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WorldRadioHistory
A s someone who started out as a classically trained musician but who then stepped sideways into rock, I'm fascinated by the one music I've never played: jazz. It seems to me that the essential difference between a performance of a classical work and a jazz performance is that in the former, the musicians use their technique to breathe life into dead notes on a page, while in good jazz, the performer not only applies a similar level of technical expertise, but also has simultaneously to have all of music theory at the fingertips in order to decide what the next note should be. It is a rare musician—Keith Jarrett, for example—who can excel in both arenas.

All of which is by way of introducing a topic I briefly discussed in this space last December: The fact that live sound differs from recorded not just in degree but in kind.

Everyone has had the experience of unexpectedly hearing the sound of musical instruments and immediately realizing that they are real. The stimulus for this column came a few months back when I was attending a conference on Digital Signal Processing. I was walking through downtown San Jose with two friends and heard the sound of two electric guitars playing jazz. The fact that they were live was unmistakable, yet—and this was the kicker—the instruments were electric, all the "real" sounds produced by speakers!

So what on earth can be the readily identifiable difference between the sound of a loudspeaker producing the live sound of an electric guitar and that same loudspeaker reproducing the recorded sound of an electric guitar?

Part of the difference must surely be that, even with 20-bit digital recorders capable of capturing an electrical signal with a fidelity unheard-of even 10 years ago, the sounds on every recording still have to be captured with microphones—every one of which changes tonal colors to a greater or lesser extent, and introduces its own set of spatial distortions depending on how it is used.

Many point out that dynamics play a key role in defining the difference, that many engineers routinely apply compression when they make a recording. It's true that the subtle differences between pianissimo, piano, and mezzo-piano are generally clear in a live performance to an extent hardly ever experienced from a recording. But the lack of compression can't be the determining factor; many purist recordings are made without compression, yet still sound "recorded."

I was given a clue to this puzzle over a decade ago when, as part of a talk I was giving at a London Heathrow Hi-Fi Show, I played my Fender bass guitar through a pair of Linn Isobarik speakers. The Isobariks were widely and correctly regarded in those days as having excellent dynamic range. When they were fed the direct-injected signal from the Fender bass, however, the woofers—four KEF B139s—crapped out at a surprisingly quiet level; surprising, that is, compared with my experience of the speakers reproducing recorded bass guitar.

The reason for this unexpected accident was simple. Though the average level of live and recorded sound may be the same—and it is the average level that determines "loudness"—the "crest factor" of live sound is greater in that the peaks are much higher in level, much "spikier" than they are once recorded and played back.

What is it about sound reproduction that reduces the transient spikiness of musical waveforms? As the English audio engineers Ben Duncan and Laurie Fincham pointed out some time ago, all recorded music has passed through one, more, or many cascaded high-pass filters—filters that roll off the low frequencies. And the sound of a high-pass filter is unnatural in that, as far as I can ascertain, it doesn't exist in real life. All natural acoustic filters roll off high frequencies—they are low-pass filters. There is also the fact that the in-band phase shift from a high-pass filter is much more severe than with a low-pass filter in that it extends much further away in frequency from the filter's nominal cutoff frequency (try modeling them sometime with SPICE or some other circuit-analysis program).

The absence of high-pass filters with live sound means that the musical waveform is preserved. The presence of high-pass filters in all reproduced sound means that the waveform is never preserved. In the words of Kalman Rubinson, an occasional contributor to The Audio Amateur and a member of The Audiophile Network,1 "Something in Nature abhors a capacitor."

COLORADO MUSE

With this issue we welcome a new writer to the ranks: Muse Kastanovich, who contributes his thoughts on the sounds of three $2000/pair floor-standing loudspeakers. Born in 1967—the year I bought my first car (!)—Muse has a bachelor's degree in physics but spends his time these days constructing and modifying audio components, modeling for art classes, landscaping, writing songs, and singing and playing bass guitar in alternative rock band Alien Chrome. He has also been singing in classical choirs for 17 years, including stints with the Oberlin College Choir and the New Mexico Symphony Orchestra Chorus. Muse describes his role at Stereophile as being an "Honest Abe" reviewer writing about real-world gear. Welcome, Muse.

—John Atkinson

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FEATURES

IMPROVING ON PERFECTION?
Barry Willis delves into the world of component mods.

NOTES FROM LUCAS VALLEY
Les Schneider experiences the THX treatment at the legendary Skywalker Ranch.

BAD VIBES!
Shannon Dickson outlines the fundamentals of vibration control in audio systems.

FRANS BRÜGGEN: DER GETREUE MUSIKMEISTER
The conductor and recorder virtuoso talks with Peter Catalano.

DAVID WILSON: WATT’s Up?
David Wilson talks to Wes Phillips about the evolution of the WATT/Puppy and explains his methods of "voweling-in" a loudspeaker.

ROLF GEMEIN: THE HEART OF THE MATTER
Symphonic Line’s designer talks with Jonathan Scull.

TED DENNEY: TED’S EXCELLENT ADVENTURE
Synergistic Research’s founder discusses cable with Jonathan Scull.

STRAUSS’S EIN HELDENLEBEN
Barbara Jahn surveys recordings of the composer’s musical autobiography.

A JAZZ MOSAIC
Michael Ullman listens to four well-stuffed boxes of vinyl and CDs from Mosaic Records.

EQUIPMENT REPORTS

99 Wilson WATT/Puppy 5 loudspeaker system (WES PHILLIPS)
108 Acoustic Energy AE2 Signature loudspeaker (JOHN ATKINSON)
108 Platinum Audio Solo loudspeaker (JOHN ATKINSON)
118 Mark Levinson No.36 d/a processor (THOMAS J. NORTON)
127 Encore Pyramid 1 d/a processor (ROBERT HARLEY)
137 McCormack Digital Duve SST-1 CD transport (WES PHILLIPS)

139 Symphonic Line Kraft 400 power amplifier (JONATHAN SCULL)
153 Swans Baton loudspeaker (MUSE KASTANOVICH)
153 Unity Audio Signature 3 loudspeaker (MUSE KASTANOVICH)
153 Thiel CS1.5 loudspeaker (MUSE KASTANOVICH)
179 Townshend Audio Seismic Sink Models 1 & 2 STD & EHD (SHANNON DICKSON)
179 Vibraplane Isolation Platform Models 2210 & 2212 (SHANNON DICKSON)
189 Billy Bags Design 5500-7 series component rack (ROBERT HARLEY)
193 Sennheiser HDC 451 NoiseGard noise-canceling headphones (WES PHILLIPS)
200 Bright Star Mini-Rock F VPI isolation base (STEVEN STONE)

FOLLOW-UPS

121 Sonic Frontiers SFD-2 Mk.II d/a processor (THOMAS J. NORTON)
121 Spectral SDR-2000 Professional hcdcd d/a processor (THOMAS J. NORTON)
121 Theta DS PRO Basic III d/a processor (THOMAS J. NORTON)
191 Merrill Stable Table component rack (ROBERT HARLEY)
197 Audio Alchemy Digital Line Controller (JACK ENGLISH)
199 VPI TNT Jr. turntable (STEVEN STONE)
November 1995 Vol.18 No.11

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COLUMNs
3 As We See It
John Atkinson wonders why recordings never sound like the real thing.

11 LETTERS
Topica this month: ape brains, knockas from fans, darts from detractors, audio fun, crazy tweets, the “bee’s knees,” real-world products, concert-hall realism, the analog/digital debate continues, hi-fi snobbery, K.W. fans sound off digital wizardry, and ambience synthesis.

33 INDUSTRY UPDATE
High-end news, including the dealer-promoted manufacturer seminars taking place in November, plus more on DVD proposals, new HiDCC® discs, Apogee joins forces with a/d/s, the Misee Boulevard scene, Internet-only magazines, 5.1 coding (DTSs at AC-3), Coherent Acoustics’ launch, RadioShack, the Benedisac Monk’s new release, and Carnegie Hall’s mystery floor.

51 ANALOG CORNER
Michael Fremer checks out a custom-built Rockport Technologies turntable that costs more than a fully loaded Lexus.

207 BUILDING A LIBRARY
Barbara John surveys recordings of Strauss’s Ein Heldenleben.

231 RECORD REVIEWS
Recording of the Month: the debut album of Big Sugar, weighing in at 500 Pounds. Our biggest-ever Record Reviews section also includes comments on important recordings of Britten’s vocal music, Messiaen’s complete bird music for piano, plus an amazing Boris Godunov, Rozsa’s Ivanhoe, more from the Shostakovich mill, and Colin Davies’s new Lohengrin. The Converse Society turns in four classical audiophile-quality solo-piano discs, with three more from Concord Jazz’s At Maybeck series. Also in Jazz & Blues, two discs each of long-lost Paul Butterfield sessions, the passionate Ivo Pernheim, and Joshua Redman. Popular discs reviewed include new ones from Marshall Chapman, Lisa Gerrard, Gora’s Mule, Shane MacGowan, James McMurry, Rod Stewart, Jennifer Trynin, Steve Vai, Chris Whitley, and Warren Zevon. Bugs Bunny & Daffy Duck sing the Beatles.

275 MANUFACTURERS’ COMMENTS
Letters of love, laments, and lashings.

306 THE FINAL WORD
Larry Archibald on the September CEDIA Expo.

INFORMATION
281 WHERE TO BUY STEREOPHILE
291 AUDIO MART
222 BACK ISSUES
68 SUBSCRIPTIONS
114 STEREOPHILE RECORDINGS
188 STEREOPHILE TEST CD 3
98 STEREOPHILE GUIDE TO HOME THEATER
30,31 SUBSCRIPTIONS
320,31 HI-FI ’96, THE HOME THEATER & SPECIALTY AUDIO SHOW
270 SCHUANN CD SERVICE
305 ADVERTISER INDEX

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APE BRAINS & THE KRELL

Editor:
Because JA mentioned it (August, p.165), I must set the record straight.
The actual lines spoken by Morbius upon finding Dr. Ostrow dead after his
experience with the Krell Plastic Educator were: "The fool; the meddling
idiot. As though his ape's brain could contain the secrets of the Krell. He was
warned and now he's paid. Let him be
buried along with the other victims of
human greed and folly."
I was there; I should know.
COMMANDER J.J. ADAMS, ret'd
Bellerophon, MA
P.S. As you might expect, Alta and I
have a Krell system (love the new KPS-
20). We got it at Altair Audio.
THE ONE AND ONLY!
Editor:
Since subscribing to Stereophile a couple
of months ago, all I can say is: Super!!!
Besides reading all the tests, etc., I get
the biggest kick out of all the letters in
each issue. Man, there are still people
out there who refuse to open their cars
and just listen to the differences in
sound of various components.
The one and only.
DEYAN MILOYEVICH
Manhattan Beach, CA
WHAT A MAGAZINE!
Editor:
What a magazine! I have been a Stereophile
subscriber for about six months
now, and have learned a ton about
the world of high-end audio. I have been
searching for the "sonic holy grail" for
about two years (I'm 21), and have
found Stereophile to be my respected
audio bible. I am a purist when it comes
to sound and music. I have an excellent
ear (I was a piano major in college), and
I am very critical when it comes to an
audio system's attempt to create the
sound of hi-fi. I really get a kick out of
the readers who write to you voicing
their opinions on certain audio issues.
There are a lot of people like me who
live, breathe, and sleep thinking about
high-end audio! Is there a support group
I can join?
The reviews done in Stereophile are
not like your typical reviews found in
some other, cheesy, so-called "audio-
ophile" magazines. Your reviews are
written by reviewers who are know-
ledgeable about audio equipment and
have an ear for what music is supposed
to really sound like through an audio
system. They tell it how it is, not the
way it's supposed to be, and they voice
their opinions with honesty and in-
tegrity.
How do I know that? I read the re-
views from top to bottom! I value every
word they say and use the information
given when I'm evaluating the reviewed
pieces of equipment at local high-end
salons.
Well, I look forward to many more
years of this great magazine. One sug-
gestion: Don't mix video with audio.
Having video equipment reviewed in
Stereophile would certainly do a dis-
service to your serious readers. There
are some great video publications out
there for people who are into that stuff,
but Stereophile is for music lovers, not
movie lovers.
SHANE MATTSON
Londonderry, NH

THE HEALING BEGINS
Editor:
Keep your free CD...and your magazine!
The only pleasure I get from Stereophile is immediately throwing it
into the garbage. (It is not absorbent
enough to be used to line the cat's litter
box.)
Come on, guys, the Yuppie culture
died several years ago! Stereophile's arti-
cles, written by egotistical jerks, are
laughable—that is, until I can't hold down
my dinner anymore. But...it's okay. You
guys keep on spending $50 million on
amplifiers. It's politically correct. It
keeps the economy moving. The sales
tax alone must be supporting the Clini-
tons. The manufacturers must be having
a real hoot, laughing all the way to the
bank! Hah!
I have been a subscriber to Stereo
Review for years—I can't get back to it
soon enough!
TERRY LAFFERTY
Milford, OH

FEELING BETTER?
Editor:
You people piss me off. The good news
is, this makes Stereophile more stimulat-
ing than most:
"There's nothing wrong with high-
end audio that some good public rela-
tions and image-building can't fix."
(September '95, p.83)
"...communicating the music's inner
essence" (p.115).
"Use your ears and decide for your-
sell" (p.171, in a discussion of $750/
meter cables from a company with just
18 dealers).
My crap detector goes off so hard that
I want to laugh and hit one of you at the
same time. Through the looking glass of
your magazine, I see a bunch of mostly
middle-aged white guys who truly love
your hobby and who truly want the
rubes to buy enough of your overpriced,
over-hyped hobby byproducts so that
you won't have to get real jobs or live in
Buffalo. Something like the winery
business.

Forbidenn Planet, MGM, 1955.
"It erupted with a force to turn sky and earth upside down..."

-Hi Fi Review [Hong Kong]

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$4795/pr.
Plowing through an issue, fending off the bullshit and backscratching, looking for usable information—thanks for appreciating HeadRoom's little headphone amps—leaves me tired and resentful, as I guess you can tell. Stereophile seems to come more often than any other monthly I get. Only Gramophone includes less useful information per pound, and I just quit them. But I felt so guilty after all those nine-month introductory packages that I bought a whole year of Stereophile. What have I done?

Thank you, I feel better now.

William J. Murphy
Sacramento, CA

Nothing has changed!

Editor:
I'm just getting back into hi-fi after a two-year hiatus, and it's nice to see that nothing has changed. Disgruntled manufacturers are still pulling their ads, unhappy and often irate readers are requesting cancellation of their subscriptions, and the lunatic fringe is still claiming that virtually every new gizmo or doodad, placed strategically on a speaker cabinet or amp, will turn an otherwise mediocre system into sonic nirvana.

Because we are human, and each has his/her own perspective on just about everything, the disagreements will never end. So what if you don't believe 50% (or more) of what you read in Stereophile? The point is to have fun with the hobby and to keep an open mind...

Remember, LL, JA, JGH, LA, etc. are people just like you and me: they have preferences, biases, and probably limited hearing acuity above 12kHz. Let your ears do the listening and your brain make the decisions. Hey, and while you're at it, remember to enjoy the music!

Ben Bernstein
Westminster, CO
nyexec@aol.com

Audio is fun again?

Editor:
About a year ago, a friend sent me a gift subscription to Stereophile. At first it was overwhelming technically, but with a little time and patience the light bulb came on; I now look forward to getting my monthly issue. Until I began to grasp some of the details of your pages, I had been listening to a 10-year-old NAD/Kimber/Moore system which provided countless hours of pleasure, both to me and others. Your magazine allowed me to finally understand why I liked those components, which alone was reason enough to read it. Due to its age, however, I've upgraded my system and continue to enjoy music as much as ever. This leads me to the point of my letter. Several times over the past year, I've seen in reader's comments, convention reports, and equipment evaluations the phrase, "Audio is fun again!" My response is: At what point did it stop being fun? Granted, I have not been subscribing for very long, so may have missed something, but I still can't imagine the origin of these comments.

Sure, there are plenty of controversies in high-end audio (double-blind testing, Shun Mook products, etc.). Any area of human endeavor is bound to have them, and that's okay: they help to expand perspective, whether one agrees with them or not.

Strong opinion is what Stereophile is all about. However, to me, the implications in that simple statement are disturbing. The caveat in the introduction to your "Recommended Components" listing is both fitting and proper: "Deletion of a component from this list does not invalidate a buying decision you have made." Technology changes, listening tastes change, reviewers change—this is life in the High End.

But it seems to me that to nonchalantly remark that audio hasn't been fun is absurd. In the broad sense it refutes the legitimacy of the High End and makes me question what those making this statement (and, by default, Stereophile for publishing it) were thinking when they said audio wasn't "fun."

JA has written that his primary responsibility is to ensure that the opinions published are transportable and repeatable, further validating these comments. I take the time to read and understand your magazine because, for me at least, audio has always been fun. If, as Robert Harley wrote, even small differences in musical presentation are important, then what am I to make of past subjective evaluations (good or bad) if their validity was published during a time when things weren't fun?

No one who reads this magazine can deny that there is a current Renaissance in the High End. There are numerous publications, Internet sites, outstanding recordings, and excellent equipment demonstrating this, and it is exciting. While enthusiasm may be running high, critiques that insinuate that the past was not fun are out of place in a venerable journal like Stereophile, especially when recent discussions have often revolved around single-ended amplifiers and horn speakers (which are, yes, fun). Don't these assertions subtly invalidate our previous enjoyment and undermine your credibility?

Enough of this bitching—the amps are warmed up, and I'm going to have some fun.

Peter P. Korch
Barnesboro, PA
gamlam9@aol.com

Listening to the crazies

Editor:
In John Atkinson's August '95 "As We See It," he makes reference to the phenomenon of sonoluminescence as reported in Science News? He misses the point. Science News is not suggesting to dunk a pair of Wilson Audio Grand SLAMMs into the swimming pool as a high-end crazy streak. Also, quoting Harry Pearson, "You have to know when to listen to the crazies"—[Pearson] was looking at the Editor of Stereophile.

Maron Horonzak
Stoufville, MO

I was merely using the example of the connection between sonoluminescence and fusion to point out that not all crazy-sounding phenomena are crazy. Consider the following scenario, which is predicted by the Special Theory of Relativity: Floating in infinite space, a spark is struck that is so brief in duration that just one photon of light is emitted. A spherical wavefront expands from the point where the spark is struck, moving at the speed of light equally in all directions. Some indeterminate time later, the wavefront impinges on an observer's retina. Even though the other side of the expanding sphere of light may now be on the other side of the universe from the observer's eye, all of the photon's energy is made instantaneously available at her eye to trigger a chemical reaction that allows her to "see" the spark.

If you don't find it intriguing that modern physics predicts it to be a true description of reality that something moving at the speed of light can be both everywhere and somewhere at the same time, you've lost the essential sense of wonder. Perhaps the truth is, Mr. Horonzak, some of the crazy tweaks are just not crazy enough to be real.

JA

Thank you

Editor:
Thank you for producing a great magazine. As a professional working in the hi-fi industry, I use Stereophile as one of four magazines to stay on top of future trends, and ahead of my competition. In fact, you are usually ahead of industry journals regarding our not-so-small niche. However, I am saddened by so

2 A typo misled some readers, in that the issue of Science News that included this report was April 29, 1995, not April 3, as stated in August '95 "As We See It." My thanks to Richard Brooks (richard_brooks@sun.exploitation.um) for catching this error.

JA
many of the letters I read each month in your “Letters” section.

To those individuals who complain that too much of the magazine is dedicated to high-end pieces they could never afford, let me suggest that you use Stereophile as an informative learning tool, a source for reviews of new music releases, and as an indication of what will soon be available in consumer-grade equipment. (Remember, technology trickles down quickly.) If none of those suggestions are viable, this magazine may not be the one for you, but there is no need to be rude to people who are attempting to educate the rest of us.

To those individuals who complain about the “foul” language that on occasion appears in these pages, I urge you to abandon your attempts at censorship. Our country is founded on the idea that certain rights are guaranteed to its citizens. Those rights, like freedom of speech, greatly outweigh the fragile sensibilities of those who deny that such exists, but if it did are sure that theirs would not stink. To put it another way, would you also censor musicians, painters, sculptors? If so, who next? Newspaper writers, ministers? Where does it end? I am interested in how reviewed equipment makes the reviewers feel, and hope that censorship never prevents me full access to their findings.

To me, Stereophile is a source of information unavailable elsewhere; it provides a reliable point of reference I use with my clients, and hours and hours of entertainment and enjoyment. While everyone can benefit from constructive criticism, I have little respect for those who detract from this truly great magazine.

Editor and staff, please keep up the great work!

JASON LYON
Billings, MT
audio@mcn.net

The bee’s knees!
Editor:
I am thoroughly incensed by the self-appointed denizens of language standards and culture who write to you every month, without fail, to complain about the “coarse” or “vulgar” language occasionally used by your writers in a review. I thumb my nose at these stiff-collared, starched-shorts blowhards (no offense intended), who are probably the quasi-literate exponents of a bankrupt ideology instilled in them by sexually repressed schoolmarm at the tender age of four, and who continue to mindlessly spew the unexamined and arbitrarily established standards of a generation now (thankfully) in its decline.

These are the same persons who would assault our libraries with copies of "expunge Henry Miller," “expunge D.H. Lawrence,” “expunge James Joyce,” “abridge Hemingway,” “burn Allen Ginsberg,” for fear of besmirching the lily-white psyches of their children.

I am of the opinion that we need more color and spice in Stereophile’s often ponderously boring, technically dense articles. I say use more earthy, organic, physical language. Let’s talk about how sensuous a component is, about how an oxygen-free copper wire from XYZ Company has renewed us as vigorous lovers, about how Forsell’s Statement amplifier has added a new dimension to lovetmaking, about how Sonic Frontiers aids the digestion, or how the cost of Cello components will most certainly make us regular (without the aid of ertaz remedies in the form of high-fiber tablets or stool-loosening beverages).

I say use more organic writing; let your writers pepper their articles with words which give a sense of flesh to the text and landscape of their Audophilia nervosa. Give this bland and anestptic medium of communication a taste of the flesh, blood, and excrement of human existence.

Incidentally, sign me up for a lifetime subscription—Stereophile is truly the “bee’s knees.”

FRANC NAPOLITANO
Des Plaines, IL

It’s about the music!
Editor:
Stereophile’s own poll shows that its average reader’s hi-fi system costs $11,000. That’s a pretty good chunk of change. I make a pretty good living for a 29-year-old—enough to need the services of a tax attorney. My own hi-fi, which I adore—Magnepan SMGs, Velodyne VA810 sub, Audio by Van Alstine Omega II power amp, Luxman TP114 tuner/preamp, Marantz transport, and Audio Alchemy DITB—cost less than one third of that, and yet I feel it at least has high-end aspirations.

It’s the quality of the writing [in Stereophile], quite frankly, that keeps me reading a review of a $10,000 preamplifier. You owe it to your readers both to continue to review bazillion-dollar gear that pushes the state of the art, and to get more real with some additional reviews of real-world gear. A $1995 power amplifier is not real-world.

Finally, I want to applaud your treatment of the tyrannical forces who continue to suggest that you cannot be into hi-fi and listen to rock’n’roll. What utter hogwash this is. My father is an audiophile, and I got my love of music and its reproduction from him. Discussion of it has deepened our relationship greatly. Does he listen to White Zombie when I’m not around? No way. Do we listen to it together? Yep. And love every minute of it. Then when he puts The Pines of Rome on next, I appreciate that. Would I listen to it by myself? Not likely.

Point is: Music, thank Jah, is an individual taste, and there is no right or wrong!!! I love music—and I love the music that I love, no other. To say that one can only appreciate high-end audio by listening to classical music is just naïve. I bet a lot of these classical-only snobs have expensive hi-fis and about 70 CDs. I have 10 times that—well over three times the investment in CDs as I do in hardware. This is because I love music. Isn’t that what the High End is really for?

Keep up the marvelous work.

Rob Hughes
Evanson, IL

Make it less technical?
Editor:
I enjoy reading Stereophile very much. The concept and realization is, at least in comparison to German hi-fi journals, outstanding. However, I feel the technical data is too much in the foreground. The description of sound quality in the test reports could be more detailed and extensive, even if this means they become more subjective. Perhaps you could also publish more general articles and more about the development of equipment—and don’t forget the history of high-fidelity. I wish there could be more hi-fi journals like Stereophile in Germany.

Peter Klucken
Bochum, Germany

Make it more friendly?
Editor:
As a new subscriber, I would like to take this opportunity to express my satisfaction with Stereophile. It is well-written, informative, and fun to read. There are, however, several points I think would improve Stereophile and help make it more “user-friendly.”

1) Get rid of the graphs. This includes all the “measurements” used for showing how a product performs on paper. As Robert Harley has stated, “there is absolutely no way to predict a component’s sonic character from looking at test results.” I don’t buy equipment based on its intermodulation spectrum or its squarewave response. These graphs belong in an industry publication aimed
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 either coaxial or optical links. It handles sampling frequencies from 25 to 58 kHz 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 regulators/filters 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.

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.

Delta/Sigma modulation with 64× oversampling and fifth order noise shaping follows a high resolution 8× 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.
FOR MORE THAN A DECADE, AUDIO REVIEWERS FROM AROUND THE WORLD HAVE PRAISED YBA PRODUCTS FOR THEIR MUSICALITY. SO, IF YOU JUDGE QUALITY ON REAL SONIC VIRTUES RATHER THAN ON THE SIZE AND WEIGHT, YBA MIGHT BE JUST RIGHT FOR YOU!

Intégré
U.K. “The best integrated amp I’ve heard so far...”

YBA 1
Spain “Redefines the State of the Art...”

YBA 3
Japan Best Component of the Year 1990

CD2
France Gold Award by Diapason

YBA 2
U.S.A. Stereophile Class A
Recommended Components

U.S.A.: Audio Plus Services Tel.: 1-800-663-9352 Fax: (514) 493-4547
Canada: Plurison Tel.: (514) 493-9352 Fax: (514) 493-4547
at engineers, designers, and acousticians. Most of the buying public does not use them, let alone understand them.

2) Review more loudspeakers. Not only are the loudspeakers the most important part of a system, they are also bought more than any other audio component. Besides, there are more than 350 speaker manufacturers out there, something other components cannot even come close to laying claim to. Stereophile tends to review one or two loudspeakers per issue, the rest of the reviews evenly divided between preamps, digital processors, racks, and so on. This should be readjusted to reflect what's actually happening in the market.

3) Review more Class B, C, and D products. Here again, Stereophile is out of sync with what we are buying. Most cover photographs are of products that cost $6000-$12,000. You've recently made progress in this area, and are reviewing more real-world-priced items, but more progress is still needed. Are Class A products fun to read about? Yes! But they're better off somewhere else, maybe in a separate publication devoted exclusively to them.

I hope these points help you become better aware of what (some of) your readers would like from this publication. I should be a good indicator of who reads Stereophile—a middle-class, average-earning citizen who appreciates the art of high-quality audio reproduction.

JOHN P. HARNICK, JR.
WATERTOWN, CT

I appreciate Mr. Harnick's point about what equipment we choose to put on the magazine's cover, but it seems that more people will pick up and purchase a copy of Stereophile at the newsstand when it has a Krell component pictured on the cover than when it has, say, one from Audio Alchemy. And although, as Mr. Hughes correctly points out, our hobby is about the music, when we run a cover with a musical theme, our newsstand sales drop into the basement. As we wish to continue spreading our editorial message as widely as possible, it seems clear what our cover strategy should be.

Although the primary goal of putting together a hi-fi system is to enjoy the music, it must not be forgotten that it takes massive use of technology to make that happen. Measurements help separate the good engineering from the bad, the inspired from the merely competent. No, the measurements can never supplant the listening experience, but without the technical analysis included in a Stereophile review, it would be impossible to see whether a product that sounded "good" did so because it had been designed that way, or because it was the happy result of: coincidences exploited by someone with talent, but without much in the way of technical knowledge. Witness the loudspeaker reviews in this issue, for example, which include examples of both kinds of design. While not everyone will read a review's measurements section—and it's okay to skip it—the totality of our review judgment would suffer without it being there.

Finally, while we publish more reviews of loudspeakers than of any other kind of component—51 models in the last 12 months, out of a total of nearly 180 individual reviews—I don't agree that the loudspeaker is the most important component. Without an amplifier, how could it make a sound? Without a source, what sound could it make? What is important to us is that we cover the entire field of high-end audio in as representative a manner as possible, bringing you what we think you need to know without fitting it into a policy straitjacket. And the simple fact is, Stereophile reviews more high-end and more "real-world" products than any other audio publication.

WHO'S IN CHARGE HERE?
Editor: I've been a subscriber for several years, but don't remember ever seeing this question answered: Who chooses which CDs to review, and on what basis do they make their selections? Just curious.

CRAIG FISHER
PLEASANTON, CA

As Music Editor, I select which CDs to review—with a lot of help from Stereophile's crack team of Contributing Music Editors. Each is extremely knowledgeable in his or her area of expertise, whether jazz, alternative or roots rock, chamber music, the standard symphonic repertoire, show music, or opera. The emphasis is on music: releases of interest and excellence always stand at least a chance of being reviewed, as do interesting failures from established artists. (No one, however, need be worried about a lousy album from an unknown performer.)

Though excellent sound quality can certainly help, it does not by itself guarantee a recording's inclusion in "Record Reviews." To get to the end of the market, each week I load up Wes Phillips's capacious arms with discs of primarily audioophile interest for him to consider for inclusion in "Quarter Notes," his quarterly survey. (Next installment: next month.) And Wes, John Atkinson, and I choose each Recording of the Month—often a title suggested and reviewed by a Contributing Editor—by equally weighting music and sonic considerations in our listening. Hope you're enjoying the results, Mr. Fisher.

CONCERT-HALL REALISM?
Editor: You guys don't even know what you're shooting for. "Concert-hall realism" is, for the most part, not achieved in concert halls! Since the 1960s, halls have been designed and refurbished by "acousticians" whose unconscious standard has been recorded sound as reproduced in the home. Thus, new halls sound like hi-fi: exaggerated treble, mushy midrange, boomy bass. Cases in point: Avery Fisher Hall in NYC (an acoustic disaster from the outset), and the total ruination of Carnegie Hall. Art (pre-hi-fi concert-hall sound) has come to imitate artifice (recorded sound ostensibly trying to reproduce the concert-hall experience).

Try listening to a church organ or chorus with orchestra in a church. I've found richer, less strident acoustic environments in places of worship than in most concert halls.

There is no "designing" good halls; they are happy accidents engendered by instinctive geniuses, not deliberate acts of scientific creation. I used to leave Carnegie Hall unable to listen to even a great stereo. Now, it doesn't matter; Carnegie Hall and the stereo sound pretty much the same. No—the stereo sounds better. At least there is some perception of detail and sense of involvement. At Carnegie, as in most new halls, one feels as if one is witnessing a distant, enclosed event, not a totally involving experience.

Hi-fi reproduction has even influenced musical instrument construction. As a piano rebuilders, I've witnessed the tendency toward brighter—, more percussive-sounding instruments. Most of my customers insist on a "big" tone, meaning very bright, with little harmonic overtone content. Unless everyone, including women, is experiencing high-frequency hearing loss, one must conclude that the standard of reality is recorded sound, not the fact of mellow, rich piano tone.

By the way, with the exception of the recent Neumann TLM 170, and perhaps a few custom-made models, all microphones used to record pianos and orchestras have a rising response.3 Most are incredibly bright and harsh, a few mildly so. Thus, the recorded artifact has little resemblance to reality, and never has. How absurd it is to tweak a megabuck stereo, only to play a recording made with exaggerated high-frequency—response microphones.

3 According to Neumann, the maker of world-standard microphones, microphones should be bright because there is a natural high-frequency dropoff as one backs away from the source. Gee, we can't have that! It wouldn't be hi-fi!
Maybe one day some brilliant genius will hang up a pair of TLM 170s in Blumlein configuration in an unspoiled concert hall or church, and record a worthwhile musical event. Maybe even a 20- or 22-bit hard-disk computer recorder will be used. And would it be too much to hope that this genius would use an audiophile-grade microphone preamp?

ARTHUR GRUDKO
Brooklyn, NY

Check out our Intermezzo and Concert CDs, Mr. Grudko (see the ad elsewhere in this issue for ordering information), as well as Peter McGrath's piano recordings for Audiofilm and Bud Graham's for Sony Classical. And see Peter W. Mitchell's report on recent discoveries in the acoustical history of Carnegie Hall, in "Industry Update" elsewhere in this issue. —JA

BLUE POINTS
Editor:
Michael Fremer's selection of the well-regarded Blue Point in his $1000 analog rig (Vol.18 No.8, p.51) leads me to write with some comments on this wonderful cartridge. In the last couple of years, I've enjoyed two of them at the end of a Sumiko MMT Premier arm mounted on my old Thorens TD321. Only recently, however, have I realized just how good this cartridge can sound.

One of the more common complaints about the Blue Point is its "rather woolly bass," to quote Stereophile's "Recommended Components." It's widely thought that this is largely due to resonances in the plastic P-mount adapter. Lyle Cartridges makes, and Audio Advisor sells, a machined aluminum replacement. It really does tighten up the bass and make it subjectively more extended. I'd be surprised if there were anything else one could do to improve the sound of a system this much for $25, and I urge every Blue Point owner at least to try it.

The Blue Point is, of course, a high-output MC, which I expect is what led Mr. Fremer to say that the 32dB gain setting on the VAC-in-the-Box is "correct for the Blue Point." One can, of course, use it directly into MM phono preamps, which I did for a long time. Then I upgraded my preamp from an NAD 1600 to a Classé Thirty. Of course, everything sounded a lot better, but one thing bothered me: The analog gear was coming through louder than the CD player, and I was having to keep the volume control down very low. I figured the circuit was set for MC, but couldn't be bothered to do anything about it for a few months, when I popped the hood and switched it to MM.

The differences were not subtle. Bass response suffered badly; dynamics were muted; rhythm and pace were comparatively absent; the list goes on. And the Classé's MM stage has 38dB of gain. In the end, I had the MC gain cut from 23dB to 13dB, for a total gain of 51dB. That restored the music's soul and let me keep the volume control in a reasonable position. I'd therefore urge Mr. Fremer to try setting the VAC-in-the-Box for 50dB of gain and see what happens—and urge all Blue Point owners to experiment with different gain settings if their preamps allow it.

Let me end by thanking you for publishing "Analog Corner." This vinyl junkie has already learned something from it, and looks forward to learning more.

RICHARD HECK
Cambridge, MA

THE ANALOG COMMANDMENTS
Editor:
Mr. Fremer's opinions on the superiority of vinyl playback would be better expressed as such, rather than in the manner of Moses handing down the Ten Commandments. It's perfectly understandable that he should jibe at the rantings of "digital snobs"; but not that he should be as blindly partial from his own side of the (utterly sterile) analog vs digital debate. In my own experience, CD junkies seem to argue (pontificate?) from ignorance, vinyl fanatics from religious conviction. I'm not sure which is less attractive.

In 100 years' time, who'll give a damn?

JIM MCDERMOTT
Maidenhead, Berkshire, England

WHY I HATE DIGITAL
Editor:
I have been reading Stereophile for a long time now and I have a high degree of respect for your reviews of equipment and software. I have thought about writing to you for a very long time because I have wanted to share with someone my great pain.

I remember loving music for my entire life. I am 26 years old and I had the opportunity to grow up with a great turntable and record collection provided by my parents. In 1984 I purchased my first CD player and began collecting CDs. I spent hours and hours at record stores collecting music that would last forever and sound better than anything else. I became so obsessed with the need to collect, I stopped listening so much.

My stereo is nothing special. I have a couple of NAD 208 amplifiers with a pair of KEF 105s, an NAD preamp, and an ADCOM GDA-600. I have been through more CD players than I can remember. My stereo is adequate. I have played around with all kinds of inter-
connects, isolation feet, and the like, and I have made modest improvements to the sound of my system.

I go to the University of Wisconsin–Madison, and on an overcast weekend this last spring I drove home and picked up an old turntable. I was bored; Wisconsin can be a miserable place. Hell, what am I smoking? It is a miserable place. Anyway, I returned to Madison, and using the interconnects and the turntable for the first time since 1984, I hooked it up to the old stereo. I also brought with me a collection of LPs including the Sheffield Drum Record, Sonic Labs half-speed-mastered Santana and Doobie Brothers albums, a Sonic Labs half-speed Dark Side of the Moon, an old Woodstock album...basically about 50 or so records of varying quality.

I was blown away. I was floored. My system kicked some ass—artists sounded natural, there was texture, images came to life, and sounds moved beyond the speakers. It sounded so damn rich. I brought friends over to demonstrate. Everyone was blown away by the rhythms on the Santana album. The Sheffield Drum Record cooked the CD version. The bells that one of the drummers moved around sounded like bells; on the CD it sounds generated like a synthesizer. Simply put, the sound was open and real on the LPs.

I discovered what I had been missing—why I had been spending all of my time at record stores and not listening to music: because digital audio sucks cow balls. There are differences in CD players, but give me a 15-year-old turntable and I believe that I can bring a CD to its knees on the altar of analog. Simply put, there is no comparison.

My point is this: All of the differences I have heard in digital audio are marginal. Even going from 16 bits down to 15 bits—hell, down even to 8 bits—makes only marginal differences in the sound. The difference—no, the superiority of LP over CD is huge; digital can evolve for another hundred years—it has many orders of magnitude to go before it can compare. Sorry, my point is that I have lost hope.

You guys have been muddled down in the controversy concerning data compression. I have heard the DCC decks and the MiniDisc. I think that they come really close to CD. No, they may not be as good, but the difference is marginal between the two when you compare them to analog. Digital is so shitty that maybe a marginal difference is important in the digital world. But the analog world blows it away, so in absolute terms it is unimportant.

I don’t know what it is, but there is something fundamentally flawed with digital audio. Maybe you can’t take ideas about sampling visual events and apply them to audio. Maybe it just doesn’t work. I think that the sampling rate and the precision need to be much higher...

I think that the idea of a Super-CD improving things is just a last hope that will fail us all. It is entirely possible that all of us can miss good sound because we will be willing to jump on that bandwagon. Once we go down that road and LPs and 30ips tape become a thing of the past, how will people know that there’s something missing? They won’t—and that is a huge con. The more we move down this road, the more people won’t know what they’re missing...and maybe all of us will forget what good sound is all about.

I am depressed because I think the CD has killed off a great deal of good music.

JEFF MUEHL
jmuehl@earth.execpc.com

THE LAWS OF PHYSICS

Editor:
I write in response to Michael Fremer’s “Analog Corner” column in the July Stereophile. In it, he asserts that analog has “effectively infinite resolution.” There seems to be a belief among many audiophiles that analog systems intrinsically have higher resolution than digital systems do. Without getting bogged down in the physics, I’d invite the readership to join me in a brief reality check.

Before going ahead, however, let me state from the outset that I am not about to tell anyone which format to listen to. You should listen to whichever format you enjoy more. It is, after all, your ears and your music. I am referring to the question of which format is more accurate as a method of electrical reproduction of recorded signals.

Analog recording and digital recording are two methods of representing the air-pressure function that we call sound. Neither is intrinsically “better” than the other, and each has its flaws. There does not exist, and there has never existed, an analog system blessed with infinite resolution. One would be hard-pressed to find an LP recording that contained meaningful, correlated, and undistorted information above 20kHz. One could further engage oneself in a fruitless search to turn up an analog recording with dynamic range to rival that of the best noise-shaped digital recordings.

This is not to say that the CD system is perfect, and early examples of the Compact Disc were particularly offensive. High-order analog anti-imaging filters caused all sorts of ringing and phase shifts, not to mention roller-coaster nonlinearities in the highest octaves.

However, improvements in the last decade have brought digital to the point where, compared to analog discs, the CD is a more accurate reproducer of audio signals. This can be demonstrated quite simply by doing a level-matched comparison between an LP and a high-quality digital copy made from it. In a properly controlled listening test, it becomes impossible to discern original vinyl from digital clone. The test does not work in reverse. A trained listener can easily discern an analog copy from a digital source.

The demonstrable reality of audio is that analog recorders add a variety of euphonic colorations that, for many people, are exactly what they wish their audio systems to do. And while I am never going to assert that someone should be listening to one format or the other, I will quite legitimately put forth the undeniable fact that the output from a digital player is as close a reproduction of the original waveform as one is likely to find.

With regard to Mr. Fremer’s claim of “infinite resolution” of analog, I would challenge anyone to show me a vinyl disc that contained as extended and as linear a frequency response as high-quality digital. The mechanical distortions of the cutter, as well as the mass and compliance of the stylus, make it nearly impossible to get real-world LP performance beyond about 18 or 20kHz. In the dynamic-range arena, the finest LPs are still constrained by inexcusable surface noise that limits the smallest electrical change that can be reproduced without ambiguity. The most advanced digital noise-shaping technologies have allowed us to encode nearly 20 bits of perceived information into our constrained 16-bit channel. The result is that the best CD recordings can exhibit perceived dynamic ranges approaching 120dB, with linearity extending far beyond that. While I own loads of vinyl and enjoy listening to it, I do not pretend for a moment that what I am hearing is accurate, let alone infinite.

While there is certainly much work to do in order to improve digital audio, it is far from the “straitjacket” that Mr. Fremer makes it out to be. Perhaps everyone should be a little more careful before elevating any current format, analog or digital, to that of the infinite. Nothing we have comes close. Audio is
**NEW PHYSICS?**

**Editor:**

I'd like to commend to the attention of my fellow *Stereophile* readers—especially those with real expertise in psychoacoustics—the article in the August 1995 *Scientific American* called “The Benefits of Background Noise,” by Frank Moss and Kurt Wiesenfeld.

As I understand it, the point of the article is this: Suppose there is some low-level signal, and a threshold level below which the signal cannot be received because of the (in)sensitivity of the receiver. Sometimes, when there is random noise that may exceed that threshold level, the sum of the signal and the noise crosses the threshold with approximately the periodicity of the signal, and the signal becomes detectable. This phenomenon is called “stochastic resonance.” Effectively, the noise amplifies the signal.

The authors have found simple biological instances of this phenomenon. It seems to me that it could play a role in the psychoacoustics of sound reproduction. It is conceivable to me that this might explain, for example, why critical listeners regularly report a dynamic range from LPs greater than that of CDs—a range that would at first blush seem impossibly large, given the noise level of vinyl records. If auditory perception works just the right way, and the noise is just the right sort of noise, then the idea of “hearing into the noise” might not be an illusion at all, but the approximate amplification of low-level signals by the noise to the threshold of perceptibility.

Pushing further into the realm of speculation, this phenomenon might also be related to the audibility of differences among LP playback systems, despite the apparently small levels of acoustic vibration associated with the mechanical differences between those systems: the precise nature of the noise might be more critical than one would naively expect. And in a similar way, stochastic resonance might conceivably play a role in determining the effects of different bit-reduction and noise-shaping techniques in digital recording and playback. (I wonder whether Johnson, Pfleumer, and Ritter of HDCD® fame are way ahead of me.)

Of course, nothing I'm saying is by any means a deduction from the findings of the *Scientific American* article, but speculation that would have to be investigated empirically. It would be of no value for *Stereophile*’s readers to use stochastic resonance as an explanation for everything in the same way that *Stereo Review*’s readers use the placebo effect.

**Dr. Frank Krausz**

Boston, MA, fgk@world.std.com

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**HI-FI SNOBBERY**

**Editor:**

Having been a hi-fi buff for over 25 years, I have come to the conclusion that there is more snobbery out there than on the ski slopes. A lot of people go for the big names on the market and are being shortchanged in the process. I don't mean that those products are no good (although sometimes they are), or that they are not worth their retail price (ditto), but a lot of products out there are being shrugged off because of a fad in the hi-fi market.

A lot of people call me because I have managed to put together a hi-fi system at a very reasonable price that seems to defy a lot of expensive stuff out there. Some of those people have very expensive equipment and have noticed the difference when they have heard it.

It's not what you put together, but how you do it. Don't buy with your eyes but with your ears.

**R. Bruneau**

Quebec, Canada

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**THE AUDIOPHILIA DISEASE**

**Editor:**

I am writing this letter primarily regarding Mr. Castellano’s letter (*Stereophile*, Vol.18 No.8, August 1995). I profoundly disagree with him. “People gravitate to the High End as their interests, expenses, and incomes grow” is a very snob position. I believe that the audiophilia “disease” is not related to age, income, etc.; it is related to passion for music and a need to enjoy its reproduction in the better possible way (closer to reality) at home.

I am only 25 and own what would be called a “mid-fi” system; although I am not completely satisfied with the way it sounds (I believe I will never be with any system), I think it reproduces music in a fair way. I also think that not all *Stereophile* readers are necessarily potential high-end consumers. (They may be one day, though.)

The articles in *Stereophile* give more than information about specific components. They give you knowledge to improve and appreciate your system even with limited means (ie, CD Stoplight). I
A Tough Act To Follow.

Accolades keep pouring in for the Proceed line of products. The PAV audio-video preamplifier, the PRE stereo preamplifier, and the AMP 2 and AMP 3 multi-monaural power amplifiers have all won critical acclaim the world over. The question on everyone's minds: what's next?

The Best of Two Worlds
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also would like Mr. Castellano to know
that it took me only six months to
switch from Stereo Review to Stereophile.
"Getting Real" gave non-audiophile peo-
ple an opportunity to develop their inter-
est in the "thing itself" and achieve fair
musical reproduction without spending
too much.  
Julien Maculan
Brooklyn, NY

THE LONG HARD JOURNEY
Editor:
Concerning Frederic A. Castellano’s let-
ter in August (p.19): Let me first con-
gratulate Mr. Castellano on his long hard
journey to becoming a Stereophile reader.
What bothered me about his letter was
the generality directed to owners of
$700-$1000 systems. If owners of such
systems were, as Mr. Castellano said,
"satisfied with the sound," why would
they be reading this journal at all? Some
of us, probably most of us, do not have
the money to throw around on $3000
preamps and interconnects, and must
work (considerably harder) at assembling
musically satisfying systems at low costs.
I would also like to applaud Stereophile
on leaving behind the kind of ignorance
and low-cost phobias that have plagued
the High End. It is still the music we are
all interested in, isn't it?
Andrew C. Hohenadel
Lancaster, PA

THAT DARNED ELITISM
Editor:
The August 1995 issue of Stereophile is
my first (and the only) issue I will read.
After perusing the report on Hi-Fi '95, I
read the letters to the editor. Judging by
the snobbism of your readers, I do not
want to count myself among their poor
ranks.
Take, for example, the letter from Mr.
Castellano of Frazer, Pennsylvania, attack-
ing Kristen Weitz (p.19). In his words,
"People gravitate to the High End as
their interests, expenses, and incomes
grow." By his own admission, the pur-
suit of audiophilia is a nouveau-riche
endeavor. This hobby is pretentious,
conspicuous consumption taken to the
extreme. It is sick and wrong when peo-
ple snub one another for any reason, but
it borders on perverseness when the expense
and quality of their stereo components
becomes the basis of the snub.
Mr. Castellano continues, "The people
who would find Kristen’s insights helpful
own complete systems that are worth
about $700 to $1000 and are quite satis-
fied with the sound." I must be missing
the essence of life and sound altogether
if I’m quite satisfied with the drivel that
oozes from my pedestrian system. And
to think I could spend $100,000 on a
speaker system rather than reserving
the best box seats at the symphony for all
the seasons to come for the same
money. Then I wouldn’t have to deal
with all those commoners who, I am
sure, would be quite satisfied with such
low-end audio.

Finally, to the editors who chose to
run Mr. Castellano’s self-aggrandizing
letter: You, sirs, are out of line. On one
hand, you publish Ms. Weitz’s opinions
in your magazine—this is an endorse-
ment of her expertise. On the other
hand, you publish ugly letters written
by self-serving suckers which attack
your own staff, then offer no defense for
them or for your choice of them.
Judging by other letters to the editors,
I know I do not stand alone in my criti-
cism. I would hope that audiophiles
enjoy music for its own sake rather than
using it to foster an attitude of elitism
and petty arrogance toward those who are
merely "quite satisfied" with rack
components.
Claus von Hecht
Newport Beach, CA
Hecht@sluva.slu.edu

My support for my writers is implicit in that I
recruit them, then publish what they have to
say. By contrast, Stereophile’s "Letters" col-
umn is for you, the readers. We have our say
in our articles and reviews; I generally only
respond to letters when they a) ask a direct
question, or b) state something that is false that
I feel should not go uncorrected. I don’t see that
it is out of line for me to publish critical letters,
Mr. von Hecht, unless you also believe I have
to agree with everything in a letter for it to
make its way into print in my magazine.
However, this does mean that anyone who
writes for Stereophile must acquire a thick
skin.

GETTING REAL... LOST??
Editor:
I read the August '95 "Letters" about
the demise of Kristen Weitz’s column,
"Getting Real," with sadness.
I usually enjoy watching the flaming
point/countertext expression of opinion
in your letters to the editor. However, the back-and-forth bantering
about whether Stereophile should even
allow space in print for "budget" prod-
ucts has always struck a nerve in me.
Then, in the August '95 issue, a few let-
ters (particularly the one by Frederic
Castellano) were practically deriding
Stereophile’s right to have a neophyte
audiophile reviewer’s perspective in
print. They were even questioning Ms.
Weitz’s capacity to write for your publi-
Beyond Description
cation! These comments were then followed by Kristen's signing off service as Stereophile's "Budget" reviewer.

Now I must jump up on my Audiophile Soap Box and add my $2 worth.

I am sorry to see Kristen Weitz go. I will miss "Getting Real," just as I missed your publication's other discussions of lower-priced gear over the years. I sincerely hope that you will continue to represent "budget" audiophile products in the pages of Stereophile in the very near future in some form.

I believe that any audiophile (those of us who feel that components do sound different) who would allow a fellow music lover to blindly purchase a mass-market stereo product without first suggesting a competitively priced audiophile-grade product, and where to go in their area to hear such a product, has failed the advancement of high-end audio. This would be akin to letting your own children walk in front of a moving vehicle without first teaching them to look (and listen) in both directions. The job of informing a budding audiophile what better-grade products are out there—and where to listen to them—should be an audiophile's prime directive.

A budget-level audio product is a very versatile reference tool. Stereophile is poised in the perfect place, as one of the biggest and most-read publications of its kind, to be the medium for this message. Your publication is well-known to be able to carry (or kill) a product in the marketplace. By continuing to review lower-priced, entry-level products, you will give the person starting out on their audiophile journey a great place to begin their listening. And if you don't provide this benchmark, some other publication will.

So, please, let's get "Getting Real" back. Or perhaps Stereophile could create a new column for the discussion of entry-level high-end audio products.

Oh, yeah, to all of you flaming the "budget" perspective, let me add a little more. You need to be more supportive of neophyte audiophiles, whether in person, in print, or in your stores. It takes a lot to keep a customer, but it doesn't take much to lose one. Show them that there is a difference. If you turn someone away because of a difference in perspective, they can never grow to be another ardent audiophile like yourself.

Your friend in Audio, KARL WIDAK
Secretary, The Detroit Audio Society
detaudio@aol.com

As explained last month, Kristen has left us for pastures new. But with Lonnie Brownell, and now Muse Kastanovich, writing about real-world components for Stereophile (see Muse's debut speaker reviews in this issue), I believe we will continue to provide guidance for entry-level audiophiles.

—JA

STOP IGNORANCE

Editor:
I find myself frustrated and bewildered by the state of affairs in high-end audio. From the recording process to the reproduction process, the misinformation, ignorance, and hypocrisy are overwhelming.

I recently played some David Sanborn and some Pat Coil records for a musician friend of mine. I seated him on a comfortable futon directly in the sweet spot and asked him to identify the processed and the realistic. He was stunned. The difference was more than obvious. Unlike the Coil, the Sanborn was compressed, edgy, and had no depth.

He asked me how such a famous musician could sound so bad and this mystery entertainer could sound so good. I then explained that the performing and the recording processes are usually fractured. That the recording studio, equipment, and engineers are too often bamboozled by digital or high-tech buzzwords and rarely are cognizant of the damage they have done to the source. I then told him that I bet if we called several recording studios in town, we would find that they had no idea how to listen; therefore they cannot possess the ability to record.

We called two studios. The recording engineer in one was asked if he could record live to two-track and what equipment he had at home. He told me that for my single-guitar recording, the 24-track would do better and that he was saving for that killer Sony rack system. The other recording studio fared much better. He was insulted by my question about what he used for reproduction in his home. He asked me what one had to do with the other.

Therein lies the rub. The musician works years to create his sound; he assumes the studio has captured it. The studio engineer assumes his shelf-mounted JBLs have captured the event indistinguishably from the source, and that the mastering process will transfer this information to the record or CD. Then the consumer buys this media, takes it home, and assumes his equalized, up-against-the-wall rack system with Bose 901s can reproduce it just as the musician produced it. We all know this is not the
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case. Now we must find the solution.

In order to fix the problem we must consider several criteria: cost, schedule, and performance. Where can we bring about the most improvement? Will it be the musician? The engineer? The writers at Stereophile? The consumer? It is all of these, of course; but the middleman, the most hypocritical, the most ignorant of all, is the dealer. This is where media and product meet the consumer. This is where the worst offenses occur. The manufacturer, the musician, and the listener all assume that the dealer has carefully and magically checked his recipe, combined the ingredients, and presented them in the proper setting. In order to do so he has obviously collected the best-recorded media, purchased components that complement each other, and set them up in an environment that conveys the message without altering its performance. I can assure you, having visited many dealers in many big and small cities, that this is rarely done. The dealers are committing suicide and dragging everyone else with them. So what’s the plan?

Certification! That’s the buzzword we’ll use. Stereophile, along with manufacturers’ assistance, will provide a service to the community. They will assist dealers in knowing quality, rounding out their ability to communicate, facilitating some courses in basic human decency and politeness, as well as helping them with their setup. Upon completion they will be added to a published list and have a neat sticker to put in their window. This can all be done without showing any equipment-manufacturer bias, and strictly on a volunteer basis. Course criteria for certification might include:

1) How to treat the customer. Yup—basics here. How to be courteous, patient, and understanding to and with everyone. This includes the millionaire as well as the bus driver. Especially the bus driver! Too often dealers feel it’s a waste of their time to cater to these lost masses. Educate them, hug them, say nice things to them, and let them listen! There are too many rack systems being sold. Give them a reason to believe.

2) Room setup. Echo chambers? That’s all I hear at dealers’. Sure, they can tell me how I should do it, how important it is, and operate the cash register very well when the wallet comes out, but that’s it. One dealer even told me, “If it sounds good here, you know it will sound good in your home.” Spend a couple bucks and put up room treatments you can demonstrate. Velcro! It’s been around for a couple weeks now. How about little hooks? How about tipping the Tube Traps over?

The same friend I mentioned earlier went with me to a dealer just last week. We listened to some B&Ws through a Levinson. The speakers cost three or four times as much as my NHT/Forté/Denon setup. (I’m waiting the HCD® thing out.) He told me that the system did not approach the system he heard in my house. The shame here is that if it had been properly set up, it would have crushed mine. No excuse here, kids.

Another big mistake I see being made is in the placement of speakers in demo rooms. Too often there is too much speaker for the room. When the speakers are in the right room, they are located in a crowded area almost right against the wall. The excuse I hear most is that it is hard to move speakers on spiked stands. Fine, skip the spikes in the store. Any benefit you gain with the spikes you crush 10 times over with poor placement. Also, try marking the floor with numeric codes matching your speakers. Each pair has a unique footprint; trace it and use it.

Just last week I got a chance to hear some Thiel CS2 2s. Everything would have been much better had the dealer wired them in phase. If he had taken the time to treat the room, set the speakers in the right spot, and check it out before I sat down, all would have been fine. When I pointed out the problem, he said I was the first customer to point out the problem to him. This brings us to…

3) Education. Sum of the parts, babe! Media, equipment, room, and setup. Skip one and you’d better replan. Maybe a media blitz. How about small demonstrations in the middle of malls? A rack system on one side of a booth and an NAD/PSB setup on the other. A tight office divider setup, with a top, will do fine. Maybe a truck parked outside of every Circuit City or Silo. Start a consumer-education task force. With some healthy donations from all dealers, manufacturers, and free space in your magazine, we could get the ball rolling. Maybe some ads in Stereo Review! Don’t waste good resources.

Hey! Let’s get on the stick. Another friend of mine asked me where he could get a good CD player for under $400. I told him to try NAD. He said he never heard of them. But he owns Bose. Hire their marketing guys. They perform miracles.

Okay. I’m done ranting and raving. The ship she goes down, gentlemen. Ignore it, placate it, take another step up on that elitist podium, and you’re dead. If just one out of every 10 rack-system purchasers were to stop by that little booth in the mall, and one out of 10 of them would spend their money in our ballpark, we will have accomplished our goal. It’s war, people. You have your orders! Michael De Kort

Kirtland Air Force Base, NM

WOLF WHISTLES
Editor:
The quality and pattern of the high-frequency noise noted by G. Durocher ("Letters," Vol.18 No.6, p.21) can be heard on one CD that I own. In the silence before the first bar of Prokofiev’s Sonata No.1 for Violin and Piano (with Shlomo Mintz and Yefim Bronfman, DG 423 575-2, DDD, 1988), and in other quiet passages of the disc, a steady high-pitched noise mars the background.

I have no idea what the cause of this is, but a few things are worth noting: I have heard this on two different copies of the disc, neither of which were from mail-order clubs; it is evident on different CD players and systems; and, most intriguingly, it is quite similar to a sound that used to find its way onto cassettes when I recorded from records and CDs while a nearby television was on. Moving the television away from my system solved this problem.

Is it possible that poorly shielded television monitors used for a video recording made during the audio recording session could be responsible for this?

Eric D. Baum
Philadelphia, PA
baum_E@at.mscf.med.upenn.edu

It is always possible that a video monitor could have been singing along with the music. I got hold of the CD in question (with some difficulty, as it appears to be no longer available—I finally found it in a secondhand store) and performed an FFT analysis on the opening measures. I sent the output of a PS Audio Lambda transport straight into the S/PDIF data input of our Audio Precision System One (thus ruling out DAC idling tones as the cause). As can be seen from the diagram (fig.1), a pure tone with a frequency of 15.675kHz is present in the noise. Mr. Baum must have golden ears, as this tone is at a relatively low level and I couldn’t hear it at all at normal listening levels. (In fact, I only heard it when I turned up the volume way above what was appropriate for the music.) I did note, however, that the background hiss on the disc was both very grainy-sounding and high in level. Something I found surprising considering the disc’s "DDD" label. And the frequency of the tone is a dead giveaway that some kind of video monitor was pre-
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sent at the sessions. Anyone else have problem discs?

—JA

DIGITAL WIZARDRY

Editor:
In the course of his review of Audio Research's SDP1 multichannel music processor (August '95, p.143), the esteemed J. Gordon Holt writes in places as if the L–R component of a stereo signal were almost entirely made up of uncorrelated reverberant information, and that any frontal signals which get into the rear channels do so only by leakage. This is a common notion, but is very misleading. A "difference" signal is just that: one channel's instantaneous voltage minus the other's, which means all sources placed on the frontal soundstage by means of amplitude differentials (the norm) will generate difference signals even in the absence of any ambience.

This is the prime reason for delaying arrival of the rear sounds, because they contain and are usually dominated by copycat versions of the frontal image, producing an anomalous effect which grows as that image adopts what JGH calls "hard-panned left and right signals." There's no escaping this fact, although in a non-delayed Hafler-style setup its effects may be ameliorated (or at least changed in character) by reversing the front/back phasing.

Of course, as JGH notes, such gross anomalies are banished if the rear signals are put into the "fusion zone" by means of an appropriate time delay, which is what the SDP1 does. But let's be clear that even then, a large proportion of what comes from the rear is actually a contorted version of the frontal signal, albeit often joined in practice by sufficient ambient and other time- or phase-related artifacts to produce a very attractive quasi-reverberant effect.

Perhaps one day some digital wizard will come up with a means of separating time-dependent L/R differences from purely amplitude ones, and it would be nice to think that some such feature might eventually find its way into use to cope with two-channel recordings in parallel with the Ambisonic ideas proposed for the Super-CD Standard set out so courageously elsewhere in that same issue of Stereophile.

John Crabbe
Todmorden, Lancashire, England

AMBIENCE SYNTHESIS

Editor:
I hate to contradict such an eminence grise as J. Gordon Holt, but "music surround" is an oxymoron if, by this phrase, one means the attempted extraction of concert-hall early reflections and reverberant tails from matrixed or unmatrixed recordings with the goal of simulating a musical soundfield at home that is a reasonable facsimile of the real thing. For starters, the assumption that the L–R difference signal can reliably represent the complex reverberant characteristics of the recording space is wishful thinking.

For example, suppose a soloist from the left side of the stage is singing a cappella. The L–R signal is then mostly L. If you delay this signal and send it to the left rear speaker, you now have a single early reflection coming from the wrong direction (plus some reverb). If we also send a delayed −L signal to the right rear speaker, the confusion is compounded because of the increase in the Interaural Correlation Coefficient. Depending on the exact delay and the four speaker positions, you could end up with a mix of interaural crosstalk, comb-filter distortion, and pinna miscues, all of which are just psychoacoustic jargon for describing an unrealistic soundfield.

What about a dry recording? If it has little recorded hall ambience, only delayed-out-of-phase L and R signals will go to the surrounds. This in no way can fool the ear/brain system into sensing a real space, even if such a space is appropriate for the music, such as an opera or symphony.

The idea that digital synthesis of musical ambience is only a novelty that wears off may have been true in the past, but will come as a surprise to at least some users of Lexicon and JVC simulators. The sophistication of today's computer-based synthesizers (Bose, Lexicon Professional, and others) are definitely up to high-end standards, but, high-end or not, there is no other practical alternative in the long run to software synthesis, particularly if the present library of LPs and CDs is not to be made obsolete in this context. The use of two JVC XPA 1010s or three Lexicon CXP s or a combination provides enough processing power to generate more realistic "you are there" concert-hall-caliber soundfields than were ever dreamed of in anyone's surround-sound philosophy.

A major advantage of synthesis is that the ambient field can be tailored to taste, based on the type of music, the reverb in the recording itself, and just plain personal preference for one concert hall over another. It is also much less expensive to synthesize three, four, or five pairs of left and right early-reflection and reverb-tail signals than to make new multichannel CDs that cost the listener extra for every CD, and put the music lower totally at the mercy of the multichannel recording engineer and whatever recording standard is adopted.

Ralph Glasgal
Northvale, NJ
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GORDON ON MIKES

Editor:
Mark M. Block ("Letters," September '95, p.16) is being naive if he thinks my own live recordings were all I used for judging the sound of the Meridian Digital Theatre system (June '95, p.73). I also used the other software mentioned in the review, although as usual, I put more credence in the accuracy of audiophile recordings (Reference Recordings, Sheffield, Telarc) than in others from other labels. I also used signals from CD and laserdisc, and the bottled-up high end I reported was present with every recording from every medium. I assure you, it wasn't a matter of my microphone distance.

I've tried five different sets of professional condenser mikes during the past few years, and judged their performance relative to a sizable cross-section of what should be state-of-the-art recordings from other sources, played through a number of high-end systems in my neighborhood. I am reasonably confident that I know what the mikes I finally selected sound like, although they still occasionally surprise me. Sure, there's room for quibbles about the high-end balance, the low-end weight, direct vs reflected ratio, and so on. But these are amenable to placement, and are trivial considerations to the Meridians, which were not so amenable. (I'm reminded of Winston Churchill's reply to a Lady's observation that he was drunk: "Yes, Madam, and you're ugly. And tomorrow morning I shall be sober."

I reiterate: The Meridians sounded gorgously lush and rich; they just didn't sound very real to me. J. Gordon Holt
Boulder, CO

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US: Wes Phillips

Dealers promoting manufacturer and designer seminars should fax (don’t call) Wes Phillips the when, where, and who, at (505) 983-6327, at least two months before the month of the event—ie, if you’re putting on an event in February 1996, you should get the information to Wes no later than December 1, 1995. Mark the fax cover sheet “Attention: Wes Phillips—Dealer Bulletin Board.” Promoters of hi-fi shows and audio societies promoting manufacturer visits should also fax Wes the details as soon as possible.

California: Sophrosyne is proud to announce their four-year anniversary with the grand opening of The Audio Gallery at 3019 D Street in Sacramento. The Audio Gallery will be demonstrating state-of-the-art products from Balanced Audio Technology, Mesa Engineering, Audible Illusions, E.A.R., Golden Tube Audio, Krell, McCormack, Townshend, Rega, Benz, Resolution, Enlightened Audio Designs, Mike Maffat Labs, Dunlary, Vandersteen, Reference 3 A, Platinum, Gallo Acoustics, Quantum Sound, Sound Dynamics, van den Hul, AudioQuest, XLO, Discovery, Knoll, Nakamichi, Sound Anchors, and ASC. Manufacturer seminars from a majority of these companies are scheduled during the next few months. Call (916) 427-2100.

Ambrosia Audio and Video (2337 Roscomare Rd., Suite 6, Bel Air) invites you to attend a 7:30pm presentation by Ross Keim of Meridian Audio on Wednesday November 15. The seminar will highlight the latest developments in the Meridian Digital Theatre, including the latest version of the 565 processor with AC-3 decoding. Refreshments provided. Seating is reserved; call (310) 440-5522 to arrange attendance.

The Audio/Video Design Group, Future Sound, announces weekend-long seminars on Home Theater. These will be held Saturday November 18 and Sunday November 19 at Future Sound’s Burlingame showplace (851 California Dr., Suite A, Burlingame). Krell will introduce its new reference home theater KAV line and will be showing the long-awaited AC-3— and DTS—compatible CSC processor preamp. Runco will demonstrate its statement video projector, the Lightamp 400, with a Faroudja Line Quadrupler. Products from Wadia, Totem, Atlantic Technology, Transparent Audio, and others will be demonstrated. For additional information, please call (415) 342-1477.

Florida: Audio Center, Inc. (120 North Federal Highway, Deerfield Beach) announces a seminar evening Thursday November 30. Guests will include Ernest Benz of Benz-Micro (Switzerland), Garth Leerer of Musical Surroundings, and David Davies and Max Townsend of Townsend Audio. The latest developments in analog playback and component isolation will be featured. Seating is reserved. Call (305) 574-9200 for details and reservations.

On Thursday October 26, from 4pm to 8pm, Wilson Audio’s Mark Goldman will showcase the new WITT speaker at Front Row Center (5030 Champion Blvd., Boca Raton). Call (407) 241-1767 for more information and to reserve a seat.

On Wednesday November 8 at 7pm, Alex Montenegro of Audiophile Systems will be introducing the Linn “Knekt” whole-house distribution system at Audio Visions South (3953 W. Kennedy Blvd., Tampa).

Georgia: On Sunday October 22, Pete Marshall and Steve Johnson of Audio Atlanta and the Atlanta Audio Society are hosting a Home Theater Seminar featuring Mitsubishi’s 35” direct-view monitors, electronics by Marantz and NAD, and loudspeakers by Vandersteen and Boston Acoustics—including the latter’s “VR” series. On Sunday November 19, from 2pm to 4pm, the Audio Society continues its series of live concerts and recording sessions with a winter program featuring a dual-piano recital by Angela and Lyudmila Ozybovy. A matched pair of counter-tuned Steinway concert grands will be recorded via half-track analog reel-to-reel and encoded to 20-bit DAT and Ambisonic sound. Recital location: the Piano Gallery of Atlanta, 2140 Peachtree Rd. Open to the public. For details, call Chuck Bruce at (404) 876-5659.

Illinois: The Chicago Audio Society will host John Övöls on Sunday December 17, who will introduce his Waveform Acoustics Mach 17 loudspeakers—which he reports, produce a true three-dimensional soundstage. Details are available at (708) 382-8433, or (708) 582-3913, or via e-mail at: sysop@nybble.com.

Naim Audio North America Inc., has moved. Their new address is 2702 West Touhy Avenue, Chicago. Tel: (312) 338-6262. Fax: (312) 338-6202.

Michigan: On Wednesday November 1, at 7pm, Overture Audio (618 S. Main St., Ann Arbor) will feature KH America’s Joel Rosenblatt, who will discuss and demonstrate NAD’s new line of affordable audiophile electronics. Call (313) 662-1812 for more information.

Montana: On Friday November 10 at 7:30pm, Brent Hefley, National Sales Manager of Martin-Logan, will hold a seminar at Thirsty Ear Hi-Fi (9 East Main St., Bozeman). Call (406) 586-8578 for more information.

New Jersey: Audio Connection will welcome Audible Illusions! Elliot Kallen on Thursday November 16 for a 5pm discussion on the Modulus 3A preamplifier. Contact (201) 239-1799 for a reservation; limited seating.

Pennsylvania: Audio Alchemy, Dahl-
Now presenting HDCD. It's the remarkable process that vastly improves the fidelity CDs, including ones you already own. And four of our new digital to analog converters have it. Simply marry one to any of our single or 5-disc CD transports and your music will come so alive that it's a little scary. To enjoy the show, head to your local Parasound dealer. Where there's never a cover charge.

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quist, and Evidence Jazz Records will be featured at the Philadelphia Audio Show on Sunday October 29. Mark Schiffter of Audio Alchemy will present new products and discuss the history of his company. Evidence will discuss the jazz reissue market and introduce their recordings to show attendees. The 1pm show, open to the public, will take place at the Wayne Hotel, lower level, (610) 687-5000. The show is sponsored by DL Communications and the Philadelphia Audio Society.

On Thursday November 9 through Saturday November 11, Overture Ultimate Audio/Video (2423 Concord Pike, Rt.202, Wilmington) will present the world premiere of Avalon Acoustics' $72,000 Osiris speaker system. Neil Patel will be demonstrating the Osiris in Overture's highly regarded listening environment. Industry leaders will be on hand. Call (800) 838-1812 for information and reservations.

Ontario, Canada: On Saturday November 18, Needletalk Audio will present the new Cliffhanger CHS-1 speaker and CHC-1 tube preamp (now including phono stage) at the Sheraton Inn, 1696 Regent St., Sudbury. Cliffhanger's new tube power amp will also be unveiled. Designers Ian Smith and Cliff Kasper will answer questions on Cliffhanger products. Kerry Richardson of May Audio Products will also be available to answer questions concerning XLO cables and McCormack electronics. Contact Gord Austin at (705) 682-4149 to arrange attendance.

Outside the US: John Atkinson

The fourth Hungarian High-End Show is being held November 10–12 in the Atrium Hyatt Hotel, Budapest. For details, contact Endre Szeghethi at Magic Sound. Tel/Fax: (36) 88 320 502.

US: Peter W. Mitchell

Since the April issue of Stereophile we’ve been following the developing proposals for a CD-size high-density digital videodisc format (DVD), because of the expectation that such a disc would also become the basis of a Super-CD with greater resolution and bandwidth. During the summer, pressure grew to negotiate a compromise between the competing Sony/Philips (MCCD) and Toshiba/Warner (SD) proposals. Historically, Japanese manufacturers have often cross-licensed each other's designs, competing only at the retail level, but the DVD format competition has been unusually public and intense.

The MCCD format gained widespread support from computer makers, while Sega (the huge videogame company) endorsed the SD system. In late July Sony was rumored to have proposed that the warring camps should at least adopt the same modulation system, so that first-generation players would not become obsolete when one system won or a compromise was adopted. In mid-August the computer industry confirmed that either the MCCD or the SD format could satisfy the computer industry's needs, while emphasizing the crucial need for both camps to compromise on a single universal standard for the high-density CD.

On August 24, on the eve of the giant annual International Funkausstellung electronics show in Berlin, Sony and Philips admitted that pressure from computer makers was stimulating negotiations in Tokyo. During September those talks ran into repeated roadblocks when compromise seemed impossible, and some of the contenders agitated for an immediate direct freeze in order to tool up and produce players by next summer. But manufacturers also salivated at the huge profit potential of a unified standard: an executive of Thomson/RCA predicted at the Berlin show that the DVD could become a bigger market success than either the Walkman or the VCR, because of its multimedia applications as a digital video disc, a Super-CD, a DVD-ROM computer data disc, and a powerful interactive videogame disc.

In mid-September, reportedly under pressure from IBM, DVD contenders agreed on the outline of a compromise. While the unified standard will employ elements of the MCCD proposal, a large part of it appears to be based on SD proposals. The focus of the compromise is that most discs will be single-sided, to meet the computer industry's demand for quick data access. Standard disc capacities will be either 4.7 gigabits (the original Toshiba SD proposal) or 8.5Gb (the Matsushita compromise that I described in July's "Industry Update," marrying SD technology with the 3M/Philips idea of a single-sided, two-layered disc). When still larger capacities are required, producers will have the option of making double-sided discs by bonding two thin discs together back-to-back.

Many details remained to be worked out, but the agreement freed eager manufacturers to start tooling up and bring their players to market next summer. (My guess is that this will lock in place the choice of Dolby AC-3 as the standard audio format for DVD, driving coffin nails into the proposal that new listening tests should re-evaluate alternative coders such as DTS or AT&T's MPAC.) At the end of August Toshiba set a record for the earliest Winter CES announcement when it invited audio/video journalists to preview Toshiba's DVD player (or a hand-built prototype) the day before the show opens.

US: Robert Harley

Now that dozens of digital processor models using the Pacific Microsonics HDCD® decoder chip are on the market, the question looms large: When will we get more HDCD-encoded discs? Without the recording industry's support, HDCD can't become anything more than an audiophile curiosity.

