the polls and voting. So vote early and vote often!
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Dick Olsher, Stereophile, Vol. 17, No. 12, December 1994

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BI T S

CHRIS DUNN & MALCOLM OMAR HAWKSFORD EXAMINE WHETHER THE AES/EBU S/PDIF DIGITAL AUDIO INTERFACE IS FLAWED, AND RE-EXAMINE THE AUDIBILITY OF JITTER IN DIGITAL SYSTEMS

Professor Malcolm Omar Hawksford is Director of the Centre for Audio Research and Engineering, Department of Electronic Systems Engineering, at England’s University of Essex. Chris Dunn is a Research Officer at King’s College, London. This work was funded by the UK’s Science and Engineering Research Council, and was originally presented as a paper, “Is the AES/EBU/S/PDIF digital audio interface flawed?” (Preprint 3360), at the 93rd Audio Engineering Society Convention, October 1992, in San Francisco. It is reproduced here with the kind permission of the AES.

High-quality digital audio systems require that all digital interfaces in the signal path exhibit signal transparency. The widely adopted AES/EBU and S/PDIF interfaces have been criticized for a lack of signal transparency; here we address possible problems with such interfaces and present methods for improving the interface standard.

In a correctly functioning (uniformly quantized and sampled) digital audio system, the only observable signal impairments should be attributable to band-limitation and an additive noise residue. Thus, although digital audio’s subjective sound quality has been criticized since the launch of the Compact Disc medium 13 years ago, the theoretical performance obtainable from the 16-bit linear PCM format sampled at 44.1kHz is superb to any analog sources available to the consumer.

When correctly dithered using triangular PDF dither, a 16-bit digital audio signal possesses a dynamic range of 93.3dB, with zero distortion and zero noise modulation. The 16-bit format holds the possibility of even higher subjective dynamic range with minimally audible noise-shaping employed during CD mastering. Lipshitz et al show that an increase in subjective dynamic range of up to 18dB is readily achievable when making the final truncation to 16 bits.

Since any practical digital audio system will err from this ideal performance, attempts are made to minimize measurable errors in digital components. For digital/analog converters (DACs), circuit-architecture advances including oversampling, noise-shaping, and 1-bit conversion result in greatly improved low-level resolution—the compact disc’s theoretical performance can now be realized at a relatively low cost, at least upon replay.

In the quest for resolution, many “outboard” DAC units have appeared on the consumer market, with their sensitive DA conversion process removed from the harsh electromagnetic environment inside the typical CD transport. Digital data is transmitted from the transport to the DAC along a coaxial or optical link (fig.1) in a serial format known as the Sony/Philips Digital Interface Format (S/PDIF). The S/PDIF standard is very similar to the AES/EBU format commonly used to interconnect professional digital components, and differs only in details, including transmission amplitude and subcode format. For much of this article, both interface standards will simply be referred to as the digital audio interface.

Some users have reported subjective differences between various implementations of the interface. Peter Van Willenswaard was among the first to note a change in out-board DAC sound quality when switching between different CD transport units; he linked this to measurable differences in interface signal risetime. Audio reviewers’ claims

concerning digital interface sound quality include differences between optical links and wired coaxial connections, and changes in sensitivity to interface quality depending on DAC architecture.

Is the digital audio interface flawed? Specifically, how can these claimed subjective differences occur in a digital data link? After all, "bits is bits."

**THE DIGITAL AUDIO INTERFACE STANDARD**

The AES/EBU and S/PDIF digital interface standards use biphase-mark encoding to transmit two-channel audio data, synchronization information, and subcode data over a single serial information channel; this coding scheme allows clock information to be embedded in the serial datastream. Fig.2 shows the serial subframe structure consisting of 32-bit cells, each subframe carrying code for one audio channel.

![Fig.2 Digital audio interface subframe format.](image)

The subframe begins with a 4-bit synchronization signal "preamble" followed by a 4-bit auxiliary data block. Up to 20 bits of audio data can be transmitted, with LSB (least significant bit) first, and the MSB (most significant bit) occupying the last audio cell position. Finally, subcode information comprises validity, user, channel status, and parity bits.

The biphase-mark encoding technique places cell transitions at the beginning and end of each cell for "0" bits, and at the cell's beginning, midpoint, and end for "1" bits. The preamble violates this coding rule, so that interface receiver circuitry can detect when each subframe begins. If the audio-data sampling rate \( f_s = 44.1\, \text{kHz} \), then the cell (0) width is equal to 354 nanoseconds, while the half-cell (1) width is 177ns; hence, the maximum rate of transitions is equal to 1,000,000,000/177 = 5.65MHz, though harmonics of the interface signal will extend to far higher frequencies.

Fig.3 shows time-domain simulation of a single subframe carrying a left-channel audio sample of value 255, equal to 1111111100000000 in 16-bit, twos-complement notation with MSB last. The mid-cell transitions can be seen at each "1" bit position, while biphase-mark violation displaces local cell transition positions in the preamble.

![Fig.3 Left-channel subframe with audio data word representing 255.](image)


![Fig.4 Experimental interface receiver circuit using Philips SAA7274 ADIC.](image)

The biphase-mark signal can be transmitted using either a coaxial or optical connection, while the interface decoder at the receiver has to extract clock and audio data, and subcode information, from the serial datastream. The clock signal embedded in the serial datastream is usually used to control a phase-locked loop (PLL), which in turn should provide a stable reference frequency for conversion circuitry interfaced to the analog world. A number of dedicated Audio Digital Input Circuit (ADIC) integrated circuits now available will perform these functions.

The circuit in Fig.4 uses the Philips SAA7274 ADIC, negative-going edges on the S/PDIF input signal are detected and compared to edges on the system clock derived from the PLL’s 112896MHz crystal oscillator. A difference signal is fed to a varicap diode, which pulls the PLL oscillator frequency to the clock frequency embedded in the incoming interface signal. The PLL has a first-order loop filter with a break frequency of approximately 1kHz, allowing clock recovery to reject short-term variations in the input frequency (i.e., high-frequency jitter).

When the interface decoder supplies data to a DAC, the analog audio output will be corrupted if the samples are the wrong value (amplitude or "bit" errors), or are output at the wrong times (jitter).

**AMPLITUDE ERRORS IN THE DIGITAL AUDIO INTERFACE**

The unfiltered digital-interface waveform is a binary signal whose transmitted information is determined by the transitions in the signal. One of the benefits of biphase-mark encoding is that the interface signal has only a small DC component—allowing interface signals to be AC-coupled, and edge detection to be performed using a comparator referenced to ground. If an audio data-cell transition is missed at the receiver, a bit error occurs, and a DAC connected to the receiver will output an incorrect sample value.

We now proceed to model a bandwidth-limited link by filtering the subframe signal with a first-order (RC) lowpass filter, and determine what degree of filtering will result in bit errors. Using the first-order filter model is a gross simplification of the time-domain behavior of a real link—accurate analysis requires the use of transmission-line theory at the high frequencies involved—but it’s a good starting point for investigation.

Consider the top section of Fig.5, which shows a simulation of the subframe signal carrying an audio word value of 255 and filtered using a time constant of 100ns, correspond-
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ing to a −3dB frequency of 1.6MHz. (For all of the simulations and measurements presented in this paper the audio sampling rate is 44.1kHz.) Although the filtered subframe now has edges with finite rise and fall times, no transitions are missed; hence, no amplitude errors will occur as long as the receiver can latch the data correctly following transitions.

The lower section of fig.5 indicates the same subframe, but filtered more severely with a 400ns time constant, corresponding to a −3dB frequency of 400kHz. In this simulation, the transition at the edge of cell 3 is missed; this will definitely result in a bit error in the decoded subframe. This example also indicates that receiver bit errors are most likely to occur during preambles where the largest variation in transition times occur (one half-cell width to three half-cell widths). This is interesting: many practical ADIC ICs indicate full lock to the received signal when the preambles are correctly detected; hence, if lock is achieved, bit errors are not likely.

However, most practical interface decoders will exhibit an upper time-constant lock limit considerably less than 400ns, due to the finite "time aperture" about the average zero-crossing point, during which a transition is allowed without latched data errors. In "Jitter in the Digital Audio Interface" (below), we derive an expression for the peak-to-peak variation in zero-crossing times $t_x$ in terms of the range of interface signal pulse widths. If we let the large pulse width be $3t_c/2$ and the smaller be $t_c/2$ (where $t_c$ is the cell width in the biphase-mark coding), then (cf Equation.11):

**Equation 1:**

$$t_x = RC \ln \left[ \frac{1 + e^{t_c/2RC}}{1 + e^{3t_c/2RC}} \right]$$

Using the experimental ADIC circuit shown in fig.4, full signal lock was achieved for interface time constants up to $RC = 170\text{ns}$, indicating that for this particular example the maximum zero-crossing-time aperture $t_x$ is approximately 45ns. In practice, time constants greater than 100ns are excessive for digital links, which should be designed with bandwidths well above 6MHz. We have measured 2-meter interface links with a characteristic impedance of 75 ohms, correctly terminated both at the transmitter and receiver, with 10–90% rise and fall times of <10ns. This performance level corresponds to a 35MHz bandwidth.

In this section we have shown that bit errors in the received subframe occur when transitions in the interface signal are incorrectly latched. This will not occur in most interface receivers for interface time constants of <100ns. Bit errors that do occur will most likely be in the preamble, and will usually result in the receiver failing to lock onto the incoming signal.

Audio bit errors due to band limitation alone are extremely unlikely. Of course, this simple analysis does not consider the effects of noise on the bandwidth-limited link. As the bandwidth of the link decreases, the eye-pattern representation of the received signal suffers from a decreasing opening. This results in more time spent in the threshold region, and the probability of noise-induced errors increases. Nevertheless, Cabot presents an interface example in which bit errors are negligible for noise levels up to 20dB below the interface signal level with RC filtering up to 160ns, and claims to have achieved zero error-rate transmissions over an unmatched digital audio link of 100m length.

**Jitter in the Digital Audio Interface**

The second interface-error mechanism to consider is that of the recovered clock frequency's modulation. If the clock signal fed to an ideal DAC varies in frequency, the reconstructed analog output from the DAC will include error artifacts, even if the sample values fed to the DAC are correct. The easiest way to analyze such an effect is by examining the jitter on the recovered clock. (In this article, we define jitter as the instantaneous timing deviation of clock transitions from their correct positions.)

![Fig 5 Subframe signal filtered with time constant of 100ns (top) and 400ns (bottom).](image1)

![Fig 6 Subframe signal unfiltered (top) and filtered with time constant of 200ns (bottom).](image2)

![Fig 7 Subframe signal unfiltered (top) and filtered with time constant of 200ns (bottom) (expanded time scale).](image3)

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Interface Bandwidth Limitation: Consider the subframe carrying an audio word value of 255 in fig. 6. In the upper diagram, the unfiltered subframe represents the signal transmitted; in the lower diagram, the received signal at the interface decoder has been filtered with an RC time constant of 200ns. If we define zero-crossing time $t_x$ as the time taken for the received interface signal to cross the 0V detection axis after a transition has occurred at the transmitter, then $t_x$ depends upon the voltage at the receiver at transmitter transition time, and inter-symbol interference occurs; ie, zero-crossing time depends on the values of previous pulse widths.

This phenomenon is shown more clearly in fig. 7, which has an expanded time scale; the zero-crossing time at the end of cell 4 is smaller than that at the end of cell 6 (where the voltage at the receiver has had time to fall to a lower value). When both transmitted and received signals are known, we can compute the change in zero-crossing times at each subframe cell boundary by searching for the change in polarity of the filtered signal.

![Fig. 8 Variation in cell-edge zero-crossing times across the subframe signal shown in the bottom of fig. 6.](image1)

![Fig. 9 Exponential rise of filtered interface signal following transmission.](image2)

A simple computer program was written to perform this task, using the filtered data shown in the bottom half of fig. 6. The calculated results (fig. 8) indicate that in this example, the zero-crossing-time variation across the filtered subframe is about 50ns; when a series of ones are transmitted, the peak voltage received at the end of the interface falls, resulting in a reduction in zero-crossing time. The variation in zero-crossing time results in a modulation of edge timing in the clock recovered from the interface signal, and this edge modulation is clearly dependent upon the number of ones and zeros transmitted in each subframe: instantaneous recovered clock jitter is dependent upon the audio-word value transmitted over the interface.

We will now develop an expression for the detected zero-crossing time at a given transition with a known history of previous transition times. Consider fig. 9, which shows the exponential rise of a filtered transition with time-constant RC. The transmitted signal has a peak "driving" voltage $V_d$, while the received voltage has an initial value $V_0$ at the time of the transition. If we denote the transition time as $t_0$, then the behavior of the received signal following the transition can be described by a simple exponential time equation:

**Equation 2:**

\[ V = V_d - (V_d - V_0) e^{-t/RC} \]

\[ = V_d \left( 1 - e^{-t/RC} \right) + V_0 e^{-t/RC} \]

Setting $V$ to zero and rearranging gives the zero-crossing time:

**Equation 3:**

\[ t_x = RC \ln \left[ 1 + \frac{V_0}{V_d} \right] \]

The zero-crossing time evidently has a dependency upon the initial voltage $V_0$ at transition time, and this in turn will depend upon previous pulse widths. If the previous transition in the interface signal occurred at $-t_1$ seconds, then $V_0$ can be written in terms of $t_1$ and $V_1$ (the voltage at the previous transition):

**Equation 4:**

\[ V_0 = -V_d + (V_d + V_1) e^{-t_1/RC} \]

Substituting into Equation 2:

**Equation 5:**

\[ V = V_d \left( 1 - 2e^{-t/RC} + e^{-(t_1+t)/RC} \right) + V_1 e^{-(t_1+t)/RC} \]

This process can be continued with the next transition time at $-(t_1+t_2)$ seconds, the next at $-(t_1+t_2+t_3)$ etc., to give:

**Equation 6:**

\[ V = V_d \left[ 1 - 2e^{-t/RC} \left( 1 - e^{-t_1/RC} + e^{-(t_1+t_2)/RC} - e^{-(t_1+t_2+t_3)/RC} + \ldots \right) \right] \]

Hence, we can write the zero-crossing time $t_x$ for the transition at $t_0$ in terms of the previous pulse widths $t_1, t_2, t_3, \ldots$

**Equation 7:**

\[ t_x = RC \ln \left[ 2 \left( 1 - e^{-t_1/RC} + e^{-(t_1+t_2)/RC} - e^{-(t_1+t_2+t_3)/RC} + \ldots \right) \right] \]

Using Equation 7, we can now compute the zero-crossing time at each transition in a filtered interface signal containing several subframes. This yields a signal with a sampling rate equal to the maximum rate of interface transitions; ie, 5.6MHz. In our simulations, we want to map the zero-crossing times of the filtered interface signal to jitter on the recovered clock at the output of the ADIC. However,
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5.6MHz is too high a sampling rate with which to efficiently compute the effect of such a jitter signal upon any reasonable length of audio data.

In order to reduce the jitter sampling rate to a useful value, we take advantage of the following argument: In a practical interface receiver circuit the PLL will usually employ a loop filter with a break frequency of <20kHz. If we assume that the audio sampling rate is much greater than the PLL loop frequency, then the zero-crossing time to jitter-mapping operation can be performed by computing a running average of the zero-crossing times across two subframes. Thus, the jitter value associated with a pair of adjacent subframes can be written:

Equation 8:

\[ t_{jRC} = \frac{RC}{M} \sum_{m=0}^{M-1} \ln \left[ 2 \left( \frac{t_{m2} - t_{m1}}{RC} - e^{-\frac{(t_{m1}+t_{m2})}{RC}} \right) - e^{-\frac{t_{m1}+t_{m2}}{RC}} + \ldots \right] \]

where \( M \) is the number of transitions averaged across two subframes, and \( t_{m1}, t_{m2} \), etc., are the pulse widths prior to the \( m \)th transition.

Note how the effect of previous transitions upon the zero-crossing time at a given transition diminishes as we move further away from the transition. This allows a further reduction in jitter computation time, since we can limit the transition history taken into account without compromising accuracy.

Before examining the results of simulations that calculate the jitter on a band-limited interface, let’s consider the idea of a jitter transfer function. Equation 8 indicates that the instantaneous jitter value associated with each interface signal frame depends upon the time between transitions (i.e., pulse widths) during that frame. The pulse widths (either half or full cell width) in turn depend upon the position of ones and zeros in the transmitted interface signal.

Given that each audio sample value is represented by a unique bit pattern when biphase-mark–encoded by the interface transmitter, it is possible to calculate a jitter value for each audio sample value transmitted across the band-limited interface — and represent instantaneous interface jitter as a deterministic function of audio sample value.

Fig.10 shows such a mapping for 16-bit audio sample values in the –32,000 to 32,000 range, in steps of 100, for an RC time constant of 100ns. Here we have assumed that both channels carry the same audio value, and that the parity subcode bit is active; the 64 zero-crossing times at each cell boundary across the frame are calculated and then averaged to obtain a jitter value for the audio sample value. Fig.11 displays the same transfer function, but with an expanded horizontal scale over the –400 to 400 audio word range, in steps of one.

The largest change in zero-crossing time occurs as the audio word value moves through zero; i.e., changes sign. This is due to the two-complement representation of the audio word within each subframe. The jitter exhibits a staircase-like transfer function as the audio word value moves away from zero; in fact, the zero-crossing time exhibits a strong dependence upon the difference between the number of zeros and ones in the 16-bit audio word. Fig.12 shows such a “Zero-One sum” across the –400 to 400 word range, with clear similarities to fig.11 (the sum extends to ±17 for the 16-bit audio word, because the parity subcode bit is active). With this approximation we can develop a simpler expression for...
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Consider the case when we transmit only zeros across the interface (even in the preamble): $t_1, t_2, t_3$, etc., will all equal $t_s$, and Equation 7 reduces to:

**Equation 9:**

$$t_{x0} = RC \ln \left( \frac{2}{1 + e^{-t_s/RC}} \right)$$

A similar expression occurs for the all-ones case, where $t_1, t_2, t_3$, etc. $= t_s/2$:

**Equation 10:**

$$t_{x1} = RC \ln \left( \frac{2}{1 + e^{-t_s/3RC}} \right)$$

Subtracting Equation 9 from Equation 10 yields the approximate peak jitter due to a band-limited interface:

**Equation 11:**

$$t_{jRC} = \frac{RC}{2} \ln \left( \frac{1 + e^{-t_s/2RC}}{1 + e^{-t_s/RC}} \right)$$

This function is plotted in fig.13 for RC up to 400ns. We can use this approximation to scale the Zero-One sum shown in fig.12 to obtain the approximate jitter transfer function of fig.14. Note how similar this plot is to fig.11 (calculated using the average jitter model of Equation 8) in both scale and shape, indicating the fundamental dependence of interface jitter upon the Zero-One sum of the transmitted audio word.

Having developed expressions for jitter based upon the bit pattern across adjacent interface subframes, we are now in a position to simulate a band-limited interface transmission and examine the resultant jitter signal for sinusoidal audio data. Fig.15 shows a dithered sinusoidal audio signal of 997Hz and peak amplitude 0dBFS, and the corresponding jitter signal for an interface time constant of 100ns. At first glance, the jitter signal appears to be noise-like, but when it is low-pass filtered (simulating a hypothetical PLL filter), the jitter is shown to be highly correlated with the audio (fig.16), despite an audio frequency that maximizes the number of PCM codes excited in the time domain. This is confirmed by computing the Fourier transform of the windowed and filtered jitter signal (fig.17), revealing strong spectral lines at the fundamental and third harmonic. (Throughout this article, the 0dB reference level in the jitter spectra is set to 1ns peak jitter.)

A similar jitter spectrum computed for a -70dB dithered 997Hz audio signal is shown in fig.18, where even stronger first and third harmonics are indicated. The increasing correlation between audio and jitter signals as the audio level is reduced is expected, since the audio signal spends a proportionately longer time in the crossover region of the jitter transfer function. Meitner and Gendron have also found that the jitter spectrum in a decoded interface signal has a strong dependency upon audio level, but they account for this behavior in terms of power-supply artifacts or "logic-induced modulation." In truth, power-supply-related jitter in an interface decoder will resemble jitter due to band limitation, though the results presented here suggest that the band-limitation model compares well to jitter measured in practical circuits.

**Comparison of Measured Results with Simulations:** Using the techniques discussed above, we will now compare the results of simulations with measured results from the

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experimental interface receiver of fig.4. This circuit allows the instantaneous frequency of the recovered clock to be measured by monitoring the control voltage on the varicap diode. In order to recover the jitter signal on the clock, we must convert the instantaneous frequency signal to a timing error. Consider a frequency deviation $\Delta f$ in a recovered clock of nominal frequency $f_0$, over a time period $dt$, the timing error $t_j$ can be written:

**Equation 12:**

$$t_j = \frac{\Delta f}{f_0} dt$$

If the measured frequency deviation is sinusoidal, the corresponding jitter frequency is also sinusoidal and of the same frequency, and $\Delta f$ can be written:

**Equation 13:**

$$\Delta f = k V \sin(2\pi f_j t)$$

where: $k =$ PLL varicap control voltage sensitivity (Hz/V);

$V =$ peak measured voltage on varicap control pin; and $f_j =$ jitter frequency.

Integrating across one quarter-cycle of $f_j$ yields the peak jitter $t_j$ at this frequency:

**Equation 14:**

$$t_j = \int_{t_0}^{t_1} \frac{\Delta f}{f_0} dt$$

$$= \frac{kV}{2\pi f_j f_0}$$

The varicap sensitivity $k$ can be determined by decoupling the PLL feedback loop and monitoring clock frequency under direct control of a DC voltage applied to the control pin. Hence, by measuring the control voltage on the varicap using an analog/digital converter (ADC), and scaling and integrating this signal to follow the law of Equation 14, we have an indirect measure of interface jitter. (Note that although the control voltage in the PLL provides a useful indicator of interface jitter, it will not reveal jitter in the PLL VCO itself above the closed-loop cutoff frequency of the loop, or jitter sources between PLL and converter). Fig.19a-e shows measured jitter spectra when a CD player's digital output is connected to the experimental interface receiver. The interface signal carries the same audio data in both channels, corresponding to a 1kHz tone at 0dBFS, -20dBFS, -40dBFS, and -60dBFS undithered, and -80.65dBFS dithered, respectively. (These signals were obtained using the Hi-Fi News & Record Review Test Disc 2.) Each jitter spectrum consists of a large fundamental harmonic of the audio signal as well as higher harmonics and noise superimposed upon the frequency response of the PLL loop filter. Note the changes in the relative magnitudes of the harmonics, as well as the absolute jitter level, as the magnitude of the audio signal changes.

These measured results can be directly compared to simulations of the recovered clock-jitter spectra for the same audio...
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signals (fig.20a-e). The simulations were obtained using the theory developed in “Interface Bandwidth Limitation” (above), with a minor change: the average jitter model outlined above calculates the jitter based on interface signal transitions at every cell edge, while the Philips SAA7274 ADIC employed in the experimental receiver controls the PLL via timing errors at each negative-going transition. The simulation software was adjusted accordingly. Results were obtained using an interface time constant of 65ns and a first-order PLL loop filter with break frequency set to 1kHz.

In general, the simulations show good agreement with the measured results; the only discrepancies appear as low-level tones in the measured jitter spectra at 230Hz, 1.6kHz, and 2.1kHz. These tones are also present in a jitter measurement taken while no CD was playing, but while the receiver was still locked to the digital interface signal (fig.21). These frequencies are due to factors not taken into account in the software model: the first frequency can be accounted for by considering the change in the subframe preamble when a channel status block begins every 192 frames; it is possible that the 1.6kHz and 2.1kHz components are jitter artifacts inherent to the ADIC employed.

Finally, fig.22 shows the jitter noise floor of the measurement system, obtained with the input of the ADIC connected to ground (note the expanded amplitude scale in this diagram). The low level of jitter in this measurement indicates that the measurement system employed has not compromised the accuracy of the results obtained above.

The good agreement achieved between practice and theory allows us to make predictions about the audibility of jitter errors in conversion electronics, based upon the band-limited interface jitter model developed above. An important result to note from the measurements is the high degree of correlation that can occur between audio and jitter signals. It is instructive to audition the measurements is the high degree of correlation that can occur between audio and jitter signals. It is instructive to audition the PLL control voltage in an interface receiver after suitable amplification; the audio signal transmitted over the interface can be clearly heard (although it is noisy and highly distorted) as the PLL attempts to track jitter on the received interface signal (a phenomenon also reported by van Willenswaard).

The authors have found that track 2 of the Hi-Fi News & Record Review Test Disc 2 is particularly useful in this experiment, since it includes sections where identical signals are recorded in and out of phase across two stereo channels. The in-phase version is heard as a much louder signal at the PLL control voltage, since the PCM two-complement-coded out-of-phase signal has a zero Zero-One sum across one interface frame. A clock used in an A/D or D/A conversion process that suffers from jitter that is highly correlated with the audio

7 AES3-1985, ibid.
8 Peter van Willenswaard, Stereophile; November 1990, Vol.13 No.11, pp.76-83.
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signal can cause distortion tones that are audibly more objectionable than noise modulation that would otherwise occur for noise-like jitter. (See "Audibility of Jitter Errors.")

The measured results for the experimental interface imply a time constant of about 65ns. This is interesting in that the interface signal used in the experiments exhibited risetimes in the order of 10ns at the receiver input when observed using a high-bandwidth oscilloscope. However, a band-limitation at any stage in the interface will cause jitter in the embedded clock signal, even if the interface signal-transition edges are subsequently cleaned up. Every stage in the interface — transmitter, link, and receiver — is a possible source of band-limitation, and thus jitter. We believe that an equivalent time constant of 65ns within the ADIC IC was responsible for the jitter observed in the experiments.

**Interface Noise:** Besides increasing the (low) possibility of amplitude errors, interface noise can also be the cause of timing jitter in a band-limited interface. Consider a link with a time constant of RC, where, at the zero-crossing points, the rate of change of the received interface signal will be equal to Vd/RC (where Vd is the transmitter driving voltage). Thus, peak interface noise of Vn results in a jitter noise of peak amplitude given by:

**Equation 15:**

\[ J_{\text{noise}} = RC \left| \frac{v_n}{V_d} \right| \]

Hence, a peak interface noise 20dB below the driving voltage and a time constant of 100ns will result in 10ns peak jitter due to the noise source. This is of the same order of magnitude as the jitter due to inter-symbol interference \( \tau_{\text{RC}} \) given by Equation 11 and plotted in fig.13. In practice, jitter due to noise will be wideband, and hence will be largely attenuated by the PLL filter at the receiver. This behavior can be contrasted with jitter due to inter-symbol interference, which will not be heavily attenuated for moderate PLL cutoff frequencies. This argument is given weight by fig.21, which shows the measured jitter spectrum in the experimental receiver for constant audio data (ie, no inter-symbol interference). Here, the jitter is shown to be lower than for the measurements taken with CD-audio tone tracks transmitted over the interface (fig.19), even though the same noise-jitter mechanism is present in both circumstances. However, note that the noise-jitter mechanism can also cause problems with the recovered clock at the receiver output after the PLL, and all clock circuits in the PLL and converter requires high-speed, low-noise characteristics.

**Interface Slew-Rate Imbalance:** Another jitter mechanism that can cause problems with biphasic-mark coded interface signals is asymmetrical slew rates across the link. If the receiver recovers the embedded interface clock by detecting transitions at every cell edge, as in our original detection model, the difference between the number of positive-going and negative-going transition durations across a frame will depend upon the number of ones and zeros (and hence the audio word) transmitted. In the limit, the jitter due to slew-rate imbalance will equal the difference between the negative- and positive-going (slew-limited) zero-crossing times. Consider an interface signal with positive- and negative-going slew rates (\( V_{\text{SR+}} \) and \( V_{\text{SR-}} \)), respectively. The peak jitter due to slew-rate imbalance will be:

**Equation 16:**

\[ J_{\text{SR}} = \frac{V_d}{2} \left( \frac{1}{V_{\text{SR+}}} - \frac{1}{V_{\text{SR-}}} \right) \]

Thus, for an interface signal detected using 74HC logic circuitry, where \( V_d = 2.5V \) and positive- and negative-going slew rates are 0.5V/\( \mu \)s and 1V/\( \mu \)s respectively, then Equation 16 gives the peak jitter due to slew imbalance as 125ns. Moreover, since the ratio of positive- to negative-going cell edges is dependent upon the transmitted audio word value, the jitter is likely to have strong components at audio frequencies.

The problem of slew-rate imbalance interface jitter can be solved by only detecting interface transitions in one direction. This is the approach adopted in the SAA7274 ADIC used in the experimental receiver circuit, where monitoring the signal on pin 4 using an oscilloscope reveals that only negative-going interface transitions are used to recover the embedded clock.

**Jitter Error Models**

To assess the consequences of jitter in a D/A conversion process, we require a DAC jitter-error model. Harris has developed an analytical model for jitter in ADCs, but the error mechanism in a DA process is different and depends upon the specific DAC architecture employed. In this section we present error models for two classes of DAC (these models are essentially the same as those presented by Hawksford).

First, we consider a Nyquist-sampling DAC with a sample-and-hold unit, in which each of the individual sample values input to the DAC are held until the next sample arrives; we term this a “100% sample DAC.” Second, an “impulsive” D/A conversion process is considered, where consecutive output samples do not overlap. This model approximates a pulse-density modulation (PDM) conversion strategy as used by Philips in their oversampled and noise-shaped “Bitstream” converters. The error models’ accuracy is established by comparing simulated results against actual measurements on physical DACs where jitter has been purposely introduced into the interface. This is important: the error models are used to make predictions about the audibility of jitter artifacts. (See “Audibility of Jitter Errors.”)

**100% Sample DAC:** A 100% sample DAC holds the value of a given sample at its output until a new sample arrives. Thus, timing error at the transition between adjacent samples results in a reconstructed analog signal with an “error area” directly proportional to the product of the sample timing jitter and the difference between the sample values (fig.23a). If we denote the normalized sample values as \( A_n \) and corresponding jitter values \( J_n \), then if the jitter amplitude is small compared to the sampling period \( t_s \) we can form an error sequence \( e_n \) by scaling the error area by the sampling period:

9 It is possible that this kind of mechanism is responsible for the reported sound-quality differences between different families of logic chips. —JA


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Equation 17:

\[ e_n = [A_n - A_{n-1}] t_j \]

This analysis is similar to Blesser’s approach in examining slew limiting in DAC output stages. The frequency-domain representation \[ E_{100\%}(f) \] of this error sequence can be obtained by taking the discrete Fourier transform of \( e_n \):

Equation 18:

\[
E_{100\%}(f) = \mathcal{F}(e_n) = \frac{1}{N} \sum_{n=0}^{N-1} [A_n - A_{n-1}] t_j n e^{-j2\pi fn_s}
\]

where: \( \mathcal{F} \) is the discrete Fourier operator;
\( N \) is the number of samples forming the discrete error sequence;
\( f \) can take on values of \( kfs/N \) where \( k \) is an integer;
\( j \) is the complex variable \( \sqrt{(-1)} \).

Equation 18 indicates that the error spectrum for the 100% model should involve intermodulation components at signal/jitter sum and difference frequencies; this can be confirmed by simulating a jitter error signal using the model.

Fig.24a shows the unjittered spectrum of a 16-bit-quantized, 0dBFS, 10,001Hz audio signal, where the choice of excitation frequency has led to a flat quantization noisefloor even though no dither has been used. Fig.24b shows the same signal, but now corrupted by a 1kHz jitter signal of peak amplitude 10ns. As expected, the error components in the jittered spectrum occur as sidebands at 10kHz ±1kHz at approximately −71dBFS.

The \( A_n - A_{n-1} \) factor in Equation 18 makes the magnitude of the error spectrum roughly proportional to the frequency as well as the amplitude of the audio signal. This is illustrated in the simulated error spectrum of fig.24c for a 0dBFS, 2001Hz sinusoid, again jittered at 1kHz; due to the fivefold drop in excitation frequency, the sidebands are now approximately 14dB lower than the 10kHz example.

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Additional simulations not shown here have revealed that the error spectrum for a 100% DAC is almost identical to that obtained from the ADC jitter model developed by Harris.

The accuracy of the error model can be verified by performing measurements with physical DACs where a known jitter signal is introduced into the digital interface signal; this technique has also been used by Peter van Willemswaard. Fig.25 shows the test arrangement used. A CD transport's digital output is connected to a custom digital interface unit, which comprises a transmitter and a receiver circuit very similar to that shown in fig.4. The receiver locks on to the incoming digital interface signal and passes the unscrambled data to the transmitter, which performs a complementary function and outputs an interface signal to the DAC under examination. Now the edge timing on the output of the transmitter is controlled by the recovered clock in the receiver, so applying signals to the control voltage on the receiver PLL allows direct injection of jitter into the digital interface signal.

In the following tests we introduce sinusoidal jitter to the interface timing by connecting a signal generator to the PLL control voltage. (Note that the PLL control voltage governs instantaneous clock frequency, so we must follow the law of Equation 14 in order to accurately predict injected jitter amplitude.) The DAC output is then digitized using a 16-bit ADC with an independent clock, and analyzed for jitter-related artifacts using a PC.

Fig.26a shows the output spectrum from the test DAC using a 0dBFS, 10kHz CD test tone with no jitter introduced into the interface. (The test unit in this example was the Musical Fidelity Digilog DAC of 16-bit, 4x-oversampling design.) The spectrum is quite pure, with a second harmonic at -96dB relative to the fundamental (the line at 2kHz is due to an idle tone in the ADC). Now consider the measured spectra shown in fig.26b, where 1kHz, 10ns peak jitter has been introduced into the digital datastream, causing sidebands to appear at approximately -73dBFS either side of the fundamental. A second measurement is presented in fig.26c, using the same jitter signal, but this time employing a CD test tone of 2kHz. Both measurements show good agreement with the simulations in terms of both relative levels (within 3dB) and spectral shape, and verify the accuracy of the 100% DAC jitter model.

This jitter-injection method can also be used to assess the performance of the PLL filter employed in the interface receiver inside the DAC; if the jitter frequency is increased while maintaining constant amplitude, the amplitude of the error sidebands also remains constant until the break frequency of the loop is encountered. This technique was used to determine that the PLL cutoff frequency of the Musical Fidelity DAC was approximately 5kHz, implying that any jitter components below this frequency won't be attenuated by this particular unit, and will contribute to jitter error at the DAC.

**Impulsive Sample DAC:** We now progress to the impulsive DAC model, in which digital data samples are output as weighted impulses with no interaction between adjacent samples (fig.23b). The output impulses are infinitesimally narrow and occur at a sampling rate $f_s$ (44.1kHz in our simulations). Of course, this is a theoretical construct; no pra-
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tical DAC would be able to create such an output pulse train. Nevertheless, the impulsive model fairly approximates a heavily oversampled PDM DAC (eg. Philips Bitstream) subject to a jitter process, where each 44.1kHz audio sample is represented by many discrete output pulses, each of unit amplitude and each subject to the same timing error. Referring to fig.23h, the continuous error signal $e_n$ due to one audio sample $A_n$ jittered by $t_{jn}$ can be written:

**Equation 19:**

$$e_n = A_n \left[ \delta(t) - \delta(t_j) \right]$$

where $\delta(t)$ corresponds to a Dirac impulse at time $t$.

Hence the discrete error spectra due to a sequence $e_n$ is:

**Equation 20:**

$$E_{imp}(f) = \sum_{n=0}^{N-1} e_n e^{-j2\pi f n t_j}$$

$$= \sum_{n=0}^{N-1} A_n \left[ \delta(t) - \delta(t_j) \right] e^{-j2\pi f n t_j}$$

$$= \sum_{n=0}^{N-1} A_n \left[ e^{-j2\pi f n t_j} - 1 \right] e^{-j2\pi f n t_j}$$

Now if we assume that the jitter interval $t_{jn}$ is very much less than the sampling interval $t_s$, then:

**Equation 21:**

$$E_{imp}(f) = i2\pi f \sum_{n=0}^{N-1} A_n t_{jn} e^{-j2\pi f n t_j}$$

$$= i2\pi f \mathcal{F}(A_n t_{jn})$$

Thus, the error spectra are simply the Fourier Transforms of the product sequence $A_n t_{jn}$ scaled to rise with frequency. Equation 21 can be compared to the error spectra obtained for the 100% DAC model (Equation 18); intermodulation between signal and jitter frequencies is still expected in the impulsive error spectra, but the intermodulation components will have different weights than those obtained from the 100% model.

This is best illustrated by comparing error spectra for the two models when a 1kHz tone is jittered by wideband white noise (fig.27). The error spectra for the 100% model are essentially flat with frequency; the impulsive error rises with frequency at 6dB/octave (the exact frequency at which the two curves intersect depends upon the audio signal frequency and the statistical properties of the jitter noise).

The accuracy of the impulsive DAC jitter error model can be confirmed by comparing simulated (fig.28a-c) and measured (fig.29a-c) results for the same signals used in “100% Sample DAC” (fig.26a-c). The measured results, made using a Meridian 203 Bitstream DAC, clearly show good agreement (within 2dB) with the simulations. The jitter injection interface was also employed to determine that the cutoff frequency of the Meridian PLL was higher than 10kHz.

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**Fig.27** Simulated 1/3-octave-smoothed error spectra for 1kHz, 0dBFS tone jittered by 10ns peak white noise: flat curve is 100% DAC model; upward-sloping curve is impulsive DAC model.

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processor, the Audiolab 8000 DAC, reveals no jitter error at all (fig 30); this is due to the superb PLL performance of this model, offering a (claimed) closed-loop cutoff frequency of just 13Hz, where all audio-frequency interface jitter will be attenuated to inaudible levels. (Note that the noise seen at 400Hz in this diagram is due to a ground-loop problem in the test apparatus.)

The greatest differences between 100% and impulsive DAC jitter errors occur when the signal frequency is low. Figs. 31 and 32 show simulations and measurements, respectively, for a 0dBFS, 100Hz audio signal jiterated by 10ns, 4kHz sinusoidal jitter. The jitter error is about 30dB higher in the impulsive (Bitstream) DAC. Thus, audible noise modulation can occur when impulsive DACs are jitered while reproducing low-frequency audio signals, and this may well be the reason some reports have suggested that Bitstream DACs lack “dynamics” and “rhythm and pace,” since most of the rhythmic content in music occurs at low frequencies and can be of high peak level.

In addition, practical low-bit DACs often possess high levels of high-frequency quantization noise that has been shaped away from the audio band, and if very-high-frequency jitter is introduced into such a conversion process, intermodulation products can fall back down into the audio band, causing further degradation of dynamic range and noise modulation. 16 (Our simulations employ a sampling rate of 44.1kHz, and thus can not model such secondary jitter artifacts.)

**Analogy to Phase-Intermodulation distortion in Audio Amplifiers:** Amplitude errors caused by timing jitter at the ADC or DAC gateway can be examined in a wider perspective by comparing the jitter-error mechanism with artifacts found in analog electronics. Hawksford 17 has shown that jitter errors in DACs can be compared to slew-rate limiting in transimpedance amplifiers located at DAC outputs. The jitter-error mechanism can also be likened to phase-intermodulation distortion (PID) in analog amplifiers. Otala 18 has shown that PID occurs when open-loop non-linearity is a feedback amplifier is mapped to a closed-loop phase non-linearity. Cordell 19 refined the PID model by writing the timing error (t(x)) in the phase-distorted output voltage x from a feedback amplifier in terms of the normalized open-loop non-linearity e(x) and closed-loop cutoff frequency f_o.

**Equation 22:**

\[ t(x) = \frac{e(x)}{2f_0} \]

If we substitute typical values of e(x_max) = 1% (0.01) and f_o = 1MHz for an IC operational amplifier, we find that the peak timing error is equal to 16ns. This is of the same order of magnitude as the jitter found in digital audio interfaces. It

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is also of interest that a typical analog transfer function non-linearity will result in PID where the timing error is highly correlated with the audio signal. This observation lends weight to the analogy made between PID and digital audio interface jitter, where we have shown that the jitter resulting from a hand-limited digital interface can also strongly correlate with the transmitted audio signal. Of course, PID in analog amplifiers is intimately linked with closed-loop amplitude non-linearity, and is not in itself a cause of additional error, while jitter in digital audio interfaces is a source of error in A/D or D/A conversion.

Nevertheless, the analogy between PID timing error and interface jitter is useful if the overall timing error in a system is to be minimized; there is little point in minimizing digital audio interface jitter if the analog circuitry preceding or following conversion is of poor quality. In general, it is rewarding to make comparisons between analog and digital system artifacts, an exercise that has shown interesting results before. In truth, the boundaries between analog and digital systems are not as clear-cut as they may at first appear, and we encourage system appraisal in a global sense.

Audibility of Jitter Errors
How much jitter is tolerable in a reconstructed stereo PCM transmission? One of the earliest studies of the audible consequences of jitter is due to Manson, who carried out a series of tests using a monophonic analog signal input to a sampling device with a stable clock. The sampled (but unquantized) audio signal is then converted back to the analog domain using a sample-and-hold unit with a controlled amount of clock jitter, and auditioned. Manson suggests that 35ns RMS jitter represents the threshold of subjective impairment using critical source material. However, we believe that several factors make this an unrealistically high figure of “minimum audible jitter.”

First, Manson’s experiments were carried out using a monophonic test signal. Much evidence suggests that the audibility of low-level distortion (as would be caused by jitter) increases when music is reproduced in stereo, as acoustic objects are now perceived in two-dimensional space, and masking of errors by the primary signal is not so effective. Second, these tests were carried out some time ago, using tape recordings; the advances in reproduction equipment now available to the consumer should result in a lower threshold.

A better estimate of the audible jitter threshold can be obtained by examining the jitter error sequence, and assuming that it will be audible if below the level of quantization noise present in the system for any possible excitation frequency. Lidbetter thus arrives at a value of 120 picoseconds for a 16-bit, 100% sample DAC, and an incredibly low 8ps for a 20-bit system. Shelton, Fourc, Harris, and van Wil-

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Fig.31 Simulated jitter error spectra for 100.01Hz at 0dBFS.
(a) 10ns peak, 4kHz jitter; for a) 100% DAC model (top) and
(b) impulsive model (bottom).

Fig.32 Measured jitter error spectra for 100.01Hz at 0dBFS.
(a) 10ns peak, 4kHz jitter; for a) Musical Fidelity Digikog (top) and
(b) Meridian 203 (bottom).
Fig. 33 Audibility of spectrally flat TPD 16-bit dither. Top curve is interpolated from the minimally audible field threshold data of ISO 226, with 0 dB equivalent to a sound-pressure level of 112 dB at 1 m per loudspeaker.

Fig. 34 Simulated jitter errors for RPD white jitter noise: a) 20 kHz at 0 dBFS, 180 ps peak jitter, 100% DAC (top); b) 100 kHz at 0 dBFS, 550 ps peak jitter, impulsive DAC (bottom).

Fig. 35 Simulated worst-case jitter errors for sinusoidal jitter: a) 22 kHz at 0 dBFS, 20 ps peak jitter at 18.5 kHz (top); b) impulsive DAC, 100 Hz at 0 dBFS, 75 ps peak jitter at 4 kHz (bottom).

lensward,28 and the recommendations embodied in AES11-1991 all quote similar values.

Are these lower limits reasonable? How audible is jitter

when its level is at the quantization noise floor? An attractive approach to answering these questions is to model the hearing process itself; i.e., find out whether a given jitter error is below the masked threshold due to the jittered audio signal—a method adopted by Julian Dunn. Correspondingly, a simple hearing model was developed in order to assess the audibility of jitter in a band-limited interface.

Our model assumes that the error due to jitter is inaudible if it is below the threshold of hearing (minimally audible field) at all frequencies. This approach will yield pessimistic results as far as error audibility is concerned, since the additional masking effect of signal tones is not considered, although masking of low-frequency noise by high-frequency tones is minimal. Recent work by Bob Stuart suggests that the audibility of errors in isolation may well be of higher significance than has previously been thought.

We define the threshold of hearing in the frequency domain by passing a cubic spline through the threshold data of ISO 226 and scaling by the gain of a typical audio system under critical listening conditions such that "0 dB" refers to a sound-pressure level of 112 dB at 1 m per speaker. The error signal is then integrated at each frequency bin across a bandwidth defined by the equivalent rectangular noise.
Fig.36 Simulated band-limited interface jitter errors with no PLL filtering: a) 20kHz at 0dBFS, 100% DAC, interface time constant 40ns (top); b) 9.8kHz at 0dBFS, impulsive DAC, interface time constant 50ns (bottom).

Fig.37 Simulated band-limited interface jitter errors with 2nd-order 1kHz PLL filtering: a) 7kHz at 0dBFS, 100% DAC, interface time constant 120ns (top); b) 7kHz at 0dBFS, impulsive DAC, interface time constant 120ns (bottom).

Fig.38 Simulated band-limited interface jitter errors with 2nd-order 1kHz PLL filtering: a) 7kHz at 0dBFS, 100% DAC, interface time constant 120ns (top); b) 7kHz at 0dBFS, impulsive DAC, interface time constant 120ns (bottom).

handwidth at that frequency, and compared to the threshold. Fig.33 indicates the audibility of 16-bit triangular probability-density (TPD) flat dither noise assessed in this manner, clearly showing the dither to be audible in the 2–6kHz frequency range; this is similar to the result achieved by Stuart in fig.2 of his AES paper.

We can use the error-audibility model to assess the validity of these claimed limits to jitter audibility. Consider the case where an audio tone is corrupted by spectrally white jitter. Fig.34a shows that for a 100% DAC reproducing a 0dB, 20kHz sinusoid, rectangular probability-density (RPD) jitter of peak amplitude 180ps should be on the threshold of audibility, although it should be noted that the error level reduces as the audio sinewave frequency is reduced. This can be compared to fig.34b for an impulsive DAC, where the error signal associated with 550ps peak jitter noise still lies below the audibility curve. It should be noted that the error curve in this case is constant with audio frequency (this diagram was obtained using 100Hz). The problem with making predictions about the audibility of jitter artifacts using noise-like jitter is that the error tends to be spread across the audio band; more stringent jitter specifications are required when the jitter is sinusoidal.

Fig.35a shows the worst-case 100% DAC jitter error resulting from a 22kHz audio signal and 18.5kHz jitter — only 20ps peak jitter is required for audibility. The 75ps limit for an impulsive DAC occurs when reproducing a low-fre-

quency tone, and both jitter sidebands are coincident due to reflection about DC (fig.35b).

Are there any circumstances under which these critical combinations of audio and jitter signals could occur at the same time? In the “Jitter in the Digital Audio Interface” section we have shown that digital audio interface jitter can be highly correlated with the transmitted audio data — and, when it is remembered that digital filters with delays up to a few milliseconds often follow interface receivers before D/A conversion (causing the jitter to precede the associated audio signal at the DAC), such combinations may indeed occur.

We now progress to an examination of simulated DAC errors due to hand-limited interface jitter. Fig.36a shows the jitter-error spectrum for a 100% DAC reproducing a 0dBFS, 20kHz audio signal with an interface RC time constant of 40ns; the PLL cutoff frequency is set to infinity so that any jitter on the interface won't be attenuated before reaching the DAC. The error contains discrete frequency components rising from the noisefloor — this is because bandwidth-limited interface jitter can contain components that are well correlated with the audio signal (see “Interface Noise”).

Fig.36b shows a similar simulation for an impulsive DAC fed a 0dBFS, 9.8kHz audio signal; in this case, an interface time constant of 50ns results in an audible error. Of course, most interface receivers will employ PLL filters such that interface jitter above the PLL cutoff frequency is attenuated. This results in the jitter error forming “skirts” around the audio signal; examples for 100% and impulsive DACs reproducing full-scale 7kHz sinewaves are shown in fig.37. The PLL second-order filter cutoff has been set to 1kHz,

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with the result that the interface time constant can be increased to 120ns before jitter audibility occurs. Finally, \( \text{fig. 38} \) compares the jitter errors from 100\% and impulsive DACs, respectively, while replicating a 200Hz full-scale sinusoid from an interface with a 100ns time constant (the PLL filter is set to 1kHz, second-order). The higher jitter error from the impulsive model while reproducing low-frequency signals is clearly evident, an interesting result considering the claimed higher sensitivity of Bitstream DACs to digital interface quality compared to their multibit counterparts.

Clearly, the lower the PLL's bandwidth, the more wideband jitter the digital interface link can tolerate. Our simple audibility model has not considered masking due to the audio signal itself; when this is taken into account, it is evident that reducing the PLL break frequency has the additional benefit of narrowing the jitter-error skirt around the audio signal—hence making the skirt less audible. There is a clear analogy here to data-reduction systems in which efficient coding of audio signals places the error directly under the audio signal where, because of masking, it is least audible.

The worst case for interface jitter audibility is when the receiver PLL has a high-jitter bandwidth; several ADIC integrated circuits on the market have jitter bandwidths up to 5kHz. \(^{35}\) In the limit (no filter at all) white jitter noise of up to 180ps peak amplitude and even less sinusoidal jitter will not produce errors that rise above the audibility curve, more or less justifying the recommendations in AES11-1991. Similarly, we have seen that for no PLL filter, the interface time constant must be lower than 40ns or, equivalently, possess a bandwidth higher than 4MHz, a requirement which makes the performance offered by TosLink-type optical interface links marginal. \(^{36} \)

The revised professional interface standard AES3-1992 \(^{37} \) stipulates a reasonable upper limit of 30ns on the 10-90\% risetime for correctly terminated interface transmitters, corresponding to a time constant of 14ns. However, we have seen that time constants need to be minimized in each part of the interface (transmitter, link, receiver), and that observing sharp rise and fall times at one point in the chain does not guarantee waveform fidelity elsewhere. For example, our experimental receiver circuit suffers from a 65ns time constant associated with the ADIC IC used.

Reducing the Audibility of Interface Jitter Errors: We have shown that embedded clock jitter in a band-limited digital audio interface is fundamentally a problem due to the digital audio interface standard in its current form. In particular, the jitter signal is intimately linked with the Zero-One bit sum of the serially transmitted audio words; a lower Zero-One sum range would result in reduced jitter.

One way of lowering the sum using the present interface standard is to pad the unused bits in the auxiliary data and low-bit sections of each subframe (see \text{fig. 2}). For example, with 16-bit audio words, the sum can be reduced from \( \pm 16 \) to \( \pm 8 \) by appropriately filling these unused bits according to the value of each transmitted audio word. A second option is to transmit one of the two audio channels supported by the interface out of phase, such that, for stereo program with a strong monaural component, the Zero-One sum is reduced.

However, although these techniques may reduce the absolute jitter level, we will still be left with the undesired high correlation between jitter and audio. In order to break this correlation, we must somehow randomize the sign structure of the transmitted bits, perhaps by modulating each bit sign with a known pseudo-random binary sequence, synchronized at the start of each interface block. The AES/EBU/S/PDIF digital audio interface is now in widespread use; we are not likely to see a new interface standard welcomed by the majority of users for a considerable time. Accepting that jitter will occur in a band-limited interface, we must examine methods of reducing recovered clock jitter in receivers. Evidently the first step to take in minimizing interface jitter is to maximize the bandwidth of all components in the interface. However, there are limits to achieving high bandwidth at low cost, especially for long links, and conflicts with RFI may develop as rise and fall times become very fast.

Alternately, the audibility of interface jitter in a conversion process can be reduced by making the receiver PLL cutoff frequency as low as possible. But note that PLLs with

\[ \text{eq. 38} \]

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extremely low cutoff frequencies may be compromised in other performance aspects, such as initial lock-on time and the frequency range over which lock is maintained. These problems can be overcome by employing two PLLs in series, where the first has high bandwidth and fast startup, and the second low-bandwidth module is switched into circuit after conditions have stabilized. Low loop bandwidths can be achieved while maintaining wide lock range by using random access memory (RAM) to buffer the audio data before it is clocked out to the converter unit.

A more fundamental solution to the problem of interface jitter is to locate a high-precision conversion clock inside the "receiver" (i.e., DAC). This then creates the problem of how to match the transmitter and receiver data rates. One solution is to employ a RAM buffer for audio data where the rate at which the data is clocked out of the interface is under the control of the local clock. Enough memory must then be available to account for the long-term differences between the transmitted interface clock and the local oscillator frequencies. However, this is hardly an acceptable solution in a studio environment, where equipment must operate with identical sampling frequencies. A more general solution is to slave the receiver clock to the transmitter via a separate link, an approach adopted by Sony and Linn in their two-box CD systems.

Details concerning how to implement the additional clock interface vary, but perhaps the most sensible and universal approach is to provide a second independent digital audio interface output at the receiver, from which the transmitter can derive a clock signal (fig.39). This scheme is also compatible with the recommendations made in AES11-1991.

Measuring Jitter in the Digital Audio Interface: The simulations presented above indicate that interface jitter may be a real problem in practical audio systems. How can we measure the effects of such jitter? In general, jitter errors in DACs will lie close to the noisefloor of the conversion process, resulting in two basic problems for measurement strategies:

First, there is the problem of resolution in the test instrument itself; since jitter errors are most easily revealed when exercising the test system with full-scale audio signals, then errors in the ADC of a digital measurement system, also excited to close to full scale, may well swamp those due to jitter in the test device.

Second, there is the problem of determining the source of measured errors. We have seen that jitter errors can contain both noise-like components and spectral lines, and that these can be confused with distortion and noise modulation due to DAC non-linearity. Noise-modulation tests in which the exciting audio frequency is chosen so that all DAC non-linearity falls on a limited number of FFT bins are perhaps the best-suited for revealing jitter errors. More work is required to develop a suitable test for jitter errors, although we can identify the tests currently in widespread use that will not reveal jitter errors.

In the popular "fade-to-noise" test that measures level-dependent logarithmic gain, the output of the test device is filtered with a 1/3-octave band-pass filter centered on the test frequency at 1kHz — where jitter errors will not be detected, since no jitter error occurs at the fundamental frequency in either of the DAC error models discussed above. In the low-level noise modulation test where a 41Hz sinewave is applied to the device under test at levels of -40dB and below, the problems lie in signal levels that are too low to result in large jitter errors for either DAC model, and in a test frequency that will not excite large jitter errors in the 100% model.

Conclusions

Is the digital audio interface flawed? We have examined the possibilities of both amplitude and timing errors corrupting audio data transmitted across an interface. The probability of received amplitude errors is not high, and indeed they are most likely to occur in the preamble of each interface subframe. This means that if a receiver can lock onto an incoming interface signal, then the audio word values are safe. However, jitter remains a concern; several jitter mechanisms exist for the biphase-mark-encoded signal, the biggest problem being that of bandwidth limitation at any stage of the interface. We have shown that band-limited interface jitter has a strong relationship to the bit structure of the serial interface code, and hence can be highly correlated with the transmitted audio data. Measurements have confirmed jitter levels of higher than 1ns in an above-average interface circuit.

The effects of jitter can be predicted by forming error models for different DAC architectures. It can be shown that, compared to low-oversampling multibit designs, pulse-density modulation converters are much more sensitive to jitter when producing low-frequency audio signals. This may explain certain subjective characteristics of PDM DACs that otherwise cannot be rationalized. A simple model of jitter-error audibility has shown that a DAC can tolerate white jitter noise of up to 180ps, but that even lower levels of sinusoidal jitter may be audible. These limits place tough constraints upon digital interface design, and it is recommended that interface receiver PLLs have closed-loop cutoff frequencies as low as possible. For the ultimate immunity to the effects of jitter, a second digital audio interface employed at the receiver can be used to slave the transmitter.