As of late August, Pacific Microsonics had shipped four "Alpha"-version professional HDCD encoders to mastering studios. The four studios are Georgetown Masters (Nashville), Ocean View Digital (Santa Monica), Gateway Mastering (Portland, Maine), and Neil Young's Redwood Studios in Northern California. Georgetown masters a full 50% of all the albums on the country charts, and 15% of the pop-chart titles.

Among the projects being encoded with HDCD are Jimi Hendrix's The Ultimate Experience, the entire Tom Petty catalog; Wynonna Judd's new album, which was mixed directly to HDCD rather than to an analog two-track; Emmylou Harris's new Wrecking Ball; Neil Young's entire catalog; a new Dire Straits album for March 1996 release; Pam Tillis's All Of This Love, a new Neil Diamond album; and dozens more titles.

Reaction to HDCD sound by professionals who have heard it appears positive. Denny Purcell at Georgetown Masters, who has mastered 250–300 albums a year for the past 25 years, has ordered six more HDCD encoders. He says, "I've waited three years for HDCD to come out. That's how important I felt it would be to the standard of mastering I can do. And it's delivered everything I've been waiting for." As for the sound quality of HDCD, Purcell says, "You can take an HDCD-encoded disk and hear the difference just by playing it on an ordinary boombox. You can make out delay trails, perceive greater width, more depth, spatial arrangements...."
The ultimate blind test: Can you see the music?

The blind test: you don't know which brand of speakers is which or how much they cost. You can judge the speakers only by the music they produce. The true test of a loudspeaker, though, is not just how musical it sounds, but how accurately it recreates the sound stage... its ability to place the performers accurately, left to right and front to back.

Introducing the KEF Reference Series for 1995, with KEF's patented Uni-Q® technology. Uni-Q places the tweeter in the center of the woofer, allowing both high and low frequencies to reach your ears at the proper time — the vital element in creating a realistic sound stage.

Once you hear KEF's new Reference, the challenge of choosing the right loudspeakers won't be so daunting. You can do it with your eyes closed.
Mastering engineer Joe Gastwirt of Ocean View had this to say about HDCD: "I'm not talking about subtle differences. The improvement HDCD makes is big enough to be perceived immediately and dramatically by anybody. The difference in the end product is unbelievable."

When I spoke to Bob Ludwig of Gateway Mastering, however, he told me that he wasn't impressed by what he's heard so far. He returned his encoder, and both he and Pacific Microsonics believe the unit may not have been working correctly. Bob is awaiting a second unit, and will comment on the record about HDCD sound after he's had more experience with the format.

As of this writing, Pacific Microsonics is building 20 more encoders, all of which are said to have been sold. The production units were scheduled to have been shown at last month's Audio Engineering Society convention, along with a white paper on HDCD technology. Unfortunately, despite earlier promises, Pacific Microsonics didn't present formal technical papers explaining HDCD in more detail.

The best way for professionals and consumers to judge the value of HDCD is to get lots of software and hardware into as many hands as possible. With the apparently imminent use of HDCD in mastering studios, we'll all have a chance to more fully assess the sonic benefits of HDCD for ourselves. [We'll also be reporting next month on our reactions to the HDCD/non-HDCD comparison tracks on the second Reference Recordings HDCD sampler CD.—Ed]

**US: Wes Phillips**

Loudspeaker manufacturer Apogee Acoustics, Inc. announced in September its merger with and acquisition by a/d/s/ (Analog and Digital Systems) of Wilminton, Massachusetts. Jason Bloom, president and co-founder of Apogee, reached an agreement with Kurien Jacob, president and CEO of a/d/s/, to consolidate the company into a/d/s'/s expansive facilities.

Apogee, best known for their Full Range Ribbon technology, have recently introduced dedicated Home Theater products utilizing a newly developed ribbon driver that provides for a unique degree of flexibility in placement. Apogee has also targeted the pro market, as they feel the new design lends itself to nearfield console monitoring.

"I will always remain as dedicated as ever to advancing the state of the art," stated Jason Bloom. "Opportunities abound for Apogee through a/d/s'/s financial resources and technical services. These will facilitate the development of new and advanced products of home and studio. I can also envision Apogee's version of high-end automotive speakers utilizing our high-end designs." a/d/s'/s, of course, was the subject of a reverse takeover by the Canadian Meitner/Musetex company a couple of years back (see Stereophile, Vol.16 No.4, p.37).

**International:**

**Jonathan Scull**

I recently attended a press luncheon at Manhattan's @ Cafe. Yes, that's right, the "at" Cafe. It's located on the fringe of the East Village at 12 St. Marks, just off Third Avenue. Things start to get "colorful" just around there as you head east through the bizarre souk-like streets that mark this part of the Village. We love it.

The @ Cafe (http://flynet) represents an explosion of such Internet-type Cafes around the country, not to mention the world. In fact, Kathleen and I hung out at a place called the Internet Cafe (http://www.bigmagic.com) on East 3rd Street between First and Second avenues. That's across from the Angels. No, not the Guardian Angels. The Angels—Hell's. It's a very peaceful block, of course, and the heavy-duty choppers parked outside their black-and-red HQ can be impressive (although one rarely feels the urge to stand over one and drool).

So I made it over to the @ Cafe with Kathleen, my assistant editor, and we checked in to check out the launch of a new electronic service on the Internet—Music Boulevard. We stay in touch so you'll be in touch. Thank you, Baba Wawa.

Located on the World Wide Web at www.musicblvd.com, "Music Boulevard" is a one-stop service where customers can listen to 30-second sound samples, view album art or artist photos, read album reviews or musician biographies, and buy from the most extensive catalog available with over 145,000 listings. Music Boulevard also offers Music Wire (Music Boulevard's daily music magazines), Billboard chart listings, and an electronic newstand that allows patrons to read articles from and purchase subscriptions to several music magazines. "The contents of the Schwarm CD Review Digests are also available on-line at Music Boulevard. All this from Telebase Systems, providers of EasyNet, iQuest, and other online services. Their press kit and goodie-bag came with a T-shirt, a CD sampler from BMG Music, and a seven day trial offer for Pipeline software and Internet access. (Call (800) 453-PIPE for a starter kit) Even though the visuals were blindingly fast and gloriously graphic on NetScape via the @ Cafe's T1 datalines, bringing up Music Boulevard at home through AOL's v2.5 Web Crawler at 14.4 bps turned out to be laborious and slow. You can pick the level of graphics you want transmitted, however, speeding things up to the detriment of the visuals. (Web graphics in general seem to stretch the creative en-
velope nicely.
The sound of scribblers working the room, munching pasta, beans, and salad (accompanied by much quaffing) was so loud, I could barely hear myself think! Take my website...please! We wound up at a table/terminal with a young guy from Details magazine (who looked like he’d stayed up way late the evening before), a Nixon Young Republican type from Good Housekeeping worried about electronic-age alienation for his readers, an attractive, serious, and businesslike writer for Working Woman, and a young, slick Wall Street hi-tech investments guy called Laurent, who concentrated on his lunch. He affected a Brideshead Revisited insouciance that made me think of...Fawltty Towers! Baaa-ZiIL! Aside from a few words in French with Paris-born Kathleen, the most animated I saw him was when he was getting Working Woman’s working woman’s number. It’s all about...schmoozing.

THe SCHWANN
CD REVIEW DIGESTS
ARE AVAILABLE ONLINE
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Cassandra Harris, our Web Tour Guide from Technology Solutions, gazed at us earnestly from behind her tortoiseshell and stepped us through the screens. She did a search I requested on the Jazz page for Miles Davis. The Details guy’s mouth hung open even farther, and his eyes seemed to glaze over a bit more. It was very cool. You could order a competitively priced CD, hear a soundbite, or request a discography or an online look at Miles’ biography. Other music categories that may interest The Young, The Hip, and The Braindead (still glazing) are Pop & Rock and Country, along with Classical, and an All Music selection, if you’re not sure. Comprehensive support keeps Net Newbies from feeling online angst.

Music Wire is an original daily online magazine with the latest music news, reviews, feature articles, and a “Today in Music History” feature. You can find excerpts from Spin, Blues Revue, Dirty Linen, Fanfare, Gramophone, and Puncture (!), as well as the online jazz magazine eBop. You can subscribe, natch. There was a “Stevie Wonder Teams With Music Boulevard For First In-Store Promotion On The Internet” thing going on as well.

Be aware that there’s advertising along the top of the screen—you can click on Impulse Records, for example, and see and hear what they think you oughta know about ’em. For more information, call Telebase at (800) 220-9553, or e-mail ads@telebase.com. See you on the web!

US: John Atkinson
Although paper magazines are thinking long and hard about what presence they should have in cyberspace, and some, such as Stereo Review and Omni, already have high online profiles, Internet-only magazines are starting to appear. CYBERF, for example, is the first such audio magazine. Edited by Jonathan Kettle, a UK journalist who contributed for years to the hi-fi magazines published by Haymarket (Hi-Fi Answers, Popular Hi-Fi, Audiophile, etc.), CYBERF aims to provide in-depth coverage of hi-fi and Home Theater and is published weekly at:

http://www.virtual-publishing.com/cyberfi

E-mail can be sent to Internet: jonathan@virtual-publishing.com. The publisher, David Rosam, can be contacted via CompuServe (100023.2646), the Internet (david@virtual-publishing.com), or by traditional means: Tel: (44) 171-732 1861; Fax: (44) 171-732 7138. Virtual Publishing World Wide Magazines, 58 Avonley Road, London SE14 5EW, UK.

A reader, Robert Bilodeau, recently alerted me to an Ambisonics-related site on the World Wide Web: http://www.omg.unb.ca/~mileese/ambisonics

And, to correct some WWW addresses recently published in the magazine, try:

http://bundy.hibo.no:80/~rpdl/audio.htm
http://www.mother.com/~audiofx

US: Peter W. Mitchell with Elizabeth Cohen
In September’s “Industry Update" we reported a controversial non-event—a comparison demo, or “showdown,” between 5.1-channel coders operating at 384 kilobits/second for the proposed digital video disc (DVD). It was supposed to occur in two parts during July, one session in Japan and the second in Los Angeles, for the purpose of giving executives in the SD Alliance an opportunity either to confirm their choice of AC-3 as the standard audio coder in the proposed DVD, or to choose the DTS system (if DTS was found to perform better).

The Tokyo sessions didn’t go as planned, reportedly because the DTS coder didn’t work. The LA session, initially scheduled for mid-July at the LA branch of Snell Acoustics, was postponed a month to give DTS a chance to get its coder working. A month passed, and then a second month, with no showdown.

On the last day of CEDIA, Elizabeth Cohen, Ph.D. (the new President-Elect of the Audio Engineering Society) and Larry Blake (a well-known recording engineer and pro-audio writer) publicly called for the SD alliance to reconsider the selection of AC-3 as the primary standard for DVD sound. They urged that, before DVD standards are frozen in chip designs, a new round of listening tests should be conducted to compare the latest versions of 384kb/s AC-3, AT&T’s MPAC, and the new 384kb/s version of DTS. Meanwhile, DVD manufacturers were already meeting in Tokyo, hoping to prevent a format war between the Sony/Philips (MMCD) and Toshiba/Varner (SD) proposals by compromising on a single DVD standard—see above. And major manufacturers like Toshiba and Thomson/RCA were agitating to freeze standards quickly in order to tool up and deliver DVD players next summer or fall.

Immediately after CEDIA, I called Kevin Voeks at Snell to check the current status of showdown plans. Answer: still no scheduled showdown, but DTS had invited hundreds of people to a demonstration of its 384k coder in the Alfred Hitchcock Theater at MCA/Universal studios. (MCA is the majority owner of DTS.) As it turned out, during the summer DTS hired Elizabeth Cohen to conduct comparisons of AC-3 and DTS coding and record the results of the comparisons on a demo CD. Copies of the CD and technical graphs were distributed to every attendee at the event. (See T/JN’s report elsewhere in “Industry Update.”)

DTS president Terry Beard announced that, contrary to published reports, the selection of 5.1-channel AC-3 as the primary standard for DVD is not
yet final. If DTS can be shown to sound better, it would be foolish of DVD developers to lock themselves into an inferior standard.

Therefore the crucial question is which system of 5.1 coding, DTS or AC-3, performs best at the DVD's standard bit-rate of 384kb/s. Obviously the ideal way to do the comparison would be to feed identical signals to both coders and evaluate the result. But when Dr. Cohen attempted to do this, she ran into an obstacle. As I reported in this space last April, the 384k version of AC-3 is not yet available as a manufactured product. The decoding side of AC-3 was frozen last year, and ICs are available. But the design of the complicated 384k AC-3 encoder is still being fine-tuned. The encoder exists as a software engine running in a dozen Ariel DSPs installed in an industrial-strength PC. Several of these systems exist at Dolby; one is usually on loan to Pacific Post in Santa Monica, where it is used to master laser discs with AC-3 coding.

Unable to gain access to a 384k AC-3 encoder, DTS did the next best thing: they bought a new two-channel AC-3 encoder, Dolby model DP523, and used it to do comparisons at 192kb/s (96kb/s per channel). The result was impressive: DTS coding of both music and test signals at 96kb/s/ch yielded playback that was very close to the original sound, while AC-3 coding at the same data rate with the DP523 produced obviously inferior sound.

One question remains: Since the stereo and 5.1-channel versions of AC-3 coding share the same core technology, is it fair to assume that the 384k version of AC-3 coding suffers from the same sonic compromises as the 192k stereo version? In her CD program notes Dr. Cohen wisely cautioned against this assumption, saying that "The purpose of this CD is to...compare where possible with Dolby AC-3 core technology. Its purpose is not to facilitate final judgment of the performance of multichannel systems."

In my experience, the performance of the DP523 stereo coder definitely does not reflect the sound of the 384k AC-3 coders that are being used to make laser-discs. For several months I have been living with the "DMX for Business" digital radio system, which is based on the DP523 stereo AC-3 coder. (The cable-borne version of DMX digital radio uses a different coding system.) The DMX tuner delivers a wide dynamic range and basically clear sound. But in classical music I'm often bothered by false brightness, and complex passages for chorus or full orchestra sound congested.

It's well-known that the 320kb/s AC-3 decoders in movie theaters contain a "dynamic downloader" facility, through which the dramatic improvements that have been made in the 384k DVD/laser disc version during the past two years will automatically be transferred to every theater. (Cinema decoders will re-program themselves by reading new AC-3 codes on the film.) But as I mentioned in September, this hasn't been done yet; recent movies like Batman Forever exhibited the same aggressive
sound that I heard three years ago. In effect, while for two years Dolby has been improving the sound of the 384k DVD/laserdisc version, theaters have been living with a sonically obsolete version of AC-3. Now that the fine-tuning of the 384k version is nearly finished, its improvements probably will be downloadable to the theater soon.

What about the commercial DP523 stereo codec? Does it contain the dramatically improved performance of the 384k version? Or, as my experience with the business version of DMX suggests, is this product sonically obsolete too? To check, I called an old friend at Dolby who is a senior member of the AC-3 development team. I've known him since his college days, and he speaks candidly as an engineer (not in corporate PR-speak). His answer: Since the 384k version of AC-3 is still in software development, many of its sonic refinements exist only in that version and have not yet been transported to the cinema or stereo versions. Moreover, the performance of the DP523 is unavoidably limited by its modest price. This AC-3 encoder is basically a single DSP chip with limited computing horsepower. For comparison, the new 384k DTS encoder contains several big DSP chips, while the PC-based 384k version of AC-3 runs in twelve DSPs.

The bottom line: The attempt by DTS and Dr. Cohen to provide a valid comparison between DTS and AC-3 deserves applause. Unfortunately, their efforts were undercut by the unavailability of the 384k version of AC-3 in any commercial product, and by Dolby's continuing delivery of sonically compromised versions of AC-3 sound to movie theaters and to users of the stereo DP523. Since the DP523 does not deliver the same sound quality as the PC-based 384k version of AC-3, the DTS demo CD cannot provide what everyone really wants to hear—a valid comparison of the current 384k versions of DTS and AC-3. We still need the showdown that was supposed to have happened last summer.

I'm told that Dolby has conducted its own in-house tests replicating the comparisons on the DTS demo CD. Using the DP523 for the 96kb/s/ch AC-3 tracks, Dolby obtained essentially the same result as on the DTS disc, with obviously inferior AC-3 sound. But when they used the PC-based 384k version of AC-3, running in the 96kb/s/ch mode, most of the differences between AC-3 and DTS reportedly vanished. I hope that Dolby will publish its tests on a DAT or CD-R, so audio critics can hear and measure the results for themselves.

A personal note: Although this story exposes the DTS comparison to have been pretty pointless, nothing that I have said here should be taken as a criticism of the DTS company or its new 384k codec. The codec is a very impressive accomplishment, combining excellent sound with a valuable array of features. The playback decoder (based on the newest Motorola 56009 DSP chip) is an equally impressive accomplishment, promising to deliver flexible DTS decoding at a modest price. Other chips in the Motorola DSP family already handle AC-3 decoding and full THX processing, so one day surround processors may automatically detect and decode AC-3 or DTS signals, and add THX processing where appropriate.

US: Thomas J. Norton

As reported above, in mid-September Digital Theater Systems (DTS) formally launched their Coherent Acoustics digital audio encoding format at a pre-

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WorldRadioHistory
sensation at Universal Studios' Alfred Hitchcock Theater in Hollywood, California. The event was well-attended by representatives from the audio industry, the recording field, and the press.

We've been hearing about this primarily for-the-home format for several months now, so a little background is in order. DTS made their name by being one of three purveyors providing digital sound for motion picture theaters. (They are now clearly the leading company in the field, with over 5000 DTS-equipped theaters. Dolby's AC-3 and Sony's SDDS also have shares of the market.) All three formats use varying degrees of data compression (more accurately, data reduction, or low-bit-rate coding) to squeeze the data required for multiple channels of audio onto the limited space available on the data carrier: on film for Dolby and Sony; and on a separate, time-synchronized CD-ROM for DTS.

Close on the heels of Dolby introducing a form of AC-3 for home applications, DTS also proposed a consumer format, which they dubbed Zeta. Operating at 240 kilobits/second/channel, or 1.4mb/s total for all channels, this format can provide remarkably transparent, 5.1-channel audio on a laser videodisc if it is allowed to pre-empt all the space currently allocated on that disc for the present two-channel, uncompressed PCM digital audio tracks. Dolby's home AC-3, on the other hand, operates at a data rate of 384kb/s for all 5.1 channels—considerably greater compression than Zeta—but fits in the space of just one of the laserdisc's analog tracks, allowing the two-channel digital tracks to remain untouched. More importantly, 384kb/s is the data rate envisioned for the 5.1-channel audio tracks on the upcoming Digital Video Disc (DVD). (While there is actually considerably more data space than this allocated to audio on DVD, other uses for it are currently envisioned, including multiple language tracks.)

DTS's higher-bit-rate Zeta has not yet been introduced to the consumer market. Dolby AC-3, on the other hand, is the current hot buzz, at least among Home Theater enthusiasts, despite the still-limited availability of software and hardware—particularly affordable hardware. In short, Dolby has the home multichannel digital audio market to itself as I write this, and AC-3 is poised to be a major presence on DVD when the latter hits the market—anticipated some time in mid to late 1996. And DTS Zeta's data rate in 5.1-channel operation is too high for use on DVD with video.

But AC-3's hold on multichannel laserdisc and DVD is still open to challenge at this early stage. To mount just such a challenge, DTS has moved beyond Zeta to a more advanced, flexible format they've dubbed Coherent Acoustics—the subject of September's rollout.

**Dolby AC-3 is the current hot buzz among home theater enthusiasts.**

As described by DTS president Terry Beard and Dr. Steven Smyth, who headed the development team, Coherent Acoustics' claim to fame is its extreme flexibility. A single encoder is said to be able to encode incoming data with sample rates from 8kHz to 192kHz and word lengths from 16 bits to 24 bits. Compression can range from 40:1 to 1:1—the latter, of course, is no compression at all. The total data rate of the encoded signal can range from 32kb/s to 4Mb/s, and the coding rate may be fixed or variable. Up to eight channels of multiplexed audio may be accommodated; for home applications using the planned encoders (which use Analog Devices ADSP21020 DSP chips), the limit is six discrete channels (sufficient for a 5.1-channel format). There is also provision for embedded dynamic-range control, channel re-identification, and down-mixing from 5.1 discrete to "LtRt" (the two-channel mix needed to feed a Pro Logic decoder).

The Coherent Acoustics decoder, as presently envisioned, can be built around a single Motorola DSP chip. Offering up to 20-bit PCM resolution at its outputs, this decoder will be able to decode the encoded signal regardless of the latter's data rate. Thus, for example, it could decode a high-data-rate multichannel CD (such as those planned by Mobile Fidelity International), a 5.1-channel soundtrack on a 12" laserdisc encoded at a 1.4Mb/s total data rate (the same rate as the earlier Zeta coding), or a 5.1-channel soundtrack of a DVD recorded at 384kb/s.

There are also some additional features that Coherent Acoustics incorporates at lower data rates—including the DVD rate. First, it will utilize a bit-pool system, as does AC-3, in which all of the available bits can be allocated among the 5.1 channels depending on the needs of each channel, rather than being rigidly assigned. It will also use a variable data rate. Within each 100ns time block, the average data rate must be 384kb/s, but the bits may be moved around within that block to, for instance, make more bits available for a sudden transient.

With such extreme flexibility, DTS is promoting Coherent Acoustics as a one-size-fits-all format ideal for high-quality audio, audio with video at whatever rate is suitable for the desired carrier, and multimedia.

At their presentation, DTS first did some brief demonstrations of the system at several data rates. Next, they ran comparisons with Dolby AC-3 at a data rate of 96kb/s per channel. Why this strange choice of data rates (which in no way resembles any rate proposed for home audio)? Apparently this is one of the primary operating rates of the two-channel Dolby AC-3 encoder/decoder used for the comparisons. Dolby's AC-3, 5.1-channel encoder is not at present a piece of hardware that anyone can go out and buy, and Dolby would certainly not loan a sample to a competitor to run a comparison demonstration.

Was this a reasonable comparison? At the presentation, DTS also passed out demonstration CDs that incorporated both music and test signals, including those used in the presentation. Among the musical selections were excerpts from commercial releases and recordings of solo instruments—including clock-spiel, acknowledged to be one of the most difficult tests for data-compression algorithms. As noted by DTS, the 16-bit CD could not demonstrate the higher—than-16-bit resolution claimed for Coherent Acoustics, but it could give a reasonable demonstration of the latter's capabilities.

During the formal presentation comparisons on the theater sound system (an excellent one, though there were indications that one channel was malfunctioning), the Coherent Acoustics playback sounded smoother to me, with a less grainy quality than the AC-3 replay. Was this a meaningful comparison? PWM goes into this in considerable depth in his accompanying piece.

I have yet to evaluate the DTS CD on my own system. But given the combination of a 96kb/s data rate (a rate of no significance in any proposed 5.1-channel format) and the particular AC-3 encoder/decoder used (again, see PWM's piece), any conclusions based on this disc may be of only academic interest.
You be the judge!

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The DTS presentation seemed intended to introduce Coherent Acoustics, not specifically to introduce DTS's 384kb/s-candidate format for DVD. There is considerably more to Coherent Acoustics than just a possible 384kb/s data rate. That said, however, this data rate is the current hot topic, with DVD on the horizon and rapidly reaching the point of having its specifications frozen. So it was a serious disappointment that DTS chose not to give a controlled demonstration of the system operating at this rate. In a conversation following the presentation, DTS representatives argued that the differences noted at the 96-kb/s/channel data rate would still be evident at the slightly lower total rate of 384kb/s. But audio critics cannot make that leap. We can only make a judgment by hearing the exact format that will find its way into our homes. In light of the pedigree of the AC-3 encoder/decoder used for comparison purposes, this would be an even more dubious leap to make.

While they made no attempt to formally demonstrate Coherent Acoustics at the DVD rate of 384kb/s, DTS did have a high-quality, five-channel audio system set up in the lobby of the theater where the formal presentation was held (Thiel loudspeakers, Krell amplifiers). According to DTS, the music playing on that system was encoded at a rate of 76kb/s/channel—very close to a total rate of 384kb/s. Unfortunately, this was not a setup configured for serious listening: a combination of crowding and the horrendous acoustics typical of a small, glass-laden theater lobby conspired against that. There was also a system set up in a smaller room downstairs, but that was limited to playing material from the CD—which I had already decided was not going to tell me what I wanted to know, though it undoubtedly would be of interest to some members of the audience.

So we still don't know if Coherent Acoustics at 384kb/s—with its bit-pooling and variable data rate—offers a viable challenge to Dolby's AC-3 at the same rate. DTS can't be blamed if an appropriate Dolby 5.1-channel encoder was not available to them for comparisons. But they at least need to seriously demonstrate what their system can do at all the rates most likely to be demanded of it—especially a rate of 384kb/s for all 5.1 channels.

When queried on the subject of software, Terry Beard would only answer indirectly: to the effect that "you know where we are." Hollywood? Universal Studios? Both? But that means movies, and movies in the near term means an audio data rate of 384kb/s. If DTS cannot demonstrate a superiority at that data rate, its ultimate success in home applications is very unlikely.

We already know that Dolby's home AC-3 is very good at what it does. But while it's certainly better, by a comfortable margin, than "good enough for video soundtracks," by all indications it is still not truly transparent. This leaves the door open for someone else to challenge it. Is that "someone" DTS? Perhaps, but my disappointment with the DTS presentation was that when it ended, the answer to that question was no clearer than when it started.

A major DTS presence is planned for the WCES in January, and at least one more demonstration—in a smaller, more suitable venue—may happen before then. Perhaps one, or both, of those events will unmuddy the waters.

**US: Wes Phillips**

Radio Shack® announced a major re-imaging campaign that includes a name change, sort of. The firm will be known as RadioShack® as of August's 1996 catalog. Store signage will be converted to the new logo over the next three to four years and updated packaging designs will appear in late 1996. Other changes include the establishment of RadioShack Unlimited, a special-order program that will provide access to over 100,000 unique and hard-to-find electronics products, accessories, and replacement parts—including those from major name-brand manufacturers. The offerings include phonograph needles and audio cartridges!, batteries for every type of personal electronics product, computers and computer hardware, hundreds of computer and video game software titles, and thousands of other hard-to-find items.

Radio Shack has also announced that IBM Aptiva™ desktop and ThinkPad® notebook computers will be their featured PC offerings. In addition, The Repair Shop at RadioShack will provide in-warranty and out-of-warranty service on all IBM computer products.

The firm has also announced alliances with GTE (for cellular services), ADT Security Systems (for installation and monitoring of home security services), and Orca™ Monitoring Services (for customers who prefer to install their own home alarms).

**US: Peter W. Mitchell**

For several months last year one of the most surprising entries in the charts of best-selling CDs was Chant, by the Benedictine Monks of Santo Domingo de Silos. This recording, containing a collection of medieval Gregorian plainchant sung by an obscure group of Spanish monks (described by some playful writers as the Boys in the Hoods), won a recommendation in last February's "Records To Die For," and sold about six million copies—a genuine worldwide hit. As always, success led to imitations (plainchant recordings by other groups) and a sequel: a second disc by the same Spanish monks, The Soul of Chant, is in stores now. Critics, while endorsing the music and the performances, have also been praising the sound of the new CD.

But if you hear the old or new disc through a high-resolution system, or via headphones, the soundstaging seems a bit odd. The reason is simple: these performances actually were recorded between 1956 and 1962, in mono! To produce the modern "stereo" CDs, the original mono signal was mixed with synthetic stereo reverb. According to Pro Sound News, the superior sound of the Soul of sequel was created by digital processing that removed noise, shortened breath intakes, and caused the two channels of reverber to have different—but complementary—frequency responses, producing a larger illusory soundstage.

The combination of digital processing and research into psychoacoustics has made it much easier to fool the ear into perceiving fake reverb as the product of a real acoustical environment. Devices such as the Spatializer and the Roland Sound-Space Processor do an effective job of processing elements of a recording to make sounds appear to be located in various directions—both in two-speaker stereo and in surround playback.

**UK: Wes Phillips**

Quad Electroacoustics, Ltd., manufacturer of Quad electronic components
and electrostatic loudspeakers, has reached an agreement with Spendor Audio Systems, Ltd., whereby Spendor will manufacture an exclusive range of loudspeaker enclosures to match Quad's existing audio components.

Designed by Derek Hughes—son of Spendor's founder—the new speakers have been approved by Quad after exhaustive tests by Ross Walker and the Quad staff. The first of these new designs, the Quad 77 10L, was released in September with a suggested list price of $1295/pair. The new Quad loudspeakers will be carried exclusively by Quad retailers.

**US: Peter W. Mitchell**

When Carnegie Hall in New York was renovated a decade ago, listeners complained that the sound of the hall had lost some of its bloom. Rumors circulated that a layer of concrete had been installed under the stage, deadening the resonance of the stage floor. The architects and acousticians who planned the renovation insisted that such rumors must be false, since they had not specified any concrete subfloor.

To everyone's surprise, when buckling of the stage structure was discovered in August, repairmen discovered that there had indeed been a layer of concrete in the underflooring beneath the stage. Attempts to discover who authorized its installation failed, while renovation architect Joseph Fleischer confirmed that the concrete was never in the renovation plans. How it got there remains a mystery. The surprise concrete underfloor was removed immediately, and repairs to the stage were completed before the fall concert season began.

Listeners who loved the hall's pre-renovation warmth may be happy now, but it won't be everybody's cup of tea. In Harvard University's Sanders Theater (a popular Boston-area concert hall) the old stage floor was quite "live," but the midbass resonance it added to timpani strokes thickened orchestral textures in a way that always annoyed me. A couple of years ago the stage floor in Sanders was rebuilt, becoming more rigid. The energy of each timpani stroke, no longer absorbed in stimulating the floor's resonance, now sounds more taut and powerful as it propagates out to the audience. This tradeoff reminds me of an old racing phrase: what you lose on the roundabouts, you gain back on the straightaways.

**US: Wes Phillips**

TDK has released an "almost free" CD designed to make system tuneups fast and easy. The Ultimate Guide to Great Sound contains 74 minutes of tips, tests, and musical selections that will enable consumers to tweak their listening system, car audio, or Home Theater. Cassette users will appreciate the "Reference Tone Library," developed to optimize recording and playback calibration for TDK tapes. Stereophile readers can receive the disk by sending a check for $5 (includes shipping and handling), payable to Dobbin/Bolga Associates, to: TDK CD Offer, 24 East 21st Street, 3rd Floor, New York, NY 10010. Remember to say that you read it in Stereophile.

**US: John Atkinson**

In our August report from HI-FI '95, held last April in Los Angeles, I mentioned the room featuring Symphonic Line, Michael Green, and Convergent Audio Technologies components ("The Best Sound at the Show," p.127) as being that of exhibitors Ultra Systems and Convergent Audio Technologies. I have subsequently been informed by Tone Studio's Mark Marynovsky that the Indianapolis high-end retailer was the official exhibitor. My apologies to all who were misled, as well as to Tone Studio.

**ERRATUM**

Due to an editorial oversight we did not credit photographer Julian Kaiser with the photograph of the Micromega Stage 2 in last month's issue. Our apologies.

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**SFL-2 PREAMPLIFIER AND POWER SUPPLY**
Class A Rated, Stereophile, April 1995, Vol.18 No.4
"...the $3795 SFL-2 is a terrific bargain... (and)... represents a genuine advancement in preamp design."
Robert Harley & Russ Novak, Stereophile, November 1994, Vol.17 No.11

The SFL-2 is a 55-pound, two-chassis unit that is built around some truly innovative circuitry and features. Not only is the power supply housed in its own separate chassis, it offers a level of performance and regulation unseen at this price point. A few of the preamplification features include: fully balanced circuitry; zero feedback design; dual mono construction; all-tube processing; and a discrete attenuator volume control.

**SFL-1 PREAMPLIFIER AND SFL-1 SIGNATURE PREAMPLIFIER**
Class B Rated, Stereophile, April 1995, Vol.18 No.4
"Kudos is due Sonic Frontiers for offering the audiophile a line-level preamp competitive with any price-no-object unit I've heard to date... Wake up, excited residents of Class A Towers—the SFL-1 is knocking on the door!"
Dick Olsher, Stereophile, February 1993, Vol.16 No.2

The SFL-1 has been a favorite choice among audiophiles for the past four years. This unit makes use of an innovative hybrid tube/FET circuit that rivals many other units in substantially higher price categories; offering outstanding musical performance. The Signature version shares the same basic circuit topology but is built with higher quality and tighter tolerance electronic parts - including film capacitor power supply, better-grade MIT capacitors, Caddock and Vishay resistors, Kimber RCA jacks, a ceramic silver tube socket and a higher quality vacuum tube.

**SFP-1 PHONO STAGE AND SFP-1 SIGNATURE PHONO STAGE**
Class B Rated, Stereophile, April 1995, Vol.18 No.4
"I rank the SFP-1 as very high Class B, bordering on Class A."
Robert Harley, Stereophile, October 1993, Vol.16 No.10

For the audiophile who recognizes analog as the most revealing and musically satisfying signal source, the SFP-1 delivers the goods. The SFP-1 skillfully amplifies the delicate and low level signals that are produced from both MM and MC phono cartridges. These signals may then be accepted by a line level amplification component such as the SFL-1, SFL-1 Signature or the SFL-2. A Signature version of the SFP-1 is also available; like the SFL-1 Signature, the SFP-1 Signature is built around higher quality and tighter tolerance electronic parts.

Call, write or fax for more information on these products or for information on Sonic Frontiers' complete line of amplifiers and digital products.
Tanglewood metal project exactly ute new sonic plans mand for murder Tel radio. T audio VPI Quest, red DCC, and many, many other audiophile and non-audiophile labels. Arrested and charged with the crime was Tobin's stepson.

Second: VPI's "Easy Analog" turntable/built-in phono section combo, to be produced in conjunction with Clearaudio and Gold Aero, and mentioned in my Hi-Fi '95 Show report last August (p.82), turned out to be not so easy: the project has been scrapped. Also on the VPI front: the company has delayed plans to manufacture its new pickup arm with a variety of upgradeable options that would have priced it between $900 and $2300. Due to the high demand for the $2300 loaded version, that's all the company plans to produce for now. [See VPI's letter in this issue's "Manufacturers' Comments."—Ed]

Third: Owners of VPI TNT III turntables (which include the flywheel and outboard motor) who are using the Bright Star Big Rock TNT isolation base absolutely need to get Bright Star's new Mini Rock F base for the outboard motor. It replaces the VPI-supplied metal shelf and, as reported by Steven Stone in this issue's Follow-Up, results in almost complete motor isolation. The sonic improvements (ie, lower noise floor) are not subtle.

On with the Show: Mahler's 85-minute "Resurrection" Symphony is not exactly my idea of light summer listening, but that was the main course Seiji Ozawa and the BSO served up at Tanglewood on an early August Sunday afternoon. It was a press event, so I was there. When it comes to glooming all the free jumbo shrimp you can stuff down your gullet, I would've shown up to see Hootie and The Blowfish. (Well, maybe.)

The CLASSICAL MUSIC WORLD IS PERPETUALLY BENT OUT OF SHAPE BECAUSE THE AUDIENCES ARE SO OLD.

The point of the TDK-sponsored event was to remind us to remind you that, thanks to a generous grant from TDK, kids under 12—up to four per parent or guardian—get free lawn tickets throughout the season. Truly a magnanimous corporate gesture, and very good PR.

Frankly, making a kid sit through an hour and a half of Mahler in the hot sun is prima-facie evidence of child abuse, in my opinion. (Thankfully, this particular Sunday was cool and overcast.) But not every concert is this heavy. Sometimes light classics are performed, like Berlioz's Requiem. Actually, "free" isn't always enough to get kids to classical music concerts. When I was a youngster you couldn't pay me to attend one—except maybe for the 1812 Overture, if there were cannons and fireworks.

The classical music world is perpetually bent out of shape because the audiences are so old. The worry is that pretty soon everyone will die off and there'll be no one left to attend. Hey, guess what? There'll always be new old people coming up to replace the ones that kick, so they should stop worrying! I should also remind you that part of the bill for Tanglewood is covered by an NEA grant, but, thanks to our "Revenge of the Nerds" Congress, that will soon end. One Piss Christ and a thousand classical music concerts get punished!

Anyway, the afternoon came complete with a shrimp-filled lunch at the Koussevitsky estate, Serinac (spells "Canires" backwards), overlooking the magnificent Berkshire Mountains; VIP parking a few feet from the gate; and tickets so close to the stage you had to wipe the musicians' perspiration from your face at the end of each movement.

This year our hosts really outdid themselves with the food—crab legs, pâtés, poached salmon, tenderloins of beef, Caesar salad, tortellini, of course all the jumbo shrimp you could eat, and fine California wines, including a Chardonnay that made the 85 minutes of Mahler bombast float by like a gosamer train wreck. Speaking of Mahler, did you know that Bruce Mahler—the guy with the parakeet on his shoulder on the Fridays television show back in the late '70s—is a direct descendant of old Gustav? But for the budgie, you can't tell them apart.

At lunch I overheard Hans Fantel and Julian Hirsch arguing over whether all symphony orchestras sounded alike. Fantel said yes. Hirsch said only if the conductors' batons measured the same length, diameter, and weight (only joshing).

The Mahler performance was spectacular, with the engorged BSO backed by the Tanglewood Festival Chorus—a grouping large enough to populate a small town—and soprano Barbara Bonney and mezzo Florence Quivar, both of whom spent most of their time on stage looking like Sally Jessy Raphael and Oprah Winfrey and not doing much vocalizing.

But the dramatic high point of the afternoon was the opening act: pianist Leon Fleisher made his two-handed debut after suffering 20 years with carpal
tunnel syndrome in his right hand. His performance of Mozart's Piano Concerto No.12 in A was agile, had a good beat, and I enjoyed dancing to it. (Sorry, I don't do classical music reviewing, and with good reason.)

**Masquerading as a Philistine in Audiophile Circles is Just Too Much Fun.**

A letter-writer recently described my taste as "catholic." I do like classical music, and listen to a great deal of it. In fact, I own Haitink's Mahler 2 (Philips 802 884/885 LY), and am quite familiar with the piece. Masquerading as a philistine in audiophile circles is just too much fun.

**The Maine Thing**

I figured that as long as I was in Massachusetts, I might as well go the rest of the way to Maine and visit Rockport Technologies. But I wouldn't have made the eight-hour trek from Lenox, Massachusetts, just to pay a social call on Andy Payor: he had something cool to show me—a scoop, really. I was to check out the first of three specially designed turntables Sony had commissioned Rockport to build—each, according to Payor, costing "more than a fully loaded Lexus."

Stung by criticism of its initial CD transfers of vintage, prerecording-tape-based catalog (ie, lacquers, acetates, and metal parts), Sony has committed to a complete overhaul of its analog transfer chain, and another go-around of its priceless heritage of American popular music, jazz, and classical. It wasn't just persnickety audiophiles (including yours truly) who were bitching. Everyone complained about the poor sound quality—including collectors of 78rpm originals. What they heard on Sony/Columbia's CDs was markedly inferior to the original 78s.

A deadly combination contributed to the poor sound: early digital converters; misuse of and primitive digital noise-reduction technology; complex, inferior-sounding electronics chains; and cheesy analog playback gear. Limburger-cheese tasty, by audiophile standards.

Certainly it makes economic, moral, and cultural sense for Sony to do it all over and get it right. When the Japanese company bought Columbia records a while back, it was paying mostly for the back catalog—everything from Broooces to Bob to Duke. The preservation of the Ellington back catalog alone justifies the expense, and expensive it will be, with Cello contracted to provide the electronics and Rockport Technologies custom-building the air-bearing turnables.

**Passing Fancy**

I love old technology: tubes, turntables, and automobiles. In fact, I drove to Maine in a 1972 Saab 96 I've owned since it was new—the original "jelly-bean" car that, back in '72, came standard with a "McGovern for President" bumper sticker and was driven by your long-haired English professor. Powered by a 65hp, 1700cc Ford V-4, the car didn't exactly set any speed records, though it had kicked serious butt on the rally circuit for many years.

My car, though, has a rebuilt engine (did it myself) fitted with oversized pistons, milled heads, an Iskendarian semi-racing cam, heavy-duty valve springs and dampers, and a two-barrel, high-performance Weber carb. It's one peppy sucker. Looks like Clark Kent, flies like Superman.

Anyway, there are guys on the road—for some reason, mostly balding mustached mid-'30s types wearing Vuarnets and driving white full-sized sedans like Pontiac Bonnevilles—who regard getting passed by my homely little bullet as the equivalent of a drive-by circumcision. They're happy at 60 until I pass them at 80. Then all of a sudden they have to go 90 to get ahead of me.

On this trip I watched guys literally *risk death* attempting to put their rear ends in my face. One guy on the Mass Pike tried using an exit lane to pass (on the right) the slowpoke in front of him. He almost had a head-on with a Cadillac entering the Pike on the same piece of road.

When the Road Warrior finally arrived at Payor's, I found the turntable in pieces. My job for the afternoon was to help assemble it so Andy and you and I could see what it looked like in one piece for the first time. Playing a record was out of the question—it needed a few days of wiring and other bits of final assembly, but I think the pictures speak volumes about the ingenuity of the design and outstanding build quality of what is probably the most expensive turntable ever built.

**800 LBS of Analog Dynamite**

Sony's needs were quite specific, and very different from those of the average analog-loving audiophile. For one thing, with three different-sized work parts, all three needing vacuum hold-down, the system required three interchangeable platters (10", 12", and 16" in diameter)—and the changeover had to be both rapid and foolproof.

Because actual platter speed was so variable in the early days of 78rpm (actually 78.26rpm) direct-to-disc recording, the new turntable had to be able to play at 78rpm ±10%, with dial-in, repeatable accuracy. Sony also specified half-speed playback of any of the 78rpm settings for half-speed mastering, as well as 33.33rpm (±10%) operation.

The drive system would be a massive, AC-hysteresis, synchronous motor turning at low rpm (300-700), coupled to the inner platter via a nonelastic Kapton belt. This would be ground to a thickness of 0.002" to reduce belt-induced wow and flutter. A motor-pulley coverplate would protect the belt from fouling.

**Sony Commissioned Rockport to Build Three Specifically Designed Turntables.**

The motor itself has no permanent poles—they're printed magnetically on the rotor, which results in varying induction angles during startup. The design would allow the motor to easily synchronize a large inertial load.

In addition, the motor-pulley shaft would be fitted with two bronze sleeve bearings to carry the radial load, and a polished carbide thrust plate and ruby ball on top, the latter fabricated in Switzerland.

The motor would be dynamically balanced in two planes to rid the system of vibrations, and the entire assembly would be mounted on the plinth in its own high-mass damped subassembly and separate suspension system.

Quick, convenient phono-cartridge changeovers required a detachable headshell, as well as easily set and instant repeatable vertical tracking angle, tracking downforce, and damping. Arching wires and airholes—simply not
acceptable in a work environment—needed to be hidden from view. In addition, Sony had one unique prerequisite: apparently the ceilings in the studios exude a particular precipitate that lands on the equipment. The air-bearing armrail would have to be protected against this fallout, as well as from greasy fingers and arms.

All of this meant that Rockport’s Sirius 2 ‘table ($30,000) could serve as the launching point for the new design. (Indeed, Payor got the contract after demonstrating the Sirius to Sony’s staff at its studios.) Nine months of computer-assisted design and production of assembly drawings lay ahead before the plans could be finalized and production commenced.

As with the Sirius, the plinth would be two thick slabs of machined and polished granite sandwiching a high-hysteresis polymer damping layer—only on a much grander scale.

The spindle bearing, as on the Sirius, would be a step-compensated air bearing with a high-pressure air-film providing both the radial (side load) and axial (thrust load) clearance. In other words, the whole thing floats, unlike other “air-bearing” tables, which use mechanical radial centering (ball or sleeve bearings) and provide an air film only for the thrust load. Rockport’s bearings also apply a vacuum preload to set its “flying height” to within 200 micro-inches. With no contacting surfaces, the unit is essentially silent.

Unlike the Sirius, the Sony bearing would include an integral high-precision optical encoder to provide an exact count of the platter’s rpm, which would be displayed on the control panel’s digital readout (okay, the unit’s not totally analog). Payor brought in Entec’s Demian Martin to design the electronics.

The second-biggest problem Payor faced was fashioning the interchangeable platter system. On the Sirius and Capella ‘tables, the platter is bolted directly onto the air spindle. For the Sony unit, Payor had to come up with a system that would provide the same degree of physical integrity, yet offer quick changeover.

What he devised was a two-piece platter: the lower section, machined from aluminum, would bolt to the air spindle. A large “O” ring, fitted into a channel on the platter housing, would provide a seal for the upper replaceable unit (urethane-coated, constrained-layer—damped, aluminum/acrylic composite) that would center easily on the platter housing via the hub assembly.

With the upper unit so placed, a powerful vacuum would be created between the two sections (due to an air-evacuation channel built into the lower platter connected to the remote vacuum pump) that would suck the “O” ring below the contact point, creating a tight metal-to-metal fit.

**NINE MONTHS OF COMPUTER-ASSISTED DESIGN AND PRODUCTION OF ASSEMBLY DRAWINGS LAY AHEAD BEFORE THE PLANS COULD BE FINALIZED.**

The result, in effect, would be a single platter. Placing one of the upper removable platters onto the permanent lower one would also seal the air-evacuation channels for the record—hold-down vacuum system. For this platter design to work, the quality of the machining would have to be virtually perfect.

The tonearm, however, posed an even bigger engineering challenge, according to Payor. The main housing, machined from a massive, 40-lb solid block of aluminum, required precise three-dimensional modeling that would have been extremely difficult to do in the pre-computer era.

In place of the add-on damping trough in Payor’s other tonearm designs, this one features a channel cut into the housing itself. Figuring out where and how all of the various compartments and moving parts (the VTA-adjustment block and machine drive, the cueing system, the bearing rail, the arm/counterweight assembly, and the damping-trough adjustment reservoir and control) would fit within the frame; and how the wires (“five 9s” copper conductors in a true Litz construction) and air hose would be hidden, and proper geometry maintained, required a great deal of ingenuity and mechanical design skill.

(Payor obviously has had this stuff built into his genes: his father has custom-designed many mechanical and structural packaging systems for Pepperidge Farms for the past 30 years.)

As on the other Rockport turntables, the arm tube is an 8-ply, constrained-mode—damped, carbon-fiber/epoxy composite that provides high stiffness, low structural resonance, and low effective mass. Because of the removable headshell and the additional arm length necessary to copy with 16” laquers, the arm tube on the Sony ‘table has to be considerably more sturdy than the already stiff and inert ones used in other Rockport products.

The removable headshell system uses electrically superior LEMO connectors, modified to fit within a custom-designed mechanical coupling, which mates the two pieces securely, forming a very rigid joint.

The entire shebang is supported with an active pneumatic, gimbaled-piston isolation unit, similar to but larger than the one used on the smaller Sirius, with a resonant frequency of 0.75Hz in both vertical and horizontal planes. This attenuates unwanted external vibrations at 12dB/octave above resonance. While
"Based on our time with the SDP1, surround sound is the essential next step in home music reproduction.

Most importantly, the two main channels pass through to the main amplifier, untouched. Execution is half the battle and ARC has applied their high standards to the SDP1. This is reflected not only in the build quality, but in the design of the digital delay circuitry and the circuits that derive the ambient and center channel information. The approach is purist...

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By Tom Miller
Reprinted from THE AUDIO ADVENTURE

"The Audio Research SDP1 plays music with superb sonic fidelity, much better than other surround processors.

As things stand today, the Audio Research SDP1 is clearly focused at the listener who is unwilling to compromise the basic sonic fidelity and spatial imaging of the front stage space, who is unwilling to settle for less music than he hears today from his high end stereo system.

On music recordings, all the musical information is up front in this front stage space. All other surround processors degrade this vital information. Only the SDP1 does not.

In fact, the SDP1 can enhance this front stage information. The SDP1 can help the center stage space become deeper, richer, and more realistic, enhancing the believability of the musical event on stage. It can even improve the apparent fidelity of instruments playing center stage. The natural musical nuances of each instrument can be more clearly heard when each instrument is surrounded by its own portion of believable stage space.

Congratulations to Audio Research for having the courage to uphold their tradition and stick to their guns. It's paid off with a unique surround processor that redefines the fidelity standard for music lovers interested in surround sound."

By J. Peter Moncrieff
Reprinted from IAR HOTLINE! 68-70
December 1994

"For those of us who have succumbed to the enticements of surround sound for music. Audio Research's SDP1 is... cause for rejoicing because someone has finally done music surround right....

Audio Research is, to my knowledge, the first company to offer completely distortionless stereo channels in a surround decoder...

I wasn't surprised to find the SDP1 the best-sounding surround decoder I've ever heard—or, rather, not heard...I could hear no "sound" from the decoder whatsoever... I guarantee you won't find another surround decoder that has any less effect on the front channels than this one...

If you have any misgivings about getting into surround-sound for your music listening, the Audio Research SDP1 should dispel them. It passes the all-important front channels completely unscathed, it does as good a job as any decoder can with the surround channels..."

By J. Gordon Holt
Reprinted from STEREOPHILE
Vol 18, No. 8, August 1995
the entire system floats, it is not bouncy.

To get the 500-lb plinth to float, and to provide air for the arm, platter, and vacuum system, requires an industrial-strength, piston-driven, oil-less compressor with an integral storage tank. Before reaching the tank, the compressed air circulates through an air dryer and filter, which lowers the dew point to -100°F and ensures that no water vapor passes through the system. One of these remote-controlled air units is sufficient to run three turntables.

THE WOULD-BE SYSTEM
You will have noted in this column a large number of "would be" phrases. The reason is that none of what Payor proposed existed, except on paper. All of it would be custom-fabricated. When all the parts finally arrived at Rockport, Payor calculated that three machinists and more than 60, count ‘em, 60 vendors had been involved in providing all the valves, switches, wires, gauges, metal work, printed circuit boards, electronics, air bearings, optical encoders, granite, milled and anodized aluminum, etc., needed to build the turntable.

BUILDING THE PERFECT BEAST
Would it all fit together and work as planned? When I arrived in Maine, it was time to put all the pieces together. Fig.1 shows some of the raw components of the tonearm: the large piece is the (upside-down) arm frame, milled from a solid block of aluminum. As shown, it rang like a xylophone. After being fitted with the other components pictured, it was essentially dead. The black tube at the top is the precision-threaded VTA adjustment pillar.

Next down in the photograph is the aluminum member, which is bonded to the outside of the air bearing. The counterweight fits into the left-hand shaft, the thin black arm tube into the uppermost hole. The two other pieces are removable headshells: one in its partially milled state, one ready to use.

Fig.2 shows the granite plinth resting on the pneumatic feet built into the custom massive stand. The square cutout on the right is for the arm assembly. The center hole is the spindle-bearing housing. The cutout and hole on the left await the electronic speed-control chassis and motor assembly. Missing: the front plate containing all the analog pneumatic gauges and other control instrumentation, which fits into the space framed by the front feet and cross members.

Fig.3 shows the electronic speed-control chassis and motor assembly in place.
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The black-anodized electronics panel with integral heatsink is fitted first, then the motor assembly is carefully lowered into place using the two handles. Note the heavy, constrained-layer-damped, stainless-steel mounting chassis. The entire motor unit rests on a four-point dampened suspension. Protruding from the bottom left of the plinth, and obviously out of position, is a leveling sensor for the pneumatic suspension.

Fig.4 shows both the arm assembly and the platter air spindle in place. Note the large VTA adjustment knob on top, cueing lever and polished stainless-steel bearing rail, captured air-bearing sleeve assembly, and arm tube with detachable headshell. Fig.5 shows the subplatter with belt and large upper platter in place.

IT'S UP! IT'S GOOD!
As I write this, Andy Payor tells me that the turntable is hooked up and running as he envisioned it on the screen all those months and a thousand work-hours ago. How does it sound? Well, you should never take a manufacturer's word for the answer to that question!

By the way, if you're thinking, "Hey, I'd like to have one of these 'tables for my system," get in line. Payor says interested parties around the world want slightly modified versions and are ready to pay the staggering admission price. Each 'table will be custom-built. But first he has to assemble Sony's two other turntables. Besides, the holder of another enormous archive is interested, so for now don't hold your high-priced breath.

Meanwhile, Sony has poured the concrete floors in preparation for delivery of the first unit. By the time you read this, it should be installed and running. I hope to be there for the first demonstration. I told Payor that I hoped this would not be of some ancient shellac, but rather playback of some state-of-the-analog-art LP, like a Columbia "6-eye" pressing of Miles Davis's Kind of Blue, for example, or Bob Dylan's Columbia "360 Sound" pressing of Highway 61 Revisited, or maybe one of Classic Records' Columbia reissues. Give these guys a taste of what the old technology can do.

That accomplished, Sony's engineers can get about the business of archiving its prerecording-tape-era collection, secure in the knowledge that whatever's in the ancient grooves, the Rockport will probably retrieve it as faithfully as the art and science of analog record playback will allow. What happens when that signal reaches the A/D converter is another story.
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WorldRadioHistory
Most audiophiles are aware of the modification and add-on aftermarket. A few have learned the hard way that modifier competence varies from primitive magic and sales hype to real engineering skill. Some modifiers are serious audiophiles who are also good technicians; others are scam artists whose only goal is to make a quick buck on the latest fad. If you have only a rudimentary understanding of electronics, you may not be able to make a distinction. Even the most jaded and battle-hardened among us can still be hooked and reeled in by a slick sales presentation.

Can you tell a product made mostly of hot air from one with lasting value? A fly-by-night company from a "real" one? In the ordinary superficial sense you can't, because many products look to be well-made, and the companies they come from appear to be substantial.

But you can look behind the curtain if you try: Get an engineer's or technician's opinion of the quality and potential benefit of the work you're considering having done, or the value of the add-on device you're thinking of buying. At the very least, talk to other hobbyists. Cruise the Internet. Check your modifier's credentials and track record. Will they be able to back up their work should repairs become necessary? Or will they be gone and their phone disconnected as soon as the fad is over?

And remember: The original manufacturer, and most repair shops, will bounce a modified product right back without even attempting to fix it. Should the modified gear fail or damage something connected to it, you may discover that the last anyone heard of the modifier, he'd gone away on a long fishing trip.

One of the most effective modifications for almost any piece of gear is a power-supply upgrade: a bigger, higher-current power transformer; low-noise, fast-recovery rectifier diodes; and low-ESR (equivalent series resistance) filter capacitors. Sam Tellig's favorable comments about the Radio Shack 3400 CD player used with the Sequerra Power Station just over a year ago mentioned the benefits of a big, low-noise power supply.

Improving on Perfection?

Barry Willis delves into the world of component mods

The success of the 3400/Power Station combo has spawned a few knockoffs. At Hifi FI '95, Stereophile's High-End Hi-Fi Show held last April in Los Angeles, I was cornered by a veteran freelance manufacturer's representative who wanted me to listen to a modified 3400 he said had been praised by another high-end publication. The modification had been done by "an engineering group" with a name like "InterGalactic Audio," who had gone to the expense of beefing up their image with some professional ad copy and glossy pictures. I politely told him that Stereophile doesn't review modifications, I don't review products, and if that was what he was looking for, I was the wrong guy to talk to.

"But you wrote about the 3400," he said.
"I did?" I replied, feigning ignorance.
"Yeah," he said, digging from his bag a tattered Stereophile from sometime last year.
"Got me there," I told him. He insisted that he just wanted my opinion of his player, nothing more. Fair enough, I thought. We met later in

1 Stereophile, Vol.17 No.10, p.51.
the hotel lobby and sought out the quietest corner we could find. He'd brought along a fully charged Power Station, a pair of Grado SR 60 headphones, some high-quality cables, and his modified 3400, which we compared to my totally stock unit. Even in the noisy hotel, my player sounded considerably more robust than usual powered by the Sequerra, but his player had better bass than mine, and a bit more midrange clarity. Not an earthshaking improvement, but noticeable.

The sales rep chatted amiably about the extent of the modifications ("totally re-engineered"), and the cost, which I seem to recall being in the $200 neighborhood. After listening to the two portables, I turned his over and opened the battery compartment. Inside were the biggest audiophile-approved coupling capacitors the modifiers had been able to shoehorn in, secured by globs of silicone sealant. I asked if he cared that such a mod both voided the warranty and rendered the little player useless as a portable.

"Well, that is something to consider," he frowned, "but this is just a prototype. What we really want to do is produce an affordable power supply of the Power Station's quality. Would you like to try one when we get it up and running? I just want to get your opinion."

I reminded him that I was not the gate to free ink, but he persisted. I said, "Sure, why not? I'll let you know what I think," and wandered off, thinking that would be the end of it.

A couple of weeks later he called me, all excited because the company he represented was about to start producing their power supply. "It's going to be a dedicated supply for the 3400," he told me, "and if you want to use it with another player, you can send it back and have it modified."

"Whoa, hold on," I said. "Wouldn't it make more sense to build a high-quality supply that could work with any portable? You know, with taps for various voltages and an assortment of reversible plugs? I think there's a real market for a good, durable, universal power supply."

He fell silent for a moment, then quietly said, "Hmm, maybe you're right. I'll have a talk with the engineering staff and get back to you."

After that came phone calls every few days—which I failed to return—and enthusiastic messages about how they were almost ready to ship. He couldn't have been more pumped up if he'd been the sole distributor for Windows 95.

Then he stopped calling. A couple of weeks went by. Then one day he called and, sounding a little distraught on my answering machine, insisted that I call him back.

"I believe I owe you an apology," he said. "We're not shipping any product. Ever. I have severed my relationship with 'InterGalactic Audio.'"

"No problem," I replied. "I wasn't all that concerned to begin with, but I am curious."

"Well, I took your suggestions to them, about making the power supply applicable for all portables, and they told me they couldn't do it. And when I dug a little deeper I found out all they were doing was buying a stock supply from Radio Shack, putting it in their own box, and marking it up 1000%. I can't support that."

He went on and on about how he hoped he hadn't damaged his reputation (he hadn't) or wasted my time (he had). Had he scratched the surface a bit before volunteering to rep this "product," he would have discovered that "InterGalactic Audio," like many startup companies, was just two guys in a garage, and two not very technically astute guys at that.

The moral of this little tale is to look and listen hard before you fork over your hard-earned money, send your gear in for surgery, or get involved in marketing an add-on of dubious value. The guy mentioned above has over 20 years' experience in this business and should have known better.

On the other hand, not all modifications are snake oil: many standard features on hi-fi equipment (such as spiked feet on loudspeakers) began as modifications. Many audiophile CD players in the mid-'80s were modified Magnavox/Philips units. Some of them were quite good, but most of their makers are gone now. Despite all the wishful thinking to the contrary, s.o.w.'s ears still don't become silk purses, and cheap portables, no matter what's done to them, still don't become Forsells or Levinsons.

The Sequerra Power Station for the much-modified Radio Shack 3400 portable CD player was a well-engineered and useful upgrade.

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Len Schneider experiences the THX treatment

As the cab crawled around a sharp uphill left turn, those on the right side gulped. Immediately below was, well, below. And far too below for comfort. This was my second trip, so I'd had enough foresight to sit on the left. I'll confess to smiling a bit at my companions' momentary discomfort. Smug superiority? Or just relief that I wasn't that close to the edge?

On the other side of the valley, the hills were surprisingly green. Northern California, even fabled Marin County, usually goes dull straw-yellow by May, but Mama Nature hadn't baked everything dry yet.

We were heading to the ranch—Skywalker Ranch, that is—for Lucasfilm/THX's Level 2 Training, the second and final indoctrination into the Gospel According to Holman. (THX, for the sake of the three readers who might have missed it, is said to stand for the Tom Holman Experiment.)

These sessions have played an important role in THX's rise from misunderstood curiosity to significant market force in Home Theater. Although nominally aimed at dealers, the seminars also attract personnel from THX-licensed manufacturers. Their purpose is to introduce and explain the group of technologies THX combines under its logo.

Part One: July 1994
The Level 1 (Introductory) Training is almost equal parts public relations and acoustical theory, but don't take that as a put-down. Skywalker Ranch is the bunkhouse (when a film's opening is but weeks away and the soundtrack isn't mixed yet) for Skywalker Sound, the division of Lucas Digital, responsible for many major motion pictures' audio post-production. (True Lies came from the Ranch's dubbing stage, as did the recently released Casper.) For most, it's as close as we'll ever come to Star Wars George and his Audio Ewoks.

The session began in the Ranch's Technical Building, a deceptively bucolic structure that houses several dubbing stages, extensive editing facilities, rooms full of tape transports, cafeteria space, offices, and the Stag Theatre, a THX theater. The formal session started here as Tom Holman outlined the history of film sound and the complexities of creating a contemporary movie soundtrack. He illustrated the challenges with the famous "Indiana Jones running from the boulder" sequence we're all sick of by now. Tom ran the same sequence several times and accompanied each pass with a different sound-effect layer to be included in the final audio mix. It was an impressive demonstration of a technology totally at odds with our conventional audiophile notions of coherent recording.

The simple fact is that film soundtracks combine dialog (most often recorded after the scene is filmed), large effects (explosions, etc.), Foley touches (rain, the crush of vegetation, a door opening), ambience (low-level background "noise" often added to preserve sonic continuity), and, oh yes, music.

If the goal of audiophile recording is to capture a musical event performed by others, the art of film sound is in the creation of an experience simply never to be found in nature. It is an entirely different sensibility, but a vital one. If an audiophile's ecstasy is a moment of crystalline aural insight, the film-sound world is a layered onion. (Ee, make that a pearl. Film-sound people have feelings, too.)

Later that evening, we saw James Cameron's personal print of True Lies in the Ranch's Stag Theatre. Holman's playpen and the place where most of THX's theoretical ideas were first put into practice. Because it was opening night for the film nationwide, we didn't get a "sneak preview." We did get something infinitely better: the finest presentation of a film I have ever experienced. Period.

Len Schneider heads TechnoCom, an independent consulting firm specializing in technology applications and communications for the consumer electronics industry. Tel: (201) 863-6774.

Notes from Lucas Valley

Skywalker Ranch—The Technical Building

The Foley Stage
I won't comment much on the visual quality. Suffice it to say that the picture was razor sharp/crystal clear. The screen, which subtended a far larger viewing angle than usual, was bright, evenly illuminated, and flicker-free.

But the real story was the sound. Yes, *True Lies* is, in some ways, just another example of Hollywood excess. But the Stag Theatre is an incredible acoustic environment. For the first time ever in a movie theater, I felt low-frequency pressure waves from explosions while simultaneously hearing intelligible (not necessarily intelligent) dialog. And these were true pressure waves—not the ill-defined and slowly diminishing thuds I'd previously associated with movie sound. These hit with impact and authority and then were simply gone. Impressive.

Equally impressive was the overall clarity and absence of audible distortion, even at peak levels higher than what I'm used to in some of Manhattan's better first-run theaters and private screening rooms. Can you say "B-chain headroom"? "Good acoustical design"? "No first-order reflections"? (If you can, you'll win a T-shirt: the THX folks throw them out like dead fish to barking seals when you come up with responses they like.)

The next morning we started the formal coursework. The previous evening's experiences with film sound provided a needed framework as the THX crew outlined the transition from theatrical to domestic considerations. Of particular note were the acoustical differences between the two environments and how THX for the home attempts to duplicate the sound of the industry-standard motion-picture mixing/dubbing stage. (An interesting note: Film-sound facilities have a standardized frequency-response curve known as ISO 2969; ISO stands for International Standards Organization.)

We covered techniques for minimizing a room's usually negative influence on sound quality, particularly the quite controversial controlled-dispersion front speakers and dipolar surrounds. We also looked closely at room setup and speaker placement, particularly for subwoofers, after a thorough (as thorough as you can be in a two-hour segment) review of standing-wave distribution as a function of room size and dimensions.

In addition, this session covered room reflections, echoes, and ways of controlling them; room modes and their effects on amplitude response; ratles; excessive absorption (yes, you can have too many "tubular tuners" in a room!); background noise levels; and ways to isolate our listening/viewing rooms so as not to disturb those around us.

Our ears were full by the end of the day, but there was a nice little "graduation" ceremony to ease the pain. "To hell with the silly certificates," I grunted, "let's have some wine." We did. After all, Marin County is just south of Sonoma and Napa, and we knew what that meant. We all left happy—we think.

**PART TWO: June 1995**

I found myself back at Skywalker Ranch the Thursday after Stereophile's LA Show. This was Level 2 time. "Serious stuff," I

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*Notes from Lucas Valley*
told myself. Now I could be irreverent and say that it cost me $600 to get my $32 Rat Shack sound-level meter calibrated. (Yes, it cost that, and yes, they did that.) But there was more.

Level 2 is a one-day session (the opening dinner the evening before hardly counts) open to those who've completed Level 1 or who think they have the basics under control. Being a certified masochist doesn't hurt.

It was a very different experience. Rather than being led through the relatively relaxed Level 1 format of session/tour-the-Tech-Building/session/lunch/walk-up-to-the-Big-House (where George Lucas hides out when he's there)/session/break, we were politely guided to a large room on the second floor of the Tech Building at 8am. The doors closed and we sat down—and didn't move for three hours as the engineering team hammered us with sentences that began, "As you remember from Level 1 training..." In some cases, the "...

The Level 2 session emphasized Home-Theater system planning and design. After a brief foray into lifestyles ("Just what do you want your Home Theater system to do, Mr. Customer?"), we explored factors such as architecture and room usage (e.g., the number of people likely to watch at the same time), picture size and screen location, acoustics and speaker locations, and equipment selection. Interestingly, THX has a recommended design path specifically tailored for dealers to use with audiophile customers. (And, no, it doesn't begin with "Shoot 'em!")

We looked at background noise again, but Level 2's viewpoint was, as expected, more rigorous than Level 1's. Specifically, we analyzed masking effects at different frequencies, and identified sources (from air conditioner air flow to taxi horns) and possible solutions. We looked at different room construction techniques (staggered stud walls, floating floors, etc.) to isolate the Home Theater room. Throughout the presentation, the THX crew emphasized the applicability of these techniques to audio-only systems. "After all, it is sound, isn't it?" was the constant reminder.

Room modes and treatment methods were explained in much greater detail. We began with traditional axial/tangential/oblique mode distribution patterns, analyzing which is most important and why. We then looked at low-frequency response irregularities and their cures: number and location of subwoofer(s), equalization, bass traps, and diaphragmatic sorbers.

We looked at boundary effects and how they influence the timbre of reproduced sound. We spent some time on center-channel speakers and the matching problems created by the fact that they are, at least when compared to left and right speakers, relatively "boundary-free."

We looked at various acoustic treatments, including absorbent panels and diffusers. We were warned about draperies: "Unpredictable effects!"

Draperies—unpredictable? Well, look at 'em! They have pleats (diffusers, to those of us with acoustical consciousness). How many pleats? How deep are they? (That'll affect diffusion.) What material are the drapes made of? (Every fabric has a different absorption coefficient.) How far away from the wall/window are they? (That'll determine how effective they are.) Will they be open or closed? (That'll...etc.)

Level 2 handouts were much more detailed than those given out at the Level 1 session. We got specific information on the varying amounts of acoustic isolation (craftily disguised as "Noise Transmission Coefficients") afforded by different
construction techniques. We received “in-room” frequency-response graphs of subwoofer/satellite systems with the subs in many different room locations. We graph the effects of the notorious but little-understood frequency-response anomaly called “floor and ceiling dip,” of sidewall influences, of combined floor/ceiling/all-walls interference patterns.

We also spent some time on video stuff: field-of-view angles for different image producers (direct-view TVs and various projectors), optimal viewing distances, optical focus, convergence, image brightness, color balance, saturation, ambient room light and its effects on contrast.

What struck me most about this segment was that there’s relatively little opinion masquerading as fact. A test shade of blue measures so many degrees on the Kelvin scale or it doesn’t. Screen brightness is measured. Contrast ratios are measured. It’s a refreshing change from the almost endless and unresolvable audiophile debates about “accurate” tonal balance and “proper” soundstaging.

We finished with a hands-on session during which we moved speakers and listened to room effects. We spent some time looking at spectral analyses of test-tone response patterns and then modifying them with a sophisticated equalizer. Lest the pure of heart cringe at this, let it be understood that we were constantly cautioned, “Gently, gently,” as we played with different corrections. It was, for some of us, a humbling experience.

My only real complaint is that Level 2 was so condensed—THX presented us with two days’ worth of material in one day and asked us to enjoy the experience. We were somewhat numb.

When it was over, I went back to San Francisco and wound at the Clement Street Bar and Grill, a hangout with a great menu and an even better wine list. I needed help: Harry the Mouth, Spica Man, Carmen Sandiego’s Travel Agent, Reference Lady, Special K, Ms. Museum, and Dr. Joe The Audiophile Podiatrist joined me. At the end of the evening, too, we were somewhat numb.

**Has the jury reached a verdict?**

We got a certain amount of proselytizing in Level 1. That was to be expected, but it didn’t fully prepare me for the force-feeding I experienced at Level 2: I suspect others shared my feeling that Level 2 should be a two-day affair.

Nevertheless, the entire experience is a unique glimpse into a body of knowledge most audiophiles never really see. It’s a valuable perspective, particularly now, when high-end audio sales are static and Home Theater components and systems drive the market. I won’t argue whether that’s desirable—regardless of what I say, someone’ll put out a contract on my word processor.

The bottom line is that I benefited from THX training. It won’t turn anyone into an acoustical designer, but I now have a much better understanding of what THX deals with daily.

The training helped me understand the dynamics of the consumer electronics market and gave me a structured view of some of the technology driving that market. It has also made me a better, more acoustically conscious audiophile, one more aware of the effects of speaker placement and room tweaking. That’s priceless knowledge, whether applied to music-only or full-blown Home Theater systems.

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with the more obvious variables—if we are to further reduce the "electronic" signature in reproduced music and move toward a more convincing re-creation of the real thing. This is true whether one is dealing with the electrical, mechanical, or acoustic arenas. From a practical standpoint, the time and frequency domains are alternate frames of reference, and most real progress in sound reproduction is being made by those designers who have a good understanding of the interplay of these realms.

Mechanical resonances may contribute to the spectral signatures of components both directly (in the case of transducing components) and through interaction with other nonlinearities. Vibrations, varying in magnitude from gross (cabinet resonances that can be felt in the fingertips) to tiny, sub-micron levels at subsonic frequencies, can negatively impact music playback through time- and frequency-domain disturbances. On a fundamental level, the issues of phase linearity and mechanical vibration are interrelated; unless properly addressed, each defines a limit to a system’s resolution. Since timing and resonance issues are two sides installed beneath it, I had experienced a pronounced enhancement in the broadband resolution of my system that was very different in degree and quality from that offered by tonal manipulation alone. These benefits turned out to be both predictable and repeatable with a variety of source components.

I rank an even, natural tonal balance—with the emphasis on balance—as one of the most critical factors in true highend performance. (This is to be distinguished from simply highlighting one area of the spectrum over another just because it sounds "better.")

But I'm not anti-tweak. Creative experimentation has often led to real breakthroughs, even when the relationships of cause and effect are not well understood. Tonal alterations that make listening to a given system more enjoyable are perfectly fine in my book as long as the effect is not mistaken for, or promoted as, a de facto increase in fidelity. In my experience, those improvements that prove most fundamental and genuine tend to be consistent throughout the audible spectrum, conferring greater cohesiveness, refinement, and absence to the entire presentation.

Tonal changes, particularly positive ones, are usually expressed with references such as "tight, focused bass," "good midrange detail," "extended and silky highs," etc.—all laudable individual attributes. But the kind of subtle yet significant improvement I'm speaking of breathes new life across the entire range of sonic attributes, enhancing every aspect of the musical experience.

This is what happened to me with the Vibraplane. A certain synergy permeated the individual elements of the usual sonic checklist—and, in a way, superseded them. As a result, I found myself absorbed in one record after another, with barely a thought about sound quality. Clearly, sophisticated pneumatic isolation is a technique that deals with external vibration at a more fundamental level than the usual practices of rigid coupling and elastomer damping, and yet each of these methods plays a critical role in any comprehensive, logical, effective vibe-reduction plan.

A ROAD MAP

In order to keep things in focus, I will explore the effects of vibration on audio systems by examining how resonances interact with each of the major elements—floor, stands, platforms or shelves, components—and the various means of connecting them. Throughout our discussion I'll be referring to large torsional, or twisting, forces on structures, as well as significant displacements vs small movements. However, these are only relative comparisons. On an absolute scale, all of the vibration interactions in a typical audio system are very small (except for some room and speaker-cabinet resonances). Objectively, the degree of sonic changes from effective resonance control is subtle compared to that from switching from one model of speaker to another; yet its subjective impact clearly illustrates the adage that big results can spring from small events—the musical merit can be surprisingly significant.

THE AUDIOPHILE, LEFTADRIFT ON A SEA OF HALF-TRUTHS DRESSED IN PLAUSIBLE, APPEALING CONCEPTS, CAN EASILY STRAY OFF COURSE TO LAND IN THE LIMBO OF COMPULSIVE TWEAKING.
The principles of "an ideal rigid body" and the use of compliant suspensions for isolation will be defined, as well as the key role played by damping in both concepts. Finally, I will compare the pros and cons of these techniques with a few practical examples that show how they can be combined to achieve superior all-around vibration control while highlighting the special qualities of pneumatic isolation. I've tried to make this fairly technical subject accessible to as many readers as possible by minimizing scientific terminology and formulae-laden examples.

THE PROBLEM
Any discussion of vibration control must start with the acknowledgment that you can never entirely eliminate the problem. Resonances in solid structures are global, insidious, and complex. Try examining your components with a stethoscope to hear how pervasive vibrations are in a stereo system—even without music playing. Yet a significant degree of damaging resonances from a multitude of sources cannot even be felt or heard under normal conditions.

MA ny AUDIOPHILES EXPECT THAT "ISOLATION" WILL BE GUARANTEED FOR A COMPONENT OR SPEAKER SUPPORTED BY A MASSIVE SLAB OF GRANITE.

The biggest offender is feedback from the music itself. High-amplitude, low-frequency sound from the speakers causes the most prominent audible disturbances, bombarding the entire system both acoustically and through mechanical coupling to the floor. However, it is the very-low-level, low-frequency vibrations (generally from 5Hz to around 100Hz) from passing trucks, elevators, machinery, and other sources, in addition to those from our speakers, that can make really effective control both challenging and costly. Since absolute isolation is impossible, realistic goals must be set based on a clear understanding of the forces at work. Otherwise you're likely to wind up out in left field after a lot of effort and expense, with results that are mixed at best.

While the physics of vibration control are intricate, mechanical vibrations can excite audio components from the floor via three common sources: stands, supporting platforms, or shelves. As you will see, common equipment-stand construction—even some heavy-duty "audiophile approved" models—can actually exacerbate floor-borne horizontal vibrations.

Acoustic pressure generated by the loudspeaker/room interface can couple directly to stands, platforms, and equipment enclosures, and then to signal-generating components. Internal vibrations arising from transformers, mechanical drive systems (including spindle motors or servos in CD players, and those in analog turntables), as well as electric current simply moving through wires and other components, can make effective solutions less straightforward—in particular we not only must deal with external sources of vibration, but must minimize the effects of a component's self-inflicted resonances as well.

This last theory has also been proposed for the mechanism of sonic degradation arising from these internally generated resonances in nonmechanical, non-transducing electronic components such as preamps and amplifiers. For example, current-induced magnetic fields forming around transformers, wires, and other passive devices can cause these components to vibrate or move, however slightly, within their own fields, creating minute non-linear currents that may subtly alter the original signal. Another well-known process, familiar to tube aficionados yet also affecting solid-state devices, is microphonic, whereby mechanical vibrations are converted into electrical signals and then combine with the music as added distortion.

THE FUNDAMENTALS: RIGID COUPLING
For the sake of clarity and relevance to audio systems, I will explore the following principles first by looking at a typical supporting platform or shelf, and later through examining various suspension designs; however, the basic concepts apply to any solid structure.

In broad terms, the goal of vibration control is to minimize the relative motion between different elements that comprise a system. Ideally, this would be accomplished by connecting perfectly rigid elements to a structure that is also perfectly rigid so that the distance between any two points of the assembly would remain dynamically constant at all times, creating a system referred to as an "ideal rigid body." This means that the size and shape of the composite structure will not change, regardless of exposure to vibration, temperature fluctuation, or static load.

Of course, such a perfectly rigid system is impossible: all solid objects vibrate through subtle flexing and twisting forces. Nevertheless, this ideal defines the direction to be pursued. In practice, this goal is approached by starting with very stiff and uniform, yet well-damped, supporting platforms upon which the component(s) of interest is placed. (Damping refers to any process that diminishes the amplitude of vibrations through conversion into heat, friction, or other resistances.)

Removing the many sources of vibration is impractical, so we must next isolate our rigid structure from floor- and stand-borne vibrations. The concept is simple, but practical attempts to address these two separate aspects of vibration control are often mixed together in the mistaken assumption that, since the physics of vibration in rigid bodies and suspensions share several traits, similar criteria should be followed for the design of each.

One example of this misconception, frequently applied in audio, is the use of massive slabs of granite or marble alone. Many audiophiles expect that "isolation" will be guaranteed for any component or speaker so supported—as if the vibrations wouldn't be able to pass through such a massive object. As we will see, the different problems of floor- and stand-borne vibrations require different practical approaches. Once you understand the basic elements of physical law that affect each, and the different roles required of a platform and its isolating suspension, their proper relationship should become clear.

Every structure associated with a typical stereo system—floor, shelf, component chassis, speaker cabinet, equipment rack—will have a number of natural resonant frequencies. Each resonant frequency of a solid object corresponds to a specific bending mode unique to that frequency. These mode shapes define the direction of motion and correlate to the
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The Rigid Body Concept

The performance of a table-top or platform is a function of the rigidity of the structure and the effectiveness of any applied damping. Each solid object will have many resonant frequencies and associated bending modes. The lower the dominant resonant frequency, the higher the modal displacement. Generally, the first several frequencies/modes are the most significant, and largely define the vibration performance of a given platform. By using materials for constructing audio platforms that are very stiff, the dominant resonances can be shifted to a higher frequency where they are associated with less-damaging, lower-displacement modal activity. Appropriate amounts of damping applied to the platform can further reduce the amplitude of any remaining vibrations over a broad frequency range.

The performance of a given platform is plotted on a “compliance,” or displacement, curve that shows any deviation from an “ideal rigid body” as defined in the main article. “Compliance” is used rather than “displacement” to show the ratio of displacement to a constant applied force. This curve is represented by a perfectly straight line sloping down the Y axis (representing displacement) from the upper left corner toward the lower right side of a log-log plot, at a slope of −2 across the X axis (representing frequency). This plot shows a platform’s actual dynamic response to random vibrations compared to that of an ideal rigid body line.

Fig.1 illustrates the ideal rigid line on the compliance curve. Fig.2 shows a typical dynamic response curve for an undamped table-top and plots the maximum amplification of the first four resonant peaks, labeled A through D, in terms of compliance and frequency. Fig.3 illustrates the relationship between the undamped platform’s vibration modes or bending shapes, the corresponding resonant peaks, and the specific frequencies plotted on the curve in fig.2. The scale of the mode shapes is exaggerated here to better illustrate the bending forces of vibration. Note that dominant peak A is the lowest in frequency and has the highest displacement or amplitude.

Also, displacement decreases inversely proportional to the square of the applied frequency. A real-world platform will follow the ideal rigid body line up to about 80Hz or so, above which structural vibrational modes are excited and begin to deform the platform’s shape. By drawing an imaginary plane through the four platform diagrams, points of minimum motion, called “nodes,” will be found. Ideally, any coupling devices between a platform and a component or floor should be located at these “quieter points,” or nodes.

—Shannon Dickson

peak amplitude of displacement that results when the particular natural frequency of a platform is excited into resonance by external vibrations of the same frequency.

Every solid object, particularly irregularly shaped ones, will have numerous modes, yet the lowest natural frequency of a given platform will usually be the most dominant, with the next few adding a significant contribution to its overall “resonant signature.” Modal analysis begins with the concept of “degrees of freedom” of a system or object. This refers to the minimum number of directions of motion necessary to define how an object can move in its particular environment. For instance, a single, independent particle has three degrees of freedom, while our ideal rigid body has six: up and down, front to back, left to right, and rotation around each of these three axes. There is a direct relationship between the number of degrees of freedom an object has and the number of natural resonant frequencies and modes it is subject to. Most fixed objects or enclosed acoustic spaces have many hundreds of degrees of freedom and related modes (see sidebar 1, “The Rigid Body Concept”).

Because audio components are non-ideal, three-dimensional objects, it doesn’t take much imagination to see how complex the twisting, bending, and flexing of modal forces can become when random and variable vibrations stimulate multiple resonant frequencies in such structures. As a result, vibrations in the horizontal and vertical planes must be dealt with. (Keep this requirement in mind; it has a major impact on the real-world performance of most vibe-reduction products.)

When you multiply the modal signature of a platform by those simultaneously at work on shelves connected to a rack or stand—which is contributing its own complex resonant pattern to the mix—and include vibrations from the floor that the stand is coupled to, you have a real problem. Toss in a few stereo components whose non-uniform chassis contain vibration-generating transformers that make their resonant frequencies particularly complex, and an incredibly elaborate set of mode interactions will likely occur that will add sonic colorations and can result in a genuine limit to a system’s resolution.

In vibration analysis, the minimum resonant frequency of a platform or suspension and the maximum amplitude of that resonance are of paramount importance. This is due to the effect of displacement. In vibration analysis, “compliance” is often used interchangeably with displacement as a
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measure of the tendency of an object to move in response to vibration. As such, it is directly related to mode shape and defines a structure’s dynamic rigidity. Compliance is a ratio of displacement to the amount of applied force, and is also the inverse of stiffness, whether of a solid object like a shelf, or of a spring-like suspension; in the latter case, the stiffer the spring, the lower the compliance, and vice versa.

There are several reasons why the minimum resonant frequency of a rigid structure is so important. For starters, a reduction in frequency leads to an increase in displacement and a corresponding amplification of the resonance, resulting in a “noisier,” less stable platform.

Realistically, the lowest natural frequency of any practical platform or table-top is around 80Hz or so, meaning that all vibrations of frequencies lower than this will transmit through the platform with little change in amplitude. Actually, most materials and shapes used for platforms have natural frequencies ranging from around 120Hz up to 400Hz or more—well into the midrange. The lower the resonant frequency of a platform, the less desirable—the associ-

ated increase in amplitude will cause more serious ringing that damping can only partially reduce. A very stiff structure will have a higher dominant resonance, and, since an increase in frequency correlates with a reduction in physical displacement, less complex mode shapes will form, even though the total amount of energy remains the same.

This, then, is the most practical solution for a good supporting platform: Employ specific materials and geometry that increase the platform’s stiffness:weight ratio so that the improved rigidity raises the resonant frequency, reduces its amplitude, and minimizes the structure’s bending mode shapes. In addition, enough damping should be applied to the platform to further lower the displacement of resonances over a broad frequency range without degrading the structure’s stiffness. As we’ve seen, damping is particularly important for supporting platforms used in audio systems, to help dissipate equipment-borne and acoustically coupled resonances.

The ideal audio support platform will be rigid, uniform in structure, and have a relatively high natural frequency.

Platform Construction

Very few structural materials deal efficiently with the requirements of both rigidity and damping. Some materials address one aspect while degrading the other. Therefore, better performance is usually obtained by a composite approach to platform or shelf construction. Mass can be a desirable quality in a material used for equipment supports as long as it contributes to dynamic rigidity. But excess mass that does not aid the cause of stiffness may actually be detrimental, as it can cause a reduction in the platform’s resonant frequency, requiring extra damping material to attenuate the increased displacement. Since most materials used for damping tend to be compliant, the amount needed to even partially reduce lower-frequency amplitudes can cause an unwanted reduction in the stiffness of the structure. Also, if a platform’s ratio of mass to stiffness is excessive, mass may contribute to a subtle sagging of the platform, degrading static and dynamic rigidity.

Most materials that are desirably stiff do have a good deal of mass, so successful plinths, platforms, or shelves used for audio combine rigid mass with the right amount of uniform damping, often by constraining one or more layers of visco-elastic material (such as E.A.R. “Isodamp”) between two or more much thicker layers of stiff material (such as granite, steel, or 6061-T6 aluminum). Another successful technique sandwiches lighter but damped materials, such as MDF or acrylic, between two skins of steel or granite. Steel has a better stiffness:weight ratio than granite, though both can be used to good effect either singly or combined, as long as their tendency to ring in the lower midrange/upper bass is controlled with damping. High-quality aluminum is approximately one third as stiff as steel but is nonmagnetic, which can be useful with some components. Certain carbon-fiber composites show particular promise as well, as do several new designs offered with well-built stands using multiple layers of various hardwoods alternating with thin damping layers. The ubiquitous shelves made from medium-density fiberboard (MDF) benefit from uniformity and are fairly well damped, but are not particularly stiff.

We’ve now defined our near-ideal audio support platform.

It will be uniform in structure as well as rigid for its size, weight, and shape. If we map out the composite sum of its modal shapes, we will find relatively few areas of significant displacement. As a result, the motion of the platform will be limited to the six basic degrees of freedom defined earlier. It will have a relatively high natural frequency and correspondingly low amplitude of resonance that will be further reduced by use of sufficient damping. This applied damping will also provide a sink for a broad range of component-generated vibrations. Sounds pretty good, doesn’t it?

Several available platforms are headed in the right direction. One example, offered as a separate item to audiophiles by D.J. Casser Enterprise’s Black Diamond Racing label, is a carbon-fiber composite platform simply called “The Shelf.” It’s reasonably stiff, has a fairly simple modal signature, and contains a good degree of self-damping.

The Rigid Coupling Surprise

Unfortunately, once we’ve built or purchased our dream platform, we then have to connect it to a stand or floor and place a component on top. This is the kicker: When you couple the most ideal practical platform to the floor with cones, spikes, or any other rigid footing, even at ideal locations with respect to each, the best vibration performance you can achieve is nearly 100% transmission of floor-borne vibrations through the platform, without amplifying them or generating any new resonances in floor or platform! The same applies to component-generated vibration. At the very best, the combined structures will roughly approximate the “ideal rigid body” we mentioned earlier, moving through space in synchrony relative to each other so that the motion of the floor is matched by the motion of the shelf, with nothing added.

Any technique that does not provide isolation of external vibrations will only vary the amount of resonant stimulation added to the components concerned. It cannot reduce at all

2 For information about “The Shelf,” contact Black Diamond Racing, 301 North Water St., Milwaukee, WI 53202. Tel: (414) 224-5300.
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the level of baseline vibrations in the floor or those coupled from the air!

This principle is illustrated by both the "ideal rigid body" line in the compliance curves shown in sidebar 1, and the horizontal unity-gain line (labeled "1.0" in the various transmissibility graphs of sidebar 2). A perfectly rigid structure would not diverge from this unity-gain baseline in either direction, indicating nearly complete transmission of all vibrations between both the floor and the coupled elements.

At first glance, transmitting nearly all of the floor vibrations to a component might seem to be of no benefit at all. On the contrary, this would be a significant accomplishment compared to most real-world coupling schemes, due to an appreciable reduction in random levels of resonance affecting key components, as described above.

Indeed, it is the degree of deviation from this ideal that defines the wide variety of subjective sonic changes experienced by audiophiles using various non-ideal rigid coupling devices, stands, shelves, and components in actual audio systems. Also, when you consider all the ramifications of this

scenario, it appropriately undermines the claim by certain purveyors of cones and spikes that these devices have a directional "diode-like effect," forcing discrete vibrations to flow like water from a dam: out of a component, through a coupled shelf, and then into the floor, where they are finally dissipated.

This may be an appealing concept, but it just doesn’t work that way. Certain ambitious advertising campaigns for these devices make it sound as if all the bad vibes will be sucked out of your audio gear as if by a hose containing a one-way check valve (often made of exotic materials and special shapes), while simultaneously preventing any floor or rack vibrations from coupling to the component via the cones. This idea is misleading at best, even though rigid coupling can play a critical role as an adjunct to an overall vibration-reduction plan incorporating isolation and damping. But before some of you "cone-heads" start writing flame mail, let’s talk about what cones actually do.

What began—with the likes of Tiptoes and Sorbothane pucks—as a cottage industry within a cottage industry has evolved into a bewildering array of products, all promising to enhance the resolution of our cherished systems. Most of these devices do result in a noticeable change in the sound of one’s system, often for the better. However, the prospective buyer must understand that the changes wrought by some of these vibration-control products are primarily a function of tuning. In other words, they merely shift the frequency and level of offending resonances around in the system, hopefully achieving a more pleasing balance.

Like many of you, I use cones and spikes for coupling certain components—with good results. However, a basic understanding of how to use cones within the mechanism of rigid coupling will not only help to get the most out of them, but will contrast their tuning benefit with the overall increase in resolution resulting from more elaborate methods of equipment support (for example, exceptional pneumatic isolation systems). As I related earlier, my experience is that the subj-
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In Sidebar 1, I explained, graphically, how the resonant frequencies of a solid structure relate to its modal activity when stimulated by vibrations. It is apparent that, regardless of which method of rigid coupling, damping, or a combination thereof is used to minimize the negative impact of vibration on a platform, stand, or component, the best one can achieve through these means alone is a reduction in amplitude approximating the ideal rigid body line.

To further reduce the impact of vibration, we must isolate any rigid structure from outside sources of resonant excitation. Isolation systems are evaluated through two models: The Simple Harmonic Oscillator, consisting of a rigid mass connected to the floor or supporting element by a linear spring (fig.1), forms a suspension that has no applied damping to dissipate mechanical energy. Every suspension has a natural resonant frequency determined by the supported mass and the spring compliance. It decreases for a heavier mass and/or a more compliant (softer) spring. Theoretically, the peak displacement caused by the excitation of a truly undamped harmonic oscillator's resonant frequency is infinite (fig.2).

The Damped Harmonic Oscillator is the same, with the addition of a damping mechanism to reduce the amplitude of displacement (fig.3). As damping increases, the amplitude at resonance decreases. However, the "rolloff" rate at higher frequencies also flattens out, meaning that the decline in the transmissibility of vibration occurs more slowly. Since the theoretical Simple Harmonic Oscillator does not exist in the real world, all practical systems are some variation of the damped suspension model (fig.4).

Transmissibility is the ratio of the amplitude of vibrations transmitted through an isolator to that of the driving force. The Y axis of the log-log graph defines the amount of vibration transmitted through the suspension. The baseline, represented by the line at unity (1.0), corresponds to transmission of 100% of the vibration inherent in the structure supporting the suspension. (It's also roughly analogous to the ideal rigid body line on a solid structure's displacement curve, as shown in sidebar 1, in that any deviation from the ideal rigid body line occurs above this baseline.) The X axis shows frequency and, combined with the Y axis (transmissibility), defines the system's resonant frequency, the height and breadth of its corresponding zone of amplification, and the amount of attenuation for any frequency beyond the amplification zone. The figures are fairly self-explanatory.

Keep in mind that all forms of rigid coupling using cones or damping techniques will either increase or decrease the amplitude of any given resonant frequency band only above the baseline represented by 11% Level 10 on the Y axis equals 100% amplification of baseline vibrations, and 0.1 equals a 90% reduction in transmission of the same to the isolated components. The curve is asymptotic, so 0.01 equals 99% reduction, 0.001 is equivalent to 99.9% reduction in transmissibility, and so forth. 100% isolation is, of course, never reached.

Fig.5 shows transmissibility curves showing actual measured performance for a typical high-quality pneumatic isolation system in both the horizontal and vertical planes. Note the near-equal performance in both planes, the suspension's very low, well-damped resonant frequency, and its steep 12dB/octave rolloff.

—Shannon Dickson

Fig.1 Simple Harmonic Oscillator.

Fig.2 Transmissibility of Simple Harmonic Oscillator. Note that without damping, amplification at the resonant peak would be infinite.

Since isolation only begins at a frequency near 1.4 times the resonant frequency of a suspension—at best—it is important to push this frequency as low as possible, while maintaining stability. A transmissibility curve is a method used for evaluating the performance of an isolation system. Transmissibility is the ratio of the amplitude of vibrations transmitted through an isolator to that of the driving force. The Y axis of the log-log graph defines the amount of vibration transmitted through the suspension. The baseline, represented by the line at unity (1.0), corresponds to transmission of 100% of the vibration inherent in the structure supporting the suspension. (It's also roughly analogous to the ideal rigid body line on a solid structure's displacement curve, as shown in sidebar 1, in that any deviation from the ideal rigid body line occurs above this baseline.) The X axis shows frequency and, combined with the Y axis (transmissibility), defines the system's resonant frequency, the height and breadth of its corresponding zone of amplification, and the amount of attenuation for any frequency beyond the amplification zone. The figures are fairly self-explanatory.

Keep in mind that all forms of rigid coupling using cones or damping techniques will either increase or decrease the amplitude of any given resonant frequency band only above the baseline represented by 11% Level 10 on the Y axis equals 100% amplification of baseline vibrations, and 0.1 equals a 90% reduction in transmission of the same to the isolated components. The curve is asymptotic, so 0.01 equals 99% reduction, 0.001 is equivalent to 99.9% reduction in transmissibility, and so forth. 100% isolation is, of course, never reached.

Fig.5 shows transmissibility curves showing actual measured performance for a typical high-quality pneumatic isolation system in both the horizontal and vertical planes. Note the near-equal performance in both planes, the suspension's very low, well-damped resonant frequency, and its steep 12dB/octave rolloff.

—Shannon Dickson
balance, and—well, you get the picture. Cones can be a mixed bag.

The ideal scenario of rigid coupling is predicated on our ability to perfectly align the minimum nodes of a concrete floor with those of our damped, rigid platform. The chances of this happening in reality are about as likely as folding the continent in half and having the Rocky Mountains fit perfectly with the Adirondacks. The much larger concrete floor will have its own varied resonant modes, but since the platform's size is so small compared to that of the floor, the floor is "seen" by the platform, via cones, as a more or less rigid body. Note that, with respect to a suspended wooden floor, the mutual excitation of resonant modes between the stand, platform, and floor can be much more complex and unpredictable. On wooden floors, try locating your equipment near structural support beams or other weight-bearing regions. If possible, also use house jacks to shore up the areas of the floor directly under and around your equipment rack and speakers.

IDEAL RIGID COUPLING IS PREDICATED ON THE PERFECT ALIGNMENT OF THE MINIMUM MODES OF A CONCRETE FLOOR WITH THOSE OF A DAMPED, RIGID PLATFORM. THE CHANCES OF THIS HAPPENING ARE REMOTE.

For those fortunate enough to have concrete floors, the modal waves are spread out, and the peaks of the waves are far apart compared to those in the platform or stand. From the point of view of the platform, it would be similar to driving over a broad speed bump. You'll notice it as a gentle rolling, but nothing like hitting a sharp, narrow bump. In other words, most vibrations transmitted to the floor, from whatever source, will couple directly through the cones without much amplification of the modal activity from the floor. In any event, there isn't a whole lot we can do about floor vibrations, whatever their origin, by using rigid coupling alone. Therefore, in order to get the best performance from this method, we must direct our attention toward placing the cones at the minimum nodes on the bottom of the platform.

While many people have noticed positive changes in system tonal balance with various cones, others have at times experienced degradation, particularly if they did not make an effort to find the quietest locations for their cones. As we inferred, the shape of a cone and its composition may contribute somewhat to its sonic effect, particularly if it contains some inherent damping qualities. However, it is their placement relative to modes and nodes on the coupled structures that has the largest impact on overall performance. Regardless, it is clear that this method, which falls in the domain of system tuning, is best used as an element in a more comprehensive vibe-reduction plan incorporating isolation and damping. (The benefits and limitations of compliant Navcom-like pucks are discussed under "Suspension Fundamentals.")

Even though rigid coupling has limitations, it does play a necessary and important role in nearly every stereo system. Therefore, if you've had bad luck with certain cones, try placing them in a variety of locations before you give up or rush out to buy new ones touted as sounding inherently better.

A good place to start your experimentation for that quietest location is 22% in from the two ends of any homogeneous rectangular platform. Simply measure the width of the platform and multiply that figure by 56%; the result will give you the spacing between the two cones, keeping them the same distance from the two ends of the platform. This corresponds to the minimum node of the first, most prominent bending mode on a typical shelf, and should put you in the ballpark. (I'm having an independent lab test a well-made platform for transmissibility when it's supported by a number of different cones and elastomer pucks. If we gain further insights with respect to cone placement, I'll be happy to share them with you in a future article.)

STAND DESIGN

So far, I've primarily dealt with the problems faced by uniform supporting structures such as shelves and floors. The modal shapes of most equipment stands are far more complicated, and add a second challenging element to the vibration equation. Since space limitations generally require the use of shelved stands, knowing what to look for is critical.

Again, the most important quality is rigidity. Though a number of stands on the market are very rigid in the vertical plane, most bend like a house of cards in the horizontal plane when bearing a heavy payload; or, a turntable on a granite slab. This happens because stands are usually made of three or four vertical legs connected with horizontal tiebars at the top and/or bottom. If diagonal tiebars or turnbuckles were placed across one side and/or the rear, these stands would be far more stable in both planes of motion. Fortunately, many heavy-duty steel or aluminum stands are filled with sand and lead shot, which increases mass and partially damps the tendency for the metal shelves to ring when stimulated by both floor- and acoustically coupled vibrations. A few stands are made with inherently well-damped materials.

It's as simple as this: Keep your stands as short as possible. The shorter the stand, the more rigid it will be.

Use all of these tips when shopping for a stand, and by all means don't skimp on quality and rigidity for the sake of looks alone. Armed with these guidelines and a willingness to investigate the available options, you're likely to find some creative and unique variations on these techniques that work very well.

COMPONENT LEVEL CONTROL

The first elements in the vibration equation affecting audio systems, and the final constituent in our look at rigid coupling, are, of course, the actual components. Since vibrations are best dealt with closest to their source, equipment designers bear the brunt of responsibility for minimizing internally generated resonances and the damaging effects of external vibrations on their chassis. As we've seen, building an inert component that is immune to outside disturbances is completely impractical; informed designers attempt to minimize the strength of offending internal vibrations while shifting inevitable resonances to a less harmful region through careful layout, strong chassis construction, and local damping.

Those manufacturers who fine-tune the sounds of their electronic devices with minor circuit adjustments or component changes are, in part, adapting the sound to the resonant signature inherent in their components' designs. The
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Jeff Rowland Design Group products—such as the MFA MC Reference, CAT Signature, Accuphase gear, and the new electronics from Balanced Audio Technologies—are just a few of a growing list of examples in which attention to vibration at the design level has paid off in improved low-level detail and subtle refinements in tonal balance.

Since most chassis have anything but uniform resonant signatures, the problems encountered in connecting a platform to the floor are compounded further when spiking a component to the top of the platform mounted on a stand. It's virtually certain that the irregular modal profiles of most components' thin enclosures will not only encourage significant amplification of related external frequencies, but the creation of new resonances as well.

Here isn't a whole lot we can do about floor vibrations by using rigid coupling alone.

Limited vibration attenuation provided by composite cones that possess a degree of damping may provide some latitude with respect to their placement between components and platforms, falling somewhere between solid cones and compliant pucks in performance. However, for the reasons described above, these devices, and rigid cones as well, can actually exacerbate a resonance problem when misapplied. Also, I've yet to find any devices from either category that produce repeatable, predictable results, regardless of what component or system they are used with. I'm therefore inclined to think that audiophiles be aware of those few products that do address the issue of vibration control at a more fundamental level.

Sand damping
We've noted the benefit of using sand to fill equipment stands. Another important damping application is in products like the Bright Star sand bases. These boxes, ranging from 2" to 5" deep, are filled with sand on which a plinth is placed to support a component. The ability of sand to conform to the entire surface of the plinth material efficiently constrains and partially damps the platform's vibrational modes. While the volume of sand typically used in these bases will not result in true isolation—particularly for the most damaging low frequencies—it is sufficient to reduce the amplitude of resonances across a broad range of frequencies arising from the modal activity of the floor, stand, and supported component. This damping effect can be surprisingly beneficial.

Speaker coupling
Perhaps nowhere are cones and spikes more widely used and accepted than when coupling speakers to a floor. Their sonic effects in this application are generally more pronounced in scale and more uniformly positive than when coupling line stage components to various shelves and stands. While many of the foregoing principles also apply to spiking speakers, there are important differences. An argument could be made that by placing speakers on cones rather than setting the entire speaker flush with the floor, the contact area between the various modal waves of the floor and those excited in the speaker's cabinet by the driving force of the woofers will be somewhat reduced, lowering the overall resonance of both structures.

This theory may provide some explanation for the effect of spiking a speaker, but the biggest impact results from simply stabilizing its motion relative to the air in the room. If a speaker is placed on a carpet or uneven floor, it will subtly rock back and forth due to the large excursions from the bass drivers. For example, when a signal comes down the cable, telling the woofer to move 1/8", its movement may be slightly reduced relative to the air due to the cabinet's pivoting action. In this example, spiking will tend to fix the pivot and result in a tighter, better-defined bass response and a cleaner presentation in the midrange. Very heavy speakers make this

Fundamentals of isolating suspensions
Now that some of the benefits and limitations of rigid coupling are better understood, we should maximize its usefulness by employing rigidity, where it counts: through supporting structures and the selective application of cones as an integral part of a complete isolation/damping/tuning system. In so doing we can move beyond simply reducing additive resonant effects transmitted by the floor/stand/component interface, through genuinely de-coupling key components from the main sources of vibration while providing an efficient mechanism for attenuating residual disturbances.

Before I explore these issues of suspensions and isolation in more depth, I'd like to address another misconception prevalent in our hobby: that of "over-damping" non-transducing electronic components.

Damping is always present to some degree in any real system. Without it, there would be no way to limit the amplitude of a resonance. The materials employed to provide damping, the ratio of these materials to those elements that need damping, and the method in which they are applied, all determine how effective any scheme is at reducing broad-band vibrations. However, you cannot mechanically "over-damp" a structure or component that is not designed to be a transducer. You can over-damp some circuits electrically; you can over-damp the "Q" of a speaker as well. You can also over-damp structures associated with a phono cartridge: tonearm, plinth, etc. But you cannot over-damp a preamp's chassis or an equipment rack. What you can do is "mis-tune" the chassis or structure by shifting resonances around and attenuating them in a frequency-selective manner that results in a dulling of the sound, which is then characterized as over-damped. You can also misapply certain damping materials in the construction of a platform so that its overall rigidity is compromised.

This may all seem like a minor issue of semantics, but it's important to understand the distinction in order to prevent conceptual errors when deciding how best to deal with a

3 Bright Star Audio, 2363 Teller Road #115, Newbury Park, CA 91320. Tel: (805) 375-2629.
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particular vibration problem. Complete damping of a nontransducing component would imply the absence of any offending resonances to tune. This type of electronic component should act as an inert conduit for the signal; any resonances added to that signal via, say, an amplifier chassis, are, by definition, distortion—no matter how sonically pleasing.

**Suspension Basics**

The concept of a successful suspension is simple. Once we’ve done everything practical to reduce the amount of added resonant energy generated in our stand and platform, the next step is to reduce the propagation of baseline external vibrations into our components through isolating as much of the remaining energy as possible with an effective suspension.

A suspension’s resonant frequency is determined solely by the ratio of the coupled mass (composed of the supporting platform and component) to the stiffness of the spring support. As in our platform discussion, the natural frequency of a suspension is amplified at resonance. For frequencies well below the suspension’s natural resonance, transmission is close to 100%. Then isolation begins for all frequencies greater than 1.4 times the resonant frequency. For undamped or sophisticated pneumatic and NSM (negative stiffness mechanism) designs, the reduction in amplitude continues to decrease at a nice, steep rate of nearly 12dB/octave.

Obviously, the issue of vibration in solid objects and the issue of isolation have resonance as a common problem. However, as we pointed out at the beginning of our discussion, there are important differences between these two aspects of vibration control in both theory and practice. Unlike the platform example, in which we pushed the resonant frequency as high as possible to reduce displacement from modal activity, a suspension will only begin to offer effective isolation at frequencies significantly above its natural resonance. Since a really effective suspension will need to isolate all structure-borne vibrations that can have an audible impact, we must push its natural frequency as low as possible so that the resulting zone of amplification is as far away as possible from the audio band—the main source of disturbance.

Two basic models are used by engineers to define an isolating suspension. First is the example of a “simple harmonic oscillator” which is formed by a rigid mass suspended by an ideal linear spring, yet has no method for dissipating the mechanical energy of its movement. There are some basic characteristics of this model that are important to remember: Any vibrations that are at or near the resonant frequency of the suspension will be significantly amplified. If the suspension truly lacked any damping, the displacement at the resonance peak would be infinite (you won’t find many of these at your local hi-fi hut). The frequency at which the height of the resonant peak has fallen back to unity is equal to the natural frequency multiplied by the square root of two. Another way of looking at this relationship is to multiply the resonant frequency of any suspension by 1.4; the result will approximate the frequency at which isolation actually begins.

Transmissibility is the ratio of vibrational amplitude that is transmitted through the suspension to the total vibration input. The transmissibility of vibration is constant for all frequencies well below the resonant point. In other words, essentially all of the low-frequency energy transmitted to the system will pass right on through without modification—as if the suspension wasn’t even there.

The amount of vibration transmitted to the isolated elements will continue to attenuate for all frequencies above the zone of amplification—i.e., after the resonance has subsided to the baseline level of unity. This is, in effect, like a low-pass filter at 12dB/octave, or 40dB per decade. Therefore, the lower you can establish the suspension’s resonant frequency, the greater the degree of isolation for all frequencies above that point. Remember, too, that the suspension’s resonant frequency is different from the inherent natural frequency of either the isolated platform or the component.

Unfortunately, the large displacement accompanying super-low frequencies—particularly those well below 10Hz—in an undamped suspension can make it very unstable and can lead to severe operational problems. The practical solution for the stability problem employed in most real-world suspensions is some variation of the second model called, appropriately, a “damped simple harmonic oscillator.” This system differs from the first example by adding a damping mechanism to the spring that reduces the amplitude and shape of the resonance. In contrast to the first model, the damped isolation system not only curtails the maximum displacement of the suspension, making it more stable—a desirable trait—but can also, unfortunately, reduce the rate of attenuation for all frequencies above that point, in effect flattening the low-pass rolloff characteristics from a 12dB/octave slope to as shallow as 6dB/octave for some heavily damped suspensions (see Sidebar 2, fig.2).

Actually, the zone of amplification for a damped suspension is broadened on both sides of the resonance, though the low-pass region is of greater importance. For any given point above resonance—say, 20Hz for a system with a 10Hz resonant frequency—the damped system will usually provide less isolation than the undamped suspension! Also, some materials used to damp the action of a typical isolator can add stiffness to a spring which, in turn, would raise its resonant frequency. All things considered, we have a classic Catch-22 that defines the fundamental limitation of the steel-spring and elastomer-based suspensions commonly used in audio.

Fortunately, this dilemma can be solved with good pneumatic isolation systems. Traditional isolators tend to have “reactive” damping characteristics, while the more sophisticated, dual-chambered pneumatic designs combine real-time damping along with other unique qualities. These factors allow good air-based systems to achieve the fast rolloff of a simple harmonic oscillator above resonance, and the low amplitude at peak resonance of a damped harmonic oscillator—resulting in a clearly superior suspension all the way around.

**Elastomer Supports**

A rudimentary version of the traditional damped suspension is formed when elastomer materials such as Navcom or
amplification will often extend into the lower audio band. For example, a system formed by typical rubber pads or pucks supporting a moderately heavy steel plate will have a vertical resonance of around 15Hz or so. Its related resonant displacement is fairly well controlled, yet the zone of amplification actually extends from approximately 3Hz up to around 25Hz–above which isolation finally begins. This scenario can contribute to the subjective impression of a "mushy," "soft," or "boomy" bass response, even as the suspension reduces the amount of transmitted vibrations from the midbass on up, and partially damps the component-generated vibrations.

Unfortunately, this limitation of certain elastomer supports is often misconstrued as "over-damping," even when describing its effect with amps and preamps, and has led to the unfortunate condenmation, by some, of any sort of damping at all. Actually, this negative subjective effect, reported when elastomer supports are used in some systems, stems from the amplification of the suspension's relatively high resonant frequency intruding into the lower audio band (the opposite of damping).

Paradoxically, systems that emphasize the bass can sometimes sound rolled-off in the treble as well, although this is usually a psychoacoustic effect rather than a genuine rolloff. In any event, this example highlights the danger in drawing cause-and-effect conclusions about subjective experiences in audio without trying to tie them back to real physical principles. The positive sonic effects of elastomers are almost entirely due to their damping and isolating qualities; when properly applied, elastomers can result in a significant reduction of vibrations from the upper bass on up.

Incidentally, several equipment supports or footers now on the market combine a degree of rigidity with a measured amount of damping, without being overly compliant. These devices seem particularly well suited for connecting components to a platform already isolated by a suspension. (See my Townshend/Vibraplane review elsewhere in this issue for some examples.)

employ suspensions that damp both the suspension and tonearm to minimize the amplitude of these resonances, particularly with regard to vibrations in the audible bandwidth, and often achieve good results. However, even these well-designed spring-based suspensions have a tough job handling the isolation requirements of a turntable. These additional factors partially explain why:

Earlier, I alluded to the need for vibration attenuation in both the vertical and horizontal planes. Almost every spring- or elastomer-based design has significantly better vertical than horizontal isolation. As a result, "flanking paths" can be created, allowing horizontal resonances to impair the overall isolation effectiveness of a suspension. Without nearly equal isolation in both planes, serious compromise is inevitable for any turntable system. The flanking mechanism can also be exacerbated by the reactive damping inherent in most spring and elastomer systems.

Modern low-output cartridges, the vagaries of the stylus/groove interface, and ever-more-refined amplifying electronics place tremendous burdens on not only the suspension, but every aspect of turntable design. These systems can amplify a signal over 30,000 times to portray the subtlest hall ambience or textural nuance—those tiny details that give recorded music so much life, vitality, and spatial resolution. Since a turntable's arm/cartridge system requires maximum isolation to be achieved in both planes by 10Hz, we need a suspension with a bidirectional natural frequency well below 5Hz, when possible.

Though some of these reactive spring-based systems have resonant frequencies that low, I feel that they simply are not as efficient as a good pneumatic system, and the stability of some is questionable. When properly implemented, air-based isolators attenuate much lower amplitudes of very-low-frequency vibrations than even the best spring designs (with the exception of the new NSM system offered by Newport, which is a little too expensive for home audio in its present configuration).
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Take Andy Payor's Rockport Cappella and Sirius II turntables, for example. Each of these 'tables contains a fully developed pneumatic suspension with a vertical and horizontal frequency of about 2Hz or less. Compared with most spring or elastomer suspensions, even those that claim similar resonant frequencies, these pneumatic systems are at least 40dB better in the ultimate isolation of very-low-frequency, micro-inch levels of displacement.

However, the bottom line is that truly effective vibration control in audio systems requires a measured, comprehensive approach utilizing rigid, well-damped stands and platforms, careful selection and placement of coupling devices, and isolation of key components—using air-based suspensions wherever possible.

All of our references up to now have concerned typical home audio systems, yet it is my fervent hope that the pro-

**Isolation and Tunning Should Be Seen as Complementary and Essential Partners in the Fight Against Bad Vibes.**

The Vibraplane, reviewed elsewhere in this issue, is very close to the Rockport suspension in isolation performance, though these cost-no-object turntables have several other key features that contribute to their outstanding sound quality—and high cost. In addition to isolating very-low-frequency vibrations in both planes, the Vibraplane also contains the real-time damping characteristics shared by the Rockport as well as other pneumatic systems like Newport’s “BenchTop” or “Noise Block” (the latter is an audiophile version built for Immedia by Newport).4

Wrapping it up

The particulars of pneumatic isolation and its sonic contributions are covered in my reviews of the Seismic Sink and Vibraplane. In summing up this evaluation of practical vibration control, it’s important to realize that, although the isolation effectiveness of these pneumatic systems surpasses that of traditional suspensions, the complexities of vibration in the audio environment are such that subjective differences are perceptible even between competing pneumatic designs. These differences arise primarily from the relative effectiveness of the various isolated platforms and the coupling methods used to connect equipment to them—particularly how well they damp component-sourced vibrations.

Subjectively, this is the tuning effect we’ve discussed, and it’s perceived as subtle tonal variations, focus, and changes in soundstage perspective. It won’t take long, however, before you’ll be able to easily distinguish these spectral variations—no matter how pleasing—from the concurrent, across-the-board improvements in system resolution, spatial definition, and greater emotional connection to the music that results from pneumatically isolating your favorite source components.

Though turntables clearly demonstrate the most dramatic improvement from proper isolation with a Vibraplane, digital gear isn’t far behind. (This is still the biggest surprise for me.) Even preamps and amplifiers, particularly those containing tubes, show a real enhancement in sound quality with the more affordable Seismic Sink, and there is a definite synergistic effect from floating the entire system. Pneumatic isolation should never be considered just a tweak. When done right, the impact can be more musically significant than changing certain amplifiers or preamps, not to mention many other accessories. This does not mean that gross sonic changes are necessarily greater than that experienced from most component upgrades, but simply that it can be more relevant in conveying the nuances and dynamics that give music so much vitality and presence.

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4 Noise-Block Isolation Base, $2300 including air tank and regulator valve. Dimensions: 20” W by 16” D by 2” H. Weight: 22 lbs. Contact Immedia, 2629 Mabel St., Berkeley, CA 94707. Tel: (510) 654-9035.

Audio world takes notice of the influence vibration has on fidelity. Eliminating the rickety rack systems common in studios around the world, then properly supporting and isolating A/D converters, microphones, preamps, tape drives, and cutting lathes could have a major impact on our treasured source material. Knowing what I now know about the impact of mechanical resonances, I get the willies when I go into a studio, see an A/D converter barely hanging off the edge of a console, and realize that vibration-induced grunge is being encoded into our source material. In some studios you can look through the inspection microscope attached to a cutting lathe during the cutting of a lacquer and actually see the light shimmering off the grooves as a truck rumbles past.

While it may seem that I’ve been a bit hard on tuning products when they’re the only means used for dealing with vibration, my intentions were simply to contrast their effects—which are familiar to most audiophiles—with those attainable from a well-rounded program that addresses each element of the equation, including tuning. Isolation and tuning should not be seen as competitive alternatives, but as complementary and essential partners in the fight against bad vibes.

As lengthy as this report has been, I’ve only outlined this pervasive subject in broad strokes. As you explore the commercially available resonance-control products, you’ll discover numerous shades and variations of these principles, some of which work very well. In any event, the purpose of this article will have been served if many of you now feel better equipped to sort through the maze of possibilities and, above all, have fun in implementing your own vibration-reduction plan. Now take a breath, listen to some tunes, and—when you’re ready—take a look at how best to use the Townshend Seismic Sink and the Vibraplane.

**Further Reading**

Interested readers can reference the following:


*Newport Corporation’s 1995 Catalog,* Chapter 16, “Vibration Control,” 791 Deere Ave., Irvine, CA 92714, Tel: (800) 222-6440.

**Acknowledgment**

I’d like to thank Newport Corp. for the kind use of their graphics in our sidebar. I owe a particular debt of gratitude to their Engineering Manager for Vibration Control, Mr. Bowie Houghton, for his invaluable references and insights.

**Stereophile, November 1995**
Frans Brüggen is considered among the foremost experts of music dating from the 18th and 19th centuries. Born in Amsterdam and a musicology student at the university there, he was appointed professor at the Royal Conservatoire in the Hague at age 21, and was later Erasmus Professor at Harvard. Yet, as Luciano Berio wrote, he is "a musician who is not an archaeologist but a great artist."

Brüggen’s early performing career on the recorder gained him international renown. His technical mastery of the instrument was complemented by pioneering scholarship into early manuscripts and active commissioning of new works.

But at the height of his recorder career Brüggen turned to conducting. In 1981 he founded the Orchestra of the Eighteenth Century, and with them recorded many of the masterpieces of the Baroque and Classical periods for Philips Classics.

In addition to conducting the Orchestra of the Eighteenth Century, Brüggen shares with Sir Simon Rattle the conducting duties of the period-instrument Orchestra of the Age of Enlightenment. In recent years he has gone on to conduct such noted orchestras as the Chicago and Concertgebouw, the Vienna and Oslo Philharmonies, and the Berlin RSO. Peter Catalano spoke with Maestro Brüggen at Boston’s Park Plaza Hotel.

Peter Catalano: When you were growing up, which recordings of Mozart and Beethoven did you listen to?
Frans Brüggen: I grew up in Amsterdam with the Concertgebouw. Mengelberg was just over, and it was his successor, [Eduard] van Beinum, who conducted them. My family had subscriptions and I went to all—well, not all—but many concerts with the Concertgebouw. I grew up in that world.
Catalano: I wondered if, although you're in the world of period-instrument performance, you go back and pull off the shelf Toscanini's Beethoven, or Busch's Mozart?
Brüggen: Oh, sure. There's a lot to be learned from them. What I learn from them is the conception of the piece; not the sound, not at all. And not the style of playing, either. But an idea—many of the older conductors had marvelous ideas and insights. So I listen to those every now and then. I actually don’t listen to my colleagues...
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Catalano: ...with other period orchestras?
Catalano: Many people feel there's a loss of personality and style in the period orchestras because of clumsy, four-square conducting.
Brüggen: That's not without justice; sometimes there is.
Catalano: Do you ever bring more rubato or tempo changes to your conducting the way the older artists used to?
Brüggen: Yes, yes.
Catalano: Are you still experimenting with the sound of the period orchestra? For example, using the tempo markings in Beethoven's manuscripts, where they exist?
Brüggen: Yes, that's the big question, of course. I follow them, but not to the letter. Sometimes they are unbelievable, those tempo markings. There are a few clear errors in the Ninth Symphony, and, in my opinion, there are two—no, three more errors in the other symphonies. But on the whole, one has to believe [the scores].
Catalano: What about in areas like tuning? Pianists and harpsichord players are using unequal-tempered tuning. Is it possible to tune an orchestra to certain keys?
Brüggen: We try to be moderate with our thirds; we get narrow major thirds and wide minor thirds. You know, tuning through the ages has been one compromise after the other.
Catalano: The Orchestra of the Eighteenth Century began in 1981. How has it developed in those years?
Brüggen: They have come out of Baroque habits, of having a fragile tone—precious playing. Which is fine—it belongs to that music. But it doesn't fit Beethoven. It has developed in that sense.
Catalano: Where do you want to go with their repertoire?
Mendelssohn. It can be quite radical, in the case of Rameau. [That music] requires totally different instruments, totally different pitch. Sometimes when we have a program of Rameau and Beethoven our musicians carry two sets of instruments. I think our orchestra is equipped [to play music dating] up to Berlioz.

Brüggen: I'm a steady conductor, with Simon Rattle, of the Orchestra of the Age of Enlightenment. [The difference in working with that orchestra is] the difference between the English and the non-English—which is the English nature and also the method of working in England. They work so quickly and have little rehearsal time. Everything costs money, which is not available in London; in London everybody rushes to play freelance. [They hurry] from one rehearsal in the morning to an afternoon rehearsal with another orchestra and in the evening a performance with still another orchestra. So that fires an automatism in a player, of being impeccable: Never make a mistake, otherwise you’re not asked back. And also not to take any risk. Just be impeccable, withhold; because if you jump too much, you

Catalano: Have you recorded Berlioz? Is it your intention to move on to that repertoire?

Brüggen: Not with this orchestra. One would not only have to radically change all the instruments again, but also change personnel. The minds of some musicians are just not set for that kind of music.

Catalano: Do you conduct other period orchestras and face similar problems?

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A Frans Brüggen Discography

(Unless otherwise noted, all recordings are with the Orchestra of the Eighteenth Century)

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Netherlands Chamber Choir
Philips 426 238-2 (2 CDs)

*St. John Passion*
van der Meel, Sijmonsdson, Stumpfies,
Bowman, Pregardien, Netherlands Chamber Choir
Philips 434 905-2 (2 CDs)

**BEETHOVEN: Symphonies 1-9, Egmont Overture**
Dawson, van Nen, Rolfe Johnson,
Schulte, Guibkenian Choir
Philips 442 156-2 (5 CDs)

**HAYDN**

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Schulte
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*Symphonies 39, 41, 49*
Orchestra of the Age of Enlightenment
Philips 446 076-2

*Symphonies 94, 95, 96*
Philips 438 152-2

*Symphonies 97 & 98*
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*Symphonies 101 & 103*
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*The 12 London Symphonies*
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Hoepfich
Philips 420 242-2

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Konzert, Stöck
Philips 424 148-2

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With: Vesperae solennes de confessore, Ave verum corpus
Pennicchi, Patrizio, Vanderstee, Drijer,
Netherlands Chamber Choir
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*Serenade, K.361 ("Gran partita")*
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*Symphonies 29 & 33*
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*Symphonies 34 & 40; Serenade, K.239; Eine kleine Nachtmusik, K.525*
Orchestra of the Eighteenth Century,
Orchestra of the Age of Enlightenment
Philips 434 113-2

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**RAMEAU**

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*Pièces de clavecin en concert*
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*Recorder Concertos in G & a; Overture; Suite in a*
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*Solo Recorder Sonatas & Fantasias*
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*Tafelmusik*
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Teldec 95519-2

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might make a mistake. That gives English orchestras a very special quality of impecableness, but also a bit of holding back. Whereas our orchestra is a wild bunch of people.

Catalano: Disciplined, yet they play aggressively. Can you change their English ways when you conduct the Orchestra of the Age of Enlightenment?

Brüggen: Yes, sure.

Catalano: Will you be releasing recordings with the OAE?

Brüggen: None live. We do concerts, but recordings are done in studio. We are in the process of doing all the Sturm und Drang Haydn symphonies, and we've done all the Bach suites, though those are not out yet. So there's a steady program of making studio recordings.

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THERE IS A DANGER THAT PERIOD ORCHESTRAS ARE GOING TO RESEMBLE EACH OTHER. I TRY TO AVOID IT.

Catalano: As for what you've already recorded, you've now finished the Beethoven cycle with the Orchestra of the 18th Century. Are you doing Mozart and Haydn cycles, too?

Brüggen: Haydn's London Symphonies are finished as well. We've also done all the late symphonies of Mozart; now it's a matter of putting them together in the box. We have done Haydn's Die Schöpfung [The Creation]; we'll also do two Masses.

The problem is that the Orchestra of the Eighteenth Century is not a year-round orchestra; it's a kind of a festival affair that plays in three blocks per year, four programs per year, always the same way. We rehearse in Amsterdam; it's central—we fly in from 18 countries, very international. We prepare our program and then tour with it.

We only make live recordings, so the procedure of putting out records is very slow. In tour number one we have a Haydn Symphony fitting well into the live program; sometimes the other Haydn Symphony comes two years later, and only then can they be coupled together [on a CD].

Catalano: Where do you perform in Amsterdam?

Brüggen: The Concertgebouw. It's a large hall similar to Boston's Symphony Hall.

Catalano: In large halls I always feel the sound dies after the first 15 rows; it doesn't have the impact and sonic shock you feel in a smaller hall.

Brüggen: Right. It is too big for us.

Catalano: Fortunately, you compensate by having your musicians play vigorously and fully, more so than other conductors of this type of orchestra.

Brüggen: I conduct a modern orchestra as well.

Catalano: But you limit your repertoire to the classical period.

Brüggen: Yes, for the moment. But I also conduct modern music.

Catalano: Do you have any plans to do opera?

Brüggen: Yes—Idomeneo in Amsterdam with the Opera House Orchestra, which, so to speak, plays for nothing. If they were going to hire [the Orchestra of the Eighteenth Century] they'd have to pay a lot of money, which opera houses can't afford these days. We'll be doing a Rameau opera at Salzburg, hopefully in 1997.

Catalano: Do you intend to record that?

Brüggen: Oh, yes; we record everything.

Catalano: Which of your recordings do you recommend?

Brüggen: I like our Rameau. The last one, in particular, Les Indes galantes, on Philips.

Catalano: Many people feel there's a homogenization of sound among the symphony orchestras, that they've lost their national identities and distinctions. Do you think the same thing is going to happen with the period orchestras?

Brüggen: There is a danger that those period orchestras are going to resemble each other. I try to avoid it.

Catalano: Are you a more or less self-taught conductor?

Brüggen: No, I had lessons with avant-garde conductors, with the director of the Schoenberg Ensemble in the Netherlands.

Catalano: Did you find that the precision and non-interpretive style of that music helped you conduct Baroque and period orchestras?
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Some products are destined never to be seen for what they are. Instead, they exist as avatars, the very embodiment of their ages or concepts. The Wilson Audio WATT (Wilson Audio Tiny Tot) and its nigh-onto-ubiquitous subwoofer, the Puppy, have achieved this legendary status—no, have manifested it almost from their creation 10 years ago—to such a degree that they've come to stand for the entire class of no-holds-barred monitor loudspeaker. They serve as the focus for a whole realm of the industry; indeed, to show any customer an expensive speaker possessing a modest footprint and not to invoke the incantation “better than a WATT” seems to abjure any pretense of serious sales strategy. At the same time, this speaker system has polarized the industry and its followers, strongly praised by some for its staggering accuracy, and equally dismissed by others for having little soul (musicality, to the initiated).

Everyone, it seems, has an opinion on this expensive, lavishly built loudspeaker system. When JA mentioned, in “Letters,” that I had the WATT/Puppy System 5 for review, my phone immediately began ringing off the hook. As nearly as I can recall, the consensus is that they: are too fast and too slow; have no character and possess a midbass hump; are hard to place and sound good anywhere (this is a problem?); are too bottom-heavy and too shrill. If everybody who offered me an assessment has
really put in time with the WATT/Pups, then stop the presses; we've got a universal reference. Not to mention that manufacturers began showering us with equipment—"Well, as long as you've got the speakers, you really must hear -- -- -- --; they'll let you hear how good it really is."

So here we have a product that everyone knows all about—not that any of them agree! At the same time, the WATT/Puppies seem to have become the industry standard for resolving power.

Is this speaker really that hard to get a handle on? Yes. Is it really that good? Yes. Is it the perfect loudspeaker? (Do you really think I'm going to answer that in my lead?)

WATT'S GOIN' ON?
The WATT/Puppy is really two speakers which, taken together, comprise a reasonably full-range speaker system. The WATT was developed by David Wilson to serve as a location monitor for his recordings (see the accompanying interview). Wilson constructed the two-way system with virtually no consideration for cost, which resulted in a speaker that set new standards for freedom from resonance, response speed, and accuracy within its bandwidth. The mass of the individual speakers left consumers gasping—though small, each speaker weighed 70 lbs! At a time when the most expensive small monitor was the Celestion SL-600, which cost $1600/pair, a pair of Wilsons were priced at a whopping $4400, which essentially took care of any breath left after hefting them. And this for a speaker that, to put it politely, had no bass response to speak of. Solutions were offered immediately—the first being a "beard," or an extension of the speaker's baffle, that altered the 2π steradian equation and "extended" its low-end response. Most consumers opted for mating the monitor to a subwoofer, however, and it didn't take Wilson long to offer a sub with what he felt to be the necessary speed and transparency to mate with the WATT. Thus was born the Puppy—not really a subwoofer so much as the woofer that the WATT was lacking.

Wilson Audio doesn't divulge much in the way of specifications for either component, so perhaps we should start with a physical description. The WATT's are dense, their 70-lb enclosure enclosing an internal volume of only about 9 liters. Their footprint is a scant 11" by 16.5"; front, rear, and both side panels slant inward toward the topline, which is half that size—4¾" by 8¾"—thus forming a truncated pyramid. The faceplate is covered with a dense suede-finish foam material in order to reduce panel diffraction.

The rear is inset, the side panels extending beyond it to form "flaps" to which a rigid alloy bar is clamped—which puts those relatively large radiating surfaces under stressed reinforcement. The enclosure is machined from a material composed of ceramic and mineral-filled methacrylic polymer, laminated to a bituminous compound on the inner surface—which further damps panel modes. Tuned, seismic damping is provided by 20mm lead slabs that are bolted internally to elastic mountings. The driver complement is one 1" inverted titanium-dome Focal tweeter, and one 7" Scanspeak midrange/woofer. Both are proprietary designs which Wilson has further modified—the Scanspeak driver looks a bit scabrous, as it has been treated with some sort of (randomly applied, it seems) damping compound. The rear panel features a removable tuned port; Wilson Audio supplies a second port, differently tuned, for users of tube amplifiers. (If the WATT is to be used with a Puppy, Wilson recommends using the standard port only—no matter what amplifier is mated to the system.)

The single pair of speaker connections is a nonstandard type manufactured by WBT. Wilson claims that of all the hardware the company has tested, these sound the best. I believe this in the superstitious way that I believe nasty-tasting medicine does the best job—I hated them, finding them difficult to use, and impossible to tighten to the point where my cat couldn't dislodge the connection just by stepping on the cables. Of the crossover, the company will reveal only that the finest-grade components are used, that the slopes are matched to achieve acoustical phase linearity, and that the low-frequency tuning employs a quasi-third-order Butterworth response.

The Puppy looks more like an ordinary box. It's 12" wide by 16.5" deep—a match for the WATT's footprint—which makes sense, since it's designed to serve as a stand for the monitors. Its 39" height is, not coincidentally, the ideal stand height for the WATT. The Puppy sports two 8" Dynaudio woofers constructed upon massive motor units (2" voice-coils). The rear-firing ported enclosure is constructed to the same degree of rigidity as the WATT, and features extensive asymmetrical cross-bracing and internal tuning to control resonant spuriae. There are two sets of those verkleimt WBT connectors, and—

Maybe I need to talk about this for a second. David Wilson doesn't design the WATT/Puppy system to be bi-amplified; he claims it won't improve performance and, God knows, at 93dB sensitivity, the system doesn't require a brace of amps. The two sets of connectors on the Puppy consist of one pair for input from your amplifier and another to connect the Puppy Tail (hey, don't blame me, I'm just reporting this)—a specially spec'd run of MIT speaker cable—to the WATT through an internal channel on the Puppy. The Puppy has threaded inserts that accept the Puppy Paws (see preceding parenthetical remark): massive cones designed to couple the Puppy to the floor.

I asked David Wilson about the Paws, since earlier iterations of the speaker employed more-typical spiking hardware. "They do more effectively couple the Puppy to the floor, but also serve as a response to two factors," he said. "Number one, a lot of people have asked for a way to slightly raise the soundstage. The height of the system—the distance between the acoustical center at any given frequency and the floor—is critical in that it affects the comb-filter response of the system when you're listening in a room. We established that to be acceptable in the widest range of rooms possible, so you don't want to haphazardly change those dimensional relationships. The Puppy Paws allow a degree of fine-tuning to that relationship, affecting soundstage height and, subtly, upper-bass/lower-midrange energy from the system. By extending the Puppy Paws to their maximum, you can lean out the response in those regions—some rooms, especially those made out of reinforced concrete, trap a lot of energy. This helps to resolve that problem."

I can attest that this works in practice, as I moved to New Mexico in the midst of doing my critical listening for this report. My old room, which had lath-and-plaster walls, proved articulate and balanced with the standard Puppy Paws. My new room has plastered Sheetrock walls covered on the outside with a rigid skin of fake adobe, and the speakers manifested a lower-region boom that obscured all of the lovely inner voicing on my favorite discs. As I tried to orga-
There's one last element of the WATT/Puppy system: the three bi-
tuminous discs that serve as the inter-
face between the two enclosures. Wilson Audio claims that removing or
changing these pads for some other ma-
terial will change the voicing of the
speakers. I can't attest to that, as I only
used the pads supplied—but I did find
that they wandered. After weeks of lis-
tening, I would find the WATTs mi-
grating off the Puppies, hanging over
one side or the other. It's a simple mat-
ter to realign the WATTs, but I suspect
that it's also a simple matter to prevent
this from happening in the first place.

David Wilson describes how to "Vowel-In" a Loudspeaker

First of all, you have to realize
that the boundaries are the
enemy: they reflect sound,
and most dynamic speakers are not
designed to compensate for these re-
lected sounds. Of course, by defini-
tion, all rooms have boundaries.
There are two ways to approach the
problem of boundary interaction:
one is to alter the boundary itself—
make it so absorptive that it has no
reflective quality. Or, you could
make it so randomly diffusive that it
breaks up the comb-filter effect and
the standing waves. The approach
that I use, however, is based on my
observation that most end-users
don't want to turn their listening
rooms into anechoic chambers or
studio environments. They want to
incorporate fine audio equipment
into their homes so they can enjoy
music—it's that simple.

If you can't alter the boundary,
you have to alter the speaker's rela-
tionship to that boundary. Now you
don't really have any latitude in
changing the speaker's relationship
to the floor; that's essentially de-
signed into the architecture of the
speaker—the same is true of its rela-
tionship to the ceiling, obviously.
The boundary behind the listener—
the far wall—is so far away from the
speaker that it doesn't have a prima-
ry influence on the response of the
speaker. So we concentrate on the
speaker's position relative to the
walls behind it and to its sides.

You have to deal with those
boundaries separately because they
interact with the speaker in different
ways. First we get a general reading
of the room with voice. We find a
"zone of neutrality" by speaking
while we walk into the room, start-
ing at the wall behind us. We know
that a boundary will interact with a
sound-source in predictable ways, so
if you stand near a boundary and
speak, you can hear it interact with
your voice. As you slowly move
away from that boundary, still speak-
ing, you can hear that interaction
change. Finally, you reach a point—
somewhere out into the room—
where there is very little perceived
interaction. We mark that point with
tape.

Walking farther into the room,
you find that for a distance of a few
feet, there is little change in the
voice. Eventually, you get far enough
away from the wall behind you—and
close enough to the wall in front of
you—that your voice takes on an
ecochy quality. We mark that point
with tape as well. Using that marked
area as a reference, we go through
the same procedure from the side
wall, again marking where the inter-
actions change—we call the area
bounded by our tape markings the
"zone of neutrality," and the rest of
the process consists of determining
exactly where within it the speakers
should be placed. [At this point in the
procedure Mark Goldman lays down two
tape axes, which he then marks in ½"
increments so that he can precisely replicate
any position within them for the fine-tun-
ing stage—W7]

First, we adjust for the wall
behind the speaker. Differences her-
ere of as little as an inch make a great
impact on the bass-response of the
system and the soundstaging. As the
speakers are moved closer to that
rear wall, they get more low-fre-
quency reinforcement—sometimes
actually becoming boomy in the
upper bass—and the soundstage nar-
rows. Pull the speakers toward the
listener, and the soundstage gets
wider while the deep bass loses rein-
forcement. You have to use your
judgment, but as you become accus-
tomed to this procedure, increment-
(al changes produce predictable and
recognizable changes in the sound.

We then adjust the speakers' rela-
tionship to the side walls without
changing the distance we've estab-
lished for the rear wall. We do this
one speaker at a time, disconnecting
the other one—using Rega Tone
Armazz, a ragtime piano recording I
made back in 1980. In establishing
the purest harmonic structure, dif-
fferences of as little as a quarter of an
inch affect the purity of the sound. I
call this "voweling" because I listen
for the tones to change from "aaa" to
"cee" or "oooo."

There are many methods of estab-
lishing speaker placement. In one
approach you use a mirror to look at
the speaker's reflection on the wall—
which primarily works in the bass. A
cable company recommends a
method based on ratios, which has a
great deal of validity if your room
happens to be a rectangle. Even then,
it works best in the lowest three
octaves. But few semp methods
address the midrange harmonic
structure the way ours does. I'm not
saying that our system's effective
with dipoles, because they interact
with the room in a different way, but
for our speakers, or Thiel's, or the
other dynamic speakers I've had
experience with, this really works
well.

—David A. Wilson
WATT’s the story?
Setting up the WATT/Puppys is an interesting process. Mark Goldman came to my house to introduce me to Wilson Audio’s system of “voweling-in” a speaker to the room in which it is located (see sidebar). Wilson’s dealers perform this service for any consumers purchasing the system. The point of the exercise is to remove the room from the equation, leaving the listener exposed to as much of the directly radiated sound as possible. The result was that the speakers were farther apart and nearer the rear walls than any other high-performance speaker I’ve experienced. My listening position was also pulled closer to the center of the room. Coupled with the WATT/Puppy’s modest footprint, this means that in an average room the System 5 is about as unobtrusive as high-end speakers get—no more speakers in the middle of the floor!

The soundstage they threw, when positioned in this manner, was staggering. “Wide” doesn’t begin to cover it—the image spread from speaker to speaker but from wall to wall, its rear boundary seemingly limited only by the resolving power of the components upstream from the speakers. This took some getting used to—my old listening room, while not huge, was generously sized, but by the time speakers were set up a third of its width from each side wall, you didn’t have a gigantic spread between them at all. I could get tightly

David Wilson talks with Wes Phillips

Wes Phillips: How did you come to design the WATT—and the Puppy?
David Wilson: I began making serious recordings back in the late ’70s, and monitored them on a variety of commercially available speakers. By about 1980 I had developed the first generation of the WAMM system, on which I would listen to the recordings critically. Generally, what I heard in the field on the monitor speakers and what I heard from the WAMMs was in agreement—the WAMMs told us a lot more, of course, but if a recording sounded okay on the monitors, then it would sound pretty good on the WAMMs.

For some time my wife and partner Sheryl had been asking me to design a smaller system, one that was more affordable and that we could sell in reasonable numbers, but I, from the standpoint of the great artist [heh-heh], couldn’t see it. Then, in 1985, we recorded in a very difficult hall—I had brought two different monitor speakers and they told me very different stories about what was going into the microphones and onto the tape. Neither set was telling me a very accurate story, so that when I brought the tapes home and played them on the WAMM, what I heard was totally unacceptable. It was as though the speakers were all speaking different languages. At that point I realized that, unless I developed a speaker that spoke the same language as the WAMM, I was likely to put myself in precarious situations like this in the future.

Sheryl said, “I told you so!” I had to establish the architecture of the system before I could progress on the design. By that I mean that I had to determine exactly what the user requirement for the system was and that took quite a while. When I decided upon the basic configuration, the next step was to examine the performance levels that can be achieved.

Through an iterative process you determine whether the architecture and the performance level are functioning to a satisfactory degree. In the WATT, my primary performance demand was resolving ability. Both of the monitors I had used at my dissonant sessions were speakers that most people would find musically acceptable for listening to prerecorded material, because they would tend to hide certain flaws—which was the opposite of what I needed. I required a speaker with low levels of coloration and rapid settling times as measured on the cumulative spectral-decay test.

Next I needed a speaker that excelled at resolving dynamic shading, which is one of the areas where musicians express themselves artistically. Often you’ll have two takes which are very similar to one another, perhaps even containing the same number of mistakes, but the musician will prefer one to the other from an interpretive standpoint.

My last requirement concerned soundstaging—which tells the story about your microphone placement. You have to make these decisions quickly.

Most people would add low-bass extension to this list, but I had decided that, with the architecture I had chosen, it was impossible to have large quantities of high-quality low bass. I remembered my experiences with the Quad electrostatics and realized that if the harmonic structure of the loudspeaker was true, you could surmise the performance of the recording in the low frequencies.

Phillips: Did it surprise you when they proved to be popular?
Wilson: Well, it did. In 1986, the most expensive minispeaker in the US was the Celestion SL-600, which sold for about $1600/pair. We introduced the WATT at $4400/pair. Actually, when we first showed the WATT at the 1986 WCES, we had no idea of offering it as a commercial product; we were promoting our recordings and we used the speaker to promote Mickey Hart’s Rhythm Devils recording of music from Apocalypse Now. We had the speakers out in the center of the room—and a WAMM subwoofer tucked away in the corner—and on a couple of tracks that woofers would really dish it out, which brought people into the room. A lot of them would stay and listen to other music, and then they wanted the speaker! So I had to decide whether to offer it as a product. Finally we did.

Phillips: When you decided to offer it to the public, did you rethink any of your design goals to accommodate the change in end-user?
Wilson: No, it stayed very pure. I’ve found that, as a designer, it’s important that my products express my design. I’m not market-driven, per se. I design products that I enjoy, and there are always going to be some people out there who enjoy some of the same things that I enjoy in a loudspeaker—those people constitute our market. So the WATT Series I was exactly the same as the prototype we showed in Las Vegas.

Frankly, I was surprised at the
focused soundstaging, but if, in an ensemble recording, only one instrumentalist was playing, that musician always seemed more or less centrally located. With the distance between the WATT/Puppy, that solo player would be so convincingly located to one side or the other that I would frequently leap up and inspect speaker connections on the opposite channel.

I've also rarely heard a system that transported me so physically into the acoustic of the recording venue. One evening, in a mildly foul mood, I played Emmylou Harris and the Nash Ramblers' "At the Ryman" (CD, Reprise 26664-2). As I listened to Stephen Foster's "Hard Times," I was somewhat aware of the warmth of Emmylou's breath, of how life-sized the image of her standing in my living room was, of how solid and full the backing harmonies were—'I have to have been dead not to! But what stunned me—and totally drew me out of my funk—was the tumultuous applause that greeted her performance. I looked up in shock: someone had removed my living-room wall and replaced it with 2000 people sitting in rows and clapping at me. Damn, that felt good!

Naturally, I programmed my CD player to A-B from the beginning of the ovation to the end and sat there basking in wave after wave of adulation, graciously acknowledging how moved I was by the tribute of all those fine folks. It became my reward for any onerous task: mopping the bathroom floor, emptying the cat-box, writing a review. Actually, if you'll excuse me for a minute, I could use a dose right now...

Dynamies? Lord, does this speaker

market acceptance; here was a speaker that was extremely expensive for its size and had no low-bass extension, but many people—particularly those who listened to acoustic jazz and chamber music—really appreciated the resolution and transparency of the system, which were at unprecedented levels.

Phillips: You immediately began to devise solutions to the bass-extension problem. I remember that you offered a "heard" almost immediately after the WATT's launch.

Wilson: That was a suggestion of IAR's J. Peter Moncrieff made when he heard us at the '86 WCES. We experimented with various sizes before coming up with one that provided about an additional half-octave of 220 srerdian support—which helped add some warmth.

A lot of people were buying subwoofers to supplement the WATT's sound, but even the best didn't really keep up with the WATT's speed—they did, however, add some needed low-end extension. We learned a lot of lessons from using these other subs, including how fast a subwoofer needed to be, and we had a basic architecture manifested by the height and width dictated by the WATTs. We also analyzed the bass-extension requirements of sensitive listeners and concluded that, if we could produce clean, fast sound down to 40Hz, it would be sufficient—which is also what Gilbert A. Briggs of Wharfedale Wireless Works had determined back in 1955! I knew that I couldn't get extension much below 35Hz and still retain the lightning-fast transient response that blending a woofer with the WATTs required. We also needed high power-handling capacity (for reliability), speed, and efficiency—all of which dictated the use of multiple 8" drivers with massive motor structures.

We ended up getting more than we bargained for in bass extension—Martin Collins has measured 35Hz in his room, but we just tell people that it will do 30Hz; the 40Hz figure was just to keep me honest.

Phillips: What has differentiated the successive generations of WATT?

Wilson: The enclosure has stayed the same—the geometry of that enclosure and its structural integrity are hard to improve upon. The 6.5" drivers have always had paper cones—in fact, the first three generations used the same bass driver, a SEAS unit that sounds wonderful in the midrange. I always voice a speaker by starting in the midrange and gradually working up an octave, down an octave, up another octave, down another octave—which is how I "vowel" a WAMM when setting them up in the field. We were going to use a different driver in the series IV, but we ended up using it in our new three-way system, the WITT.

The tweeter has always been an inverted dome, which has become the trademark of Focal, who make more of them than anyone else. Focal and Wilson Audio have worked very closely on the development of specific drivers—we fine-tune the magnetic structure, the pole-piece structure, of these drivers, and Focal builds them for us on a proprietary basis. The first version had a fiberglass inverted dome with a "Tube Trap" behind the pole-piece. The second version had the same fiberglass inverted dome, but had a larger trap behind the pole-piece. The third version had a different magnetic structure, but kept the larger trap. The current tweeter is a titanium inverted dome with a very large bass trap behind it.

The Puppy's drivers have been the same in each iteration. The crossover network on the WATT has been completely different on each version, to accommodate the different characteristics of the drivers. The first version had an impedance dip at about 2kHz that would drop down to about half an ohm. Occasionally that would cause problems with certain amplifiers. Series II dropped to about eight or nine tenths of an ohm, which made it easier on amplifiers in a number of ways. By the third version, we were up to about 1.5 ohms, and the reactive nature of that impedance dip was more benign than previous ones. Series 5 does not have a 2kHz dip at all! The crossover configuration is not only different in specific values, but the topology is completely different as well.

Phillips: What a minute—did you just say that there's a new Wilson loudspeaker?

Wilson: Yes, it's a single-enclosure three-way called the WITT, and it's shipping now. It costs $8888 a pair—we think it offers more than 80% of the performance of the WATT/Puppy System 5 for about 60% of the price. Everybody who has heard it is quite excited by it.

Phillips: Was there anything that might have predicted your success?

Wilson: In 1948, when I was about four years old, my parents bought a console phonograph—it even had a 9" television in it—and my sister and I would lie down on the floor and listen to 78rpm records of Hapaolng Cassidy and Danny and all of these wonderful stories. It was like magic to me. My father wasn't really able to explain how a phonograph record worked, but I do remember looking at the grooves and being fascinated.
system limn the full dynamic range. No detail is too slight to hear—this is the rare speaker that truly distinguishes between pp and ppp. On the other hand, if you want to hear a blast of raw power, this is your meat. My first exposure to the current generation of the speaker was at Audio Consultants, the Chicago-area Wilson dealer, back at the '94 SCES; Mark Wilson had invited me over to watch him “vowel” a pair into position. After the speakers were set up and we fell into the usual pattern of trading favorite cuts, I got around to whipping out my Corigliano First Symphony. The excerpt I chose started quietly, so I turned up the preamp. As the third movement ground relentlessly toward its climax, I felt that it was getting a little loud, but I really hate it when a listener stomps all over a work’s integrity by potting it down as it is supposed to be growing in authority.

Did I say authority? By the end of the movement, Mark and I were practically being pushed back in our chairs by the force of the sound. In the sudden silence at the end of the movement, I swear I heard air molecules still sizzling. Mark looked at me and asked, “Do you normally listen that loud?” Well, no. But the sound never got distorted or congested. As we left the sound room, the manager rushed in and began checking the Sheetcock seams: “I don’t know what they were doing in here, but on that side they were bulging!”