42 Since this paper was presented in the fall of 1992, this practice has become quite widespread.

43 This strategy is adopted in the Mark Levinson No.30.5 and No.36, though locking the buffer output data clock to the long-term average of the incoming data clock to avoid the RAM either emptying or overflowing is not trivial. --JA


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Audio Alchemy took the hi-fi world by surprise in 1991 with the introduction of their first product, the $399 Digital Decoding Engine v1.0. At the time, $399 was unheard of for a full-featured digital/analog converter. The product was successful, with more than 10,000 units sold.

The DDE provided a blueprint for Audio Alchemy's product strategy. By offering audiophile-quality products at low prices, Audio Alchemy has come to virtually own the market for budget high-end audio components. We've come to look to Audio Alchemy for consistently good—sometimes even great—sound at a price everyone can afford.

Part of Alchemy's secret is their method of sharing a product's manufacturing cost. But in a wider sense, Audio Alchemy's success is largely based on the synergy between two of its four founders, Mark Schifter and Peter Madnick, President and Vice President, respectively. Mark conceives of products and markets them; Peter is the engineering talent behind the company. Mark and Peter recently visited my listening room, and I asked them how they each became involved with high-end audio:

Peter Madnick: I started getting interested in audio when I was about 12 or 13. A friend who worked at Radio Shack showed me stuff they made, which led me to start fixing things at the local Radio Shack. When I was 15½, a local retailer called Tech Hi-Fi hired me to work in the back of their hi-fi store. By the time I was 16 I was selling on the retail floor, and did that concurrent with going to high school.

Soon after I started college I helped found a high-end audio store called Natural Sound in Framingham, Massachusetts with Jim Lackey and Kevin Voecks [who later became a prominent loudspeaker designer, notably for Snell Acoustics]. They were running it in their college dorm; we put it in a storefront after I joined. Soon after that we bought Kevin out because he didn't want to be in the retail business any longer.

This was in the mid-'70s. We established Natural Sound as a pretty significant store. There weren't a whole lot of very respected stores in the Boston area at the time—or even a lot of high-end stores at all. It was a fun business and I got to meet a lot of people. But my love for the product started to emerge over my love for the sale of the product.

I went and joined a little company called Dennesen Electrostatics. We were trying to sell a hybrid electrostatic loudspeaker, which we had some moderate success at. But I got really bogged down in why our speakers sounded so different in different stores. We'd go to one store and they were just glorious, and in other stores they were truly dismal-sounding. I started to look at the source material, and figured out that one of the problems was that we had no control over the quality of the source—cartridges were all over the place and not always optimally aligned. Records therefore sounded different. That realization led to the development of a product called the SoundTracktor, which was a phono-cartridge alignment device of which I'm one of the patent holders. [It was reviewed for Stereophile by J. Gordon Holt in August 1980, Vol.4 No.7.—Ed] So we started making an accessory product that helped hi-fi systems sound better. That's actually how I met Mark, who was then the Dynavector representative in this country.

Mark Schifter: That was actually the second time I'd met you. The first time was at Natural Sound. My heavens—I
MISTs

sold you Connoisseur turntables 20 years ago!

Madnick: Anyway, back to Dennesen. I worked my way up through a very small organization to be President of that company. I did all the product development. We struck a deal with John Curl to develop a preamp called the JC-80, which was really my first exposure to how high-end audio electronics should be done. John is an incredibly brilliant man, but little understood. Most people in the world can’t get along with the guy. I pride myself on being able to get along with almost everybody out there. John and I had a good relationship, and I learned an awful lot from the man. Just a brilliant man. We built a really good-sounding preamp, the JC-80. Later, I worked with other talented engineers to develop a small amp and preamp called the Sirius and Antares, which were well-regarded.

So that’s where the high-end bug came from. I just jumped straight in. I went from selling it to building it without any formal training. My schooling was in physics, math, marketing, and business, but nothing specific to this industry. I used college to learn things I wanted to know rather than to come out with something specific.

In 1983, consumer audio was getting to be a little tiring and I was starting to get really interested in music production. A friend of mine introduced me to Jim Croce’s widow, Ingrid. I helped her put a band together, tour, and do recording sessions. I took recording lessons and learned how the music was made on the professional side.

I came to a point where I needed to make a decision about going in a different direction, so I left Dennesen. I was going to pursue this career in pro audio when a mutual customer of mine and Mark’s called me. He was putting a business together that involved Mark. They enticed me to move out West and do this new business, which had nothing to do with audio.

Schifter: It was our three years off from audio.

Madnick: Then the desire to design audio products came back. I formed a little consulting company called DTG, Developmental Technologies Group, that was involved in developing new technologies in a variety of areas. Some products were audio products, but a lot weren’t. I got five more patents out of that little effort. Things as far-flung as a traffic-monitoring reporting system for the road, to a device that detects radon gas, to FM antennas, and an accessory for Mercedes Benz automobiles. All kinds of things.

It was really interesting because I got exposed to technologies in many, many industries. But audio kept pounding inside, and I started to do a lot more consulting work in the audio design business. Many audio products you’ve seen before came out of my little company—most of which I can’t talk about.

I was still talking to Mark fairly frequently, and he was starting a company in the audio business. Their product needed to be designed and that’s the business I was in, so we got back together. That takes me up to the beginning of Audio Alchemy.

Robert Harley: We’ll talk more about that after we hear from Mark.

Schifter: I began working at Amcron Electronics when I was 13 years old, as a salesman. I was originally at the tube and parts counter; I was the kid that went in the back and got the 12AX7s and stuff.
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That lasted several years, and in 1974 I went to work for Woodland Stereo in Woodland Hills, which was at the time one of the Meccas of high-end. It was there that I met Arnie Nudell [co-founder of Infinity and later Genesis Technologies] and began a lifelong friendship with him.

I worked for Woodland for several years and out of that relationship, and my friendship with Arnie, I was introduced to Mel Schilling from Music & Sound. Mel was moving West, and Arnie recommended to Mel that I would be the right guy to be the manager of his store. And I accepted that job.

Mel was involved at that time with John Iverson, and they were partners in a company that was the predecessor of Electron Kinetics. I went to work as Vice President of Sales at the ripe old age of 20. Working for John Iverson was... an experience [laughs]. That's the only way I could possibly describe it. The experience really honed my interest in the High End; it became my love.

I then went to work as the original founder of Dynavector's business here in this country. After a few years I wanted to open up my own retail store. I missed the customer contact every day. At that time Woodland Stereo was on the wane, so I was able to make a deal to buy that store, which we renamed Audio Exchange. Peter and I had a linkage at that time because I bought Densnes loudspeakers and Sirius and Antares amplifiers from him. There's been this constant ebh and flow of crossed paths between Peter and me throughout a period of 20 years.

I bought the store at the worst possible time — 1981. I mean, it was just awful. It was the real tough time for audio. I ended up selling the store to a small chain in Los Angeles. I was pretty fed up with audio at that point in my life.

I took about two years off to learn about video. I ended up working at a television station in Nigeria. In the Lagos airport, I read a story about how billions and billions of dollars were spent on advertising every year. I thought that if one could only find a way to address the consumer at the point of sale, one might have a good business.

We developed the point-of-purchase video system and started selling advertising time to the Coca-Cola, Procter & Gamble, and Johnson & Johnsons of the world. That company ran until 1986. I wanted to get back into audio, so my wife Lynn and I formed a company with the express intention of working on an OEM [Original Equipment Manufacturer — Ed] basis to develop products and ideas for other people. Peter worked with us then, and one day in 1990 I walked into Peter's office and said, "I believe there would be a real market for an outboard D/A converter at $399." Peter wasn't too excited about that [laughs]. But I persevered and persuaded him to get involved and help us make a product that was to become the DDE v1.0. And that is how Audio Alchemy was born.

Harley: The whole company was based on the DDE v1.0? Madnick: The company started with a box that I milked out in my shop in the back of my consulting company. It was three LEDs and a battery to drive them — no electronics inside. And Mark went to the [Las Vegas Consumer Electronics] show with it. I didn't believe he could sell it.

Schifter: There were only the PS Audio and Arcam DACs available at the time — and they were expensive. I rented a little suite in the Frontier Hotel and sent faxes to all the world to importers. In three days we walked out of that show with over 2000 units on order.

Harley: Before the thing had even been built? Schifter: That's correct.

Harley: Had you done the research to see if you could build the thing for $399 at retail — before Mark took the orders? Madnick: There had been some research done [laughs].

Harley: I get the feeling the same relationship between you continues to this day.

Madnick: Yeah. But my confidence level is much higher now.

Schifter: Bob, after 20-odd products, he tends to believe me. He didn't before.

Madnick: But I have to be skeptical. That's probably what makes us work — the cross-checking. He might ask me if I'm building it the right way, and I may ask him if he's really sure he can sell the product in the market. That's part of our checks and balances.

Harley: How did you approach making this D/A converter that you could sell at retail for $399?

Madnick: Mark had a relationship with a gentleman who put Mark in touch with the folks at Philips. If we were willing to use the Philips chips, display them prominently, and use Philips's name so they could spread the Gospel According to Philips, then Philips would take the pricing of the parts, project them out to what they were going to be a couple of years later, and sell them to us at that price. They wanted us to buy a lot of parts, which we of course agreed to do.

The thing that allows Alchemy to do what it does is to approach the job the way companies like Sony and Pioneer...
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approach it. They don’t think about making 100 of something. They think about making lots of something. What would happen if you based all your designs on mass production, but in high-end audio?

Mass production is a relative term here, but we build things in much larger quantities — much larger production runs — than other people in our industry do. Doing that allows us to build products a lot more economically. I’d love to tell everybody that our products are all hand-built and soldered by trained elves and all that, but they’re not. We’ve got lots of people that sit there and stuff little parts into boards. Real production-level work goes into these products. That’s how we do it.

Schifter: On a given mouth now, we’ll produce upwards of 400 units. This coming year we’re projecting an even greater rate of growth.

Harley: How many employees do you have?

Schifter: It depends on how you want to count them. We use an outside builder who’s contiguous with our building. We don’t build our own things; we have a subcontractor who helped us into business. There are 27 at Alchemy and a couple of dozen at the contractor. It’s about 51 total.

Harley: How is the DDE v1.0 conceived to have laid the foundation for how all of Alchemy’s future products would be built. You [Mark] set the retail price, then expect Peter to make it at that point price.

Schifter: That’s really how it works, Bob. What generally will happen is I have an idea of what I want to do with a product. I will see an opening. One of the passions that Peter and I share is to keep taking slices off an existing pie, but to create new pies. I think there’s a lot of slice-taking going on in the industry now.

We’re interested in doing new things. Peter had been talking about jitter long before a lot of other people were talking about it. I said to Peter, “Why don’t we make something to reduce jitter?”

It’s a process. Peter will ask me a series of questions. I’ll tell him, “I need these features, these functions,” and project how many pieces the market can stand to buy at a given price. And then he’ll come back with, “If it cost this much more, how many less will you sell?”

Madnick: Or if it was this much less, how much more will we sell? It works both ways.

Schifter: We try to find out where the market is within our economies-of-scale formula that has worked so well for us. That constant questioning is part of that process. I get these ideas and I ask Peter if he can make them reality. I draw in the sand and then Peter makes it come true. There’s kind of a reverse process that goes on too: He talks about technology and I distill it down to how I might be able to market it.

Harley: Do you operate on a lower margin and reduced profit to gain a larger market share?

Schifter: Absolutely not. We operate on what is very much the standard in the industry. Some products have less margin — DACman and DAC-in-the-Box are admittedly skinny.

Harley: Everyone was surprised when you came out with a DAC for $399. Then you came out with the DAC-in-the-Box for $259, and then DACman at $159. What’s next? Can you make a DAC that sells for less than $159?

Madnick: Unquestionably.

Harley: Why did you address the budget segment of the high-end market initially?

Schifter: We wanted to create a band of followers of Audio Alchemy. There’s a hell of a lot more people who can spend $159–$199 on a DAC than there are who can spend $10,000 on a DAC. We’ve always sold an upgrade path. Start with us here, but don’t end with us — ever.

We can show you ways to add de-jittering. We can show you ways to improve your sound with power supplies. We can show you ways to improve software instead of replacing an entire component. Most of our recent things have some form of software — everything from our DLC to our DTTI-Pro 32. These things have plug-in upgrades so we can create an upgrade path and make it available to the consumer. That way, he can enjoy the advances as we discover opportunities to make the products better.

Harley: What specific techniques do you use to keep the manufacturing cost low?

Madnick: We try to use as many common elements between our products as we can. We have, right now, three chassis that we use. We have the chassis that the DACman is in, which is an extruded piece of aluminum. We own a die that makes that part in 12’ lengths; we just cut it off to the length we need. Our DAC-in-the-Box chassis is also the headphone amplifier, the VAC-in-the-Box phono preamp, and the DTTI Plus jitter filter.

We do the same thing with the DDE v3–size chassis. That extrusion is also the DDE v1.1, DTTI-Pro 32, and DTTI v2. Because sheetmetal is a major part of the cost of building a product, we save a lot of money.

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Harley: Is purchasing power that significant a factor in the cost of building a product?

Schifter: It's very significant. The original mission statement of the company was to produce products that gave a high degree of performance and that were affordable. We've stuck to that mission statement, even when we didn't understand what a mission statement was. We kept our focus on that ideal. Volume buying is an important element to achieving our goal.

Harley: Alchemy now has a full line of amps and preamps. Did you foresee Alchemy as offering a wide range of products?

Schifter: We saw ourselves—to use words that other people have used—as a "modern-day Harff." We focused very heavily on that. We sought the price-to-performance ratio that Harff did so very well. Peter's got tremendous expertise in analog and, frankly, we want to pay homage to what brought us here. We listen to records all the time. We're known as the "digital guys," but records are where it's at too. And VAC-in-the-Box [Alchemy's phono preamplifier] is a wonderful example of that.

Madnick: All the products pay attention to the analog side of things, because once we turn digital into analog, it has to come out of the DAC somewhere. If the analog stages weren't good, you wouldn't hear what we did on the digital side.

Schifter: We like to benchmark our products against competitors' products. We open up competitors' converters and preamps and things like that. We're frankly very surprised at what we see representing itself as an analog stage.

Harley: How much of the design time is spent listening? Is it a case of listen and tweak, listen and tweak, or is it mostly done on paper?

Madnick: I don't know why this happens, but generally I'll come up with three different versions of something. We hover over it at my house, comparing, tweaking, listening, and changing. Mark will say, "I want the treble of that one with the bass of this one."

Schifter: That's exactly what happens. I want this and I want that, but don't leave out these features! I gotta have these features to sell it at this price!

I still read every single warranty card that comes into the company. Every one. And if any of those cards have a negative comment, they get a personal call from me or one of our staff to find out if we can fix it or serve them in any way. Out of a stack of 200 warranty cards there might be four negative comments in there. But it's the people who have negative comments and write the long letters who truthfully want to understand what's happening. So we talk to all those people. Peter ends up using a lot of those people as beta testers.

Madnick: That's a fact. Several of what would have been nightmare kind of customers two years ago are people we send prototypes to now so they can give us their comments. They feel like they're part of our development staff. We use their feedback to refine the product.

Harley: When you conceptualize a product, do you set the retail price and then make Peter design to that price, or is there any flexibility after the design gets under way?

Madnick: He, in fact, sets an unrealistically low retail price! Schifter: [laugh] I look long and hard at the market—something I've been doing for five years now. I see where I want to go and what price points the products must hit. So I do set very tight price targets.

Peter knows all 17 products that I want for 1996. He has them today in his notebook. He knows exactly the prices, the features—everything about what I want. They're very diverse products. I want different things in different areas because I see that that's where our company should go.

Madnick: And very clearly, they can't all come out of me. I'm kind of like the traffic director for a lot of this design work. We have very competent experts in the related fields that we need attached to us. We have a brilliant guy, Keith Allsop, doing DSP. He's just a brilliant man. He's the source of what is DTP-Pro and Pro 32—and the resolution-enhanced disc systems that we showed at the '96 WCES in Las Vegas.

Harley: You started this company making $400 DACs, yet you explore innovative technology like resolution enhancement.

Madnick: We need to set ourselves apart from other people. We don't want to make just another product. Mark's idea of creating new pies rather than carving out slices of the old pie requires new technology. I'm always out there looking for things to push the envelope of technology. Not just to have a cool new thing; it has to make sense. It has to do what we need technically, and be reasonably priced for it to be cost-effective for our customers.

Schifter: I saw opportunities. When a lot of people were talking about squeezing 20 bits into 16, I didn't understand why it can't go the other way. I asked Peter if he could build it... One night I was in Asia somewhere, and I called up Peter in the middle of his night—one or two o'clock in the morning.

Madnick: The common telephone conversation time between Mark and me.

Schifter: We talk usually twice a day regardless of what country I'm in. I asked Peter: if 20 bits were better than 16, could we find a way to rebuild 16 bits into 20?

There was a very long pause on the other end of the phone. That's when DTP-Pro was born. Peter went off to go looking for a technological means to do what I thought about, what I theorized. That's how it happened. The jitter box was basically the same deal. And DST [Alchemy's pow-

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StereoPile, March 1996
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S/PDIF digital interconnect was the same way.  
Harley: Your very first product included an PS port. At the time, it was billed as an expansion port, not as a newly jitter-free transmission interface. Were the jitter benefits of PS realized then?  
Madnick: At the time... no. We saw it as an open channel to future products. It really was following the same path that Philips themselves were following with their CD players. Philips was building CD players with digital output jacks because they knew the DACs they were building weren't as good as they were going to build later. That's what happened with DDE. We knew we were building something that was very good for the money, but Philips themselves were telling us they were making new DACs we were going to have soon. So we provided an access port so that when they came up with new chips, our customer wouldn't lose his investment in the part of the DDE he'd still need.  
Harley: Audio Alchemy built and demonstrated a DSP room-correction system, yet we've seen no product introductions. What's happening with that?

Schifter: There's no question that the last frontier is the room, and there's also no doubt that we're going to be on the scene with a product — with several products — this year.  
Madnick: We learned a tremendous amount from the earlies experimentations we did in that whole field. One of the things we learned is that it's an incredibly difficult field. It's much, much more complicated than we'd ever imagined. We learned that the amount of computing horsepower that was necessary to attack the room was massive.

The Alchemy approach has traditionally been, "What do you have to keep in the design to give the customer the best bang for the buck?" I engineer things on what's traditionally called the 80/20 rule: You get 80% of the performance for 20% of the price. What is it worth to get the extra 10% or 20% that other products might get?  
We've applied that approach to loudspeaker and room correction. The enormity of the task focused us on the loudspeaker. The first product will be something like a DTI-Pro 32 with a plug-in software spot. We'll have software available for a variety of loudspeakers that is designed to correct for the anomalies of that particular loudspeaker, in either an anechoic environment or maybe in what we'll call an average room.  
We'll correct for all the phase and frequency aberrations, which are independent of the room. Then we can correct for some amount of the floor reflection, because you do know you're going to set the speaker on the floor — the woofer is x number of feet from the floor.  
There will be "personality modules" available for a variety of loudspeakers. Ultimately, we hope to have software modules for lots of different loudspeakers. It kind of depends on how much cooperation we get from loudspeaker manufacturers.  
Schifter: We're making it easy. The loudspeaker manufacturer provides us a set of MLSSA measurements, and our system creates the right coefficients to correct that particular loudspeaker. We'll be able to offer the customer with a pair of Vandersteens, as an example, a module for his loudspeaker—

Harley: I can see how a DTI-Pro 32 works, interpolating 20-bit samples from 16-bit CDs and adding dither for input to your 20-bit DAC. But I don't understand how you can take in 16-bit data, then output 16-bit data, that's better than the original data. How can those new 16-bit words contain additional information?  
Madnick: Part of it's the adaptive dithering — dither that changes with the music's spectral content...  
Schifter: We're being real careful about what we say because I don't know how much of this we want printed. It's brilliant, and we're very proud of it. We're happy with the results thus far. Now we have to commercialize it and figure out how to sell the product.

A lot of companies are out there talking about resolution enhancement now because we've set this benchmark — companies that don't even have DSPs inside their boxes running interpolation algorithms.

Harley: Your $259 DAC-in-the-Box has a pair of multi-bit ladder DACs. If you choose to use a multi-bit DAC, you need a minimum of five chips — the digital filter, two DACs, two current-to-voltage converters, and MSB trimmers, all of which add to the eventual retail price. A 1-bit DAC design, however, needs only one chip for all those functions, and no MSB trimming. Given your tight build budgets, you must see a huge sonic advantage in using multi-bit converters over 1-bit.

Madnick: For the most part the multi-bits sound better. From an engineering perspective, they seem to be easier to make sound good. It's a lot harder to make the 1-bits operate in an environment that makes them happy. We worked really hard on DDE v1.1, which uses the Crystal 4303 1-bit, and it took a lot of work to get that part to shine the way we wanted it to shine.

Harley: What do you hear as the musical differences between 1-bit and multi-bit DACs?  
Schifter: 1-bits are usually harsher, less dimensional. Spatial

2. See my Jan. '95 "Industry Update" on Audio Alchemy's ERD process.
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rendering is a real important thing, and I usually don’t get it from 1-bit.

**Madnick:** Multi-bits seem to have more midbass. They seem to have that slam that I really like and value a lot. They also have more bloom.

**Harley:** Designing to a low price involves greater subjective tradeoff decisions than if you weren’t so restrained by budget. Does that mean that more of your personal listening tastes end up in how the product sounds?

**Madnick:** Interesting question… Mark has a particular sonic character that he would like out of our lower-price products, which isn’t necessarily the case as we get into the DDE v3, for example. DAC-in-the-Box and DACMan have a kind of a sound which DDE v1.1 moves away from, and DDE v3 moves further away from.

**Schifter:** We value dynamics. I also value for myself a very present sound. I don’t like to use the word “forward,” because that can have wrong connotations, but I value a very honest portrayal, if you will. I also tend to like things brighter than Peter does.

**Madnick:** Mark likes to sit a little closer. I like Row F, Mark likes Row D… Part of what your readers might find important is that we go to live music all the time. We’re season ticket holders of the LA Chamber Orchestra, Santa Barbara Community Arts and Music Association, the Los Angeles Philharmonic, and Bach Camerata. It’s the only way to really know.

**Schifter:** And we sit together. I force him to have a forward perspective.

**Madnick:** We have fourth-row center seats for everything we go to. It’s taken me years to get them. But we cleanse our ears a lot with live music. I think that really helps. There’s the occasional other kind of music that we see, but a lot of classical music goes into the design work. It really grounds us in what we’re supposed to be doing.

**Schifter:** Music is universal. I’m traveling usually 26-27 weeks of the year, and I make a point of trying to hear different types of music in foreign countries. I enjoy that a lot. People really love music. It’s totally universal. And that’s exciting. We like to make money in the audio business, but the overriding reason is to bring great joy to people.

**Harley:** What can we expect from Audio Alchemy in the future?

**Schifter:** There’s going to be a new emphasis on professional products, as well as several higher-end D/A converters. By higher-end, I mean larger, more conventional-chassis D/A converters for both the high-end consumer and the pro audio user.

Little did we know that a lot of our products are being used in recording studios. In the last few months we made a concerted effort to look at the pro market and see what people want. We’ve got an analog/digital converter coming that will be high-end consumer for the guy who might be doing his own live DAT recordings, and also for the pro user. We’ve got several DACs that were inspired by professional industry people I’ve spoken with.

We spend quite a bit of time talking to customers on the Internet, TAN [The Audiophile Network], AOL, and CompuServe, and we’ve found that Alchemy tends to confuse people. DTHs, DDEs, DDS—it’s like this alphabet soup of acronyms. One of the things that continually comes up is why don’t just put it all in one damn box—an upgradeable CD player. So we’re going to do just that. We’re going to have a product called ACD•Pro, which is a Pioneer Stable Platter Mechanism with a plug-in D/A, HCDIP® compatible, and plug-in dejittering, all in one chassis ready to rock’n’roll. And we expect that product to be out in the April-ish time frame, and to sell at less than $1000.

We have other ideas with DSP. We’re going to be coming out with a center-channel loudspeaker system that’s adaptive to the room and to the needs of the consumer. The consumer will be able to correct by remote control what we perceive to be perhaps an inherent defect in two-channel stereo listening.

We also have a newly formed Alchemy Video Products Group. The first product, called VRE v1.0—for Visual Reality Engine—accepts composite or S-video input from a laserdisc, VCR, DSS, or cable system, and outputs improved video. In its standard form, it’s a 2D squared adaptive filter. What that means is that it looks at the scan line before and after the current one, as well as the actual dot on either side of the one it’s on, to determine what that dot should be. It’s used as a comb filter to better define each

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Another plug-in upgrade is called the time-base corrector, which is essentially dejittering for video. What DTJ•Pro does for digital audio, this will do for television. It will plug into the VRE through an expansion port on the back — very Alchemy-like. You’ll expand out to several other boxes that will become available. One is an even more advanced filter called the 3D adaptive comb filter, which actually looks at the entire picture that was broadcast, the last scan prior to this one, and the one ahead of it. It’s actually looking to one further dimension. There will also be a line doubler that will then be followed by a line quadrupler—all of which plug into the VRE’s expansion port.

**Harley:** And all of which, presumably, will be low-priced.

**Schifter:** Oh, yeah. I’ve already set the price target, as you can well imagine. You can’t invent products without setting targets. The basic VRE will retail for less than $600. A line doubler with the VRE attached will be under $3000.

**Harley:** It sounds like you’re trying to do for video what you’ve done for audio.

**Schifter:** Exactly. We’re applying price-to-performance ratios that haven’t been seen in video. Again, it’s the new pie concept. My charter is to keep looking ahead and keep giving these ideas to Peter.
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A shock for some of us older guys at the 1995 Winter Consumer Electronics Show was the announcement that the grand old name of Western Electric was once more to be found on a vacuum tube, specifically a new version of the venerable 300B. As Jonathan Scull had been trying the new Western Electric 300B in the Jadis 300B single-ended monoblocks he reviews elsewhere in this issue, I asked him to talk to WE's Charles Whitener about why anyone would want to get into tube manufacture 50 years after Shockley, Bardeen, and Brattain invented the transistor at Bell Labs. —John Atkinson

Charles Whitener: Westrex Corporation was originally called Western Electric Export, founded in 1928 as a division of Western Electric. Its primary purpose was handling the development of audio equipment out of Bell Labs, which at that time was called Western Electric Engineering. Western Electric Export was a marketing organization and equipment builder that put together the amplifiers that you know of as the Model 91 and so forth. And of course they used electron tubes in these devices, which were made primarily for telephony use.

Western Electric was actually founded in 1872, and existed even prior to that under the name Gray and Barton. You've heard of Graybar Electric?

Jonathan Scull: Um-hmm... Whitener: In 1869 Elisha Gray and Enos Barton founded a...
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small company in Chicago, predating AT&T, which didn't get into the swing of things until the late 1800s. Western Electric didn't actually become a division of AT&T until 1882, after some patent fights over the telephone. Anyway, by 1872 the original Gray and Barton were building telegraphy equipment for Western Union, hence the name Western Electric. In fact, Elisha Gray had also invented a telephone, as had Alexander Graham Bell, but Bell's patents preceded his by an hour or two. Then you have the rest of the history of Western Electric, and that's a long story!

Scull: Charles, let's fast-forward to a more contemporary context...

Whitener: Okay, let's move up to the late '20s, when synchronized talking pictures were developed. Western Electric purchased the patents on the Lee DeForest Audion, which as you know, was the first true triode.

Scull: Yes, papa triode!

Whitener: Right. Well, Western Electric bought those patents from DeForest, and that's how they originally got into the tube business. And that evolved into the synchronized picture industry—talkies. This all came to an end in 1958 by order of the Antitrust Department of the Department of Justice, which forced

on doing something with it. I suspect it's gonna have something to do with cable TV—converter boxes, etc.

We had approached AT&T about using the trademark on certain audio products, starting off with vacuum tubes, with the intention of producing other lines over time. Back in 1958 when they were forced to divest themselves of Western Electric, it was considered the jewel in the crown—it hurt them to have to let go of it. They're able to revive the name now because of the 1984 consent decree where AT&T was split up the first time. It novated all the other consent agreements, so they weren't prevented from being in other businesses as of that date. That's why they could legally license the name to be used again. Anyway, we bit the bullet and signed on the dotted line.

Scull: How did you wind up rolling your own, Charles?

Whitener: As things evolved, it became clear that the tubes could not be made offshore. The biggest thing that worried us regarding offshore-produced tubes was that almost everybody we talked to in electron tube technology said that anything done by the Russians or Chinese universally had a problem: as soon as they let the drawings out, the product started coming out the back door! [laughs]

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Western Electric out of everything except telephony and government contracts. They were forced out of the picture business, based on a suit brought by RCA, who had a competing recording system. So in 1958 Westrex was sold to Litton Industries—and we purchased the corporate entity from Litton Industries, a corporate entity that actually goes all the way back to 1928! We own the original corporate shell.

Scull: How did your relationship begin with AT&T?

Whitener: We approached AT&T back in about '92. Actually, we were originally looking to purchase vacuum tubes from them. There were quite a number left that they'd been saving for safety stock, and we bought the entire inventory they had at the time.

Scull: Do you recall the total number of tubes?

Whitener: Yes, we bought 35-something-thousand tubes—not all 300Bs, of course. We also bought the production equipment, so you might say we bought the tube business.

Scull: How did AT&T receive your initial overture?

Whitener: They were always positive—even though it took over a year to get things worked out because of the bureaucratic maze. And the reason was that the Western Electric trademark had all but disappeared from consumer products, although it was and still is used in a lot of equipment sold by AT&T Network Systems to other Bell operating companies.

The breakup of AT&T was driven in part by the fact that companies like MCI and Sprint were very nervous buying equipment from their competitor. They didn't like that at all. In any case, AT&T was very interested in reviving the Western Electric name. At the time we didn't know exactly why, but they were happy with our putting the name out in front of the public again. I hear that at some point, they plan

We decided we just couldn't let the drawings out, or the technology for that matter. So at that point, we looked at it domestically—could we avoid putting the original plant back together ourselves?

Scull: This would be the Kansas City plant you're speaking of?

Whitener: Right. We went to Richardson, but for a number of reasons, that didn't work out. We realized that audiophiles simply weren't going to accept a re-badged Cetron tube, and neither would AT&T. By the way, I'm speaking as if this is all a Westrex project—it's not. AT&T is directly involved.

Scull: That's good to hear. AT&T manufactured the last 300B in the late '80s, isn't that right?

Whitener: Yes, 1988 was the last year of production for the 300B. AT&T shut down the production facility, but they still needed stock—there are still a limited number of vacuum tubes used throughout AT&T’s system. The 300B was, in fact, the last tube AT&T continued to make. One problem; they couldn't get an outside-approved vendor for this tube; so they thought to make enough gap stock to carry them. Call it a “life build.” Some audiophile types heard about it, tapped in, and got them to build a few more. Most of those were sold to the Japanese and the French, by the way.

To make a long story short, we decided we'd have to go ahead and make the tube ourselves at the old location—the Kansas City works. This facility is more than a million square feet, and they continue to make connectors, transistors, and diodes there. We set up in a small location in a part of the plant—we don't need that much space because we're only making a few tube types, not 400 different ones like they used to. We unmoaballed some old equipment that was out

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McIntosh components. A great investment. A great American institution.
there, and acquired some new equipment, put it all together, and retired a number of retirees from the original 300B line.

Scull: Charles, let me ask you, did some of the equipment you acquired come from Richardson? It occurs to me that may be a possible link with a rumor I heard—false, as we have learned—that Richardson was manufacturing your tubes.

Whitener: When the Kansas City operation was closed in 1988, Richardson bought a few pieces of equipment from AT&T, which wound up sitting in storage. We bought one piece back from them. It saved us some time, you understand. So we brought in the retirees and retrained them—everyone was just delighted. It's like family. We were all so happy to get this going again, particularly Bernie Magers, who was the senior engineer in charge of tube manufacturing there. Gosh, he'd been there for 35 years, I'd guess. He was in charge of the entire production and knew the 300B intimately. In fact, he's the guy who printed the Western Electric book—I guess you've seen that?

Scull: Of course... Tell me, what are the differences between your 300B and others available out there?

Whitener: Let's first look at the philosophy of the manufacture of electron tubes, Western Electric is everyone else. First off, the reason Western Electric licensed the Audion from DeForest was that there were no amplifiers at that time. Long-distance telephone service predated the amplifier. The first trunk was between Philly and NY, and it had no tubes or amplifiers in it—it was all just voltage-driven. That was the longest link they could manage with standard battery currents. Beyond that, they had to come up with some method of amplifying the signal. Well, DeForest had come up with the Audion, and a guy at Western Electric named Armstrong took it and developed it into a usable amplifier. So the first use of electron tubes in an amp were for telephony.

As you know, everything Western Electric made was built like a tank. These tubes were designed for what's called "leased service" use, which means you plug the tube in the central office and you leave it there. They weren't designed to be re-placed like consumer tubes were. So the research behind them, the quality of materials, every component surrounding the development and execution of the manufacturing of these tubes, was dramatically different from other tube types. RCA, GE, Sylvania—all these tubes were mostly used in commercial applications. But the point is they were all designed with not nearly the same care, especially when it came to the cathodes and filaments. That's the secret to long life in a tube—the cathodes and filaments. During the last couple of years, we've done a lot of spectrographic analysis of tubes made by other makers, and we found that all these companies were doing almost a direct opposite chemistry to what Western did. But Western tubes last anywhere from two to 10 times as long as other tubes.

Scull: How do they manage that, Charles?

Whitener: Well, a lot of that falls under trade secrets. I can tell you that the nickel that goes into our 300B cathode, along with the special coating that's on it, are sort of like the Coca-Cola formula. Top secret! It's even more like the Coca-Cola formula in that once it's "cooked," it's different from how it started—you can't reverse-engineer it. The reason they were developed in such a manner was because of the "transoceanic" requirement for what they call submarine cables. These tubes had to be installed in these cables laid at sea, and you couldn't just send Mike Nelson to change the tubes out.

Scull: So the 300B benefited from this build philosophy?

Whitener: The 300B was an unusual tube in the Western Electric lineup in that it—along with the 212E, the 284D, plus a few others—were designed specifically for high-fidelity audio use, even though "high fidelity" wasn't a term used back in those days. These tubes were made for theatrical use, which was the closest thing to hi-fi that we know of today. Back then, Western Electric had a huge business, you know. Television wasn't developed until the late '40s and early '50s, and so theater was the primary entertainment outlet for people—aside from live entertainment, of course.

As you probably remember, not too long ago you couldn't actually buy a telephone; you had to lease it. Well, the same was true of Western Electric's theater equipment—theater owners had to rent the equipment, including the speakers. And that practice went on until 1964. And then there was ERPI—

**Once the 300B Line is Up and Running, and We're Just About There Now, We Expect by Late February We'll Have Significant Quantities Available.**

you've heard of ERPI?

Jonathan Scull: No, can't say that I have.

Whitener: ERPI—Electrical Research Products Inc. That was another division of the Westrex group that started in 1928. They did all the actual leasing and maintenance. So the Westrex side built equipment, and ERPI leased, installed, and maintained it.

The 300B was designed expressly for high-fidelity use. In fact I think it's the only medium-powered triode ever developed specifically for hi-fi. The THD and IMD are inherently very low, and that's why it sounds so good without negative feedback, push-pull designs, etc. Most of your other hi-fi tubes were designed in the late '40s/early '50s, like the pentodes you're more familiar with—the 6L6, KT88, and 6550s. Those tubes have, as you know, additional grids that improve power output but dramatically increase distortion. You need a push-pull circuit or negative feedback to null out the deleterious effects. That's not true in a 300B, a 212E, or a 284D. (Those will be follow-on products, by the way.) Even the RCA 2A3 wasn't designed for audio.

Scull: I don't know if that's popularly known...

Whitener: And the other reason it was one of the only tubes developed for audio is because Western Electric had a virtual lock on the theaters—a real monopoly.

Scull: What can you tell us about the Western Electric 300B's construction?

Whitener: The materials are chosen very carefully. I can tell you the Russians and the Chinese don't have access to the kind of purity in materials that we do.

Scull: Can you be more specific?

Whitener: Sure: the anode in our 300B is 99-point-whatever pure nickel—that's carbonized in a real special process. A lot of other manufacturers that are making tubes are using...
either dramatically less pure nickel, or, in a lot of cases, they're using steel that's nickel-plated. It just increases the THD if you use less pure materials.

Scull: Anything else you can reveal about the materials or processes?

Whitener: The tubes are mostly highly purified, Grade One nickel, with the exception of the filament hooks, which are tungsten, and the filament itself. But as regards the filament core material, I can't divulge what that's made of—Coca-Cola again!

Also, the actual processing itself is very critical. One of the primary issues involved in making any electron tube is cleanliness, and we take great care with that. And another issue revolves around the anode — we bring it up to way above what other tube manufacturers do during the heat-treating process. Typically those temperatures would take the carbonized coating off of just about anybody's anode — it would strip it right off. But by doing this, we pre–life-test the tube. Normally this would damage it but for a certain special process we have. And I'd say that our vacuum is probably significantly higher than others.

Scull: I understand you age the tubes?

Whitener: Let me tell you a few things with respect to aging and testing. All Western Electric tubes were aged and prescreened. There's a step in tube making called "screening" that most people don't do today, and didn't do back then — even the Chinese and Russians. You take the tube beyond its characteristic voltage and current — you hit it hard — that's called screening. This is where you find infant mortality. So we do this screening and then we do a rigorous aging process, which is a critical part of the manufacturing process. Aging — traditionally called conversion — is the stage at which the oxides on the filament are converting from the carbonates. So the aging process, its steps and accuracy, are very important. And that's very carefully done in the Western Electric process. At the same time there's a 500-hour life test given to Western Electric tubes — we select random samples from an aging set of tubes and we don't release that batch until 500 hours are reached in that particular sample from that batch. We don't release any tubes in a particular lot until the samples pulled from it reach the 500-hour mark.

Scull: "No tube will be sold before its time," as Orson Welles would said?

Whitener: Right!

Scull: Charles, the tubes I have here are production units?

Whitener: Yes, they are.

Scull: So you are in fact charting them out now?

Whitener: Right.

Scull: When will they be popularly available? Everybody is practically taking it personally that they're not out yet?

Whitener: Let's get into a little of the why of that.

Scull: Sure.

Whitener: Anytime you start up a production line of any active electronic part like transistors or tubes, you have what's called a yield issue. How many parts did you get that meet spec out of every 100? It's not atypical to get a 50% yield when you start up. Make 100 tubes, and 50 have to be thrown away! Western Electric had a standard that even if you had 50 good tubes, you still couldn't ship them. You had to earn what's called "eligability." We've had to go through several manufacturing cycles and adjust the processes just so, until we got a very high yield. Then we could release them.

Now I know that sounds unusual, but that's just the way Western Electric does it, because even though you had 50% that passed, the fact is, you had 50% that didn't. Well, there may be the possibility that the other half wasn't quite up to spec. So our yield has to be up to a certain predetermined level.

Scull: That makes a sort of large-corporation sense.

Whitener: We simply have to make AT&T spec, you see — we're audited by Bell Labs... They're the guys who say if the tubes can be released or not.

Scull: And to this point?

Whitener: Well, since October '95 we've been increasing the yields to where they're releasable, which is, by the way, a very expensive ordeal.

Scull: I can well imagine!

Whitener: Once the line is up and running, and we're just about there now, we expect by late February we'll have significant quantities available. Right now, we're there on certain lines, but we want all our 300B lines up to spec.

Scull: Charles, let me ask you what in the world made you decide to get into this?

Whitener: Well, Jonathan, I used to be in the instrumentation business. We built devices for Monsanto, Dupont, and Allied Signal. They were machine-vision products, highly technical on-line quality-control instrumentation. I sold the company in 1990. I'd always been an avid audiophile, and kept looking at this Western Electric thing, and thought, why in the world doesn't AT&T pursue this? I thought it could be a great product line for them. So I guess you could say I'm just a guy who was at the right place at the right time.

Scull: Well, Charles, you obviously didn't do this because you thought single-ended is going away. Anything to say in general on this topic?

Whitener: Well, you know, I'm one of those guys who'd write a letter to the editor that I'm tired of reading about green pens being used on the edges of CDs, and I was just as suspicious when I started hearing about single-ended amps. But the first time I heard it, I was just in shock — I couldn't believe the difference. The level of detail and the lack of that analytical sound you get with push-pull and amps that use feedback was amazing.

Scull: What's next for Western Electric?

Whitener: I think the single-ended market will grow because of the quality of its sound, so we're going to come out with a 212E. That's a triode too, but it's sort of like the 300B's big brother. It has a plate dissipation of 250W, six times that of the 300B, so you can expect between 50 and 75 watts of single-ended power from this tube.

Scull: Something like a 211?

Whitener: It's two to three times the output of the 211. Another tube we'd do is the 284D, which was designed for high-power theater systems. You might say the 284D was the successor to the 300B.

Scull: How much will the Western Electric 300B cost?

Whitener: They'll retail for $350 each, $400 overseas. By the way, if you look at the price of our tube, they're actually cheaper than they were in '88 if you consider inflation.

Scull: Any guarantees associated with the sale?

Whitener: It's 90 days, which is extended to one year if you return the warranty card. That's the longest in the business.

Scull: Anything besides tubes we should be looking for from Western Electric?

Whitener: Watch for more interesting products from us, including cables and loudspeakers!

Scull: Thank you, Charles.

Whitener: And thank you, Jonathan.
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STEREOPHILE, MARCH 1996
I’ve never written a love story before, but then, there’s always a first time. This romance concerns the surprisingly anthropomorphic Jadis Eurythmie II (mostly) horn speakers and the petite, jewel-like, and vivacious Jadis SE300B amps—a 10W single-ended triode design with paralleled output tubes.

Kathleen and I, having flung ourselves into single-ended’s embrace, have become, to some fashion, quite experienced. I’ve described the purity of presentation available with the Wavelength Audio Cardinal XS monoblocks when coupled with the Swiss-made Reference 3A Royal Master Controls in these pages (January ’96). Using the Eurythmies speakers, which supplanted the 3As in our system, we’ve listened to Gordon Rankin’s Wavelength Cardinal XS monos, the Kondo-san Audio Note Kasai parallel 300B stereo amplifier (next SE review to come), the ebullient and eager-to-please Cary 301SE 300B stereo unit, and the Jadis single-ended triodes, as well as our reference JA 200s (yes, Jadis also does push-pull).

And we evaluated a cornucopia of 300B tubes which were slipped into the waiting sockets of these amps: the VAIC VV30B and the less-costly VV300B; the long-anticipated and very suave Western Electric 300B (see my interview with Westrex’s Charles Whitener elsewhere in this issue); Chinese Golden Dragon 300B Supers; the not-quite-ready-for-prime-time ESTI 4300BLX; Audio Note–branded 300Bs (carbon-plate ESTI, I’m told). (For the hoopy-scoopy on these tubes, see my “Brace of Bs” sidebar.) At this point, even Jimi Hendrix would consider us experienced—if not quite in a Purple Haze. Most of the time.

**Eurythmies Descending a Staircase**

The speakers arrived in a multitude of oversized boxes. Importer Frank Garbie dragged them into our downstairs lobby and broke them open, elevating the individual modules up to our door. This happened on one of my office days, but Kathleen pushed me out the door in the morning with a “Don’t worry, cherie, I can handle it…” She phoned in periodic updates on Garbie’s progress. Remember that old Stan Freberg routine? “I got it, I got it… I don’t got it!” I arrived home just in time to hook up the amps.

Frank had set down the Eurythmies in roughly the same position the Avalon Ascents had occupied on the 10’ by 4’ MDF platform (this screwed and bolted through to the floor and beams below). This left the Eurythmies in the familiar nearfield listening position. We powered them with our Jadis JA 200s at first, as we were all still waiting for the single-ended Jadis SE300Bs to appear. Frank had been enjoying the 200s on the Eurythmies in his Durango listening room, so was familiar with this pairing’s voice. (The 200s are a classic push-pull class-A pentode design of approximately 130W, and our long-time reference amps.)

How practical is it to use high-powered push-pull on a horn speaker? Well, the Eurythmies are a hybrid design of sorts. The 103dB-sensitivity horn array—lower-midrange driver up inside the “butterfly” enclosure, a time-delayed tweeter sitting atop a similarly delayed upper-midrange mahogany horn—is sited above a bass cabinet enclosure containing two 96dB-sensitivity 15" woofers in an “Isobarik” arrangement. Each speaker’s external crossover features a potentiometer, adjusted with a digital voltmeter, which varies the sensitivity of the horn array in relation to that of the woofers, thus optimizing the amp/speaker cable interface.

After a day or two fiddling with the
crossovers, we realized we still weren't getting them to perform as best they might. Problems revolved around several points. To begin with, I heard that hoover horn coloration I dislike — saxophones sounded like they were made of wood, for example. The imaging was off—I wasn't getting the spread and depth that we've grown accustomed to. The bass wasn't very tight or well-integrated into the overall presentation, and there was a noticeable lack of dynamics.

That particular week JA was in town, and stopped by to visit. I was nearly cross-eyed from a vicious and debilitating weather-induced migraine, but managed to keep the fires lit—just. Between draughts of Veuve Cliquot, JA focused on the horn coloration, and agreed that the Eurythmies were a tough uninvolving and polite-sounding.

I'm carefully noting these anomalies to make you aware I didn't turn a blind eye to what many consider to be inherent (and terminal) problems with horns of whatever design. But it also occurred to me that, with the renewed global interest in single-ended triodes, it should come as no surprise that advances might be made across a broad front, and that some of these new designs might well succeed in vaulting over the very horns of the dilemma, especially given the advances in materials technology we enjoy today.

A WELCOME BREAK
As it happens, Kathleen and I had planned a 10-day holiday around then. Like most guilt-ridden New Yorkers, I kept telling anyone who'd listen that it was our first getaway in three years. That's what everyone says. "Oh, I know, me too!" In the event, we had a heart-to-heart with importer Garbie and suggested a post-vacation rendezvous with the two French architects who'd designed the Eurythmies, and Jean-Paul Caffi of Jadis. Thirty-seven-thousand-dollar speakers do not hoot, I was sure.

I thought so, and with that, Kathleen and I bid au revoir to M. Garbie and disappeared into the wilts of Southern California to think no more of high-end audio. We began our vacation with four days of sailing with a waterlogged audio victim of our acquaintance. Nautical activities centered around a 38' racing sailboat—a Catalina. Coming from a sailing family, Kathleen loved every minute at sea, but as for me... taxi!

After several days consuming mass quantities of Dramamine, followed by (even I have to admit) a keenly enjoyable keeled-over faster-than-fast return from Catalina Island to Newport Beach, we found ourselves back on blessed terra firma. (I didn't kiss the ground, but I considered it.) We rented a total pig—a hard-steering barge of a Bonneville staved far, far from its '60s roots. Cursing Detroit, we headed north out of L.A. for my first taste of the Pacific Coast Highway, complete with a souvenir speeding ticket. Our plans were to visit several SoCal audiophiles we have the pleasure of knowing as we headed north up to Fremont near San Francisco, where liveth the Shun Mook Monks and their new Bella Voce "tuned" speaker (what else?). Five kay the pair. More Monkish speaker matters later, he said innocently...

BACK IN NEW YORK...
...we had but one Sunday to decompress before the French Foreign Legion showed up, shepherded by Importer Garbie and his partner at Northstar, Scott Isaacs. We read the Sunday Times, and caught up on audio gossip. Monday morning, off I went once again to the office, encouraged out the door with a smile and one of those very French shrugs accompanied by that they-all-do-it expressive-beyond-words pursing of the lips. It's usually accompanied by a slight shrug of the shoulders and a breathed-out "Ouff." I know, I know... she can handle it!

That evening when I returned, there were Frenchmen scattered everywhere in our loft. Bonjour to Jean-Paul Caffi; the Eurythmie's designer, Jean-Bernard; and his associate Jean-Phillipe; and right back to work. Everyone looked innocently around as I noted that the speakers were set even farther back in the box and fairly close to the sidewalls, finished off with a mild toe-in. I was happy to see the Jadis SE300Bs up and running, wired up with all-XLO. Digital data-links were the fantastic new Illuminati Orchid AES/EBU, Aural Symphonics glass gooped with io Gel, and the newest Marigo Apparition Reference Signature.

The speakers' aluminum forward bottom-plates were supported on large Audiopoints set into their brass bases. The crossovers had been adjusted to 2.9 ohms, which I was informed is the Jadis...
amps' ideal setting. Setting the crossover is quite straightforward. The multiple Jeans played Keith Jarrett's *The Köln Concert* (ECM 1064; you can use any well-recorded piano) and listened for an imbalance between the right and the left hands—the treble and bass clefs. When the energy seems equally distributed, and one register doesn't overpower the other, you're there. Piece of gi-
tense, no?

This leads me to a Scullgression.1 I spotted RH in my review of the Wave-
length Cardinal XS for pronouncing the Infinity Compositions with their pow-
ered woofers as the way to go with single-
ended triodes. I demurred, feeling that many aficionados would prefer to listen to single-ended full-range—as one can certainly do with the Eurythmies, in spectacular fashion. However, Jadis's Jean-Paul Caffi, responsible for the Eurythmies' passive crossover, will be introducing an active tube crossover as an optional replacement sometime soon. Those chasing the final degree of musical perfection might then employ push-pull or big single-ended tubes on the bottom, such as the 211 or 845. The question is, when this further evolution of the Eurythmies' crossover is ready, will I eat my words? (A writerly punishment, no?)

In any case, with the gemlike Jadis 300Bs driven by the Jadis digital front-
end (J1 Drive/JSI Symmetrical Con-
verter) and a J180MC, things were much improved. I checked the wood factor (tut, tut, tut...) with Saxophone Vocalise, Delos DE 3188. I always get a kick out of listening to track 2, Heiden's (no, not that one) *Division for Alto Saxophone and Band*, which sounds like it was written expressly for the Hercules Poirot series.

I don't know if you're a fan of the diminutive Belgian sleuth with the hyperactive leettle gray cells, but we love his "remarks most pointed." Listening to that track, I couldn't help but visualize Captain Hastings at the wheel of his open Lagonda, an alarmed Poirot at his side keeping his hat in place with the sil-
ver beak of his walking stick. Should you suffer from saxophone sweet-tooth, this disc will put you in insulin shock with works by Gershwin, Massenet, Bruch, and several other composers I confess I'm unfamiliar with. The recording is a lot of fun, and the horn in ques-
tion is beautifully, *lively* recorded. For another check on wood (and imaging), I played "The Nearness of You" from that old favorite *Thin Jeep* (Columbia CK 44199) by Branford Marsalis—my fa-
vorite thing he's done. Final verdict? No wood. (And no jokes!)

**Eurythmie II: Technical Description**

I'll both paraphrase and quote verbatim from the Eurythmie's spec sheets. "Scul-
\tured to reply the laws of nature, they are surprising by aesthetic in appearance. As they cannot be hidden, we have made them into works of art and have used craftsmen's techniques in their manufacture." But of course! One night after they'd first been installed, Kathleen jumped up in front of them and started dancing sinuously. "Jons-a-ten..." (hence the J-10 moniker, get it?), "they look like hula-hula girls!" That they do, *ma cherie*: Keep dancing!

In a not-quite-white paper we're reminded that our brains do not actually "hear" acoustic energy; rather they ana-
lyze electrochemical data created by the movement of the eardrum. The Jadis Eurythmie speakers create these electrochemical reactions by utilizing horn transducers from 180Hz up, which allows "30 times as much energy as a traditional speaker. By economizing on the power of the amplifiers, these sys-
tems also have the advantage of mini-
\ntsing the effect of the room due to the con-
\ntrolled direction option." I'll presume we're talking about dispersion here.

"A horn speaker's design is based upon calculations that determine the correct shape to amplify a certain range of fre-
\ncuencies. Hence our optimized four-driver system: Bass, Mid-Low, Mid-High, and Treble." See, it's Franglais, but it gets the point across. "With the Eurythmies, the bass crossover frequency of 180Hz allows a maximum of fundamental tones to be reproduced by the horn transducers—the pitch, the treble clef, and the bass clef are present in frequen-
cies from 180 to 800Hz. We have there-
\fore prioritized this range and kept the advantages of a drum..." (that's a dy-
namic moving-coil driver, which they dub *isodynamic*...) for the bass range. That's the best compromise if you want to have a speaker with reasonable di-
\nensions, that is transportable, and has a pleasant aesthetic. Too many conces-
sions would have to be made for a bass horn. Of course, restitution with a horn in this range is the ideal solution." But of course...

They're not small: about 60" high, with a width at the front face of almost 28", and a similar depth at the base. In spite of their size, they don't visually overpower the room...

"Above 180Hz the horn system is in three-ways to respect some important design parameters such as directivity control and distortion. The Mid-Low horn (180Hz to 700Hz) is separate from the Mid-High horn (700Hz to 7kHz) in order to improve directivity and to get away from reverberation problems. (It is better to minimize the effect of the room because reverberations confuse and mask some information.) The Eu-
\rythmie's directivity is perfectly con-
trolled and optimized, and is more marked than with other horn speakers."

We'll come back to this directivity is-
\sue in a few moments. Wading on through the documentation... "Horn distortion problems are real and you can calculate them precisely. Bad quality horn speakers only add to the subject. A horn working through a too-wide fre-
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*jadis SE300B monoblock power amplifiers*
As first of ly achieved, for made Mid-High that is by phase technology. The annulation quency sensitivity to 7000 Mid-High (180-700Hz). "The Mid-Low horn uses the same manufacturing technology as the bass cabinet, bent plywood inner sides proper to Jads." That is to say, proprietary to Jads. "It is driven by the famous 6½ from Audax which is notable by its moving mass of only 9.2 grams. It fits perfectly for this use, the efficiency reaching 30% (12 times more than with an isodynamic driver)."

Mid-High (700Hz-7kHz). They feel that what's right for a dynamic driver is also right for a compression driver. "The Mid-High is a 1" model with a 4.4mm titanium diaphragm spooled with aluminum wire onto Kapton. The phase plugs are very precisely shaped. The 135mm magnet generates an induction of 7000 Gauss in the air gap. The horn is made of mahogany plywood and produces no resonance in this range. Its expansion is proper to Jads and is optimized for this type of driver. It is also notable that a wide horizontal dispersion (100°) is achieved, constant from 1kHz to 10kHz."

Treble (over 7kHz). "The tweeter is a small compression model, with an anular diaphragm and an ultra-light coil of 20mm, not very directive due to the weak diameter of its horn. We can easily understand that this sort of tweeter, excellent in the extreme treble, will not work well from 4kHz, just as in the manner of many other 'normal' drivers. Only the match with a Mid-High horn like the one used on the Jads Eurythmie, allows the tweeter to work in optimal conditions." Well said, mes amis.