If there’s a price to be paid for every boon, then in the case of the WATT/Puppy, that price is the extent to which it will reveal everything about the chain of reproduction. I mean everything. Most wire is slower and much more colored than these speakers, so matching cables to them becomes an almost overwhelming task. I found MIT’s MH-770 CVTerminator speaker cable to be the best match given the components I had on hand, which makes a certain amount of sense since Wilson employs MIT as the umbilical between the WATT and Puppy. I’m sure there are other complementary packages as well; I didn’t have a chance to experiment with much of what’s out there.

Component matching was also a sensitive issue. “These speakers are microscopes,” one manufacturer claimed; “small stuff gets magnified until it seems monstrous.” Every time I thought I could describe the WATT/Puppy sound, I found that changing a component in the system changed their character. This means that they’re not a speaker system for the uncertain. If you’re the type of audiophile who tends to be fickle in your sonic affections, these speakers will cost you a lot more money than their purchase price as you stagger from component to component in your search for perfection.

This doesn’t mean they’re picky about what they play with. I connected them to a lot of modestly priced equipment and they performed well. In fact, the first system I listened to consisted of Audio Alchemy’s DLC, VAC’s $2000 PA 80/80,2 and McCormack’s SST-1/DAC combo—a front-end I really enjoyed, and which costs out at less than $5000. Ultimately, however, I moved on to other gear, discovering when I did so that the sound I had enjoyed was not, in fact, that of the speakers themselves, but of everything else. A WATT/Puppy system must be carefully constructed around its owner’s sonic preferences. Leaving it to a dealer or randomly choosing Class A components from Stereophile’s “Recommended Components” might well generate a reference-quality system that would still manage to disappoint.

So how do you describe a chameleon? Fast—staggeringly fast, in fact. This is a dynamic speaker that’s as quick as any electrostatic I’ve heard. It shares with ‘stats a phenomenally low level of coloration as well. Tonally neutral, it favors no one frequency range over another. I’ve heard it described as lean and lacking in low bass, but I didn’t find this to be so. Perhaps, with a rated response going down only to 28Hz, it doesn’t offer deep bass, but I couldn’t have exploited anything lower in the rooms I used it in.

The bass it does reproduce is articulate and well-defined—I have never heard more of the subtle performance details that distinguish one acoustic bass player from another. Heavy Sounds, by Richard Davis and Elvin Jones (LP, Impulse! A-9160) is one of my acid tests for bass articulation: “Summertime” is an 11-minute duet between bowed bass and drums (played with mallet and

2 Other amplifiers used to drive the Wilsons in the review period were a pair of Pass Aleph 0 solid-state monoblocks, and Audio Research D-200 and Conrad-Johnson Premier Eleven A stereo amps.
brush only) that exploits just about every
tonal possibility the two instruments can
muster. Davis has never had the deepest
bass tone; his instrument possesses a
light, almost nasal timbre, and the WATT/Puppys reflect that. Toward the
climax of the song, Davis turns his bow
around and, putting wood to the strings,
sets aswirl a cascade of overtones that
almost screech their way toward inaudi-
ibility, while Jones anchors the excursion
with muted tom tom flurries. The com-
bination of near-ultrasonic color and
woody earliness tests the resolving
power of just about any system—I would
have said any system, but the WATT/
Puppys weren't fazed by it one bit. It
remained music, intelligent and compre-
hensible, never descending into noise.

WATT price glory?
Ultimately, however, one aspect of the
WATT/Puppys' performance left me
unsatisfied. I want to be careful here be-
cause I think that they are extraordinarily
well-built; in fact, I'm not sure I've
ever heard speakers improve upon their
strengths. Yet this is not the speaker sys-
tem that I would necessarily choose to
just listen to music through, hour after
hour. If you want to throw my own
words back at me and point out that
every time I changed components, what
I had taken to be the sound of the
speakers changed—well, I'd have to ad-
mit you'd have a point.

Perhaps I never found my perfect
combination. For instance, I never
heard them with Spectral's components,
which would, seemingly, match them
strength for strength. Furthermore, if
you read my interview with David
Wilson, you'll conclude that the WATT/
Puppys do, indeed, sound exactly as he
intended. How could I fault them for
that? I don't, but I have to admit that
they never precisely engaged me. (Yes, I
know—properly speaking, that's not a
speaker's job, but the music's.)

Here's an example of what I'm talk-
ning about. Last January, a few days be-
fore the Wilson speakers arrived at my
house, Jerome Harris dropped by with a
dub of his recording session for *Hidden
in Plain View* (New World/Counter-
currents 80472-2), wanting to listen to it
through my system, which included the
Metaphor 2s. He was suddenly yanked
right out of a conversation with my wife
by what he heard. "That sounds just like
us!" he exclaimed. "I ought to know—I
was there!" Two weeks later, he drop-
ped by again with a dub of the final
mixdown, once again wanting to hear it
in a different context. The system was
essentially the same, the only difference
being that now I had the WATT/
Puppy 5s in place. Jerome was im-
pressed: "I can hear everything we did in
the studio!" I find the difference in his
comments instructive.

My buddy Ruben, a lutenist who also
plays electric geetar (as he would have
it) in a noise-rock band, maintains that
since the 17th century, instrument mak-
ers have increasingly opted for volume
over tonality. He points to the baroque
guitar, which emphasized warmth and
an over-rich (to 20th-century ears, at any
rate) harmonic signature and contrasts it
to a contemporary concert instrument
which is a lot louder and has greater sus-
tain, but at a sacrifice in the seductive
body of the tone.

Look at keyboard instruments: far
from being a parlor instrument, an un-
amplified piano these days may reach
4000 listeners at a solo concert. Yet, to
hear a late Schubert sonata on a forte-
piano is to understand how connected
the composition is to the instrument it
was composed upon—the difficulty of
really pounding out the left-hand lines,
while balancing them dynamically to the
right-hand parts, is so great that
players on modern instruments often
squander much of the passion written
into those phrases. Does the Wilson
personify a particularly modern hunger
for clarity and dynamic impact?

WATT CHU SAY!
"What," asked Charles Ives, "has sound
to do with music?" That is the question
here, isn't it? I've stated that I have never
heard *more* of what is on a recording
than I have with the WATT/Puppy;
furthermore, I have adjudged the speaker's
ally neutral. Transparent. How do I
proceed from *that* to the conclusion
that, on some level, something I
demand from musical reproduction re-
mains tantalizingly out of this speaker's
reach? Struggle as I will, I can't reconcile
this paradox. One possible answer is that
I've been programmed by our audi-
ophile vocabulary—in which the word
"accurate" is all too frequently invoked
with a slight sneer, containing the im-
plication that accuracy somehow misses
the musical point. I don't think so, but
then I'd be the last to know, wouldn't I?

But consider this: Music is a system
through which we experience profound
eotional and aesthetic reactions, yet
the mechanism by which such commu-
nication occurs is at best only crudely
understood. Stokowski claimed that
"music is by nature remote from the
tangible and visible things of life."

George Szell defined its paradoxical na-
ture by saying, "Music is indivisible. The
dualism of feeling and thinking must be
resolved to a state of unity in which one
thinks with the heart and feels with the
brain." It is, most certainly, hubristic
of me to think that I might fathom its
mechanisms simply though the con-
templation of a loudspeaker, no matter
how superb that speaker may be. Yet
that is precisely the level of examination
that the WATT/Puppy demands.

Most listeners, I imagine, won't un-
derstand what my problem is. Listening
to a speaker that possesses the levels of
clarity, articulation, neutrality, transient
quickness, and vanishingly low levels of
coloration that the WATT/Puppy 5 ex-
hibits, they'll simply goggle in amaze-
ment, gasping, "You got a problem with
*that*?" I understand this—I ask myself the
same question.

WATT'S WHAT & THAT'S THAT
But I'd be remiss if I left the story there;
it has an epilogue that throws all of my
maundering into a different light. As I
said earlier, my wife and I moved to
New Mexico after I'd done the bulk of
the critical listening for this review—
most of my conclusions and descriptions
derive from five months of listening
conducted in our Brooklyn apartment.
We disassembled the stereo several days
before moving and, although we had
music in our car driving across the coun-
try, and rigged up a makeshift stereo
while unpacking in Santa Fe, we were
without a real hi-fi for about five weeks.

Finally, when all of our books and
records were unpacked and mounds of
boxes no longer dominated our rooms,
I got a chance to install our primary sys-
tem in our new living room. I busied
myself with the minutiae of setup
because that's what audiophiles do, little
thinking that I was about to experience
a profound catharsis. My wife helped
me level the speakers and we sat down
to listen to Joshua Redman's *MoodSwing*
(CD Warner Bros. 45643-2). The in-
stant we heard that Texas tenor, so full
of breath and thick with body, our eyes
met. Two thousand miles and two time
zones disappeared—we were home.

And a speaker that can do that is
probably worth $15,000.

MEASUREMENTS FROM JA
Coupled with a very high sensitivity—
calculated at 91dB/2.83V/m (B-
weighted)—the impedance of the Series
5 WATT by itself (fig.1) is definitely
kinder on amplifiers than the earlier
versions. Its minimum value is 5.2 ohms
in the lower midrange, and the phase angle is moderately low above this region. The WATT’s reflex-port tuning frequency is revealed by the impedance dip between 35Hz and 50Hz, though the high values of the impedance peaks either side of this “saddle” have implications for the crossover to the Puppy, as will be seen later. The two wrinkles in the fig.1 traces at 15.5kHz and 23kHz indicate the presence of resonances in the tweeter’s output at those frequencies.

The Puppy, on the other hand, is a demanding load, its impedance (fig.2) reaching a current-hungry 2.4 ohms in the upper bass, although this will be moderated by the relatively innocuous phase angle in the same region. The rise in impedance above 100Hz is due to the low-pass crossover; the low port tuning is revealed by the magnitude saddle between 20Hz and 40Hz.

When the WATT is combined with the Puppy, the current demands of the woofer are imposed on those of the more benign monitor to produce the impedance characteristic shown in fig.3. Though it is overall a demanding load, the relative change in magnitude is mild. In addition, with a tube amplifier having a moderately high source impedance, the magnitude dip in the upper bass will usefully pull down the overall energy in this region.

The trace on the right of fig.4 shows the quasi-anechoic response of the WATT 5 by itself on an axis level with the top of its woofer. This is where I found it to measure flattest, and is 36" from the floor when the WATT is sitting on the top of the Puppy—a typical listening height for someone sitting in a typical chair (not a director’s chair). The response of the WATT in free space is inherently shelved-down below the upper midrange, though this region will be reinforced by the boundary effect when the speaker is on top of the Puppy. The same would be true if the WATT were used on top of a mixing console. The response is very smooth through the treble; only the two peaks in the upper octaves coincident with the impedance wrinkles are noticeable. In my own auditioning, I could just hear a slight emphasis of video-monitor line whistles due to the lower peak, but its effect was inaudible on music. Overall, I would expect the WATT’s measured response to correlate with a sound that was smooth-balanced but very revealing of recorded detail.

To the left of fig.4 are shown three traces representing the responses of the woofer and port, both measured in the nearfield, and their complex sum. The latter is the top trace and reveals the WATT to extend down to about 55Hz without the Puppy, though the lack of lower-midrange energy makes the balance lean.

Fig.5 shows how the WATT’s response changes to the sides. There is more top-octave energy apparent between 5° and 25° off-axis, suggesting that the user can use toe-in to optimally balance the speaker’s high-treble balance. In very bare-furnished rooms, however, the speaker might sound a little “wiry.” Throughout the rest of the audioband, the WATT’s dispersion is very even, something that always correlates with well-defined stereo imaging, in my experience.

Vertically (fig.6), major middle-treble suckouts appear in the speaker’s balance once you sit above the tweeter axis or below the woofer dustcap. Wes did find that he needed to sit with his ears in this region to get the best balance. As noted above, however, with normal seating, placing the WATT on the Puppy results in just the right listening height. Fig.6 also shows that there is too much top-octave energy above the tweeter axis. Do not listen to the WATT/Puppy standing up!!!

The sheer mass of the WATT/Puppy combination made it impractical to measure its overall response, which is why I have so far concentrated on the WATT by itself. Fig.7 shows the near-
field responses of the Puppy. The trace labeled "W" is the woofer, showing the expected notch in its output at the nominal port tuning frequency. The port output labeled "P," however, peaks almost an octave lower, though it does produce a broad output shelf through the midbass. The complex sum of the two outputs, taking both phase and the physical distance between the port and woofer into account, is shown in fig.7 as the trace labeled "CS." It shows that the Puppy produces a bandpass output centered on the octave region between 120Hz and 60Hz. Its quasi-anechoic response is down 6dB at 46Hz; this will be extended somewhat in-room.

The final trace in fig.7, labeled "HP," is the electrical drive to the WATT, measured at the satellite's speaker terminals when connected to the Puppy with the Puppy Tails. Though the drive signal is gently sloped down below 750Hz or so, the high bass-region peaks in the WATT's impedance result in a drive signal that reaches full level between 60Hz and 70Hz. The WATT's output will therefore significantly overlap that of the Puppy, which could contribute to the system's midbass "blump," as Sam Tellig named it. But remember spike from the tweeter. The tweeter's output, however, features a much larger negative-going overshoot. This is clearer in the step response (fig.9), which, apart from the short positive energy spike from the tweeter, features an excellent—if inverted—triangle shape. The Puppy's step response (fig.10), however, indicates that it is connected with positive polarity.

Finally, the WATT's waterfall, or cumulative spectral-decay, plot (fig.11) reveals a very clean initial decay across the band, other than short-lived ridges associated with the two high-frequency tweeter resonances mentioned earlier. This is excellent performance, correlating with the System 5's grain-free and smooth—but detailed—presentation.

—John Atkinson
“Flip flip flip... Where the heck is it?... [flip flip flip]... Got it!” What am I looking for? There, in black and white, on p.634 of J. Gordon Holt’s Really Reliable Rules for Rookie Reviewers,¹ is the Prime Directive On Loudspeaker Setup: “Never, ever, choose a loudspeaker that has too much bass extension for your room!”

Time and time again I get letters from readers who have relatively small rooms asking why they can’t get an even tonal balance from their [insert brand-name of massive, flat-to-20kHz behemoth here] speakers.

The answer is a no-brainer: If you have only a small room, the “best” loudspeaker will almost always be one with limited low-frequency extension. Not only will this reduce the amount of excitation given the lower room resonant modes; the effect of the boundaries in a small room will actually increase the amount of bass. In such circumstances, a minimonitor will actually give better, more neutrally balanced low frequencies than a full-range design. The latter will produce an exaggerated LF response that might be seductive in the short term, but over the long term the incessant boom will prove irritating. And in the small room, the need for massive sound-pressure levels does not mandate equally massive loudspeakers.

Which is why in my relatively small room—irregular in shape, it basically measures 19’ by 16.5’ by 9’—I have used small speakers as my long-term references: Celestion SL600s and ’70s, Rogers LS3/5as, Harbeth HL-P3s, Epos ES-14s, Thiel CS2 2s (okay, the Thieles aren’t so small), and most recently, B&W John Bowers Silver Signatures.² Despite their modest size, the Silver Siggins fill the room with an astonishing amount of low frequencies, flat down to 33Hz or so—as long as you don’t play them too loud.

I’m always on the lookout, therefore, for small speakers that will rival the B&W’s in transparency, midrange neutrality, and soundstaging, but that kick big booty when it comes to playing loud and proud.

The two speakers featured in this review are definite contenders. Both are stand-mounted, reflex-loaded two-ways. One is British, the other American—the English speaker engineer Phil Jones played a prominent role in the design of both.

REVIEW CONTEXT

Each of the loudspeakers was positioned for the best sound (with only one pair of loudspeakers in the listening room at a time), generally some 3’ from the rear wall (which is faced with books and LPs) and approximately 5’ from the side walls (which also have bookshelves covering some of their surfaces). Each pair of speakers sat on their dedicated stands, these spiked to the concrete floor beneath the rug/pad, and was driven by the magazine-owned pair of Mark Levinson No.20.6 monoblocks, a Mark Levinson No.333 dual-mono amplifier (review under way), or a Cary

² I use the Silver Signatures with the tweeters on the inside edges of the baffles—is away from the sidewalls—and toed-in to the listening position. This, to my ears, gives the smoothest transition through the crossover region. I have also been able to improve their definition in the lower mids by weighing them down with a small bag of lead shot draped over the top rear of the cabinet.

¹ Published in 190 parts, starting in November 1962.
Audio Alchemy DTI-Pro (old model) or a Sonic Frontiers UltraJitterbug.

Interconnects used were AudioQuest's AudioTruth Lapis x3 alternating with XLO 11 Signature; speaker cable was a doubled run of AudioTruth Sterling. All source components and preamps used in my listening room were plugged-in to a Power Wedge 116 MK.II, itself plugged-in to a dedicated AC circuit and fitted with the Power Enhancer option. The amplifiers were plugged-in to a Power Wedge 100, again fitted with the Power Enhancer.

Each pair of speakers was broken-in before auditioning by using the old Tom Norton trick of placing them face-to-face and driving them with out-of-phase, high-level pink noise for 48 hours, followed by the Burn-in Noise track on Stereophile's Test CD 3 for another 24 hours.

**AcoSTIC ENERGY AE2 Signature: $5495/Pair**

I reviewed the original AE2 loudspeaker in February 1990 (Vol.13 No.2); while I was most impressed with its dynamics and clarity, I was bothered by a forward-balanced, colored mid-range. The AE2's designer, Phil Jones, moved on to Boston Acoustics, then founded his own company, Platinum Audio. Meanwhile, Acoustic Energy's Managing Director, Steven Taylor, redesigned the AE2's crossover network and decided to offer the loudspeaker in a premium, "Signature" edition. (The standard "A" version, still available, costs $2195/pair.)

The AE2 still features a 1" metal-dome tweeter (anodized black in the Signature edition) and two small metal-cone woofers, these reflex-loaded by three narrow-diameter, 5.5"-deep ports on the front baffle. For the Signature series speaker, the drive-units are matched to close tolerances. As supplied, the tweeter dome is protected by a small wire-mesh grille. This is held in place by the drive-unit magnet and can be easily removed for critical listening. All my auditioning and measurements were performed with the tweeter "muted."

Whereas the original AE2 featured 24dB/octave crossover filters, the current Reference "A" version and the Signature use first-order, 6dB/octave electrical slopes in order to have the shortest, most direct signal path. High-quality parts are used: polycarbonate-dielectric capacitors; vitreous-enamel, wire-wound resistors; high-current, air-core inductors; and 99.99% pure silver, Teflon-insulated internal wiring. The entire crossover is potted in a resin compound to minimize microphonics.

The AE2 Signature is a striking-looking speaker. The cabinets of each pair are finished in matched wooden veneers, then sealed and hand-polished with high-gloss clear lacquer. The result is a finish that, particularly when the light strikes it just so, appears to glow translucent. As a finishing touch, on top of each loudspeaker is a Sterling silver nameplate, individually hallmarked by Steven Taylor. A nice finishing touch is the canvas bag wrapped around each speaker to prevent the lacquer from being marred in the shipping container.

The attention to detail and finish is echoed by the Signature series loudspeaker stand. Pricey at $1195/pair, each Acoustic Energy stand features two vertical pillars, each pillar a finned aluminum extrusion some 4" in diameter, inside of which is a polyethylene bag filled with lead shot. These pillars are bolted to cast-aluminum top and bottom plates; a lacquered fascia wooden panel fits down the front column. The stand top plate has four small upward-pointing cones at the corners to make contact with the speaker; the bottom plate is fitted with four carpet-piercing spikes, these adjustable from above with an Allen wrench. Each stand is 26" high with spikes and weighs about 70 lbs once assembled (according to my Health-O-Meter bathroom scales).

**Sound:** Acoustic Energy recommends setting up the AE2 Signatures with the tweeters on the outsides of the asymmetrical baffles—the speakers are supplied as a mirror-imaged pair—and toed-in so that the listener's line of sight is just down the inside face of each cabinet. The recommended vertical axis is level with the tweeter; on the Signature stands, this is 34° from the floor.

My initial impression was of very smooth high frequencies. It wasn't that the treble was excessively rolled-off—though the top octave was a little recollected—but there was an absence of HF grain that made even bright, overcooked recordings like Annie Lennox's *Medusa* CD (Arista 25717-2) sound acceptable.

There was an occasional touch of mid-treble brightness, which was very music-dependent, and a slight nasality in the upper mids was noticeable on classical orchestral music. The strings on Elgar's arrangement of the Bach Fantasia & Fugue in c (EMI Studio CDM 63133), for example, sounded just a little bit more "hooded" than they would in real life, while well-recorded female voice—Sara K.'s "History Repeats Itself" on Stereophile's Test CD 3, for example—was slightly "hooty" at times in that occasional notes sounded less well-defined, with a little more overhang, than others.

The bass was leaner than that of the B&W Silver Signatures, but extended somewhat lower in frequency. The 32Hz wallop-tone on Test CD 3 was easily audible without any obvious "doubleing" (where the presence of high levels of second-harmonic distortion makes the note more audible at the expense of a doubling of perceived pitch). This bass performance enabled the 2 Signatures really to sing on bass guitar and double bass. Check out the low-tolling, open-string, 36Hz-fundamental Ds on the Dean Peer solo bass track on Test CD 3 for an example of the kind of bass sound reproduced without, ahem, peer by the AE2 Signature.

Which brings me to the area where the Acoustic Energy beats out every minimonitor I've heard: dynamics. Whether it was on the macro level (the ability to play loud) or on the micro (the differentiation between very slight loudness changes, such as the different attack Ginger Baker uses for each drumbeat on *Going Back Home*, his excellent 1994 album with Charlie Haden and Bill Frisell, Atlantic 82652-2), the AE2 Signature reinforced the musical message by allowing you to hear what was happening, free from strain or compression.

And boy, could this speaker kick out the jams! Playing "Africa I'm Home," from Stanley Clarke's *East River Drive* (Epic NK 47489) at an average in-room level of 96-98dB, the 0dBFS kick drum produced puffs of wind from the ports that could be felt 6' away! Yet the overall sound remained clean and dynamic despite reflex winds that could probably blow out candles!

Despite the high wind velocities in the ports, no turbulent noises could be heard. By comparison, the B&W's sounded staid. And the combination of midbass power and dynamic range had not been obtained at the expense of speed or transient clarity. Many reflex speakers produce low frequencies that seem to lag behind the musical beat—this is what is meant by the common oxymoron "slow bass transients," I believe. By contrast, the AE2 boomed like a
good 'un, as was revealed when I reached for Stereophile's official test track for loudspeaker Boogielocity, James Brown's classic "Get Up (I Feel Like Being A) Sex Machine" (rereleased as part of the 1991 Polydor Star Time boxed set). Now that's what the "Repeat Track" button on the Levinson's remote control is for! (As I'm sure all you fellow owners of Levinson CD players have already discovered.)

As boogielicious as the Acoustic Energies were reproducing the Father of Funk At His Finest—their clarity allowing me to hear for the first time the kickdrum pedal squeaking on JB's "Super Bad (Part 1)"—they were beaten out by the Silver Signatures when it came to soundstage presentation. There was plenty of depth apparent. The awesome Hall of the Grail scene in the Barenboim Parsifal (Teldec 74448-2), where the mighty bells tolling out the consecutive falling fourths of the "Gralsglocken" leitmotif, for example, defined a huge acoustic space with seemingly endless depth. But there wasn't quite the sense of lateral image precision typical of the B&Ws. Images were a little pulled to the sides, giving a U-shaped soundstage. But this is a minor failing, offset by this small speaker's ability to "Say it Loud..." (© The Hardest Working Man in Show Business).

Overall, I preferred the B&Ws—but it was a close-run thing!

Enter the Cary: With the little single-ended 300SEI amp driving the AE2 Signatures, things got a little confusing. Voices became both more tangible and thrown more forward in the mix, while every instrument seemed to become more of an entity unto itself while making more musical sense. Bass guitar, however, acquired a rather detached, "hummy" quality that I quickly tired of, and vocal sibilants sounded occasionally a little too spitchy for comfort. Overall, though, for those who love the sound of human voice and who aren't bass guitarists, the match seemed one made in heaven. The high sensitivity of the Acoustic Energies helped out the voltage-swing-challenged Cary in a big way. Check it out.

Measurements: As I found with the single-ended Cary, the Acoustic Energy will play reasonably loud with only a few amplifier watts, reaching SPLs in the mid-90s without discomfort: I estimated its B-weighted sensitivity as 88dB/W/m, but this figure is compromised by the frequency response on the tweeter axis (see later). With an impedance magnitude that drops to 4.3 ohms in the lower midrange but stays above 6 ohms over almost all the rest of the audioband, the AE2 Signature is a relatively easy load for an amplifier to drive (fig.1). The double peak in the bass is typical of a reflex design, with the minimum at 43Hz indicating the tuning frequency of the tiny ports.

The major wrinkle in the traces at 25.5kHz corresponds to the metal tweeter's "oil-can" resonance, while the...
minor wrinkle just below 400Hz—not visible at the scale at which this graph is reproduced here—is probably due to a cabinet resonance of some kind. This was confirmed by sweeping a sinewave oscillator through this region while I listened to the cabinet’s vibrations with a stethoscope. Each of the cabinet walls could be heard to vibrate strongly between 350Hz and 370Hz, particularly the back panel. Though the musical note F# at the bottom of the treble staff lies in the center of this frequency region, and that note could be heard to sound a little sour with the semitone-spaced sinewave track on Test CD 3—the resonance “pulls” the pitch of the perceived sound a little off-key—no problem could be heard on music.

Fig. 2 shows the individual responses of the two drive-units on the tweeter axis at a microphone distance of 50°, together with the nearfield outputs of the woofers and ports. The actual crossover frequency can be seen to be around 4kHz, with an octave or so of overlap. The rolloff of both drivers is rather untidy, with acoustic slopes that appear to be a little less than 12dB/octave. Despite the use of a metal-cone woofer, there are no energy spikes in the woofer’s treble output that could be laid at the door of cone-breakup modes.

The woofer’s response shows the expected null at the approximate reflex port-tuning frequency—the back pressure from the resonance effectively prevents the woofer cone from moving, with all the output at this frequency consequently coming from the port—with the port output peaking in the same region. Notice, however, that the port output features sharp, strong peaks in the low treble, at 1.1kHz and 2.2kHz. These are presumably due to strong pipe resonances in the ports; I don’t think it a coincidence that the farfield woofer output features a sharp notch at exactly the same frequency. While I could hear the 1.1kHz mode as a whistle coming from the ports with a pink-noise signal, particularly when the tweeter was disconnected, I was not aware of any problem playing music. Fortunately for Acoustic Energy, the ear is more tolerant of narrow response notches than of narrow peaks.

But in fig. 3, which shows how all

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5 Other than impedance, all acoustic measurements were made with the DRA Labs MLSSA system and a calibrated B&K 4906 microphone. To minimize reflections from the test setup, the measuring microphone is flush-mounted inside the end of a long tube. Reflections of the speaker’s sound from the mike stand and its hardware will be sufficiently delayed not to affect the measurement.
Fig.4 Acoustic Energy AE2 Signature, horizontal response family at 57°, normalized to response on tweeter axis, from back to front: differences in response 90°–5° off-axis on tweeter side of baffle; reference response; differences in response 5°–90° off-axis on woofer side of baffle.

these individual responses sum on the tweeter axis in the far field (averaged across a 30° horizontal window), a large notch appears in the crossover frequency. Because the tweeter is to one side of the twin woofers, the design axis will also be to one side. Fig.4 shows the differences introduced by moving to the AE2’s sides, with the tweeter-side changes plotted to the rear. Although it is hard to see from this graph, the crossover suckout deepens immediately off-axis on the tweeter side of the baffle, but fills on the woofer side. This can be seen from fig.5, which shows the response 20° off-axis on the woofer side. Other than the sharp notch at 1.1kHz, the balance is smooth, though the treble is slightly shelved-down on this axis. This is the reasoning behind Acoustic Energy’s recommendation about putting the tweeters on the outside edges. The user can also fine-tune the overall high-frequency balance by experimenting with toe-in.

To the left of figs.3 and 5 is shown the complex sum of the nearfield woofer and port outputs. As expected from my auditioning, it is a little overdamped but offers quite good LF extension, with a -6dB point of 45Hz. The high peak at 25.5kHz is due to the metal-dome tweeter’s primary resonance. Though it looks alarming, its frequency is well above the limits of my hearing, at least. (In the mornings, my sensitivity extends up to 16.5kHz, which is about typical for someone my age, 47.)

Fig.6 shows the response changes introduced by moving above and below the AE2 Signature’s recommended axis. Though the crossover notch fills in away from the tweeter axis, the upper mid-range loses energy due to destructive interference between the two woofers. This reinforces Acoustic Energy’s choice of the tweeter being the optimum vertical axis.

Once I had the AE2s optimally set-up, I found their perceived tonal balance to be neutral. This is confirmed by fig.7, which shows the speakers’ spatially averaged response in my room.6 The balance is pretty flat, with just a slightly forward midrange evident. If you ignore the peak at 63Hz, which is a residual room mode that has not been removed by the spatial averaging, the bass region can be seen to be actually shelved-down slightly, which correlates with my feel-

6 For my in-room spectral analyses I average six measurements at each of 10 separate microphone positions for left and right speakers individually, giving a total of 120 original spectra. These are then averaged to give a curve that, in my room, has proved to give a good correlation with a loudspeaker’s perceived balance. I use an Audio Control Industrial SA-305A spectrum analyzer with its own microphone, which acts as a check on the MLSSA measurements made with the B&K mike. I also used the Gold Line DSP-30 automated spectrum analyzer (currently under review).

Fig.7 Acoustic Energy AE2 Signature, spatially averaged, 1/3-octave response in JA’s room.

Fig.8 Acoustic Energy AE2 Signature, step response on tweeter axis at 50° (5ms time window, 30kHz bandwidth).
ing that the bass region sounded a little lean.

But note that reinforcement from the room means that useful bass is present down to the 32Hz band. Below that frequency, however, the use of a reflex alignment means that the speaker’s output drops like a stone.

In the time domain, the AE2’s impulse response (not shown) is overlaid with ultrasonic ringing from the tweeter, while the step response (fig.8) reveals that the tweeter is connected with negative polarity, the woofers with positive. Because the drive-units are not vertically aligned, the opposing-polarity connection aims the main response lobe to the woofer side of the baffle. Reversing the tweeter polarity still gave a notch on the tweeter axis (though lower in frequency), but now the main response lobe was off-axis on the tweeter side.

Finally, the Acoustic Energy’s cumulative spectral-decay, or waterfall, plot (fig.9) showed an initially clean decay, but with then some hash developing in the mid-treble, this possibly due to woofer-cone modes. Note that the notch at 1.1kHz is associated with the release of delayed energy at the same frequency.

**Conclusion:** At $6690/pair including the excellent stands, Acoustic Energy’s AE2 Signature is not intended for those who have to account for every penny. However, it is both a superb-sounding loudspeaker and a superb-looking piece of furniture. It performs equally well on rock and classical musics, and offers a more dynamic sound than the even more expensive B&W Silver Signature. If, like me, you’re stuck with a relatively small room, the Signature edition of the AE2 might be all the speaker you’re likely to need.

**PLATINUM AUDIO SOLO:**
$2497.50/PAIR
The Solo is the smallest in the debut range of loudspeakers from Platinum, a new New Hampshire company founded by loudspeaker engineer Phil Jones. Jones, whose track record includes stints at Acoustic Energy and Boston Acoustics, has long been involved in the quest to get high, distortion-free sound-pressure levels from small speakers. He was a pioneer in the reinvention of the metal-cone woofer in the mid-’80s; the acoustic notch filters to be seen in front of the tweeters in Boston Acoustics’ Lynnfield-series speakers were also his idea.

The Solo appears to be a fairly conventional-looking, reflex-loaded two-way mini. It features a metal-cone woofer with a radiating diameter of about 4”, this terminated with a rubber half-roll surround. The cone has some concentric rings molded into it. Mounted above the woofer on the front baffle is a 1” tweeter, with a protective “phase-plate” in front of the metal dome. No frequency response is specified, Platinum saying that “The industry standard is to publish frequency response data based on anechoic chamber...measurements. We don’t know anyone who listens to music in this environment. Frankly, it sounds dreadful.” The 1995 Audio Equipment Directory, however, lists 40Hz–20kHz, ±3dB, which is fair considering the Solo’s size.

The cabinet rear- and side-walls are finished in an attractive wood veneer, with the top and bottom panels high-gloss black. These are radiused at the front and overlap the front baffle by an inch at the center. The black wire-mesh grille has foam inserts to try to minimize reflections from these acoustic obstructions. The crossover is carried on the inside of a heat-fin-equipped black metal panel inset into the rear panel. This also carries at its top the flared openings for the two 1.5”-diameter reflex ports. One is 6” deep; the other is blocked with foam 4” in.

The black-crackle–finished Platinum Pedestals are similar to the very expensive Acoustic Energy stands but use flat steel bottom and top plates. Two steel cylinders are filled with lead shot (recommended), or a mixture of lead shot and sand (which is what I used). The result was acoustically inert. Four knurl-grip spikes can be adjusted from above to level each at a 25”-high stand and prevent it from rocking. The speaker can be coupled to the stand top plate with rubber feet, cones, or bolts.

**Sound:** After some experimentation, the Solos were placed on their stands in what turned out to be pretty much the same positions as the Acoustic Energies, well away from the room boundaries. The stand puts the speaker’s tweeter 36” from the floor, this listening height recommended by Platinum in their handbook. I experimented with both the rubber feet and the optional cones to couple the Solo to the stand top plate. It was the cones that stayed, the sound losing out on maximal clarity with the compliant feet. (Your sonic mileage may vary.) With the cones, the speaker and stand were as solid and inert as a rock.

Before I get well stuck into a discussion of the subtleties of the Solos’ sound, you have to understand one thing: Phil Jones is a bass guitarist. Oh, and a second thing: so is Platinum’s Sales Manager, Geof Bates. Both are aficionados of the thunder-thumbed, lightning-licked power-plucking techniques endemic among thoroughly modern bassists. When you hook up the speakers and reach for a record from the Brothers Johnson, or Larry Graham, or Bootsy Collins, the Solos sing’n’swing in the lows. “All that bass coming from those little boxes?” was a common reaction to the pint-sized Platinums.

One of the reasons I wanted to include the Airtor Moreira and the Gods of Jazz track “Nevermind” (from Killer Bees, B&W Music BW041) on Stereophile’s Test CD 3 was to pay tribute to bassist Stanley Clarke. Stanley’s double-bass solo on this track may be recorded close, but I think it’s the best-recorded jazz double bass I’ve heard: round, deep,
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response, the off-axis treble "horns" would have resulted in a balance that would have been too bright. The apparent off-axis peaks in the high treble in fig.13 are also due to on-axis suckouts filling to the speaker's sides. This can also be seen in the Solo's vertical dispersion plot (fig.14). This graph also confirms that the choice of vertical listening axis is quite critical, a deep suckout appearing at the 2.5kHz crossover frequency if you sit more than 10° above or below the tweeter axis.

Fig.15 shows that in my listening room the balance is basically flat, but with slight lacks of energy in both the lower mids and in the crossover region. The latter will make the speaker sound a little polite; it also reveals that the filling-in of the on-axis suckout is not as efficient as it could have been. But look at the lows! Verifying my small-room/ small-speaker thesis even more than the Acoustic Energies or B&Ws, the Solos in-room are flat down to 32Hz, and even make a brave try at reproducing the 25Hz band!

In the time domain, the step response (fig.16) indicates that the Platinum speaker is not time-coherent. As well as the tweeter being connected in inverted acoustic polarity while the woofer has a conventional positive polarity, the woofer output follows the tweeter by about 0.4ms. The waterfall plot (fig.17) is generally clean, though a slight ridge of delayed energy can be found at the 4.3kHz cursor position.

Conclusion: The Platinum Solo is a must-audition speaker for the bass-lover with a small room. Yes, it does need a lot of amplifier watts to come alive; and yes, at a hair under $3000/pair with its essential stands, the perceived value is on the low side; and yes, it will need careful matching with the room and system to avoid excess midbass bloat. But when everything floats its way, the Solo is a serious contender. Recommended—Platinum's Solo is a great start for a new speaker company.

And for you fellow bass players out there: If Phil Jones can do this with a woofer with a 4" cone, what will the bass-guitar speaker he's working on be capable of? Warn your neighbors—and their neighbors!

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Stereophile, November 1995
To echo Audio Cheapskate Sam Tellig, who was in turn paraphrasing Thomas R. Marshall, what the world needs is a great $299 CD player. Certainly there’s no shortage of expensive units vying for your attention—most of them consisting of separate transports and D/A converters.

Sam, of course, has often advised against spending big for CD playback. That’s an easy recommendation to make if you have a bazillion LPs and consider CD to be a secondary (and inferior) program source. There was a time when I would have agreed with Sam’s low opinion of digital, but no longer. Neither does Madrigal Audio Laboratories, if we can judge by the fact that they make some of the best—and most expensive—CD playback devices around.

When they introduced their Mark Levinson No.30—now the No.30.5—its price put it out of reach of any but the most affluent or debt-tolerant audiophiles. Add their No.31 transport, and you have a terrific combination which, unfortunately, turns up mostly in homes with four-car garages and security gates. And when the less-expensive No.35 was introduced, we were still talking champagne and Brie.

Now, however, with the introduction of the No.36 (and the companion No.37 transport, not yet received for review), Madrigal has a CD playback combination available to the merely terminally obsessed among us. You can, of course, reduce your outlay more—a lot more—and still get quality digital replay. But if you want your less-pricey thoroughbreds to come from the Madrigal stable, they will bear the name “Proceed,” not “Mark Levinson.”

Features & Design
With inputs for every popular type of digital connection, the No.36 is ready for use with any transport or other digital source. The selected input signal fades in slowly to prevent extraneous switching noise. A front-panel LED display indicates the status of the selected input. The No.36 also may be programmed to display an appropriate name for that source—CD, DAT, DCC, or what-have-you. Other front-panel functions are Polarity, Teach, IR, Mode, Display Intensity, and Standby. Polarity, as you might expect, inverts the polarity of both channels. Teach IR allows the No.36 to program an outboard learning remote to control its functions (no remote is provided with the No.36, but the remotes furnished with other Madrigal products are suitable). And Mode selects or turns off the digital output and serves as a control switch during processor setup (naming the inputs).

In addition to its inputs, and balanced and unbalanced outputs, a rear port labeled “Master Communications Port” allows the No.36 to be linked with other 30-series components such as the No.37 and ‘31 transports, No.38 and ’38s preamplifiers, and No.33-series power amplifiers, further expanding functional flexibility.

One of the HDCD® specifications calls for some form of level control to compensate for the 6dB difference in peak output level between conventional CDs and decoded HDCDs. The No.36 may be set up to do this automatically (Auto mode), in which case it drops the level of standard CDs by 6dB in the digital domain to match the average perceived level of HDCDs. In its Manual mode, it feeds the unaltered signal to the analog outputs, meaning that you must boost the preamplifier level by 6dB. Madrigal strongly prefers the latter, analog-domain level change as the most sonically transparent. If you use the No.36 with the most recent versions of the operating software for either the No.38 or ’38s preamplifier, the communications link referred to in the preceding paragraph will automatically trigger this level change in the preamp when the No.36 senses an HDCD. In my case, since I used a preamp from a different manufacturer, I used the manual mode on the No.36 and made the level change myself at the preamp. (Incidentally, the No.36 is delivered in the Auto mode—with the level change made digitally and internally—because of HDCD requirements. This can be easily changed to Manual mode by the user.)

Madrigal makes much of the fact
that the No.36 uses the new Pacific Microsonics PMD100 HDCD, 24-bit throughput, 8x oversampling HDCD decoder/digital filter chip, which is said to be inherently superior, sonically, to previous digital filters even when used with conventional CDs. The overall resolution of the No.36 is limited to 20 bits by its D/A converters, two per channel operating in a balanced configuration. (We should never forget, with manufacturers throwing references to 20- and 24-bit resolution around with abandon, that higher-bit converters can never recover more than 16 bits from CDs—which are inherently limited to that resolution unless some kind of noise-shaping/rediithering has been used in the mastering process. They simply make it more likely that we'll get the full benefit of those 16 bits).

The No.36 also makes use of something called a “smart” FIFO (First In, First Out) buffer to minimize jitter. FIFOs are basically a way of re-clocking the incoming data with high precision, minimizing jitter that may be inherent in the incoming signal, and are not unusual in high-end D/A converters. But if the FIFO is too small, the buffer can either overflow with a subsequent loss of data, or be under-filled with a resultant need for additional error correction. If the buffer is large, there may be an unacceptable time delay (okay for audio but unacceptable with the audio signals on a laserdisc). With the No.36's “smart” FIFO, the data rate of the buffer is controlled by software that tracks the signal's long-term data rate. The amount of data in the buffer memory will therefore never approach the full or empty states. As the output data clock can be made to be of very high stability and accuracy, any time variations in the received data clock—jitter—are simply ignored. Madrigal claims less than 20 picoseconds of jitter for the No.36.

This “smart” FIFO operates at the 44.1kHz sampling rate of CDs and laserdiscs and the 48kHz sampling rate of DATs. Though the No.36 will lock onto and decode the 32kHz sampling frequency proposed for digital satellite transmission—the latter little used and of no real concern in any event for high-end reproduction—the FIFO buffer is not functional at this rate.

Elsewhere, the No.36 shunts unselected digital inputs to ground to minimize interference. The internal circuitry is also fully balanced in both analog and digital (unbalanced digital inputs are converted to balanced before any processing is performed).

**Review System**

The system used with the No.36 consisted of a Denon DP-S1 transport, Rowland Consummate preamplifier, Carver Research Lightstar amplifier, and Energy Veritas v2.8 loudspeakers. The primary digital link was either Kimber TGD1L or AGDL coaxial. TARA Labs Master RSC interconnect linked the Levinson converter to the preamp. The preamp-to-power-amp interconnects were Cardas Hedlinks, the loudspeaker cables were Monster M1.5s, tri-wired.

**Sound**

When I first put the Mark Levinson No.36 in my system, the Levinson No.35 D/A converter had been a long-term resident there. My initial impressions were that the No.35 was a little more open and sparkling on top—though those who tend not to like this quality may refer to it as “crispess.” But I had the same impression of the No.35 when I compared it with the original No.30 (Vol.16 No.11), so the No.36 was certainly in good company.

Most of my listening to the No.36 was done in its unbalanced mode. Direct comparisons between unbalanced and balanced modes in my system resulted in no significant differences.1 If I thought I heard anything, it was perhaps—just perhaps—a slightly more full-bodied sound in the unbalanced configuration. But it was a very elusive thing. Similarly, I used the coaxial digital input (ICCA) for most of the auditioning. The differences between coaxial and ST optical were subtle and about what I've observed in the past. The coaxial—with the Kimber digital cables—was slightly more immediate and sparkling, the ST a little softer and sweeter.

In any mode, the longer I listened to the No.36, the more I liked it. When the No.35 went back to the manufacturer, I had some initial separation pangs, but they lasted about two days. The No.36 picked up the slack without missing a beat. I've used it not only in the system listed above, but also as the primary signal source in every review I've done in the past several months—both for Stereophile and for the listening-room portions of my reviews for the Stereophile Guide to Home Theater. It has not been a limiting factor in any of these reviews.

How do I describe the sound of the No.36 without describing the sounds of the components with which I used it? Only with great difficulty. The bass was deep and powerful through the Energy loudspeakers, full-bodied and extended through the KEF Reference 107/2s, and tight and punchy with the Thiel CS7s. From the solid bottom-end whack of the drums on Dafos (Reference RR-12 CD) and the bite of Dean Peer's bass on Travelogue (Fahrenheit FR2451), to the low-end extension of the organ on Jean Guillou's organ transcription of Musorgsky's Pictures at an Exhibition (Dorian DOR-90117), I found nothing to criticize. And if the top end of the No.36 had seemed a bit softer and sweeter in my initial exposure to it, the crisper-sounding No.35 was now just a memory: The No.36 revealed itself to have all the subtlety and detail I could hope for, while never sounding aggressive or harsh (except on the worst recordings).

But as with the frequency extremes, the sound of the No.36 through the midrange—including soundstaging and depth—appeared to be pretty much that of the rest of the system. It never imposed anything on the sound that I could point to and say “Ah—ha—that No.36 sound, again.” It simply did not call attention to itself.

**High Definition Compatible Digital**

As to HDCD, the performance of the No.36 remained top-class. Pop an HDCD into the transport, and the letters “HDCD” light up the No.36's LED display screen. But color me undecided when it comes to HDCD vs standard CD. To date, there's simply not enough material available (make that almost none) in both formats to make a really intelligent comparison. Sure, the HDCD recordings I've heard have been uniformly terrific in sound. But they've been excellent with and without decoding. Comparisons between their uncoded or decoded playback are not only invalid—because the coding results in subtle changes to the sound of an uncoded disc over that which might be expected from a conventionally mastered one—but also nearly impossible to make. You can't shut off the HDCD processing in any HDCD decoder I know of, and comparing the modes using two processors—one HDCD, the other not—requires that the processors be otherwise identical: an impossible condition to meet.

Will HDCD catch on? A lot depends on what happens over the next year in the development of DVD, which promises a new, high-resolution format that

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1 This is consistent with my past experience. In an environment with long interconnect runs and a lot of RF (downtown New York, maybe), the advantage of balanced lines might be more evident. For most listeners and with modest equipment, however, I'm not convinced that it justifies the complication and expense.
Technobabble.

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might just revolutionize audio software. But it's not available now, and HDCD is, if only in limited supply. All I can say is, when I switch from a cross-section of my best-sounding standard CDs to the small population of HDCDs now in existence—and given that I'm not talking about identical program material, but only general overall impressions—the clouds do not part, and the sun does not emerge to cast life-giving light on the fertile plains. When we get our hands on an HDCD encoder/ADC, so we can compare an original source to an HDCD recording of it—and perhaps in comparison with a first-rate conventional digital transfer of the same material—then we'll talk.

Comparisons: Theta, Spectral, Sonic Frontiers

Though it's hard to pin down a specific level of performance with any given component and state that this is the point at which noticeable improvements in sound quality come only with precipitous increases in cost, the No.36 is as good a point as any. Though some will set that point much lower, I think I can say with assurance that the No.36 is definitely on that part of the curve beyond which incremental improvements come at a stiff price.

The only way to be sure, of course, is to compare the No.36 directly with a variety of other processors. With the Denon transport's two coaxial digital outputs and the Rowland preamp’s precise and storable input level settings (the No.38 and '38s also have these capabilities), I was uniquely positioned to make these comparisons. Material could be played back and compared long-form, or instantly switched at matched levels. The latter capability required no extraneous equipment beyond the basic system itself. It was not a blind comparison, but was otherwise tightly controlled.

I compared the No.36 directly with the Theta DS Pro Basic III, the Sonic Frontiers SFD-2 Mk.II, and the Spectral SDR-2000 Professional D/A converters. Except for the Sonic Frontiers, which I auditioned in both its balanced and unbalanced modes, these comparisons used unbalanced connections. The digital feed was again the Denon.

First up, the Theta DS Pro Basic III, a processor costing approximately half as much as the No.36. How did it differ? First, it's fair to say that the Theta is a superb D/A in its own right, with good detailing, depth, and a lack of any irritating qualities—nothing artificial or off-putting about the sound of this converter. If I were shopping in this price range, I'd put the Pro Basic III high on my list of candidates to audition.

What, then, do you buy with the No.36 that you don't get in the Theta? The No.36 had a quality of focus—call it clarity, transparency, inner detail—which the Theta cannot quite match. The soundstage was just a little less tightly defined with the Theta; multiple sources within the stage had less space between them. Solo voices and instruments were just a little more “there” on the Levinson. At the top end, the No.36 had more air and was more open. The difference wasn't mind-bending or even close to it, but it was audible. And while I heard no inherent difference in depth between the two units, this added openness at the top added more space to the sound of the No.36; ambiance, in particular, was more convincingly rendered.

At the bottom, however, it was a different story. As I went back and forth between the two processors, I initially heard no notable differences. But with continued listening, the Theta began to pull ahead. Though both processors were comparable in extension, the Theta sounded tighter and more detailed. The difference, again, was not enough to have me dancing in the streets, but I have to give the Theta the nod in its portrayal of the bottom octaves.

Next up: the Spectral SDR-2000 Professional HDCD D/A processor. RH salivated over this processor in Vol.18 No.5, and this was my first chance to hear it in my system. He did not exaggerate. It is clearly a Class A processor; it may even be the best processor in Class A, though I haven't had the opportunity to compare it directly with the Mark Levinson No.30.5, which isn't exactly chopped liver. [When I did this comparison, I found the Spectral to edge ahead in sheer coherence of its soundstage presentation, though its HF balance sounded a little too filled-up in the context of my system.—Ed.]

At first I found the differences between the SDR-2000 and the No.36 to be subtle—less notable than the differences between the No.36 and the Theta, above. Shortly, however, two primary differences crystallized. First, there was an increase in high-frequency air with the Spectral, combined with a boost in clarity and fine detail. This came without any of the corresponding edginess or roughness that often ride along with enhanced definition. (RH's review measurements indicated a very small top-end rise in the Spectral's frequency response that might account for this, though at +0.3dB at 20kHz, it doesn't seem terribly significant—and I can't hear 20kHz in any event.) And second, the Spectral was leaner through the upper bass and lower midrange. Riding on the coattails of these primary differences was an increase in soundstage precision, in lateral focus and depth. This improvement struck me as a result of the tonal changes, not an independent enhancement.

After a period of familiarity it was hard not to appreciate what the Spectral did for the sound of CDs, from the subtle percussive details on Mokave's Afriqúe (AudioQuest AQ-CD1024) and The All Star Percussion II (Golden String GSCD 013), to Branford Marsalis's ethereal saxophone on the soundtrack from Sneakers (Columbia CK 53146), to the separation of vocalists on recordings as dissimilar as the King's Singers' Good Vibrations (BMG Classics 60938-2), and Postcards (Reference RR-61CD).

Stated this way, these differences sound dramatic. They weren't. The more I listened, the more obvious they became—and the more I agreed with RH's conclusions. But the No.36 was very close. It was just a bit soft-sounding next to the Spectral. In one respect, however, I did prefer the No.36. Its slightly greater warmth sounded more natural with the human voice. The Spectral may have been a hair better defined at the very bottom end of the spectrum, but I wouldn't base any purchase decision on the bass differences between these two excellent processors.

Which would I buy? If money were no object, the Spectral. The more I listened to it, the better I liked it. But at more than twice the price of the No.36, it had better be better. The fact that the differences are there will be of significance to those with the resources to take advantage of them. But I'd certainly be more than happy living with the No.36. The important point is not how good the Spectral is (and it is good), but rather just how close the No.36 is for half the price.

At $5295, the Sonic Frontiers SFD-2 Mk.II is somewhat more expensive than the No.36, but of the three processors compared here, it's closest in price and a logical choice for a face-off. Again, the match was a close one, but not without noticeable differences. The Sonic Frontiers had a slightly more powerful low end, but the No.36 was noticeably tighter and better-defined in this region. The fuller bottom gave the Sonic Frontiers an appealing warmth; next to the No.36, it was richer and fuller on vocals—the one area where I definitely preferred it. In the upper range, the
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No.36 had a more subtle, airy treble. The difference didn’t jump out and grab me, but percussion and other instruments with strong high-frequency overtones were more finely shaded on the Levinson. On the other hand, through the low and mid-treble, the Sonic Frontiers was more vivid, more “there.” I never found it to be unnaturally bright in this region, though here the differences with the No.36 were most obvious. More often than not the Frontiers added a subtle but effective presence to the sound. There were few, if any, differences in depth and soundstaging—but to the extent that there were, I attribute them primarily to this small spectral shift.

When I switched to the balanced mode on the Sonic Frontiers, the sonic differences between it and the No.36 became even more subtle. The contrasts were noted in the same areas, and I would not significantly change my observations.

On balance, I have a tough time declaring a preference between the Sonic Frontiers and the Levinson processors. I liked the good old “palpable presence” of the SF, and the top- and bottom-end detail and definition of the No.36. I can’t imagine anyone being unhappy with either, but of course definite preferences will develop depending on the individual listener and the system. If they fit your budget, you should definitely hear, and consider, both.

MEASUREMENTS

RH generated the test-bench measurements and provided me with the data after I finished my listening tests. The Mark Levinson No.36 has an output of 1.85V (left) and 1.84V (right), unbalanced (3.69V, L&R, balanced) when decoding a 1kHz, 0dBFS (full-scale) sinewave. Its output impedance measured 7 ohms unbalanced, 13.4 ohms balanced—this processor should be able to drive any commercial preamplifier and cable with no adverse effects. The No.36 was non-inverting in its unbalanced mode, with pin 2 positive in the balanced mode. Its DC offset was 0.2mV in the left channel, 0mv in the right, unbalanced (balanced: 0.2mV left, 0.1mV right).

The remaining measurements were taken from the balanced outputs, unless otherwise noted:

The No.36’s frequency response was very flat (fig.1). The top curves indicate the normal frequency response, the bottom the de-emphasis error. The latter would matter on only a small percent-

age of discs; most don’t use pre-emphasis. Nevertheless, the No.36 will play such pre-emphasized discs with vanishingly small response deviation. The Levinson’s crosstalk (not shown) is outstandingly low—so low, in fact, that at better than -120dB across the band, it is of little more than academic interest.

Fig.2 shows a decoded -90dB, 1kHz dithered sinewave signal. The only artifacts worth noting here are at 120Hz and 240Hz—clearly power-supply noise. But they are below -120dB! Using the same type of spectral analysis, fig.3 shows the result of the Mark Levinson decoding a track of "digital silence" (all data words zero) out to 200kHz, with first-rate results. Again, the very-low-level power-supply noise is visible—and little else.

Fig.4 shows the fade-to-noise with dither, indicating superb linearity down to the measurement limit at -120dB. In fact, while we’ve measured D/A converters with slightly less linearity error at -80 and -100dB (the No.36 is off by an inconsequential 0.5dB or so at those points), I have not seen another D/A converter with so little error at -120dB.

The plots in figs.5 and 6 show the results of the Mark Levinson decoding a 1kHz, undithered sinewave at -90dB, with 16-bit and 20-bit resolution, respectively. Both results are superb in both waveshape and absence of noise, with the classic step-appearance of the 16-bit result clearly evident, as it should be.

Noise modulation as a function of signal level vs frequency is plotted in fig.7. The results shown here are for six different, progressively lower signal levels decreasing from -50dB to -100dB. In theory, the more tightly clustered the results, the better. The clustering here is relatively poor as high-end D/A converters go; yet the overall levels indicated are generally 10dB or more lower than those in the converters we’ve tested that.

Stereophile, November 1995
have performed best on this measurement. Should the No.36 be criticized because it demonstrates dramatically lower noise, at the expense of the best clustering on this test? I think not. In any event, I tend to be conservative in attempting to relate the result of this test to a converter's audible performance. Below a certain threshold—a threshold I suspect is well above the result here—that relationship may well disappear.

Feeding a full-scale combined 19kHz +20kHz signal into the No.36 and performing an FFT analysis of the output results in the plot in fig.8: the artifacts are very low, comparable to the best we've measured.

The FFT of the Meitner LIM Detector output, an assessment of the No.36's jitter performance, is shown in fig.9. I've shown only the result with a 1kHz, 0dBFS sinewave input; the results with a -90dB, 1kHz sinewave, and with an all-zero input, were essentially identical, except that the spikes at 16kHz and 18kHz disappear into the noise. This is a very clean result. The major jitter component is just under 6kHz. I suspect that the audible result of this—and of the other isolated artifacts indicated—is nil. At least, I'd be unwilling to draw any conclusions unless I could hear an otherwise identical D/A converter exhibiting no artifacts at all—an unlikely circumstance. The RMS jitter of the No.36 measured 50 picoseconds and was independent of signal level. While this is higher than the specified 20ps, it is nevertheless one of the best results we've measured.

The measured performance of the No.36 is superb, consistent in every way with the listening tests.

CONCLUSIONS
What can I say? Run out and buy the No.36! That would not be bad advice if you have the price of admission. It certainly must be heard, even if only to hear what's possible in today's best D/A converters. Make no mistake: the No.36 can compete in that company. [And just to add icing to Tjin's cake: after I purchased the Mark Levinson No.30.5, I spent some time comparing it with the No.36. The '96 gets 95% of the way to matching the awesome '30.5—at one-quarter the price! All it lacks is the ultimate low-frequency authority and soundstage definition.—Ed]
I've always been suspicious of audio products with novelty appearances. Such products seem to appeal to the gadget freak or status-oriented "hi-fi buff," not the serious music listener. Although I admire innovative aesthetic design—the Mark Levinson No.30-series products come to mind—some audio products put the emphasis on appearance rather than on musical quality. Function should never follow form.

Nonetheless, there's no reason why high-performance music-reproduction equipment must be housed in large, square chassis with sharp corners. Indeed, one of the reasons high-end audio doesn't reach a larger audience of music lovers is the often industrial appearance of the products. Meanwhile, many audio components aimed at interior decorators don't measure up in the listening room.

Which brings us to the most unusual-looking audio product I've ever reviewed: the Encore Pyramid 1 DAC digital processor. If you've seen the Luxor Hotel in Las Vegas, you know what the Pyramid 1 looks like, right down to the light at the top. (Encore claims that their design was finalized before the Luxor was built.) But is the Pyramid 1 DAC a mere novelty unworthy of serious consideration, or does it prove that musical performance and unconventional appearance are not necessarily mutually exclusive?

ENCORE

Encore was founded in 1988 by Daric Laughlin and Mike Fessler, both aerospace engineers with more than a dozen years' experience designing sophisticated electronic systems (including parts used in the Space Shuttle). The company designs a full line of products, some of which are hand-built in limited numbers by Daric and Mike. At CES demonstrations, Encore has consistently produced good sound, in my experience.

The Pyramid 1 DAC is a pyramid made from black pearl Corian measuring 13" at the base and 7" in height—dimensional ratios identical to those of the Great Pyramid at Giza—and topped with a clear Lexan tip that glows blue when the unit is powered.

All of the Pyramid 1's switches, inputs, outputs, and status indicators are mounted on a flat panel set into the pyramid's rear. The only break in the apparently monolithic enclosure is a front-panel HDCD® logo and HDCD-indicating LED, both required by the HDCD license. The pyramid's bottom surface and rear panel are slotted for ventilation. Although the scaled structure doesn't provide an upward path for air flow, the ¼"-thick Corian pyramid supposedly acts as a heatsink. The unit is supported by four custom-machined aluminum cones attached to the base.

Toggle switches on the rear panel select between the Pyramid 1's two digital inputs (AES/EBU and ST-Type optical only), and invert absolute polarity. Because only AES/EBU and ST-Type optical inputs are offered, Encore supplies an RCA-to-XLR adaptor for use with RCA-output transports. The adaptor reportedly matches the impedance between the 75 ohm RCA output and the 110 ohm AES/EBU input. Rear-panel LEDs indicate when the unit is locked to an incoming source, and the source's sampling frequency. Balanced outputs are provided on XLR jacks, and unbalanced signals appear on RCAs. An IEC AC line-cord jack finishes off the rear panel.

The Pyramid 1 DAC comes in four versions, priced from $3595 to $4995. For $5995 you get an NPC 8x-over-sampling digital filter and single-ended outputs. Replacing the NPC filter with the PMD100 HDCD decoder/filter brings the price to $3995. The NPC-based balanced Pyramid 1 sells for $4995, the fully loaded unit (HDCD and balanced outputs) for $4995. The review sample was the $4995 model.

ONCE MORE

The Pyramid 1's power supply starts with dual toroidal transformers, one for the digital circuit supply and one for the analog circuits. As you might imagine, fitting two power transformers inside the pyramid's limited space was a design challenge. Moreover, keeping the transformers' radiated noise from getting vast:
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The user two selectable output filters to optimize the Pyramid 1's sound for a specific system. According to the owner's manual, Filter Setting "A" provides a sound that is "more accurate, extended in the upper frequency extremes, and should be used in environments that are warm-sounding or not lively enough," while Filter Setting "B" results in "a sound that is more natural in most environments and has slightly better phase measurements, although out-of-band rejection is slightly worse." Filter B has a steeper rolloff, with more than 0.5dB attenuation at 20kHz, compared with the <0.1dB attenuation of Filter A. Changing the filter is simply a matter of sliding four switches that are accessible through the bottom panel vents.

The Pyramid 1's build and parts quality are excellent, with Cardas output jacks, ultra-expensive MIT MultiCap capacitors, and Roderstein and Resist metal-film resistors. The unit's finish quality is exceptional, particularly the Corian. For example, the Lexan tip fits so well into the Cornan than you can run your hand across the transition from Lexan to Corian and feel almost no discontinuity. Even so, Encore says the Pyramid 1's shell is now made with an improved process that results in even better finish quality than the review sample.

Reference system
I auditioned the Encore Pyramid 1 DAC in my usual reference system on its own, and in comparison with the similarly priced Sonic Frontiers SFD-2 MK.II and the reference-quality Spectral SDR-2000 Pro. The transport was primarily a Mark Levinson No.31 driving the Pyramid 1 through an AudioQuest Diamond X3 AES/EBU cable. The processors under audition fed a Sonic Frontiers SFL-2 preamplifier, which in turn drove a pair of Audio Research VT150 monoblocks. Interconnects were AudioQuest Diamond X3 and AudioQuest Lapis. I also spent some time listening through the terrific Wireworld Gold Eclipse, which seemed a good match for the Pyramid 13.

The loudspeakers were Genesis II.5s, their woofers driven by the Genesis servo amplifier. The system was housed on a Merrill Stable Table and a Billy Bags Design 5507 rack (see review else-

1 The only difference between the UltraAnalog AES20 and AES21 input sources is that the AES21 does not have an integral transformer.

2 You can hear the difference between analog and digital-domain attenuation in the Mark Levinson No.305 and No.36 processors (see Ty's review elsewhere in this issue). The Levinson processors default to digital-domain attenuation, but can be programmed to provide no attenuation. With no attenuation, turn down your preamp by 6dB (half the output voltage) to match level.

3 I've been experimenting with Wireworld's Interconnect Comparator, a unique device that lets you compare any two pairs of interconnects or one pair of interconnects to a straight-wire bypass. The Comparator is extremely revealing of an interconnect's sound, and is an invaluable tool for judging intercon-

4 It's a good sign when your listening impressions contradict preconceptions about what the product will sound like. It means you're hearing the component's intrinsic performance, not your expectations.

Listening
To be honest, I wasn't expecting superlative sound from the Pyramid 1. The novelty appearance—and the layout constraints imposed by the pyramid shape—had biased me against the unit. Although the Pyramid 1 uses excellent parts, and I'd heard a good sound from it in the Encore room at a recent CES, something told me not to expect top-notch musical performance.

My first listening session with the Pyramid 1 quickly dispelled any prejudices; the processor was highly musical and had many qualities I hear from only the best digital components.

First, the Pyramid 1 had the rare ability to present lots of musical detail without sounding etched or fatiguing. The processor struck a perfect balance between resolution and an important aspect of musicality that few processors get right. I could hear a wealth of fine detail without ever feeling assaulted. The music was vivid, palpable, and immediate, yet wasn't forward, aggressive, or pushy.

Many processors blur distinctions between instruments, producing a synthetic continuum that makes the presentation seem like one big sound rather than individual images hanging in space. This perception is fostered by two processor faults: overlaying instrumental timbres with a common texture; and lack of space, air, and bloom around image outlines. These two flaws can combine to produce a flat sterility that robs the music of its life and palpability. I can count the Pyramid 1 among a handful of processors that excel in presenting images as individual objects within the soundstage. It had a wonderful sense of space, image focus, air around image outlines, and ability to present fine gradations of timbre. The result was a much more believable presentation that enabled me to hear exactly what was going on in the music.

This strength was most apparent in the highly complex orchestrations of Frank Zappa's The Yellow Shark (Barking Pumpkin R2 71600). Through the Pyramid 1, I could hear each instrument's contribution, even in the most
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Lloyd Jones

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Terry Evans  Puttin' It Down  AQ1038

Lloyd Jones  Trouble Monkey  AQ1037
dense passages. In this respect, the Pyramid 1 was on a level with the Sonic Frontiers SFD-2 Mk.II, but still a notch below the resolution offered by the Spectral SDR-2000 Pro.

Similarly, the Pyramid 1 threw a deep and layered soundstage, with a nice sense of air between the layers. I could hear fine gradations of depth and spatial detail all the way to the back of the soundstage. Some processors tend to resolve several layers of depth rather than present the front-to-back information along a continuum. The result of the Pyramid 1's ability to keep individual instruments separate, present blooms around image outlines, and portray depth was a remarkable sense of hearing instruments in an acoustic space before me.

The Pyramid 1's soundstage was, however, less expansive and airy than that heard from either the SFD-2 Mk.II or the SDR-2000 Pro. Both of the latter processors had more bloom and air around the outside edges of the soundstage. The SDR-2000 Pro, in particular, had a more tangible sense of air and reverberation around images and the entire soundstage. Nonetheless, the Pyramid 1's tight, precise image focus was similar to the Spectral's, with clearly defined, razor-sharp image outlines. Image specificity was better defined through the Pyramid 1 than through the SFD-2 Mk.II, but at the expense of some presentation size. The SFD-2 Mk.II gave me lots of space, the Pyramid 1 presented tight image focus, and the Spectral let me have my cake and eat it, too.

I liked the Pyramid 1's overall perspective, which was less forward than that of the SFD-2 Mk.II and very similar to what I heard from the SDR-2000 Pro. The music had an incisive immediacy without being forward, similar to what you hear about halfway back into the hall. The best way to describe the Pyramid 1's overall perspective: assertive yet not overbearing.

Tollinally, the Pyramid 1 had a smooth, neutral balance. The bass was less full and warm than that of the SFD-2 Mk.II, but more punchy and dynamic. The mids and treble were relatively clean from grain, but not as liquid as the SDR-2000 Pro's pristine clarity. Although the Pyramid 1's midrange was cleaner than the SFD-2 Mk.II's in terms of grain, the Pyramid had a hardness in the upper mids not heard from the SFD-2 Mk.II or SDR-2000 Pro. It almost sounded like a spotlight on the upper mids that emphasized a narrow band of energy and added a touch of stridency. This characteristic was manifested in several ways: brass instruments had increased bite and edge; strings took on a slightly steely character; saxophone was less warm and round, instead sounding thinner; and piano notes in some registers had a bit of a glassy edge on transients. I don't want to give the impression that this hardness dominated the presentation; it was a minor flaw in an otherwise superlative sound.

This midband edge didn't affect the treble, which was clean and smooth. Vocal sibilance was surprisingly free from hash, and cymbals sounded smooth and delicate. In fact, I greatly enjoyed the Pyramid 1's portrayal of cymbals—a rare feat in digital. The instrument had just the right balance of top-end sheen to midband "song," and I could hear the fine inner detail of the cymbals' delicate decay. Moreover, the treble lacked the white-noise-like character that makes cymbals sound like aerosol sprays—a common fault of digital processors. In addition, cymbal images didn't splatter across the soundstage, but stayed tight and focused. In ultimate terms, however, the Pyramid 1 didn't have quite the resolution in the treble I had enjoyed in the SFD-2 Mk.II and SDR-2000 Pro.

Another aspect of the Pyramid 1 that contributed to its overall musicality was the tremendous sense of pace and drive. The music had a tight, upbeat, propulsive quality that engaged and involved me. One sonic characteristic that contributed to the Pyramid 1's rhythmic drive was the unit's dynamic power, particularly in the bass. The bottom end had a remarkable robustness that gave the bass exceptional power and kick. A drum kit's floor-mounted toms, for example, had a wonderful visceral impact that made them jump out of the music. I could feel the drummer's energy drive the music in a way that riveted me to that impact. This bottom-end solidity combined with the Pyramid 1's agile dynamics to infuse the music with a powerful rhythmic underpinning. The Pyramid's outstanding pace and drive was a significant factor in my enjoyment of music with this processor.

These impressions were made with the Pyramid 1's Filter Setting B selected. Through Filter A, the music was more forward and lacked the tight focus of Filter B. Moreover, the bass was softer and less defined through A, and the rhythmic drive was dulled. Finally, Filter Setting A seemed to provide less musical detail. No wonder Encore ships the Pyramid 1 with Filter B selected.

Finally, the Pyramid 1's single-ended outputs were excellent, and nearly as good as the balanced outputs. In the SFD-2 Mk.II, the single-ended outputs didn't sound nearly as good as the balanced jacks; the SFD-2 Mk.II needs to be heard in its balanced mode. The Pyramid 1's balanced and unbalanced performances were much closer to each other, suggesting that the single-ended version ($3995 with HDCD) may be appropriate for systems lacking a balanced-input preamplifier.

**Measurements**

The Pyramid 1's maximum output level was 43.6V from the balanced outputs and 2.17V from the single-ended jacks. Output impedance was a very low 2.5 ohms balanced, 1.5 ohms unbalanced. This combination of highish output level and low output impedance means the Pyramid 1 will have no trouble driving any preamp, or even a power amp directly through a passive level control. DC levels were low, measuring just under 2mV at any output. The Pyramid 1 locked to 32kHz and 48kHz sampling frequencies, and did not invert absolute polarity unless the rear-panel polarity switch was engaged.

Because the Pyramid 1 has two selectable analog filters, I measured its frequency response in both filter positions and combined the curves on a single graph (fig.1). The top graph is Filter Setting A, the middle pair of curves is Filter Setting B, and the bottom pair of traces is the de-emphasis filter. Note the steeper rolloff with Filter A and the ruler-flat response of Filter B. This has no bearing on the differences I heard, but is interesting nonetheless.

The Pyramid 1's channel separation for both the balanced and unbalanced outputs is shown in fig.2. The balanced...
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crosstalk is considerably lower in level than the unbalanced, measuring better than 120dB at 1kHz—impressive performance. The unbalanced channel separation is still better than 100dB across the band, except for the unbalanced right channel, which decreases to 93dB at 20kHz.

Driving the Pyramid 1 with a 1kHz, -90dB dithered sinewave and plotting the spectrum of the output (fig.3) shows the Pyramid 1 has a low noise level, good linearity, and a total absence of power-supply noise in the audio circuits. Though I had some concern about housing two transformers and the audio circuits in such a confined area, Encore has apparently managed to keep the power supply out of the audio circuits. We can see a trace of second-harmonic distortion (the wrinkle in the trace at 2kHz), but the plot is exceptionally clean. Note that this measurement was made with a 20-bit input signal, which is more revealing of a processor's intrinsic performance than is a 16-bit test signal. (With the recent emergence of processors that can pass 20-bit data, we've increased the word length of our test signals to 20 bits for many tests.)

Fig.4 shows a wideband spectral analysis of the Pyramid 1's output when fed a signal of all zeros. The low noise level seen in the previous graph is again apparent, but the left channel has unusual peaks of energy at 30kHz, 60kHz, and 90kHz. Surprisingly, I measured no difference in the Pyramid 1's out-of-band performance between the unit's two filter settings.

The Pyramid 1's low-level linearity (fig.5) was among the best I've measured. The unit was perfect to well below -100dB, and had a very low noise floor. This is exceptional performance. The unit's good low-level performance can also be seen in figs.6 and 7: the Pyramid 1's reproduction of a 1kHz, -90dB undithered sinewave. Fig.6 was made with 16-bit input words, fig.7 with 20-bit input data.

Note the waveforms' excellent symmetry and freedom from noise.

Fig.8 is the Pyramid 1's noise-modulation plot, generated by driving the processor with a 41Hz sinewave at -60dB, filtering the test signal, and plotting the processor's output spatially. The test is repeated with signals at -70dB, -80dB, -90dB, and -100dB, and the five curves are combined on one graph so that any differences in level or spectral distribution are easily seen. The tighter the trace groupings, the less the processor's noise changes in level or spectral distribution as a function of input level. As you can see in fig.8, the Pyramid 1 had excellent performance, with very little variation between traces.

Driving the Pyramid 1 with a full-scale mix of 19kHz and 20kHz, then creating an FFT-derived spectral analysis of the output, produced the plot of fig.9. The 1kHz difference component just rises above the -100dB level, but the rest of the spectrum is very clean.

The Pyramid 1's jitter performance was not as good as I'd expected, considering the unit's otherwise excellent technical performance and good sound. Moreover, the Pyramid 1 uses the UltraAnalog AES21 low-jitter input receiver module, a device that has shown itself capable of low intrinsic jitter. Fig.10 is the clock-jitter spectrum made with a 1kHz full-scale sinewave driving the Pyramid 1. The closely spaced periodic jitter components below 5kHz are highly unusual; in fact, I thought this
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might have been a measurement artifact, and spent a considerable amount of time probing different points in the circuit and trying various grounds to get a cleaner-looking spectrum.

I even considered the possibility that the RCA-to-XLR adaptor supplied with the Pyramid 1 may have caused an impedance mismatch between the PS Audio Lambda (our standard source for jitter measurements) and the Pyramid 1, thus degrading the jitter performance. (In last month’s review of the Resolution Audio Quantum processor and Cesium transport, I measured higher clock jitter in the Quantum when it was connected with an RCA-to-BNC adaptor.) I repeated the jitter measurements more than a week later with a Sonic Frontiers SFT-1 transport and a direct AES/EBU connection, but got identical results.

I also measured the Pyramid 1’s jitter measurements while I had the Mark Levinson No.36 processor open on the bench. Moving the test probe between the No.36 and the Pyramid 1 suggested that the unusual jitter spectrum was indeed representative of the Pyramid 1’s intrinsic performance. (The No.36 measured under identical conditions had extremely low jitter—50 picoseconds—and a very clean spectrum). The Pyramid 1’s RMS jitter level, measured over a 400Hz-20kHz bandwidth, was nearly 500ps (half a nanosecond).

With an input signal of all zeros, the Pyramid 1’s RMS jitter level dropped to 275ps, and the spectrum was much cleaner (fig.11). The unusual spikes are still present, but are lower in amplitude (another indication that the measurement was valid). When the Pyramid 1 was driven by a 1kHz, -90dB sinewave, the RMS jitter level rose to 690ps, and the spectrum showed the typical spikes of periodic jitter energy at the test-signal frequency and its harmonics (fig.12).

This measured jitter performance is at odds with my listening impressions; good pace and rhythm, a deep soundstage, and air around instrumental outlines are usually indicative of a low-jitter design. (However, many other design variables can affect the sound; jitter is just one of them.) Looking at the spikes in the three jitter plots, I wondered if my impression of a metallic hardness in the midrange was somehow related to the presence of these periodic jitter components below 5kHz. I welcome Encore’s comment on this unusual performance.

Other than the jitter, the Pyramid 1 had superb technical performance. The unit’s low noise, excellent linearity, and good low-level resolution all suggest a competent design and execution.

CONCLUSION
The Encore Pyramid 1 DAC digital processor proves that an audio component can offer superlative sound quality and unique aesthetic design. I came to greatly enjoy the Pyramid 1’s visual statement. More important, however, the Pyramid 1 offered terrific musical performance. The unit’s wonderful soundstaging, wide dynamics, powerful rhythmic drive, and freedom from grain combined to produce an involving musical experience. I thoroughly enjoyed my time with the Pyramid 1, even though I had on hand some of the world’s best-sounding digital processors: the Spectral SJR-2000 Pro and Mark Levinson No.305. No, the Pyramid 1 wasn’t at the level of the Spectral or Levinson processors, but it was competitive with what I consider to be the best of the $5000-$6000 processors: the Sonic Frontiers SFD-2 Mk.II and the Theta DS Pro Gen.V. If you’re in the market for a processor in this price range, all three units must be auditioned before making a purchasing decision.

In absolute terms, the Pyramid 1 had a trace of midrange hardness that added an edge to instrumental timbres. This character will be more objectionable to some listeners than to others. As is often the case when choosing high-quality music reproduction components, weighing the sonic tradeoffs to match your system and musical taste is half the job. In the Pyramid 1’s case, you give up some midrange liquidity for the unit’s outstanding pace and drive.

With that minor caveat, I can recommend the Encore Pyramid 1 for its musical performance—its unique and stunning appearance is icing on the cake.

Fig.10 Encore Pyramid 1, word-clock jitter spectrum, DC-20kHz, when processing 1kHz sinewave at 0dBFS; PS Audio Lambda transport (linear frequency scale, 10dB/vertical div., 0dB=1ns).

Fig.11 Encore Pyramid 1, word-clock jitter spectrum, DC-20kHz, when processing digital silence; PS Audio Lambda transport (linear frequency scale, 10dB/vertical div., 0dB=1ns).

Fig.12 Encore Pyramid 1, word-clock jitter spectrum, DC-20kHz, when processing 1kHz sinewave at -90dBFS; PS Audio Lambda transport (linear frequency scale, 10dB/vertical div., 0dB=1ns).
The Allure is a refinement of a DIY design by Stereophile's senior contributing editor Dick Olsher. Dick called his version the Poly Natalia and described it as "one of my all-time favorite dynamic loudspeakers and one which I shall return often for critical listening". With Dick's blessing, we built our own version and now offer this elegant design to those who want the best! The Allure is 93 dB efficient and works wonderfully well on both tube and transistor amplifiers.

Dick Olsher receives no royalties or other remuneration from this design.
SUPER-SENSIBLE TRANSPORT?

Wes Phillips listens to McCormack's Digital Drive SST-1

What's the big deal? All it does is spin the disc, right?

Nothing infuriates some of my rather shell-backed audiophile friends more than the notion that I get to play with a lot of hi-fi toys that they don't. Especially when they can't conceive of why something should—or should not—sound different. They can't imagine that reality would have the poor taste to prove them wrong.

Case in point: CD transports. Other than spin the disc and read the data, what on earth could they do?

Ask Robert Harley for the skinny on all of this; all I know is that my job allows me the luxury of simple observation. They sound different from one another, that's all. Like most audiophiles, I tend to get excited by the big-ticket items—I just after the "upside-down" Forsell, I covet the otherworldly C.E.C. TL 0, I wish to fiddle with the lisening Jads. But even in my fantasies, I don't got that kind of scratch. So is there a high-performance transport I can afford—or at least aspire to? Now there is: the McCormack Digital Drive SST-1.

SPUN GOLD

The McCormack SST-1 (Scientifically Synchronized Transport) is surely one of the more striking transports available. Clad in the firm's customary blue-gray pebbled finish, it features a faceplate uncorrupted by a disc drawer—this unit is a top-loader! A sliding panel gives access to the CD; after the disc is covered with the specially designed damper, the cover should be slid closed. I say should because the SST-1 will play a disc whether or not the unit is closed. McCormack points out—and listening confirms—that it sounds better with the hatch closed.

The fit and finish are exceptional on this unit. Elegantly designed controls fit the finger and are easily sorted out at a glance. The front panel is dominated by the display in its middle; I found it easy to read from across the room. Directly beneath it is a large oval button (Play) flanked by two round ones (Pause and Stop). To the left of the display are four round buttons that control the programming and time functions. To the right are five controls for track and search functions. All commands—except scan forward and reverse—are repeated on the standard frogdesign® Philips remote.

The rear panel has two digital outs in the standard configuration—one coaxial and one BNC. AES/EBU and ST optical/AT&T are available as options (AES/EBU adds $150, ST optical costs $250; both together cost $350). A removable three-wire ground AC cord is supplied for powerline experimentation. The component's hand-built legacy is readily apparent: this is not just a standard frogdesign® Philips transport that's been modified by adding a badge. I've had transports four times as costly that didn't feel nearly as well-built.

The unit sits on four of McCormack's compliant Soft Shoes. An insert in the underside of the chassis takes a threaded spike—the idea being that vibration can't be controlled simply through damping, but must be offered a path away from the unit. Since there's no mention of this option in the owner's manual, I didn't at first take advantage of it. Oh, I found the spike all right, and wondered what to do with it, but decided not to call McCormack about it for fear of appearing foolish (though, after all, I'm a hi-fi reviewer—how could their opinion of me get any lower?). Then I read TJN's review of the DNA-1 amplifier in the February '95 Stereophile, which is also equipped with a spike—ah-ha!

Up to this time, I'd been resting a weight on top of the sliding disc cover, as I'd found it tightened the sound. Once I utilized the spike, this "mod" became an affectation. I guess they're on to something here. I really have to salute McCormack. Perhaps it's their Mod Squad heritage, but you really have to work to improve on the SST-1's performance. Better AC cables help, but most other easy mods improve things only minimally, if that.

Warning: The clearance between the disc in play and the bottom of the disc tray is so tight that the SST-1 will not spin CDs that have Navcom rings around their edges; however, the disc...
clamp affords strikingly similar results, and is simpler to apply.

**SPIN DRIFT**
I lingered over reviewing this transport, so my associated equipment list is lengthy. Speakers were either the WATT/Popup System V or the Metaphor 2s. DACs included McCormack's DAC, the Assemblage DAC-1, the Micromega DAC 2, and the Arcam Delta Black Box. I had some extremely satisfying preamps on hand: the Conrad-Johnson EV-20 SE, Audio Research SP-9 Mk.III, and Melos SHA Gold—note to mention VAC PA 80/80, CJ Premier Eleven A, Audio Research D-200, and Pass Aleph 0 power amplifiers.

Digital cables were primarily MIT's T3 and Illuminati coaxial, as well as McCormack's Wonder Link 1—which sports BNC connectors, a true 75 ohm termination. Cables included Transparent Music Wave Reference and Music Wave Ultra, and MIT 750 CV Terminator and 350 CV Terminator.

**TALE SPINNING**
The SST-1 sounds clean, open, and dynamic. Its clarity, balance, and transparency match those of the most expensive units I've had in my system. I've noticed a lot of range in low-frequency response from the various transports I've auditioned, and the McCormack is robust yet balanced. If you believe acoustic architecture is constructed upon this region, you'll find the SST-1 builds on solid rock. I found the controlled, articulate bass convincing, but I'm sure some will wish for a fatter sound. String bass has body and the requisite sense of slam. Bass drum has kick and impact.

The midrange is characterized by an incredible sense of articulation—I pulled out guitar CD after guitar CD, reveling in the subtle differences between instruments. Nuanced and rhythmic, the transport was easy to listen to for long periods of time—principally due to its relaxed, liquid presentation of the upper octaves, especially when I used the Kimber/Illuminati digital interconnect. (Oh, I forgot—we're not supposed to hear any differences between digital cables, either.)

When CD was first thrust upon us, I felt disconnected from the most basic element of music: its progression through time. Naturally, music occurred in time when played on those early players, but they seemed to strip from that progression the more nuanced components of pace and swing. We've come since far, but I remain quite sensitive to digital's effects upon these domains. The SST-1 preserves the sense of music's motion to a remarkable degree. I wondered if this was the result of unusually low jitter, so I plugged it into an Audio Alchemy DTI-Pro—and did, indeed, notice the SST-1's performance audibly improve, but by less of a margin than any other transport in its price range that I've played with. I suspect, in the absence of measurements, that the McCormack's jitter production is remarkably well-controlled.

Dynamics also receive the proper heft and weight. Listening to the Boulez/Cleveland Debussy disc (La mer/Nocturnes/Jeu/Rhapsodie pour clarinette et orchestre, DG 439 896-2), I was almost preternaturally aware of the shifting tone colors and the subtle levels of dynamic shading—an effect enhanced by Boulez's admirably clear interpretation. One might argue that, Boulez having removed the emotional scrim that so frequently obscures our perception of these pieces, his performance cannot work unless the exceedingly subtle dynamic and timbral shadings emerge.1 Man, oh man, did the SST-1 support him in this endeavor.

Nor does the McCormack fall down in its presentation of spatial information. Béla Fleck's Tales from the Acoustic Planet (Warner Bros. 45854-2) is a fun CD—Fleck collaborates with a wide range of musicians on it, and everybody sounds like they're enjoying themselves. But as much fun as it is—it's pretty well-recorded, too—it just doesn't develop any three-dimensional soundstaging. The McCormack, to its credit, doesn't add any; it just strings the players out from speaker to speaker. But give it a disc that does contain that information, and whee doggies! you... are... there! Keb' Mo' (OKeh/epic EK 57863)—a CD that Audio's Ken Kessler promotes so heavily you'd think Sony gave him a royalty—establishes this in just one note. In a different room, but immediately before you, and with solidity greater than that of your rear wall, stands Keb Mo' (Kevin Moore). Playing a Resonophonic guitar and singing in a husky tenor, he's a testament to the virtual reality we call hi-fi. At least, that's what it sounds like when the McCormack SST-1 pulls the digits off the disc.

**IN-EX-SPIN-SIVE QUALITY**
I can't tell you whether the SST-1 can stand toe-to-toe with stratospherically priced transports—I guess, in my heart of audiophile hearts, I'd like to believe that the latter really are sublime. But how much better can they really be? The McCormack reads the data and presents it in a balanced, musically engaging manner. It's built to a standard that belies its modest—at least in the realm of digital separates—price. The perception of musical value, tonal balance, and resolution is intensely subjective, and not everyone will agree with my conclusions. But before buying any digital transport, I think you must listen to this one. Its price/performance advantage could give you a hefty step up toward that more expensive D/A processor you've also been wanting.

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1 I was once lucky enough to sit in an orchestra seat at a Boulez concert. To be able to observe the man's economy of body movement at such close quarters while he controlled an enormous Mahler orchestra (the work was Das Lied von der Erde) was a wonder. —JA
Things didn't start off auspiciously. I'd been after Symphonic Line's Klaus Bunge for more than a year to send me the Kraft 400 Reference monoblocks. Finally he called. He said he was going to be in town for a few days, and he had with him a pair of what he described as his "traveling" Kraft 400s, which he proposed to leave with me.\footnote{As reviewed, the amplifiers were called Kraft 250s. As we went to press, however, Klaus Bunge asked that we refer to them as Kraft 400s. 

JA}

Klaus showed up with the enormous amps encased in high-mileage cardboard domestic travel boxes so crisscrossed with packing tape they looked mummified. I eagerly poked around Klaus's Trooper for the cart I just knew he had to have with him. He didn't. When I quibled for the large, broad-shouldered one regarding this oversight, he admitted he hadn't brought one.

Two hunnerd'n'sixty pounds each! We managed to hump the amps into the elevator and up to our loft, but only just. It took me three days to straighten up fully again (please walk this way), and my arms now seem to be a few inches longer. I'm positively simian.

**DEATH & THE MAIDEN**

My advice to visiting manufacturers bearing heavy audio objects: *bring a cart*, or next time I *keel*! Kathleen and I listened to the German Giants for a few days, switched amps for a bit, then returned to the enormous, bad-Euroboy, sexy, cobalt-blue 400s. One channel was silent. I called Klaus, probed some under the hood with a voltmeter, and together we confirmed one of the amps was down for the count. Supine on the mat, so to speak. Kaput!

Of course. Give a reviewer your best piece, and it'll be sure to colorfully self-immolate. But "best piece"? I'm not so sure. This pair was a little scruffy and also sported what Klaus described as his "traveling top covers." The plates didn't fit very well and were a chore to screw down. In fact, a few of the retaining screws wouldn't seat at all, so the top plate resonated when thwapped. Not good.

I can appreciate that, at this price level, an importer can't spray amps around reviewers willy-nilly; but I knew I'd have to find some solution, which presented itself in the form of two Bright Star Little Rock 2s (in dark granite). Their hefty weight nearly damped and welded the top plates to the chassis, and their inherent EMF-rejecting capabilities may have sweetened the amps' overall presentation a touch. (They were placed a little forward on the top plates so as to rest over the transformer) They definitely helped the sound.

I was also slightly Wienerschützled to learn I'd have to wait two weeks for a Symphonic Line-approved techie to visit us from Chicago to resurrect the duff amp. Klaus told me that, while he was at it, the output boards on both amps would be upgraded to the latest production spec, which included a new set of bipolar output devices ringed about the board, and which are an integral part of the assembly. And that meant, of course, that a further break-in period would be required! Kathleen and I asked ourselves just what Klaus had meant when he'd said "200 hours." Nawnaw... I thought of giving him 200 hours— to leave the country!

**RESURRECTION**

I contentedly returned to the Forsell Statement amplifier that I'd reviewed last June and my own Jadis JA 200s to drive the Avalon Ascents while we waited. Computer-whiz Karl Szczypa finally showed up at our door one Saturday, tool-kit and soldering station in hand. Karl, sitting cross-legged on our carpet, broke down the Kraft Kondominiums one at a time. Watching him remove the aluminum side panel *am* heatsink and expose the amp to inspection from the side, I felt as if I were looking at a skyscraper under construction—all stainless-steel girders and giant nuts'n'bolts.

I've heard many showgoers exclaim, while gazing into this cavernous amp, that they just don't find that much in there! The main circuit board, a tiny thing (for short signal paths) measuring

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**SYMPHONIC LINE KRAFT 400 MONOBLOCK POWER AMPLIFIER**

Jonathan Scull

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**Solid-state, handcrafted power amplifier with class-A output stage. Output power:**

- 300Wpc RMS into 8 ohms (24.8dBW);
- 500Wpc into 4 ohms (24dBW).

**Current capability:** >150A.

**Frequency range:** 1Hz–1MHz.

**Damping factor:** >1500, equivalent to an output impedance of 0.005 ohms.

**Dimensions:** 21" H by 30" D by 14" W.

**Weight:** 260 lbs each. Price: $35,000/pair installed. Approximate number of dealers:

1. Manufacturer: Symphonic Line, Germany. Distributor: Symphonic Line, 5883 N. Victoria Dr., Indianapolis, IN 46208. Tel/fax: (317) 299-5578.

**Manufacturer:**

Symphonic Line, Germany. Distributor: Symphonic Line, 5883 N. Victoria Dr., Indianapolis, IN 46208. Tel/fax: (317) 299-5578.

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**Stereophile, November 1995**
lump of a thing it is. Behind the black hole that is the transformer lurk four high-speed rectifiers, and eight 50,000μF electrolytic capacitors with a total capacitance of 400,000μF. The caps are linked along their top surfaces by three flat, aluminum “bridges” which give the power supply an extremely low impedance and further the 400’s dynamic capabilities, according to designer Rolf Gemein. In addition to the two internal fuses and the single outside fuse is a special circuit that protects the loudspeakers. And you’d best pay attention to the bright yellow High Voltage sticker.

In addition to a bit of support circuitry are two user-replaceable, sand-filled fuses and a pair of large, bright LEDs at the back end of the bridge, these given the task of signaling the successful sluice of power to charge Cap City below. While Karl was working away, I glanced at the brief technical description Klaus had supplied me:

“Differential amplifier in the input section with constant current source and current monitoring. Class-A pre-driver stage with constant current source. Output stage biased with two class-A Emitters in a row, followed by NPN-PNP outputs with six pairs of Ring-Emitter bipolar Sanken power transistors of 20 amps, 50 MHz each. All transistors highly selected and matched which are very stable and operate with a high level of linearity on virtually all demands. Extremely low local negative feedback of all stages. Separate power supplies for input and output stages. Rectifier assembled with ultrafast diodes. Pre-driver stage pro-

**The Heart of the Matter:**

**Jonathan Scull talks with Symphonic Line’s Rolf Gemein**

I’m not sure why, but people tell me things. Maybe it’s because they realize I listen. They reveal themselves, sometimes in charming and unexpected ways. So I was almost prepared for my three-way conference call with designer Rolf Gemein in Germany and Indianapolis-based importer/distributor Klaus Bunge. I started by asking Rolf about his design philosophy.

**Rolf Gemein:** Hi-fi systems in general are not able to reproduce natural, live sound. We’re not even getting close to the intimate experience of an opera house, for example. There are three inherent problems in reproducing a musical experience through a hi-fi system:

First, the vast majority of amplifiers and loudspeakers don’t distribute the energy correctly. There is enough energy in the bass frequencies, but this energy is somewhat lacking through the mids and the highs. However, the human ear is used to the large amount of energy that musical instruments can produce—like a trumpet, for instance. Most hi-fi systems can produce the *tone* of the trumpet, but not the necessary energy.

Second is the phasing. Correct time coherence of all frequencies is inherent in music. This means that the sound of a human voice, for example, is time-coherent in all frequencies in a wave form that is itself a specific time unit. Most hi-fi systems rip apart the timing of a tone into a slower bass frequency and faster high frequencies. So the sound pattern is unnatural and can’t be identified correctly.

Third, the sound pattern must have a comprehensive body, which should create a visual illusion of a certain instrument. As transducers, loudspeakers have to make place for emotions. The radiation pattern of each frequency determines whether or not a tone is free and airy in the room, seemingly out of nowhere, or if it seems that there is a music system playing. And you know, the research can’t be done alone with measuring instruments.

In fact, at this time there are no suitable instruments for measuring these very complex correlations. They can only be grasped and interpreted with the ear and a sensitive nervous system.

**Jonathan Scull:** [usually more talkative!] Uhuhuhuh, huh.

**Gemein:** Then and only then can one transfer the emotional results, so to say, into the technical side of it, and not vice versa. Once all these three factors act in unison, a natural and three-dimensional sound pattern can be possible.

**Scull:** As I understand, you place great importance on equal energy distribution throughout the frequency range.

**Gemein:** To come even close to the musical reproduction of a live experience, a power amplifier must evenly distribute a tremendous amount of energy, far and above the normal listening spectrum, with absolute and correct phasing with no distortion. For instance, internationally there are a great number of very powerful amplifiers on the market. It is, however, common knowledge that the smaller amplifiers produced by these same manufacturers sound much better. So, the bigger brothers do something wrong. Why?

**Scull:** [laughing] I was just about to ask!

**Gemein:** [laughs] Ja, first of all, it is because of the general layout of an amplifier—especially the size of the output boards. If you throw away all the advantages of a small, compact board layout and distribute the signal path over a square foot or two, sonically most of the fine inner details are simply gone to hell. This is the reason why we have invested so much time in bringing down the size of the main output board to an extremely small 5.6" by 6".

Anyway, for a truly natural reproduction, you can’t do without pure class-A operation. We’re talking true, natural sound here, not just the hype and marketing opportunities of class-A.
A LA RECHERCHE DU TEMPS PERDU
I began serious listening with my CAT SL-1 Signature preamp. Analog front-end was the Forsell Air Force One with either the Clearaudio Insider, Symphonic Line RG-8, or vdH Grasshopper IV GLA. Digital was rendered with Forsell’s D/A coupled with their Mk. II CD transport.

Unhappily, the Jadis JP-80MC (suffering from RF heebie-jeebies) and the JL/JSI Drive/Processor combo had all been repossessed by then-importer Victor Goldstein for use at HI-FI ‘95. (I tried not answering the phone or the door, but he got in anyway.) As it transpired, Frank Garbie’s Northstar Leading The Way, Inc.—Tel: (970) 259-6722, Fax: (970) 259-6727—was named importer for Jadis products shortly after the Show.

During this transition, I requested loaners from the factory in France, and toward the end of the review period, boxes of French audio goodies began to arrive. Oh, mm, it was like... Hanukkah in July! I bring you the lurid details so you’ll understand that my reviewing system was very stable for the first half of the serious listening, as Kathleen and I came to know the voice of the Kraft 400s.

Consider, then, the description of the sound to be a melange of impressions garnered from listening with both my recently (factory) retuned CAT SL-1 Signature and an early-arriving Jadis JP-80MC. Some updates to the CAT vs. JP-80MC debate: Over time, the sound of both preamps has moved toward a unparalleled convergence of presentation. The CAT, in its more recent incarnations, sounds a touch more like the JP-80MC. The Jadis preamp sounds...a

Feeling this way, I have searched a long, long time for the perfect heatsink. To the best of my knowledge, our customized heatsink holds the world record. It has the sensational K-value of 0.1!

Scull: What! A K-value of 0.1! Rolf... what the hell does that mean, please?

Gemein: [laugh] It’s very easy. You can say this special aluminum heatsink allows for about three to four times better heat dissipation than, say, those of Krell and Levinson.

Scull: Okay, I’ll buy that.

Gemein: This incredible heatsink—or each individual ‘sink let into its structure—made it possible for me to run the amp in pure, high-bias, class-A operation without fans or other tricks. We incorporated the same excellent, very fast pre-driver transistors we use in the smaller Symphonic Line units. Most of the other powerful amplifiers on the market resort to bad-sounding, sluggish transistors so they will be stable under high voltages. And, very important: I’m using a type of capacitor that has been produced specifically for Symphonic Line. It has a totally even distribution of energy, without favoring any specific frequency. Internally, we also use special Symphonic Line cables and an extremely rare kind of silver solder.

Scull: Tell me, Rolf, what drove you to make these statements about the Kraft 400s?

Gemein: You know, as long as I’ve been doing hi-fi, I’ve had the feeling that, in existing amps, there’s something like a brake that holds back the energy necessary to make a total, complete sonic picture. Especially the energy in the region where people think you don’t hear it, like over 20kHz. Believe me, to get it right way out to there, you can’t have enough power. If I could, Jonathan, I would build my amps three times as big to get even more class-A out of them!

Scull: I see... (I see Rolf is having a breakdown. Just kidding!)

Gemein: You see, it’s a real important part of reproduction to make the sound palpable, realistic—to make it emotional. To achieve this, it’s important to consider what is beyond the range of human hearing. This beyond-20kHz range is the most difficult and most overlooked area. This is how you will notice the art of the amplifier designer: by their handling of the region beyond the human ability to hear. This includes not only frequency, but also coherency of phasing and time, distribution of energy, and any distortions up there.

Scull: All right. Anything you’d like to leave us with? Besides a huge electric bill?

Gemein: I will tell you about something very important to me, and this is the first time I’m saying it officially.

Scull: [to Kathleen] See? They tell me stuff!

Gemein: I believe every living thing on earth has its own resonance factor. For a human, it’s the heart chakra. If you’re a designer and you take this into account, you can be successful no matter if you are making a speaker, an amp, or a race car. That is, if you’re capable of hitting exactly this point—the heart chakra. Then everything can resonate, perfectly balanced on all sides.

Then you’ll succeed, because the whole universe, everything around us, is perfectly balanced and working on the same basis. Like our solar system—the sun is the chakra, and everything else is perfectly balanced in their orbits around it. That’s my way of thinking, and it defines my approach to the entire situation.

Rolf Gemein

Stereophile, November 1995
The picture is worth a thousand words. The sound will leave you speechless.
bit more like the CAT! I believe their mutual excellence has driven each into the other's arms.

While maintaining its neutrality, the newer CAT Signature displays a richer, fuller-sounding tonal palette that better complements and flushes out its leg-4-5ary imaging. It continues to out-preamp the JP-80MC in the bass, and to this point in the break-in) it wins the edge-definition sweepstakes.

The JP-80MC, with its taller bass, beautiful highs, and toe-in-for mid-range—coupled with its luscious, bloomy, 3-D palpability factor (the air is simply incredible)—may be said to justify its lofty price, tellement cher though it may be. (The phono stage is phase-invert- ing, so I'll have to see if the focus sharpens up when the phono leads are reversed. Forget about flipping the tri-wired Avalons!) Interestingly, this JP-80MC—the first unit I've heard direct from the factory—is certainly more neutral than I've ever heard from a Jadis preamp to date. I understand from importer Garbie that unadulterated, "factory-fresh" Jadises will continue to be available, and I ap- plaud him for his efforts in this direction. It occurs to me that I finally may be hearing a JP-80MC as its designer meant it to be voiced.

CHERCELE CABLE!

I started listening to the Kraft 400s with the AudioQuest Diamond intercon- nects and Dragon speaker cables I found so suitable with Forsell's The Statement. I also cycled through a few of the several families of cables and interconnects I keep handy. Joe DiPhillips of Discovery Cable visited one day, his Signature interconnect and speaker cable held in one hand, a Clearaudio Insider cupped in the other. (More on the Insider and how it relates to the Symphonic Line RG-8 and the vH Grasshopper IV in due course.)

We hooked the bright red Signature throughout the system and were well pleased with the result. I've found that most cable break-ins run as follows: to begin, a brief glimpse of the cable's sound (if a bit grainy); then a destabi- lized, out-of-focus, and phasexy period; then they slowly regain focus and "cohere" into their final sound. Regrettably, some take longer than oth- ers. Much longer.

So it was with the Synergistic Research cables and interconnects that Boy Racer and "I'll-give-your-system-2 Tel: (800) 578-6489, (714) 642-2800. Fax: (714) 642-2900. the-cable-it-needs" Ted Denney in- stalled shortly after the Signature's arrival. (Denney makes cables at several price points optimized for different types of gear—see my "Ted's Excellent Adventure" sidebar for the hoopy- scoopy.)

Ted set us up with two pairs of Resolution Reference speaker cable for the midrange and highs, and a run of Signature No.2 to run to the woofers of the Avalon Ascents. Ted's cables bring new meaning to the word "stiff"—even to a totally intrepid guy like me, who's ac- customed to the SPROING of tri-wired XLO Signature.

The 5m run to the amps were hand-crafted Phase Two Mk.V shielded to 1GHz for RF-rich New Yawk, with another 5m pair of Resolution Ref- erence interconnect on hand for tube amps. The digital cable Ted left us with in both RCA/RCA and BNC/BNC (for the Forsell) was the Digital Corridor No.2. Not a dad coax datalink for $150, but I soon reverted to my favored Kimber AGDL or the airy Marigo Apparition Reference.

The digital line-level was more Phase Two Mk.V, and Ted went for a 1.5m run of the top-of-the-line Resolution Reference for the phono. This unshielded cable caused a minor low-level hum with the CAT, but an Original Cable Jacket quieted things to a tolerable level, while the JP-80MC's higher gain smote the hum into the noise floor. When I cranked the spsi with the CAT, I substitu- ted a length of Diamond or my fa- vorited XLO Signature Phono Cable.

After these loooong-to-break-in cables loosened up, Kathleen and I de- cided they sounded so good with the Forsell/CAT/400 combo that they would remain as the reference cables for this review. (They also got on famously with the JP-80MC and other Jadis front-end naughty bits. More on the pregnant-with-possibilities Discovery Signature as I rotate them into several systems coming up for review. And more, too, about the four-chassis Jadis JP 200 dual-mono preamp (!) that eventually showed up at our door.)

I prefer to use the same family of cables and interconnects when review- ing rather than hodgepodge around. So we powered up with Ted's stiff but bendable (you will obey) AC Master Couplers. They are, simply put, excel- lent. They were everywhere in the sys- tem save for the Kraft 400s, whose non-standard locking 90° connectors re- quired a custom length to reach our dual-quad 30A hospital-grade sockets.

(Kathleen crawled between ceiling and roof pulling the heavy BX cable when we installed the sockets, along with dual-quad 20 amp service for the front- end. What can I say? J'adore ma femme)! Other connectors are being evaluated, but these unusual locking connectors are childproof, pointed out new-Dad Klaus.

Michael Griffin of Essential Sound Products (Tel: (810) 375-5093) made up a custom pair of The Essence power cords for the 400s, and also sent along a number of IEC power cords for the rest of the system. These made a significant improvement to the sound of the amps, and as I moved them into the rest of the system, I noted how well they per- formed. (The connectors are filled with a material that is said to stabilize their impedance characteristics!) More on these guys later.

ROUND UP THE USUAL SUSPECTS!

The rest of the room treatments and ac- cessories were much as you may have read about in my "A Matter of Taste" in the June issue (Vol.18 No.6), with these additions: I've had excellent results with a Shakti Stone placed on the Forsell CD Transport's lid. (Yes, that is during play!) And I've discovered what I consider the hot setup for mounting a CAT (can the jokes, please)—Shun Mook Ultra Diamond Resonators, the biggest ones, placed under the unit: two in front, at 5 and 7 o'clock; rear center, 6pm (do you know where your CAT is?); and a fourth Resonator on top, also at 60—pointy side up, of course. This ebony- ringed CAT is snugged into a Michael Green Signature ClampRack. Eventu- ally I'm going to try to gently squeeze the JP-80MC, which now sits on a trio of Shun Mook Super Diamond Reso- nators, the power supply on Michael Green Audiopoints.

Class-A though they may be, I left the 400s turned on for most of their stay, shutting them down and removing their power cords only when one of last summer's many lightning storms lit up the skies. One night I awoke only after the storm was upon us (the lightning is particularly vivid through the skylight), and found both amps had cycled off. Con-Ed must have taken a real hit! Next morning they reset with no problem.

Which brings me neatly to their turn-on sensitivity, which is either a two-stage or a two-person affair. Depress the large square switch (what else?) and either wait about 15 seconds for the an-
swerving click of the internal relay, or step around to the front of the behemoth and have a look at the LED. If it doesn’t work the first time (it didn’t), give it another shot. Or if your Significant Other hasn’t murdered you yet for dragging Sphinx-sized Wunderampen into the house, you can ask, “Is the LED lit brightly, choice?” And hope he or she won’t tell you where to put your light-emitting diode! I consider myself extremely lucky in these matters. Kathleen is the consummate audiophile.

**Setting the Stage**

So, what is the sound of one multi-kilobuck amp clapping? Once again, as with the yet more expensive Forsell Statement, we have to ask if the Kraft 400s do anything to justify that kind of a price tag. I mean, what could be so entirely special about a pair of amplifiers?

Everything. These are magnificent beasts.

As Peter Forsell has pointed out, what we hear from the speaker is, in essence, the electricity itself. In this sense, the Kraft 400s stand alone as the ultimate expression of purity in design when it comes to the power supply and short, simple signal paths. This paradoxical fusion of gargantuan and minimalist concepts would prove a futile gesture indeed if it didn’t actually serve the music in some mighty special way. But it does—magically.

The foundation of their sound was the richly complex and textured, powerful, transparent, and huge soundstage the 400s bring about the speakers and the listening room. The ambient soundsfield had an integrity that I had never before experienced. They developed a spread and layering of soundstage of perfect control—all musical elements absolutely stable. The classical descriptions of wide, deep, layered, and so on lose their meaning in this context. Put a CAT/Forsell combo or a JP-80MC and a JSL/J1 in front of the 400s, and the original acoustic is simply there before you. Cue up an Insider or the Symphonic Line RG-8 phono cartridge on The Forsell, and you are transported. There are no room boundaries to overcome, no sense of displacement of

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**Ted’s Excellent Adventure**

As I had been impressed with Ted Denney’s Synergistic Research cable, I thought that asking him for 25,000 words on his thoughts on cable design and performance would be an appropriate accompaniment to my Symphonic Line review.

**Ted Denney:** Two important things to start off with: First, no one cable can perform musically in every system; second, price is not a guarantee of performance. For example, in your system, Jonathan, I recommended our Phase 2 Mk.V—not the more expensive Resolution Reference—to run to your amps, because they’re more suited to that application. The Reference interconnect is designed for a different kind of component, like the tubed Jadis JA 200s.

You have to find a cable that works with a given set of components, so what we do is develop different sets of cables designed to complement or bring out the best possible performance for these different types of components. In some cases, our entry-level cable, the Alpha Series, can outperform our most expensive cables, provided they’re properly matched.

**Jonathan Scull:** How does your customer typically choose the right cable at Synergistic Research?

**Denney:** We have a book available at all of our dealers called The Synergistic Research Explorer’s Guide. Your readers can give us a call and we’ll send it out to them. It outlines every cable we make and which components and price level they’re designed to work with. The other thing we do for our customers is, when you go to an authorized Synergistic Research dealer, you can fill out a form that allows us to run a diagnostic on your system.

Aside from determining the equipment, we ask important questions about the way the system sounds: how it soundstages, its general timbre, if it’s forward, dark, bright, the placement of the speakers, and the general acoustics of your listening room. The dealer faxes this information to us, and, based on the information provided, we fax back a recommendation of what will work given that particular system. So, in essence, we’ll match a complete set of cables to anyone’s system, and do it right here at the factory.

You see, it’s not a question of price points, or the more money you spend, the better it gets. Designing at progressively higher price points is inherently a flawed concept. It’s true that, as the associated equipment gets more expensive, it allows us to do more—either by hand-building them or by careful materials selection. You can’t do that at a lower price point. But anyway, since we optimize the cable for a particular application, you can get a cable that works best for your system without spending a ton of money!

**Scull:** Let’s hear about the materials selection.

**Denney:** First, we select cable geometries for a given cable based on the engineering requirements or the transfer characteristics of the target components. For example, if we supply an interconnect for a broadband solid-state amp, like the Kraft 400s, we’ll make a heavily shielded cable. If we’re going into a tube amp, we’ll do an unshielded cable that’s extremely low in capacitance. Then we build several versions of that cable using different materials, listening for their contribution to the sound. With us, there isn’t a standard hierarchy of materials, with silver and Teflon, for example, at the top of an almost infinite list of possibilities.

**Scull:** What are the typical materials
your listening room’s acoustic. You’re simply there.

And there was a lot of “there” there. The detail and transparency coupled with remarkably fast transients forms a terrific sense of body. Focus was superb, yet enough of the natural bloom of music remained to prevent the sharpened definition from seeming unnatural. Know that the Kraft 400s set up the deepest soundstage we’ve ever heard produced here—and did so without recessing the top end and distancing us from the pointy end of the music.

As you should expect at this price, when you light the afterburners and crank the preamp (one of Kathleen’s favorite pastimes), not a trace of distortion, grain, or compression exists anywhere in the frequency spectrum—the sound remains as pure and coherent as at moderate or even low volume levels. The more you turn them up, the more magnificent they sound.

And the 400s articulated this nuanced soundstage with apparent ease. But we all understand that effortless sound is never what it seems. It requires, in fact, the highest degree of effort to achieve—not another paradox of life that somehow transfers so readily to the high-end experience.

**The Power & the Glory**

So, let’s spin a disc, shall we? To begin, I chose Poulenc’s Concerto for Organ, Strings, and Timpani in G-Minor (side A) and his Concert Champêtre for Hapsichord and Orchestra (side B). This lovely LP (Eratosthene STU 70637) was recorded by the ORTF (French National Radio Orchestra) under Jean Martinon. The Organ Concerto features Marie-Clarie Alain on the Gonzalez organ of Studio 104 at ORTF; as recorded, the organ sounded deep, resonant, and less “wet” and ambient than a typical church-housed instrument would be. One hears an enormously deep, incredibly wide, totally ambient soundstage augmented by stunningly powerful bass registers, a richly textured harmonic palette, and lovely highs.

The 400s never wavered or faltered on this complex and orchestrally dense work. Every string tone, organ note, musical thread, precisely placed and lay-

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**found in your products?**

**Denney:** We don’t use any pure silver or copper in our interconnects—it’s all alloy. They have better measurable characteristics at 1 GHz than do silver or copper, and in subjective listening tests seem to have a more developed midrange and are texturally more complete. We picked up that technology by working with aerospace engineers.

**Scull:** Is the wire silver-plated?

**Denney:** It’s coated with a preparatory alloy that prevents it from oxidizing. It also improves high-frequency transfer at the surface, where these frequencies propagate. However, our speaker wires are pure copper—simply sounds the best.

**Scull:** How about the dielectrics?

**Denney:** We use foamed polypropylene and modified polyethylene.

**Scull:** Swell, Ted.

**Denney:** Yeah, we’ve changed the chemical compounds slightly. We like polyethylene because it has a dielectric constant almost equal to that of Teflon; but in our listening tests, it sounded much more developed both spatially and texturally, where Teflon alone sounds somewhat thin and bright by comparison.

**Scull:** And the jacket material?

**Denney:** On our more expensive cables, we use a handmade, woven jacket that acts as a dissimilar surface that dissipates vibration. We also use polymer cores and cotton shafts to suppress conductor resonances. On the lower-cost Alpha Series, the jackets are vacuum-sealed over the conductors and dielectrics to suppress the conductor resonances.

**Scull:** In what configurations do you make your cables?

**Denney:** We use solid-core, stranded, and Litz conductors, combining them to get the best performance. You know, Jonathan, you can’t build a symphony with just one instrument.

**Scull:** Can I quote you on that, Mr. Denney?

**Denney:** Yeah! You get a more complete presentation by combining different technologies—that’s why we use subjective listening tests when selecting materials. Earlier you asked about the dielectric—I want to tell you that sometimes we actually pass the signal through two separate modifications of a polyethylene dielectric. In many of our interconnects, one type seems to have the right character for upper frequencies, while another will flex out the bass and the lower midrange.

**Scull:** I see...

**Denney:** And, you may ask, why do we build some of our cables by hand?

**Scull:** Yes, I may ask that...

**Denney:** Well, we make the less expensive Alpha interconnect on a machine—the Alpha Sterling goes for $150 with silver, and I want to tell you, it costs as much to build as any one’s silver cable, which they might sell for $500 or $600. Just because you build a cable out of silver and Teflon doesn’t automatically make it worth 10 times its weight in gold! But we also make handmade interconnects that take over an hour to build just for one pair, which we then run through some tests and give a serial number to.

When we build ’em by hand, we can scrutinize the materials through listening tests before putting them in the cable. Whenever I get a new spool of conductor material, we build a test assembly and listen to the signal in one direction, then flip it around and listen in the other direction. I mark the spool with the direction of the cable. What direction they wind up in the cable itself is dependent on which cable it’s going in. It may run in either one direction or another! In many cables, we’ll run it in one direction in 6-inch lengths, and flip it around for longer lengths. If we made it all by machine, we couldn’t do any of this.

Another thing: We may run the signal wire in one direction and the ground wire in the other. Whatever sounds best. When we build our most expensive stuff, the Resolution Reference, sometimes it’s murder to find a spool of cable or conductor material to build it with. People want ’em, but we can’t get the materials that have the sound for it.

**Scull:** Okay, Ted. That’s 24,998 words—two to go!

**Denney:** Thanks, Jonathan.

**Scull:** That’s it!
In our opinion, the only time flashing red and green lights are appropriate in your home is in the last week of December.

Fewer parts, better parts, better sound.
ered instrument, and small acoustic detail was rendered with equal importance. The result was a mammoth, transparent, concise, extremely coherent sound that brought us the ultimate power of the orchestra by perfectly tracking the many voices of each individual instrument. This certainly has much to do with designer Rolf Ge- mein's theories regarding proper distribution of energy throughout the frequency spectrum, and to his attention to time and phase coherence.

Side B, with Robert Veyron-Lacroix on the Newpurt Harpsichord (Mercier-Yhier, Paris), highlighted two more sides of the 400s' mastery of musical presentation: speed and clarity. I had simply never heard a harpsichord so vibrantly recorded. Like the organ, the harpsichord was beautifully integrated into the recording's orchestral sweep. It sounded fast, light, sparkling and vibrant, differentiated and colorful, well-defined and quite palpable in its own space and surrounding air. The perfectly natural details of the instrument's mechanical action enhanced the intimate, alive quality of the presentation.

One of the best "360 Sound" Columbia two-eyes I have is of Mozart's Concerto 26 for Piano and Orchestra ("The Coronation") coupled with his Concerto 27. The dream team? Robert Casadesus, with George Szell conducting the Columbia Symphony Orchestra.

In his seminal tome, Mozart: His Character, His Work, Alfred Einstein called No.26 an "hors doewve" penned in February 1788. "Brilliant and amiable, this ebullient concerto proved a perfect foil for the many strengths of the Symphonic Line amps. The tonal colors generated by Casadesus's piano were strong, harmonic, powerful, bloomy, emotive, and well-focused in center stage. The piano may be difficult to record, but the 400s re-create this instrument's tonalities and power throughout the frequency range without raising a hair.

The orchestral sound was powerful, colorful, rich, and spread out left, right, and behind the piano in an immense volume of air. String tone was superb (some two-eyes are variable, to say the least), and the dynamic contrasts were so well-developed that the pleasure in the listening seemed to come close to what a live performance might yield.

THE NETHER REGIONS

The bass was one of the truly stunning elements of the 400s' sound. They managed absolutely the most pitch-differen-
tiated, tightest, deepest, lautest, most powerful, and yet still redolent bass it has ever been my pleasure to hear. (How do you really feel about it, J-10?) Up to now, the Lamms M1.1s (reviewed last April, Vol.18 No.4) had that distinction in our system. As deep and wonderful as those amps were, the 400s made them seem a touch lightweight and delicate in comparison. (Still no bad thing—the Lamms do deliver a nuanced, transparent, and delicate sound.)

Listen to the shudderingly powerful bass in Dead Can Dance's Into the Lahynth (4AD 45384-2) and marvel at your absolute ability to hear the actual tautness of a drum head stretched over the body of the instrument. Or the incredible bass transients on JA's favorite track from La Fabuleuse Histoire de Mister Swing (WEA/MJ.M. 2292-42383-2), "Le Temps Passe" (or our own preferred upbeat cut, "Si Si Si, Le Col!). Or the heart-thrumbing bass on "Three," from Massive Attack's Protection (Virgin 93983 2). Or the incredibly visceral acoustic and electric bass work on the classic track "Love for Sale," from the Sire's Svale Band's Blackbird (SON CD 2001, a Norwegian import distributed by Ars Jörg Kessler, Germany. Tel: (49) 4082-5567 Fax: (49) 4082-5897).

The Symphonic Line amps were as powerful, taut, lithe, and incredibly precise in the midbass region, right down to the very grimy depths. You'll be pinwheeling your music out of the shelves to hear the incredible pitch-differentated bass these amps deliver. I guarantee you'll be humbled by the experience.

The bass from Forsell's The Statement can sound bigger; it shudders out at you on Labyrinth more impressively, but is certainly less pitch-perfect than the 400s'. But The Statement's strength—and indeed that of all Forsell products, in fact the very basis of their musicality—is the superb manner in which it re-creates musical bloom. While the Kraft 400s didn't have the great gentleness and ultimate bloom of The Forsell Statement—they sounded somewhat leaner and more controlled overall—they're nevertheless capable of blooming with the best of them!

BETWEEN THE SHEETS & ON TOP OF IT ALL

I won't make much of the midrange except to say that we didn't lose much with these amps with either the Jads or Forsell digital front-ends. Or with the Air Force One, with either the Insider (and its magnificent and complex midrange) or the Symphonic Line RG-8 (mating very well with its intellectual stablemate). Just read between the lines and know that there can be no musical bloom without a well-developed harmonic midrange. On some of the enjoyable Classic Records jazz reissues with the Insider and the JP-80MC, for example, the midrange could simply be to die for, dazzling.

And how about those highs? Forsell says bipolaras have a "little bit of transistor sound" in the highs and aren't much good at reproducing small acoustic details when leveled into high-bias class-A. How did the Kraft 400s hold up to this scrutiny?

Let me riffle through my notes... how about an LP? Let's find a hard case... Deutsche Grammaphon! (Usually heavily equalized in the highs, to be kind...) I wrote: "Beethoven Edition 1970, Piano Trio Op.1 No.3 in C, 2nd movement, acting beauty (from DG!), beautiful midrange with the Insider/ XLO Phono Cable/CAT, tremendous detail and naturalness to the presentation. On this DG at least, the highs are pretty much intact, a little tweak of VTA bringing it under control." If the 400s could make a DG sing, imagine what they could do to well-recorded efforts.

And speaking of AbFab recordings, let's turn to Sinatra and Ellington on Francis A. and Edward K. (Reprise FS 1024). Afroh, God, what a recording. (First heard at WCES in Vegas in the Discovery/Clearaudio/Alón room, it knocked me for a loop then, too.)

The Chairman was at the absolute top of his form back in 1967, and the Duke was at his intimate and restrained best. I'm not a Frankie fan, really, but this LP is richly compelling and beautifully recorded. The soundstage, huge in every dimension, was extremely ambient. The fast attack and lovely harmonic bloom of the warm, burnished horn section made me squirm with pleasure in the Ribbon Chair.

There's no question but that these amps did superb justice to the human voice—male, female, and anything in between. Listening to Sinatra crooning on this album with either the Insider or the Symphonic Line RG-8 was a transcendent experience. Francis was in the room, doing his thing. As Edward R. Murrow would have said, "You are there."

Another perfect example of heavenly vocals was Joe Williams on his fine-sounding Nothin' But the Blues CD (Delos D/CD 4001). I drew the unbe-
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lievable soundstage on a Post-It note and stuck it to the back of the jewelbox. Joe sounded just about perfect [pad pad pad] way back here [pad pad pad], and the horns were spread out from [pad pad pad] way over here, to...you get the idea. It reminded me of JA clomping around in his ubiquitous Durango Vild Vest boots calling out the soundstage on the wetter-than-wet Robert Silverman piano recording. Like, it's okay, JA [puff puff pad]—we can take a cab to the back of the soundstage!

Or listen to Bill Henderson's great Live at the Times (Discovery DSCD-779)—especially that soulful "Send in the Clowns"; or the entertaining and romantic Milla on The Divine Comedy (SBK/ERG 27984-2). Play any vocal recording, and keep a comb handy to plaster down the hairs on the back of your neck.

I could go on dissecting the sound to its basic components, but what was significant about these amps was no one point of their world-class presentation, but rather the way the whole construct combined to bring me the music. The design goals of time and phase coherence, coupled with equal energy distribution throughout the frequency range, have resulted in a sonic pentimento of museum quality.

COMMUNIQUE FROM THE MINISTRY OF SILLY WORKS

A word or two regarding the wild-eyed and tediously repeated question of no meaning: "Is it better than..." Puh-leez. As a statement product, the 400s obviously succeed, if in their own way, in defining the high-end ideal. Listening to it, Kathleen and I never felt the need to fire up the "bipolar"-opposite Forsell The Statement or Jadis JA 200s. (Of course, as part of the review process, I did critically listen to The Statement for the differences in their presentations.) The 400s always gave their all, importantly at every volume level, and always remaining willing partners in the audio game. In spite of their overwhelming physical presence, they called attention to the music rather than to themselves. That's exactly what I demand from a component.

By the way, the only tubed amplification I listened to during the 400's stay were the Manley 440s, as we piled on the hours and hoped the blessed Break-In Fairy would finally pay us a visit. Have we lost any of the music without having turned to thermionic amplification? I don't think so.

FINALE

So what's the final musical test? You know what it is. It's your version of this scenario. It's Sunday morning, you're having the first coffee of the day while beginning to dig into the tome that is the Sunday New York Times. The Forsell Air Force One has quickly stabilized at 33⅓, and you choose the (mono) Mozart Quartets Dedicated to Haydn by the wonderful Budapest String Quartet (Columbia/Odyssey Y3 31242).

How does it make you feel? Does the music reach you during this almost-in-between state early in the morning? I'll tell you how the Symphonic Line Kraft 400s sounded. "Sweet—and how," read my hastily scribbled notes. (Kathleen spoils me with a constant stream of beautifully chosen note-taking books.) The Budapest's transcendent musical offering touched me emotionally—I jotted that I seemed to be hearing the music through my pores! (It was still a little early.)

So...what's feeling that way worth to you? If you're one of the small but demanding group who make up the consumers of the "statement product" spectrum of the High End, you will do yourself no injury to audition these amps.

—Jonathan Scull

MEASUREMENTS FROM TJP

A full set of measurements of the Symphonic Line Kraft 400 was made in its unbalanced mode. Balanced measurements were not made, for reasons explained below.

Following the ½-power, one-hour preconditioning test, the Kraft 400's heatsinks were barely warm to the touch—so cool, in fact, that it seemed that the heatsinks are far larger than they need to be.

The input impedance measured a moderately low 9.8k ohms. Some care should be exercised to avoid matching the Kraft 400 with a preamp having an unusually high output impedance. The output impedance was 0.04 ohms or less at low and mid frequencies, and under 0.07 ohms at 20kHz—which should not affect the system's frequency response into different loudspeaker loads. Voltage gain into 8 ohms measured 33.1dB, and signal/noise (ref. 1W into 8 ohms) measured 103.4dB over a 22Hz-22kHz bandwidth, unweighted (but see below). The Kraft 400 is non-inverting in the unbalanced mode.

Fig.1 shows the frequency response of the Kraft 400 at 1W into 8 ohms; the result into a 4 ohm load was virtually identical. The 10kHz squarewave shown in fig.2 is an excellent result, with only the slightest reduction in rise-time to distinguish it from a virtually perfect result. The 1kHz squarewave, not shown, was virtually perfect.

Fig.3 shows the THD+noise vs frequency curves. It is here that my problems with the Kraft 400 are first visible. When the amplifier was first turned on for its ½-power pretest, there was a slight but unmistakable odor of burning insulation or paint. It lasted only a few seconds, the amp appeared to be functioning normally, so I thought little of it. Later, as I was about to make the THD+noise vs output measurements, I noted a much stronger, similar aroma. While the amplifier was briefly subjected to a 1V input into a 2 ohm load at about the same time, this was only for slightly over a second, and should not
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have caused a malfunction in such a large, powerful amplifier. In any event, I turned the amplifier off briefly, after which it appeared to function normally.

To be certain nothing was amiss, I went back and remeasured the THD +noise is frequency. Before and after measurements are shown in fig.3. The "after" results, while still quite good, are noticeably higher. When I remeasured the S/N, it had deteriorated to 74dB. As the amplifier was otherwise functioning properly, I completed our test series to see if anything else unusual turned up. I did encounter a subsequent pattern of fuses blowing on the power-supply rails, though I was able to restore operation several times to complete the measurements presented below.

The THD+noise waveform is shown in fig.4. Note that the result is heavily second-harmonic—always a good sign for an amplifier's sound. The spectrum of the Kraft 400's output while it drove 50Hz into 4 ohms is shown in fig.5. While this is a respectable result—about 0.5% (-45.4dB) at 100Hz, and just over 0.08% (-61.5dB) at 150Hz—this was for an output of just over 55W. The distortion rises significantly at only a few watts higher, with the waveform showing quite visible, and intermittent, distortion. Most good amplifiers can get reasonably close to 1/2 power into 4 ohms (with the 400, just over 400W)

before any sign of clipping becomes visible.

Fig.6 shows the output spectrum with the amplifier reproducing a combined 19+20kHz signal at an indicated 258W into 4 ohms. This is a more respectable result, with only three artifacts greater than -60dB (0.1%). The result was slightly better still at 155W into 8 ohms (not shown). With this input signal, it is much more common that an amplifier clip prior to reaching two-thirds its rated power.

The 1kHz, THD+noise is output power curves for the Kraft 400 are shown in fig.7. The rise in distortion around 100W—well short of actual clipping—may have been due to the incidents reported earlier, but this could not be verified. At any rate, this amplifier does put out substantial power, clipping at approximately 250W into 8 ohms, 470W into 4 ohms, and 780W into 2 ohms. And the line voltage was slightly low when these measurements were made—about 107V! Because of this, I decided to finish the rest of the measurements the next day.

But the next day the Kraft 400 refused to respond. It turned on, and all the LEDs lit up, but there was no output. It wasn't a fuse, but if it had been, this would have been the sixth rail fuse blown in the test—sufficient reason to discontinue further measurements. Whatever had caused the intermittent problems of the day before was now clearly plotting to prevent the completion of the tests. Remaining incomplete were the balanced measurements, measurements into our simulated real-world load, discrete clipping tests, and checking the DC offsets.

Had JS not experienced any service problems with the Kraft 400, we would have hauled our second sample up to the test bench despite the heroic efforts required to move this amplifier (ropes, pulleys, and a chorus of "Yo, heave ho!"). But Jonathan had had problems. We called it a test.

Aside from our difficulties in keeping the Kraft 400 operating properly, I had several problems with the amplifier's physical design. The internal parts appear to be of good quality, but there's a lot of dead air inside the amplifier—more than half its volume, in fact. I estimate the total weight of the internal parts to be no more than a third, or perhaps as little as a fourth, of the amplifier's total weight. The rest is the heatsink and the massive steel plates of the case. The output transistors are all mounted in a square at the center of the heatsink, another indication (along with the cool operation) that the heatsink is considerably overdesigned.

The case itself of the review samples is not well finished, with unpolished, butt-joined edges. Certainly it's not up to the superior fit'n'finish we've seen in earlier Symphonic Line products. The square, sharp edges of the amplifier, combined with its weight and lack of any handles or convenient handholds, make it a dangerous design to move around.

Given the asking price, these are not trivial considerations. The amp should be about half as large as it is, and about half as heavy. But then, it wouldn't be muy macho, and the asking price would have to be reduced. But I guess that's just the cynic in me talking.
W

hy do we audio nuts spend so much money on systems that we have to stay at home to enjoy, while all those "active" people are out doing "fun things" and meeting all sorts of "interesting friends"? Do we even know why? Is it because we'd rather meet Jimi Hendrix or Anton Bruckner than some guy named Ralph down at the local bar? Come on, Ralph would try to enlighten us on the finer points of football, Budweiser commercials, and trivializing women. We wouldn't want to miss out on that, would we? Okay, maybe "active" was the wrong word. Ralph is about as interesting as a passive preamp driving speakers.

It's obvious to us that listening at home can bring a lot of peaceful enjoyment, but perhaps there's more to our obsession than just enjoyment. In the book Being and Vibration, by Joseph Rael and Mary Elizabeth Marlow (ISBN 0-933031-72-6), my Native American friend Joseph writes about his spiritual upbringing. When he was living in Picuris Pueblo in New Mexico as a boy, his Grandmother educated him in ancient American wisdom, for she knew that he would become a shaman. She said, "Since people are made of sound, listening is important. It is through listening that you become a true human, and a true human is a listener who is constantly attuned by working with everything that is happening." The people of this land thought it very important to be careful listeners thousands of years before stereo equipment came along.

What does all this have to do with a bunch of speakers? Well, it's the very crux of the biscuit, as Frank Zappa would say. If you don't know why you listen, how can you form value judgments about what you're listening to? I've been thinking a lot about what's most important to me in reproduced sound. Number one in my book--and, not surprisingly, important to me in every aspect of life--is a good balance. If something is designed such that it can excel in one area of performance at the expense of other areas, it is likely to disappoint over the long term. Number two is the ability to communicate the maximum amount of musical information from the recording to my ears. I want to hear as much of the subtlety of the musicians' performance as possible, and am willing to tolerate the uncovering of annoying multitack, mediocre microphones and recording equipment, and overprocessing artifacts for the sake of high resolution.

Many recordings have such artifacts; I think that trying to ignore them is better than having your system filter them out along with the fine inner detail of the performances. Living with nothing but purist audiophile recordings is not an option, though it would save you from recorded nasties on a very analytical system. While the amount of detail exposed was the final deciding factor for my value judgments in this review, don't forget that this detail should not come in the form of an unbalanced presentation of any kind. A speaker that has an elevated treble response, for example, might initially seem to highlight recorded details, but is officially out of consideration because it does not satisfy requirement number one.

What of frequency response, soundstaging, and other such concerns? These are definitely included in my hierarchy of importance, but they fall somewhere below the first two, and I'm not sure in what order. It is possible to live with and ignore many small frequency-response errors, or a small bit of harmonic distortion. It is impossible to re-create in your mind, in exactly the way they exist on the recording, small musical details that are being lost by your system. High-end audio is not just about presenting the same information in a prettier form, but instead providing a subjectively much larger quantity of musical information that brings you much closer to the exact feel of the artist. Besides, as you improve the resolution of your system, more reverberation information becomes available and your soundstaging will also improve. Things are interrelated; life is complicated.

All three pairs of speakers reviewed here, as well as my own Br~W 804s, are approximately the same size, the same price, are designed to be floorstanding, and sit on the same ring of the loudspeaker ladder. I like to think of them more as overgrown mimenitors than as wimpy little alternatives to full-sized speakers. This size of speaker is actually more appropriate than a much larger one for listening in a modest-sized
room like mine. They don't have an abundance of low bass, or even midbass, but in a small room, what they have can be quite adequate. Also, the tweeter and mid-woofer are placed in close proximity on the baffle so that one may listen quite close to the speakers and still get good driver integration.

I like listening close in order to minimize the room sound. Particularly with speakers like my B&Ws, which were designed to measure flat in an anechoic environment, the closer you get, the better they sound (at least until you can hear the different parts of the music coming from different driver locations).

**SYSTEM**

The CD player used for my debut Stereophile review was a Kinergetics KCD-20B that I've modified somewhat. (I promise not to modify anything while I'm reviewing it!) Recently, I've been using the best preamp in the world: no preamp at all. What? I don't listen to vinyl? I must not be a real audiophile.

The power amplifiers currently in my system are Nelson Pass-designed 15W single-ended "Zen" monoblocks. They have just one large MOSFET in the signal path, and I have to tell you they sound wonderful because I built them. I pick flowers to give to them, and I'm going to host a lovely birthday party for them in December.

Other power amps ready for active duty were an NAD 2100X, a Michael Yee Audio PA-1, and Muse One Hundred Fifty monoblocks. Power-line filtering was compliments of a MagneTek isolation transformer sandwiched between a couple of stages of 0.1μF polypropylene shunt capacitors. (Your mother told you not to play with electricity, so don't go building your own power-line filter and electrocuting yourself.) My Zen monos don't need anything extra because I've built overkill filtering into their power supplies. My long-term reference pair of speakers, the B&W Matrix 804s (also slightly modified), were on hand for comparison purposes.

Interconnects were 1m long, homemade, unshielded, lead-free soldered, Teflon-sheathed, all twisted and goofy-looking, whatever. Speaker cables were mostly AudioTruth Argent, but I also tried TARA Labs RSC Master Gen2, Dunlavy DAL-Z8, and 2' lengths of Straight Wire Maestro. Hooray for short speaker cables.

My listening room is 14.5' by 13' by 8'. I placed the speakers in front of the long wall, with a 2' H by 5' W piece of "egg-carton" foam hung on the wall behind them at tweeter/woofer height. On the right wall was a larger piece of foam at ear height, and a handsome tapestry. On the left and back walls I have hung some not-so-handsome blankets, but they help out with the imaging and treble balance. My homemade comfy chair sits in the middle of the room, placing my ears about 7' from each speaker and about 34" from the floor. When I stylishly rotate my body counterclockwise in my chair (clockwise for watching gophers), the wooden floor's tuning-focus snapedge maximizes, so that all the blooming palpatude and harmonic convergence of the rehabilitated deviant electrons gives me radiation bumps.

I was told that all the speakers that were sent to me were already broken-in, and I pretty much found that to be the case. Some were ready for a bit of woofer-screw tightening, I gently obliged. All that was left was to find optimum locations for the speakers. I've heard it said that it's desirable to have the speakers symmetrically arranged in the room for the best imaging. I think that's dumb. First of all, absorbing most of the side-wall midrange and treble reflections gives better imaging than bouncing them off of symmetrical walls. Also, you want the speakers to be staggered with respect to wall distances in order to minimize bass standing waves in the room. You want their distances to the front wall to be different by at least a few inches, as well as their two side-wall distances. In addition to this, each speaker's distance to the front wall should not be an integer multiple of its distance to the side wall.

Finally, if you're really nuts (like me), you can check, and adjust if necessary, to see that each speaker's front-wall and back-wall distances are not integer multiples of each other. Then do the same for each speaker's two side-wall distances. This can be accomplished by two people stretching a tape measure from the center of the woofer or port to the wall, so that it is orthogonal (perpendicular) to the wall. The iterative adjustments should be started only after you've found an estimated position where the speaker's bass seems to be decent, and decided on the best angle of tiltback. Of course, all this math can be done more quickly by a computer with one of the listening-room programs available. If you don't have any of that software, you can just do it the old cave-man way (like me).

---

Stereophile's Kristen Weitz had the last word on Arcam's affordable* Alpha 6 Amplifier and Alpha 1 CD Player.

"Excellent."

(Kristen Weitz, Stereophile, Vol. 18 No. 5)

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shape its response. It's not a physically easy task for a woofer to reproduce (well) all the frequencies from about 60Hz up to much above 2 or 3kHz. One that succeeds is a nice find, though, because the sound has a nice coherence to it when most of the music is coming from the same driver. But don't take my word for it—just look how many zillions of two-way speakers there are out there.

The cabinets of these speakers are quite dead, meaning they shouldn't add too much garbage to the sound coming from the drivers. The walls are 1" thick and braced on the inside, and the edges of the cabinet are rounded to reduce detrimental diffraction effects. In a nice touch, Swans puts the crossover inside a sub-compartment to isolate the components from internal sound waves. The drivers are sonically matched in pairs at the factory prior to assembly, after which the speakers are submitted to lengthy break-in calisthenics. After break-in, the speakers are tested again. Then they're shipped out, and you get to test 'em.

Sound: When I set up the Batons in the "minimized room modes" position that worked well with the B&W 804s, their bass was a little boomy. I realized that, since these speakers are rear-ported, I'd have to check all the wall distances to the ports, as well as to the woofers. This meant twice as much work and trickier problem-solving than was required by the other loudspeakers, whose woofers, ports, and passive units were lined up more or less vertically. Not to worry, though—an inch this way, a couple inches that way, and all the numbers worked out oh-taay.

I found the Batons sounded best tilted way back. It didn't sound like there was optimal driver integration until I got my eyes on the axis of the lower grille anchors, below the woofer. (Be careful: if you tilt them back much more than this, they might fall over.) With the amount I used, though, they still seemed to have enough stability. The threaded spikes (included) are nice and large, and have no nuts attached. These spikes were easy to adjust, looked plenty strong enough, and gave lots of maneuvering height to reach a good tilt angle. I wish more speakers had spikes like these.

After a bit more listening it became apparent that the Batons should be toed-in so that they point directly at the listening position. This configuration gave the most detail, and the Batons needed all the detail they could get. The sound was less involving if they were angled away from me at all. Also, I preferred listening with the little grilles removed. (I've found that grilles in general interfere too much with the top octave.)

Steve Tibbetts' recent masterpiece *The Fall of Us All* (ECM 1527) is a wonderfully weird album with one of the most diverse collections of instruments I've heard: rock'n'roll guitars, New Age-y synthesizers, and ethnic Asian instruments and drums. Tibbetts' gift for composition really turns me on, and his creative and masterful use of his analog studio doesn't hurt, either. Through the Swans, I heard less detail than with my reference B&W. The Swans seemed to give everything a warm, wooden quality, which helped line the drums to sound quite realistic, but metallic instruments came out sounding a bit muffled. The lower-midrange detail was actually fairly good, and the bass was fairly tight, but there appeared to be information missing from the upper mids on up.

The Batons' bass sounded less extended than that of the Thiel or B&W's. They went down *almost* as low, but their mid-bass was a bit recessed. With Dorian Records' Sampler II (DOR-90002), I had the impression that the bass was slightly too lightweight. Though in general the Batons' bass had good speed, with little overhang, their upper bass somewhat obscured the midbass, making the bass viols and organ pedals difficult to pick out. The bass coloration overall is not that large; I'm just pointing out minor flaws.

I noticed some colorations in the midrange. Some of these were admittedly due to the room, but others were present regardless of where I placed the speakers. I'm not going to try to name particular frequencies; I'll just say there were peaks and dips slightly bigger than expected in speakers of this price. These colorations, in addition to the lack of detail overall, made me want to stop listening to classical music on the Batons. The instrumental timbres were changed enough to detract from the level of realism that normally excites me with well-recorded acoustic music. I reached for rock'n'roll instead.

Now for the good news. I put on Toto's *Isolation* (Columbia CK 38962) and immediately started to enjoy myself. This ain't no cave, and my name ain't Bruce Wayne, so out with Bat-on, and in with Rock-On! These speakers worked wonders with this recording. Much of the overlap balance, recording artifacts, and excessive cymbals were mercifully absent. Through the Rock-Ons, this recording sounded more natural than usual, thanks to the speaker's slightly soft treble and rolled-off top octave. This is not high fidelity. I think I'd call this Fidelity Band-Aid. I also think I like it on some recordings, even though I know better.

Moving on to Journey's *Greatest Hits* (Columbia CK 44493), I wrote, "Now I'm on to something here. Steve Perry's voice has a warm, natural-sounding roundness, but I've never heard this recording sound this good before. The electric guitars sound particularly good." I had never heard "Don't Stop Believin" sound as good as it did on the Swans "Rock-Ons," and it made me wonder if the speakers the recording engineer had used had a similar balance. I was having a lot of fun with this synergistic match between recording and speaker. I hadn't known that it was possible to strap a pair of speakers on to the end of a transparent, neutral playback system, and have them systematically transform bright, gimmicked recordings into more natural-sounding music.

The main drawback left with the Journey was the speakers' tendency to reduce ambience, even though there isn't much on these recordings. What would normally sound like a medium-sized recording studio sounded a bit smaller and more heavily damped. The left/right image placement was well-defined, and the images themselves gave a fairly good illusion of being in the room with me, but they were more atmospheric than well-fleshed-out. Everything sounded a little softer than real, and the depth was foreshortened a little.

As the Zen amps have a moderately high output impedance of about 0.8 ohm, I wanted to try the Swans with a more characteristic transistor amplifier. I hooked up the NAD 2100X, which has an output impedance less than 0.1 ohm, and the treble sounded a little improved. The difference was not that large, but it was definitely a change for the better. Later, I performed the opposite experiment, connecting 2.2 ohm resistors in series with the Zen and the speakers. This simulates an amplifier impedance of 3 ohms, such that you might find in a single-ended tube design. The treble sounded worse with this setup. I definitely recommend using amplifiers with low output impedances with the Swans. I didn't use the NAD with them all the time, however, because it couldn't compete with the Zen in terms of sound quality. (It's a good amp for the money, though.)

The renamed "Rock-Ons" performed admirably in the Greenberg Memorial Loudness Test. (As Corey doesn't write
for Stereophile anymore, I figured we should name something after him.) I played some Megadeth and some Warrior Soul, and turned the volume up beyond the point where I had to put cotton balls in my ears to be comfortable. The Swans uttered nary a complaint. No woofer bottoming out. No tweeter bits on the floor. Not even any kind of strain or excessive distortion. This refusal to expire (or even perspire) is impressive for a pair of 7" two-ways, and convenient considering how loudly their preferred program material wants to be played. So bring on your poorly-recorded-yet-lots-of-fun rap, heavy metal, alternative, industrial dance, and disco, and turn it up.

**Measurements from JA:** Although the audiophile grapevine has it that the Baton is well-suited for use with low-powered tube amplifiers, its B-weighted sensitivity weighed in at a moderate 86dB/2.83V/m. In addition, its impedance (fig.1) drops below 4 ohms in the lower midrange, coinciding with a moderately demanding phase angle in the same region. The saddle at 46Hz in the magnitude trace coincides with the port tuning and suggests reasonably respectable low-frequency extension.

Fig.2 shows the Baton's acoustic crossover on the tweeter axis, this 34" from the floor, with the port and woofer low-frequency outputs measured in the nearfield and the microphone almost touching the woofer cone. As expected, the port's bandpass output is centered on 46Hz, this coincident with the null in the woofer's output. The latter's response is a little exaggerated in the upper bass, however. Higher up in frequency, the woofer/tweeter crossover lies at 2kHz. The woofer's steep rolloff is broken up by a couple of peaks, but these are well down in level. The tweeter's on-axis output is commendably flat in its passband.

Averaged across a 30° window on the tweeter axis, the Baton's overall response is...
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is shown in fig.3, married to the complex sum of the nearfield low-frequency responses weighted in the ratio of the radiating diameters. The bass rolls off at the expected 24dB/octave below the port resonant frequency—though both port and woofer have just 12dB/octave rolloffs, these are in antiphase and subtract from one another. The –6dB point is a low 38Hz. The midrange and treble are commendably flat, though a slight lack of energy in the low-presence region (1–3kHz) might tie in with the “taming” effect the Batons had on rawly recorded rock. The top octave is also a little shelved-down.

For reference, and for the information of those who have older Batons, fig.4 shows a similar graph, measured under identical conditions, for an earlier version of the Swans Baton that was submitted for review.4 This speaker, serial number A4.112 (compared with A4.160 for the latter one), is noticeably less flat, with exaggerated bass and high-

4 Dick Olsher, now with Hi magazine, originally worked on a review of this sample of the Baton, but as Swans is now marketing a loudspeaker for which Dick did the preliminary design work, that review was aborted and a new review commissioned from MK.

treble regions. It did have a slightly higher sensitivity, however, and its waterfall plot was superbly clean.

The Baton’s horizontal dispersion is shown in fig.5. As well as having a shelved-down top octave, the Baton beams in the same region, its output falling off above 5kHz to the speaker’s sides. In all but very lively, undamped rooms, this will add to the lack of air in the speaker’s perceived balance.

Note also that the woofer has difficulty in maintaining its on-axis output at extreme angles to the speaker’s sides. Vertically, MK found that he preferred the Baton’s balance sitting quite low. The vertical-dispersion family of curves (fig.6) reveals that sitting on or below the tweeter axis does indeed give the optimal tonal balance. Sit so you can see the top of the cabinet, and an immediately-robbed suckout appears. The room reverberant field, however, will lack energy in this region, subtracting from the Baton’s sense of liveliness and perhaps making it sound too polite.

In the time domain, the step response on the tweeter axis (fig.7) indicates that the two drive-units are connected with the same positive acoustic polarity, but that the speaker is not time-aligned, the spike from the tweeter leading that of the woofer by 0.5ms or so. The cumulative spectral-decay, or waterfall, plot (fig.8), however, is commendably clean.

Unity Audio Signature 3: $1895/Pair
When I saw these speakers arrive in one box, I was happy. Not just because it meant there would be that much more space left in my basement. No, because it means that Unity is saving money on packaging costs. That means they can spend more money on things like super-nice crossover components. That means…well, I think you know what that means. After all, any piece of audio gear is only as good as the parts it’s made from.

To get these overgrown bookends to stand up, you slide little black boards into the slots in their bottoms. Each board is held in place by two set screws, and sticks out to support the speaker with two of the four spikes. The board also tilts the speaker back a little. How do they get sufficient bass out of such slim cabinets? Unity Audio is glad you asked. They call it “Inverse Force Vector Coupling,” and are very proud of their development, isolated through “extensive physics research.” The back wave of one woofer is said to cancel that of the other. The system can be tuned by varying the dimensions of the tube that runs through the middle of the cabinet. Unlike an acoustic suspension system or a ported system, this type of bass alignment is said to be able to work with an extremely small internal volume.

The Signature 3 has a 7” polypropylene-cone, cast-basket woofer mounted at the top of the front baffle, and a second one mounted at the bottom of the speaker’s back wall. This rear woofer puts out midrange as well as bass, so whatever is behind the speaker will affect the sound more than with an ordinary front-firing speaker. It also has a 1” silk-dome tweeter. My first samples were old enough to not have the ceramic coating on the tweeters, and they looked like the same units as in the Swans Baton, but without the Marigo dots. Unity Audio apparently has done quite a bit of resonance-structure research for the development of their new tweeter, investigating different ways of getting the best transient speed from the dome while trying to avoid ringing. They found a lightweight ceramic material more than 10 times as rigid as aluminum, and which can be deposited in very thin layers. Multiple layers of this are used on the dome, alternating with thin layers of what’s said to be a very effective damping material. All recent production of the speaker has featured the new tweeter.