Less than technical first impressions
As you can see from the photo, this is a remarkable-looking speaker, to say the least. I've heard it described as resembling a flower, a butterfly, and even a giant tooth! (That was XLO's Roger Skoff ... his poetic license seems to have expired.) Interestingly, women fell easily under its spell, preferring the Jads even one to more obturate and boxy shapes. They seemed equal parts fascinated and engaged by its agreeable presence as well as the quality of sound it made. Ahhh yes, that's something to do with it also.

Horns have always put me off. I now realize that may have been my preconceptions voiding the warranty, so to say. What I mean is, horns present sound quite differently than do moving-coil loudspeakers. I'm accustomed to hearing dynamic drivers in the relative nearfield, fairly well spread apart, in a free-field away from all room boundaries. (For details, see "A Matter of Taste," June '95.) This way, even the Avalon Ascents disappear with the same sonic sleight-of-hand as do smaller monitors, like the Reference 3A Royal Master Controls.

We're used to a soundstage that wraps around the speakers, extending somewhat forward, and often way back. And I don't mean receded, of course. We also, as detailed in June, normally listen against a back wall treated with Harmonix RFA-78 Room Tuning Wall Dots (as is the whole listening area and beyond) plus a pair of RoomTunes angled back against the rear wall just behind the listening position. (See MF's review of the Audio Physic Virgo speaker, September '95, for a cogent explanation of near-rear-wall listening theory.)

But the Eurythmies didn't work well with this setup. They blossomed only when moved much closer to the listening area's rear wall, and when toed-in to converge just behind the listening position, which itself was moved forward into free space about 5' forward from the normal rear-wall listening spot. Actually, we keep another chair against the wall behind the Ribbon Chair — it's a valid secondary listening position. The two seats differ in that the forward-optimized listening position is richer, more amazingly ambient, and so airy you can feel the breeze. The rearmost seat delivers a more transparent sound that resembles more what moving-coils deliver: a spread of sound in a more rearward-biased soundstage. After hopping back and forth, most listeners preferred the Ribbon Chair to the rear-wall position.

And we had a lot of listeners. They came out of the woodwork once word got around that the Eurythmies were here. That was fine with me — I wanted witnesses, as I told everyone who sat in wonderment listening to the system. While that was fun, one of the more telling moments occurred during a visit by Steve Guttenberg. He'd brought a new Chesky release with him, Nicola Frisardi's performance of Mozart's Piano Concertos 9 and 27 (CD136). It was recorded in the Mozarceum, Grosser Saal in Salzburg, Austria. (A wonderful recording I can recommend to Mozart Kügel everywhere.)

After careful listening, Steve told us the playback sounded the way the music sounded in the Grosser Saal during recording. Hearing that from one of the recordists means something, even from one so polite as M. Guttenberg. Ascribe to it what you will. I can tell you, it made me think about things. For instance, I'd have to say that to this point I've regarded a high-end system's prime directive as re-creating the master-tape as faithfully as possible. Somehow, despite the quality and elegance of some of the statement products we've had here for review, my opinion never really changed. But what if that were to change? What if ... what if you can get really close to ... being there?

Letting that question dangle provocatively in the air, let's get back to the Eurythmies' sound. What put off some audiophile visitors on first listen was the manner in which they project the soundstage before them, rather than wrapping it around themselves as do box speakers. To illustrate, I'll use some impressions gleaned from my notebook. "Listening to Milla's The Divine Comedy (SBK/EMI 8 27984 2), especially the opening of the first track where the phase-manipulated musical effects were stunningly re-created in an enormous ambient field of illuminated sound that, by the projective nature of the horns, existed not wrapped around the speakers so much as wrapped around the listener."

"Ah-ha! It's truly an exquisite experience. I feel I've never been so spoiled and catered to by a music playback system as I do at this very moment." Ah-ha, indeed ... The lobe of sound the Eurythmies threw seemed pear-shaped, with the bulbous end acoustically circumambient to the listener. I know about pear-shaped — that's what Kathleen says I am! That may account for the sense that I was sitting a few aisles removed from
the middle of the concert hall when taking the rear seat. In fact, you’re at the rear of the lobe, looking into, rather than being immersed by, the energy of the soundstage.

While pear-shaped is what I’ve used to describe the lobe of sound, it should be understood that, sitting within that fruity lobe, the apparent soundstage for the listener was truly enormous in all directions. Unlike a pear, the rear of the soundstage never appeared narrower or smaller than what was heard at the front. Interestingly, the Eurythmies’ sound off-axis as we moved about the loft was always pleasurable and musically fulfilling. It wasn’t at all a head-in-a-vise experience.

Due to this projective nature, then, plus the system’s transparency, some few over-indoctrinated audiophile types felt — at first blush — that sounds were coming a bit too recognizably from the speaker itself. But as I bid them listen further (Kathleen rubbing their tense shoulders, perhaps, I introducing a relaxed state with the rubberized 20 Pound Test ScullMallet™) I’d watch as they’d relax into the music, seduced by the beauty on tap within the huge acoustic.

Because the presentation’s spread and sheer musical breadth were often just beyond belief. Swapping amps, 300Bs, and wires all produced subtle shifts and balance changes in the sound, but the Eurythmies always projected before them an enormous, wide, free, airy, open, and above all acoustic soundstage. What a delight.

A Tweak by Any Other Name

What review would be complete without a nod to the three Shun Mook Monks? In this case, they arrived for a flash visit shortly after the French contingent had left. Alone at last? Not for long. After an intensive afternoon of listening and tweaking, we wound up with 10 Mpingos per side, located at strategic points about the Eurythmies with transfer tape. It would be beyond the scope of this review to illustrate their positioning, but any Eurythmics II owner can fax the magazine or e-mail me — jonathan.scull@tanet.com — for details.

Two improvements stood out from the rest. The bass sounded tighter, deeper, better pitch-differentiated, and altogether more interesting with Mpingos in place. The other outstanding effect was on the tweeter. One disc behind each assembly, pointed to 11:00 and 1:00, tamed a certain slight aggressive-ness that would, untreated, pop up from time to time on poorly recorded digital source material.

There are sure to be those of you who feel that, at this price, one shouldn’t have to do anything to an audio product. If you feel that way, there are a number of other high-end efforts to choose from. But I’ll wager there are enough of you out there looking for total refinement who are willing to work for it. And that’s what the Mpingos get you for your investment. Take what’s there and make the small adjustments that bring it to full flower. You can certainly enjoy the Eurythmies as they are, or you can bring them into the top of their performance envelope by tuning and choosing the right associated components.

Eurythmies Sonorous

So, just what is the Eurythmies’ performance envelope? As do speakers of whatever design, the Eurythmies needed time to break-in — something on the order of a hundred hours, minimum. Perhaps it’s the very small movement of the compression drivers, coupled with the large excursions required of the double 15-inchers in the bass module, that’s the cause.

The quality and power of the bass were very much dependent on which amplifier was driving the boat, along with the setting of the crossover. In general terms, it was just terrific. The Wave- length’s single-tube 8 or 9W provided surprising power and impact in the bass, nicely pitch-differentiated and redolent with harmonics and overtones. Yes, it could be a little less than perfectly controlled around the edges, but tweaking the crossover ameliorated most objections. In any case, there was much more high-quality room-filling bass available than with the Reference 3As.

As for the Jadis amplifiers in the bass, they always had me thinking to myself, These simply can’t be only 10 watts! They presented an attractive, tight, punchy, interesting, but not overwhelming, bass register. While it was deep, strong, and well-controlled, don’t imagine that it sounded like what the Kraft 400s or the LAMM Audio Labs M1.1s do down under on the Avalons. At lower volume levels, no matter the amp, the bass was somewhat small and lacked impact. Twist the JP80MC’s ganged volume controls into the low-moderate to high range, and the bass was right there with you, providing the foundational underpinnings of the music in a very satisfying manner.

The Audio Note Kassai had the biggest bass of all the single-ended amplifiers here. I’ll tell you all about its special qualities in a full review upcoming. The Aww-shucks Cary 301SE also made a nice-sounding, satisfyingly chunky bass. In all cases, we’re talking real bass that never needed apology. (The active tubed crossover to come should paint a phenomenal picture in the nether regions)

Moving up from 180Hz into the horn array, I’ll begin by saying the integration of the upper-midrange horn (at the speaker’s waist) with the small horn tweeter above it, along with the lower-midrange horn located deep inside the large upper structure — the butterfly — was fantastic. I was never aware of any unseemly or disorderly progression from one driver to the next. (You need to put a little space between yourself and the speakers to achieve this integration, however — in our case, the listening chair was about 10½ from the Eurythmies.) The acoustic energy always sounded truly continuous and seamless. No transducer at this price, assailing the very top of the statement product arena, could do otherwise. Important, this included the 180Hz crossover region where the bass module hands off to the horn array. Get the setting right, and it was as well-integrated into the overall acoustic as any moving-coil ever managed.

So what’s the sound of this multitude of horns in the midrange and highs? Just plain... wonderful. The exact quality, texture, imaging and tonal balance depended on the driving amp. The Wave-length could sound pure and startlingly pelliculous, all subde nuance and tonal shadings. Depending on the front-end and the software, the mids might sound lavish and warm to cool and transparent, but always with a complete lack of grain, and of such integrity, in terms of musical presence, that you too may be struck dumb.

The Jadis amplifiers sounded just fabulous in the midrange and up: inviting, oh-so-musical, detailed and nuanced, with some kind of sexy mad exuberance of presentation that was positively infectious. You want to dance with the Jadis; know what I mean, jelly-bean? And perhaps wrap your arms around a bit more tightly than you might doing the rhumba with cousin Pearl.

And these glories of presentation are the Eurythmies’ pleasures to bring you. The highs, as a separate issue, you ask? Let me sum it up for you. Ooooo-la-la. Come to me, my leafy cabbage... They could be... sweet, charming, attractive,
Jonathan Scull: How long have you been making cables, Ulrik?

Ulrik Poulsen: It's actually close to three years now... It's a spinoff from other products we make. Actually, Alpha-Core manufactures magnetic cores and various materials and components for transformers... And we have a daughter company called Tortran that manufactures toroidal transformers. Anyway, five years ago we introduced a new product called Laminax. It's a combination of copper or aluminum with various kinds of dielectrics. This is laminated together continuously in various fashions to produce a material that's used as shielding for EMI and RFI in the electronics industry.

We were selling this special material all over the world, as we'd developed a method for combining special types of thin films and metals without using any adhesives at all!

Scull: Ah-hah...

Poulsen: We export this material, and we also developed machines to manufacture it. Then 3½ years ago I developed and patented a cable design of two parallel conductors inside a single sheath. I thought that cable might have applications in various areas of the electrical industry. The thing about it was, it utilized the same technology we use to make the Laminax products. But I didn't find any takers when I showed the cable around, until a friend of mine thought it might just be the cable the world was waiting for—a speaker cable. And his name is Goertz!

Scull: I see...

Poulsen: Yes, he's an accomplished Danish electronics and audio engineer. He told us what characteristics would be required for audio applications, and we manufactured a cable to those specs. We sent it to him for testing, and he was able to show that it totally eliminated the type of distortion that in this country is called high-frequency rolloff.

Scull: That was the original copper cable?

Poulsen: Yes...

Scull: We have the more expensive silver cable, so perhaps you'll tell us about that?

Poulsen: Sure—it's what we call M1 Ag II Matched Impedance type. The basic thought behind the development of the entire cable line—silver and copper—was that if you have a characteristic impedance that matches that of the load, you get a better-functioning cable. That's basically transmission-line theory, where you match the characteristic impedance of the cable to the impedance of either the load or the source or both in order to prevent mismatch reflections. That's why for certain applications—television or antenna wiring, for example—you need a 300 ohm or 75 ohm cable. That's the same theory, mostly used at much higher frequencies. But it's also valid at lower frequencies within the audio spectrum. We were able to demonstrate the effects of both the mismatch reflections and the absence of high-frequency rolloff reaching well below 10 kilocycles, which is smack in the audible range of course.

But you asked about the silver cable—that's the same geometry as the original copper cable—a 10-gauge 2.5-ohm characteristic impedance speaker cable. It consists of two solid conductors ½" wide and 10 one-thousandths of an inch thick. Placing those two conductors a mere three one-thousandths of an inch apart really drives the inductance way down. At the same time, it raises the capacitance of the cable. And since the characteristic impedance is the square root of the inductance divided by the capacitance, that combination enabled us to reach a characteristic impedance that's in the single digits. And that is not the case with most other audio cables.

Scull: I wonder if that's why it works so well with the Jads single-ended amps, which have a typically high output impedance?

Poulsen: Yes, but you see, the output impedance of the amplifier is of no real significance in this case as long as the load impedance is of the same order of magnitude as the characteristic impedance of the cable. It's sufficient if you have an impedance match at only one end of the link. You can compare them if you take an optical point of view. If you had mirrors at both ends of the cable, you'd have multiple reflections—you'd be able to see yourself repeated hundreds of times.

Scull: I understand...

Poulsen: If you have just one side with an absorbing characteristic instead of a reflective characteristic, that breaks the chain, and you avoid having those repeated reflections. And that's sufficient—if you have a match on either the load end or the source end.

Scull: Okay, let me carry on my earlier threat and come back to dreaded RFI. Obviously your cable isn't a twisted pair of a type that fights RFI, so...?

Poulsen: Because they have a low inductance, which pulls both ways, the radiated fields of the cable itself are virtually zero. By the same token, it also makes the cables insensitive to outside fields. You can easily test this by bundling the cables with power cords—you don't get any line-frequency hum. And you can bundle them with other signal-carrying cables, and you get no crosstalk whatsoever. You can also easily check that they're impervious to broadcast frequencies, because you can hear that there's no dirt getting into your feedback loop at all.

Scull: As I understood from speaking with you earlier, you were saying that the dielectric of your speaker cable affects break-in time?

Poulsen: Well, Jonathan, there are a few things I personally don't believe in at all. I don't believe in the importance of directionality, and I also don't believe in having a cable sit on full-load for weeks on end before it sounds right.

Scull: It's true your cable sounds just terrific from the get-go, Ulrik. But I have to tell you, I thought you were kidding when you said they required no break-in.

Poulsen: We've looked into this, of course. A lot of people whose opinions I respect believe in running-in...
glamorous, sexy, come-hither with those bedroom eyes, er... depends. More
detail as I describe the Jadis' sound.
Sufficient to say, the Eurythmics, in spite of the
different nature of their presenta-
tion, are Reference Transducers from the
point of view of the sound I enjoyed in
the Ribbon Chair. (Cor bless me if the
measurements stink!)

Another huge difference in compar-
tion to the Reference 3A Royal Master
Controls was in the area of dynamics.
This should come as no surprise — the
single-ended amplifiers were only using
a portion of the first watt or two with
the highly efficient Eurythmics, with
the occasional foray into the upper
reaches of the power band only for the
most demanding of passages. It was a
choice to get any single-ends wired up
to them to clipping mode, although it
could be done with enough persever-
ance. My ears usually gave up before the
amplifiers did.

Listening to the Mahler 4 with Solti
and the Concertgebouw Orchestra of
Amsterdam (London "Blueback" CS
6217), my listening notes (that I can
decipher) tell of a powerful and
encompassing bass, but also of a sense of
scale and impact that breathed life into
the music. I'd credit the Eurythmics
with doing "scale" to a remarkable
degree, rather than limiting the descrip-
tion to a function of how good its bass
or dynamics were.

Listening to Heifetz tear his way
through the last movement of the Si-
belius Violin Concerto with the CSO
cables very thoroughly, but they
thought as you did about our cable...

Scull: Well, Ulrik, let me qualify that. In
my experience, with some cables it's ab-
soolutely necessary — some can take ages to
break in.
Poulsen: You're probably right. If
that's the case, there's only one expla-
nation I can think of that's physically
responsible. I don't think much actu-
ally happens to the metal in a cable,
but all the organic material that's car-
rried in the dielectric and the insula-
tion may well change during the break-in period. And if that is so, that
might explain why our cables break-in
so fast. The fact is that in our cable
the dielectric is only there in minute
amounts. When you have 0.003" be-
tween the conductors, that means that
there's only a small, small percentage of the total amount of the dielectric
that is active in our cable compared to
the amount that's active in other
cables.

Scull: Ah-hah. What's the actual mater-
ial of the dielectric?
Poulsen: It's called polyether tereth-
phathale.

Scull: Oh... sure... that old stuff. Can
you spell that for me, Ulrik? [laughs]
Poulsen: Actually, it's not an uncom-
mon material — nothing particularly
fancy. The reason we're using it is that
it's available in a very thin film, and as
I mentioned, we found a very good
way of bonding it directly to the me-
tal without using any adhesives.

Scull: But you're not saying how you do
that?
Poulsen: [very quickly] No!
Scull: [laughs]
Poulsen: This material enables us to
have a very high dielectric strength.
That means you can apply thousands
of volts between the two conductors
and yet you won't have any break-
through.

Scull: That's amazing, just three thou-
sandths of an inch between the conductors...
Poulsen: Actually, 2.4 thousandths,
because each layer of insulation that
surrounds each conductor is only 1.2
thousandths of an inch thick. Then
the whole thing is encased in a com-
mon jacket, and for that we are using
Lexan, which is a polycarbonate.

Scull: What about some of the elec-
trical properties of the MI Ag? What's the capac-
tance of the cable?
Poulsen: For the cable you have, it's
about one nanofarad [1nF] per foot.

Scull: Of course! You know, that means
absolutely nothing to me! [laughs]
Poulsen: Well, it's high compared to
other cables, but the inductance, that's
the important feature. That's only six
nanohenries (6nH) per foot.

Scull: Ahh, yes, nanohenries — I've heard
of those!
Poulsen: [laughs] Yes, we all know
about old Henry! [laughs]

Scull: Ulrik, can you simply state why it's
true that low inductance is superior to low
capacitance?
Poulsen: Yes: because it's been
proven that if you have a high indu-
cance in a high-frequency circuit, it
will act as a high-frequency series
impedance. Yes, some of the high-fre-
quency components will be filtered
out as the signal passes through the
cables. And any electrical engineer can
make the calculation that high indu-
cance is much more of a problem than
high capacitance. The reason that high
 capacitance has been considered har-
mful by some is that it can sometimes
cause a poorly designed solid-state
amplifier to oscillate. If you have a cor-
rectly designed amplifier which does
not violate the "Nyquist criterion for
stability" on the permissible amount of
phase lag negative feedback you can
use, you don't have a problem.

Scull: That's quite a spade lug you supply
on the cables. What's its construction?
Poulsen: Yes, it's a solid, almost
forged piece of high-quality brass
that's rhodium-plated, because rho-
dium is generally considered to be a bet-
ter contact material than gold. It's also
more wear-resistant. You know, rho-
dium is from the platinum group — a
metal — and we consider it far
better than gold for audio applica-
tions.

Scull: How much are the silver cables
retail, Ulrik?
Poulsen: Well, with the silver cables
it depends how you buy it. If you pur-
chase a 75' can for professional instal-
lization, it's $4668, to be exact. For the
typical audiophile who needs 6" ter-
mimated, it's $760/pair — a hell of
a lot of money for cable. But we know
from many of our customers, those
who paid $10,000 or $20,000 for their
systems, that they just don't want any
weak links in the chain.

Scull: What reception has your novel design
received in the audio community?
Poulsen: We brought the cable over
to Dick Sequerra, who loved it. He
A/B'd them with what he was using,
and he made a lot of measurements to
illustrate the differences. We have a lot
of other fans too, like Vince [Bruzese]
at Totem, who also loves the cables.
We use his Model 1 speakers in our
valuations, by the way. We know that
Thiel also feels that our cable is the
right way to go, and then there's Dan
D'Agostino at Krell, who has become
so enthused that we are now develop-
ing a special 7-gauge cable especially
for him. It'll be called Krell/Goertz.

Scull: Congratulations. Any last stones to
roll?
Poulsen: [laughs] Actually, I can talk
my head off on the subject, but the
proof of the pudding is in the listening.
(RCA LSC-2435) shows off this sense of scale and impact to a wondrous degree. Listening to Jascha's blazing reading, it was obvious the Eurythmics were able to expand the music out into an exciting, living, breathing, palpable, and dynamic musical entity, brilliantly highlighting tonal contrasts and dynamics in both the micro- and macro-senses.

I heard this dynamic, soaring, and exuberant through-the-pores feeling whether listening to the Beethoven Triple Concerto with Serkin, Laredo, and Parnas (Columbia "two-eye" MS 6564), or Ellington's Jazz Party in Stereo (Columbia "six-eye" CS 8127). But even on less over-the-top dynamic material, say the Poulenc Sonatas on a two-record set featuring such notables as Jacques Fèvrier, Yehudi Menuhin, and Pierre Fournier, among others (UK EMI EMSP 553), smaller dynamic contrasts and expressive subtle nuance were there to experience and enjoy. Truly, grist for the horn mill.

And lastly, before turning our attention to the beautiful Jads SE300Bs, let's cover the Eurythmics' imaging. Within the context of the projective nature of the soundfield, the Eurythmics image in a world-class manner. As I suggested in my review of the Wavelength Cardinal XS monoblocks (January '96), single-ended triode imaging is somewhat different in nature from typical push-pull. That is to say, the special closeness one feels to the musical event is accomplished by single-ended's concentration upon the origin of the acoustic event, and its diffusion into the nearfield about the performer. Imaging, as an object in itself, is less important than the subtle communication of the overall acoustic event.

Given this enhanced harmonic triode slant, and given the Eurythmics' abilities to communicate this special musical presence, it must be said that they also managed to image like bandits. Perhaps not with the scary solidity of the Avalon Ascents on push-pull (champions at this, by the way), but damn close.

For example, a recording that requires a speaker with strong imaging, detail, and a Brace of Bs

It was a great pleasure auditioning so many 300B tubes. Here are thumbnails of our experiences with them.

**Western Electric 300B:** In the way that audio can be anthropomorphic, I'll say these guys are suave, baby. Dean Martin, Sammy, and Frank — the rat pack. The Pierce Brosnan double-oh seven of 300Bs. Or a Ralph Lauren Polo type. Older guy — an arbitrager — with impeccable style and the cash to indulge it. The tubes are beautifully made and presented — check the serial number on the tube and its box for authenticity. (This is one tube **sure** to be knocked-off.)

I'd characterize this tube as extremely balanced in all sonic qualities. It's powerful and strong-sounding, without getting overboard about it, never falling crude or rough. On the contrary, it is as refined as it's possible to be. It does excellent-quality bass, evenly distributing energy from the bottom to the upper midbass. The midrange abilities are at the top of the 300B heap, bar none. The highs range from transparent and neutral to warm, burnished, and so seductive you'll cock the house just to keep them going... depending on the front-end and source material. The 300B was very quiet, perfectly behaved, and reliable. It was also extremely and delightfully ambient — the air was extraordinary.

The build quality is obviously first-class. For instance, Westrex even uses the same melt from back in 1987 for the filament material! As for the time it has taken to make quantities available, be aware that AT&T owns a stake in the company, audits their output, and insists on a particular percentage yield before the Bell Labs guys will release the tubes to the public. Color me reassured. The Western Electric 300B sells for $700/pair. My highest and most enthusiastic recommendation for this classic American tube.

**VAIC VV30 & VV300:** I first heard a VAIC VV30, their premium tube, in the Wavelength Cardinal XS. One of them let go, and a set of Golden Dragon Supers took their place until another set arrived, which worked perfectly. As reported in the article, the VAIC tubes could not be auditioned in the Jads SE300Bs. I did listen to them in the Wavelength amps — as test beds from which to listen to the various 300Bs, Gordon's amplifiers were peerless.

The '30s are refined, finished, educated, well-traveled, wealthy, and possibly titled. The "big" VAIC is a slightly jaded European suavest with a beautiful chateau, a perfectly aristocratic wife, decadent kids (one of them's the VV300), and a mistress installed in his pied-à-terre in Paris. Whereas the Westrex tube can roll up its sleeves and kick some serious butt, the VV30 would have his man take care of it. It doesn't get its hands dirty — it's terribly refined and sophisticated, don't you know, old man. In that sense, when it comes to dynamics, pace, transient behavior, and power in the bass, the beautifully balanced Western Electric just manages to outdo the Eurotube. The '30 lacks the push of the Westrex, but it makes up for it with a ravishing midrange and practically lascivious highs. For ultimate refinement with perhaps fewer fireworks, the VV30 may do it for you.

The build quality of the VV30 is extraordinary. The heavy glass envelope and base, the unimaginably complex-appariting filament structure (much more complex than any other 300B variant), the entire production exudes lavish quality.

If the VV30 is slightly more "mature," its offspring, the VV300, sounds younger and spunkier. It's a little rambunctious and outspoken, drinks, and gets into trouble. The '300's shirt was always hanging out of its pants as a lad, but now it's in Armani and a tux. The '300 is a refined monster! Well, certainly less refined than the '30, but even at its most cross-ed up and out-of-shape, it's still way more refined than the Golden Dragon 300B Super. The midrange is well-developed, but not so lush as the VV30 or the Westrex. The bass is very good, maybe even a touch punchier than the '30's. It's got rhythm and it's got highs, even if neither is so perfectly well developed as
and harmonic bloom is a French CID of Mozart’s 12 Duos for Basset Horns, K.487 (Capricl/A1DIA 58104). Let me tell you about the basset horn from the booklet. “Copies made in 1984 by Laurent Verjat and Giles Thomé after an instrument by Friedrich Gabriel A. Kirst (1750–1806) of Potsdam, now in the instrument museum of the Paris Conservatoire. The instrument is made of boxwood with ivory ferrules, equipped with 6 keys. Two ‘ravellment’ keys for the right thumb have been added for the fundamental or pedal-notes. The bell is made of copper.”

The bizarre-looking instrument pictured in the booklet resembles a left-handed sewr-flute that Tom — er, rather, Ed Norton would be happy to own.

Ahhh, but the sound and the music are simply divine. Here we have a fairly specific image — a single instrument playing in acoustic space — with the detail of the clacking keys, the ambient information of the crazily reproduced fundamentals and harmonics diffusing into the nearfield, and the reflective nature of these sounds as they interact with the space of the original recording venue. All elements combine to deliver a breathtakingly musical experience of absolutely the first order.

Whatever else the Eurythmics do irrespective of their horn design, they surely image superbly well. I don’t think you can say that of past horn designs, where imaging (or lack thereof) was one of the key faults cited by critics.

Let’s turn our attention now to the Jadis amps.

**THE JADIS SE300B: THE LONG VIEW**

This amplifier is drop-dead gorgeous. Working front to back on the elegant, nonmagnetic, highly polished stainless-steel chassis, you’ll find an On/Off switch on the front apron with a green LED signaling “power on.” There’s no provision for warmup/standby mode as with Jadis’s larger amps. Topside, there’s an oozing-with-casual-quality power transformer, somewhat more diminutive in size than the lump of a hand-wound thing that crouches darkly on the chassis of the JA 200s. That’s followed by a pair of 5R4 rectifier tubes, a pair of caps, and its dad. The build quality, while still high, is a lot simpler than the VV30’s — the plate structure looks more like the rest of the 300B litter.

Common to both VAIC tubes is a slight — and I mean slight — darkness in the upper-midrange and treble regions, the 30 slightly less so than the 300. I don’t want to make too much of this, but it’s noticeable in comparison to the Western Electric (which suffers no such darkening whatsoever) or the lively 300B Supers from Golden Dragon. Interestingly, the less-expensive 300 seems to splash out a more vivid and palpable soundstage, if one not quite so transparent and continuous as the 300’s. I wonder if the lighter internal structure of the 300 gives it a more resonant signature, and therefore develops a slightly more alive and kicking quality to its sound. There’s something boyish and exuberant about the 300 that the 30 tames in some way. You lose a little something with the more expensive tube, but you gain... quite a lot. The 300’s bass is also deeper, more extended, and pitch-differentiated, if somewhat less kick-butt.

The VV30 retails for $760/pair and the VV300 for $595/pair, all US sales handled through the importer, Fanfare International.2 If VAIC can keep their tubes lit and stem the blowups, they’ve got a winner in both of these tubes.

**Golden Dragon 300B Super:** The glass on this Chinese tube is lighter, it seems somewhat more flimsily made than the Westrex or the VAIC, and there’s no Gucci or Ralph Lauren anywhere to be seen. They run hot — the micas at the top of four of the six on hand became discolored and one grew rather crispy-looking. Nevertheless, they sounded robust, exciting, dynamic, and were nicely acoustic. Their presentation, while entertaining and vivid, was a bit rough-edged and slightly ragged. However, this is still single-ended triode sound we’re talking about — how bad can it be? Trust me, not that bad. It’s just that the Super comes across as a bit unreined and coarse compared to the best on offer. It is a little brighter on top, a touch grainier, but it rewards its gruffness with a dramatic and effervescent musical presentation that can be winning with the right music and with the right equipment.

For its dynamic qualities, for the good bass, for the midrange it does develop, and for the highs — which, while not the sweetest available, still can be attractive — the Super is a valid choice. This is especially so when the budget becomes an issue. You can do (much) better, but at a significant cost increase. In the meantime, this tube will do nicely, thank you! The Golden Dragon 300B Super retails for $354/pair. (Golden Dragon also makes available the 4300B for $368/pair, and the titanium-plate 4300BLX for $552/pair.)

**Overall:** The VV30 and the Western Electric 300B are the two really serious audio devices here, with the Golden Dragon a contender, but at the head of a second rank of pretenders to the throne. The Westrex tubes are the perfect blend of old-boy smoothness with a touch of the ruff’n’tuff that got him there. He’s not afraid to rumble when it comes to it — many a stuff was left on the boardroom desk. These would be my pick for the top of the hill. The VAIC sounds a little more Euro, with a higher degree of smoothness at the cost of a little sparkle and life, like a noble family fallen on hard times.

I suppose there are those of you who will choke on the following notion, but perhaps the true single-ended aficionado will keep several sets of 300Bs at hand, and depending on mood or music, he (she) can just change ‘em out. If the amplifiers are broken-in and have been on for the day, and if the tubes are broken-in — they do break-in — then it takes a mere 15 minutes or so before sounding at 90% of its abilities, with that last 10% of nuance catching up after 30 minutes, more or less.

I wasn’t able to get the Cetrons in the Cary to work well in the Wave-length XS, so I’ve nothing to say about them. The four carbon-plate ESTI 300Bs from the Audio Note also wouldn’t settle down and behave in anything but the Audio Note amp. Gigger... I look forward to hearing the Sovtek and Swetana 300Bs, neither ready for production at the time of this writing.

— Jonathan Scull
the elegant Jadis signature square black potted output transformer with its elegant gold top-plate. Behind are "ignited" the two 300Bs, and a single 6SN7 at center chassis rear, flanked by another pair of caps. On the rear apron, there's an IEC power cord socket, an input RCA jack, and a single pair of binding posts.

**JADIS SE300B:**

**THE TECHNICAL VIEW**

I'll quote from a spec sheet on the Jadis parallel single-ended triode amplifiers prepared by J-P Caffi. I haven't paraphrased his words very much, as I found the charm and humor inherent in his Technical Frangais to be without peer in communicating the concepts behind them.

"The SE300B supplies a power of 10W RMS and functions in pure class-A with single-ended mounting (the two tubes are in parallel) with an automatic bias.¹ The two high voltages, driver and power, have vacuum-tube power supplies. The bandwidth (at −3dB) is from 20Hz to 20kHz, without any feedback. The driver stage, powered at 400V, is built around a double-triode 6SN7. The two elements of the tube are mounted in cascade. The output stage is powered at 320V, which allows the tubes to work in the best conditions. The filament voltage is very finely regulated. Like other Jadis units, the output transformers are handcrafted without any gap in the magnetic circuits, and are used well below their full possibilities (they can be employed on 250W amplifiers). It is important to have a large output transformer because a direct current crosses the primary in this construction, while in a push-pull construction, the direct current in the transformer primary cancels itself out."

I couldn't have said it better myself, isn't it so? And before I cancel myself out, how about let's getting to the sound!

**TUBE MATTERS**

The Jadis amplifiers were delivered with a quartet of matched EST 4300BLX tubes (evidently from the same Chinese factory that churns out the Golden Dragon BLX). In addition, there were a quartet of JAN 5R4WGY rectifier tubes from Chatham Electronics, made in the ol’ U.S. of A. (These were egg-cup style 5R4s, with a large solid base that extended up part of the way around the glass envelope. JAN stands for Joint Army Navy, by the way.) In addition, there were two input 6SN7s not marked for origin or brand name.

A surprise package arrived soon after from what must be the nicest guy in audio, Wavelength's Gordon Rankin. "I thought I'd send you input and rectifier tubes that'll work well in the Jadis," he explained. *Now I smell teen spirit!* A public *merci*, Gordon. (As J-P Caffi seemed quite willing for me to try other tubes in his amps, I felt it very apropos to do so.) Gordon had sent a pair of his favored Sylvanias 6SN7s, along with Tung-Sols, NOS (New Old Stock) red-base GE7s, Golden Dragon 6SN7GTs, and very unusual looking 6SN7GTYs from the British Valve Electronic Company, whose glass-bottle interiors were coated in black.

I tried all the input tubes, with some interesting results. Gordon pointed out to me that the relationship between the input tube, the capacitors used in a particular design, and the output tube affects the sound in significant ways. Keep that in mind — the following description reveals the sound of these tubes in the Jadis's circuit.

As I have always found with Golden Dragons of whatever type, they were exciting, dynamic, but slightly bleached-and white-sounding throughout the frequency range. They proved fatiguing over the long haul — just too thin in the end. The Tung-Sols were a pleasant taste o' Olde Tyme 'Tube Sound', much lushfulness, not terribly transparent, and not very dynamic or extended. The Sylvanias, which I expected from Gordon's experience to sound the best, didn't. They were indeed wide-band and vivid, extended, clear, and spatial, and did great bass, but they proved a shade uninvolved and "hi-fi"-like. They sounded a little too clean — music seemed robbed of its emotional content.

The input tube that really floated my boat was the NOS GE7s. "Yup, these are the ones!" exclaimed an excited Ben Lichtenstein, an audio-crazy of our acquaintance who had come over to listen to the system. He can hear — the GE7s had just the right combination of extension, tremendous air, transparency, rich harmonic structure, and tonal color. In a word, magic. Interestingly, Gordon mentioned that the Sylvanias work much better than NOS GE7s with Howland caps, so once again, be aware that everything in-circuit can make a difference. Relax, open your ears, and have a ball.

As for the output tubes... ahhh, therein lies a tale. The EST 4300s went south of the border almost immediately. One pair fell way out of balance, one tube nearly burning itself up while the other sat practically dormant, its filament barely lit. Same with the other matched pair, but here the dominant tube was gassy (spattering blue light in the bottle) and began sending spitchy high-frequency bursts through the Eurythmics. Out, out, damned spot!

I got on the horn ( Palmer) to Frank Garbie, who quickly supplied two matched pairs of brown-base Golden Dragon 300B Supers, which some feel are a better bargain than GD's more expensive black-base 4300BLXs. These worked just fine, sounding enjoyably dynamic, bold, and vivid. They created a large soundstage; had good timing, rhythmic pace, and great bass; and sounded fast. They stayed in the amplifiers until the Absolutely Fabulous Western Electric 300Bs showed up. *These Ever-Suave apologies to ManleyClan™* 300Bs became the reference output tubes for the review. (See my sidebar on 300Bs for details, and check out my interview with Western's Charles Whitemore elsewhere in this issue.) As it transpired, importer Garbie has made arrangements with Western Electric, and their wonderful 300Bs will be a factory option for the Jadis SE300B. Truly, a match made in heaven.

And what of the VAIC tubes? In a somewhat comical twist of audio fate, the VAIC tubes simply wouldn't fit into the Jadis amps. The tube sockets are slightly recessed, held in place by a short pair of bolts that terminate with a nut on the top chassis. The VAIC tube's glass envelope becomes very wide almost immediately above its base, and these securing nuts interfered with their seating completely. Pretty funny, if you ask me. Victor Goldstein, VAIC's importer, was somewhat crestfallen. Ex-Goldstein associate and current Jadis importer Garbie was ecstatic!

**GOERTZ CABLE**

We tried many different speaker cables with these little beauties, and eventually settled upon one that was a perfect match in every way — the Alpha-Core Goertz MI Ag silver ribbon cables. In conjunction with XLO throughout the rest of the system, these cables sounded, above all, *ultra*-clean and delightfully fast. You'd think a flat ribbon would be an invitation to the RFI Heebie-Jeebies, but this was absolutely not the case. Quiet, full-bodied, apparent DC-to-light extension, *extreme* high resolution, *wonderful* spatial qualities, these cables let the Jadis amplifiers be *all* they might. No editorializing whatsoever, aside from the points we've already made...
from a certain lightness to the deep bass that could be corrected with the crossover adjustment.

"But wait, there's more!"—only a very few minutes of break-in required! I'm not joking. Oh, blessed is he who casteth off the drudgery of break-in from this sublunary coil... All this from an easy-to-handle cable that won't suddenly uncoil and gore house guests, and that was designed to lie flat under a carpet or against a wall! The Goertz has relatively high capacitance, but the secret in the recipe is... very low inductance.

The MI Ag works at least as well on the Wavelength XS monos, and we'll see what happens with the Audio Note Kassai. I'll try them with push-pull eventually—I've got another hi-wire pair so I can waffle up the big Avalons with them. (For the 20/20 on Ulrik Poulsen and his amazing flat cables, cast an eye at my accompanying interview.)

**Widgets**

The amplifiers were positioned on Michael Green Designs Tuning Amp Stands, with a trio of Audiopoints beneath each amp.

Other widgets in play included the by now de rigueur MIDAS Tube Dampers (from Bluemote SAS, Firenze, Italia) on the input tubes, and a Shakti Stone on the cap of each power transformer. Now, while the Dampers are Euro'screet and looked cute hugging the input tubes, the rather unattractive dark rectangular lump that is the Shakti Stone really took away some of the visual beauty of the amplifier. You'd better know they work, otherwise... And they do. To what effect? In a word—focus. (I rarely put things in a word, what?)

**Sonus Jadis**

The Short Form: Glamorous, sexy, seductive, emotive, emotional and dynamic, so gorgeous you just want to bed it now! Sorry, I lost my head. But... that's the point. You want to know what the sound of the Jadis SE300Bs was? It was the sound of music (with apologies to Julie Andrews).

In some ways, this was a difficult review to write. Normally, I'm picky,icky,picky. "Forget it. Take this amp, please. Close, but no cigar. Closer, have a cigar. Gets really close, but..." In fact, during most of the review period, even as I was enjoying these amplifiers immensely, I thought their sound was just too good to be true. They sounded wonderful on the Eurythmics all the time. If they're that attractive, I thought, they must be colored in some way consonant with the music. But I was wrong. Let's zoom in and see where this confusion stemmed from. The Jadis SE300Bs' bass was extraordinary for single-ended, parallel or otherwise. Punchy, differentiated, controlled, and of an excellent overall character, it never disap- pointed. At the lowest late-night listening levels, as mentioned, it could sound small and rather inconsequential. But at anything approaching normal volume and beyond, I had no complaints. Haydn, Mahler, Poulenc, Ellington, Art Blakey, Art... of Noise? Take Dead Can Dance. Please! I have to tell you, I stayed away from 1CD's Into the Labyrinth (4AD 45384-2) with the Cardinals on the Reference 3As, but this group returned to our loft with a vengeance after the Eurythmies were installed.

While Into... was impressive on the Wavelength amps, listening to it on the all-Jadis system was phenomenal. As knockout as that was, when I spun the LP version on the Forsell Air Force One with the Clearaudio Insider, things got out of hand. There was a moment when I thought, "This can't be happening!" It sounded so wonderful, powerful, overwhelming, palpable, and so bloody acoustic and enveloping that I didn't want to believe anything could be so wonderful!

There was magic in the air. All the little pieces fitting just so, like a jigsaw puzzle. NOS GE inputs, Tube Dampers, Western Electric 300Bs, Shakti Stones, Audiopoints, Tuning Stands, Goertz MI Ag (the last piece of the puzzle to fall into place), the Mook'd Eurythmies, and the all-Jadis front-end. You know, in the search for those ecsta- tic moments of musical magic, I've spent hour after (push-pull) hour tweaking the system like a man obsessed, no detail left unturned. We would impress the hell out of visitors, but I felt that, as special as it was, the real magic only made an appearance from time to time, when everything was just so. But now, hour after hour, day fol- lowing day... magic, seemingly on tap!

Let's change-up to something less otherworldly than Dead Can Dance, like the new Holly Cole release, Temptation (Metro Blue CDP 8 31653 2). This CD is a complete success, in my view. Well-recorded right out of the box, no reservations about the sound this time, nothing to get past. It's entire- ly less shiblin than Cole's earlier releases, for example. If you're reluctant about getting your feet wet Cole-wise, start with track 6, "Invitation to the Blues," which sports a telling and reverberant acoustic bass. Or try track 8, "Frank's Theme," with a powerful and fulsome piano stretched by pianist Aaron Davis, who covers the strings with one hand while playing with the other. This tech- nique creates an intriguing, muted, modernesque hammered sound. The integration of Cole's voice with the powerful acoustic presence of the piano and the bass in such a huge soundstage was a wonder to enjoy. She existed so touchingly in front of me—especially on track 3, "Jersey Girl" (haha). It was so... filling.

Listening to Holly's smoky voice, I jotted in my notebook that the Jadis 300Bs... "...develop a sense of pace and rhythmic movement of such harmon- ic and musical integrity that you can find yourself ravished by the sound. These amplifiers are the very embodiment of all that is sex, seductiveness, attractiveness, and wildly gyrating pheromone—they are romance and life. They are love." Well, it must've been late... "They sound extended, fast, open, clear, creating a huge ambient soundfield of great delicacy and nuance, detail and slant in the bass. Everything sounds quick as it comes in life, so accu- rate yet totally musical. The Jadis ampli- fiers are so... endearing."

I enjoyed every vocal I spun on the system without fail, CD or LP: Sara K's terrific new release on Chesky, Tell Me I'm Not Dreaming (J1133), which I wrote about at such length in my Wavelength review; Bill Henderson's beautifully recorded Live at the Times (Discovery DSDCD-779); "Love for Sale" on Blackbird by Siri's Svale Band (SON CD 2001); and Ellington's and Sinatra's Francis A. & Edward K. (Reprise 1024) was just plain killer!

Speaking of ravishing vocals, I'd drop The Intimate Ellington (Pablo 2310-787) on the Forsell/Insider combo wearing an innocent smile when I wanted to reduce our guests to blubbing Audio- philus protoplasm. Ellington vocals, you ask in confusion? Yes, yes... you must find this record. It's "just" a Pablo, no audiophile pretensions, but on the first cut, side A, you'll find "Moon Maiden." It's listed as "Duke Ellington, celeste and vocal, 14 July 1969." Ahh, such unmiti- gated pleasure must be illegal! Duke purrs this warm, sweet little ditty at you, for you it would seem, and with such... intimacy. His great charm is wrapped around each luscious syllable. His voice was so well developed it seemed to go well beyond the notion of artifice and the re-creation of sound to some special existence on a higher musical plane. The celeste sounded shimmering and
communicative, an active vocal counterpart to the Duke.

I appreciated this beautifully developed ability to portray human voice even on modern digital productions. Listen to track 7, "Muddy River," from Laurie Anderson's great release Bright Red (Warner Bros. 45534-2) — she gets my vote for Babe of the Year (after Kathleen, of course). I was struck by how distinct and easy it was to follow her voice as she twined with backup vocalist Phil Ballou (any relation to Car?), their voices elegant, melodic, and harmonic, backed by a contrasting military drum line. Or try track 11, "In Our Sleep" with my main man Lou Reed. It's a sonic treat listening to them both sounding so effortlessly expressive. This close-in vocal expertise is hardly at the cost of larger ambience retrieval — the extreme 3-D musical effects in track 12, "Night in Baghdad," are impressive, enjoyable, and very participatory. Visitors in the Ribbon Chair always yodeled, "Listen to that!" as it played. (We like to have fun around here!) On a more serious note, the giant acoustic and powerful slam of the timpani in Stravinsky's Rite of Spring (UK Decca CS 6885) were entrancing.

Part of the wildly attractive sound results from the snappy dynamics that keep everything on time and pace with great élan. While the overall pace and timing of the Wave lengths are as natural as music, the Jadis amplifiers more easily start my foot tapping with their sharply defined rhythmic drive. The Goertz cable was particularly well adapted to passing along the signal unaffected. Certainly the SE300Bs sounded faster and more alive than the Wave lengths, if a touch less transparent.

In fact, the Jadis amplifiers always sounded as if they had a very light flywheel when it came to tracking the signal. This is something common to all the single-ended triodes we've heard so far, but especially so with the Jadis. That, combined with the beautiful tonal palette and the giant acoustic they generate, contributed to the uncanny sense that I was not only listening to the master tape (one goal of High End), but actually transcending the mechanics of reproduction to the acoustic event itself. Now, that's progress.

As regards the inner illumination of single-ended triodes I described in the Cardinal XS review — their Unbearable Lightness of Being — I'll say that as beautiful, luminous, and approachable as Sara K. screamed via the Jadis, it was a bit less in evidence. The Jadis's presentation is made up of a combination of a degree of this special single-ended interior luminescence (still way more than push-pull), combined with a chrome-like reflective sense of a light shining upon the mids and highs from without. I don't mean this in a pejorative way. Chrome... as in a sculpture by Jeff Koons, for example. Shiny, sexy, sleek, seductive — not metal-licounding by any stretch of the imagination, horrors the thought. I don't think the amplifiers were capable of it, unless we're talking about the shimmery sheen of a brushed cymbal, in which case they am sound metallic, but only as they should. And magnificently so.

If blane must be apportioned for the greater amounts of push-pull like exterior lighting supplementing that special triode luminescence from within, it might be laid at the SE300Bs' parallel single-ended configuration. As Gordon Rankin had mentioned to be his experience, a parallel design is great for dynamics, but he suggested you lose something of the clarity and information in the midband. I don't want to make too much of this, but clearly it is so.

Listening to Sara K. on this all-Jadis system was close in experience to what the Cardinal XS amplifiers had managed that had so knocked me out before. In fact, the Jadis amplifiers sounded much more visceral and less ephemeral than the Cardinals, but at some price — the French amplifiers lacked some sense of ultimate resolution in the midband which the Cincinnati Cardinals managed to portray with such consummate skill. In this way, Gordon's amplifiers were certainly more pellucid and ultimately transparent down into the very weave and texture of the sound than were the Jadis amps. But also at some cost — the Cardinals' presentation was somewhat removed from the sharp end of emotions. They were more aesthetic — the thinking man's amps — while the Jadises were more pvelic! (But never gauche or unrefined.)

With its wonderfully recorded vocals and terrific acoustic bass, "Love For Sale," on the Norwegian Blackbird CD, sounded less restrained through the Jadises, more dynamic, exuberant, and sexy. The highs were very open, refined, and sweet, but at the same time compelling, grabby, and startlingly attractive. According to my notes, I was once again feeling that, in some way, I'd never heard this recording sound so good. The balance of sound achieved by Jean-Paul Caffé with these amplifiers is stunning in its total naturalness, ease of presentation, exuberance, and nuance.

Yes, the minimalist two-gain-stage Wavelength XS monos do exhibit ever so slightly more of the detail, texture, and soft molecular inner illumination in the sound. But on balance, the Jadis amplifiers came across as more involving. The Cardinals may direct-connect to your higher-order brain functions, but the Jadis SE300Bs spoke as well... right to the heart of my emotions. On balance, given the ravishing sound the Jadis amplifiers did make so supremely well, I'd say... I can live with it.

This is not to say the Jadises aren't capable of delivering the velvet in the midrange, either. Listening to Kjell Fageis on Opus 3's Lonely Souls, Solo Sonatas for Clarinet (CD19406) was like taking a warm sonic bath. His clarinet was so supremely resolved by the Jadises, so lush and harmonic, so present, that it almost had me in tears. Or I could hear these lovely midrangey qualities when listening to Dr. John's Afterglow (Blue Thumb BTD-7000). He sounded so warm and sweet — ch'ere bubie, time for a noogie! Or on Gene Ammons's Gentle Jug, a two-LP Prestige set (P-24079) that sounded so warm, inviting, musical, and ambient that I just had to stop what I was doing as it played and let the music wash over me. Languidly, soothingly, and splendidly.

Rather than continuing to rhapsodize over the midrange and the highs, let me just tell you, they were sublime. Take my word for it, it's done better by none.

—Jonathan Scull

Measurements from TjN

[Logistical problems, a winter storm, and sheer lack of time to make the trip to Durango, CO, prevented JA from measuring the Eurythymic in time to accompany this review. He did mutter something about the horn speaker having an even-balanced power response, however, based on his experience at J-10's, where it sounded less-colored/more-neutral the farther away he listened to it. — Ed.]

The amplifier measurements here were made using the tubes JS found to be the best-sounding: Western Electric 300B, GE 5692, and RCA 5414GB.

The Jadis SE300B was warmed up for 1 hour at ½ of its rated maximum power of 10W. Nothing unusual was observed in this pretest; the 300B ran typically hot for a tube amplifier. Its input impedance measured a high 135k ohms. The output impedance was 2.5 ohms at 1kHz, 2.7 ohms at 20kHz, and 0.76 ohms at 20Hz. This amplifier's frequency response will be very dependent on the loudspeaker load. Voltage gain into 8 ohms was 24.3dB. Unweighted S/N measured 83dB over a bandwidth
of 22Hz–22kHz (ref. 1W into 8 ohms), 81dB over a wider 10Hz–500kHz bandwidth, and 86dB A-weighted. DC offset was unmeasurable.

Fig.1 shows the Jadis SE300B’s frequency response. Note the expanded scale. The SE300B has a significant rolloff at the top-end and a severe rolloff in the bass — the worst we’ve yet seen in an amplifier intended for full-range use. With our simulated real-world load, clearly audible variations in the response are added to already-compromised performance — these variations will vary for different loudspeakers, but should be audible on most. Fig.2 shows the 1kHz squarewave response. It indicates a fast risetime, but with noticeable but moderately damped ringing on the leading edge and a downsloping top reflecting the LF rolloff. (The slightly jagged top is an artifact of the digital oscilloscope used to obtain these curves; it doesn’t appear on an analog oscilloscope.) Fig.3 shows the 10kHz waveform, with a rather slow risetime, the rounded leading edge typical of an amplifier with limited HF extension, and the same oscillation as in fig.2 visible on the top and bottom of the waveform.

The Jadis’s THD+noise vs frequency performance at low levels is plotted in fig.4. Except for the rise at low frequencies, this isn’t unexpected distortion performance for this sort of design. The very high level of distortion into 2 ohms indicates that the Jadis cannot be recommended for use into low impedances.

The waveform of the distortion into a 4 ohm load at 1kHz is shown in fig.5. It’s heavily second harmonic, with a trace of irregularity indicating higher-order components at very low levels. The distortion waveform into 2 ohms is similar, as is the 8 ohm result (neither shown), though the latter has slightly lower high-order content.

Fig.6 shows the spectrum of the Jadis’s output in response to a 50Hz input, taken at a 1.6W output into a 4 ohm load. The distortion here is very high, at ~14.3dB (about 20%) at 100Hz (2nd harmonic) and ~23.4dB (about 7%) at 150Hz (third harmonic). Into our simulated real load (not shown), the distortion was very slightly lower, but not significantly so.

Feeding a combined 19kHz+20kHz signal into the Jadis results in the spectral content shown in fig.7 for 4.17W into 4 ohms. Somewhat higher distortion was obtained at 3.3W into 8 ohms (not shown), mainly the 1kHz difference component, which lay at ~32.6dB (or about 2.5%). This is a fair result for this type of design, though we’re talking very low power here: ~40dB (1% distortion+noise) at 1kHz and approximately the same at 18kHz and 21kHz. The remaining artefacts are below ~80dB (0.01%), which is actually good.

The THD+noise vs level measurements (fig.8) indicate that 8 ohms is about the optimum load for this amplifier. I’ve also plotted the curve for a 16 ohm load; it’s similar to the 8 ohm result, though with less overall power output. [Note that for output powers below 1W into 8 ohms and above, the distortion content is actually respectably low — Ed] The clipping levels are shown in Table 1. We present the values here for both the 1% and the 3% levels of THD+noise.

— Thomas J. Norton

**Finis by JS**

Over time, I came to realize I always scribbled such adjectives as "sexy," "glam-
When I measured the Wavelength Cardinal, another single-ended tube amplifier, I commented on its poor test-bench results and noted that it might have been a hot design in 1940. It's only fair that I make the same comment about the Jadis. The Jadis also measures worse than the Wavelength in one very significant way: it has a severely compromised bass response. Though I haven’t heard the Jadis horn loudspeaker, which JS used in his review, many commercial horn loudspeakers don’t have a very extended bass. [Note JS’s auditions comments about the system’s bass quality—"Punchy, differentiated, controlled, and of an excellent overall character, it never disappointed. At the lowest late-night listening levels, as mentioned, it could sound small and rather inconsequential..." all of which appear to correlate with the measured response—Ed.]

And in my February issue (p.57), Sam Tellig commented in his column on the SE300B using the Infinity Composition Prelude loudspeaker, which not only has a high sensitivity, but which also has its own built-in, powered subwoofer, which would eliminate the need for good bass response from the Jadis.

Like all single-ended tube amplifiers, the Jadis SE300B is a very specialized product, and must be carefully matched to its partnering loudspeaker. It’s not a general-purpose amplifier. As a reviewer assessing a wide range of loudspeakers, for example, I simply couldn’t tolerate its low power and load-dependent frequency response. Nor would a loudspeaker that sounds its best on this amplifier necessarily make a good all-around reference. Make no mistake, the Jadis (as with many other tube amplifiers, particularly single-ended ones) is a tone control. A crooked wire with gain. This is not a reflection on Jadis’s implementation—except in the bass response. It’s simply the nature of the beast.

The measured frequency response with our simulated loudspeaker load in fig.1, at least above 100Hz, is not inconsistent with the appeal of such an amplifier. The small radium at 180Hz will tend to open up the sound, though to a limited degree the amplifier’s LF distortion will help fill in the hole, substituting distortion—however pleasant-sounding—for real information. The rise at 1–2kHz will give the sound a bit of immediacy and palpability; the dip at 4–5kHz will soften recordings that are edgy in the mid-treble and sweeten the sound. And since I suspect most potential customers for a design such as this are heavily into analog playback, the HF rolloff will help soften the HF rise typical of moving-coil cartridges.

To address the whole Pandora’s box of measurement vs listening, I believe the listening results are primary. I also believe there are certain boundaries within which a product’s performance must fall to make it recommendable, even if it sounds “good.” Otherwise, we’re dealing with trying to match complementary colorations, the minefield of audio never—never—land. I won’t attempt to specify what those measured boundaries should be—yet another minefield. But, in my opinion, the Jadis SE300B clearly falls outside them. We’ve said it before, but it bears endless repetition: does it sound “good” because of the way it measures, or in spite of it? You can argue that we haven’t yet learned to measure all the right things, and I’d be first to agree with you. But high statistics—distortion figures, frequency—response aberrations, and lack of power are important considerations, and will be clearly audible in many, perhaps most, applications.