Remember what I said about saving on packaging costs? The crossovers of these beauties feature copper-foil aircore inductors, Kimber Kap polypropylene capacitors, and pure silver wire. The cabinets are internally braced, and small enough to not want to resonate much anyway. They did seem a little wobbliefit, though, so I placed some disks on them. Was it those neat bingo
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woofer with a subwoofer's rolloff (with calcium!)

Sound: Which hot glue.

I was taking a look at the first pair, I saw a little bump on the woofer surround. It felt hard. I removed the woofer and found some nice things inside. The input wires are soldered directly to the woofer terminals, eliminating crossover components. The woofer crossover is accomplished mechanically, by mass loading the cone with a coating of hot glue.

Which brings me back to the bump. It was a stray piece of glue that had accidentally splashed onto the surround and stuck there. By reducing the elasticity of that side of the surround this could theoretically be bad for the sound. In my listening, though, I had difficulty detecting any difference between the sounds of the two speakers. At least this little defect proves that Unity Audio doesn't give preferential treatment to speakers that will be sent to reviewers, which is nice to know. I only found such bumps on two out of the eight woofers of the two review samples; they don't seem to affect the sound much, but Unity's glue people should be more careful.

I substituted the Signature 3s after listening to the Swans Batons for a week. It was immediately obvious that the Unity Audio reproduced well-recorded music in a more neutral fashion than the Canadian design, and this impression continued throughout my listening. I listened with the grilles off, mostly with the speakers in the same positions as the Batons. I found the bottom of the woofer to be a good listening axis and preferred a slight toe-in.

With Steve Tibbetts' The Fall of Us All, I got the sense that the Signature 3 was well-balanced, with better top-octave air and a much more spacious presentation than the Swans. The only part of their presentation that seemed to be substandard was the midbass: there wasn't much. True, the upper bass was of high quality and at a good level, but a certain visceral push was missing. The bass-frequency tones on Stereophile's Test CD 3 (STPH006-2) were missing in action below about 60Hz.

Despite being endowed with what looked like the same tweeter as in the Batons, this pair of Signature 3s had a brighter presentation. Instrumental timbres were more natural with source material of the trustworthy, unequalized type. They also had more treble detail to offer the listener, although I felt they couldn't quite equal the Thiel CSL.5 and B&W 804 in this department. Partly because of their nice top end, they provided a large sense of space from their reproduction of the reverberation info on the recording. Their spaciousness was also augmented by the rear-firing mid-woofer. While I felt this was a bit too much to be strictly realistic, it was very pleasing, and certainly closer to reality than the Batons' persistent tendency to reduce soundstages to the equivalent of a Sonexed bedroom.

This first pair of Signature 3s had a good midrange: fairly smooth in terms of tonal balance, but with a few small departures from linearity. The really cool thing about their midrange, though, was the amazing transient speed. With no crossover to get in the way, the Signature 3 reproduced all the mid detail that the amp could feed it. After all of my mod madness, and other listening escapades, I know how well simplicity can take me closer to the original event of the performance. With this setup there were only two resistors, two capacitors, one MOSFET, and four mechanical connections between the CD player's output and the midrange's voice-coil. I was a happy little pew-wrist.

The Sound of the Current Signature 3: Towards the end of the review period, Unity submitted a revised pair of Signature 3s,5 these featuring the revised crossover and slightly larger midrange.
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This suckout is not serious; it just showed up because the speakers are so smooth in most other respects. Of the many wonderful tracks on Dorian's Sampler II, one taken from J.S. Bach's Cantata BWV63 (DOR-90113) is the real torture test for components in my system. The amazingly rich presentation of all the different instruments, as well as the enveloping feel of the different halls on all the tracks, led me to use this disc as a reference. But if there's anything I know the sound of, it's a choir, having sung with several for many years. The Bach revealed some midrange colorations that I had previously been oblivious to. These were fairly small, though, and I'd have to say that vocal timbres were quite realistic in general. But only with my reviewer-mandated critical ear toward casting judgment do I find anything to complain about in the midrange.

The second sample of the Signature 3's bass quality was about the same as the first pair, maybe a little smoother in the upper bass. It remained smooth all the way to the cutoff point, still about 55Hz. With Simple Minds' latest, Good News from the Next World (Virgin 399222 2), the lack of low bass was a little unsatisfying. This is a bright recording, so it sounds lightweight on its own. With the Signature 3 it sounded even more lightweight than with the other speakers in this review, both of which will all go at least another half-octave down in frequency.

This lightweight balance is the Signature 3's only major drawback. It was more of a casualty on rock music like this, which relies so much on that driving beat. This shortcoming was partially offset by the high quality and tightness of the upper bass, however. Everything did have a nice rhythmic feel, if not a sense of low-end heft.

The Signature 3s provided me with plenty of detail, falling short of what I heard with the Thiefs and B&W's, but not by much. I prefer listening to even mediocre recordings like Journey's Greatest Hits on a very revealing system. Hits they sure are—they hit you over the head with the harsh sound of too much electronic processing. I'm willing to take a few blows if I must, for the sake of hearing more of what the musicians are doing. Correctly, the Unitis didn't pull any punches.

The Signature 3s, however, sounded just too bright on the Journey Hits album, which is, at any rate, a collection of too-bright recordings. The speakers had their usual hazy, too-prominent treble, yet I was still able to listen past the recording flaws and enjoy the music. Here, again, the lack of anything resembling low bass was a liability. I didn't miss it too much unless I was listening to rock, and I bring it up because I really can't find too many other things to complain about with these speakers. I think whether or not you'd rule them out as candidates because of their limited LF extension really depends on what type of recordings you listen to the most.

Though the Unity Audios gave a generally spacious presentation, with a subjectively large amount of ambience, their imaging was not as pinpoint as I'm used to. The ambient decay of the new samples seemed to be a little better than with the older versions, more precisely defining the exact spaces where the recordings took place. They tended to foreshorten the depth associated with instrumental locations, although not to the detriment of the music. In spite of this, the recording venues did have a nice large feel, partly because of the rear woofers' sound spreading around without bound. Individual instruments were not placed quite as precisely as I've heard with other speakers. The (quasi) dipole design has tradeoffs, but I've definitely enjoyed the benefits of this method of loudspeaking.

I briefly tried driving the Unitis with the NAD 2100X, to get an idea of the effect of a low output impedance on their sound. The midrange and treble seemed just a little worse in terms of balance, but the difference was very small. The bass seemed a tiny bit fuller. Kathy Grost of Unity Audio told me that the more recent Signature 3s have a fairly flat impedance curve, so that their balance should not change drastically when changing amps. It sounded to me as if that was the case. However, sometimes even a small change in balance can be important, so I recommend a careful audition before pairing these speakers with one of those crazy billion-ohm output impedance single-ended amplifiers.

The Signature 3s passed the Greenberg Memorial Loudness Test without blowing up—given their maximum power rating, you'd expect them to pass. I think 300W might be a little optimistic, but I didn't get quite that carried away, so I wouldn't know for sure.

**Measurements from JA:** The Unity Audio's sensitivity was about average at a calculated 86dB/2.83V/m. As stated above, the Unity Signature 3 does have a relatively flat impedance with frequency, as can be seen from its impedance plot (fig.9). This was for one of the second samples; the first sample was fundamentally similar. The phase angle is generally moderate, but with a magnitude at all times below 6 ohms and averaging under 4 ohms through the midrange, the Signature 3 is best left to beefy solid-state amps and respectable tube amps with a goodly amount of current available from their 4 ohm transformer taps. The impedance peak at 80Hz indicates the sealed-box tuning frequency—as MK found, this is basically a floorstanding minimonitor! Note the small wrinkle in both magnitude and phase traces at 210Hz—some kind of resonance is present at this frequency.

I wanted to investigate the Signature 3's bass performance in some detail, as the company's literature is confusingly worded: “Sound...is an energy mass...” It states, continuing that “extensive physics research isolated a way to use two identical drivers, operating in parallel, each using the rear energy of the other to cancel its own rear, out-of-phase 'sound'... this works independent of internal volume.” (Unity's italics.) All well and good, but fig.9 and MK's auditioning indicate that the Signature 3 behaves as a traditional, small sealed-box design with limited low-frequency extension.

The lower trace in fig.10 shows the nearfield response of one of the woofers (the other is virtually identical). It rolls off with a classic 12dB/octave slope below 100Hz: sealed-box behavior. Above that frequency, there is a notch in its output at 200Hz—the frequency of the wrinkle in the impedance plot—but then with a flat response through the rest of its passband. Basically, however, the two woofers are mounted in a small sealed box, and that's exactly how they behave, electrically and acoustically.

The only modification of the classic sealed-box response is the notch at 200Hz. And look what happens when the nearfield outputs of the two same-polarity woofers are summed, taking into account the phase response of each.
and the path-length difference calculated at a listening distance of 5'. The resultant response is shown as the upper trace in Fig. 10. Both woofers have a notch at 200Hz, hence their summed output also does. Below that frequency, their sound-pressure levels sum in-phase to give an approximate boost of 6dB compared with the single woofer. Their outputs also sum in-phase above 450Hz or so, again resulting in a 6dB level boost. But in between these two frequency regions, the path-length difference results in a cancellation between the two woofer outputs. The result is a large suckout centered on 325Hz, a frequency right in the middle of the midrange.

Note that this is a theoretical calculation. It's possible that in a real room, the two woofer outputs will not cancel in so neat a manner. Nevertheless, in my own auditioning of the Signature 3s, both in Muse Kastanovich's Boulder room and in the Stereophile listening room in Santa Fe, I was bothered by what I felt was a touch of midrange hollowness to the speaker's tonal balance.

So how did the Signature 3 measure in the far field? Fig. 11 shows the quasi-anechoic response of the first sample with the microphone on its tweeter axis at a distance of 50'. Though this is a low 33.5° from the ground, the slight tilt-back due to the base plate will make it a typical listening axis. On the left of this graph is the complex sum of the two nearfield woofer outputs; this is spliced at 300Hz to the farfield response averaged across a 30° horizontal window. Points to note are: the notch at 200Hz; the expected lack of farfield energy in the lower midrange, due to the interference between the two woofers (which appears, therefore, to be real, not just theoretical); a lack of energy in the lower treble; and a tweeter level that averages around 6dB too high. (MK did find the speaker to have plenty of top-octave air.)

Fig. 10 Unity Audio Signature 3, sample 1, nearfield response of front woofer (the bottom curve at 100Hz) and the complex sum of both woofers (the bottom curve at 323Hz).

Fig. 11 Unity Audio Signature 3, sample 1, anechoic response on tweeter axis at 50°, averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield woofer responses plotted below 300Hz.
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The second sample, measured under identical conditions (fig.12), was considerably flatter on the tweeter axis, though there was still an excess of top-octave energy.

So how come MK was not bothered by the speaker's measured problems? I suspect that the answer to that question lies in the Signature 3's complicated interaction with the room. Fig.13 shows the speaker's response measured 180° behind. The rear woofer's output, broken by the expected interference dips, actually extends all the way into the low treble. When the speaker is positioned relatively close to the wall behind it, it's possible that the delayed, reflected energy from the rear woofer reinforces the overall sound in a beneficial manner.

Fig.16 Unity Audio Signature 3, step response on tweeter axis at 50° (5ms time window, 30kHz bandwidth).

In addition, some of the on-axis dips fill in to the speaker's sides, as shown in fig.14, which will mean that the room reverberant field will be more evenly balanced than the Signature's direct sound. Remember also that MK chose to sit beneath the tweeter axis. As shown by fig.15, this also will result in better integration between the woofers and tweeter and a more even mid-treble—though if you sit too low, a big suck-out appears in the crossover region.

In their literature, Unity Audio makes much of their crossover. They term this a "Balanced Class-A Design," due to both positive and negative legs, in my understanding, featuring identical circuitry compared with a conventional crossover. The latter would place the network in series with just one of the drive-unit terminals, the other being a direct ground return. Their crossover topology, they claim, "eliminates the phase error at the drivers, resulting in huge advances in our loudspeaker's total phase characteristics." (Their italics.)

So how does the Signature perform in the time domain? Fig.16 shows its step response on the tweeter axis. The design is not time-coherent on this axis, the sharp spike of tweeter energy leading the slower spike of woofer energy by about 0.2ms. The woofers are wired in-phase—i.e., both cones move outward from the cabinet when the speaker is fed a positive electrical pulse. The associated graph of excess phase—the difference between the speaker's actual phase response and what it would have were it a true minimum-phase design—is shown in fig.17. The Signature 3's large negative phase error above 1kHz on its tweeter axis is exactly what you would expect from a conventional non-time-coherent design.

A strategy to minimize this error is to move the tweeter's output back in time by tilting the speaker back—Unity does recommend a 7° tilthead—by sitting lower, as MK indeed did. Fig.18 shows the Unity's step response approximately 15° below the tweeter axis. The tweeter output now does align in time with the front woofer's, but the price to pay for this coherency, even with the tilthead provided by the Unity's bass plate, is a listening height that will in my opinion be impractical unless you sit quite a long way away from the speaker. And the amplitude response will not be appreciably different from that on the tweeter axis, as revealed by the lowest trace in fig.15.

Finally, fig.19 is the Signature 3's waterfall plot. The initial decay is clean, but a resonant ridge appears in the tweeter's output just above 10kHz.

Overall, these measurements suggest that while it might be possible to get a tonally balanced presentation from the Unity Audio Signature 3s with careful setup and choice of listening distance and height, as MK found, the speaker is not inherently neutral. Consistent factors in its presentation will be an exaggerated top octave and a restricted LF, which will make a recommendation very much a matter of taste.

—John Atkinson

Thiel CS1.5: $1990/PAIR

Sam Tellig has already written about the Thiel CS1.5 at some length in Stereophile, so you may want to look and see what he had to say about them (Vol.17 No.8, p.39). JA gave me the go signal to write up a full review with technical descriptions and everything, so don't blame me for redundancy. Just think of Sam's words as a Lead-Up instead of my words as a Follow-Up, and it all makes sense.

The CS1.5, Thiel's second smallest speaker, is a two-way system with a passive radiator mounted below the woofer. In Thiel's larger models there are plenty of drivers to handle the overlap in ranges.
For the first time in over three thousand years, light has broken the darkness that has enshrouded King Tut's tomb! Here is the continuing account. After long hours of careful digging, the excavation party finally stood before the hole they had carved in the tomb barrier. Lord Carnarvon asked Mr. Carter if he saw anything, to which he replied, "Yes, wonderful things!!" Carter, once his eyes had adjusted to the candlelight, was able to distinguish shapes and shadows throughout the room. Everywhere there were animals of wood, statues, and the overwhelming gleam of gold. Found in the tomb so far have been the personal belongings of the boy-Pharaoh as well as an inestimable wealth of treasures placed there in accordance with Egyptian custom. The discovery has completely stunned the archeology world and without a doubt will provide scientists with valuable information about the ancient Egyptian culture's sophistication and good taste, as is seen in the exquisite craftsmanship of King Tut's belongings. (Story continued on p. A-3)
dictated by their insistence on using first-order crossovers. In these the poor mid-woofer not only has to handle the bass and midrange, but also has to behave itself way up into the treble. At a 6dB/octave rolloff, the woofer’s output will still be audible to 10kHz, a stratospherically high frequency for most 6.5” drivers. Can Thiel’s extraordinary metalcone woofer rise to the challenge, or will it fall flat on its faceplate like most average woofers? Hey, no fun—you read Stereophile, so you already know the answer. Where’s the suspense in that?

The 6.5” woofer is quite a special aluminum-coned unit, with no dustcap, an exotic short-coil/long-gap magnetic structure for lower distortion, and a cast magnesium basket. As if all of that weren’t enough, the woofer also has a second, reverse-polarity magnet attached to the back plate to focus the total field even more uniformly into the gap. It also reduces the stray field so your neighbor- hood Gauss catcher won’t impute the poor little guy, not to mention making it practical for placement close to a video monitor. There is also a copper sleeve on the magnet’s pole piece to lower distortion even further. The 1” metal-dome tweeter has a large magnet and a vented pole.

Thiel has tough assignments for their crossovers. Here they expect it to not only correct the drivers’ frequency responses, but also to synthesize a virtually perfect measured 6dB/octave slope in the crossover region, and to present a very smooth impedance, between 3 and 5 ohms at all frequencies. In order to accomplish this, the crossover has to be very complicated.

If you look at one of Thiel’s cutaway views (ouch! that must hurt) you can see bunches of doodads all stuck to the inside of the speaker. Not to worry—that’s not a nest of Borg insects. Thiel uses high-quality parts, even going to the trouble to bypass the series tweeter capacitor with a small-value polysyrene-and-tinfoil cap.

Still, I can’t help but wonder if all those parts don’t mess up the music a little bit. Maybe these speakers would sound even more transparent if they threw some of their "first-order perfection" theory out the window for the sake of more simplicity. For example, there’s a notch filter in the crossover to smooth the woofer’s diaphragm resonance at 7kHz, and this also restores linear phase behavior in that region. What if, instead, the crossover increased to second- or third-order in this region to try to eliminate all of the chaotic output from the stiff cone? Wouldn’t a rough sound be better than phase-coherent less-rough sound? But what do I know? I’m a speaker user, not a designer.

Thiel goes to great lengths to ensure that their speakers will have a very linear phase response. That they actually publish specifications for it is unusual, and shows the importance they place on it. The synthesized first-order crossover, the shaping of the individual drivers’ responses, and the physical arrangement of them on the baffle all allow such time-coherent behavior. Basically this is important because it means that all the different components of the musical waveform will arrive at your ears synchronized in time, as they would in real life.

The 1.5’s cabinet is 1” thick, and well-braced on the inside. The front baffle is 2” thick in places, and sloped so that the speakers need little or no tilt to achieve the proper listening axis. The edges of the baffle are not curved like the other speakers; Thiel decided to instead curve the edges of their grille frames to reduce diffraction. Their frequency response was optimized with the grilles in place, as that’s how they’re meant to be used.

I stripped a couple of the input binding posts (hexnut plastic-capped types) when changing speaker cables. I tried to tighten them and they just kept going round and round. I really do like to have cables held on by more than just the occasional lucky puff of wind. You manufacturers out there—you know who you are—let’s see some case-hardened titanium binding posts that come with their own lug wrench and have 4”-long rotational braces inside the cabinet. Hopefully you won’t get too many lawsuits from people claiming to have thrown their backs out while attempting to loosen the “Cable Drydocks.” But seriously, the location of these posts is a pain even if you don’t strip them. It’s difficult to fit large spoke-terminated cables into the space without bending them sharply, and it’s virtually impossible to put them on unless you have the speakers tipped over precariously.

Sound: I started out with the CS1.5s in the same positions as the other speakers: positions fiendishly calculated to make the bass nice and smooth in the room. At 17” and 20”, these positions were closer to the front wall than Thiel recommends; I felt like such a bad boy abusing their fine products so. Actually, I like the speakers so close to the front wall because I usually listen with the volume very quiet, and the bass balance of most recordings would otherwise be too light at such volumes.

They sounded good in these positions, and I left the grilles on so they’d have the proper balance. I found Thiel’s toe-in recommendation spot on; i.e., fitting straight ahead toward the back wall, not toward the listening seat. They didn’t seem to need any tilting; I preferred the sound with the bottoms parallel to the floor. If you have a taller listening seat than mine, though, and you prefer nearfield listening, you’ll probably want to tilt the 1.5s to be on the optimum axis.

Detail, detail, detail. These speakers let me hear into The Fall of Us All enough to hear its minor shortcomings. I could hear the slight loss of detail and the soft top octave resulting from Thibetts’ analog recording equipment. The Unitys did not reveal these small inaccuracies as well. In general, I think this album has very good recording quality; I can only find fault with it in comparison with super audiophile discs. All the exotic little metallic instruments and percussion sounded particularly lifelike on the Thielis. I think the Coherent Source thing they have going is really far out. There is a wholeness to the CS1.5’s
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sound similar to what I hear from my B&W 804. It's not a trivial thing to arrange to have your sound groups all arriving with the proper time relationships, but I find it greatly improves the illusion of reality.

These Thiels are real thoroughbreds; they might even reveal recording-quality differences a little better than the 804s. Listening to Brian Eno's tripped-out space music on the Instrumental boxed set (Virgin/EG 39110 2), it all sounded perhaps a bit more detailed and involving than I was used to. This was good. Of course, calling this style of music "involving" might be a bit farfetched, but it seems to make a lot of sense late at night. The "High Definition Remastering, Super Bit Mapping" seen on this box is not just a cute little logo. This high caliber of digital mastering really delivered the sonic goods, and benefits from the super accuracy of a pair of Thiels. You'll believe that you're actually relaxing in Eno's home studio at two in the morning, surrounded by the soft colored lights from multiple keyboards and synthesizers, sipping jasmine tea, and staring like a zombie into a big fish tank while contemplating what it would feel like to float around in outer space.

Unlike the Unitis, the 1.5s didn't have a bass balance that reminded me of minimonitors. They went down to 35–40Hz, and were neither boomy nor lightweight. The bass was smooth enough, and served the music rhythmically enough for me not to notice it as an individual entity very often. Instead, I was usually only aware of the bass as an integral part of the whole of the music. They did have slightly less bass overall than the B&W 804s, but this may be the more accurate balance.

The CS1.5 was also very smooth in the midrange. Instrumental timbres seemed quite accurate with good source material.

Listening once again to Journey's Greatest Hits, it was obvious that the speaker treble was neutrally balanced. (Love those compilation albums for reviewing!) The recordings sounded definitely too bright. There was too much treble obscuring the midrange and yielding unnatural timbres. The 1.5s presented the recordings as they are; they were still enjoyable, but weren't given as natural-sounding a balance as they were by the Swans. Of course, in a perfect world the recording engineer wouldn't have turned all the treble knobs up to 8 while rolling his eyes in their sockets and cackling evilly.

All was not bliss in ThieLand, though. A dark cloud hung over the bucolic scene, casting an ominous shadow that warned of things to come. Using a metal-coned woofer is great in terms of transient speed, but that resonance at 7kHz could be a bit nasty. Throughout my listening I was aware of a small amount of unmusical hash in the upper treble. It was worse if they were pointed toward me at all, so I mostly listened with no toe-in. This roughness was very minimal and did not bother me unless I was intent upon being critical. It was there, however; I wonder if these speakers might sound even better if the woofer's resonance region in the treble were attenuated more.

Back to the peaceful calm of Dorian's Sampler II. All the tracks on this disc sounded just about right on the Thiels. Instrumental timbres were very natural. The sense of space provided by the wonderful halls in which these tracks were recorded was very pleasing. The 1.5s seemed to reproduce most of the subtleties of the recordings effortlessly, except for the low bass. The spaces of the performances seemed to envelop me about as well as they could without using surround speakers. Their time-coherent nature paid off in other ways as well. Fast classical guitar, harp, and harpsichord arpeggios had a luscious, rolling quality to them, thanks to each of the many notes being so well-defined in time.

I do wish that Thiel would make these speakers to be used without grilles. I tried listening with them off, and found that I liked the immediate feel that the top octave had in this configuration. However, without the grilles their balance was just a little bright. I have the same Catch-22 with my B&W:s: if I pop off their little tweeter screens they sound a little too bright, though the sound is more immediate.

I tried the 1.5s with the low-output-impedance NAD 2100X, and their balance did not change. Because Jim Thiel works hard to give his designs a flat impedance characteristic, their frequency responses will be reliably flat regardless of what kind of amplifier you throw at them. I concur with my esteemed colleague, Sam Tellig, in his conclusion that the 1.5s require a high-quality amplifier. They're an easy load to drive, but are so revealing that any grain or roughness in the amplifier will be easily heard. Not only power amps, but also source components will be under close scrutiny when these Thiels are in the system.

Armed with my trusty NAD, I embarked on (you guessed it) the great Greenberg Memorial Loudness Test adventure. How far could I twist that little volume knob until the Thiels' tweeters were just another nostalgic audio tale? "Use it or lose it". I think he may have exaggerated that bit.

I was a little worried, considering that designer Jim Thiel is a sick puppy, actually boosting the level of the 1.5's tweeter below the crossover point to maintain a 6dB/octave acoustical rolloff. A tweeter's moving displacement must increase four times for every halving in frequency, to maintain a constant volume. So, with such a minor rolloff provided by the first-order slope, the poor little tweeter will have to move around too much, unless it's played at sane volumes.

I proceeded carefully, and the 1.5s started to sound distorted somewhere past louder than I ever like to listen, but not quite as loud as a drummer plays his stereo when he's drunk. They seemed to survive the ordeal, and I didn't dare proceed further. Suffice it to say that these are not the speakers for someone with hearing damage: they won't go as loud as the others in the group.

Measurements from JA: The Thiel is moderately sensitive at a calculated 86.5dB/W/m (B-weighted). Its impedance, however, averages 4 ohms, as can be seen from fig.20, which also reveals a drop to 3.3 ohms in the lower midrange. Note the moderate electrical phase angle, though. Low-powered tube amplifiers will probably be able to cope with the Thiel from their 4 ohm output taps. The tuning of the passive radiator is indicated by the minimum in the amplitude trace centered at 391Hz. This suggests quite good low-frequency extension for a small speaker.

This is confirmed by the nearfield measurements shown to the left of fig.21. The bandpass trace peaking just below 40Hz is the passive radiator's output, its level adjusted with respect to the woofer's in the ratio of their radiating diameters. The corresponding notch in

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173
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the woofer’s output is offset a little, at 31Hz. Adding the outputs of the woofer and radiator, taking phase into account, gives the top trace in fig.21. The speaker is basically flat down to 50Hz, with then a typical 24dB/octave reflex rolloff, reaching -6dB at 35Hz.

To the right of fig.21 is the CS1.5's quasi-anechoic response averaged across a 30° horizontal window on the tweeter axis. Superbly flat overall, it’s broken only by a few small peaks and dips. The top octave seems to roll off a little prematurely, however, which is at odds with MK’s auditioning comments.

The Thiel’s horizontal dispersion (fig.22) provides a possible answer to this anomaly, because the speaker doesn’t narrow its high-frequency dispersion until way off-axis. The room’s reverberant field will therefore be more energized in the top two octaves than is the case with, for example, the Swans Baton, which can be seen from fig.3 to have a similar on-axis HF balance. Despite the wide horizontal radiation pattern, vertically (fig.23), suckouts develop in the Thiel’s output if you sit much above or below the tweeter axis.

Fig.21 Thiel CS1.5, anechoic response on tweeter axis at 54°, averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield woofer and passive radiator responses plotted below 300Hz (top trace below 10Hz), as well as individual nearfield responses of woofer and passive radiator, also plotted below 300Hz.

Fig. 22 Thiel CS1.5, horizontal response family at 54°, 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. 23 Thiel CS1.5, vertical response family at 54°, normalized to response on tweeter axis, from back to front; differences in response 45°–5° above tweeter axis; reference response; differences in response 5°–45° below tweeter axis.

MK mentioned how much attention Thiel pays to time coherence: the CS1.5’s impulse response (fig.24) has a classically time-coherent shape, broken up only by some ultrasonic ringing from the metal-dome tweeter. The step response (fig.25) also has a classically time-coherent shape, meaning that on the tweeter axis, all the frequencies arrive at the measuring microphone at the same time. This is also shown by the excess phase graph (fig.26), which is plotted to the same scale as the Audio Signature 3’s excess-phase graph (fig.17). Virtually a straight line, it reveals the Thiel to be a true minimum-phase system.

Finally, as well as the clean, uniform initial decay confirming the time-coherent behavior, the CS1.5’s cumulative spectral-decay, or waterfall, plot (fig.27) shows a couple of low-level resonant modes in the mid-treble, exactly as MK predicted. I’m surprised he was bothered by this behavior, but I suspect that...
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it is not generally masked by the music.

To sum up its measurements, the CS1.5 is another well-engineered, time-coherent, flat-responsive, neutral-balanced speaker design from Jim Thiel. As always with a Jim Thiel speaker, it demands a lot from the partnering amplifier. But in my opinion, having listened to all three speakers in this review, both at Muse Kastanovich's and in the Stereophile listening room, the CS1.5 is a lot of loudspeaker at an affordable price.

—John Atkinson

CONCLUSIONS

I wanted to like the Swans Baton a lot. It's so well made and looks so good, you just automatically expect great things from it. But I can't recommend the Baton for music-lovers in general. Their sound just did not offer a clear enough view into the recording—or, by extension, into the original performance—for them to be competitive at this price. Their lack of treble detail, reduced bass, and midrange colorations take them out of contention for neutral transducer honors.

Nevertheless, people who have very specialized collections of nothing but over-bright, over-processed rock and pop music might want to give the Batons a listen. Why should you buy the relatively wimpily Swans as your dedicated rockin' speakers, when you could have 15" woofers? Because, silly, those monstrosities are usually crossed-over too high in frequency, so that they're dragging their slow 15" butts all over the midrange. Well, not in my midrange you don't! Kickdrum, guitars, and voices all sound way better when most of their sound comes from a single, fast woofer. And remember, swans may look pretty, but they can attack if provoked. Rock On!

I do think both the Unity Audio Signature 3 and the Thiel CS1.5 are worthy of recommendation for listening to any kind of recording. And, like any two high-end components that you might hit if you threw two rocks in the air, they have different balances of strengths. The Signature 3 will play louder, but the '1.5 will go lower in the bass. The CS1.5's imaging is more pinpoint-accurate, but the Signature 3s give a more enveloping sense of space. The Signature 3 presents more midrange detail, but the '1.5 has a flatter frequency response.

Come to think of it, the Unity Audio and the Thiel have a lot in common (in addition to the loudspeaker ladder thing). They both have a bit of an unforgiving treble. They both are very detailed and will reveal the quality of anything they're matched with. Also, they both have tight and tuneful bass.

Which did I prefer, after all of my auditioning? For me, the nod has to go to the Thiel CS1.5. I felt it was a little more accurate in some respects, and the bass extension was a necessity given the amount of rock music I listen to. I certainly enjoyed my time listening to the Signature 3, though, and so might you.

For the record, I marginally preferred the sound of the B&W Matrix 8046 over those of the other three speakers. This surprised me a little, since the B&Ws are four years old. Still, I've gotten some really fine replacement woofers under warranty from B&W. As you can imagine, I was relieved: it meant that dancing the Buy/Sell Tango was still way off in my future. —Muse Kastanovich

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TOWNSHEND AUDIO SEISMIC SINKS & VIBRAPLANE ISOLATION PLATFORMS

Shannon Dickson

Townshend Audio Seismic Sinks: Model 1 STD: supports up to 35 lbs. $349; Model 1 HD: supports up to 60 lbs. $399; Model 2 HD: supports up to 110 lbs. $449. Model 2 STD: supports up to 35 lbs. $369; Model 2 HD: supports up to 70 lbs. $419; Model 2 EHD: supports up to 130 lbs. $469. Model 3 EHD: supports up to 220 lbs. $725. Dimensions: 1-series models: 17" W by 14" D by 2' H. 2-series models: 19" W by 16" D by 2' H. 3-series models: 27" W by 21" D by 2' H. New CD Sink, same as STD model but without LED indicators, leveling feet, or damping pads designed for stacking. $150. Custom sizes available. Approximate number of dealers: 50. Manufacturer: Townshend Audio, 7 Bridge Road, Hampton Court, Surrey KT8 9EL, UK. Tel./Fax: (44) 181-979-2155. US: Townshend Audio, 10375 Richmond Ave., Houston, TX 77042. Tel: (800) 377-3448. Fax: (713) 266-1039.


With most of the main avenues leading to improved fidelity in the control of creative designers, effective vibration control is one area in which knowledgeable audiophiles have an opportunity to make a genuine difference in the service of superior sound. At the very least, a better grasp of these issues will help you spend your time and money more effectively.

Tuning products like Tiptoes, cones, elastomer pucks, damping sheets, etc. can play invaluable roles in an overall vibration-control strategy. However, a whole new frame of reference is opened up by effectively combining these well-established tweaks with the increases in broad-band resolution and dynamic impact afforded by such comprehensive pneumatic isolation systems as the Vibraplane and the Townshend Seismic Sink.

REFERENCE GEAR

A wide variety of components were used to assess both isolation systems. An Immedia RPM-2 and unipivot arm with Lyra DaCapo and Audio-Technica ATML-170 cartridges handled analog needs, while a Theta Data II, Theta Data Basic, and Micromega T-Drive 2 transports joined my Muse Model Two, Theta Generation V, and Audio Alchemy DAC-in-the-Box processors to round out the front-ends. A Rowland Consummate phono stage and Sonic Frontiers SFP-1 Signature were combined with either the Sonic Frontiers SFL-2 line-stage, the Rowland Consummate, or Rowland's awesome new battery-driven Coherence preamp.

Amplifiers included the well-built and sweet-sounding Ayre V-3, followed by two pairs of high-rez Rowland Model 6 monoblocks bi-amping my reference Audio Artistry Dvorak and Avalon Radian HC loudspeakers. Speaker cables included MIT 770 and 850 bi-wired Terminators, Cardas Golden 5-C, Yamamura Millennium 5000, and TARA Labs RSC 5000 Master 2. Cardas's new Golden Cross balanced interconnects were used throughout, and a few lengths of Discovery Signature also proved enjoyable.

Audio Power's updated Power Wedge 116, 110, and Power Enhancer, along with Versa Labs' Red-Rollers and Woodblocks in selected locations, helped clean up the RFI for those components still connected to the AC supply. ASC Tube Traps performed acoustics detail, while two custom Mike Fredericksen equipment stands supported line-stage and source components. An assortment of cones were used at various times and places, as were several Navicom or Sorbothane pucks. D'Feet SH-22 footers were used the most for coupling all gear, other than turntables, to the respective isolation platforms.

The following reviews do not stand entirely on their own. For a fuller understanding of this material, please first read my article on vibration fundamentals elsewhere in this issue.

TOWNSHEND SEISMIC SINKS

Description: The Seismic Sink is the more modest of the two air-based suspensions under review. It represents, however, a very cost-effective means of addressing the isolation requirements of most electronic components and turntables. The "Sink" springs (no pun intended) from the fertile mind of Australian designer Max Townshend, famous for his unique Rock Reference turntable. Indeed, the Seismic Sink is an offshoot of the pneumatic suspension built into each Townshend Rock Reference and Mark III cabinet.

The Sink is an attractive charcoal-gray platform composed of a 1/4"-thick steel top plate sporting a handy spirit level centered on the front edge. It's damped with a sheet of EAR Isolamp, a viscoelastic constrained-layer material, sandwiched between the top plate and the isolator section. Using a constrained damping assembly adds some mass while both partially attenuating the...
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metal top-plate's resonance and those vibrations originating above the isolators—ie, from the component and acoustic coupling. The upper plinth is decoupled from and floats above a base made of steel and MDF.

This base houses the decoupling air bladders and electronic sensors that monitor air pressure and alert the user, by way of front-mounted LEDs, to the need for adding air with the provided hand pump. Four adjustable rubber-tipped plastic feet are used for leveling the unit. A filling valve is provided on the rear of the base for adding or subtracting air to or from each bladder. There is also a small power socket for the sensor's remote power supply. Additional air valves allow daisy-chainng multiple Sinks to an optional Central Sink that acts as a filling station.

The eight standard sizes range from 17" by 14" by 2" for the standard models, each weighing 21 lbs, to 19" by 16" by 2" for mid-sized units, and up to 27" by 21" by 2" for the biggest model, which weighs 52 lbs. Custom sizes are available, and special units can be ordered for isolating both Basis and VPI TNT turntables. Maximum payloads for each model cover from up to 35 lbs to 220 lbs, in 30- to 50-lb increments. For best performance using any pneumatic suspension, you should choose a size whose maximum support weight is somewhat higher, yet near that of the intended component's weight. The latest versions of the Seismic Sink also have a grounding screw on the top-plate. Prices range from $349 for the smallest unit to $725 for the largest.

The air bladders in the Seismic Sink are similar to bicycle inner tubes rather than the rolling-diaphragm pistons found in more elaborate pneumatic isolators.

Setup: Simply slide the unit under a component on a stable flat shelf, level the Sink using the spirit level and adjustable feet, and then plug in the power supply. If you notice that the red LEDs are flashing, just fill each bladder until it stops and you're set. Be careful not to over-fill or under-fill the Sink; either condition will dramatically impair its isolation effectiveness and sound quality. If you wish, unplug the power cord after your component is properly floated—just check it every few weeks or so. Once you become familiar with the standard settings, experiment with various air-fill levels in the Sink, as each component will have a range in which it sounds best. The bladder material used in the Seismic Sink is not very permeable, so refilling is an infrequent requirement.

I found the most significant sonic improvement with the Sink when it was used beneath turntables and CD transports or players. I'll describe the subjective qualities of floating turntables in the accompanying section dealing with the Vibraplane, as the overall effect of the Sink on analog 'tables is similar, but to a much lesser degree. For processors, preamps, and amplifiers, the performances of both products more nearly match one another, and the cost difference makes the Seismic Sink a slam dunk for these applications. It also highlights just how sensitive turntables are to vibrations in both planes, be they analog or digital. Yet the Seismic Sink can work wonders with most turntables as well, and is highly recommended for this application if your budget won't allow a Vibraplane or one of its industrial competitors—like Immedia's new Noise Block (manufactured for them by Newport Corp.). However, the qualitative advantages conferred by these more elaborate and expensive isolation platforms are well worth the big difference in price, if you can swing it.

The Sounds of Seismic: Though the Seismic Sink's pneumatic isolation works primarily in the vertical plane, its well-damped, fairly low vertical resonant frequency—a quite-good 6Hz or so with normal loads and fill level—produced a startling increase in clarity, dimensionality, and transient definition throughout the whole frequency range in just about any source component with which it was used. Images had greater focus, subtle details and dimensional perspectives were more clearly delineated, and depth perception was noticeably enhanced on natural recordings that have this potential. Overall, the music took on a sweeter, more dynamic, more rhythmic quality. The degree of improvement was not vague or ambiguous.

Among electronic components, I noticed the most dramatic impact with the Theta Data II transport, followed by either the Muse Model Two or Gen.V processors. The all-tube Sonic Frontiers SFL-2 preamp and Signature phono stage experienced big jumps in clarity, focus, and smoothness of detail when placed on a Seismic Sink. Isolating my digital front-end fundamentally improved its already excellent sound quality. An added measure of ease and spaciousness was imparted to each of my favorite CDs; those that were well recorded became satisfying in an almost analog-like manner.

Digital gear contains crystal oscillators that, apparently, can be particularly prone to vibration-induced errors. Even very low levels of vibration may cause a slight frequency shift in the crystal oscillator, resulting in excess jitter and sonic degradation. At least that's the best theory I know of for the surprising gains from pneumatically isolating number-crunchers.

Just floating my digital front-end resulted in an across-the-board improvement in the sound of my system that more than justified the Seismic Sink's cost. Even better news is that the effect was cumulative. Recently, I acquired enough Sinks to float my line-stage gear and amplifiers as well as the digital rig, achieving a further level of refinement that proved the sum is greater than the effects of the individual units alone. Of course, the relative impact of isolating amplifiers and line-stage gear was less pronounced than with source equipment, yet still easily perceptible and uniformly positive.

By the way, the combination of the D'Feet SH-22 pucks1 coupling the Seismic Sinks with my processors, amps, and preamp was a great match. These devices seemed to provide just the right balance of even, broadband damping of the residual resonances between the amplifiers and the Sinks' top-plates, without adding excessive compliance.

Stacking two Sinks under a source component can have an even greater impact than using just one. I suspect that this enhancement results from providing, in essence, another pole to the filter effect of the first Sink's vertical isolation, and by adding a measure of horizontal attenuation as well. If you can't pony up for a Vibraplane for your analog rig, a pair of Sinks under your record player could be your next-best bet for a big advance in sound quality.

If you do decide to stack two Sinks, try placing the less expensive version on the bottom, provided it can bear the supported load, as the extra damping layer on the top-plate of the standard model should be located nearest the component. (During the WCES in

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1 D'Feet SH-22 damping feet are 2" in diameter and 1" thick, with a 1/4"-thick brass disc in thecente. Clear rubber membranes sealing the top and bottom enclose liquid silicone and air-damping elements. Set of four retail for $195. Less-expensive versions also available. Imported from Europe by Audio Advancements of Lincoln Park, NJ. Tel: (201) 633-1151.
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Vegas, Townshend unveiled a less expensive version sans leveling feet, the LED control lights, and the E.A.R. damping layer under the top-plate—but otherwise the same as the regular Sink. Called the CD Sink and selling for only $150, this unit is intended to make the performance boost from stacking two Sinks more affordable.

My experience with the Townshend Seismic Sink makes it an easy recommendation for those looking for a genuine improvement in system resolution and musical enjoyment. In absolute terms, the Sink is limited by its relatively light weight and modest rigidity, its lack of horizontal isolation, and the rudimentary (though clever) design of its pneumatic suspension. There will tend to be a greater degree of variability in its overall performance with different gear than will be experienced with the several-times-more-expensive Vibraplane.

However, no one should dismiss the Sink’s impact on real-world systems: it provides far more than a glimpse of what truly effective isolation can mean for high-end audio, and is very attractively priced. Don’t even think of using a Vibraplane for preamps and amplifiers with the Sink available to handle that job admirably for a fraction of the cost.

Compared with most other forms of equipment support, the Seismic Sink is a genuine advance. I plan to continue using them for everything other than my source components. Were it not for the existence of the Vibraplane, I’d wholeheartedly suggest the Seismic Sink for most turntables as well.

VIBRAPLANE ISOLATION PLATFORMS

The Vibraplane isolation platform was not designed with high-end audio in mind. It competes in the more demanding arena of electron microscope isolation and other ultra-sensitive scientific and industrial processes. Actually, the Vibraplane is the entry-level product in the manufacturer’s catalog, and is intended for use in applications where relatively easy portability and space constraints are important. Steve Klein, owner of Sounds of Silence in Nashua, New Hampshire, has the exclusive distribution rights to the Vibraplane in the audiophile market. While there are several competitors in the industrial market, of those currently offered to the audiophile, I found the Vibraplane possessed the best combination of size, performance, features, and price.

Description: The design of the Vibraplane is particularly well suited to the constraints of the top shelf found on most equipment racks. It measures 24" wide, 20" deep, and 4" high, and weighs a hefty 140 lbs. The entire 24" by 20" top surface is flat and unobstructed, allowing easy access and plenty of room for almost any turntable.

The ⅝"-thick “Vibradamped” steel supporting platform is covered with a Formica top skin. Steel has a good stiffness:weight ratio and can be very useful in minimizing the effects of resonance, provided its inherent tendency to ring is properly damped. “Vibradamped” steel is formed by two layers of steel of different thicknesses bonded with a damping adhesive to minimize the material’s resonant signature. Some people have expressed concern about possible electrostatic interaction between certain components and the steel. The Vibraplane can be ordered with a grounding lug to minimize any such effects. An optional nonmagnetic stainless-steel top layer is also available, as is an antistatic plastic skin.

The top platform is isolated by three patented, pneumatic isolators using a special bladder sealed in an airtight piston housing—each connected to a supplementary air chamber that improves real-time damping of periodic and random vibrations in the vertical plane. Horizontal isolation is provided largely by a series of special, highly compliant elastomer discs separated by thin, hard spacers. This portion of the isolator is located under the vertical air piston and moves side to side almost as efficiently as the pneumatic portion responds vertically. The elastomer sandwich appears to operate as a variation of the bearing slip-plate concept for horizontal motion.

An additional 10" by 14" by 1.25" piece of steel is welded to the bottom center of the platform to provide additional mass and stability. Remember, the ultimate resonant frequency of a suspension is determined by the total supported mass and the compliance of the suspension—in this case determined primarily by the volume of enclosed air in both the air spring and damping chambers, as well as the area of each piston.

The Vibraplane can support an external load of 275 lbs, with larger capacities available by special order. So you’ll want to support this isolation platform on a rigid, solid stand closer to the floor, the better. For cosmetic purposes, the additional mass-plate, along with the pneumatic isolators, damping chambers, and associated plumbing, is concealed beneath the larger platform by a short steel skirt, painted black and attached vertically around the outer perimeter of the Vibraplane. A control panel with air fill and bleed valves is located on the right side of this skirt.

Each of the pneumatic isolators on the Vibraplane connects to separate supplementary air chambers made of 2" by 10" PVC pipe. These chambers, combined with the two-stage isolators, allow the Vibraplane to achieve a high damping factor. The stated effective resonant frequency of the Vibraplane is approximately 2.5Hz for the vertical plane and 3Hz for the horizontal. As you can see in my article on vibration elsewhere in this issue, after reaching peak resonance, the accompanying displacement decreases, returning to baseline at a frequency slightly greater than 1.4 times the natural frequency—in this case, 2
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3.5Hz for vertical motion, 5Hz for horizontal—beyond which true isolation begins. For all frequencies beyond this point the inherent mechanical low-pass filter continues to attenuate vibration at 12dB/octave. As a result, the Vibraplane can reduce vibrations of even very low amplitudes by approximately 90% in both planes at 10Hz! The unique supplementary damping chambers are partially responsible for this desirable roll-off characteristic through improved real-time, progressive damping. This feature also contributes to a highly stable platform that damps vibration inputs immediately, with little or no residual oscillation.

The 2210 passive Vibraplane sells for $1695, the price including a high-quality hand pump. Each of the three isolators can be filled from a central Schrader valve using separate needle valves for each piston, and a central bleed valve for all three, to achieve fast and accurate leveling by hand. When using the passive model, I checked the level each day before sitting down for a listening session, and made subtle adjustments every three days or so. Fine-tuning the level of the Vibraplane by hand takes no more than a couple of minutes and is the primary difference between the passive and active models.

Unlike the Seismic Sink, with its thicker membrane material, the Vibraplane uses a thin, strongly reinforced Buna-N type material for its air bladder. This thinner membrane helps improve overall isolation. Every part on the Vibraplane is easily field-serviceable, and the isolators can be replaced by anyone with a screwdriver, thus making long-term customer satisfaction a likely prospect.

The 2212 active model costs $300 more ($1995), and has a "Watts" regulator gauge in place of the three needle valves on the control panel. This valve controls the 60 to 80psi of air pressure required to float the Vibraplane's platform. However, the additional cost for the active unit does not include a source of compressed air. You must supply an air compressor or bottled gas to operate the active unit. One benefit of the active unit is its automatic self-leveling feature. If you push on one corner of the table, the other feet will bleed air automatically to re-level the unit. On the other hand, because the isolation effectiveness is roughly equivalent for both units, the sonic performance should be similar as well; the difference is primarily one of convenience.

Sounds of Silence also offers a very quiet, high-quality air compressor. Made in Europe by Jun Air, it generates only 35dB of spl at 1m. The downside is its $800 price. As an alternative, you could buy an air tank around 4' high by 9" in diameter from a medical supply house, along with a regulator valve and a less expensive—though noisier—air compressor with which to periodically fill the tank. Since the isolators only consume air when the table moves, such a setup could last several days or longer before refills are necessary. In any event, refilling would only take a few minutes. With this approach you could cut your air-supply cost by more than half and eliminate the need for running a compressor—no matter how quiet it is—while listening to music.

How's the Sound? At first glance, $1695 may seem like an awful lot to pay for an after-market suspension. However, within half an hour of listening to your turntable properly supported on a Vibraplane, you'll be almost happy to fork over the dough.

This is no exaggeration. (In my vibration article, I make a particular point about how important it is to keep subjective enhancements in audio systems in perspective. Even so, the qualitative enhancement brought about by "Vibraplaning" was simply stunning. From top to bottom, every aspect of the sonic presentation took on new life. It was all in the details: sonic imagery developed a more tactile presence; low-level micro-dynamics and the display of spatial characteristics—such as the distinction between the overall hall space and the local ambient envelope around instruments on well-recorded music—seemed much more realistic.

Timbral definition was also greatly improved, with the notes having real impact and body from the rear of the stage as well as from the front. A feeling of cohesiveness was imparted to the whole presentation that I subconsciously identified as being more natural. I must say, the ability of the Audio Artistry Dvorak speakers to "unmask" so much low-level detail, normally obscured by acoustic standing waves, was particularly helpful in allowing me to more fully appreciate many of the finer nuances afforded by effective isolation.

Percussive impact, that sense of air pressure normally most pronounced in the front half of the stage, was conveyed with equal effectiveness from instruments along the rear wall on naturally recorded orchestral works such as the LP of Malcolm Arnold Overtures from Reference Recordings (RR-48). Another example was the excellent Classic Records reissue of Witches Brew (LSC-2225), in which the London underground train captured in the background sounded as if it was making a stop in my listening room! If you have the least doubt about the merits of analog, try listening on your Vibraplaned turntable to Classic's reissues of The Royal Ballet (LDS-6065), or something intimate like Hamiet Bluiett's Dangerous Suite (Soul Note SN 1018).

In short, music became more emotionally involving, captivating my attention to a degree that I had not experienced before floating my turntable on air. The scale of the overall effect is really difficult to convey; while subtle from a gross perspective, it is profound in impact. Unlike many improvements that blend into your normal expectation after a few weeks of acclimation, you'll appreciate the visceral presence that the Vibraplane adds to both analog and digital playback every time you spin some wax or plastic. The bottom line is that the Vibraplane allows your turntable to transport to more fully extract those elements embedded in the grooves and pits that connect you to the emotional current of the music.

For those who use CD as their principal source, try a Vibraplane for your transport or CD player as well. I'm still shaking my head at the increase in depth, transient purity, and image specificity I experienced after isolating my Theta Data and Gen.V atop the 'Plane. Qualitative improvements in the sound of my digital system, beyond those attri-

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**Tips for Floating Turntables**

For any given turntable, some experimentation with the Vibraplane is needed to find the precise fill level to maximize its performance. The best range would usually be with the platform top floating between 3.5" and 4" from the supporting surface. Over-fill the unit for a given weight, and performance will suffer noticeably. Too low a setting and you risk bottoming-out the platform and defeating the isolation. Once you've found the ideal level, just pay attention so that you can match the setting whenever adding air to the passive unit—the active unit automatically returns to the preset level.

—Shannon Dickson
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Analog attributes from plane. The Vibraplane offers a close approximation, at least in terms of the suspension, that can be added to any existing record player. Good turntable design, of course, depends on far more than the suspension alone. However, for under $2000 you'll see just how important effective isolation really is, while turning several less ambitious record-spinners into killer rigs! With several top-flight tables priced in the $10,000-plus category, the relative benefit afforded by the Vibraplane suddenly seems like a bargain. It's certainly no ordinary tweak.

**CONCLUSIONS**

I fully sympathize with any of you who may doubt the veracity of my findings regarding effective isolation for a CD player or transport. I'm still baffled myself—not only by the improvement when using a Seismic Sink, but by the further gains afforded by the Vibraplane. Apparently, those crystal oscillators are even more sensitive to very-low-level, low-frequency vibrations than you would imagine. Listening to Eric Clapton's *Unplugged* CD (Reprise 45024-2), I had the distinct impression of a "holographic" camera, if you will, coming into focus in all planes simultaneously. As a result, I felt suddenly transported into the recording space. Timbral delicacy and texture took on an air of authenticity that knocked me out.

Incidentally, A/B testing is very easy using a Vibraplane, and even more so with the Immedia Noise Block.3 It takes just seconds to fill or bleed the air from the isolators. I've performed this experiment, although admittedly in an informal and unscientific manner, on different occasions with over a dozen friends, many of whom are not audiophiles. The result: a unanimous thumbs-up for floating on air. Even when I made the switch without telling the person I was doing anything, they invariably readily noticed the change in sound quality. Though the Vibraplane was noticeably superior to the Seismic Sink when used with digital gear, the absolute differences were greatest with turntables.

If budget constraints allow only one Vibraplane and analog is your thing, by all means consider a Seismic Sink for your CD source. The musical impact of pneumatically isolating CD transports has convinced me—beyond any question—of the need to apply roughly similar vibration standards to digital discs, spinners as are lavished on analog front-ends. I also hope digital designers will take what I'm saying seriously, acquire a Vibraplane or one of the other full-feature pneumatic isolation systems from Newport Corp. or Immedia, and try to define with more precision the cause of such a notable improvement in performance. With a better understanding, perhaps those elements most responsible can be effectively treated closer to the source. After all, a CD player shouldn't respond like a mechanical transducer.

While a product like the Vibraplane represents an outstanding solution for the well-heeled audiophile, don't overlook the significant contribution of the Seismic Sink; it's very practical, and worth every penny. The synergistic effect of pneumatically isolating your entire system must be heard to be appreciated.

While it may seem prohibitively expensive to do so, I've seen people spend far more on cables, dubious wooden discs, and even some equipment upgrades, and not achieve anywhere close to the overall improvement in resolution and musical enjoyment as I have with the Vibraplane and the Townshend Seismic Sink.

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3 Although I didn't evaluate the Immedia Noise Block, its unique compact isolation modules, developed by Newport Corp., provide isolation in both planes through pneumatic action, while the Vibraplane's horizontal isolation works on a slip-plate mechanism and its vertical effect is pneumatic. As a result, when you let the air out of a Vibraplane you still have the benefit of most of the horizontal isolation. With the Noise Block, all isolation is defeated, so it serves as a more dramatic contrast in A/B testing.
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I've always admired the appearance and solidity of component racks made by Billy Bags Design of Ventura, California. When I found myself in the market for a rack, a Billy Bags unit seemed a good choice: I wanted a vibration-resistant platform that looked good and offered high value for money. I also wanted to be able to custom-order the size and shelf configuration that fit my needs. I requested a customized 5500-series rack for review, with an eye to buying the review sample if it lived up to my expectations.

Billy Bags racks are made from 1"-diameter, 0.035"-thick cold-rolled steel that's cut and milled on machines unique to Billy Bags Designs. To assure perfect alignment, the frame pieces are individually milled for the space they're intended to fit. The crosspieces are welded inside the frame, giving the exterior the refined look of molded metal. Short strips of steel are welded at a 45° angle between the vertical frame and horizontal crosspieces to hold the shelves. Each shelf has a rubber washer between the steel strip and shelf for vibration isolation and damping. Screws hold the shelves to the strips.

The shelves are made from high-density particleboard, laminated on both sides. In a nice touch, the rack's top deck is beveled and the corners are cut at 45°, with black banding on the bevels and corners. The result is a softer appearance that subtly metamorphoses the rack's rectangular shape. The frame is available in three colors: Wrinkle Black, Desert Sand, and Tropic Jade. The last two finishes add $106 to the rack's price. Shelf colors available with the black frame are Charcoal Black, Lunar Green, Verde Pompeii, Light Gray, Dark Charcoal, Bleached Wood, and Black Star Granite. Only Bleached Wood shelves are available with the Desert Sand–colored frame. Similarly, the Tropic Jade frame is available only with Lunar Green shelves.

Although the review sample was 49" tall, the unit was sturdy and stable. The rack's basic construction confers a rigidity further enhanced by "truss supports" on the top and bottom sections ($50 extra for both). Only racks with at least 7" of space between the top deck and uppermost shelf can be fitted with the truss supports.

The legs come with 1/4" spikes and nuts, which can be adjusted to level the rack. Fortunately, my concrete-slab floor was flat, and needed no spike adjustment. The legs are surrounded by foam, which Billy Bags claims improves the rack's damping properties. Before I heard that claim, I thought they merely protected the legs from vacuum cleaners and feet—they don't look like they could provide much damping.

You can custom-order virtually any size rack (width and height) with any number of shelves at whatever spacing you want. In fact, two-thirss of Billy Bags' production is dedicated to custom racks, which take four to six weeks to build. When ordering, you can specify that the frame and crosspieces be filled with sand or lead shot. Alternately, you can fill the rack yourself (and save the cost of shipping sand across the country), provided that you specify that the rack include endcaps to keep the sand in place. I ordered a sand-filled version, which brought the shipping weight to 98 lbs. Of course, you can also buy a Billy Bags rack ready-made; their stock designs work well for most systems.

The review sample—with five shelves, a top deck, top and bottom truss supports, and spikes, and filled with sand—carries a retail price of $1090. The unit without sand, but with endcaps so you can fill the rack with sand or lead shot yourself, costs $970. Shorter racks with fewer shelves generally cost between $675 and $850. Spikes add $70 to the retail price.

The 5500-7's appearance and build quality were exceptional. The unit looked great, complementing the equipment it held. Moreover, the open design and large space between shelves made it easy to access the backs of components; a high priority for a reviewer or someone who changes equipment or cables frequently.

**Bad Vibes**

There's no doubt that keeping vibration out of audio components improves the sound—see Shannon Dickson's article elsewhere in this issue. Some of the mechanisms by which vibration degrades sound quality are well-documented; others aren't. For example, vacuum tubes are microphonic; you can yell into a high-gain tubed phono preamp and hear your voice come from the loudspeakers. The sound of your voice impinging on the tube is converted to an electrical signal by the tube (the function of a microphone), which is amplified by the rest of your system. When the system is playing music, acoustic energy impinging on the tube introduces the same phenomenon, which can only degrade the system's musical performance.

One noted digital designer told me that a crystal oscillator changes its frequency slightly when vibrated, causing timing variations (jitter) in digital components. To prevent this in his designs,
If you've been reading Stereophile—or any of the critical audiophile review magazines—you've probably read about Audio Alchemy's remarkable DTI•Pro digital anti-jitter filter which is designed to improve the performance of virtually any high-grade D/A converter. Stereophile's Robert Harley called the DTI•Pro a "break-through in digital audio reproduction" and said "DTI•Pro's effect must be heard to be believed..."

What's a Digital Anti-Jitter Filter?

One of the most serious types of digital distortion is called digital jitter. Jitter is caused by timing errors created at various stages of the digital signal transmission and conversion process. Jitter is most obvious in the highs where it causes a brightness which most audiophiles find irritating.

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he isolates the crystal oscillators from vibration. But why a solid-state pre-amplifier, for example, should benefit from vibration isolation is still a mystery.

Of course, the most vibration-sensitive component is the turntable. Any relative motion between the record and the stylus is interpreted as signal. When the turntable vibrates, either from sound impinging on it or from structure-borne vibration, that vibration is converted into an electrical signal that pollutes the musical signal.

John Bicht, designer of the Versa Dynamics turntables, many tonearms, and Formula One race-car chassis (among other things), once told me that if we could hear an audio system totally devoid of all vibration and resonance, it would be vastly better than any audio system we’ve ever heard. When he distributed Micromega digital equipment, John came to my listening room with the Trio CD player. Knowing he was into vibration isolation, I proudly showed him the 260-lb Merrill Stable Table on which the Trio would sit. His response? “It will have to do.” He then explained to me that his equipment sits on huge blocks of granite cut by a tombstone maker!

Another radical approach to vibration isolation is to put your equipment on an air-filled isolation platform, such as the units used to support scanning electron microscopes. Shannon Dickson reviews two such units elsewhere in this issue.

Since few of us can go to such extremes, I can happily report that the Billy Bags 5500-7 rack works just fine. In addition to being functional, the 5500-7 performed well sonically, and rendered a significant improvement over the generic “stereo” rack it replaced. With my system sitting on the Billy Bags, image focus tightened and the spatial presentation became more coherent. The rack also seemed to make dynamic contrasts wider, with a greater ability to resolve low-level detail. The music’s fine structure was better revealed with the preamp, CD transport, and digital processor on the 5500-7. Finally, the music had a “blacker” background, with a heightened impression of transparent space.

Moreover, the 5500 series racks can be improved simply by putting absorbent feet beneath your equipment. I used AudioQuest’s large Sorbothane feet, which slightly improved the sound and also improved ventilation.

Against the Merrill

The 5500-7 didn’t offer the ultimate isolation from vibration my second rack, the Merrill Stable Table, did. The Stable Table’s shelves sit on ball bearings for isolation, and the top deck is a giant slab of polished granite. The unit weighs 161 lbs before you add 100 lbs of lead shot. Moreover, the Stable Table’s shelves are thicker and denser than those of the Billy Bags rack. At $1097 (plus $100 for lead shot), the Stable Table is in the same price range as the fully loaded 5500. The Stable Table has, however, only three shelves plus the top deck, which may not be enough for some systems. (The Stable Table can also be ordered with four shelves, at additional cost.) I ended up with the two racks side-by-side, with my LP front-end and Genesis woofer amplifier on the Stable Table, everything else on the 5500. This setup also let me compare the sonic performance of these two units by moving the turntable between racks. The rest of the system used to evaluate the 5500 is described in the review of the Encore Pyramid 1 DAC digital processor elsewhere in this issue.

Comparing the sound of the Well Tempered Turntable on the Merrill Stable Table with the WTT on the 5500’s top deck, it wasn’t a contest: LP sound using the Stable Table was significantly better than when the turntable was on the 5500. With the Stable Table, the entire bottom end was tighter, better-defined, and more extended, with greater rhythmic drive. The soundstage was also more transparent, with greater resolution of low-level information at the soundstage rear. The mids were less forward and had greater liquidity with the Stable Table. With the 5500, the presentation was more aggressive and hard in the midrange, a characteristic particularly noticeable on the horn section of Tower of Power’s Direct LP (Sheffield Lab 17).

I should note that the WTT is an un sprung design, meaning that the tonearm and platter are mounted directly on the base, with no springs to absorb vibration. A well-executed sprung turntable, such as a Basis, may be less sensitive to the rack on which it is mounted.

Conclusion

If you want greater vibration control, the Merrill Stable Table offers more mass and better damping for essentially the same price. If you have a turntable and don’t need lots of shelf space, the Merrill is the rack of choice. The Billy Bags 5500, however, has two more shelves for the same price, and can be ordered in a greater variety of colors and shelf configurations. I had the best of both worlds: the LP front-end (Well Tempered Turntable and Vendetta SCP-2B phono stage) on the Stable Table, and the preamp and digital front-end on the Billy Bags.

At $1090 as configured, the 5500-7 is toward the upper end of the price range, but is still less expensive than the excellent Bright Star Rack of Gibraltar and Sound Anchor designs, and is substantially sturdier and better-looking than the many popular $300–$600 racks I considered. In short, the Billy Bags 5500 rack meets all the criteria for use in a high-end audio system: it’s solid and well-built, looks terrific, and offers good sonic performance. A good value.

1 Reviewed by Guy Lemon in October 1989, Vol.12 No.10. Stereophile bought the review sample, which I’ve used continuously for the past five years.

Stereophile, November 1995
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4. Good Morning School Girl - 3:12
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I was cruising at 36,000 feet, totally relaxed, listening to Richard Thompson. Looking down at my lap, I caught sight of a little box with a glowing green light. Switching off this light was like turning on the noise—the 767 was roaring like a locomotive and the ambient sound hit me like a fist. Thompson’s crisp Celtic chordings turned mushy, undetailed, and dull. I felt weary. "Whoa, I wouldn’t do that again if I were you, ladde! I fumbled for the switch and reactived the NoiseGard circuitry on my Sennheiser HDC 451 noise-canceling headsets. Thompson’s guitar rang out clearly, the airplane quieted to sound like an S-class Benz, and I relaxed into a calm reverie with only one worry clouding my contentment. But I patted my pocket: yup, still two cognacs left. Everything would be all right.

Noise annoys
When I recently visited Sennheiser’s manufacturing facilities in Wennebostel, Germany, I learned that the firm has long been a leader in avionic communication devices. At first I figured that pilots and air-traffic controllers just recognize a quality headset when they hear one—but there’s a little more to it. Noise in their high-stress environment isn’t merely an annoyance—it causes fatigue, masks vital information, and can lead to permanent hearing damage.

So Sennheiser set out to combat noise and its side effects by actually canceling it. Their NoiseGard circuitry incorporates a microphone that inverts ambient noise 180° and feeds it back into the headset diaphragms, resulting in a drastic reduction in the perceived levels of that noise. While at the factory, we got to don various models of their aviation communication rigs while they played tapes recorded in different aircraft at real-life loudness levels. From single-engine Cessna to fighter jet, the headgear did the job—turn on the NoiseGard and suddenly we could hear what our colleagues were saying, clearly and without strain. Pretty darned impressive, especially when you consider that the number—one cause of in-air accidents is miscommunication. I may never get on a plane again without confirming that the flight-deck crew is wearing Sennheisers—I don’t want to be a statistic!

On our way to the airport the next day, Sennheiser’s John Bevier passed out samples of Sennheiser’s HDC-451, a consumer model that incorporates NoiseGard into a pair of dynamic Open-Aire™ headphones like the ones commonly used with quality portables. Set in the middle of the connecting cable is a box just large enough to hold two AA batteries. One side of the box sports a sliding switch and an LED, the other a belt clip. Sliding the switch activates the NoiseGard and illuminates the LED. Battery life is given as 80 hours. The only-slightly-oversized motor housings on the earpieces contain discreet pea-sized screens—these are the microphones.

"Cum on, feel the noize" A busload of audio critics just received free headphones. Quick! What do you think happened next? To a one, we all either bum-rushed our luggage for our portables or stood there clicking the circuit on and off, giggling. I did both. Turning on the noise-canceling circuitry without music playing does feel a little weird. First, it causes a slight pressure on your eardrums. After all, that is what it’s doing—creating a signal just as loud as the noise in order to cancel it. This is not uncomfortable, but I found myself...
swallowing more, as if to equalize pressure. Second, from 400Hz to 1kHz the noise does fall away—a measured 10dB reduction. What I found interesting was that the reduced-noise state doesn’t feel unnatural; turning the circuitry off and re-emerging into the world of noise—that feels unnatural. It’s like turning the noise on. Who’d want to do that? Not me. In those first few minutes I swore a solemn vow to never take off my 451s.

I turned to tell my wife that she was going to have to live with a man permanently attached to a pair of headphones—less of an adjustment than you’d think, actually. She removed her 451s to catch what I was saying and winced at the roar of the bus’s diesel. She put her phones back on and whispered, “Wow, I hear you so much more clearly with these on!” It was true; an added benefit was the extent to which speech and other essential sounds were able to penetrate. On the plane, when our stewardess gave her safety presentation, we put our 451s on to hear her better. We were getting hooked.

Listening to music through the 451s is enjoyable, too. I consider them several steps above the standard Walkperson headphone, although sonically they’re no match for the Sennheiser HD 580s, Etymotic ER-45es, or Stax Lambda Pros that rightly inhabit Class A of our “Recommended Components.” In fact, it’s a little hard to get a handle on how good they are at just playing music. Put them on without activating the Noise-Gard circuitry and they don’t, frankly, sound very much different from the bulk of Walkperson headsets. Grado’s $60 SR 60s sound considerably better, I think. But turn on the circuitry and they immediately improve in clarity, articulation, and freedom from fatigue-producing artifacts. Perhaps they sound a touch too bright, but I start to mistrust my sonic judgments around Noise-Gard—after all, I’m the guy who said that turning off the device felt like you were turning on the roar of the world—very confusing, that. Is it too bright with the circuit on, or has the noise reduction subjectively brought out detail otherwise masked? I keep turning it on and off looking for an answer.

Since I enjoy listening critically while flying—enough to lug around a complete HeadRoom system—I’ll probably continue to employ my Etymotics for in-flight listening. After all, their in-the-ear isolation renders 24dB of noise reduction and greater frequency range to boot. But not everybody listens to music the way I do while traveling. For listening to the in-flight programs, or for watching the featured film, the 451s are great! In fact, Sennheiser includes an adaptor for that dorky dual-mono plug that the airlines have designed specifically to keep you from using your own headsets.

Here’s a little hint for you even if you don’t listen to music: buy a pair of HDC 451s to listen to nothing with. “Buy a headphone and not even plug it in?” you ask? It sounds crazy, but you’ll land feeling so relaxed without having had all that jet-roar pounding at your ears. Or use ‘em for sleeping—while I’m not sure there’s such a thing as quality sleep on an airplane, you’ll get much better rest with a pair of these.

You might find these handy if you transcribe tapes a lot, as I do when writing up interviews. They’ve become my favorite tool for that—I strain less to make out details and therefore work much faster.

I took them into the subway back when I lived in New York. A lot of subway noise is below 400Hz, but even so, they made my trips a lot more enjoyable. They also deterred a certain number of those annoying subway conversations with crazy people—even [they] know better than to talk to someone with head-phones on.

FLY THE QUIET SKIES...

The Sennheiser HDC 451 NoiseGard Mobile headphones are not, I suppose, for everyone. Business travelers and other unfortunatee who seem to live on aircraft should definitely consider buying a pair, if only to get a good flight’s sleep. If they also get a chance to enjoy some high-quality music, or better comprehend an in-flight movie, so much the better. If you work in one of those open-plan offices or have your desk under the fan—or if you generally find yourself tired from constantly battling a noisy environment—then the HDC 451s may actually purchase you some peace. God knows, not many products offer that.

1 I took the 451s with me on a recent trip to Europe. While I found the sound quality was nothing to fax home about, particularly when compared with the Grado SR 125s that I stuck in the HeadRoom Supreme’s output jack for music-listening—great cans, these—the noise cancellation with no music playing was addictive. One thing puzzled me psychoacoustically: The effect of the headphones seemed to be that while the noise within my head was very much lower in level, I was still aware of low-frequency noise coming from the sides. I guess that the cancellation is very much more efficient with common-mode noise, hence this weird effect. Or, perhaps, the cancellation of upper-bass and midrange noise unmasked the lower-frequency component.

-JA
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As a crucial element of this essentially limitless adventure, better audio equipment has become a joyous pursuit in its own right. I've always loved hearing the latest work of different designers and the sound of innovative new gear. But over years of upgrading, I find I've become less excited by the equipment, in part due to the extraordinary price escalation we've witnessed at the cutting edge.

But every now and again a fascinating product comes along that is remarkably faithful to the real thing, yet is priced within reach of most music lovers. All too often, being "priced within reach" implies all sorts of sonic compromises. When convenience features are thrown into the mix, it would seem inevitable that the sonic compromises would have to be severe.

This is what I was thinking when I finally got my hands on Audio Alchemy's Digital Line Controller (DLC). Wes Phillips recently wrote a formal review of the DLC—a little cute $459 product with a remarkable remote control—but I'd been fascinated with the DLC ever since I'd heard a prototype at a CES. I couldn't help but wonder what sonic tradeoffs had been made to include all that convenience at such a relatively low price. Could the DLC truly offer low price, great features, and good sound, too?

Convenience or sonic performance? The pursuit of high-end sound

often forces us to put up with inconvenience. So what if mid-fi lovers had remote control? We had superior sound!

Gee, couldn't we have both? Not long ago, such a question would have been considered heresy. Then, with the late-'80s introductions of microprocessor-laden, remote-controlled preamps from such high-end companies as Rowland and Primare, we finally had high-end sound coupled with mid-fi convenience in elegant, albeit pricey, packages. Since then, other high-end companies have followed suit with their own remote-controlled preamplifiers.3 But could there really be a legitimate high-end preamp with remote control at an affordable price?

Audio Alchemy,4 the first company to offer a true high-end CD transport at a real-world price, and who followed that up with the trendsetting DAC-in-the-Box, took on the challenge. For under $500, the DLC includes a wonderfully functional, if somewhat chunky/clunky remote called the Remote Wand, or RW-1.5 The RW-1 offers just six large buttons offering full mute, balance, level, and source selection by rotating through the inputs. The level control puts many a more expensive preamp to shame, offering 1dB steps from -96dB up to -40dB, and then 0.5dB steps all the way up to +31.5dB! Using the balance and level controls together, I could select any combination of settings for any input, and the specific settings were remembered for each source.

In addition to remembering the volume and balance settings for each input, the DLC/RW-1 offers a number of useful and unusual functions. For example, after any change or adjustment, the display glows brighter for 15 seconds, then automatically dims. The program mode allowed me to change display brightness levels, and to set the unit to bypass unused inputs or restrict the level range (both high and low) for each input independently. To reset the balance to the level of either channel, I simply put the unit into Mute and pressed the appropriate balance button—both channels then had the same output level. The convenience of this remote was sensational; I sincerely hope all preamps will offer similar convenience features in the future.

The DLC buck's still another high-end trend. For many years, preamps have been growing in size, with separate power supplies, outboard phono stages, or separate left- and right-channel chassis. The DLC is something else entirely. A palm-sized package weighing in at just 4 lbs—about the heft of a chicken you might select for your outdoor rotisserie—it's remarkably compact, with an even smaller outboard power supply. (Larger/beefier power supplies are also available.) While the small size allows the DLC to be placed anywhere, its light weight can pose a problem with many heavier interconnects. I ended up using a VPI brick6 atop the unit to keep it in place.

Setup was simple, although the manual does caution the user to plug the power supply into the unit and connect both the inputs and outputs prior to plugging-in to the AC mains. Four inputs and two sets of identical outputs (another convenience for bi-amping or driving a separate set of speakers) were aligned vertically, with the left channels on top. Setup, small size, and ease of use all earned five stars.7

But what about the sound? My overall impressions of the unit came into focus when I was listening to a recent CD sampler from Jazziz magazine through the musically satisfying, floor-standing Epos 25 speakers. The performance was easy, smooth, and holistic, the music washing naturally over me in waves of sound. Nothing was going on to draw my attention away from the artistry of the performers and toward the equipment. The DLC simply got out of the way and let the music through. It's a lovely-sounding preamp, well worth its asking price even if it

1 While the Natalie & Nat King Cole duet springs to mind, the list of performances that fit my criteria is virtually limitless, ranging from CD reissues of Robert Johnson's blues to the four-track splendor of the Beatle's Sgt. Pepper's Lonely Hearts Club Band.
2 Vol.18 No.8, August 1995, p.159.
3 Other high-end remote-control preamps include the Levinson No.385 at $6495, Klei KRC-HR at $6900, Sutherland C-1000 at $15,000, and Threshold T2 at $5250.
4 Audio Alchemy, Inc., 31133 Via Colinas, Suite 111, Westlake Village, CA 91362. Tel: (818) 707-8504. Fax: (818) 707-2610.
5 Being nitpicky, I'd like to see Audio Alchemy include the two required AAA batteries; nothing is more frustrating than setting up a piece of equipment only to find out that you can't use it until you pick up some batteries.
6 While I haven't commented on VPI brick it's a phenomenally useful accessory for which I continue to find new uses. No audiophile should be without a few of them.
7 The DLC lacks a phono input as many audiophiles no longer need a phono stage, and the inclusion of one in the DLC would only drive up the price unnecessarily. Audio Alchemy does offers a separate phono stage, the VAC-in-the-Box, reviewed in August and September 1995 by Michael Fremer and Steven Stone, respectively.
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didn't offer remote control, surprisingly sophisticated programming, and a clever visual display. Considering all of that, the DLC rates as still another outstanding audio bargain from Audio Alchemy.

The primary responsibility of any piece of audio gear must be the flat and neutral reproduction of all frequencies. There was no doubt that the DLC had an extended treble that went out beyond the limits of my own hearing. With musical material, this top-end capability was evident in the reproduction of cymbals and triangles—outstanding in power, speed, and clarity. At the same time, there was none of the exaggerated sense of detail often associated with a pumped-up lower-treble region.

An uneven treble and other high-end anomalies will quickly show up as excessive splash or diminished decays on cymbals. Using the SBM CD version of Dave Brubeck's "Blue Rondo A La Turk" (Time Out, Columbia CK 64408) through the very impressive Classe 1000 power amplifier, the reproduction of cymbals was outstanding, with lovely percussive strokes and glistening decays. The resolution of detail and transient ability of the DLC/Classé combo let me hear how hard each stroke was and how different each sounded on specific parts of each cymbal. A great example of top-end resolution was the sound of tape hiss just before Rickie Lee Jones's vocal entries on "Comin' Back To Me" (Pop Pop, Geffen GEFD 24426) as her track was brought up in the mix.

At the other frequency extreme, my impressions were a bit different. Initially I thought the DLC was somewhat weak throughout the bass range, but it turned out that the DLC's bass performance was very much related to volume. At low settings, bass output sounded attenuated. As the level was increased, bass performance improved substantially. Once brought up to a high enough level (a bit higher than I would have liked), the bottom-end extension rivaled that at the top.

Nevertheless, the bass range continued to bother me over the long haul. Regardless of level, the midbass region never seemed sufficiently dynamic or harmonically full. A good illustration was the attention-grabbing "Car Bomb" from Negativland's Escape From Noise (SST Records SST CD 133). While I could play this track as loudly as I could stand, the dynamically explosive sound effects never jumped out as they should have. This same lack of dynamic contrast and harmonic robustness was evident on Rob Wasserman's "Ode to Casals" (Solo, Rounder RCD 0179), where the overwhelming musical content was in the bass region. Starting at approximately 1:47, the dynamics on this cut should be startling. With the DLC, they were restrained. I confirmed this impression using the DLC with the Classé amp driving ProAc Response Fours. A number of other preamps provided a more expansive dynamic range on bombastic material.

The lack of harmonic richness in the mid/upper bass region continued up into the midrange. More than any other single factor, it was this leanness that separated the DLC from the sound of such great preamps as my reference CAT SL-1 Signature. In this critical region, the sound was clean and smooth with no additive colorations, but timbres were simplified with a diminished sense of overtone structure. I returned to the Rickie Lee Jones: her voice remained pure, clean, and delicate, but lacked some measure of emotional substance. Everything that was there was wonderful, but something was missing.

As I listened to Midori's violin (Live at Carnegie Hall, Sony SK 46742), it became clear that this lack of harmonic richness extended up into the treble range as well. Once again, everything was smooth and clean, but not full-bodied enough to successfully emulate the sound of a live performance. I had expected a bit more immediacy and presence from the DLC. Instead, the music often sounded as if there were a small but wide-band midrange depression. Sounds in this range—into which all vocals fall—often were presented behind the speakers, never at the plane of the cabinets or in front of them. Invariably, my "seat" at virtually any performance was mid-hall or farther back. The soundstage presentation was consistently wide from this position, but lacked depth layering and three-dimensional imaging—performers were a bit distant and physically flat.

However, this is not to say that the music failed to communicate. My wife and I spent an entire evening marveling at our 2½-year-old's ability to tell us which Disney movie almost every one of the 54 tracks off three CDs from The Disney Collection came from (Walt Disney 60816, 60817, and 60818). We clapped, laughed, and sang along to all sorts of wacky things. And that was a great summary of what the DLC was all about: We enjoyed the music; we pumped up the volume when it was needed; we muted the sound when the phone rang; and we never had to jump up to do any of it. The DLC has now found its way into my wife's system. I doubt it will be leaving any time soon.

**Conclusion:** Having made numerous criticisms of the DLC, I nevertheless want to de-emphasize their relative importance. No, the little line-stage from Audio Alchemy didn't fool me into thinking I was hearing live music, or cause me to put the latest version of my CAT up for sale. While the DLC had sonic shortcomings, they were subtractive in nature and did not impose themselves on the music. The DLC was never offensive, and always pleasant to listen through.

The Audio Alchemy Digital Line Controller is a wonderfully satisfying product, with sonic performance alone worthy of its asking price. But for sheer convenience, it sets standards that every high-end manufacturer should aspire to, at a price within almost every audiophile's reach. It clearly reinforces Audio Alchemy's well-deserved reputation for providing unique products with tremendous levels of performance at real-world prices. After spending a great deal of time with the DLC, I can comfortably recommend it as a wonderfully convenient and musically enjoyable product.

—Jack English

**VPI TNT JR. UPGRADES**

One of the things that impressed me about the VPI TNT Jr. turntable that I reviewed last January (Vol.18 No.1, p.143) was the opportunity it offered its owner to upgrade it to full TNT status. The TNT Jr. upgrade path is not a superhighway, but a country road with forks, detours, and possible dead ends. What follows is a road map.

The first step is the so-called "cost-effective" upgrade. This consists of the tripod pulley system for the belt-drive system and the Power Line Conditioner (PLC). This change is pretty straightforward: pop the pulleys through the holes on the plinth, put on the new belt, and plug the motor into the PLC. The only fly in the ointment is that, to get the right speed, you'll have to crank the PLC up to between two and three o'clock. This deviation from the middle of the scale (12 o'clock) is necessary because the TNT Jr. motor shaft is not optimized for use with the tripod pulley system (it's a slightly different diameter from the one used on a regular TNT).
This isn't a big deal; it's just slightly annoying to compulsive types.

I mentioned in my original review of the Jr. that I used it mounted on a Bright Star TNT base unit resting on a VPI turntable stand. With the TNT Jr., I had found the Bright Star base an absolute necessity to ensure maximum attenuation of motor rumble. Isolating the motor on its own separate platform (via Bright Star's slit plinth) is definitely the way to optimize performance. Shortly after I finished my Jr. review, Townshend Audio, makers of the Seismic Sink, sent me their largest unit—specifically designed for the TNT Jr. I live in a rural area with no nearby subways, pumping stations, bus lines, nuclear test sites, or other sources of low-frequency vibration. So when, after much huffing and puffing (that sand-filled Bright Star base is awfully heavy), I first installed the Seismic Sink beneath the Bright Star Jr., I noticed no improvement. This all changed when I got the TNT flywheel upgrade.

The flywheel upgrade ($1000) consists of new belts, a 28-lb flywheel, and a metal platform to attach to the side of the Bright Star base. The idea is to further isolate the motor from the platter while employing good of inertia to further stabilize speed. The Flywheel should replace the motor, and the motor should be placed on the metal platform. In theory, a simple upgrade.

With a regular TNT, the upgrade is about that simple. Not so with the TNT Jr. The first problem you'll encounter with the flywheel upgrade is that you can no longer get your TNT up to an accurate 33rpm speed without using the 45rpm setting on your PLC. Forget about 45rpm—you can't get there from here. The problem is that darned TNT Jr. motor shaft. It's the wrong size to get proper speeds with the flywheel and the tripod pulley in place. The solution is to swap out your Jr. motor for a III motor. The motors themselves are exactly the same; only the shafts are different. It took me all of five minutes to make the swap. (I'll probably take you even less.) Now, when you set your PLC back to 33rpm, you'll find—miracle of miracles—that the speed will be almost dead on at the 12 o'clock setting.

It's not all bonbons and ice cream quite yet. You'll notice a new problem once your turntable is up and running: rumble. While I'm told the $800 spring upgrade that's standard on the Mk.III TNT does a great job of isolating the platter and plinth from motor vibration, you don't have one on your TNT Jr. The lack of the spring system is what makes the Bright Star base de rigueur with the Jr. Once you move the motor onto the outboard metal plate, it's no longer isolated on the Bright Star base's nice, thick bed of sand. Its vibrations are now passed through the plate, right into the top-plate of the Bright Star base, and into your plinth and platter. Damn.

Using just the Bright Star base and metal plate, the only way to achieve acceptable rumble levels is to put the motor back where it was originally and place the flywheel on the metal plate. While this does let the flywheel's inertia stabilize speeds, it doesn't do much to isolate the motor from the platter. This way, you're only getting half the benefits, compromising the upgrade. The High End isn't about compromise.

I called Barry Kohan at Bright Star and suggested that there was an opportunity to make a new product that would solve my dilemma. What I needed was a small Bright Star sandbox that would attach to the side of the TNT base and hold the outboard-mounted motor. I offered him the idea gratis; I just wanted the first production model. About a month later a box from Bright Star showed up at my door containing—

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**Hafler Closeout specials**

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<tr>
<th>Model</th>
<th>Description</th>
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<td>MOSFET Stereo Power Amplifier 105W per channel stereo amplifier</td>
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<td>Bridged to 208 watts into 8 ohms</td>
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<td>Hafler 945</td>
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<td>Hafler 915</td>
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200 WorldRadioHistory
Stereophile, November 1995
you guessed it— a new Mini-Rock F (for flywheel) from Bright Star.

This cute little 7½" W by 5¾" L by 4½" D unit costs $89 in Dark Granite and $99 in Black Granite. It attaches to the TNT base by means of two slide-on metal pieces (it can also rest adjacent to the Big Rock TNT when both are on a large flat surface). With the help of the supplied paper template, I had the thing installed in about 20 minutes, and spliced not a grain of sand in the process. Unfortunately, the little box didn't quite work as intended. Yes, there was less rumble than with the metal plate, but there was still rumble. So much for my future as an accessory designer.

After a restless night of pseudo-sleumber, I came up with a solution (sometimes I'm smarter when I'm unconscious). Remember that Townshend Seismic Sink that didn't do anything? Luckily, I hadn't sent it back to Texas. During my night's tossing and turning I recalled that Max Townshend had told me it was designed to isolate components from subsonic vibrations such as motor noise. Motor noise? How about using the Sink to isolate the VPI from its own motor?

Next day I went to a local home-improvement mega-store and purchased a 34" by 22" piece of ¾" interior-grade plywood, and one patio brick. I conned my next-door neighbor Elm into helping me disassemble the TNT Jr. and the Bright Star base. We placed the piece of plywood on the VPI stand, put the Seismic Sink on top of the plywood, lowered the Bright Star base on top of the Seismic Sink, and finally put the TNT Jr. on top of the Bright Star base. Next we placed the Bright Star Mini-Rock F atop the patio brick, which was placed on the plywood board. Result: the motor was now isolated from the turntable by not only the Bright Star Mini-Rock F, but also by the Seismic Sink and Bright Star TNT base. Now the rig passed the rumble test with flying colors. Even with my ear about an inch away from the Dunlavy SC-VI's 15" woofer, there was no audible difference in the rumble level with the motor on or off. Yessssss!

Those of you with a flair for numbers might stop and say, "But Steven, the cost of a Bright Star TNT base ($305 with split plinth), a TNT-size Seismic Sink ($600), a Bright Star Mini-Rock F ($89), and the brick and plywood ($35) is more than the cost of a VPI TNT spring upgrade. Why don't you just get the springs?" I hate number-crunchers. I assume most TNT Jr. owners will probably already own the Bright Star base by the time they begin their uphill climb to VPI nirvana. If they don't have the base, the springs might be a better option.

I'm not a big fan of springs. Unless you have a solid floor that moveth not, with many turntables (like the VPI HW-19 IV) springs can make for a less stable image. But I plan to try them out in the near future, along with the model III platter—let's call that Part B of the TNT Jr. upgrade Follow-Up.

The Sound After the Fury: What does all this messing around buy you? For one thing, you get a very silent turntable. With rumble at least 80dB down by my primitive measurements, you don't have to worry about your full-range speaker system wasting effort reproducing motor rumble: now it can devote all of its energies to record warp (just kidding). The differences between the stock and upgraded VPI TNT Jrs. are subtle but pervasive. No, the upgraded unit doesn't make the stock unit sound like an old Garrard, but you do get a bit more of the music's subtleties and nuances, with less effort on the listener's part. There's more of a sense of ease to dynamic peaks on the upgraded TNT Jr. The strain-free crescendos (every audiophile's dream) are standard operating procedure with the TNT III plus. The upgraded TNT Jr.'s soundstaging is quite amazing. While different cartridges, arms, and phono preamps can all have major impacts on soundstage presentation, the upgraded unit does produce a slightly larger soundstage, with the same setup, than the stock TNT Jr. It's as if the outer edges of the soundstage are rendered with greater clarity, with more distinct delineation of the area where the soundstage ends. Listen to the way the bass drum in the beginning of the Jcan Martinon/LSO recording of Shostakovich's The Age of Gold Suite (Classic Records LSC-2322 LP reissue) reverberates around the edges of the stage. With the upgraded Jr., the half's dimensional limits are more distinct.

I'm more aware of wow and flutter with the upgraded TNT Jr. No, not wow and flutter created by the turntable, but wow and flutter present on the original master tapes. Many of my mid-'70s rock and blues albums have now-clearly-detectable wow and flutter problems—acoustic pianos and guitars should not have natural continuous vibrato. Perhaps listening to as many digital sources as I do has made me more sensitive to the subtle pitch variations that are often found on older, less-than-state-of-the-art analog master tapes. I haven't noticed these pitch problems on Classic or Chesky vinyl reissues, so it's really source-dependent. Keith Richards' guitar on Biggar's Banquet flattens outrageously, but keep in mind that he recorded his rhythm guitar tracks on a less-than-perfect cassette machine, then transferred them onto a multitrack tape machine—the flutter is part of the "sound." Still, that sick guitar makes me queasy.

Summary: So there you have it—the complete, unexpurgated tale of what to expect on the long and winding road upgrading a basic TNT Jr. to a TNT III plus. Hope it helps you swerve around the potholes.

Is the trip worth taking? I think so. After all, the improvements wrought by this upgrade path are what the High End is all about—making a fine product even better.

—Steven Stone

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**RUMBLING**

Inquiring minds may want to know how I determined when rumble was present. Here's my oh-so-scientific method. Try it at home—if you dare!

First, you must be able to uncouple your platter from your motor, so when you turn on the turntable the platter doesn't spin. With the VPI 'table this is really simple—just remove the belt. Put a record on the platter as you normally would, and place the stylus on the record.

Now comes the tricky part: Set your preamp on Phono and turn up the gain all the way. Listen to the base noise level with the motor off. Then "mute your preamp and turn your motor on. (If you don't mute your preamp, the turn-on pop generated by a VPI motor will take out your woofers!)

Now de-mute your preamp and listen to the noise level. If you have a low-rumble system, there should be virtually no difference in the base noise level, whether the motor is on or off. If there's a difference, that difference is rumble. Note that this test doesn't reveal the presence of rumble from the bearing or transmitted through the belt.

---

—Steven Stone
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Richard Strauss's
Ein Heldenleben

In 1897, while still working on *Don Quixote*, Strauss began composing *Ein Heldenleben*, Op.40. This 45-minute-long tone poem was finished toward the end of the following year, Strauss himself conducting its first performance, with the Städtisches Orchester in Frankfurt, in March 1899.

In his earlier tone poems, Strauss had explored the nature of heroism in the forms of Shakespeare's Macbeth, Nietzsche's Zarathustra, and Cervantes' Don Quixote. In *Don Juan* and *Till Eulenspiegel* he used legendary characters to fire his imagination. Then he decided he would compose a work about himself, explaining to Romain Rolland, "I find myself quite as interesting as Napoleon or Alexander." It is no coincidence, then, that the work is in E-flat, for he had Beethoven's "Eroica" in mind from the outset.

The work is in extended first-movement sonata form and is scored for a luscious late Romantic orchestra of quadruple woodwinds, augmented brass, two harps, a huge battery of percussion, and a large string section. Although they were withdrawn after its first performance, Strauss originally headed each of the ongoing six sections that comprise the piece with titles that not only help us to understand its programmatic content, but also give easy guidelines to its form: Sections 1–3, depicting "The Hero," "The Hero's Critics," and "The Hero's Companion," approximate the first subject, transition, and second subject of an exposition; Section 4, "The Hero's Battlefield," is the development, while Section 5, "The Hero's Works of Peace"—with its veritable profusion of quotations from his earlier tone poems, his opera *Guntram*, and two songs, and opening with an unmistakable horn declaration of the *Don Juan* theme—represents the recapitulation. Section 6, "The Hero's Retreat from the World and his Fulfillment," brings the work to a close in the form of an exquisite coda.
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Stereophile, November 1995
It seems rather precocious for Strauss to have considered writing his musical autobiography at the age of 34 (he was to live another 51 years). However, it is a wonderfully interesting work and should be in any serious music lover's collection.

Although neither are listed in the current Schwann Opus, it might still be possible to get hold of Willem Mengelberg's 1929 recording of Heldenleben with the New York Philharmonic (RCA 60929-2), two discs also containing performances of Zarathustra, Don Quixote, Tod und Verklarung, and Aus Italien, conducted by Koussevitzky, Beecham, Stokowski, and Frederick Stock, respectively, or his 1941 recording with the Concertgebouw (Teldec 76441-2). They are significant in that Strauss dedicated the work to Mengelberg and the Amsterdam Orchestra, and it is always intriguing to hear what was made of these early interpretations. It is even more fascinating to hear Strauss himself conducting the piece, also in a recording from 1941, with the Bayerisches Staatsorchester (Preiser 90205, a two-CD set also including Don Quixote, Eine Alpensinfonie, Japanische Festmusik, and Walzerfolgen).

Mengelberg has often been accused of making arbitrary changes of tempo—of "agogic posturing," as one critic called it—and his 1928 recording is a fair illustration of this. Yet it was a seminal recording and had a profound and lasting influence on many other musicians. After some 90 concert performances of the work, Mengelberg teamed up with the original dedicatees in 1941 to take it into the studio a second time. Sadly, this performance is raucous by comparison, with more frenetic hysteria evident in the "Battlefield" and less serenity in the love scenes and "Works of Peace"; in all, a sad representation of a lifetime's dedication to the work.

Strauss himself hardly shows the piece in better light, pushing it forward with restless impatience, and allowing the strings to predominate so that little thematic detail from other sections of the orchestra can break through. As the "Battle" and the wonderful windmill scene from Don Quixote in the final section are also tame and rather matter-of-fact, this compounds the disappointment of an altogether unharmonious performance that can be deemed of historical interest only.

Although Strauss had a long association with Dresden, only one recording with that City's orchestra is extant in the catalog, despite the fact that at least two others, by Böhm in 1957 and Blomstedt in '84, are of worthy consideration. But we have to be thankful that the greatest of the three, under Rudolf Kempe, is still readily available (EMI CMS 64342 2, a 3-disc set coupling Horn Concertos 1 and 2, the Oboe Concerto, the Duett-concertino, Till Eulenspiegel, Don Juan, and piano pieces). This analog recording has been quite well remastered to give a warm, full-bodied, mellow sound, but it does become tiring in the more thickly orchestrated parts of the score. However, theme, unravels the intricately woven recapitulated themes of the work from those of Strauss's other works with an innate sense of balance and a fine ear. In the serene sunset coda, the Hero is quiet, turning to his loving companion for comfort and support. The langsam string theme here is breathtakingly beautiful, and brings an eloquent but impassioned performance to a fitting close.

Karl Böhm was fortunate enough to work closely with Strauss during his lifetime, and his performance of Heldenleben reveals a complete understanding and comfortable familiarity with the score (DG 423 488-2, 3-disc set with Eine Alpensinfonie, Don Juan, Zarathustra, Festliches Präludium, Till Eulenspiegel, Salome's "Dance of the Seven Veils," and Tod und Verklärung). Although Böhm sets the piece in motion at a cracking pace, Erich Muthibach is given plenty of time to give yet another delightful depiction of Pauline. But, during the "Battle" scene especially, the sound becomes overloaded; and an unfortunate cymbal trill, sounding for all the world like a firebell, makes a farce of the threatening windmill scene in the Coda.

Herbert Blomstedt with the Dresden Staatskapelle (Denon C37-7561) also gives an authoritative and poetic reading, with Murring again the fine violin soloist. All is captured in a warm, detailed recording that nonetheless lacks the immediacy of the one Blomstedt set down in '94 with the San Francisco Symphony (London 436 596-2, with Metamorphosen). But it is in every way preferable to this later interpretation, the Americans introducing an impetuous Hero whose companion lacks real strength of character—a far cry from the facts of Strauss's marriage. The "Battle" opens with cannon-fire weight and force of articulation, but the sound soon becomes saturated at fortissimo, and the faders are pulled back to compensate. Worse still, they're pushed forward again to boost the recapitulation and Don Juan theme, and, with the work brought to a hasty conclusion in what should be a peaceful coda, the performance has little to commend it.

Many American orchestras have taken Heldenleben to their hearts, the initial commitment to the works of Strauss being made by the Chicago Symphony back in 1891 when Theodore Thomas became its Musical Director. Together they gave the American premières of most of the composer's tone poems, that of Heldenleben taking place in March 1900, just over a year after Strauss presented it for the first time in Frankfurt.
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Four years later Thomas invited Strauss to be the Chicago's first Guest Conductor, this close collaboration continuing with Frederick Stock's succession following Thomas's sudden death.

Two recordings with the CSO are extant in the current catalog, the most famous being Fritz Reiner's 1954 recording (recommended in its finest coupling with Also Sprach Zarathustra on an RCA Living Stereo CD, 61494-2), the other a modern recording made nearly 40 years later under Daniel Barenboim (Erato 45621-2, coupled with Till Eulenspiegel).

Reiner's interpretation has for long been the yardstick against which all others have been measured. It is certainly a vivacious reading, the Hero bold and genial and the Critics snipping at each other in vitriolic dialog via some wonderfully precise woodwind playing. I'm not so keen on Reiner's Pauline; John Weicher dramatizes her but fails to capture her whimsical side, his account of the solo being rather screechy. But during the love scene at the end of this long section, Reiner maintains exquisite control over the pianissimo bridge to the "Battle" scene. The off-stage trumpets that herald this sound menacing, instantly threatening the engaging mood of serenity that was so beautifully created, and helping to build in both tempo and dynamics through the vivid "Battle" to reach a joyful climax at the destruction of the enemy with Don Juan's triumphant entrance. Some of the solos in the following fifth section sound a little crude, even Don Juan being less attractive than on other recordings. But Reiner is going for the big close, riding impatiently through the calm of the coda and the violin's langsam theme in his surge for the massive Zarathustra-like final chords.

By contrast, Barenboim is blandly sophisticated. Admittedly, his Critics are gossipy and mean, and his Battle is absolutely cataclysmic in its speed and fury, with the CSO gushing exuberantly in the way that most characterizes Strauss's writing. But his Hero is pompous and earthbound, his Pauline dull, his Don Juan deadly serious; I feel this performance is an illustration of Barenboim the Hero, imposing his own strength and power on an impetuous work that does not want to be kept in its place. The recording, too, while big and full-bodied, sounds curiously confused.

Toscanini, like Mengelberg and Strauss, also set his Heldenleben down in 1941, this time with the NBC Symphony of New York (Music & Arts CD-754, coupled with Don Juan and Till Eulenspiegel, the same selections are also available on Arkadia 538; and, on AS Disc AS 308, Heldenleben with Tod und Verklärung and Weber overtures). This live recording is so lacking in body sonically that it distractes totally from the performance; it is only for the most avid Toscanini aficionado.

From 1960 comes an excellently remastered analog recording of the work from Eugene Ormandy and the Philadelphia on Sony's Essential Classics series (SBK 48272, coupled with Don Juan and Till Eulenspiegel given by George Szell and the Cleveland Orchestra in 1957). I love the way this performance opens, the Hero joyous, the Critics bickering, silly, and pretentious, and Ansel Brusilow's Pauline is skittish and premeditatedly alluring by turns. But then things deteriorate, with a less than impressive "Battle" rendering the Works of Peace rather nondescript. Although the "Hero's Fulfillment" is delicately described, an ugly dynamic boost some 34 bars before the end of the piece would continue to disappoint on re-hearing.

Recently reissued on Philips Solo (442 645-2, with Zarathustra) is Seiji Ozawa's account with the Boston Symphony, originally recorded in 1982. With the same coupling as Reiner's, this disc, sadly, is no competition either sonically or interpretively. It's not that there's anything specific to criticize, apart from an unsuitably thin body of sound; it's simply that this performance doesn't excite or encourage dedication on the part of the listener apart from in the breathtakingly tranquil coda.

In 1985 Ashkenazy set down a reading of Heldenleben with the Cleveland Orchestra that is well worth hearing if you can find it. Readily available, though, is Christoph von Dohnányi with the same orchestra on the same label (London 436 444-2, with Till Eulenspiegel). Although other critics have condemned this performance for de-glamorizing the work and taking altogether too cautious an approach, I hear it in a very different way. Though certainly not Technicolour, it is still a very carefully paced, well-thought-through reading, with a genial, good-natured Hero content with his gently compliant Pauline, and glowing but compassionately serene climaxes. I admire Dohnányi's control here, and his confidence to shun the usual frivolous, heart-on-sleeve interpretation of many of his colleagues. The recording is excellent too, great clarity and focus supporting the touching mood of acceptance cultivated here.

Another relatively recent addition to the catalog is that from Gerard Schwarz and the Seattle Symphony as part of what turned out to be a very successful series of Strauss recordings (Delos DE 3094, coupled with Macbeth and the Wind Serenade). For some reason, this disc does not index the six sections separately as do most of the others (although many of these differ as to exactly where sections 4, 5, and 6 begin). I find the recording from the Seattle Opera House a little strident, and although the "Battle" begins with great gusto, strange things seem to be going on technically to cope with the immense fortissimo thereafter. That said, though the performance has many wonderful moments, not least the glorious recapitulation and coda, all in all I don't consider it a main contender.

I had great hopes for the two Zubin Mehta recordings of this work, as I was so taken by his interpretation of the Alpensinfonic, but sadly neither has anything inspiring to say. The first was made in 1981 (CBS MDK 45650), with a rather scrappy NYP showing little compassion for or commitment to the task. The coupling is of a performance of the final scene from Salome made by Andrew Davis and the Toronto Symphony, a combined force that has set down its own recording of Heldenleben on Clic Enterprises (SMCD 5036). Poor value as the only work on the disc, and with only one separate indexing point of the sections to boot, this is off to a bad start. Davis shuns any element of risk in a work that thrives on it; everything is neat and cautiously done, climaxes flat and uninteresting.

Mehta's second recording, this time

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Karl Böhm WORKED CLOSELY WITH STRAUSS DURING HIS LIFETIME; HIS PERFORMANCE REVEALS COMPLETE UNDERSTANDING AND COMFORTABLE FAMILIARITY.

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Michael Ullman listens to four well-stuffed boxes of vinyl and CDs from Mosaic Records

Founded in 1982 by producer Michael Cuscuna, Mosaic Records has been a collector's dream: their first issue, then solely on LP, was the complete Thelonious Monk on Blue Note, alternate takes and all, and included 13 previously unissued takes of Monk classics. Mosaic followed this invaluable set with the complete Clifford Brown and some even more impressive sets, including all the recordings Milt Gabler made for his '30s and '40s Commodore label, which came out in three huge boxes of LPs.

Mosaic's complete sets, exhaustive and sometimes exhausting, are all limited issues—many of the earliest have gone out of print. With their discographies and extensive notes, they are frequently educational as well as entertaining. Years ago, Cuscuna and partner Charlie Lourie moved Mosaic from California to Stamford, Connecticut. More recently, the company, which moved to CDs at what seemed like an appropriate time, has begun issuing releases on both formats.

An exception is the Miles Davis Plugged Nickel collection (see sidebar). Sony reserved the rights to the CDs, so...
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Mosaic issued only LPs. In fact, Cusco and Louie have entered on an extended agreement with Sony for the simultaneous release on Mosaic LPs of Sony/Columbia Legacy's multi-CD boxes of Miles Davis's recorded legacy. Sony and Mosaic will be releasing seven of these definitive sets in the next three years; available later this month will be a set of the complete collaborations of Miles Davis and Gil Evans on nine LPs or six CDs, including several discs' worth of previously unreleased material.

This special partnership aside, Mosaic's other new issues for the most part follow the label's established pattern: the Ellington and Hill boxes bring us difficult-to-find or unavailable recordings arranged chronologically.

The Phil Woods set is an exception only in that its contents are all new to us. Talking about his band's surprising survival—with a few personnel changes, it has lasted from the beginning of 1974 without having recorded for an American label since 1977—Woods notes: "It's kind of strange that we've enjoyed this longevity without any real support from record labels." The music on his Twentieth Anniversary Set was recorded by drummer Bill Goodwin, generally with the assistance of engineers. (The exceptions are the three mono numbers with which the set opens.) Despite the critical success of his 1976 recording Live from the Showboat (RCA BGL2-2202), RCA dropped Woods soon after he won a Grammy. He then recorded for Gryphon, Adelphi, and Century Records, but couldn't keep a steady contract.

But few jazz musicians have been able to keep a steady relationship with a label over the years, so we have to be grateful when someone like Alfred Lion at Blue Note decides to record everything pianist Andrew Hill has on his mind, even if Blue Note was unable to put out half of what was recorded. And even if Duke Ellington himself was disgruntled with Capitol Records, leaving the label in mid-decade after a futile search for a hit record, we're grateful for the mixed results Capitol got in its sessions with this great band.

Duke Ellington is such an icon today that it's hard to remember back to the mid-'50s when his band's existence was endangered. There's an edge to these Capitol recordings, made between April 6, 1953 and May 19, 1955, when Ellington left Capitol and found himself temporarily without a record label. (Even,

DEKE ELLINGTON: The Complete Capitol Recordings
Duke Ellington, Billy Strayhorn, piano; Ray Nance, violin; Clark Terry, Cat Anderson, Willie Cook, Ray Nance, trumpet; Quentin Jackson, Britt Woodman, Juan Tizol, George Jean, Alfred Cobbs, John Sanders, trombone; Russell Procope, Rick Henderson, Paul Gonsalves, Jimmy Hamilton, Harry Carney, reeds; Wendell Marshall, Oscar Pettiford, Jimmy Woode, bass; Butch Ballard, Dave Black, drums; Ralph Collier, congas; Jimmy Grissom, vocals
Mosaic MQ-160 (8 LPs), MD 5-160 (5 CDs). Dave Dexter, prod. A-A/A-D. TT: 5:39:47
ANDREW HILL: The Complete Blue Note Andrew Hill Sessions (1963-66)
Andrew Hill, piano; Kenny Dorham, Freddie Hubbard, trumpets; Joe Henderson, Eric Dolphy, John Gilmore, Sam Rivers, reeds; Bobby Hutcherson, vibes; Richard Davis, Eddie Khan, Cecil McBee, Walter Booker, bass; Roy Haynes, Elvin Jones, Tony Williams, Joe Chambers, J.C. Moses, drums; Nadi Qamar, Renaud Simmons, percussion
Mosaic MQ 10-161 (10 LPs), MD 7-161 (7 CDs). Alfred Lion, prod.; Rudy Van Gelder, eng. A-A/A-D. TT: 6:56:50
PHIL WOODS: The Phil Woods Quartet/Quintett Twentieth Anniversary Set
Phil Woods, alto sax, clarinet; Tom Harrell, Brian Lynch, trumpets; Zoot Sims, tenor sax; Hal Crook, trombone; Harry Leahey, guitar; Mike Melillo, Hal Gilder, Jim McNeely, piano; Steve Gilmore, bass; Bill Goodwin, drums
Mosaic MQ 7-159 (7 LPs), MD 5-159 (5 CDs). Bill Goodwin, prod.; Chris Fischer, Kent Heckman, engs. AAA/A-D-D-D. TT: 4:32:46

Stereophile, November 1995
Miles Davis at the Plugged Nickel

Miles Davis was his own advance man for these recordings, made in December 1965 soon after the trumpeter returned to playing after a six-month layoff following a hip operation. For years Davis grumbled about the tapes that Columbia had in the can, mentioning the Plugged Nickel sessions as an example. His band was hot then, made even fresher, he thought, by the layoff caused by his illness. They also hadn't recorded in a while—their last album had been the groundbreaking *E.S.P.* made the previous January—and it wasn't clear when the quintet would go into the studio again. Producer Teo Macero sought to remedy the situation by recording the band live in Chicago. He did so for three nights at the relatively inelegant Plugged Nickel, a long rectangle of a club shaped like a shotgun house and poised in the middle of Chicago's entertainment district. (If I remember correctly, right across the way was a club given over to a very rotund woman who played trumpet and sang the blues. She never took breaks because she didn't like to get up.)

Macero recorded for three nights, but the first night was evidently given over to fooling with the recording equipment. What happened the rest of the weekend, on December 22 and 23, can be found on the ten Mosaic LPs and eight Columbia Legacy CDs issued here. Each Columbia disc contains one of the seven sets that Davis played, except for the second set of December 22: it was so long that Columbia has issued it as discs 2a and 2b, counting seven CDs where I count eight.

Most of this material has been previously available, but just barely. In 1976, Japanese Sony issued a two-LP set taken from these sessions; the two LPs were released on American Columbia

MILES DAVIS
Miles Davis, trumpet; Wayne Shorter, tenor sax; Herbie Hancock, piano; Ron Carter, bass; Tony Williams, drums.

The Complete Plugged Nickel Sessions
The Complete Live at the Plugged Nickel 1965
Columbia Legacy CKX 66955 (8 CDs). Deborah Parkinson, remastering. A-D. TT: 7:32:21
Both: Teo Macero, prod.; Frank Bruno, Buddy Graham, engs.

only in 1982. A third LP followed in 1987. Much more recently, Sony-Japan issued what then passed for the complete sessions—what was missing were some solos that had been captured only by a second tape recorder, whose tapes had at that point not been found. With those tapes retrieved, Mosaic and Columbia have been able to issue the restored complete performances. (Meanwhile, the incomplete Japanese versions are being sold on gold CDs as the "Teo Macero" edition.)

I heard this band repeatedly around this time and soon after, and remember my astonishment at its freewheeling interpretations of familiar tunes ("My Funny Valentine," "So What," "Autumn Leaves," etc.), and at the brilliance, strangeness, and expansiveness of the playing—and its in conclusiveness. No piece was set: moods shifted as rapidly as the tempos, and the tempos, particularly in the ballads, sometimes floated so dreamily one hardly knew when the next foot would fall—until Tony Williams would suddenly start to sizzle on his cymbals and the piece would end in a rush. Davis might follow a Herbie Hancock solo, as he does here on "All of You," not with the expected repise of melody, but with a rapidfire statement of the next piece ("Oleo"). Hancock usually started to solo in tempo, and then would saunter airily into his own rhythmically dreamy world, disorienting even the most alert listener. It was odd, too, the way Tony Williams seemed to dictate the shifts in each performance: he was, after all, a teenager at the time. Seemingly ignoring the way Williams kept on top of the beat when he was swinging, Wayne Shorter could be so laid-back he made Lester Young seem aggressive. Then again, he might begin ripping wildly, as he does on the startling "So What" the band plays on the second set of December 23. In my experience, Wayne Shorter's playing varied radically from night to night—sometimes it seemed to follow his muses into outer space. The Plugged Nickel sessions find him in his best form, playing vigorous, imaginative solos, attacking each piece from his own, often oblique angles. Here he sounds like the logical successor to John Coltrane in the first Miles Davis quintet.

I can't imagine a document more faithful to my memories of those nights in clubs listening to the Miles Davis Quintet than these Plugged Nickel recordings. They capture the band's scintillating brilliance, and the breathtaking risks they took as they played long versions of Davis's standard repertoire. (Only Davis's "Agitation," as annotator Bob Blumenthal points out, was written for this quintet. "Yesterday," the second-to-last number of all, made a surprise appearance. Miles had only recorded the Jerome Kern tune once before, and he rarely played it.) There are problems as well: the mediocre sound system typical of clubs at the time, the occasional distortion caused when Miles pressed too close to the microphone or turned away from it.
arrange numbers like the boss himself, he generally hired outside people, including Gerald Wilson, whose sentimental version of “Smile” is barely listenable. In these final post-war years, it was still possible to create a hit with the proper vocalist: it turned out, though, that Jimmy Grant, who belares a variety of blues and ballads, couldn’t do for Ellington what Joe Williams would do for Basie.

But, Ellington being Ellington, he redeemed himself over and over again. His band was suffering from the loss of its alto star Johnny Hodges—Rick Anderson was a journeyman replacement—but it had a fine collection of brass players, and Ellington was able to assign solos to stalwarts such as tenor saxophonist Paul Gonsalves, clarinetist and Ron Carter seems generally under-recorded. To my ears the Mosaic LPs deal with the material marginally better than the CDs, which inflate the material and presence of Davis, and of Shorter when he is playing. The LPs place the band back farther, and put the horns in more realistic relations to the rhythm section.

There are distractions, not the notes that Davis tries for and misses, and the occasional muddiness of his tone that reminds us that he had recently been ill. The telephone rings regularly during the early sets (who calls nightclubs?), drinks and dishes clink, and worse still, there’s the guy in the front who comments regularly on the music throughout the first night. At one point, Davis plays in his eerily clipped fashion the first phrase of “When I Fall in Love,” then pauses almost interminably. Then, as if Davis might have forgotten it, the exuberant audience member sings the next phrase distinctly. This comes considerably after a woman suggests to him, “I wish you’d shut up.”

These recordings aren’t, then, precisely definitive. I don’t think Davis meant them to be. He was already moving toward his performance practice of his later years, when he would play sometimes sketchy versions, perhaps of a medley of tunes, stalling on one at will if the sequence of moods meant more than any particular number. On “If I Were a Bell,” which opens these sessions, Davis begins with a recognizable hit of the written melody, but one made surprising by its rhythmic displacements. After that, he virtually ignores the rest of the written tune. In later choruses, he leaves gaps between phrases so large any other band would founder in them.

Elsewhere, he’s pushy. On “Stella by Starlight,” he nudges his way into Wayne Shorter’s solo and engages him in an impromptu duet. Eventually he calls for a Tony Williams crescendo by playing a rising, swirling pattern, a tornado of sound that sweeps up the rest of the band. The volatility of this performance—its shifts in volume, texture, and tempo—is typical of this quintet, particularly on ballads. The uptempo numbers, such as “So What,” were getting faster and faster in a way that reminds me of Charlie Parker’s devas-

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Robert Deutsch, Stereophile Vol. 17, No. 8 August, 1994

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who thought it would help him overcome the color barrier. (He told me that his Haitian story had one unforeseen consequence: for years real Haitians just arrived from the island would show up on his doorstep, needing a place to stay.)

When he settled in New York in the early '60s, Hill worked as an accompanist, recorded with vibist Walt Dickerson, and made Our Thing with Joe Henderson. His career with Blue Note had begun. Soon he was recording sessions after session—there were four in the vaults before a single one had been issued. The best of the issued recordings are found on the seven discs of The Complete Blue Note Andrew Hill Sessions (1963-66), with such mid-'60s classics as Black Fire, featuring Joe Henderson; Judgment, with Bobby Hutcherson; and Point of Departure, with Eric Dolphy and Kenny Dorham. There are no previously unissued sessions here, but there are 11 unissued takes.

A pianist with a restless, abstract-sounding style, Hill was celebrated as a composer and as an organizer of sessions that sometimes included relative traditionalists such as Freddie Hubbard: Hubbard was prodded by Hill into some of his most probing playing. The rhythm sections were state-of-the-art, with drummers Elvin Jones, Tony Williams, and Roy Haynes working with bassists Richard Davis and Cecil McBee. McBee plays on the freest session, Compulsion, from 1965. I'm also particularly fond of the earlier session, issued as Smokesack. It featured Hill with two bassists and drummer Roy Haynes, and offered a chance to hear Hill in a relatively exposed setting playing such compositions as "Wailing Wall," with its bowed bass solo.

Though prized among Hill fans, these original records did not sell particularly well, and Hill soon went off into different directions, trying a more funky approach in one session, then adding a chorus of vocalists in the next. The intense focus of these mid-'60s recordings left him, and he was never able to find a producer willing to record his output with such fullness and exciting rapidity.

Mosaic has issued these three sets in both CD and LP formats. Recorded by Rudy Van Gelder, the Hill sessions have the most consistent, most immediate and realistic sound. There are slight differences between formats. On "Land of Nod," Joe Henderson's tenor sounds a little more prominent on CD. In this case, both LPs and CDs have Van Gelder's stamp, but I found the LPs to best reproduce the sound of my originals.

The quality of the Woods and Ellington sessions vary with the venues and engineers. The first Woods date was recorded off the p.a. system with a mono cassette recorder, with acceptable sound in both formats. The later, stereo recordings sound much better, of course. I prefer the LP version of "Goodbye Mr. Evans" for the slightly greater warmth of the bass, and for the way it places Wood's growling alto in the band.

The Ellington recordings, with their artificial resonance and mono sound, weren't made to please current audiophiles, but the sound has its virtues: on "Stardust," the bass is solidly focused, and Ellington's piano cuts through the band in a way that demonstrates his icy aplomb as an accompanist. (Even in the '20s, Ellington insisted that the bass be adequately recorded.) Again, I find the greater weight of the recorded sound on LP preferable. Others will, of course, prefer the greater convenience of the CDs, whose sound is certainly close to that of the LPs.
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Talking about Big Sugar’s 500 Pounds, RL and I kept asking ourselves, “Why do we like this disc so much?” After all, this Canadian band basically serves up the same “blues rock” that late-’60s bands like Cream, Led Zeppelin, Humble Pie, and the like introduced over 30 years ago. Been there, done that, got the bumper sticker. So why do we dig it like crazy?

Well, for starters, these boys aren’t really “retro.” They may take the same road as those earlier bands, but they end up in a slightly different place. Bassist Gary Lowe is a gray-bearded rasta-man. Guitarist Johnson is into Hugo Boss threads. It’s the ’90s—Punk has come and gone and come again. All these things inform the music, rendering it palpably different from the ’60s version. Still, like Clapton, Page, and Beck, Geordie Johnson starts with a solid command of his instrument and a high regard for the roots masters. On 500 Pounds his flashy fretwork and fierce vocals are placed in the service of mostly cover tunes. Traditional field hollers like “Wild Ox Moan” stand beside tunes by Al Green and Muddy Waters. He even includes (on both CD and EP) a cover of Traffic’s “Dear Mr. Fantasy” as further indication of from whence he comes.

But what finally rescues Big Sugar from RetroLand is that, just like their British forebears, they use this material as a jumping-off point, not a finishing line. The key to this lies on the EP, which contains the Al Green obscurity “I’m A Ram,” along with not one, but two Reggae dub versions of the same tune. The band may begin with classic R&B, but brings its own experience to the party.

Then there’s the sound: not live, but fantasy-live. I’ve heard bands like this live—in nine out of ten rooms, it sounds like dogshit. But here, both EP and CD sound like real instruments played together in a room you can only dream of someday entering. For the most part the soundstage is natural, save for the occasional dub-influenced echoed guitar spread.

The bass is that obese reggae thump, the drums drive the mike and board to the edge of distortion for that all-important trashcan attitude, and the guitars are aggressive and present in a way much more difficult to achieve than you’d imagine.

The art of this type of recording is in its apparent artlessness, disguising a well-thought-out, carefully crafted product as a rockin’ rave-up.

I guess that’s why we like it.

—Michael Ross

[Sigh] I suspect we’ll catch some flak here, because 500 Pounds ain’t pretty. It doesn’t have dulcet overtones, crystal limpidity, or a perfect scale-model of the performance space down to the cracked plaster on the ceiling. What it’s got is RAW POWER—it sounds more like a live, swaggering, heavily amplified mondo-blues band than any other record I’ve heard in years.

Michael’s right—you’d never hear the purity of the bass impact off of Wynston’s drums and the sheer megawatt sustain of Johnson’s guitar live—not in an arena, anyway. But anybody who’s put in the time in practice rooms, or up-front in blues bars, will recognize this as the real thing—up close and personal. So yeah, I agree whole-heartedly: this is a killer disc, filled with monster chops and recorded with rare verisimilitude. Not for the faint of heart, but a treat if you’re ready to crank it up and boogie.

—Wes Phillips
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This recording sounds compressed, and not by the engineers. Exultant movements (ones with trumpets and timpani) have little majesty; intellectually weighty movements (like the "Gratia" fugue) are coasted through lyrically; and the soloists (all but one) sound uninvolved. In short, this B-minor is emotionally challenged. Other small-scale performances, mainly Leonard's and Herreweghe's, have shared a similarly reverential approach. But it need not be so, even with period instruments, as Hickox and Gardner have shown. Even Riffin, with one singer per part, is better, because his musicians sing and play with commitment and enthusiasm.

Among the soloists, only the soprano Barbara Schlick has much range of color, her "Laudamus" is nicely done. Her duets, though, are less special. The "Domine" with tenor Guy de Mey sounds like a rhythm exercise of over-phrased eighth and pulses on every fourth sixteenth note (judging from his "Benedictus," de Mey alone is not much better). In the two duets with countertenor Kai Wessel, the voices don't match well (though Wessel's "Agnus" is okay). Bass Klaus Mertens' "Et in Spiritum" is nicely done, but the "Quoniam" is "pretty" where grit is needed. The 27-member Choir does well in the meditative choruses and well enough in exuberant movements such as "Cum sancto," "Et resurrexit," or "Patrem." Generally, though, their singing is bland ("Cunctifixus") or precious ("Credo").

What's needed in modern and period performances is an approach that acknowledges the majesty of the piece. The B-minor is a summit of civilization, and we need performers (whether many or few) to tell us the piece really matters by singing and playing all-out. Performances also should reflect the Baroque spirit of dance, for this is the language through which Bach's metaphors pass.

This disappointing set is further compromised by the too-distant recording and lack of clarity in the lower voices of the choir. I stick by my recommendations in Vol. 16 No. 11: Marriner for modern instruments, Hickox for period forces.

—Paul L. Althouse

**BEETHOVEN: The Creatures of Prometheus**

Nikolaus Harnoncourt, Chamber Orchestra of Europe

Telefun 90876-2 (CD only).

The unpredictable Harnoncourt is at his best here. Favoring slightly broader tempos than those in the admirable Orpheus Chamber Orchestra recording of this, Beethoven's only ballet, he enlivens things with crisp articulation, judicious balances, and a fluid, unmannered buoyancy that conveys the music's balletic character. Although in a sense this is the only modern instrument used, the vibrato-free tone of the strings and the piquancy of the winds suggest period-instrument sonority. Those familiar with this music will know that its 18 numbers do not comprise top-drawer Beethoven. But they will also know that the score has great charm and appeal and offers glosses on the composer's other works, one section anticipating the finale of Fidelio, and the finale of the ballet itself employing the same dance tune that forms the basis for the closing movement of the "Eroica" Symphony.

Completing the catalog of virtues of this release is Telefun's splendid in-concert engineering: natural in timbre, wide in dynamic range, and realistic in its not-too-close perspective. An outstanding release.

—Mortimer H. Frank

**BLITZSTEIN: Symphony: The Airborne**


RCA 62568-2 (CD only).

For 78s in 1946, this rare set has received the usual respect accorded by Ward Marsten and does not appear to have been heavily post-produced by BMG. Altogether a highly listenable example of 40s-period sound. In every respect, a fascinating curio of time and place.

—Richard Schneider

**BRITTEN: The Complete Orchestral Song-Cycles**

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The 26-year-old Moscow-born pianist Boris Berezovsky won first prize at the International Tchaikovsky Competition in that city in 1990. I haven’t heard the recording he made of the complete Chopin Etudes, which garnered him a 1992 Deutscher Schallplattenpreis, nor, as yet, any of his other four discs—although I have no doubt that they display the same extraordinary technical facility, coupled with a very wide dynamic palette, as can be heard in the present Ravel recital.

Having played through this disc several times, however, I must comment that, while I greatly admire the effortless and polished way in which Berezovsky renders such a difficult piece as Gaspard de la Nuit, each piece of his program also had moments for me that seemed less than ideal. The opening Ondine in Gaspard is quite exquisite in execution, but Le Gibet, on the other hand, is rather too neutral emotionally—and peculiarly unhorrifying for a portrait of a man hanging on a gallows. Michelangeli’s way with that section was far more evocative and frightening.

Sonatine opens rather too quickly, almost as a technical exercise, as well as a bit too brutally. There is no innocence here. Similarly, the Valses nobles, in spite of an excellent evocation of humor in No.6 and some ravishing dynamic effects toward the conclusion, do not always convey elegance.

La Valse, stunning overall in its strength and obviously orchestral in Berezovsky’s concept, makes a splendid impression, with only a slackening of tempo in the very last pages a small disappointment. Two things bother me overall: a lack of color (that has nothing to do with the pianist’s superb dynamic control), and sometimes a missing element of tenderness. Still, Berezovsky’s playing has much to commend it; I look forward to hearing more examples of his skills. As far as Teldec’s recording is concerned, I could have wished for more transparency and depth to the piano sound.

—Igor Kipnis

REGER: Complete Preludes & Fugues for Solo Violin, Opp.117 & 131a
Mateja Marinkovic, violin
ASV CD 876 (2 CDs only). Stephen Johns, prod.; Mike Hatch, eng. DDD. TT: 82:43

When the centuries-old tradition of tonal music faced a crossroads early in this century, German composer Max Reger paused, turned around, and looked back to the time of Bach—but not without first helping himself to the expanded chromaticism of his own time. As a result, we have a collection of preludes and fugues for solo violin that, while not the equal of the earlier master’s work, offers many rewards—and a few disappointments.

Brief and spare compared to most of Reger’s compositions, these works receive their world-premier recording in the capable hands of Mateja Marinkovic. A few of the pieces suffer from a lack of inventiveness—a failing not helped by the minor keys encountered in 10 of the 13 works. But despite the persistence of the dark tonalities, there are many, many inspired moments.

I suggest that anyone interested in Reger’s solo violin music start with the beguiling sonatas recorded by Ulrike-Anima Mathé on two Dorian CDs (see Vol.16 No.7, p.175 and Vol.18 No.9, p.205). The heavier fare offered by Marinkovic serves as an enlightening foil well worthy of your consideration.

—Robert Hessen

ROZSA: Ivanhoe (complete film score)
Bruce Broughton, Sinfonia of London
Intrada 7055 (CD only). Douglas Fake, prod.; Mike Ross-Trevor, eng. DDD. TT: 61:53

Forty-three years after the initial release of Ivanhoe comes the first comprehensive recording of one of Miklos Rozsa’s finest film scores. MGM issued its own soundtrack recording of Ivanhoe in 1952—barely 15 minutes’ worth on one side of a 10” LP—backed with another of Rozsa’s then-current scores, Plymouth Adventure (a Mayflower epic, not a car chase). At just over an hour, the current release features practically every cue, heard in the finished film’s order.

The Hungarian Rozsa became an established Hollywood presence in the immediate post-war era. His approach to historical epics differs from Korngold’s fulsome Straussian chromaticism, Rozsa leaning more toward a spiky Bartokian idiom of fourths and fifths, and employing modes and pentatonic rather than traditional diatonic.

Most important, Rozsa undertook each of his historical scores with scrupulous attention to the period under consideration. For Ivanhoe, the result was principal character themes based on surviving 12th-century material from Anglo-Saxon, Norman, and Hebrew sources. Almost buried under the film’s opening narration, but clearly heard on this recording, is a tune attributed to Richard the Lionhearted. Bois-Guilbert’s theme, based on a Latin hymn by a Norman troubadour, has in Rozsa’s treatment a curious Middle Eastern flavor—not out of place for a character who was a key player in the Crusades, one result of which was the gradual importation to medieval Europe of Middle Eastern art, music, and mathematics.

Rozsa’s music stands up remarkably well on its own. Without the film and its often busy foley, one can savor Rozsa’s ambiguous polytonality. Many cues end with chords of several keys quietly vying for attention. One can appreciate the influence Rozsa has had on the following generation of film composers—just as he was obviously affected by that great-granddaddy of epic film scores, Prokofiev’s Alexander Nevsky.

Max Reger’s complete Preludes and Fugues for Solo Violin are given their world-premiere recordings by Mateja Marinkovic.
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240 WorldRadioHistory Stereophile, November 1995
This has clearly been a labor of love for producer Fake and the performers, who enjoyed Rozsa’s advice and encouragement during the production. The Abbey Road sound is sumptuous and detailed. Next up: the suite for Julius Caesar, presumably with more to follow.

—Richard Schneider

SCHNITTK: Chamber Music
Vol.1: Mateja Marinkovic, violin; Linn Hendry, piano; Paul Silverthorne, viols; Tim Hugh, cello
ASV CD DCA 868 (CD only). DDD. TT: 65:17
Vol.2: Mateja Marinkovic, violin; Linn Hendry, piano; Thomas Bowes, violin; Tim Hugh, cello
ASV CD DCA 877 (CD only). DDD. TT: 68:27
Both: Stephen Johns, prod.; Mike Clements, eng.

Alfred Schnittke is commonly considered the greatest living Russian composer. His wide-ranging, eclectic compositional approach seems to embrace everything—atonal invention, serialism, pantonal complexity, and neo-classical sublimity. The surprising thing is that, despite his often modernist tendencies, he seems to be in no danger of record-label neglect. These two British discs add fresh interpretations to an already well-represented discography of Schnittke’s chamber works.

Mateja Marinkovic is a smooth, polished musician with a meticulous nature and a keen eye for detail. For the most part, his strengths suit Schnittke’s music, but there are times when one wishes for a bit more passion—Marinkovic never seems caught up in the heat of the moment. This can be good and bad. In the two numbered Sonatas for Violin and Piano on Vol.1, Marinkovic’s restraint is entirely appropriate. He brings a crisp clarity to these works that is both illuminating and aesthetically “right.” In particular, Marinkovic’s precision allows the harmonics in the third movement of Sonata 1 to shimmer with an almost glassine beauty.

Although Marinkovic’s virtuosity is fully up to the task on Vol.2’s A Paganini, more heat would have enhanced this feisty piece. Compare the work of the uncredited violinist on Mobile Fidelity MFCD 915 for an example of how this composition can come to life. Elsewhere on Vol.2, however, Suite in the Old Style (1972) is played with grace and charm, making the timeline from Mozart to Schnittke seem natural and fully continuous.

Sonics on both discs are delicate, detailed, and satisfyingly rich, with good soundstage depth and separation. Schnittke admirers will want both CDs, since they offer an alternate view many will find appealing. The recent Lubotzky Sony Classical discs (SK 53271 and 53357, reviewed December ’94, p.223) are more essential, as is the Bis series; but ASV has certainly added value to the burgeoning Schnittke discography with these suave, elegant recordings.

—Carl Baugher

SHOSTAKOVICH: Symphony 4
Ladislav Slovak, Czechoslovak Radio Symphony (Bratislava)
Naxos 8.550625 (CD only). Leoš Komárek, prod.; Hubert Geschwandnet, eng. DDD. TT: 64:56

SHOSTAKOVICH: Symphony 5
Kurt Sanderling, Berlin Symphony
Eterna/Berlin Classics BC 2063-2 (CD only).

SHOSTAKOVICH: Symphony 8
Kurt Sanderling, Berlin Symphony
Eterna/Berlin Classics BC 2064-2 (CD only).

SHOSTAKOVICH: Symphony 8
Yoel Levi, Atlanta Symphony
Telarc CD-80291 (CD only). Robert Woods, Elaine Martone, prods.; Michael Bishop, eng. DDD. TT: 64:14

Gustav Mahler once posited—in a conversation with Sibelius, no less—that a symphony “should contain the whole world.” His dictum came to mind while I was surveying the present crop of symphonies by Shostakovich, who apparently shared that aesthetic. The Soviet composer is undoubtedly most affecting emotionally in those broadly lyrical, brooding strains that seem to spring from the soul’s depths; but their juxtaposition with apparently unrelated material—banal, parodic marches and brittle, nose-thumbing scherzos—certainly plays a role in producing their effect. That characteristic dark melancholy constitutes the Soviet composer’s singularity: while Mahler, even in works as fundamentally pessimistic as his Symphony 6, seems to be struggling toward the light at the end of the tunnel, Shostakovich often seems barely aware of its existence.

The surprise among the current releases comes from budget label Naxos, whose Fourth under Ladislav Slovak is as cohesive a performance as you’ll hear. The chief problem with this symphony is the composer’s fecundity of invention within an innovative form—which can leave the listener feeling overwhelmed by a surfeit of diverse material. It’s almost impossible to project the structures of the discursive outer movements—although Previn (Angel S-37284, LP, nla) managed to highlight some of the arrival points. But Slovak has a clear enough conception of them that he doesn’t let his strongly characterized individual episodes disturb his view. In the Finale particularly, the transitions are superbly managed: despite its unfathomable structure, the movement becomes persuasive by its sheer linear logic. (An obvious splice at the tempo change at 6:36 suggests that the realization was not always smooth.) Only the passage of question-and-answer quarter notes in the strings (beginning at 8:09) turns into vacant note-spinning.

The orchestra is quite often good. The bass clarinet is too reticent, and the oboes don’t agree on the A, making unisons a trial. But the solo clarinet and bassoon are excellent, and the English horn, though sounding a bit like a singer with two registers, phrases sensitively. The brasses are fortunately secure. The strings, though strained by some of the higher writing, are mostly firm: I would prefer more incisive articulation in the first movement’s Presto fugue (compare Previn’s Chicago Symphony recording), but its shape is always clear. The engineering is inconsistent: after two movements of topnotch quality, with clean definition, natural perspectives, and a wide dynamic range, the Finale comes up at an overall lower level, as if the engineers feared distortion in coping with masses of sound.

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pearing here when they were new. The Berlin Symphony, although that city’s “second” orchestra, sounds first-rate. String attacks are as smooth as those of the Philharmonic, but more secure rhythmically; the sectional tone is rich and even from top to bottom, its resonance enhanced but not muddled by the overhang of the Jesus Christus Kirche. The characterful woodwinds, thanks to some occasionally discreet section-making, register with color and depth, while the forthright brasses are rounded, never driven.

Symphony 5 here receives one of its most integral, broadly scaled performances yet; each episode proceeds organically from the previous one, producing a sweeping, powerful cumulative effect. Tempos are deliberate, but the approach is hardly placid—for example, in the anxious undercurrent at the start of the first-movement development. The slow movement, easily yet firmly guided, emerges in a long-breathed emotional curve, with the closing fade an inevitable outgrowth of the climax. The Finale, taken reasonably close to the metronome for once, is neither glib nor skittish. Sanderling, German-born but a longtime Russian resident, draws stylistically expressive playing from his orchestra. The flute soloist is cool and clear, the horn often mournful; high strings are unusually pure-toned and accurate in intonation.

Sanderling’s solid, serviceable 8 leaves some mits to pick, primarily where he ignores markings intended to set up the score’s important points of arrival. In the first movement, for example, the long English horn solo abruptly veers into the return of the lyrical second subject without even a smidgen of the indicated ritard. Similarly, the transition from the fourth movement to the fifth is undercut by the lack of a fade from the clarinets, so that the unexpected arrival of C-major misses the needed magic. Rhythmic insecurity mars the fourth-movement passacaglia, as when the soft strings turn tentative under the solo horn. And the spot-miking becomes obtrusive, rendering the high trumpets peaky and the Finale’s last bassoon duet excruciatingly sour. The performance has its good points—the grim determination of both Scherzos, and the crisp textures and rhythmic spring of the Finale—but the overall effect is disappointing.

Yoel Levi has a good feel for 8’s drama, conveying a monolithic power in the first movement’s march recapitulation. Too frequently, however, his insights are compromised by inattention to complementary details. He gives the English horn plenty of time to shape a spacious, broadly tragic lament, for example, but the punctuating chords in the supporting tremolos are soggy and loose. The Scherzos emphasize sheer motor rhythm over weight; the passacaglia feels brisk and inappropriately phlegmatic. The Finale’s opening is fluently and deftly shaped, and this movement fares best overall. The Atlanta Symphony woodwinds are outstanding: the passage for four unison flutes is impeccably tuned, and the double-reeds contribute full, bright tone throughout. (But the bass clarinetist is another bashful one.) The strings, on the other hand, are a bit raspy and unfocused—especially in direct comparison with the Berlin Symphony. Telarc’s sound is clear and unguinicked, though the climax at 7:38 of the Finale is shrill.

Sanderling’s 5 should probably be near the top of any list of recommended recordings, but Philip’s release of Yevgeny Mravinsky’s concert performance of 8 (422 442-2) is invaluable as a document of a gripping, powerful performance, firmly controlled and vitally committed.

—Stephen Francis Vasta

WAGNER: Lohengrin
Ben Heppner; Lohengrin; Sharon Sweet, Elsa; Sergei Leiferkus, Telramund; Eva Marton, Ortrud; Jan-Hendrik Rootering, King Henry; Bryn Terfel, Herald; others; Bavarian Radio Chorus, Bavarian State Opera Chorus, Bavarian RSO, Sir Colin Davis
RCA Victor 62646-2 (3 CDs only). Wolfram Graul, prod.; Hans Schmid, eng.; Susanne Herzog, editing; DDD; TT: 5:43:42

Hard on the heels of Claudio Abbado’s excellent DG set of a few months ago comes this fourth recording of Lohengrin.
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in fewer than eight years. Any new recording of the work faces some of the toughest competition on disc: \textit{Lohengrin} has been far luckier than most operas, by Wagner or by anyone else, in receiving one "perfect" recording (Kempe, of course), and five all-but-perfect ones (Solti, Schrecker: Abbado, Keiller, Leinsdorf).

That Colin Davis’s account—RCA’s first recording of the work since Erich Leinsdorf’s thrilling version (nia) of 30 years ago—cannot join those sets on their increasingly crowded pinnacle is due not so much to any inherent fatal flaws as to the fact that, with such an embarrassment of riches, one must draw the line somewhere. After all, who but a fanatic "needs" more than the top six recordings of any opera?

So we’re faced with a recording in which the work of each soloist, however consummately professional, is in each case exceeded in quality by the work of most, if not all, of that soloist’s counterparts on the other recordings cited. In the absence of Elisabeth Grümmer, Eleanor Steber, Cheryl Studer, and Jessye Norman, no reasonable critic would have serious reservations about Sharon Sweet’s erratic, occasionally pinched, but deeply felt Elsa. We’d counter ourselves lucky to have an Ottilie as darkly imposing as Eva Marton’s—especially as Marton now seems finally to be learning how to control and focus her impressive instrument just as it begins to show hints of wear and that wobble grows yearly wider. But Marton is simply not in the same league as Astrid Varnay, Christa Ludwig, Waltraud Meier, or even Gabriele Schnaut. Had Gottlob Frick, Josef Grenzl, Hans Senn, and Kurt Moll not already sung King Henry for the microphone, the strong but stuffy Jan-Hendrik Rootering might entirely satisfy. And without such assured and supple-voiced singer/actors as Dietrich Fischer-Dieskau, Hermann Uhde, Ekkehard Wlaschka, and Sigmund Nimsgern plumbing the tortuous depths of Telramund’s twisted soul, why bother listening to Serge Leiferkus’s strained, smothered tone and bad German pronunciation? Even the monolithic Bryn Terfel sounds forced here as the Herald.

The one exception is the remarkable Ben Heppner in the title role, vocally every bit a match for Siegfried Jerusalem and Jess Thomas, and showing greater conviction than Paul Frey, more soaring vocal quality and stamina than Wolfgang Windgassen, and sounding, well, just righter for the role than Plácido Domingo—who I find ultimately unbelievable as a Wagnerian heldentenor, regardless (perhaps because) of his lush voice. Heppner’s Lohengrin is a bastion of unquestioning purity and moral rectitude, his voice as clear as his conscience. Granted, this is not the most interesting interpretive choice for this role—see Jerusalem/Abbado for a complex, fully human characterization—but it’s supported by music and text, and this production needed strong direction from someone.

So Colin Davis couldn’t quite provide it from the podium, despite his craftsmanlike attention to orchestral detail evident in every bar, and regardless of the BRSO’s impeccable playing and the two choruses’ lively, disciplined singing. Apparently Davis couldn’t decide—especially in his sluggish, stop/start Act I—whether Lohengrin is a moderately interesting legend set to great music, or simply an immense Romantic symphony in three movements with vocal obbligato. What he seems not to have considered at all is any interpretation that might have hinted at the transcendent, the spiritual, the inanelectric, or even the tragic (this is, after all, Wagner’s only true tragedy)—all of which other conductors have found in abundance in this score. Things improve considerably in Acts II and III, but the thrilling moments—Lohengrin’s entrance in II, the slow build of Elsa’s procession to the Minster in IIIV, the gathering of the tribes in IIJI—are the big, splashy, obvious ones, the Grail music never gets off the ground.

Where this recording is second to none is in its sound, even better than Abbado’s 4.1 DG set, which almost made it to "Recording of the Month" status. It was recorded in the Herkulessaal of Munich’s Residenz, the same hall in which Bernard Haitink’s glowing EMI Kong was taped. Here is the same floating, golden sound, warm but always clear, with truly excellent soundstaging right up there with James Judd and the Florida Philharmonie’s Mahler 1 on Harmonia Mundi. There’s no digital harshness, and it sounds good at any volume level. And Thomas Grey’s cogent essay in the accompanying booklet comprises four of the best analytical pages ever written on this work.

But with so many better performances available, I’m hard put to recommend this one on sonics or scholarship alone; the competition is just too stiff. Try Kempe (EMI) first, then Abbado (DG), Solti (London), Schrecker (Philips), or Keiller (Teldec, Bayreuth ’53)—and, if you can find the LP’s, Leinsdorf (RCA: please reissue this).

—Richard Lehnert
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products of his company, Connoisseur Society. Most of the music on these CDs was recorded at the Tarrytown Music Hall in New York—a singularly fine acoustic space—mostly using either Yamaha pianos or, in the case of Wehr's splendid Liszt-Wagner collection, a Hamburg Steinway.

Still, these are but contributing factors. The sound is still the product of one mind—one that for many years now, since the superb-sounding recordings of Ivan Moravec of the mid-60s, has represented piano reproduction that has seldom been excelled.

Why is it so good? Listen to any bevy of recent solo piano discs. All too often you will notice a tendency toward clutter and stridency, toward glassiness in the treble; color is in short supply, bass notes are devoid of richness, the instrument and its placement in the hall/studio lack transparency, and the piano seems spread over the entire distance separating the left and right speakers.

Alan Silver's productions successfully solve these problems; the instrumental sound has ideal warmth and tangibility. The only differences are the sounds that the respective pianists bring to their instruments, the manner in which they produce their individual sonorities, and, of course, the variety of interpretive styles.

A good example is David Allen Wehr's Wagner recital, in which one hears the various ways Liszt arranged orchestral music for the keyboard, ranging from such straightforward transcriptions as the Tannhäuser "Song of the Evening Star" to the elaborate fantasy on themes from Rienzi. At best, as in the Act 3 Lohengrin Prelude, the playing has such panache that one almost doesn't miss the orchestral colors.

Wehr's expansive playing throughout is both exciting in its sweep and lyrically reflective when necessary. Listening to this dramatically imposing set of performances (note, for example, the marvelous climax of the Meistersinger), full of dynamic variety, I found myself thoroughly enjoying the collection.

Brazilian pianist Antonio Barbosa was born in 1943 and made a number of excellent recordings, including Chopin's second and third sonatas, for Connoisseur Society. He died, quite unheralded, of a heart attack in September 1993. His 1979 performances of nine Schubert songs arranged for piano by Liszt justifiably received a Grand Prix de Disque from the Hungarian Liszt Society, and for the Connoisseur Society CD reissue of these, Barbosa, not too many months before his unexpected death, added the large-scale Dante Sonata and the popular Consolation.

So good was the earlier recorded sound that one can find little difference between the two recordings. Barbosa's wide-ranging dynamics make the most of the dramatic Dante turbulence, but the songs are really the most impressive contribution here—mainly because of the pianist's feeling for the music's vocal qualities. Barbosa, unlike so many modern pianists, is able to distinguish between the all-important melodic line and the supplemental filigree, which never overshadows. If I marginally object to too many delays of downbeats through agogic accents in (only) the Etüding, that is the smallest reservation I have in an otherwise absolutely splendid disc—one that sadly must act as a memorial to an unusually satisfying pianist.

Zaidee Parkinson, with such impressive credentials as having studied with Rosina Lhevinne, Leon Fleisher, and Beveridge Webster, impressed me greatly with her atmospheric characterizations in the first book of Debussy Preludes. Try, for instance, the effective single-tone tolling-bell effects in her Cathédrale engloutie, or the winsome gracefulness of the Dance de Paix. The attractiveness of her often gentle playing, warm and full of color, is also heard, but with suitably bittersweet overtones, in the moody disc-mate, Janáček's In the Mist—a work that has grown on me considerably each time I have heard her performance of it. Her disc is a real pleasure.

Finally, we have a nicely varied collection of mostly finger-breaking etudes by Ilana Vered, ranging through six composers and concluding with three virtuosic and moody pieces written for the Israeli-born pianist in 1991 by Ezra Laderman. A rarity in her program is the set of Seven Etudes in the form of Variations on a theme by Beethoven—the theme being the opening to the slow movement of the Seventh Symphony. This work without opus number, written when Schumann was 23, is not a strong one, but it is a curiosity that bears an occasional hearing.

The remainder of the program, far more familiar, receives big, romantic treatment with plenty of rubato. The fingerprint excels, the interpretive emphasis perhaps being more aimed at virtuosity than inwardness. That thoroughly extraverted approach, however, is brilliantly projected, with many moments—such as in the two dynamically wide-range Debussy pieces—where considerable tonal sensuousness is revealed.

—Igor Kipnis

GORECKI: Piano Concerto
SHOSTAKOVICH: Chamber Symphony
Anna Gorecka, piano; Agnieska Diszmal, Ama-
deus Chamber Orchestra
Conifer Classics 75605 51246 2 (CD only).
Andrzej Sasin, prod.; Andrzej Lupja, eng. DDD.
TT: 7358
GUBAUDULINA: Piano Concerto, Solo Piano
Works
Andreas Haeffiger, piano
Bernhard Klee, Radio-Philharmonie Hannover
des NDR
Sony Classical SK 53960 (CD only). Wolf
Erichson, prod.; Markus Heiland, eng. DDD.
TT: 72:18

My initial reaction to the music of Henryk Górecki was largely based on his string quartets, which I found simplistic to a fault. I've been warming up to him as of late, however, and have begun to sense a passionate expressiveness in such pieces as his famous Symphony 3 and Three Pieces in Old Style (the latter included in this outstanding Co-

ifer Classics disc) which seems to justify his widespread appeal.

With a spirited, urgent reading of Górecki's Piano Concerto featuring the composer's daughter at the keyboard and the aforementioned Three Pieces, the composer is given sensitive, intelligent interpretations by Dzuclnal and her Amadeus Chamber Orchestra. Equally impressive are the renderings of sel-dom-heard works by Polish composers Wojciech Kilar (b.1932), Karol Szy-
manowski (1882-1937), Grazyna Bace-
wicz (1909-1969), and Russian master

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Dmitri Shostakovich.

Kilar’s Oko is similar to Górecki’s work in its repetitve momentum and harmonic surety. Szymanowski’s Etude in b-flat is somewhat cooler and less anguished, but no less intensely conveyed. Bacwicz’s Concerto for String Orchestra is less involving than the work of the other composers on this disc, but my appreciation of her neo-classical style grows with repeated listening.

Shostakovich’s shattering String Quartet 8 is heard here in its Chamber Symphony arrangement by Bashai. It would be hard to imagine a more affecting and evocative reading. Diczman seems to completely understand this music, and offers an interpretation of tremendous depth and insight. Sonatas are deeply soundstaged, resonant and rich. If you, like me, love dark music, you must have this CD.

In sharp contrast to the Górecki disc, pianist Haefliger’s collection of piano works by modern Russian composer Sofia Gubaidulina is uncompromisingly current and forward-looking. Under Bernard Klee’s direction, Gubaidulina’s music—Chaconne (1962), Sonata (1965), Musical Toys (1969) for solo piano, and Introitus: Concerto for Piano and Chamber Orchestra (1978)—is alternately moody, reflective, and crushingly dramatic.