Absolute accuracy is impossible, and beyond a certain point we’re forced to fall back on what sounds “good” to us—what most closely results in a believable simulation of the real thing—rather than a literal translation, which we cannot yet accomplish, of what’s on the recording (never mind the accurate recording of the source itself, an even bigger problem). It’s the balancing of such trade-offs that makes audio such an endless—fascinating pursuit. Short of the immediate perfecting of everything in the record/playback chain, I wouldn’t have it any other way. And there’s also that large, fuzzy gray area where the degree of achievable—and achieved—accuracy will continue to be debated. But outside of this area, how far are we prepared to go? Should we throw away some of that objective accuracy we know what we aim to achieve for “sounds good”? That is the crux of the problem.

But as I said about the Wavelength Cardinal, if you fall in love with the sound of the Jadis in your system, and have the disposable cash, buy and enjoy. But make the decision by consciously weighing the options—knowing what you’re gaining and what you’re throwing away in the process—and not because of the current drumbeat for single-ended tube amps as Magic Feathers. They’re not.

—Thomas J. Norton

Table I: Jadis SE300B

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Measurements vs. Listening

W.
Take Me To JoLida

Lonnie Brownell auditions the JoLida SJ 502A integrated amplifier

When the average, hard-working audiophile comes up to me on the street, he (and I use the term in a non-gender-specific way) usually says, "Spare change?"

No, not really. What he says is, "Lonnie, I'd sure like to try a tube amp, but I just don't know. I can't afford the price of most of 'em, and even if I could, I'm not sure I could afford to re-tube it every few weeks, which is what you have to do, right?"

"Uh, well, no, not that often... sure, you'll have to get new tubes some day, but..."

"And what about biasing? Don't you have to rebias them all the time?"

"Now and then, sure, but you shouldn't have to..."

"And they run hot, right? I mean, they're going to heat up my listening room so much in the summer that I'll have to sit around naked while listening!"

"You mean you don't already?"

"No... you think I should? Would it make my system sound better?"

Sartorial tweaks aside, that average panhandling audiophile speaks for many of us in the Audio Underclass who are intrigued by the allure of tubes, but are either unable take the plunge because of a tight budget or afraid to because it seems like an utterly insensible thing to do.

The folks at JoLida must have been hanging around the same streets as I have, because they've entered the tube amp market to meet the needs and desires of exactly these folks. People like... me! According to JoLida's Mike Allen, JoLida wants to go ahead to head with similarly priced solid-state amps, giving people who'd never even thought about trying a tube-based product the opportunity to do so. In fact, JoLida sees their charter as bringing tubes back into the "mid-fi" market, where they haven't been seen for over 30 years — before we even knew that there was such a thing as mid-fi. Knowing that solid-state stuff, for the most part, features plug-it-in-and-forget-about-it maintenance, JoLida also felt that they had to make their products as trouble-free and easy to use as possible. Oh, and they wanted them to sound good too. This model, SJ 502A, is the largest of their line of integrated amps. Like all their products, it's intended to meet the above criteria. Did they succeed? C'mon along... What's a JoLida?

Like most of you, I'd never heard about JoLida until Jonathan Scull's report from the 1995 WCES! mentioned them as a new player offering low-priced amps. However, they've been in business for over 10 years, selling electronic componentry (read: parts), including tubes (some of which they manufacture) and transformers (ditto), and getting involved in various engineering joint ventures. They toyed with the idea of making tube amplifiers for a while, but wondered, Does the world need another $5k tube amp? They answered themselves with a resigned "No," but perked up when they thought about the prospect of producing affordable tube amps. Several years of development later, here they are with their first-ever consumer products.

We'd like to know a little bit about you for our philes

The SJ 502A has a real classic tube amp look to it, with a natty dark metalflake, 2"-tall base, out of which sprout three rows of stuff. In the back row, a large, central power transformer is flanked by somewhat smaller output transformers; in the front row are four small tubes (two 12AX7A input tubes, two 12AT7 drivers); and in the middle row are four big ol' power tubes (6550s). The output tubes are Russians, manufactured by Sovtek, while the small tubes are...

1 Stereophile, April '95, p.111
Chinese. The amp was originally outfitted with KT88 power tubes, one of which had some intermittent noise problems. I can hear the more farthearted among you now: "Uh oh—just like I thought—tubes are unreliable!" They can be, but the intrepid souls at JoLida decided to stop using the KT88s altogether, due to such problems with reliability (and breakage during shipping—they seemed overly delicate) and are now shipping the amp with the 6550s, which proved trouble-free and noise-free during their stay at El Rancho Brownell. If you're into the tube-rolling game, you can take your pick among the plethora of compatible tube types, but I stuck with the ones JoLida provided; after all, their goal is to make owning a tube amp as easy as owning a solid-state amp, and you're not about to find me swapping transistors anytime soon.

In front of the input transformer is a little square hole through which you can see a set of five small sockets, each the right size for a multimeter probe, which is just what you stick in there as part of the bias-adjustment routine. "What? Bias adjustment? I'm getting nervous..." Hey, chill. It's easy, and the mostly excellent user's manual explains the procedure in exquisite detail.) In front of each pair of output tubes is a round hole just big enough for the medium-sized flathead screwdriver blade you'll use to turn the bias trim pot for each output tube. Just hook up the meter to the appropriate slots, check the reading, and dial in the value. Takes a couple of seconds. According to the JoLidians, you should only have to do this every one to three years. If you're a twitchy, tweaky audiophile, you can check 'em every time you fire up the system—it's up to you. Me, I checked them periodically, and found that the readings would in fact drift by a few millivolts, but not by even as much as the ±4mV tolerance range specified by JoLida; even so, I'd dutifully dial 'em back in. However, you don't have to keep that multimeter in a holster on your hip unless you want to. See? Easy.

On the chassis' front left is the power switch and a red power-indicator LED; toward the right are the input selector switch (with Tuner, Tape, CD, and Aux selections) and the balance and volume controls. All the lettering on the amp is a dark gold color—classy looking, but perhaps not the best choice, as it doesn't show up well (or at all) when lights are turned down to the "intimate bachelorette" setting, often a favorite choice for listening sessions.

Looking 'round back we find gold-plated RCA input jacks for the aforementioned input choices, a standard IEC AC cord receptacle, a fuse, and six gold-plated five-way binding posts, three per channel (one for ground, and 4 ohm and 8 ohm posts).

The build quality is mostly good: The transformers and the base itself look positively bulletproof. But the bias-adjustment socket was somewhat off-center—not a problem, because I could move it a little to get it centered, meaning it's not well-anchored. The five-way binding posts are of the ubiquitous "red'n'black plastic nut" variety. I know that these are apropos to equipment at this price level, but I can dream of more heavy-duty binding posts. At one point I tried to bi-wire by inserting two sets of spade lugs into each post, but I couldn't swing it; the nuts wouldn't open up far enough. This isn't a complaint against only the JoLida amp, of course—every other amp I've used recently also has these same posts, so it applies to all of them.

Inside, things are pretty simple. What we've got here is a basic stereo tube amp with a selector switch, balance pot, and volume pot in front of the input stage. There's a large-ish circuit board to which the input and driver tubes and their (minimal) associated circuitry are attached; a smaller, vertically mounted circuit board contains power-supply parts. The components are not big-name Audiophile Specialty items (but the volume pot is from ALPS), and the construction looks to be just good enough. For those of you keeping count, you'll be happy to know that there's exactly one capacitor in the whole signal path.

The transformers, so crucial to tube-amp performance, are special. They're designed and manufactured by JoLida for just this application, using German grain-oriented silicon steel for the core. JoLida's amp-design honcho, Hanson Huang, told me that they tried steel for their transformers from Japan and the US as well, and found that the German steel had the highest µ and lowest loss overall. JoLida also uses a proprietary multilayer cross-winding technique in the manufacture of their transformers, which allows them to obtain very low distortion and very wide bandwidth.

Hanson said they figured out the basic design pretty quickly, but then spent five years refining it to lower the price and increase reliability. One method of doing both was to use some offshore manufacturing; the circuit-board sub-assembly is done in Korea or China, and many of the components come from Japan, but final assembly and testing are done here. Being a major tube manufacturer and distributor, they also have a wide selection of tubes to choose from, and in fact, they burn-in and computer-match their output tubes.

The stock unit comes with a Tape Input, but no Tape Output; however, an optional tape loop is available upon request for a MSRP of $50. Were I running the world, or at least the JoLida factory, I'd add an "Amp Type" switch. This would allow you either to run the amp as it is now, as an integrated amplifier; or to bypass the selector, volume, and balance controls, turning it into a basic power amplifier. Or, maybe JoLida could just go ahead and make a basic amp. If this sounds like a good idea to you, then you'd better get that letter-writing campaign going, 'cause the JoLidians are pretty well set on making integrated amps; they feel that there's a market for the more complete functionality and higher perceived value of an integrated amp, especially at the price points they're targeting, and they currently have no plans to make any basic amps. But things can change.

THE HOME TEAM

Things were set up a little differently for this review: I ran the output of the digital chain (Magnavox CJB-560 player, used as a transport, connected via Illuminati Data/Video Flex digital cable to an Audio Alchemy D7I, then via an Illuminati Data Flex Studio digital cable to an Audio Alchemy DAC-in-the-Box) directly to the CD input of the JoLida amp, via either XLO/PRO Type 100 or Synergistic Research Looking Glass interconnects. For LPs, it was the usual lineup of a Linn AxiS 'table with Basik Plus arm and Shure V-15 Type 5MR cartridge, routed via the stock Linn cable into the Audible Illusions Modulus 2A preamp, which was wired into the JoLida using either the XLO/PRO Type 100 or Synergistic Research Looking Glass interconnect. Most stuff that could sit on a Bright Star Audio Big Rock isolation device did so, and a few (like the preamp) also wore a Bright Star Little Rock on top. All but the amps sat on an Arcidi Superstand, while the amps

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2 The 6550s are stamped with the Ruby logo, but JoLida informs me that these are in fact manufactured in Russia.

3 Funny thing about the user's guide: in the copy I got, the front half was for the SJ 502A, while the back half was for its little brother, the SJ 302A! The JoLida manuals consist of separate pages bound with a plastic spine, and apparently my copy got assembled incorrectly.
(besides the JoLida, the Audio Alchemy
Overture OM-150) rested their laurels
and hardys on my homemade MDF’n’
wood amp stand. Speaker cables were
primarily Alpha-Core Goertz M1 1,
though XLO/PRO 1200 and Syner-
gastic Research Signature Nos.2 and 3
also made the scene. Speakers used were
Vandersteen 2Cs, Thiel CS.5s, and
PSB Alphas. Everything else was
plugged into an Audio Power Industries
Power Wedge 116; amps were plugged
into an API Power Wedge 110.

PRICK UP YOUR EARS
Upon first listen, two things struck me:
that this was one very quiet tube amp,
and that it didn’t sound very involving.
The former was obviously good.
Having lived with a tubed preamp (and
an ancient integrated tube amp in my
office system) for some time, I’m used
to hearing all sorts of odd chirps and
hiss-es and sputters and rushing noises,
but from the JoLida came not a peep.*
As the Bard o’ Santa Fe (aka JA) put it,
it was “as silent as the grave” with no
input signal. The “not very involving” part
was pretty disconcerting, though. The sound
presented was flat (that is, decidedly 2-D
and not 3-D), a little grainy, and
dynamically constricted. Of course, this was a
cold, just-out-of-the-box item, one I’d
fully intended to break-in before begin-
ing serious evaluation . . . but I just
couldn’t wait to give it a quick listen.

So I let it cook for a while, using the
Sheffield/XLO CD burn-in tracks and
all manner of music to do the job. After
a week or so of this, I listened again, and
all I can say unto you, brothers and sis-
ters, is that you must believe in the magic of
breaking-in! That which was flat sprung to
almost full-fledged 3-D life (missing that “you can almost see
around the instruments” feeling that you
can get with the best, most holographic
systems); the grain had been dissolved;
and dynamic contrast had improved as
well. The entry-good news is that the
background hadn’t changed — it was
still noise-free.

SCOTS
SCOTS is short for Southern Culture
On The Skids, a band whose current
release, *Dirt Track Date* (DGC DGC-24812
on CD), and Telstar Records
TR020 on vinyl†, was played many
times during the evaluation period.
Why? It’s a great record, that’s why. Sound-
ing a little like The Cramps playing
obscure Creedence Clearwater Revival
tunes, with just a touch of B-52’s camp,
it’s uplifting in the way only down-
’n’dirty swamp-rock can be. And it’s
clean recording, with clear, vibrato-
laden guitars, crisp drums, and smooth
vocals, which is how it was portrayed
via the JoLida amp. Rick Miller’s too-
cool vocal delivery on “Voodoo Cadil-
lac” stood out from the backing tracks
like the fluorescent lines on a velvet
portrait of Elvis. And, I need to say, this
amp rocks. From the straightforward 4/4
of “Voodoo Cadillac” to the disjointed
rhythms of “Camel Walk,” the JoLida
kept the beat popping along vividly.
Switching from the CD to the LP (and
therefore inserting the Audible Illusions
preamp into the signal path, for two sets
of volume controls), the LP had a slight-
ly darker but “sexier,” fuller sound, no
doubt due to the full analog/nothing-
but-tubes amplification used.

On Nicky Skopelitis’s *Ekstasis
(Axon 314 514518-2), during the track
“Meet Your Maker,” the myriad sounds,
percussive and otherwise, were layered
in a delicate, intricate tapestry that
offered as complete a soundstage as one
could hope for — especially from what
is most likely a multitracked studio re-
ording. The brushwork on the cymbals
was especially “right,” without fizzle
or tizz, and the slow groove of this track
had me rockin’ steady.

The above descriptions apply to
the JoLida driving the Thiels. Switching to
the Vandersteens and listening to the
title track of James Carter’s *JC On The
Set*(DJW/Columbia CK 66149),
I found JC himself back a bit, honking
and blowing in the way only he can,
with the cymbals up front and, again,
just perfect, which is a rare and beautiful
thing. It was a big, round, soulful sound
that swung hard — I had to hang onto
the sofa. Switching to “Sour Times”
from Portishead’s *Dummy* (Go! Discs/
London 422 828553-2), I was taken by
how Beth Gibbon’s vocals stood out
like a beacon in a foggy night, sur-
rrounded by the wash of sampled and
“played” sounds. Did I mention that the
amp can play loudly? I had the volume
control less than halfway up, and I was
getting 95dB peaks. Aldo Ciccolini’s performance of Satie’s *Gymnopédies
from Satie: L’Œuvre pour Piano, Vol I
(EMI CDC 7 49702 2) was just
gorgeous, conveying the melancholy mood
and pianistic tonal color without editorial
comment.

While the ‘Steens and the Thiels
seem to be in about the right price
range to mate with a kilobuck integrat-
ed amp, I figured why not try my PSB
Alphas? These are actually the “Special
Edition” Alphas; they have five-way
binding posts instead of spring clips and
they’re shielded for use in a Home The-
ater system — which is where mine are
used. Oh, and they’re available in white,
which is exactly the color mine happen
to be. All this comes at a price, of course;
the regular Alphas are $200/pair, while
these are $250/pair.

The Alphas are widely regarded as
something of a bargain reference, and I
do own a pair, but I’ve always found
them to be a little raggedy, a little rough,
a little gritty and grainy. I put ’em in the
big system, and . . . hey, not bad! In fact,
pretty damned good! They still seemed
a little grainy, but not to the extent I’d
expected. The soundstage flattened
considerably, and the surprisingly full
bass was a little “chummy” compared to
that produced by the bigger speakers,
but even so, that SCOTS album still
rocked! I could live with this system for a
while — for example, if I wanted to put
together a system right away and could
only afford some small speakers at the
get-go, this setup would be a highly
likely combination.

Downsides? Well, there’s the bass —
it wasn’t flabby or loose (except with the
Alphas, which had more to do with the
speakers than the amp); no, it was
tight and tuneful, but it seemed just a
little light, or lightweight, which, if you’re
gonna err, seems the way to do it. And
even though the dynamics improved
after break-in, they weren’t as heart-
stopping as, for example, those pro-
duced by the Audio Alchemy amplifier.
I’m not saying the amp was *wimpy*
— rather, it was just a tensy bit on the
polite side. After the break-in, I didn’t
hear that graininess (with more refined
speakers, in any case) anymore, but nei-
ther was the amp overly sweet, or clas-
sically tubey (ie, euphonically colored),
being quite neutral from the upper bass
on up. A pretty short list of minor
gripes, wouldn’t you say?

MEASUREMENTS FROM JA
Tom Norton being away taking a
much-deserved vacation, it fell to me
to measure the cute little JoLida. Dusting
off my manual for the Audio Precision
System One, I hooked the test set to the
amplifier and took a few measurements
and . . . drat, I hadn’t remembered to
check the output-tube bias settings. As
El Bee sez, it’s no big deal: the black
Golden Dragon Audio Tubes

Premium tubes developed specifically for audio by British audiophiles and engineers.

"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... the Golden Dragon goal of premium tubes rivaling the best ever made appears to have been realized."


TWIN TRIODES

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**NEW**
multimeter lead goes in the center socket; the red one goes in each of the other four sockets in turn for each of the four tubes. Specified bias is 40mV ±4mV; I set each Ruby 6550 to exactly 42mV—the recommended 40mV plus 2mV for luck!—and left the amp to cook for an hour at one-third full power.

Back at the bench, I checked out the JoLida's output impedance—not bad for a tube amplifier at 0.7–0.9 ohms, depending on frequency, from the 8 ohm outputs and 0.41–0.45 ohms from the 4 ohm tap. Modification of the amplifier's frequency response by the interaction between its source impedance and the impedance of the loudspeaker will be relatively mild. Its input impedance was lower than spec at around 30k ohms, but this is high enough not to be a problem. Voltage gain with the volume control wide open was a high 33.9dB into 8 ohms from the 8 ohm output transformer tap, 33.3dB into 4 ohms from the 4 ohm tap.

Next task was to look at the amplifier's frequency response, which I did up to a higher-than-normal 200kHz high-frequency limit (even with high-quality output transformers, tube amplifiers sometimes have some ultrasonic peaking evident in their responses). Fig.1 shows the response taken under a number of different load conditions, but always with the volume control set to its maximum and the output voltage equal to 2.83V. The bottom trace is from the 8 ohm tap into a 2 ohm resistor: perfectly flat in the audioband, it starts to roll out above 50kHz. Above it is the response from the 8 ohm tap into a 4 ohm resistor: still flat in the audioband, it peaks up by a moderate 1.5dB at 130kHz. The response into 8 ohms also peaks up, now by just over 2dB. The final trace in fig.1 is the response plotted with the JoLida driving our simulated loudspeaker. This is a collection of resistors, capacitors, and inductors designed by NHT's Ken Kantor to resemble a loudspeaker with one important difference—it doesn't make a noise! The variation of impedance of this simulated speaker is shown in fig.2; it can be seen that its shape is echoed in the top trace in fig.1. But as I said above, the fact that the JoLida's output impedance is not that high means that, while any response modification is audible, it is mild at a measured ±0.7dB.

From the 4 ohm output transformer tap, the height of the ultrasonic peak is approximately halved, while at lower volume-control settings and into lower-impedance loads, the peak disappears. This can be seen in fig.3, where the volume control was set to its 12:00 position. One pair of traces is from the 8 ohm tap into 8 ohms; note the reduced height of the 130kHz peak. The other pair of traces are taken from the 4 ohm tap into 4 ohms; note that the ultrasonic output actually shelves down a little. Note also that while the channel matching was perfect in fig.1—the dashed right-channel traces overlaid the solid left traces—adjusting the volume control to the 12:00 position has introduced a 0.25dB balance error.

The presence of an ultrasonic peak makes its presence known in the amplifier's small-signal squarewave responses. Fig.4, for example, shows a 1kHz squarewave taken with the JoLida driving 4 ohms with the volume control full: the flat top to the waveform confirms the excellent low-frequency response, but the response peaking correlates with the slight overshoot. The 10kHz response (fig.5) reveals a short rise time but a few cycles of ringing. This should be innocuous—and irrelevant if you only play CDs, which don't hit the amplifier with fast-enough transients to excite the resonance.

Channel separation is usually compromised in budget components, but look at fig.6. While the crosstalk traces reveal the rise with frequency due to capacitive coupling between the channels above 2kHz, the separation in the midrange is an excellent 90dB. The rise in the lower frequencies may be due to crosstalk through the power supply, but my gut feeling was that the measurement was dominated by low-frequency noise. With the volume control wide open and the inputs shorted, S/N ratios (unweighted, 22Hz–22kHz, ref. 1W into 8 ohms) measured 65dB/60dB (L/R)—which, if not great, is okay.

---

**Figure 1** JoLida SJ 502A, frequency response from 8 ohm tap with volume control maximum at (from top to bottom at 1kHz) into simulated speaker load, 1W into 8 ohms, 2W into 4 ohms, 4W into 2 ohms (right channel dashed, 0.5dB/vertical div.).

**Figure 2** Simulated loudspeaker load, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div.).

**Figure 3** JoLida SJ 502A, frequency response with volume control at 12:00 (from top to bottom at 1kHz): 1W into 8 ohms from 8 ohm tap, 2W into 4 ohms from 4 ohm tap (right channel dashed, 0.5dB/vertical div.).

**Figure 4** JoLida SJ 502A, small-signal 1kHz squarewave into 4 ohms.

**Figure 5** JoLida SJ 502A, small-signal 10kHz squarewave into 4 ohms.

**Figure 6** JoLida SJ 502A, crosstalk (from top to bottom at 10kHz): L–R, R–L (10dB/vertical div.).
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-- John Atkinson
With loudspeakers of average sensitivity, LB didn't have any noise problems.

The JoLida's specification claims less than 5dB of overall negative feedback, implying that the basic circuit is pretty linear. Plotting the THD+noise against frequency at 2.83V into 8, 4, and 2 ohms (fig.7, 8 ohm tap; fig.8, 4 ohm tap) revealed pretty respectable figures, at least as long as the load impedance isn't below the transformer-tap rating. The distortion level at high and low frequencies rises—presumably due to output-transformer limitations and open-loop bandwidth restrictions, respectively—but not to anything I would call severe. And with the simulated typical loudspeaker load (fig.9), the distortion hovers below 0.2% between 40Hz and 13kHz, which should be innocuous as long as the harmonic content remains low-order.

Which it does. The lower trace in fig.10 shows the THD+noise waveform at 4W into 8 ohms, using the 8 ohm tap. It is heavily second-harmonic and overlaid with noise. Into lower impedances and at higher power levels (fig.11), the third harmonic dominates the overall higher level of distortion. This predominance of low-order harmonics in the JoLida's output is confirmed by fig.12, the spectrum of the amplifier's output signal driving 50Hz at high power into 8 ohms from the 8 ohm tap. The second and third harmonics are the highest in level at -48dB (0.35%) and -51dB (0.27%), respectively. Perhaps more important, note the stairstep reduction of level with increasing harmonic order, something that Jean Hiraga pointed out in the mid-70s is correlated with consonant amplifier sound quality. Note also the presence of some low-level AC-supply components, at 60Hz and 180Hz, indicating that the power supply is perhaps a little undersized for the output rating—but this is, after all, an affordable design, not an Audio Research behemoth.

These 60Hz components can also be seen as sidebands in the plot of the JoLida's HF intermodulation distortion spectrum (fig.13). Here, the amplifier is fed equal levels of 19kHz and 20kHz tones, very demanding signal. Major IM products can be seen in fig.13 at 1kHz, 18kHz, and 20kHz, but these are all relatively low in level, at around 0.15% or below. This again suggests good fundamental linearity for the JoLida's circuit.

Finally, figs.14 and 15 show the manner in which the JoLida's THD+noise level varies with output power, assessed

Fig.7 JoLida SJ 502A, 8 ohm tap, THD+noise (%) vs frequency at (from top to bottom at 1kHz): 4W into 2 ohms, 2W into 4 ohms, and 1W into 8 ohms (right channel dashed).

Fig.8 JoLida SJ 502A, 4 ohm tap, THD+noise (%) vs frequency at (from top to bottom at 1kHz): 4W into 2 ohms, 2W into 4 ohms, and 1W into 8 ohms (right channel dashed).

Fig.9 JoLida SJ 502A, 8 ohm tap, THD+noise (%) vs frequency at 2.83V into simulated speaker load.

Fig.10 JoLida SJ 502A, 4 ohm tap; 1kHz waveform at 4W into 8 ohms (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

Fig.11 JoLida SJ 502A, 4 ohm tap; 1kHz waveform at 12W into 2 ohms (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

Fig.12 JoLida SJ 502A, 8 ohm tap, 50Hz sinewave, DC-1kHz, at 40W into 8 ohms (linear frequency scale). Noise the presence of 60Hz harmonic components and that the second harmonic at 100Hz is the highest in level, at -48dB (about 0.35%).

Fig.13 JoLida SJ 502A, 4 ohm tap; HF intermodulation spectrum, DC-22kHz, 19+20kHz at 4W into 4 ohms (linear frequency scale).

Fig.14 JoLida SJ 502A, 8 ohm tap, distortion (%) vs output power into (from bottom to top at 1W): 8 ohms, 4 ohms, and 2 ohms.

Fig.15 JoLida SJ 502A, 4 ohm tap, distortion (%) vs output power into (from bottom to top at 1W): 8 ohms, 4 ohms, and 2 ohms.
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<td>43 (16.3)</td>
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at the 8 ohm and 4 ohm taps, respectively. Below a few hundred milliwatts, the traces are dominated by noise, this revealed by the regular drop of THD+Noise level with increasing power delivery. The saddles in the traces reveal the true distortion level, this very low into matched loads or loads that are much higher than the transformer tap rating. The sharp knees indicate where the amplifier runs out of steam and starts to clip. The measured maximum output powers (assessed at 1% THD+Noise) are shown in Table 1.

Overall, this is a respectable set of measurements, especially when you consider a) that it is a tube amplifier, and b) that it costs just $995. Color me impressed.

—John Atkinson

And in conclusion...

In case you haven’t figured it out yet, I think JoLida’s SJ 502A is one fine little amplifier. It played as loudly as I wanted to listen, with the kinds of speakers I had around — none of which were horrible loads to drive, but neither were they pushovers — and, more important, it made music. If you’re looking for an all-in-one preamp/amp package at about this price range (or maybe even a little higher), and don’t need a phono stage, and are just itching to try some tubes, then what’s the question?

If you need a phono stage, the guys from JoLida recommend the Audio Alchemy VAC-in-the-Box. If you’ve already got a preamp, you can run it into the amp, but you’ll wish you could bypass those controls. But don’t worry too much — in fact, don’t worry at all.

Trouble-free? Well, you will have to get some new tubes someday, but until then, you’ve got a lot of albums to listen to, so turn down the lights, take off your clothes, and enjoy! — Lonnie Brownell $
**Show Some Emotion!**

Wes Phillips auditions VAC’s PA80/80 power amplifier


I love the sound of glowing glass, especially when I’m lonely. I love the nuances of emotion. It’s nothing new, nothing new, The sound of glowing glass… (with apologies to Nick Lowe)

I do, I really do love the sound of a tube amplifier. I also love the glow, the physical warmth, even the smell of heated glass. Years ago, when I had my first system that could be dubbed “high-end,” my wife and I would occasionally turn off all the room lights and spend romantic evenings in front of our Marantz 8B — much as other couples would cuddle by the fireplace.

But I’m not kinky about it — my real reason for loving tubed gear is that I love to wallow in that sense of emotional immediacy that hot glass seems singularly capable of presenting. So it’s not surprising, really, that at the 1994 Summer Consumer Electronics Show I was drawn into a warm cave of a room where VAC’s amplifiers shone out of the darkness like diamonds in a dungheap. “Too zb,” I moaned, shambling into the room. “Pretty! Wes like.”

Recognizing a bad-sound burnout when he saw one, Kevin Hayes sat me down in the sweet spot and plied me with glorious music until I was reasonably coherent. The sound from his Renaissance 140 monoblocks was intimate, yet surprisingly dynamic. Of all the exhibits I heard in Chicago, only the VAC room kept bringing me back — and I wasn’t alone. Sometimes I couldn’t even get in the door for the crowds. On my final restorative trip, Hayes mentioned a project he was working on. “We’re almost ready to bring an affordable amp to market — one that shares a lot with what you’re hearing now. Would you be interested in listening to it?”

Oh my, yes indeed. And so, in the final months of ’94, the PA80/80 showed up on my doorstep.

**The Architecture of Feeling**

The VAC PA80/80 is a single-chassis, wide-band, low-feedback stereo amplifier rated at 80Wpc. The input circuitry of the 80/80 is based upon the venerable D.T.N. Williamson design and features a direct-coupled input amplifier and phase splitter, which results in low phase shift and precise balance of the phase splitter at all frequencies. The input/splitter and driver tubes are 12AU7 triodes operated in class-A with no cutoff or grid current. The output stage, derived from VAC’s respected PA90C, features partial-triode (“ultralinear”) push/pull operation, although VAC can convert the amplifier to full triode operation at additional cost. The output tubes supplied are Golden Dragon KT88s, which operate in “rich” class-AB, being biased to an idle current of 70mA per tube with a B+ voltage of approximately 535VDC. KT90s or 6550As may also be used, but adjustments need to be made to the bias point if you choose these.

The parts quality and build are superb. The transformers are impressive 14-lb, 22-section, ultra-wideband output joggles, and polypropylene and polystyrene capacitors are used throughout. High-current rectifiers, low-ESR power supply, highest quality wiring — all the usual audiophile suspects are here.

The PA80/80 is, to my eyes at least, a beautiful amplifier — broad-shouldered and robust looking. It presents its tubes for inspection in front of its three potted transformers. Four KT88 output tubes stand in a single rank directly in front of the transformers, while two pairs of 12AU7s stand in staggered array to their front. Six 450V-rated capacitors in a row mark the center of the toplate, dividing the eight tubes into right- and left-channel groupings. The low-line front panel sports a power switch on the right and the VAC logo...
We suggest that those who rely upon shiny badges to make an impression might seek a career in law enforcement.

Fewer parts, better parts, better sound.
referred to the Third Symphony as his "monster," and I'm not sure he was kidding. It's huge — the first movement alone is longer than Beethoven's Fifth Symphony — and it calls for an immense orchestra, a contralto soloist, a women's chorus, and a boys' choir. Emotionally, it ranges from moments of tender, yearning melodicism to a series of increasingly tremendous — but never vulgar — climaxes.

The first movement opens with a heroic theme, declaimed forte piano by eight horns in unison. The full orchestra bursts in upon the theme, accenting it with great blasts of sound that quickly fade to silence. What a test for an amplifier! The 80/80 sings it all full-throttle. The orchestral outbursts are overwhelming but totally controlled, and as the tones fade one can clearly hear the immensity of the Avery Fisher auditorium — and the cracking stage floor and audience paper rattle that project as well as (if not better than) the music itself in that cursed, quirky hall.

The score, now carried by the low winds, ebb and flows onward like rising and falling breath, through passages labeled "What the flowers of the meadow tell me," "What the animals of the forest tell me," "What man tells me," "What the angels tell me," and "What love tells me." And that's just the first movement!

Lenny was particularly known as an interpreter — and champion — of Mahler, and for these concerts he pulled out all the stops. I attended several of the performances during the November 1987 series that produced this disc, and as I watched him conduct this work it seemed less that he commanded the orchestra than that he implored it, inhabited it. His body would go rigid as he rose on to the tips of his toes, and I was reminded of that point in the religion of voudou — being "ridden by the loa" in the language of the initiates — where the worshippers venture so far into the sacred that they are no longer resident in their own bodies.

I think that's what happened to Lenny on those cold November evenings — I know it's what happened to me and continues to happen as I listen to the performance on this disc. But not always. Lenny, Mahler, or perhaps only that not-so-random-stream-of-electrons, cannot be communicated through any hi-fi gear. This is one of the best-sounding recordings I've heard of the contemporary NYP, yet I've heard the CD sound sterile and removed. But never through the VAC: the PA80/80 conveyed the muscle, the sweat, and that ineffable sense of the sublime almost as powerfully as I experienced them on the nights I was there.

It wasn't merely on the blockbusters that the '80 distinguished itself, either. Ensemble Galilé's Following The Moon (Dorian DIS-80139) is a quiet disc, full of passionate music. It features a lot of delicate, tinkly percussion effects, which the VAC floated as ethereally as any amplifier I've ever heard. Yet the bodhran's thunder did not suffer a whit. Once again, the feature that kept me nailed to my listening chair was the amp's ability to convey the emotional nuances of the pieces — from the gentle longing of an old Celtic air to the immediacy of one of the Ensemble's own compositions.

But it was Stereophile's Festival: Works by Copland, Kohjiba, and Milhaud (STPH007-2) that really allowed the 80/80 to strut its stuff. I suppose I should be all modest about this project and simply state that the disc is "adequate" — but I think that's a load of hooey. I love this disc. It's the most direct statement about what Stereophile is all about that we're capable of making: "This is what live music sounds like to us. This is what we value." I think it captures much of the excitement of live music-making — we were certainly fortunate in having an exemplary ensemble to record, and man, did they ever perform!

The PA80/80 puts me back in Santa Fe's St. Francis Auditorium on those July nights. The hall's unique sound is re-created in all of its ambient glory — this amplifier's a real corkscrew when it comes to the re-creation of a specific space. I hear the musicians in their familiar positions, the ones drummed into me in rehearsal after rehearsal. But most of all, the amplifier delivers that electric, every-hair-standing-erect thrill that almost never comes across in recordings. The anticipatory hush that introduces Appalachian Spring is palpable, and that bizarre mariachi brass chuckling amid the frenchified africains of La Création du Monde punches through the ensemble like a needle through silk. I'm there, brother, I'm there.

**EMOTIONAL BREAKDOWN**

Toward the end of my audition, the PA80/80 failed. I was listening to a test pressing of Analogue Productions' Lay Me Down by Nancy Bryant (AAPO 2002) when things went quiet. Glancing up, I noticed that the biasing lights...
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were extinguished. Hmmm, I thought, the preamp must have passed some DC. I'll just change the fuse. Repeated attempts to power up the amp—with tubes in place and without—just blew a handful of fuses. Notice how uneventful the failure was: it just muted and powered down—no rude noises or speaker pyrotechnics. I'm impressed. The amplifier has gone back to VAC, and we'll publish their findings next month. TJN had a different PA80/80 shipped overnight air so he could do the measurements.

**C-J comparisons**

Once the VAC went down, I put my longtime reference power amplifier, the Conrad-Johnson Premier Eleven A, back into the system. This amplifier, which costs $700 more than the PA80/80, provided an instructive contrast to it. While retaining many of the tube virtues, the Premier Eleven A sounds even less like a classic tube product than the VAC does—it's more extended at the frequency extremes, which also gives it a tauter, leaner sound. Its deeper, slightly more controlled bass lacks the midbass punch that gives the PA80/80 much of its drive. Many will prefer the '80 for the excitement generated by that punchy propulsiveness. But the C-J has a degree of harmonic refinement that I value immensely and that the PA80/80, for all of its juicy, visceral impact, lacks.

For years, tube-lovers and solid-state fanciers have had a rich debate over the merits of their respective preferences. These days, that debate has gotten a lot more complicated, as the distinctive sounds of each have given way to a far richer diversity within each category. It would be too simplistic to say that the C-J leans toward the solid-state camp in its frequency extension, while the VAC exhibits more of that classic lush tube sound—but there would be a kernel of truth to that reduction.

**TJN measures**

All measurements for the VAC PA 80/80 were made with the load connected to its appropriate output tap; ie, 8 ohm load to the 8 ohm tap, etc. The VAC was warmed up for 1 hour at 80% of its rated power of 80W; it ran typically hot for a tube amplifier.

The PA 80/80's input impedance measured a high 96k ohms at 1kHz. The output impedance was also high, at between 3.5 and 3.5 ohms (from the 8 ohm tap), depending on frequency. The system frequency response will thus be highly dependent on the loudspeaker load. Voltage gain into 8 ohms measured 30.6 dB. S/N ratio (ref. 1W into 8 ohms) measured 70.5 dB, unweighted, over a bandwidth of 22Hz-22kHz; 70dB, unweighted, over a wider 10Hz-50kHz bandwidth; and 85dB, A-weighted. DC offset was 3.1mV in the left channel, 0.2mV in the right.

Fig.1 shows the PA 80/80's frequency response; it is quite flat with a resistive load—the slight rise above 20kHz doesn't result in a sharp peak at frequencies above those shown on the graph. With a simulated real load, however, we see the variations typical of an amplifier possessing a high output impedance; these will be audible, and their nature and degree will vary with the impedance characteristics of the loudspeaker used. Fig.2 shows the amplifier's response to a 10kHz squarewave. It indicates a slight overshoot and damped oscillation. The 1kHz squarewave response (not shown) shows the same slight overshoot, but it's damped immediately; the 1kHz squarewave is otherwise close to a textbook response. The VAC's crosstalk is shown in fig.3. We've seen better, but this is certainly more than adequate for full stereo performance.

The manner in which the VAC's small-signal THD+noise varies with frequency (at 1kHz) is plotted in fig.4. While not remarkable, it's reasonable performance for a tube amplifier.
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Note, however, the rise at lower frequencies. The waveform of the distortion into a 4 ohm load at 1kHz is shown in fig.5. It's heavily second-harmonic, with some higher-order components. The 8 ohm and 2 ohm results (not shown) weren't substantially different; the higher-order components simply increase slightly as the load impedance is lowered.

Fig.6 shows the spectrum of the VAC's output in response to a 50Hz input, taken at 53.5W output into a 4 ohm load (two-thirds of the amplifier's rated 80W). The distortion here is moderately (but not surprisingly) high, along with numerous AC-supply noise components. The second and third harmonics are dominant, at about -43dB (approximately 0.7%). The response at the same output into a simulated real load (not shown) actually shows slightly less distortion at 100Hz (~50dB or about 0.3%), but in general differed little (and in insignificant ways) from the 4 ohm result.

Feeding a combined 19kHz+20kHz Hz signal into the VAC results in the spectral output content shown in fig.7. The level was 44.8W into 8 ohms—the maximum level obtained with this signal without visible signs of clipping. The result into 4 ohms (not shown) was very similar. This is a fair, if not special, result; the 1kHz component lies at -44.6dB (about 0.6%), the 18kHz component at -48dB (about 0.4%).

The THD+noise vs output power measurements (fig.8) are unexceptional in that they're fairly typical of tube amplifiers, though with a slightly sharper "knee" than many. They are unusual in one respect, however, in that the results for 8, 4, and 2 ohms (taken from their respective output
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As I talked with Kevin Hayes, we touched on many subjects, including his engineering background—or lack thereof—when he started the Valve Amplification Company. Rather than being defensive about it, he argued that it may have, in fact, been advantageous.

Kevin Hayes: When I started the company, my electronics background was almost entirely informal. My bachelor's was in experimental psychology—the perceptual-encoding side of psychology—and my master's was in business, manufacturing actually. My doctorate was in a field of mathematics called operations research—you'd be amazed at how much of all this actually has proven useful. But in terms of actual circuit information, I was primarily self-taught.

That's not a bad thing, because the traditional electronics curriculum of the last 20 years does not encompass any information about the vacuum tube. During the years I was at Duke, I would go into the Engineering Library archives and spend time looking through the old publications, such as the RCA Review going back into the 1920s—I believe that we've forgotten more about tube technology than we currently remember. I found some fascinating things in those journals that are no longer common knowledge.

Wes Phillips: Such as the "sleeping sickness" that develops in tubes kept in soft-start mode?

Hayes: That's the informal name for it, yes. That piece of data was developed during the 1950s, and it came out of two non-audio-related fields. The first was radar, where you put a very brief, very powerful pulse through the circuit after a long period of rest, and the other was computers, where the tube acted as an on/off switch. The tube may be turned off, with no plate current flowing, for a long time and then suddenly be asked to do something. If you do have the tube hot, but not flowing plate current, a change happens to the cathode—it builds up an interference layer, which acts in practice like a capacitor in series with the cathode, and you can't do anything about it. You'd be unlikely to find that information if you only searched audio-only references, however.

Phillips: Does the interference layer become a permanent function of the tube, then?

Hayes: That's an unknown. The tube does seem to rejuvenate over time, but whether it's complete or not remains undetermined. Given how dynamic the cathode is, however, I'd be inclined to mess with it as little as possible.

When you go back and examine the physical and chemical sciences of tube construction, there are many ways that people have gone about building them: different cathode lead materials, cathode coatings, getter materials, methods of evacuation—all of these react differently over time. One particular brand of 12AX7 may be more prone to cathode interference than another, but we aren't certain, since serious tube research more or less ended with the introduction of the transistor—before we'd fully answered all the questions.

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Table 1: VAC PA80/80
Discrete Clipping Levels
(1% & 3% THD+noise at 1kHz)

<table>
<thead>
<tr>
<th>Load</th>
<th>Both Channels</th>
<th>One Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>ohms</td>
<td>Drive</td>
<td>Drive</td>
</tr>
<tr>
<td>8% (2%)</td>
<td>10%</td>
<td>117V</td>
</tr>
<tr>
<td>11%</td>
<td>115V</td>
<td>116V</td>
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<tr>
<td>12%</td>
<td>114V</td>
<td>116V</td>
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<tr>
<td>13%</td>
<td>117V</td>
<td>116V</td>
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<tr>
<td>14%</td>
<td>118V</td>
<td>116V</td>
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<td>15%</td>
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<td>116V</td>
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<tr>
<td>19%</td>
<td>113V</td>
<td>116V</td>
</tr>
<tr>
<td>20%</td>
<td>112V</td>
<td>116V</td>
</tr>
</tbody>
</table>

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W P CONCLUDES: THE SHORTHAND OF EMOTION
In the final analysis, I could surrender myself to the VAC PA80/80 and wallow in its revelation of the emotional truth of musical performance with nary a regret. It's extremely well-constructed. The 80/80 offers good value in today's market and is certainly competitive with products costing more. It recalls the glorious tube sound of the past, while offering thoroughly modern conveniences such as exceptional silence and easy-to-adjust biasing. It may not be the amplifier for everybody, but that statement applies to every amplifier I've ever heard. If you think of music as a form of emotional communication, however, this could well be the amp for you.

— Wes Phillips

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CREDENTIALS & ARCANcE KNOWLEDGE FROM THE GLASS AGE

Adapted from the March, 1995 issue of SHORTHAND.

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140

STEREOFILE, MARCH 1996
With the introduction of Audio Alchemy's Digital Transmission Interface (DTI) more than three years ago, the company created an entirely new category of hi-fi product: the jitter filter. The original DTI was a good start, but didn't always improve the sound of the better-quality digital front-ends.

The DTI•Pro, released 18 months later after little similarity to the rather simple DTI, The Pro added a more sophisticated dual Phase-Locked Loop (PLL) input receiver for much lower jitter, and also performed a new type of Digital Signal Processing (DSP) that Audio Alchemy called "Resolution Enhancement." This processing reportedly increased the resolution of the compact disc's 16-bit digital words, approximating 18- or even 20-bit resolution. It did this by looking at the 16-bit words over a time window, and calculating the additional bits that would have been present had the signal been originally encoded with higher resolution than 16 bits.

In my November 1994 review of the DTI•Pro, I called it a "breakthrough in digital audio reproduction" and a "musical revelation." When inserted in the playback chain between a transport and digital processor, the DTI•Pro significantly improved the sound of my system. Moreover, experimenting with the output word length suggested that the Pro's benefits were indeed rendered by Resolution Enhancement, not just jitter reduction.

Shortly after the DTI•Pro was launched, Star Semiconductor, the manufacturer of the Pro's DSP engine, temporarily went out of business. Although Audio Alchemy scoured the globe and hoarded all remaining Star DSP chips, it was clear that the DTI•Pro's days were numbered.

Audio Alchemy took the opportunity to redesign the Pro with a 32-bit DSP chip from Texas Instruments, hence the product's new name, the DTI•Pro 32. The new chip reportedly has 50% more computing horsepower to run the Resolution Enhancement algorithm. The Pro 32 also includes some operating improvements over the Pro. Fortunately, I still have an original DTI•Pro on hand for comparison with its successor.

**DESCRIPTION**

The DTI•Pro 32 is housed in Audio Alchemy's standard 8.5" wide by 2" high chassis. From the front panel, the DTI•Pro 32 looks identical to the DTI•Pro. The front panel's 10 LEDs indicate the input selected, power to the Pro's three main sections, when the unit is locked to a source, and whether the phase or polarity has been inverted.

The lock indicator actually requires two LEDs, marked "Primary" and "Secondary." The Primary lock shows that the Pro 32's first PLL stage has locked to the source, and the Secondary LED indicates the low-jitter "double-lock" condition. The Pro 32 should double-lock to most CD transports. More on this dual PLL later.

The tiny rear panel is consumed by input and output jacks. Input is via coaxial (BNC jack), TosLink optical, or Alchemy's PS bus. The addition of the PS bus input is new on the Pro 32, and is included to accept PS output from Alchemy's forthcoming CD transport. For an additional $179 you can swap the TosLink input for an ST-Type optical jack. The Pro 32's output appears on a BNC jack, AES/EBU connector, ST-Type glass optical jack, and PS bus. A DC input connector, which accepts a plug from the Pro 32's small external power supply, finishes the rear panel.

An PS connector looks like an S-Video jack, but has five pins rather than S-Video's four. The five pins carry left and right audio data on one line, bit clock, word clock, master clock, and the emphasis flag. By separating the clock and transmitting it independently of the audio data, the unit receiving an PS-formatted signal need not "lock" to the incoming datastream and "recover" a clock. The result is nearly total immunity to interface-induced jitter. Indeed, the whole idea of extracting a clock signal from the audio data is a fundamentally flawed approach to transmitting digital audio. Note that when one of Alchemy's processors with PS input is connected to the DTI•Pro 32's PS output, the familiar and comforting "lock" LED doesn't illuminate on the processor's front panel. Don't worry: the processor will still decode the PS data.
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Seven user-selectable operating modes optimize the Pro 32's output for your digital/analog converter. These modes set the output word length (16, 18, 20, 22, or 24 bits) and other output conditions. One mode turns off the dither, but performs Resolution Enhancement. The output word length in this no-dither mode changes with the program source, with the algorithm deciding how many additional bits it can reliably interpolate. Turning off the DTI-Pro's dither can be a benefit with some digital processors that are already dithered internally.

The seventh mode turns off the Resolution Enhancement processing for HDCD™ playback. HDCD decoding requires that the control code buried in the least significant bit of the CD's 16-bit words arrive at the HDCD filter in your digital processor. Any change in the data — such as that introduced by Resolution Enhancement — corrupts this control code and prevents HDCD decoding. This is why the Pro 32 offers the HDCD bypass mode. Note that this HDCD bypass option wasn't offered on early versions of the Pro.

Choosing the correct output word length is crucial to getting the best performance from the DTI-Pro 32. Let's say you have a digital processor with 18-bit DACs, and you set the Pro 32's output word length to 20 or more bits. The DACs will simply truncate (cut off) any bits below 18, introducing noise and distortion. As JA described in his review of the Meridian 518 Mastering Processor in the January 96 Stereophile, truncation also hardens midrange textures and reduces the sense of space.

Conversely, setting the Pro 32's output word length to 18 bits if you have a true 20-bit processor prevents you from experiencing the full benefits of Resolution Enhancement.

Just because your digital processor has 20-bit DACs doesn't mean that it will pass 20-bit data from input to output. The NPC 5813 digital filter, for example, truncates the incoming data to 18 bits. The older Yamaha YM3623 input receiver chip will pass only 16-bit data. For comparison, the Crystal Semiconductor CS8212 and Ultra-Analog AES21 input receivers will pass up to 24-bit data, as will the Pacific Microsonics PMD100 HDCD decoder/ filter.

There's yet another trap to be aware of. Digital processors with the Crystal or UltraAnalog input receivers, the PMD100 filter, and 20-bit DACs still may not pass 20-bit data. Some processors that have been retrofitted with the PMD100 weren't redesigned to pass the PMD100's full resolution to the DACs. Two such examples are the PS Audio UltraLink Two and Enlightened Audio Designs DSP7000 Series III. Each of these processors has only a 16-bit data path from the digital filter to the DACs. Consequently, they'll truncate 20-bit input data, even though they have a 24-bit input receiver, 24-bit digital filter, and 20-bit DACs. Any processor designed from the ground up around the PMD100 (as opposed to an existing design retrofitted with the PMD100) should pass at least 20-bit data. The only way of finding out which "20-bit" processors truly pass 20-bit data is by the measurements included in reviews.

Reports from readers suggest that some processor manufacturers either aren't aware of their products' capabilities, or provide misleading information.

Setting up the DTI-Pro 32 and choosing its output word length requires the owner's manual; there's no direct readout of the 32's operating status. You must instead interpret a code provided by the three power-indicating LEDs. For example, 20-bit output is indicated by illumination of only the bottom two LEDs. Without the owner's manual (or a great memory), you won't be able to correctly set up the Pro 32 for your system.

To change the output word length, press and hold the "Phase" button until the three power-indicating LEDs switch from power indication to operational status indication. Still holding the Phase button, press the Input button to scroll through the output word-length options. Note that you must go through this procedure for playing back HDCD-encoded CDs (if you have an HDCD-based processor), then reset the Pro 32 to its previous settings for conventional CDs. The process is a little clumsy, but workable. Fortunately, the new Pro 32 remembers the input and output settings in nonvolatile memory when powered down, meaning you don't have to reset the unit after it's been turned off. This important feature was lacking in the DTI-Pro. The Pro 32's output mode selection and display are also improved over those of its predecessor.

The Pro 32 uses the same jitter-reduction technology as that of the original DTI-Pro. A Crystal CS8412-based input receiver locks to the incoming data stream with a Phase-Locked Loop. A second, low-jitter PLL locks to the first PLL's output, then generates a low-jitter master clock for output to your outboard digital processor. The first PLL recovers the data stream, the second attenuates jitter. A Voltage-Controlled Crystal Oscillator (VCXO) provides the timing reference. The quality of the VCXO's output largely determines the quality of the output signal. The Pro 32's jitter attenuation cutoff frequency (the frequency above which the circuit attenuates jitter) is reportedly a low 5Hz. For comparison, a Crystal CS8412 without a dual-stage PLL has a JACF of 25kHz. The Pro 32's second PLL has a slightly narrower bandwidth than that of the Pro, a characteristic that reportedly improves the product's jitter performance.

The recovered signal is then processed with Audio Alchemy's Resolution Enhancement algorithm. A Texas Instruments TMS320C31 Digital Signal Processing (DSP) chip running at 40MHz executes the processing. The Texas Instruments chip is a 32-bit floating-point device, while the Star SPROC DSP is a 24-bit fixed-point processor. Although the Resolution Enhancement algorithm remains unchanged from the original DTI-Pro, the new Pro 32's greater computing horsepower and longer interpolation filters mean that the algorithm can be executed with greater mathematical precision. A Programmable Read-Only Memory (ROM) chip contains the Resolution Enhancement software that tells the DSP chip what to do. This software is easily upgradable in the field simply by replacing the socketed PROM.

The DTI-Pro 32's build quality is classic Audio Alchemy; no cosmetic frills or lavish construction, just solid engineering in a spartan package.

LISTENING
I've had the DTI-Pro 32 in my system for a few months, removing it temporarily while auditioning the Avalon/Spectral/MIT system reviewed in the January Stereophile. I did, however, listen to the DTI-Pro 32 in that system before dismantling it for return to the manufacturers.

Most of my experience with the DTI-Pro 32 was in my usual system, consisting of a Sonic Frontiers SFL-2 preamplifier driving a pair of Audio Research VT150 monoblock power amplifiers. Loudspeakers were Genesis II.5s, whose woofers were driven by an integral servo power amplifier. Interconnects in the Sonic Frontiers/ARC/Genesis system were AudioQuest Lapis, Diamond X3, and WireWorld Gold Eclipse; loudspeaker cables were short runs of AudioQuest Dragon II.
The following is the second in a series of technical articles by TARA Labs designer Matthew Bond.

How Conductor Size and Shape Affect Performance; What to Look for

In Part 1, we measured the frequency linearity of various cable designs using TARA Labs' Constant Current Impedance Testing (CCZT)™.

Why do different conductor types of the same mass yield such different results? In a few words: electromagnetic flux linkage.

Referring to the graph of the CCZT results, we see that the single 2 mm² (14 gauge) conductor shows the least linearity with frequency. This is because in a larger single conductor there is more electromagnetic flux, which increases in density towards the center of the conductor. This crowding, or density of the electromagnetic lines of force at the center of the conductor effectively chokes off higher frequencies and forces them to travel towards the outside of the conductor.

DC resistance. A large diameter conductor, whether solid-core or stranded, will have the same impedance vs. frequency curve for a given diameter and mass. In other words, the closely bundled small conductors in a multi-strand conductor approximate a single large solid-core conductor, so nothing is gained by stranding many smaller conductors.¹

In the second trace, we have split the single conductor into two smaller ones. Combined, they have the same mass, but the frequency linearity is improved because of their smaller individual diameters and lower electromagnetic flux linkage. Although the conductors are subject to flux linkage because of proximity, they have the greater frequency linearity that goes with a smaller diameter. This is the principle behind many of TARA Labs' Prism™ Series solid-core cable designs.

These guidelines hold true regardless of variations on these design themes and account for most of an audio cable's sound. Other elements, such as dielectric and conductor material and treatments, are the icing on the cake of cable design, having a lesser effect on cable performance than good, solid design principles. In the next article, we'll begin to examine those issues to shed some light on their relevance to audio cable performance.

¹In fact, there is another serious compromise to sound quality with stranded conductors. Oxidation between the strands (inevitable because of the presence of tiny air spaces within the cable) produce a diode-like effect which inhibits electrical flow. This effect shows up as noise, hash, and graininess, a condition which only worsens with the age of the cable.
KEF Reference Series Model Four loudspeaker

Thomas J. Norton

The Model Four is the largest model in KEF's current Reference series of loudspeakers, discounting the R107/2 Raymond Cooke Special-Edition, (reviewed in a Follow-Up in October '95). It's also the largest KEF model that uses their Uni-Q™ loudspeaker configuration. When I visited the KEF factory last October with a group of audio journalists from the US, KEF emphasized the importance of Uni-Q technology to their future plans. They say it's proprietary, and intend to enforce the worldwide patents they hold on the design. One look at KEP's current line will be enough to tell you why they're so serious. Uni-Q drivers may be found not only in most of the Reference series, but in most of their other models as well. The most significant exceptions: the Raymond Cooke series, a few inexpensive models, and their THX-certified loudspeaker system.

The Uni-Q driver was originally developed by KEP for use in the Eureka Archimedes project, an ambitious research effort conducted by KEP and a number of other companies to investigate the interaction of loudspeakers and rooms. Uni-Q, for those unfamiliar with the design, positions the tweeter at the apex of the midrange cone, in the position normally occupied by a dust-cap. The advantages: a coherent radiator, free from the acoustic interactions present in all loudspeakers with physically offset drive-units. The disadvantages: the tweeter is now loaded, effectively, by a horn (the midrange cone). So we are trading one form of interference, perhaps, for another; hopefully we will gain more in the tradeoff than we lose.

Earlier versions of Uni-Q had shown that there are advantages to the design, though not without some sacrifice in top-end smoothness. But the Uni-Q technology is now in its fourth generation. My listening tests confirmed that it is definitely a different-sounding beast than earlier versions of the design. There's more to the Reference Four, however, than a... similar midrange-tweeter configuration. At the other end of the spectrum, KEP uses what is commonly called a bandpass enclosure for bass loading. In this type of design, the woofer is (or woofers are) mounted inside the cabinet. One side of the woofer is loaded into an internal chamber, which may be either sealed or ported. The other side loads into a second chamber, which is in turn vented to the outside. Properly designed, this type of system can provide extended bass, while the port to the outside acoustically rolls off the top-end response of the inter-
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nal driver(s)—simplifying the work of the system’s crossover network.

In the Model Four there are two 10" internal bass drivers. Each fires into its own individual, internal chamber. The other side of each driver loads into a third internal, common chamber. The latter—which is also connected via ports to the other two internal chambers—vents ultimately to the outside. The bottom line here is that the total output of the two internal woofers—below their 160Hz crossover—comes from the external port.

If all this sounds rather complex, it is. Any reflex design is inherently more difficult to design for optimal operation than a sealed cabinet; KEF’s bandpass design, which they refer to as a “Coupled-Cavity,” is even more so. And there’s an added wrinkle. The internal drivers are connected back-to-back by a rigid rod to help cancel physical vibration. Vibration is further reduced by decoupling the front-mounted drivers from the cabinet by rubber bushings. The cabinet itself is well-damped; the knuckle-rap test indicates a damped cabinet of average thickness rather than the cast-from-concrete sensation typical of a cabinet with ultra-thick walls. Both approaches are valid design routes to solving the problem of cabinet vibration, each having strong advocates. Clearly, the Wilson WITT, which I reviewed in January (Vol.19 No.1, p.177), comes down on the other side of the fence.

The Model Four is much easier to move around the room than the WITT, though at over 100 lbs, the KEF itself is hardly svelte. Oxygen-free copper wiring is used for all internal connections in the Model Four, with different gauges for bass, midrange, and treble drivers. Knurled, gold-plated bi-wire terminals are provided. I don’t like KEF’s terminals. They’re big, heavy-duty, and unattractive—and will not accept most spade lugs unless you put one of the tines through the hole in the terminal and thereby mash it when (if you can) you tighten it down. But this is, I admit, a more irritating problem for a reviewer than for an owner, who’s not likely to switch leads at all often.

The cabinet’s base is made from a rigid, mineral-filled polymer (as is the front baffle), and can be filled with sand or lead shot if desired (I did not do so). Reversible, adjustable spikes are fitted; when the spikes are used, the gold-plated cabinet feet act as lock nuts for them. Recognizing the way the market is moving, KEF has provided magnetic shielding for all of the drivers in the Model Four, for use with video monitors if desired. While I have no objection to using a speaker like the Reference Four for combined audio/video duties, it would be a shame (from a stereo soundstage viewpoint) to place them close enough to a video monitor—and thus probably only 4-5 feet apart—that shielding might be a concern. Finally, all of KEF’s Reference Series are matched to within 0.5dB of the standard for that model. And as I observed when I toured KEF’s plant, each pair of Reference loudspeakers is hand-assembled to completion (starting with the finished drivers, finished cabinets, and assembled crossovers) by a single craftsman.

THE SYSTEM

The system used in the review of the Model Four consisted of the Denon DP-S1 transport, Mark Levinson No.36 D/A converter (the two linked by a Kimber AGDL coaxial digital cable), and a Jeff Rowland Design Group Consonant preamp. Amplification and cables will be discussed in the review. All auditioning took place in my (approximately) 26’ by 18’ by 11’ listening room.

LISTENING

Because I began my auditioning of the KEFs immediately after finishing with the Wilson WITTs, I started by placing them in the same locations the WITTs had vacated, a few feet out from the short wall of my listening room. At this point, I was using XLO Reference interconnects from D/A converter to preamp and preamp to amplifier. The interconnects were unbalanced, the amplifier a Mark Levinson No.332. Speaker cables were a single run (not bi-wire) of XLO Reference. Things didn’t really come together on this first try. Imaging was fair, but there was an occasional phasey quality to the sound. The room’s sidewalls were damped, so odd reflections seemed an unlikely cause.

Bass was decent, though not remarkable. The top end was a little dry, and the midrange rather forward with a trace of coloration. Minor repositioning didn’t really solve the problems, so I completely rearranged things, moving the KEFs to the loudspeaker locations I generally favor in my room, firing across a diagonal. Things definitely started looking up at this point. But I still did not feel I was getting the best out of the loudspeakers.

It was hard to find things to criticize in the Four’s mids and highs; they were clean and sweet (that dryness noted above largely disappeared with the change in location). Yet something seemed lacking. It was, perhaps, that “snap” that JGH refers to. Or perhaps it was simply a lack of air. The sound was not at all dull, but was closed-in compared with, say, the Energy Veritas v2.8 or the Wilson WITT. Otherwise good recordings, which on other good loudspeakers tend to be a little aggressive-sounding, were sweeter than I’m accustomed to hearing them. The Reference Four appeared to be simply too forgiving and polite. The bottom-end balance contributed to this—rich and warm-sounding through the mid- and upper bass. While the bass was deep and powerful, it was not at all tight or well-defined—certainly no competition for even the hardly lean-sounding Veritas or WITT. These loudspeakers both measure and sound a little rich in the same region, but manage to grab hold when needed. The Reference Four was let down by its too-much (quantity), too-little (quality) lower octaves.

I must add that I had the same impression of the KEF when I heard it, briefly, in KEF’s own listening room in England. Big, full-bodied, and rich—but not very transparent. That extra warmth reduced the clarity through the mids, also, though that midrange was otherwise very good. Perhaps just a trace more forward than I like it, but now very low in coloration, including the all-important vocal region. Imaging was solid—in the sweet spot, the phaseness disappeared—though not really better than I am accustomed to (most good loudspeakers image very well in my listening room when properly set up). Depth was good, though that combination of warmth and slight midrange forwardness kept the depth from being really notable. Up to this point I had used both the Levinson No.332 and Krell KSA-300S amplifiers. Things sounded a little tighter with the Krell, but the overall balance was not dramatically different.

MAKING IT HAPPEN

It’s amazing how, when evaluating a product, you can set off on a tangent and, operating through the back door, find just the right combination of associated components to make that product come alive. That is exactly what happened to me with the Model Four. Up to now, I’d been listening to a decent pair of loudspeakers priced in a
The New Reference in Digital Playback

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The first transport to offer the I^2S bus digital data output format providing a jitter-free link to Alchemy's DTI•Pro32 or DDE v3.0

Features the new-generation Pioneer "Stable Platter" based engine

All clock signals are generated via a proprietary, high-accuracy, ultra-low jitter (2 pS) internal master reference oscillator

External power supply utilizes four separate transformers and employs 12 low-impedance regulators/buffers to provide filtered, low-noise DC

S/PDIF data – clocked to master reference oscillator for jitter-optimized output – is provided via BNC coaxial and AES/EBU (standard), or ST glass (optional)

Controller and display interface are each enclosed in their own shielded environments; chassis is resonance damped for additional isolation.

Complete with full-function remote control and detachable AC mains cord with integrated line filtering

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range where “decent” just doesn’t cut it. The Four didn’t irritate. It sounded clean and relatively uncolored. But the big KEF really didn’t get up and dance, either. In fact, the speaker was just a little lead-footed. At this point I made two changes. I went to a bi-wire set of Monster M1.5 loudspeaker cables (a second set, or bi-wire set, of XLO Reference were not available to me, or I would undoubtedly have tried them first) and switched to a new Aragon 8008 power amplifier.

Better. Much better, in fact.

The speakers’ balance remained a little up-front, but never in-your-face. Solo instruments and voices were surprisingly palpable now, helped by a tighter quality in the mid- and upper bass. On the Fairfield Four’s Standing in the Safety Zone (Warner Bros. 26945-2), the solo vocals still sounded a little rich and warm, but only enough to give the vocals an appealingly full-bodied character. On Gordon Lightfoot’s If You Could Read My Mind (Reprise 6392-2), the same positive vocal qualities were noted, together with a guitar accompaniment which was sweet, clean, and subtly detailed. Sibilants on this and other recordings were neither fizzy nor smothered. The mid- and upper bass were still not quite there, but the Model Four was now closer to the mark. On the King’s Singers’ Good Vibrations (RCA Victor 60938-2), the balance was definitely on the full side of neutral, but not enough to irritate.

The main effect of the fullness was to slightly close down the sound, reducing the sense of openness and transparency. The same was true on recordings as diverse as Dean Peet’s Travologue (Fahr- enhen FR2451) and the soundtrack from Sneakers (Columbia CK 53146). Bass guitar (on the former) and percussive drums (on the latter) were just a little less punchy than they should have been. The top-end remained a little forgiving. But little else was wrong or missing. I now returned to the Krell KSA-300s amplifier, but this time with the above-mentioned Monster bi-wire loudspeaker cables. What I now heard is no reflection on the Aragon amplifier (review to come), but a tribute to the loudspeaker control of the Krell. The bass was dramatically cleaner and tighter. This shouldn’t have surprised me; when I reviewed the Energy Veritas v2.8s, it was this very combination of loudspeaker cable and amplifier which tightened up the sound of that loudspeaker.

The Krell really forced the KEFs to get a grip on the bass. This hadn’t been true to the same extent when I used the Krell with the XLO loudspeaker cables. Synergy, as ever, is everything. Or most everything. KEF argues that their Reference loudspeakers can be used with modest electronics, and I have no doubt that there are other suitable amplifier/cable combinations — and less expensive ones — that will solve this loudspeaker’s tendency to lay it on too heavily in the bottom end. But the combination I found was the Krell/Monster. The Patriot Games soundtrack (RCA 66051-2) is one of my favorite tests of bass clarity and drive. The bass percussion on this recording must be heard on a good system to truly appreciate the meaning of bass punch, and over the Reference Fours, in their final setup, it now had it, with room to spare.

Cleaning up the mid- and upper bass also did wonders for the rest of the audible spectrum. While I would still rate the Model Four as being below the very best loudspeakers in its presentation of inner detail, transparency, and top-end openness and air, the margin was now small. The bass control of the Krell, combined with its vivid low and mid-treble (which can make it sound a trace bright on some loudspeakers compared with some of the competition), was just the right prescription for the KEF. The speaker no longer sounded as polite or forgiving as before. Recordings which tend to be just a little bright — though otherwise superb — such as Mark Knopfler’s Screwwing (Warner Brothers 45457-2), were now just a bit bright on the KEFs, where before they had been smoothed-over and sweetened.

Tightening up the bass can also do wonders for the soundstage precision and focus. And the KEF’s soundstaging, good before, definitely moved up a notch on the scale, particularly in the reproduction of depth. If you want to hear excellent depth reproduction, listen to “Hostias” from the Berlioz Requiem (Telarc CD-80109) on a first-class pair of loudspeakers. Like the KEF Model Fours.

Before I switched to the Krell/Monster cable combination for driving the KEFs, I’d intended to try moving the Model Fours yet again, this time to the long wall of my listening room. I never look forward to these major rearrangements, but sometimes there’s no other option. The change wrought by the Krell/Monster tandem made that rearrangement unnecessary.

Before I made the last amplifier/cable change, I was pondering how to rate a loudspeaker that so clearly belonged in Class B of Stereophile’s “Recommended Components” listing in the midrange and highs, and was so clearly not class B in the bass. Extension, yes. Clarity, no.

After the amplifier/cable change, however, I had no doubt. While the bass from the KEFs isn’t the tightest I’ve heard, or the deepest, with the optimal combination of amplifier and cable it’s definitely competitive with the best I’ve had in my listening room. The same goes for other vital aspects of its performance — midrange, highs, soundstage, dynamic range, and power-handling capability.

**Measurements**

JA measured the KEF Model Four using the DRA Labs MLSSA system and a calibrated BrK 4006 microphone, and provided me with the results after I had completed my listening tests.

The KEF’s calculated sensitivity measured a very respectable 90dB/W/m. Though this is slightly below specification, the fact that this figure is B-weighted might explain the difference. Its impedance characteristic is shown in Fig.1. With a minimum impedance of 3.2 ohms at about 70Hz, and a notable increase in the phase angle below 20Hz, this is a relatively demanding load. The two dips at 28Hz and 70Hz define the twin woofers’ bandpass tuning.

Fig.2 shows the responses of the
"Every reviewer who writes about wire should have a Wireworld Interconnect Comparator, so should every retailer who sells cables... I've never experienced an easier, less stressful way to audition cables. And the findings are terrifying... especially if you feed the output into a headphone amp for even more vivid results... My worst fears were confirmed about certain over-hyped wires, while I was relieved to find that some of my faves did survive the tests with dignity intact."
Ken Kessler, HI-FI NEWS & RECORD REVIEW, Oct. 1995

"The Comparator is extremely revealing of an interconnect's sound, and is an invaluable tool for judging interconnects."
Robert Harley, STEREOPHILE, Vol. 18, #11, Nov. 1995

"It is obviously apparent that this splendid device, beyond simplifying the lives of reviewers and retailers, is destined to bring pleasure to many dedicated listeners."
Bebu Moroni, SUONO, Italy, Sept. 1995

"As soon as I replaced my reference powercord with Aurora, I knew this was no ordinary cable; the lower bass became lower, and at the same time, the resolution improved. The Gold Eclipse also sounded extremely neutral and vivid, and seems to be capable of supreme tuning ability for the total system. Once again, the magic of the audio world is restored."
Makoto Akikawa, AUDIO ACCESSORY, Japan, Summer 1995

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internal, bandpass-loaded drivers as measured nearfield at the port, and the summed on-axis response of the exterior drivers on the tweeter axis (43" from the floor). The bandpass port output shows well-suppressed modes (the top-end rolloff of the port output is very smooth). Its LF response rolloff appears to be greater than expected, presumably due to an additional series capacitor in the feed to the bandpass woofer, probably to minimize LF overload. The strong low-bass response, -6dB at 28Hz, is clearly visible.

The overall response — complex sum of the nearfield bandpass and midrange responses combined with HF response averaged across a 30° lateral window — is shown in fig.3. The slight rise in the lower-midrange/upper-bass might explain the problems I had toning the loudspeaker's warmth, though as loudspeakers go this rise is not great. There is a rise between 1 and 3kHz which might explain the slightly forward quality I noticed, but this is small and well-controlled. In fact, the response in fig.3 is, overall, a superb result.

The horizontal response family of a KEF Model Four, with any on-axis response deviations subtracted out so that the reference response appears flat, is shown in fig.4. The off-axis response rolls off quite smoothly, with the off-axis response helping to fill in the averaged response for some small on-axis irregularities. However, the upper treble does roll off quite rapidly to the sides. This could well account for the slight lack of air and closed-in sound noted in the review, which even in the end I could never entirely eliminate. The vertical response plot (fig.5) is well-maintained off-axis, dropping significantly only when the listener's ears are level with the top of the cabinet (about 49") or the lower-midrange driver (about 29") — both unlikely listening positions.

The impulse response on the tweeter axis is plotted in fig.6, the step response in fig.7. The Model Four's drivers are all connected with the same acoustic polarity, though the speaker is not time-coherent. The cumulative spectral-decay or "waterfall" plot is shown in fig.8. This is a very clean result, with noticeably less decay hash apparent across the spectrum than is usually seen. The only significant mode is associated with the on-axis rise above 10kHz.

Finally, fig.9 shows the cabinet vibration measured on one of its side-walls, 12" from the floor. As I'd suspected, this is a very well-braced, well-damped cabinet. Measurements taken at other locations were similarly lacking in significant panel resonances.

This is a superb set of measurements of what is clearly a well-engineered loudspeaker. A little less output in the upper-bass/lower-midrange and a little greater HF horizontal dispersion are the only areas where I feel improvements might pay big dividends. But,
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Hence, "The Book of Truth", a musical bible containing such towering commandments as: Thou shalt not listen to speakers with undersized voice-coils. Thou shalt not listen to speakers plagued with phase response problems. Thou shalt only listen to speakers that employ one-piece MSP (Magnesium Silicate Polymer) woofer cones. Thou shalt only listen to speakers that utilize complete absorption of evil, backwards-radiated energy, and allow for virtuous, echo-free sound reproduction.

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 ance coil windings are specified to allow for paralleled electrical connection. Again, these drivers operate in a sealed box, the so-called “infinite-baffle” loading. Their response is tapered by an over-damped alignment so as to give good boundary-matching up to a rated limit of 251Hz, -3dB.

The speaker may be bi-wired via gold-plated five-way binding posts; these have rather small endcaps, making it more difficult to tighten the connections. The bi-wire transition is from the midrange/bass to the treble. All internal wiring and connections are hard-soldered for consistent electrical performance. Set at 100Hz and 3.2kHz, the electrical crossovers are essentially 12dB/octave, with additional damping to optimize the acoustic slopes and phase matching. The treble feed is via a single 3.3µF capacitor augmented by the natural treble rolloff, only the high-pass filter to the midrange is purely acoustic. High-quality components are used in the crossover, with polypropylene-dielectric film capacitors used at critical points for both the mid and treble sections. However, no correction appears to have been made for the inevitable metal-cone resonance that appears in the 4-6kHz region.

The speaker is constructed of 3⁄8" MDF throughout and excellently veneered, the enclosure achieves resonance control via a mixture of high-stiffness bituminous damping pads and multi-section, multi-compartment bracing. There are four braces in all. It may not be the heaviest box in its class, but the results show that the technique is effective.

Acoustic foam lines the midrange

**Heavy Metal**

While discussion continues on the pros and cons of metal-cone drivers, the number of designers using them does seem to be on the increase, including several from the US (Platinum, NEAR, Thiel, Hartke). In addition to Monitor Audio, there’s the pioneer of the craft in the UK, namely Acoustic Energy, as well as JPW, Studio Power, B&K (the Nautilus), and Musical Technology. In Norway, the popular driver maker SEAS is producing a range of aluminum-and-magnesium-alloy units, while the metal-dome tweeter is currently used in many speakers and is produced by a number of manufacturers worldwide.

Fundamentally, the argument for metal rests on its very high stiffness, with the potential avoidance of any unwanted resonance or “breakup” in the intended working range. To optimize metal-cone stiffness, special alloys are used. They’re physically hardened and then reinforced by electrolytic anodizing, resulting in a thick coating of a very tough “ceramic,” aluminum oxide, on the outside. This anodized surface lends itself to dye coloring, as in the case of Monitor Audio’s well-known “Gold” dome. Both bass midrange cones and tweeter domes benefit from the chemical reinforcement process.

When commonly used softer materials give or bend, and they generally do so in their operating range, their resonances must be carefully apportioned and controlled to try to attain the highest sound quality. Resonances do color the sound, and their presence is often seen as irregularities in the frequency response. How these errors appear in the measured response may not always be a good indication as to how they actually sound.

With softer, damped materials—fibrous paper or pulp card, plastic and bonded matrix combinations—bending may be imperfect, because these materials don’t act as perfect springs. A linear spring recovers immediately from deflection or deformation with near 100% restitution after being stressed. In contrast, many composites and plastics show some memory effect, a slower recovery after bending, and some nonlinear compression with higher forces. This may cause a change in sound quality as sound level is increased. The nonlinear response to high bending forces, and the slowed recovery after bending—technically speaking, it is a form of hysteresis—is a factor in the overall linearity of the driver. In return for the favorable internal damping from a resonance viewpoint, non-metal-cone technology can provide a smooth response, nicely extended to the required upper limit, and then may often deliver a smooth acoustic rolloff beyond this point.

In contrast, the metal diaphragm or cone may be essentially perfect from its bass resonance to beyond the required range, and have no resonance whatever in this lower operating region. Potentially, it has a singular freedom from compression and hysteresis distortion. Subjectively that manifests itself, if the overall system design is of sufficient quality, as a great neutrality, a sound with expressive dynamics and a high dynamic range.

Clarity can be very high and low-level detail excellently resolved; fine transparency is typical of the genre.

However, there’s a price to pay. Like for like, metal is generally heavier than the alternative cone materials, and magnet for magnet, this determines a reduced sensitivity, often a loss of 2–3dB. Metal cones are substantially more expensive than pulp or plastic equivalents, and there’s also a higher reject rate in their production.

Finally, while there are no resonances in the primary frequency range, when the metal cone does finally give up and resonate, it lets go with greater exuberance than the alternatives.

So severe is the first resonance, it can rise 10–15dB above the main response with sufficient energy to suck power out of the adjoining frequency bands. Thus a 6½" cone might resonate at 6kHz, desirably higher than the 1kHz typical of a good pulp or plastic cone, but it does so with such amplitude that the cone output decays prematurely into a pre-resonant suckout, tailing off above 2kHz. This makes the crossover design more awkward.

If the crossover rolloff is insufficiently fast, some of that 6kHz peak may pop up into the treble band, roughening both the tweeter’s sound and its measured response. Some designers resort to anti-resonant traps: electrical filters that seek to notch out the resonance and remove it from the system’s sound.

Ultimately it’s up to the loudspeaker designer to make the best choices in the system build, regardless of the cone technology employed. Fine speaker systems have been produced using every conceivable combination of driver technology. — Martin Colloms

*Stereophile, March 1996*
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chamber, this scaled off from the treble section by a full compartmental brace. As the frequency response is restricted to below the nominal 100Hz crossover point, little damping is required in the bass enclosure, which is consequently almost empty. A heavy, stabilizing, black-painted MDF plinth is bolted to the enclosure’s underside. This takes strong 8mm floor-locking spikes and provides a larger footprint for the spikes. The improvement in stability must be tried to be believed.

Since I looked at an early production sample for the UK’s Hi-Fi News & Record Review magazine a couple of years ago, the Studio 50 has benefited from build-quality improvements including a better grille, the replacement of some electrolytic capacitors in the crossover network with polypropylene-film types, and the addition of the all-important plinth. One aspect of the Studio series of speakers (and, for that matter, designs from some other manufacturers) is a dependence on ambient temperature. If too cold, both the Studio 20 and the Studio 50 will sound too dry in the deep bass and show a loss of speed and timing precision in the low range — for want of a better expression, the speaker will sound “uptight.” As the speaker warms beyond 19°C (66°F), the sound opens out. The bass gains pace and depth, the result sounding significantly more engaging than before. The ideal operating temperature is 21°C (70°F). Beware of a chilly demonstration!

SYSTEM

Initial tests suggested that tubed amplifiers were not well-suited to the Studio 50. Despite sounding good, they clearly couldn’t deliver the degree of low-end grunt of which the speaker is actually capable. (Presumably, the speaker’s low impedance below 50Hz was responsible.) Despite the promising 90dB specified sensitivity, tubed SE amplifiers need not apply.

I had a range of amplifiers on hand. The Audio Research VT150SE did the ’50 justice, working from its 4 ohm matching connection but at a reduced peak output level. Krell’s Kas-2 really took hold of the Studio 50, stretching the speaker to its performance limit. Both the Krell KSA-100S and the Sonographe SA400 showed fine matching. On the preamplifier side I used an Arc LS22 and a C-J PV12, as well as dispensing with a preamplifier when I used a Krell KPS-20i/CD player.

The scaled-box loading of the ’50 suited it especially well to analog disc replay, this supplied by a Ling’d Linn LP12/Naim ARO/van den Hul Grasshopper IV GLA cartridge fed straight into the PV12. Cone excursions due to low-frequency disc excitations were at a minimum, helping to deliver a notably stable result.

Speaker cables were Siltech LS4-180 and van den Hul Revelation, while interconnects were Siltech FTM-4 and van den Hul The First. Comparison speakers included the Wilson WATT/Puppy 5, the Quad ELS-63, and the Wilson WITT. Only one pair of speakers was present in the listening room at a time.

SETTING UP

These speakers proved to be a breeze to set up. Their tight, quick bass didn’t easily tend to boomy excess and allowed for a range of locations. I was happiest with the enclosures nearer the back than the sidewalls — about 2’ distant compared with 3½’ to the sides.

I could tune the subjective LF weight quite easily, by adjusting for the distance to the rear wall while making relative shifts in the sidewall distance to maintain smoothness in the bass region together with the optimum midrange tonality. As for toe-in, with the grille detached, a placement where the inside walls of the cabinet could just be seen was appropriate in my room acoustic.

As supplied, the driver-mounting screws had slackened a little, as is common; judicious retightening brought rewards in definition and midrange dynamics. I also preferred the sound with the grilles detached, despite appreciating that the overall treble balance was probably more correctly “sweeten” with the grilles in place. The Studio 50s were well broken-in and operated at what I regard as their “natural” 68–72°F operating temperature.

As supplied, the relative phase responses of the ’50’s mid and treble sections indicated that the best crossover integration and the best sound would be obtained above-axis. This contrasted with the result I’d obtained for the original pair two years ago. Given my usual scanted height below the tweeter axis, I tried the reverse connection for the current sample of the bi-wired system and preferred it; this agreed with my measurements (see above- and below-axis data in the test results section). My listening results are for the tweeters reversed; no doubt we’ll hear more from the manufacturer on this matter.

SOUND QUALITY

Depending on the designers’ views of life, speakers often reflect a corresponding attitude to music replay. Those with a strong leaning toward classical music may tend to maximize speaker performance, given the limitations of recording technique, in one particular direction. A concert-hall sound is the objective, encompassing the scale, majesty, and tonal color of a large orchestra. Silky-sounding treble, a neutral midrange, and a full extended bass with natural acoustic perspectives are the order of the day.

On the other hand, a designer with a more active temperament, who loves to dance, and who strongly appreciates rhythm and close-up dynamics, will seek to express these qualities in the loudspeaker system design. In fact, the engineering parameters available to a designer are so varied that many dimensions of speaker performance are possible within nominal limits of specification; this fact helps to keep scribes like me in work.

Subtleties of voicing, the final determination of the speaker’s octave-by-octave tonal balance, represent just the first layer of this complex procedure, which even reaches back to the detailed mechanics and acoustic properties of cone and enclosure materials. Vital design decisions are made all the way down the line.

Such variations sometimes bias a loudspeaker in the direction of classical program — but on the other hand, a speaker that’s a touch coarse for a sufficiently mellifluous orchestral replay may have the right rhythmic and dynamic balance to be highly involving and entertaining on studio-mastered rock music.

Proving tolerant all round, the Studio 50 blended well with a number of trial systems and was evenhanded in its treatment of a wide range of program material. Sufficiently smooth-sounding and neutral for easy listening with classical program, the Studio 50 is at the same time quick enough on its feet to drive well on rock. Thinking back to the Studio 20, I find a strong family resemblance, not surprising in view of the major common parts. Where the ’50 advances the cause is revealed at higher sound levels where the ’20 might begin to sound comparatively stressed.

Driven hard with a wide range of material, the ’50 remained cleaner and clearer than the Studio 20, achieving several decibels more of usable dynamic range. In the bass, and at first hearing,
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the Studio 50 was less generous than the '20, but the listener quickly learns to appreciate the greater control as well as the superior if subde bass extension, this achieved without drama. Studio 50 bass is less colored than that of the '20, thanks to the sealed-box design.

However, the Studio 50's bass may be on the lean side for US tastes. Judged right for concrete-clad apartments and stone- or brick-built houses, it may sound too dry in timber-frame properties with more open layouts. I got good bass power down to 30Hz in my room, if not to the 25Hz, -3dB point claimed. Nevertheless, this is good performance for a compact system of this high sensitivity.

Heaviness can afflict the upper bass of this class of floor-mounted speaker. Not so in the case of the Studio 50, which I felt matched the room boundaries well and avoided false richness.

Given substantial power inputs, that crisp, taut bass came into its own, helping to give an unexpected turn of speed on complex, heavy, percussive bass lines. It can be driven hard on heavy rock, acquitting itself with honor.

That legendary metal-cone transparency was certainly present. The Studio 50's presentation of fine midrange detail was excellent, both at whisper-quiet levels and at volumes close to maximum. The speaker accepted high power inputs without complaint, and a brief trial with a professional 250Wpc amplifier showed no premature rattling or knocking except on very deep, high-level bass below 30Hz. On the other hand, you could create a very big-sounding system by coupling the Studio 50 with a pair of high-quality active subwoofers.

I hesitate to describe the midrange as perfectly neutral; there was a hint of boxiness apparent. But such coloration was sufficiently mild that one's awareness of the effect faded in the memory as the total of listening hours progressed. The vocal balance was well-judged and the midrange wasn't overly projected out of the soundstage.

Through the treble, the sound was up to Monitor Audio's usual high-quality standard. However, it seemed even more focused than that of the '20, perhaps due to the very rigid compartmented cabinet section housing the tweeter. There was no false stridency; the treble sounded airy and extended, delicately shaded, with well-formed sibilants. Only really critical listening - together, perhaps, with the benefit of foreknowledge - revealed a touch of glaze in the mid-treble, this expressed as a slight carelessness, even a sheen on some treble sounds. Despite this, the treble was transparent and helped throw considerable depth in the soundstage.

Stereo imaging was particularly good, while stage width was excellent and considerable depth was achieved. Perspectives were stable, aided by very good focus. Lead vocals were presented in the plane of the speakers, and there were no spurious variables in perceived image height with widely differing sounds. Big, well-focused soundstages were readily achieved with the '50.

Perhaps the '50's best quality was its unobtrusive character, both visually and sonically. It didn't let you down. Longer-term listening was consistently rewarding, free from false drama and yet satisfying in the context of the chosen music.

Weighing all these aspects, I was aware of a measure of British reserve and control, of correctness, all of which inspire confidence and a sense of ease. On the other hand, in a more reckless mood one might wish for more of the unrestrained enthusiasm and excitement of a Wilson WITT. This is a matter of temperament, and will find its resolution in the perception and taste of the potential purchaser for these rather different speakers.

**MEASUREMENTS**

Scoring very close to the target sensitivity, the Studio 50 achieved 89.5dB/W/m based on a median drawn through the central five octaves (89dB/W/m B-weighted). This is above-average sensitivity, implying that a wide range of amplifiers will drive this speaker successfully. Choose solid-state if that last ounce of slam and extension is to be wrung from the deep bass. I had wondered whether the '50's impedance would compromise the usefully high sensitivity, but the impedance trace (fig.1) revealed a good result, typically 5–10 ohms over the bulk of the power-dominated frequency range. Only below the box tuning frequency of 55Hz was there a downward trend, leveling out at just below 4 ohms by 20Hz, in my view no great problem.

For a typical single-ended tube amplifier with a highish source impedance, there will be little change in sound quality over the broad upper-bass/midrange region, but the Monitor Audio's high-impedance region in the treble — an average of 10 ohms from 2kHz to 8kHz — will result in some increase in treble brightness, 1–1.5dB or so. This might perhaps be compensated for by the generally refined SE character in this frequency range.

Fig.2 shows the individual responses of the four drive-units. The upper crossover may be nominally located at 3.2kHz, but there is substantial overlap, the tweeter hanging until 1.5kHz, supporting the upper midrange, while the midrange unit itself has its dominant cone-resonance kick at 5.5kHz reaching almost to full level. The top trace to the left of fig.2 is the midrange unit's output, measured in the nearfield. As expected, it gently rolls out below 120Hz in an overdamped manner. The two bandpass responses at a lower level are the individual nearfield responses of the two woofers, plotted to scale. Both show a degree of resonant behavior in the midrange, but this is down in level.

Fig.3 shows the reference frequency responses.

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*Fig.1* Monitor Audio Studio 50, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div.).

*Fig.2* Monitor Audio Studio 50, acoustic crossover on tweeter axis at 45°, corrected for microphone response, with nearfield woofer and midrange responses plotted below 700Hz and 3000Hz, respectively.

*Fig.3* Monitor Audio Studio 50, anechoic response on tweeter axis at 45°, averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield midrange and woofer responses plotted below 200Hz. The top trace is for the optimum tweeter connection; the trace with the large suckout is with the tweeter connected in inverted acoustic polarity - see the text.
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Output transformerless
Distortion products primarily even-order harmonics
response on the tweeter axis with both in- and out-of-phase corrections for the tweeter. With my samples connected nominally in-phase, the upper treble was fine, but there was a broad suckout of up to 10dB at crossover. Phase-reversed, the upper treble wasn't quite so smooth, but uniformity was restored to the overall response on the listening axis, and so it sounded. [MC's samples were supplied with the tweeter internally hooked-up to be out-of-phase in the crossover region, giving the fig.3 trace with the large suckout in the mid-treble when bi-wired with the units nominally in-phase. The Santa Fe samples had the tweeter connected with the opposite polarity, so that the in-phase connection gave the flat trace in fig.3, the opposite way round to MC's. We experienced a similar drive-unit wiring confusion with the small Monitor Audio Studio 2 speaker that WP reviewed a year ago (February '95, Vol.18 No.2, p.92). Inverting the polarity of that speaker's tweeter connection both swung the optimal listening axis up to something practical and gave much the flattest on-axis response. It appears that Monitor Audio perhaps has a QA problem here. As MC stated earlier, I am sure we will hear from the manufacturer about this phenomenon. — Ed.]

On-axis, the speaker met ±3dB limits all the way to 20kHz, through there was some rolloff in the final audible octave. The peak on the listening axis at 25kHz, due to the tweeter resonance, should hopefully be inaudible. Since the rest of the major amplitude variations are due to minor phase shifts between the mid and treble, it was clear that the Studio 50 has a substantially flat and well-balanced frequency response.

These measurements were all taken without the grille. While the grille is transparent at 15kHz and below 1.5kHz, it imposed up to 2dB of loss in the main treble range and, as such, is no model of acoustic perfection.

Measured with nearfield mike placement, the low-frequency readings showed good uniformity, ±1dB from 60Hz to 200Hz, ~3dB by 5kHz, and ~6dB at 45Hz, with the anticipated 12dB/octave rolloff below the enclosure tuning frequency. With typical room reinforcement, clean (if dry) bass will be available down to 30Hz, but in my view the Studio 50 doesn't meet the specified 25Hz.

Fig.4 shows the vertical response family, the traces referenced to the optimized axial response, the computed straight line. Above-axis, the output is deeply notched, while the variation below-axis is fairly mild. Moving to the lateral off-axis family (fig.5), there is an initial mild shift as the output settles down, and then the correspondence can be seen to be very good, with little variation between the 30° and 45° off-axis outputs.

In the listening room, the '50 gave a wide, well-integrated output, ±4dB 30Hz-8kHz, with a smooth, natural "room" decay thereafter. The desirable lack of energy step through the crossover range was noteworthy, as was the good control of the usual floor-reflection dip between 100 and 200Hz. Here it was limited to a wholly tolerable ~3.5dB at 100Hz.

The Studio 50's step response (fig.6) result was tidy enough — noting that the inverted leading edge is due to the tweeter. Prolonged ringing is absent. The phase response on the listening axis was smoother than expected, at ±45°/70°, 100Hz-13kHz. Assessing the decay of energy with time, the waterfall representation (fig.7) reveals that the decay rate is very good except for that metal cone ringing at 5.5kHz. Mostly over by 1.5ms, however, it's not so much of an audible problem as it might look. Good behavior was also evident in the low range.

Spot checks on distortion showed normal values of 0.15 to 0.25% at 90dB spl, 100Hz-15kHz, this the essentially harmless low-harmonic. Distortion rose at the lower frequencies, but held at a satisfactory 5% for 40W output at 40Hz, good for the class. More important, the low end of this speaker sounded clean, unless it was ultimately flattened against the stops.

[Finally, checks on the cabinet vibration that I performed using a simple piezoelectric plastic strip confirmed that the Studio 50's cabinet is effectively braced. Fig.8, a waterfall plot calculated for the output of the accelerom-
eter fastened to the enclosure sidewall about 12" from the floor, reveals a low level of resonant modes; what modes there are have been pushed high enough in frequency by the bracing to have little subjective effect. — Ed.]

CONCLUSION
An expensive but undeniably classy speaker, the Monitor Audio Studio 50 performs with considerable credit. Fine-focused, with a taut, tidy presentation, it also possesses considerable transparency, this quality apparent over a wide frequency range. In dynamic expression and rhythm, it holds back a tad, but at the same time it allows the program to speak for itself—it doesn't interpose itself between source and listener. Fine detail comes easily to the Studio 50, while its high power handling allows this comparatively compact, slim pillar-style enclosure to generate clean, room-filling sound levels.

Technically, it performed well, especially with the tweeter polarity reversed to my taste and preferred listening height. It offers a good directivity, fine frequency balance, high sensitivity, and tolerably good amplifier loading.

The Studio 50 is a good speaker, one that can be recommended with considerable confidence.

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Fig.7 Monitor Audio Studio 50, cumulative spectral-decay plot at 45° (0.15ms risetime).

Fig.8 Monitor Audio Studio 50, cumulative spectral-decay plot of accelerometer output fastened to side of enclosure 12" from floor (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

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SNELL ACOUSTICS TYPE A
REFERENCE LOUDSPEAKER SYSTEM

Larry Greenhill

The Type A has served as Snell Acoustics' flagship loudspeaker since 1974. The Type A Reference System reviewed here is the sixth update of the late Peter Snell's original three-way floorstanding design, and is the most radical departure from Snell's original. Gone is the pair of "upright bricks of polished wood and stretched cloth" that delighted decorators because they functioned best against a wall. Today's Type A Reference $18,999 price tag purchases two tall midrange-tweeter towers, two huge subwoofers, two short but heavy enclosures housing the outboard passive crossover networks, and a small electronic crossover.

The $1990 Type A/III Improved was a hefty system with a total shipping weight just over 300 lbs. The Type A Reference doubles the weight and quadruples the former loudspeaker's suggested retail price. However, all Type A's have remained faithful to Peter Snell's high priority, which was the production of a uniformly flat amplitude response by addressing the interaction between the speaker and the nearby room boundaries. In so doing, the new Type A Reference makes the powerful reproduction of deep bass a top priority.

The former Type A/III-Improved was more of a modification than a redesign, involving the addition of a new Danish VIIFA tweeter, a rebuilt internal baffle, and a retuned crossover. It was reviewed in these pages in March 1990 (Vol.13 No.3). JA's measurements revealed an "ultraflat frequency response" and a "superb coupling of low frequencies with room acoustics." Although bi-amplification extended the speaker's dynamic range, the Type A/III failed to achieve Stereophile's top recommendation because of a lack of treble transparency and a shallow image depth. The new Type A was auditioned here to determine if its new away-from-the-wall modularity results in better image depth and improved treble transparency.

Type A Reference Physical Characteristics

Although I was familiar with the previous Type A's four shipping cartons, I wasn't prepared for the stream of boxes that arrived from the Snell factory at Haverhill, Massachusetts (two subwoofers and a crossover), from Stereophile headquarters in Santa Fe (two Reference Towers, two outboard passive networks, and a set of unlabeled cable looms), and Utah (a separate set of labeled cable looms from Kimber Kable). In total, I opened a dozen shipping cartons before assembling this system. Two of the truck deliveries exceeded 300 lbs!

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runs farther internally. The cone driver has a resonance of 28Hz and the port has a resonance of 14Hz. This 18" driver has a 3" excursion, and is equipped with two spiders to prevent twisting when driven with large signals. The subwoofer cabinet can be positioned on its narrow, or long, side. With the sub units mounted on their sides, as TJN had them in his Snell Music & Cinema review, the 18" driver and the port are equally close to the floor. TJN indicated that this may deliver the most bass reinforcement. One can also mount them vertically, with either the port or the driver closer to the floor.

The Type A Reference Towers, on the other hand, were designed to be placed away from walls and out into the room, thus optimizing imaging and depth of field in a way that the back-wall-situated older Type A could not. Freed of a large woofer driver and the passive crossover network, Voecks was able to make the towers very narrow — the Reference Towers are only 9" wide; the previous Type A was 23.5" wide. In fact, he designed the towers to be as wide as the human head. He explained that his experiments suggested that narrow loudspeakers are better at producing an illusion of depth.

The Towers feature a computer-modeled, tiered baffle supporting seven drivers arranged vertically in a so-called D'Appolito configuration. This array is vertically symmetrical, with one hand-made 1" textile tweeter at center, flanked by a set of three drivers each above and below. Each flanking set consists of one 5" cast-magnesium basket, one mineral-filled midrange driver, and two 6.5" cast-magnesium basket woofers with mineral-filled polypropylene cones. This driver array uses the company's Coincident Virtual Image (CVI) technology, which is designed to create a virtual image of the mid bass and midrange that coincides with the tweeter's for improved imaging. Voecks said that the Reference Tower arrays generate a number of room or floor reflections at staggered time intervals. This minimizes the overall impact of these reflections on the loudspeaker's response because each driver is a different distance from a room boundary. As on earlier Type A loudspeakers, there's a rear-firing metal-dome tweeter, which is said to flatten the Type A's power response in the room by adding HF energy to compensate for the loss due to the front tweeters' increased directivity at higher frequencies.

The Reference Towers' narrowness led Voecks to move their passive crossover networks into separate, shorter, but similarly styled enclosures. As TJN pointed out in his review of the M&C Reference System, the crossover network circuit boards had to be so large as to allow enough space between individual components, such as open-air coils, and to remove the crossover boards from the vicinity of the eight powerful loudspeaker magnets. Each passive network enclosure features an elaborate hookup panel with a top section for fuse; a switch and level control for the tower's rear tweeter; a center section of four jumpers to set the front tweeter levels at +1dB, calibrated flat, -1dB, and -2dB; and a middle section of input jacks to take the audio signal from the upper-range stereo amplifier. Jumpers in this section allow the owner to separate the high- and low-frequency tower drivers for bi-amping or bi-wiring. Finally, the bottom section contains four pairs of four-way binding posts for connections to the Reference Tower.

The eight output terminals on the back of the passive network enclosure connect to eight similar terminals on the rear of the Reference Tower via a color-coded cable loom made by Kimber Kable. Although it seems that the inclusion of such a cable set with the speaker system might be an optional convenience, it doesn't pay to try to replace them with other types of speaker cable. Snell Acoustics provides this Kimber Kable hookup to standardize the system's performance by specifying the precise length and electrical characteristic of each connection.

The cable set consists of a ribbed black rubber sheath the size of a large garden hose, with four color-coded pairs of terminated cables. Each pair consists of a black lead intertwined with a colored lead. On the review sample, the red lead was for the midwoofer, the white for the midrange, the green and blue ambiguously marked for the tweeters. One of those colors — say, green — might be used for the rear tweeter, leaving the blue for the front tweeters. At installation, the owner makes certain the same colors are used for both tower and crossover terminals, and has to choose the correct black lead, always the black lead intertwined with the particular colored lead at the base as the leads enter the rubber sheath. I fully

---

4 We used our legs, not our backs, to ram the carton up the steps. This involved putting the top of the thigh under the part of the carton facing downstairs and extending the leg. As the leg curved, it gradually pushed the box's weight up as it slides up the stairs. It is possible to "push up" hundreds of pounds with quadriceps strength, even if one's back won't tolerate lifting a fraction of that weight above waist level.

5 The Type A Reference Towers differ from those in the company's M&C Reference System in having two more tweeters (to meet the THX multiple-tweeter specification) in the Tower's front array, for a total of nine drivers.
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support TJN’s cautionary note that “care should be exercised in connecting the two pieces together to ensure that the hookup is correct.”

The review samples sent to me were finished in a dark walnut veneer. The cabinets were matched closely, for their veneers were taken from different depths of the same piece of wood. The cabinet work was first-rate, with superb fit and finish. As on the former Type As, the grillecloth is flush with the wood veneer.

**Room & Associated Equipment**

This physically large audiophile system calls out for installation in a large listening room. During a 1988 home renovation I made the first floor of my house as open as possible, so that the listening room has approximately 5500 cubic feet with an effective room length of 51’. The main listening area is 26’ long by 13’ wide by 12’ high. An 8’ high by 4’ wide doorway at the back of the room opens into our kitchen, adding an additional 25’ by 15’ area. The Reference Type A loudspeaker system was set up within 6’ of the back wall, with the subwoofers and outboard crossover networks against the wall and the Towers placed out into the room. The 12-high semi-cathedral ceiling almost made the huge subwoofers fit in visually.

The Reference Type A is the third Snell Acoustics Type A system to see extended use in my listening room. This adventure began with a ca 1981 Type A/II system (reviewed in July ’84, Vol.7 No.6), which was replaced in September ’89 with a Type A/III system (reviewed in March ’90, Vol.13 No.3). These earlier versions were set up against the back wall, 6’ apart, toed-in, and most listening was done in the bi-amplified mode using db Systems DB-3-Snell A/III-Improved crossover.

Because previous Type A systems had achieved outstanding bass response from this back-wall location, I felt confident in placing the SUB 1800 subwoofers in the same spots, positioning them vertically with the driver 3’ from the floor boundary and the port about 36’ from the floor.

All listening tests were conducted with the Snell Type A Reference System bi-amped, as designed, and with the Reference Towers bi-wired. Upper-range amplifiers for the Reference Towers were selected to be able to deliver at least 100Wpc into an 8 ohm load. At different times, Bryston 3B-ST and Mark Levinson No.27 and No.331 amplifiers were used. Because I had two SUB 1800s and a stereo signal, I used the EC-2000’s stereo bass outputs rather than the summed RCA output. Heeding TJN’s advice, I selected large subwoofer amplifiers capable of sustained output above 250Wpc, including a (discontinued) Krell KSA-250 (300Wpc at 5 ohms) and a pair of Bryston 7B-STs (bridged in series, each rated at 579W continuous into 8 ohms). Because the KSA-250 requires somewhat greater input to drive it to full power (2.1V vs 1.5V for the Bryston 7B-ST), I was concerned that I would have differing levels of bass as I switched subwoofer amplifiers. However, this didn’t prove to be a problem.

Preamplifier was a Bryston BP-25MC, linked to the Snell EC-200 crossover by a pair of AudioQuest Topaz single-ended interconnects. The Bryston BP-25MC preamplifier was used with its remote to allow me to make volume adjustments from my listening seat. Single-ended Randall Research interconnects were used from the crossover to the power amplifiers. Monster speaker cables were run from the subwoofer amplifier to the SUB 1800s, and parallel bi-wired runs of Sumiko’s OCOS speaker cables were run from the upper-range amplifier to the outboard crossover panels. Other associated equipment used in this review included Day Sequerra FM Reference and Rotel RHT-10 FM tuners, and a Linn Sondek LP12/Lingo turntable fitted with an Itoke arm and a Spectral moving-coil cartridge.

Compact discs were played on a Krell MD-1 turntable, which drove an Audio Alchemy D71 jitter attenuator using a 75 ohm Silver Starlight digital coaxial cable. This unit fed either an Adcom GDA-700 D/A processor or an Audio Alchemy DDE v3 HDCC” over its PS bus. This converter was fitted with a RW-1 Remote Wand One.

**First Impressions**

Although setting up the Snell Reference Type A loudspeaker system took planning, thought, and the better part of a day, I was rewarded quickly. First impressions were very positive, with the system pouring forth open, transparent, detailed sonics with layered, deep soundstaging. So, my first question — had Kevin Vocke’s transparency and depth of soundstage to the Type A? — was answered affirmatively and quickly. Regardless of source — FM radio, my better vinyl discs, or HDCD compact discs — the same improvements were evident. The new Type A retained all the past versions’ dynamics, bass slam, and smooth frequency response, but added midrange and treble transparency with a depth and layering I hadn’t heard in any of Vocke’s early Snell designs.

I learned that the new Type A Reference had an uncanny ability to magnify sonic characteristics of the components driving it. Sometimes, this can result from a loudspeaker’s unusual impedance curve that stresses the driving amplifiers. Not so with the Type A Reference. I was also hearing differences between FM tuners and D/A converters that couldn’t be a result of amplifier-loudspeaker interactions. For example, via the Snells, the Adcom GDA-700 DAC had see-through transparency and open, extended highs. I noticed these characteristics even more when the Adcom had to be sent to Santa Fe for bench testing. However, the stand-in decoder, an Audio Alchemy DDE v3, sounded richer, warmer, and less transparent, and was less satisfying.

Mind you, when I reviewed the unit, I’d actually felt the Audio Alchemy unit had a slight sonic edge. But this opinion had been gathered while listening with my Quad ESL-63 system, before I installed the Snell Reference Type A. The Adcom GDA-700’s edge in transparency became very evident on the Snell Reference Type A. This happened again when I had to send in the Mark Levinson No.331 for its bench testing. Comparison amplifiers, even those featured in former Recommended Components with an “A” rating, didn’t have the ’331’s openness, transparency, or speed. The Santa Fe staff quickly returned the Adcom and Levinson units after TJN’s bench testing so that I could complete this review.

**Awesome Bass Response**

The Type A Reference System’s bass response was outstanding in its power and extension, but it integrated perfectly with the rest of the loudspeaker system. This became evident as I explored...
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its range in the subsonic 14Hz–25Hz region with a signal generator. As the signal dove below 20Hz, I didn’t hear any doubling — the production of second-harmonic distortion — but instead felt a tightening pressure like a cloud surrounding me, accompanied by floor vibrations. This pressure wave intensified as I tuned the signal generator down to 14Hz. Only the slightest amount of doubling at that frequency could be heard as a whisper from the towers, with no doubling at all emanating from the sub. I turned up the gain. With the grilles off, the levels were so high that the subs’ bass reflex port was beginning to chug with pulsating air, but the pressure wave continued. This is the lowest frequency I’ve been able to detect with any loudspeaker system, including stereo subwoofer systems.

The large SUB 1800s were even better when playing music. I used other musical sources I’ve found useful in reviews of dynamic loudspeaker systems, including organ and synthesizer to test deep bass, and recordings using synthesizers to listen for bass transient speed. Finally, rock recordings allowed me to listen for kick-drum bass peak, and male vocals, including FM announcer voices, were used to test for lower-midrange emphasis. In test after test, the SUB 1800 delivered first-class bass response. As TJN noted, from synthesizer to pipe organ, from string bass to conga drum, the bass was fast, powerful, and well integrated with the rest of the system.

Sustained organ-pedal notes shook the air, and created a pressure wave on the body I’ve only encountered with one other system — the Bag End S-18 stereo subwoofers. But these SUB 1800s blended well with the Reference Towers, integrating the bass power into the fabric of the music. Jean Guillou’s transcription of Mussorgsky’s Pictures at an Exhibition (Dorian CD, DOR-90117) is a good example. During the second cut, “Gnomus,” the pedal notes from the Kleuter-Seimüeyer Organ of the Tonhalle in Zurich shook the room, but didn’t mask the clarity of the instrument’s flutes and trumpets. The Type A Reference brought out the fullness and air of the 32-foot pedal notes, retaining their pitch and distinction as separate notes.

This deep-bass pitch definition was evident in other recordings. I could easily discern the stair-step descent of organ notes on Saint-Saëns Symphony No.3 (Marcel Dupré, organ; Paul Paray conducting the Detroit Symphony Orchestra on Mercury Living Presence CD, 432 719-2). This pitch definition reminded me of the performance of the Muse Model 18 subwoofer coupled to Quad ESL-63s. The Type A Reference has great bass dynamics, as shown by its rendition of the powerful bass drum in “La Fiesta Mexicana” (Owen Reed, Fiesta, Reference Recordings RR-38CD). On the film soundtrack score for My Cousin Vinny (Varese Sarabande VSD-5364), the Type A delivered stunning subterranean bass on Randy Edelman’s “Something’s Wrong,” but did not muddy the keyboard notes.

On the other hand, I agree with TJN that very deep bass over the SUB 1800s wasn’t “exceptionally tight.” The Type A Reference System didn’t produce the bass shock waves that the Snell Type A/III Improved or the Velodyne ULID-18 could deliver on bass-drum whacks or sudden synthesizer chords. The SUB 1800s could not generate the stunning drumhead whack that a servo-controlled ULID-18 can. Playing John Williams’/Carnow’s “Liberty Fanfare” (Winds of War and Peace; National Symphonic Winds; Lowell Graham, conductor; Wilson Audioophile WCD-8823), the Velodyne delivered a sudden, solid, gut-punching bass note that slammed into the room with no unnecessary overtones, no overhang — just a well-defined leading edge followed by its musical note. The SUB 1800s produced a powerful bass-drum note, but without quite capturing the harmonics of the drumhead or its suddenness.

Despite this, the SUB 1800s do a much better job of blending powerful bass with the Reference Towers in a way that aftermarket subwoofers have yet to do. This is shown by the Type A Reference’s exceptional sense of pace and an ability to involve the listener. Giorgio Moroder’s soundtrack score for Cat People (MCA MCAID-1498) is a good example, particularly the first cut, David Bowie’s “Putting out Fire.” The slowly building kick-drum beat drives the music in a way not evident with any other loudspeaker. This sense of pace can be readily heard on Stanley Clarke’s East River Drive album ( Epic EK 47489), particularly on the cut of the same name. It adds greatly to the new opening instrumental on “Hotel California” on the Eagles’ Hell Freezes Over (Geffen GEF1-24725). After a minute of delicate and detailed acoustic guitar themes, pulsating drums signal the first chords of the main song’s melody. These drums seem to trigger the audience’s recognition of the song, and they erupt into applause, and the song takes off.

Deep bass synthesizer chords on the Patriot Games (RCA 66051-2) selection “Assault on Ryan’s House” (cut 9) builds the same type of pace. Composer James Horner tightens emotions by mixing a variety of synthesizer-generated sounds, such as subterranean rumblings with high-pitched hissing gas jets.

The Type A rendition of kick drum easily outperformed other Snell loudspeakers I’ve auditioned in my listening room. Over the Type A Reference, Jeff Beck and Terry Boggio’s “Behind the Veil” from Epic’s Jeff Beck’s Guitar Shrap, EK 44313, delivered a kick-drum backbeat that was powerful, but distinct from the bass guitar. The drum kit was involving, with lots of bass slam and snap, without being overblown. The kick drum on Richard Thompson’s “She Misunderstood,” on his Rumor and Sigh album (Capitol C215 95713), had good pitch definition and didn’t overpower Thompson’s acoustic guitar.

This loudspeaker system reproduces the male voice with no sign of tubbiness or ugly emphasis. It didn’t color FM announcers’ voices pulled in by the Day Sequerra FM Reference. José Carreras’s light, lyrical tenor remained pure, with no nasality during the Kyria on Ariel Ramirez’s Misa Chilba (Philips 420 955-2, 1DDD). Harry Connick Jr.’s rendition of “Don’t Get Around Much Anymore” (When Harry Met Sally... Columbia CK 45319) was also transparent and clear, with none of the warmth and extra resonance heard with lesser dynamic loudspeakers.

The Type A’s extended, well-integrated low frequencies don’t mask instruments playing in the other parts of the sonic spectrum. The flute, Maggie Boyle’s soprano, and the 35Hz bass synthesizer chords on the “Main Title” selection of Patriot Games retained their distinctive timbre, with no blurring of instrumental or vocal outlines. Even during the most dramatic fortissimo orchestral selections, or the loudest portions of Jeff Beck’s “Behind the Veil,” the Type A maintained the sonic perspective, openness, and a clear depiction of acoustical space. Richard Thompson’s voice on “Rumor and Sigh,” clear and unornished by the kick drum, floated between the Reference Towers, well-defined and palpable.

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bass response.

As noted above, the Type A Reference allows one to hear qualities in the matching electronics. For example, I preferred the Mark Levinson No.331's neutrality and lack of midrange grain for driving the Reference towers. Switching to another stereo amplifier changed the sound dramatically. The No.27, a previous 100Wpc stereo amplifier now out of production, sounded thinner and more analytical; the Bryanston 3B-ST sounded punchier and faster, but had more midrange presence than the Mark Levinson No.331. For these reasons, I used the No.331 for most of this review.