The relatively early Chaconne, though stylistically predictive of Gubaidulina’s later efforts, hardly prepares one for the microdetail of the Concerto. With an eye for color, nuance, and carefully sculpted lines that rival that of Lutosławski, Gubaidulina is one of the most stimulating constructivists currently active. Haeffler plays the music with a spirit and seeming abandon that belie their fiendish difficulty. Deep waters indeed, but wonderfully satisfying for modern listeners with the aesthetic perspective to appreciate post-totnal creativity.

—Carl Baugher

ANNE SOFIE VON OTTER: Love’s Twilight

Late Romantic Songs by Berg, Korngold, Strauss
Anne Sofie von Otter, mezzo; Bengt Forsberg, piano
DG 437 515-2 (CD only). Ulrich Vette, Karl-August Naegler, prod.; Klaus Behrens, Stephan Ploch, eng. DDD. TT: 64:00

COPLAND: Long Time Ago (American Songs)

Dawn Upshaw, soprano; Thomas Hampson, baritone; Hugh Wolff, Saint Paul Chamber Orchestra
Teldec 77310-2 (CD only). Martin Fouque, Bernhard Minich, prod.; Michael Bramm, eng. DDD. TT: 61:00

THOMAS HAMPSON: Lieder Recital

Songs by Schumann, Greg. Beethoven, Loewe, Franz Thomas Hampson, baritone; Geoffrey Parsons, piano
EMI 5 55147 2 (CD only). John Fraser, prod.; John Kurlander, eng. DDD. TT: 74:39

VILLA-LOBOS: Songs

Roberta Alexander, soprano; Alfred Heller, piano; Diane Chaplin, cello
Ectere KTC 1665 (CD only). Alfred Heller, prod.; Tatyana Liberman, eng. DDD. TT: 58:30

Love’s Twilight is a very fitting title for the compilation of late Romantic songs recorded for DG by Anne Sofie von Otter. Her beautiful mezzo voice has just the range of color and flexibility to render the seven Strauss songs chosen with extreme sensibility. The delicacy of the sentiments she expresses in “Befreit” are as sensitively handled as the whimsical mood of “Die Sieben Siegel” and “Hat gesagt—bleibt’s nicht dabel,” and all are supported by an exquisite pianism colored by an intimate knowledge of Strauss’s unique orchestral palette.

In Berg’s Sieben frühe Lieder, skillful tone-painting is again the key to success—sample the starry skies of “Nacht” and the water splashing in “Schillied”: the full symphony orchestra is only a stone’s throw away. Even the more modernistic sounds of “Traumgekrönt” are delicately shaded, with one foot firmly planted in the lushness of late Romantic harmonies, while the other sensitively dips a toe in the waters of atonality.

The selection of songs by Erich Korngold span some 35 years, yet it is the Op. 18 set, Drei Gesange, rather than the architectural Sonett für Wien, Op. 41, that is the most intense and profound. Earlier still, “Sterbelied,” Op. 14 No. 1, a setting from Christina Rossetti’s “Four Songs of Parting,” is quite Brahmsian in its widespread accompaniment if not in its harmonies. All are recorded with clarity and focus and an intimate presence that makes this disc the more delightful.

Long Time Ago is the title of the third song in Copland’s First Set of Old American Songs, both sets of which are sung by Thomas Hampson on the Teldec disc. He has a wonderful way with them: lighthearted, witty, and throwaway, but all prepared and given with a rhythmical precision and style that retain the freshness of these simple songs.

The disc continues with Eight Poems of Emily Dickinson, again set by Copland but this time sung by Dawn Upshaw. She too handles the texts with the fluency of a 20th-century specialist, although it hardly needs to be said that both artists are equally at home in Romantic lieder.

The disc is rounded off with a selection of three pieces from Billy the Kid. Here, the immediate articulation and enthusiasm of the Saint Paul Chamber Orchestra, already experienced in supporting the soloists, can be appreciated in its own right. Hugh Wolff’s commitment to the task is everywhere apparent, and has made this one of the best discs to have come my way this year.

The second disc featuring Thomas Hampson is of a solo recital recorded live from the Usher Hall, Edinburgh, in 1993; thankfully, the audience was quietly attentive, and all applause has been edited out. The first half of the program consists of settings of the Scottish poet Robert Burns by Franz, Loewe, and...
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Schumann, while the second concentrates on German poets and includes Beethoven's "An die ferne Geliebte" and Schumann's wonderful "Dichterliebe." The range of expression that these invocations show Hampson's enviable skill and dexterity. I have heard finer versions of the two named song cycles, but, nevertheless, Hampson's controlled power and untrammelled strength in such a demanding program make this a worthy addition to the catalog. The recording is excellent, though not reminiscent of the concert hall, if that is what you want.

Finally, a disc of 19 songs by Villa-Lobos composed over a period of 40 years. The first 10 tracks are arrangements of Brazilian folksongs and others familiar to the Carioca Carnival. Here, Roberta Alexander is good with the saucious lit of "The Charm Song," and the jazz and samba rhythms that permeate most of the songs; but, on the whole, I feel her voice is too smooth and sophisticated to invoke their peasant roots.

They are followed by a chamber version, made by the pianist Alfred Heller, of both movements of the Bachianas Brasileiras No.5, given here by soprano, cello, and piano. This simply doesn't work—the accompaniment is far too effete for the Arias's soaring vocal line.

The Three Indigenous Poems composed in 1926–two to Parici texts, the third to words by Mario de Andrade—are quite marvelously performed. These are art songs, a genre in which Alexander excels, and the somber lamenting tone of the second is powerful and moving.

The disc concludes with 4 Songs from Forest of the Amazon, the music composed for the MGM film Green Mansions. Once again, these receive a fine performance, pianist Alfred Heller, a protégé and friend of Villa-Lobos, revealing the insights gleaned during a study of this score with the composer in 1958–59. A disc of mixed fortunes, but a must for all devotees of this South American composer. —Barbara John

Show Music

PASSION: Original Broadway Cast
Music & lyrics by Stephen Sondheim; Paul Genignani, cond.
Angel CDQ 55251 2 (CD only). Al Schmitt, John Patterson, Frank Filipetti, eng.; Phil Ramone, prod. DDD. TT: 56:44

Stephen Sondheim, generally regarded as the most talented composer/lyricist writing for the musical theater today, doesn't make it easy for his admirers. His last show, Assasins, was about people who've attempted to assassinate the President of the United States. Hardly Hello, Dolly! in popular appeal, but it actually had a score with some real songs, as opposed to the series of microtunes and recitatives that characterized Sunday in the Park with George.

With Passion, Sondheim is at his most Sondheim-esque. At its best, the music washes over you like a wave, and, for the moment at least, its appeal seems irresistible. And yet...it doesn't go anywhere. The tunes are, again, very short, and more than a little reminiscent of bits of Sunday and Follies. You keep waiting for at least one memorable song—a "Send In The Clowns" or a "No One is Alone"—to provide focus, but it never comes. The closest is "Happiness," which opens the show and is reprised at the end, but it's musically too ephemeral.

Sondheim's lyrics are, as always, models of craftsmanship, but my sense is that he's in a musical rut of his own making. It's often said that Sondheim's music improves with repeated hearing—a comment reminiscent of Twain's description of Wagner's music as being "better than it sounds"—but I had to force myself to listen to Passion more than once. Music shouldn't be like that.

Whatever doesn't work in Passion is not the fault of the cast. They're all terrific, especially Donna Murphy in a Tony-winning performance. Excellent sound, too. Pity about the music.

If Passion were the work of a new composer, I'd probably call it "promising." Tony voters were sufficiently impressed to give it a slew of awards, including Best Musical. Still, this had little impact on attendance figures, which by early fall were hovering close to the 50% mark. TheaterWeek's Ken Mandelbaum holds Passion in high regard, and predicts that it will find a home in opera houses.

Maybe so. I just hope that Sondheim will return to his roots (he did work with Julie Styne, Leonard Bernstein, and Richard Rodgers) and write a show that, without abandoning his personal style, is closer to mainstream American musical theater.

—Robert Deutsch

Jazz & Blues

PAUL BUTTERFIELD BLUES BAND
The Original Lost Elektra Sessions
Elektra Traditions/Rio R2 73505 (CD). Paul A. Rothchild, prod., eng.; Joe Gastwirt, mastering; Dan Rothchild, mix. AAD? TT: 58:56

The late Paul Butterfield triggered one of my first transcendent musical experiences. On a bitter night in the winter of 1970, the Butterfield Blues Band was struggling to make the best of my college gym's truly awful and boomy acoustics. Halfway through the slow blues of "Dripin' and Driftin'," the band dropped out as Butter stepped up to take a long, mind-bending, unaccompanied harp solo that seemed to take time itself and turn it inside out, each rhythm, syncopation, and gracenote compounding and commenting on the one before. (A pale version of this solo can be heard on The Butterfield Blues Band Live, Elektra 7E-2001: two out-of-print LPs recorded on that same tour.)

I'd never heard anything like it. By the time the solo was over, and with no memory of how or when I'd risen to my feet, I was floating stageward in a somnambulant slackjawed stumble. (And I was straight at the time, amazingly enough.) Like Bessie Smith before him, Butter had "walked" one. Unlike Bessie, he'd never had to look once at this pogoised fan to do it.

Some of that unparalleled harp power, as virtuoso as it was raw and vital, can be heard on Strawberry Jam, which excerts various 1966–68 club dates from the private stash of Butterfield Blues Band organist Mark Naftalin. The sound quality is, at best, just acceptable; Jam has the feel of a bootleg compiled by a fan with impeccable taste, lousy equipment, and the idea that his VU meters should be pegged red at all times. What Jam preserves with absolute emotional fidelity is the feel of a raw white/black Chicago blues band—the first such integrated band, in fact—with equal doses of chops, attitude, and...
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sleaze, playing to please only themselves and those audience members tough enough to take the edge. The crowd ambiance is as thick as the distortion, and the playing is solid and sharp. In fact, the long tided instrumental, otherwise unreleased, is one of the band's more satisfying East-West-style explorations, while "Come On In This House" is the sort of grinding, gutbucket blues the BBB did so well in concert but almost never recorded. Though the sound will keep many away, Strawberry Jam is required listening for those interested in Butterfield at his peak.

As is The Original Lost Elektra Sessions, though for different reasons. Turns out that the 11 tracks released as The Paul Butterfield Blues Band, Butter's 1965 debut album, actually constituted Elektra Records' third complete attempt at a releasable album. Pre-dating those historic sessions had been tapings of a weeklong gig at the Cafe Au GoGo in Greenwich Village—miles of tape that, in the words of Paul A. Rothchild, who produced all three projects, resulted in less than "50 consecutive seconds of good music."

But December '64, months before the GoGo gig, was when the Butterfield Band had first recorded for Elektra. Eighteen of Lost Sessions' 19 tracks—the masters were lost in a New Jersey warehouse for most of the last 30 years—date from these earliest sessions. They went well enough; Elektra had already pressed 25,000 copies of the album when Rothchild, who had never before recorded electric instruments, decided that he'd utterly failed at capturing the sparking, spitting megawattage he'd seen and heard Butterfield putting out nightly at Chicago blues clubs like Big John's. The 25,000 LPs were scrapped.

Ultimately I've got to agree with Rothchild's assessment—nothing here matches the band captured live, or even the best tracks on The Paul Butterfield Blues Band: the throat-ripping urgency of "Look Over Yonders Wall," the brash authority of "Born in Chicago," or the dark holler of "Mystery Train." But The Original Lost Elektra Sessions is still a damn fine record. "Mellow Down Easy" is at least as good as its remake on the eventual debut disc; we finally hear what "Everything's Gonna Be All Right" sounded like in the studio; and "Ain't No Need To Go No Further" gives a preview of the country blues Butter would fully explore years later with his Better Days band.

The sound is clean but primitive, predictable three-track at 1964—drums left, guitar right, harp and vocals dead center—with vague bass, little bottom, and raunchy highs. But that's how Elektra (and almost everyone else) recorded everything in those days. This is better than most.

Butter and his boys never again recorded 16 of these songs, mostly standards out of the basic Chicago bluesbook by Little Walter (Butter's harp mentor) and Willie Dixon (a too-brisk "Spoonful"), plus tunes by Tampa Red and Arthur "Big Boy" Crudup. There are also early Butterfield originals like "Lovin' Cup," the earliest evidence of Butter's odd blend of tough-as-nails harp work and melodramatic lyrics too earnestly sung—a mixture that led him astray in later years, when he increasingly saw himself as a soul singer instead of what he was: the best blues harpist in the universe.

Funny thing—the single outcome from the third and final Paul Butterfield Blues Band sessions, "Love Her With A Feeling," is the worst track here—there's no energy, Michael Bloomfield's out of tune, and Mark Naftalin, in his only appearance on Lost Sessions, drones unimaginatively on what does not sound like a Hammond B-3. But, after mostly uptempo shuffles, the album ends with its strongest track: the slow blues of "Goin' Down Slow," rife with Bloomfield's state-of-the-art fills. In fact, there are almost no guitar solos anywhere on Lost Sessions, but they're not missed, even with such a consummate blues stylist as Bloomfield aboard: the emphasis is on band, harp, and voice, in that order. (I've always liked Bloomfield's fills better than his solos anyway; listened to Highway 61 Revisited lately?)

Should you buy The Original Lost Elektra Sessions? If you have any interest at all in the Butterfield Band of the mid-'60s, absolutely: this is energetic, exciting music with a confidence and authenticity that greatly—and, given the times, almost miraculously—belied Butterfield's race and upbringing. It may not "walk" you slackjawed to your speaker grillecloths, but it will give you a hell of a good time. Rothchild: These tapes are better than you thought.

—Richard Lehner

T.S. Monk: The Charm
T.S. Monk, drums; Don Sickler, trumpet; Bobby Porcelli, alto sax, flute; Willie Williams, tenor & soprano sax; flute; Ronnie Mathews, piano; Scott Colley, bass
Blue Note CDJ 89875 2 (CD). T.S. Monk, Don Sickler, prod.; Joe Febo, eng. DDD? TT: 56:30

JAVON JACKSON: For One Who Knows
Javon Jackson, tenor sax; Fareed Haque, acoustic guitar; Jacky Terrasson, piano; Peter Washington, bass; Billy Drummond, drums; Cyro Baptiste, percussion
Blue Note CDJ 30244 2 (CD). Craig Street. prod.; Danny Koppelmann, eng. DDD? TT: 50:02

The unmistakable white-and-navy graphic of the Blue Note label is a jazz icon. If the label is no longer the dominant cultural force it was in the '50s and '60s, it's still important. It's significant that Blue Note albums are all over the Down Beat International Critics Poll every year (in the various "Record of the Year" categories), but nonexistent in Stereophile's "Records To Die For" listings. Going back to 1991, only two Blue Notes have ever been so anointed in Stereophile, and both are venerable reissues. Presumably Stereophile writers ignore the label because they're looking for recordings that are sonically superior—or at least sonically interesting. Typically, Blue Notes have been neither.

In the good old days, Blue Notes were produced by Alfred Lion and engineered by Rudy Van Gelder. The audio quality of the early Van Gelder recordings has been overpraised, but in its heyday the label had an undeniable musical identity and a sonic signature. Nowadays, Blue Notes are heterogeneous. Two new Blue Note releases by T.S. Monk and Javon Jackson demonstrate how the producer can make or break the aesthetic and sonic success of a recording project.

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most remarkable jazz recordings of the past decade: Cassandra Wilson’s Blue Light ’Til Dawn, Javon Jackson’s For One Who Knows clearly benefits from Street’s deft touch with pacing and mood. It also possesses sonic vitality. In contrast to the Monk album, there are details and shades of contrast within Jackson’s ensemble, and there is air around his throaty tenor sax.

Jackson takes his time, and his album therefore flows and eddies and discovers fresh perspectives for every song. The title track has bongo eruptions from Cyro Baptista and huge drum rolls from Billy Drummond, which provoke Jackson’s trilling, squawking cries. But on “Et cetera” Jackson slides languidly on a samba pulse. His solos always sound relaxed, even on declamatory pieces with sharp angles like Wayne Shorter’s neo-bop “Angola.”

The album is enhanced by major contributions from pianist Jacky Terrasson, whose solos are adventurous, splashing cascades, and from guitarist Fareed Haque. The delicately spun textures of Haque’s steel strings are set against the strong, dark-grained strokes of the tenor sax.

For One Who Knows places Javon Jackson among the most promising young tenor saxophonists in jazz. It may not quite be a record to die for, but it’s certainly a record to drive out of your way for.

—Thomas Conrad

IVO PERELMAN: Man of the Forest
Ivo Perelman, tenor sax; Dom Salvador, accordion; Joanne Brackeen, piano; Mark Helias, bass; Billy Hart, drums; Guilherme Franco, Cyro Baptista, Nana Vasconcelos, Duduka da Fonseca, percussion
GM Recordings 3029 (CD only). Gunther Schuller, Ivo Perelman, prod.; Alec Head, eng. DDD. TT: 46:17

IVO PERELMAN: Soccer Land
Ivo Perelman, tenor sax; Jose Eduardo Nazario, drums
[beij 09599-2 (CD). Alberto Ramuluche, Getulio Junior, Daniel Casilli, engs. DDD. TT: 46:10

Produced by composer Gunther Schuller. Man of the Forest features Brazilian tenor saxophonist Ivo Perelman playing themes by his country’s most beloved composer, Hector Villa-Lobos. But it’s hardly the polite exercise in neo-classic jazz that one might expect.

Perelman has a broad, throbbing, even abrasive tone that reminds me of his countryman Gato Barbieri, who emerged in the ’70s as a more lyrical version of such avant-gardists as Albert Ayler and Pharoah Sanders. Perelman plays with a constant growl in his horn and a catch in his throat. That gives a rough edge to even his most lyrical

statements—as on the theme “Rasga o Coracao,” which he states alone and then allows Joanne Brackeen to take over.

Recorded in New York, Man of the Forest adds Brazilian percussionists to an American rhythm section. We hear congas, ceramic drums, a triangle, wood blocks, and Brazilian instruments such as the cuica, caxixi, and timba. We also hear on three tracks the powerful piano playing of Brackeen, who in recent years has been playing more Brazilian music. The most familiar number is the little guitar piece “Prelude No.1.” It takes a while for the theme to emerge from a percussion introduction—then Mark Helias bows it, and Perelman absorbs it. Soon he’s improvising freely, with a panoply of cackles, yells, and full-throated cries. He never abandons the melody absolutely, sketching it repeatedly in his extended solo.

Soccer Land is even more free, but features the same kind of disguised lyricism. Recorded in Brazil with a considerable amount of resonance, it’s a series of duets with percussionist Jose Eduardo Nazario. The title of the disc comes from the fourth cut, with its vocalized evocations of what Perelman hears (I suppose) in a soccer game. It sounds like a soccer game played with Ping-Pong balls.

“Paranau” includes a free vocal improvisation by Perelman and Nazario—imagine two manic Bobby McFerrins as a pretty samba played on saxophone, and a Brazilian radio announcer narrating the moment when Brazil scored its winning goal against the US in last year’s World Cup match.

But mostly we hear the brash improvisations of two outgoing musicians playing a hip-swaying Latin version of avant-garde jazz. The sound on Soccer Land is strikingly resonant—perhaps too much so. Man of the Forest sounds more realistic, closely miked, and solid in its presentation.

—Michael Ullman

WADADA LEO SMITH: Kulture Jazz
Leo Smith, trumpet, flugelhorn, koto, mbira, harmonica, bamboo notch flute, percussion, vocalist ECM 1507 (78118-21507-2, CD only). Steve Lake, prod.; Martin Weiland, eng. AAD. TT: 53:25

Leo Smith, who has written orchestral pieces as well as small-band jazz, is far from a naïve man, but there’s an appealing innocence, a folksy lack of what people used to call “side,” to much of the music here, which begins with Smith playing the thumb piano, singing “Don’t You Remember?,” and asking us to recall a time when people were real-
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You might enjoy *Kulture Jazz* even if you're not in touch with your ancestral memory. Most of its short pieces are dedicated to earlier musicians or to Smith's friends and relatives. These include the multitrack trumpet feature "Louis Armstrong Counter-Pointing," with its darting exchanges among trumpet lines; and Smith's tribute to Albert Ayler, which moves surprisingly from sober trumpet phrases to a bluesy interlude for harmonica and then back to the trumpet, this time played high and in short, tense phrases.

The idea must have been to evoke the spiritual qualities of Ayler's playing, but also his funk and parade sides. Smith plays his tribute to Billie Holiday on overdubbed trumpets and flugelhorns, creating a warmly burnished background for his bleak melody lines. On "Firesticks, Chrysanthemums and Moonlight (for Harum)," Smith plays a dark-toned wood flute and rattles a variety of (mostly) metal percussion instruments and shakers, which move from left to right in a peripatetic fashion I find a little unnerving.

That's the product of ECM's close mincing, which also results in a clean, intimate sound appropriate to the folksy, improvised aura of much of this music, which we might call avant-garde if it weren't so immediately accessible.

—Michael Ullman

**Joshua Redman Quartet: *Spirit of the Moment: Live at the Village Vanguard***

Joshua Redman, tenor sax; Peter Martin, piano; Christopher Thomas, bass; Brian Blade, drums. Warner Bros. 45923-2 (2 CDs), Matt Persson, prod.; James Farber, eng. AAD. TT: 2:27:49

**Joshua Redman Quartet: *MoodSwing***

Joshua Redman, tenor sax; Brad Meldau, piano; Christian McBride, bass; Brian Blade, drums. Warner Bros. 45643-2 (CD), Matt Persson, prod.; James Farber, eng. AAD. TT: 70:01

Most people have heard of Joshua Redman for all of the wrong reasons. He's the son of Dewey Redman, one of the most consistently fascinating tenor saxophonists of the last half century, and the press has made much of that—as it has of his departure from law school to pursue a career in music. He could be forgiven for assuming that the public doesn't even care that he's also prodigiously talented and inventive. Yet these are the very qualities that he refined in last spring's *MoodSwing*—improving upon his already staggering chops, his ensemble technique, and his compositional abilities. This disc serves as a masterpiece in the grand old tradition. With *MoodSwing*, Redman announced the end of his apprenticeship and the opening of the next phase of his career.

It's not only that Redman composed the 11 tracks on this disk; he also evinces an assurance and instrumental maturity that are new. He's not just soloing here, now he's the bandleader—the spirit that inhabits the ensemble, not merely its star. His compositions support this new role, they have the feel—at first hearing—of swaggering, swinging classics. To cite but one example, "Chill,++" has an insouciant charm that, like "Toppy," feels instantly familiar yet unfailingly fresh. And the songs fit the horn, too—exploiting the deep, luxurious richness of the tenor sax. While undeniably modern, Redman never strays totally beyond the ken of the great Texas tenors who have gone before him; when he needs to he can really reach down into that good old gut-bucket funk.

His band is a dream—one brought to life by the brilliant recording, which sounds clean, honest, and true. Christian McBride anchors the band with the deepest, most articulate acoustic bass-tone that's been committed to disc in quite a while. His sparse accompaniment is always tasteful and damn close to perfect. Brad Meldau's bright aggressive attack on piano serves as acerbic counterpoint to Redman's muscular drive. Brian Blade is that rarity, a drummer who listens, and his subtle touch on cymbal and tom-tom reveal him to be a master of tonal color. Don't be fooled, though; he can unleash the thunder when it's appropriate. Mostly though, this is a band—and a recording—that leaves a lot of space at the center of these pieces, with the result that the listener can inhabit them as well.

The Quartet changes membership on *Spirit of the Moment*—Christian McBride and Brad Meldau both lead their own bands these days. Replacing them are Peter Martin on piano and Christopher Thomas on bass. Both of them have integrated into the band successfully, although I miss McBride's assurance and impeccable pace.

This two-CD set documents a five-night stand at the Vanguard, and Warners has assembled a dream out of those dates. Redman solos aggressively—but never, I think, just to showboat—and the band plays together with precision and aplomb. Redman composed nine of the fourteen tunes on the set; the others are primarily standards—ballads mostly. The one glaring exception is Sonny Rollins's "St. Thomas," a choice that must be regarded as gutsy to the point of arrogance—it inevitably invites comparison to one of the greatest tenor-players of our age and the most consistently creative improvisor ever. Damned if Redman doesn't stake a claim to the piece! Over 12 minutes, taking cadenza after cadenza, he worries that theme, exploiting every ounce of honk, squawk, and wail you could possibly coax out of the tenor sax. Does he cut Sonny? No, but there's no shame in that—he does play the living hejneus out of the tune.

The sound on this disc is phenomentially live; there's occasional congestion and the soundstage is, at times, confused—but mostly, *Spirit* leaps out of the speakers with a rare sense of presence. This one's definitely a keeper.

These are auspicious releases. If you care about tuneful compositions, impeccable ensemble playing, or the state of thoughtful contemporary music, you owe it to yourself to take heed of Joshua Redman now. He's here for the long haul, and these records assure us all that he came to play.

—Wes Phillips

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Ted Rosenthal, piano


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Kenny Drew, Jr., piano


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Monty Alexander, piano

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There's never been anything quite like Concord Jazz's Maybeck series, which has grown to 40 volumes in five years. With the exception of a few of the biggest names--Jarrett, Peterson, Tyner--just about everybody who's anybody in current jazz piano has participated in this series of solo piano albums recorded at Maybeck Recital Hall in Berkeley, California: Kenny Barron, Jaki Byard, John Hicks, Fred Hersch, Toshiko Akiyoshi, Hank Jones, and 34 others to date.

What's notable about the series is not its quantity but its quality. Maybeck is a small, high-ceilinged performance space (it holds about 60 listeners) dominated by natural wood: acoustics exactly "live" enough for solo piano. From Vol.1 through Vol.40, Concord's technical staff (including several different chief engineers, but always including Bud Spangler as remote recording coordinator) has rendered in live-to-DAT recordings the expressive power and the chiming, sustaining beauty of a single Yamaha S-400 B. The jazz-piano muse seems particularly happy at Maybeck; many artists' contributions constitute some of their strongest recorded work. The three discs discussed here present pianists who are recording solo for the first time. The creativity varies within a high level, from solid (Vol.38) to irresistibly listenable (Vol.40) to astonishing (Vol.39).

The interests and competencies of Ted Rosenthal (Gerry Mulligan's current piano player) cover a wide range, from Bach to Bud Powell to James P. Johnson. His classical training is perhaps too obvious on such pieces as Cole Porter's "It's All Right With Me" and Lennie Tristano's "Lennie's Pennies," where his fleet melodic dissections and key transpositions sound a bit like technical exercises. But Rosenthal has a sensitive intelligence for little-known ballads. He transforms the three-note motif of Tadd Dameron's "You're a Joy" into a delicate tone poem, and creates something unsettling from the harmonic ambitions of Herbie Nichols' "117th Street." As with all the albums in the Maybeck series, the musical rewards are inseparable from the audio quality, which puts us in the intimate presence of that Yamaha S-400 B.

Monty Alexander, one of the Concord label's most popular pianists, was originally scheduled to record the fourth or fifth album in the series. Apparently uncomfortable with the exposure and vulnerability of solo performance--with no rhythmic accompaniment, the role of the pianist's left hand changes--he postponed the project for several years. Alexander has always been a highly percussive player whose Jamaican roots are audible in the flexible insistence of his rhythms. The Maybeck setting turns him uncharacteristically inward for gentler songs, such as "When I Get Too Old To Dream" and Charlie Chaplin's "Smile." Though never an innovator or a deep thinker, Alexander has the dramatic sense of all good storytellers. The purity and simplicity of feeling of Monkian mini-concerto; and "Straight, No Chaser" is hammered and twisted into a new, abstract shape that somehow remains recognizable.

Such a style could easily become grandiose and florid in less gifted hands. But even Drew's most elaborate decorations are architecturally integrated. "Autumn Leaves," a perfect denouement for this program, peels away the pop standard's outer layers to reveal in its undiscovered implications, finally finding the melody at 7:25.

One of the fascinating aspects of Concord's Maybeck series is how the same piano in the same space recorded with the same digital technology can sound so different with different pianists. In this case, Drew coaxes unique, ringing cries and whispers from the instrument.

If you love jazz piano but have not yet discovered the Maybeck series, you're late. Every one of the 40 volumes is worth owning—but start with Vol.39.

—Thomas Conrad

RANDY WESTON: Marrakech: In the Cool of the Evening
Randy Weston, piano
Verve Gitanes 341 521 588-2 (CD only), Randy Weston, Jean-Philippe Allard, prov.; Vincent Blanchet, eng. DDD. TT: 70:15

No one records this way anymore. Marrakech: In the Cool of the Evening was taped, as the notes tell us, "on September 2, 1992 between 7pm and 8:30pm in the ballroom of the La Mamounia hotel, Marrakech, Morocco." Randy Weston recorded, in other words, 70 minutes of remarkable music in an hour and a half.

Nothing sounds rushed or unplanned. Weston plays in his big-toned, orchestral style with his usual authority. His repertoire is fascinating. Besides 10 originals, he pays tribute to Dizzy Gillespie with four tunes, all reworked so that even "Night in Tunisia" sounds newly evocative. Fats Waller's "Jitterbug Waltz" is given a new power—the melody emerges shily from among the commanding chords of the introduction.

Weston's resonant bass lines remind us that his early influences included Monk and Ellington. He's percussive, even startling, but never clangy. His sound has rarely been captured so beautifully as here in this resonant ballroom (on two-track digital tape). We hear the power, and the crisp highs of what sounds like a wonderful piano. Weston is in good form throughout, playing his own witty blues, such as the memorable "Blues for Five Reasons" with its slow,
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spacious lines—or the last number, "Lotus Blossom," which Ellington fans will remember was also the final tune of Ellington's tribute to its composer, And His Mother Called Him Bill.

A master in his own right, Randy Weston is not afraid of showing his lineage even as he demonstrates his originality. I wish I had been in Marrakech Sept. 2, 1992.

—Michael Ullman

**POPULAR**

**BUGS & FRIENDS Sing the Beatles**
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Featuring: Bugs Bunny as Paul McCartney; Daffy Duck as John Lennon; Elmer Fudd as George Harrison; The Tasmanian Devil ("Taz") as Ringo; with Yosemite Sam & Road Runner as Themselves

Also Featuring: Mendig Segal as Bugs Bunny; Joe Alaskey as Daffy Duck & Yosemite Sam; Jim Meskimen as Elmer Fudd; Jim Cummings as Taz

Kid Rhino R2 71769 (CD). Geoff Levin, Chris Many, prods.; Bruce Chiause, eng. TT: 32:23

It's astonishing, actually, that this pairing-up of four of Warner Bros.' top-grossing film stars with four likeable if little-known lads from Liverpool has never been thought of before. That's just how right it feels, despite the disparities in media recognition. In case you've not heard of them (hardly surprising), "The Beatles" enjoyed a brief local fame just before the onslaught of the Irish Invasion in the early '60s. They've long languished in the vestibule of history, their considerable appeal gratifying only a small coterie of cogno- scentis. (I myself have had to make do over the years with only a scratchy, long-out-of-print "best of" compilation.)

This tribute—surely a testament to the seasoned taste of the four American thespians involved—attempts to rectify that sorry situation.

The casting could hardly be bettered: "Daffy" Duck plays and sings the part of John Lennon, throughout the album bringing to the role a subtly psychotic edge that brings out the tortured Lennon's warring and unskulled thrills for fame, power, and lost love, all leavened by a sharp, never-failing wit.

Duck, now 54, transforms the admittedly mindless "yeah, yeah, yeah" chorus of the Beatles' "She Loves You" into a three-part sigh of world-weary cynicism and ennui, with devastating effect. But it is on "Yesterday," a disposable but pretty enough ballad tossed off by original Beatle Paul McCartney, that Daffy truly plunges the depths. Bringing to the session the same surreal, even deconstructionist techniques that he brought to the groundbreaking avant-garde short films he made for Warner Bros. in the '40s and '50s, Daffy exposes depth after depth—subbasement after subbasement, as it were—of meaning in this ostensibly sentimental tune. Here, in this audio vérité vignette, presented on disc without a single edit, Daffy's struggles with a callous, uncompromising producer reproduce in miniature the serious, committed artist's endless struggle with the mercenary forces of marketing and the jaded, cynical manipulations of the aesthetic powers-that-would-be. A remarkable and disturbing—not to say disturbed—performance.

Perhaps even more disturbing in its quiet, ever-smiling geniality is that emi- nence grise of Warner Bros. screenrom, "Bugs" Bunny himself, who here plays McCartney. It's fascinating to hear Bugs effortlessly reinvent a novelty song like "Hello Goodbye" with an absurdist "deep reading" that confounds and demystifies serial logic and the narrative lock of "traditional" texts (the latter represented in this duet by a consternated Daffy, tongue most certainly planted firmly in beak (ironies within ironies)).

Though we must leave any ultimate judgment in the hands of posterity, it seems to this reviewer that Bugs's gently relentless reiterations here of "you say/I say," "yes/no," "stop/go," and "hello/ goodbye" are certainly as evocative, even as revolutionary, as any of the stark "I can't go on/I'll go on" dualisms of, say, a Samuel Beckett—albeit infinitely more entertaining.

But Bugs and Daffy represent, respectively, only the superego and ego, as it were, of the Fuzzy Four's corporate body. Elmer Fudd plays the role of the group's soul—its spiritual enthusiast, its Holy Fool, its Pansy—much as George Harrison (a shadowy, mysterious figure about whom little is known) did for the Beatles. There is a touchingly naïve wisdom in Fudd's lisping, childlike observations and hesitant declarations that I find entirely disarming—a sort of unconscious spirituality in which even the mild imprecation of "Gwacious!" imparts heretofore unsuspected levels of awe and wonder. In fact, in "The Fool on the Hill," a special guest appearance by the Beatles' spiritual advisor (rumor has it that, to this day, all four remain devotees of the holyman, residing in his ashram somewhere west of Bombay) reveals esoteric interpretations—clearly indicated with aural signposts of echt Brechtian alienation techniques—of many of the Beatles' verses from long ago. And such lines as "...the man of a thousand voices talking perfectwy would" take on new meaning in Fudd's errant mouth: surely this can be read as an homage to Warner Bros.' own man of many voices, Mel Blanc?

But Fudd's ido savant nominal grace is firmly counterpoised by the flesh in all its noisome hairiness, here embodied by the Tasmanian Devil, or Taz, who throughout the album sounds his barbaric yawp. (He is assisted in this by the cameo appearance of a blustering Yosemite Sam on "Help!") Taz—who, it would be churlish to point out, did not
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I listened to this CD shortly after the Oklahoma City bombing, which gives Carnahan’s “Penny for the Guy” a strange resonance. You see, in Merrie Olde England in the Old Queen’s day, a “Guy” was an effigy of filled Parliament-bomber Guy Fawkes (or any other appropriate figure of British scorn, such as Rupert Murdoch). Carnahan’s seeming sympathy for the Gunpowder Plotter comes off much less effectively than it might have, given recent events. It’s a good tune, though, and Petrie does it proud. Harmony’s the thing with Carnahan and Petrie: we get plenty of it on Cut and Run, and it’s well worth hunting through the bins for.

Sound is close-nicked folk rock—nothing to write home about, but it doesn’t mangle the voices. I listened twice in a row to the whole disc, which says something these days. —Les Berkley

MARSHALL CHAPMAN: It’s About Time

This is an odd little major-label comeback sort of album, but then Marshall Chapman, an upper-class white woman from Spartanburg, SC whose life was saved—arguably—by rock’n’roll, has carved herself a strange, contrarian sort of career. A giggling blues guitarist, songwriter, vocalist, and debutante with pop superstardom just around the corner (M: I’m Feeling Free, Jaded Virgin, Marshall, all on Epic), Chapman moved to Nashville and worked out raunchy blues-rock and songs and self-respect in a time and place where any female brighter, taller, less docile, or more conservatively dressed than Dolly Parton was viewed with alarm. (Born to wear the avant-garde, Chapman stands an even 6’ tall, another clue that the Nashville fraternity—despite her superior musicianship—might not clasp her to its bosom.)

They just couldn’t reach, and while this isn’t the 454 words to argue the interrelationship of self-destruction, single-mindedness, and creativity, there’s a certain consistency to the observation that if you don’t give ‘em hell, like Frank Zappa, you go to hell, like Chapman, or—like Alberta Hunter, Janis Joplin, Jimi Hendrix, and Jim Morrison—both.

Which is why Chapman, after a surfeit of nerves and “a certain period of bad choices and big trouble,” found herself taking up a long-postponed engagement to play for the ladies incarcerated...
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in the Tennessee State Prison for Women. Recorded live in 1993, the sound—leading off, of course, with Chapman's four-piece Love Slaves in a butt-kicking interpretation of "Jailhouse Rock"—is cracking. Chapman's self-deprecatory two-way conversation with the inmates is eerie: hard to hear, almost confession- al, almost apologetic, it's so honest and real—especially from an honest-to-god second-degree-magnitude star. It's a shock, tough to take.

So just do it. It's About Time is a genuinely original and genuinely honest album, and you'll never ever hear any of it on pop radio, or even WFMU. It's not what passes for alternative/cool young chick navel-gazing: Liz Phair, Belly, PJ Harvey, Throwing Muses. It's just Marshall Chapman, a woman of a certain age who's traveled hard; strictly quirky, and very audience-specific, full of affectionate tunes about good ol' girls ("Alabama Bad"), real love (she says she's finally found it, and you believe her in "Beyond My Wildest Dreams"), and everyday solutions to everyday problems ("A 45's quicker than 409 / Betty cleaned house for the very last time...Betty's being bad / It's her way of leaving"—"Betty's Bein' Bad"). It's About Time is as unnerving as being in group therapy with someone like Kinky Friedman or Teri Garr—talented, semi-famous, and in there plugging: at the end of the session, you feel real good.

—Beth Jacques

LISA GERRARD: The Mirror Pool

4AD 45916-2 (CD). Lisa Gerrard, prod.; Guy Charbonneau, mix; Charlie Louis, asst. mix. Robin Gray (Eaton Studios); Garry Havillay (Abc Studios); Gerrard, Jack Tusckowski (home studio), engs. Orchestral work arranged & conducted by John Hommar. TT: 68:14

I get tired of detailed obfuscation. With her new solo release, Lisa Gerrard, one-half of the supergroup for the spiritualist set Dead Can Dance, has helpfully included no background information, no lyric sheet, and no explanation about either the sudden mysterious absence of Irish folkie poet Brendan Perry or the fact that this CD is so like the typical Dead Can Dance release his absence hardly ripples the pond.

Which is one way of saying, I suppose, that the mystical, sound-track-to-a-dream—like style of Dead Can Dance—primarily a potpourri of world-music influences ranging from the Western classical and liturgical traditions (Handel's "Largo") through the Eastern-inflected, realized via mostly non-verbal vocalization and syncratic instrumental work: tablas and bouzouki, Steve Reich–like rhythm loops, and Gregorianesque chant trott out for "Violina" and "Glorafui," for instance—is entirely Gerrard's own work. Yes? No? I think we should be told.

Still, it hardly matters. What Dead Can Dance—and now Gerrard—are about is the musical embodiment of the Symbolist tradition, a sort of kinesthesia evoking emotion from the great universal Jungen archetypal, beyond time and space, through sound. Yes, it works: "The Rite," "La Bas (Song of the Drowned)," and "Laurelei" are evocative, ethereal, calling to mind whatever you've got floating around back in the preconscious.

That's Lisa Gerrard (of Dead Can Dance) behind those scary eyes. Her solo album is up.

But is it good music? It's hard to tell, and it's also very difficult to judge work that is essentially a mélange of styles and instrumentation, not composition. Like David Byrne and other international magpies, Lisa Gerrard seems to stitch together bits and bobs of everything she's heard, often over and over (periodic tracks like "Sanvean" and "Persian Love Song" inevitably pop up here), often by way of guest artists, instead of pursuing a focused inner vision. That's fine—but would there be bouzoukis if Dinitri Kyrakoyuk hadn't happened? Woodwinds, if The Victorian Philharmonic hadn't been available?

Without a clear identity or style—an author's "voice," if you will—The Mirror Pool veers dangerously close to New Age tape loop. I got bored and did the ironing. Sure, any one of the tracks could be the leitmotif for a film like Excalibur—but equally, they'd work for Kagemusha, Air America, or the cartoon version of The Lord of the Rings. That's becoming a problem.

—Beth Jacques

GOV'T. MULE: Gov't. Mule


Warren Haynes is the other guitar player in the Allman Brothers Band—the guy with the thankless task of filling Duane's shoes. The guy who isn't Dickie Betts.

For his own record, Haynes sidesteps the issue by playing almost no slide, and writing music that's much closer to Free and Cream than to the Allmans—much closer. In fact, when Gov't. Mule covers Free's "Mr. Big," it sounds as if they've written it.

Ordinarily, such rampant retro would evoke the usual jaded reaction. The problem is, they do it so damn well. Haynes handles the vocals, and while his gruff shout may not be as refined as Paul Rodgers', it might just be more soulful.

The songwriting, too, is first-rate if derivative. "Painted Silver Light" begins with a Zep-type acoustic intro before a verse reminiscent of Robin Trower, and a chorus that returns to the land of the Free.

But with such obvious influences, what does Gov't. Mule have to offer of its own? Not much that's new, but much that's good. The songs may sound like those of other bands, but they sound like the best of those bands, not the filler. And songs like "Mule" offer a glimpse of a nascent jazz-inflected style of their own. Too, Haynes sings and plays with a commitment that makes the music sound fresh.

Recorded largely live in the studio, Gov't. Mule offers unadorned, warm, in-your-face sound that recalls the great guitar records of the late '60s and early '70s, but with a presence that's pure '90s. If evolution rather than revolution is your thing, and you miss testosterone-fueled guitar music, you could do a lot worse than this CD.

—Michael Ross

DAVID KNOPFLER: Small Mercies

Mesa 2-92548 (CD only). David Knopfler, Harry Bogdanov, prod.; Barry Hammont, Paul Apted, Mark Darely, Tim Petrit, Ian Hoffman, Jonathan Mille, Julian Mog, engs. TT: 56:47

Just as a lawyer who defends himself has a fool for a client, the singer-songwriter who produces himself has a sycophant for a producer, and every songwriter I've ever met thinks their latest tune is their best ever.

Not to say that David Knopfler's songwriting here is less than sterling. In fact, he makes it seem so effortless that
it must have been hard to keep it down to even the 14 songs herein. Still, a little judicious pruning wouldn’t have hurt.

As well-crafted as ditties like “Rockin’ Horse Love” (a father reminiscing about his son as a tot) and the Hoagy Carmichael/Randy Newman-esque “Papa Don’t You Worry” are, they seem out of place sandwiched between the powerful indictment of apathy, “Weeping in the Wings,” and “I Wasn’t There At All”—a heart-wrenching tune about abandoning a loved one.

While there’s certainly room for lightness in a serious work, there’s a fine line of focus that separates the journeyman from the genius. The lack of focus here is evident in the arrangements and production as well. Instruments are layered on, competing for sonic space and our attention. When attempts are made at giving the tunes the drama they deserve—"The Slo-Mo King," “Forty Days and Nights”—the boys get carried away: by end of song the drums are flailing, pianos pounding, and it all becomes just a little too much.

A talent as large as Knopfler’s deserves a producer who can frame his art appropriately and light it to its best advantage. Everybody needs an editor.

—Michael Moss

SHANE MacGOWAN & THE POPE'S: The Snake
ZTT/Warner Bros. 45821-2 (CD), Shane MacGowan, Dave Jordan, prod. TT: 52:03

Shane MacGowan—formerly of the Pogues, now the Pops—lights up guitar, as MacGowan barks his partner credo, part nod-and-wink confession: “I ruined my life by drinking, bad wives, taking pills and cursing,” he growls, “Rock and Roll, you crucified me.” This slash-and-burn pacing is maintained pretty much nonstop.

Some of these tunes are merely attitude-rich throwaways, but several achieve a lofty, albeit blurred poetic vision tempered by self-deprecating humor. As MacGowan watches his girlfriend pack and leave without a word, all that comes to mind is: “Her Father Didn’t Like Me Anyway.” Later, he comes on to a barmaid: “I’ll Be Your Handbag,” he declares, “though I’d rather be your nag.”

The most fascinating piece, though, is also the most atypical: “A Mexican Funeral in Paris” is cinematically proportioned, a hellish cop-out—bad tale driven by muscular guitar and lean horn charts reminiscent of a younger Van Morrison. MacGowan delivers the story of sudden death in a gripping, guttural voice: “A scar, tattoo, a blood-line scorched,” he splutters, “Revenge, the only game!”

I’ll drink to that.—David Prince

JAMES McMURTRY: Where’d You Hide the Body?

McMurry is one hell of a storyteller, and these 12 songs (and one instrumental) draw you into narratives already well under way. Rather than a typical pop record, Where’d You Hide the Body? resembles a series of finely crafted short stories—McMurry holds down a well-turned rhymic than on the telling detail.

With producer and bassist Don Dixon, he has crafted a unique sonic landscape in which to place these tales—fast and spacious, but ever so slightly otherworldly. Dixon’s deep, deep bass anchors these performances, which are awash with swirling guitars (and mandolins, banjos, dobro, pedal steel...). All of the numbers sound rich and clean, but the sound isn’t realistic in the normal sense of the word. There’s a superficial resemblance to Daniel Lanois’ production of U2, but this is lighter and airier—as if a North Texas wind had cleaned out the muck between the players, letting in the sunlight. Holding it all together is the intelligent drumming of Jim Brock, whose light touch and skittering rhythms provide drive without a trace of ponderousness.

Ultimately, though, this disc lives in its stories. McMurry’s not exactly a polished vocalist, but, as if anticipating this criticism, he sings (in “Right Here Now?): “I’ve been scored on a seven-year run / his knees could barely hold him / but he got the job done.” So does McMurry. In song after song, he makes me feel that I know these people, that I’ve lived on their streets. Sometimes a book, a story, a song captures a life so perfectly that you wonder, “Did that happen to me? How else could I know that?” On Where’d You Hide the Body? it happens 12 times.—Wes Phillips

RED HOUSE PAINTERS: Ocean Beach
4AD 45859-2 (CD). Mark Kozelek, prod.; Gibbs Chapman, eng. TT: 54:27

Red House Painters are not an easy listen. What band with this languorous a gait—their 1992 debut, Down Colorful Hill, was a six-song EP 44 minutes long—could be? When chief Painter Mark Kozelek (words, music, rhythm guitar, approximate vocal pitch) sings of “feeling sluggish,” he really means it. Forget beat—there’s barely a pulse.

According to Kozelek, who claims to spend long periods lying in bed, this is exactly the point. This folk-rock Proust indulges himself in leisurely reminiscences of places, people, and things past—a Terry Riley armed with I-V-V chord sequences in place of figural changes. Change happens only over the long run as the music unfurls in dream-time: late-night listening done slow and deliberate.

Down Colorful Hill clicked in its own sweet way; if ensuing releases were a bit too introspective for their own good, Ocean Beach is far easier to love. The riffs Kozelek runs together are stronger, his
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WorldRadioHistory
Stereophile, November 1995
joined Frank Zappa's band, Vai's father approached Zappa backstage after a concert and asked, "Be straight with me, Mr. Zappa. Does the boy have what it takes?" Zappa supposedly answered, "Mr. Vai, the boy's a virtuoso."

While I can't vouch for the veracity of the story, I can vouch for its conclusion. Steve Vai is a virtuoso if ever there was one—a regular Paganini of the electric guitar. The lingering question, however, is: how much substance is there beneath all that technique and flash?

Judging by this CD, a lot. Despite an uneven discographical track record, Vai has always been a monster player. Unfortunately, his attempts to expand his audience to the mainstream (his Whitesnake stint and the last album, Sex & Religion) have not been particularly successful. By contrast, when he sticks to what he does best (hint: play the guitar), he's often overwhelming.

"Bad Horse," with its whining horse/guitar effects, charges out at the start of this CD and never lets up. Along the way, "The Boy from Seattle" is a lyrical and meaty Hendrix tribute, complete with Jimi's signature "Little Wing" guitar sound and bluesy asides. "Ya-Yo Gakk" is a brilliant composition based on samples of Vai Jr.'s baby-talk. Vai's fluency on and command of his instrument are almost bionic, but he's genuinely saying something on these tracks. He not only plays at blinding speed but creates lines with genuine musical logic. The closing "Tender Surrender" owes debts to both Hendrix and Zappa, but Vai's combination is referential rather than imitative.

This is also a sonically superb recording (presumably done in Vai's home studio and mastered by Bernie Grundman), with enough bass and presence to slam you around the room. Vai gets nearly everything right on Alien Love Secrets. Pity that it's so damned short. Let's have twice as much music next time, Steve. Otherwise, don't change a thing. —Carl Baugher

CHRIS WHITLEY: Din of Ecatasy
Work/Sony OR 52970 (CD only), John Custer, Chris Whitley, prods; Steve Melton, eng. TT: 47:37

I figure it went something like this: Boy records brilliant, textural, moody, rootsy debut. Critics (including yours truly) are effusive, radio reluctant. Boy takes music on the road, opening for the boogie-down fans of Tom Petty who don't know him from Adam and could care less about moody, mid-tempo, textural music. Boy gets frustrated and depressed, turns to drugs, has marital problems, and four years later emerges with an album noisy enough to drown out the din of indifference.

On first listen, Din of Ecatasy will undoubtedly put off that small club of Whitely fans (including yours truly) who loved the first CD. The fuzzed-out, raging guitar tunes herein bear little resemblance to the back-porch intimacies of Living with the Law. Whitely's bluesy vocals and National steel guitar are, for the most part, replaced by pounding drums and wah-wah feedback. The rural images of "pickaxes," "roadhouses," and "big sky country" are edged out by cinified "hippie rings" and more amorphous images of "anaesthetic days," "slow neuroses," and "vain redemptions."

The thing is, the more you listen to Din of Ecatasy, the less removed it seems from Whitely's last effort. Where Malcolm Burn's spread of swirling guitars created a texture of one sort, John Custer's gloriously recorded raunch provides another. Far from being a random din, feedback and fuzz are carefully layered into a powerful soundtrack for Whitely's dark visions. The imagery may have changed, but the subject matter hasn't. Physical love and death, politics, and religion run rife through tunes like "O God My Heart is Ready" and "Guns & Dolls."

In the end, it's the difference between Robert Johnson and Jimi Hendrix: Johnson's rural directness transformed into Jimi's urban spaceman. The package is different, but the soul's the same. Maybe this time Whitely will wow the masses. If not, at least this time he can out-shout them. —Michael Ross

WARREN ZEVON: Mutinyer
Giant 24618-2 (CD). Warren Zevon, prod. TT: 35:46

Poor, poor, pitiful Warren Zevon. It's not easy being a musical wise guy and intellectual renegade. There's probably not a middle- or near-middle-aged geezer around who hasn't howled along with "Werewolves of London" or smirked at the imagery of "Excitable Boy." But therein lies the rub, cause both those ditties are off an album that's been out since 1978—long before he sang that one about "Boom Boom Mancini" with the guys from R.E.M.

There's far more to Zevon than the occasional novelty hit, though. He's covered the musical waterfront, hanging out with Igor Stravinsky and Robert Craft in his teens, working for Don and Phil Everly, placing a couple tunes on the Midnight Cowboy soundtrack, and releasing a short-lived solo debut (Wanted Dead or Alive) all by 1970. He now has ten full-length albums in print (but why isn't 1982's The Envy of one of them)?

The self-produced Mutinyer is his best in some time. The songs are concise, their images strong, and he mainly resists the temptation to hide behind off-hand wit and cynicism. Digitally recorded at his home studio, it's more or less a one-man show, although a number of guests—David Lindley, Peter Asher, and Bruce Hornsby among them—do appear. And while he's no Stevie Wonder (just dig that, ah, drumming), his lead-guitar playing has an enjoyably perverse edge, and he's still possessed of one of rock's most identifiable and satisfying voices.

All the usual topics are rounded up, from the mock-noirish exploits of a securities scam artist on the lam in the Everglades ("Seminole Bingo") to the mean-spirited "Rottweiler Blues." A cower ("Judee Sill's "Jesus Was A Cross Maker") and an autobiographical sketch ("Piano Fighter") are thrown in for good measure, but the record's slim heft is predominantly taken up by a series of ballads detailing a failed love affair. Of these, the obsessively repetitive "Something Bad Happened to a Clown" and the acoustic guitar outlines of "The Indifference of Heaven" are especially memorable.

On the down side, he'd have been better off using real instruments on the title track in place of all those silly synthesizers heard twirling the horn parts; and Zevon's production leaves no doubt as to the pieced-together nature of this project, each instrument occupying its own space in the trebly, watery mix. But if, like me, you come to Warren Z. for his particular point of view, then you've come to the right place. Rueful heartache spoken here. —David Prince
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The DAC-1's component list is exemplary. It employs aotted toroidal power transformer, low ESP power supply capacitors, Crystal CS8412 input receiver, NPS 5813 digital filter, and two Burr Brown PCM1702 20-bit DACs. The output stage is a direct coupled, Class A design, utilizing high speed Analog Devices AD1944 and AD1947 op amps, film and foil polysineopole capacitors, and 1% metal film resistors. It accepts both Co-Ax RCA and Toslink digital inputs.

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MARK LEVINSON NO.36

Editor:
While we do not wish to respond to the No.36 review per se, when I was last in Santa Fe, I briefly shared some information on jitter measurements with Mr. A that I thought might be of interest. Jitter is far from a simple phenomenon, yet tends to be characterized by a single number. In this oversimplification, there is room for gross misunderstanding and errors of judgment.

The No.36 uses four PCM 1702 DACs. These DACs change their output signal at 8 times the sampling frequency, 352.8kHz for a 44.1kHz-sampled CD. For most DACs, each of these changes is induced by a single signal, called the "sample clock." This sample clock signal is generated within the digital filter and transmitted to the DAC.

Typically, this sample clock is used to derive jitter information on the D/A conversion rate. Most jitter-measurement devices compare this signal to some threshold to determine precisely when the signal changes state. The time deviations along a series of these state changes constitute the jitter measurements.

Unfortunately, there are several problems intrinsic in this approach. With respect to the No.36, the approach is flawed because the PCM 1702 does not use the "sample clock" signal to gate its output. Rather the No.36's DAC changes its output state on the fourth bit clock [transition] after the sample clock. It is more important, then, to keep the time between every fourth bit clock precise. Unfortunately, this signal is contained within the DAC and is not available for measurement.

Another problem with the jitter measuring device is its choice of threshold against which to distinguish the two states of a digital signal. Most logic devices transition between high and low states at around 1.4V (above their ground potential). Equipment we use that allows us to zoom in on these transition points shows great variations from a theoretically perfect "straight line" transition. There are often flat spots during the transitions, some lasting in the hundreds of picoseconds. If the receiving device's threshold is at that particular flat spot, it would show far more jitter than might exist for another receiving device that uses a different threshold. Obviously, slight variations in the ground potential for the devices also has a great effect on this transition detection—both in digital processors and in instrumentation (which do not necessarily agree with one another).

Finally, while Stereophile deserves credit for consistently bringing the importance of jitter to the fore, your readers should be aware of the fact that any single number cited as a jitter measurement is inherently oversimplified and therefore potentially misleading. It is very conceivable for a device to have a very small amount of jitter from one transition to the next. But at the same time, that jitter deviation may accumulate over many cycles. So while the cycle-to-cycle jitter may be touted as wonderful, the overall time deviation could really be quite poor. These two categories of jitter (cycle-to-cycle and cumulative) provide different information about the performance of the device in question, and cannot be characterized by a single number.

As an example, enclosed are two plots of identical waveforms captured from our Intelligent FIFO. Also, the same measurements are enclosed for the recovered clock from the digital interface receiver (DIR). Noteworthy is the change in the "numbers" when you consider cycle-to-cycle jitter vs a cumulative time deviation (during a 2.9ms snapshot). The exact same measurement window may be characterized as either ±2ps or ±35ps RMS jitter (approximate). Similarly, the source transport could be cited as having either ±25ps or ±1200ps RMS jitter from the same two measurements. Which is correct? Neither, because neither alone tells the whole story.

Of course, to make matters worse, the instrument that we have used to capture this information cannot be perfect. It also has some threshold to determine a state change. And probe capacitance (even active probes) will change some of the signal's edge characteristics. It becomes an iterative process to accumulate results from these instruments to get an accurate
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WorldRadioHistory Stereophile, November 1995
view of a circuit's performance. So, beyond a certain point, even these results must be taken as being somewhat qualitative rather than absolute.

The point is that, while we have made some grand advances in understanding jitter, it is dangerous to blindly accept jitter measurements as final without considering all issues impacting those measurements. The goal is to re-create that analog waveform perfectly in both the amplitude and time domains. Intermediate measurements (taken in context) are essential for good engineering, research, and development; but it is the result in the analog domain that really matters.

Jon Herron
Madrigal

ENCORE PYRAMID I

Editor:
Thanks to Stereophile, and Robert Harley in particular, for the objective and informative review of the Pyramid 1 digital-to- analog converter. It was a great compliment to be compared with the Spectral, Mark Levinson, Sonic Frontiers, and Theta processors. The design goal for the Pyramid 1 was to combine flawless reproduction of music and an artistically appealing appearance. We share Mr. Harley's feeling that these two elements can complement each other.

The basic Pyramid 1 DAC was derived from our Pyramid 1 System, which is composed of two single-channel Pyramid 1s and a central system controller. 100% channel-to-channel isolation and significant reduction in lengths of analog interconnects and speaker wire when used with mono amps are a few of the benefits of the Pyramid 1 system.

The Pyramid 1 project was extremely challenging and gratifying at the same time. We are pleased that Mr. Harley liked what he saw and heard. We agree with Mr. Harley's comments concerning bass performance. We feel the Pyramid 1 has superior power and control of bass in the lower registers. Similarly, we agree with his assessment of the upper-register sound, which delivers "the right balance of top-end sheen to midband 'gong.'"

Concerning the closely spaced periodic jitter spikes and high jitter values that Mr. Harley discovered during his testing, we were as surprised as he was and offer the following comments. The prototype Pyramid 1 units had a jitter measurement of 90 picoseconds in our tests. These development units were constructed with isolated semigrid coax word-clock line feeds. Production units incorporated changes to shorten the word-clock line and make it part of the circuit board, and slightly different placement of the AES21 regulators. After careful review of the jitter plots, one can measure the spikes to be very close to 120Hz intervals. These are probably related to the production changes that we made. This leads us to believe that rectified power-supply components may be getting induced into the word-clock circuit track or are directly modulated by the AES21's power supply.

One other possibility is that the ST-Type optical input that we prefer and test from gives different jitter results than the AES/EBU input. The optical input is connected directly to the AES21 in a balanced fashion via a high-speed comparator and does not pass through any transformer. This unique approach provides the best optical and AES/EBU interface possible. Although the Pyramid 1's external transformer—through which Mr. Harley's AES/EBU and RCA measurements were made—could account for small differences, the spectral content points to power-supply–related interaction.

We commend Mr. Harley for his thorough and competent test measurements. His findings have prompted us to reexamine our current design for jitter improvements. Any improvements implemented in current production will be made available to existing Pyramid 1 owners at no charge. As Mr. Harley stated in the review, it would be interesting to test if the circuit elements were responsible for the slight midrange hardness he noticed. We will resubmit an updated unit to Stereophile for jitter measurements and subjective comments.

The Pyramid 1 products are designed to provide excellent results with both tube and solid-state systems. Finally, Encore will continue to use innovative ideas and approaches on upcoming products to provide a superb sound, look, feel, and value. Once again, we are sincerely thanks to Robert Harley and Stereophile for the review of the Pyramid 1 DAC.

DAIRC LAUGHLIN
President, Encore Electronics

SWANS SPEAKER SYSTEMS

Baton

Editor:
I would like to respond to the review of our Baton loudspeaker. I understand that this was Muse Kastanovich's first review. As a reader, I found his review well-written; he brought up some very good points regarding the sound of the Batons. I agree with some of his observations, and as a result we have made improvements to the Baton and are sending a revised sample to Stereophile for evaluation.

Regarding the somewhat off-the-wall comments about our speaker: My first reaction was, "Oh no, not another loose cannon." Muse, you are free to write what you want, but keep in mind that you have a real power at your fingertips, and you can very easily crush people who are passionately trying to do the right stuff.

FRANK HALE
Swans Speaker Systems

TOWNSHEND AUDIO

SEISMIC SINK

Editor:
I write to express thanks to Shannon Dickson and Stereophile for at last taking a mature scientific look at the realities of equipment isolation in the context of hi-fi components.

With regards to the effects of vibration on digital circuitry, many more mechanisms have been suggested (as well as the vibrating crystal). The list includes the following: the piezoelectric effect on ceramic encapsulated components, the microphony of PVC (or other high-dielectric-moment polymer-insulated wires, and the change in capacitance and inductance between adjacent circuit-board tracks. Some of these concepts may seem farfetched, but when jitter in the hundreds of picoseconds is known to audibly affect the sound, these seemingly minute phenomena may be just as significant.

Whatever the cause, the improvement wrought by "Sinking" is, more often than not, as subtle as a sleighhammer.

The Seismic Sink was awarded "Best CD Upgrade 1993" by Britain's prestigious magazine What Hi-Fi. At last, the serious debate has started.

MAX TOWNSHEND
Townshend Audio

SOUNDS OF SILENCE

VIBRAPLANE ISOLATION BASE

Editor:
I am very pleased to see that isolation is finally receiving the acknowledgment it deserves! Audiophiles all over the world have finally realized that proper isolation can bring about more sonic improvement than the actual changing of a speaker or amplifier in one's system. Our thanks to Shannon Dickson for taking the time to research different forms of isolation, and for recognizing the vast sonic improvements brought by the Vibraplane.

One additional factor impacting isolation not mentioned in the article is the importance of mass for proper isolation. From an engineering standpoint, the isolation product must have mass to guarantee isolation down to 2.5Hz. Our engineers have tried to develop other products that weigh 30 to 40 lbs, but unfortunately haven't been able to achieve the isolation properties found in the Vibraplane.

An important part of our success is the quality-control program utilized by Sounds Of Silence. This consists of filling each of the three isolators with helium. At this point, a 100-lb weight is placed on top of the Vibraplane and a helium sensor is located beneath the unit. After five days, if there is no helium leakage detected by the sensor, the units are then packaged and ready for shipping.

Regarding Shannon's tips for floating the Vibraplane, I highly recommend a
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height of 3½" from the supporting surface to the top of the platform to achieve the best sonic results. After surveying my customers, I found that minor leveling adjustments are needed every three to six weeks. This varies based on the weight of the component.

Happy Listening!

Steven M. Klein
President, Sounds of Silence

Billy Bags Design
Custom 5500-7

Editor:
We want to thank Robert Harley and Stereophile for the specific review of our custom 5500 series of audio component racks! Knowing how your readers are "sticklers for detail," a few things need to be clarified:
1) The isolation tips are an option with all our units. They add 1⅛" to the height, using a ¾-20 male thread into a matching female insert (a tension-loaded spider nut) inside the leg!
2) Only the legs of units can be filled with sand/lead shot—not the cross-pieces!
3) If vibration for a turntable is indeed an issue, we can provide for "earthquake brackets" which will actually bolt the unit to the wall (or the floor!)

Further, as Bob Harley mentioned, our custom capabilities are a key factor in our business and our growth. We have found the end user likes to get involved with the design of their system, as they have already made a considerable investment of money and time. So why not have the system the way they want it, for their specific components? Billy Bags Design's Audio Video Component racks are not only extremely well-built, solid, and functional, but are unparalleled aesthetically. And, as Home Theater systems are growing, we feel custom has become even more individualized! We must be doing something right!

Thank you again,

Larry Gesking
(One of the Bags Boys)
Billy Bags Design

Audio Alchemy DLC

Editor:
Our sincerest appreciation to Stereophile and to Jack English for another highly complimentary review of our Digital Line Controller preamplifier.

Like Wes Phillips before him, Jack English clearly emphasizes the value we've designed into the DLC. Most important, Jack accurately mirrors the design criteria of the product to be "...remarkably faithful to the real thing, yet...priced within reach of most music lovers." We appreciate his clear description of the functions of the DLC, and we too "hope all preamps will offer similar convenience features in the future."

Regarding Jack's minor criticisms of the DLC's sonics, let me remind the reader that the reviewer's sample utilized the standard PS-1 power supply. The addition of the upgrade power supply, the PS-3, improves the unit's bass extension, as well as its overall dynamic performance. Customers tell us that this can be such a significant change that the DLC/PS-3 combination is a tough competitor for preamps many times its price. Lots of expensive preamplifiers have been put up for sale!

Again, thanks for such a wonderful review. Keep up the good work!

Peter Madnick
Vice President, Audio Alchemy

Michael Green/Ultra Systems

Editor:
No sooner did your September issue hit the newsstands than I was receiving calls concerning Michael Fremer's review of the Audio Physic Virgo speaker in that issue, and the accompanying piece on Audio Physic's designer, Joachim Gerhard. The calls came in because of the extensive (hurray!) sections dealing with Gerhard's speaker-placement preference and his overall room-setup guidelines. His preference is for mid-room placement of the speakers, with the listener sitting against the rear wall. I guess many readers found this to be somewhat familiar, as this is also the setup method I strongly favor.

To answer the "usual" questions:
a) Yes, we do indeed apply the same setup technique, both for speaker placement and acoustic treatment, and
b) Yes, in the case of speaker placement, we came to these conclusions independently.

Audio being the small world it is, we found out about each other some years ago due to our common, but at the time, unconventional, approach to setup (and speaker-cabinet resonances, for that matter). Following a "room-tuning" visit to their factory and sound room, Audio Physic has been the German importer for our RoomTune products these last five years.

If any Stereophile readers are interested in more information on this method of room setup, drop a note to me in care of our Ultra Systems distributor (P.O. Box 570, Point Pleasant, PA 18950, fax: (215) 297-8661) and I will send you a copy of our booklet, "Let's Tune Your Room."

Michael Green
RoomTune/Michael Green Designs

Paragon at CES

Editor:
Thank you for including us in your September Stereophile reports from the CES Specialty Audio & Home Theater show. Paragon would like to thank Mr. Michael Fremer and Mr. John Atkinson for their favorable report on the new Paragon Jubilee/JEM.

Mr. Atkinson's report mistakenly cites the actual price for the JEM subwoofer at $2000. The actual suggested retail price of the JEM (Jubilee Extension Module) is $3000. Together, the Paragon Jubilee ($1795), a high-performance minimonitor, and JEM subwoofer ($3000) form the Paragon Jubilee/JEM ($4795).

Donald R. Monson
Sales/Marketing, Paragon VPI

VPI

Editor:
On May 6, 1995, our 17-year-old son, Jon, was killed in a car crash. The office at VPI was closed for 30 days. This has been a very difficult time for all of us and we certainly appreciate your condolences, understanding, and support.

Before this tragedy, VPI was introducing a new tonearm called the TNA-1 to retail at approximately $2000. A prototype of this arm was shown at Hi-Fi '95, the Los Angeles Stereophile Show. We also were preparing to market a new form of the HW-19 Junior that was to be equipped with a low-mass tonearm, Clearaudio moving-magnet cartridge, and a Gold Aero-built phono section. The table was supposed to come completely set-up. This prototype was also shown at the Stereophile Show. Spec sheets were handed out.

Once Jon was killed, we told everybody that our lives were to be put on hold, temporarily. No new items would be advertised or promoted during the mourning period. Any advertisements you may have seen may not necessarily be correct, since VPI was closed and not authorizing anything for 30 days. The special VPI-19 Jr. may or may not be produced. VPI will make that decision when the time is right.

The name of the new tonearm has been changed to the JMW Memorial Arm. JMW were our son's initials and are appropriate since the development of the arm was greatly influenced by his knowledge of the sound of the acoustic and electric bass. Jon played acoustic and electric guitar, acoustic and electric bass (+5, -5, and 6-string, as well as fretless), and the upright bass. His sonic fingerprint will be noticed on this new tonearm. The JMW is in production and three units were shown at the June CES. The first tonearms were shipped on July 15. The retail price is $2300. Part of the proceeds from the sale of these arms will go to the Jonathan M. Weisfeld Memorial Fund to further support the arts and music. We hope this clears up any confusion or rumors. At the present time, there is no other version of the tonearm planned.

Sincerely yours,

Sheila & Harry Weisfeld
VPI

Stereophile, November 1995
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WorldRadioHistory Stereophile, November 1995
THE FINAL WORD

I had the privilege this last September to attend a dramatically growing show—up nearly 100% over last year's version, which itself was no slouch in the growth department. I'm talking about CEDIA Expo, held in Dallas this past September 6–10.

And it was great. Of course, the supposed subject matter—custom installation and systems integration—isn't right up my alley. But Expo has, over the last three years, added Home Theater as a major focus, and that is right up our alley, now that we're publishing the Stereophile Guide to Home Theater (see ad on p.98 to order the latest issue).

CEDIA stands for Custom Electronic Design and Installation Association. Founded in 1989, it's the fastest-growing industry organization—and show—out there. Custom installers have always suffered from a showroom image, particularly among the ranks of the specialist retailers who sell Stereophile and most of the equipment reviewed therein. Custom installers used to be called "trunk-slammers," a particularly pejorative term intended to convey the fact that they didn't have storefronts—they worked out of their vehicles, pulling equipment and tools out of the trunk, then slamming it on their way into the job.

Even "custom installer" is nowadays almost frowned upon at CEDIA—"designer-installer" is the term to use. More important, the image of an industry loaded with transient businessmen who can't afford to store is largely incorrect. Manufacturers who sell to this group have told me the CEDIA members are frequently in better financial shape than your average high-end retailer and, since designer-installers don't need product until a system is actually ordered by a customer (and a deposit paid), most shipments are cash on delivery rather than the 30–120 days typical in specialty retail.

And, based on the business owned by CEDIA Treasurer Mitchell Klein—Media Systems, in Boston, which I stopped by during a recent visit to my home town—specialist audio/video retailers would do well to see what their local CEDIA members are up to. Media Systems, a now-independent offshoot of New England A/V chain Tweeter, etc., could give some lessons to most specialist retail stores I've visited in terms of non-threatening atmosphere and attractive, comfortable layout.

Mr. Klein had the nice parts of a high-end store—a comfortable, fancy Home Theater room, and two typical living rooms complete with big-screen TVs and attractive high-end speakers—without the obnoxious "wall of TVs," racks of receivers, and dozens of anonymous boxes lined up cheek to jowl. I certainly had a comfortable time, and the several offices full of architect-like designers and engineers didn't hurt, either—if, that is, I'd been planning on filling up my house with high-end audio, Home Theater, fancy lighting, and a security system.

Moreover, this is the direction in which high-end specialty stores are most likely to evolve. With Circuit City selling Infinity and Celestion, and with traditional, successful high-end brands looking to increase their volumes, regional chains such as Sound Advice in Florida are going to be selling more and more high-end equipment. Smaller retailers are going to have to be selling more than just limited-distribution brands; they're going to have to sell more and more expertise. As DVD, fiberoptic television and telephone delivery, and the Internet become a part of daily life, confused and wealthy consumers are going to need a specialist's knowledge more and more.

At least that's what 184 exhibitors at CEDIA Expo seemed to think. High-end audio and video were there en masse: Proceed, Kef, Runco, EAD, Kinergetics, Adcom, AMPro, Atlantic Technology, API (Energy, Mirage), B&W, Monster, Bryston, Counterpoint, N.E.A.R., Faroudja, Rotel, Snell, XLO, Velodyne, Meridian, NHT, PSB, Infinity, M&K, Lexicon, and McIntosh; also represented were more mainstream audio brands such as Denon, Boston Acoustics, JBL, Carver, Harman/Kardon, Kenwood, Polk, and Marantz.

The most exciting products I saw were both from Runco, in partnership with larger companies. The first was Digital Light Processing technology almost 20 years in development from Texas Instruments, with Runco the first licensee to use it in a consumer product. The technology consists of a 1"-square microchip with over 500,000 (!) very small mirrors on its surface. The mirrors are moved by small electrostatic forces controlled by the signal running through the microchip. Because the mirrors are so highly reflective, enormously powerful light sources—up to 1.5kW was cited—can be beamed onto the 1"-square chip; as the light is redirected to a screen or wall, a video image is created by varying which mirrors reflect and which don't.

The other technology adapted by Runco, this time using a base product sold to the commercial market over the last three years by Hughes JVC, was a light-valve projector. The Runco consumer version also puts out huge amounts of light—a 16" screen in the Dallas Infomart auditorium was bright using only a third of the potential output of the projector used—and costs in the $90,000-plus range. The combination of high brightness (in a theater-like setting) and apparently excellent color fidelity was particularly exciting.

Most gratifying of all was the general exhibitor and attendee excitement. These are people who are part of a dramatically expanding industry, and they like it. The best joke of the show came from CEDIA Treasurer Klein. The CEDIA keynote speaker was EIA/CEG Group Vice President Gary Shapiro. The EIA has quite a reputation for acquiring successful shows and consumer-electronics organizations; given Shapiro's prominent presence, there was bound to be talk of the EIA making a deal with CEDIA for some kind of acquisition. So, to put the proper spin on the situation, Klein joked with Shapiro that, now that CEDIA was in the black, they were prepared to acquire the EIA! It was a good joke, and it did a good job of squelching those unpleasant rumors.

—Larry Archibald
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