The Type A Reference's midrange excels in imaging, reproduction of vocal timbre, and the ability to show soundstage depth. All three qualities came through vividly in "Tom's Diner," an *a cappella* cut from Suzanne Vega's *Solitude Standing* (A&M 75021 5136-2). On the Type A Reference, Vega's voice formed a palpable three-dimensional image between the two towers. Her transparently rendered voice sounded so chillingly realistic that she seemed to be in the room. On lesser speakers, Vega's voice is shrill, thin, and flat. Piano was similarly realistic on the Type A system, particularly when I listened to Mike Garson's rendition of "A Song for You," from *Oxnard Sessions, Vol.2* (Reference Recordings RR-53CD), which was natural, quick, and convincing.

The Type A Reference allowed me to hear more of the timbre and harmonics in male singers' voices as well. Willie Nelson's voice singing "Getting Over You" on *Across the Borderline* (Columbia CK 52752) imaged beautifully, sitting slightly above and to the right of center, with Bonnie Raitt set over to the left. It was possible to discern changes in Don Henley's voice singing the original "Hotel California" on the Eagles' LP of the same name (Asylum 7E-1084) with the compact disc version made 14 years later (Asylum 103-2), where his voice is deeper and narrower in range. Such is the resolving power and definition of this system that voices don't sound as realistic over other loudspeakers.

The Type A Reference is able to deliver open, effortless-sounding highs. Driven by the Mark Levinson No.331, the Type A's played Prokofiev's *Romeo & Juliet* Ballet Suites 1 & 2 (Stanislaw Skrowaczewski conducting the Minneapolis Symphony Orchestra, Mercury Living Presence CD 432 004-2) with a transparent, delicate, sweet string tone and considerable depth of soundstage. Treble detailing stood out, even in such studio recordings as Joe Beck's "Unspoken Words" (*The Journey*, DMP CD-481), allowing me to hear all the harmonic overtones of the vibes. The highs were best on my HDCD recordings, where I became aware of instrumental clarity of bells, cymbals, and treble piano notes. I particularly noticed the sound of the struck cymbal fading away in the *Chains Line* overture on the HDCD-encoded *Beachcombers* (Dallas Wind Symphony, Frederick Fennell, Reference Recordings RR-62CD).

**SOUNDSTAGING**

By now, it must be clear to you that the Type A loudspeaker is capable of producing a wide and deep soundstage. The back-to-front depth of imaging gave the listener a better sense of the hall's perspective than most loudspeakers. This was evident listening to the vinyl disc recording of Shostakovich's Symphony No.6, Philadelphia Orchestra conducted by Leopold Stokowski (RCA LSC-3133). This resolution of sonic layers permitted the clarinet, the organ, the harp, and the male and female choirs to be discerned and followed on the HDCD recording of Rutter's "The Lord is My Light and My Salvation," from *Requiem* (Reference Recordings RR-56CD).

Sense of space and instrument placement were easily heard on rock recordings such as the Eagles' *Hell Freezes Over*, particularly on the live concert recordings recorded on tour. The Snells achieved a well-defined placement of audience sounds, acoustic guitars, and conga drums, creating a very wide, deep soundstage. Listening to the LP from the soundtrack of the motion picture *Glory* (Virgin 90531), I found the sweep and power of the music compelling. The choir voices spread from wall to wall, with soundstage depth, and many distinct voices discernible, even during crescendos. Again and again, I found myself becoming involved in music that was so three-dimensional, vibrant, and clear.

While the Type A Reference provides an excellent reproduction of all parts of the musical spectrum, its best sonic characteristic comes from its size. This is a large, physically imposing system, with tall speaker enclosures capable of generating a big sonic image with a large dynamic range. The vertical array of drivers in the Reference Towers is elevated several feet above the floor, which must help maintain the speakers' transparency (less interference from floor bounce), and the towers' out-in-the-room placement improves soundfield depth and imaging. The Type A Reference shares this characteristic with other physically large high-end loudspeaker systems, such as the old Mark Levinson HQD system, the Infinity IRS, the Sound-Lab Ultimate, and the Apogee Studio Grand. Adjectives such as "majestic" and "grand" come to mind when listening to the Type A Reference play an orchestral *fortissimo*. These accolades have as much to do with the Type A's ability to generate a large sonic image as with the speaker's neutrality, transparency, and dynamics.

— Larry Greenhill

**MEASUREMENTS FROM JA**

My estimate of the Type A's B-weighted sensitivity was a little lower than the specification, 86dB/2.83V/m. Its impedance, however — measured with the Audio Precision System One — was only moderately demanding, and then only in the treble, where the impedance dips below 4 ohms. Fig.1 shows the tower's impedance magnitude and phase with the tone control set to its "flat" position and the rear-firing tweeter switched off. Though the phase angle is moderate through the midrange, the magnitude is high. The peak at 46Hz indicates the sealed-box's tuning; this is high for the size of the enclosure, but remember that the tower is intended to be used with a matching subwoofer. With the tone control set to its maximum positions and the rear tweeter switched on, the impedance drops to 2.9 ohms at 3.7kHz; this should not be a problem for the kind of solid-state amplifier likely to be paired with the Type A Reference.

Fig.2 shows the electrical drive signals to the tower drive-units. The midrange units can be seen to be padded down a little compared with the woofer and tweeter, as is the rear-firing
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The axis tweeter, snell drive woofer, and midrange speakers plotted below 300Hz and rear tweeter response plotted above 2kHz.

The Type A's overall on-axis response is shown in fig.4. Impressively flat throughout the treble, the curve is marred by a bit of excess energy in the midrange. The lower midrange appears lean in this graph, but this may be a result of the difficulty in splicing the summed nearfield bass responses to the quasi-anechoic farfield response with such a physically large loudspeaker. In the bass, the restricted low-frequency extension can be seen, reaching -6dB at the lowest note of the four-string double bass, 42Hz. But this is sufficient to allow the external EC-200 electronic crossover to optimally integrate the towers with the SUB 1800 subwoofers. The effect of the HF control can be seen in fig.5. Just the differences between the on-axis response and the responses with the tone control set to its maximum and minimum positions are shown. These reach a sensible maximum treble cut of -2dB at 8kHz, and a maximum boost of 1.1dB at 10kHz.

Vertically (not shown), the Type A Reference's balance doesn't change to any significant extent as long as the listener's ears are somewhere between the two midrange units, a distance of between 30° and 45° from the floor. Laterally (fig.6), the Type A features the kind of even off-axis treble rolloff that tweeter (the bottom trace above 4kHz). The resultant acoustic response of the individual drive-units, measured on an axis level with the tweeter 39° from the floor, using the DRA Labs MLSSA sys-

Fig.2 Snell Type A Reference, individual electrical drive signals, measured with the external crossover loaded by the drive-units.

Fig.3 Snell Type A Reference, acoustic crossover on tweeter axis at 45°, corrected for microphone response, with nearfield woofer and midrange responses plotted below 300Hz and rear tweeter response plotted above 2kHz.

Fig.4 Snell Type A Reference, anechoic response on tweeter axis at 45°, averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield midrange and woofer responses plotted below 200Hz.

Fig.5 Snell Type A Reference, effect of HF control set to its maximum and minimum positions, normalized to response on tweeter axis (5dB/vertical div.).

Fig.6 Snell Type A Reference, horizontal response family at 45°, normalized to response on tweeter axis, from back to front: differences in response 90°-5° off-axis; reference response; differences in response 5°-90° off-axis.

Fig.7 Snell Type A Reference, step response on tweeter axis at 45° (5ms time window, 30kHz bandwidth).

Fig.8 Snell Type A Reference, cumulative spectral-decay plot at 45° (0.15ms risetime).
has proved to correlate with excellent soundstaging.

In the time domain, the speaker’s step response (fig.7) indicates that all the drive-units are connected with the same acoustic polarity, while the associated cumulative spectral-decay or waterfall plot (fig.8) is relatively clean.

—John Atkinson

**LG CONCLUDES**

The Snell Type A loudspeaker system requires a large room and is very expensive. Installation should be done by the dealer, with careful matching of components. At this price level the dealer should be prepared to provide loaners, so the best match of electronics for the room can be chosen at leisure. Prospective and current owners alike should arrange to obtain the electronic crossover upgrade from Snell Acoustics when it becomes available.

All the real-world factors—the Type A’s expense, its multiple shipping cartons, and having to plug in six interconnect cables and tighten 32 speaker connections—were forgotten when it began to play music. Without a doubt, the Snell Type A Reference System is the finest loudspeaker system I’ve heard in my listening room. It maintains the traditional Type A strengths, providing extended, THX-level bass response from its stereo SUB 1800 subwoofers that couple with room boundaries for added power. The rest of the frequency range has been vastly improved; the midrange is now blessed with a transparency I’d formerly heard only from electrostatic loudspeakers. Depth of soundstaging, missing from former Type As, is now world-class. Kevin Voecks has done a masterful job bringing the Type A up to the standards of today’s top loudspeaker systems. The new Type A Reference’s sound—deep, powerful bass extending to well below 20Hz, ultra-transparent midrange and highs, excellent soundstaging, and majestic sonic perspective—merits a Class A recommendation in Stereophile’s “Recommended Components.”

—Larry Greenhill
Linn Kremlin FM Tuner

Don Scott


When the drawer covering the nine function buttons on the lower left hand corner is closed, Linn's Kremlin appears to be a basic black-box FM tuner. Only the yellow multi-function display on the upper right, and below it the power switch and green power-on indicator, recessed in a slot for the infrared remote receptor, break its clean lines.

The rear panel holds two sets of identical fixed-level RCA audio outputs, along with two aerial inputs and two RCA jacks for remote control interfacing with other Linn components. Interior construction is first-class and allows for a board swap to update the tuner for future FM or operational control developments. The switching power supply is borrowed from the Numerik D/A processor.

The remote control duplicates all tuner-selectable functions — scan, manual tune, mono/stereo, aerial select, 80 preset memory controls, and signal-strength display in 1dB segments. In addition, the remote allows direct frequency entry of a station, operation of other Linn system components, mute(scan threshold setting, and entry into the tuner's software mode. The software mode allows reverting (after a few seconds) to scan, tune, current mode, or display off, routing of 13.7VDC (40mA maximum current) into either aerial input to remotely power a rooftop FM booster, and decisions as to whether the tuner is the main system control or not. The adequate instruction manual will take some extra reading time to get the most from this tuner. Warranty is five years.

RF PERFORMANCE

The Kremlin features a single, wide-bandwidth IF stage with extreme care taken to maintain phase integrity within the IF amplification stages. A 13-stage IF filter is used, the end result being little phase shift and low-distortion amplification. However, this purist, barn-door approach results in poor adjacent-channel selectivity and inadequate ability to separate closely spaced stations. "This should not be a problem in the UK but makes the Linn less suitable for use in the US, where FM stations are crammed together." — Ed] Sensitivity is barely adequate for fringe reception in mono (2µV/11.22dBm). On the flip side, stereo sensitivity is surprisingly good — and noise-free — with signals as low as 27µV/33.83dBm, without the artificial enhancement of a noise-reduction circuit, which would trade stereo separation as it slants toward quieter mono.

ANCILLARY EQUIPMENT

Amplifiers: Marantz Model 5s in triode configuration with 8417 tubes; Krell KST-100; Proceed AMP 2 (this amp features superb detail even at low power levels). Preamplifier/Controller: B&K PRO-5 with Tiffany jacks, toroidal transformer, and other Sound Unlimited mods. Loudspeakers: Amrita Monitors. Cables and interconnects: various.

Anything below 35µV/36.08dBf is better than typical. Other measurements in the opening specifications are slightly above normal and further contribute to low noise.

The Kremlin also uses a shunted transmission-line coaxial resonator as the basis of a high-stability oscillator rather than a simple varactor diode for tuning purposes. This arrangement is normally used in the power stages of broadcast transmitters because of its low spuriae and good stability, and is applied in the Kremlin for the same reasons.

AUDIO QUALITY

The Kremlin's sound is free from high-frequency grunge. Highs are free of distortion even on stations taxed by carrying several SCAs in addition to their regular stereo audio programming. This excellent performance verifies the Kremlin's excellent 70dB SCA rejection specification. Also contributing to the undistorted highs is the design of the stereo decoder itself. In a stereo decoder, a 38kHz signal is generated that phase-locks with the incoming 38kHz subcarrier from an FM station. Often this
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internal signal contains spurious tones that cause the tuner to stumble over its own feet with added distortion. The Kremlin incorporates a low-spurious design to avoid this problem.

The 19kHz pilot tone, which lights up the stereo indicator and does some switching, has very low (-55dB) residual and contributes to the recovered audio signal's freedom from distortion. Additionally, a phase-locked-loop detector is used to extract audio from the IF signal. This stay-tuned circuit also contributes to low distortion. To put it more simply, distortion doesn't rise in stereo appreciably over mono, something very common in other tuner designs.

Although every station has its own brand of tonal balance and audio processing, influenced by the whims of a program director or engineer, and is subject to the response of the car radio of the day, there's something special about a tuner that has dead flat response, especially through the mid-range. Perhaps it's because added colorations are not present to further hamper the receiving process. Particularly in the Kremlin's case, the audio features an uncanny, in-the-room live quality to voices.

Low-frequency response is through-the-floor deep, tight, and articulate. On pop, rock, rap, or classical, this tuner gets with the program. Stereo separation and soundstaging are flawless.

**CONCLUSION**

The Kremlin is no more or less than expected. Following British design thought, it's a wide-band tuner with excellent sound, poor selectivity, sufficient but not overwhelming sensitivity, and excellent build quality. However, Linm has taken this "stereotype" to perfection within these parameters, adding a little extra class in the process.

The Kremlin needs to be fed a clean signal (one free of high signal levels on adjacent channels) in order for it to perform properly. When this narrow condition is met, the Kremlin excels. In fact, it could serve well as an air monitor for a broadcast station; it doesn't miss a thing and gives an uncorked hearing of an air signal.

However, in real terms, this means the Kremlin will not do well in RF-congested areas where high selectivity and exceptional sensitivity are musts. Since the tuner doesn't silt out stations well, a quality, highly directional outdoor antenna—see the sidebar—is a must to aid in rejecting unwanted signals. However, if desired local signals are strong or very strong, topnotch audio can be obtained from an indoor antenna. The Kremlin is highly recommended but only if it can be fed a diet of "clean" RF signals, when it justifies its price.

**ANTENNAE**

It's very interesting that nothing new has been investigated in outdoor FM antenna design in 30 years. The Channel Master Probe 9 and the Winegard CA-6065, thought to be the epitomes for distant FM reception, are really mediocre outdoor antennas with about 7-8dB true gain—at best—and have left the serious FM listener unaware of FM's real reception potential. However, there is an antenna design facility in Connecticut, Antenna Performance Specialties,1 that takes FM reception seriously and has computer-designed a line of superior FM antennas.

While testing the Kremlin, I had the opportunity to evaluate the tuner connected to the largest, no-holds-barred—design antenna from this company, the "Sniper." This 330" antenna has about 12dB true forward gain at any FM frequency, and extremely low SWR (Standing Wave Ratio). (An antenna with high SWR won't feed all the signal it picks up down the feedline, but will waste it by reradiating it and picking it up again on its own elements as a form of continuous multipath interference.) In addition, careful attention has been paid to how little signal Antenna Performance Specialties' antennas pick up off the sides. Other designs mainly concern themselves with minimizing rejection directly off the back of the antenna (180°) and have little rejection at other degree points. This factor is very important because a desired station may only be 60° from an undesired on an adjacent or the same frequency. In brief, the "Sniper" picks up signals only where it is aimed, and adds nothing to the infidelity of reception.

While the "Sniper" is a huge custom-order antenna requiring the ruggedness of a ham-radio-antenna-type installation/rotor and has limited application because of space restrictions, it does set a standard to measure any other antenna's performance. With this in mind, the company has developed the QFM-12, a still large but manageable 200" version of the monster bird perch. This sells for $175 and offers 10dB gain and only slightly less pattern performance than the larger antenna. Both mentioned antennas are of the vector design in which the driven elements are in a V shape with several directors in front of the narrow confluence of the V.

So why do I feel a good antenna is necessary? Increasingly I find that most commercial and some PBS stations aren't worth listening to because they've succumbed to the loudness race with the latest digital audio processing. In these processors, the outgoing audio is held in a buffer circuit and the overshoot dynamic peaks are removed before the audio signal is released on its journey to the transmitter. The result is loud, detail-free audio with a constantly changing tonal balance and compression ratio mandating that a case of seasickness pills be kept next to the listening chair. Also, when a particular tone is brought up to a much louder value than it should have in relation to its surroundings by a limiter and compressor aiming at maximum audio level, not only is the tonal balance destroyed, but phase shift occurs—which adds to the seasickness and the nasal sound. (This sound is similar to tape-head misalignment that's constantly changing, but a station isn't playing tapes.)

For the most part, therefore, it's the low-powered college or rare distant or weak commercial station that still offers magical sound, because they don't have the money to purchase the latest audio-destroying equipment. It's these stations that add to the high-end audio experience. — Don Scott

1 Antenna Performance Specialties, P.O. Box 9597, Bolton, CT 06043. Tel: (860) 643-2733.
## Record Sleeves

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## Record Mats

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## Cartridge Demagnetizer

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## Stylus Cleaning Accessories

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The received wisdom on the subject of Dmitri Shostakovich’s Fifth Symphony of 1937 is that, following Pravda’s (read: Stalin’s) denunciation of his opera, Lady Macbeth of Mtsensk, for its musical and topical coarseness and vulgarity, the composer withdrew his difficult Fourth Symphony during rehearsals — that work would not be performed until 1961 — and co-opted himself by composing a more conservative symphony, the Fifth in D-minor, which Shostakovich would refer to as “a Soviet artist’s reply to just criticism,” and which brought him immediate and lasting success as well as ingratiating him with the regime.

Well, maybe.

Roy Blokker and Robert Dearling, in their invaluable guide The Music of Dmitri Shostakovich: The Symphonies (Fairleigh Dickinson University Press, 1979), sensibly counterpropose that the composer himself realized his earlier works were leading him in unproductive stylistic directions, and, under cover of the official criticism, proceeded to compose in a more coherent, immediately accessible style. Where Symphony 4, for example, staggers under a profusion of angular, dissonant melodic material, 5 achieves thematic unity by melodic, rhythmic, and even textural links, between as well as within movements; and where Shostakovich’s formal tricks in 4 (such as recapitulating the first movement’s themes in reverse order) can be all but impossible to fathom, 5’s innovative touches — the outer movements’ brief introductory themes play important developmental roles, and the Finale is a free fantasia rather than a real sonata movement — occur within more easily discernible structural patterns.

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appears the first subject proper: a long, sinuous, searching violin melody, various bits of which are subjected to instrumental commentary. The second subject, its long notes soaring over gentle string pulses, is recognizable, if you listen carefully, as an altered version of the introductory theme.

Questing flute and clarinet phrases mark the transition into the development, which begins with the pulsing second group, this time harmonically disturbed, as if waiting for trouble. As its final eighth-note tail descends through the strings, piano and pizzicato basses abruptly seize it, as ominous low horns and trumpets proclaim the first theme. Whirling reed and string scales gradually increase the speed until the sudden arrival of a parodic march on trumpets and snare drum, actually the violins' big theme transformed, breaks the momentum. Low brasses take up the opening flourishes in a powerful augmented canon, propelling the music into the recapitulation: reeds and strings play the canon in a turbulent doubletime, supported by sustained brass; repeated octave A's resolve in a mighty unison statement of the first subject, punctuated by brass and percussion chords. Hammering trumpet notes fade into the second subject's return in major, with flute and horn floating serenely above the pulsing strings. The quiet, unsettled coda expires in D-minor celesta scales.

After the first movement's violent emotions, the second, a brief Scherzo, provides a welcome respite. The opening stomping bass motif, a perky staccato reed theme, and a martial horn proclamation are its main subjects, as it builds to sweeping, sarcastic waltz-like tuttis. A violin solo with a graceful Viennese lilts leads off the trio section, which alternates this theme with marato string octaves. After the Scherzo's reprise, the oboe interjects a wistful reminder of the trio's opening phrase, but the rest of the orchestra will have none of it and forcefully cadences in A-minor.

For the Adagio, Shostakovich leaves the brasses silent, and divides the strings into eight parts (as against the usual five) to lighten the textures, using the distant key of F-sharp minor to poignant effect. The opening theme is a pensive string threnody, yielding to a repeated-note motif on first violins that will play a recurring role. A second theme, for flutes and harp, makes an effective textual contrast; after a return of the opening subject, solo oboe introduces a third theme. At the movement's climax, reeds, strings, and xylophone hammer out the repeated-note motif fortissimo, followed by an impassioned cello statement of the oboe's theme. The first two subjects return in subdued manner, and the movement fades into desolate celesta and harp harmonics.

The Finale's opening tutti crescendo with trilling woodwinds breaks the spell. Over pounding timpani, octave brasses play the menacing introductory theme, which immediately accelerates into the violins' energetic first subject, with its driving accompaniment. The music accelerates further by stages, until whirling strings and reeds usher in the second theme on solo trumpet. Following its Hollywoodish climax, pounding chords lead to the "development," with the second theme now transmuted into a nostalgic horn reminiscence under violin quavers. A gentle crocheted ostinato accompanies various episodes, including a quiet augmented version of the first theme on violins. Just as the music reaches a point of repose, soft timpani quavers herald a reed statement of the introductory theme, pizzicato, which turns into a nattering accompaniment to other sections of the orchestra. The passage builds to a blazing climactic tutti, and the coda restates the introductory theme in triumphant D-major.

Despite the detailed instructions in the composer's score — the terraced accelerations of the outer movements are indicated by precise metronome markings at each juncture — the symphony can be heard to go at every conceivable tempo (especially the Finale, which gallery-minded conductors tend to take faster than indicated). The surprise is that most performances, of whatever interpretive bent, work on their own terms; the only out-and-out failures are, perhaps significantly, among the slower ones: the inert, dispirited Skrowaczewski/IMP, further handicapped by veiled recording quality; and the Slatkin, whose strings are seemingly bereft of note-to-note continuity in the actual playing as well as in the phrasing, like a singer with poor legato. In the Adagio, there's some breathtaking pianissimo detail, but even here the climaxes stubbornly refuse to expand or bloom.

But then, the interpreters of the slower persuasion all seem to have their work cut out for them, metronome marks or no. Maxim Shostakovich, as the composer's son, might be expected to bring the work a certain automatic authority, but his LSO remake further broadens the first-movement tempos just that bit too much over his earlier account (last seen as Quintessence LP PMC 7202, nla): the first group seems endless, and the second subject plods, its theme separating into individual notes. The middle movements are characterized affectingliy, but the Finale, after a strong start, is a sudden slog by the recapitulation.

The Bernstein digital and Celibidache accounts are barely better, although one suspects they had the musical equipment to bring off this approach. Celibidache, in a concert aircheck, is attuned to niceties of phrasing and has a good feel for the long line, but the Italian orchestra is inept, with wretched string intonation. Bernstein's remake falls, not on the tempi, which he sustains well — the first movement's second group evokes a peaceful snowfall — but on recorded sound that seats the entire orchestra within an area six feet deep. (The NYP strings themselves, however, are probably to blame for the gray, diffuse tone.)

I still can't make up my mind about Bernard Haitink's account; sometimes I think it's slack and underenergized, but on other listenings it will weave a hypnotic spell. Certainly the integrity and wholeness of the interpretation are unquestionable; the London Philharmonic's playing is beyond reproach, round and warm-toned as Haitink limns a rich tapestry of textures; and the
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Kurt Sanderling’s firmly cohesive if Germanic account is probably the best of this type: the first movement, its tempo changes underplayed, builds to the climaxes almost in spite of itself; the Scherzo has a Klempner-like solidity and deliberation; and the unheralded, flowing ostinato in the Finale’s development is mesmerizing. String ensemble

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is a bit loose-limbed, and the engineers unabashedly resort to section mikes to clearly capture woodwind detail in the reverberant Jesus Christus Kirche.

An alternate approach is to play the music in a direct, unfussy manner, without straining for profundity by stretching the tempos. This approach, as that adopted by most Russian conductors, can be considered authentic, and certainly the long-limbed themes of the first and third movements find their natural contours more easily than they do at slower tempos. The great Yevgeny Mravinsky is represented by three concert recordings, all of which attest to his unmistakable perception and authority; none of them strikes me as truly definitive, primarily because the playing is consistently louder than indicated. I prefer the 1966 Russian Disc issue, with its individual, characterful first movement, the tonally saturated climaxes of its Adagio, and its exciting and well-proportioned (if objectively too-fast) Finale. The 1973 version finds Mravinsky introducing odd bits of rubato that sit awkwardly on his forthright interpretive framework, and the orchestra is distinctly off form, with choppy solo horn and granulose strings; and the 1984 Erato is simply too closely miked, exacerbating the already overloud effect.

Orchestral deficiencies let down the side in the other Russian-based performances. Dimitri Kitaenko’s conscientious, sensitive reading is frequently illuminating — I especially enjoyed his lightfingered, waltzy Scherzo — and, unlike Mravinsky, he makes good use of dynamic variety to produce atmosphere. But his impulsive accelerations produce some stumpy playing, and the watery, recessive horns are unacceptably weak. The last two movements of Yevgeny Svetlanov’s performance — a clean, flowing Adagio, and a characterful, impressively climactic Finale — are excellent, but diffuse, unfocused strings and an uncomfortable solo horn mar the opening movement. If you enjoy Eastern European wind timbres, bypass the Russians in favor of Karel Ancerl’s sane, musical Czech PO version; the conductor glosses over many of the indicated tempo adjustments, but he makes a good case for his choices — only a few passages in the Finale remain stubbornly earbown.

Among Western conductors, Solti most closely resembles Mravinsky in his robust manner as well as his tendency to overplay the piano passages. He commits some sins against tone — the Adagio’s opening is incongruously sweet, and his impersonal approach tends to shortchange atmosphere — but the bright-eyed attacks, crisp textures, and plangent brass playing (from the Vienna Philharmonic, be it noted, not the Chicago Symphony), as captured in London’s capacious sonic, are mighty convincing.

Among similar performances with American orchestras, Skrowaczewski’s Mercury account is worlds different from his limp remake in its tensile, thrusting line and clear detail, with impeccably articulated strings and firm, powerful attacks. The vivid digitized sound retains the “toppy,” AM-radio finish familiar from the LPs. Maazel’s builds progressively to a rousing conclusion; his flawless control ensures that we always hear simultaneously occurring motifs as separate, correctly balanced entities. The focused yet translucent Cleveland strings make no small contribution to this achievement, but some misplaced horn blasts in the transition to the coda are puzzling. The opening phrases provide the key to Riccardo Muti’s performance: the strings’ attack is smoothed-out, the tone consciously polished, but there is still ample rhythmic spring. So it goes throughout a conservative but dramatic and brilliantly played interpretation; I could do without the Scherzo’s mannered dis- tention, but the Philadelphia string sound, even in its current etiologic version, is singularly apt in this music.

Leopold Stokowski was a law unto himself, but the basic thrust and vigor of his recordings place them with this group. Despite the nearly 30 years separ- ating them, the two accounts are markedly similar. The 1935 recording, which comes up amazingly well in Pearl’s CD transfer, is spoiled by an egregious Stokysim — a loud, heavy-syrup treatment of the first movement’s second theme; otherwise, the conductor’s unique feel for drama and color come into play within a generally straightforward framework. The Philadelphia strings, whether lithe or lush, sound marvelous, but the handsome polish of the London Symphony in the 1964 concert performance, heard in a smooth, listenable aircheck, is hardly to sneer at.

Refinement of texture is the keynote of the Denon and Bis releases, whose sonic live up to their respective labels’ audiophile reputations. Aronovich’s is often quite beautiful, with clear balances, and the Stockholm strings have a silky sheen; but his impetuous accelerations are too much — the first-movement development is excitingly febrile, but the

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recapitulation is over the top. Inbal/ Frankfurt makes some good points in the first movement, but the Scherzo’s mannered dis- tention are predictable, and the last two movements lack punch; on his remake, Denon’s clarity mercilessly exposes the Vienna Symphony’s technical and tonal limitations.

The type of performance which I ultimately find most persuasive balances flow and weight, keeps a clear eye on structural matters, and invests the
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themes with a natural plasticity while respecting their shape. The first movement of Previn's account is an object lesson in style: perfectly paced and balanced, with tremendous atmosphere and a good ear for detail; the rhetorical touches contribute to, rather than detract from, the overall coherence, and the London Symphony sounds beguilingly suave. Unfortunately, the rest of the performance misses this exalted level: the similarly rhetorical, spry "Finale" is comparatively careless in detail, while the great Adagio, well-played though it is, emerges as distinctly chilly.

Similarly respectable also-rans in this style include Ashkenazy, whose erratic technical control undermines his insightful conception (and the RPO's tutti sounds is light in the bass), and Järvi, who shapes the music in long, flowing paragraphs but permits the playing to get too loud, unhappily for the main motifs; the Chandos sound, at first impressively robust, becomes boomy and overbearing as the textures thicken. Bernstein's famous 1959 account benefits from his energy and intensity, but the sound is starting to show its age.

It is left to three relatively unglamorous entries to best convey this music's emotional power and sweep. James DePreist draws attentive, committed playing from the Helsinki Philharmonic for his coloristically sensitive, weighty, but unpretentious interpretation; a few uncertain dovetailings and creaky transitions are mild distractions. Onnandy's sound is clear and present, with a nice sense of the hall around the woodwinds. Yoel Levi matches the refinement of the Inbal and Aronovich versions while better capturing the music's ebb and flow, and his molded phrasing is always well-considered. An epic quality emerges in his restrained Adagio; he underplays the accelerations at the Finale's start, but the character later on is marvelous. Telarc's predictably clean sound brings excellent localization of the brass choirs, so you can tell the trombones from the horns for a change.

The crown jewel of the catalog happens to be the most recent issue. Mistral Rostropovich has recorded this symphony before, with the same orchestra (DG 2532 027, LP, n/a); his new account shares the earlier one's virtues and is even more naturally recorded. The performance is utterly persuasive from the beginning — where the nearly vibratoless violins conjure up a stark desolation — to the end, where a grand, pompous coda caps the moderately paced, atmospheric "Finale." In between, the grotesque "Scherzo" is balanced by a delicate trio, and the unerringly built Adagio features breathtaking hushed pianos, sizzling tremolos, and an anguished climax, none of which is superficial or exaggerated. One could wish for richer tone from the National Symphony strings, but their leaner sound is appropriate to Rostropovich's conception, and they can now rise to the climaxes without recourse to DG's trick nuking. If you can only have one recording of this music, make it this one.

If you're on a budget, the pickings are unusually slim. Ormandy's Philadelphians are typecast in this music, but he blithely ignores many of the tempo changes and allows patches of unstable rhythm, while Rahbari's understated strings can't fill out the music properly. Slovak, after a sluggish start, is good in the outer movements and decent in the inner ones, but you'd be better off saving up some more money and going for one of the good midpriced issues — say, the first Bernstein, or Maazel, or the first Mravinsky.

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<td>Russian Disc 11188</td>
<td>41:19</td>
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<td>Russian Disc 11023</td>
<td>40:54</td>
<td>60:43</td>
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<td>RCA 54968-2</td>
<td>53:18</td>
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*Stereophile, March 1996*
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The vinyl deluge continues — this time we split 50/50. The most hopeful sign is that companies like Analogue Productions and Classic Records/Rock the House are no longer contending themselves with reissuing classics,1 but have taken to issuing new LPs. If vinyl is going to be healthy, this is a necessary step — we can't just recapitulate the successes of the past, but must prove that the LP is still an exciting, viable medium. However, many vinyl providers still cite sluggish support in the audiophile community. Reference Recordings, like AudioQuest before them, has discontinued their policy of issuing every recording in both formats, stating that they will continue to release LPs on a case-by-case basis.

The good news on the digital front is that CDs really do just keep sounding better and better, especially when played back through much of the new hardware — even the affordable stuff. I didn't hit a true sonic stinker in this quarter's listening, and while that could just be luck, I'd like to think it's because we audiophiles have been so vocal in our criticisms. Yay us!

Analogue Productions

JOHNNY ADAMS: Sings Doc Pomus/The Real Me

NANCY BRYAN: Lay Me Down

Johnny Adams is an immensely talented R&B singer who possesses the taste, chops, and prodigious technique of a great jazz vocalist. This session is clearly a labor of love, for him as well as for session leader Dr. John and everyone else involved. And why not? Doc Pomus wrote great songs — for Elvis, for the Drifters, for everybody — and was a sweet, sweet man, beloved by everyone who met him.2 The Real Me is a straightforward session with uncluttered studio sound. The instruments and voice come across with tonal truth and great clarity, although there's not a great deal of room sound to sustain them. I'd mind this more if the performances weren't so damn good!

Adams has a rich, full-bodied voice and an unmatched delivery — he's the master of inflection and shading, which he calls his "tricks." Here, they're totally at the service of the songs, making even the slightest of these tunes resonate with depths of emotion. The band is first-rate, too, consisting of such New Orleans stalwarts as Dr. John, Duke Robillard, James Singleton, and Johnny Vidacovich.

"The Real Me" is a searingly stark love song that Adams sings with a toughness that saves it from seeming maudlin. It's a powerful moment — after hearing it, you'll realize why it had to come last on the record, and why they couldn't call this tribute to a great songwriter anything else.

Lay Me Down is AP's second original recording (the first was the phenomenal Bluebird by Jimmy Rogers). Nancy Bryan has a crystalline soprano and a mournful songwriting sensibility, highlighted by one of the most dynamic and timbrally pure recordings I've heard in a long time — my stylus had a hard time staying in the groove on some of the bass transients. True, it could be just my test pressing, but the CD sure mirrors all of the dynamic fidelity I heard on the LP.

Much of that awesome bottom-end is contributed by fellow audio critic Dan Schwartz (also featured on Sheryl Crow's Tuesday Night Music Club), but there's also (tastefully done) synthesizer on some of the tracks. Despite the synths, the disc sounds naturally ambient, crisp, and articulate.

But I find this a hard set of songs to cotton to — they seem overly crafted to me. A tad too arch, or something like that. But hey — had it depended on me, Nanci Griffith would still be lingering in obscurity. There's a lot to like in this album, especially if you tend to favor female singer-songwriters in the first place. I suggest that everyone at least hear it for the sound; unlike me, you may be seduced by the songs as well.

Chesky

MOZART: Piano Concertos 9 (K.291) & 27 (K.595)
Nicola Fasardi, piano; Miguel Kertman, Mozarteum Orchester Salzburg

THE JAZZ WOODWINDS COLLECTION
featuring: Phil Woods, Eddie Daniels, Paquito D'Rivera, Chris Potter, Joe Henderson, Herbie Mann, Joe Lovano, Paul McCandless, others

1 Even when re-releasing current (otherwise CD-only) discs, AP and Classic are spending the money to have analog masters cut — which isn't cheap. These guys are serious.

2 I mean this literally. Enconced in his wheelchair, Pomus was a fixture at several Manhattan clubs — principally the Lone Star Cafe and the Bottom Line — and was gracious toward, and interested in, everybody — even star-struck, stammering fan-boys like me.

Stereophile, March 1996
The Mozart concertos were recorded with a close but purist microphone perspective—which is a double-edged sword. On the plus side, it sounds tremendously exciting, with a snap and bite that cannot fail to set the heart aflutter. On the other hand, everything sounds a bit larger than life. The recording loses much of the hall’s ambience but gains a sense of immediacy. Give George Kaye and Steve Guttenberg credit: they obviously weighed the tradeoffs and opted for the thrilling presence they achieved. The recording is not only exciting, it’s also tonally true. The woodwinds are lush but exhibit bite and broio, while the strings’ luster testifies to a natural—and extended—top-end.

Yet the performances seem all competence and clockwork. Despite lovely solo passages, not to mention thrillingly virtuosic runs, Fritsali’s playing seems predicated more on not making mistakes than on any overarching conception of the pieces—as opposed to the puissant Gillels/Böhm/VPO reading of Concerto 27 that remains my reference.

The Jazz Woodwinds Collection I recommend unreservedly, however. A strong compilation taken from 10 of Chek’s jazz releases, it’s powerful, punchy, and brimming with drive. Chek’s studio philosophy pays extraordinary dividends here: the instrumentalists’ individual sounds come forth with all of their power and distinctive tonal personality intact. As good as the instrumentalists are—and these are some of the best—the real hero of this release is Bob Katz, who displays an amazing ability to capture all that diversity with consistent energy and a palpable sense of events taking place absolutely here in the present. The tradeoff for that sense of immediacy is a loss of room-sound (but how much of that do you get in the average studio, anyway?). Thoroughly enjoyable.

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**CLASSIC RECORDS/ROCK THE HOUSE**

**MILHAUD: La Creation du Monde, Suite Provençale**

Charles Munch, Boston Symphony

RCA/Classic LJS2-2625 (LP), Max Wilcox, prod.

Lewis Layton, John Crawford, engs.; Bernie Grundman, remastering eng. AAA TT: 32:47

**DAVE BRUBECK QUARTET: Time Out**

Dave Brubeck, piano; Paul Desmond, alto sax; Eugene Wright, bass; Joe Morello, drums

Columbia/Classic CS 8902 (LP). Bernie Grundman, remastering eng. AAA TT: 38:50

**ENO/WOBBLE: Spontaneous**

All Stars/Rock the House RTH 1023-1 (LP). Brian Eno, Jah Wobble, prod.; Jah Wobble, Mark Ferda, engs.; Bernie Grundman, remastering eng. AAA TT: 43:42

**JOHNNY HODGES & HIS ORCHESTRA: Blues-A-Plenty**

Johnny Hodges, alto sax; Ben Webster, tenor sax; Roy Eldridge, trumpet; Vic Dickenson, trombone; Billy Strayhorn, piano; Jimmy Woode, bass; Sam Woodard, drums


**SONNY LANDRETH: Outward Bound**


**SONNY LANDRETH: South of 1-10**


**LOVE JONES: Live in Hollywood**

Rock the House RT1 5060-1 (LP). Low Jones, Jimmy Edwards, prods.; Dick Pekkonen, eng. AAA TT: 46:50

**SHAVER: Tramp On Your Street**


The Milhaud disc comes from RCA’s Soria series, which were some of the most lavishly packaged genies from analog’s golden age—thick covers (usually with tipped-in art printed on glossy stock) and glorious booklets printed on heavy stock, resplendent with art and essays on the programs. I was curious as to how Classic would handle the Soria, and I’m happy to report that they’ve decided to go for it. This one comes with designer Skira’s luxe booklet printed on some of the classiest, glossiest paper I’ve ever seen. Historical notes, photographs of the premiere performance, the essay by the composer—they’ve all come through intact. I love it!

The disc itself has never been noted as one of the better RCAs. The sound is somewhat murky and opaque—partially, but not entirely, because of the instrumental forces Milhaud specified for the work: two flutes, piccolo, oboe, two clarinets, E-flat saxophone, two trumpets, horn, bassoon, trombone, piano, timpani, lots o’ percussion, and a string section lacking violas. The work is, by design, somewhat murky.

In case you’re not familiar with the work, La Création is a ballet based on African myths of the creation, set to a score influenced by the jazz Milhaud heard in Harlem. It certainly is a whiteboy’s view of jazz, rhythmically foursquare with nary a trace of the complex cross-rhythms heard in the real thing. Not even a backbeat in sight. Yet I’ve always found the piece charming, even if imitative to its purported sources.

It’s hard for me to come to this particular performance with open ears, since I was so closely involved in Stereophile’s recording of the work, as performed at The Santa Fe Chamber Music Festival last summer. Munch and the BSO seem uncomfortable with the jazz elements of the work, such as they are, and appear to be trying to place it firmly in the French tradition. This is not an approach that works for me, although I’m sure it has its adherents.

The recording does manifest amazingly deep bass, especially in the Suite Provençale, and the sonority of the brasses is rendered with thrilling clarity. I’m on the fence with this one: A— for presentation, B— for sound, and a gentleman’s C for the performance of the principal work.

What’s left to write about Time Out? It just may be the greatest-selling jazz record of all time—not to mention the most frequently reissued. Everyone

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**SYSTEM**

The recordings mentioned in this installation of “Quarter Notes” were auditioned on the following system:

- **LP Playback:** Linn LP12 with Naim Armaggedon Power Supply/ Naim ARO Tonearm/Sumiko SHO. Digital Playback: Theta Data Basic II/DSI Pro Basic III.
- **Preamplifiers:** LAMM Model L1, Audio Research PH3 phono section.
- **Power Amplifiers:** VAC PA 80/80, Conrad-Johnson Premier Eleven A.
- **loudspeakers:** JMlab Daline 6.1.
- **Interconnects:** Kimber KCAG.
- **Speaker Cables:** Kimber KCAG.
- **Digital Interconnects:** Illuminati.

**Accessories:** VersaLabs Red Rollers, Flat Rollers, Ground Block, and Wood Blocks; Audio Power Industries Power Wedge 112; MIT Z-series power cables; Highwire Audio Power Wrap (on components with non-replaceable power cables); Shakti Stones (not on all components); Bedia Ultra Clarifier; Townshend Seismic Sink; The Shelf by Black Diamond Racing; Golden Sound DH Cones.
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knows that Brubeck, a student of Milhaud's, rocketed to stardom off this collection of pieces that daringly (for the time) eschewed the 4/4 norm of popular jazz—the band became the darling of college campuses everywhere, and Brubeck even graced the cover of Time magazine on the strength of it. I'm sure that unusual time signatures (such as the 9/8 in "Blue Rondo à la Turk" or even the mild 5/4 of Desmond's "Time Out") did contribute to the appeal of the disc, but let's face it—most people who thrilled to Time Out weren't beating out four on one knee and live on the other. What made the record popular was that, first, it's a great collection of tunes played with an almost telepathic sense of communication; and second, it boasted the mercurial, ever-graceful presence of Paul Desmond, surely one of the greatest alto players in history.

The remarkably lifelike sound didn't hurt, either. While the original LP must have gone through a bajillion pressings—some of which really didn't sound that great—early copies, at least, had presence and dynamic signature that were quite remarkable. As does this reissue—in spades! The most recent CD reissue sounded fast to me when I heard it in C-J's listening room. I can't say for sure that it was speeded up in the remastering, but it certainly lacked the Classic reissue's relaxed sense of swing.

There's audible tape hiss, particularly in quiet passages and in the decay of tones, but I found it easy to ignore while the band was playing. If you're sensitive to such things, be warned. However, the instruments sound true and have an almost physical presence, especially Desmond's alto and Morello's cymbals, which ring rich with brassy overtones. Well done, Classic. Thanks.

Friends assure me that the music—and musical manipulations—of Brian Eno are an acquired taste. One that I've acquired and they haven't, obviously. (The most recent person to sneer at me for my addiction was JA, over Thanksgiving dinner.) Okay, Eno's not everybody's cup of tea, but I still like him. Spanner originated as the soundtrack for Derek Jarman's last film, Glittering. As discrete music (sorry, inside joke), it didn't really stand on its own, so Eno shipped his tapes off to Jah Wobble to augment/modify. In the end, Wobble's participation varied from leaving the tapes alone to utilizing them as components in entirely new works.

I find the result engaging, stimulating, and frustrating—all valid reactions to a work of art. Sonically, you've got to throw away any insistence on the audiophile verities of soundstaging, natural timbre, or even of music existing in a real space. None of that applies here: Eno/Wobble-world is a murky, at times atmospheric place lacking the three dimensions of the one you and I inhabit. It does got gobs of bass, though; and Wobble's rhythmic drive, augmented by Eno's dreamy washes of real and electronic sounds, set my mind adrift upon its eddies and currents. I'd count that as a success, and I'm glad to see that Classic thinks the realm of the audiophile LP is vast enough to encompass it. (One of

**More RCA Living Stereo Reissues by Classic Records**

Though Classic Records' basic reissue philosophy appears unchanged, it's starting to look as if they're subtly adjusting their approach. Bernie Grundman is obviously still cutting the best records he can from the original masters while listening very closely to the original shaded dogs. I've heard back-and-forth comparisons of master tapes, original pressings, and Classic reissues in Grundman's Hollywood studio, and can attest to the meticulousness with which these records are being created.

However, recent reissues have a sonic signature considerably closer to the originals than that of the early Classics. While the differences are subtle, they're significant enough to be noted. Here's a recent round-up, with gratitude to San Diego audiophiles Larry Bowers and Jeff Jones for providing selected original pressings.

**LSC 2364** boasts a deep, almost distant soundstage on the original 1S/1S pressing. Lower strings and woodwinds are especially well-articulated and natural-sounding. Impact, dynamics, and detail are also impressive (listen to the sleigh bells in the first movement). The Classic reissue offers significantly improved detail, with instruments that seem to be larger but not louder. Everything remains fixed in a luxurious soundstage. These new Classics have consistently proven to be at least a match for the originals in soundstaging, and are sometimes even better—a considerable achievement. Violins and winds have more bite and inner detail (eg, pizzicato basses). This reissue sounds the closest to the original of any I've heard so far.

The 55/55 original shaded dog of LSC 1901 conveys a dark, resonant hall sound, as befits Tchaikovsky's tortured, valedictory "Pathétique." Look elsewhere for the definitive performance of this symphony, however. Still, the strings are sweet as honey, and front-to-back Imaging is as solid as it gets. One can almost sniff the rosin on the cellos. Warm? You bet. Classic has lifted the sonic veil, and the sound, though heightened to a degree, is still gorgeously warm. Dynamics (a Classic trademark) are certainly improved, but the new record offers a wider, more open sense
the three pressings of this disc that I listened to was saturated with tics and pops — the other two were extremely clean and quiet.)

Johnny Hodges’ *Blues-A-Plenty* manifests brilliant, vivid instrumental timbre only slightly marred by Verve’s left/right soundstaging. Less well-known than *Side by Side or Play the Blues* — the previous Classic Hodges reissues, which co-starred Duke Ellington — this one, like its predecessors, rewards listeners with a solidly tuneful, gently rocking set of tunes. I can’t get enough of Hodges; the man never played a false note, and that big, breathy alto sound is addictive. He soloed — always — with grace and passion and, backed here by compatriots from the Ellington band, he turns in a typically suave, swinging performance. Recommended.

Sonny Landreth is the real thing — an electric slide-guitarist with solid chops, unique sound, and lots and lots to say in solo after solo. His tone is as solid as a wall — full of moaning, wailing distortion that’s nevertheless crystalline in its purity. (I think you have to be a student of the electric guitar to even begin to understand that oxymoron.) Harmonic overtones snap out of the plane of the speakers like kernels of popcorn propelled by their own combustion. As a vocalist, Landreth doesn’t have that same sense of doom and menace that come across in his playing; I find him an interesting songwriter and have the sense he could develop into a great one.

Both albums are worthwhile, but *South of I-10*, with its rooted-in-New Orleans conceptional underpinning, is the standout — all the more so for Allen Toussaint’s presence (as pianist and arranger) on “Great Gulf Wind.” But it’s the guitar sound — clanging bedrock, throwing off metallic sparks and squeals — that’s the hook, reeling me back time after time. Watch out for this guy and, if you have any interest in state-of-the-art guitar slinging, get these records.

Love Jones is an LA band that caters, I gather, to the lounge scene’s taste for “exotica” and TV-commercial music parodies. I applaud Classic (via its Rock the House subsidiary label) for seeking unsigned contemporary bands, but I’m baffled as to Love Jones’ appeal. The music is innocuous enough, neither relentlessly rocking nor hopelessly bland, but the attitude of the band comes across as offensive — to me, at any rate. They seem to feel they’re so much hipper than their audience that they only have to go through the motions. This is reinforced by such charming stage patter as, “Thank you for your patience…” “...as we took a large musical shit on all of you!”

Still, this is one of the best-sounding live rock albums I’ve ever heard. Deep, punchy bass, perfectly articulated vocals (gee, thanks), and unusual purity of instrumental tone — all in the service, ultimately, of... not much. Or maybe my reaction to Love Jones is just further proof that I’m getting old.

Define “outlaw.” For me it would be somebody so far outside the musical mainstream that he’s one of Waylon Jennings’ heroes. Someone like Billy Joe...
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Shaver (Jennings’ superb early classic, 
_Honey Tonk Hoves_, consisted entirely of Shaver songs.) _Tramp On Your Street_ makes a good case for Shaver’s music: hard-edged and rock-tinged (thanks in large part to guitar-wiz son Eddy), his songs are diverse, ranging from country gospel (“I’m Gonna Live Forever”) to straight-ahead Southern hoogie (“Hottest Thing In Town”), and consistently express points of view different from the ones you’d expect on “just a country record.”

A good case in point is the title song, which tells the story of Shaver, as a kid, going into town — barefoot and dressed only in a pair of overalls — to hear a young Hank Williams at the local juke joint, and then jumps from this epiphany event to a chorus that contrasts Shaver’s apparent poverty with his rich spiritual life. “I'm just a tramp on the street” sounds patently ironic as Al Kooper’s B-3 and the male chorus swell in the background. The record is filled with moments like that — where simple stories reveal their complexity — making it a great primer for those who claim they “don’t like country music because it’s all the same.”

The sound is first-rate, too. Fat and meaty, with instrumental definition of exceptional clarity. Whether sizzling Strat with overtones screaming off the bridge pickup, or kickdrum and bass locking into a lowdown groove, there’s a richness and depth unusual in popular recordings. Even though it’s studio sound, with not a lot of room there, I sure hope there’s more where this comes from.

**DCC COMPACT CLASSICS**

**BADFINGER:** _Straight Up_  
GZS-1088 (Gold CI). George Harrison, Todd Rundgren, prod.; Steve Hoffman, remastering eng.  
AAD; TT: 65:36

**RAY CHARLES:** _Greatest Country and Western Hits_  
LPZ-2012 (LP). Sid Feller, prod.; various engs; Ray Charles, Steve Ioffone, remastering engs.  
AAD; TT: 63:19

**STAN GETZ/CHARLIE BYRD:** _Jazz Samba_  
LPZ-2011 (LP). Creed Taylor, prod.; various engs; Stan Getz, Charlie Byrd, bass; Gene Barge, bass, guitar; Buddy Deppenschmidt, drums  
AAD; TT: 47:37

**ROD STEWART:** _Never A Dull Moment_  
LPZ-2010 (LP). Rod Stewart, prod.; Glyn Johns, Mike Bebeak, engs; Steve Ioffone, remastering eng.  
AAD; TT: 56:32

**RAIDERS OF THE LOST ARK:** _Original Soundtrack_  
John Williams, London Symphony Orchestra  
LPZ(2)-2009 (2 LPs).  
I)ZS-990 (CI). John Williams, prod.; Eric Tomlison, eng; Steve Hoffman, remastering eng.  
AAD/AAD; TT: 79:20; 73:52

I always thought Badfinger came across best in three-minute singles played on the radio — and three of their finest appear on _Straight Up_; “Baby Blue,” “Day After Day,” and “Perfection.” These of those who mourned the Beatles took our consolation where we could find it, and Badfinger’s perfectly crafted little ditties took some of the sting out of that loss.

The sound here is superior to my (far from early) Apple pressing. Steve Hoffman has coaxed better ( punchier) bass off the tapes, and the top end, which sounds closed-down on my LP, is open and extended. You also get six bonus tracks, including the 45rpm remix of “Baby Blue.” A must for any Beatles completist or student of pure pop.

The Ray Charles C&W disc and the Getz/Byrd outing have been available as DCC CDs for some time; the big news is their release on vinyl. Get ’em — everything I liked about them on the gold CDs is on the LPs, plus a whole lot more presence, spaciousness, and downright ingratiating tonal balance. So far, DCC has been doing a fantastic job with their analog remastering — I can’t wait for more.

An example of just how well they’re doing is _Never A Dull Moment_, a record that never sounded all that great on my Mercury pressing. Here, it’s revealed to be a worthy successor to Stewart’s great trilogy: _Rod Stewart (much better sounding as the British An Old Raincoat Never Lets You Down), Gasoline Alley_, and _Every Picture Tells A Story_. In this mix, Stewart’s canny song selection is revealed to be just as on-target as on the earlier three — especially on side two where “You Wear It Well” segues into “I Would Rather Go Blind” when Rod loses himself in the slam of “Dancin’ the Night Away.” A strong draught, one made doubly intoxicating by the freewheeling guitars of Ron Wood and the splashes — but very real-sounding — drums of Mick Weller. Not the last word in depth or tonal accuracy, perhaps, but a very convincing re-creation of the bloozy bonhomie of Stewart’s bands at the time.

I’m not the biggest soundtrack aficionado around, so I was stunned by how much I enjoyed the new CD and LP releases of _Raiders_. With close to 30 minutes of added material, these reissues are thoroughly entertaining and sonically splendid. For one thing, in their expanded versions, they work quite successfully as symphonic pieces. As I listened one morning, my wife was pulled out of the back room by a rousing march that followed a stormy sequence. “What’s this?” she asked. “Mahler?” Yeah, Mahler’s cheerful brother who emigrated to Hollywood.

As a serious music person, I know that I’m supposed to find Williams contemptible for his shameless borrowings and for squandering his considerable abilities on Spielberg’s frivolities. _Hogwash!_ Lighten up, people; Salieri disapproved of how Mozart “squandered” his talents, too. Okay, Williams isn’t a Mozart, but this is great stuff, eminently listenable and a lot more substantial than you might think.

Sonically, it’s a killer: full frequency response mated to a dynamic range that could stun a cat at 30 paces. This shouldn’t come as a surprise; compared to the cost of a feature film, a soundtrack recording session — even a meticulously performed one utilizing every state-of-the-art gizmo around — is just a drop in the bucket. My surprise pick of the month.

**DORIAN**

**CARAMELOS LATINOS** (Latín American “Lollipops”)

**Guarnieri:** _Trio Danzas para Orquesta_, **Ginastera:** _Obertura para El Fausto_, **Chulpo; Revuelta:** _El Cantar de Pescador (The wandering Tadpole)_

**Maximiliano Valdes, Simon Bolivar Symphony Orchestra of Venezuela**

DOR-90227 (CD only). David H. Walters, prod.; Britan C. Perez, David H. Walters, ens. DOR-90227. TT: 58:34

**LA NEP:** _The Garden of Earthly Delights_  
Sylvan Degrooten, harp; oud; gamba; viola; guitar; Izabel Waller, flutes; Isabelle Marchand, viola da gamba; bowed vielle; voice; Daniéle Forget; soprano; Jean-Pierre Noisieux, san- mor; percussion; recorders, tenor voice; Claire Gagnac, recorders, bass guitar; gamba; bowed; Pan Collard, voice; percussion; oud  
1)S-80135 (CD only). Jean Turgeon, prod.; André Filhotes, eng. DOR-90227. TT: 64:04

**ENSEMBLE GAILLE: Following The Moon**  
Marcia Dielh, soprano, soprano, alto, tenor, & bass recorders, pennywhistle, dulcimer; Sue Richards, Celine harp; Carolyn Anderson Sorick, treble & bass viol, pedales de pellote; Howard Bass, lute; Myron Bretholz, bodhran, drums, triangle; finger cymbals, frame drums; Bonnie Rideout, fiddle; viola; Eric Wagner, oboe  

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Latin American "Lollipops" sounds about right—bright and flavorful fun for all. Not to disparage these pieces for their lack of "seriousness," but we're not talking Mahler here. Filled with local color and more than a hint of exotic spice, these works are a pleasing contrast on your musical palate.

Sonically, though, they're plenty meaty, with a palpable presence to the precisely articulated orchestral sound. And whoa, manna: does this baby got bottom—especially in the Ginastera. Cool stuff... I mean hot stuff. The kind audiophiles like.

The Garden of Earthly Delights is an ambitious project: nothing less than an evocation of Hieronymus Bosch's weird, wonderful triptych and masterpiece. Of course, in the world of early music, you can either base a program on some obvious subject, such as Marist chant in the 14th century (thematicaly pure, but boring), or you can stretch. This one's a stretch all right, but ya gotta love it!

The tour starts with the triptych closed; on the obverse of the outside panels is a work called The Third Day of Creation—portraying a translucent globe, glowing in the firmament, that contains the world rushing toward the state of being, filled with sea creatures and spiky, menacing plants. La Nef conjures up this image through the use of breath, as they blow though their flutes without embouchure. It's an eerily apt sonic image and a beautiful beginning to this entrancing disc.

The mood gets more boisterous as the middle panel of Bosch's work comes into focus. That's the panel where every appetite from lust to gluttony seems to be in full flower; here the ensemble have chosen songs celebrating love (sacred and profane), flowers, and food. And for the next panel, with its scenes of cheerful demons torturing the damned, the music turns dark and ominous. 

Garden... is filled with wonderful performances supported by harmonically rich sound. The recording is dramatically dynamic and reverberant—the perfect mirror for the passion and awe residing in these readings. Highly recommended.

Ensemble Galilei have also scored a winner in Following the Moon, which is suffused by reverberant warmth—I was stunned to note that it was recorded in a studio (Bias Recording in Springfield, Virginia). The perspective is intimate, but oh-so-informed by the room. The crystalline finger cymbals send delicate washes of silvery decay through the soundscape, while the violins all but speak with human tongue. The lutes, emphatically articulate, float above the thunder of the bodhran.

This is very personal music making that borrows from several centuries and several traditions. If I had to chose a single overriding sensibility, it would be the rich stew of Celtic music, filtered through an early-music interpretive sense. The songs are filled with quiet passion and a lot of strength. If music is the food of the gods, this disc comes from their private stock.

Hey! Did it suddenly get poetic in here? I can't help myself—I've fallen under this disc's spell, and speech (even my old ally, the printed word) seems inadequate to describe it to you. I want to sing it for you. Or better yet, play it for you.

GRP Impulse!

JOHN COLTRANE & JOHNNY HARTMAN
Johnny Hartman, vocals; John Coltrane, tenor sax; McCoy Tyner, piano; Jimmy Garrison, bass; Elvin Jones, drums
GR-157 (LP); Bob Thiele, prod.; Rudy Van Gelder, eng.; Michael Cusumano, reissue prod.; Eric Lusben, remastering eng. AAA. TT: 30:35

This seemingly unlikely pairing created what has proven to be an enduring masterpiece. Intimate and caressing, Hartman's voice is, as an old friend put it, vocal honey. Sweet, rich, and golden, it serves as the perfect foil for Coltrane's astringent tenor. The two soloists were also temperamentally well-matched—Hartman and Tran cerebrate audibly here, as they carefully weigh their techniques against the soul of these songs. Hartman's horn-like voice and Coltrane's voice-like horn play off each other, always serving the lyric. Perhaps these six ballads took the jazz vocal as far down one particular path as it was destined to go—in the 30-odd years since this was recorded, nothing quite like it has followed.

Sonically, it lives up to the artistry of its protagonists—after all, it was recorded by Rudy Van Gelder. Extended frequency response renders everything, from Elvin Jones's crisply articulated brushwork on cymbals to Jimmy Garrison's full-bodied bass, with a relaxed but intrinsically correct tone. Early pressings of the original (Impulse! AS-40) may, perhaps, manifest even more air on top and exhibit even greater bloom around the instruments. But let's face it: if you don't already have one, you're going to need deep pockets to pick it up. And the CD? A joke, not even to be considered. This is the one—and while you're at it, you might want to think about picking up an extra.

Klavier

SULLIVAN: Orchestral Music
The Tempest (Incidental Music), The Merchant of Venice (Suite), In Memoriam (Overture)
Sir Vivian Dunn, The City of Birmingham Symphony Orchestra
KS 527 (LP); Doug Sax, mastering eng. AAA. TT: 51:30

These three pieces are quite reminiscent of Mendelssohn at his most eager to please. Inconsequential but frequently thrilling, they seem to disappear from memory even as you listen to them.
However, the recording itself is spectacular, possessing a deep, ponderous soundstage and magnificent lateral spread. Brass tuttis are brilliant, tightly articulated and packed with punch. There’s also surprisingly little sense of compression, resulting in a bottom end that’ll rattle your foundation—especially the organ on In Memoriam. Vinyl-roar was surprisingly high in places, and my pressing had almost continuous tics and pops through the first eight minutes on side one.

**Linn**

**PALLADIAN ENSEMBLE: An Excess of Pleasure**

Music by Corelli, Manders, Locke, Simpson, Blow, Marini, Anon., Geminiani, Purcell

Pamela Thombre, recorders; Rachel Podger, viols; JoAnna Levine, viola da gamba, cello, violone; William Carter, theorbo, guitar

CKIX/10

This aptly titled collection features English music composed in the Italian manner, and music composed by Italians who lived—or worked—in England. It’s a lot of fun. Almost all the pieces are played over a ground, or a repeated bass progression (the most common is the same I-V-V-I progression that lent early rock’n’roll so much of its power). These are lively, vigorous performances; the Palladian Ensemble shows a rollicking exuberance and is willing to really dig into the rhythms.

The recording is bright and filled with color. It’s recorded from a fairly close perspective—close enough to hear the gamblers’ heavy breathing—but that just fills the brilliant soundfield with lively overtones and a sense of fullness. These pieces were written to be heard close by, after all. Lively, lively—and a thorough delight throughout.

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**Lyrichord**

**NEW YORK’S ENSEMBLE FOR EARLY MUSIC: Istanbul Vol. I: A Medieval Dance Band**

Wolfe Hancock, bagpipes, shawm, flutes; Karen Hanca, recorders, psaltery, pipe; Ronsund Morley, Patricia Ann Neeley, viel; Christa Paron, flutes, shawms, bagpipe, harp; Paul Shpper, lute, flutes, hand drums; Thomas Zajac, shawm, bagpipes, flutes, dulcimer; Glen Veler, frame drums; Frederick Renz, clavecytherium, organum, dir.

Lyrichord Early Music Series LEMS 8036 (C3). Dr. Frederick J. Busboom, prod., eng. 1991, TT: 62:49

Wow! This one’s a solid corker! Spectacular sound—very direct and alive, containing a dynamic range that’ll knock your chair right out of the sweet spot. This is one of those rare recordings that gets the instrument-to-room balance absolutely right: the sound, for all its directness, is totally informed by the space in which it occurs.

The EEM is one of those New York treasures that I miss most now that I’ve left. They’re “in residence” at the Cathedral of St. John the Divine, where their concerts are highlights of each musical season—as this program was when performed at Christmas 1994. The disc is Vol. 1 of a proposed two-volume survey of European instrumental music prior to 1460; surprisingly, fewer than 50 pieces, or fragments of pieces, have survived—all almost of them will be featured in EEM’s survey. All 11

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**Stereophile, March 1996**
works on Vol.1 are dances: estampies (estampitas) and saleríos, frequently performed paired with rotos and rotas (stylized dances that follow a given set of steps or "routes"). And it's wild stuff — not overlaid with that stultifying sense of dignity that cripples so much early music, but rather ululating, bacchanalian celebrations of movement that sound vaguely Middle-Eastern to modern ears. Interspersed among the ravers are quiet moments such as "Te fontane," whose instrumentation of transverse flute and two gemshorns, with overlapping melodic runs, resembles nothing so much as the quiet slip of water across smooth stone.

MAPLESHADE/WILDCCHILD!

BAD INFLUENCE: featuring Whop Frazier and Junior Tash
Wildchild 03152 (CD). Pierre Sprey, prod., eng. DDD.
TT: 62:51

Recorded live at DC's Bad Habits Cafe, this rollicking set spans the distance from jump blues to Motown with a U-R-There directness that'll have you screaming, "Where's my waitress?" This hard-rocking quartet features Whop Frazier (great name!) on bass and vocals, "Junior" Tash on guitar, Jay Corder on sax, and Dennis Hash on drums—they have a kind of retro/roots/soul-slam groove going, if you know what I mean.

No? Well, they focus on that nexus of R&B and early rock, but with a totally modern sensibility; they aren't a purist band trying to re-create any genre, but rather a modern band that has assimilated all that's come before them and decided to just use the most essential components of that stew. Still not clear? I guess you had to be there.

Which is exactly what this recording feels like. Sprey has recorded the group with uncanny immediacy. There's the obligatory 60Hz hum coming from the PA, which is distinct from the direct sound of the instrumental amplifiers—and when Tash switches on his amp's reverb plate, it doesn't get confused with the real ambience of the room one jot. The recording captures Corder's sax's honks, squeals, and buzzes with startling physicality, and the drums have that snap! overlaying the dull thunk of their bodies that you never hear on disc.

But the centerpiece of the set it all, is Frazier — half intimate soul singer, half blues shouter—who pulls the songs along vocally while pushing them forward with his bouncy, bubbling bass. Tash is everywhere on this recording, a real master of the Stratocaster, and his fills, solos, and rhythm work are electrifying.

This is one hell of a performance, given a recording to die for. I'm taking it with me to CES, where I'll be easy to find. Find a room with a party in it and I'll bet Bad Influence and I will be there.

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ELLA FITZGERALD & LOUIS ARMSTRONG: Ella and Louis Again
Frazier, vocals; Louis Armstrong, vocals, trumpet; Oscar Peterson, piano; Herb Ellis, guitar; Ray Brown, bass; Louis Bellson, drums
UCCD 2-170 (2 mono Gold CD's), Norman Granz, prod.;Val. Valentine, eng. AAD. TT: 88:12
BILLIE HOLIDAY: Body and Soul
Billie Holiday, vocals; Jimmy Rowles, piano; Barney Kessel, guitar; Ben Webster, tenor sax; Harry "Sweets" Edison, trumpet; Alvin Stoller, Larry Bunker, drums
MPSL-1 247 (LP only). Norman Granz, prod. AAD. TT: 44:13

BOB MARLEY & THE WAILERS: Catch A Fire

THE FANTASY FILM WORLD OF BERNARD HERRMANN
Bernard Herrmann, National Philharmonic Orchestra
MPSL 1-240 (LP), UCCD 656 (Gold CD). Raymond Few, prod., Arthur Lilley, engs. AAD. TT: 45:59

What more can you say about Ella and Louis Again than that two of the greatest American song stylists perform great American songs, backed by a quartet of jazz giants? Well, you could say that the sound is extremely high-quality mono — richly burnished, glowing like brass, and possessing a fat, juicy bottom end. Or you could say that, whether singing solo or together, Ella and Louis are at the very tops of their forms here. Or you could say, as I emphatically do, "Don't miss out on this one, hear?"

Not that you should hesitate on Body and Soul, either. Some folks, myself among them, consider Billie Holliaday's Verve recordings to be among her very

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finest. It's true that life had not treated Lady Day well, and that her voice was no longer as supple as it had been—but Norman Granz surrounded Holiday with supreme musicians (many of them old colleagues) and, in that relaxed and supportive atmosphere, Holiday blossomed. One can hear regret and acceptance tempering these songs; I've never heard a more supernal "Body and Soul" than this one—or a more world-weary (and wary) "They Can't Take That Away from Me." Listening to that last, you just know that Holiday isn't convinced that there is anything that endures—except, ultimately, art such as hers. Superlative mono sound and very quiet pressing.

Catch A Fire catapulted Bob Marley and the Wailers into prominence in this country back in 1973. Of course, some of us were getting our reggae, and other Jamaican pleasures, straight from the Island long before that, so it was amusing to watch new fans rave about the "debut" of a band that had been performing for a decade. The Wailers at that time boasted the dream lineup of Marley (vocals, guitar, songwriter), Peter MacKintosh — later known as "Tosh" (piano, organ, guitar, vocals, songwriter), Bunny Livingston "Wailer" (congas, bongos, vocals), Ashton "Familyman" Barrett (bass), and Carlton "Carlie" Barrett (drums). These musicians, individually and in various combinations, would dominate reggae for the next decade, even as Marley personified the music to the world at large.

What a record! Rocking, groove-filled, rooted in Familyman's rhythm, and possessing a political conscience that went down 200 easy after some of the shrill excesses of American protest music, Catch A Fire was certainly never far from my turntable during the mid-'70s. My Island and Trojan versions of this disc have been so played that I can't rightly do a direct comparison (oh, those parties), but these grooves have been worn into my genetic code by now and I think MoFi has done a superb job on this reissue. It's got gobs of bottom, and while it sounds a tad soft on top, my recollection is that Fire always did suffer from some murriness. One friend heard the MoFi remastering while riding in my car and felt that the bass they've coaxed out of the tapes is too much of a good thing, but I'm not sure the concept applies to reggae, where the bass is the lead instrument, soul, and bedrock of all that goes with it. Irie. (Now, how about talking to Trojan about doing African Herbsman?)

The Fantasy Film World of Bernard Hermann has been an audiophile fave for years—and deservedly so. Each of the four suites presented here calls for a unique orchestral configuration: Journey to the Centre of the Earth is scored for woodwinds, brass, and four organs; The Seventh Voyage of Sinbad employs a full orchestra with an augmented percussion section; The Day the Earth Stood Still calls for conventional woodwinds to play against theremins, electric guitars, violins, and basses; Fahrenheit 451 evokes the future through a lush string orchestra. Four entirely different sonic worlds whose sounds greatly enhanced the resonance of the films they supported.

Fantasy Film Worlds is dramatic and compelling, not to mention extremely thrilling. No audiophile could resist the dramatic—and sonic—impact of the cathedral organ on Journey or the clattering marimbas of the skeleton attack in Sinbad. With its deep, deep bass and the brilliant transient attacks of all the percussion, this truly is a demonstration-quality recording. MoFi's LP edges out the CD on spatial properties, but the CD sounds crisper (in a good way) than the LP, which loses a little air on top. The original Phase 4 recording is still tops, if you've got the scratch for it. Otherwise, settle down and listen to one of these—MoFi's done us a favor to make them available.

Home of Whispers is sumptuously packaged, with a heavy paper insert and gold-plated CD. The sound caresses the ear—intimate yet vivid. The recorded perspective shifts subtly from track to track—a reflection of the effort that it took to capture all of this live, with only two microphones.

Lieberman's voice sounds stronger and more confident than it did on last year's A Thousand Dreams, but it's still an instrument that shows its wear. Paradoxically, this becomes one of her strengths—she doesn't coast; she tears each song out of her experiences, disappointments, and victories. And that may be too strong a draught for some folks—much of the time, it is for me. But not always; sometimes, it's just what I need.

Entangled Devotions features a remarkable interpretation of the "Emperor" concerto that is matched—and aided and abetted—by the remarkable two-microphone recording that presents it. The balance between soloist and orchestra (always a challenge to present realistically) is perfect.

There's a palpable sense of the hall and the players that inhabit it. What a glorious ambience, what remarkable decay. I hear a slight steeliness in the strings, but that may be attributable to the instruments themselves, not the recording.

There's strength in the performances that bucks the chilly "just play the text" trend and invests these works with resolve and nobility. I love the fact that the performers, by investing so much of themselves, end up with so much Beethoven in these interpretations. Glorious.

At first, I had the sense that the Tchaikovsky "Pathétique" featured a more distant perspective than the other PopeMusic discs, but I should have had
faith. The disc utilizes no compression and, to accommodate the more dynamic passages, the softer ones come across as quite soft—but man, does this disc have dynamic passages. The massed brasses have a startlingly rude quality, and the muted winds and strings quiver with hushed anticipation. Am I waxing mystical here? I don’t think so—but this powerful performance is intoxicating. It simply crackles with electricity.

Francais was recorded with a different (newer) ADC—a 20-bit Apogee, as opposed to the 18-bit used for Symphony 6 and the rest of the PopeMusic recordings. The differences are not subtle. It sounds warmer, fuller-bodied—perhaps even spectacularly so. Oh boy! Mo’ betta.
some soloist on his way to internalizing all of the elements that would manifest themselves in his greatest works—it's the diary of Coltrane's search for his fully realized voice.

But don't be fooled into thinking that *The Heavyweight Champion* is of interest only to jazz scholars and completists. This collection is filled with liquid gold—the sound of one of jazz's greatest voices testing his limits, composing his own songs, making hoary standards and pop-fluff totally his own. (Just listen to Trane's 13-minute exploration of the possibilities inherent in "My Favorite Things" and see if the song doesn't reveal depths you've never dreamed of.)

*The Heavyweight Champion* is, hands down, the most significant release of 1995. Rhino, as always, has put together superb documentation: sessionographies, interviews, essays, and reproductions of the covers. They've tracked down nearly 70 minutes of unreleased outtakes and appended them to the previously released material. They've even included a tribute from original session engineer Tom Dowd, as well as comments from McCoy Tyner and Elvin Jones. A class act.

And the LPs! Released in a limited edition of 3000 copies at $180 each, the LP box is enough to make an analog junkie start to twitch uncontrollably. Original cover art has been used for each disc, and the booklet is presented in a drop-dead gorgeous 12" by 12" format. The outtakes are spread over four sides of a gatefold edition.

"The sound? I hear you asking, "Tell us about the sound!" Very, very good. Comparing it to my originals, the CD comes close to my best pressings and far surpasses my worst. Over the course of the 10 releases featured, there was obviously some variation from disc to disc, but Coltrane worked consistently with the same engineer, Tom Dowd, and recorded mainly in Atlantic's 56th Street studio. Instrumental voices are clean and well-defined, always recorded with a "near" perspective—but this was before the era of multitracking and isolation booths, so the room-sound is always evident. The LPs sound amazingly like the CDs, originally leading me to suspect that Rhino did not prepare a separate analog master for the box. I was wrong about that—they did. I guess it just shows how good the CDs are. Pick your format, but for my money the LP package is just too damn special to pass up.

If you only buy one jazz release this decade, make it something that has stood the test of time. Make it ambitious. Make it... ah, hell—make it this one.

![Image of a CD cover with text](image.png)

**TELARC**

**JIM HALL: Dialogues**

Jim Hall, guitar; Scott Colley, bass; Andy White, drums; Bill Frisell, guitar; Joe Lovano, tenor sax; Tom Harrell, flugelhorn; Gil Goldstein, accordion; Mike Stern, guitar.

CD-83369 (CD only). John Snyder, Jane Hall, prods.; Jack Renner, Michael Bishop, engs. DDD. TT: 56:06

**RAY BROWN: Some Of My Best Friends Are...**

The Piano Players

Ray Brown, bass; Lewis Nash, drums; Ahmad Jamal, Benny Green, Dado Moroni, Geoff Keezer, Oscar Peterson, piano.

CD-83372 (CD only). Ray Brown, Elaine Martone, prods.; Jack Renner, eng. DDD. TT: 56:27

**BACH ORGAN BLASTER**

Michael Murray, organ.

CD-80316 (CD only). Robert Woods, prod.; Jack Renner, eng. DDD. TT: 75:45

*Dialogues* is an inspired concept; Hall is, of course, infinitely inventive as a soloist, but also possesses the much rarer knack of entering into intimate instrumental conversations with his fellow players. Which is all the more impressive if you consider the quality of the improvisors he's been involved with: Ben Webster, Sonny Rollins, Paul Desmond, Bill Evans, Lee Konitz, Art Farmer—the list goes on and on.

Pairing him with some of the most distinctive solo voices of today, this disc focuses on his strengths and those of his fellow musicians: it's witty, gentle, articulate, and personal. And these are true dialogues, changing topic and tone with each new companion. I'm particularly taken with the two with accordionist Gil Goldstein, where the reedy physicality of that instrument is contrasted nicely with Hall's particularly percussive attack.

The disc is appropriately here—recorded from a close perspective that captures both the body and decay of Hall's tone with harmonically rich verismo. The soundstaging is exemplary.

*Some of my Best Friends Are...* is similar in conception to *Dialogues*, pairing peripatetic bassist Ray Brown—who has appeared on more jazz recordings than any other musician in history—with a variety of pianists young and obscure, seasoned and famous. And as in *Dialogues*, the players respond with marvelously intimate communication.

However, as befits a session led by a double-bassist, the sound is big and beefy—especially Brown's bass, which manifests tremendous physical presence. Not to slight the piano sound, which is immediately vibrant, but it's Brown who's the sonic touchstone here.

Highlights would have to include Ahmad Jamal's "St. Louis Blues," with its robust walking bass and rompin', stompin' chorded crescendos, and Dado Moroni's sublimely silly "Giant Steps," which he plays like an Erroll Garner jam. I couldn't continue listening—the song's a show-stopper. Check it out for yourself.

*Bach Organ Blaster* is a sampler of Michael Murray's Bach recordings for Telarc, spanning 11 years and 11 organs (and 11 halls, of course). Murray's Bach is solid and thrilling, filled with majesty but also possessing grace, even awe.

Telarc has been criticized for favoring an overly reverberant perspective on its orchestral recordings, but here that philosophy is right on the money. You can't record an organ without recording the space it inhabits, and even though these represent 11 different recording dates, the balance is consistently right. Well-recorded and lots of fun.

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3 There's a lovely Robert Baker quote about the relationship of organ to environment: "After you've designed and placed an organ as well as you possibly can, some well-meaning lady is able to ruin the whole thing by donating memorial carpeting."
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Record Reviews

Recordings of the Month

Each of these releases is an example of the extremely high-quality reissues Analogue Productions has been quietly producing over the last few years. With luxurious packaging, superlative sound quality, 180-gram virgin vinyl pressings — or, for the Janis Ian CD, 24K gold plating — this enterprise has to be reckoned a class act. These two Recordings of the Month also highlight the diversity of AP's selections.

Neither the Copland nor the Menotti has ever received another recording, although the Copland boasts a satisfying Bernstein/Copland reading. Don't take the paucity of recordings as an indication of the works; while they may not scale the Olympian heights of the "Emperor," they're charmingly brash and idiomatic. It's hard to imagine them receiving a more sympathetic reading than Wild's — his prodigious technique and easy mastery of the scores' jazz and popular elements reveal how attuned he was to their demands. While he does emphasize their inherent vigor, he never descends into coarseness, playing always with delicacy and precision.

The recording tends to highlight the piano a tad too prominently — a common failing. Many engineers can't resist the compulsion to focus on the soloist as the star, rather than charting the far more interesting conversation between soloist and orchestra. That cavil aside, this disc is a stunner. There is phenomenally deep bass — particularly the bass drum in the Copland — wide soundstaging, and exemplary center-fill chock-full of depth and delicate decay. Kudos to AP for reviving these engaging works in most wondrous performances.

Copland: Piano Concerto in F.

Menotti: Piano Concerto in E-flat.

Janis Ian: Breaking Silence

Janis Ian's Breaking Silence consistently shows up on audiophile lists of reference popular recordings. Deservedly so — Ian points out in the liner notes that no synths, limiters, or samples were used during recording. In any case, the sonic purity is clearly audible: Simply recorded drums, guitars, bass, harmonica, and (of course) Ian's voice manifest an intimate setting for these direct, personal songs. Breaking Silence also broke from the mold of Ian's earlier albums: it's not preachy or self-consciously topical. The unguarded nature of the songs is reflected in Ian's vocal delivery, which eschews the broad vibrato that, for me, marred her earlier efforts.

While Breaking Silence has always sounded good, AP's CD and LP sound even better. The quiet, supremely flat vinyl offers an even clearer sense of intimate space than did the original, and the improvements in bottom-end extension are nothing short of mind-boggling. Harmonic overtones, whether from guitar string or cymbal, ring out with greater clarity and an increased sense of their inevitable decay.

Some long-time lovers of Breaking Silence have complained that the LP omits "Guess You Had To Be There" due to timing constraints — which is a pity, for it's a great song. But I'd have a hard time choosing to eliminate any of the other songs from the disc. The CD has them all, and is as close a match for the LP as any I've ever heard.

I suppose my favorite piece here is "What About the Love?" — an indictment of ugly religion, economic Darwinism, and a society that discards those it uses up. As social protest songs go, it runs a fairly consistent course — but it doesn't end there. Looking in the mirror, "I saw my pointing finger / pointing back at me / saying — Who named you accuser? / Who gave you the scales?" Ian's honesty, her ability to stare at her own shortcomings and not flinch, makes Breaking Silence worth shouting about.

— Wes Phillips
This performance comprises a marked improvement over Solti's earlier Chicago-based Missa. The sonority is less homogenized, the overall reading less churchly and more aptly symphonic, and the engineering (if somewhat flat in perspective) far more revealing of the work's magical moments. Notable in this last regard are the hushed timpani at the very close, suggesting how the military outburst that had interrupted the Dona nobis pacem may not have fully surrendered to the prayer for peace. Added to these virtues are expressive, musical soloists.

Yet for all its admirable features, Solti's conception does not hold its own with the best. The orchestral texture is still too diffuse, significant brass and wind passages often buried in a colorless base. Then, too, the conductor is not that adept at holding this sprawling score together. Tempo transitions are sometimes too abrupt, and the potential climaxes implicit in the codas of the Gloria and Credo sound more anemic than they should. Finally the Sanctus, if beautifully paced, tends to cloy in its overly sweet tone and the excessively wide vibrato Solti permits the solo violin.

Recorded in concert in 1994, this performance would surely satisfy in the hall. But intense phonographic competition makes it pale against the great accounts of Toscanini (his 1953 studio effort, or the hair-raising 1940 broadcast performance), Klemperer, and Harmonic. In such company, Solti sounds relatively colorless, loose-limbed, and bland.

— Mortimer H. Frank

CHOPIN: Piano Concertos 1 & 2
The Legendary 1984 Moscow Concert
Evgeny Kissin, piano; Dmitri Kitaenko, Moscow Philharmonic
ADH: TT: 71:30

The performances of the two Chopin Concertos, made when Kissin was but 12, have been astonishing listeners for years now — as did (to judge from the original audience reaction) the March 27, 1984 Moscow concert itself. First released that same year on two Melodiya LPs (C10 21837 008 and C10 21839 0020), these recordings were the first examples of the young pianist's extraordinary abilities.

In the annotations for those albums, E. Lieberman, then assistant professor at the Gnessin Pedagogical Institute of Music, provided a panegyric tribute about Kissin's Chopin on that occasion: "With all their captivating ingenuity, there is nothing childish in the twelve-year-old Zhenya's interpretations. We are confronted with profound, forceful, dramatic and deeply lyrical and opti- mistic playing demanded by the original. As for his command of the keyboard, his virtuosity? The young artist's extraordinary technical ability allows him to give utterance to his innermost thoughts, to every movement of his artistic soul."

One cannot really argue with that enraptured appraisal, but, as I've pointed out in past reviews of Kissin, referring to far more recent performances, though I find his playing often astonishing — most especially from a 12-year-old — not all elements completely satisfy me. Perhaps that's my own problem, but what I miss in his very big style — a stentorian manner that obviously from earliest days has been fostered to send waves of sound to the auditorium rafters — is an understanding of the beauties and contrasts of soft playing (which, incidentally, can just as easily be heard in large halls).

Though such criticism may be totally unfair directed to a lad near the beginning of his career, the lack of really quiet, inward, intimate playing — especially in Chopin — has bothered me in the majority of Kissin discs. He as-}

This is a very important release, and an almost perfect performance. Composed in 1950 but not performed until 1988 (in concert), Beatrice Cenci is as close to a contemporary masterpiece as we tend to get; As a work for the stage it's probably foolproof; on discs it works brilliantly.

The opera is based closely on Shelley's play, The Cenci, a tale of murder, incest, rape, and sadness — in other words, excellent grist for the operatic mill. The music is invariably at the service of the drama: We learn about characters and situations from the music; there are flowing melodies (just listen to the third-act nocturne), rich dissonances and harmonies, and Goldschmidt is a master orchestrator. The tension is kept high throughout, and there's no flab. The effect is as shattering here as it is in Wozzeck, although this opera holds none of the atonal fears that Berg immediately brings to mind.

The English libretto is as taut as the music, and about half the text can be understood. Roberta Alexander as Beatrice, who has been raped by her father, is touching and strong. Della Jones as her stepmother offers great sympathy — their music together is heartbreakingly beautiful. Indeed, the entire cast sings its heart out; only Simon Estes, as the villainous Cenci, disappoints somewhat — he's gruff and unpleasant (as he should be), but his voice seems here to have lost all focus, coming out woolly. Zagrosek leads a tight, exciting performance without ever missing a chance to underscore the opera's lyricism. The sound is magnificent, with nothing lost, nothing artificial.

A nice bonus are the four songs, well
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sung by Iris Vermillion; these miniatures capture moments and moods expertly. In all, a not-to-be-missed set.

—Robert Levine

In symphonies monic his where Symphony Pavilion times, bly symphonic bling S all, late Certainly, Symphony SK hear this Sommeil by following effect forces Richard work of Lutoslawski, with a focused ARCH reading Richard King, Symphony 4, with the L.A. Philharmonic at the Dorothy Chandler Pavilion in the orchestra's native city. While I somehow missed that event, I did hear Essa-Pekka Salonen lead the same forces through this gripping work in late 1993—just prior to the recording of this CD. Salonen understands Lutoslawski, and that's no faint praise. Symphony 4 employs aleatoric sections where the orchestra is left to phrase at will, following no rigid meter demands. The effect is almost other-worldly at times, but never, as one might fear, chaotic. Certainly, a sympathetic orchestra and conductor are a must for this music.

Even more focused and detailed than Symphony 3 (with which it's paired here), Symphony 4 is a diverse, ever-changing work of tremendous clarity, lyricism, and micro-detail—it's probably safe (and accurate) to say that this is Lutoslawski's ultimate expression in symphonic form. At just over 21 minutes, there is never a moment of rambling or groping.

Salonen's reading seems slightly more subdued and polished than the live performance I witnessed, but he never glosses over texture or detail. His remark that Lutoslawski's music "possesses the beauty of a giant organism, like a tree, or maybe a forest; we are moved by the logic of the form and the inevitability of growth," reveals a deep understanding of the composer's art. It's also a concise summary of Lutoslawski's overall conceptual approach.

Sony's 20-bit recording is open and massively detailed, as befits this meticulous, dynamic music. While the inclusion of the previously released Symphonies 3 and Les Espaces Du Sommeil will constitute some duplication for collectors, it's a pleasure to have these works grouped in an all-Lutoslawski program. I'm attempting to exercise critical restraint, but Lutoslawski's Symphony 4 is a fascinatingly original and unforgettable work; though its place in the pantheon remains to be determined, modern music devotees should own this disc.

—Carl Baugher

MEDTNER: Piano Music

Vladimir Vardo, piano
Elektra Noneuch 79283-2 (CD only). Max Wilcox, prod, eng. DDD. TT: 58:35

Moscow-trained and currently a professor and artist-in-residence at the University of Northern Texas in Denton, Vardo has an excellent grasp of both the Medtner and the Rachmaninoff. The style is secure, the playing suitably vigorous throughout; only in the Corelli variations did I sense a certain holding back, with the ultimate vestiges of electricity and temperament just slightly wanting. For the Rachmaninoff, I would still opt for Ashkenazy. (Watch for the first of that Russian pianist's three recordings, a remarkable 1957 performance which is being reissued on CD, as well as the fine Oxana Yablonskaya recording on Connoisseur Society.) Noneuch's generally good sonics present a moderately close piano, somewhat left-centered and lacking the ultimate in sparkle.

—Igor Kipnis

MENDELSSOHN: Complete works for Cello & Piano

James Krager, cello; Gerald Robbins, piano
Musical Heritage Society MH5 5128202Z (CD only). DDD. TT: 65:11

I was particularly taken by James Krager's impassioned, declamatory style on this disc. He has a rich, sensuous tone that is eminently suited to the intimate balance and immediacy afforded the recording here. He makes a winning case for these cello works; the Second Sonata, which opens the disc, is a showcase for both Mendelssohn's jaunty melodic style and Kreger's own highly charged emotional barometer, which responds so readily to changes in the score.

The Variations Concertantes are again a wonderful indicator of this. They may not always be perfectly in tune, but they're given with such conviction that criticism seems irrelevant. In both these works, the Cello Sonata 1, and Lied ohne Worte that concludes the disc, Gerald Robbins proves the perfect partner, coping with the delicate role of accompanist and sometime soloist with equal sensitivity. If you consider Mendelssohn a composer of minor interest, I urge you to sample this delightful disc.

—Barbara Jahn

PROKOFIEV: Symphony 3
MOSOLOV: Iron Foundry

VARÈSE: Atrana

Riccardo Chailly, Royal Concertgebouw Orchestra
London 436 640-2 (CD only). John Dunkerley, eng.; Andrew Cornall, prod. DDD. TT: 57:16

Riccardo Chailly is often successful at conveying poetic lyricism, as in his Bruckner recordings. However, he seems to shy away from analytical, sharp-edged incisiveness, even when it's essential.

While he's certainly no Boulez, Chailly does get closer to the urgency and outright brutality these scores demand than previous efforts have suggested. His Mosolov Iron Foundry is relentlessly driving, and his Prokofiev Symphony 3 seethes with dissonant tension, offset by transitory passages of hallucinogenic calm. It's exactly what's needed.

On the other hand, Chailly's reading of Varese's Atrana is too smooth and soft-edged. Although spirited, Chailly seems to lack conviction and vision—particularly when compared with Mehta's passionate London CD (Japanese POCL-2346) or Nagano's carefully committed reading (Erato 92137-2).

Among in-print CDs, Boulez's razor-sharp and insightful interpretation (Sony Classical SK 45844) remains the top choice, despite distant, subdued sonics. On purely audiophile grounds, Mehta's London CD is hard to beat, but the original 1972 British pressing of the red-label, ffrr London LP is spectacular and without sonic peer.

—Carl Baugher
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2 Kenneth Wilkinson, eng.; 3 Charles Gerhardt, prod.;
3 Tim Page, exec. prod.; Andrew Kazdin, prod.; Karl
Herrera, remastering prod.; Samuel Osullivan, eng.
AdD. TT: 69:28
REVUELTAS: String Quartets 1-4
Cuarteto Latinoamericano
New Albion NA0621CD (CD only) Foster Reed, exec.
prod.; Saul Bitran, Riccardo Schulz, musical prods.;
Riccardo Schulz, Raymond Chick, engs. TT: 42:45

The essence of the 41-year-old flashfire
life of Mexican composer Silvestre Revueltas explodes in the manic, com-
pulsive, and intensely vibrant music pre-
sented in these collections. Born on the
final day of 1899, Revueltas spent his
short life as a frequent patient in mental
hospitals, as a soldier in the Spanish
Civil War, and as an alcoholic. This mercurial
existence produced music of wild con-
trasts, shifting from the macabre to the
fertive without warning. Revueltas was a
great spirit, largely untempered by con-
straints of convention but deeply rev-
erent of his Mexican heritage.

The works in the Night of the Mayas
collection are fresh, original, intense,
and puzzling. Brilliant in their orchest-
ral colors, they are full of life, even
when they present life’s dark side — as
in the sparse, stark Planos. Extreme juxtapo-
sitions, such as that between the
night-music and the festive sections of
Homemade a Federico García Lorca, may be
enigmatic, but they become effortlessly
natural with Revueltas’s genius for con-
trast. In this collection we are also taken
from the hypnotic, nightmarish inten-
sity of Sensmena to the puckish wit of
Toscata and the rhythmic orgy of The
Night of the Mayas without complaint
that spirit dominates over form.

But form does get a nod from Rev-
ueltas in his string quartets. Still full of
the bipolar contrasts of his orchestral
works, his quartets exhibit a little more
European influence. None of these
works is over 13:01 in length, yet so ex-
pressively succinct are they that they
form emotionally complete — and often
cathartic — statements. Revueltas’s fourth
and final quartet, Música de Feria, is an
eight-minute cascade of exuberant mu-
sical ideas and compositional bravado
that crystallizes the many passions of the
composer in a compelling declaration.

Both CDs also offer compelling
sound. The Night of the Mayas is remark-
ably consistent, considering that several
different production teams were in-
volved — including the legendary duo
of Charles Gerhardt and Kenneth Wil-
kinson. This disc is quite amazing in its
natural orchestral detail and three-di-
menSional soundstaging. Superb timbres
and ambience characterize the quartet
disc, which also offers excellent detail
without stridency.

These two recordings contain intense
music intensely performed by all musi-
cians involved. Those not familiar
with Revueltas will find a revelation;
those who know this profoundly alive
composer will find ample edification.
— Robert Henson

SCHUBERT: Symphonies 1 & 2
Michael Halász, Falhoni Orchestre
Naxos 8.553093 (CD only), Tamás Benedek, prod;
Gabor Mocsány, eng. TT: 63:05

These may not be the most tonally
suave or most musically probing of per-
formances, but both surpass the efforts
of some big-name conductors. More im-
portant, at its $5 price this disc has no
peer. Halász’s well-chosen tempos give
the music considerable spring without
compromising its gracefulness; and
both symphonies, if not masterpieces,
bespeak Schubert’s extraordinary pre-
cocity, 1 composed when he was 16, 2
the following year. There is as much
promise in these scores as in virtually
anything produced by the young Moz-
art.

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Naxos release, one can acquire superior
performances of both works led by
Abbado. He secures a leaner, more trans-
parent sonority and buoys the finale of 2
with a lilting legato phrasing matched
only in a magnificent 1938 live perfor-
ance led by Toscanini (issued by
opened). The minor shortcomings of
Halász’s accounts are occasional spot-
lighting of wind solos and a few in-
stances where the strings cover impor-
tant material in other choirs. Otherwise,
these are highly attractive, well-recorded
readings worth far more than their mod-
est price. All exposition repeats are ob-
served, a generally good practice — ex-
cept, perhaps, in the first movement of
2, where it causes excessive length and
a disproportion in which exposition and
recapitulation comprise 90% of the 14-
minute movement. — Mortimer H. Frank

VERDI: Requiem, Quattro Pezzi Sacri
泸a Oragonova, soprano [Requiem]: Donna Brown,
soprano; (Te Deum); Anne Sofie Von Otter, mezzo;
Luca Canonici, tenor; Alastair Miles, bass; Mon-
teverdi Choir, Orchestre Révolutionnaire et Homo-
tique; John Eliot Gardiner
Philips 442 142-2 (2 CDs only). Wilhelm Hellweg,
prod. 13013. TT: 119:52

There had better be a good reason for a
30th recording of anything to appear in an
already glutted marketplace — par-
ticularly when half the other 29 are as
good as they are. Ostensibly, the reason
— besides John Eliot Gardiner’s ap-
parent refusal to leave vocal music of
any period, save Wagner (so far), unre-
corded — is the use of instruments on
which the Requiem would have been played
in 1875, instruments manufac-
tured before the technological revolu-
tions of the 1890s altered the balances
among the instrumental groups.

Still, I’m not certain I’d have picked
up that that was the difference in this
recording. What I notice is remarkable
clarity throughout — not only in bal-
ances but also in expressiveness, both
vocal and instrumental. The trumpets
ring out; the timpani sock it to us; the
woodwinds float above it all; the strings
carry us along, jangle our complacency,
support the drama. The chorus’s dic-
 tion, phrasing, and involvement (just listen
to the “Sanctus”) are glorious.

All of Verdi’s dynamic markings are
scrupulously observed, and inner voices
are always audible. And while per-
formances of this work can usually be
divided into the “reverential” and the
“operatic,” I can fairly say that this one,
like Giuliani’s and Toscanini’s, is both.
The mystery and awe with which solo-
ists and chorus intone the text is noth-
ing if not prayerful, and the singing is
Verdian at its best — it never smacks of
verismo-like exclamation.

The star soloist is Luba Orgasonova,
whose soprano floats exquisitely and
eloquently over the proceedings; von
Otter’s contribution, while less spec-
tacular, is just as solid. Luca Canonici,
much touted when he first came on the
scene a few years ago, has since disappoi-
ted; here he lives up to early expec-
tations. Alastair Miles holds up the bass
line handsomely.
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The recording has early-Karajan tendencies: If your dials are set high enough to hear the opening pianissimi, later fortissimi will blow your brains out. But the clarity is magnificent; the engineers should be applauded.

This is an epic performance, worthy of a place at the top of the 30. Gardiner has been known to be scholarly for the sake of scholarship, but not here. This is deeply felt music-making that just happens to be somewhat revolutionary. And if I haven’t mentioned the Quattro Pezzi Sacri, it’s only for want of space—they’re as beautifully performed as the Requiem. Don’t miss this release—even if you think you already own the ideal performance. There’s more to be heard here than ever before. —Robert Levine

WAGNER: Orchestral Works
Overtures & Preludes: Rienzi, Lohengrin (Act III), Tristan and Isolde (with Liebestod). Die Meistersinger von Nürnberg, Parsifal, Siegfried Idyll
Roger Norrington, London Classical Players; Jane Eaglen, soprano
EMI 5 55479 2 (CD only), Simon Woods, prod.; Mike Hatch, eng. DDD. TTI: 6343

I usually avoid “bleeding chunks” collections of Wagner excerpts, but this one was potentially too interesting to resist: Wagner on original instruments.

Roger Norrington and his London Classical Players play with musicologists’ best guesses as to the performance practices of the five decades (1840s–1880s) represented here by cuttings from the appropriate Wagner operas. Not surprisingly, considering their almost entirely Classical repertory to date, they fare best with the earliest selections, from Rienzi and Lohengrin. (Norrington conducted a successful Flying Dutchman overture a few years ago on his Early Romantic Overtures disc.) The interpretations of these are lively enough and dramatically sculpted, though Norrington’s avoidance of all vibrato ("we do not believe that vibrato played any part in orchestral playing") does tend to point up raggedness of ensemble more than would otherwise be evident.

But when Norrington & Co. enter the very different world of Tristan and Meistersinger they seem out of their depth. Here the combination of "pure tone" string sound and Norrington’s obsession with historically accurate playing times leads him astray. Despite his own noting of the fact in the accompanying booklet, Norrington seems to have missed the point Wagner was trying to make when, starting with Dutchman, the composer deliberately stopped indicating metronome markings in his scores in order to thwart just the sort of temporal punctiliousness Norrington indulges here. Yes, it’s certainly true that playing times of Wagner’s works have steadily lengthened over the past century. What seems more difficult to grasp is, that in itself, this is meaningless—nothing seems as long as an ill-formed or uninspired performance, no matter how few clock-minutes it lasts.

The Tristan Prelude is a case in point. Norrington rides roughshod over most of the opportunities this score offers him for expression through the most basic use of rubato or sculpted phrasing, whether marked by Wagner or not. If he was attempting to create a mood of relentless tragic passion, what comes across is the passion of a pedant, not a lover.

On the other hand, the Meistersinger Prelude is lightened and legato-ized to an extreme of diffidence. Certainly it’s true that Meistersinger tends to be played too thickly, heavily, and portentously—Wagner did want his immense orchestra to dance with the grace and incisiveness of a late Beethoven quartet. But Norrington makes the music sound tentative, slight not only in sonic heft but in musical substance—which it most definitely is not. In a mere 8:28, Norrington seems to be accelerating in just those places where every other conductor indicates a ritard. He isn’t, of course, instead keeping up an almost unvaried tempo; it’s the counteracting of expectation that makes it sound speeded-up. It’s fascinating to hear… once.

Despite his quest after historical accuracy and the composer’s wishes, Norrington unaccountably dismisses Wagner’s very specific requests for the size of his string section, explaining that “in few theaters did he achieve his later, Bayreuth ideal of 16.16.12.12.8.” This not very neatly sidesteps the important fact that Wagner did achieve his ideal there, and did not change his mind following the 1876 Bayreuth premiere of the Ring—those 64 strings had given him exactly the sound he’d hoped for. The LCP’s 14.13.9.8.8 string complement leaves a hole in the center (violas and cellos) of the string sonority that makes the sound more lean, less rich than Wagner obviously intended it to be. Norrington points out that the LCP’s 52 strings make it the equivalent of the 1880s Vienna Philharmonic, but this seems beside his own point, let alone Wagner’s.

The Ring itself is represented here by the Siegfried Idyll, which, as a work for chamber orchestra, does not represent the massive sonorities of the Ring at all. It also allows Norrington to avoid having to deal with, say, such daunting musical challenges as the Rhine Journey or Funeral Music from Götterdämmerung, not to mention the Immolation Scene. On the other hand, the Idyll’s small scale permits it to be Norrington’s most successful performance here; the avoidance of rubato and vibrato well serve a work which, after all, already has written into it plenty of sentimentality, if not outright schmaltz.

And the Parsifal Prelude, too, at least in its unaccompanied string passages, benefits from Norrington’s astringent strings. But again, his refusal to ritard makes this music sound rushed in a way only Pierre Boulez before him has dared to put on record—with disastrous results—on his 1970 Bayreuth Parsifal (DG 435 718-2). Norrington keeps his metronomic resolve to the very end, making the Prelude seem to end all too abruptly. Throughout the disc the sound is quite good, with orchestral tonalities and soundstaging equally convincing (though the strings are a bit overbright).

Despite or because of all his research, in most of these selections Roger Norrington seems to have lost sight of the
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musical. Ultimately it doesn’t matter how many players there are, how long or short anyone’s interpretation is, or whether or not Wagner’s string men played with vibrato. All that’s important is that the music seem to grow organically and inevitably out of itself in a constant fulfillment of expectation via unexpected routes, the listener ever arriving at musical destinations hitherto unvisited but somehow recognized. This is the difference between art and life, and why art is so important to us. Though his Siegfried Idyll is a model of economy and grace, too often here Norrington provides not music, but merely one damn note after another. —Richard Lehner

JOEL COHEN/BOSTON CAMERATA: Nueva España
Music of New Spain, 1590–1690
Joel Cohen, Boston Camerata
Erato 459772-2 (CD only). Yasabelle van Wersch-Cot, prod.; David Giesinger, eng. DDD. TT: 75:23

After a few false starts over the years, Joel Cohen is getting awfully good at what he does: performances of music from less-known traditions, with the emphasis on the American.

Here, he augments his Camerata with the Boston Shawm and Sackbut Ensemble and the Schola Cantorum of Boston, along with the Black women’s church choir, “Les Amis de Sagesse,” for his most ambitious effort to date: an exploration of the remarkable musical fusion of cultures that existed under the Spanish Empire in the New World. Cohen points out, quite correctly, that the indigenous Americans (at least those who survived the initial contact with the colonizers) eagerly adopted Christianity — especially its musical traditions. With this recording, he also makes us aware of the considerable contributions of immigrant Africans to this musical heritage.

Curiously, however, Cohen nowhere mentions the word slave, thereby diminishing the Africans’ achievement in keeping a part of their original culture more or less intact in the face of efforts to obliterate it. This seeming lapse into political correctness (if that’s what it is) does not in any way detract from the excellence of this performance, which is literate, lively, and truly joyous.

Cohen has chosen an excellent representative selection of works for this disc. We are given songs in Spanish, Gallican, Quecha, and Nahualt, among others, with a wide range of instrumental accompaniment. African and vernacular Iberian dance forms mix with Spanish classical idioms in a genuine world music. (‘I’ve said as much before, in my review of Scott Reiss and Hespeons, but it certainly bears repeating.)

The by now well-known Boston Camerata performs at the height of its powers, and Cohen’s additional forces are no less fine. I loved their versions of two folk-based tunes, the galago “Si al nacer,” and a guaracha (Cuban dance) “Conviviendo esta la noche.” I should also mention that Anne Azéma, who is fast becoming one of my favorite early-music performers, sings very beautifully here, as does the redoubtable countertenor Derek Lee Ragin, and “Les amis de Sagesse” provides considerable force and vitality.

The musical history of America is a complex one — no one living can understand it in its entirety, and all of its threads may never be traced. It is also very much a living history — we interpret the past in terms of the present, and vice versa. To this understanding and interpretation, Joel Cohen is making a very valuable contribution. If the New World is supposed to be a melting pot, perhaps we are beginning to learn what its real ingredients are.

I’m also obliged to add that Erato’s engineers and producers have learned to give Joel Cohen’s recordings exemplary sonorous presentations; this is no exception. —Les Berkley

JAZZ & BLUES

GARY MEEK: Time One
Gary Meek, soprano, alto, & tenor saxophones, flute, vocals; Mitchell Forman, synthesizers, Fender Rhodes, acoustic piano; José Neto, nylon-string electric guitar; Mike Miller, guitar; Jerry Watts Jr., bass; Michael Shapiro, drums; Brad Dutz, percussion, frame drum, timpani, xylophone; Kevyn Lettau, Scott Mayo, vocals; Lee Thornburg, trumpet

Born in Rio de Janeiro, Dutra studied with Béla Siki (a Lipatti pupil) at the University of Washington in Seattle, where she now lives. This, her debut recording, is notable both for displaying her temperament and a real understanding of the Latin style. The program, as well as her playing, is an attractive one whose main disadvantage is a tightly miked, uncomfortably close midrange recording in which dynamics and color are not allowed full sway. The lack of ambience rather limits the recording’s appeal, but the playing is of sufficiently high quality that listeners might like to try the disc anyway.

—Igor Kipnis

STEREOPHILE, MARCH 1996
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Stereophile, March 1996
his listeners to “enjoy the rays of organic intelligence coming to you from individuals living in Californian culture and Global sunlight.” Reading on, Gary Meeks thanks everyone including his travel agent and golf partner, and Iain Ballamy thanks “whoever may be listening to this CD.” It is a subset of the aforementioned Law that artists who are compelled to thank everyone in their life for helping make their albums possible rarely make recordings which justifiably the generosity which created the gratitude.

Struggling with himself but still brave and determined, Your Reviewer cues up Time One by Gary Meeks. It sounds like a series of commercialingles for a car company. But not a major car company. Drummer Michael Shapiro and electric bassist Jerry Watts Jr. set up a bounce so reliably happy as to suggest the progress over hills and dales of a Suzuki, perhaps, or a Hyundai. Over this unwavering chunk-a-chunk, Gary Mecks’s saccharine soprano sax squeals toy melodies, accompanied by ooh-ing vocalists.

On to Sound Advice. Byron Wallen’s work contains more elements with which to layer dense textures (exotic percussion, horns, voices), and his time is more supple and fluid than Mecks’s. He’s usually content to stab his muted or open trumpet randomly through the pulsing rhythmic undercurrent, creating catchy flashes of color. But Wallen’s work is more ambitious, which is not necessarily good news. His musical content cannot bear the weight of its intended cosmic messages. When Wallen or guitarist Alan Weckes attempts to create actual linear development (as on “Paradox” or “Let Go (And Embrace”), their ideas are strings of clichés with trite resolutions.

If you ever wondered what became of John Tchicai, the avant-garde saxophone player who played on Coltrane’s Ascension in the ’60s, Love Is Touching is your unfortunate answer. Tchicai attempts to assemble a personal collage. The ingredients include his own abstracted horns (their concepts simplified and their jagged edges rounded for this context), funky bass ostinatos, hip-hop rap doggerel, thrashing guitar distortions, Latin-inflected momentums, and twittering synths. The hope must be that unexpected juxtapositions will spark fresh synergies. The result is tortuous and inane. “Salt Lips City Blues,” with three unattractive solos from guitarist Grandi and Oi, and Tchicai on honking tenor, is tyrannical in its rhythmic monotony. “You Made

When one of the world’s most renowned loudspeaker companies starts a subsidiary record label, the audiophile press pays attention. With curiosity and high expectations, Your Humble Reviewer approaches this small stack of new B&W’s. Because he is generous and open-minded to a fault, he does not allow himself to be thrown off stride by first impressions. Except for John Tchicai, virtually every artist on these four albums is unknown to him. No problem. He is a positive glutton for new experiences. True, the cover art ranges from merely cute (Tchicai) to truly hideous (Iain Ballamy as “Mad Man”). But he reads each insert booklet with careful attention. That’s when the high expectations start to wane. The designs are cluttered and kitschy, and there is almost no useful information about how the recordings were made. It gets worse.

Through years of sometimes painful experience, Your Reviewer has formulated Conrad’s First Law. It goes something like this: You are in for a long night when liner notes contain pronouncements from the artist such as, “I hope this album takes you down many roads of discovery, leading closer and closer to the jewel of yourself.” Unfortunately, that’s exactly what Byron Wallen says in the notes to Sound Advice. Wallen also lists the (sometimes misspelled) names of the most important books in his life, and dedicates his album to “all committed to a path of love.” John Tchicai’s liner notes implore

Byron Wallen — his Sound Advice is one of four recent releases from B&W Music surveyed by Thomas Conrad.

Me Laugh (And Snot Came Out)” mercifully has no lyrics, but is melodically trivial.

Iain Ballamy’s All Men Amen would seem to stand by itself in this foursome: the rhythm section contains respected players like Django Bates and Martin France, and the format is close to a conventional acoustic quartet except for Bates’s occasional use of synthesizers and E-flat horn. Several of Bates’s piano solos shift pleasantly among levels of lyricism. But this is Ballamy’s date, and both as composer and improviser he is a predictable and uninteresting thinker. The sticky-sweet simplicity of his songs could actually benefit from some of the camouflage of Byron Wallen-style tape loops and banks of conga players.

Theoretically, certain objective standards of audio quality should apply regardless of musical genre, but the thick, amplified musical soup on most of these recordings makes sonic evaluation difficult. Multitracking and the use of prerecorded synthetic insertions render such issues as soundstaging irrelevant to recordings like Tchicai’s. But individual instruments, when they momentarily separate themselves from the throng, should be vivid and present — and they’re cloudy on Love Is Touching. The bass drum and bass guitar, at least, should slam — and they don’t. Even allowing for Byron Wallen’s kitchen-sink approach to orchestration (stirring voices into bubbling percussion along with “loops, beats, and MIDI sequencing”), why must the whole presentation rasp and boom and confuse? Gary Meeks’s Time One is a simpler mix, but it sounds two-dimensional and manufactured.

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mediocrity of the Ian Ballamy album. There have been hundreds of excellent recordings of acoustic jazz quartets. Here, both Bates’s piano and Ballamy’s saxess lack clean edges; Steve Watts’s bass is far; France’s cymbals have no air around them. There is not a single interesting sonic detail in this recording to suggest a connection with B&W, the company on whose speakers over 80% of the world’s classical recordings are monitored.

Your Reviewer can now report that the experiences described herein have led him to dutifully investigate 11 other B&W releases, and that he has found the four recordings under consideration here to be, alas, representative. If anyone can explain to Your Reviewer how the makers of classics like the B&W Matrix 801 and the Silver Signature can be responsible for the aesthetic and sonic contents of B&W discs, he is, like Ross Perot, all ears. — Thomas Conrad

CHICO FREEMAN: Focus
Chico Freeman, tenor sax; Arthur Blythe, alto sax; George Cables, piano; Santi Debriano, bass; Yoron Israel, drums
Contemporary CJ3·14075-2 (CD), Eric Miller, prod.; Dove Lake, eng. AD10. TT: 66:11

Saxophonists Chico Freeman and Arthur Blythe hit New York, if I remember correctly, about the same time: in the mid-’70s. Both were eagerly awaited, Blythe because he had already recorded several powerful records on the West Coast, and Freeman because of his Chicago-born reputation for playing contemporary sax while also demonstrating his evident mastery of traditional jazz saxophone styles. It didn’t hurt that his father, Von Freeman, was a legendary saxophonist, who mainly stayed in his hometown of Chicago. Together they seemed to suggest the building of bridges between mainstream and avant-garde jazz.

They hardly sound alike: Blythe has a broad, buttery tone that seems to go back to Benny Carter. He can be romantic, while Freeman has that tough tenor sound, rough-edged and decisive. But they sound compatible here on Focus, a reunion album. In his notes, Freeman tells us his intentions: “The idea is for the two of us to sound almost like one instrument together. Like we were thinking of the two saxophones as one big saxophone, with a range from the tenor up through the alto, and us being able to call and answer to ourselves, finish each other’s solo lines.”

They rarely tread on each other’s toes to that extent, but Freeman and Blythe do engage in some dual improvisations on this disc, and communicate so well that, despite the difference in sounds, they can sound like twins filling-in each other’s thoughts rather than dueling saxophonists.

Their repertoire includes two particularly swinging Monk tunes, “Benisha Swing” and “Rhythm-a-Ning.” “Ah George, We Hardly Knew Ye” is pianist Don Pullen’s tribute to the co-leader of his wonderful band, George Adams. Since writing it, Pullen, too, has passed on. Playing its melody with a big, wailing vibrato, Blythe makes the tune more romantic than bleak, and even, on its slyly-sounding triplet figure, mildly comical. The witty Cecil McBee composition “Peacemaker” features shifting rhythms and a whimsical use of space, which Yoron Israel fills with his brushes.

For me, though, Focus’s highlight is the dual improvisations of the two saxophonists on “Rhythm-a-Ning.” They rework Monk’s version of “I Got Rhythm” with grace and authority, keeping its good spirits while making it a lighter, darting work. The improvisations heat the place up, and we get to hear the fine rhythm section: fans of jazz piano should hear George Cables’ work throughout Focus, which is Freeman’s first session on an American label in five years. Recorded in closely miked fashion, the disc doesn’t project a particularly deep sense of space, but the vigorous, lively communication among these players makes this session welcome.

—Michael Ullman

STAN GETZ: Blue Skies
Stan Getz, tenor sax; Jim McNeely, piano; Marcus McLaurine, bass; George Johnson, drums
Concord Jazz CJ3·4676 (CD only), Carl Jefferson, prod.; Steve Getz, comps; Phil Edwards, eng. AD10. TT: 43:25

After moving to San Francisco from New York in the early 1980s, Stan Getz recorded four quartet albums on the Concord Jazz label. Until now we only knew about three of them: Spring is Here and The Dolphin, both recorded live at Keystone Korner in 1981, and Pure Getz, from a studio session in January 1982. Now, after 14 years in storage, comes Blue Skies, from the same session as Pure Getz. No insights are provided as to why Concord waited so long to release what Getz’s son Steve calls “the finest of the four Concord albums.”

It doesn’t matter now. Blue Skies is all of a piece, a powerful dose of the freecool Getz tenor sax sound and musical imagination, a flowing of ideas like effortless breezes stirred by subsurface urgency.

The first three tunes are ethereal ballads. Rodgers and Hart’s “Spring is Here” is one of the most perfect examples in popular song of form following function, a melodic affirmation identical with renewal. Getz just whispers it, yet never stops climbing, “Antigny,” by bassist Marc Johnson, sustains the mood of elevated contemplation. No wonder Getz achieved widespread popular acclaim in his lifetime — his sound sings to and soothes our innermost beings, yet also acknowledges pain. Pianist Jim McNeely takes a solo on “Antigny” like a light waterfall blown about in the wind. “Easy Living” is languid yet purposeful. McNeely’s “There We Go” is the only up piece, and it still exudes relaxation. The title track and “How Long Has This Been Going On?” complete this small, pristine collection.

Blue Skies has the sonic quality typical of early-’80s Concord: too close up to be fully in focus, warm and slightly overripe, yet pleasant.

We lost Stan Getz in 1991, but he’s still bestowing gifts. — Thomas Conrad

ABDULLAH IBRAHIM: Yarona
Abdullah Ibrahim, piano; Marcus McLaurine, bass; George Johnson, drums
Eng/Tape: 988820 2 (CD only). David Baker, eng. AD10. TT: 56:18

Recorded live on a fine piano at Sweet Basil’s and wonderfully recorded by David Baker, Yarona is one of Abdullah Ibrahim’s strongest albums. Part of its power comes from the sound: the full-bodied piano, the excellent balance of the rhythm section. Ibrahim’s music, with its uplifting melodies and powerful, dancing rhythms, always comes across better live than in the studio: the pianist himself seems inspired by audiences as he moves (sometimes restlessly) from composition to composition in medleys that often feel like one extended piece. Ibrahim’s melodies are based,
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This is Crimson, however, if Adrian Belew sounded vocally like Kenny Loggins, and was more into the Classics than the Beatles. I like early Kenny Loggins, so when I say that "Stone Diamond" sounds like Loggins & Messina gone progressive, I'm being descriptive, not pejorative.

Rinehart's style leans toward recitative verses resolving into melodic, catchy, but lyrically sophisticated cho- ruses. His words strive for poetry, which doesn't always make for fully realized songs. Fortunately, Torr, Karn, and drummer Kurt Worman surround the tunes with plenty of interesting sonics, allowing the listener to tune in and out of the dense stories at will. Torr's production deftly juggles the complexities of the music, allowing the many textures to breathe. It all makes for a pop record that bears repeated hearings.

I'm not sure how successful Jason's Chord ultimately is, but it finds its way into my player a fair amount. It's worth seeking out, if only because it flies in the face of all that's currently hip in the pop world.

—Michael Ullman

ANDY RINEHART: Jason's Chord
CM CD 1003 (CD only). David Torn, prod.; Walter Quintron, eng. 13:03. TT: 43:46

You'll have to hunt for this one — even though CMP's owner, Kurt Rtenker, records music ranging from European improv to a new piano/vocal Jack Bruce disc, his product usually gets casually tossed into "Jazz."

In the broadest sense, Andy Rinehart is a singer/songwriter. A hip local store filed him under Japan — the band, not the country — because fellow CMP artist Mick Karn's instantly recogniz- able bass stylings are prominently fea- tured. Add David Torn's guitar, and what you have is something more akin to King Crimson than James Taylor.

Ed Schuller and the members of his band — particularly the brash trombonist Gary Valente and hard-blowing Joe Lovano — share a muscular quality in their playing, something that used to be called animal spirits. That's not a back- hand compliment. Schuller's exuber- ance, which we hear played and hummed on his solo on "Sooner Than Before," is exhilarating; but there's sub- tlety on To Know Where One Is as well, in the quieter moments of "Sooner Than Before" and the exoticism of "Nicole's Soul," or the misty wanderings of "Now It Can Be Told," which brings guitarist Bill Bickford to the fore. With the exception of "Chazz," written by brother George, all of the pieces were written by Ed Schuller.

It helps that, besides having two top-of-the-line horns, Schuller has one of the great jazz drummers along in Billy Hart. Hart's a versatile drummer who likes to keep things happening. Keeping his drums in a tight semicircle around him, he deals out rhythms like cards, crisply and with a little bit of flash. His every move means something, whether he's changing the beat around, switch-
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Steroephile, March 1996
where moody meets comatose. And just be glad Margo Timmins' 2:33 story about a seagull, as pointless as it is inerrasticable, was given a track of its own—you can hit Skip instead of Search. In short, 200 Miles won't obsolete my copy of Trinity.

But those of you as enchanted with Margo Timmins' voice as I am will find a lot to like here. Songs from their three most recent albums—plodding ventures all—benefit from the more offthecuff treatment. Especially nice is the duet, "If You Were the Woman and I Was the Man," where John Prine's earthy growl grounds Timmins' ethereal musings.

The sound is almost as good as Trinity. Well, not really, but I can't think of too many better-recorded live albums. You can hear that each cut was recorded in a different venue, and yet the discontinuity isn't jarring. The soundstage is wide and deep (if not immuamanged), and the low bass is there when it oughta be. But Trinity Session it ain't.

Rickie Lee Jones: While RLJ is the only one here who hasn't earned a place on the prestigious Allen St. John Records To Die For list, it's not because of the sound. The sonics of her studio albums—especially Pop Pop—are top drawer. It comes down to the material.

Before you whip out the poison pen, I'll state upfront that I'm not a big Rickie Lee Jones fan. As far as I'm concerned, since her self-titled debut it's all been downhill (with the possible exception of the Girl at Her Volcano EP). While I find her nasal delivery a little grating, it's her scatty, sloppy phrasing that just doesn't work for me. It sounds like a 14-year-old girl trying to do an Ella Fitzgerald imitation after listening to one album once. Substitute "Tom Waits" for "Ella" in the preceding sentence and you'll understand what I think about her writing.

That said, I think that even RLJ fans may find Naked Songs disappointing. It's unplugged, and that's the problem. The arrangements have been a strong point of her studio work, and they're MIA here. And her playing and singing aren't strong enough to make, say, "Last Chance Texaco" come to life. Bassist Rob Wasserman's input helps a bit on "Chuck E.'s in Love," but even he can't rescue her tortured reading of "Autumn Leaves." I've said it before and I'll say it again: she shouldn't be allowed within a light year of a standard. If you disagree, save the postage, and buy the album if you must.

The sound is appealing, if perhaps not quite honest. Jones and her guitar are spotlit a bit, and the audience reaction sounds like an Ozzie Osbourne concert on a rowdy night. I can't believe anybody could get that excited about Rickie Lee Jones. Maybe I'm wrong.

Steely Dan: Okay, I realize that Steely Dan fans will have to own this one, if only to prove that the tour happened. But once you get past the "Like Wow" thing, you realize why Becker and Fagen retreated to the studio in the first place.

The playing here is fine, and Fagen proves himself a supple enough vocalist, but there's a certain sameness to the songs. That's not really surprising, considering that one of Becker's and Fagen's strong points was the ability to find the right player and exactly the right performance. But it's a tough thing to take on the road. The result sounds like nothing so much as a set of demos. And even after all these years, B&F feel no need to deconstruct the classics: the versions are very true to the albums. Call me strange, but my favorite track was "Book of Lairs," from Becker's solo album. Do the words "too hip" mean anything?

With the help of Roger Nichols, they did manage to re-create the Steely Dan sound. Almost. The 20-bit sound is cleaner than a hospital nursery, and the recording lacks neither nuance nor impact. Wish I could say the same about the music.

Victoria Williams: How can you not like someone as relentlessly cheerful as Victoria Williams? Her studio albums, especially Suing the Statue, have a campfire-story feel to them, and I'm happy to report that it comes across fine in concert. Unlike the other albums, this one has the feel of a really special show. The pacing's right, her homespun charm more than makes up for any lack of studio polish, and Williams is smart enough to lean on her band (it includes David Mansfield on mandolin and pedal steel and Don Heffington on drums). They more than pull their weight.

The material, too, seems perfectly chosen. Williams cherry-picks her own albums with an ear to the dramatic, and the results are far better than the Street Relief tribute album to her. You can't help but laugh at the dog noises on "TC," and her whimsical version of "Summer of Drugs" blows away Soul Asylum. She chooses her covers with the same care, quoting, possibly for the first time anywhere, from the Beatles' "Dear Prudence." Her version of "Smoke Gets in Your Eyes" would do Jerome Kern proud, and "Can't Cry Hard Enough" may be the best song you've never heard.

It all adds up to a great night. The sound is, well, just like you were there. After the first cut, you'll wish you had been.

— Allen St. John

THE JOHN DOE THING: Kissingahard

Forward 01/82 72184 (LP/C/1). John Doe, prod.: Don Gilmore, prod., eng.; Walter Macpherson, Travis Dickerson, Eric Greedy, Ed Shryer, engs.; TT: 49:14

If aesthetics ruled pop music, Michael Bolton would be working the local Holiday Inn lounge and John Doe would be accepting Grammys while his songs blasted out of every AM radio in the country. In 1990, ex-X leader Doe released one of the best albums in a decade with his first solo disc, Meet John Doe (Geffen GDICD-24291, nla). The record is loaded with classic, hook-filled songs of great intelligence, insight, wisdom, and pain. The music is a heady mix of rockabilly, roots rock, and punk urgency (just like the best X, in fact). It sank like a rock. Doe was dropped from the label.

It's taken five years for the followup, partly due to industry apathy and partly due to Doe's time-consuming second career as an actor (he's appeared in a number of major films, including the acclaimed Salvador). Fortunately, Doe's artistry is matched by his persistence—Kissingahard was worth the wait.

With more edge than Meet John Doe, the new songs are equally strong and original. Doe's vocals, which often suggest a cross between Ian Anderson and Leo Kottke, are the main attraction. He gives whatever he sings a melodic twist, energizing a song and focusing attention on its words. This is no easy trick; many of his poetic lyrics avoid rhyming.
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couples, regular metric patterns, or easy resolution. On "My Goodness," Doe adds a jarringly dissonant guitar track that totally (and purposefully) conflicts with what he's singing. It works. Doe's artistic vision is focused and piercing, giving his work an authenticity that can't be faked; his songs are true to his vision, not to some pop formula.

Occasionally criticized as being too clever and cynical, Doe makes no excuses for his realist view. Strangely, his lyrics suggest an alternative romanticism far more interesting than the standard "Baby, I can't live without you." When he sings "Lonely has got no name / Come's even though it can't be called / Maybe it's just the same / As catching tears as they fall," it's obvious that he's an artist who's found more than one way to address emotional need.

The LP is more satisfying than the CD, surrounding Doe's vocals with more air and providing more upper-register openness, but the CD is dynamic as hell and mastered hotter. Whenever you buy, send away for the lyric sheet; the words are at least as important as the music.

If you like your rock intelligent and edgy, get Kissinggolden—before it goes out of print and you have to scour the used bins. — Carl Baugher

ENYA: The Memory of Trees
Warner Reprise 46186-2 (C3). Nicky Ryan, prod., eng. TT; 45:54

In the beginning, about 1000 BC, most of Western Europe was occupied by the people we now call Celts. The religion of many Celtic tribes was headed by priests called Druids, who worshipped trees and practiced human sacrifice.1 Driven west by the Romans, the Celts found sanctuary in (among other places) Ireland, where they invented the so-called "tree alphabet," or Ogham, also known as the B-L-M-T alphabet. This was not an alphabet in the sense of our modern one; it was much more difficult to read, and sometimes its inventors couldn't understand it. An Irish clan once lost a battle when its chieftain wasted several hours trying to read an Ogham message.

Shortly after this, at the end of the 19th century, the Celtic Twilight movement (Yeats, Synge, Lady Gregory, etc.) awakened interest in the customs and music of the ancient Celts. Even more shortly thereafter, in the late 1970s, the Celtic Revival band Clannad was

1 The Romans say they did, and the Romans wouldn't lie, would they?

formed, with Eithne ni Bhraonain on keyboard and backing vocals. In 1982 Eithne changed her name to Enya and started a solo career. In 1988 she released the monster single "Orinoco Flow," which was continuously heard somewhere on the FM dial for about three years, and led to its parent CD Watermark going Fourple Platinum, or something like that.

The Memory of Trees is Enya's new one, and it draws on the old tradition of Druidic mysticism for inspiration. The lyricist is poetess Roma Ryan, who is, to put it politely, not a major threat to Yeats or Padraic Colum, but when Enya sets Ryan's texts to music it doesn't matter. The result is so gorgeous, you can't help but be drawn into the intimate world that words and melodies create. You have to understand one thing here: Enya is an extreme romantic, and as such she constantly does a tightrope act fifty feet above a sea of sentimentality. Fortunately, she happens to be a genius at creating beautiful melodies surrounded by glorious sonic textures. Nearly every phrase of music she writes is evocative of both passion and spirituality. From beginning to end, The Memory of Trees is a mystical and emotional journey through a private world of extraordinary beauty. If it has this effect on a jaded soul like mine, I can only imagine what it must do to a listener experiencing this sort of interior revelation for the first time. I suspect that some of Enya's fans must be literally overwhelmed by her.

Enya is also fortunate in her producer and collaborator Nicky Ryan. Together, they create an incredibly soundscape, totally artificial but absolutely convincing. The Memory of Trees will stretch your sound system as well as your intellect if you give it a chance. I must admit that I'm a little worried for the future. As brilliant as Enya is, she could use some stronger lyrics, perhaps drawing more from the Old Irish myths. (Enya grew up speaking only Gaelic, with her charming accent as a result.) I don't believe that the impossibly incompetent Patrick Cassidy has spoiled The Fate of the Sons of Ulaidh yet.

—Les Berkley

The common wisdom is that you have your whole life to write the songs for your first record but only six months for the next one. Melissa Etheridge's eponymous debut was chock full of great songs, dripping with a non-gender-specific sexuality that recked rock 'n' roll. For all the clamor about her recent coming-out, it didn't take a rocket scientist to figure out that straight women didn't sing about unbridled lust and desire in quite this manner. But no matter — straight or gay, her joyous honesty about matters of the glands is refreshing.

Add to this a voice reminiscent of Rod Stewart's back when his had a smile rather than a smirk behind the soul, a band that swung and interacted with her driving acoustic 12-string, a production that stripped it down to the essentials, and you had a recipe for a classic.

Etheridge has waxed rhapsodical about her first record, cut in four days live after a previous over-produced pop effort was thrown out (she and Island's Chris Blackwell hated it). So why does Your Little Secret sound like the one that was thrown away?

Instead of filling the speakers with her expressive rasp, between her faceless band's plodding power-rock clichés and Padghan's pop production Etheridge is often reduced to screaming her way out of a reverber-drenched hole, fighting for space with "big" guitars and drums. Of course, if she's going to pen hooks like "I Really Like You (baby)," perhaps she's comfortable in this setting, as co-producer, she's at least partially responsible.

There are still some glimmers of the unique perspective that made Etheridge more than just another gravel-voiced rock singer. In the same song she says, "I'll shave everything, baby / I'll press
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Stereophile, March 1996
my suit.” In general, her lyrics are as gender-neutral as ever: they just aren’t as well-crafted. No way is the backdoor lover of “I Want to Come Over” as interesting a premise as the psycho-pathology of “Similar Features” from her debut. And the power of performance and production that put over even a simple lust song such as the first record’s “I Want You” is missing.

Only “Any Unusual Kiss,” apparently the story of a threesome, has a helping of the rawness and intimacy that once set Melissa Etheridge apart from, say, Bonnie Tyler. Stadium success may be great for her pocketbook, but, like many others, it could easily do in her music, turning her into a mere curiosity—a lesbian Bryan Adams.

—Michael Ross

THE GRATEFUL DEAD: Hundred Year Hall
Recorded in Frankfurt, Germany, 4/26/72
Grateful Dead/Arista GICCD 40202 (2 CD’s only).
John Cutler, Phil Lesh, prod.; Aesopnic, engs. AAI?
TT: 2:22:23

THE GRATEFUL DEAD/JOHNS OSWALD:
Grasfolded
Recorded everywhere, 1969-1992. Music by The
Grateful Dead, reproduced Plunderphonically by
John Oswald
Swell/Artifact S/A 1969-1996 (2 CD’s only). John Os-
wald, producer; Nick Larriva, Tape Archive.
AAI?: TT: 109:49

HENRY KAISER: Eternity Blue
Shanachie 6016 (C31 only). Henry Kaiser, prod.; many
engs. AAI?: TT: 28:23

Eternity Blue is avant-garde guitarist and
lifelong Grateful Dead fan Henry Ka-
iser’s hastily assembled tribute to Jerry Garcia — good news for those who
know Kaiser’s previous tribute, the 30-
minute “Dark Star” included on Kaiser’s
excellent and undervalued 1987 disc,
Those Who Know History Are Doomed to
Repeat It. In that session Kaiser ap-
proached the song with all the mastery,
reverence, and revisionary zeal of a
Glenn Gould reinventing Bach’s Gold-
b erg Variations.

Some of these recordings of (mostly)
Garcia compositions have appeared on
now-out-of-print Kaiser albums, others
are outakes from History, still others are
previously unreleased gems from Ka-
iser’s archives. “Dark Star” reappears here in
a delicious 20-minute version segued with Coltrane’s “A Love Supreme,” jazz
pianist Marilyn Crispell sits in on “Blues
for Allah,” and three tracks (“High
Time,” “Blue Eternity,” “Brokedown
Palace”) were recorded a month after
Garcia’s death.

Like virtually all of Kaiser’s work, the
playing throughout is strong, densely
muscular, relentlessly intelligent, and a
good bit more musically concentrated
than the Dead’s own gentler, more ram-
bbling approach. In fact, it’s fascinating to
hear how much Garcia’s music benefits
from a more aggressive approach than
the late guitarist himself was usually in-
clined to. Sound quality is as varied as the
recording dates and venues, but the
“Dark Star”/“Love Supreme” centerpiece
thankfully receives the best sounds
here.

The Grateful Dead’s own Hundred Year
Hall, third in the band’s “From the
Vault” series of live albums, preserves a
single concert taped in Frankfurt,
Germany during the “Europe ’72” tour.
Piper was aboard for this one, and the
gig is meaty and high-energy from the
gt-go, with terrific playing throughout,
and includes a 20-minute “Love Light”
that’s as feel-good as, if harder-edged
than, the classic one on Live Dead. Disc
1 is mainly uptempo tunes — “Big Ber-
tha,” “Me and My Uncle,” “China Cat
Sunflower,” “Big Railroad Blues,” “Play-
ing in the Band,” “One More Saturday
Night” — and by the time you insert
disc 2, the solidity of playing, invention,
and sheer musicality are almost over-
whelming. The extended “Truckin’” /
“Cryptical Envelopment” jam, almost
an hour long, goes places that make the
“spacier” sections of the Live Dead “Dark
Star” seem downright tentative. Sound is
vivid, honest, and convincing. With great
liner notes by Dead lyricist Robert
Hunter, Hundred Year Hall is an absolute
must-have for any fan of the Dead —
especially those who stopped listening
20 years ago. It’s one of the best live
albums ever from a band that never
should have bothered making studio
recordings after 1970.

The very different Grasfolded is even
better. Digital wizard John Oswald has
applied his Plunderphonics digital cut/
fold/paste techniques to more than 100
different live versions of the Dead’s
“Dark Star,” all culled from the band’s
extensive tape archives. Though “Dark
Star” was all but dropped from the
band’s set lists through most of the ’80s,
the song has always enjoyed a special
place in the band’s repertoire. This was
where the Dead stretched out most
freely, in what became known among
Deadheads as the “space” section of
their concerts (usually the first half of
the second set), and to musicians as the
most consistently interesting and unpre-
dictable aspect of the band’s music.

Before being approached for this
project, Oswald had only heard one Grate-
ful Dead album — Live Dead, naturally
enough, where the first extended “Dark
Star” appeared. Oswald liked the record
well enough, but bassist Phil Lesh still
had to convince him to cast his Punn-
derphonics spell on the treasures in the
Dead’s vaults. Though Oswald, no
Deadhead himself, is incisively critical of
the band, he remains respectful of their
consistent willingness to risk culls de sac
to tape splices for their long quest to, in
the late Jerry Garcia’s words, “surprise
themselves.” Thirty years after they be-
gan, on Grasfolded the Grateful Dead
have taken — or have taken for them
—the next and biggest step in that quest.

But Grasfolded’s illusion of one con-
tinuous two-hour-long “Dark Star” Of
The Gods is no mere melding of vari-
ous live takes — tape-splicing was only
Oswald’s starting point. Unlike analog
recording media, a speeded-up digital
tape increases the tempo of a musical
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[Image of album cover]
performance without raising the pitch. After his digital transfer of the analog masters, Oswald was thus able to subdivide, multiply, and superimpose—in short, "fold"—the lengths of different sections of different performances into a vast suite whose various component parts unfold sequentially and simultaneously. It may read like chaos on the page; it sounds like divine order.

For example: a 30-second section of tape can be "folded" twice to play in a mere 7% seconds, or slowed down tenfold to last for five minutes and act as a base on which other sections can be superimposed in something closer to real time. When, 25 minutes into disc 1 (titled Transitive Axis), Jerry Garcia's voice finally enters to sing the first word of the song, Oswald samples and extends the single syllable of "Dark" into a continuous vocalization lasting more than a minute. And on disc 2 (the more aggressively edited and folded Mirror Ashes), at one point the entire hour of Transitive Axis is folded 16,384 times, allowing the listener to "hear" all of disc 1 in a mere 2 seconds. This and more is explained in exhaustive and entertaining detail in Rob Bowman's excellent liner notes, reproduced microscopically in the CD booklet along with a detailed foldout time/date/dynamics chart for each CD.

After all of Oswald's digital manipulation, the sound is understandably dry (though track 3 on Mirror Ashes will definitely tax your system's low-end capabilities), but overall Grayfolded is infinitely more musical and enjoyable than my clunky description can convey. Although the Dead themselves did indeed play every note here, the final result is a meta—"Dark Star" that's as much Oswald's creation as the band's. And, though Grayfolded replicates in its own long rhythms a typical Dead concert, the more adventurous parts taking up the first half of disc 2, this remarkable palimpsest concentrates more sheer creativity in two hours than anything the Dead themselves have ever released.

Grayfolded is an important record, an excitingly creative work in its own right, and points out a whole new direction in the manipulation of recorded music. This truly novel melding of artifice and organics, the unpredictable and the systematic, the spontaneous and the deliberate, is paradoxically the most seamless and "natural"-sounding Grateful Dead album since Live Dead itself. Now that the Dead have formally disbanded, they seem to have saved their biggest surprise—for themselves and for us—until the very end. —Richard Lehnert

THE MER MEN: A Glorious Lethal Euphoria
Toad&Co/Outers/Blue Moon THP 100 (CD only)
Jim Thomas, The Mer Men, prod.; John Karr, eng.
TT: 75:50

When is surf music not merely surf music? When purveyed by the likes of The Mer Men. The Mer Men take the raw energy of a '60s instrumental outfit and add '90s technology and musical sophistication to create soundscapes that alternately soothe and terrify, like the surf itself. Mer Men Jim Thomas has a firm command of surf-style guitar—
the tremolo picking, the whammy-bar wiggling—but his obsession with fine points of feedback, distortion, and different delays brings colors to his band's music that were unavailable to The Ventures and their contemporaries.

Thomas uses these colors in "Blue Xoan" to raise the typical surf-band evocation of the ocean to a level that will give even the most landlocked listener the feeling of being hurled to the sandy bottom and dragged ashore by the sea's primal power.

But surf music is only a jumping-off point for these boys. "Under the Kou Tree" has a Celtic feel as Thomas tears off riffs reminiscent of Richard Thompson, and "Obsession for Men" calls to mind Hendrix and Terje Rypdal as much as Dick Dale.

It's not unheard-of for surf bands to appropriate classical themes, as The Mer Men do here with "Ithabu's Third Movement 3rd Symphony." What's less common is for a surf band's own music to be complex enough to have movements. But this is not your dad's surf band.

Too bad A Glorious...'s sound is as muddy as a lake after a storm. The inin-

What's less common is for a surf band's own music to be complex enough to have movements. But this is not your dad's surf band.

Too bad A Glorious...'s sound is as muddy as a lake after a storm. The indistinct bottom gives us tom-toms that are mumble more than thunder, and the anemic top offers guitar shrieks that are shrouded rather than showcased. The net result is a CD that makes them sound like a garage band, which they obviously are not. Now that they're on a larger label, we can hope that the next CD adequately captures the enormity of their live sound. (Okay, I admit it. They're from my town. I know them. They're still great.)

Don't let a little mud make you deny yourself the pleasure of discovering The Mer Men. Turn it up loud enough and you won't care. Instrumental music this powerful comes along too rarely in any genre.

—Michael Ross

MORRISSEY: Southpaw Grammar

Perhaps it's something in the water: Hot on the heels of Boy George's recent metamorphosis into a heavy-metal glam rock star, everybody's favorite aesthete Morrissey comes out of the chrysalis as ... wait for it... King Crimson. Thundering In the Court of the Crimson King—era King Crimson, no less, writing the sort of paranoid-but-outpoint lyrical stuff Pete Sinfield would have done if he'd been upfront when they handed out IQ.

In true '70s high-pomp style, two of the tracks on this eight-track outing top 10 minutes ("The Teachers Are Afraid of the Pupils," 11:15; "Southpaw," 10:03), and the screaming guitar on "The Teachers" is Robert Fripp to-die-for via Alain Whyte, Booz Boorer, and producer Steve Lillywhite (the George Martin of folks like Peter Gabriel).

In all the ways that count, it's the same old Morrissey ("There's too many people planning your downfall/when your spirit's on trial/these nights can be frightening/sleep transports sadness/to some other mid-brain/but somebody here/will not be here next year"), with the added oomph of that band—Morrissey on steroids, if you will. Radio Free New Yorker likes "Southpaw," which isn't bad in the old homosexual subtext department (yawn), but for me the standouts are "The Teachers" and Morrissey's unique twist on "Don't Worry, Be Happy": "Do Your Best and Don't Worry."

—Beth Jacques

YOKO ONO/IMA: Rising
Capitol CD 431 59817 2 (CD). Yoko Ono, prod.; Rob Stevens, prod., eng.; Timo Ellis, Chris Hubeck, Alfred Brand, Wes Najmsek, Mike Anzellozwe, Paul Goodrich, George Marinos, engs. TT: 59:20

Rising revisits familiar Ono territory: perseverance in the face of adversity and the purging of pain. In this case, the 50-year anniversary of the Hiroshima tragedy provides resonance and a historical point of reference. On a musical level, how-
Sometimes Dreams Do Come True

Most auspicious debut of an expensive loudspeaker: The Stealth from Quintessence Acoustics.

Guy Lemcoe
Stereophile, Vol. 18, No. 8, August 1995

Their $35,000 Stealth is another sensitivity champ: 97db ... supplemented with a $5,000 sub-woofer ... had a big, spacious sound.

Robert Deutsch
Stereophile, Vol. 18, No. 8, August 1995

Looking rather like sleek modern sculpture ... sounded fabulous, too, with a big, bold, vibrant presentation.

Rosen/Brownell
Stereophile, Vol. 18, No. 8, August 1995

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**Monitor Audio Studio 50**

Editor:

Our unique designs with Alloy metal cones have been recognized by many critics around the world.

Please note: Phase reversal of tweeter is a matter of personal taste — one can do this by reversing at terminals in bi-wiring mode.

We are now on to our next generation of cone materials using Profile Shape.

**Audio Alchemy DTI•Pro 32**

Editor:

We wish to offer Stereophile and Robert Harley sincere thanks for such a wonderful review of our DTI-Pro 32.

When we were forced to discontinue the original “breakthrough” DTI-Pro, we knew that there was a risk that we "couldn't do it again." We soon convinced ourselves, and hundreds of customers, that we could with the Pro 32. We are quite pleased that Mr. Harley calls its effects a "significant improvement," and can recommend to owners of even the most respected of equipment that "You may not have heard what your system can do until you've experienced Audio Alchemy's DTI-Pro 32." Quite a validation of both our jitter-reduction and resolution-enhancement technologies!

We also wish to point out that the improvement heard when Bob used the DTI-Pro 32 with our D1E v.3.0 via the PS bus attests to the v3.0's capabilities. Wait 'til he hears our DTS-Pro transport! If anything, using the PS bus here is even more significant. Our D1S-Pro beta testers who are v3.0 or DTI-Pro 32-equipped tell us they are hearing their discs as never before.

Our DSP engineer, Keith Allsop, agrees that the Resolution Enhancement algorithm, because it is operating at sub-LSB (16-bit input) levels, can be quite difficult to measure. As an example, he has provided two plots below, showing the input and output of a DTI-Pro 32 when fed with a 72dB tone at one eighth of sampling frequency (5512.5Hz for CD). From these plots it is very difficult to see any difference between the DTI-Pro 32 input and output.

However, if we look at this same data in the frequency domain, there are clearly some large differences, as shown in the next two plots. The DTI-Pro 32 has reduced the amplitude of the distortion in the quantized input signal down to the noise floor of the measurements.

Further to the measurement question, we have stated in earlier letters to the editor, and Bob mentioned in the January "Industry Update," that Audio Alchemy has been working toward the development of a meaningful technique for measuring jitter which correlates with what we all hear. In Stereophile, the DTI-Pro 32's jitter-reduction performance has been measured by the FM detector method on the word-clock signal inside the DAC. Our measurements have verified that the DTI-Pro 32 does indeed have a 3dB jitter-attenuation cutoff frequency that is less than 5Hz. Viewed over a wider bandwidth, Bob could have seen further improvements from the DTI-Pro 32.

Other magazines have utilized different techniques to quantify the improvements they hear when the DTI-Pro 32 is inserted into their listening systems. At this point in time, unless we all have the same measurement equipment and methodology, it is very difficult to compare our results. Since the goal is to correlate with our listening experience, we are evaluating a new measurement technique that operates directly on the DAC analog output. One would agree that this is the ideal area to focus upon, since it is only in the analog domain that we really care about the effects of jitter. In the next several months we will be able to make a presentation to all interested parties on the results of this study.

In conclusion, you have once again done an excellent job of explaining the virtues of our products to your readers. Thank you.

Peter Maddick
Vice President, Audio Alchemy

**Z-systems Z-link**

Editor:

We wish to thank Robert Harley for his review of the Z-Link and for bringing it to the attention of the high-end market. We first began designing products based on the Analog Devices AD1890 chip in late 1993, with the primary goal of building a better sample-rate converter for the professional recording market. Mr. Harley is indeed correct (as is the chip's designer, Bob Adams) in pointing out that the AD1890 is better suited as a sample-rate converter than as a jitter attenuator. As a sample-rate converter, the chip provides a simple, elegant, high-performance solution to many of the digital audio interfacing and synchronizing problems that plague professional recording facilities. One of the important features of the AD1890 is that it gives the designer the luxury of decoupling the input and output clocks from one another. It is precisely this feature that allows a product based on the AD1890 to function as a jitter attenuator: a " sloppy" (jittery) digital audio signal can be applied to the chip's input and a stable clock signal can be applied to the chip's output.

The output signal from the AD1890 can be made to have extremely low jitter, assuming the clock generation on the output side is handled properly. There's one important side effect, however: the output word will not be identical to the input word. Roughly speaking, more jitter on the input leads to more change in the output word. In effect, the AD1890 will take a signal that has the right value at the wrong time and output a signal that has the wrong value at the right time. It is difficult to quantify exactly what this means to the listener, however, as the audible effects tend to be system-dependent. Furthermore, other processes take place in a typical digital audio playback chain that output different ("wrong") values at the right time (e.g., any number of oversampling-type processes not based on Mth band-interpolation filters). These processes have not been met with the same scrutiny as the AD1890's process, yet
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they do have data-integrity issues of their own. Ultimately, the listener needs to determine if these effects are tolerable or not.

I value highly Mr. Harley's subjective comments about the Z-Link's sonic performance and do not dispute in the least what he has heard. My only comment is that there are as many different opinions about the way the unit sounds as there are listeners; everyone seems to hear something different. This only underscores the notion that jitters is indeed a complicated phenomenon, and that jitter attenuators based on the AD1890 have different effects in different digital audio playback systems. The bottom line is that nothing can replace a personal audition.

Dr. Glenn Zelniker
President, Z-Systems

TOTEM MANI-2

Editor:

Totem would like to graciously thank Stereophile, and particularly Mr. John Atkinson, for their continuous high standards and the complete and thorough synopsis, test, and in-depth multi-faceted educational review [February 1996, p.163].

We respect the knowledge and experience projected by Mr. Atkinson. In the past, we have always read his technical, equipment, and musical reviews with great appetite and interest. We acknowledge his deep love for music, and ultimately the enormous responsibility Stereophile and Mr. Atkinson have in transmitting some of the feeling and power with which music inbibes the listener.

At Totem, we have always marched to the rhythm and beat of a different drummer. We have heard doom and gloom from many so-called experts industry-wide who said seven years ago that convincing the commercial world markets of the merits of our philosophy, products, dedication to quality, and, ultimately, musical expression, would not be viable.

However, thanks to the foresight and courage of quality publications such as Stereophile and the perceptiveness of reviewers such as Larry Greenhill and John Atkinson, we were given our place in this most competitive of market places. Totem has a mission which it will diligently pursue. We also are following our Totem. Mr. Atkinson's quiet comments and tremendous knowledge certainly have given great insight into the power of our Mani-2. The Mani-2 represents a viable real-world product that goes beyond euphemism, explanations, and specifications. It wholeheartedly transmits what it does best: Pure...Simple...Music.

At Totem, we feel great accountability to the ultimate High End: our consumers and prospective consumers. We try to achieve the absolute ultimate from each of our designs, regardless of cost or time involved. Mr. Atkinson convincingly reports the Mani-2 as a phenomenal full-range transducer to be reckoned with. Its overall balance, specs, and great cumulative spectral-decay plot just hint at what is really behind the sonically imposing yet advantageously diminutive offering...Magic!!

Musical truth remains elusive to language. Cutting-edge diatrices and effective terminology cannot explain how one feels and experiences a medium that is so powerful: musical language. Totem hopes to promote that creation-old inner instinct of acknowledging music's power by providing a tremendous medium — Mani-2.

Cordial thanks again to Stereophile, John Atkinson, and dedicated consumers and retailers for their great part in promoting this conduit called "Music."

VINCENT BRUZZESE

TOTEM ACOUSTIC

JOSEPH AUDIO RM7SI

Editor:

All of us at Joseph Audio would like to thank John Atkinson for his fine review of the RM7si [February 1996, p.163]. We set out to offer the most value, the most performance, the most satisfaction for the least investment. Our feeling is that if the high-end industry is to grow, we must create products that allow as many people as possible to experience the magic of recorded music. All too many times, designs are targeted at a narrow group of fanatical audiophiles (aka "Us") who are willing to jump through the hoops necessary to elicit musical performance from them. Our designs certainly merit this type of care and attention, yet — with a broad listening axis, and an easy-to-drive impedance characteristic, they don't demand it.

Richard Modafferi's thorough engineering skill delivers better performance in the real world. This is what we offer that makes our products unique.

It was gratifying to see our goals validated, not only at Stereophile's H-FI '95 Show in LA, and EIA's Specialty Audio and Home Theater Show in Chicago, but also in the listening rooms of JA and music lovers throughout the world.

An important element in obtaining the magic is listening for the synergy between components. We set out to make our speakers as amplifier-friendly as possible, so as to open up options to Joseph Audio owners denied by other, lower-impedance designs. JA's all-too-brief visit to tube amplifiers with the 10W Cary touches on the possibilities for a synergistic match between the RM7si and the new wave of inexpensive tube amplifiers (e.g. the Golden Tube SE40) to create a surprising sense of depth and improved image precision. Had time allowed, I'm sure that such a combination would have proved magical.

The RM7si's bass response is a particular source of pride. We find that many other "Mimics" overemphasize the bass region at the expense of definition and pace. Sure, a twice-as-expensive model did reach 35Hz vis our 39Hz in JA's room, but the resulting bass was "noticeably less right" and "on the point of becoming boomy," a high price to pay for four extra Hz! We also firmly believe that our clean, well-extended bass response lends itself to better integration with subwoofer systems (Home Theater, anyone?).

We are flattered that the other speakers compared with the RM7si are two times, three times, and seven times its price. Yet, even in this exalted company, there is one area where the RM7si stood alone: "...it meets superb ±1.25dB limits over a wide range, from 315Hz to 10kHz." Not even the $8000 speakers JA compared them to can make that claim.

As the creators of the RM7si, we are glad that JA concludes that our baby "represents good sound for the bucks and is strongly recommended," but we feel that there's even more to it than that. To borrow JA's phrase, "an island of musical tranquility" is something we can reach when the music reproduction is of high enough caliber to be transparent to the senses. We believe that many will find the RM7si to be the ticket to that island. JEFF JOSEPH

Joseph Audio

PARASOUND & SPICA

Editor:

I appreciated Stereophile printing my Spica press release in its entirety ("Industry Update," January '96, p.37) and refraining from chopping it up. It's not easy to admit that I failed to bring the correct perspective and discipline to the revival of Spica.

It's very simple: Spica needs to be a bigger enterprise for its high-value pricing to be viable. The investment required to make that happen is more urgently required to sustain the 45-50% annual growth which Parasound has achieved over the past five years.

However, contrary to Stereophile's dismissive remark, it is not quite a foregone conclusion that the Spica brand and Spica designs will pass from the audio scene.

1) Spica's Albuquerque factory will continue to manufacture TC-60s, as long as we receive sufficient orders to cover our very reasonable overhead expenses. In fact, Spica just recently reordered parts to sustain a number of months' further production.

2) The cost advantages which would be enjoyed by an original manufacturer of speaker drivers or speaker cabinets would well justify the investment to expand and market the Spica line. To the right buyer, this competitive advantage would make such an investment quite attractive.

3) In fact, I've already been approached by several potential buyers who are interested in purchasing Spica. It's my hope that Spica can pass into equally caring hands that will better translate the unique-

Stereophile, March 1996
When pigs fly.

Well, pigs have flown and The Parts Connection Catalog & Resource Guide, Volume 2 has finally arrived. It has been a long road, a lengthy wait, but the time is finally here. No longer just a parts catalog, but an essential resource guide for those DIY projects. Volume 2 includes some of the opening pages from the RCA Receiving Tube Manual, data sheets for many of the most popular tubes and schematics for several classic vacuum tube amplifiers and preamplifiers.

We have also added a whole slew of new products. An expanded selection of premium tubes from Golden Dragon, Audio Glassic and Sovtek, plus directly heated triodes like the newly manufactured Western Electric 300B and the Virc Valve VV30B.

More transformers from Magnequest, Pitron and Hammond. new capacitors, inductors, cable and more from all the best names in the business.

So, it took longer than expected. But we're confident that you will find it worth the wait. Make sure you get a hold of The Parts Connection Catalog & Resource Guide, Volume 2 today. For just $10 US you can land a copy of your very own, which includes a coupon worth $10 off your first purchase over $100 or $25 off your first purchase over $250.

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ness of Spica designs to the realities of the marketplace.

My experience with Spica has been far more stimulating and positive than my press release would suggest. It's hard to express my thrill that Spica TC-60s are used with Parasound electronics and GMAS-18 subwoofers in the three music systems installed in the home of Michael Tilson Thomas, Musical Director of the San Francisco Symphony!

MITT says his primary music system is still superior, but it involves over 100 musicians playing on the stage of Davies Hall—and it's a little harder to operate.

Thanks again for the fair coverage and the opportunity to clarify my position on Spica.

Richard Schram
President, Parasound Products

NAD
Editor:
In the “Industry Update” column of the January 1996 issue, [the late] Peter Mitchell writes of Onkyo as being NAD's “principal OEM manufacturer...”

NAD designs and engineers its products in London, and, like many well-known brands, has them built to specification in various factories, both in the UK and in Asia. This practice is standard procedure in the audio industry, allowing companies to avoid costly production facilities as well as gain increased flexibility in developing and producing product.

As one of several production sources for NAD, Onkyo is a valued manufacturing partner. However, Onkyo only represents approximately 25% of NAD’s production.

Knut Rosness
Managing Director, NAD London

Tommy Jenving AB
Editor:
In the January Stereophile [p.337], Mr. Poulsen of Alpha-Core writes to the Editor and comments on Ben Duncan’s article “What a Difference a Wire Makes,” published in the December Stereophile [p.95]. Mr. Poulsen insinuates that the inventor of the Supra Ply speaker cable, Tommy Jenving, has copied Alpha-Core’s cable, the Goertz. Mr. Poulsen writes: “...but we were once contacted by—you guessed it—Mr. Jenving, who inquired about its design.”

Ben Duncan proves by new measurements that a low inductance makes a better speaker cable, whereas the capacitance as well as the characteristic impedance of the cable are negligible. Tommy Jenving has based his design of the Supra Ply cable upon the same knowledge; Ben Duncan refers to it as “The Jenving Approach” in a sidebar of his article [p.97].

Mr. Poulsen claims that their Goertz cable is a low-inductance cable and that “The Goertz Approach” would be a more correct headline.

As Ben Duncan correctly says, “A num-

ber of other cable makers—e.g. Kimber and Goertz in the US—have converged on much the same minimum-inductance approach...they’re apparently unable to explain in their approach so coherently.”

Although the Goertz cable coincidentally is of a low inductance, it is certainly not the main approach; whereas the characteristic impedance of their cable is.

In order to achieve a low impedance, they have lowered the inductance but also taken steps to increase the capacitance between the conductors. In their patent application they headline their design “Characteristic Impedance Corrected Audio Signal Cable” and specify “a thin interlayer of a dielectric material, e.g. polyester film” to increase the capacitance. (Pat. number 5,393,933, dated February 28, 1995.)

First, the Supra Ply cable was launched a year before Mr. Jenving “once contacted” Mr. Poulsen. Mr. Jenving called him in May 1995 to check whether or not the Goertz was a copy of our Supra Ply. He understood that this was not the case, and he also sent Mr. Poulsen our Supra Catalog, wherein the Supra Ply was presented. This means that Mr. Poulsen knows that Supra Ply existed long before he was contacted by Mr. Jenving. Such an insinuation that Mr. Jenving contacted him in order to copy the Goertz is severe and of low class.

Second, the Supra Ply low-inductance concept does not aim to increase the capacitance, as although it is considered negligible it is still a less parameter that is not desirable. The Goertz design is not of the same approach, although it happens to be a low-inductance cable.

We think that it is good that Mr. Poulsen and Alpha-Core now work for the same achievement as Supra does; ie, to emphasize the low-inductance concept and to make hi-fi enthusiasts aware of the false, high-priced, semi-technical cosmetic innovations which are called exotic cables.

So please be smart, Mr. Poulsen, and cooperate with the team you are playing in, instead of kicking in the wrong direction.

The above-mentioned Supra catalog can be requested from Tommy Jenving AB, Fax (46) 303 92566, Sweden.

Tommy Jenving
President & Founder
Patrik Bostrom
R&D Chief Engineer
Tommy Jenving AB, Sweden

EAD DSP-1000
Editor:
We are pleased to see the Enlightened Audio Designs DSP-1000 included among Class C in Stereophile’s “Recommended Components” [December 1995, p.193]. The section of your review about the 16-bit to 20-bit signal paths caused many ques-
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tions and concerns among current and future DSP-1000 owners. We would like to comment on what was written.

Enlightened Audio Designs’ DSP-1000 and DSP-7000 each have a 16-bit input signal path. The NPC filter as previously used for the Series II models was operated in the “right-justified” mode. In this mode there is no room for more bits above 16 and it is therefore limited to 16-bit input. We chose to keep the DSP-1000 and DSP-7000 this way for two reasons.

First, it allows all existing DSP-1000s and DSP-7000s to be upgraded to HDCD?Digital Flywheel without permanent modification to the motherboard. Our distributors around the world can perform the upgrade without sending the DSPs back to Fairfield. One of the main design philosophies of EAD is total upgradeability of all our digital processors. Second, until a DVD high-bit standard comes about, we are still in a 16-bit world. All CD players that conform to the S/PDIF standard, even HDCD, deliver information in 16 bits.

EAD’s Series III upgrade contains our Digital Flywheel jitter-reduction circuitry and Pacific Microsonics PMD-100 HDCD process decoder IC. Combined, these two reduce jitter to about 10 picoseconds and enhance the resolution of the 16-bit signal to 20 bits. The 20-bit signal is dithered and sent directly to Hutt-Brown PCM63P-K 20-bit DACs before going to the award-winning Accusinear current-to-voltage stage. All Pacific Microsonics PMD-100-equipped DSPs have 20-bit output.

Outboard resolution enhancers generally also do the conversion to 20 bits by adding dither to the signal. So the equation boils down to which resolution-enhancement circuits a listener prefers.

The EAD DSP-9000 III and TheaterMaster have 24-bit capable inputs. Every DSP-9000 III and TheaterMaster owner we have talked to has found no benefit from these external enhancers. It is easy to understand why. If users wish to use an external enhancer, we have developed a low-cost modification that allows existing DSP-1000s or DSP-7000s to pass up to 24 bits. However, we feel this is not necessary because of the extraordinary features of our Series III upgrade.

Alastair Roxburgh
Director of Engineering
Samuel Wuebben
Technical Support Manager
Enlightened Audio Designs

BRIGHT STAR MINI ROCK F
Editor:
We would like to thank Steven Stone and Stereophile for an in-depth discussion of our Mini Rock F isolation platform [Vol.18 No.11, p.200]. The Mini Rock F was designed, in part, to Mr. Stone’s request for increased isolation between the separate outboard flywheel and motor assembly for the excellent VPI TNT turntable while it was situated atop our Big Rock TNT isolation platform. We are very pleased that he found the Mini Rock F enhanced the performance envelope of this phenomenal analog front-end (we are also thrilled with Michael Fremer’s endorsement of the Mini Rock F in the same issue).

In the time since Mr. Stone’s initial evaluation took place, we have redesigned the mounting system between the Mini Rock F and the Big Rock TNT to minimize undue spurious energy transfer. This change has resulted in yet further sonic enhancement and lower vibrational contamination and obviates the need for the extra isolation scheme Mr. Stone employed. We have submitted this new mounting system to Mr. Stone and look forward to his comments in a future report.

Interested audiophiles can receive full information on our extensive Isolation Series, including our new Big Rock 3AA, specifically designed for Audio Alchemy components, by contacting our offices at (805) 375-2629 or Barry.Kohan@Tanet.com.

BARRY KOHAN
President, Bright Star Audio

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The Final Word

The 1996 WCES was saddened for all Stereophile folk, and for many others in the industry, by news of Peter W. Mitchell's death the Saturday before, of congestive heart failure (see Brad Meyer's obituary elsewhere in this issue). Peter had a wonderful mind and, though his personality was irascible and occasionally mean, he had an inspiring love affair with music, and with truth. It seems a cliché to describe someone's mind as towering, but Peter's was—I guess it's what you say when someone knows so much, and in such great detail, that you can't fathom how they do it. There will, unfortunately, be no replacement for his words or his presence. He will be heartily missed.

The Show was another huge event, the second biggest CES ever—last year's was 6% better attended, with more exhibitors—but the excitement generated by even smaller CESes didn't seem to be conferred on this one. The big news was DVD, but we'd all seen it and reported on it, albeit in slightly different form, exactly a year ago. DVD, marvelously delivering better-than-laserdisc quality from a CD-like medium, was a foregone conclusion. I predict it will be the Product of the Decade, which is to say, the Product of the End of the Millennium. And, as long as the Advanced Digital Audio (ADA) Conference makes wise decisions about the standards for an all-audio version of DVD, it will deliver spectacular music quality to our (probably) multichannel home systems. At least, based on our experience with very-high-quality digital recording, there's no reason it couldn't. It was great to see DVD in action, but it wasn't a whole Show's worth of excitement.

Beyond that, the news from CES concerned magazines and organizations more than products. My prediction last month that The Academy for the Advancement of High End Audio would work its way around an internal schism came true. Laura Hendershot of Counterpoint, who had been one of those announcing her public nonsupport of The Academy's leadership, graciously reembraced her Academy Board colleagues at the organization's semiannual General Meeting—which, by the way, was the best in the five and a half years The Academy's been around. Academy President Chris Browder, of B&W, went out of his way to thank the EIA for their tremendous help to high-end audio companies in meeting the technical strictures of the European Union (see Vol.18 No.4 for a preview of same), and especially Kathy Gornuk, of Thiel, for her work on behalf of the High End as head of the EIA's Audio Division.

DVD will be the Product of the Decade.

The EIA also got positive reviews for its selection of the Alexsis Park Hotel in Vegas as the site for specialty audio next year. There will undoubtedly be some people-handling problems as the 500-room hotel tries to deal with the crowds that have been surging through the Sahara's spaciousness (2045 rooms), but the Alexsis Park's cleanliness and elegance—not to mention the absence of the adult-video crowd, who've been packed off to The Sands (we'll see how that diminishes the crowds at specialty audio!)—will be a welcome relief to high-end stalwarts who've braved the Sahara's grime for so many years.

The latest high-end magazine entry, Fi, launched its first issue with a lavish CES party (to which I was graciously invited but, alas, could not attend), and ex-TASer Tom Müller's Audio Adventure was all around the Show—not to mention ex-TASer (now Stereophile) Michael Fremer's The Tracking Angle, and ex-TASer Art Dudley's Listener. Do I detect a theme here?

If you detect that I'm running out of enthusiastic things to say about the 1996 Winter CES, your detection gear's in a good state of tune. I'm confident that Stereophile's massive troop of writers will have found much more that's exciting than I found—you'll hear about it all next month—but this wasn't the upbeat January Show that I'm used to.

Maybe it was all the retailers having been through a dreadful December. Maybe it was the East-coast winter storms that bookended the Show and caused massive delays in both arrivals and departures. Maybe it's simply that CES is weighed down by its own success.

As I said last month, everyone has to be there, and everyone is there to be seen—how can you possibly do it all? There were high-end exhibits in 12 separate hotels that I counted (plus the Las Vegas Convention Center), and only two of the 12 were within walking distance of one another, all others required a half-hour cab ride on either end of the visit. Given the 400+ companies that are to be seen, the Show would have to be six days long (it's actually four) to even give us a chance.

Why complain? After all, CES is the most successful consumer electronics trade show in the world. Receding focus, though, is a problem for any event. 1996 was the first year since The Mirage hotel opened that it wasn't an official CES exhibit space, and this lost some focus for the Show. 1996 was also the first year that the Professional Audio/Video Retailers Association (PARA) wasn't housed at The Mirage, due to a big boost in their room prices, and this lost some focus. For 1997 we already know that Wes Phillips's new specialty—car audio—will be housed away from the Las Vegas Convention Center, which will introduce a new lack of focus. And I fear that the previously mentioned and appreciated Alexsis Park, with its dearth of lavish suites, will give rise to yet more "outboarding"—exhibitors who take advantage of all the folks brought to town by CES, but who choose non-CES hotels to save money and get a better-sized space.

Journalists and retailers alike are confounded by these circumstances. The companies are important, so how can you ignore them? The companies are making your life impossible, so how can you visit them? After all, the more you visit them, the more likely they are to outboard again. I urge the Powers That Be at CES to think long and hard about how to renew WCES's focus, and the Powers That Be at outboarding companies to work with CES toward a maximally focused Show. We-all want to visit you-all—but we can't the way things are going.

—Larry Archibald
The Wadia 16 expands upon the capabilities of any product of its type and redefines the potential of a Compact Disc Player. With its digital volume control (eliminating the need for a preamp), 24-bit digital processing capability, and the facility to connect up to four other digital sources to it, the Wadia 16 is designed to be the centerpiece of a high quality audio system.

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It just so happens that cables are the part of your system which can help or hurt the performance the most... and for the least money. Whether you have two-channel stereo or multi-channel stereo, you have to have cables. You can't completely fix a bad system with good cables, but you can seriously degrade a good system with badly designed cables.

You won't see the cables and you won't see the sound – but you will experience the difference!